THE
ELECTRIC POWER BOARD
OF THE
METROPOLITAN GOVERNMENT
OF
NASHVILLE
AND
DAVIDSON COUNTY

NASHVILLE ELECTRIC SERVICE

UNDERGROUND CONSTRUCTION

PLATE BOOK

T&D UNDERGROUND CONSTRUCTION

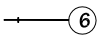
PLATE BOOK INDEX

SECTIONS REVISED SINCE LAST ISSUE: TRANSFORMERS

OVERVIEW & COMPATIBLE UNITS STANDARDS

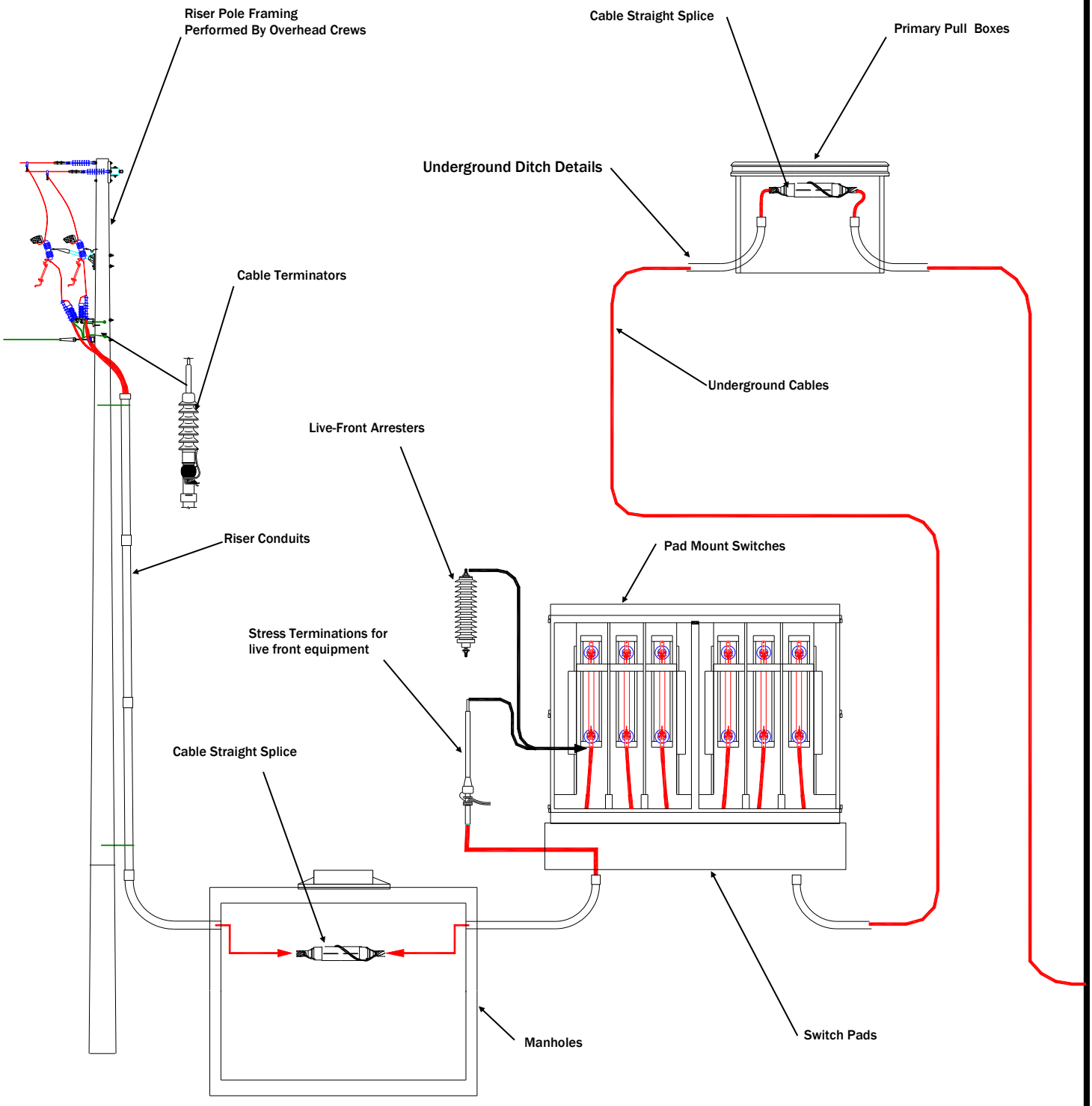
APPROVALS			
ISSUE DATE	ENGINEER	SUPERVISOR	MANAGER
2/15/06	FRED FRITON	RON DAVIDSON	NICK THOMPSON
2/04/08	FRED FRITON	RON DAVIDSON	NICK THOMPSON
2/2/18	WES SUDDARTH		

TABLE OF CONTENTS

EXISTING	NEW	REMOVE	TEMPORARY	DESCRIPTION	Plate Book Location
BLACK	RED	GREEN	BLUE		
				SECONDARY PULL BOX	See Pages 134, 135
				PRIMARY PULL BOX	See Page 100
				TERMINATING CABINET	See Pages 40-45, 102-103
				LARGE MANHOLE	See Pages 94-95
				SMALL MANHOLE	Obsolete due to small size
				OCTAGONAL MANHOLE	See Page 96-97
				TEMPORARY SERVICE PEDISTAL	See Page 136
				SINGLE PHASE TRANSFORMER	See Pages 55-63, 72-75
				THREE PHASE TRANSFORMER	See Pages 63-71, 76-85
				SWITCH	See Pages 86-91, 110-117
				ARRESTER GROUND	See Pages 32, 35, 57, 62, 63, 66
		N/A		CONDUIT STUB-OUT FOR FUTURE USE	See Ditch Details
		N/A		GANG METER WITH NUMBER OF METERS	See Customer Handbook
		N/A		CONDUIT DOUBLE SECONDARY STUB-OUT FOR FUTURE USE	See Secondary Ditch Details
				FEED THROUGH BUSHING INSERT	See Page 31, 56
				RISER POLE	See Appendix D
				CABLE SIZE, PULL LENGTH AND CONDUIT REQUIREMENT	See Pages 15-23
				UNDERGROUND CABLE	See Pages 15-23
				THREE PHASE CABLE INSTALLATION	See Pages 15-23
				TWO PHASE CABLE INSTALLATION	See Pages 15-23
				SINGLE PHASE CABLE INSTALLATION	See Pages 15-23
				ADD 2 PHASES (CONDUCTORS ARE IN A SEPARATE CONDUITS)	See Pages 15-23
				ADD ONE PHASE TO A TWO PHASE SYSTEM (CONDUCTOR IS IN A SEPARATE CONDUIT)	See Pages 15-23
				ADD ONE PHASE TO A SINGLE PHASE SYSTEM (CONDUCTOR IS IN A SEPARATE CONDUIT)	See Pages 15-23
				TRANSFORMER PHASING WHEN MORE THAN ONE PHASE IS PRESENT AT TRANSFORMER	Drawing Notation Only
				13.8KV TRANSFORMER PHASING WHEN MORE THAN TWO PHASES ARE PRESENT AT TRANSFORMER	Drawing Notation Only

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

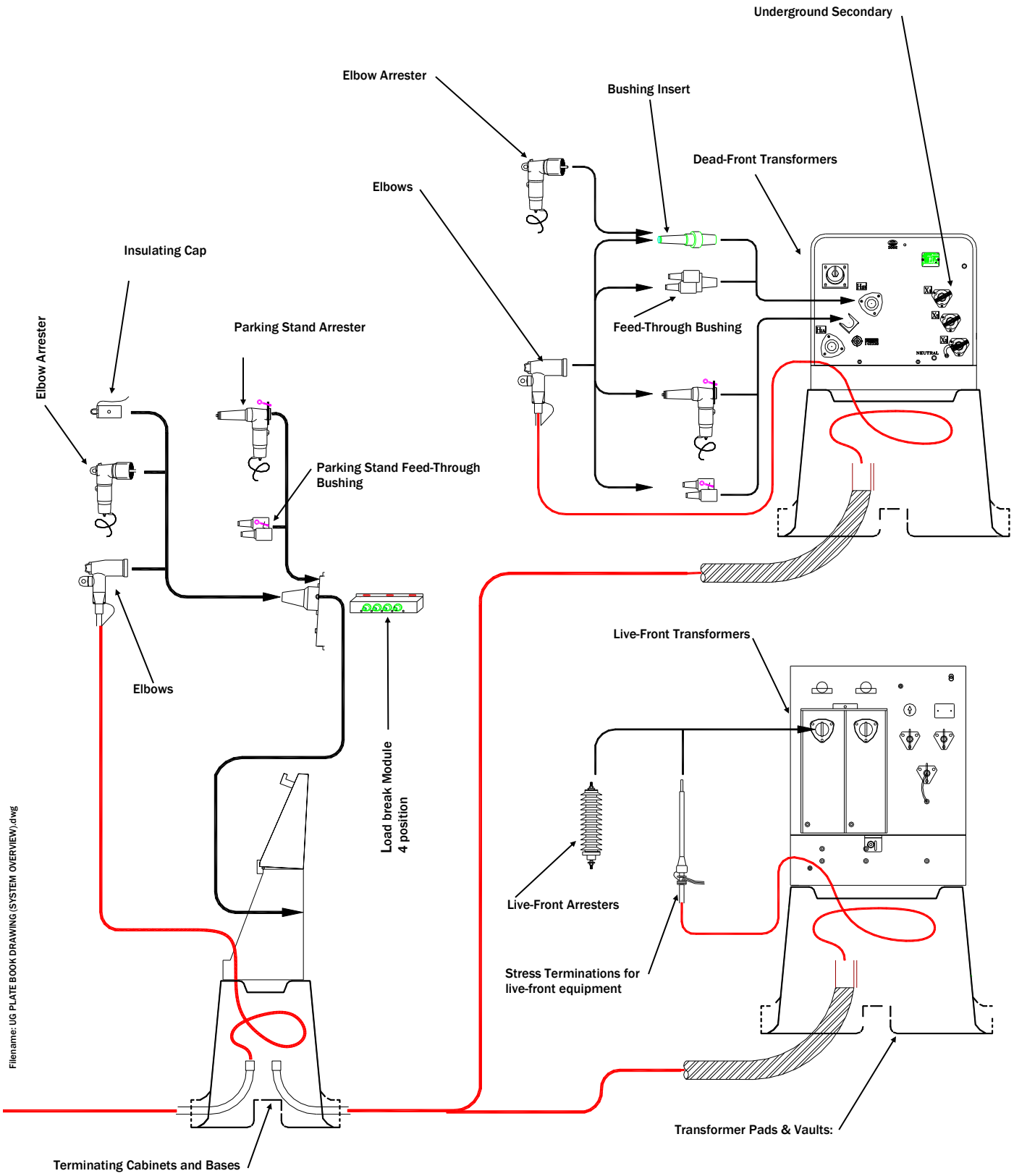
T&D DRAWING STANDARDS
UNDERGROUND DRAWING SYMBOLS



REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	FAF		2/04/08
c	MTE	REMOVED PAGE REFERENCES	3/12/18

NES

T&D DRAWING STANDARDS
UNDERGROUND PRIMARY SYSTEM OVERVIEW



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C	MTE	REMOVED PAGE REFERENCES	3/12/18

T&D DRAWING STANDARDS
UNDERGROUND PRIMARY SYSTEM OVERVIEW CONT'D

CU Number	CU Desc	Prop. Unit/Min. Matr.
U1P4P	PAD MTD TERMINATING CABINET 1PH-4POLE	96597800
U1P4P-BASE	TERM CAB BASE - 1PHASE 4 POLE 36X22X30	
U24626	SI DF 1P 75KVA 13.8 120/240	96462600
U2P4P	PAD MTD TERMINATING CABINET 2PH-4POLE	96598200
U3P3P	PAD MTD TERMINATING CABINET 3PH-3POLE	96599500
U3P4P	PAD MTD TERMINATING CABINET 3PH-4POLE	96600500
U3P4P-BASE	TERM CAB BASE FOR 2PH OR 3PH 4POLE	
UBINS200A	BUSHING INSERT 200A 25KV	
UBINS200A-F	BUSHING INSERT -FEEDTHRU 200A 25KV	
UBINSCAP200A	UG BUSHING INSERT INSULATING CAP, 200A	
UBINSCAP600A	UG BUSHING INSERT INSULATING CAP, 600A	
UBOX-PRI	PRI PULLBOX ADJUSTABLE GRADE 30WX48LX36D	6004400
UCAL1	CABLE,1,AL,C/N,EPR,25KV	2054200
UCAL1-3C	CABLE,1,AL,C/N,EPR,25KV	2054400
UCAL1-3CP	CABLE,1,AL,C/N,EPR,25KV, 3CP (3 PH)	2054403
UCAL40-3CP	CABLE,4/0,AL,C/N,EPR,25KV, 3CP	2055003
UCAL500	CABLE,500MCM,AL,C/N,EPR,25KV	2058000
UCAQ-40	CABLE,4/0-2/0N,AL,QPXD,XLP,600V	2038200
UCAQ-500	CABLE,500MCM-350MCM N,AL,QPXD,XLP,600V	2043000
UCAT-20	CABLE,2/0-1N,AL,TPXD,XLP,600V	2035000
UCAT-20-OH	CABLE,2/0-1N,AL,TPXD,XLP,600V, OHT	2035010
UCAT-350	CABLE,350MCM-4/0N,AL,TPXD,XLP,600V	2039500
UCAT-40	CABLE,4/0-2/0N,AL,TPXD,XLP,600V, 1000FT	2038100
UCAT-40-OH	CABLE,4/0-2/0N,AL,TPXD,XLP,600V, OHT	2038101
UCAT-500	CABLE,500MCM-350MCM N,AL,TPXD,XLP,600V	2041000
UCCH10	CABLE,1/0,CU,BHD	1106000
UCCH2	CABLE,2,CU,BHD,7S	1100000
UCCH40	CABLE,4/0,CU,BHD,7S	1110000
UCCS10	CABLE,1/0,CU,BSD	1106000
UCCS1000	CABLE,1000,CU,BSD	1132000
UCCS40	CABLE,4/0,CU,BSD	1126000
UCCS750	CABLE,750,CU,BSD	1130000
UCCT-20	CABLE,2/0-2/0N,CU,TPXD,XLP,600V	2035100
UCCU40-3CP	CABLE,4/0,CU,C/N,EPR,25KV 3CP	2402003
UCCU500	CABLE,500MCM,CU,C/N,EPR,25KV	2404000
UCCU69KV-500	CABLE,500KCM,CU,1/C, 69KV,RIPE	2406000
UCCU750	CABLE,750MCM,CU,C/N,EPR,25KV	2405000
UCCU750-1/C	CABLE,750,CU,1/C,25KV,KERITE INSULATION	2400000
UCN-3H	URD CONNECTOR 3 HOLE	
UCN-4H	URD CONNECTOR 4 HOLE	
UCN-5H	URD CONNECTOR 5 HOLE	
UCN-6H	URD CONNECTOR 6 HOLE	
UCN-7H	URD CONNECTOR 7 HOLE	
UCN-CTRM1	UG CONNECTOR, CABLE TERMINATOR, #1	
UCN-CTRM40	UG CONNECTOR, CABLE TERMINATOR, 4/0	
UCN-CTRM500	UG CONNECTOR, CABLE TERMINATOR, 500MCM	

CU Number	CU Desc	Prop. Unit/Min. Matr.
UCN-CTRM750	UG CONNECTOR, CABLE TERMINATOR, 750MCM	
UCN-SPL1	UG CONNECTOR, STRAIGHT SPLICE, #1 AL	
UCN-SPL40	UG CONNECTOR, STRAIGHT SPLICE, 4/0AL	
UDUC6-FA	DUCT PLASTIC FEMALE ADAPTER 6" THINWALL	
UDUCL4-11	DUCT PLASTIC ELBOW 4" 36R 11.25 ANGLE	
UDUCL4-22	DUCT PLASTIC ELBOW 4" 36R 22.5 ANGLE	
UDUCL4-45	DUCT PLASTIC ELBOW 4" 36R 45 DEGREE BEND	
UDUCL4-5	DUCT PLASTIC ELBOW 4" 5 DEGREE BEND	
UDUCL4-90	DUCT PLASTIC ELBOW 4" 90 DEGREE BEND	
UDUCL5-90	DUCT PLASTIC ELBOW 5" 90 DEGREE BEND	
UDUFLEX-2	DUCT, FLEX 2" SCH 40	10577000
UDUTA6	DUCT PLASTIC TERMINATOR ADAPTER 6"	
UELBC-1	ELBOW CONN,#1AL/CU 200A 25KV W/SEAL KIT	
UELBC-2CU	ELBOW CONNECTOR,#2CU 200A 25KV	
UELBC-4/0	ELBOW CONN, 4/0 AL/CU 25KV200A W/SEAL KT	
UELBC-4/0-6	ELBOW CONN, 4/0 AL/CU 25KV600A W/SEAL KT	
UELBC-4/0CU	ELBOW CONN,4/0 CU 25KV 200A W/SEAL KIT	
UELBC-500-6	ELBOW CONN, 500 AL/CU 25KV600A W/SEAL KT	
UELBC-CP	ELBOW CONNECTOR PLUG 25KV 600A	
UFIB-144	FO CBL, 1', 144 COUNT UG	2450240
UFIB-216	UNDERGROUND 216 FIBER OPTIC CABLE	2450110
UFIB-24	FO CBL, 1', 24 COUNT UG	2450200
UFIB-96	FO CBL, 1', 96 COUNT UG	2450210
UFIB-TRACER	CBL, 1', #6 CU THHN BLACK	
UFIBRISER-3L	RISER, FOR 144 CNT FO CABLE, PVC80, 3"	10327300
UFIBRISER-3S	RISER, FOR 24&96 CNT FO CABLE, PVC80, 3"	10327300
UFIBRISR-2L	RISER, FOR 144 CNT FO CABLE, PVC80, 3"	
UFIBRISR-2S	RISER, FOR 24&96 CNT FO CABLE, PVC80, 2"	
UFTWBX-9X11	POLYMER FO TRACER WIRE BOX 9 X 11 X 6	
UFUSEHLD-SM4	FUSE HOLDER S&C SM-4 200A 25KV	
UFUSEMNT-SM4	FUSE MOUNTING S&C SM-4 200A 25KV	
UGAL2	CONDUIT,GALV 2"	10120000
UGAL2.5	CONDUIT,GALV 2.5"	10122000
UGAL3	CONDUIT,GALV 3"	10124000
UGAL4	CONDUIT,GALV 4"	10128000
UGAL5	CONDUIT,GALV 5"	10130000
UGAL6	CONDUIT,GALV 6"	10131000
UGALL2-STDR	CONDUIT ELBOW GALV 2" STD RADIUS	
UGALL2.5-18R	CONDUIT ELBOW GALV 2.5" STD RADIUS	
UGALL3-24R	CONDUIT ELBOW GALV 3" 24" RADIUS	
UGALL3-STDR	CONDUIT ELBOW GALV 3" STD RADIUS	
UGALL4-16R	CONDUIT ELBOW GALV 4" 16" RADIUS	
UGALL4-24R	CONDUIT ELBOW GALV 4" 24" RADIUS	
UGALL5-36R	CONDUIT ELBOW GALV 5" 36" RADIUS	
UGALL6-36R	CONDUIT ELBOW GALV 6" 36" RADIUS	
UGCPL2	CONDUIT COUPLING, GALV 2"	

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A	FAF	CREATED	2/15/06
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C	WMS	UPDATED LIST	2/2/18

NES

T&D DRAWING STANDARDS
COMPATIBLE UNIT INDEX

CU Number	CU Desc	Prop. Unit/Min. Matr.
UGCPL2.5	CONDUIT COUPLING, GALV 2.5"	
UGCPL3	CONDUIT COUPLING, GALV 3"	
UGCPL4	CONDUIT COUPLING, GALV 4"	
UGCPL5	CONDUIT COUPLING, GALV 5"	
UGCPL6	CONDUIT COUPLING, GALV 6"	
UINERDUCT-L	INNERDUCT 1.25 IN LARGE	10578100
UINERDUCT-S	INNERDUCT 0.9375 IN SMALL	10578000
ULA12DF	SURGE ARRESTER 12KV, DF,TRANSF OR SWITCH	
ULA12LF	SURGE ARRESTER 12KV LIVE FRONT	
ULA18DF	SURGE ARRESTER 18KV, DF,TRANSF OR SWITCH	
ULA18DF-PKS	SURGE ARRESTER 18KV DF PARKING STAND	
ULA18LF	SURGE ARRESTER 18KV LIVE FRONT	
ULA18LF-SW	SURGE ARRESTER 18KV LIVE FRONT	
ULA3DF	SURGE ARRESTER 3KV, DF,TRANSF OR SWITCH	
ULA3LF	SURGE ARRESTER 3KV LIVE FRONT	
ULAB-CONST	LABOR, U&S CONSTRUCTION	
ULAB-ELECT	LABOR, ELECTRICIAN - PADMOUNT	
ULBMOD3POLE	LOADBREAK JUNCTION, 3 POSITION, 200A	40109500
ULBMOD4POLE	LOADBREAK JUNCTION, 4 POSITION, 200A	40109000
UMH-CARM-SUP	UG MANHOLE SUPPORT, CABLE BACK 9 HOLE	
UMH-CARM13	UG MANHOLE, CABLE ARM FIBERGLASS - 13"	
UMH-GRDINS	UG MANHOLE GROUND INSERT	
UMH-THROAT	UG MANHOLE, THROAT & COVER FOR PRECAST	
UMNHOLE-LG	PRECAST MANHOLE, LARGE PM-2L	6037500
UMNHOLE-OCT	PRECAST MANHOLE, 10'X10',OCTAGON	6037750
UNISTRUT	UNISTRUT 1 1/2 INCH/10 FT	6320000
UPCPL3.5	DUCT PLASTIC COUPLING 3.5" THINWALL	
UPCPL4	DUCT PLASTIC COUPLING 4" THINWALL	
UPCPL5	DUCT PLASTIC COUPLING 5" THINWALL	
UPCPL6	DUCT PLASTIC COUPLING 6" THINWALL	
UPVC40-1.25	CONDUIT, PVC, SCH 40, 1 1/4"	
UPVC40-2	CONDUIT, PVC SCH 40, 2"	10320000
UPVC40-2.5	CONDUIT, PVC SCH 40, 2.5"	10322000
UPVC40-3	CONDUIT, PVC SCH 40, 3"	10323000
UPVC40-4	CONDUIT, PVC SCH 40, 4"	10325000
UPVC40-5	CONDUIT, PVC SCH 40, 5"	10326000
UPVC80-2	CONDUIT, PVC SCH 80, 2"	10327200
UPVC80-3	CONDUIT, PVC SCH 80, 3"	10327300
UPVC80-4	CONDUIT, PVC SCH 80, 4"	10327400
UPVCL1.25	CONDUIT, ELBOW, PVC, 1 1/4" STD RADIUS	
UPVCL1.25-ST	CONDUIT, ELBOW, PVC, 1 1/4" STD RADIUS	
UPVCL2-STDR	CONDUIT ELBOW,PVC 2" STD RADIUS	
UPVCL2.5-24R	CONDUIT ELBOW,PVC 2.5" 24" RADIUS	
UPVCL2.5-STD	CONDUIT ELBOW,PVC 2.5" STD RADIUS	

CU Number	CU Desc	Prop. Unit/Min. Matr.
UPVCL3-80-18	CONDUIT ELBOW,PVC 3" SCH 80 18" RADIUS	
UPVCL3-STDR	CONDUIT ELBOW,PVC 3" STD RADIUS	
UPVCL4-24R	CONDUIT ELBOW,PVC 4" 24" RADIUS	
UPVCL5-36R	CONDUIT ELBOW,PVC 5" 36" RADIUS	
UR-PSTRAP.5	UG RISER PIPE STRAP, .5", 1H	
UR-PSTRAP1	UG RISER PIPE STRAP, 1", 1H	
UR-PSTRAP2	UG RISER PIPE STRAP 2"	
UR-PSTRAP2.5	UG RISER PIPE STRAP 2.5"	
UR-PSTRAP3	UG RISER PIPE STRAP 3"	
UR-PSTRAP4	UG RISER PIPE STRAP 4"	
UR-PSTRAP5	UG RISER PIPE STRAP 5"	
UR-PSTRAP6	UG RISER PIPE STRAP 6"	
UR-STANDOFF	RISER CONDUIT STANDOFF BRACKET	
UR-SUP15	UG RISER CONDUIT SUPPORT 15" OFF SET	
UR-SUP15ST	UG RISER CONDUIT SUPPORT 15" STRAIGHT	
UR-SUP23	UG RISER CONDUIT SUPPORT 23" OFF SET	
UR-SUP26ST	UG RISER CONDUIT SUPPORT 26" STRAIGHT	
UREBAR-4	REINFORCING STEEL - 1/2" (#4)	
URISERP-2	PRIMARY CABLE RISER, SINGLE 2"	10120000
URISERP-2.5D	PRIMARY CABLE RISER, DOUBLE 2.5"	10122000
URISERP-25	PRIMARY CABLE RISER, SINGLE 2.5"	10122000
URISERP-25D	PRIMARY CABLE RISER, DOUBLE 2.5"	10122000
URISERP-25T	PRIMARY CABLE RISER, THREE 2.5"	10122000
URISERP-3	PRIMARY CABLE RISER, SINGLE 3"	10124000
URISERP-4	PRIMARY CABLE RISER, SINGLE 4"	10128000
URISERP-5	PRIMARY CABLE RISER, SINGLE 5" 500	10130000
URISERP-5 40	PRIMARY CABLE RISER, SINGLE 5" 4/0	10130000
URISERP-5D	PRIMARY CABLE RISER, DOUBLE 5"	10130000
URISERP-6	PRIMARY CABLE RISER, SINGLE 6"	10131000
URISERP-6D	PRIMARY CABLE RISER, DOUBLE 6"	10131000
USTAOFF-FDHR	BUSHING STANDOFF FEEDTHRU 200A 25KV	
USTUBMARKER	FIBERGLASS STUBOUT MARKER	
USVB4-2622X	SW UG VISTA 422 25KV 12.5KA 125BIL	96593500
USVB6-2642X	SW UG VISTA 624 25KV 12.5KA 125BIL	96593000
USVB6-3632X	SW UG VISTA 633 25KV 12.5KA 125BIL	96593200
USVB6-CAB	SW UG VISTA 6WAY CABINET ONLY	96593100
USW-MOST11	PAD MTD SWITCH DF MOST11 200A	96595600
USW-MOST15	PAD MTD SWITCH DF MOST15 200A	96596000
USW-MOST6B	PAD MTD SWITCH DF MOST6B 200A	96595000
USW-MOST9B	PAD MTD SWITCH DF MOST9B 200A	96595400
USW-PMH11	PAD MTD SWITCH LF PMH-11 600A	96591900
USW-PMH12	PAD MTD SWITCH LF PMH-12 600A	96592400
USW-PMH6	PAD MTD SWITCH LF PMH-6 600A	96591200
USW-PMH9	PAD MTD SWITCH LF PMH-9 600A	96591600
USW-PMH913.8	PAD MTD SWITCH LF PMH9 14.4KV AUTO TRANS	96591610
USW-PMH9AUT	PAD MTD SWITCH LF PMH-9 25KV AUTO TRANSF	96591610

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C	WMS	UPDATED LIST	2/2/18

T&D DRAWING STANDARDS
COMPATIBLE UNIT INDEX

CU Number	CU Desc	Prop. Unit/Min. Matr.
USW-PMU6M	PAD MTD SWITCH LF PMU-6M 600A	
USW-RVAC9	PAD MTD SWITCH DF RVAC9 200A	96595500
UT0216	PAD MTD 1PH LF 25KVA 4160/2400-240/120	92021600
UT0224	PAD MTD 1PH LF 50KVA 4160/2400-240/120	92022400
UT0228	PAD MTD 1PH LF 100KVA 4160/2400-240/120	92022800
UT0324	PAD MTD 1PH DF 50KVA 2.4/4.16-120/240	92032400
UT0326	PAD MTD 1PH DF 75KVA 2.4/4.16-120/240	92032600
UT0328	PAD MTD 1PH DF 100KVA 2.4/4.16-120/240	92032800
UT1138	PAD MTD 3PH LF 225KVA 4160-208Y/120	94113800
UT1522	PAD MTD 3PH LF 45KVA 4160-216Y/125	94152200
UT1526	PAD MTD 3PH LF 75KVA 4160-216Y/125	94152600
UT1532	PAD MTD 3PH LF 150KVA 4160-216Y/125	94153200
UT1540	PAD MTD 3PH LF 300KVA 4160-216Y/125	94154000
UT2134	PAD MTD 1PH LF 167KVA 7200/4160-240/120	92213400
UT2324	PAD MTD 1PH DF 50KVA 13.2/7.62-120/240	92232400
UT2326	PAD MTD 1PH DF 75KVA 13.2/7.62-120/240	92232600
UT2328	PAD MTD 1PH DF 100KVA 13.2/7.62-120/240	92232800
UT2334	PAD MTD 1PH DF 167KVA 13.2/7.62-120/240	92233400
UT2340	PAD MTD 1PH DF 250KVA 13.2/7.62-120/240	92234000
UT4616	SI DF 1P 25KVA 13.8 120/240	96461600
UT4624	SI DF 1P 50KVA 13.8 120/240	96462400
UT4626	SI DF 1P 75KVA 13.8 120/240	96462600
UT4628	SI DF 1P 100KVA 13.8 120/240	96462800
UT5626	PAD MTD 3PH DF 75KVA 13.8/7.96-216Y/125	94562600
UT5632	PAD MTD 3PH DF 150KVA 13.8/7.96-216Y/125	94563200
UT7024	PAD MTD 1PH LF 50KVA 14.4 -120/240	92702400
UT7026	PAD MTD 1PH LF 75KVA 14.4-120/240	92702600
UT7034	PAD MTD 1PH LF 167KVA 14.4-120/240	92703400
UT7040	PAD MTD 1PH LF 250KVA 14.4-120/240	92704000
UT7924	PAD MTD 1PH LF 50KVA 14.4/24.9-120/240LF	92792400
UT7926	PAD MTD 1PH LF 75KVA 14.4/24.9-120/240LF	92792600
UT7928	PAD MTD 1PH LF 100KVA 14.4/24.9-120/240L	92792800
UT7934	PAD MTD 1PH LF 167KVA 14.4/24.9-120/240L	92793400
UT7940	PAD MTD 1PH LF 250KVA 14.4/24.9-120/240L	92794000
UT8116	PAD MTD 1PH DF 25KVA 14.4/24.9-120/240	92811600
UT8124	PAD MTD 1PH DF 50KVA 14.4/24.9-120/240	92812400
UT8126	PAD MTD 1PH DF 75KVA 14.4/24.9-120/240	92812600
UT8128	PAD MTD 1PH DF 100KVA 14.4/24.9-120/240	92812800
UT8134	PAD MTD 1PH DF 167KVA 14.4/24.9-120/240	92813400
UT8140	PAD MTD 1PH DF 250KVA 14.4/24.9-120/240	92814000
UT8324	PAD MTD 1PH LF 50KVA 24.9Y/14.4-120/240	92832400
UT8326	PAD MTD 1PH LF 75KVA 24.9Y/14.4-120/240	92832600
UT8779	PAD MTD 3P LF 2500KVA 23.9/13.8-216Y/125	94877900
UT8996	PAD MTD 3PH LF 15MVA 23.9/13.8-13.8/7.9	94899600
UT9164	DRY VAULT 3PH 1000KVA 14.4/24.9-216Y/125	94916400

CU Number	CU Desc	Prop. Unit/Min. Matr.
UT9170	DRY VAULT 3PH 1500KVA 14.4/24.9-216Y/125	94917000
UT9179	DRY VAULT 3PH 2500KVA 24.9/14.4-216Y/125	94917900
UT9326	PAD MTD 3PH DF 75KVA 14.4/24.9-125/216	94932600
UT9332	PAD MTD 3PH DF 150KVA 14.4/24.9-125/216	94933200
UT9338	PAD MTD 3PH DF 225KVA 14.4/24.9-125/216	94933800
UT9343	PAD MTD 3PH DF 300KVA 14.4/24.9-125/216	94934300
UT9352	PAD MTD 3PH DF 500KVA 14.4/24.9-125/216	94935200
UT9358	PAD MTD 3PH DF 750KVA 14.4/24.9-125/216	94935800
UT9364	PAD MTD 3PH DF 1000KVA 14.4/24.9-125/216	94936400
UT9370	PAD MTD 3PH DF 1500KVA 14.4/24.9-125/216	94937000
UT9426	PAD MTD 3PH LF 75KVA 24.9/14.4-216Y/125	94942600
UT9432	PAD MTD 3PH LF 150KVA 24.9/14.4-216Y/125	94943200
UT9438	PAD MTD 3PH LF 225KVA 24.9/14.4-216Y/125	94943800
UT9443	PAD MTD 3PH LF 300KVA 24.9/14.4-216Y/125	94944300
UT9452	PAD MTD 3PH LF 500KVA 24.9/14.4-216Y/125	94945200
UT9458	PAD MTD 3PH LF 750KVA 14.4/24.9-125/216	94945800
UT9464	PAD MTD 3PH LF 1000KVA 14.4/24.9-125/216	94946400
UT9470	PAD MTD 3PH LF 1500KVA 14.4/24.9-125/216	94947000
UT9526	PAD MTD 3PH DF 75KVA 14.4/24.9-277/480	94952600
UT9532	PAD MTD 3PH DF 150KVA 14.4/24.9-277/480	94953200
UT9538	PAD MTD 3PH DF 225KVA 14.4/24.9-277/480	94953800
UT9543	PAD MTD 3PH DF 300KVA 14.4/24.9-277/480	94954300
UT9552	PAD MTD 3PH DF 500KVA 14.4/24.9-277/480	94955200
UT9558	PAD MTD 3PH DF 750KVA 14.4/24.9-277/480	94955800
UT9564	PAD MTD 3PH DF 1000KVA 14.4/24.9-277/480	94956400
UT9570	PAD MTD 3PH DF 1500KVA 14.4/24.9-277/480	94957000
UT9632	PAD MTD 3PH LF 150KVA 14.4/24.9-277/480	94963800
UT9638	PAD MTD 3PH LF 225KVA 14.4/24.9-277/480	94963800
UT9643	PAD MTD 3PH LF 300KVA 14.4/24.9-277/480	94964300
UT9658	PAD MTD 3PH LF 750KVA 14.4/24.9-277/480	94965800
UT9664	PAD MTD 3PH LF 1000KVA 14.4/24.9-277/480	94966400
UT9670	PAD MTD 3PH LF 1500KVA 14.4/24.9-277/480	94967000
UT9676	PAD MTD 3PH LF 2000KVA 14.4/24.9-277/480	94967600
UT9679	PAD MTD 3PH LF 2500KVA 14.4/24.9-277/480	94967900
UT9682	PAD MTD 3PH LF 3750KVA 14.4/24.9-277/480	94968200
UT9764	PAD MTD 3PH LF 1000KVA 14.4/24.9-2.4/4.1	94976400
UT9779	PAD MTD 3HP LF 2500KVA 14.4/24.9-2.4/4.1	94977900
UT9782	PAD MTD 3PH LF 3750KVA 14.4/24.9-2.4/4.1	94978200
UT9784	PAD MTD 3PH LF 5000KVA 14.4/24.9-2.4/4.1	94978400
UT9792	PAD MTD 3HP LF 10MVA 14.4/24.9-2.4/4.1	94979200
UT9870	PAD MTD 3P DF 1500KVA 14.4/24.9-4.16/2.4	94987000
UT9964	DRY VAULT 3PH 1000KVA 14.4/24.9-277/480	94996400
UT9970	DRY VAULT 3PH 1500KVA 14.4/24.9-277/480	94997000

CU Number	CU Desc	Prop. Unit/Min. Matr.
UT9979	DRY VAULT 3PH 2500KVA 14.4/24.9-277/480	94997900
UT9980	DRY VAULT 3PH 3000KVA 14.4/24.9-277/480	94998000
UTPAD-COVER	TRANSFORMER FIBERGLASS PAD 48X37.5	6039000
UTPAD-FG	TRANSFORMER FIBERGLASS PAD 48X37.5	6039000
UVAQ-40	CABLE, SERVICE, 4/0-2/0NAL QPXD XLP 600V	2038200
UVAQ-500	CABLE, SERVICE, 500-350NAL QPXD XLP 600V	2043000
UVAT-20	CABLE,2/0-1N,AL,TPXD,XLP,600V	2035000
UVAT-20-OH	CABLE,2/0-1N,AL,TPXD,XLP,600V,OHT	2035010
UVAT-350	UPR2, 1 FT. 350MCM-4/0N,AL,XLP,600V,TPXD	2039500
UVAT-40	UPR2, 1 FT. 4/0-2/0N,AL,XLP,600V,TPXD	2038100
UVAT-40-OH	UPR2,1 FT. 4/0-2/0N,AL,XLP,600V,TPXD,OHT	2038101
UVAT-500	UPR2, 1 FT. 500MCM-350MCM,AL,XLP,600V,TP	2041000
UVBOX-13X24	PRECAST PULLBOX, LT. TRAFFIC, 13" X 24"	6002000
UVBOX-17X30	PRECAST PULLBOX, LT. TRAFFIC, 13" X 24"	6002100
UVBOX-18X32	URD SERVICE BOX 18WX32LX20D	6003400
UVLA-240	ARRESTER, SURGE, SECONDARY, 120/240V	
UVLA-380	ARRESTER, SURGE, SECONDARY, 380V	
UVLA-650	ARRESTER, SURGE, SECONDARY, 650V	
UVPVC-L-24R	CONDUIT ELBOW,PVC 2.5" 24" RADIUS	
UVPVC-L2	CONDUIT ELBOW,PVC 2" STD RADIUS	
UVPVC-L2.5	CONDUIT ELBOW,PVC 2.5" STD RADIUS	
UVPVC-L3	CONDUIT ELBOW,PVC 3" STD RADIUS	
UVPVC-L4	CONDUIT ELBOW,PVC 4" 24" RADIUS	
UVPVC40-2	CONDUIT, PVC SCH 40, 2"	10320000
UVPVC40-2.5	CONDUIT, PVC SCH 40, 2.5"	10322000
UVPVC40-3	CONDUIT, PVC SCH 40, 3"	10323000
UVPVC40-4	CONDUIT, PVC SCH 40, 4"	10325000
UVPVC80-2	CONDUIT, PVC SCH 80, 2"	10327200
UVPVC80-3	CONDUIT, PVC SCH 80, 3"	10327300
UVPVC80-4	CONDUIT, PVC SCH 80, 4"	10327400
UVRISER-2	RISER, SERVICE, PVC80, 2"	10327200
UVRISER-3	RISER, SERVICE, PVC80, 3"	10327300
UVRISER-4	RISER, SERVICE, PVC80, 4"	10327400
UVTEMP-PED	FIBERGLASS TEMPORARY SERVICE PEDESTAL	
UVTERM2-20T	TERMINATIONS, SERV, UGRD, 2" COND, 2/0AT	
UVTERM3-20T	TERMINATIONS, SERV, UGRD, 3" COND, 2/0AT	
UVTERM3-350T	TERMINATIONS, SERV, UGRD, 3" COND, 350AT	
UVTERM3-40T	TERMINATIONS, SERV, UGRD, 3" COND, 4/0AT	
UVTERM3-500T	TERMINATIONS, SERV, UGRD, 3" COND, 500AT	
UVTERM4-40Q	TERMINATIONS, SERV, UGRD, 4" COND, 4/0AQ	
UVTERM4-500Q	TERMINATIONS, SERV, UGRD, 4" COND, 500AQ	

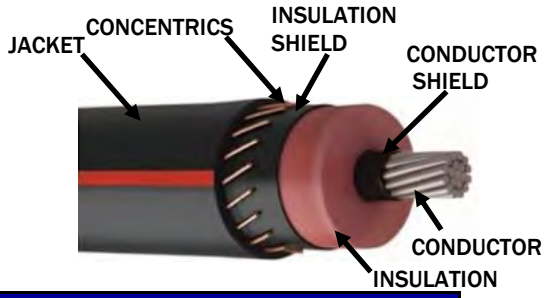
PRIMARY CABLE STANDARDS

APPROVALS			
ISSUE DATE	ENGINEER	SUPERVISOR	MANAGER
2/15/06	FRED FRITON	RON DAVIDSON	NICK THOMPSON
11/18/17	WES SUDDARTH		

TABLE OF CONTENTS

UNDERGROUND DISTRIBUTION CABLE (URD,UD) CONCENTRIC NEUTRAL
25kV ALUMINUM - 90°C Rating (UL)

CONDUCTOR - Solid or Class "B" Strand
CONDUCTOR SHIELD - Semiconducting layer
INSULATION - EPR rubber insulation
INSULATION SHIELD - Semiconducting Layer
CONCENTRICS - Neutrals as Specified Below
JACKET - 50 mil Over Concentric Wire, Insulating LLDPE W/3 Red Stripes

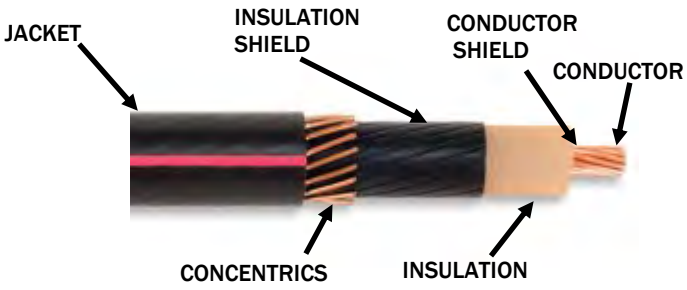


CABLE INFORMATION TABLE

SINGLE PHASE; SINGLE CONDUCTOR; FULL NEUTRAL ; 25kV; 260 MIL INSULATION									Ampacity		
NES Stock Number	NES Compatible Unit	Size (AWG/ kcmil)	No. of Strands	Copper Neutral Wires (No. - AWG)	O.D. Over Insulation (Inches	O.D. Over Jacket (Inches)	Cable Weight (lbs./kft)	ft / full reel	Direct Burial	PVC Conduit	Min. Bending Radius
020542000	UCAL1	1	19	13-#14	0.93	1.23	775	4,000	200	145	15"
THREE PHASE; SINGLE CONDUCTOR; 1/3 NEUTRAL; 25kV; 260MIL INSULATION									**Ampacity**		
NES Stock Number	NES Compatible Unit	Size (AWG/ kcmil)	No. of Strands	Copper Neutral Wires (No. - AWG)	O.D. Over Insulation (Inches	O.D. Over Jacket (Inches)	Cable Weight (lbs./kft)	ft / full reel	Direct Burial	PVC Conduit	Min. Bending Radius
020544030	UCAL1-3CP	1	19	13-#14	0.93	1.23	775	3-1,500	200	145	15"
020550030	UCAL40-3CP	4/0	19	11-#14	1.12	1.44	1,034	3-1,000	255	245	18"
020580000	UCAL500	500	37	25-#14	1.41	1.73	1,690	1,500	400	395	21"

UNDERGROUND DISTRIBUTION CABLE (URD,UD) CONCENTRIC NEUTRAL
25kV COPPER - 90°C Rating (UL)

CONDUCTOR - Solid or Class "B" Strand
CONDUCTOR SHIELD - Semiconducting layer
INSULATION - EPR rubber insulation
INSULATION SHIELD - Semiconducting Layer
CONCENTRICS - Neutrals as Specified Below



CABLE INFORMATION TABLE

THREE PHASE; SINGLE CONDUCTOR; 1/3 NEUTRAL; 25kV COPPER; 260 MIL INSULATION									Ampacity		
NES Stock Number	NES Compatible Unit	Size (AWG/ kcmil)	No. of Strands	Copper Neutral Wires (No. - AWG)	O.D. Over Insulation (Inches)	O.D. Over Jacket (Inches)	Cable Weight (lbs./kft)	ft / full reel	Direct Burial	PVC Conduit	Min. Bending Radius
024020030	UCCU40-3CP	4/0	19	18-#14	1.12	1.45	1,582	3-1,000	325	310	18"
024040000	UCCU500	500	37	26-#12	1.41	1.77	3,014	1,500	490	485	22"
024050000	UCCU750	750	61	25-#10	1.60	2.02	4,288	1,200	575	565	25"

**** Ampacity assumes:**
(SEE PAGE 12 FOR MORE DETAILED LOADING INFORMATION)

1) Earth RHO 90°C - cm/Watt	4) 75% load factor
2) Earth ambient temperature 20°C	5) Average 36 inch burial depth
3) Average earth interface temperature limited to 45°C	6) Sheath losses included

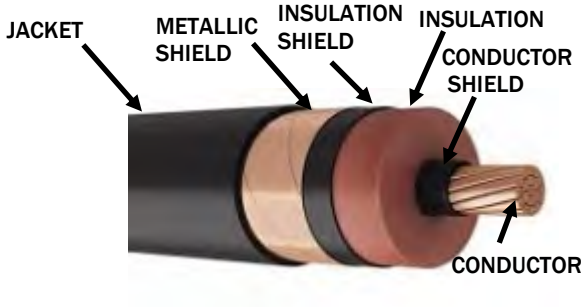
REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	WMS	UPDATED CABLE DESCRIPTIONS	11/8/17

NES

T&D DRAWING STANDARDS
CABLE INFORMATION
JACKETED CONCENTRIC NEUTRAL CABLE

POWER CABLE - TYPE MV-105 25kV SHIELDED SPS

CONDUCTOR - Class "B" Copper Strand
CONDUCTOR SHIELD - Semiconducting layer
INSULATION - EPR rubber insulation
INSULATION SHIELD - Semiconducting Layer
METALLIC SHIELD - 5 mil Copper Tape, 20% Overlap **JACKET** - PVC



CABLE INFORMATION TABLE										
THREE PHASE; SINGLE CONDUCTOR; *NO NEUTRAL*; 25kV COPPER; 260 MIL INSULATION								Ampacity		
NES Stock Number	NES Compatible Unit	Size (AWG/ kcmil)	No. of Strands	O.D. Over Insulation (Inches	O.D. Over Jacket (Inches)	Cable Weight (lbs./kft)	ft / full reel	Direct Burial	Nonmetallic Conduit	Min. Bending Radius
024000000	UCCU750-1/C	750	61	1.61	1.99	4,288	1,000	575	565	24"

NOTE: A 500MCM CU neutral must be pulled into the same conduit with these cables when used on a grounded wye system. The copper tape shield is not rated for any sustained neutral current.

MINIMUM CABLE BENDING RADIUS TABLE

FOR ALL PRIMARY CABLES THE MINIMUM BENDING RADIUS IS THE GREATER OF:
12 x Single Conductor Outside Diameter
7 x Multi-Conductor Assembled Outside Diameter

Non-Shielded Cable See Table Below
Single and Multiple Conductor-All voltages

	600V	2kV	5kV	8 kV and larger
Through 500 kcmil	3	3	4	6 x Outside Diameter
600-1750 kcmil	4	4	5	7 x Outside Diameter
2000 kcmil and above	5	5	6	8 x Outside Diameter

During Installation
Cable should not be pulled with a radius less than that determined for the installed cable. Due to limitation of side bearing pressure, it is recommended that larger radius bends be used.

MINIMUM CONDUIT DIAMETER

Cable Size	Number	Cable Diameter	Calculated Diameter	Minimum Conduit	NES Standard
Aluminum					
#1AL	1	1.23	1.73	2"	2.5"
#1AL	2	1.23	2.96	3"	3" or 2-2.5"
#1AL	3	1.23	3.15065	4"	4" or 3-2.5"
4/0AL	3	1.44	3.6032	4"	5"
500AL	3	1.73	4.22815	5"	5"
Copper					
4/0CU	3	1.45	3.62475	4"	5"
500CU	3	1.77	4.31435	5"	5"
750CU	3	2.02	4.8531	5"	6"

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	WMS	UPDATED CABLE DESCRIPTIONS	11/8/17

NES

T&D DRAWING STANDARDS
CABLE INFORMATION
TAPE SHIELD SUBSTATION CABLES

CABLE MAXIMUM PULLING TENSIONS

Method 1:

Maximum allowable tension when cable is installed by pulling directly on the conductors.

Tmax=0.008*n*CM

Where: n= number of cables
CM= conductor circular mils

Cable Size	CM	n	TMAX
#1 AL/CU	83,693	1	670
4/0 AL/CU	211,600	1	1,693
500 AL/CU	500,000	1	4,000
750 AL/CU	750,000	1	6,000

Method 2:

Pulling by attaching a Kellems grip over the jacketed and shielded cable the maximum tension allowable is **1000lbs.***

* Do not exceed the maximum cable tension listed above.

Method 3:

Maximum allowable tension due to side wall pressure when pulling through a radius.

Tmaxr = 675*D1*R

Where: D1= Diameter of one cable in inches
R= Radius of bend in feet

Cable Size	D1	R	Tmaxr
#1 AL/CU	1.23	2	1,661**
4/0 AL/CU	1.44	2	1,944**
500 AL/CU	1.77	3	3,584
750 AL/CU	1.99	3	4,030

**Do not exceed the maximum cable tensions from method one or two.

MINIMUM CONDUIT DIAMETER

Cable Size	Number	Cable Diameter	Calculated Diameter	Minimum Conduit	NES Standard
Aluminum					
#1AL	1	1.23	1.73	2"	2.5"
#1AL	2	1.23	2.96	3"	3" or 2-2.5"
#1AL	3	1.23	3.15065	4"	4" or 3-2.5"
4/0AL	3	1.44	3.6032	4"	5"
500AL	3	1.73	4.22815	5"	5"
Copper					
4/0CU	3	1.45	3.62475	4"	5"
500CU	3	1.77	4.31435	5"	5"
750CU	3	2.02	4.8531	5"	6"

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

NES

T&D DRAWING STANDARDS
MAXIMUM CABLE PULLING TENSIONS
AND MINIMUM CONDUIT DIAMETERS

MAXIMUM CABLE PULLING DISTANCES

Single Phase Installation

Installation conditions used to determine the maximum pull distance:

1. Single phase run from a pad to a riser pole.
2. Pull rope is attached to the cable or a Kellems grip.
3. Two large radius 90˚ bends, no sweeps and no change in elevation from riser to pad.
4. Pay-off reel is located at the pad and applies 100 lbs of tension to the cable.
5. Conduit is in average condition with moderate contamination and the cable is well lubricated.

CABLE SIZE	RISER HEIGHT	ESTIMATED TENSION	MAXIMUM DISTANCE OF CONDUIT	FEET /REEL
#1AL	30'	665 lbs	500'	4,000

Two Phase Installation

Installation conditions used to determine the maximum pull distance:

1. Two phase run from a pad to a riser pole.
2. Pull rope is attached to each cable. NO KELLEMS GRIPS.
3. Two large radius 90˚ bends, no sweeps and no change in elevation from riser to pad.
4. Pay-off reel is located at the pad and applies 100lbs of tension to the cable.
5. Conduit is in average condition with moderate contamination and the cable is well lubricated.

CABLE SIZE	RISER HEIGHT	ESTIMATED TENSION	MAXIMUM DISTANCE OF CONDUIT	FEET/REEL
#1AL	30'	1,330 lbs	800'	4,000

Three Phase Installation

Installation conditions used to determine the maximum pull distance:

1. Three phase run from a pad to a riser pole.
2. Pull rope is attached to each cable. NO KELLEMS GRIPS.
3. Two large radius 90˚ bends, no sweeps and no change in elevation from riser to pad.
4. Pay-off reel is located at the pad and applies 100lbs of tension to the cable.
5. Conduit is in average condition with moderate contamination and the cable is well lubricated.

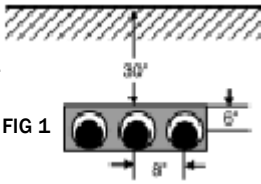
CABLE SIZE	RISER HEIGHT	ESTIMATED TENSION	MAXIMUM DISTANCE OF CONDUIT	FEET/REEL
#1AL	30'	1,995 lbs	900'	3-1,500
4/0AL	30'	4,970 lbs	1,800'	3-1,000
500AL	30'	10,300 lbs	2,500'	1,500
4/0CU	30'	4,750 lbs	1,100'	3-1,000
500CU	30'	10,400 lbs	1,400'	1,500
750CU	30'	11,670 lbs	1,100'	1,200

Notes:

1. Pulling distance limits are based on conditions anticipated at the time of cable replacement. Cables installed in new ducts may be pulled much farther. **It is critical to establish limits that anticipate the conditions expected to be encountered during future maintenance.**
2. Severe conduit contamination will significantly increase the pulling tensions. It is necessary therefore to remove the sections of conduit contaminated by dirt when repairing damage from a dig-in.
3. Sweeps and elevation changes, depending on their position with regard to distance from the pay-off reel, can considerably increase the pulling tensions. These should be avoided if possible. The estimated pulling tension should be calculated for swept conduit runs. See Appendix A.
4. Distances may be limited by pull rope strength and the amount of cable on a reel.
5. Large radius = 24" for conduits up to 4" in diameter and 36" for 5" and 6" conduits.

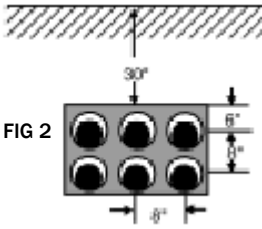
1 CIRCUIT

FIG 1



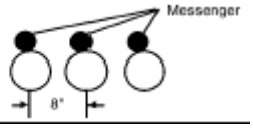
2 CIRCUIT

FIG 2



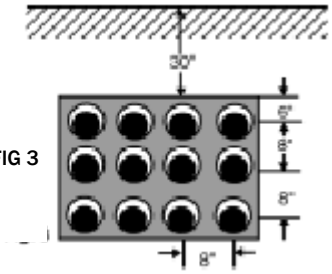
1 CIRCUIT

FIG 11



4 CIRCUIT

FIG 3



Note:
Conduit is non-metallic.

Assumptions:

Ambient Temperature 20°C
Conductor Temperature 90°C
Earth RHO 90°C - cm/watt
Concrete RHO 85°C - cm/watt
Duct RHO 600°C - cm/watt
No Sheath Losses (Single point grounding)
5 Inch Duct
* NOTE: Cable surface temperature limit may reduce conductor operating temperature.

ALUMINUM CONDUCTORS

Underground in Ducts - One Single Per Duct										In Air	
Conductor Size (AWG/ kcmil)	1 Circuit Fig. 1 Load Factor			2 Circuits Fig. 2 Load Factor			4 Circuits Fig. 3 Load Factor				
	50	75	100	50	75	100	50	75	100	Fig. 11 In-door	Fig. 11 Out-door
1	185	173	161	173	156	141	155	134	115	184	228
4/0	317	295	272	294	262	233	260	220	188	324	403
500	527	484	442	483	424	372	419	350	296	558	687

COPPER CONDUCTORS

Underground in Ducts - One Single Per Duct										In Air	
Conductor Size (AWG/ kcmi	1 Circuit Fig. 1 Load Factor			2 Circuits Fig. 2 Load Factor			4 Circuits Fig. 3 Load Factor				
	50	75	100	50	75	100	50	75	100	Fig. 11 In-door	Fig. 11 Out-door
4/0	409	380	350	379	338	300	335	284	243	417	509
500	676	621	566	619	543	477	538	448	380	712	863
750	849	775	703	773	674	588	667	552	464	907	1082

FIG 4

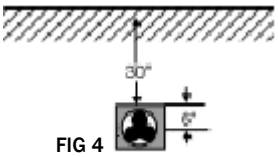


FIG 5

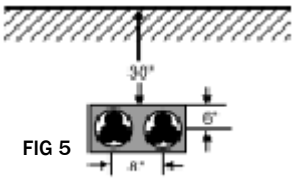


FIG 6

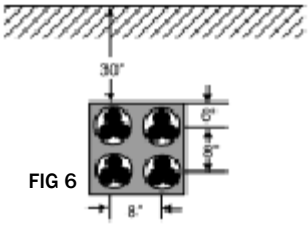
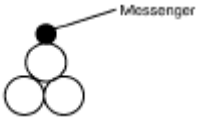


FIG 12



ALUMINUM CONDUCTORS

Underground In Ducts - Three 1/C Cable Per Duct											
Conductor Size (AWG/ kcmil)	1 Circuit Fig. 4 Load Factor			2 Circuits Fig. 5 Load Factor			4 Circuits Fig. 6 Load Factor			Three Singles In Air	
	50	75	100	50	75	100	50	75	100	Fig. 12 Indoor	Fig. 12 Outdoor
1	153	145	137	146	135	123	134	119	105	157	197
4/0	260	245	229	246	225	204	224	196	171	276	344
500	428	400	371	402	363	326	361	311	269	472	581

COPPER CONDUCTORS

Underground In Ducts - Three 1/C Cable Per Duct											
Conductor Size (AWG/ kcmil)	1 Circuit Fig. 4 Load Factor			2 Circuits Fig. 5 Load Factor			4 Circuits Fig. 6 Load Factor			Three Singles In Air	
	50	75	100	50	75	100	50	75	100	Fig. 12 Indoor	Fig. 12 Outdoor
4/0	337	317	297	319	291	264	290	253	221	358	439
500	549	513	475	516	465	417	463	398	344	605	735
750	680	633	584	636	571	510	568	485	418	760	905

Note:
Load Factor is the expected percentage of time per 24 hour period that the cable will be running at the stated load.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

NES

T&D DRAWING STANDARDS
DRAWING SYMBOLS
POLES AND ANCHORS

Maximum Transformer KVA for a Given Wire Size									
Three Phase Installations kVA= 1.73 * I * kV									
Voltage (kV)	23.9			13.8			4		
Load Factor									
Wire Size	50%	75%	100%	50%	75%	100%	50%	75%	100%
1Al	6,326	5,995	5,665	3,653	3,462	3,271	1,059	1,003	948
4/0AL	10,750	10,130	9,468	6,207	5,849	5,467	1,799	1,695	1,585
500AL	17,697	16,539	15,340	10,218	9,550	8,857	2,962	2,768	2,567
4/0CU	13,934	13,107	12,280	8,046	7,568	7,091	2,332	2,194	2,055
500CU	22,700	21,211	19,640	13,107	12,247	11,340	3,799	3,550	3,287
750CU	28,116	26,173	24,147	16,234	15,112	13,942	4,706	4,380	4,041
Single Phase Installations kVA = I* kV									
Voltage (kV)	23.9 and 13.8kV			7.96kV			4kV		
Load Factor									
Wire Size	50%	75%	100%	50%	75%	100%	50%	75%	100%
1Al	2,553*	2,387*	2,222*	1,473*	1,377*	1,282*	740*	692*	644*

General Notes:

This table is based on the following conditions.
1. Three phase kVA is based on the amperages listed on Figure 4 on the previous page.
2. Single phase kVA is based on the amperages listed on Figure 1 on the previous page.

Do not use this table for any other cable configuration:

Reduce three phase kVA by 50% if phases are in separate metal ducts or separate riser conduits.

***Single phase sidelines must not exceed 500kVA connected. This is limited by the maximum circuit un-balanced load settings at the substation. The numbers in the table above only reflect the cable's limits based on the conditions listed on the previous page.**

MOVEMENT, STORAGE AND HANDLING OF CABLE

Movement of Reels of Cable

1. Reels of cable must not be dropped from any height, particularly from trucks or other transporting equipment.

2. Lift reels using following methods:

(a) Crane or boom type equipment—insert shaft (heavy rod or pipe) through reel hubs and lift with slings on shaft, preferably utilizing spreader or yoke to reduce or avoid sling pressure against reel flange.

(b) Fork lift type of equipment may be used to move smaller, narrower width reels. Fork tines should be placed so that lift pressure is on reel flange not on cable, and must reach all the way across reels so lift is against both reel flanges.

3. Reels may be moved short distances by rolling. Reels should be rolled in the direction indicated by arrows painted on reel flanges. Surfaces over which the reels are to be rolled should be firm, clear of debris, and also clear of protruding stones, humps, etc. which might damage the cable if the reel straddled them.

Storage of Reels of Cable

1. Cable ends are sealed prior to shipment. If factory seals are removed or damaged, new tape seals must be applied to prevent moisture entry into cable. Strip cable finishes back 2", down to insulation for braided or non-jacketed constructions. Then apply four layers of an insulating tape, criss-cross over the cable end and carry back at least 4" onto cable outer finish. Add a containing cover of two layers of vinyl electrical tape completely over the end seal. Cold shrink covers may also be used.

2. Whenever possible, the factory applied lagging (protective cover) should be left in place. Additional covering such as tarpaulin, plastic sheeting, etc., may be used if cable is to be stored for long periods outdoors or in excessively dirty, dusty areas.

3. Store reels of cable on a firm surface, paved if possible, or on planking to prevent settling into soft ground.

4. The storage areas should have good drainage.

5. Use fencing or other barriers to protect cables and reels against damage by vehicles or other equipment moving about in the storage area.

Handling During Installation

1. Cold weather handling and pulling-in of cable can be more difficult, depending on the cable construction and installation location. Cold-induced stiffness of cable must be considered along with radius and number of bends in the proposed installation run.

In general most cables can be safely handled without damage if not subjected to temperature lower than 10°F (-12°C) in the 24 hour period proceeding pulling and bending. If it is anticipated that store temperatures will be below this level during the 24-hour pre-pull period, arrangements should be made to move the reel, avoiding impact, to a warmer area. If no indoor warming area is available, a plastic sheeting-covered shelter may be constructed and heated. The reel should be held in the warm storage area at a temperature of at least 60°F (16°C) for 24 hours to ensure total warmup. Apply pulling eyes or grips while cable is in the warming area, prior to movement outdoors or uncovering. If these instructions cannot be followed, please consult manufacturer regarding the particular situation and cable involved.

2. Always determine the safe maximum pulling tension of the cable and compare this to the tension required for the particular run configuration being considered.

3. Always determine that ducts and conduits are clear of obstructions and properly sized. After swabbing or brushing, a sizing mandrel should be pulled through to ensure the cables will fit without jamming.

4. Attachment to the cable can be accomplished with any of the commercially available devices (Kellems grips, Greenlee wire grip, etc.) or by field or factory-made pulling eyes. The choice may depend on the tension requirements, especially when long runs or runs with several bends are to be made. If the pull is through wet or damp locations, the cable ends must be positively sealed to prevent moisture entry, and resealed after pulling.

5. Cable end seals may be disrupted during the pulling operations and therefore should be checked and replaced if the cables are not going to be spliced or terminated right after pull-in. This is especially important for underground runs where cable ends may be left in manholes which are subject to flooding.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	WMS	REMOVED KERITE REFERENCE	11/8/17

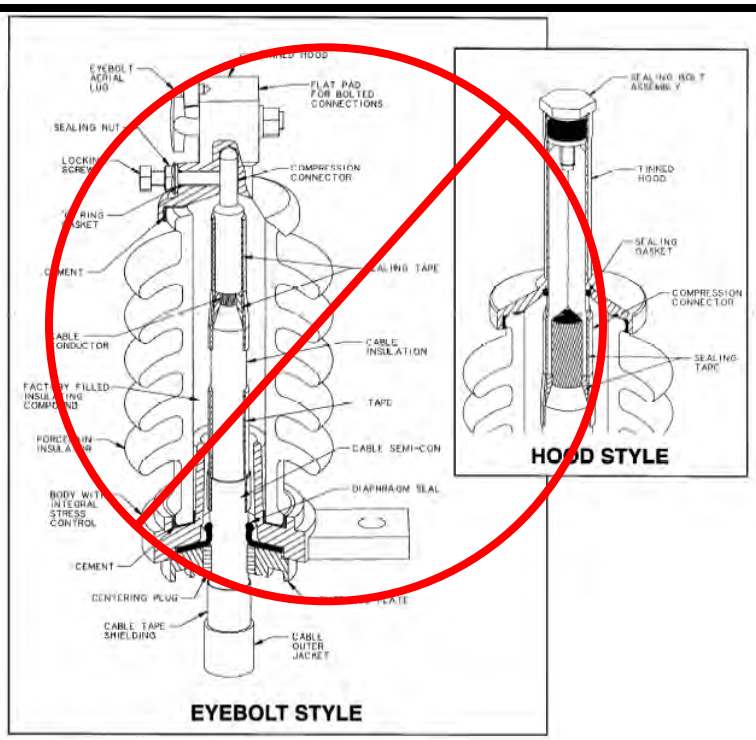
NES

T&D DRAWING STANDARDS
CABLE STORAGE AND HANDLING INSTRUCTIONS

CABLE ATTACHMENT COMPONENTS STANDARDS

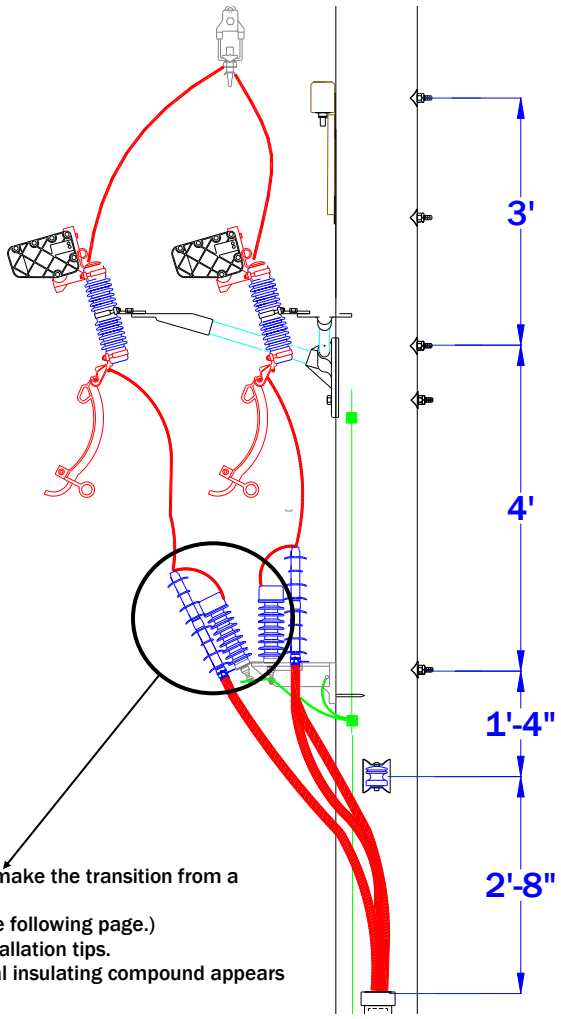
APPROVALS			
ISSUE DATE	ENGINEER	SUPERVISOR	MANAGER
5/18/21	CHRIS MCREYNOLDS	RONALD REASONOVER	VAUGHAN CHARLES
7/21/21	CEDRIC SHORT	RONALD REASONOVER	VAUGHAN CHARLES
8/10/21	CHRIS MCREYNOLDS		

TABLE OF CONTENTS

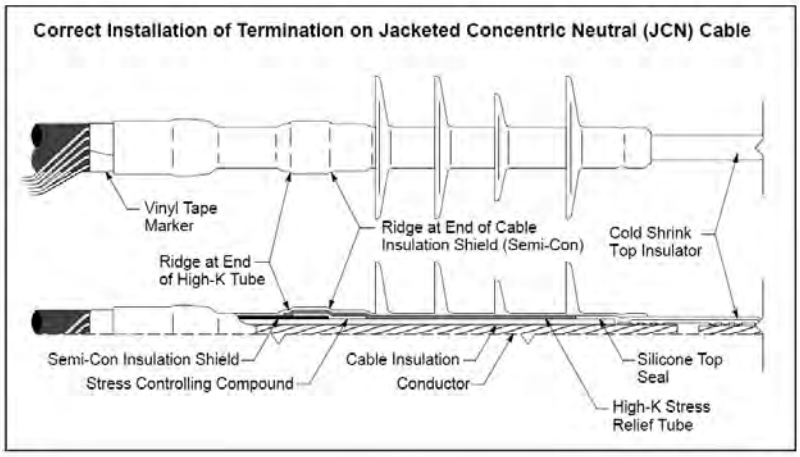


CAUTION NOTE:
The insulating compound inside of ceramic cable terminations can leak out over time. These should be immediately replaced if the cable below the termination appears to have a buildup of contamination.

Ceramic Cable Termination



Silicon Rubber Cable Termination



GENERAL NOTES:

1. These devices are referred to as "cable terminators". They are used at the riser pole to make the transition from a rubber insulated cable to an air insulated wire.
2. These should not be used inside of live front equipment. (See stress terminations on the following page.)
3. Refer to the manufacturers instructions for the proper stripping distances and other installation tips.
4. Ceramic cable terminations are no longer installed and should be replaced if the internal insulating compound appears to be leaking.

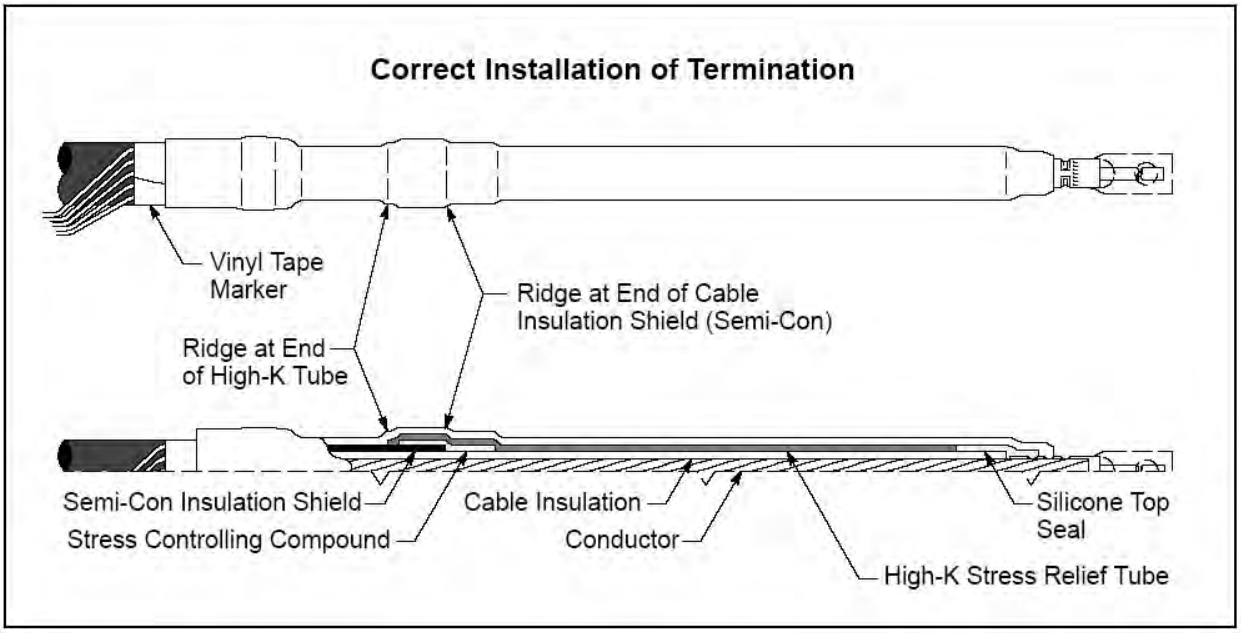
CABLE TERMINATIONS
MATERIAL LIST

CU CODE	STOCK #	DESCRIPTION	QUANTITY	UNIT
UCN-CTRM1	402678000	UG CONNECTOR, CABLE TERMINATOR, #1	1	EA
UCN-CTRM40	402680000	UG CONNECTOR, CABLE TERMINATOR, 4/0	1	EA
UCN-CTRM500	402700000	UG CONNECTOR, CABLE TERMINATOR, 500MCM	1	EA
UCN-CTRM750	402700000	UG CONNECTOR, CABLE TERMINATOR, 750MCM	1	EA

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

NES

T&D CABLE STANDARDS
HIGH VOLTAGE CABLE TERMINATIONS
RISER POLE APPLICATIONS



STRESS TERMINATOR

GENERAL NOTES:

1. This type of cable end is referred to as a “stress terminator”. It is used inside live front equipment.
2. Never use this type of termination on riser poles or any outdoor installation. (See the cable terminations on the preceding page.
3. Refer to the manufacturers instructions for the proper stripping distances and other installation tips.

CABLE TERMINATIONS

MATERIAL LIST

CU CODE	STOCK #	DESCRIPTION	QUANTITY	UNIT
UCN-STRM1-40	403830000	UG CONNECTOR, STRESS TERMINATOR, #1-4/0	1	EA
UCN-STRM750	403850000	UG CONNECTOR, STRESS TERM. 500-750MCM	1	EA

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

NES

T&D CABLE STANDARDS

HIGH VOLTAGE CABLE TERMINATIONS
LIVE-FRONT EQUIPMENT APPLICATIONS

SEMI-CONDUCTING SHIELD
Molded peroxide-cured semi-conducting EPDM shield meets requirements of IEEE Standard 592 and provide ground shield continuity between elbow and cable shield.

PROBE
Field replaceable, tin plated copper probe ensures reliable electrical connection. Specially formulated ablative arc follower provides dependable loadbreak switching characteristics.

PULLING EYE
Stainless steel reinforced pulling eye provides reliable hotstick operating point.

LOCKING RING
Locking ring ensures secure connection when engaged in locking groove or mating apparatus.

COPPERTOP CONNECTOR
Coppertop compression connector is a field proven bimetallic friction welded design that accepts copper or aluminum cable conductors.

SEMI-CONDUCTING INSERT
Molded peroxide-cured EPDM semi-conducting insert control electrical stress.

DRAIN WIRE TAB
Drain wire tab is molded into the semi-conducting shield for the attachment of a drain wire to ensure dead-front construction.

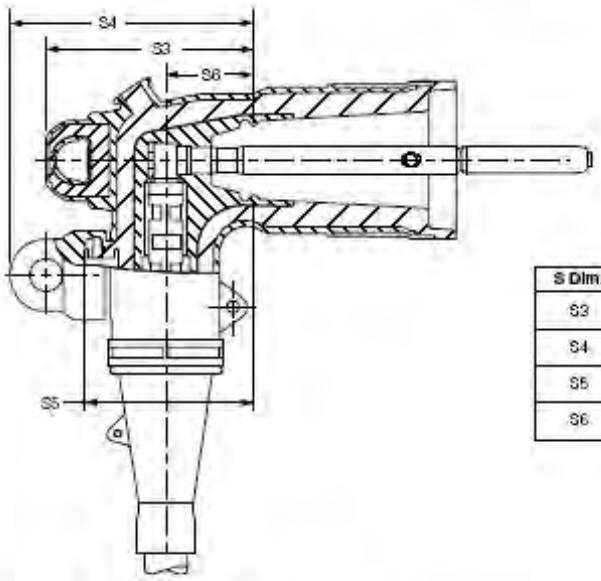
TEST POINT
Option capacitive test point with snap-on cap provides a shielded, hotstick-operable means to determine if the circuit is energized
.

LOAD BREAK BAND
White black, white band identifies the device as having three phase switching and fault close capabilities

CONDUCTIVE INSERT ENDS
Encapsulated with insulating rubber, reduces cable extrusion and distortion that can be caused by thermo-cycling, This mitigates the effects of the electrical stresses along the cable to elbow interface thus greatly reducing the possibility of interface tracking.

EPDM INSULATION
High quality peroxide cured EPDM insulation.

COOPER POWER SYSTEMS ELBOW CUTAWAY



S Dim.	25 kV
S3	3.9" (99 mm)
S4	4.6" (117 mm)
S5	3.2" (81 mm)
S6	1.7" (44 mm)

Figure 3.
Elbow profile and stacking dimensions as referenced in IEEE Standard 386™.
Note: Dimensions given are for reference only.

CAUTION:

THE CABLE STRIPPING DISTANCES VARY SLIGHTLY BETWEEN DIFFERENT MANUFACTURER'S ELBOWS.

REFER TO THE MANUFACTURER'S INSTRUCTIONS FOR THE CORRECT INSTALLATION PROCEDURES.

CABLE TERMINATIONS

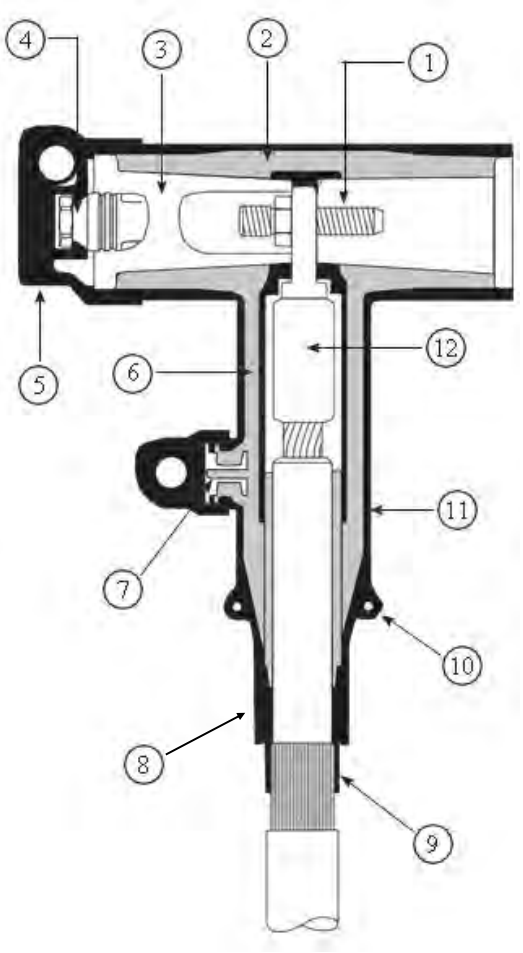
MATERIAL LIST

CU CODE	STOCK #	DESCRIPTION	QUANTITY	UNIT
UELBC-1	400396000	ELBOW CONN,#1AL/CU 200A 25KV W/SEAL KIT	1	EA
UELBC-4/0	400400000	ELBOW CONN, 4/0 AL/CU 25KV 200A	1	EA
	400318200	CABLE SEALING KIT 1/0-750	1	EA
UELBC-2CU	400408000	ELBOW CONNECTOR,#2CU 200A 25KV	1	EA
UELBC-4/0CU	400412000	ELBOW CONN,4/0 CU 25KV 200A KERITE 1/C TAPE SHIELD CABLE	1	EA
	400318200	CABLE SEALING KIT 1/0-750	1	EA

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

NES

T&D CABLE STANDARDS
DEAD-FRONT EQUIPMENT
DEAD-FRONT 200A 25KV LOAD BREAK ELBOW



1. Clamping Screw
Tin plated copper screw secures the conductor contact to the bushing.

2. Insulation
Moulded EPDM insulating rubber.

3. Basic Insulating Plug
Molded epoxy part has a threaded metal insert to accept the clamping screw.

4. Capacitive Test Point
Capacitive test point provides means to check the circuit status.

5. Rubber Cap
Molded EPDM rubber protects and earths the test point during normal operation.

6. Internal Screen
EPDM conducting rubber screen controls electrical stress.

7. Optional Capacitive Test Point
Provides placement for fault indicators

8. Stress Relief
The configuration of the outer screen and the cable adapter provide stress relief.

9. Cable Adapter
Maintains a watertight seal and provides the initial cable stress relief.

10. Earthing Eyes
Molded into the external screen for connection of an earthing wire.

11. External Screen
Molded EPDM conducting rubber mates with the cable screen to maintain continuity and ensure that the assembly is at ground potential

12. Conductor Contact
Inertia welded bimetallic compression connector accepts copper or aluminum conductors.

Copper Power Systems 600A Elbow

CAUTION:

THE CABLE STRIPPING DISTANCES VARY SLIGHTLY BETWEEN DIFFERENT MANUFACTURER'S ELBOWS. REFER TO THE MANUFACTURER'S INSTRUCTIONS FOR THE CORRECT INSTALLATION PROCEDURES.

GENERAL NOTES:
1. This elbow is a dead break only unit.
2. This is used only for special project applications in 600amp dead front switch gear such as S&C's Vista gear.

CABLE TERMINATIONS

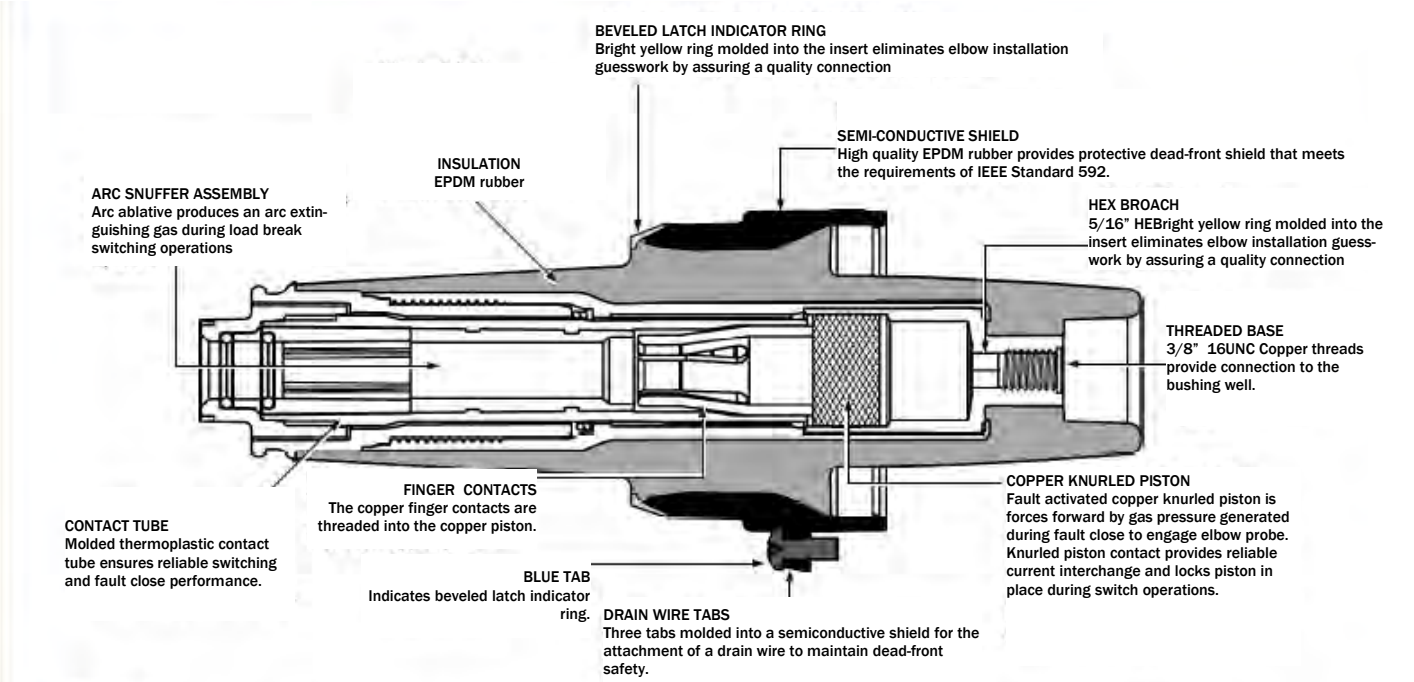
MATERIAL LIST

CU CODE	STOCK #	DESCRIPTION	QUANTITY	UNIT
UELBC-4/0-6	400415000	CONN ELBOW NLB 4/0 AL/CU 600A	1	EA
	400318200	CABLE SEALING KIT 1/0-750	1	EA
UELBC-500-6	400416000	CONN ELBOW NLB 500 AL/CU 600A	1	EA
	400318200	CABLE SEALING KIT 1/0-750	1	EA
UELBC-1-6	400414700	CONN ELBOW #1AL 15/25KV 600A	1	EA
	400318000	CABLE SEALING KIT #1-4/0	1	EA
UELBC-750-6	400418000	CONN ELBOW NLB 750 CU 600A	1	EA
	400318200	CABLE SEALING KIT 1/0-750	1	EA

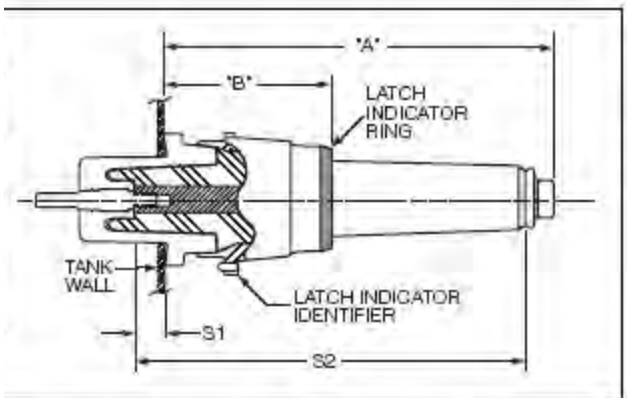
REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	CJM	ADDED ELBOW CU'S TO CABLE TERMINATIONS TABLE	08/10/21

NES

T&D CABLE STANDARDS
DEAD-FRONT EQUIPMENT
DEAD-FRONT 600A DEAD BREAK ELBOW



Cooper Power Systems Bushing Insert Cutaway

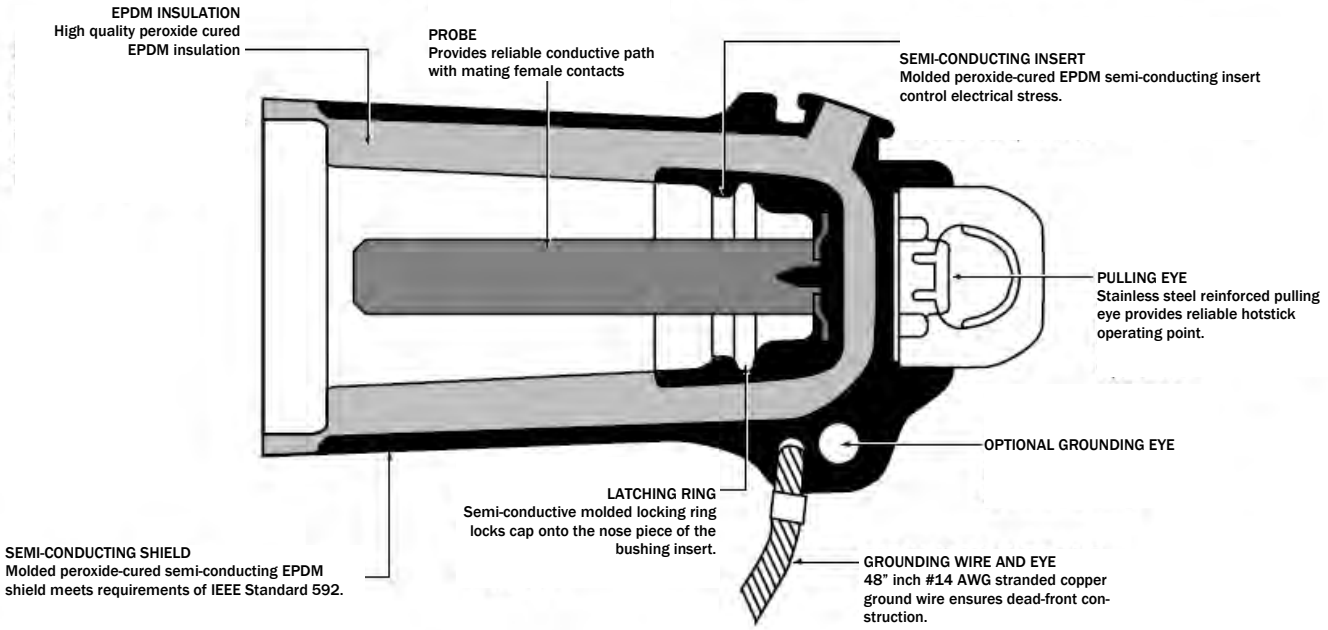


BUSHING INSERT				
MATERIAL LIST				
CU CODE	**STOCK**	**DESCRIPTION**	**QTY**	**UNIT**
UBINS200A	401073000	BUSHING INSERT 200A 25KV	1	ea

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

NES

T&D CABLE STANDARDS
DEAD-FRONT EQUIPMENT
200A 25KV BUSHING INSERT



Cooper Power Systems Insulating Cap Cutaway

GENERAL NOTES

This device must be installed on any unused bushing insert such as in termination cabinets when all the poles are not needed. Never leave a live bushing insert uncovered.

Never use this device in place of a dead front arrester in the last transformer on a circuit.

INSULATING CAP

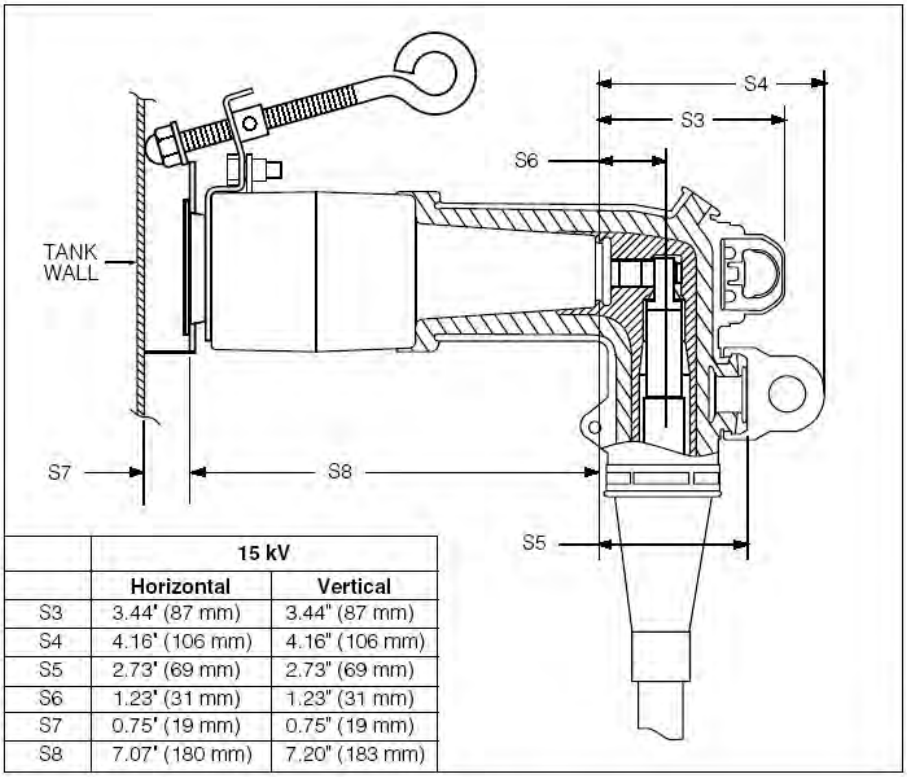
MATERIAL LIST

CU CODE	STOCK	DESCRIPTION	QTY	UNIT
UBINSCAP200A	401344000	UG BUSHING INSERT INSULATING CAP, 200A	1	EA
UBINSCAP600A	401034100	UG BUSHING INSERT INSULATING CAP, 600A	1	EA

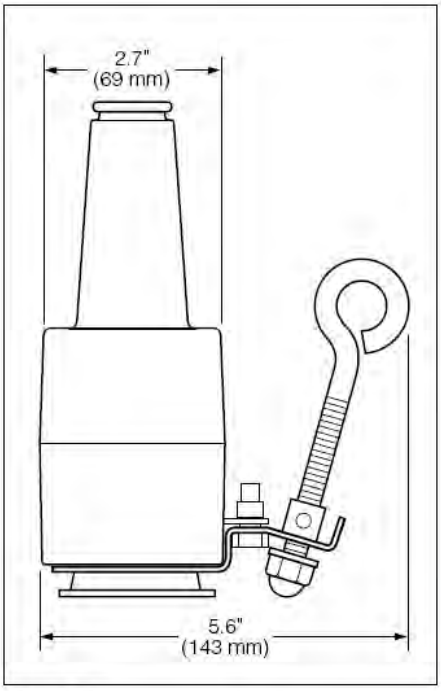
REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	CJM	ADDED 600A INSULATING CAP CU	5/18/21

NES

T&D CABLE STANDARDS
DEAD-FRONT EQUIPMENT
25KV INSULATING CAP



	15 kV	
	Horizontal	Vertical
S3	3.44" (87 mm)	3.44" (87 mm)
S4	4.16" (106 mm)	4.16" (106 mm)
S5	2.73" (69 mm)	2.73" (69 mm)
S6	1.23" (31 mm)	1.23" (31 mm)
S7	0.75" (19 mm)	0.75" (19 mm)
S8	7.07" (180 mm)	7.20" (183 mm)



GENERAL NOTES:

This feed through bushing is not used in engineering designs. It is typically used to temporarily ground a cable during maintenance.

STAND-OFF FEED THROUGH BUSHING INSERT (NON-DESIGNED ITEM)

MATERIAL LIST

CU CODE	STOCK	DESCRIPTION	QTY	UNIT
USTAOFF-FDHR	401078000	BUSHING STANDOFF FEED THROUGH 200A 25KV	1	EA

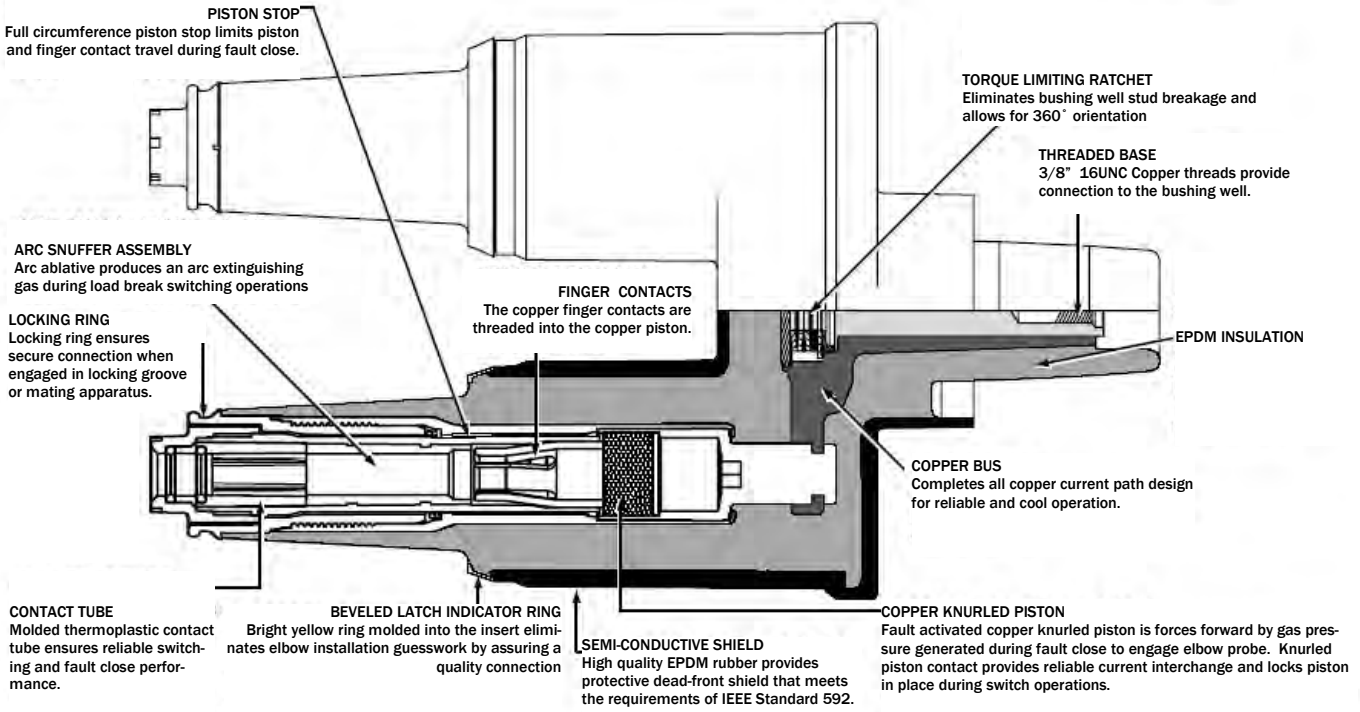
REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

NES

T&D CABLE STANDARDS

DEAD-FRONT EQUIPMENT

200A 25KV STANDOFF FEED THROUGH BUSHING



Cooper Power Systems Feed Through Bushing Insert Cutaway

GENERAL NOTES:

This device provides a convenient method to send a single phase circuit in two directions without havivg to install a terminating cabinet.

This device is only used in dead front single phase transformers.

The standard bushing insert is removed and the feed-through insert is installed.

FEED THROUGH BUSHING INSERT

MATERIAL LIST

CU CODE	STOCK	DESCRIPTION	QTY	UNIT
UBINS200A-F	401072000	BUSHING INSERT FEED-THROUGH 200A 25KV	1	EA

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

NES

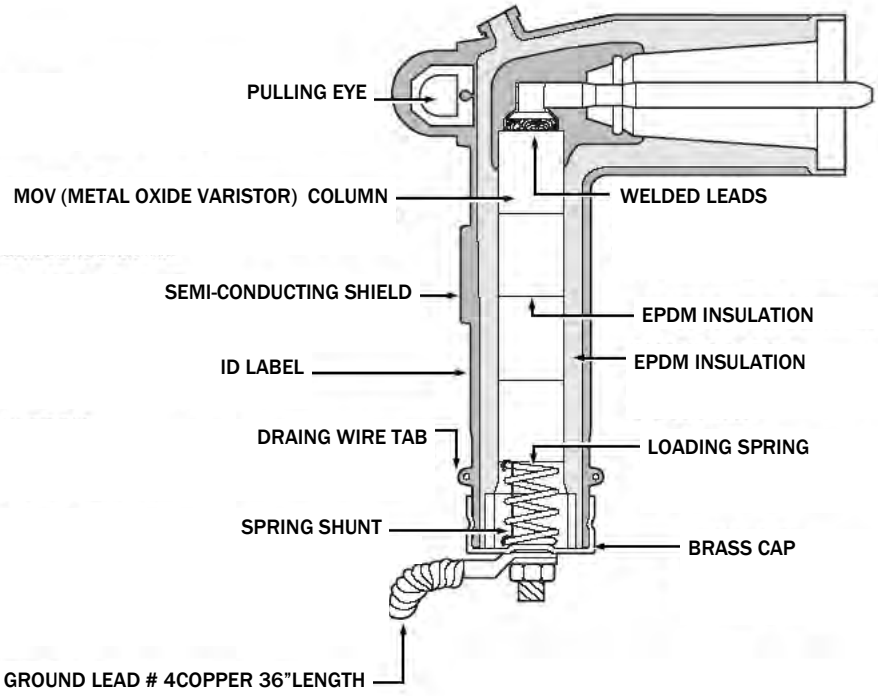
T&D CABLE STANDARDS

DEAD-FRONT EQUIPMENT
200A 25KV STANDOFF FEED THROUGH
BUSHING INSERT

GENERAL NOTES:

Install one arrester per phase at the end of any underground circuit.
These units may only be used with dead front transformers, dead front terminating cabinets and dead front switches equipped with 200A 25kV bushing inserts.

As of October 2005 all 4kV and 7.96kV transformers are ordered with 200A 25kV bushing inserts to simplify future conversion to 23.9kV system voltages. Elbow arresters equipped for these transformers are in inventory.



Cooper Power Systems Elbow Arrester Cutaway

DEAD-FRONT LIGTHNING ARRESTERS

MATERIAL LIST

CU CODE	STOCK	DESCRIPTION	SYSTEM VOLTAGE (kV)	QTY	UNIT
ULA3DF	140190100	SURGE ARRESTER 3KV, DF,TRANS TC, OR SWITCH	4.16	1	EA
ULA12DF	140190200	SURGE ARRESTER 12KV, DF,TRANS TC, OR SWITCH	13.8 and 7.96	1	EA
ULA18DF	140191000	SURGE ARRESTER 18KV, DF,TRANS, TC, OR SWITCH	23.9	1	EA

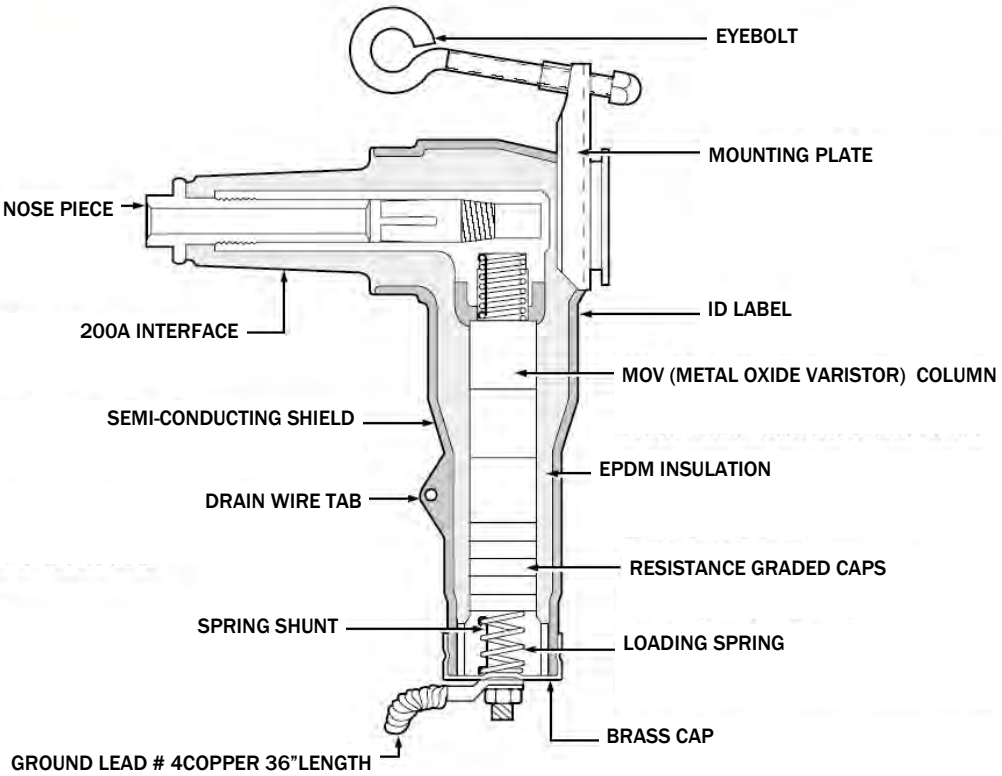
REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

NES

T&D CABLE STANDARDS
DEAD-FRONT EQUIPMENT
SURGE-ARRESTERS

GENERAL NOTES:

Parking stand arresters are only used as a temporary cable termination when a dead front transformer is taken out of service for repairs.



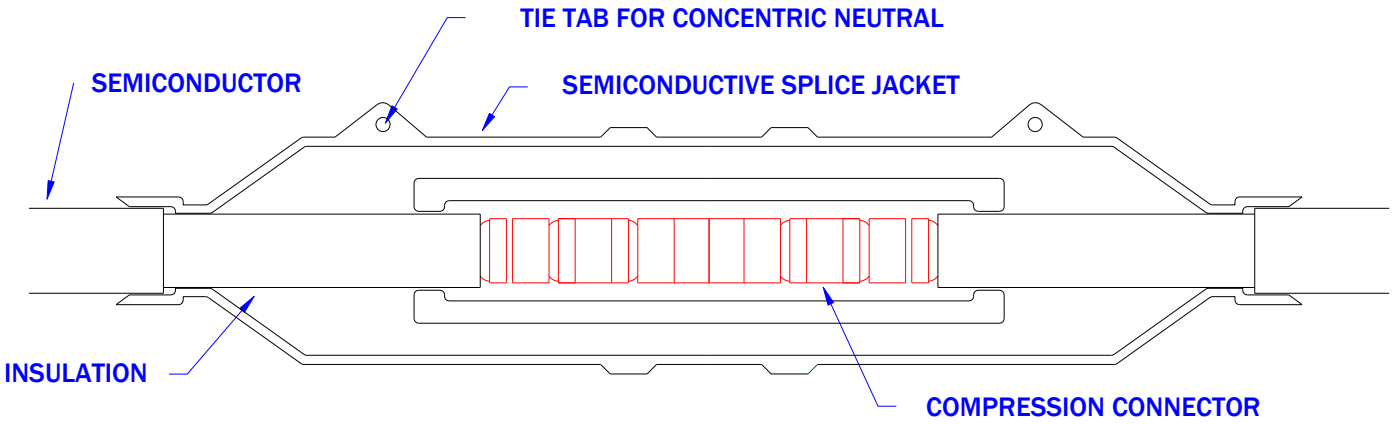
Cooper Power Systems Parking Stand Arrester Cutaway

PARKING STAND ARRESTER				
MATERIAL LIST				
CU CODE	STOCK	DESCRIPTION	QTY	UNIT
ULA18DF-PKS	140193000	SURGE ARRESTER 18KV DF PARKING STAND	1	EA

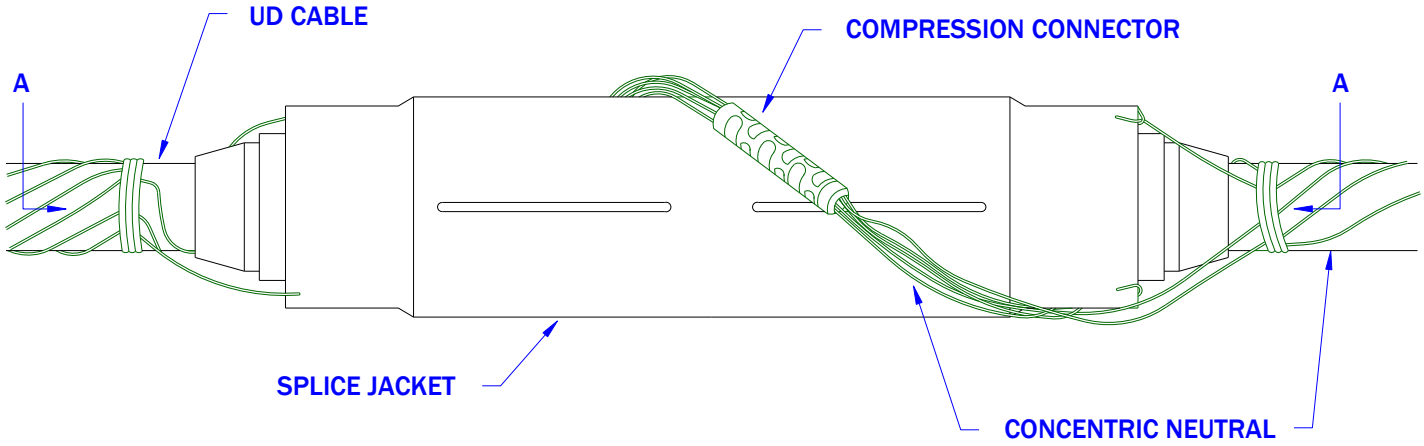
REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

NES

T&D CABLE STANDARDS
DEAD-FRONT EQUIPMENT
PARKING STAND ARRESTERS



SECTION AA



CONCENTRIC NEUTRAL IS NORMALLY BONDED TOGETHER USING A CABLE SEALING KIT. THE CABLE SEALING KIT IS LISTED IN THE MATERIALS, HOWEVER IS OMITTED FROM THIS VIEW.

STRAIGHT SPLICES

MATERIAL LIST

CU CODE	STOCK	DESCRIPTION	QTY	UNIT
UCN-SPL1	401983000	STRAIGHT PREFORMED SPLICE FOR USE WITH #1 AL. 25KV (JCN)	1	EA
UCN-SPL40	401985000	STRAIGHT PREFORMED SPLICE FOR USE WITH #40 AL/CU. 25KV (JCN)	1	EA
	400318200	CABLE ACCESSORY SEALING KIT, INCLUDES MASTIC STRIPS	1	EA
UCN-SPL500	401986000	STRAIGHT PREFORMED SPLICE FOR USE WITH #500 AL. 25KV (JCN)	1	EA
UCN-SPL750CU	401984000	STRAIGHT PREFORMED SPLICE FOR USE WITH #750 CU. 25KV (JCN)	1	EA

UG PLATE BOOK DRAWING (PRIMARY SPLICE).dwg

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

NES

T&D CABLE STANDARDS
CABLE COMPONENTS
STRAIGHT SPLICE

LIVE FRONT ARRESTERS

ARRESTER PLACEMENT.

1. ONE ARRESTER PER PHASE WIRE AT THE LAST TRANSFORMER, TERMINATING CABINET OR SWITCH OF AN UNDERGROUND CIRCUIT.
2. TWO ARRESTERS PER PHASE AT EVERY OPEN SWITCH POINT. ONE ARRESTER ON EACH SIDE OF THE OPENING.
3. IT IS OPTIONAL TO INSTALL ARRESTERS ON THE UNUSED JUNCTIONS OF A TERMINATING CABINET WHERE THE CABLE LOOPS THROUGH THE JUNCTIONS.
4. RISER CLASS ARRESTERS SHOULD BE USED ON THE 23.9kV SYSTEM RISER POLES.
5. INSTALL ONE ARRESTER PER PHASE ON ANY DEVICE PLACED IN A CIRCUIT THAT DIPS FROM OVERHEAD TO UNDERGROUND THEN BACK TO OVERHEAD.

NOTE:

These arresters may vary in appearance due to the number of design changes over time .

LIVE-FRONT LIGTHNING ARRESTERS

MATERIAL LIST

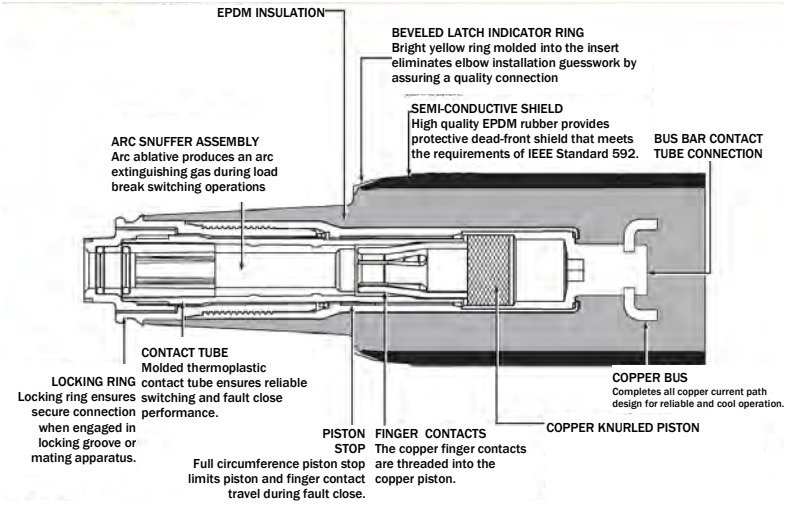
CU CODE	STOCK	DESCRIPTION	SYSTEM VOLTAGE (kV)	QTY	UNIT
ULA3LF	140120000	SURGE ARRESTER 3KV, LV,TRANS AND SWITCH	4.16	1	EA
ULA12LF	140180000	SURGE ARRESTER 12KV, LF,TRANS AND SWITCH	13.8 and 7.96	1	EA
ULA18LF	140320000	SURGE ARRESTER 18KV, LF,TRANS	23.9	1	EA
ULA18LF-SW	140310000	SURGE ARRESTER 18KV, LF SWITCH	23.9	1	EA

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

NES

T&D CABLE STANDARDS
LIVE-FRONT EQUIPMENT
SURGE ARRESTERS

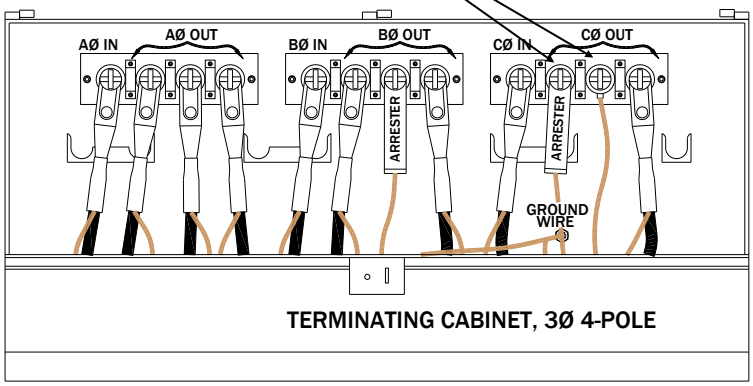
Load Break Module. The three position or pole is pictured. This unit is stocked only in the four position module. Two position modules are also available.



Cooper Power Systems Load Break Module Arrester Cutaway

GENERAL NOTES:

Junctions may be used to hold elbow arresters, insulating caps as well as cable elbows.
Each position must have an accessory mounted before the circuit is energized. The junctions do not provide the necessary insulation to maintain circuit integrity and dead-front safety without the attachments.



TERMINATING CABINET, 3Ø 4-POLE

4 POSITION LOAD BREAK MODULE FOR TERMINATING CABINETS				
MATERIAL LIST				
CU CODE	STOCK	DESCRIPTION	QTY	UNIT
ULBMOD4POLE	401090000	PAD MOUNTED TERMINATING CABINET 3 PHASE 4 POLE	1	ea

UG PLATE BOOK DRAWING (3P4P TERMINATING CABINET INSTALLED).dwg

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

NES

T&D CABLE STANDARDS
DEAD-FRONT EQUIPMENT
TERMINATING CABINET CABLE JUNCTION

Small Core FCI Module

Large Core FCI Module

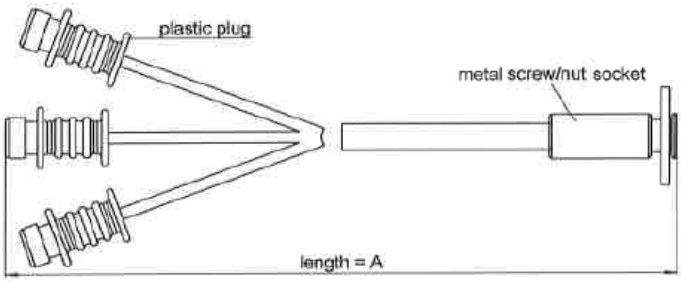
OPERATING SPECS:

MAX VOLTAGE:	46kV L-L
MINIMUM TRIP CURRENT:	200A @200 MSEC.
LOAD TRACKING START:	50 AMPS
TEMP RANGE:	-40 to +85 Deg. C
CURRENT WITHSTAND:	25kA, 170 MSEC
ACCURACY:	+10% @20 DEG. C
CURRENT RESET:	5 Amps (small) /10Amps (large)
TIME RESET:	4 Hours

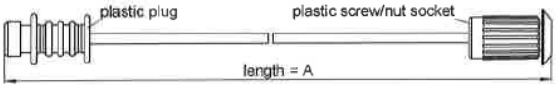
FAULT CURRENT INDICATOR NOTES:

1. FCI MODULES ARE FOR USE IN BOTH 1 PHASE AND 3 PHASE (DELTA/WYE) NSTALLATIONS.
2. FCI MODULE CAN BE MOUNTED ON ELBOWS OR CABLE.
3. FCI MODULE RESET PRE-CONFIGURED FOR TIME + CURRENT BASED OPERATION.
4. UNITS HAVE SELF-ADJUSTING TRIP RATING TO LOAD CURRENT (50 Amps min.)
5. UNITS ARE SELF POWERED W/ NO FIELD ADJUTMENTS OR CALIBRATION REQUIRED.
6. TO BE INSTALLED W/ STANDARD HOT STICK TOOLS.
7. EACH KIT CONTAINS: FCI MODULE & FIBER-OPTIC CABLE
8. INCLUDES LITHIUM BATTERY W/ 20 YEAR SHELF-LIFE.
9. REFLECTIVE FCI LABELS ARE STOCKED AS SEPARATE ITEMS.

Remote Fiber Optic

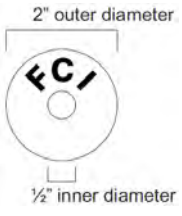


3 Phase Fiber-Optic Cable (6 FT.)



1 Phase Fiber-Optic Cable (6 Ft.)

FCI Reflective Label



MINOR MATERIAL LIST			
STOCK #	DESCRIPTION	QTY	UNIT
465260056	FCI REFLECTIVE LABEL (MOUNTED OVER PANEL LED OPENING)	1	EA

FAULT CURRENT INDICATOR KIT W/ FIBER OPTIC LED MATERIAL LIST						
CU CODE	STOCK #	DESCRIPTION	KIT	UNIT	FCI MODULES	Fiber Optic Cable
FCI-1LARGE	346245030	UG FCI 1 PH LG DIAM FOR 500MCM & ABOVE	1	EA	1	(1) - 1 Phase
FCI-1SMALL	346245020	UG FCI 1 PH SMALL DIAM FOR 4/0 & BELOW	1	EA	1	(1) - 1 Phase
FCI-3LARGE	346245010	UG FCI 3 PH LG DIAM FOR 500MCM & ABOVE	1	EA	3	(1) - 3 Phase
FCI-3SMALL	346245000	UG FCI 3 PH SMALL DIAM FOR 4/0 & BELOW	1	EA	3	(1) - 3 Phase

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	CWS	CREATED	7/21/21

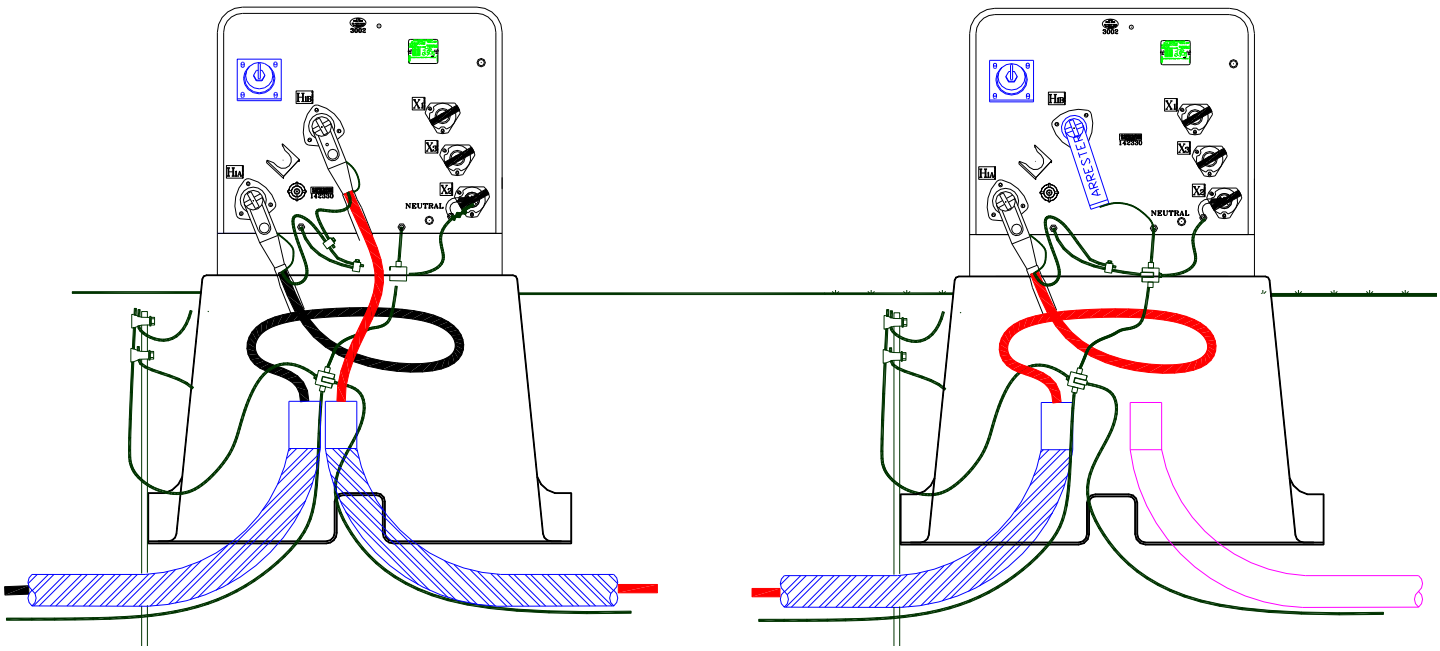
NES

T&D CABLE STANDARDS
CABLE COMPONENTS—1 PHASE &
3 PHASE FAULT CURRENT INDICATORS

CABLE INSTALLATION STANDARDS

APPROVALS			
ISSUE DATE	ENGINEER	SUPERVISOR	MANAGER
2/15/06	FRED FRITON	RON DAVIDSON	NICK THOMPSON
12/14/17	WES SUDDARTH	RON DAVIDSON	NICK THOMPSON
04/22/21	Chris McReynolds		

TABLE OF CONTENTS



PRIMARY CABLE LOOP:

A large loop of primary cable should be installed at the end of each cable run. This will provide slack for replacement of failed terminations. Additionally, during a dig-in, this could prevent damage to the equipment. This is not a mandatory requirement, however it should be installed wherever space permits. Follow all cable minimum bending radius requirements when installing the loop.

At every installation point there must be enough slack in the cable to prevent temperature related contraction of the cable from pulling off an elbow or otherwise damaging the device.

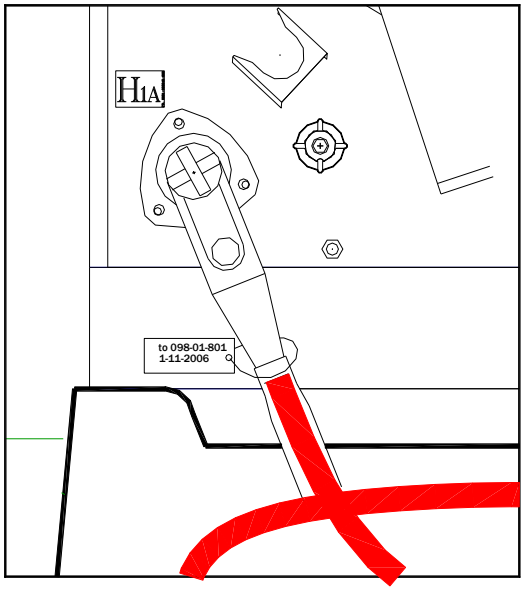
Although only a single phase transformer installation is pictured, these rules apply to all underground installations.

It is critical that cables spliced in a manhole have this additional cable because of the high failure rate of primary cable splices.

CABLE TAGS:

Every cable should be tagged with the number of the device or manhole that is next on the circuit. The tag should also have the installation date of the cable embossed on the tag. The table below indicates a code for each of the common devices.

Doing this is especially helpful during trouble calls. It speeds location of the next transformer and confirms information on the maps. Having the cable installation date will help determine if the cable should be replaced.



Device	Tag Code
Transformer	Number only
Terminating Cabinet	T
Manhole	M
Switch	S
Riser Pole	R

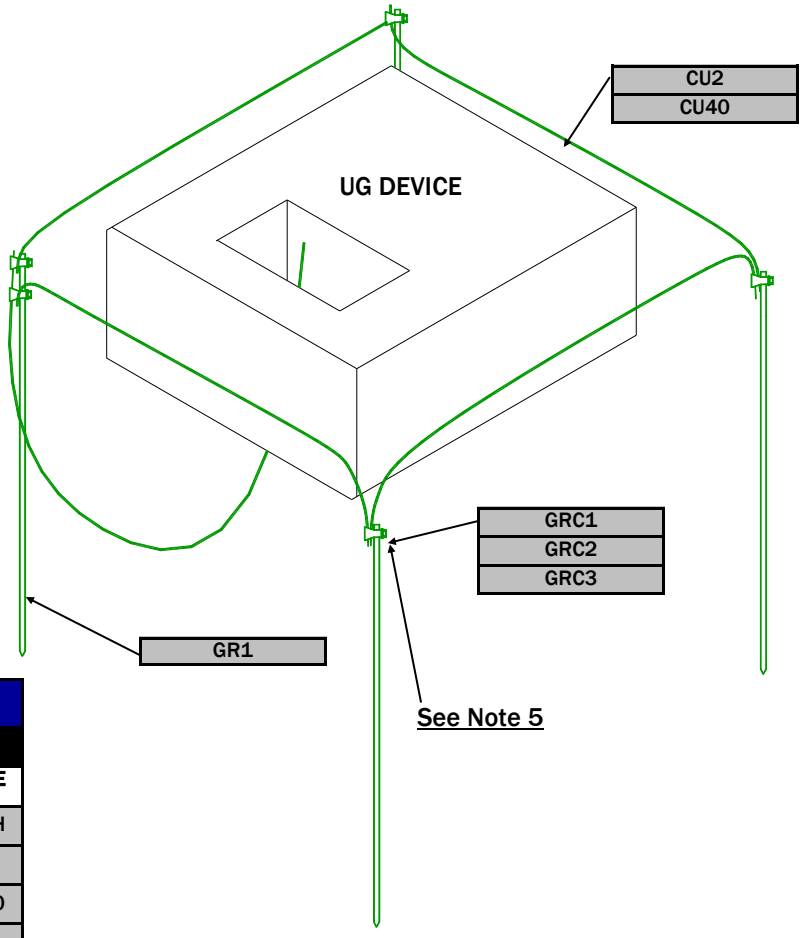
NOTE:
THIS PLATE APPLIES TO ALL TRANSFORMERS, TERMINATING CABINETS, MANHOLES, PULL BOXES AND SWITCHES. FOR SIMPLICITY ONLY A SINGLE PHASE TRANSFORMER IS PICTURED.

UG PLATE BOOK DRAWING (CABLE LOOPS AND TAG).dwg

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

T&D TERMINATING STANDARDS
CABLE INSTALLATION
CABLE LOOPS AND TAGS

USE THE FOLLOWING TABLE TO ADD LABOR AND WIRE TO THE JOB FOR THE GROUND RING		
C.U.	ULAB-ELECT	UCCS40
EQUIPMENT TYPE	INSTALL HOURS	QUANTITY
3 PHASE PAD	10	50
1 PHASE PAD	8	20
SWITCH	10	50
MANHOLE LG	10	60
MANHOLE OCT	10	60
Vault	n/a	100' to contractor
3 phase TC	10	25'
1 phase TC	8	20
Pull Box	N/A	N/A
Metal Enclosed SW	12	As Required.



PAD MOUNTED EQUIPMENT GROUNDING ITEMS		
MATERIAL LIST		
STOCK	DESCRIPTION	CODE
011000000	CABLE CU BHD 2 7S	CU2H
011210000	CABLE CU BSD 2 7S	CU2
011260000	CABLE CU BSD 4/0 19S	CU40
184380000	ROD GROUND CW 5/8X8	GR1
220500000	CLAMP GR ROD 8-2 CU	GRC1
223480000	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	GC1
223486000	GRD CONN # 2 TO 4/0 CU CABLE AMP WRENCH-LOK	GC2
223490000	GROUND CONNECTOR 1/0, 2/0 CU. TO 4/0 CU OR 5/8" GND ROD	GRC2
223494000	GRD CONN 4/0 TO 4/0 MCM CU. CABLE AND 4/0 MCM CU.TO 5/8" GRD ROD	GRC3
223496000	GRD CONN 500 TO 4/0 MCM COPPER CABLE.	GC5
223498000	GRD CONN 500 MCM TO 500 MCM CU. CABLE	GC6

COUNTERPOISE GROUND WIRE SIZE			
MATERIAL LIST			
CABLE CU	CABLE SIZE	GROUND WIRE SIZE	GROUND WIRE CU
UCAL1	1	2CU	UCCH2
UCAL1-3CP	1	2CU	UCCH2
UCAL40-3CP	4/0	2CU	UCCH2
UCAL500	500	4/0 CU	UCCS40
UCCU40-3CP	4/0CU	2 CU	UCCH2
UCCU500	500MCM CU	4/0CU	UCCS40
UCCU750	750MCM CU	4/0CU	UCCS40
UCCU750 –1/C	750MCM CU	500MCM CU	

General Notes:

1. Ground ring is required on all equipment energized by underground **primary** cables.
2. The ground ring must be tied to the rebar at each corner of a concrete pad.
3. Ring is to be 12" deep and 12" away from the device.
4. Ground rods may be driven at angle.
5. The ground wire must be tied before attaching to the ground rod or installed in the same grounding clamp.

Communications companies that install equipment within touching distance of NES's equipment are required to bond to NES's grounding system.

UG PLATE BOOK DRAWING (GROUND LOOP).dwg

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

NES

T&D TERMINATING STANDARDS

GROUND RING INSTALLATION FOR BELOW GRADE & PAD MOUNTED EQUIPMENT

U3P4P
U2P4P

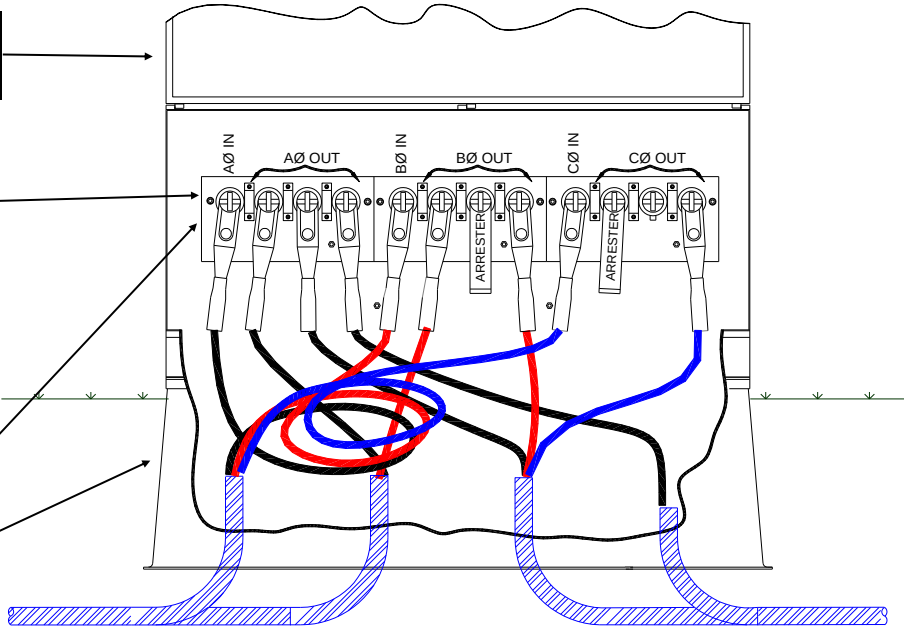
ANY COMBINATION OF THE FOLLOWING DEVICES MAY BE INSTALLED ON THE LOAD BREAK MODULE.

INSTALL A VOLTAGE APPROPRIATE ARRESTER WHEN A SINGLE TERMINAL IS OPEN. INSTALL A BUSHING INSERT CAP ON ANY ADDITIONAL FREE TERMINAL.

- UELBC-1
- UELBC-4/0
- ULA18DF
- ULA12DF
- ULA3DF
- UBINSCAP200A

INCLUDED WITH CABINET ← ULBMOD4POLE

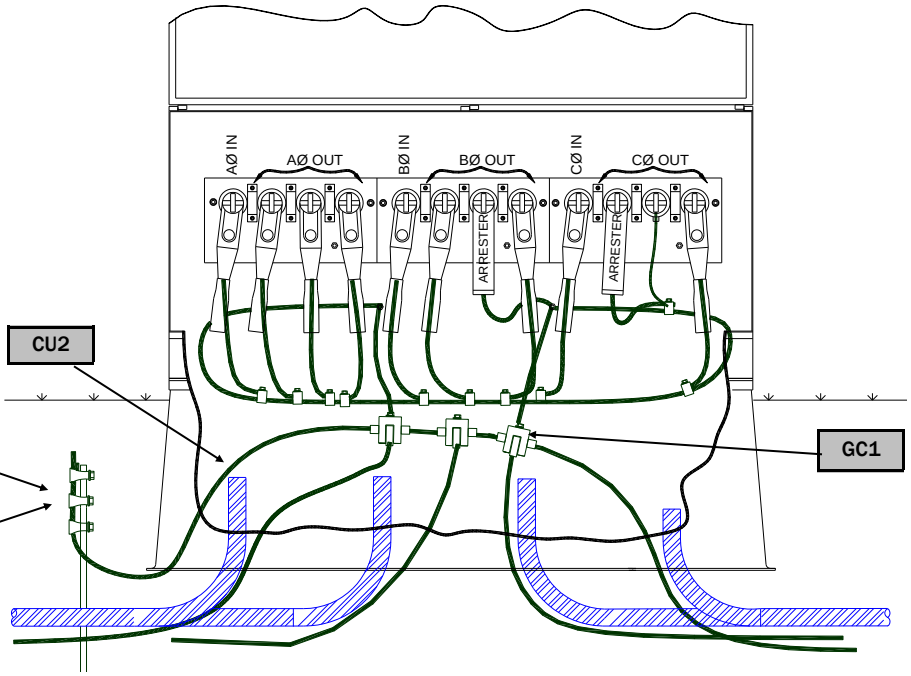
NES PROVIDED: CUSTOMER INSTALLED ← U3P4P-BASE



HIGH VOLTAGE CABLE ILLUSTRATION

PAD MOUNTED EQUIPMENT GROUNDING ITEMS		
MATERIAL LIST		
STOCK	DESCRIPTION	CODE
011210000	CABLE CU BSD 2 7S	CU2
011260000	CABLE CU BSD 4/0 19S	CU40
184380000	ROD GROUND CW 5/8X8	GR1
220500000	CLAMP GR ROD 8-2 CU	GRC1
223480000	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	GC1

See Ground Ring Installation



GROUNDING ILLUSTRATION

General Notes

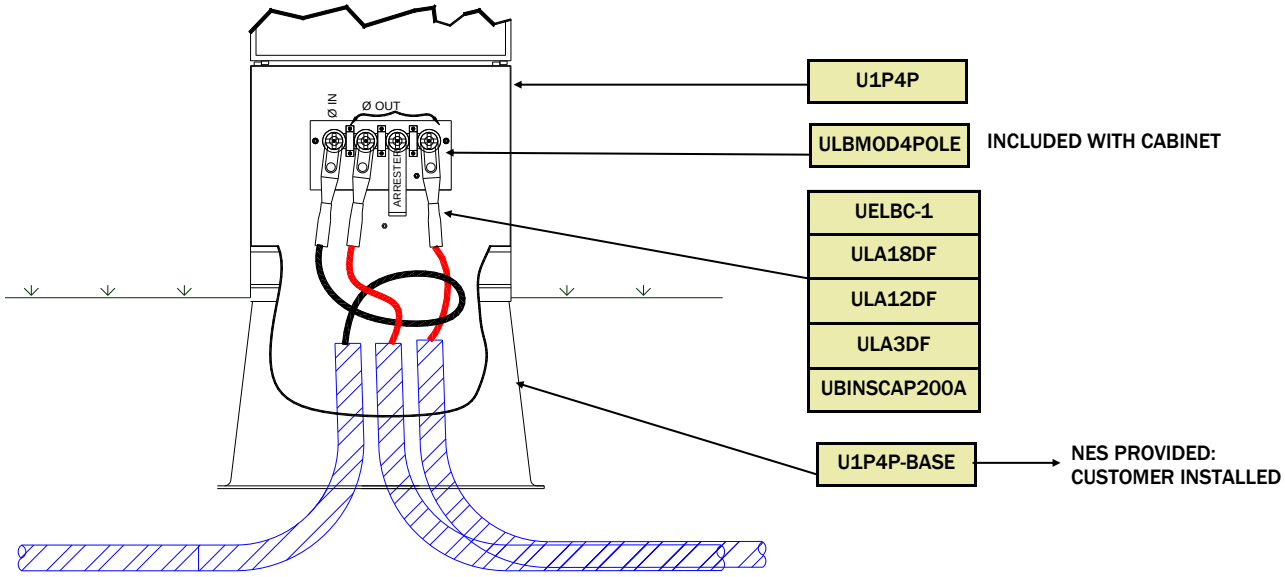
1. When connecting the concentric neutrals to ground leave adequate slack to operate the elbows.
2. Tie the concentric neutrals together before connecting to the ground loop. This is necessary to ensure uniform neutral conductivity.
3. Ground ring is not pictured.
4. Elbow, arrester and bushing cap bleed wires are not shown.
5. Because of the similarity between the three phase and two phase units, the two phase units are not shown. Both units use the same base and attachments.
6. All junction points must be covered before the unit is energized.

UG PLATE BOOK DRAWING (3P4P TERMINATING CABINET).dwg

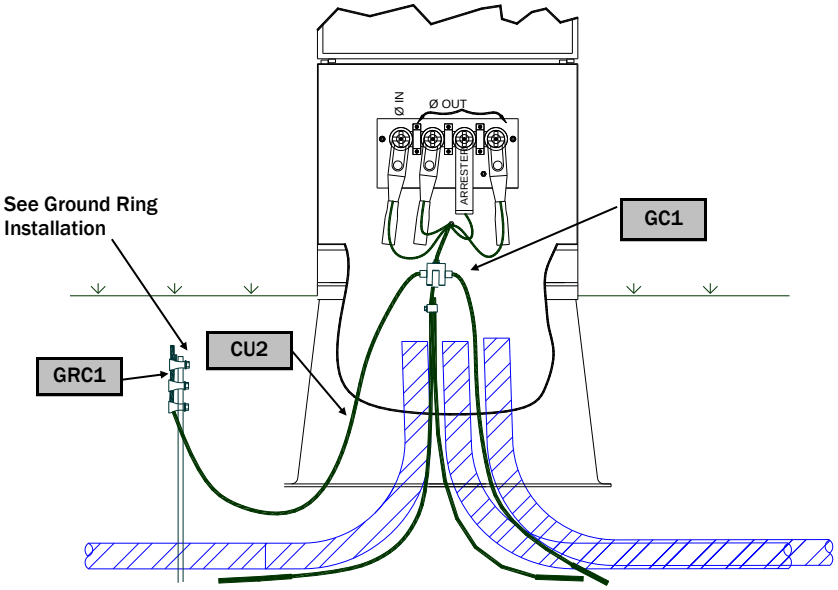
REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

NES

T&D TERMINATING STANDARDS
INSTALLATION DIAGRAM
2 & 3 PHASE TERMINATING CABINETS



HIGH VOLTAGE CABLE ILLUSTRATION



GROUNDING ILLUSTRATION

PAD MOUNTED EQUIPMENT GROUNDING ITEMS		
MATERIAL LIST		
STOCK	DESCRIPTION	CODE
011210000	CABLE CU BSD 2 7S	CU2
011260000	CABLE CU BSD 4/0 19S	CU40
184380000	ROD GROUND CW 5/8X8	GR1
220500000	CLAMP GR ROD 8-2 CU	GRC1
223480000	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	GC1

General Notes

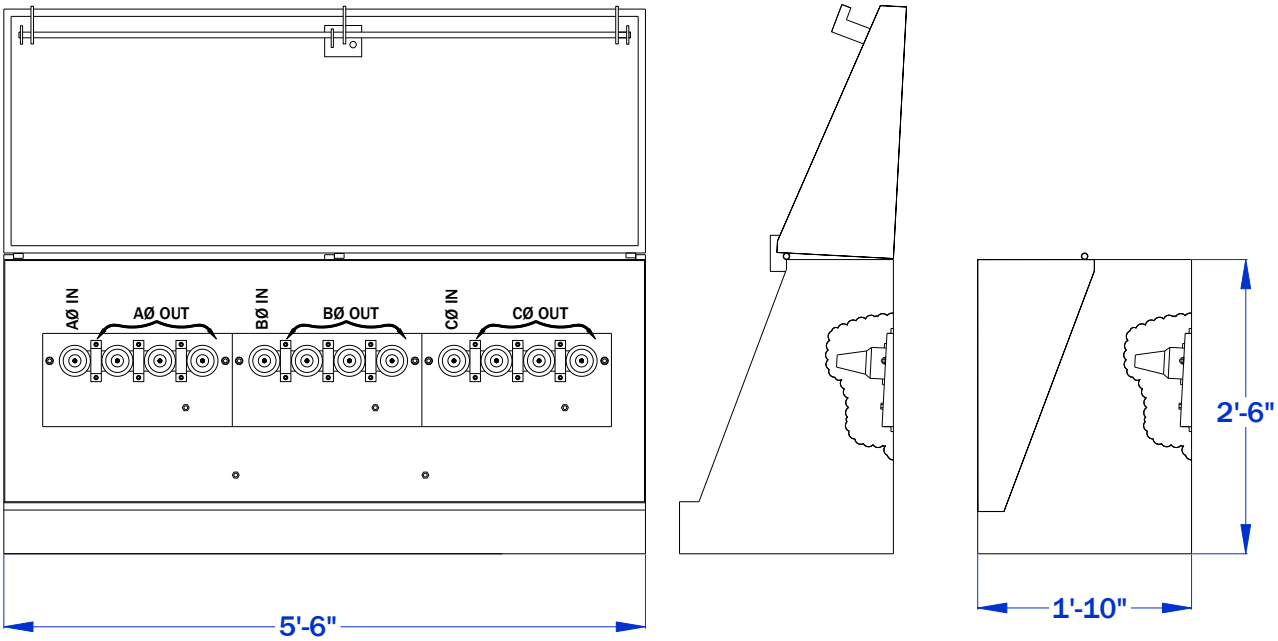
1. When connecting the concentric neutrals to ground leave adequate slack to operate the elbows.
2. Tie the concentric neutrals together before connecting to the ground loop. This is necessary to ensure uniform neutral conductivity.
3. Ground ring is not pictured.
4. Elbow and bushing cap bleed wires are not shown.
5. All junction points must be covered before the unit is energized.

UG PLATE BOOK DRAWING (1P4P TERMINATING CABINET).dwg

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

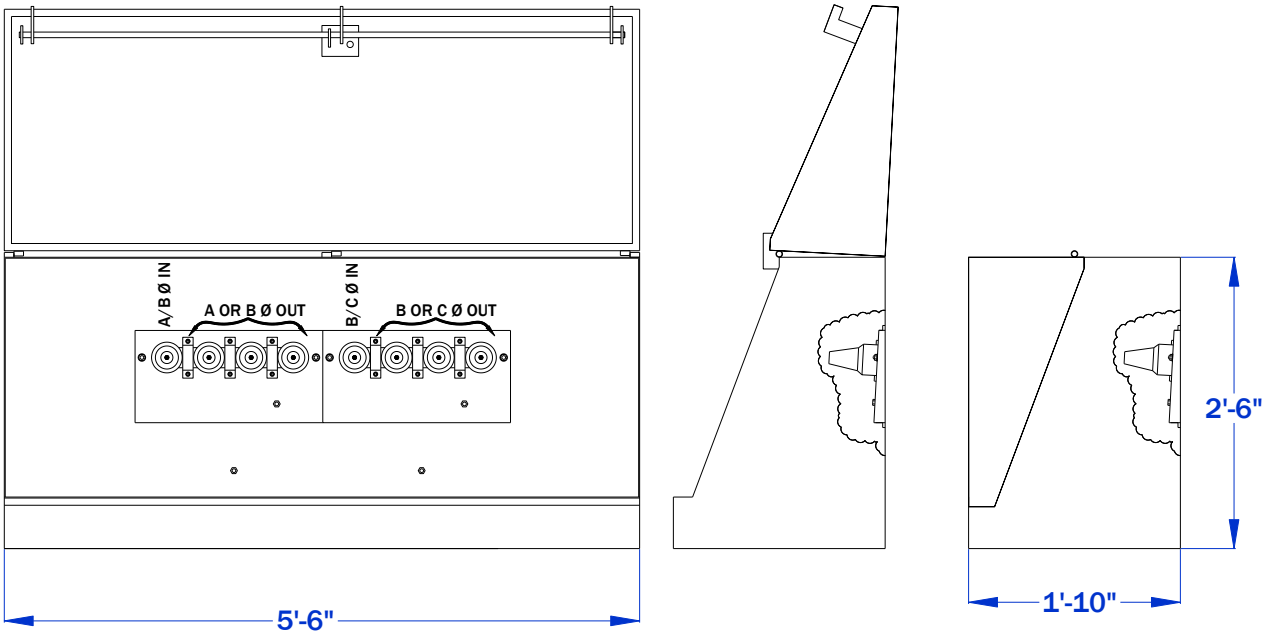
NES

T&D TERMINATING STANDARDS
INSTALLATION DIAGRAM
SINGLE PHASE TERMINATING CABINETS



UG PLATE BOOK DRAWING (3P4P TERM CABINET CU).dwg

THREE PHASE, FOUR POLE TERMINATING CABINET				
MATERIAL LIST				
CU CODE	STOCK	DESCRIPTION	QTY	UNIT
U3P4P	966005000	PAD MOUNTED TERMINATING CABINET 3 PHASE 4 POLE	1	EA



UG PLATE BOOK DRAWING (2P4P TERM CABINET CU).dwg

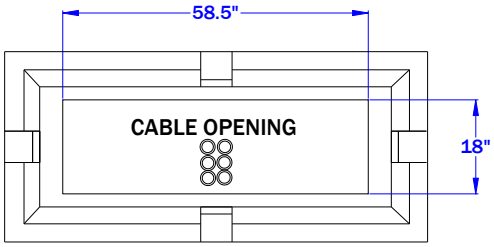
TWO PHASE, FOUR POLE TERMINATING CABINET				
MATERIAL LIST				
CU CODE	STOCK	DESCRIPTION	QTY	UNIT
U2P4P	965982000	PAD MOUNTED TERMINATING CABINET 2 PHASE 4 POLE	1	EA

NOTE:
Cabinet designs may vary by manufacturer. The designs shown are only to illustrate the general appearance and overall dimensions.
NES specifications require the cabinets be constructed of 12 gage steel and that the 25kV 200A load-break modules be furnished with the cabinets.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	CJM	UPDATED 3 PHASE TABLE TITLE	4/22/21

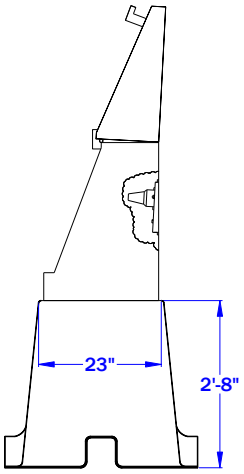
NES

T&D TERMINATING STANDARDS
MATERIAL LISTING
2 & 3 PHASE TERMINATING CABINETS

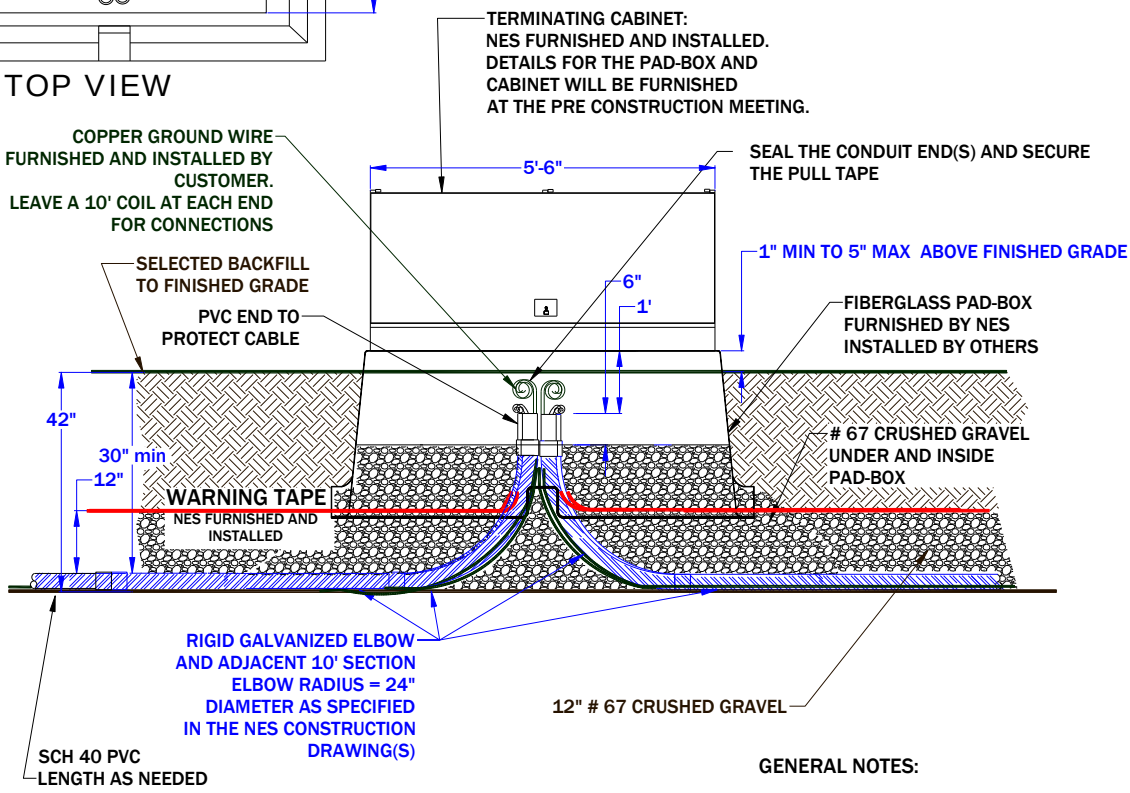


TOP VIEW

NOTE:
ALL MATERIALS, LABOR AND EQUIPMENT NECESSARY TO COMPLETE EXCAVATION, CONDUIT INSTALLATION, AND BACKFILLING SHALL BE FURNISHED BY THE CUSTOMER OR THE CUSTOMER'S REPRESENTATIVES HEREIN REFERRED TO AS OTHERS OR CUSTOMER.



END VIEW



GENERAL NOTES:

The pad is normally installed by the developer's contractor during the utility installation phase of the project.

Grounding is performed by NES crews.

THREE PHASE, FOUR POLE AND TWO PHASE, FOUR POLE TERMINATING CABINET BASE (UGS-0016)				
MATERIAL LIST				
CU CODE	STOCK	DESCRIPTION	QTY	UNIT
U3P4P-BASE	060015000	TERM CAB BASE FOR 2P OR 3P 4 POLE	1	EA

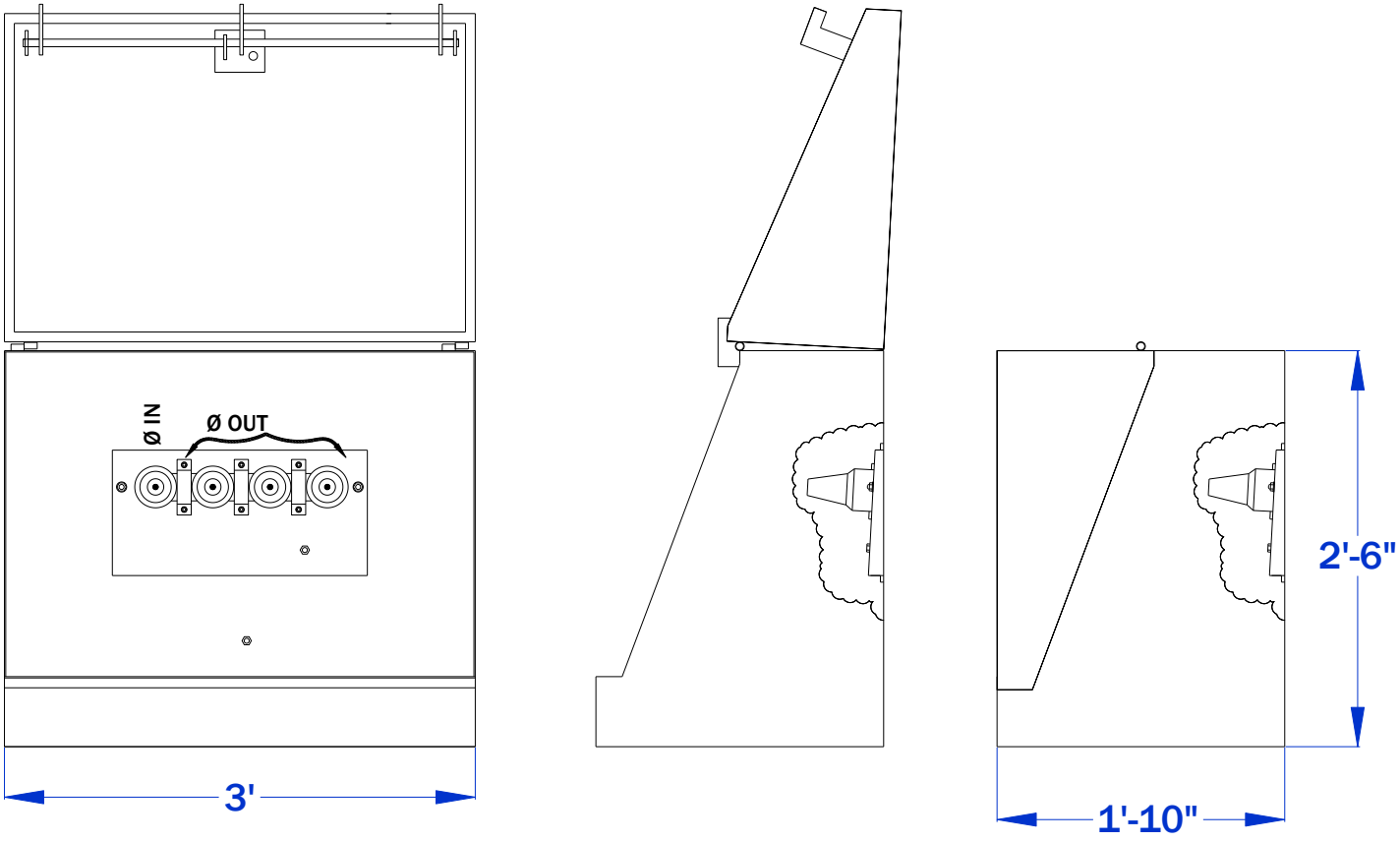
GROUNDING ITEMS			
TRUCK STOCK MATERIAL LIST			
STOCK	DESCRIPTION	QTY	UNIT OF ISSUE
011210000	CABLE CU BSD 2 7S	20	FT
184380000	ROD GROUND CW 5/8X8	4	EA
223490000	GRD CONN 1/0 OR 5/8" GND ROD	8	EA
223480000	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	2	EA

UG PLATE BOOK DRAWING (UGS0016 3P TERM CAB BASE).dwg

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	WMS	UPDATED CONDUIT CONFIGURATION	12/14/17

NES

T&D TERMINATING STANDARDS
MATERIAL LISTING
2 & 3 PHASE TERMINATING CABINET BASE



SINGLE PHASE, FOUR POLE TERMINATING CABINET				
MATERIAL LIST				
CU CODE	STOCK	DESCRIPTION	QTY	UNIT
U1P4P	965978000	PAD MOUNTED TERMINATING CABINET 1 PHASE 4 POLE	1	EA

NOTE:
Cabinet designs may vary by manufacturer. The designs shown are only to illustrate the general appearance and overall dimensions.
NES specifications require the cabinets be constructed of 12 gage steel and that the 25kV 200A load break modules be furnished with the cabinets.

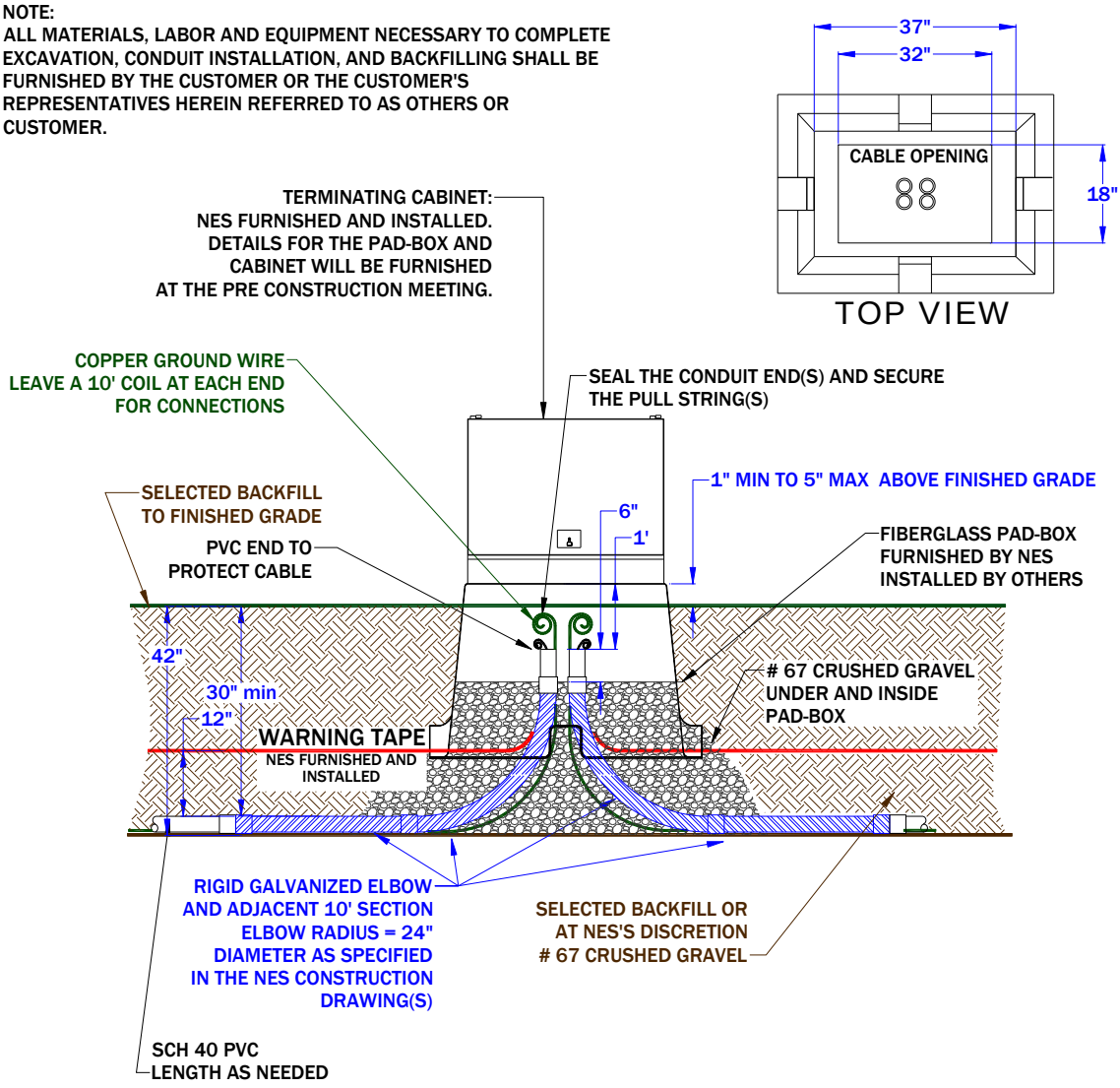
UG PLATE BOOK DRAWING (1P4P TERM CABINET CU).dwg

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

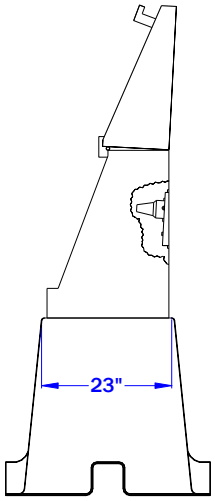
NES

T&D DRAWING STANDARDS
DRAWING SYMBOLS
POLES AND ANCHORS

NOTE:
ALL MATERIALS, LABOR AND EQUIPMENT NECESSARY TO COMPLETE EXCAVATION, CONDUIT INSTALLATION, AND BACKFILLING SHALL BE FURNISHED BY THE CUSTOMER OR THE CUSTOMER'S REPRESENTATIVES HEREIN REFERRED TO AS OTHERS OR CUSTOMER.



TOP VIEW



END VIEW

BASE FOR SINGLE PHASE, FOUR POLE TERMINATING CABINET Drawing (UGS0018)				
MATERIAL LIST				
CU CODE	STOCK	DESCRIPTION	QTY	UNIT
U1P4P-BASE	060010000	TERM CAB BASE FOR 1P HASE 4 POLE TERMINATING CABINET	1	EA

GENERAL NOTES:

The pad is normally installed by the developer's contractor during the utility installation phase of the project.

GROUNDING ITEMS			
TRUCK STOCK MATERIAL LIST			
STOCK	DESCRIPTION	QTY	UNIT OF ISSUE
011210000	CABLE CU BSD 2 7S	20	FT
184380000	ROD GROUND CW 5/8X8	4	EA
223490000	GRD CONN 1/0 OR 5/8" GND ROD	4	EA
223480000	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	4	EA

UG PLATE BOOK DRAWING (UGS0018 1P TERM CAB BASE).dwg

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	MTE	REVISED GROUND WIRE NOTE	3/12/18

T&D DRAWING STANDARDS
MATERIAL LISTING
1 PHASE TERMINATING CABINET BASE

TRANSFORMER STANDARDS

APPROVALS			
ISSUE DATE	ENGINEER	SUPERVISOR	MANAGER
11/25/19	CEDRIC SHORT	RON DAVIDSON	VAUGHAN CHARLES
3/18/21	CEDRIC SHORT	RONALD REASONOVER	VAUGHAN CHARLES
9/2/22	BRAD MCKELVEY		

TABLE OF CONTENTS

TABLE OF CONTENTS

REV.	ENG.	DESCRIPTION OF CHANGE	DATE

Voltage Code

Code	Primary Voltage	Secondary Voltage
02	PM 2400/4160Y LF	120/240
03	PM 2400/4160Y DF	120/240
04	2400/4160Y pole type	120/240
05	4160/2400 dry	240/120
06	2400/4160Y	240/480
08	4160p	120/240
10	4160p	208Y/120
12	4160p	208Y/120
13	PM 4160Y DF	208Y/120
14	4160Y	240
15	PM 4160Y LF	208Y/120
16	4160Y	240X480
17	PM 4160Y LF	480Y/277
18	4160p	480Y/277
19	PM 4160Y DF	480Y/277
20	11,800/13,200	2300/4000
22	PM 13,800Y/7970 LF	120/240
23	PM 13,800Y/7970 DF	120/240
24	13,200Y/7620	240/480
25	13,200Y/7620	208Y/120
26	13,200/12,540/11,880	120/240/480
27	PM 13,200Y/7620 DF	208Y/120
28	13,200	120/240
29	13,200	125/250
30	13,200	220/440
31	13,200	240
32	13,200	240/480
33	13,200	240x480
34	13,200	230/460
35	13,200	277
37	13,200	440
38	13,200	460
39		
40	13200 pole mt	2.4/4.16Y or 2.52/4.36Y kV
41	13200 platform	2.4/4.16Y or 2.52/4.36Y kV
42	13200 other	2.4/4.16Y or 2.52/4.36Y kV
44	13,200/22,860Y no tap	120/240
46	13,800	120/240
47	13,800	125/250
48	13,800/23,900Y	125/250
49	13,800p	208Y/120
50	13,800	230/460
51	13,800	230x460

Code	Primary Voltage	Secondary Voltage
52	13,800	240/480
53	13,800	240x480
54	13,800/23,900	277
55	13,800p	240x480
56	PM 13,800Y/7960 DF	208Y/120
57	13,800	277
58	13,800/23,900	277
59	13,800	460
60	13,800	480
61	PM 13,800pLF	208Y/120
62	13,800p	480Y/277
63	PM 13800 LF	480Y/277
64	13800 pole mt	2400/4160Y or 2520/4360Y
65	13800 platform	2400/4160Y or 2520/4360Y
66	13800 other	2400/4160Y or 2520/4360Y
67	13800GrdY/7970	480/240
68	14,400	120/240
69	14,400	125/250
70	14,400	208Y/120
71	14,400	240/480
72	14,400	240x480
74	14,400	277
75	14,400/24,940	277
76	14400 pole mt	2400/4160Y or 2520/4360Y
77	14400 platform	2400/4160Y or 2520/4360Y
78	14400 other	2400/4160Y or 2520/4360Y
79	PM 13,800/23,900Y LF	120/240
80	14,400/24,940Y	120/240
81	PM 13,800/23,900Y DF	120/240
82	14,400/24,940Y	240/480
83	PM 13,800/23,900Y Dry	240/120
84	23,900Y/13,800	208Y/120
86	23,900Y/13,800	240X480
87	23900GrdY/13800	480/240
88	23,900Y/13,800	480Y/277
89	PM 14.4/24.9grdY/14.4	7.96/13.8grdy/7.96
90	23,900Y/13,800	7.97x13.8
91	DV 14.4/24,9Y/14,4 DRY VAULT	208Y/120
92	24,940Y/14,400	120/240
93	PM 14.4/24,9Y/14,4 DF	208Y/120
94	PM 14.4/24,9Y/14,4 LF	208Y/120
95	PM 14.4/24,9Y/14,4 DF	480Y/277
96	PM 14.4/24,9Y/14,4 LF	480Y/277
97	PM 14.4/24,9Y/14,4 LF	4,160/2,400
98	PM 14.4/24,9Y/14,4 DF	4,160/2,400
99	DV 13.8/23.9GRDY/13.8 DRY VAULT	480Y/277

kVA Code

06	5
12	10
14	15
16	25
18	30
20	37.5
22	45
24	50
26	75
28	100
30	112.5
32	150
34	167
36	200
38	225
40	250
43	300
46	333
49	400
52	500
55	667
58	750
61	833
64	1,000
67	1,250
70	1,500
73	1,667
76	2,000
79	2,500
80	3,000
82	3,750
85	5,000
90	7,500
92	10,000

Transformer Type Code

91	Single Phase Pole Type	94	Three Phase Pad-mounted
92	Single Phase Pad-mounted	95	Three Phase Submersible
93	Three Phase Pole Type	97	Three Phase Dry Vault

TRANSFORMER TYPE 92 = SINGLE PHASE PAD MOUNT
TRANSFORMER VOLTAGE 81 = PAD MOUNTED 14,400/24,900Y DEAD-FRONT TO 120/240V
TRANSFORMER SIZE 16 = 25kVA

NES TRANSFORMER STOCK #: 928116000 The front of the transformer should be labeled 8116.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
C	WMS	UPDATE UG VOLTAGES	12/14/17
D	WMS	ADDED 67 AND 87 VOLTAGE CODES	10/9/18

T&D TRANSFORMER STANDARDS
TRANSFORMER STOCK NUMBER CODES

PAD MOUNTED TRANSFORMER INSTALLATION COMPATIBLE UNITS

PHASE TO PHASE LINE VOLTAGES/SECONDARY VOLTAGE

Transformer	4kV	7.96kV	7.96kV	13.8kV	23.9kV	23.9kV
kVA	120/240	120/240	480/240	120/240	120/240	480/240
SINGLE PHASE DEAD-FRONT						
25	N/A	N/A	UT6716***	N/A	UT8116	UT8716
50	UT0324*	UT2324***	N/A	N/A	UT8124	N/A
75	UT0326*	UT2326***	N/A	N/A	UT8126	N/A
100	UT0328*	UT2328***	UT6728***	N/A	UT8128	UT8728
167	N/A	UT2334***	N/A	N/A	UT8134	N/A
250	N/A	UT2340***	N/A	N/A	UT8140	N/A
SINGLE PHASE LIVE-FRONT						
25	UT0216**	N/A		N/A	N/A	
50	UT0224**	N/A		UT7924*	N/A	
75	N/A	N/A		UT7926*	N/A	
100	UT0228**	N/A		UT7928*	N/A	
167	N/A	N/A		UT7934*	N/A	
250	N/A	N/A		UT7940*	N/A	

NOTE:

1. All new installs should use dead front transformers. The only exception is single phase 13.8kV.
2. Dead front transformers require two cable connections when the cable continues or loops through the transformer. Transformers located at the end of the circuit require one cable connection and one arrester.
3. 13.8kV Live front transformers require twice the cable connections and arresters to perform the same functions as above, four cable connections at the loops and two cable connections and two arresters at dead-ends.

PAD MOUNTED TRANSFORMER CONNECTION COMPATIBLE UNITS

SINGLE PHASE DEAD-FRONT

PHASE TO PHASE LINE VOLTAGES/SECONDARY VOLTAGE
TRANSFORMER TO CABLE CONNECTION CU AND ARRESTER CU'S

Transformer	4kV –120/240		7.96kV –120/240		13.8kV –120/240		23.9kV –120/240	
kVA	CABLE CONN	ARR	CABLE CONN	ARR	CABLE CONN	ARR.	CABLE CONN.	ARR
25	N/A	N/A	N/A	N/A	N/A	N/A	UELBC-1	ULA18DF
50	UELBC-1	ULA3DF	UELBC-1	ULA12DF	N/A	N/A	UELBC-1	ULA18DF
75	UELBC-1	ULA3DF	UELBC-1	ULA12DF	N/A	N/A	UELBC-1	ULA18DF
100	UELBC-1	ULA3DF	UELBC-1	ULA12DF	N/A	N/A	UELBC-1	ULA18DF
167	N/A		UELBC-1	ULA12DF	N/A	N/A	UELBC-1	ULA18DF
250	N/A		UELBC-1	ULA12DF	N/A	N/A	UELBC-1	ULA18DF
SINGLE PHASE LIVE-FRONT								
	4kV –120/240		7.62-120/240		13.8-120/240		23.9-120/240	
25	UCN-STRM1-40	ULA3LF	N/A	N/A	N/A	N/A	N/A	N/A
50	UCN-STRM1-40	ULA3LF	N/A	N/A	UCN-STRM1-40	ULA12LF	N/A	N/A
75	N/A	N/A	N/A	N/A	UCN-STRM1-40	ULA12LF	N/A	N/A
100	N/A	N/A	N/A	N/A	UCN-STRM1-40	ULA12LF	N/A	N/A
167	N/A	N/A	N/A	N/A	UCN-STRM1-40	ULA12LF	N/A	N/A
250	N/A	N/A	N/A	N/A	UCN-STRM1-40	ULA12LF	N/A	N/A

- **** For all special application transformers check the MSQ100 screen for stock level and location.***
- ** ONLY USE THESE LIVE FRONT TRANSFORMERS TO REPLACE EXISTING UNITS WHERE THE CABLE WILL NOT ALLOW INSTALLATION OF DEAD FRONT EQUIPMENT. ALWAYS CONSULT U&S BEFORE USING LIVE FRONT 4KV TRANSFORMERS.
- *** 7.96KV CONNECTIONS ARE (1) PHASE L-N ONLY.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	WMS	ADDED 1PH 480/240 CUS	7/23/19
C	CWS	UPDATED UT67XX FROM 13.8KV TO 7960KV	11/18/19

NES

T&D DRAWING STANDARDS
1 PHASE PAD MOUNTED TRANSFORMER

PAD MOUNTED TRANSFORMER COMPATIBLE UNITS

DEAD-FRONT

THREE PHASE TRANSFORMERS
4 WIRE 3 PHASE SERVICES

TRANSFORMER kVA	4kV 208Y/120	13.8kV 208Y/120	23.9kV 208Y/120	4kV 480Y/277	13.8kV 480Y/277	23.9kV 480Y/277
75	N/A	UT9326	UT9326	N/A	UT9526	UT9526
150	N/A	UT9332	UT9332	N/A	UT9532	UT9532
225	N/A	UT9338	UT9338	N/A	UT9538	UT9538
300	N/A	UT9343	UT9343	N/A	UT9543	UT9543
500	N/A	UT9352	UT9352	N/A	UT9552	UT9552
750	N/A	UT9358	UT9358	N/A	UT9558	UT9558
1000	N/A	UT9364	UT9364	N/A	UT9564	UT9564
1500	N/A	UT9370	UT9370	N/A	UT9570	UT9570
LIVE-FRONT						
75	UT1526*	UT9426*	UT9426*	N/A	N/A	N/A
112.5	N/A	N/A	N/A	UT1730*	N/A	N/A
150	UT1532*	UT9432*	UT9432*	UT1732*	N/A	N/A
225	N/A	N/A	N/A	N/A	UT9638*	UT9638*
300	UT1543*	UT9443*	UT9443*	N/A	UT9643*	UT9643*
500	N/A	UT9452*	UT9452*	N/A	N/A	N/A
750	N/A	UT9458*	UT9458*	N/A	UT9658*	UT9658*
1000	N/A	UT9464*	UT9464*	N/A	UT9664*	UT9664*
1500	N/A	UT9470*	UT9470*	N/A	UT9670*	UT9670*
2000	N/A	N/A	N/A	N/A	UT9676*	UT9676*
2500	N/A	N/A	N/A	N/A	UT9679*	UT9679*
3750	N/A	N/A	N/A	N/A	UT9682*	UT9682*

THREE PHASE PAD MOUNTED TRANSFORMER CONNECTION COMPATIBLE UNITS

DEAD-FRONT

PHASE TO PHASE LINE VOLTAGES
TRANSFORMER TO CABLE CONNECTION CU AND ARRESTER CU'S

Transformer kVA	Cable Size	4kV		13.8kV		23.9kV	
		CABLE CONN	ARR	CABLE CONN	ARR.	CABLE CONN.	ARR
75-1500	#1AL	UELBC-1	ULA3DF	UELBC-1	ULA12DF	UELBC-1	ULA18DF
75-1500	4/0AL	UELBC-4/0	ULA3DF	UELBC-4/0	ULA12DF	UELBC-4/0	ULA18DF
LIVE-FRONT							
45-3750	#1-4/0	UCN-STRM1-40	ULA3LF	UCN-STRM1-40	ULA12LF	UCN-STRM1-40	ULA18LF

* Please contact the Standards Section before using transformers with an asterisk behind the CU. These transformers are so rarely used that there may not be any in stock. For the same reason, some of the CU's were not created at go live.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
B	WS		3/13/14
C	WS		6/09/16
D	WMS	UPDATED SERVICE VOLTAGES	12/14/17

NES

T&D TRANSFORMER STANDARDS
3 PHASE PAD MOUNTED TRANSFORMER COMPATIBLE UNIT CHART

REMOVAL COMPATIBLE UNITS FOR THREE PHASE PAD MOUNTED AND VAULT ENCLOSED TRANSFORMERS

ALL THREE PHASE SERVICES						
TRANSFORMER	4kV	13.8kV	23.9kV	4kV	13.8kV	23.9kV
kVA	208Y/120	208Y/120	208Y/120	480Y/277	480Y/277	480Y/277
45	RUT-3P-0045					
75	RUT-3P-0075					
150	RUT-3P-0150					
225	RUT-3P-0225					
300	RUT-3P-0300					
500	RUT-3P-0500					
750	RUT-3P-0750					
1,000	RUT-3P-1000					
1,500	RUT-3P-1500					
2,000	RUT-3P-2000					
2,500	RUT-3P-2500					
3,000	RUT-3P-3000					
3,750	RUT-3P-3750					
5,000	RUT-3P-5000					
7,500						
10,000						

REMOVAL COMPATIBLE UNITS FOR PAD MOUNTED TRANSFORMERS

ALL SINGLE PHASE SERVICES				
TRANSFORMER	4kV	7.96kV	13.8kV	23.9kV
kVA	240/120	240/120	240/120	240/120
25	USE RUT-1P-050			
50	RUT-1P-050			
75	RUT-1P-075			
100	RUT-1P-100			
167	RUT-1P-167			
250	RUT-1P-250			

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	WMS	UPDATED 3PHASE SERVICE VOLTAGES	12/14/17

NES

T&D TRANSFORMER STANDARDS
PAD MOUNTED TRANSFORMER
REMOVAL COMPATIBLE UNITS

IMPORTANT RISER FUSE NOTES:

CUSTOMER ENGINEERING—CONSULT WITH DESIGN ENGINEERING FOR RISER FUSE SIZES

C&M—CONTACT THE LOAD DISPATCHER WHEN REPLACING RISER FUSES

THREE PHASE LIVE FRONT WITHOUT INTERNAL FUSING

FUSE TYPE		TRANSFORMER kVA	4KV		13.8KV		23.9KV	
			PAD	RISER	PAD	RISER	PAD	RISER
S&C E TYPE SM-4		750*			25E		15E	
		1000*			40E		20E	
		1500*			50E		30E	
		2000			80E		40E	
		2500			100E		50E	
		3750			175E		80E	

* At these sizes always install internally fused transformers. These numbers are only for maintenance purposes.

THREE PHASE DEAD-FRONT OR LIVE-FRONT INTERNALLY FUSED

FUSE TYPE	TRANSFORMER kVA	4KV		13.8KV		23.9KV	
		PAD	RISER	PAD	RISER	PAD	RISER
CURRENT SENSING BAY-O-NET	75	25		10		6	
	150	40		15		10	
	225	65		15		15	
	300	65		25		15	
	500			40		25	
	750			65		40	
	1000			65		40	
	1500			100		65	
	2000			140		100	
	2500			140		100	

SINGLE PHASE INTERNALLY FUSED DEAD AND LIVE FRONT TRANSFORMERS

FUSE TYPE	TRANSFORMER kVA	4KV		7.96KV		13.8KV		23.9KV	
		PAD	RISER	PAD	RISER	PAD	RISER	PAD	RISER
CURRENT SENSING BAY-O-NET	25			6		6		6	
	50	40		15		10		10	
	75	65		15		10		10	
	100	65		25		15		15	
	167			40		25		25	
	250			65		40		40	

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
B	WS		3/13/14
C	WS		6/09/16
D	WMS	COMPLETE TABLE REWORK	12/14/17

NES

T&D TRANSFORMER STANDARDS
PAD MOUNTED SWITCH AND TRANSFORMER FUSING CHART

SECONDARY CURRENT @ 100% OF THE NAMEPLATE RATING

		SECONDARY VOLTAGE					
Transformer	Z%	208	480	480	240	4160	13800
kVA	-7.50%	Y/120	Y/277	Delta	Delta	Y/2400	y/7960
45	3.46875	120	54	54	108		
75	3.46875	200	90	90	180		
112.5	3.46875	300	135	135	270		
150	3.46875	400	180	180	360		
225	3.46875	600	270	270	540		
300	3.46875	801	360	360	720		
500	5.31875	1,334	600	600	1,201		
750	5.31875	2,001	901	901	1,801		
1,000	5.31875	2,668	1,201	1,201	2,402	139	42
1,500	5.31875	4,003	1,801	1,801	3,602	208	63
2,000	5.31875	5,337	2,402	2,402	4,803	277	84
2,500	5.31875		3,002	3,002	6,004	346	104
3,000	5.31875		3,602	3,602	7,205	416	125
3,750	5.31875		4,503	4,503	9,006	520	157
5,000	5.31875					693	209
7,500	5.31875						313
10,000	5.31875						418

Formula:

Current =kVA / 1.735*Voltage

These figures do not apply to the downtown network area.

FAULT CURRENT AVAILABLE @ THE TRANSFORMER SECONDARY

		SECONDARY VOLTAGE					
Transformer	Z% @	208	480	480	240	4160	13800
kVA	-7.50%	Y/120	Y/277	Delta	Delta	Y/2400	y/7960
45	3.46875			1558	3,116		
75	3.46875	6,430	2,596	2596	5,193		
112.5	3.46875			3,894	7,789		
150	3.46875	12,860	5,193	5,193	10,385		
225	3.46875	19,291	7,789	77,89	15,578		
300	3.46875	25,721	10,385	10,385	20,770		
500	5.31875	28,203	11,288	11288	22576		
750	5.31875	42,304	16,932	16932	33,864		
1,000	5.31875	56,406	22,576	22,576	45,152	2,605	785
1,500	5.31875	84,608	33,864	33,864	67,728	3,907	1,178
2,000	5.31875		45,152	45,152	90,305	5,210	1,571
2,500	5.31875		56,440	56,440	112,881	6,512	1,963
3,000	5.31875		67,728	67,728	135,457	7,815	2,356
3,750	5.31875		84,661	84,661	169,321	9,769	2,945
5,000	5.31875					13,025	3,926
7,500	5.31875						5,889
10,000	5.31875						7,853

Formula Secondary Current @ 100% of Transformer Rating / Z%

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	WMS	UPDATED TO 208Y/120, REVISED FAULT CURRENT	12/14/17

NES

T&D TRANSFORMER STANDARDS

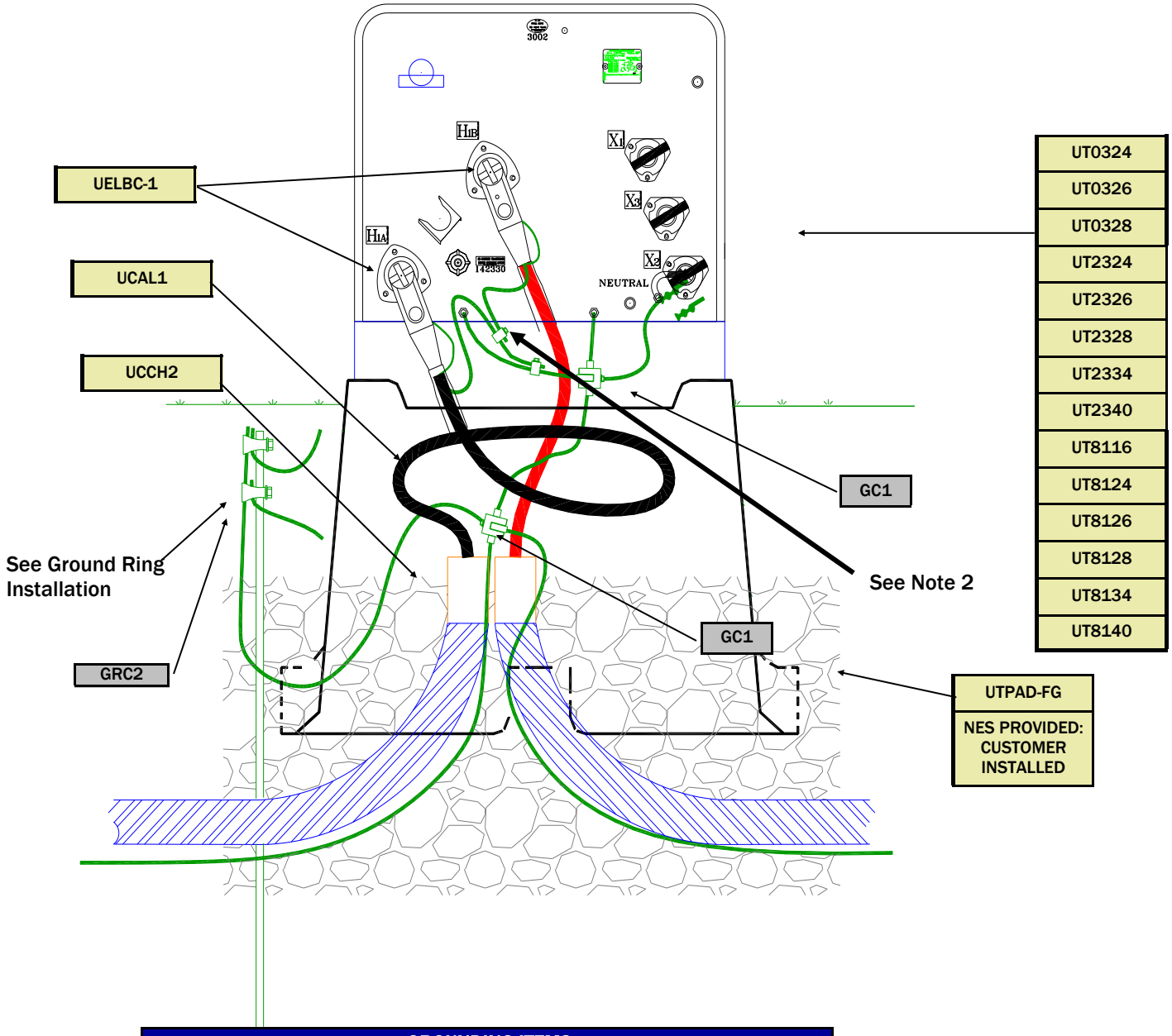
PAD MOUNTED TRANSFORMER FAULT CURRENT TABLES

Stock Code	Item Name/Description	Stock Code	Item Name/Description
263192000	FUSE REFILL 25E A 15KV SM-4 ;FUSE, REFIL	260210000	FUSE BAY-O-NET 8 AMP ;BAY-O-NET FUSE 8 A
263193000	FUSE REFILL 40E A 15KV SM-4 ;FUSE, REFIL	260220000	FUSE BAY-O-NET 15 AMP ;BAY-O-NET 15 AMP
263194000	FUSE REFILL 65E A 15KV SM-4 ;FUSE, REFIL	260230000	FUSE BAY-O-NET 25 AMP ;BAY-O-NET FUSE 25
263200000	FUSE REFILL 100E A 15KV SM-4 ;FUSE, REFI	260240000	FUSE BAY-O-NET 50 AMP ;BAY-O-NET FUSE 50
263220000	FUSE REFILL 125E A 15KV SM-4 ;FUSE, REFI	260250000	FUSE BAY-O-NET SHORTING BAR ;SOLID COPPE
263220200	FUSE REFILL 150EA 15KV SM4 ;FUSE REFILL,	260260000	FUSE BAY-O-NET CART & END CAP ;FUSE CART
		260265000	FUSE BAY-O-NET INNER HOLDER ;COMPLETE BA
263230000	FUSE REFILL 65A 14.4KV SM-5 ;FUSE, REFIL		
263235000	FUSE REFILL 125A 14.4 KV SM-5 ;FUSE, REF	263600000	FUSE NX SAND 3A 15.5KV/CANSTR
263240000	FUSE REFILL 150E A 15KV SM-5 ;FUSE, REFI	263602000	FUSE NX SAND 6A 15.5KV/CANSTR
263250000	FUSE REFILL 175E A 14.4KV SM-5 ;FUSE, RE	263604000	FUSE NX SAND 8A 15.5KV/CANSTR
263260000	FUSE REFILL 200E A 15KV SM-5 ;FUSE, REFI	263606000	FUSE NX SAND 10A 15.5KV/CANSTR
263280000	FUSE REFILL 250E A 15KV SM-5 ;FUSE, REFI	263608000	FUSE NX SAND 12A 15.5KV/CANSTR
263300000	FUSE REFILL 300E A 15KV SM-5 ;FUSE, REFI	263610000	FUSE NX SAND 15A 15.5KV/CANSTR
263310000	FUSE REFILL 400E A 14.4KV SM-5 ;FUSE REF	263612000	FUSE NX SAND 18A 15.5KV/CANSTR
		263614000	FUSE NX SAND 20A 15.5KV/CANSTR
263376000	FUSE REFILL 15E A 23KV SM-4 ;FUSE, REFIL	263616000	FUSE NX SAND 25A 15.5KV/CANSTR
263378000	FUSE REFILL 20E A 23KV SM-4 ;FUSE, REFIL	263618000	FUSE NX SAND 30A 15.5KV/CANSTR
263380000	FUSE REFILL 25E A 23KV SM-4 ;FUSE REFILL	263620000	FUSE NX SAND 40A 15.5KV/CANSTR
263382000	FUSE REFILL 30E A 23KV SM-4 ;FUSE REFILL	263624000	FUSE NX SAND 50A 15.5KV CANSTR
263384000	FUSE REFILL 40E A 23KV SM-4 ;FUSE, REFIL		
263386000	FUSE REFILL 50E A 23KV SM-4 ;FUSE REFILL	263503000	FUSE UNIT NX SAND 3A 15.5KV
263390000	FUSE REFILL 65E A 23KV SM-4 ;FUSE REFILL	263506000	FUSE UNIT NX SAND 6A 15.5KV
263395000	FUSE REFILL 80E A 23KV SM-4 ;FUSE, REFIL	263508000	FUSE UNIT NX SAND 8A 15.5KV
263400000	FUSE REFILL 100E A 23KV SM-4 ;FUSE, REFI	263510000	FUSE UNIT NX SAND 10A 15.5KV
263420000	FUSE REFILL 125E A 23KV SM-4 ;FUSE, REFI	263512000	FUSE UNIT NX SAND 12A 15.5KV
263440000	FUSE REFILL 150E A 23KV SM-4 ;FUSE, REFI	263514000	FUSE UNIT NX SAND 18A 15.5KV
263460000	FUSE REFILL 175E A 23KV SM-4 ;FUSE REFIL	263516000	FUSE UNIT NX SAND 30A 15.5KV
263461000	FUSE REFILL 200E A 23KV SM-4 ;FUSE REFIL	263517000	FUSE UNIT NX SAND 40A 15.5KV
263464000	FUSE REFILL 65E A 23KV SM-5 ;FUSE REFILL		
		265100000	FUSE DRYWELL 12A 8.3KV
263466000	FUSE REFILL 125E A 23KV SM5 ;FUSE REFILL	265120000	FUSE DRYWELL 25A 8.3KV
263468000	FUSE REFILL 150E A 23KV SM-5 ;FUSE, REFI	265130000	FUSE DRYWELL 30A 8.3KV
263472000	FUSE REFILL 250E A 23KV SM-5 ;FUSE, REFI	265140000	FUSE DRYWELL 45A 8.3KV
263474000	FUSE REFILL 300E A 23KV SM-5 ;FUSE REFIL	265170000	FUSE DRYWELL 25A 8.3KV
263474500	FUSE REFILL 250E 23KV SMU-40 STD ;FUSE R	265200000	FUSE DRYWELL 4A 15.5KV
263475000	FUSE RFL 300E 23KV SMU-40 SLOW ;FUSE REF	265210000	FUSE DRYWELL 8A 15.5KV
263475500	FUSE RFL 300E 23 KV SMU-40 STD ;FUSE REF	265220000	FUSE DRYWELL 12A 15.5KV
263476000	FUSE RFL 400E 23KV SMU-40 SLOW ;FUSE, RE	265230000	FUSE DRYWELL 18A 15.5KV
261051000	FUSE LINK 1A TYPE D ;FUSE LINK, 1 AMP TY	263185000	FUSE REFILL ;S&C FAULT FITER ELECTRONIC
261051500	FUSE LINK 1.5A TYPE D ;D-LINK FUSE 1.5 A		
261052000	FUSE LINK 2A TYPE D ;FUSE LINK, 2 AMP TY	150350000	HOLDER FUSE 15KV 400A SM-5 NDT ;FUSE HOL
261053000	FUSE LINK 3A TYPE D ;D LINK FUSES 3 AMP	150360000	HOLDER FUSE 23KV 200A SM-4 NDT ;FUSE HOL
261054000	FUSE LINK 4A TYPE D ;D-LINK FUSE 4 AMP R	150365000	HOLDER FUSE 23KV 300A SM-5 DT ;FUSE HOLD
261055000	FUSE LINK 5A TYPE D ;FUSE LINK 5A TYPE D	150100000	CLIP FUSE S&C SM4 NDT ;FUSE CLIP, STICK
261057000	FUSE LINK 7A TYPE D ;FUSE LINK 7A TYPE D	150120000	CLIP FUSE S&C SM5 NDT ;FUSE CLIP, STICK
261060000	FUSE LINK 10A TYPE D ;FUSE LINK, 10 AMP.		
261063000	FUSE LINK 15A TYPE D ;FUSE LINK, 15A. TY	263020000	FUSE PRI 50-75KVA 14.4KV CTC ;PRIMARY FU
261065000	FUSE LINK 20A TYPE D ;FUSE LINK, 20 AMP.	263022000	FUSE PRI 100KVA 14.4KV CTC ;PRIMARY FUSE
261067000	FUSE LINK 25A TYPE K ;FUSE LINK, 25 AMP,	263024000	FUSE PRI 167KVA 14.4KV CTC ;PRIMARY FUSE
261069000	FUSE LINK 30A TYPE K ;FUSE LINK, 30 AMP,	263026000	FUSE PRI 250KVA 14.4KV CTC ;PRIMARY FUSE
261072000	FUSE LINK 40A TYPE K ;FUSE LINK, 40 AMP,	263040000	FUSE PRI 50KVA 14.4KV GE ;PRIMARY FUSE F
261074000	FUSE LINK 50A TYPE K ;FUSE LINK, 50 AMP,	263042000	FUSE PRI 75KVA 14.4KV GE ;PRIMARY FUSE F
261077000	FUSE LINK 65A TYPE K ;FUSE LINK, 65 AMP,	263044000	FUSE PRI 100KVA 14.4KV GE ;PRIMARY FUSE
261080000	FUSE LINK 80A TYPE K ;FUSE LINK, 80 AMP,	263046000	FUSE PRI 167/250KVA 14.4KV GE ;PRIMARY F
261083000	FUSE LINK 100A TYPE K ;FUSE LINK, 100 AM	263070000	FUSE PRI 50KVA 14.4KV ME ;PRIMARY FUSE F
261086000	FUSE LINK 140A TYPE K ;FUSE LINK, 140 AM	263072000	FUSE PRI 75KVA 14.4KV ME ;PRIMARY FUSE F
261089000	FUSE LINK 200A TYPE K ;FUSE LINK, 200 AM	263074000	FUSE PRI 100/167KVA 14.4KV ME ;PRIMARY F
		263076000	FUSE PRI 250KVA 14.4KV ME ;PRIMARY FUSE
260280000	FUSE CAP CUR LMTG/1-12A K LINK	263170000	FUSE PRI 50KVA 14.4KV/TAP WH ;PRIMARU FU
260300000	FUSE CUR LMTG/20-25A D LINK	263171000	FUSE PRI 75KVA 14.4KV/TAP WH ;PRIMARY FU
260310000	FUSE CUR LMTG/30-40A D LINK	263172000	FUSE PRI 75KVA 14.4KV/STUD WH ;PRIMARY F
		263173000	FUSE PRI 100KVA 14.4KV/TAP WH ;PRIMARY F
144800000	FUSE HOLDER 100 A LBU ABB ;FUSE HOLDER F	263174000	FUSE PRI 100KVA 14.4KV/STUD WH ;PRIMARY
144805000	FUSE HOLDER 200 A LBU ABB ;FUSE HOLDER F	263175000	FUSE PRI 167KVA 14.4KV/TAP WH ;PRIMARY F
144807000	FUSE HOLDER 100 AMP UNIVERSAL ;FUSE HOLD	263176000	FUSE PRI 167KVA 14.4KV/STUD WH ;PRIMARY
		263178000	FUSE PRI 250KVA 14.4KV/TAP WH ;PRIMARY F

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

T&D TRANSFORMER STANDARDS

FUSE STOCK NUMBER TABLE



GROUNDING ITEMS		
MATERIAL LIST		
STOCK	**DESCRIPTION**	**Item**
011210000	CABLE CU BSD 2 7S	CU2
184380000	ROD GROUND CW 5/8X8	GR1
220500000	CLAMP GR ROD 8-2 CU	GRC1
223480000	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	GC1
223490000	GRD CONN 1/0 OR 5/8" GND ROD	GRC2

General Notes

1. When connecting the concentric neutrals to ground leave adequate slack to operate the elbows.
2. Tie the concentric neutrals together before connecting to the ground loop. This is necessary to ensure uniform neutral conductivity.
3. Ground ring is not pictured.

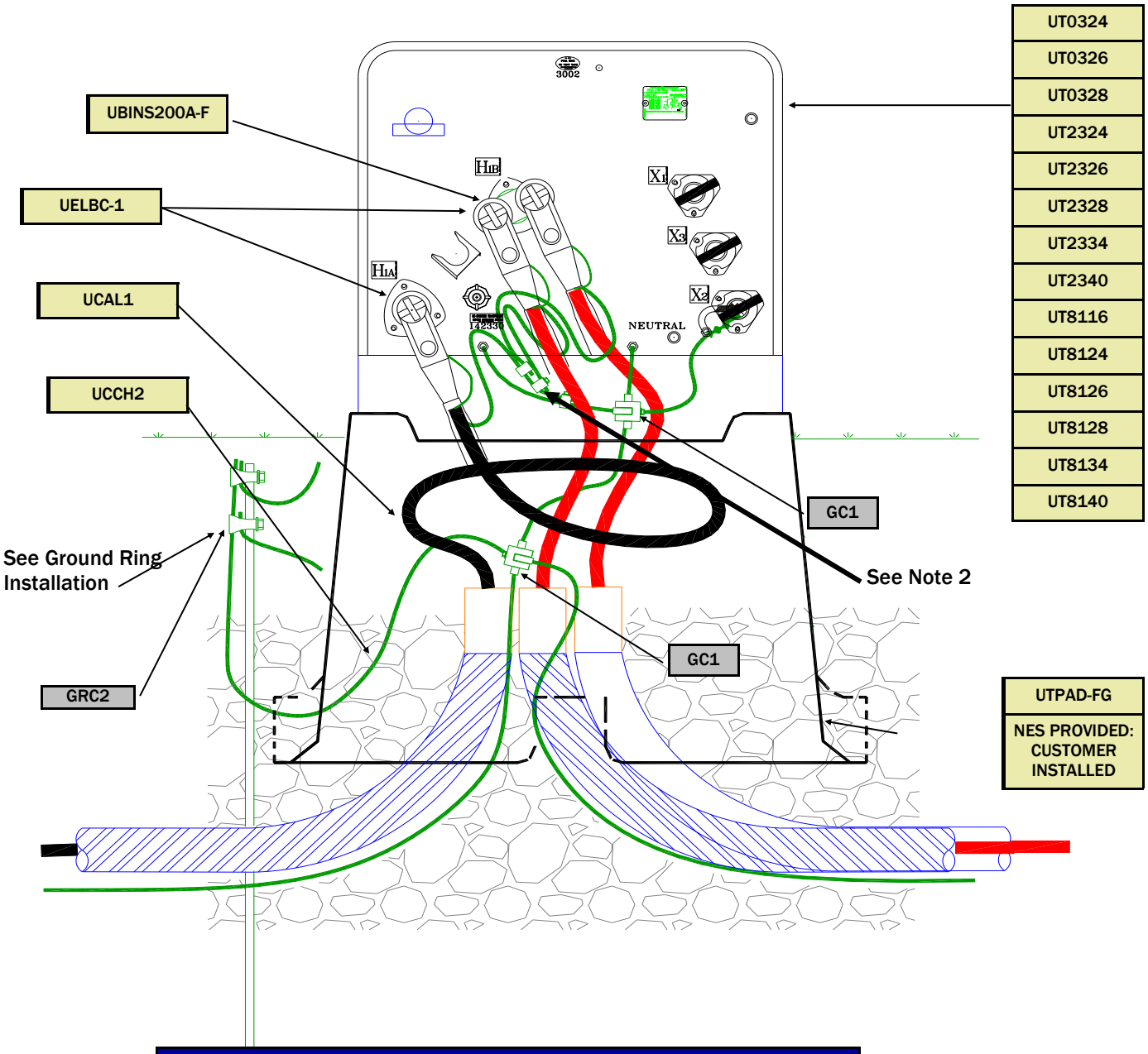
UG PLATE BOOK DRAWING (TRANS INST 1P DF).dwg

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	WMS	REVISED DRAWING TO SHOW BAYONET	12/14/17

NES

T&D TRANSFORMER STANDARDS

DEAD-FRONT TRANSFORMER INSTALLATION 1 PHASE LOOP FEED



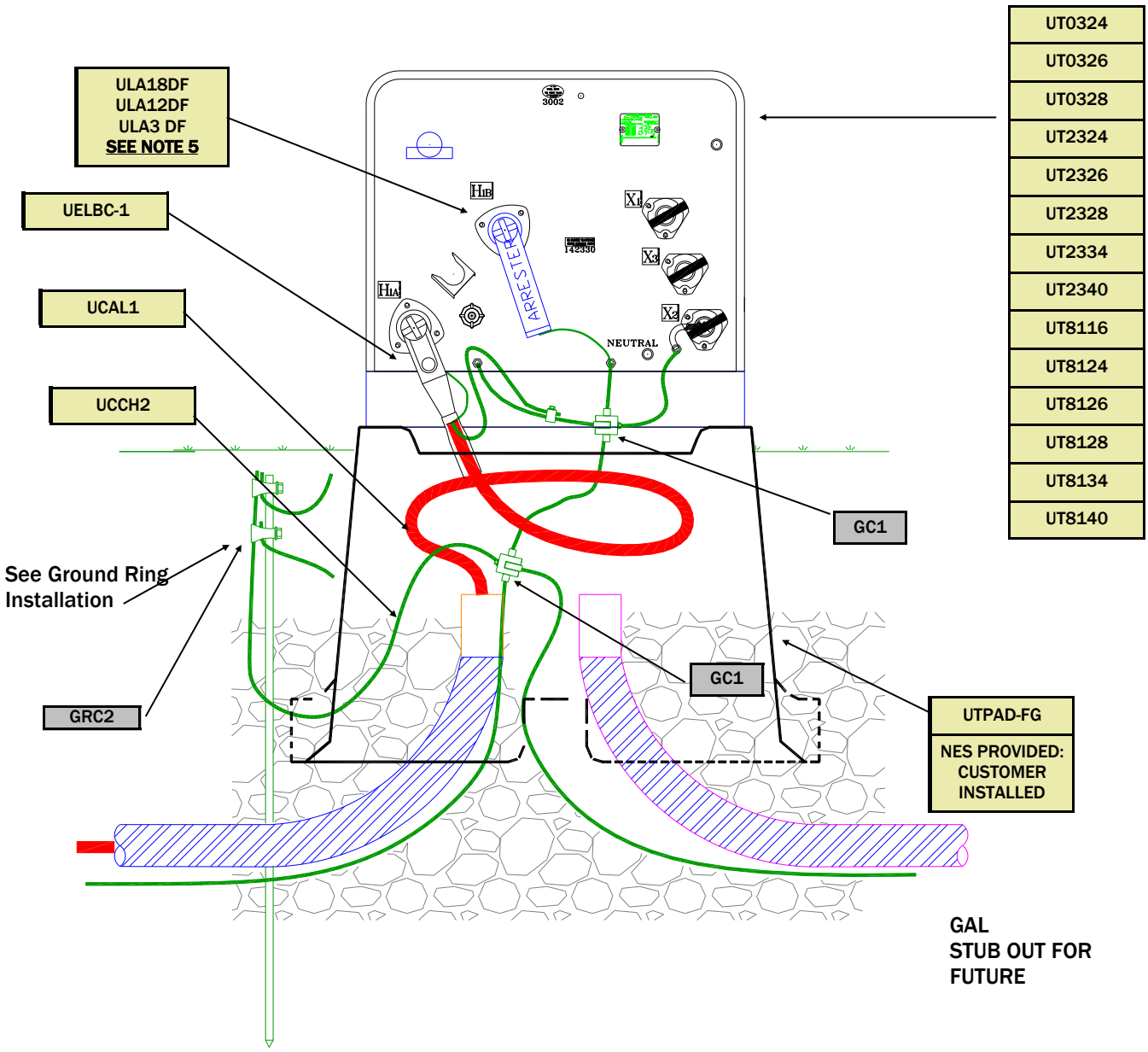
GROUNDING ITEMS		
MATERIAL LIST		
STOCK	DESCRIPTION	Item
011210000	CABLE CU BSD 2 7S	CU2
184380000	ROD GROUND CW 5/8X8	GR1
220500000	CLAMP GR ROD 8-2 CU	GRC1
223480000	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	GC1
223490000	GRD CONN 1/0 OR 5/8" GND ROD	GRC2

General Notes
1. When connecting the concentric neutrals to ground leave adequate slack to operate the elbows.
2. Tie the concentric neutrals together before connecting to the ground loop. This is necessary to ensure uniform neutral conductivity.
3. Ground ring is not pictured.

UG PLATE BOOK DRAWING (TRANS INST 1P DF).dwg

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	WMS	UPDATED TO BAYONET FUSE	12/14/17

T&D TRANSFORMER STANDARDS
DEAD-FRONT TRANSFORMER INSTALLATION
1 PHASE WITH FEED-THROUGH BUSHING



GROUNDING ITEMS		
MATERIAL LIST		
STOCK	**DESCRIPTION**	**Item**
011210000	CABLE CU BSD 2 7S	CU2
184380000	ROD GROUND CW 5/8X8	GR1
220500000	CLAMP GR ROD 8-2 CU	GRC1
223480000	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	GC1
223490000	GRD CONN 1/0 OR 5/8" GND ROD	GRC2

General Notes

1. When connecting the concentric neutrals to ground leave adequate slack to operate the elbows.
2. Tie the concentric neutrals together before connecting to the ground loop. This is necessary to ensure uniform neutral conductivity.\.
3. Ground ring is not pictured.
4. Ground lead from the arrester to the transformer tank must be as short as possible. This is critical to reduce the voltage stress on the transformer during a lightning strike or other voltage spikes.

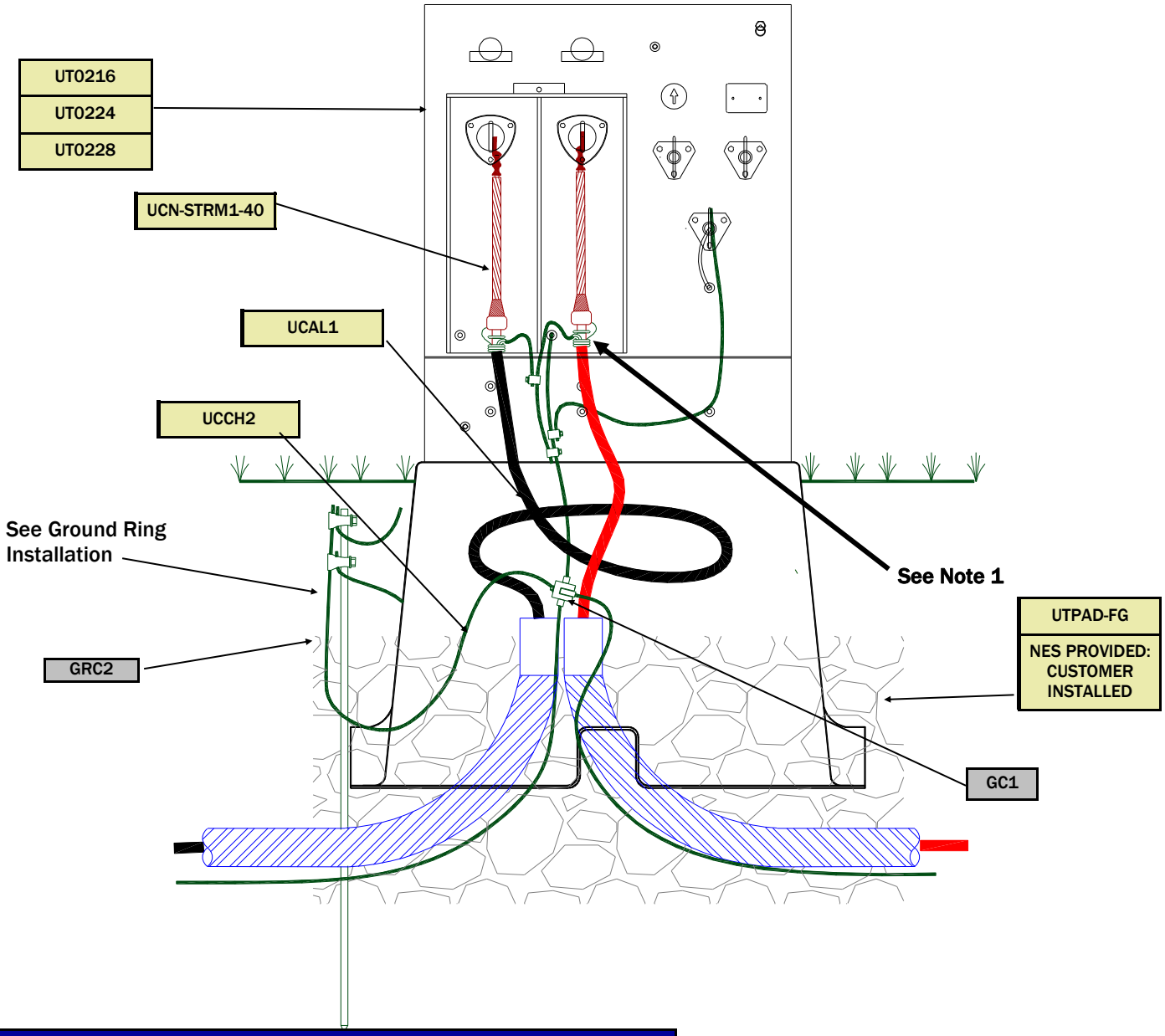
UG PLATE BOOK DRAWING (TRANS INST 1P DF).dwg

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	WMS	UPDATED TO BAYONET FUSE	12/14/17

NES

T&D TRANSFORMER STANDARDS

DEAD-FRONT TRANSFORMER INSTALLATION 1 PHASE DEAD-END



GROUNDING ITEMS		
MATERIAL LIST		
STOCK	**DESCRIPTION**	**Item**
011210000	CABLE CU BSD 2 7S	CU2
184380000	ROD GROUND CW 5/8X8	GR1
220500000	CLAMP GR ROD 8-2 CU	GRC1
223480000	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	GC1
223490000	GRD CONN 1/0 OR 5/8" GND ROD	GRC2

NOTE:

REPLACEMENT ONLY
FOR ALL NEW INSTALLATIONS USE
4kV DEAD-FRONT TRANSFORMERS

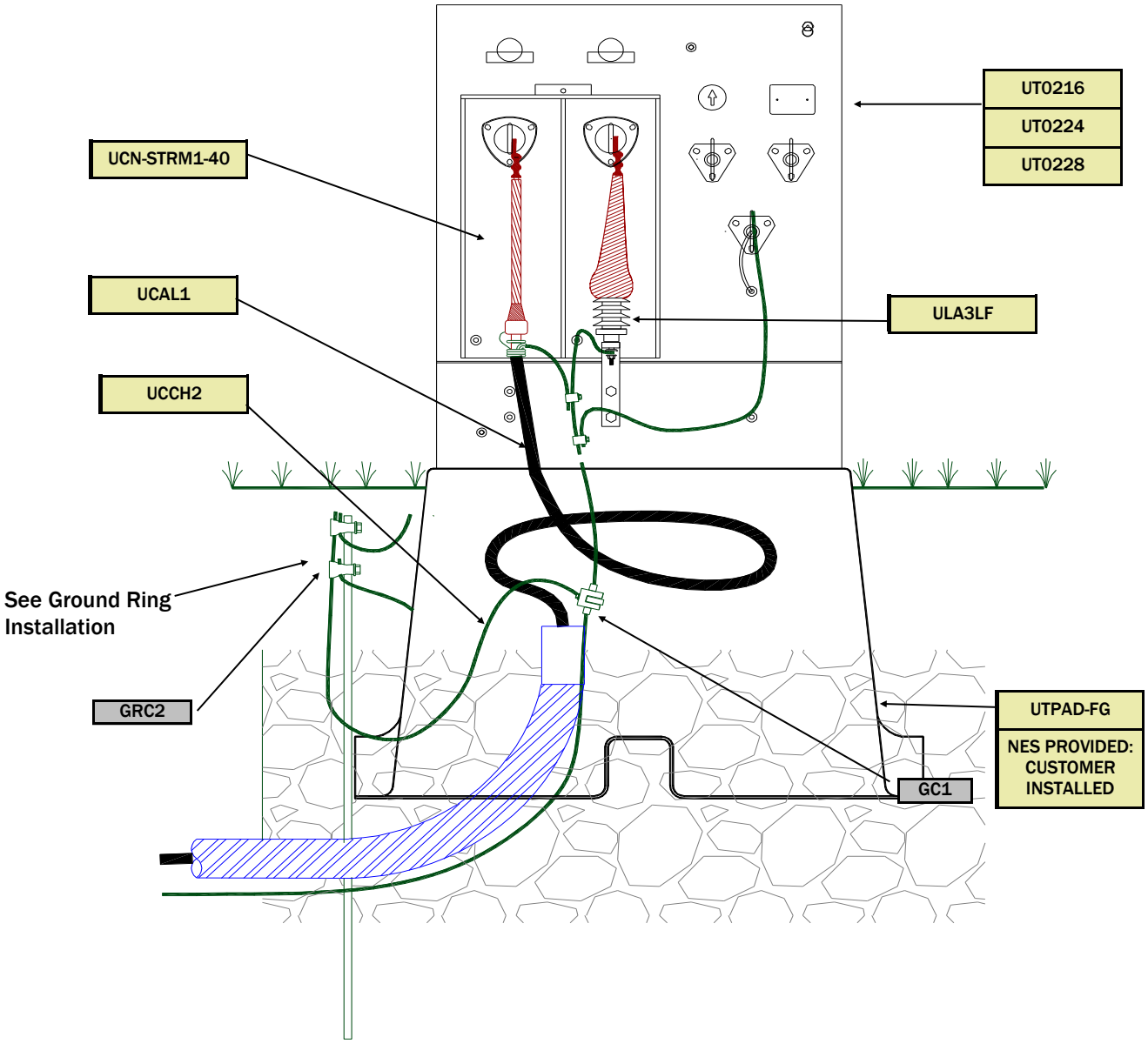
General Notes
1. Tie the concentric neutrals together before connecting to the ground loop. This is necessary to ensure uniform neutral conductivity.
2. Ground ring is not pictured.

UG PLATE BOOK DRAWING (TRANS INST 1P LF).dwg

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

T&D TRANSFORMER STANDARDS

LIVE-FRONT TRANSFORMER INSTALLATION
1 PHASE 4KV WITH LOOP FEED



NOTE:

REPLACEMENT ONLY
FOR ALL NEW INSTALLATIONS USE
4kV DEAD-FRONT TRANSFORMERS

GROUNDING ITEMS		
MATERIAL LIST		
STOCK	DESCRIPTION	Item
011210000	CABLE CU BSD 2 7S	CU2
184380000	ROD GROUND CW 5/8X8	GR1
220500000	CLAMP GR ROD 8-2 CU	GRC1
223480000	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	GC1
223490000	GRD CONN 1/0 OR 5/8" GND ROD	GRC2

General Notes

1. Ground ring is not pictured.
2. Ground lead from the arrester to the transformer tank must be as short as possible. This is critical to reduce the voltage stress on the transformer during a lightning strike or other voltage spikes.

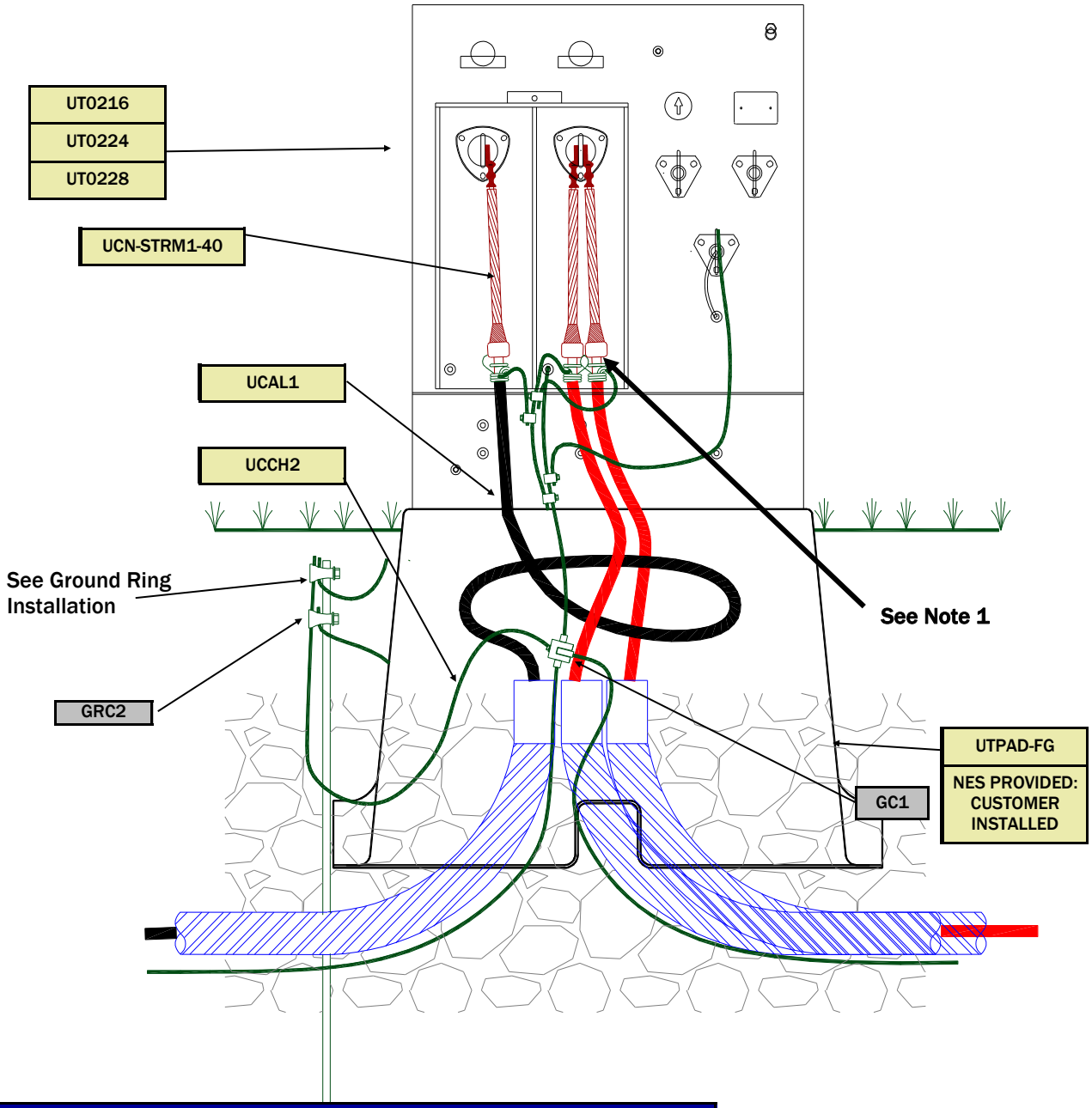
UG PLATE BOOK DRAWING (TRANS INST 1P LF).dwg

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

NES

T&D TRANSFORMER STANDARDS

LIVE-FRONT TRANSFORMER INSTALLATION
1 PHASE 4KV DEAD-END



GROUNDING ITEMS		
MATERIAL LIST		
STOCK	DESCRIPTION	Item
011210000	CABLE CU BSD 2 7S	CU2
184380000	ROD GROUND CW 5/8X8	GR1
220500000	CLAMP GR ROD 8-2 CU	GRC1
223480000	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	GC1
223490000	GRD CONN 1/0 OR 5/8" GND ROD	GRC2

NOTE:

REPLACEMENT ONLY
FOR ALL NEW INSTALLATIONS USE
4kV DEAD-FRONT TRANSFORMERS

General Notes

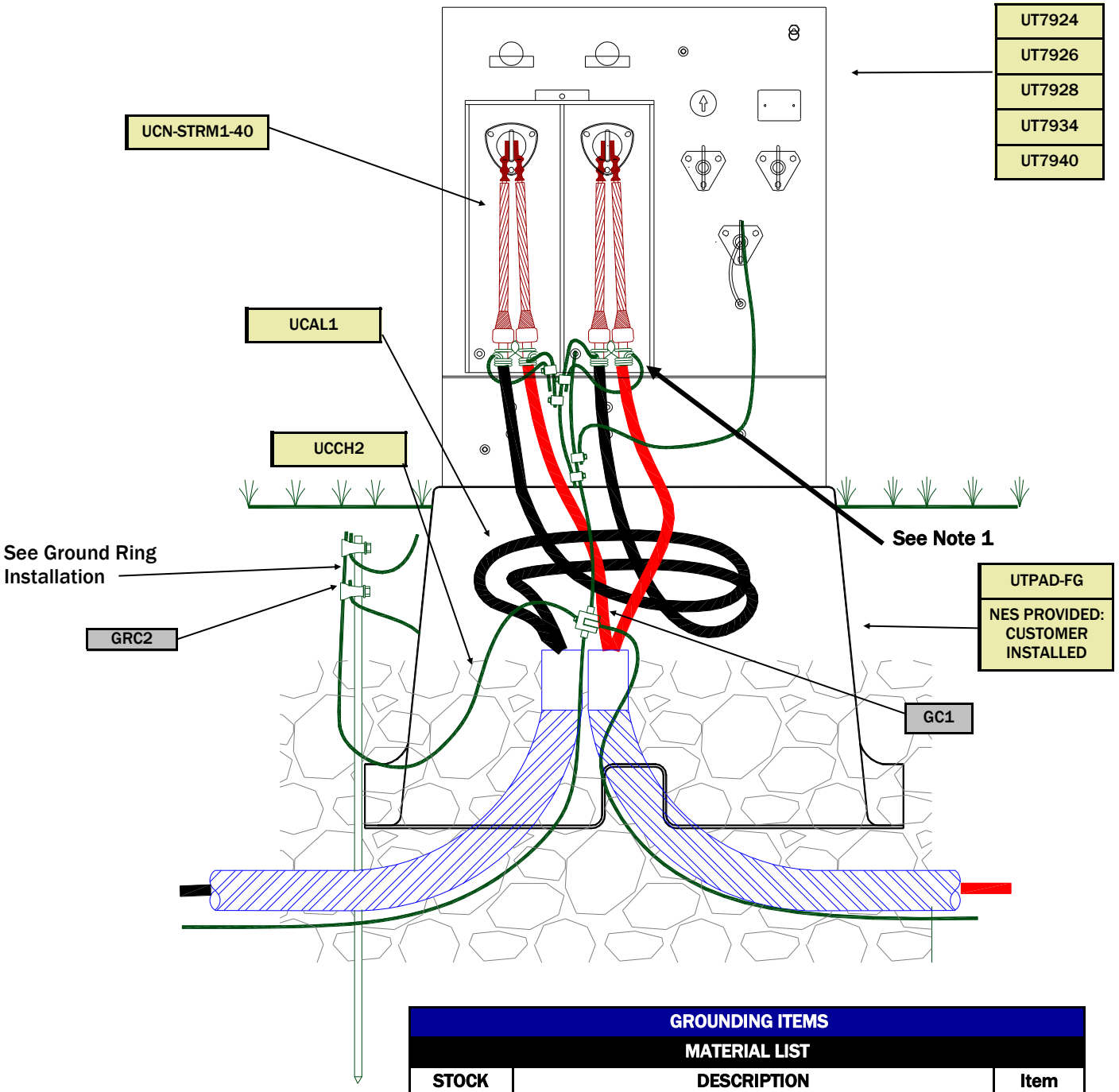
1. Tie the concentric neutrals together before connecting to the ground loop. This is necessary to ensure uniform neutral conductivity.
2. Ground ring is not pictured.

UG PLATE BOOK DRAWING (TRANS INST 1P LF).dwg

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

T&D TRANSFORMER STANDARDS

LIVE-FRONT TRANSFORMER INSTALLATION
1 PHASE 4KV WITH TWO PRIMARY TAPS



GROUNDING ITEMS		
MATERIAL LIST		
STOCK	DESCRIPTION	Item
011210000	CABLE CU BSD 2 7S	CU2
184380000	ROD GROUND CW 5/8X8	GR1
220500000	CLAMP GR ROD 8-2 CU	GRC1
223480000	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	GC1
223490000	GRD CONN 1/0 OR 5/8" GND ROD	GRC2

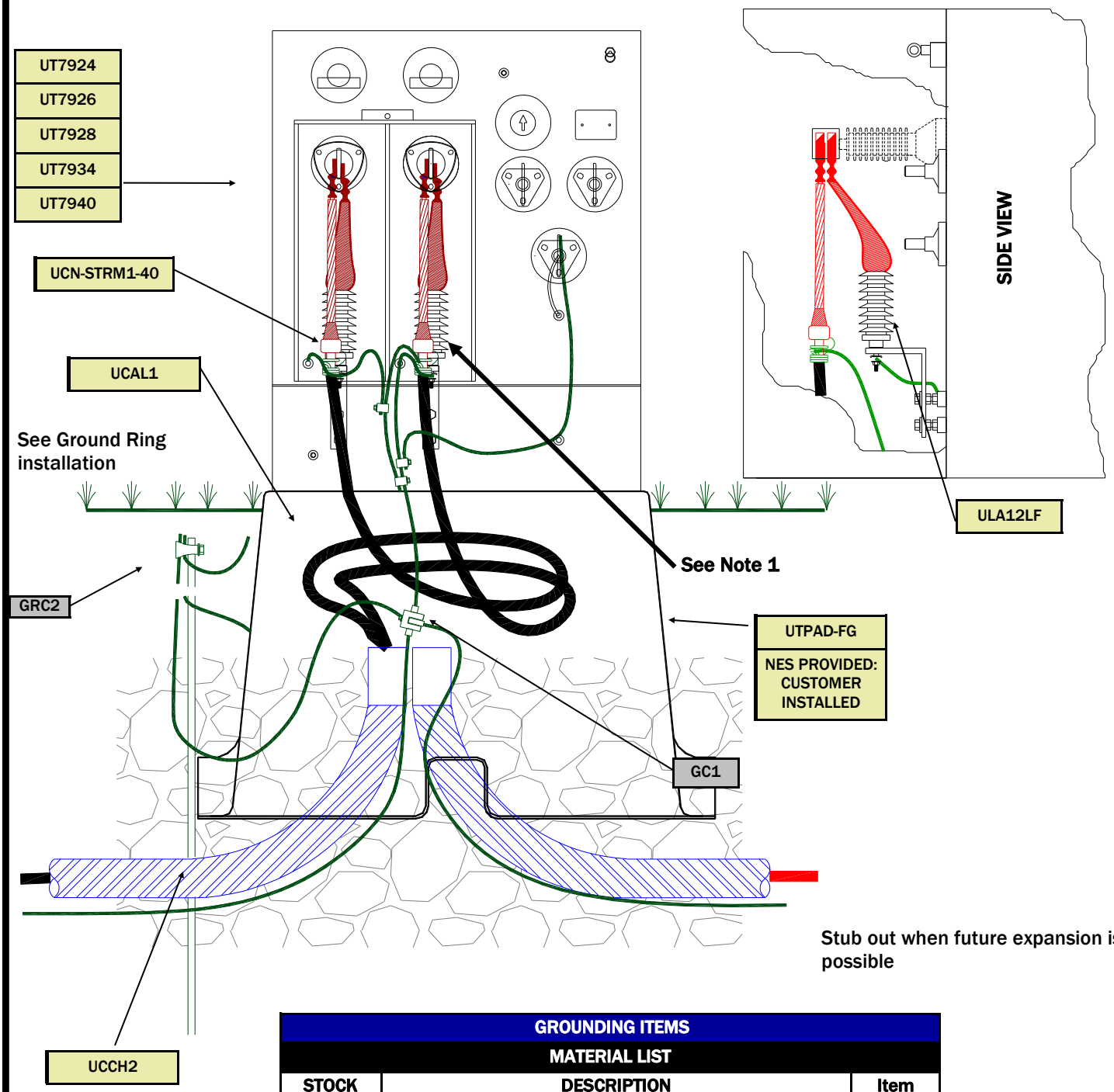
General Notes
1. Tie the concentric neutrals together before connecting to the ground loop. This is necessary to ensure uniform neutral conductivity.
2. Ground ring is not pictured.

UG PLATE BOOK DRAWING (TRANS INST 1P LF).dwg

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	WMS	UPDATED TO BAYONET FUSE	12/14/17

NES

T&D TRANSFORMER STANDARDS
LIVE-FRONT TRANSFORMER INSTALLATION
1 PHASE 13.8KV LOOP FEED



GROUNDING ITEMS		
MATERIAL LIST		
STOCK	DESCRIPTION	Item
011210000	CABLE CU BSD 2 7S	CU2
184380000	ROD GROUND CW 5/8X8	GR1
220500000	CLAMP GR ROD 8-2 CU	GRC1
223480000	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	GC1
223490000	GRD CONN 1/0 OR 5/8" GND ROD	GRC2

General Notes
1. Tie the concentric neutrals together before connecting to the ground loop. This is necessary to ensure uniform neutral conductivity.
2. Ground ring is not pictured.
3. Leads from the arrester to the transformer tank and HV bushing must be as short as possible. This is critical to reduce the voltage stress on the transformer during a lightning strike or other voltage spikes.

UG PLATE BOOK DRAWING (TRANS INST 1P LF).dwg

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	WMS	UPDATED TO BAYONET FUSE	12/14/17

T&D TRANSFORMER STANDARDS
LIVE-FRONT TRANSFORMER INSTALLATION
1 PHASE 13.8KV DEAD-END

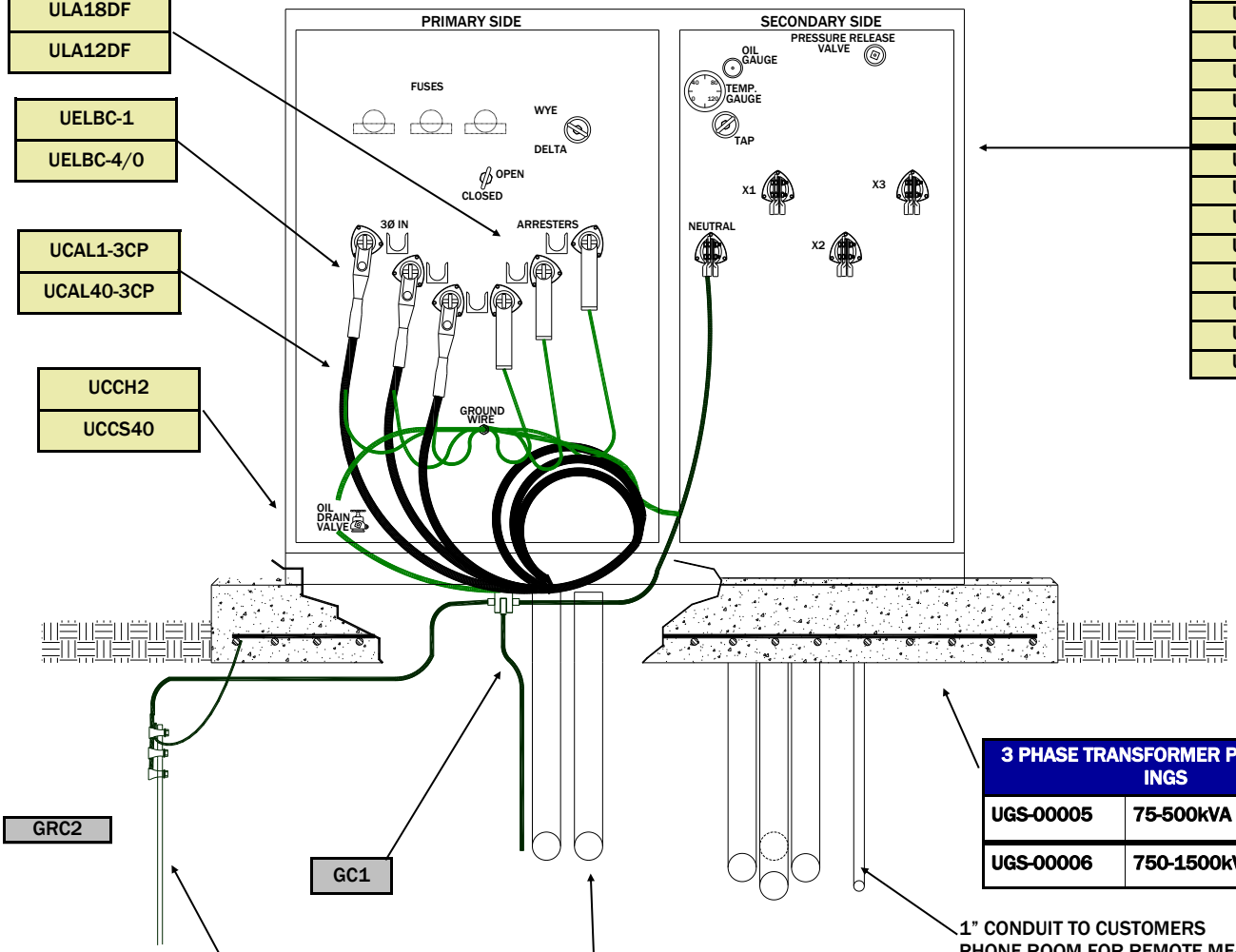
UT9326
UT9332
UT9338
UT9343
UT9352
UT9358
UT9364
UT9370
UT9526
UT9532
UT9538
UT9543
UT9552
UT9558
UT9564
UT9570

ULA18DF
ULA12DF

UELBC-1
UELBC-4/0

UCAL1-3CP
UCAL40-3CP

UCCH2
UCCS40



GRC2

GC1

See Ground Ring installation

SPARE PRIMARY CONDUIT

1" CONDUIT TO CUSTOMERS PHONE ROOM FOR REMOTE METERING

3 PHASE TRANSFORMER PAD DRAWINGS	
UGS-00005	75-500kVA
UGS-00006	750-1500kVA

CUSTOMER'S SECONDARY CONDUIT:
Maximum Conduits Allowed:
8 DUCTS 75-500kVA
12 DUCTS 750kVA-1500kVA

GROUNDING ITEMS MATERIAL LIST		
STOCK	DESCRIPTION	Item
011210000	CABLE CU BSD 2 7S	CU2
184380000	ROD GROUND CW 5/8X8	GR1
220500000	CLAMP GR ROD 8-2 CU	GRC1
223480000	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	GC1
223490000	GRD CONN 1/0 OR 5/8" GND ROD	GRC2

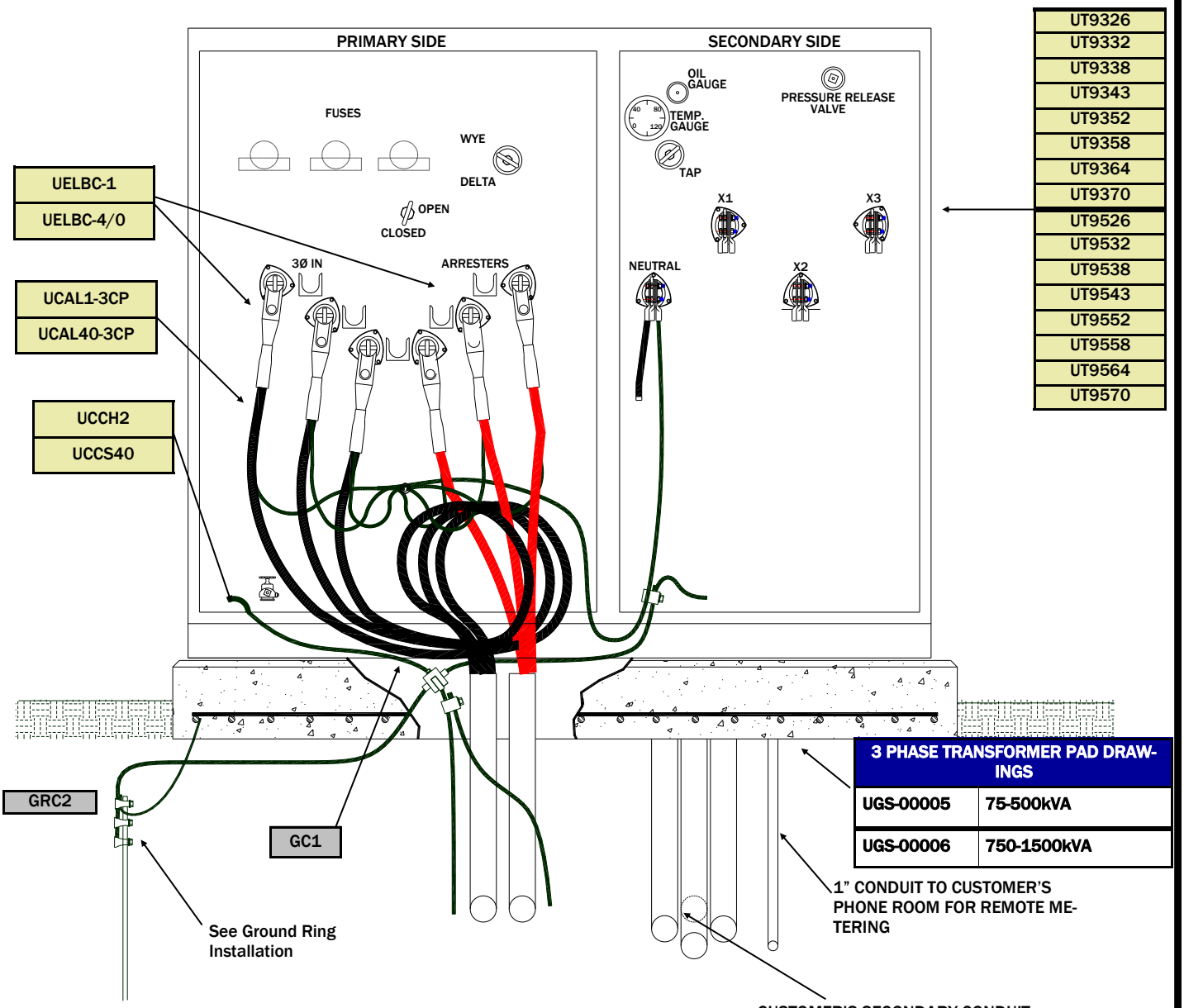
General Notes
1. When connecting the concentric neutrals to ground leave adequate slack to operate the elbows.
2. Tie the concentric neutrals together before connecting to the ground loop. This is necessary to ensure uniform neutral conductivity.
3. Ground ring is not pictured.
4. Ground lead from the arrester to the transformer tank must be as short as possible. This is critical to reduce the voltage stress on the transformer during a lightning strike or other voltage spikes.
5. Rebar in pad must be tied to the ground ring at all four corners.

UG PLATE BOOK DRAWING (TRANS INST 3P DF).dwg

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	WMS	UPDATED TO BAYONET	12/14/17
C	MTE	UPDATED TRANSFORMER PAD DRAWING #	10/25/18

NES

T&D TRANSFORMER STANDARDS
DEAD-END TRANSFORMER INSTALLATION
3 PHASE DEAD-END



UT9326
UT9332
UT9338
UT9343
UT9352
UT9358
UT9364
UT9370
UT9526
UT9532
UT9538
UT9543
UT9552
UT9558
UT9564
UT9570

3 PHASE TRANSFORMER PAD DRAWINGS	
UGS-00005	75-500kVA
UGS-00006	750-1500kVA

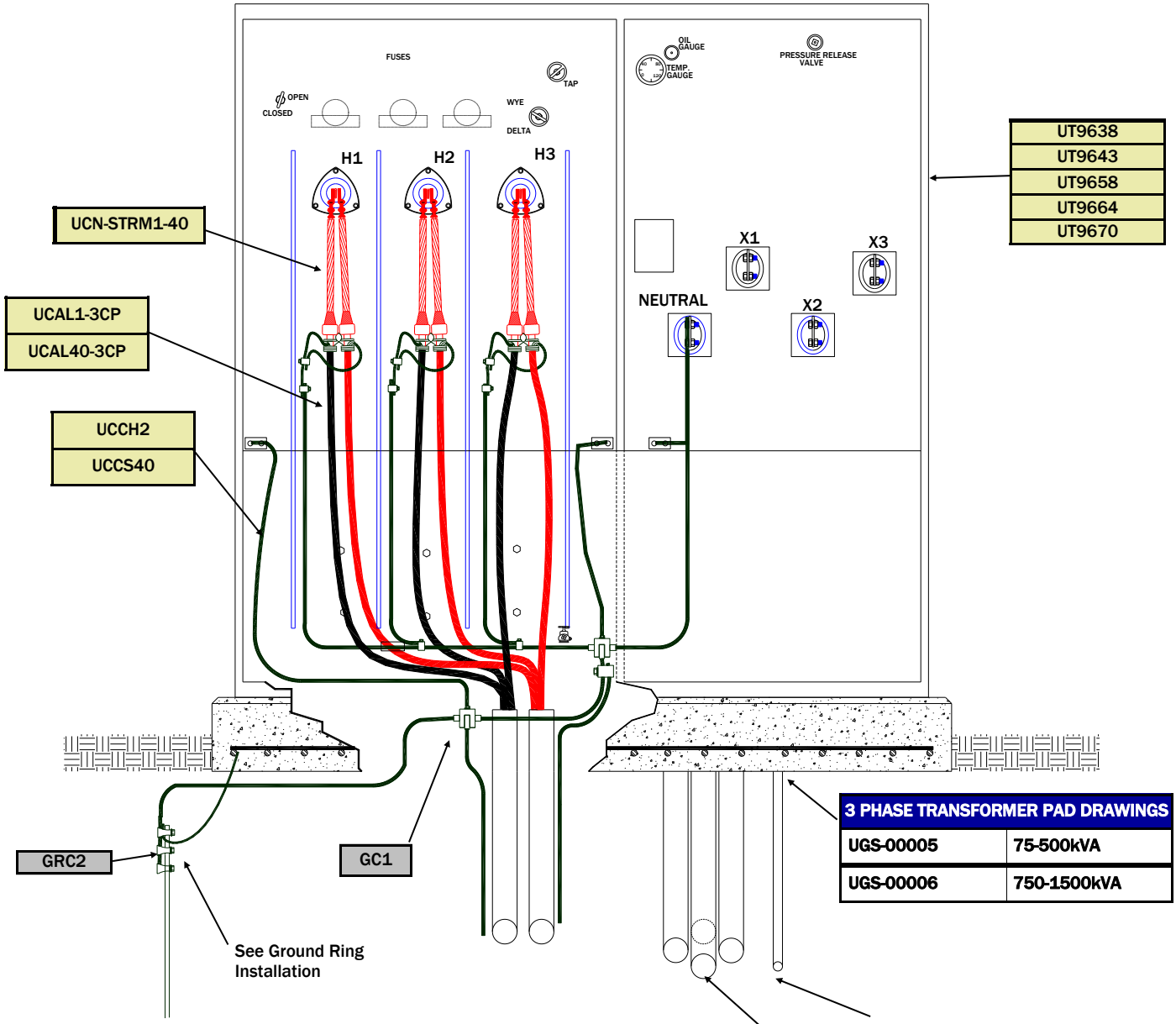
GROUNDING ITEMS		
MATERIAL LIST		
STOCK	DESCRIPTION	Item
011210000	CABLE CU BSD 2 7S	CU2
184380000	ROD GROUND CW 5/8X8	GR1
220500000	CLAMP GR ROD 8-2 CU	GRC1
223480000	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	GC1
223490000	GRD CONN 1/0 OR 5/8" GND ROD	GRC2

General Notes
1. When connecting the concentric neutrals to ground leave adequate slack to operate the elbows.
2. Tie the concentric neutrals together before connecting to the ground loop. This is necessary to ensure uniform neutral conductivity.
3. Ground ring is not pictured.
4. Rebar in pad must be tied to the ground ring at all four corners.

UG PLATE BOOK DRAWING (TRANS INST 3P DF).dwg

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	WMS	CHANGED TO BAYONET FUSE	12/14/17
C	MTE	UPDATED TRANSFORMER PAD DRAWING #	10/25/18

T&D TRANSFORMER STANDARDS
DEAD-FRONT TRANSFORMER INSTALLATION
3 PHASE LOOP FEED



3 PHASE TRANSFORMER PAD DRAWINGS	
UGS-00005	75-500kVA
UGS-00006	750-1500kVA

CUSTOMER'S SECONDARY CONDUIT:
Maximum Conduits Allowed:
8 DUCTS 75-500kVA
12 DUCTS 750kVA-1500kVA

GROUNDING ITEMS MATERIAL LIST		
STOCK	DESCRIPTION	Item
011210000	CABLE CU BSD 2 7S	CU2
184380000	ROD GROUND CW 5/8X8	GR1
220500000	CLAMP GR ROD 8-2 CU	GRC1
223480000	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	GC1
223490000	GRD CONN 1/0 OR 5/8" GND ROD	GRC2

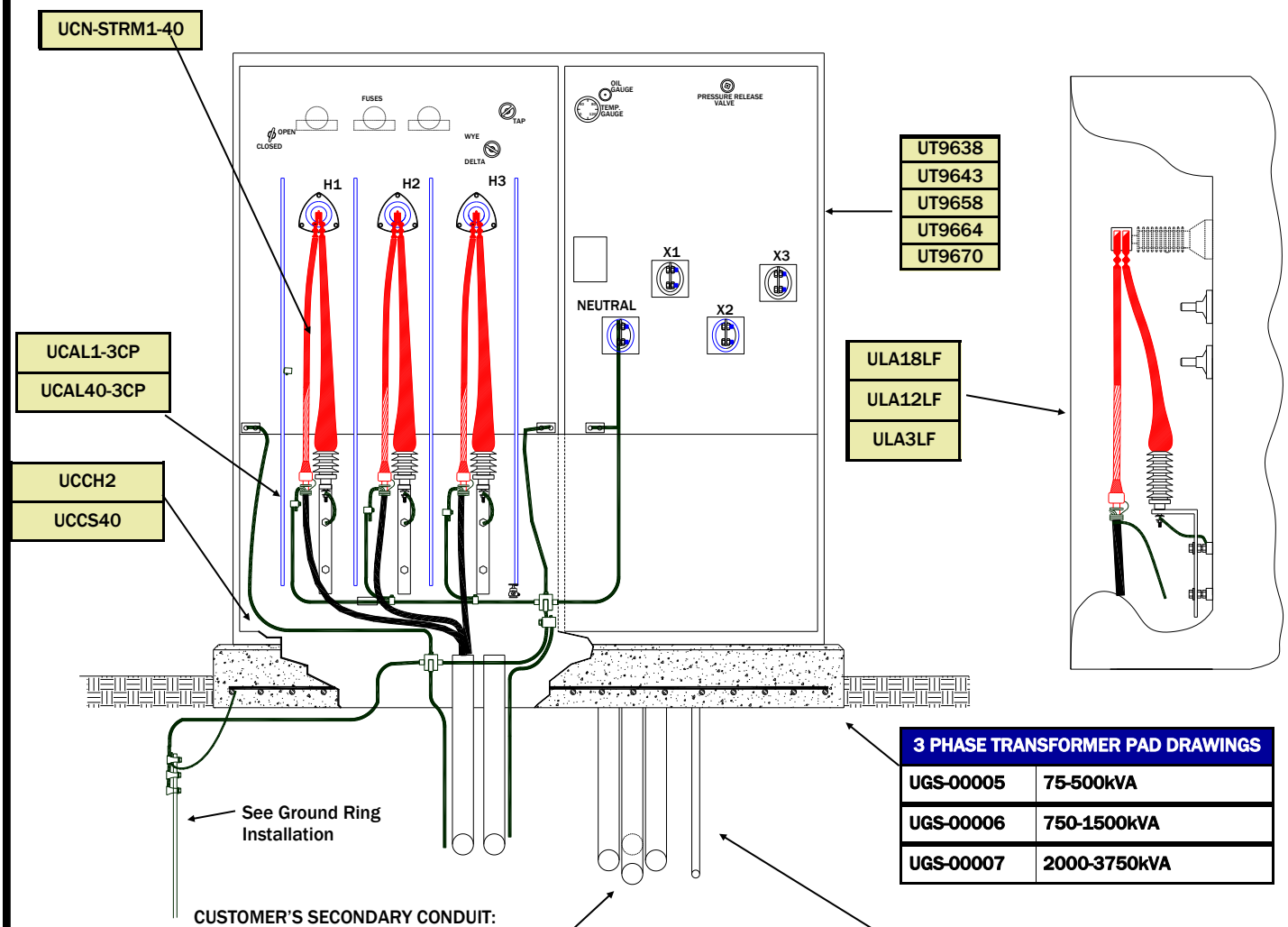
General Notes
1. Tie the concentric neutrals together before connecting to the ground loop. This is necessary to ensure uniform neutral conductivity.
2. Ground ring is not pictured.
3. Rebar in pad must be tied to the ground ring at all four corners.

UG PLATE BOOK DRAWING (TRANS INST 3P LF).dwg

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	WMS	UPDATED TO BAYONET FUSES	12/14/17
C	MTE	UPDATED TRANSFORMER PAD DRAWING #	10/25/18

NES

T&D TRANSFORMER STANDARDS
LIVE-FRONT TRANSFORMER INSTALLATION
3 PHASE LOOP FEED



3 PHASE TRANSFORMER PAD DRAWINGS	
UGS-00005	75-500kVA
UGS-00006	750-1500kVA
UGS-00007	2000-3750kVA

GROUNDING ITEMS MATERIAL LIST		
STOCK	DESCRIPTION	Item
011210000	CABLE CU BSD 2 7S	CU2
184380000	ROD GROUND CW 5/8X8	GR1
220500000	CLAMP GR ROD 8-2 CU	GRC1
223480000	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	GC1
223490000	GRD CONN 1/0 OR 5/8" GND ROD	GRC2

UT9676
UT9679
UT9682

Although the primary connection is the same as in this drawing, 2000-3750kVA transformers do not have internal fusing and must be fused for the transformer at the riser pole.

General Notes

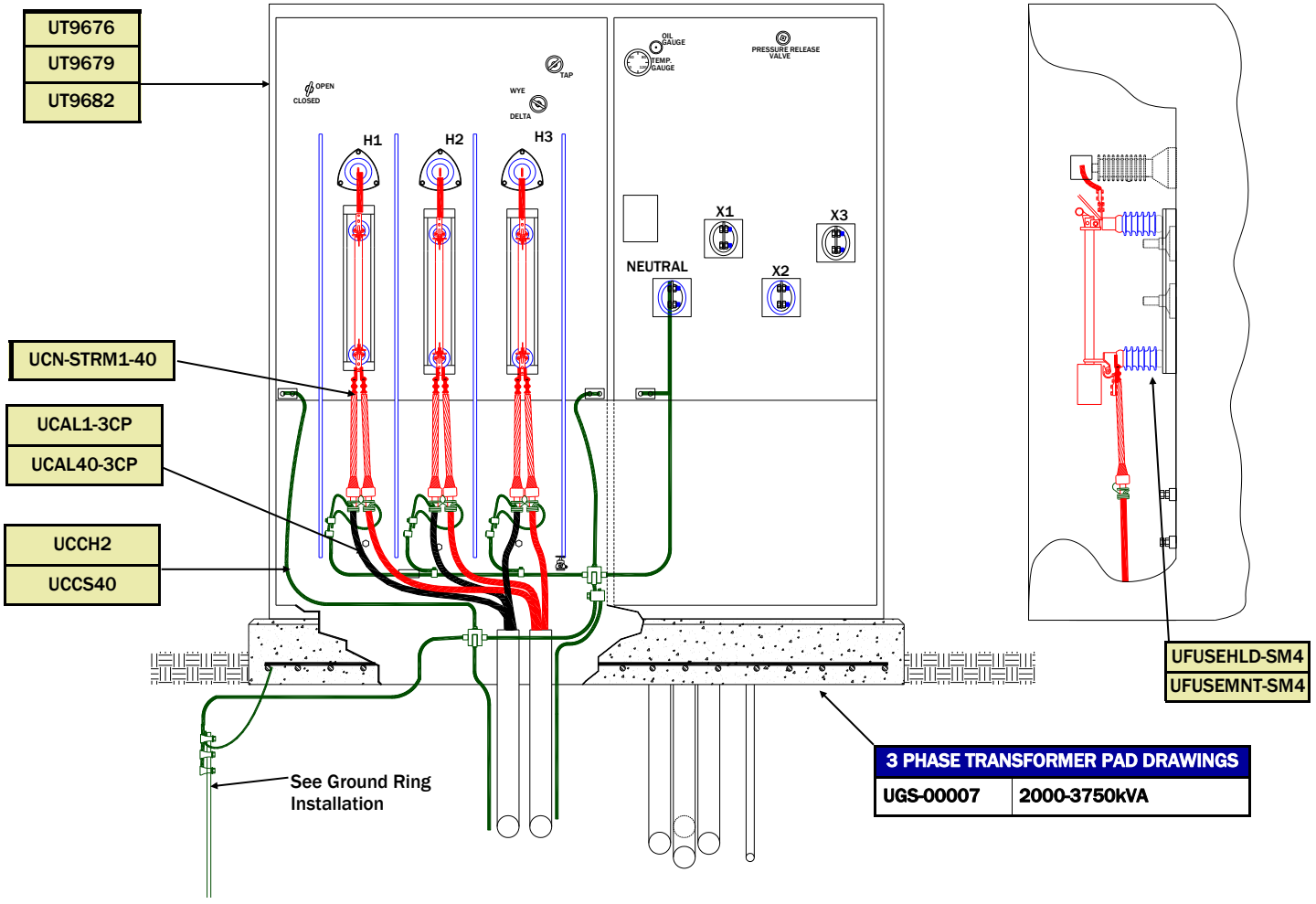
1. Tie the concentric neutrals together before connecting to the ground loop. This is necessary to ensure uniform neutral conductivity.
2. Omit the secondary neutral connection if a ground strap is present.
3. Ground ring is not pictured.
4. Rebar in pad must be tied to the ground ring at all four corners.
5. Stress cones must be positioned at the arrester's base.
6. Leads from the arrester to the transformer tank and HV bushing must be as short as possible. This is critical to reduce the voltage stress on the transformer during a lightning strike or other voltage spikes.

UG PLATE BOOK DRAWING (TRANS INST 3P

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	WMS	UPDATED TO BAYONET	12/14/17
C	MTE	UPDATED TRANSFORMER PAD DRAWING #	10/25/18

T&D TRANSFORMER STANDARDS

LIVE-FRONT TRANSFORMER INSTALLATION 3 PHASE DEAD-END



3 PHASE TRANSFORMER PAD DRAWINGS	
UGS-00007	2000-3750kVA

General Notes

1. Tie the concentric neutrals together before connecting to the ground loop. This is necessary to ensure uniform neutral conductivity.
2. Omit the secondary neutral connection if a ground strap is present.
3. Ground ring is not pictured.
4. Rebar in pad must be tied to the ground ring at all four corners.

GROUNDING ITEMS		
MATERIAL LIST		
STOCK	DESCRIPTION	Item
011210000	CABLE CU BSD 2 7S	CU2
184380000	ROD GROUND CW 5/8X8	GR1
220500000	CLAMP GR ROD 8-2 CU	GRC1
223480000	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	GC1
223490000	GRD CONN 1/0 OR 5/8" GND ROD	GRC2

NOTE:
Typical installation practice is to fuse 2000kVA and larger transformers from individual bays of a PHM type switch or from individual riser poles. Use this plate only if it is not possible to install multiple risers or a pad mounted switch.

UG PLATE BOOK DRAWING (TRANS INST 3P LP).dwg

NON-STANDARD INSTALLATION

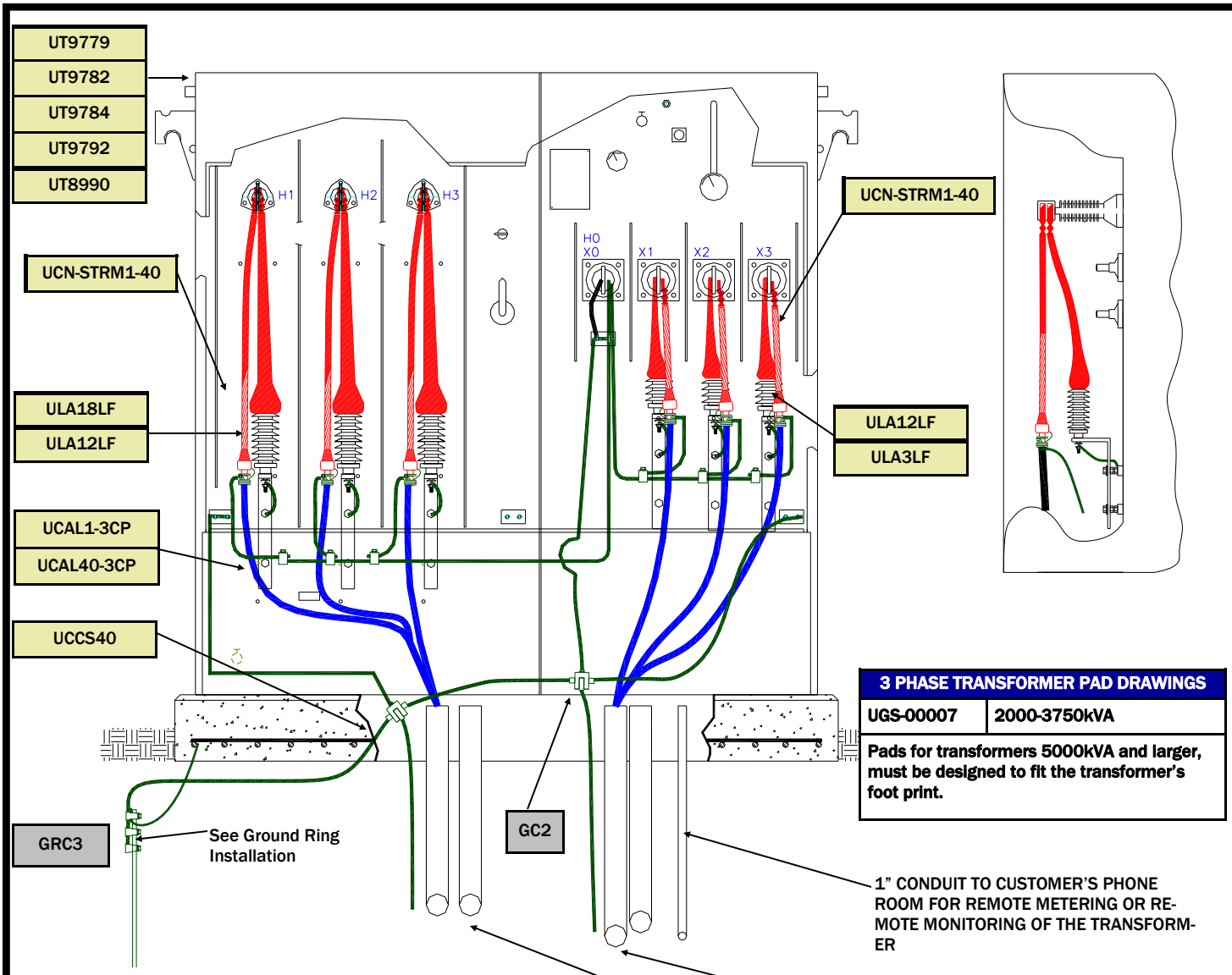
REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	MTE	UPDATED TRANSFORMER PAD DRAWING #	10/25/18

NES

T&D TRANSFORMER STANDARDS

LIVE-FRONT TRANSFORMER INSTALLATION

3 PHASE FUSED LOOP FEED 2000-3750KVA



3 PHASE TRANSFORMER PAD DRAWINGS	
UGS-00007	2000-3750kVA
Pads for transformers 5000kVA and larger, must be designed to fit the transformer's foot print.	

GROUNDING ITEMS MATERIAL LIST		
STOCK	DESCRIPTION	Item
011260000	CABLE CU BSD 4/0 19S	CU40
184380000	ROD GROUND CW 5/8X8	GR1
223486000	GRD CONN # 2 TO 4/0 CU CABLE AMP WRENCH -LOK	GC2
223490000	GRD CONN 1/0 OR 5/8" GND ROD	GRC2
223494000	GRD CONN 4/0 TO 4/0 MCM CU. CABLE AND 4/0 MCM CU.TO 5/8" GRD ROD	GRC3
223496000	GRD CONN 500 TO 4/0 MCM COPPER CABLE.	GC5

General Notes

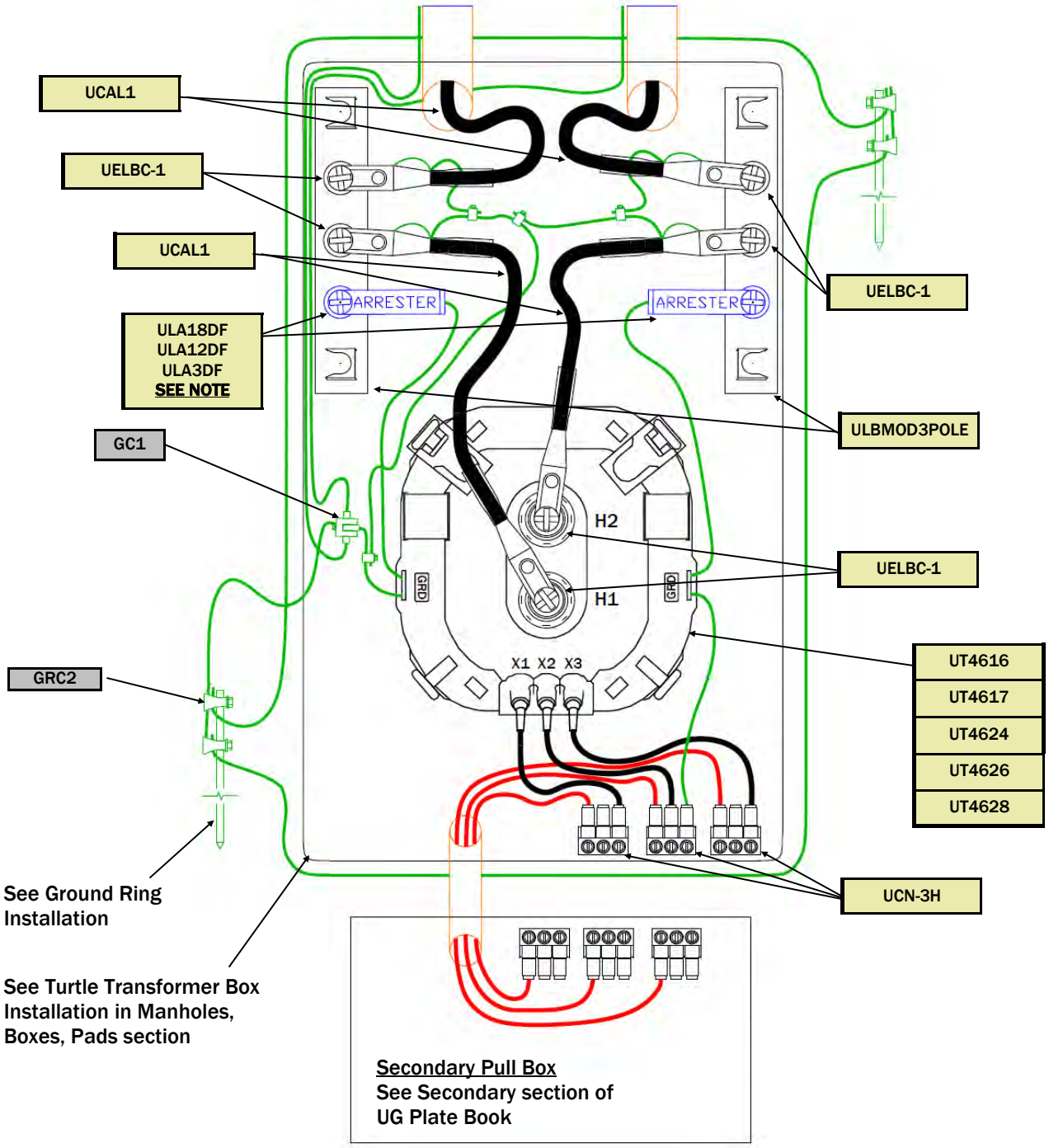
1. Tie the concentric neutrals together before connecting to the ground loop. This is necessary to ensure uniform neutral conductivity.
2. Omit the secondary neutral connection if a ground strap is present.
3. Ground ring is not pictured.
4. Rebar in pad must be tied to the ground ring at all four corners.
5. Stress cones must be positioned at the arrester's base.
6. Leads from the arrester to the transformer tank and to the bushings must be as short as possible. This is critical to reduce the voltage stress on the transformer during a lightning strike or other voltage spikes.
7. Arresters must be installed on both the high and low voltage leads.

UG PLATE BOOK DRAWING (TRANS INST 3P LF STEP DOWN STATION).dwg

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	MTE	UPDATED TRANSFORMER PAD DRAWING #	10/25/18

T&D TRANSFORMER STANDARDS

LIVE-FRONT TRANSFORMER INSTALLATION 3 PHASE STEP-DOWN STATION



GROUNDING ITEMS		
MATERIAL LIST		
STOCK	DESCRIPTION	Item
011210000	CABLE CU BSD 2 7S	CU2
184380000	ROD GROUND CW 5/8X8	GR1
220500000	CLAMP GR ROD 8-2 CU	GRC1
223480000	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	GC1
223490000	GRD CONN 1/0 OR 5/8" GND ROD	GRC2

General Notes

1. When connecting the concentric neutrals to ground leave adequate slack to operate the elbows.
2. Tie the concentric neutrals together before connecting to the ground loop. This is necessary to ensure uniform neutral conductivity.
3. Ground lead from the arrester to the transformer tank must be as short as possible. This is critical to reduce the voltage stress on the transformer during a lightning strike or other voltage spikes.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	BMM	CREATED	9/2/22

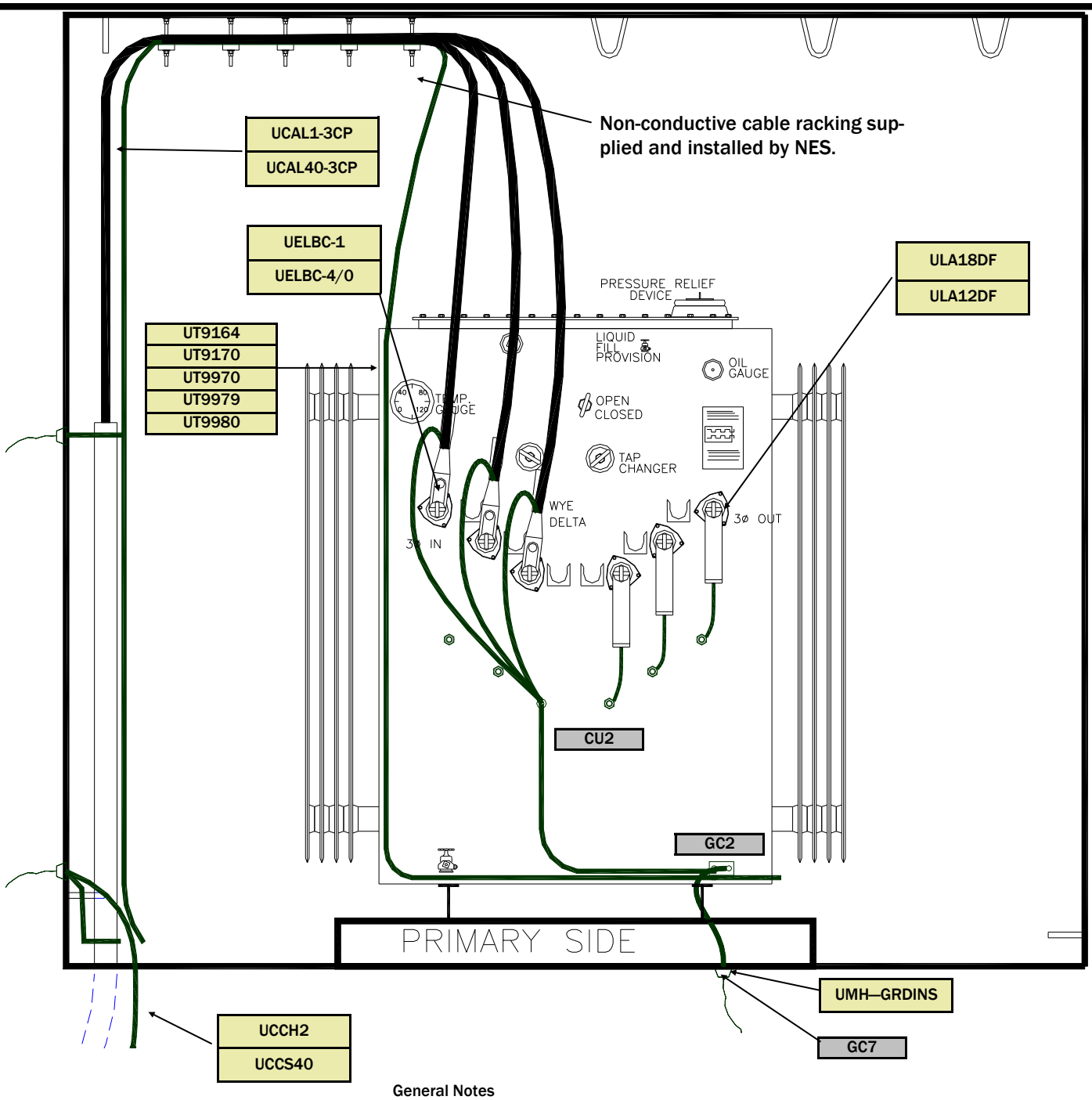
NES

T&D TRANSFORMER STANDARDS

SOLID INSULATION DISTRIBUTION TRANSFORMER (SIDT)

SUMBERSIBLE TURTLE TRANSFORMER

1 PHASE BELOW GRADE



General Notes

1. When connecting the concentric neutrals to ground leave adequate slack to operate the elbows.
2. Tie the concentric neutrals together before connecting to the ground loop. This is necessary to ensure uniform neutral conductivity.
3. Grounding must be tied to the building structure. The builder will position ground inserts per NES specifications .
4. Ground lead from the arrester to the transformer tank must be as short as possible. This is critical to reduce the voltage stress on the transformer during a lightning strike or other voltage spikes.
5. A spare primary conduit is always required for vault installations.
6. Contact Customer Engineering Standards Group to obtain the latest revision of the "Vault Design Guide".

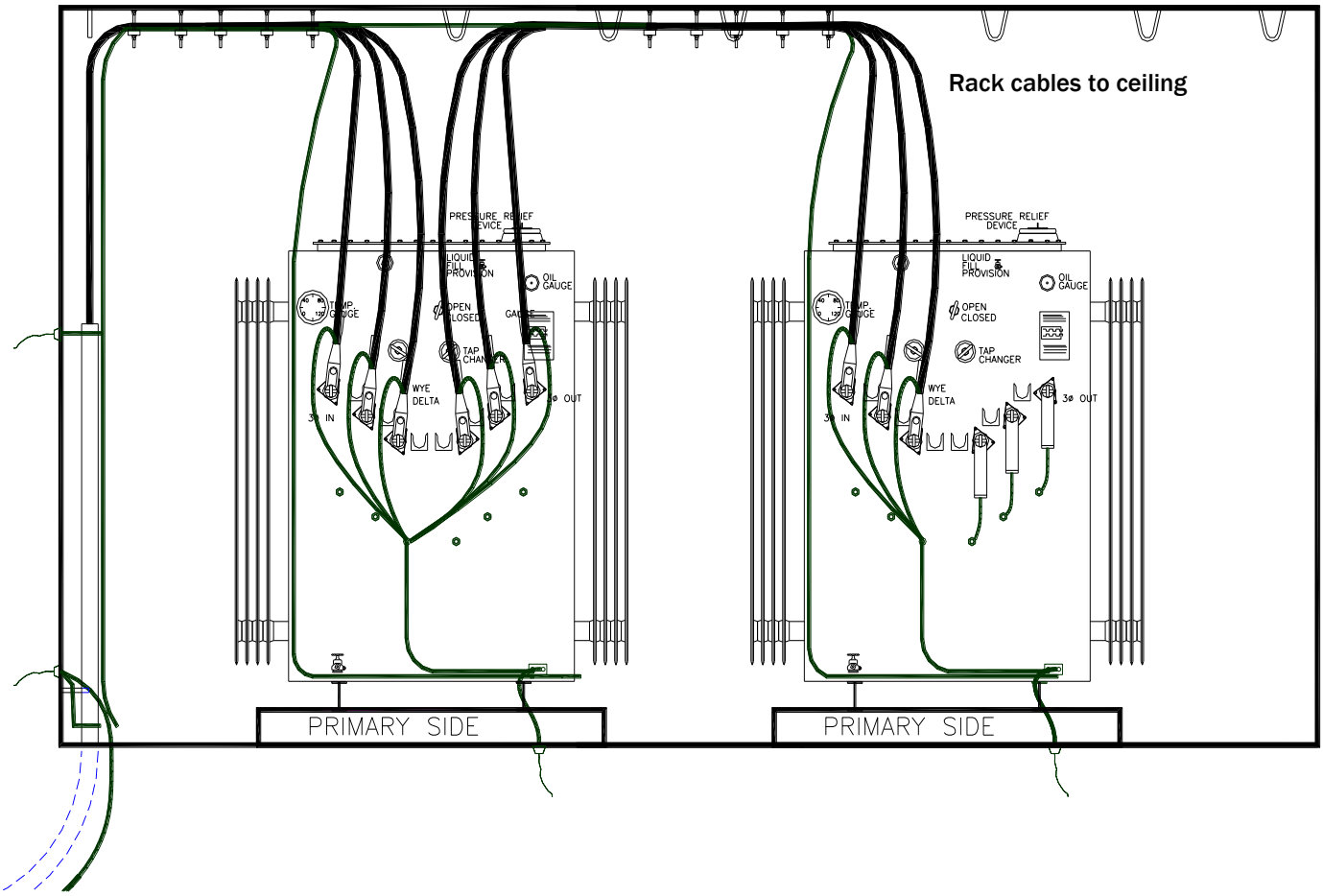
GROUNDING ITEMS
MATERIAL LIST

STOCK	DESCRIPTION	Item
011210000	CABLE CU BSD 2 7S	CU2
223480000	CONN GRD 4-2 TO 4-2 CU	GC2
380300000	INSERT GROUND #1/0-300MCM	GC7

UG PLATE BOOK DRAWING (TRANS INST. 3P DV).DWG

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	FAF		2/04/08

T&D TRANSFORMER STANDARDS
VAULT TRANSFORMER INSTALLATION
3 PHASE DEAD-FRONT; DEAD-END



GENERAL NOTES:

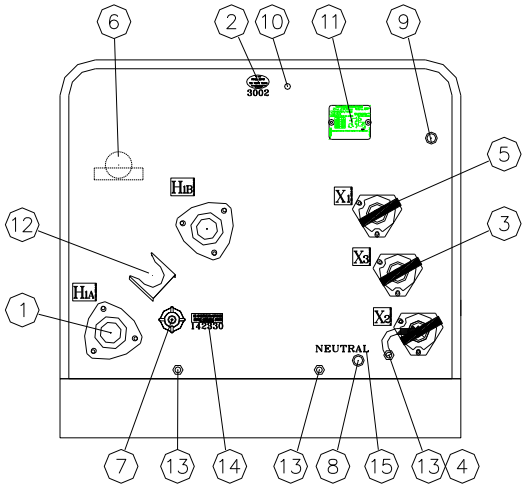
1. The NES standard for non network vault installations is to have a single transformer fed from the riser pole or an isolated switch bay.
2. It is preferable to have multiple risers, individual switch bays and vaults when multiple transformers are required. This limits the impact of a transformer failure to the customers served from the failed unit. This also limits the number of customers affected by maintenance.
3. The drawing above indicates how to install a loop feed configuration in a single vault.
4. Cable conduits should not be installed in the floor where they cross transformer ingress/egress path. The weight of the transformer could collapse the pipe.
5. Cables should be racked to the ceiling. Do not lay the cables on the floor where they could become a tripping hazard.
6. All materials are the same as the dead-end installation.
7. Connect the concentric neutrals to each other before tying to the grounding system.

UG PLATE BOOK DRAWING (TRANS INST. 3P DV).DWG

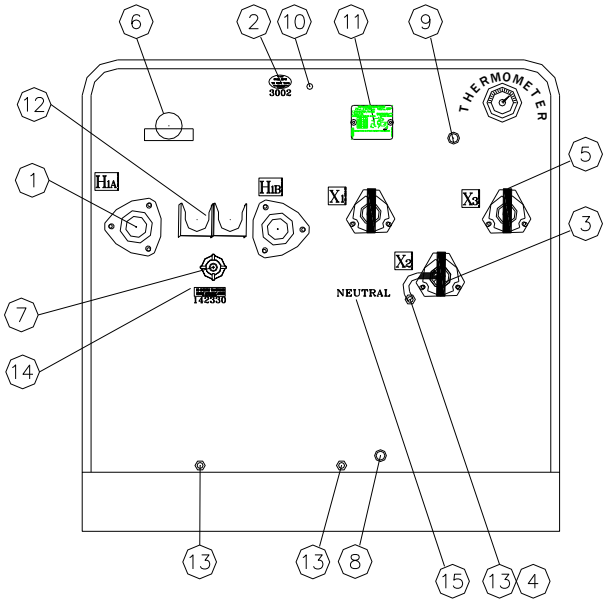
REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	FAF		2/04/08

T&D TRANSFORMER STANDARDS

VAULT TRANSFORMER INSTALLATION
3 PHASE DEAD-FRONT; LOOP FEED

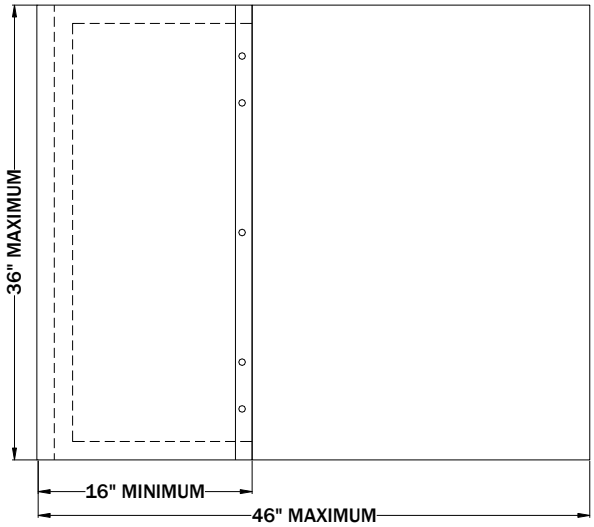


FRONT VIEW
25-100kVA



FRONT VIEW
167-250kVA

DEAD FRONT TRANSFORMER TYPICAL COMPONENTS	
ITEM	**DESCRIPTION**
1	High Voltage Wells (Loop Feed)
2	Pressure Relief Valve Decal
3	Low Voltage Bushing
4	Removable Copper Ground Strap
5	4/6/8 Hole H Type Spades
6	Bayonet Fuse
7	Tap Changer Switch
8	1/2" Drain Plug
9	1/2" Fill Plug
10	Pressure Relief Valve
11	Type A Nameplate
12	Parking Stand
13	1/2"-13 Ground Pad
14	Tap Changer De-energize Decal
15	Stencil Neutral in 1/2" Yellow Letters
Additional Features (Not Shown)	
Hold Down Cleats	
Penta-Head Security Bolt	
Removable Sill	
5/8"-11 Stainless Steel Lifting Bolts	
Epoxy Paint Undercoat 2" up	
Adhesive Terminal Decals	
Munsell Green 7GY3.29/1.5	
Mild Steel Tank	
Stainless Steel Hinges and Pins	
CLF Fuse	
Thermometer (167-250kVA)	



LIMITING DIMENSIONS

Transformer kVA	Impedance
25	Z > 2.1%
50	Z > 2.1%
75	Z > 3.2%
100	Z > 2.1%
167	Z > 3.2%
250	Z > 4.8%

NES SPECIFICATION NUMBER ET-561-X

NOTE:
Transformers may vary in placement of features and dimensions

UG PLATE BOOK DRAWING (1P DF TRANS).dwg

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	WMS	UPDATED TO BAYONET FUSES	12/14/17

T&D TRANSFORMER STANDARDS
MATERIAL LISTING
DEAD-FRONT 1 PHASE TRANSFORMERS

SINGLE PHASE; PAD MOUNTED; DEAD-FRONT TRANSFORMERS

Compatible Unit	NES Stock #	Primary Voltage	Secondary Voltage	kVA	BIL	Fuse Rating	Fuse Type	Tap Settings (Kilovolts)
UT0324	920324000	4,160 GRD Wye/2,400	240/120	50	60kV	25A	Bay-O-Net	2,520 2,460 2,400 2,340 2,280
UT0326	920326000	4,160 GRD Wye/2,400	240/120	75	60kV	50A	Bay-O-Net	
UT0328	920328000	4,160 GRD Wye/2,400	240/120	100	60kV	65A	Bay-O-Net	
UT2324*	922324000	13,800 GRD Wye /7,970	240/120	50	95kV	10A	Bay-O-Net	2@2-1/2% ABOVE 2 @ 2-1/2% BELOW
UT2326*	922326000	13,800 GRD Wye /7,970	240/120	75	95kV	18A	Bay-O-Net	
UT2328*	922328000	13,800 GRD Wye /7,970	240/120	100	95kV	25A	Bay-O-Net	
UT2334*	922334000	13,800 GRD Wye /7,970	240/120	167	95kV	40A	Bay-O-Net	
UT2340*	922340000	13,800 GRD Wye /7,970	240/120	250	95kV	45A	Bay-O-Net	
UT8116	928116000	23,900 GRD Wye /13,800	240/120	25	125kV	3A	Bay-O-Net	14,400 14,100 13,800 13,500 13,200
UT8124	928124000	23,900 GRD Wye /13,800	240/120	50	125kV	6A	Bay-O-Net	
UT8126	928126000	23,900 GRD Wye /13,800	240/120	75	125kV	10A	Bay-O-Net	
UT8128	928128000	23,900 GRD Wye /13,800	240/120	100	125kV	12A	Bay-O-Net	
UT8134	928134000	23,900 GRD Wye /13,800	240/120	167	125kV	18A	Bay-O-Net	
UT8140	928140000	23,900 GRD Wye /13,800	240/120	250	125kV	30A	Bay-O-Net	

ITEMS REQUIRED FOR CABLE CONNECTION

SYSTEM VOLTAGE	23.9kV		13.8kV		4kV	
CABLE CONFIGURATION	CU	QTY	CU	QTY	CU	QTY
LOOP FEED	UELBC-1	2	UELBC-1	2	UELBC-1	2
LOOP WITH FEED-THROUGH BUSHING	UELBC-1	3	UELBC-1	3	UELBC-1	3
	UBINS200A-F	1	UBINS200A-F	1	UBINS200A-F	1
DEAD END	UELBC-1	1	UELBC-1	1	UELBC-1	1
	ULA18DF	1	ULA12DF	1	ULA3DF	1

GENERAL NOTES:
All dead-front transformers ordered since the date of this standard should arrive with 200A 25kV bushing inserts. This includes both the 13.8kV and 4kV transformers.
An arrester must be installed at the end of every cable run.
A parking stand arrester should be used to protect the cable whenever a circuit is opened for maintenance.

GROUNDING ITEMS

TRUCK STOCK MATERIAL LIST

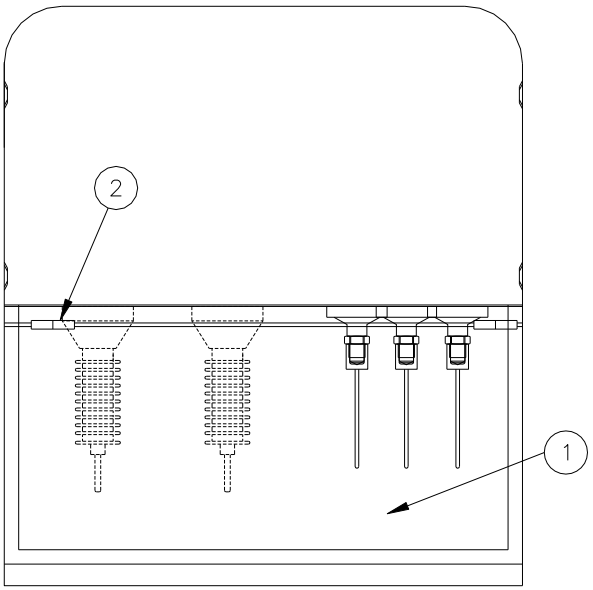
STOCK	DESCRIPTION	QTY	UNIT
011210000	CABLE CU BSD 2 7S	20	FT
184380000	ROD GROUND CW 5/8X8	4	EA
223490000	GRD CONN 1/0 OR 5/8" GND ROD	8	EA
223480000	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	2	EA

* These transformers can only be used on 13.8kV circuits where there is a system neutral from the substation to the riser pole feeding the underground circuit. Care must be taken before selecting these transformers because the 13.8kV system is predominately a delta configuration.

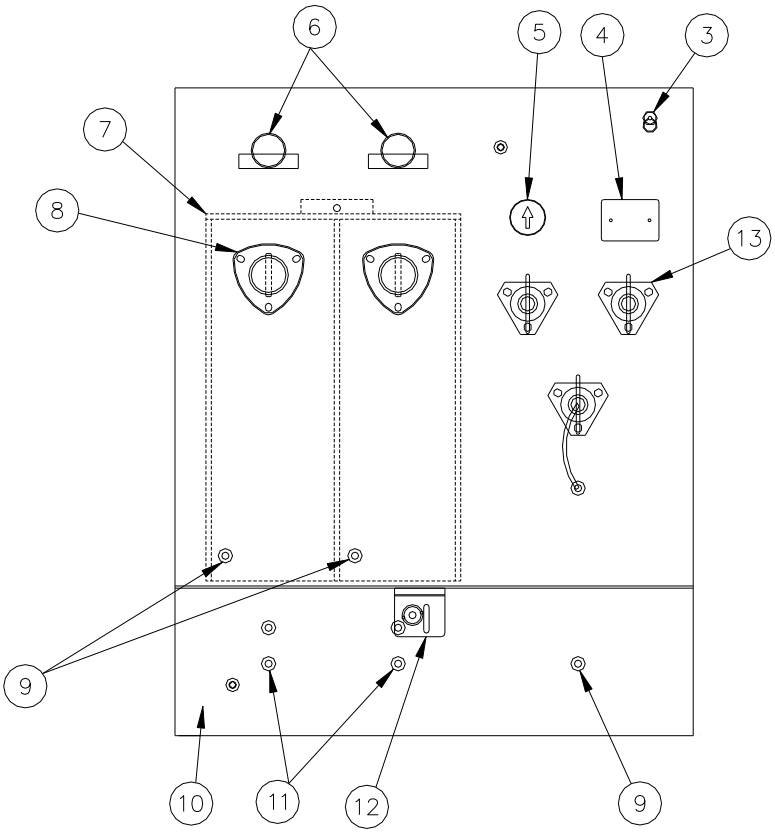
REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	WMS	UPDATED VOLTAGES AND TAPS	12/14/17

NES

T&D TRANSFORMER STANDARDS
MATERIAL LISTING
DEAD-FRONT 1 PHASE TRANSFORMERS

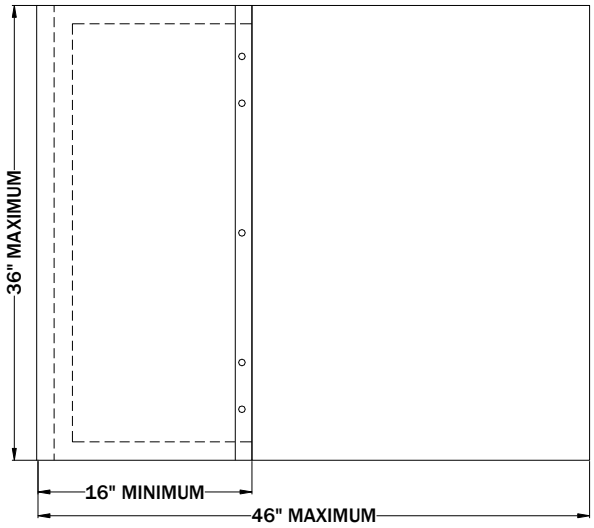


TOP VIEW
25-250kVA



FRONT VIEW
25-250kVA

ITEM	DESCRIPTION
1.	CABLE ENTRANCE AREA
2.	COMPARTMENT COVER W/STAINLESS STEEL HINGES
3.	PRESSURE RELIEF VALVE
4.	DIAGRAMMATIC NAMEPLATE
5.	NO-LOAD TAP CHANGE
6.	BAYONET FUSE W/DRIP SHIELD
7.	HV BARRIER SHIELD ASSEMBLY
8.	HV BUSHING, EXT. CLAMPED WITH A 2 HOLE VERTICAL SPADE
9.	GROUND NUT
10.	REMOVABLE SILL
11.	ARRESTER MOUNTING PROVISION
12.	DOOR LIFT TAP W/PANTA-HEAD BOLT AND PADLOCK PROVISION
13.	LV BUSHING CLAMPED WITH 6 HOLE SPADE



LIMITING DIMENSIONS

UG PLATE BOOK DRAWING (TRANS 1P LF).dwg

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

NES

T&D TRANSFORMER STANDARDS
MATERIAL LISTING
LIVE-FRONT 1 PHASE TRANSFORMERS

SINGLE PHASE; PAD MOUNTED; LIVE FRONT TRANSFORMERS								
Compatible Unit	NES Stock #	Primary Voltage	Secondary Voltage	kVA	BIL	Fuse Rating	Fuse Type	Tap Settings (Kilovolts)
UT0216	920216000	4,160 GRD Wye/2,400	240/120	50	60kV	25A	Bay-O-Net	2,520 2,460 2,400 2,340 2,280
UT0224	920224000	4,160 GRD Wye/2,400	240/120	75	60kV	50A	Bay-O-Net	
UT0228	920228000	4,160 GRD Wye/2,400	240/120	100	60kV	65A	Bay-O-Net	
UT7924*	927924000	23,900 GRD Wye /13,800	240/120	50	125kV	2-6A	Bay-O-Net	2@2-1/2% ABOVE 2 @ 2-1/2% BELOW
UT7926*	927926000	23,900 GRD Wye /13,800	240/120	75	125kV	2-10A	Bay-O-Net	
UT7928*	927928000	23,900 GRD Wye /13,800	240/120	100	125kV	2-12A	Bay-O-Net	
UT7934*	927934000	23,900 GRD Wye /13,800	240/120	167	125kV	2-18A	Bay-O-Net	
UT7940*	927940000	23,900 GRD Wye /13,800	240/120	250	125kV	2-30A	Bay-O-Net	

Transformer kVA	Impedance
25	Z > 2.1%
50	Z > 2.1%
75	Z > 3.2%
100	Z > 2.1%
167	Z > 3.2%
250	Z > 4.8%

ITEMS REQUIRED FOR CABLE CONNECTION						
SYSTEM VOLTAGE	23.9kV		13.8kV		4kV	
	CU	QTY	CU	QTY	CU	QTY
LOOP FEED	UCN-STRM1-40	2	UCN-STRM1-40	4	UCN-STRM1-40	2
DEAD END	UCN-STRM1-40	1	UCN-STRM1-40	2	UCN-STRM1-40	1
	ULA18LF	1	ULA12LF	2	ULA3LF	1

NES SPECIFICATION NUMBER ET-244-X

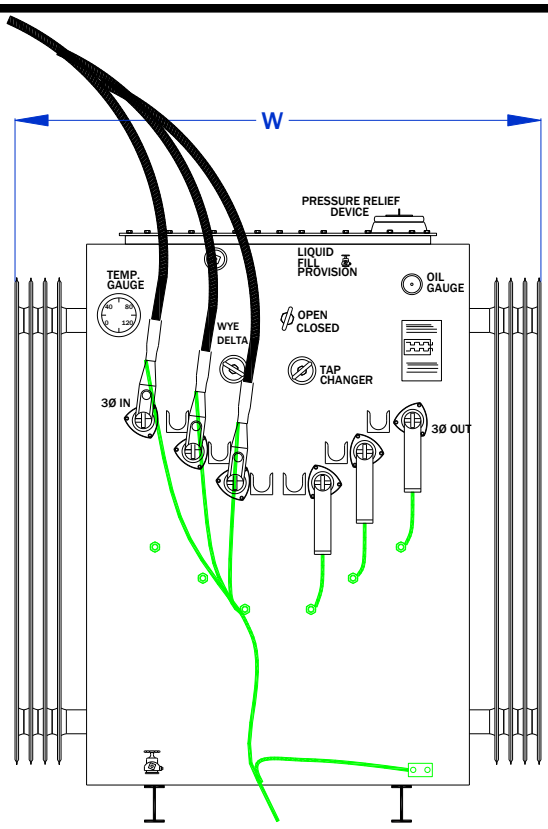
NOTE:
Transformers may vary in placement of features and dimensions

GENERAL NOTES:
* These transformers are normally used only on the 13.8kV Delta system. They require two phases of 13.8kV

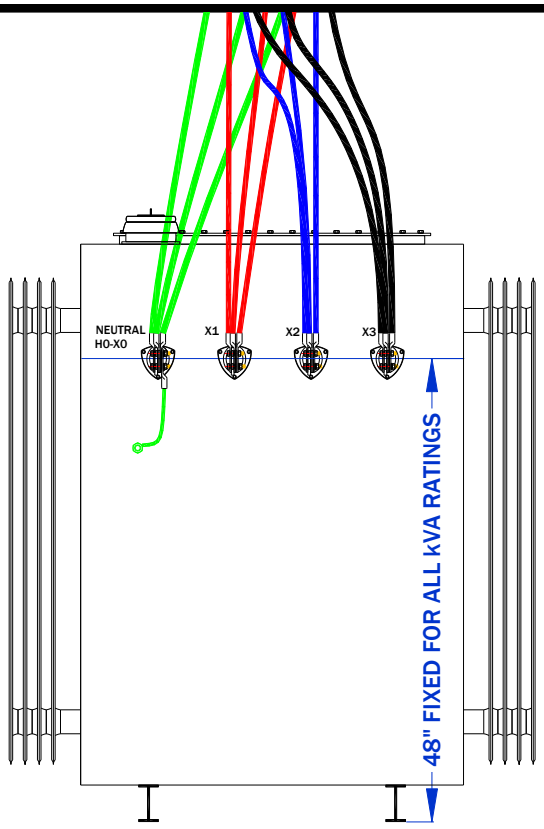
REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	WMS	UPDATED VOLTAGES	12/14/17

NES

T&D TRANSFORMER STANDARDS
MATERIAL LISTING
LIVE-FRONT 1 PHASE TRANSFORMERS



PRIMARY SIDE



SECONDARY SIDE

GENERAL NOTES:

- Customer must build vault in accordance with the latest revision of the NES "Vault Design Guide". Contact the Customer Engineering Standards Group to obtain a copy of the latest revision.
- These transformers must be installed in a vault room with a minimum 4 hour fire rating and secondary oil containment.
- The vault room must provide sufficient ventilation to evacuate the heat generated by the core and winding losses in the transformers.
- These transformers may be used in 23.9kVGrd Wye areas and in 13.8kV Delta areas.
- These transformers are only fused at the riser pole.
- These transformers ARE submersible.
- Transformers may vary in placement of features and dimensions. Specific requirements for vault transformers are available in NES Specification ET-260. Go to the Procurement Sharepoint site, or contact CE Standards Group to access the latest revision.

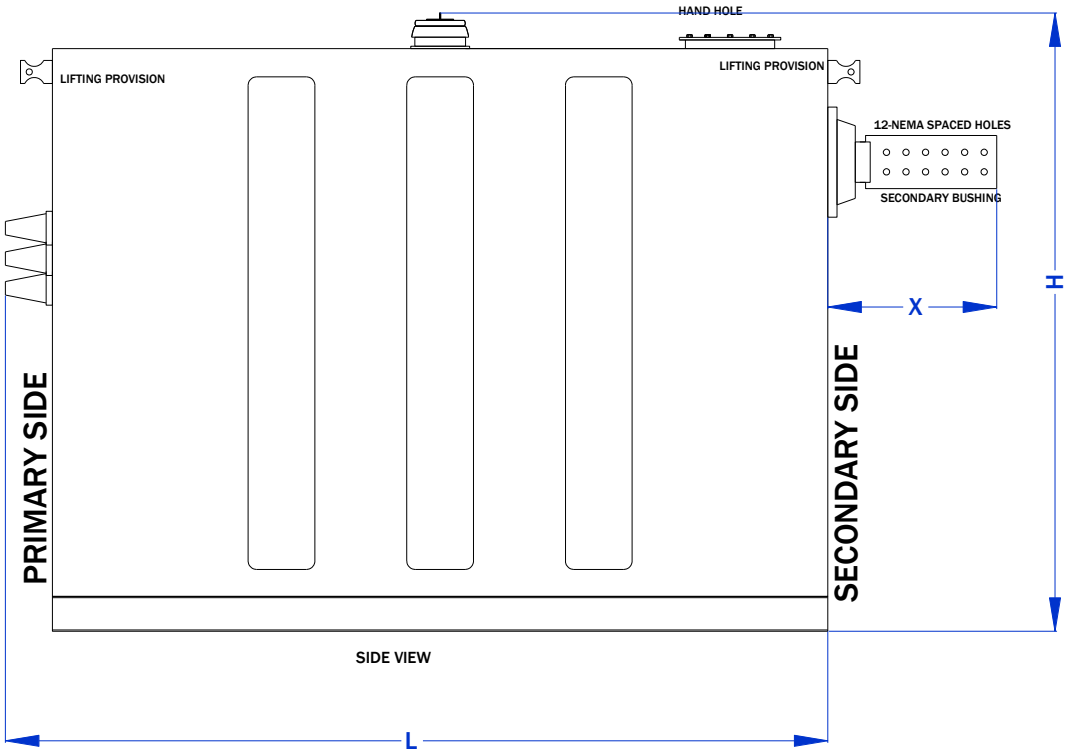
Compatible Unit	NES Stock #	Primary Voltage (kV)	Secondary Voltage (V)	Kilovolt Ampere Rating	Primary Winding BIL	Secondary Winding BIL	Impedance %	Tap Settings (kV)
*** Contact the Customer Engineering Standards Group to have this number created in Ellipse.*								14.4
**	949152000	13.8/23.9GrdY/13.8	208Y/120	500	150kV	30kV	5.75	14.1
UT9164	949164000	13.8/23.9GrdY/13.8	208Y/120	1000	150kV	30kV	5.75	13.8
UT9170	949170000	13.8/23.9GrdY/13.8	208Y/120	1500	150kV	30kV	5.75	13.5
								13.2
**	**	13.8/23.9GrdY/13.8	480Y/277	500	150kV	30kV	5.75	14.4
**	**	13.8/23.9GrdY/13.8	480Y/277	1000	150kV	30kV	5.75	14.1
UT9970	949970000	13.8/23.9GrdY/13.8	480Y/277	1500	150kV	30kV	5.75	13.8
UT9979	949979000	13.8/23.9GrdY/13.8	480Y/277	2500	150kV	30kV	5.75	13.5
UT9980	949980000	13.8/23.9GrdY/13.8	480Y/277	3000	150kV	30kV	5.75	13.2

UG PLATE BOOK DRAWING (TRANS DRY VAULT).dwg

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	FAF		2/04/08
C	WMS	UPDATED VOLTAGES	12/14/17

NES

T&D TRANSFORMER STANDARDS
MATERIAL LISTING
VAULT ENCLOSED TRANSFORMERS



VAULT TRANSFORMER LIMITING DIMENSIONS					
kVA	Width (in)	Length (in)	Height (in)	Weight (US Pounds) ±20%	Oil Volume (US Gallons) ±20%
150 kV BIL					
1000	72	108	93	9,500	450
1500	72	108	97	12,000	510
2000	84	120	113	16,000	575
2500	84	120	117	20,000	650
3000	96	120	120	25,000	850
3750	97	85	76	31,300	706

CU CODE	UMN—GRDINS		
MATERIAL LIST			
STOCK	DESCRIPTION	QTY	UNIT
380300000	INSERT GROUND #1/0-300MCM	1	EA

CU CODE	UCCU-2		
TRUCK STOCK MATERIAL LIST			
STOCK	DESCRIPTION	QTY	UNIT
011210000	CABLE CU BSD 2 7S	20	FT

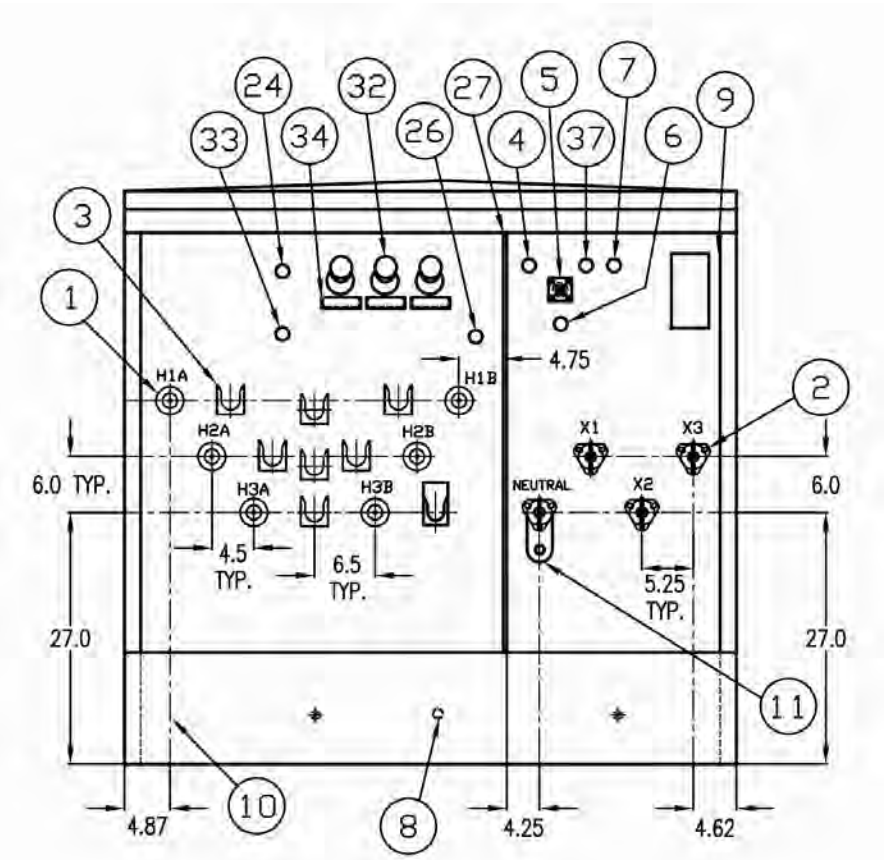
GROUNDING ITEMS:
Grounding must be tied to the building steel and vault reinforcing steel. Ground inserts must be issued and installed per the vault design.

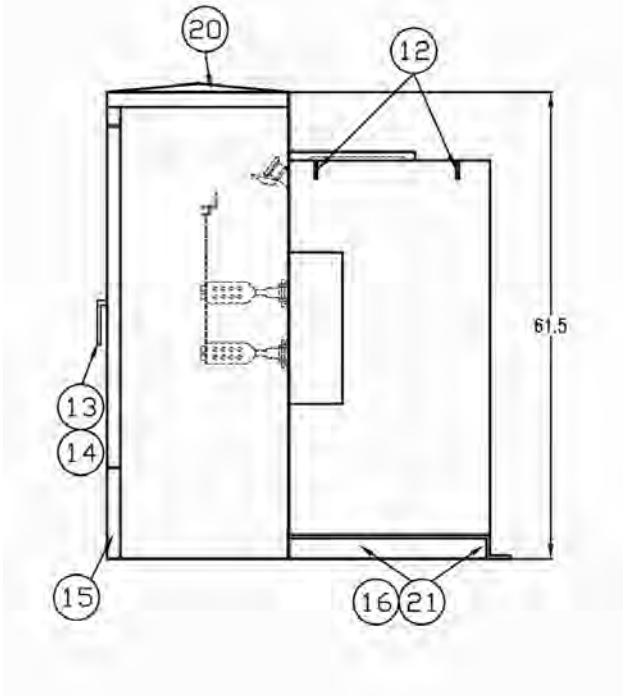
ITEMS REQUIRED FOR CABLE CONNECTION				
SYSTEM VOLTAGE	23.9kV		13.8kV	
CABLE CONFIGURATION	CU	QTY	CU	QTY
LOOP FEED	UELBC-1	6	UELBC-1	6
DEAD END	UELBC-1	3	UELBC-1	3
	ULA18DF	3	ULA12DF	3

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	FAF		2/04/08
C	WMS	UPDATED DIMENSIONS TABLE	12/14/17

NES

T&D TRANSFORMER STANDARDS
MATERIAL LISTING
VAULT ENCLOSED TRANSFORMERS





75-1500kVA DEAD-FRONT TRANSFORMERS	
FEATURES LIST	
ITEM	DESCRIPTION
01	HIGH VOLTAGE BUSHING
02	LOW VOLTAGE BUSHING
03	PARKING STAND
04	OIL GAUGE
05	OIL TEMPERATURE GAUGE
06	OIL SIGHT GAUGE
07	OIL FILL VALVE
08	OIL DRAIN VALVE
09	NAMEPLATE
10	GROUND NUTS WITH LUGS
11	GROUND STRAP
12	LIFTING LUGS
13	DOOR HANDLE
14	PENTAHEAD LOCK
15	REMOVABLE LOWER FRONT SILL
16	BASE
17	RADIATOR
20	DOMED TOP
21	JACKING PROVISIONS
24	TAP CHANGER
27	HIGH-LOW BARRIER
32	BAYONET FUSES
33	LOADBREAK SWITCH
34	DRIP SHIELD
37	SCHRADER VALVE

NES SPECIFICATION NUMBER ET-570-X

NOTE:
Transformers may vary in placement of features and dimensions

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	WMS	UPDATED TO BAYONET FUSE	

T&D TRANSFORMER STANDARDS
MATERIAL LISTING
75-1500KVA 3 PHASE
DEAD-FRONT TRANSFORMERS

Compatible Units	NES Stock Number	Primary Voltage (kV)	Secondary Voltage (V)	Kilovolt Ampere Rating (kVA)	Fuse Size 13.8kV (A)	Fuse Size 23.9kV (A)	Tap Settings (% Steps) Or (kV)
UT9326	949326000	13.8/23.9GrdY/13.8	208Y/120	75	6	3	14.4 14.1 13.8 13.5 13.2
UT9332	949332000	13.8/23.9GrdY/13.8	208Y/120	150	10	8	
UT9338	949338000	13.8/23.9GrdY/13.8	208Y/120	225	18	10	
UT9343	949343000	13.8/23.9GrdY/13.8	208Y/120	300	18	12	
UT9352	949352000	13.8/23.9GrdY/13.8	208Y/120	500	30	18	
UT9358	949358000	13.8/23.9GrdY/13.8	208Y/120	750	2-25	2-15	
UT9364	949364000	13.8/23.9GrdY/13.8	208Y/120	1000	2-30	2-18	
UT9370	949370000	13.8/23.9GrdY/13.8	208Y/120	1500	2-40	2-25	
UT9526	949526000	13.8/23.9GrdY/13.8	480Y/277	75	6	3	14.4 14.1 13.8 13.5 13.2
UT9532	949532000	13.8/23.9GrdY/13.8	480Y/277	150	10	8	
UT9538	949538000	13.8/23.9GrdY/13.8	480Y/277	225	18	10	
UT9543	949543000	13.8/23.9GrdY/13.8	480Y/277	300	18	12	
UT9552	949552000	13.8/23.9GrdY/13.8	480Y/277	500	30	18	
UT9558	949558000	13.8/23.9GrdY/13.8	480Y/277	750	2-25	2-15	
UT9564	949564000	13.8/23.9GrdY/13.8	480Y/277	1000	2-30	2-18	
UT9570	949570000	13.8/23.9GrdY/13.8	480Y/277	1500	2-40	2-25	

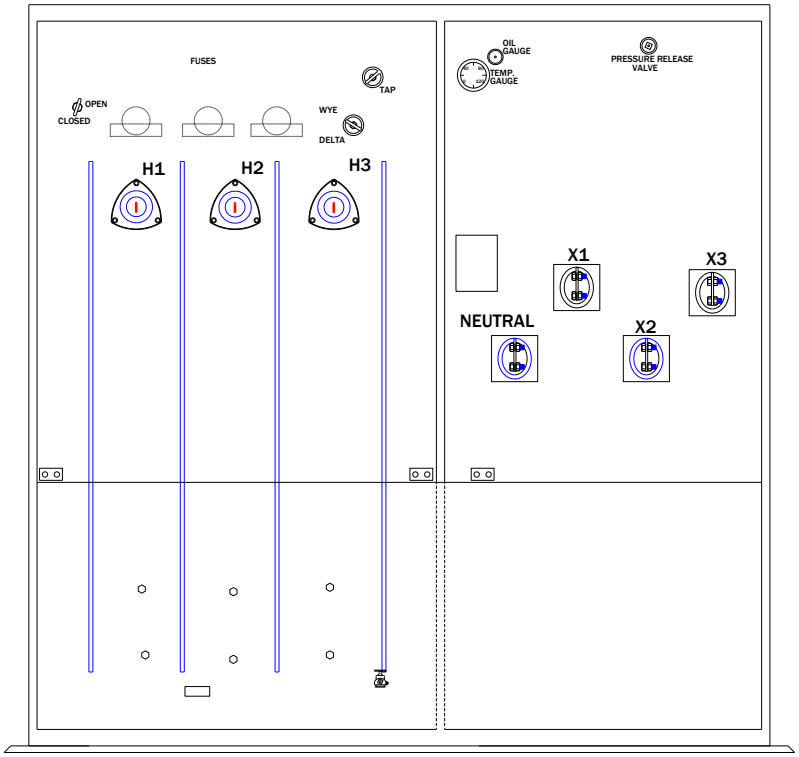
Transformer kVA	Impedance
75-300	Z = 3.5%
500-3750	Z = 5.75%

ITEMS REQUIRED FOR CABLE CONNECTION				
SYSTEM VOLTAGE	23.9kV		13.8kV	
CABLE CONFIGURATION	CU	QTY	CU	QTY
LOOP FEED	UELBC-1	6	UELBC-1	6
DEAD END	UELBC-1	3	UELBC-1	3
	ULA18DF	3	ULA12DF	3

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	WMS	UPDATED VOLTAGES	12/14/17

T&D TRANSFORMER STANDARDS

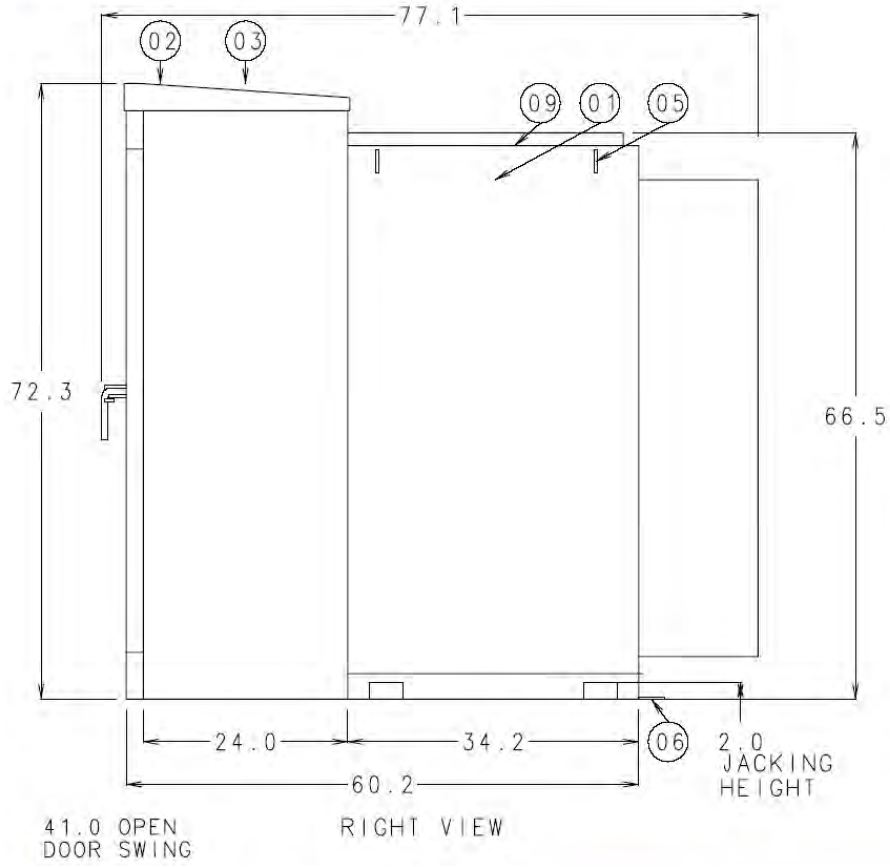
MATERIAL LISTING
75-1500KVA 3 PHASE
DEAD-FRONT TRANSFORMERS



GENERAL NOTES:

1. Except in 4kV areas were conversions are cost prohibitive, 45kVA –1500kVA live front transformers should only be used to replace damaged units or as a substitute for dead front transformers when a stock outage occurs.
2. This drawing indicates the transformer components required by NES's current specification. The arrangement of the components will vary by size and manufacturer.

Transformer kVA	Impedance
75-300	Z = 3.5%
500-3750	Z = 5.75%



75-1500kVA LIVE-FRONT TRANSFORMERS	
FEATURES LIST	
ITEM	**DESCRIPTION**
01	TANK
02	REMOVABLE SILLS
03	WEATHER COVER
05	LIFTING HOOKS
06	SHIPPING BRACKETS
09	HANDHOLE

NES SPECIFICATION NUMBER ET-570-X

NOTE:
Transformers may vary in placement of features and dimensions

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	WMS	UPDATED TO BAYONET FUSE	12/14/17

T&D TRANSFORMER STANDARDS

MATERIAL LISTING
45-1500KVA 3 PHASE
LIVE-FRONT TRANSFORMERS

Compatible Unit	NES Stock Number	Primary Voltage (kV)	Second-ary Volt-age (V)	Kilovolt Ampere Rating (kVA)	Fuse Size (A)		Fuse Type Bay-O-Net (B) Dry-Well (D)	Tap Settings (% Steps) Or (kV)
	941138000	4.16Y/2.4	208Y/120	225	65		B	4 @ 2-1/2% Below
	941522000	4.16Y/2.4	208Y/120	45	18		B	4 @ 2-1/2% Below
	941526000	4.16Y/2.4	208Y/120	75	25		B	
	941532000	4.16Y/2.4	208Y/120	150	50		B	
	941540000	4.16Y/2.4	208Y/120	300	65		B	
					13.8kV	23.9kV		
	949426000	13.8/23.9GrdY/13.8	208Y/120	75	6	3	D	14.4 14.1 13.8 13.5 13.2
	949432000	13.8/23.9GrdY/13.8	208Y/120	150	10	8	D	
	949438000	13.8/23.9GrdY/13.8	208Y/120	225	18	10	D	
	949443000	13.8/23.9GrdY/13.8	208Y/120	300	18	12	D	
	949452000	13.8/23.9GrdY/13.8	208Y/120	500	30	18	D	
	949458000	13.8/23.9GrdY/13.8	208Y/120	750	2-25	2-15	D	
	949464000	13.8/23.9GrdY/13.8	208Y/120	1000	2-30	2-18	D	
	949470000	13.8/23.9GrdY/13.8	208Y/120	1500	2-40	2-25	D	
UT9638	949638000	13.8/23.9GrdY/13.8	480Y/277	225	18	10	D	14.4 14.1 13.8 13.5 13.2
UT9643	949643000	13.8/23.9GrdY/13.8	480Y/277	300	18	12	D	
UT9658	949658000	13.8/23.9GrdY/13.8	480Y/277	750	2-25	2-15	D	
UT9664	949664000	13.8/23.9GrdY/13.8	480Y/277	1000	2-30	2-18	D	
UT9670	949670000	13.8/23.9GrdY/13.8	480Y/277	1500	2-40	2-25	D	

ITEMS REQUIRED FOR CABLE CONNECTION

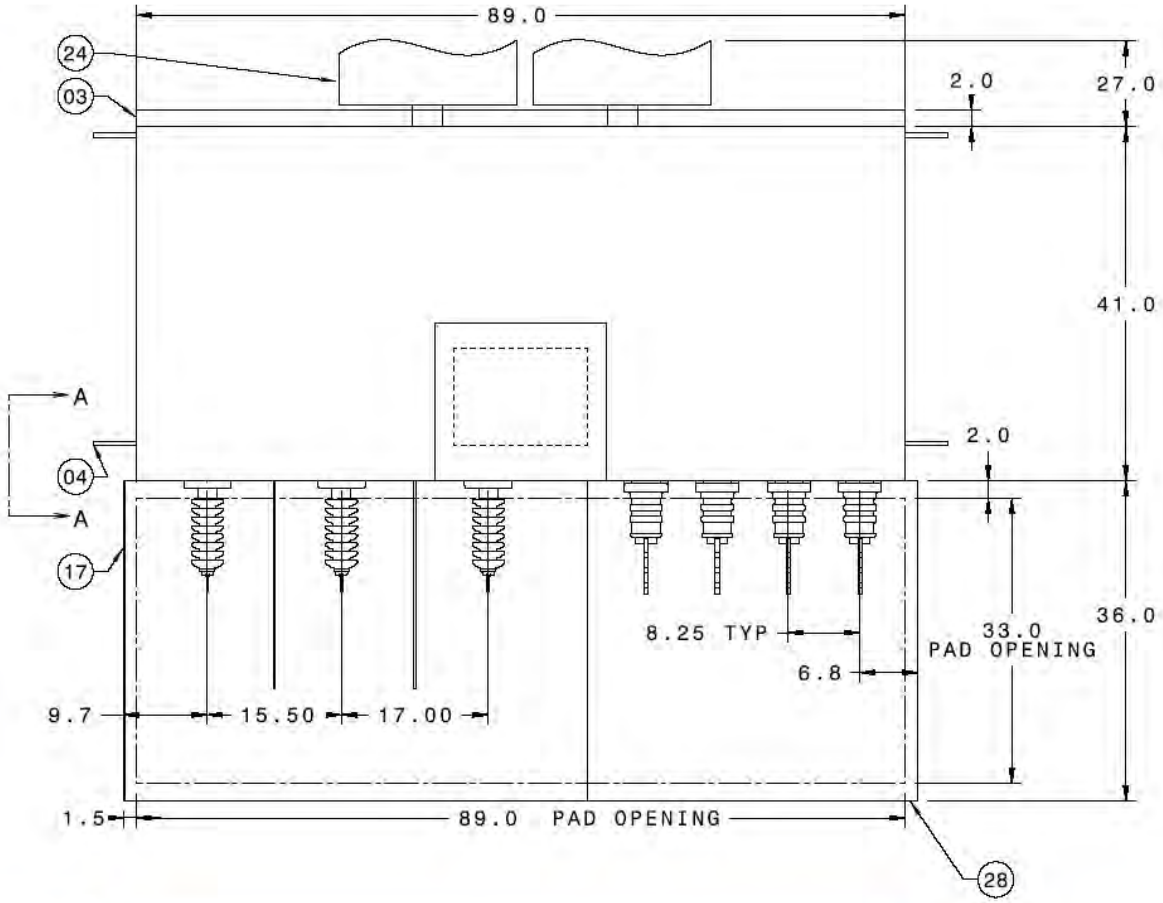
SYSTEM VOLTAGE	23.9kV		13.8kV		4kV	
	CU	QTY	CU	QTY	CU	QTY
LOOP FEED	UCN-STRM1-40	6	UCN-STRM1-40	6	UCN-STRM1-40	6
DEAD END	UCN-STRM1-40	3	UCN-STRM1-40	3	UCN-STRM1-40	3
	ULA18LF	3	ULA12LF	3	ULA3LF	3

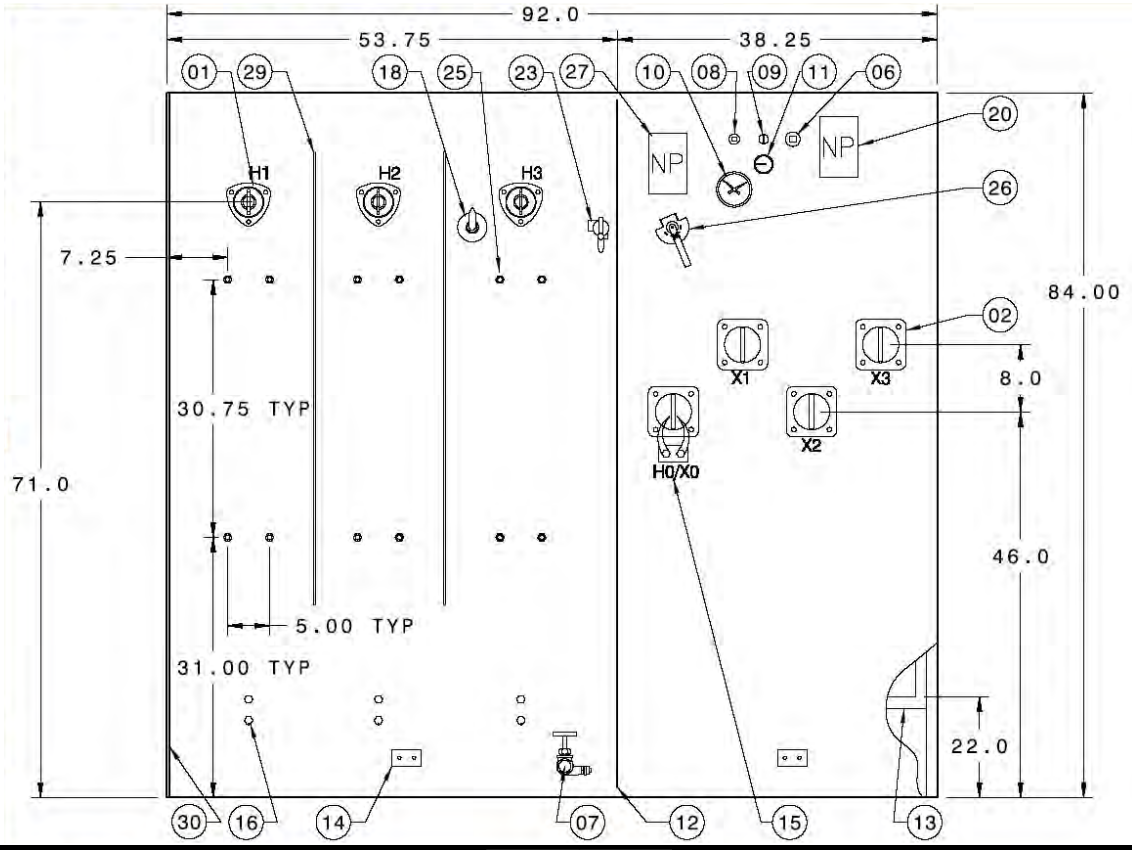
REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

NES

T&D TRANSFORMER STANDARDS

MATERIAL LISTING
45-1500KVA 3 PHASE
LIVE-FRONT TRANSORMER





REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

NES

T&D TRANSFORMER STANDARDS

MATERIAL LISTING
2000-3750KVA 3 PHASE
LIVE-FRONT TRANSFORMERS

NES Stock Number	Primary Voltage (kV)	Second-ary Volt-age (V)	Kilovolt Ampere Rating (kVA)	Fuse Size 13.8kV (A)	Fuse Size 23.9kV (A)	COMPAT-IBLE UNIT	Tap Set-tings (% Steps) Or (kV)
949676000	13.8/23.9GrdY/13.8	480Y/277	2000	80E	40E	UT9676	14.4 14.1 13.8 13.5 13.2
949679000	13.8/23.9GrdY/13.8	480Y/277	2500	100E	50E	UT9679	
949682000	13.8/23.9GrdY/13.8	480Y/277	3750	175E	80E	UT9682	

ITEMS REQUIRED FOR CABLE CONNECTION				
SYSTEM VOLTAGE	23.9kV		13.8kV	
PRIMARY CABLE CONFIGURATION	CU	QTY	CU	QTY
LOOP FEED	UCN-STRM1-40	6	UCN-STRM1-40	6
	UFUSEMNT-SM4	3	UFUSEMNT-SM4	3
	UFUSEHLD-SM4	3	UFUSEHLD-SM4	3
DEAD END	UCN-STRM1-40	3	UCN-STRM1-40	3
	ULA18LF	3	ULA12LF	3

2000-3750kVA LIVE FRONT TRANSFORMERS
TYPICAL FEATURES LIST

ITEM	DESCRIPTION
01	HIGH VOLTAGE BUSHING WITH 2 HOLE SPADE
02	LOW VOLTAGE BUSHING WITH 4 HOLE SPADE
03	TANK BASE WITH JACKING AND ROLLING PROVISIONS
04	LIFTING LUGS
05	WELDED COVER WITH HANDLE
06	ONE INCH UPPER FILTER PRESS. CONN. AND FILL PLUG
07	DRAIN VALVE WITH OIL SAMPLER
08	PRESSURE VAC GAUGE PROVISION
09	PRESSURE RELIEF DEVICE
10	THERMOMETER
11	MAGNETIC OIL LEVEL GAGE
12	GPO INSULATING DIVIDER PLATE
13	REMOVABLE SILL
14	GROUND PAD
15	GROUND STRAP AND PAD FOR HO/XO
16	ARRESTER MOUNTING PROVISION
17	HIGH SECURITY CABINET W PENTA HEAD DOOR BOLTS
18	TAP CHANGER
20	NAMEPLATE
23	HIGH VOLTAGE DELTA-WYE SWITCH
24	COOLING RADIATORS
25	1/2-13 STAINLESS STEEL NUTS FOR SM-4Z FUSE MOUNTINGS
26	LOW VOLTAGE DELTA-WYE SWITCH
27	LOW VOLTAGE DELTA-WYE SWITCH NAME PLATE
28	NON-PCB DECAL
29	GPO INSULATING INTERPHASE BARRIERS
30	GPO INSULATING CABINET SIDE BARRIER

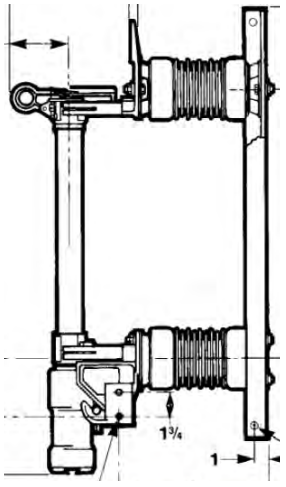
SM-4Z FUSE MOUNTING
MATERIAL LIST

CU CODE	STOCK	DESCRIPTION	QTY
UFUSEHLD-SM4	150362000	FUSE HOLDER S&C SM-4 200A 25KV	3
UFUSEMNT-SM4	150540000	FUSE MOUNTING FOR S&C SM-4	3

General Fusing Notes:

Generally these transformers have no internal fusing. Fusing is installed the riser pole or pad mounted switch. The fuse mountings are only required if other transformers are on the same circuit.
Jobs that require these transformers should be designed such that there is only one transformer on the circuit beyond the riser pole or pad mounted switch.

Do not install these fuses unless the circuit loops through the transformer.



NES SPECIFICATION NUMBER ET-570-X

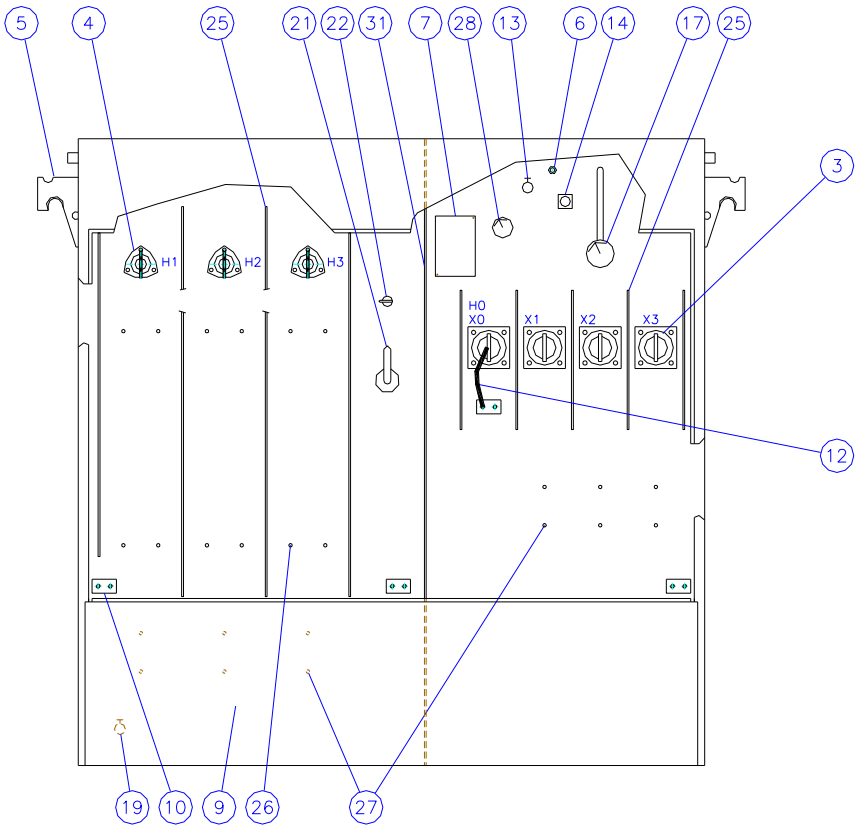
NOTE:
Transformers may vary in placement of features and dimensions

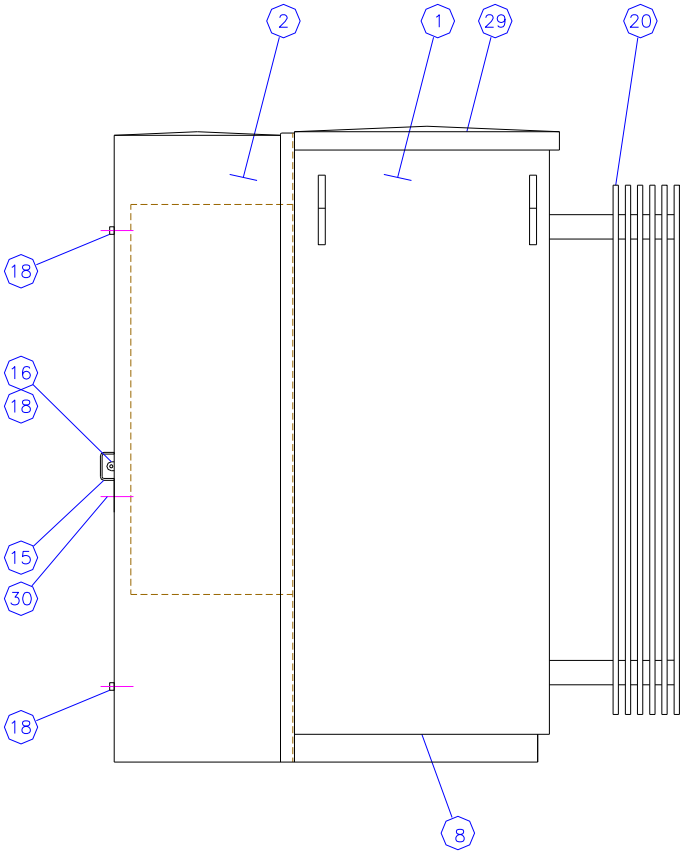
Transformer kVA	Impedance
75-300	Z = 3.5%
500-3750	Z = 5.75%

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	WMS	UPDATED VOLTAGES	12/14/17

NES

T&D TRANSFORMER STANDARDS
MATERIAL LISTING
2000-3750KVA 3 PHASE
LIVE-FRONT TRANSFORMERS





2000-3750kVA LIVE FRONT TRANSFORMERS	
TYPICAL FEATURES LIST	
ITEM	**DESCRIPTION**
01	Transformer Tank
02	Cable Compartment
03	LV Bushing
04	HV Bushing
05	Lifting Lug
06	Pressure Relief Device
07	Nameplate
08	Jacking Provision
09	Removable Sill
10	Grounding Pad
11	Intentionally Blank
12	Ground Strap
13	Oil fill Valve
14	Oil Level Gauge
15	Door Handle
16	Padlock Provision
17	Pressure Gauge
18	PentaHead Bolt
19	Oil Drain Valve
20	Radiators
21	Tap Switch
22	Load Break Switch
25	Interphase barriers
26	SM-4 Fuse mounting
27	Arrester Mounting
28	Thermometer
29	Bolted Cover
30	HV Door Lock
31	HV/LV Compartment barrier

Transformer kVA	Impedance
2500-10000	Z = 5.75%

NES SPECIFICATION NUMBER ET-559-X

NOTE:
Transformers may vary in placement of features.

UG PLATE BOOK DRAWING (TRANS 3P LF STEP DOWN SUBS).dwg

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

T&D TRANSFORMER STANDARDS

MATERIAL LISTING
1000-10,000 STEP-DOWN STANTIONS
LIVE-FRONT

NES Stock Number	Primary Voltage (kV)	Secondary Voltage (kV)	Kilovolt Ampere Rating (kVA)	Fuse Size 13.8kV (A)	Fuse Size 23.9kV (A)	COMPATIBLE UNIT	Tap Settings (% Steps) Or (kV)
949764000	13.8/23.9GrdY/13.8	2.4/4.16Y	1000	40E	20E	UT9764	14.4 14.1 13.8 13.5 13.2
949779000	13.8/23.9GrdY/13.8	2.4/4.16Y	2500	100E	50E	UT9779	
949782000	13.8/23.9GrdY/13.8	2.4/4.16Y	3750	175E	80E	UT9782	
949784000	13.8/23.9GrdY/13.8	2.4/4.16Y	5000	250E	150E	UT9784	
949792000	13.8/23.9GrdY/13.8	2.4/4.16Y	10000	Recloser	Recloser	UT9792	
948990000	13.8/23.9GrdY/13.8	7.96/13.8GrdY/7.96	7500	Recloser	Recloser	UT8990	

ITEMS REQUIRED FOR CABLE CONNECTION (HV COMPARTMENT)

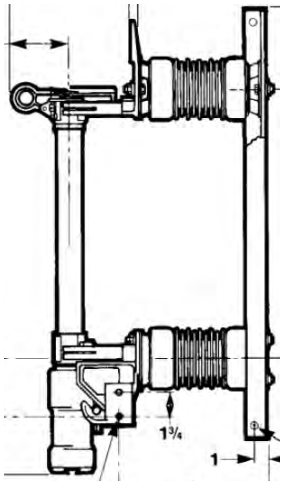
SYSTEM VOLTAGE	23.9kV		13.8kV	
PRIMARY CABLE CONFIGURATION	CU	QTY	CU	QTY
LOOP FEED	UCN-STRM1-40	6	UCN-STRM1-40	6
	UFUSEMNT-SM4	3	UFUSEMNT-SM4	3
	UFUSEHLD-SM4	3	UFUSEHLD-SM4	3
DEAD END	UCN-STRM1-40	3	UCN-STRM1-40	3
	ULA18LF	3	ULA12LF	3

ITEMS REQUIRED FOR CABLE CONNECTION (LV COMPARTMENT)

SYSTEM VOLTAGE	13.8kV/7.96kV		4kV	
LOW VOLTAGE CABLE	CU	QTY	CU	QTY
DEAD END	UCN-STRM1-40	3	UCN-STRM1-40	3
	ULA12LF	3	ULA3LF	3

General Fusing Notes:

Generally these transformers have no internal fusing. Fusing is installed the riser pole or pad mounted switch. The fuse mountings are only required if other transformers are on the same circuit.
Jobs that require these transformers should be designed such that there is only one transformer on the circuit beyond the riser pole or pad mounted switch.



SM-4Z FUSE MOUNTING
MATERIAL LIST

CU CODE	STOCK	DESCRIPTION	QTY
UFUSEHLD-SM4	150362000	FUSE HOLDER S&C SM-4 200A 25KV	1
UFUSEMNT-SM4	150540000	FUSE MOUNTING FOR S&C SM-4	1

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	WMS	UPDATED VOLTAGES	12/14/17

NES

T&D TRANSFORMER STANDARDS
MATERIAL LISTING
1000-10,000 STEP-DOWN STATIONS
LIVE-FRONT

SWITCH STANDARDS

APPROVALS			
ISSUE DATE	ENGINEER	SUPERVISOR	MANAGER
2/15/06	FRED FRITON	RON DAVIDSON	NICK THOMPSON
1/9/18	WES SUDDARTH	RON DAVIDSON	VAUGHAN CHARLES
1/19/22	CEDRIC SHORT		

TABLE OF CONTENTS

Figure 9. Fuse-side view of a Model PMH-9 with SML-20 Power Fuses in the right-hand compartment and Fault Fiter Electronic Power Fuses in the left-hand compartment. (This nonstandard combination of fuses is shown for comparison only.)

1. **Cautionary signs** are unmistakably bold and clear.
2. **S&C Uni-Rupter.**
3. **Insulated roof** - "no-drip" compound on underside of roof guards against formation of condensation that could drip onto energized parts.
4. **Segregrated circuits:** full-length steel barriers separate side-by-side compartments; fiberglass-reinforced polyester barriers separate front compartments from rear compartments and isolate the tie bus.
5. **Main bus** - 600 amperes continuous.
6. **Dual-purpose tint barriers** of GPO_3-grade fiberglass-reinforced polyester for all fuses and switches guard against inadvertent contact with live parts when in the normal vertical position. Inserted into the open gap of a fuse or switch, barriers provide isolation from bus and upper contacts.
7. **Storage racks** on each fuse compartment door hold up to six SM-4 Refill Units or three SMU-20 Fuse Units per rack . . . lets you restore service quickly.
8. Grappler – the S&C fuse-handling fitting-is provided with each model equipped with fuses.
9. **Door holders** store above door openings, in full view with doors open, behind doors when closed.
10. **Viewing window** for visible verification of switch position is easily removed for phasing.
11. **Aluminum bus connections** – wire-brushed and protected by an oxide-inhibiting abrasive compound-are bolted at a uniform torque of 50 ft-lb; two Belleville washers per bolt maintain contact pressure.
12. **Compartment-identification** and phase-identification labels.

General Construction Notes.

1. If room permits, loop the primary cables under the switch to allow extra for future termination replacements.
2. Install arresters on both sides of a opening.
3. Stress terminations are required for each used bay.
4. See the table for fuse sizing.

THREE PHASE; PAD MOUNTED; LIVE-FRONT SWITCHES					
Compatible Unit	NES Stock #	DESCRIPTION	MAIN CIRCUIT BAYS	FUSED BAYS	AMPS
USW-PMH6	965912000	PAD MTD SWITCH LF PMH-6 600A	2	1	600
USW-PMH9	965916000	PAD MTD SWITCH LF PMH-9 600A	2	2	600
USW-PMH11	965919000	PAD MTD SWITCH LF PMH-11 600A	3	1	600
USW-PMH12	965924000	PAD MTD SWITCH LF PMH-12 600A	1	3	600
USW-PMH9AUT	965916100	PAD MTD SWITCH LF PMH-11 600A AUTOMATIC SOURCE TRANSFER	2	2	600
USW-PMH913.8	965914000	PAD MTD SWITCH LF PMH9 14.4KV AUTO TRANS	2	2	600

ITEMS REQUIRED FOR CABLE CONNECTION		
UCN-STRM1-40	UG CONNECTOR, STRESS TERMINATOR, #1-4/0	3/BAY
UCN-STRM750	UG CONNECTOR, STRESS TERM. 500-750MCM	3/BAY
ULA18LF-SW	SURGE ARRESTER 18KV, LF SWITCH	3/open bay
ULA12LF	SURGE ARRESTER 12KV, LF,TRANS AND SWITCH	3/open bay

CONSULT WITH DESIGN ENGINEERING FOR FUSING OF SWITCHES FEEDING MULTIPLE TRANSFORMERS.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	WMS	DELETED FUSING TABLE, ADDED 13.8 AUTO	1/9/18

NES

T&D SWITCH STANDARDS
PADMOUNTED SWITCHES
PMH LIVE-FRONT SWITCHGEAR

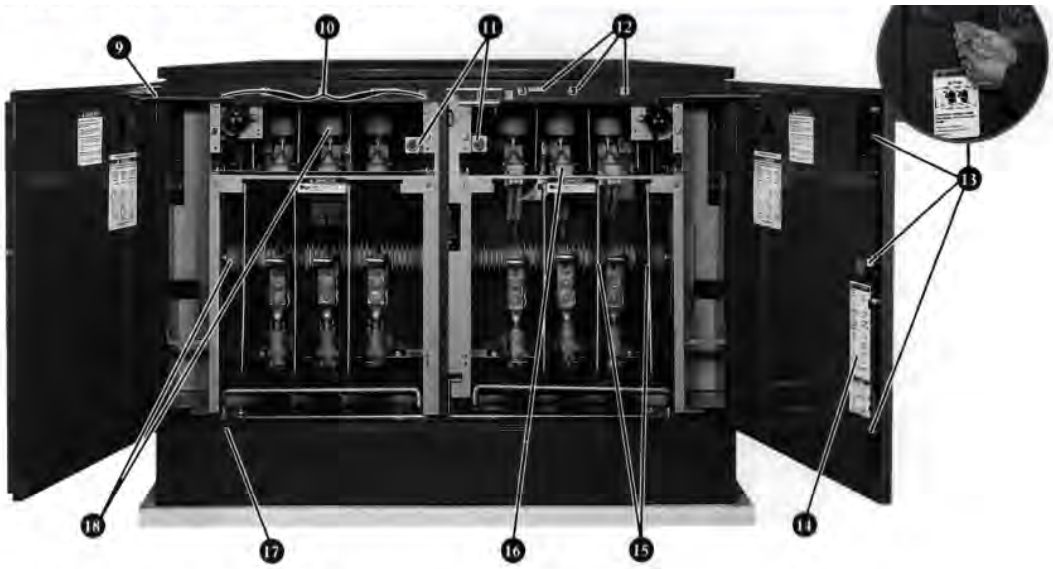


Figure 10. Switch-side view of a Model PMH-9.

13 **Penta-Latch Mechanism** provides vandal-resistant three-point door latching for S&C Pad-Mounted Gear. Closing the door releases the charged Penta-Latch Mechanism, automatically latching the door and securing the pentahead actuator-only after the actuator is secured can a padlock be installed. Protective hood shields padlock shackle.

14 **Circuit diagram** provides instant view of circuit configuration . . . keeps the mystery out of switching operations. Label also gives complete switch and fuse ratings.

15 **Interphase and end barriers** for all switches and fuses-of fiberglass-reinforced polyester for superior arc and track resistance-provide phase segregation, help achieve BIL ratings, and aid in fuse handling.

16 **S&C Mini-Rupter** Switch – furnished with operating handle for easy operation. Handle folds for storage behind the switch-operating-hub cover.

17 **Ground pads,** on inside at bottom door stile in each compartment, accommodate connectors for attachment of cable concentric-neutral ground leads and ground studs.

18 Cypoxy®, S&C's cycloaliphatic epoxy resin system, insulates all live parts from ground.

19 **SML-20 Power Fuse with Uni-Rupter.**

20 **Ground studs** for fuse terminals, switch terminals, and the ground pad in each compartment.

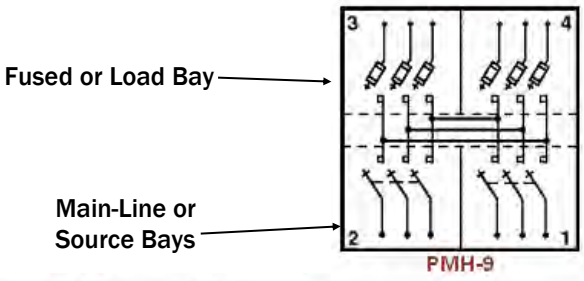
21 **Terminals** accept a wide variety of field assembled cable-terminating devices.

22 **Fault Fiter Electronic Power Fuse with Uni-Rupter.**

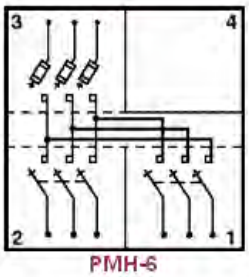
23 **Corrosion resistant non-ferrous door hinges and hinge pins.**

24 **S&C's Ultradur® Finishing System** provides a tough, multistage, baked-on finish with exceptional performance proved by a rigorous battery of industry tests.

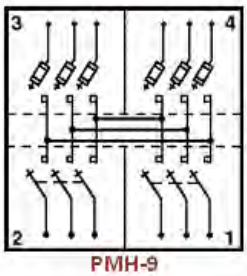
AUTOMATIC SOURCE TRANSFER SWITCH CONTROLLER PARTS LIST	
367701000	S&C CARD ANALOG INPUT METAL ENC MICRO AT
367702000	S&C CARD ANALOG INPUT PAD MT MICRO AT
367703000	S&C CARD BURDEN METAL ENC MICRO AT
367703500	S&C CARD BURDEN PAD MOUNTED MICRO AT
367704000	S&C CARD CPU MICRO AT
367705000	S&C CARD DIGITAL INPUT MICRO AT
367706000	S&C CARD RELAY OUTPUT MET ENC MICRO AT
367706500	S&C CARD RELAY OUTPUT PAD MMT MICRO AT
367707000	S&C CARD REMOTE INDICATION MICRO AT
367708000	S&C CARD POWER SUPPLY MICRO AT



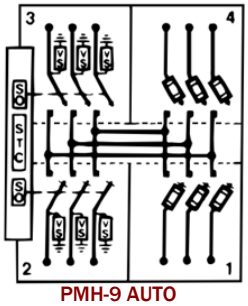
PMH-9



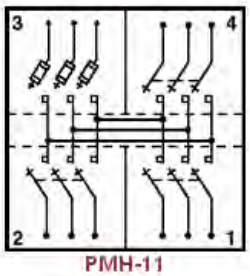
PMH-6



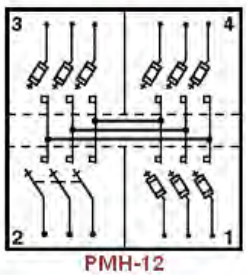
PMH-9



PMH-9 AUTO



PMH-11



PMH-12

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	WMS	ADDED PMH-9 AUTO	1/9/18

NES

T&D SWITCH STANDARDS
PADMOUNTED SWITCHES
PMH LIVE-FRONT SWITCHGEAR

IMPORTANT RISER FUSE NOTES:

CUSTOMER ENGINEERING—CONSULT WITH DESIGN ENGINEERING FOR RISER FUSE SIZES

C&M—CONTACT THE LOAD DISPATCHER WHEN REPLACING RISER FUSES

THREE PHASE LIVE FRONT WITHOUT INTERNAL FUSING

FUSE TYPE		TRANSFORMER kVA	4KV		13.8KV		23.9KV	
			PAD	RISER	PAD	RISER	PAD	RISER
S&C E TYPE SM-4		750*			25E		15E	
		1000*			40E		20E	
		1500*			50E		30E	
		2000			80E		40E	
		2500			100E		50E	
		3750			175E		80E	

* At these sizes always install internally fused transformers. These numbers are only for maintenance purposes.

THREE PHASE DEAD-FRONT OR LIVE-FRONT INTERNALLY FUSED

FUSE TYPE	TRANSFORMER kVA	4KV		13.8KV		23.9KV	
		PAD	RISER	PAD	RISER	PAD	RISER
CURRENT SENSING BAY-O-NET	75	25		10		6	
	150	40		15		10	
	225	65		15		15	
	300	65		25		15	
	500			40		25	
	750			65		40	
	1000			65		40	
	1500			100		65	

SINGLE PHASE INTERNALLY FUSED DEAD AND LIVE FRONT TRANSFORMERS

FUSE TYPE	TRANSFORMER kVA	4KV		7.96KV		13.8KV		23.9KV	
		PAD	RISER	PAD	RISER	PAD	RISER	PAD	RISER
CURRENT SENSING BAY-O-NET	25			6		6		6	
	50	40		15		10		10	
	75	65		15		10		10	
	100	65		25		15		15	
	167			40		25		25	
	250			65		40		40	

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	WMS	REPLACED WITH REVISED FUSE CHART	1/9/18

NES

T&D SWITCH STANDARDS

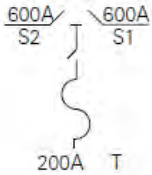
PAD MOUNTED SWITCH AND TRANSFORMER FUSING CHART

SOURCE SIDE

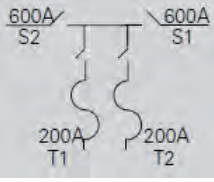
LOADBREAK SWITCH
Side-mounted loadbreak switch (shown with optional key locking accessory) has positive position indicator. Switch is operable by hotstick or optional hand-operated "T" handle. Frontplate-mounted switches are available as an option.

DATA PLATE
Indicates voltage and amperage ratings, catalog number, serial number and unit weight.

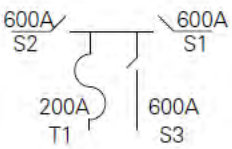
6B



9B



11



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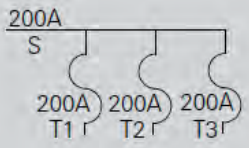


ONE-LINE DIAGRAM
Easy-to read one-line diagrams are provided on both source and tap sides.

ENERGY-LIMITING FUSES
RTE Components energy-limiting fuses are housed in an under-oil wet-well assembly. A fuse driptray is provided.

CONVENIENT OPERATION
RTE Components bushings, installed at a convenient height, give dependable, sure operation. Phase designations are clearly labeled. At least one standoff bracket per bushing is provided.

1/2–13 ground nut is mounted beneath each bushing as standard.

TAP SIDE

GENERAL NOTES:

NES does not install this type of switch on new projects.

Pad drawings are omitted because new installations use PMH type switches.

THREE PHASE; PAD MOUNTED; DEAD-FRONT SWITCHES

Compatible Unit	NES Stock #	DESCRIPTION	MAIN CIRCUIT BAYS	FUSED BAYS	AMPS
USW-MOST6B	965950000	PAD MTD SWITCH DF MOST6B 200A	2	1	200
USW-MOST9B	965954000	PAD MTD SWITCH DF MOST9B 200A	2	2	200
USW-MOST11	965956000	PAD MTD SWITCH DF MOST11 200A	3	1	200
USW-MOST15	965960000	PAD MTD SWITCH DF MOST15 200A	1	3	200

REPLACEMENT ONLY

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	WMS	ADDED ONE LINES	1/9/18

NES

T&D SWITCH STANDARDS
PAD MOUNTED SWITCHES
MOST DEAD-FRONT SWITCHGEAR

NOTE:
The manufacturer provides an etched metal tag for each bay: The tag must include the following information:
Bay Function: Entrance, Feeder, Meter, Fuse, Transfer etc.
Bay Number: This coordinates with the manufacturer's switch drawing

Feeder, Fuse or Entrance Bays need to have the number of the next device in the circuit:
Riser Number, Manhole, transformer, etc.

GENERAL NOTES:

This switchgear is special ordered for an individual customer's switching needs. Typical cost is $25,000.00+ per bay. Delivery can take as long as 12 months for complex units and typically exceeds 6 months.
Typical load capacities include 600 and 1200 amps at 15 or 25kV.

There are any number of bay configurations. The bays may perform the following functions:
Source Entrance Bays
Fuse Bays
Meter Bays
Source Transfer Bays
Feeder Bays

CRITICAL INSTALLATION NOTE:

The concrete pad is custom designed to each switch. The pad must be level to 1/16" across its entire length. Surface imperfections exceeding 1/16" will prevent the sections from aligning.

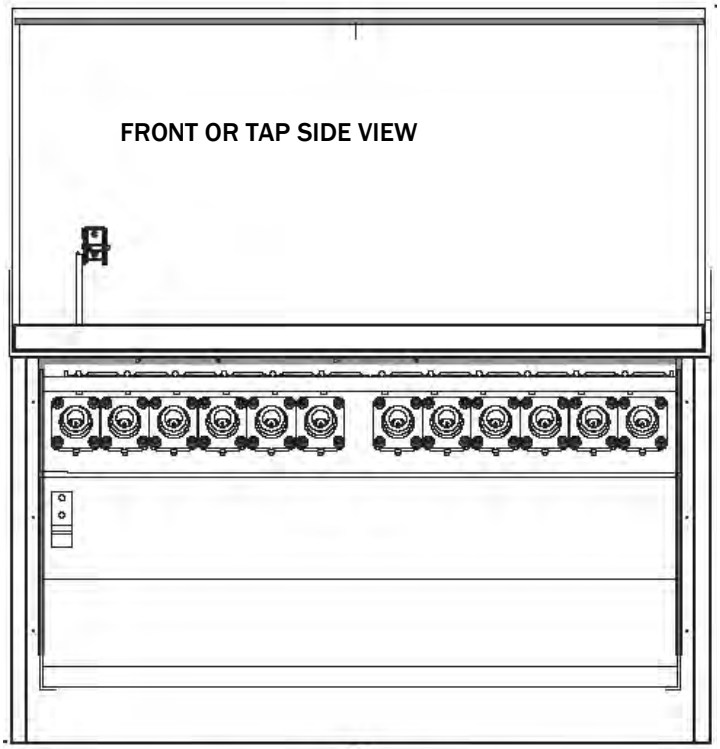
The nine bay unit above is rated for 600amps. It is approximately 50' long.

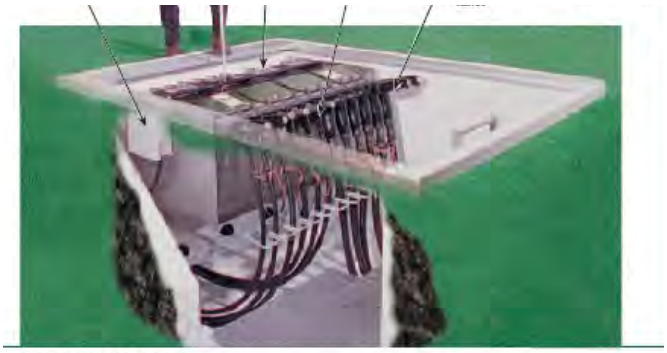
Additional room may be required for the meter equipment pad.

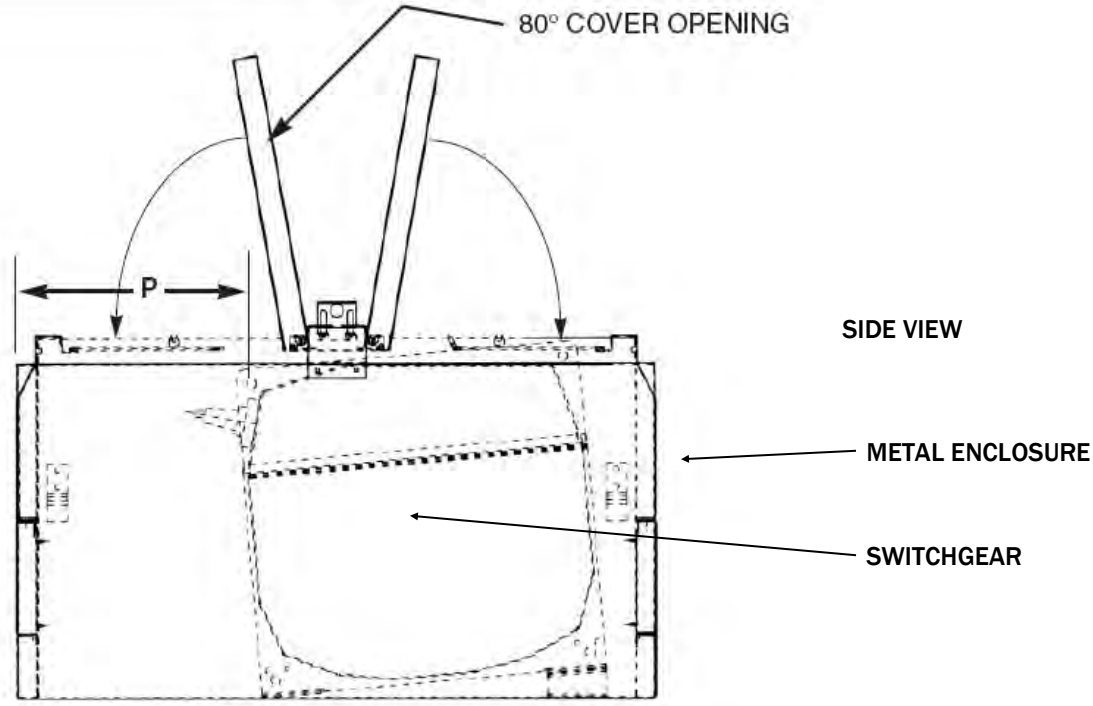
Communications conduits from the customer's building and to each riser pole are required.

AUTOMATIC SOURCE TRANSFER SWITCH MICRO AT CONTROL PARTS LIST	
367701000	S&C CARD ANALOG INPUT METAL ENC MICRO AT
367702000	S&C CARD ANALOG INPUT PAD MT MICRO AT
367703000	S&C CARD BURDEN METAL ENC MICRO AT
367703500	S&C CARD BURDEN PAD MOUNTED MICRO AT
367704000	S&C CARD CPU MICRO AT
367705000	S&C CARD DIGITAL INPUT MICRO AT
367706000	S&C CARD RELAY OUTPUT MET ENC MICRO AT
367706500	S&C CARD RELAY OUTPUT PAD MMT MICRO AT
367707000	S&C CARD REMOTE INDICATION MICRO AT
367708000	S&C CARD POWER SUPPLY MICRO AT

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06







This gear is submersible to 10 feet thus it may be installed in below grade vaults.
The common configurations for this switch are shown on the following page
It may be configured for automatic source transfer.
Maximum load capacity is 600 amperes.
Unit Pricing begins at approximately $30,000.00 and may exceed $80,000.00

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

NES

T&D SWITCH STANDARDS
PAD MOUNTED SWITCHES
S&C VISTA DEAD-FRONT SWITCHGEAR

Proposed Vista Switch CU Names

SPACE 1 IS ALWAYS (U)

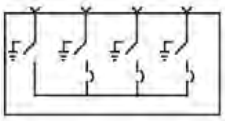
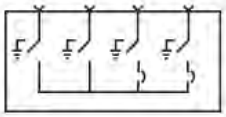
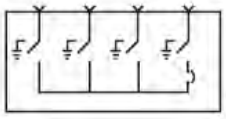
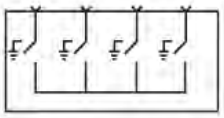
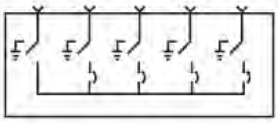
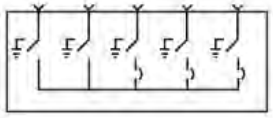
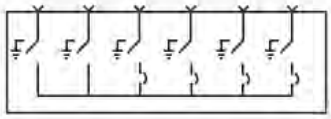
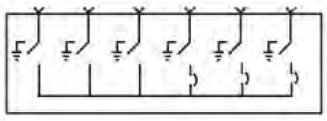
SPACE 2		SPACE 3		SPACE 4		SPACE 5		SPACE 6		SPACE 7		SPACE 8		SPACE 9		SPACE 10		SPACE 11		SPACE 12	
				LOCATION		# WAYS		SEPARATOR		# FEED-ERWAYS		# FEEDER WAY AMPS		# LOAD WAYS		# LOAD WAY AMPS		FAULT CURRENT RATING		USED FOR REMOVAL CU	
CODE	DEF.	CODE	DEF.	CODE	DEF.	CODE	DEF.	CODE	DEF.	CODE	DEF.	CODE	DEF.	CODE	DEF.	CODE	DEF.	CODE	DEF.		
S	SWITCH	V	VISTA	A	ABOVE GRADE	4	4 way	-		1	1 way	6	600a	0-4	# WAYS	2	200a	X	12.5K AIC		
				B	BELOW GRADE	5	5 way			2	2 way	9	900a			6	600a	Y	25K AIC		
						6	6 way			3	3 way	1	1200a								
										4	4 way										

S&C - VISTA PAD OR VAULT ENCLOSED SWITCHES AND CABINETS

CU	NES STOCK #	DESCRIPTION	VOLTS (KV)	MAIN CIRCUIT BAYS	# FEED-WAYS	FEED AMPS	# LOAD-WAYS	LOAD AMPS	K-AIC
USVB6-2642X	965936000	SW UG VISTA 624 25KV 12.5KA 125BIL RS	25.0	6	2	600	4	200	12.5
USVB4-2622X	965938000	SW UG VISTA 422 25KV 12.5KA 125BIL RS	25.0	4	2	600	2	200	12.5
USVB6-3632X	965937000	SW UG VISTA 633 25KV 12.5KA 125BIL RS	25.0	6	3	600	3	200	12.5
USVB6-2642Y	965940000	SW UG VISTA 624 15KV 25KA 125BIL RS	15.0	6	2	600	4	200	25.0
USVB4-2622Y	965942000	SW UG VISTA 422 15KV 25KA 125BIL RS	15.0	4	2	600	2	200	25.0
USVB6-3632Y	965941000	SW UG VISTA 633 15KV 25KA 125BIL RS	15.0	6	3	600	3	200	25.0
USVB6-CAB	965931000	SW UG VISTA 6-WAY CABINET ONLY	—	—	—	—	—	—	—
USVB4-CAB	965974400	SW UG VISTA 4-WAY CABINET ONLY	—	—	—	—	—	—	—

NOTES:

1. Vista Switch ("**RS**") suffix indicates "**Remote Supervisory**" ready for SCADA communications and control — (add separately as needed).
2. 15kV, 25kA high fault current switches are required **when fed from substations within 3000'.**
3. 15kV, 25kA high fault current switches require Dead-Break 600A "bolt-on" style bushings, caps and elbows.
4. 25kV, 12.5kA standard fault current switches require 200A Load-Break bushings, caps and elbows.
5. 6-Way and 4-Way Vista switch cabinets are used in above grade padmount applications. See Manholes, Boxes and Pads section for pad details.
6. 6-Way and 4-Way Vista Vaults are used when mounting switches in below grade applications. See Manholes, Boxes and Pads section for vault details.

Model①	One-Line Diagram②	Ratings③ kV Max	Ratings③ kV BIL	Ratings③ Short-Circuit Amperes, RMS, Sym.	Catalog Number④	Net Wt., Lbs.⑤	Page Reference for Dimensional Information
413		15.5	95	12 500 25 000	934132R1 854132	1100 1100	12 through 15
		29	125	12 500 25 000	934133 854133	1100 1350	
		38	150	12 500 25 000	934134 854134	1350 1350	
422		15.5	95	12 500 25 000	934222R1 854222	1100 1100	
		29	125	12 500 25 000	934223 854223	1100 1350	
		38	150	12 500 25 000	934224 854224	1350 1350	
431		15.5	95	12 500 25 000	934312R1 854312	1100 1100	
		29	125	12 500 25 000	934313 854313	1100 1350	
		38	150	12 500 25 000	934314 854314	1350 1350	
440		15.5	95	12 500 25 000	934402R1 854402	1100 1100	
		29	125	12 500 25 000	934403 854403	1100 1350	
		38	150	12 500 25 000	934404 854404	1350 1350	
514		15.5	95	12 500 25 000	935142R1 855142	1375 1375	
		29	125	12 500 25 000	935143 855143	1375 1625	
		38	150	12 500 25 000	935144 855144	1625 1625	
523		15.5	95	12 500 25 000	935232R1 855232	1375 1375	12 through 15
		29	125	12 500 25 000	935233 855233	1375 1625	
		38	150	12 500 25 000	935234 855234	1625 1625	
624	USVB6-2642X 	15.5	95	12 500 25 000	936242R1 856242	1650 1650	
		29	125	12 500 25 000	936243 856243	1650 1900	
		38	150	12 500 25 000	936244 856244	1900 1900	
633		15.5	95	12 500 25 000	936332R1 856332	1650 1650	
		29	125	12 500 25 000	936333 856333	1650 1900	
		38	150	12 500 25 000	936334 856334	1900 1900	

① The model number defines the total number of ways, the number of load-interrupter switch ways, and the number of fault-interrupter ways. For example, a Model 431 has "4" ways in total of which "3" are load-interrupter switch ways and "1" is a fault-interrupter way.

② Refer to the nearest S&C Sales Office for other configurations.

③ Refer to "Standard Three-Phase Ratings" on page 3 for continuous, load-dropping, interrupting, and short-circuit ratings.

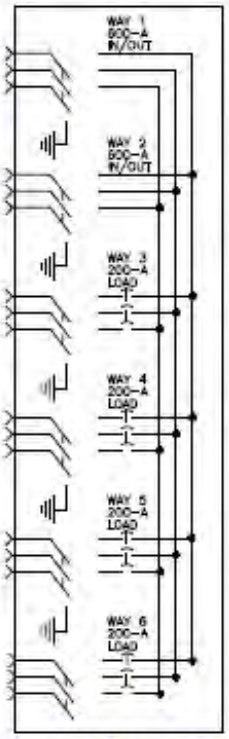
④ Vista UDS units with the R1 suffix use arc-spinning contacts for fault interruption instead of vacuum interrupters where applicable.

⑤ Welded-steel tank including components and SF_6 gas.

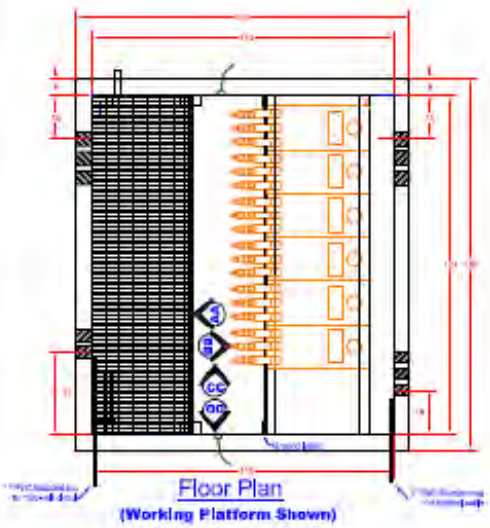
REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

NES

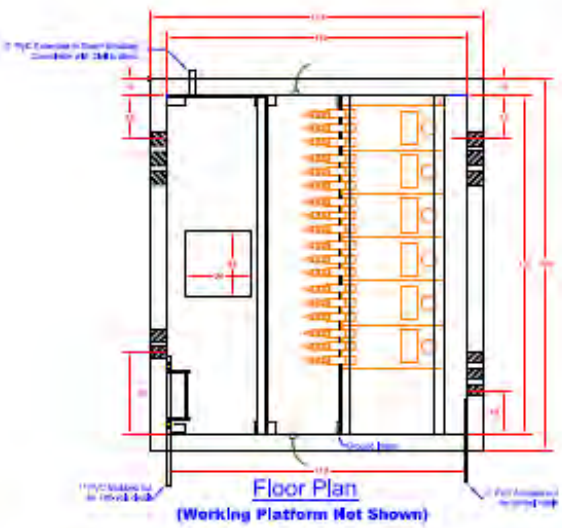
T&D SWITCH STANDARDS
PAD MOUNTED SWITCHES
ONE-LINE DIAGRAMS



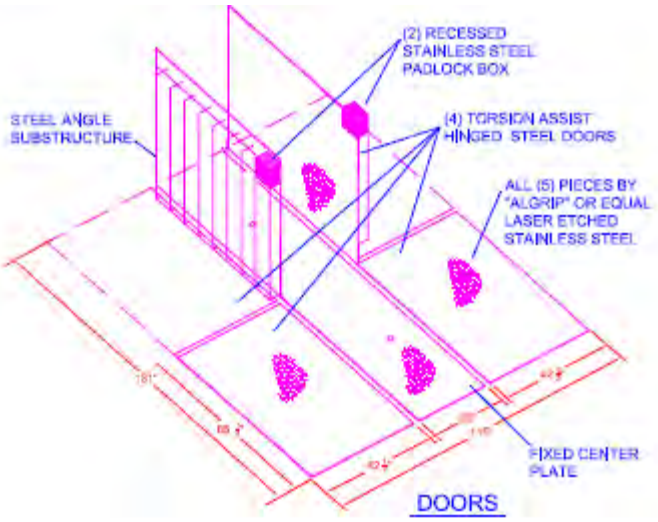
WIRING DIAGRAM



Floor Plan
(Working Platform Shown)



Floor Plan
(Working Platform Not Shown)



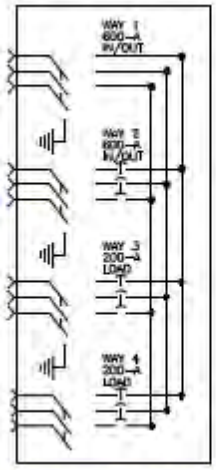
DOORS

This drawing can be found on the Customer Engineering SharePoint page: UGS-00028B.

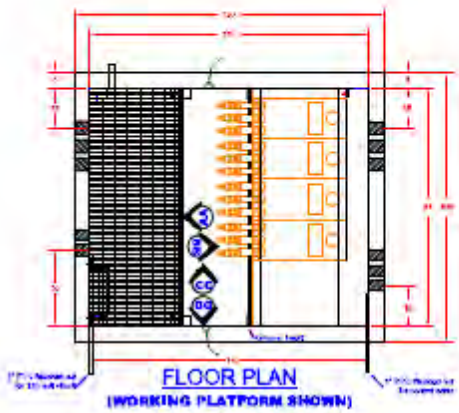
Customers will typically install these vaults for their projects. They will need to submit shop drawings to NES Customer Engineering for review and approval well in advance.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	WMS	CREATED	1/9/18

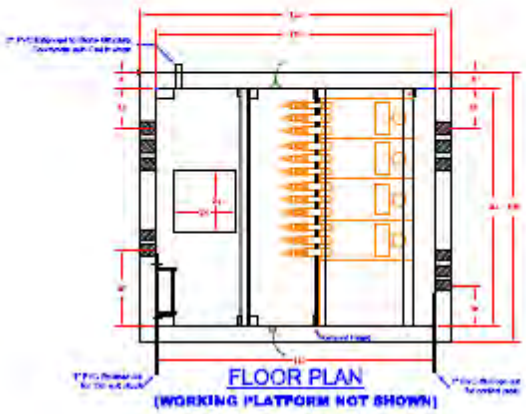
T&D SWITCH STANDARDS
S&C VISTA DEAD-FRONT SWITCHGEAR
6 WAY VAULT EXAMPLE



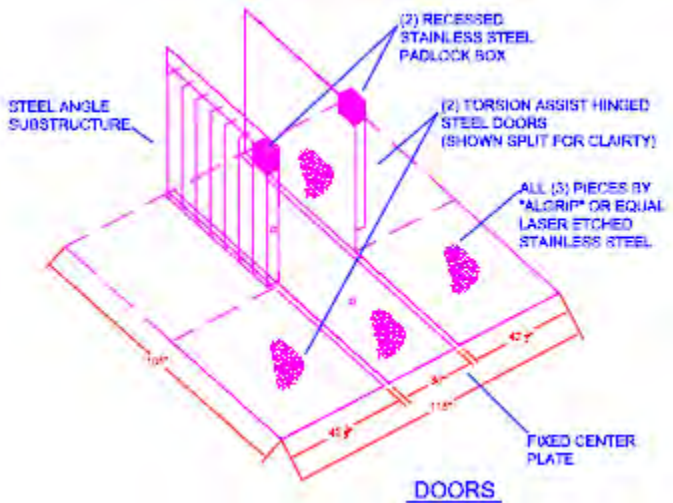
WIRING DIAGRAM



FLOOR PLAN
(WORKING PLATFORM SHOWN)



FLOOR PLAN
(WORKING PLATFORM NOT SHOWN)



DOORS

This drawing can be found on the Customer Engineering SharePoint page: UGS-00032B.

Customers will typically install these vaults for their projects. They will need to submit shop drawings to NES Customer Engineering for review and approval well in advance.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	WMS	CREATED	1/9/18

NES

T&D SWITCH STANDARDS
S&C VISTA DEAD-FRONT SWITCHGEAR
4 WAY VAULT EXAMPLE

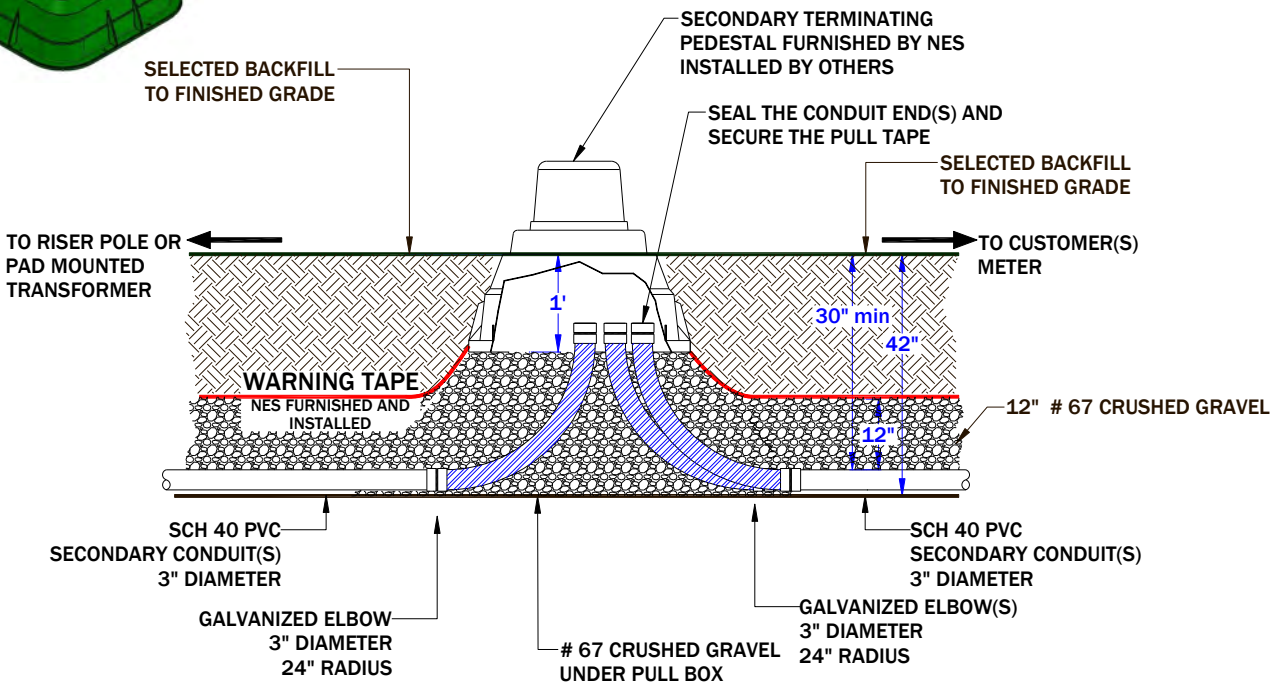
MANHOLES, BOXES & PADS STANDARDS

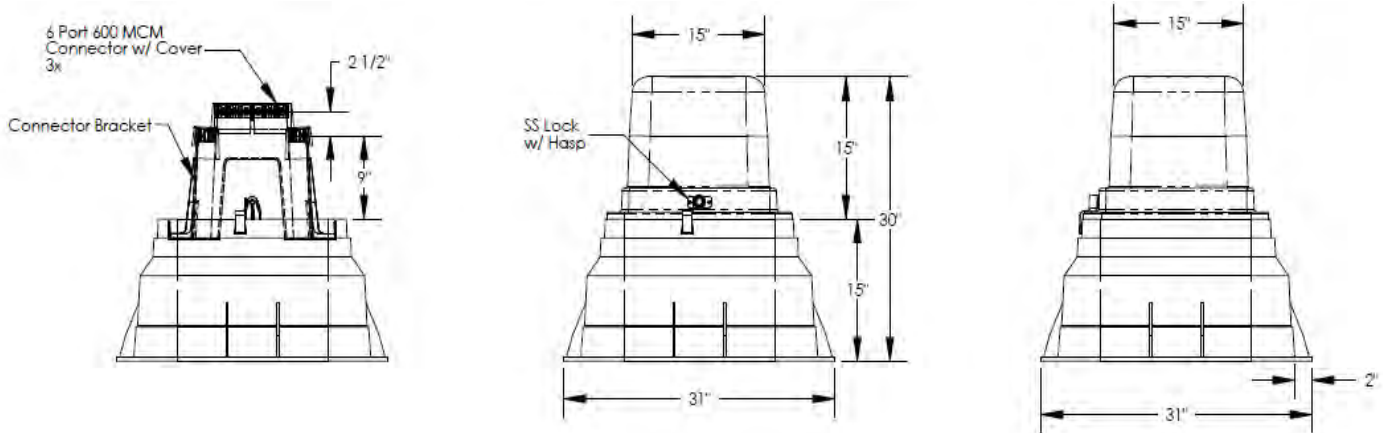
APPROVALS			
ISSUE DATE	ENGINEER	SUPERVISOR	MANAGER
3/16/22	BRAD MCKELVEY	Ronald Reasonover	Leonard Leech
8/4/22	BRAD MCKELVEY	Ronald Reasonover	Leonard Leech
4/24/23	CHRIS MCREYNOLDS		

TABLE OF CONTENTS

TABLE OF CONTENTS

NOTE:
ALL MATERIALS, LABOR AND EQUIPMENT NECESSARY TO COMPLETE EXCAVATION, CONDUIT INSTALLATION, AND BACKFILLING SHALL BE FURNISHED BY THE CUSTOMER OR THE CUSTOMER'S REPRESENTATIVE(S) HEREIN REFERRED TO AS OTHERS OR CUSTOMER.





GENERAL NOTES:

- PEDESTAL IS FURNISHED BY NES AND INSTALLED BY THE CUSTOMER
- 5 PERMANENT SERVICE CONDUITS MAXIMUM, INCLUDING THE FEEDER CONDUIT
- 3" CONDUITS, UNLESS SPECIFIED OTHERWISE ON THE DESIGN DRAWING
- 1-3" TEMPORARY AND 1-2" LIGHTING CONDUIT MAY BE ADDED IF NEEDED
- 3' CLEARANCE REQUIRED ON ALL SIDES AROUND THE PEDESTAL
- PEDESTAL IS FOR RESIDENTIAL, NON-NETWORK APPLICATIONS ONLY

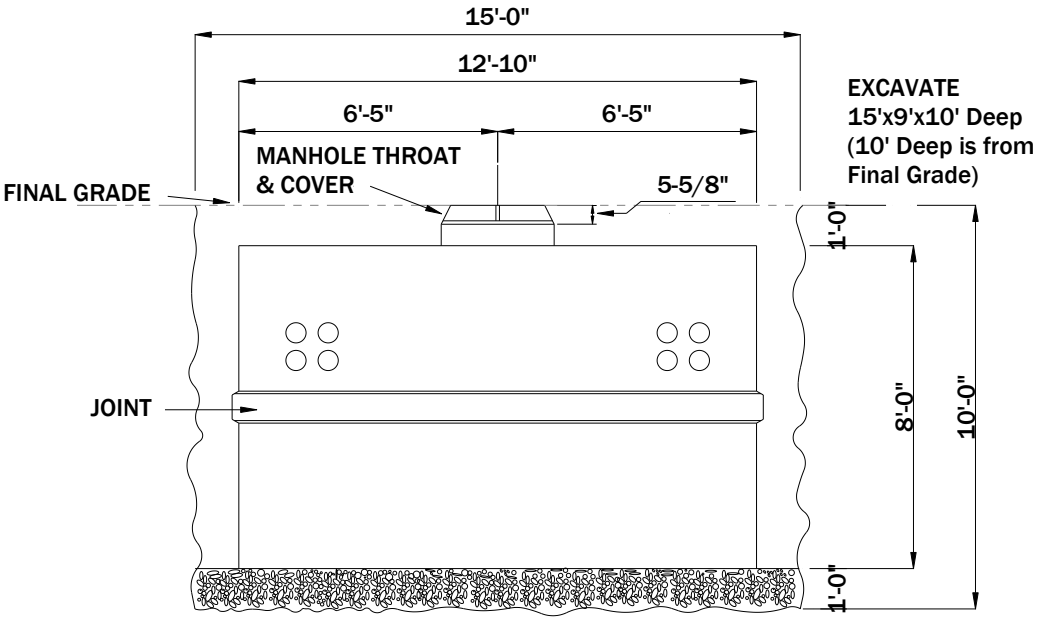
SECONDARY TERMINATING PEDESTAL
MATERIAL LIST

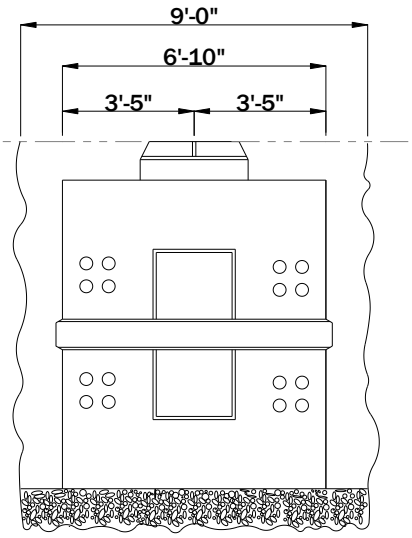
CU CODE	STOCK #	DESCRIPTION	QUANTITY	UNIT
UVPED-31X31	060395500	URD SERVICE PEDESTAL 31X31	1	EA

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	BMM	CREATED	8/4/22

NES

T&D MAHOLE, BOXES STANDARDS
SECONDARY TERMINATING PEDESTAL





GENERAL CONSTRUCTION NOTES:

1. The contractor is responsible for excavation and backfill.
2. The backfill should be reasonably level for the placement of the manhole.
3. Set the base half and install seal.
4. Set the top half.
5. Set throat and cover.
6. Install the conduits.
7. Contractor should finish backfill with # 67 gravel to the seam between the manhole sections.
8. Proper shoring or sloping of earth must be in place before entering the hole to install grounding.
9. Backfill to final grade.
10. Because of size and handling issues the manufacturer delivers the manholes to the job site.

GROUNDING ITEMS

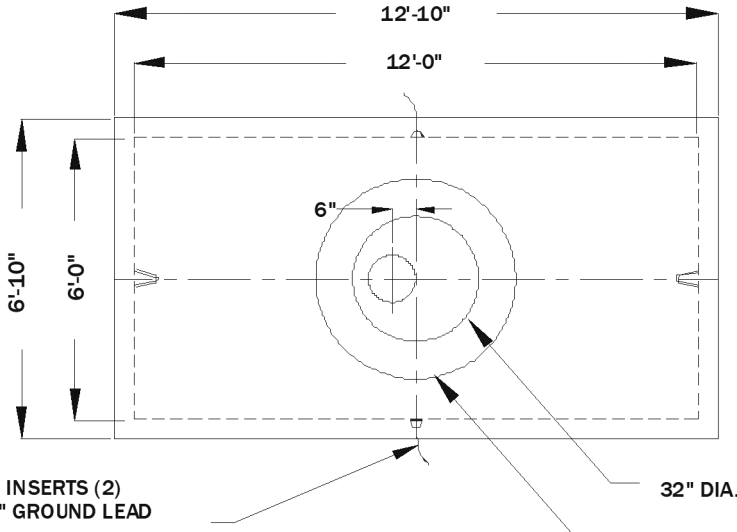
TRUCK STOCK MATERIAL LIST

STOCK	DESCRIPTION	QTY	UNIT
011210000	CABLE CU BSD 2 7S	60	FT
184380000	ROD GROUND CW 5/8X8	4	EA
223490000	GRD CONN 1/0 OR 5/8" GND ROD	8	EA
223480000	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	2	EA

UG PLATE BOOK DRAWING (U-22365 (Manhole Setting Details)).dwg

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

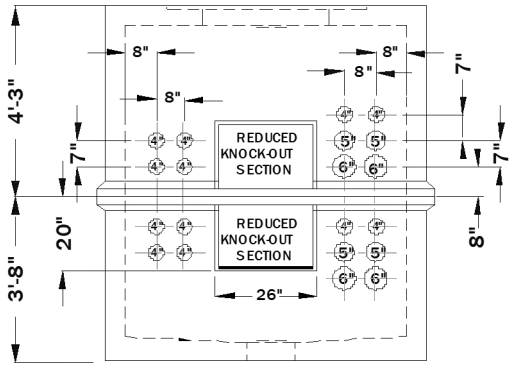
T&D MANHOLE, BOX STANDARDS
LARGE RECTANGULAR MANHOLE INSTALLATION DETAILS



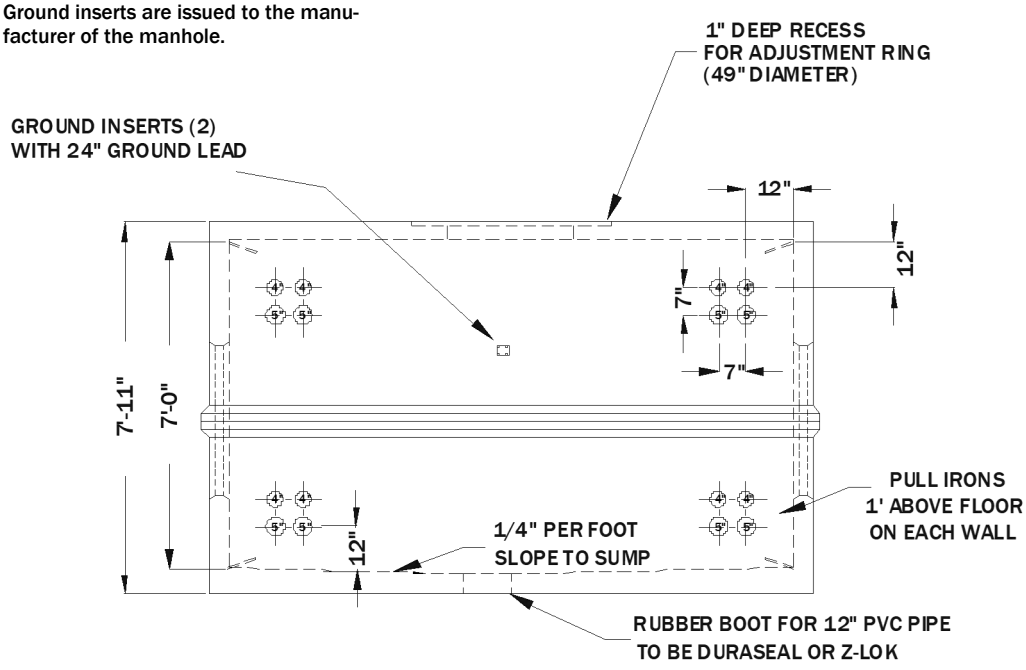
TOP VIEW

UMH—GRDINS

NOTE:
Ground inserts are issued to the manufacturer of the manhole.



END VIEW



SIDE VIEW

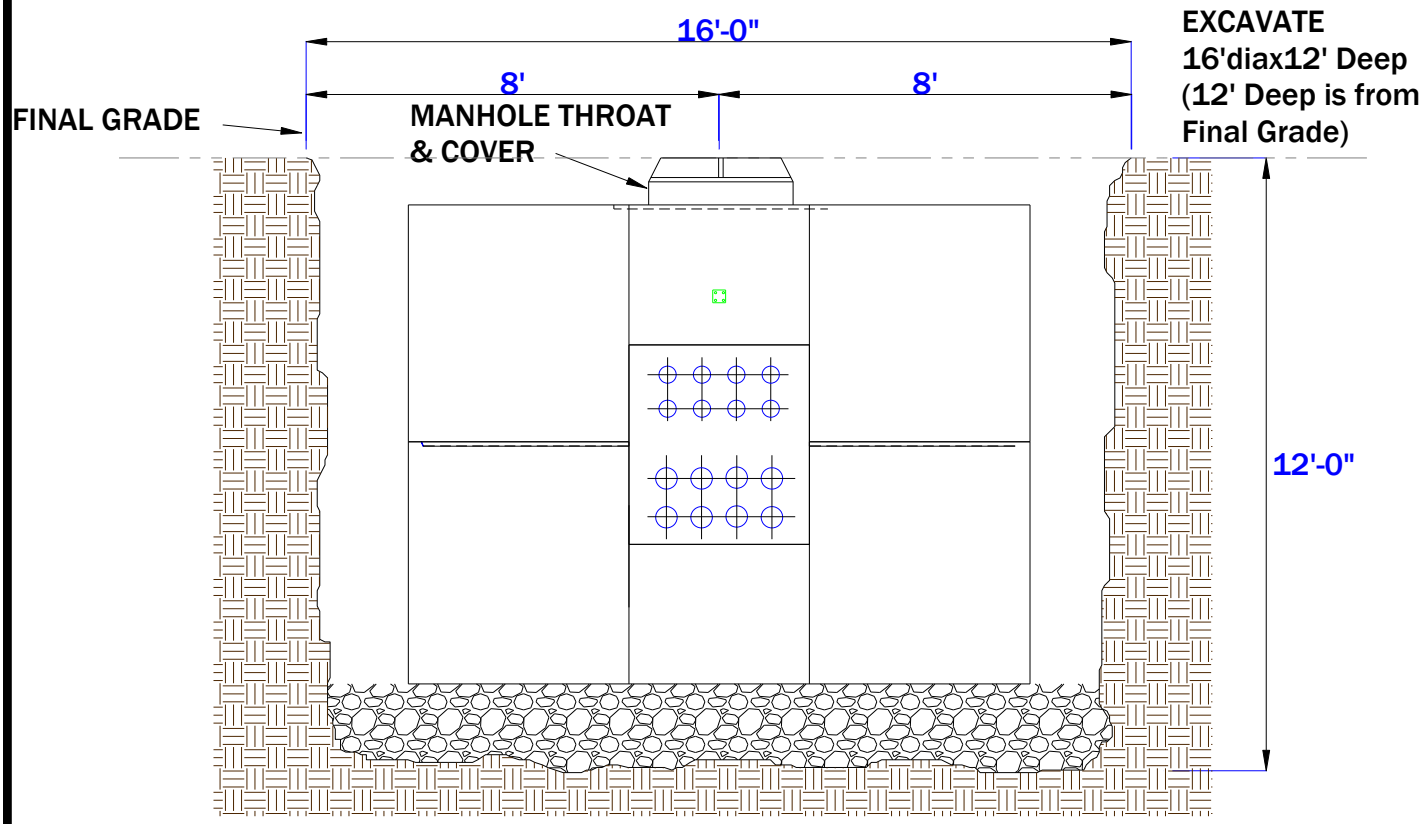
LARGE MANHOLE MATERIAL LIST				
CU CODE	STOCK #	DESCRIPTION	QUANTITY	UNIT
UMNHOLE-LG	060375000	MANHOLE: PRECAST LARGE	1	EA
	063000000	THROAT AND COVER	1	EA

UG PLATE BOOK DRAWING (USK-1185a (Manhole 8x12x7)).dwg

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

NES

T&D MANHOLE, BOXES STANDARDS
LARGE RECTANGULAR MANHOLE HOLE PATTERN



GENERAL CONSTRUCTION NOTES:

1. The on new installations, the contractor is responsible for obtaining and/or building the manhole to NES's specifications
2. The contractor is responsible for all excavation and backfill.
3. The backfill should be reasonably level for the placement of the manhole
4. Set the base half and install seal.
5. Set the top half.
6. Set throat and cover.
7. Install the conduits.
8. Conduits should be rigid galvanized.
9. Contractor should finish backfill with # 67 gravel to the seam between the manhole sections.
10. Proper shoring or sloping of earth must be in place before entering the hole to install grounding.
11. Backfill to final grade.
12. Because of size and handling issues the manufacturer delivers the manholes to the job site.

GROUNDING ITEMS

TRUCK STOCK MATERIAL LIST

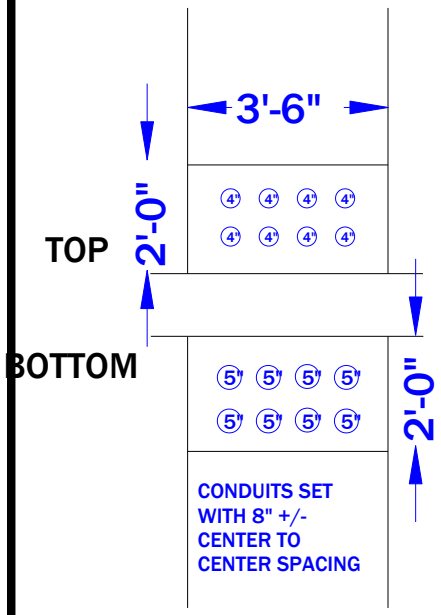
STOCK	DESCRIPTION	QTY	UNIT
011210000	CABLE CU BSD 2 7S	50	FT
184380000	ROD GROUND CW 5/8X8	4	EA
223490000	GRD CONN 1/0 OR 5/8" GND ROD	8	EA
223480000	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	2	EA

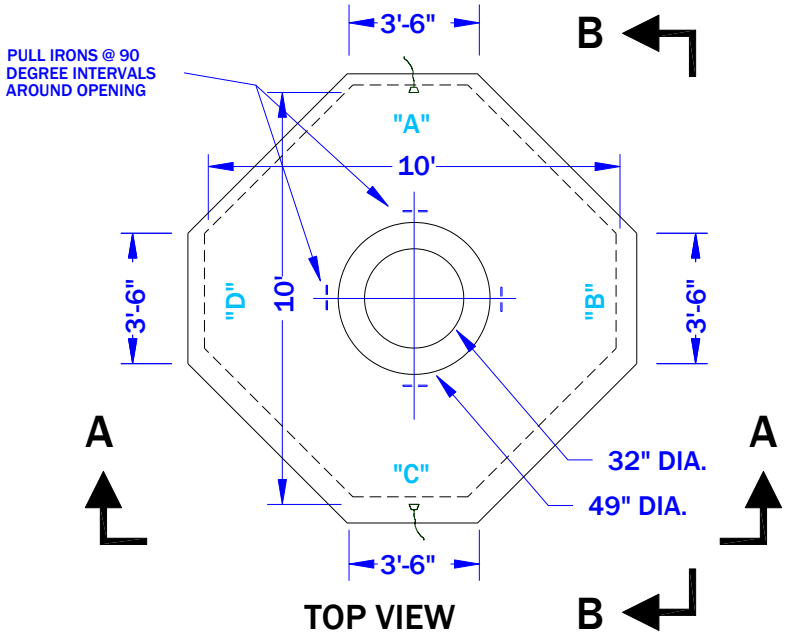
UG PLATE BOOK DRAWING (U-22365 (Manhole Setting Details)).dwg

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

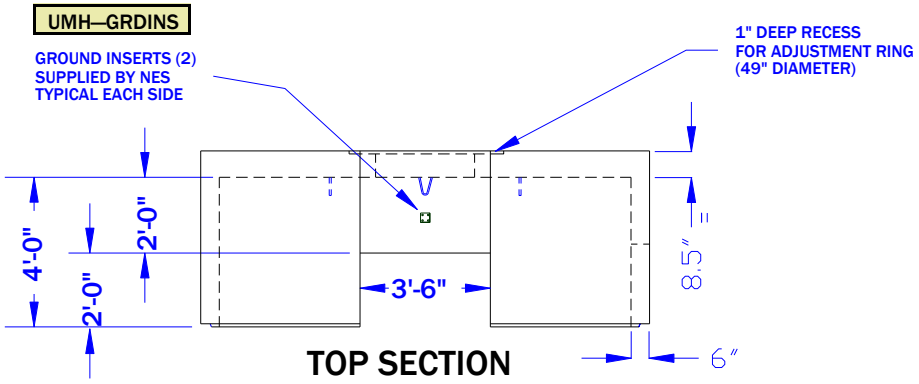
NES

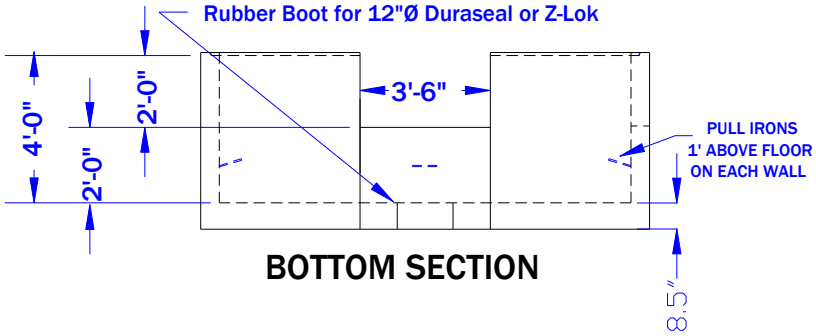
T&D MANHOLE, BOX STANDARDS
OCTAGONAL MANHOLE INSTALLATION DETAILS





NOTE:
Ground inserts are issued to the manufacturer of the manhole.





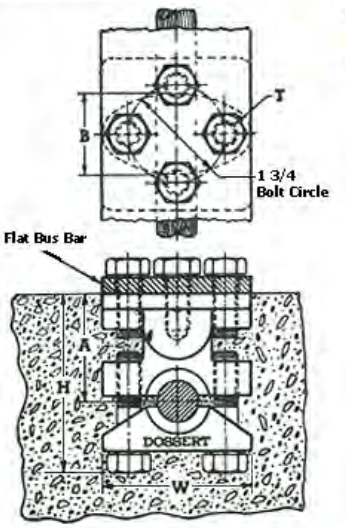
SECTION A-A
SECTION B-B

OCTAGONAL MANHOLE				
MATERIAL LIST				
CU CODE	STOCK #	DESCRIPTION	QUANTITY	UNIT
UMNHOLE-OCT	060377500	MANHOLE: PRECAST OCTAGONAL	1	EA
	063000000	THROAT AND COVER	1	EA

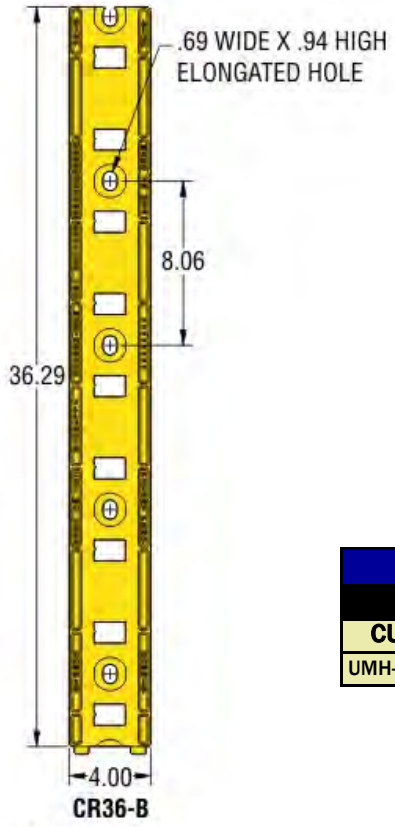
REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

NES

T&D MANHOLE, BOXES STANDARDS
OCTAGONAL MANHOLE HOLE PATTERN

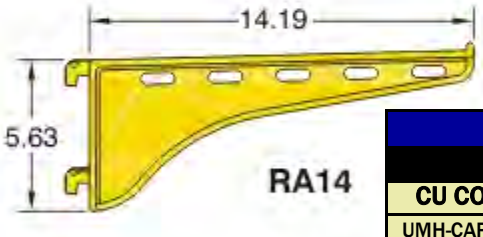


GROUND INSERT				
MATERIAL LIST				
CU CODE	STOCK #	DESCRIPTION	QUANTITY	UNIT
UMH-GRDINS	380300000	INSERT GROUND #1/0-300MCM	1	EA



Cable Rack installation.
Minimum of 8 required per manhole .
Consult U&S for specific applications.

CABLE RACK				
MATERIAL LIST				
CU CODE	STOCK #	DESCRIPTION	QUANTITY	UNIT
UMH-CARM-SUP	381100000	SUPPORT CABLE BACK 9 HOLE PLAS	1	EA

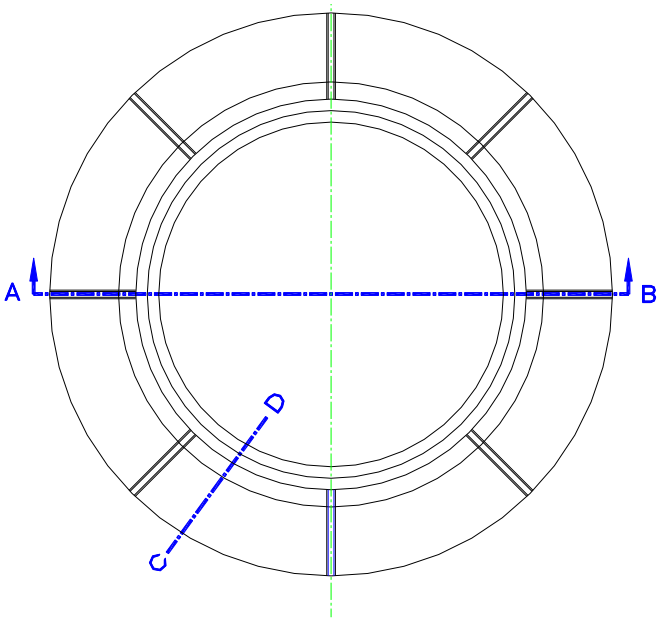


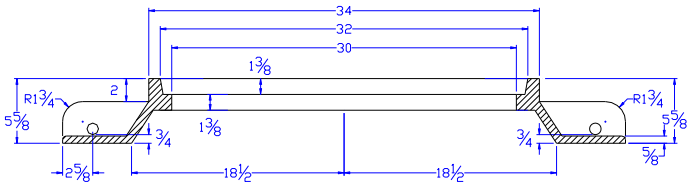
CABLE ARM				
MATERIAL LIST				
CU CODE	STOCK #	DESCRIPTION	QUANTITY	UNIT
UMH-CARM13	380080000	CABLE ARM 14 INCH PLAS	1	EA
NCARM-NM-20	380090000	CABLE ARM 20 INCH PLAS	1	EA

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

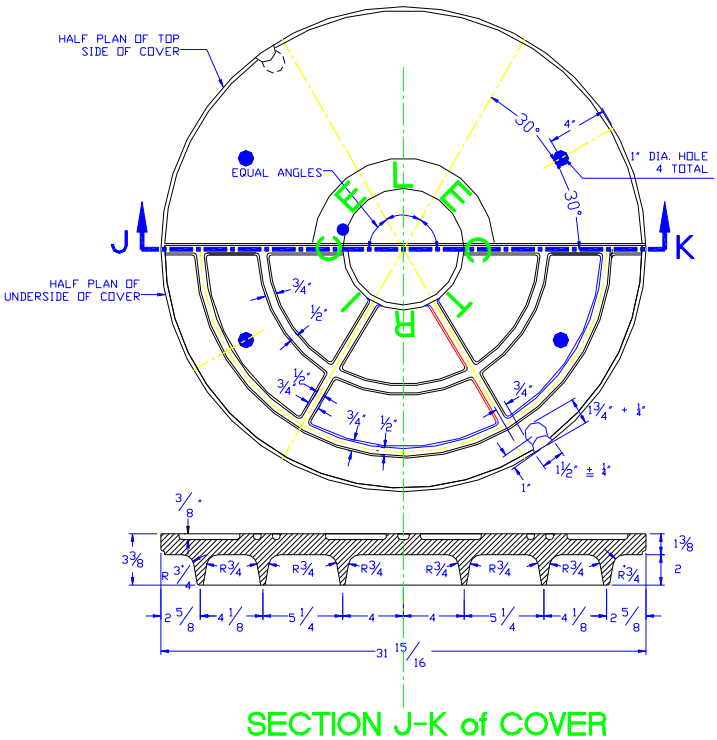
NES

T&D MANHOLE, BOX STANDARDS
MANHOLE ACCESSORIES
GROUNDING AND CABLE RACKS





SECTION A-B of FRAME



SECTION J-K of COVER

UG PLATE BOOK DRAWING (UN-22309 MH THROAT AND COVER).DWG

MANHOLE THROAT AND COVER				
MATERIAL LIST				
CU CODE	STOCK #	DESCRIPTION	QUANTITY	UNIT
UMH-THROAT	063000000	THROAT AND COVER	1	EA

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

NES

T&D MANHOLE, BOXES STANDARDS
MANHOLE ACCESSORIES
THROAT AND COVER

GROUNDING ITEMS TRUCK STOCK MATERIAL LIST			
STOCK	DESCRIPTION	QTY	UNIT
011210000	CABLE CU BSD 2 7S	20	FT
184380000	ROD GROUND CW 5/8X8	4	EA
223490000	GRD CONN 1/0 OR 5/8" GND ROD	8	EA
223480000	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	2	EA

DITCH DETAIL
PRIMARY PULL BOX
RIGID GALVANIZED CONDUIT

NOTE:
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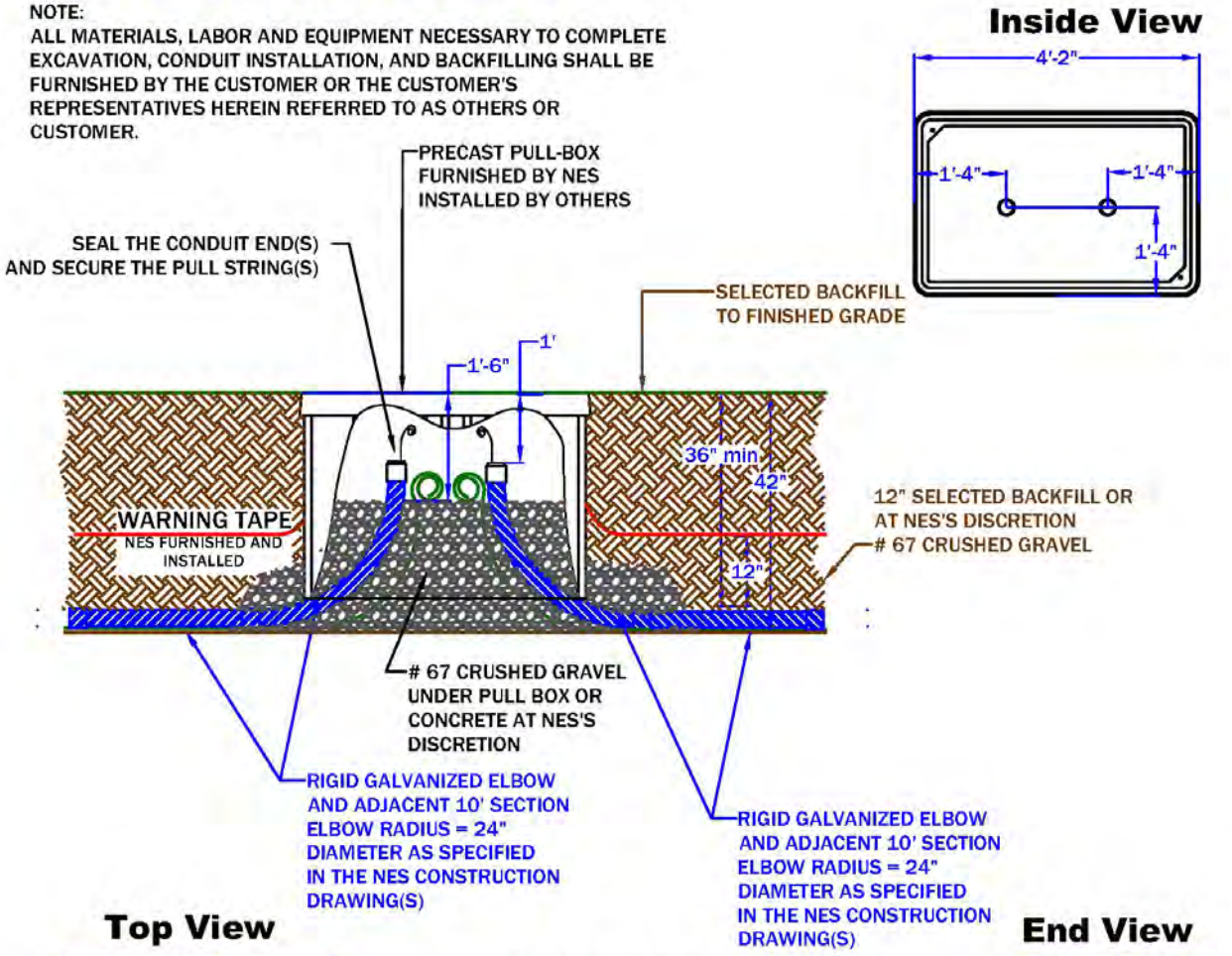

PRIMARY PULL BOX (DRAWING UGS0051) MATERIAL LIST				
CU CODE	STOCK #	DESCRIPTION	QUANTITY	UNIT
UBOX-PRI	060044000	PRIMARY PULL BOX	1	EA

UG PLATE BOOK DRAWING (UGS0051).dwg

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	BMM	UPDATED DIMENSIONS	3/16/22

NES

T&D MANHOLE, BOX STANDARDS
PRIMARY PULL BOX
DRAWING

GROUNDING ITEMS			
TRUCK STOCK MATERIAL LIST			
STOCK	DESCRIPTION	QTY	UNIT
011210000	CABLE CU BSD 2 7S	20	FT
184380000	ROD GROUND CW 5/8X8	4	EA
223490000	GRD CONN 1/0 OR 5/8" GND ROD	8	EA
223480000	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	2	EA

DITCH DETAIL
PRIMARY PULL BOX - TRAFFIC RATED
RIGID GALVANIZED CONDUIT

NOTE:
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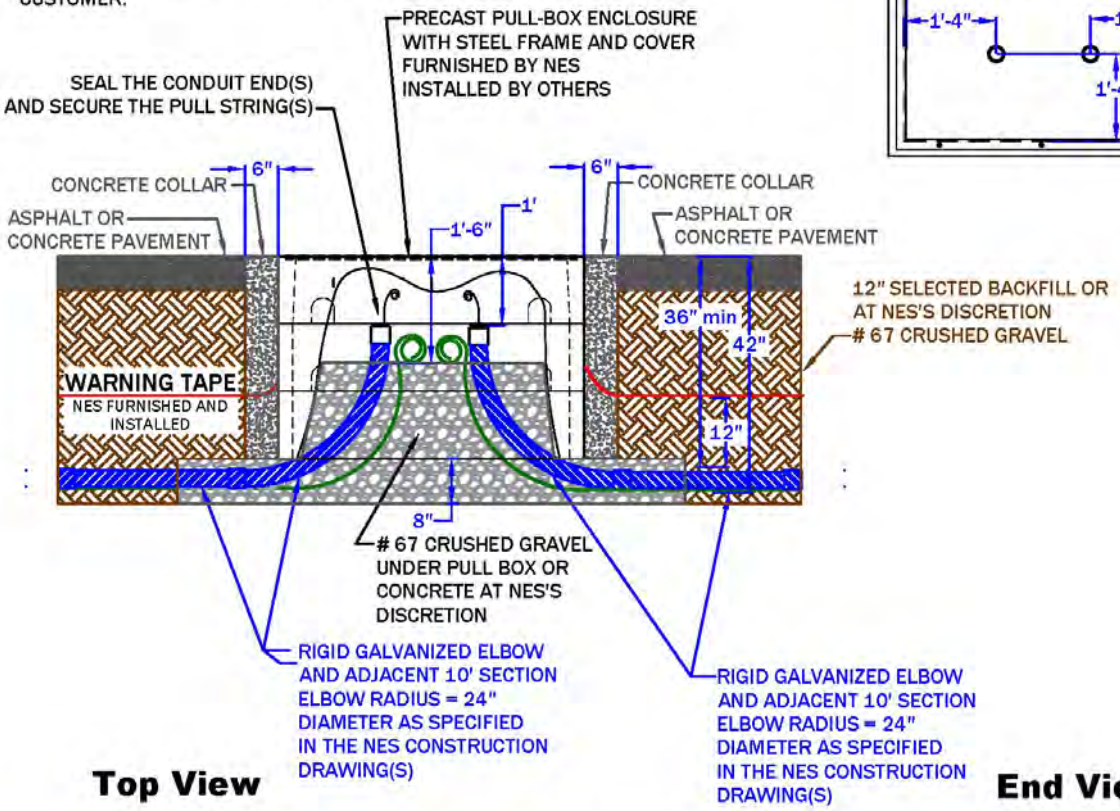
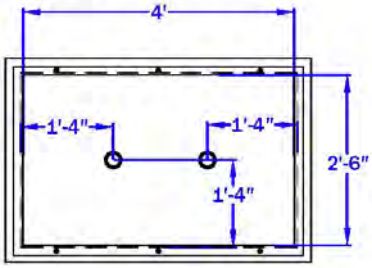
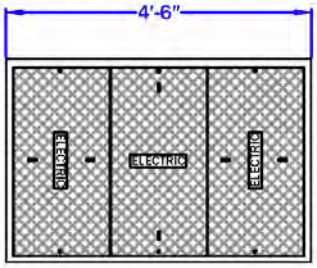


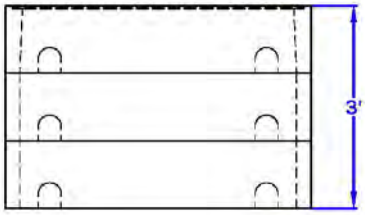
Inside View



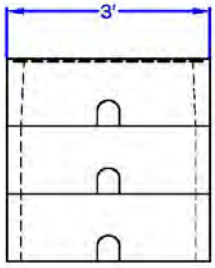
Top View



Side View



End View



PRIMARY PULL BOX (DRAWING UGS0051)				
MATERIAL LIST				
CU CODE	STOCK #	DESCRIPTION	QUANTITY	UNIT
UBOX-PRI-TF	060045000	PRIMARY PULL BOX—TRAFFIC RATED	1	EA
UBOX-PRI-TFX	060045200	PRIMARY PULL BOX EXTENSION-TRAFFIC RTD.	2	EA
UBOX-PRI-TFC	060045500	PRIMARY PULL BOX COVER—TRAFFIC RATED	1	EA

UG PLATE BOOK DRAWING (UGS0051).dwg

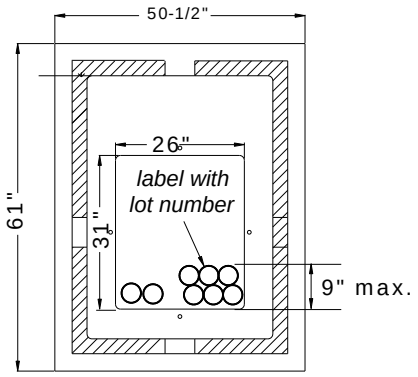
REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	BMM	CREATED	3/16/22

NES

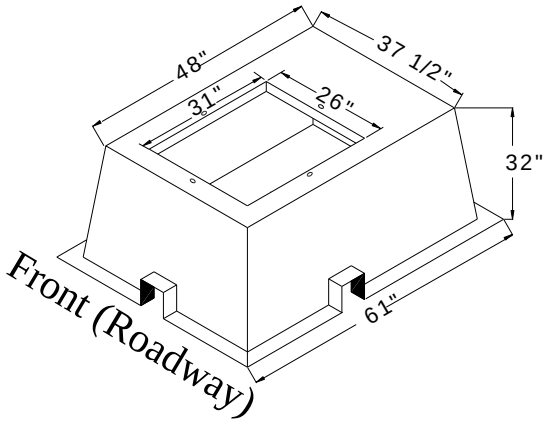
T&D MANHOLE, BOXES STANDARDS
PRIMARY PULL BOX
TRAFFIC RATED (AASHTO H20)

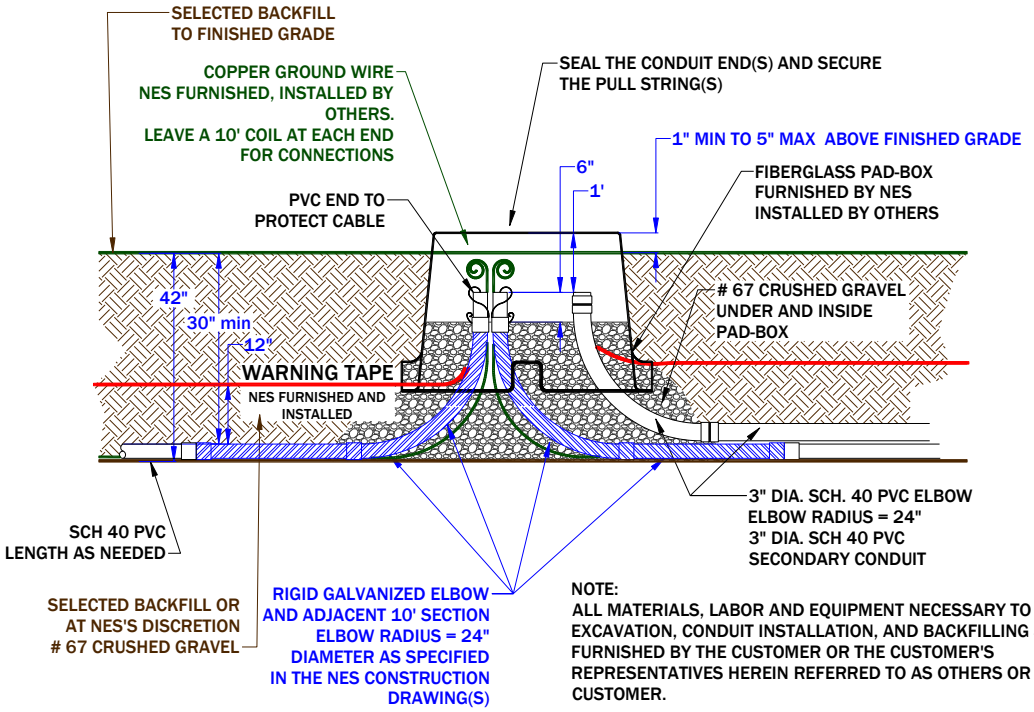
SINGLE PHASE TRANFORMER LOOP FEED INSTALLATION

Top View



Isometric View





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GROUNDING ITEMS TRUCK STOCK MATERIAL LIST			
STOCK	DESCRIPTION	QTY	UNIT
011210000	CABLE CU BSD 2 7S	20	FT
184380000	ROD GROUND CW 5/8X8	4	EA
223490000	GRD CONN 1/0 OR 5/8" GND ROD	8	EA
223480000	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	2	EA

FIBERGLASS PAD-BOX FOR SINGLE PHASE TRANSFORMERS (DRAWING UGS0051) MATERIAL LIST				
CU CODE	STOCK #	DESCRIPTION	QUANTITY	UNIT
UTPAD-FG	060390000	PAD BOX FIBERGLASS 48"X37.5 FOR SINGLE PHASE TRANSFORMERS	1	EA

UG PLATE BOOK DRAWING (UGS0051).dwg

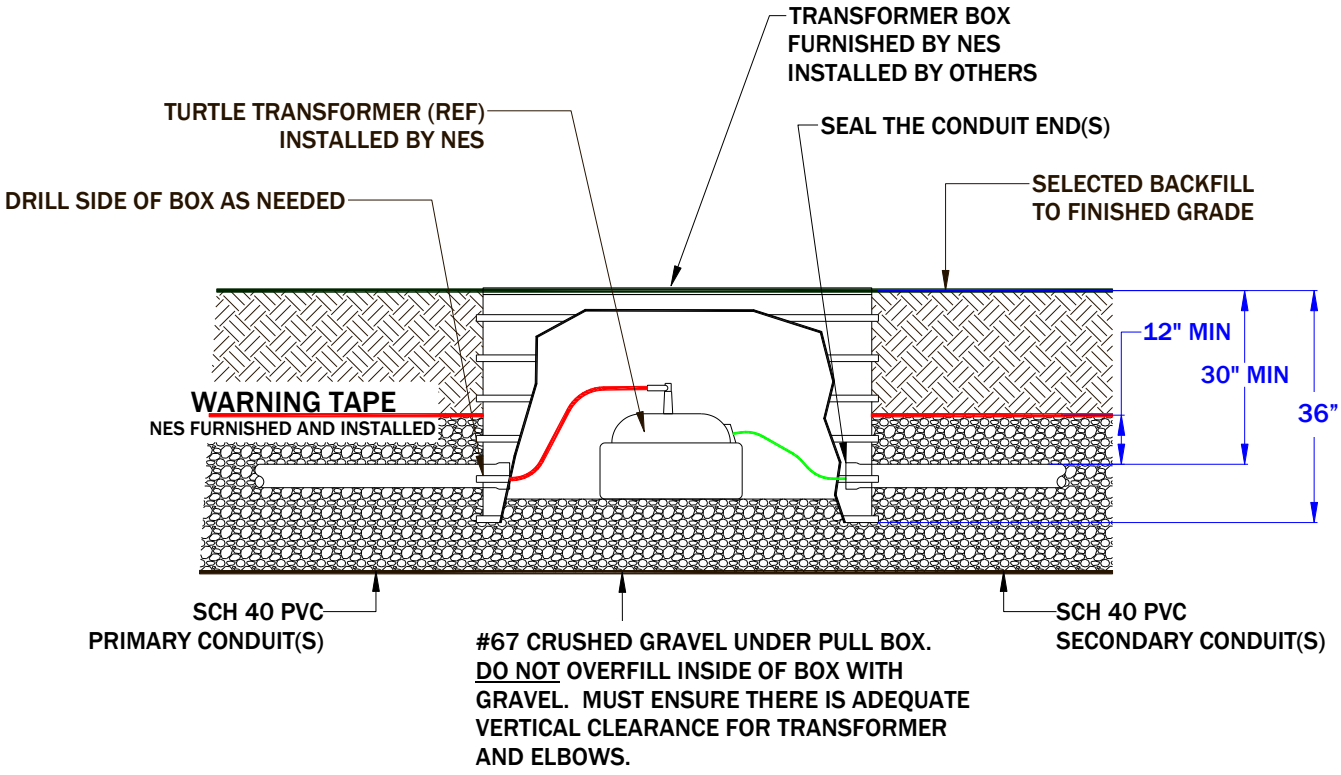
REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

T&D MANHOLE, BOX STANDARDS
SINGLE PHASE TRANSFORMER FIBERGLASS BOX

GROUNDING ITEMS			
TRUCK STOCK MATERIAL LIST			
STOCK	DESCRIPTION	QTY	UNIT
011210000	CABLE CU BSD 2 7S	20	FT
184380000	ROD GROUND CW 5/8X8	4	EA
223490000	GRD CONN 1/0 OR 5/8" GND ROD	8	EA
223480000	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	2	EA

TURTLE TRANSFORMER BOX DITCH DETAIL
PVC AS INDICATED OR RIGID GALVANIZED CONDUIT

DITCH INSTALLATION PROCESS
1. EXCAVATE DITCH
2. INSTALL BOX AND CONDUIT
3. CALL FOR INSPECTION
4. BACKFILL 12" AS REQUIRED
5. CALL FOR INSPECTION
6. AFTER WARNING TAPE IS INSTALLED, BACKFILL TO FINISHED GRADE



NOTE:
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TURTLE TRANSFORMER BOX (DRAWING UGS-00061)				
MATERIAL LIST				
CU CODE	STOCK #	DESCRIPTION	QUANTITY	UNIT
UBOX-UXFMR	060463600	BOX PULL 36W X 60L X 36D	1	EA

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	MTE	CREATED	3/31/21
B	CJM	UPDATED TURTLE XFMR BOX DIMENSIONS	11/23/21
C	CJM	UPDATED NOTE ABOUT GRAVEL UNDER BOX	4/24/23

NES

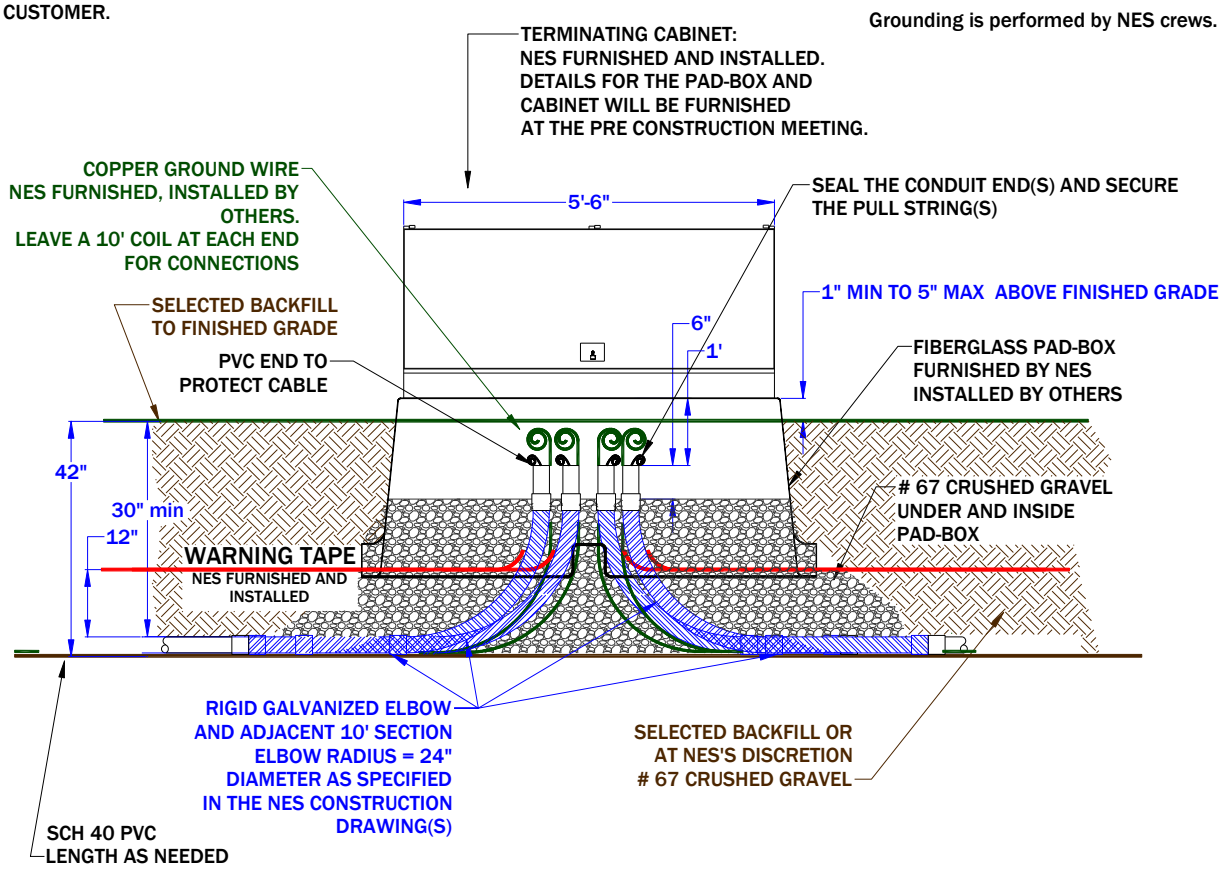
T&D MANHOLE, BOX STANDARDS
TURTLE TRANSFORMER BOX

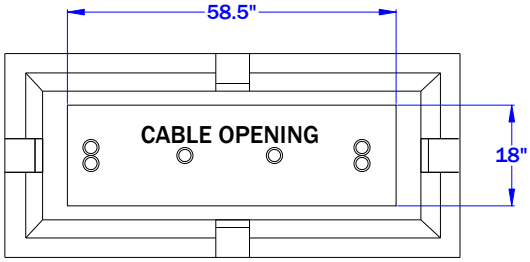
NOTE:
ALL MATERIALS, LABOR AND EQUIPMENT NECESSARY TO COMPLETE EXCAVATION, CONDUIT INSTALLATION, AND BACKFILLING SHALL BE FURNISHED BY THE CUSTOMER OR THE CUSTOMER'S REPRESENTATIVES HEREIN REFERRED TO AS OTHERS OR CUSTOMER.

GENERAL NOTES:

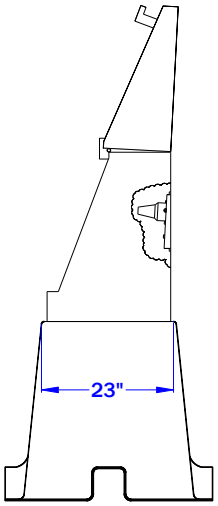
The pad is normally installed by the developer's contractor during the utility installation phase of the project.

Grounding is performed by NES crews.





TOP VIEW



END VIEW

GROUNDING ITEMS

TRUCK STOCK MATERIAL LIST

STOCK	DESCRIPTION	QTY	UNIT
011210000	CABLE CU BSD 2 7S	20	FT
184380000	ROD GROUND CW 5/8X8	4	EA
223490000	GRD CONN 1/0 OR 5/8" GND ROD	8	EA
223480000	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	2	EA

FIBERGLASS PAD-BOX FOR TWO AND THREE PHASE TERMINATING CABINETS (DRAWING UGS0016)

MATERIAL LIST

CU CODE	STOCK #	DESCRIPTION	QUANTITY	UNIT
U3P4P-BASE	060015000	TERM CAB BASE FOR 2P OR 3P 4 POLE TERMINATING CABINETS	1	ea

UG PLATE BOOK DRAWING (UGS0051).dwg

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

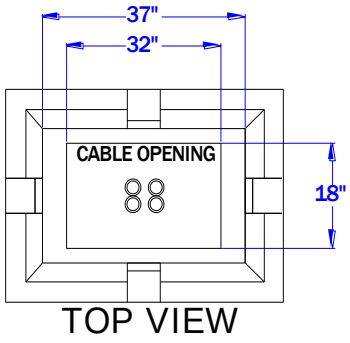
T&D MANHOLE, BOXES STANDARDS
2 & 3 PHASE TERMINATING CABINETS FIBERGLASS BOX

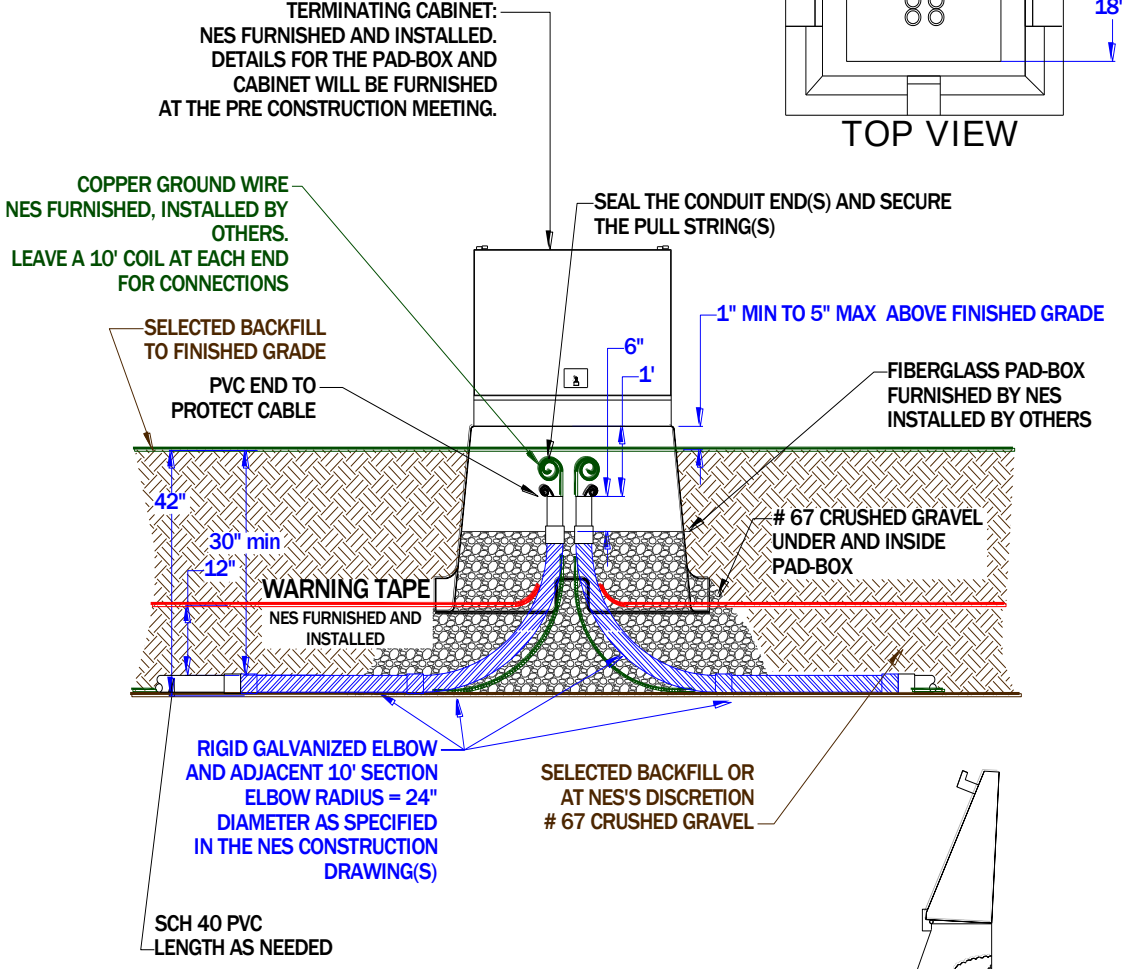
GENERAL NOTES:

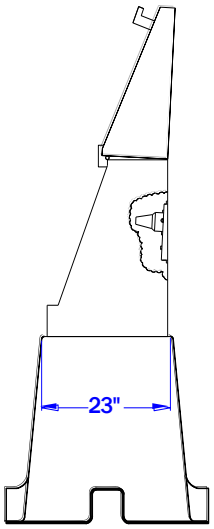
The pad is normally installed by the developer's contractor during the utility installation phase of the project.

Grounding is performed by NES crews.

NOTE:
ALL MATERIALS, LABOR AND EQUIPMENT NECESSARY TO COMPLETE EXCAVATION, CONDUIT INSTALLATION, AND BACKFILLING SHALL BE FURNISHED BY THE CUSTOMER OR THE CUSTOMER'S REPRESENTATIVES HEREIN REFERRED TO AS OTHERS OR CUSTOMER.







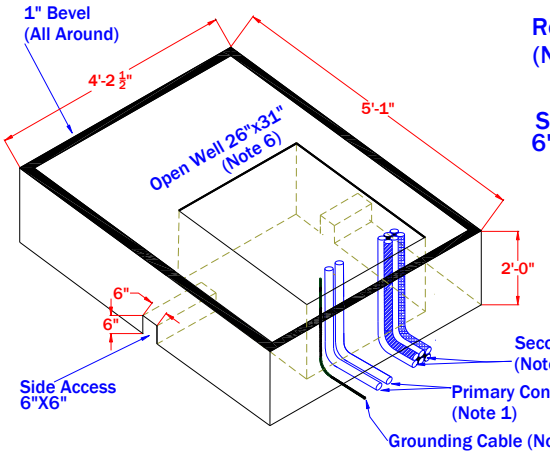
GROUNDING ITEMS			
TRUCK STOCK MATERIAL LIST			
STOCK	DESCRIPTION	QTY	UNIT
011210000	CABLE CU BSD 2 7S	10	FT
184380000	ROD GROUND CW 5/8X8	4	EA
223490000	GRD CONN 1/0 OR 5/8" GND ROD	8	EA
223480000	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	2	EA

FIBERGLASS PAD-BOX FOR SINGLE PHASE TERMINATING CABINETS (DRAWING UGS0018)				
MATERIAL LIST				
CU CODE	STOCK #	DESCRIPTION	QUANTITY	UNIT
U1P4P-BASE	060010000	TERM CAB BASE FOR 1PHASE, 4 POLE	1	ea

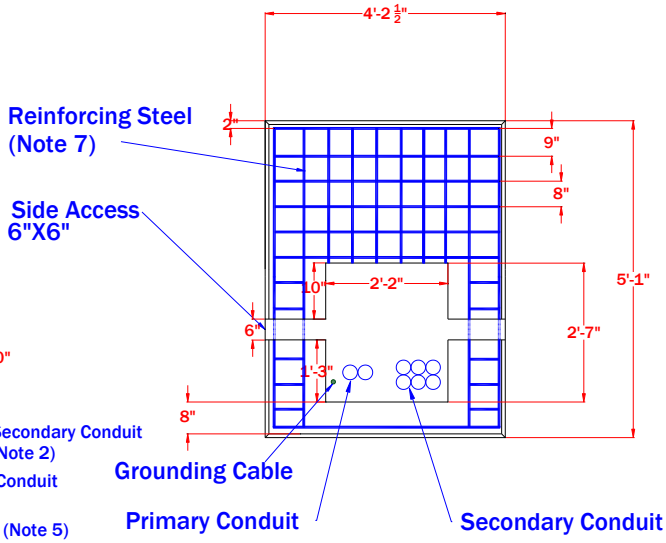
UG PLATE BOOK DRAWING (UGS0051).dwg

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

T&D MANHOLE, BOX STANDARDS
SINGLE PHASE TERMINATING CABINETS
FIBERGLASS BOX



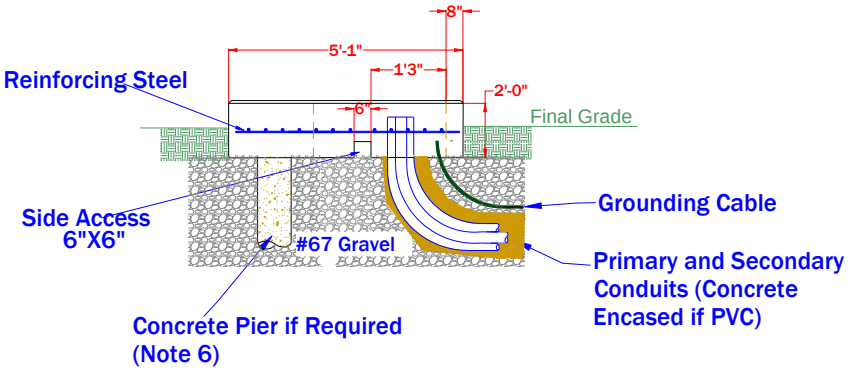
ISOMETRIC VIEW



TOP VIEW

CONSTRUCTION NOTES

1. A spare NES primary conduit is strongly recommended, and may be required at the NES designer's discretion. NES to inspect all conduit prior to covering or encasing in concrete. When ready for inspection, contact the NES representative listed above.
2. Maximum of eight (8) customer secondary conduits, or eight (8) conductors per phase. The secondary conduits shall not cross NES conduits, and must be approved by local Codes.
3. Secondary conduits shall not extend more than 1'-6" from the inside edge of the open well, as shown in the FRONT VIEW.
4. No other utilities shall pass beneath the NES pad location or be located within six feet (6') of the transformer pad.
5. NES will install grounding rods and grid at the pad location when excavation is complete, and prior to backfilling or forming the pad. Contact the NES representative above.
6. The NES pad shall be on a firm bearing. All fill material beneath the pad will be a minimum of two feet (2') of #67 washed gravel base to below local frost line. Increased pad depth or concrete piers may be necessary to reach a firm bearing for the pad. Do not fill open conduit well.
7. Reinforcing steel shall be ASTM A-615 Grade 60 (#5 rebar) or better. Reinforcing steel shall be spaced in six inch (6") by eight inch (8") grid as shown.
8. NES will inspect the pad form and rebar steel prior to concrete being poured. Contact the NES representative listed above.
9. Concrete shall be a minimum of 3,000 PSI compressive strength at 28 days.
10. Barrier posts will be installed by Customer at NES approved locations if the NES transformer is exposed to vehicular traffic. Barrier post specifications are available in the NES Electric Service Guidelines, available at www.nespower.com.
11. Pad Clearances: No landscaping, shrubbery or trees (final growth) allowed within six feet (6') of the front or three feet (3') from the sides and back of the pad.
12. No obstructions to transformer access such as walls, screens or overhangs are permitted.
13. Other brands of precast pads may be considered only if approved by NES Standards Group prior to the Pre-Construction Meeting.



LEFT SIDE VIEW

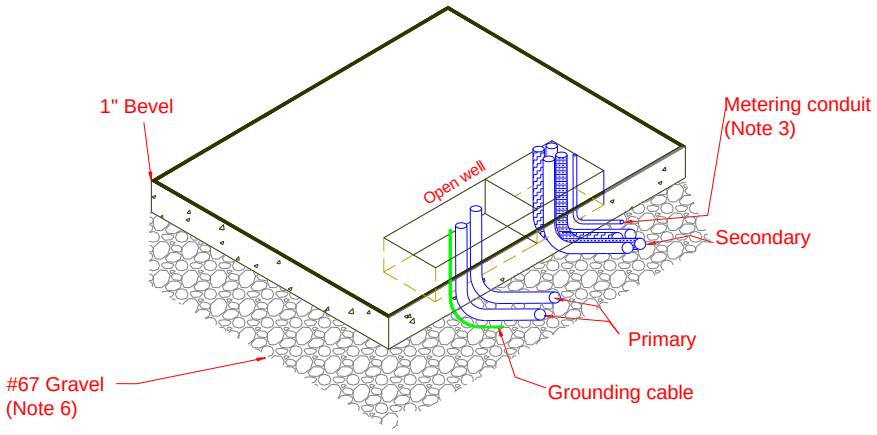
GROUNDING ITEMS			
TRUCK STOCK MATERIAL LIST			
STOCK	**DESCRIPTION**	**QTY**	**UNIT**
011210000	CABLE CU BSD 2 7S	20	FT
184380000	ROD GROUND CW 5/8X8	4	EA
223490000	GRD CONN 1/0 OR 5/8" GND ROD	8	EA
223480000	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	2	EA

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	MTE	CREATED	4/12/21

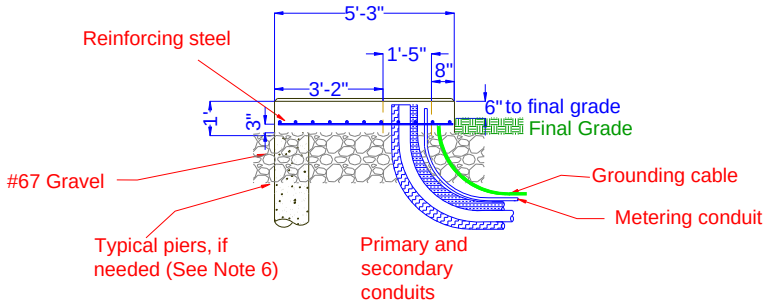
T&D MANHOLE, BOXES STANDARDS

CONCRETE PAD DETIALS 75-200 KVA SINGLE PHASE TRANSFORMERS

NOTE: CONTRACTOR INSTALLED: NO NES MATERIALS OR LABOR



ISOMETRIC VIEW



LEFT SIDE VIEW

Construction Notes

NES U&S Supervisor: _____

Phone Number: _____

1. A spare NES primary conduit is strongly recommended, and may be required at the designer's discretion. NES to inspect all conduit prior to covering or encasing in concrete. When ready for inspection, contact the NES Supervisor.
2. Maximum of eight (8) customer secondary conduits, or 8 conductors per phase. The secondary conduits should not cross NES conduits, and must be approved by Codes.
3. A one inch (1") conduit (minimum) shall be provided from the transformer pad secondary well to the customer electric equipment room for remote metering.
4. No other utilities may pass beneath the NES pad location or be located within three feet (3') of the sides and back or six feet (6') of the front of the transformer.
5. NES will install grounding rods and grid at the pad location when excavation is complete and prior to backfilling or forming the pad. Contact the NES Supervisor.
6. The NES pad shall be on a firm bearing. All fill material beneath the pad will be a minimum of two feet (2') of #67 washed gravel base to below local frost line. Increased pad depth or concrete piers may be necessary to reach a firm bearing for the pad. Do not fill open conduit well.
7. Reinforcing steel shall be ASTM A-615 Grade 60 (#5 rebar) or better.
8. NES to inspect the pad form and re-bar steel prior to concrete being poured. Call the NES U&S Supervisor above.
9. Concrete shall be a minimum of 3000 PSI compressive strength at 28 days.
10. Barrier posts will be installed by customer at NES approved locations if the NES transformer is exposed to vehicular traffic. Barrier post specifications are available in the ***NES Customer Guidelines for New Electric Service*** (aka Customer Handbook).

PAD CLEARANCES

Landscaping Shrubbery, Trees

(Minimum clearance from mature growth)

Front – 6 ft.

Sides & Back – 3 ft.

Walls/Screens/Overhead

No obstructions permitted

Minimum distance from Pad to non Fire-Proof Building

10 ft. for transformer up to 75 kVA

20 ft. for transformers 76-300 kVA

30 ft. for transformers over 300 kVA

if minimum distance not met, Customer is required to erect a four-hour fire wall per NES drawing UGS-0027.

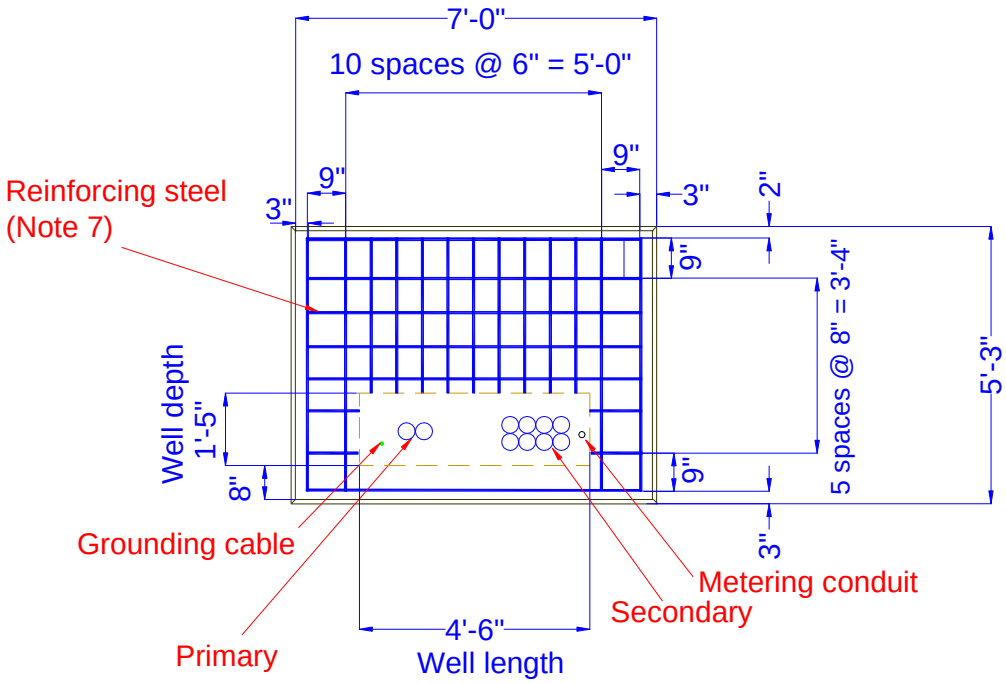
GROUNDING ITEMS			
TRUCK STOCK MATERIAL LIST			
STOCK	**DESCRIPTION**	**QTY**	**UNIT**
011210000	CABLE CU BSD 2 7S	20	FT
184380000	ROD GROUND CW 5/8X8	4	EA
223490000	GRD CONN 1/0 OR 5/8" GND ROD	8	EA
223480000	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	2	EA

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

T&D MANHOLE, BOX STANDARDS

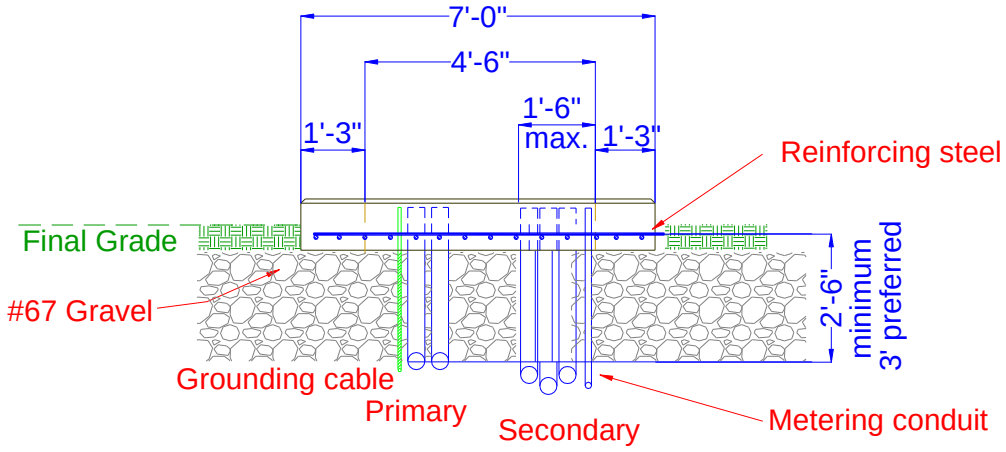
CONCRETE PAD DETAILS

75-500KVA TRANSFORMERS



TOP VIEW

NOTE: CONTRACTOR INSTALLED; NO NES MATERIALS OR LABOR



FRONT VIEW

UG PLATE BOOK DRAWING (USk-1125H (75-500)).dwg

CONCRETE PAD MATERIALS (USE ONLY IN THE EVENT THAT NES MUST REPLACE A PAD UNDER MAINTENANCE)

MATERIAL LIST

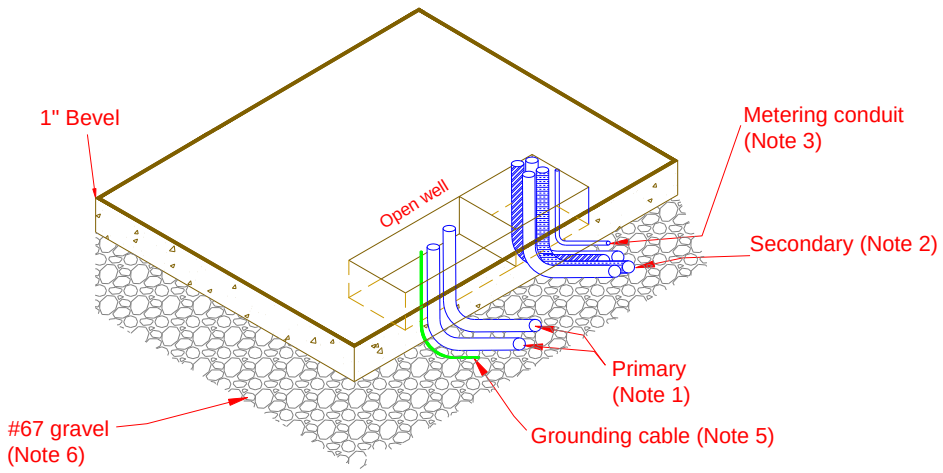
CU CODE	STOCK #	DESCRIPTION	QUANTITY	UNIT
UCONCRETE	509000000	CONCRETE 1 CUBIC YARD	2	YD^3
UREBAR-4	491500000	REINFORCING STEEL 1/2" (#4)	100	FT
ULAB-CONST		LABOR TO BUILD THE PAD 1HR/PERSON	40	HR

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

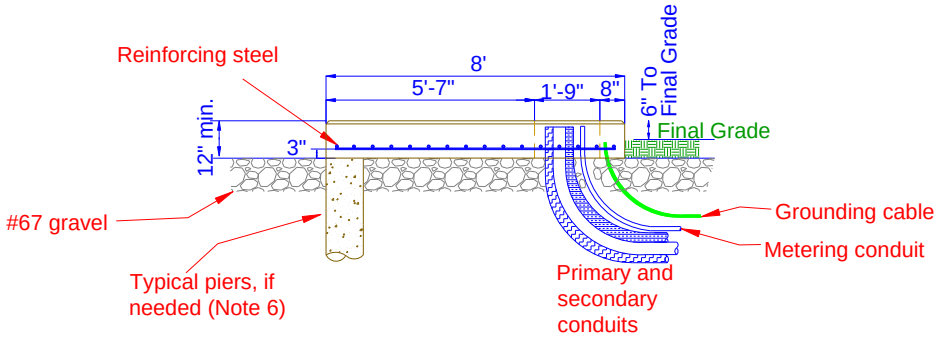
NES

T&D MANHOLE, BOXES STANDARDS
CONCRETE PAD DETAILS
75-500KVA TRANSFORMERS

NOTE: CONTRACTOR INSTALLED: NO NES MATERIALS OR LABOR



ISOMETRIC VIEW



LEFT SIDE VIEW

Construction Notes

NES U&S Supervisor: _____

Phone Number: _____

1. A spare NES primary conduit is strongly recommended, but optional. NES to inspect its conduit prior to covering or encasing in concrete. When ready for inspection, contact the NES Supervisor.
2. Maximum of twelve (12) customer secondary conduits, or 12 conductors per phase. The secondary conduits should not cross NES conduits, and must be approved by Codes.
3. A one inch (1") conduit (minimum) shall be provided from the transformer pad secondary well to the customer electric equipment room for remote metering.
4. No other utilities may pass beneath the NES pad location or be located within three feet (3') of the sides and back or six feet (6') of the front of the transformer.
5. NES will install grounding rods and grid at the pad location when excavation is complete and prior to backfilling or forming the pad. Contact the NES Supervisor.
6. The NES pad shall be on a firm bearing. All fill material beneath the pad will be a minimum of two feet (2') of #67 washed gravel base to below local frost line. Increased pad depth or concrete piers may be necessary to reach a firm bearing for the pad. Do not fill open conduit well.
7. Reinforcing steel shall be ASTM A-615 Grade 60 (#5 re-bar) or better.
8. NES to inspect the pad form and re-bar steel prior to pouring concrete. Call the NES Supervisor.
9. Concrete shall be a minimum of 3000 PSI compressive strength at 28 days.
10. Barrier posts will be installed by customer at NES approved locations if the NES transformer is exposed to vehicular traffic. Barrier posts must be in accordance with NES Drawing UGS-0030.

PAD CLEARANCES

Landscaping Shrubbery, Trees

(minimum clearance from mature growth)

Front – 6 ft.

Sides & Back – 3 ft.

Walls/Screens/Overhead

No obstructions permitted

Minimum distance from Pad to non Fire-Proof Building

10 ft. for transformer up to 75 kVA

20 ft. for transformers 76-300 kVA

30 ft. for transformers over 300 kVA

if minimum distance not met, Customer is required to erect a four-hour fire wall per NES drawing UGS-0027.

GROUNDING ITEMS

TRUCK STOCK MATERIAL LIST

STOCK	DESCRIPTION	QTY	UNIT
011210000	CABLE CU BSD 2 7S	20	FT
184380000	ROD GROUND CW 5/8X8	4	EA
223490000	GRD CONN 1/0 OR 5/8" GND ROD	8	EA
223480000	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	2	EA

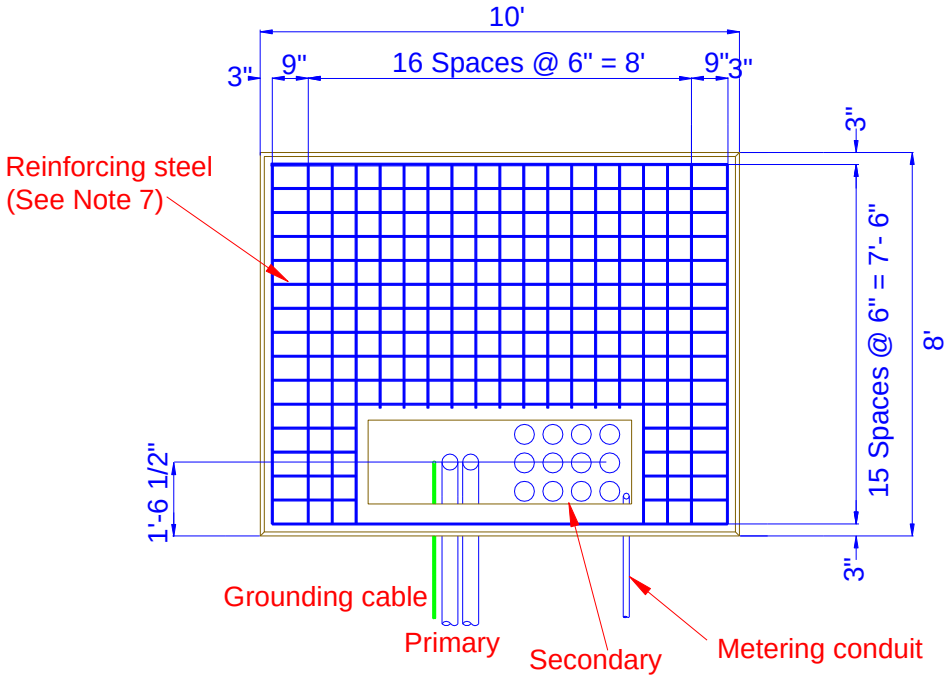
REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

NES

T&D MANHOLE, BOX STANDARDS

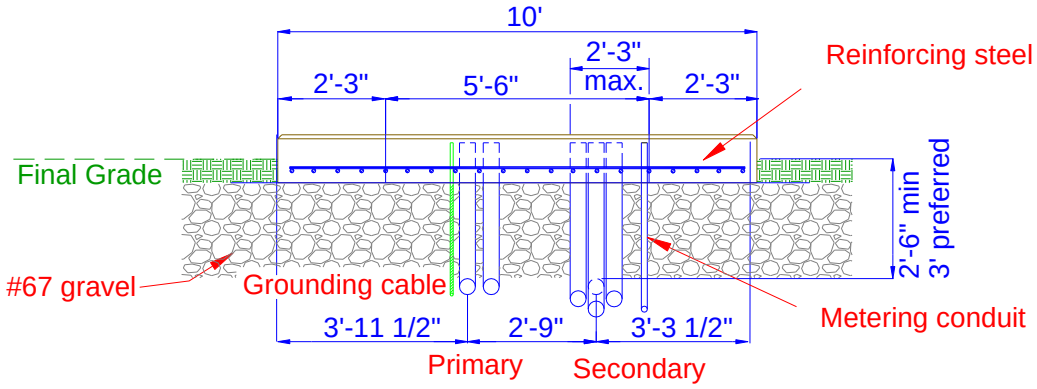
CONCRETE PAD DETAILS

750-1500KVA TRANSFORMERS



TOP VIEW

NOTE: CONTRACTOR INSTALLED; NO NES MATERIALS OR LABOR



FRONT VIEW

UG PLATE BOOK DRAWING (Usk-1123G (750-1500)).dwg

CONCRETE PAD MATERIALS (USE ONLY IN THE EVENT THAT NES MUST REPLACE A PAD UNDER MAINTENANCE)

MATERIAL LIST

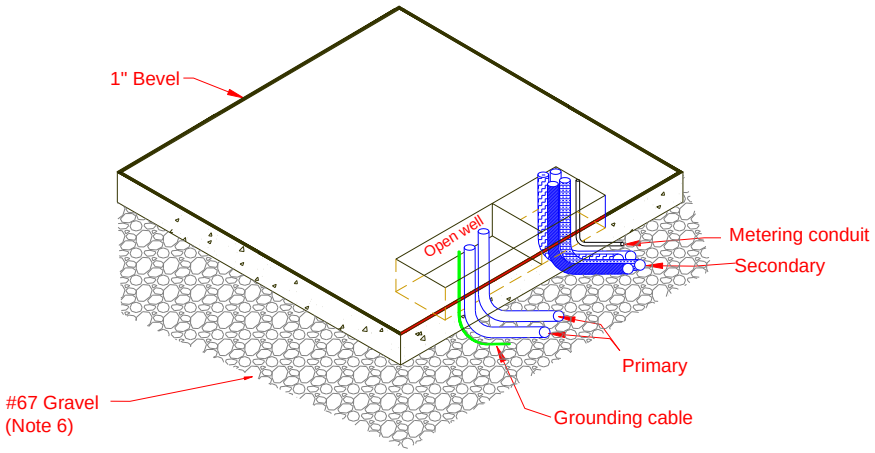
CU CODE	STOCK #	DESCRIPTION	QUANTITY	UNIT
UCONCRETE	509000000	CONCRETE 1 CUBIC YARD	3	YD^3
UREBAR-4	491500000	REINFORCING STEEL 1/2" (#4)	250	FT
ULAB-CONST		LABOR TO BUILD THE PAD 1HR/PERSON	60	HR

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

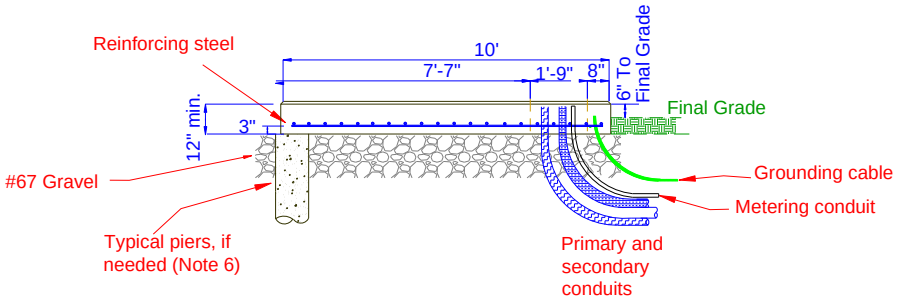
NES

T&D MANHOLE, BOXES STANDARDS
CONCRETE PAD DETAILS
750-1500KVA TRANSFORMERS

NOTE: CONTRACTOR INSTALLED: NO NES MATERIALS OR LABOR



ISOMETRIC VIEW



LEFT SIDE VIEW

Construction Notes

1. A spare NES primary conduit is strongly recommended, but optional. NES to inspect its conduit prior to covering or encasing in concrete. When ready for inspection, contact the NES Supervisor.
2. Maximum of twelve (12) customer secondary conduits, or 12 conductors per phase. The secondary conduits should not cross NES conduits, and must be approved by Codes.
3. A one inch (1") conduit (minimum) shall be provided from the transformer pad secondary well to the customer electric equipment room for remote metering.
4. No other utilities may pass beneath the NES pad location or be located within three feet (3') of the sides and back or six feet (6') of the front of the transformer.
5. NES will install grounding rods and grid at the pad location when excavation is complete and prior to backfilling or forming the pad. Contact the NES Supervisor.
6. The NES pad shall be on a firm bearing. All fill material beneath the pad will be a minimum of two feet (2') of #67 washed gravel base to below local frost line. Increased pad depth or concrete piers may be necessary to reach a firm bearing for the pad. Do not fill open conduit well.
7. Reinforcing steel shall be ASTM A-615 Grade 60 (#5 re-bar) or better.
8. NES to inspect the pad form and re-bar steel prior to pouring concrete. Call the NES Supervisor.
9. Concrete shall be a minimum of 3000 PSI compressive strength at 28 days.
10. Barrier posts will be installed by customer at NES approved locations if the NES transformer is exposed to vehicular traffic. Barrier posts must be in accordance with NES Drawing UGS-0030.

PAD CLEARANCES

Landscaping Shrubbery, Trees

(minimum clearance from mature growth)

Front – 6 ft.

Sides & Back – 3 ft.

Walls/Screens/Overhead

No obstructions permitted

Minimum distance from Pad to non Fire-Proof Building

10 ft. for transformer up to 75 kVA

20 ft. for transformers 76-300 kVA

30 ft. for transformers over 300 kVA

if minimum distance not met, Customer is required to erect a four-hour fire wall per NES drawing UGS-0027.

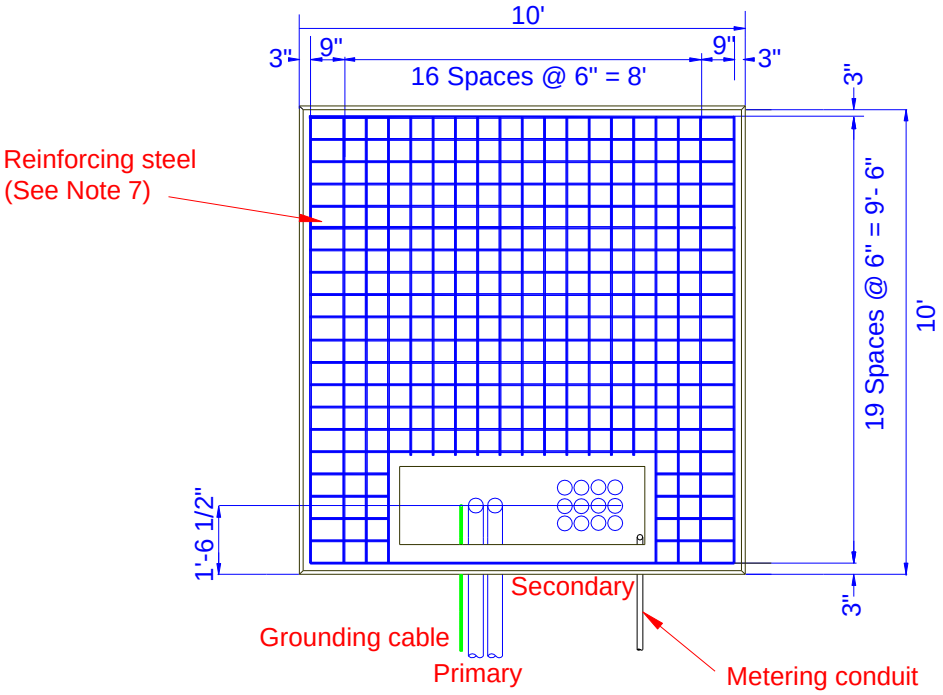
GROUNDING ITEMS			
TRUCK STOCK MATERIAL LIST			
STOCK	**DESCRIPTION**	**QTY**	**UNIT**
011210000	CABLE CU BSD 2 7S	20	FT
184380000	ROD GROUND CW 5/8X8	4	EA
223490000	GRD CONN 1/0 OR 5/8" GND ROD	8	EA
223480000	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	2	EA

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

T&D MANHOLE, BOX STANDARDS

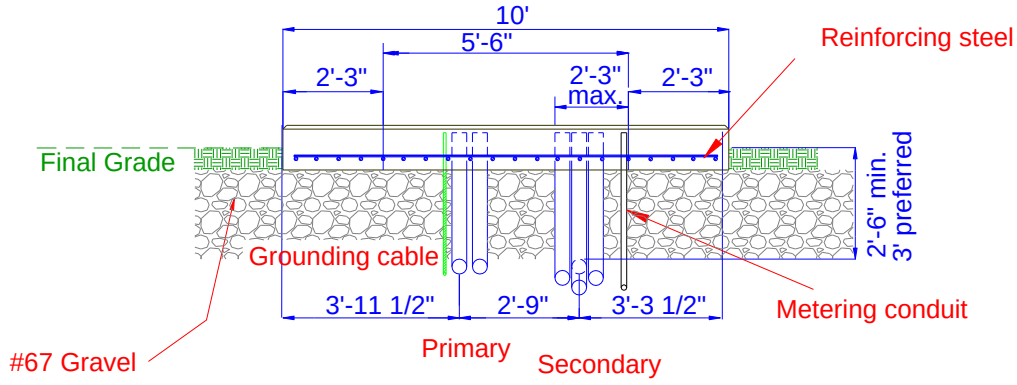
CONCRETE PAD DETAILS

750-1500KVA TRANSFORMERS



TOP VIEW

NOTE: CONTRACTOR INSTALLED; NO NES MATERIALS OR LABOR



FRONT VIEW

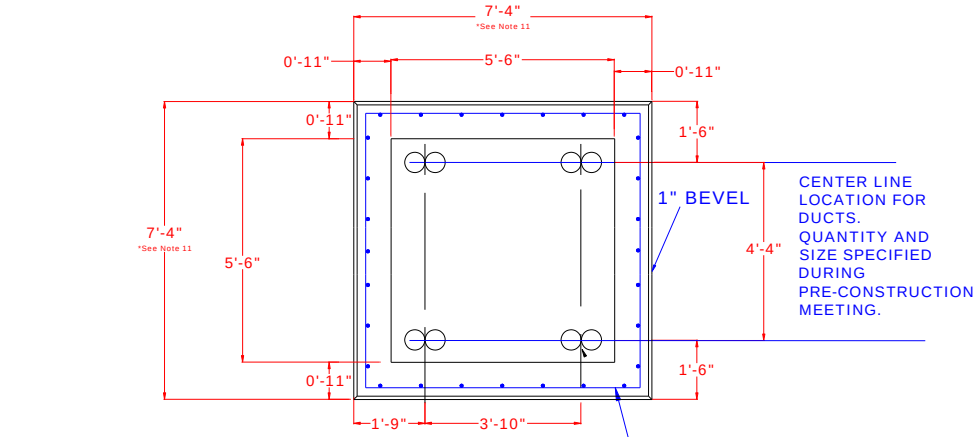
UG PLATE BOOK DRAWING (Usk-1155E (2000-2500 LF).dwg

CONCRETE PAD MATERIALS (USE ONLY IN THE EVENT THAT NES MUST REPLACE A PAD UNDER MAINTENANCE)				
MATERIAL LIST				
CU CODE	STOCK #	DESCRIPTION	QUANTITY	UNIT
UCONCRETE	509000000	CONCRETE 1 CUBIC YARD	4	YD^3
UREBAR-4	491500000	REINFORCING STEEL 1/2" (#4)	350	FT
ULAB-CONST		LABOR TO BUILD THE PAD 1HR/PERSON	70	HR

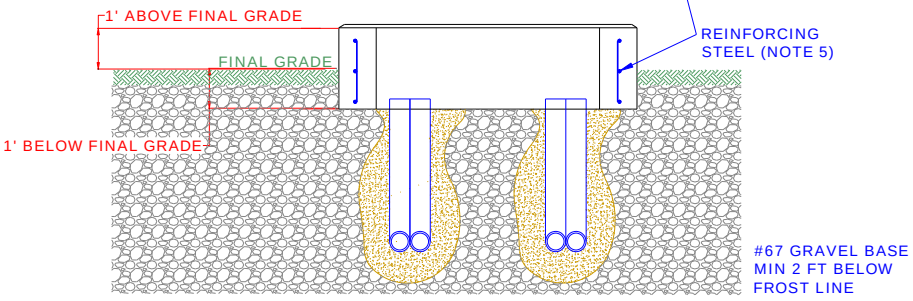
REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

NES

T&D MANHOLE, BOXES STANDARDS
CONCRETE PAD DETAILS
2000-3750KVA TRANSFORMERS



TOP VIEW



FRONT VIEW

Construction Notes

1. No other utilities may pass beneath theNES pad location or be located within six feet (6') of the switch pad.
2. NES will install grounding rods and grid at the pad location when excavation is complete, prior to Customer backfilling or forming the pad. Contact the person listed in #1 above.
3. The NES pad shall be on a firm bearing. All fill material beneath the pad will be a minimum of two feet (2') of #67 washed gravel base to below local frost line. Increased pad depth or concrete piers may be necessary to reach a firm bearing for the pad. Do not fill open conduit well.
4. Reinforcing steel shall be ASTM A-615 Grade 60 (#5 rebar) or better.
5. NES will inspect the pad form and rebar steel prior to concrete being poured.
6. Concrete shall be a minimum of 3000 PSI compressive strength at 28 days.
7. Barrier posts will be installed by Customer at NES approved locations if the NES switch is exposed to vehicular traffic. Barrier post specifications are available in the NES Electric Service Guidelines, available at www.nespower.com.
8. Pad Clearances: No landscaping, shrubbery or trees (final growth) allowed within six feet (6') of the front or three feet (3') from the sides and back of the switch pad.
9. No obstructions to switch access such as walls, screens or overhangs are permitted.
10. NES will accept pre-cast pads in accordance with OldCastle model# 772NESPMH612-TN. NOTE: Outside dimensions will be 8'-4" by 8'-4" consult engineer for potential fitment concerns. Other brands may be considered only if approved by NES Standards Section prior to the Pre-Construction Meeting.
11. Duct size: ___" sources, ___" loads Elbow radius 36" unless otherwise noted here: _____

PAD CLEARANCES

Landscaping Shrubbery, Trees

(Minimum clearance from mature growth)

Front & Back– 6 ft.

Sides– 3 ft.

Walls/Screens/Overhead

No obstructions permitted

NOTE: CONTRACTOR INSTALLED: NO NES MATERIALS OR LABOR

CONCRETE PAD MATERIALS (USE ONLY IN THE EVENT THAT NES MUST REPLACE A PAD UNDER MAINTENANCE)

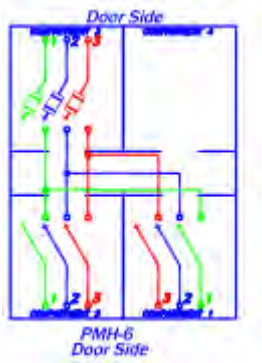
MATERIAL LIST

CU CODE	STOCK #	DESCRIPTION	QTY	UNIT
UCONCRETE	509000000	CONCRETE 1 CUBIC YARD	3	YD^3
UREBAR-4	491500000	REINFORCING STEEL 1/2" (#4)	115	FT
ULAB-CONST		LABOR TO BUILD THE PAD 1HR/PERSON	60	HR

GROUNDING ITEMS

TRUCK STOCK MATERIAL LIST

STOCK	DESCRIPTION	QTY	UNIT
011210000	CABLE CU BSD 2 7S	20	FT
184380000	ROD GROUND CW 5/8X8	4	EA
223490000	GRD CONN 1/0 OR 5/8" GND ROD	8	EA
223480000	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	2	EA



UG PLATE BOOK DRAWING (USK-1178B (PMH6)).DWG

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	MTE	REVISED DETAILS AND NOTES	4/25/18

T&D MANHOLE, BOX STANDARDS
CONCRETE PAD DETAILS
PMH-6 SWITCH

Construction Notes

1. No other utilities may pass beneath theNES pad location or be located within six feet (6') of the switch pad.
2. NES will install grounding rods and grid at the pad location when excavation is complete, prior to Customer backfilling or forming the pad. Contact the person listed in #1 above.
3. The NES pad shall be on a firm bearing. All fill material beneath the pad will be a minimum of two feet (2') of #67 washed gravel base to below local frost line. Increased pad depth or concrete piers may be necessary to reach a firm bearing for the pad. Do not fill open conduit well.
4. Reinforcing steel shall be ASTM A-615 Grade 60 (#5 rebar) or better.
5. NES will inspect the pad form and rebar steel prior to concrete being poured.
6. Concrete shall be a minimum of 3000 PSI compressive strength at 28 days.
7. Barrier posts will be installed by Customer at NES approved locations if the NES switch is exposed to vehicular traffic. Barrier post specifications are available in the NES Electric Service Guidelines, available at www.nespower.com.
8. Pad Clearances: No landscaping, shrubbery or trees (final growth) allowed within six feet (6') of the front or three feet (3') from the sides and back of the switch pad.
9. No obstructions to switch access such as walls, screens or overhangs are permitted.
10. NES will accept pre-cast pads in accordance with OldCastle model# 772NESPMH612-TN. NOTE: Outside dimensions will be 8'-4" by 8'-4" consult engineer for potential fitment concerns. Other brands may be considered only if approved by NES Standards Section prior to the Pre-Construction Meeting.
11. Duct size: ___" sources, ___" loads Elbow radius 36" unless otherwise noted here: _____

PAD CLEARANCES

Landscaping Shrubbery, Trees

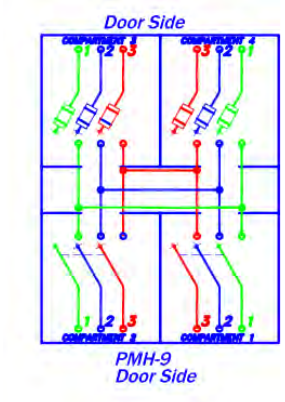
(Minimum clearance from mature growth)

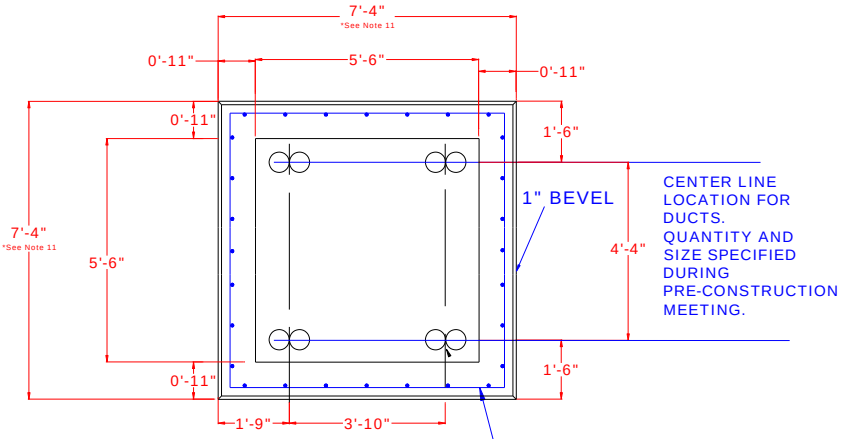
Front & Back– 6 ft.

Sides– 3 ft.

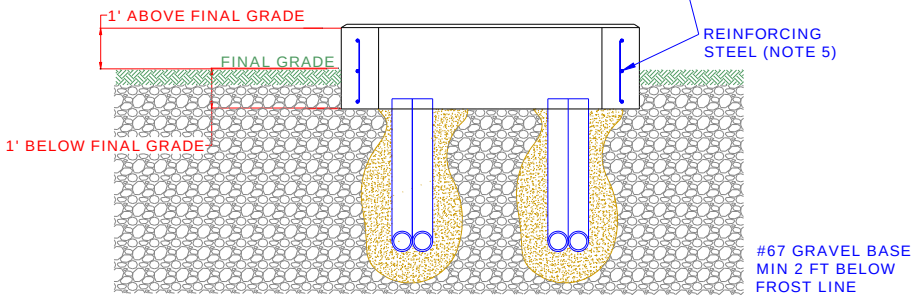
Walls/Screens/Overhead

No obstructions permitted





TOP VIEW



FRONT VIEW

NOTE: CONTRACTOR INSTALLED; NO NES MATERIALS OR LABOR

CONCRETE PAD MATERIALS (USE ONLY IN THE EVENT THAT NES MUST RE-PLACE A PAD UNDER MAINTENANCE)

MATERIAL LIST

CU CODE	STOCK #	DESCRIPTION	QTY	UNIT
UCONCRETE	509000000	CONCRETE 1 CUBIC YARD	3	YD^3
UREBAR-4	491500000	REINFORCING STEEL 1/2" (#4)	115	FT
ULAB-CONST		LABOR TO BUILD THE PAD 1HR/PERSON	60	HR

GROUNDING ITEMS

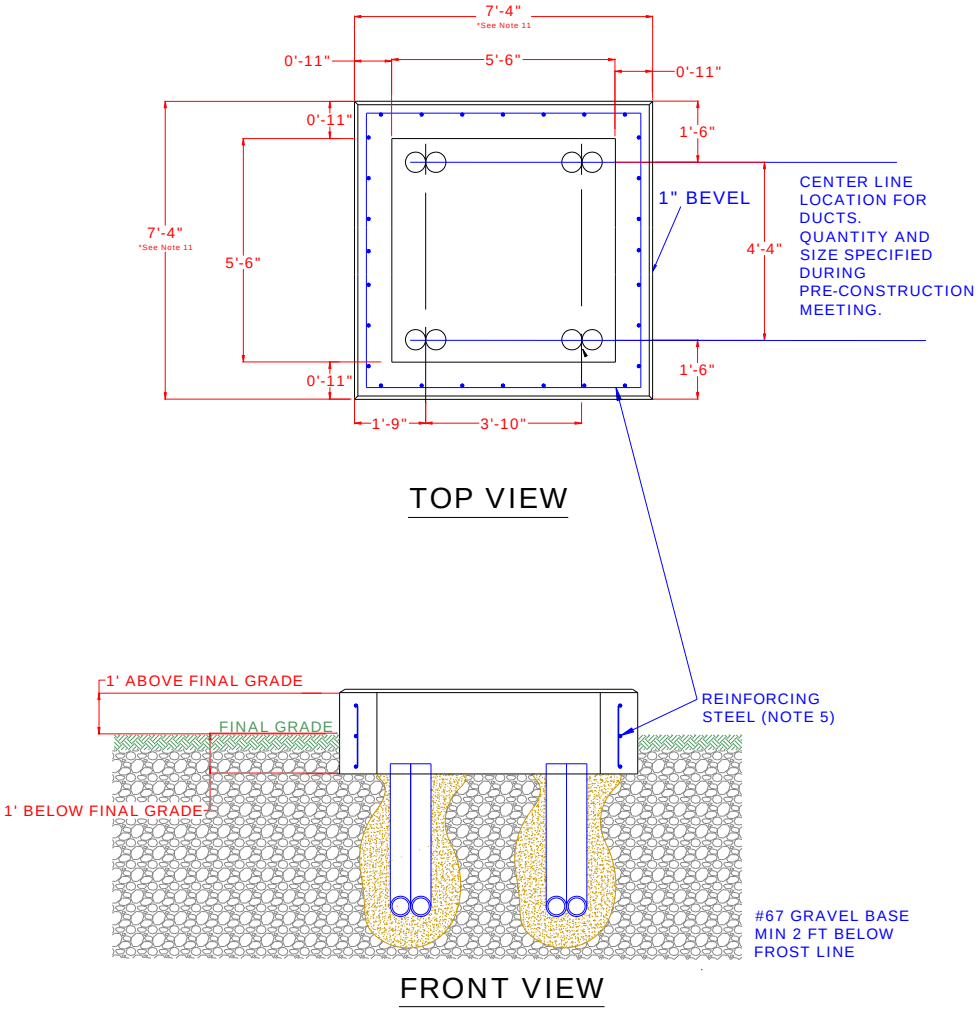
TRUCK STOCK MATERIAL LIST

STOCK	DESCRIPTION	QTY	UNIT
011210000	CABLE CU BSD 2 7S	20	FT
184380000	ROD GROUND CW 5/8X8	4	EA
223490000	GRD CONN 1/0 OR 5/8" GND ROD	8	EA
223480000	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	2	EA

UG PLATE BOOK DRAWING (USK-1179C (PMH9)).DWG

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	MTE	REVISED DETAILS AND NOTES	4/25/18

T&D MANHOLE, BOXES STANDARDS
CONCRETE PAD DETAILS
PMH-9 SWITCH



Construction Notes

1. No other utilities may pass beneath theNES pad location or be located within six feet (6') of the switch pad.
2. NES will install grounding rods and grid at the pad location when excavation is complete, prior to Customer backfilling or forming the pad. Contact the person listed in #1 above.
3. The NES pad shall be on a firm bearing. All fill material beneath the pad will be a minimum of two feet (2') of #67 washed gravel base to below local frost line. Increased pad depth or concrete piers may be necessary to reach a firm bearing for the pad. Do not fill open conduit well.
4. Reinforcing steel shall be ASTM A-615 Grade 60 (#5 rebar) or better.
5. NES will inspect the pad form and rebar steel prior to concrete being poured.
6. Concrete shall be a minimum of 3000 PSI compressive strength at 28 days.
7. Barrier posts will be installed by Customer at NES approved locations if the NES switch is exposed to vehicular traffic. Barrier post specifications are available in the NES Electric Service Guidelines, available at www.nespower.com.
8. Pad Clearances: No landscaping, shrubbery or trees (final growth) allowed within six feet (6') of the front or three feet (3') from the sides and back of the switch pad.
9. No obstructions to switch access such as walls, screens or overhangs are permitted.
10. NES will accept pre-cast pads in accordance with OldCastle model# 772NESPMH612-TN. NOTE: Outside dimensions will be 8'-4" by 8'-4" consult engineer for potential fitment concerns. Other brands may be considered only if approved by NES Standards Section prior to the Pre-Construction Meeting.
11. Duct size: ___" sources, ___" loads Elbow radius 36" unless otherwise noted here: _____

PAD CLEARANCES

Landscaping Shrubbery, Trees

(Minimum clearance from mature growth)

Front & Back– 6 ft.

Sides– 3 ft.

Walls/Screens/Overhead

No obstructions permitted

NOTE: CONTRACTOR INSTALLED; NO NES MATERIALS OR LABOR

CONCRETE PAD MATERIALS (USE ONLY IN THE EVENT THAT NES MUST REPLACE A PAD UNDER MAINTENANCE)

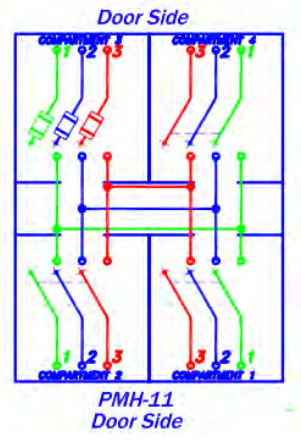
MATERIAL LIST

CU CODE	STOCK #	DESCRIPTION	QTY	UNIT
UCONCRETE	509000000	CONCRETE 1 CUBIC YARD	3	YD^3
UREBAR-4	491500000	REINFORCING STEEL 1/2" (#4)	115	FT
ULAB-CONST		LABOR TO BUILD THE PAD 1HR/PERSON	60	HR

GROUNDING ITEMS

TRUCK STOCK MATERIAL LIST

STOCK	DESCRIPTION	QTY	UNIT
011210000	CABLE CU BSD 2 7S	20	FT
184380000	ROD GROUND CW 5/8X8	4	EA
223490000	GRD CONN 1/0 OR 5/8" GND ROD	8	EA
223480000	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	2	EA



UG PLATE BOOK DRAWING (USK-1180A (PMH11)).dwg

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	MTE	REVISED DETAILS AND NOTES	4/25/18

T&D MANHOLE, BOX STANDARDS
CONCRETE PAD DETAILS
PMH-11 SWITCH

Construction Notes

1. No other utilities may pass beneath theNES pad location or be located within six feet (6') of the switch pad.
2. NES will install grounding rods and grid at the pad location when excavation is complete, prior to Customer backfilling or forming the pad. Contact the person listed in #1 above.
3. The NES pad shall be on a firm bearing. All fill material beneath the pad will be a minimum of two feet (2') of #67 washed gravel base to below local frost line. Increased pad depth or concrete piers may be necessary to reach a firm bearing for the pad. Do not fill open conduit well.
4. Reinforcing steel shall be ASTM A-615 Grade 60 (#5 rebar) or better.
5. NES will inspect the pad form and rebar steel prior to concrete being poured.
6. Concrete shall be a minimum of 3000 PSI compressive strength at 28 days.
7. Barrier posts will be installed by Customer at NES approved locations if the NES switch is exposed to vehicular traffic. Barrier post specifications are available in the NES Electric Service Guidelines, available at www.nespower.com.
8. Pad Clearances: No landscaping, shrubbery or trees (final growth) allowed within six feet (6') of the front or three feet (3') from the sides and back of the switch pad.
9. No obstructions to switch access such as walls, screens or overhangs are permitted.
10. NES will accept pre-cast pads in accordance with OldCastle model# 772NESPMH612-TN. NOTE: Outside dimensions will be 8'-4" by 8'-4" consult engineer for potential fitment concerns. Other brands may be considered only if approved by NES Standards Section prior to the Pre-Construction Meeting.
11. Duct size: ___" sources, ___" loads Elbow radius 36" unless otherwise noted here: _____

PAD CLEARANCES

Landscaping Shrubbery, Trees

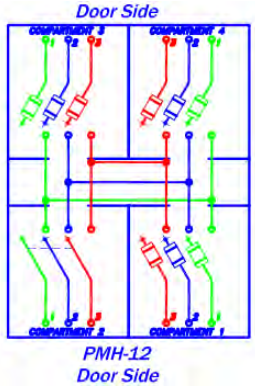
(Minimum clearance from mature growth)

Front & Back– 6 ft.

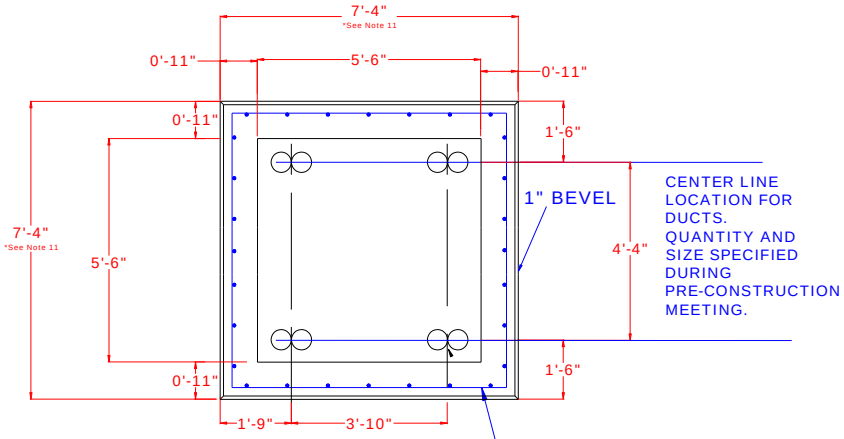
Sides– 3 ft.

Walls/Screens/Overhead

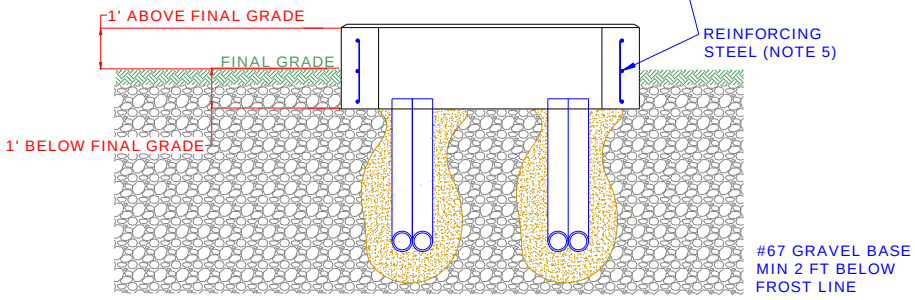
No obstructions permitted



UG PLATE BOOK DRAWING (USK-1182A (PMH12)).dwg



TOP VIEW



FRONT VIEW

NOTE: CONTRACTOR INSTALLED: NO NES MATERIALS OR LABOR

CONCRETE PAD MATERIALS (USE ONLY IN THE EVENT THAT NES MUST REPLACE A PAD UNDER MAINTENANCE)

MATERIAL LIST

CU CODE	STOCK #	DESCRIPTION	QTY	UNIT
UCONCRETE	509000000	CONCRETE 1 CUBIC YARD	3	YD^3
UREBAR-4	491500000	REINFORCING STEEL 1/2" (#4)	115	FT
ULAB-CONST		LABOR TO BUILD THE PAD 1HR/PERSON	60	HR

GROUNDING ITEMS

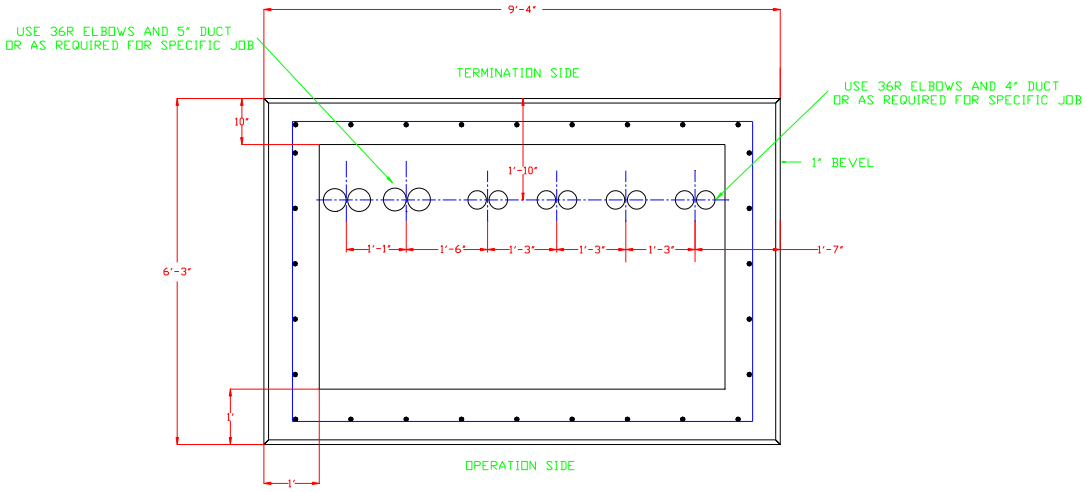
TRUCK STOCK MATERIAL LIST

STOCK	DESCRIPTION	QTY	UNIT
011210000	CABLE CU BSD 2 7S	20	FT
184380000	ROD GROUND CW 5/8X8	4	EA
223490000	GRD CONN 1/0 OR 5/8" GND ROD	8	EA
223480000	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	2	EA

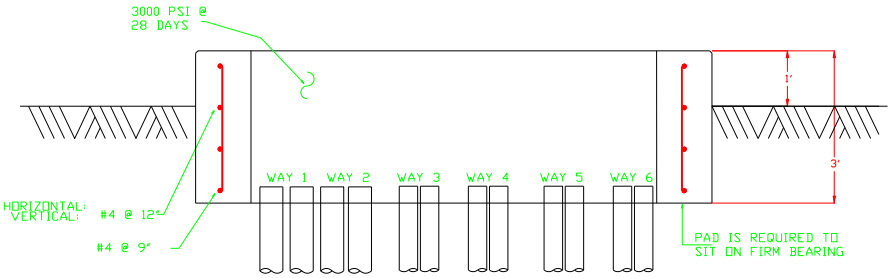
REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	MTE	REVISED DETAILS AND NOTES	4/25/18

T&D MANHOLE, BOXES STANDARDS
CONCRETE PAD DETAILS
PMH-12 SWITCH

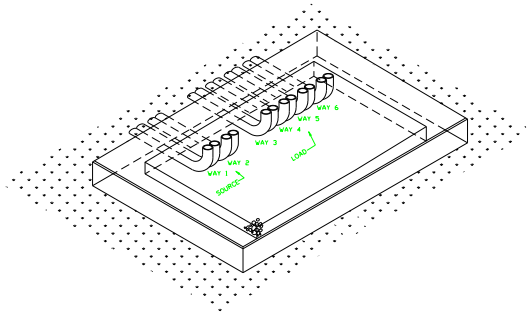
NOTE: CONTRACTOR INSTALLED: NO NES MATERIALS OR LABOR



TOP VIEW



OPERATION SIDE VIEW



CONSTRUCTION NOTES

1. Inspection of the pad will be required before and after concrete is poured. Call C&M department 615-747-3782
2. The pad will be grounded by NES C&M dept. prior to pouring concrete.
3. Other utilities will not be located under the switch pad. Divert other utilities away from NES equipment 15' before and after coming into the proximity of NES equipment
4. All concrete 3000 psi compressive strength after 48 days
5. Reinforcing steel shall be ASTM A615 grade 60.
6. Pad will be on firm bearing. Increase pad depth or concrete piers may be used to reach firm bearing.
7. Primary conduit elbow will be rigid galvanized, standard radius minimum.
8. First 10' length of conduit from pad will be rigid galvanized.
9. 10' separation between water hydrants and NES equipment
10. Fill conduit well with #67 washed gravel
11. Barrier posts will be provided by the contractor where pad is exposed to traffic, per NES standard drawing USK-1126.
12. All conduits shown in detail include a spare.

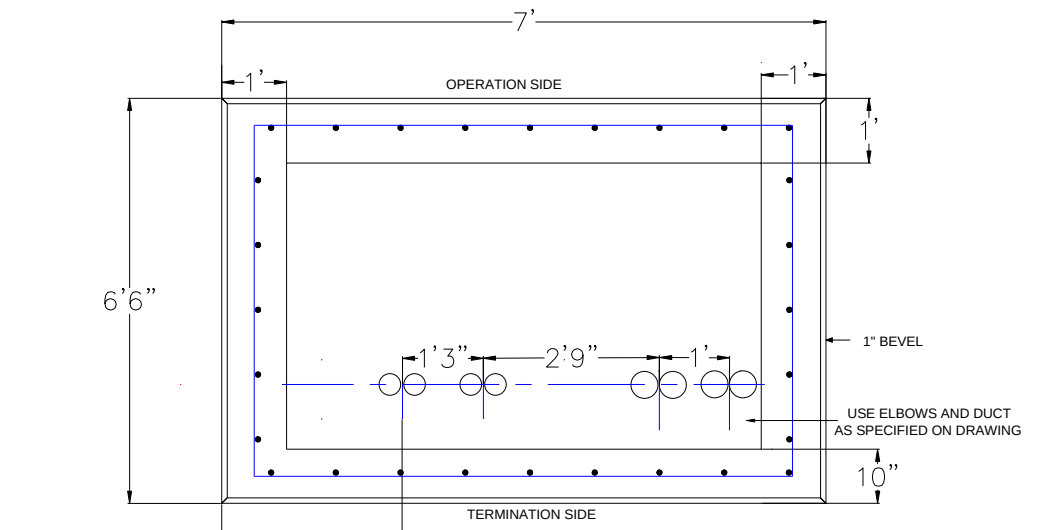
GROUNDING ITEMS TRUCK STOCK MATERIAL LIST			
STOCK	**DESCRIPTION**	**QTY**	**UNIT**
011210000	CABLE CU BSD 2 7S	30	FT
184380000	ROD GROUND CW 5/8X8	4	EA
223490000	GRD CONN 1/0 OR 5/8" GND ROD	8	EA
223480000	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	2	EA

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	MTE	UPDATED	4/12/21

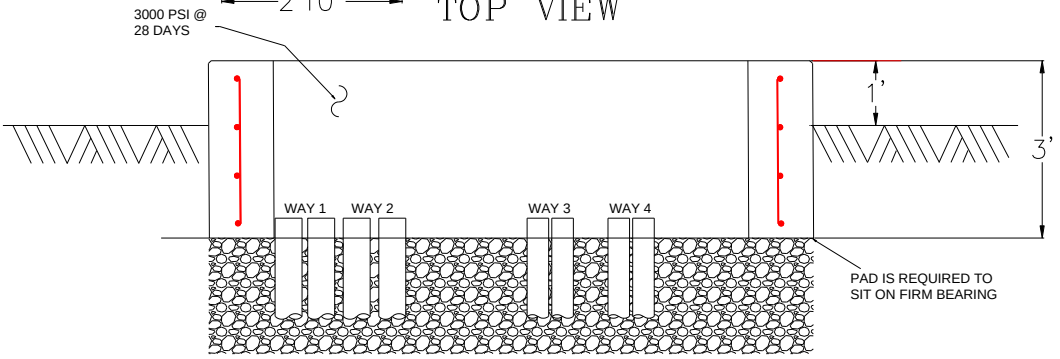
T&D MANHOLE, BOX STANDARDS
CONCRETE PAD DETAILS
VISTA 6 WAY SWITCH GEAR

UG PLATE BOOK DRAWING (USK-40120 VISTA PAD).dwg

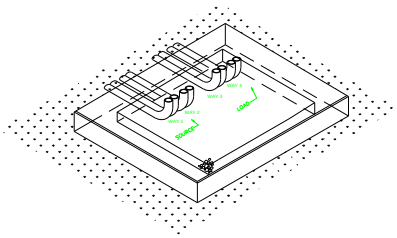
NOTE: CONTRACTOR INSTALLED: NO NES MATERIALS OR LABOR



TOP VIEW



OPERATION SIDE VIEW



ISOMETRIC VIEW

CONSTRUCTION NOTES

1. Inspection of the pad will be required before and after concrete is poured. Call C&M department 615-747-3782
2. The pad will be grounded by NES C&M dept. prior to pouring concrete.
3. Other utilities will not be located under the switch pad. Divert other utilities away from NES equipment 15' before and after coming into the proximity of NES equipment
4. All concrete 3000 psi compressive strength after 48 days
5. Reinforcing steel shall be ASTM A615 grade 60.
6. Pad will be on firm bearing. Increase pad depth or concrete piers may be used to reach firm bearing.
7. Primary conduit elbow will be rigid galvanized, standard radius minimum.
8. First 10' length of conduit from pad will be rigid galvanized.
9. 10' separation between water hydrants and NES equipment
10. Fill conduit well with #67 washed gravel
11. Barrier posts will be provided by the contractor where pad is exposed to traffic, per NES standard drawing USK-1126.
12. All conduits shown in detail include a spare.

GROUNDING ITEMS

TRUCK STOCK MATERIAL LIST

STOCK	DESCRIPTION	QTY	UNIT
011210000	CABLE CU BSD 2 7S	30	FT
184380000	ROD GROUND CW 5/8X8	4	EA
223490000	GRD CONN 1/0 OR 5/8" GND ROD	8	EA
223480000	GRD CONN #4 - 2 TO #4 - 2 CU CABLE, AMP WRENCH-LOK	2	EA

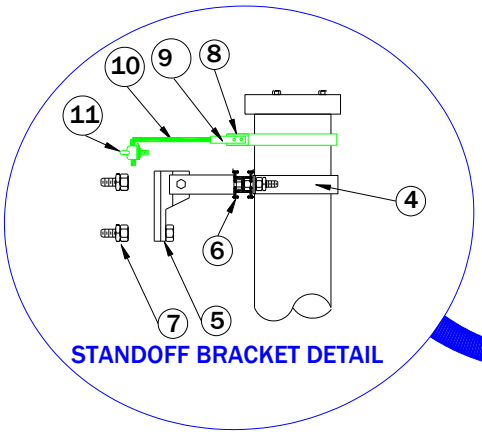
REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	MTE	CREATED	4/12/21

T&D MANHOLE, BOX STANDARDS
CONCRETE PAD DETAILS
VISTA 4 WAY SWITCH GEAR

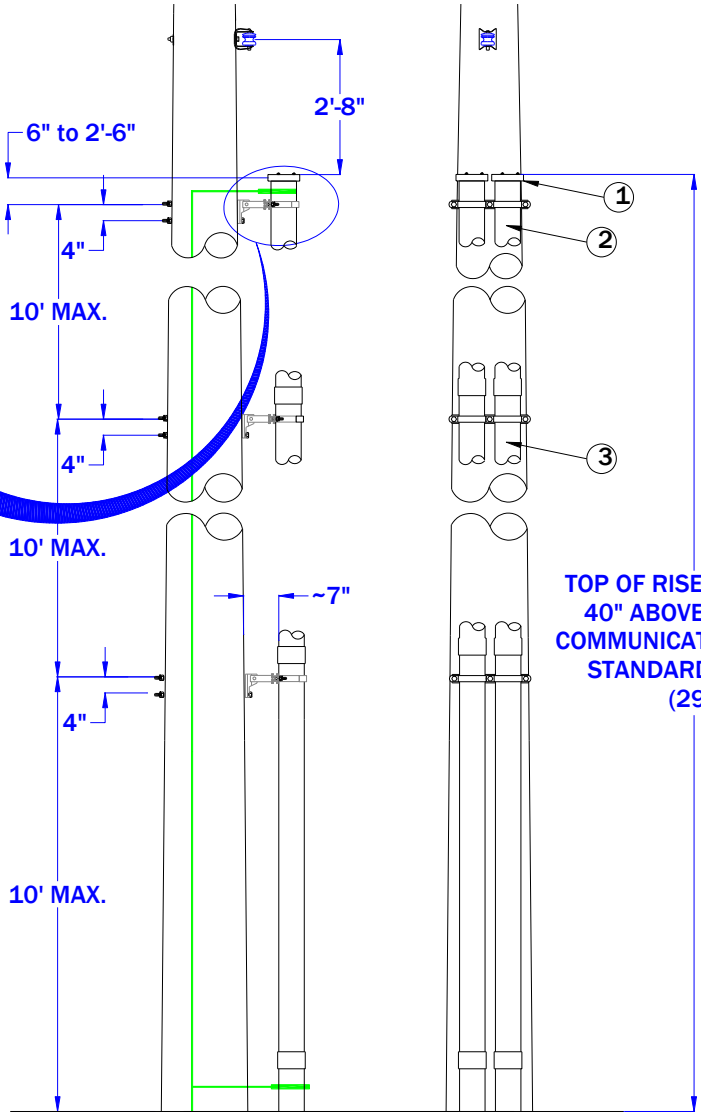
RISERS STANDARDS

APPROVALS			
ISSUE DATE	ENGINEER	SUPERVISOR	MANAGER
2/15/16	FRED FRITON	RON DAVIDSON	NICK THOMPSON
1/31/18	MIKE EDWARDS	RON DAVIDSON	VAUGHAN CHARLES
8/6/19	MIKE EDWARDS	Ronald D Davidson	

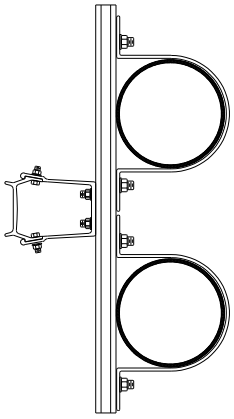
TABLE OF CONTENTS



STANDOFF BRACKET DETAIL

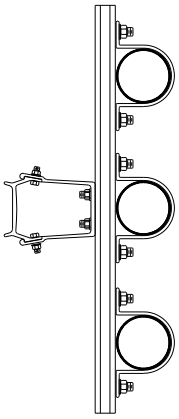


STANDOFF BRACKET DETAIL
DOUBLE CONDUIT



TOP VIEW

STANDOFF BRACKET DETAIL
TRIPLE CONDUIT



TOP VIEW

GENERAL CONSTRUCTION NOTES:

1. Primary risers are constructed with galvanized rigid conduit and schedule 80 PVC.
2. For 3" and smaller risers, the complete riser must be galvanized steel rigid conduit.
3. For 4", 5" and 6" risers; Schedule 80 PVC conduit may be used. The first 10' out of the ground must be galvanized rigid conduit.

UG PLATE BOOK DRAWINGS (Primary Riser Installation Details).dwg

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	MTE	ADDED PVC CONDIUIT INFO	1/31/18
C	MTE	REVISED PVC CONDUIT INFO	8/6/19

NES

T&D RISER STANDARDS
UNDERGROUND CONDUIT
PRIMARY RISER INSTALLATION DIAGRAM

Material Notes:

Item 6:
Four way channel is furnished in 10' sections and is cut to length as needed for each installation by U&S crews.

Items 3, and 4:
Add conduit and attachments as necessary for poles over 50' tall.

Item 8:
Ground strap for conduit is manufactured by U&S from 1/8"x 1" copper plate.

MAJOR AND MINOR MATERIAL ITEM LIST

FRM. CODE	URISERP-2	URISERP-25	URISERP-25D	URISERP-25T	URISERP-3	URISERP-4	URISERP-5	URISERP-5D	URISERP-6	URISERP-6D		
ITEM	QTY				QTY	QTY	QTY	QTY	QTY	QTY	DESCRIPTION	STOCK #
1	1	-	-	-	-	-	-	-	-	-	TERMINATOR 2 #1 1-1.27" HOLE	402485000
	-	1	2	3	-	-	-	-	-	-	TERMINATOR 2 1/2 #1 1-1.27" HOLE	402495000
	-	-	-	-	1	-	-	-	-	-	TERMINATOR 3 #1 2-1.27" HOLES	402520000
	-	-	-	-	-	1	-	-	-	-	TERMINATOR 4 #1 3-1.125" HOLES	402580000
	-	-	-	-	-	-	1	2	-	-	TERMINATOR 5 750-25KV 3-1.92" HOLES 1-0.528" HOLE	402670000
	-	-	-	-	-	-	-	-	1	2	TERMINATOR 6 750 25KV 3-2.375" HOLES 1-0.625" HOLE	402675000
2	1	1	2	3	-	-	-	-	-	-	GRIP RISER 2 X 1.0 - 1.24	401350000
	-	-	-	-	1	-	-	-	-	-	GRIP RISER 3 X 1 3/4-2	401370000
	-	-	-	-	-	1	-	-	-	-	GRIP RISER 4 X 1 1/2-1 3/4	401400000
	-	-	-	-	-	-	-	-	-	-	GRIP RISER 4 X 2-2 1/2	401420000
	-	-	-	-	-	-	-	-	-	-	GRIP RISER 4 X 2 1/2-3	401440000
	-	-	-	-	-	-	-	-	-	-	GRIP RISER 5 X 3-3 1/2	401460000
	-	-	-	-	-	-	1	2	-	-	GRIP RISER 5 X 3 1/2-4	401470000
	-	-	-	-	-	-	-	-	1	2	GRIP RISER 6 X 3 1/2 - 4	401475000
3	20'	-	-	-	-	-	-	-	-	-	CONDUIT GALV 2	101200000
	-	20'	40'	60'	-	-	-	-	-	-	CONDUIT GALV 2 1/2	101220000
	-	-	-	-	20'	-	-	-	-	-	CONDUIT GALV 3	101240000
	-	-	-	-	-	20'	-	-	-	-	CONDUIT PVC 4	103274000
	-	-	-	-	-	-	20'	40'	-	-	CONDUIT PVC 5	103275000
	-	-	-	-	-	-	-	-	20'	40'	CONDUIT PVC 6	103276000
4	3	-	-	-	-	-	-	-	-	-	STRAP 2 INCH KIT/STANDOFF BRKT	062800000
	-	3	6	9	-	-	-	-	-	-	STRAP 2 1/2 INCH/STANDOFF BRKT	062810000
	-	-	-	-	3	-	-	-	-	-	STRAP 3 INCH KIT/STANDOFF BRKT	062820000
	-	-	-	-	-	3	-	-	-	-	STRAP 4 INCH KIT/STANDOFF BRKT	062840000
	-	-	-	-	-	-	3	6	-	-	STRAP 5" KIT/STANDOFF BRKT	062850000
	-	-	-	-	-	-	-	-	3	6	STRAP 6" KIT/STANDOFF BRKT	062860000
5	3	3	3	3	3	3	3	3	3	3	BRACKET CONDUIT STANDOFF	060050000
6	10'	10'	10'	10'	10'	10'	10'	10'	10'	10'	CHANNEL 4 WAY T-SLOT/10 FT	060070000
7	6	6	6	6	6	6	6	6	6	6	NUT PALNUT GALV 5/8	206520000
8	2'	2'	4'	6'	2'	2'	2'	4'	2'	4'	BAR CU BUS 1/8 X 1 IN	320120000
9	2	2	4	6	2	2	2	4	2	4	TERM COMP 2-1 AL/CU 2H	231760000
10	4'	4'	4'	6'	4'	4'	4'	4'	4'	4'	CABLE CU BSD 2 7S	011210000
11	2	2	2	2	2	2	2	2	2	2	CONN GRD 4-2 TO 4-2 CU	223480000

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	MTE	REVISED PVC CONDIUIT INFO	8/6/19

NES

T&D RISER STANDARDS
UNDERGROUND CONDUIT
PRIMARY RISER COMPATIBLE UNITS

Hot Dip Galvanized Rigid Steel Conduit (RIGID)
General Information

RIGID is manufactured from high-strength steel, and produced by the electric resistance welding process. The finished conduit is uniform in OD size, wall thickness, a defect free interior surface and smoothly welded seams. RIGID is produced using an inline galvanizing process. It is hotdipped galvanized inside and outside, so that metal-to-metal contact and galvanic protection against corrosion are provided. Additionally, it is top-coated with a compatible organic layer to inhibit white rust and increase corrosion resistance. The good interior surface quality provides smooth continuous raceways for easy and fast writing pulling. Its excellent ductility provides easy bending, cutting and joining to prevent waste of time and materials. You do not need to worry about damage to the conduit system, even through multiple 90° bends. RIGID is threaded on both ends, with a coupling applied to one end and a thread protector to the other. The pitch of the threads conforms to the American National Standard for pipe threads, general purpose (Inch), ANSI/AMSE B1.20.1. Threads are protected after cutting by an application of molten zinc. Galvanized Rigid Steel Conduit can be installed indoors or outdoors, exposed or concealed, in all kinds of atmospheric conditions, and in hazardous locations, when in accordance with NEC® 2002 Article 344. Also, it provides mechanical protection for the conductors while reducing Electro-Magnetic Field (EMF) exposure and shielding against Electro-Magnetic Interference (EMI). Galvanized Steel Rigid Conduit is an approved equipment grounding conductor under the 2002 NEC® Section 250.118.

Schedule 80 PVC
General Information

PVC conduit must be manufactured to NEMA TC-2 specifications and must be UL listed
PVC is resistant to most chemicals and is not affected by corrosive soils or salts. PVC electrical conduit is rated for use with 90˚C conductors in under and above ground applications. PVC is fire resistant and self extinguishing.

CONDUIT DETAILED INFORMATION

COMPATIBLE UNIT (s)		DESCRIPTION	STOCK #	Weight Lbs Per 10'	Outside Diameter (in)	Wall Thickness (in)
PRIMARY	SECONDARY					
UGAL2		CONDUIT GALV 2	101200000	35	2.375	.146
UGAL2.5		CONDUIT GALV 2 1/2	101220000	56	2.875	.193
UGAL3		CONDUIT GALV 3	101240000	73	3.500	.205
UGAL4		CONDUIT GALV 4	101280000	104	4.500	.225
UGAL5		CONDUIT GALV 5	101300000	140	5.563	.245
UGAL6		CONDUIT GALV 6	101310000	184	6.625	.266
UPVC80-2	UVPVC80-2	CONDUIT, PVC SCH 80, 2"	103272000	9	2.375	.218
UPVC80-3	UVPVC80-3	CONDUIT, PVC SCH 80, 3"	103273000	19	3.500	.300
UPVC80-4	UVPVC80-4	CONDUIT, PVC SCH 80, 4"	103274000	28	4.500	.337
SPVC-5-80		CONDUIT, PVC SCH 80, 5"	103275000	39	5.563	.375
SPVC-6-80		CONDUIT, PVC SCH 80, 6"	103276000	54	6.625	.432

Galvanized Steel Electrical Metallic Tubing (EMT)
Not used at NES for primary or secondary service installations. It is also unacceptable as parts of lighting installations that will be maintained by NES.

The reasons it is not accepted are:
1. Poor corrosion resistance in outdoor environments.
2. Poor impact resistance.

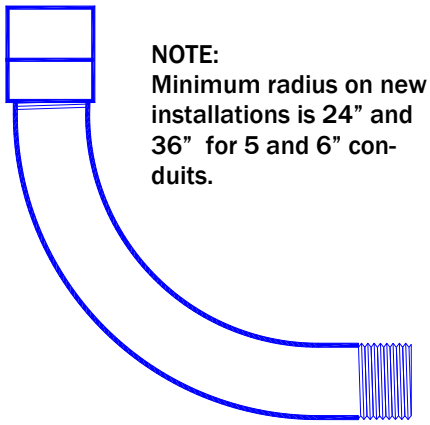
REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

NES

T&D RISER STANDARDS
CONDUIT PROPERTIES

CONDUIT STOCK ITEMS

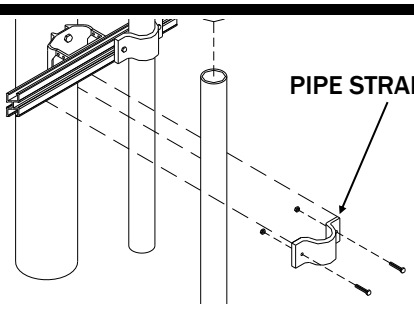
COMPATIBLE UNIT	DESCRIPTION	STOCK #
UPVCL2-STDR	CONDUIT ELBOW,PVC 2" STD 9.5" RADIUS	103548000
UPVCL2.5-24R	CONDUIT ELBOW,PVC 2.5" 24" RADIUS	103600000
UPVCL2.5-STD	CONDUIT ELBOW,PVC 2.5" STD 10.5" RADIUS	103598000
UPVCL3-80-18	CONDUIT ELBOW,PVC 3" SCH 80 18" RADIUS	103703000
UPVCL3-STDR	CONDUIT ELBOW,PVC 3" STD 13" RADIUS	103628000
UPVCL4-24R	CONDUIT ELBOW,PVC 4" 24" RADIUS	103640000
UPVCL5-36R	CONDUIT ELBOW,PVC 5" 36" RADIUS	103650000
	CONDUIT ELBOW,PVC 6" 36" RADIUS	103655000
UGALL2-STDR	CONDUIT ELBOW GALV2" DIA STD 9.5" RADIUS	102280000
UGALL2.5-18R	CONDUIT ELBOW GALV2.5" DIA STD 10.5" RADIUS	102300000
UGALL3-24R	CONDUIT ELBOW GALV3"DIA 24" RADIUS	102330000
UGALL3-STDR	CONDUIT ELBOW GALV3"DIA STD 13" RADIUS	102320000
UGALL4-16R	CONDUIT ELBOW GALV4"DIA 16" RADIUS	102400000
UGALL4-24R	CONDUIT ELBOW GALV4"DIA 24" RADIUS	102410000
	CONDUIT ELBOW GALV5"DIA 30" RADIUS	102460000
UGALL5-36R	CONDUIT ELBOW GALV5"DIA 36" RADIUS	102480000
UGALL6-36R	CONDUIT ELBOW GALV6"DIA 36" RADIUS	102490000



NOTE:
Minimum radius on new installations is 24" and 36" for 5 and 6" conduits.

UGCPL2	CONDUIT GALV CPL 2	102000000
UGCPL2.5	CONDUIT GALV CPL 2 1/2	102020000
UGCPL3	CONDUIT GALV CPL 3	102040000
UGCPL4	CONDUIT GALV CPL 4	102080000
UGCPL5	CONDUIT GALV CPL 5	102100000
UGCPL6	CONDUIT GALV CPL 6	102110000

UR-PSTRAP2	STRAP 2 INCH KIT/STANDOFF BRKT	062800000
UR-PSTRAP2.5	STRAP 2 1/2 INCH/STANDOFF BRKT	062810000
UR-PSTRAP3	STRAP 3 INCH KIT/STANDOFF BRKT	062820000
UR-PSTRAP4	STRAP 4 INCH KIT/STANDOFF BRKT	062840000
UR-PSTRAP5	STRAP 5" KIT/STANDOFF BRKT	062850000
UR-PSTRAP6	STRAP 6" KIT/STANDOFF BRKT	062860000



UINERDUCT-RED	MAXCELL INNERDUCT—RED	105782000
UINERDUCT-BLACK	MAXCELL INNERDUCT—BLACK	105783000

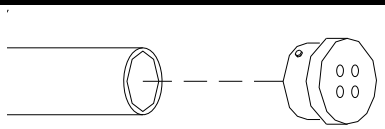
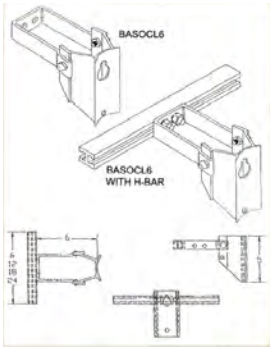
UPCPL3.5	DUCT PLASTIC COUPLING 3.5" THINWALL	105812000
UPCPL4	DUCT PLASTIC COUPLING 4" THINWALL	105814000
UPCPL5	DUCT PLASTIC COUPLING 5" THINWALL	105815000
UPCPL6	DUCT PLASTIC COUPLING 6" THINWALL	105816000

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	MTE	ADDED MAXCELL INNERDUCT	9/26/17

NES

T&D RISER STANDARDS
CONDUIT ACCESSORIES

CONDUIT STOCK ITEMS

COMPATIBLE UNIT	DESCRIPTION	STOCK #	
SEE RISER CU'S	TERMINATOR 2 #1 1-1.27" HOLE	402485000	
	TERMINATOR 2 1/2 #1 1-1.27" HOLE	402495000	
	TERMINATOR 3 #1 2-1.27" HOLES	402520000	
	TERMINATOR 4 #1 3-1.125" HOLES	402580000	
	TERMINATOR 5 750-25KV 3-1.92" HOLES 1-0.528" HOLE	402670000	
	TERMINATOR 6 750 25KV 3-2.375" HOLES 1-0.625" HOLE	402675000	
SEE RISER CU'S	GRIP RISER 2 X 1.0 - 1.24	401350000	
	GRIP RISER 3 X 1 1/2-1 3/4	401360000	
	GRIP RISER 3 X 1 3/4-2	401370000	
	GRIP RISER 4 X 1 1/2-1 3/4	401400000	
	GRIP RISER 4 X 2-2 1/2	401420000	
	GRIP RISER 4 X 2 1/2-3	401440000	
	GRIP RISER 5 X 3-3 1/2	401460000	
	GRIP RISER 5 X 3 1/2-4	401470000	
	GRIP RISER 6 X 3 1/2 - 4	401475000	
TRUCK STOCK	CHANNEL 4 WAY T-SLOT/10 FT	060070000	
UR-STANDOFF	BRACKET CONDUIT STANDOFF (STANDARD BRACKET FOR NEW INSTALLATIONS)	060050000	

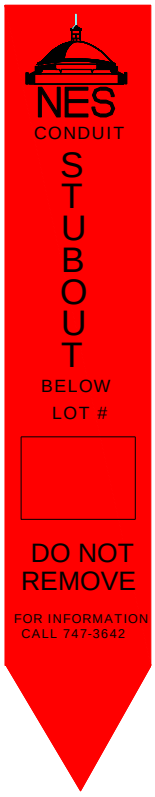
REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	MTE	REMOVED OLD ITEMS	9/26/17

NES

T&D RISER STANDARDS
CONDUIT ACCESSORIES

CONDUIT STOCK ITEMS

COMPATIBLE UNIT	DESCRIPTION	STOCK #	
UDUTA6	DUCT PLASTIC TERMINATOR ADAPTER 6"	105835000	



CONDUIT MARKERS: (STUBOUT MARKER DRAWING UGS0012)

MATERIAL LIST

CU CODE	STOCK #	DESCRIPTION	QTY	UNIT
USTUBMARKER	465337000	SIGN STUBOUT MARKER	1	EA
	465760000	TAPE MARKER/6 IN X 1000FT ROLL WARNING	1	EA

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	MTE	REMOVED OLD ITEMS	9/26/17

NES

T&D RISER STANDARDS

CONDUIT ACCESSORIES AND STUB OUT MARKER

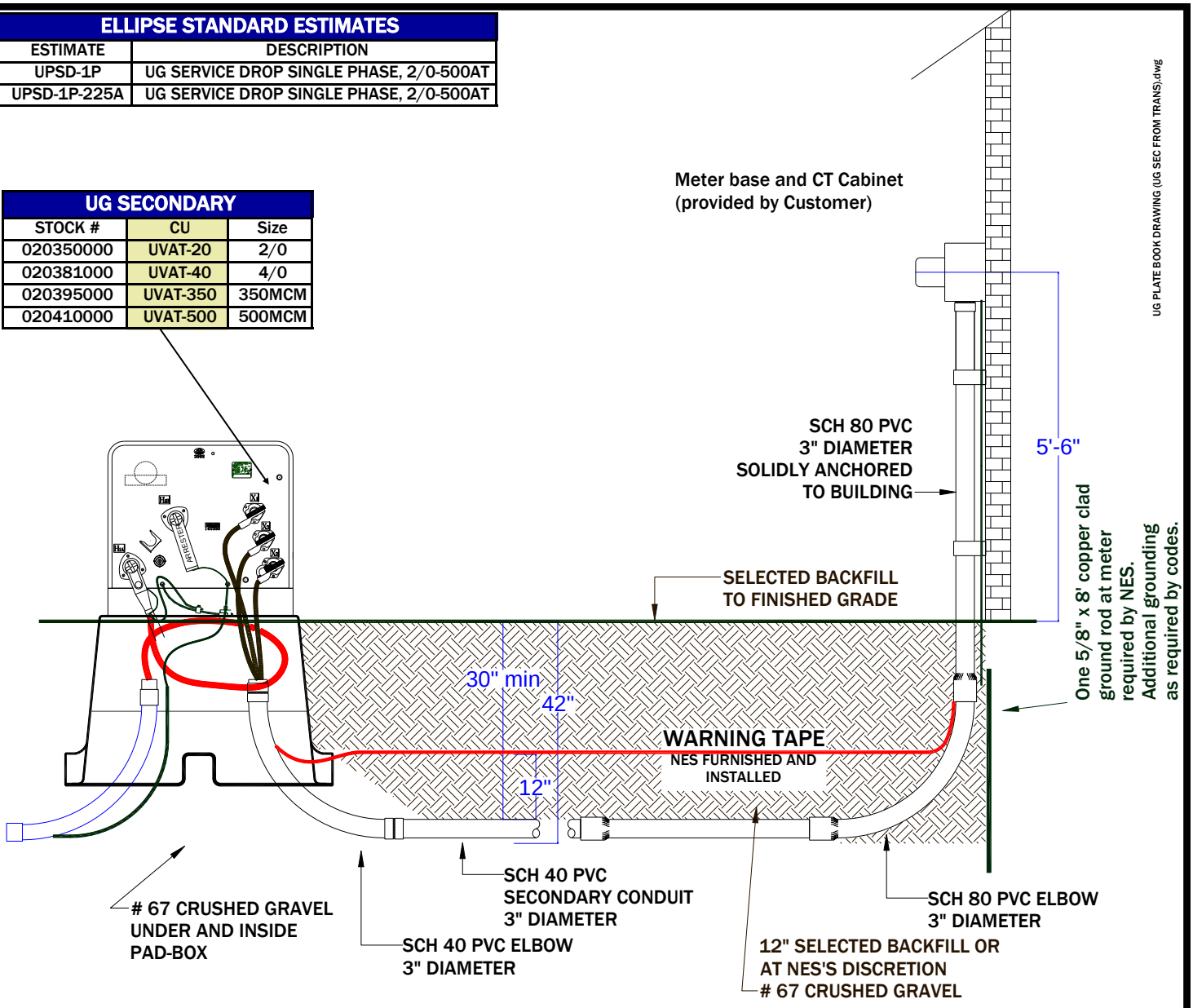
SECONDARY STANDARDS

APPROVALS			
ISSUE DATE	ENGINEER	SUPERVISOR	MANAGER
2/15/06	FRED FRITON	RON DAVIDSON	NICK THOMPSON
1/25/18	WES SUDDARTH		

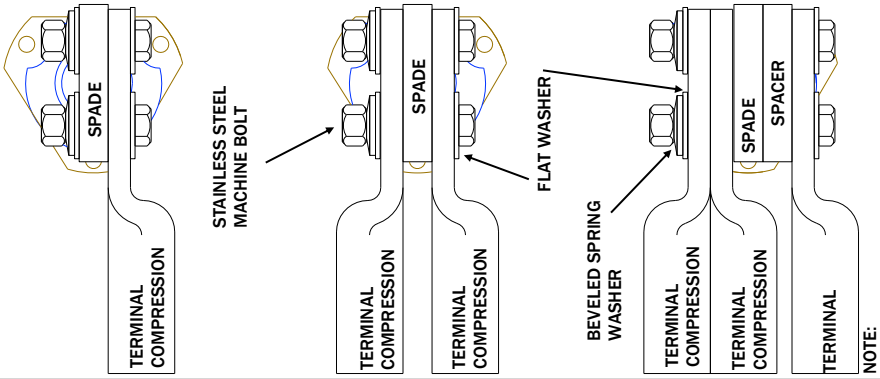
TABLE OF CONTENTS

ELLIPSE STANDARD ESTIMATES	
ESTIMATE	DESCRIPTION
UPSD-1P	UG SERVICE DROP SINGLE PHASE, 2/0-500AT
UPSD-1P-225A	UG SERVICE DROP SINGLE PHASE, 2/0-500AT

UG SECONDARY		
STOCK #	CU	Size
020350000	UVAT-20	2/0
020381000	UVAT-40	4/0
020395000	UVAT-350	350MCM
020410000	UVAT-500	500MCM



TRANSFORMER SECONDARY CONNECTIONS



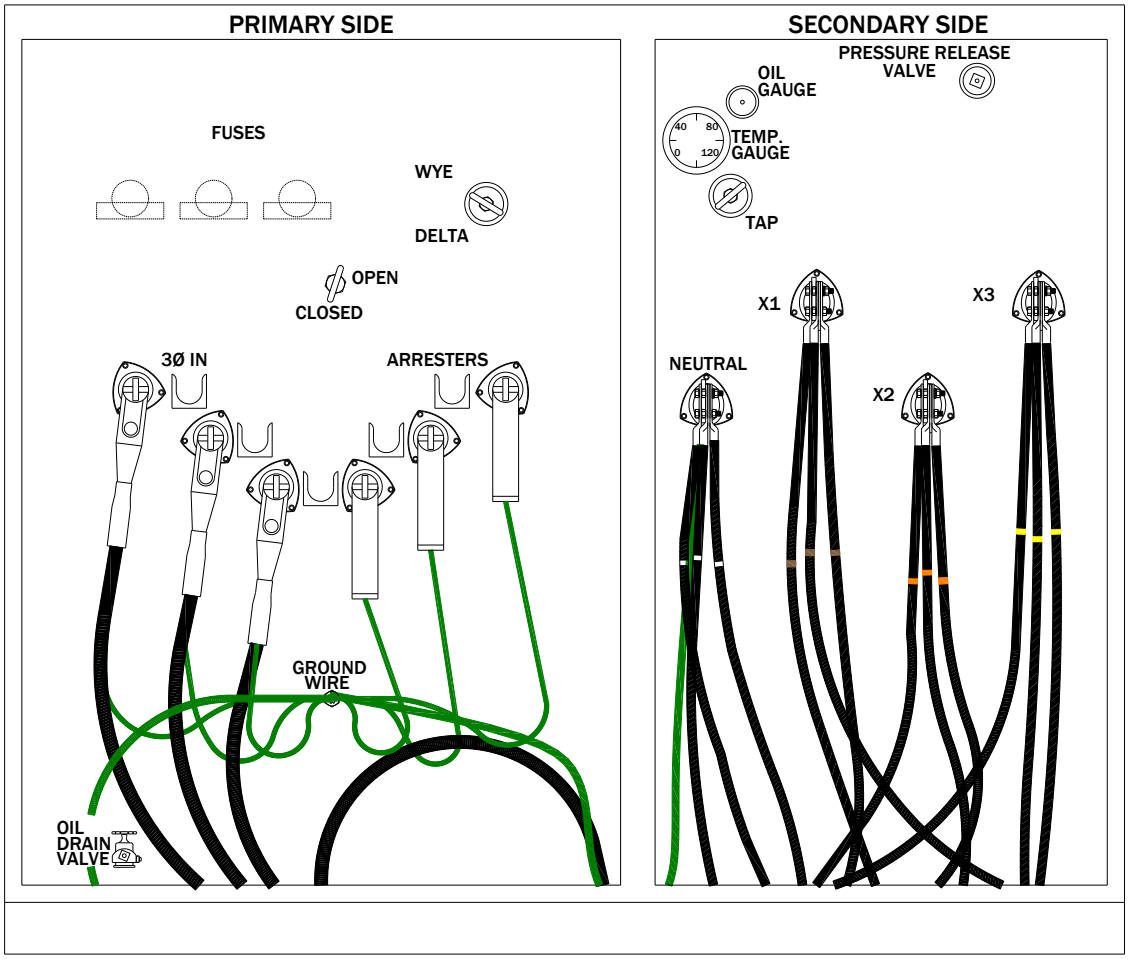
TRUCK STOCK ITEMS

Stock #	Description
230500000	SPACER COMP TERM AL 2H
231760000	TERM COMP 2-1 AL/CU 2H
231780000	TERM COMP 2/0 AL/CU 2H
231800000	TERM COMP 4/0 AL/CU 2H
231840000	TERM COMP 350 AL/CU 2H
231860000	TERM COMP 500 AL/CU 2H
209700000	WASHER SS BVL SPG 1/2H
204330000	BOLT MACHINE SS 1/2X3/4
204340000	BOLT MACHINE SS 1/2X1
204360000	BOLT MACHINE SS 1/2X1 1/2
204370000	BOLT MACHINE SS 1/2X1 3/4
204372000	BOLT MACHINE SS 1/2X2
204380000	BOLT MACHINE SS 1/2X3
204384000	BOLT MACHINE SS 1/2X3 1/2
204440000	BOLT MACHINE SS 1/2X4 1/2
209740000	WASHER SS FLAT ROUND SS 1/2

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	WMS	CHANGED TO BAYONET FUSE	1/25/18

T&D SECONDARY STANDARDS
UNDERGROUND SECONDARY

UG PLATE BOOK DRAWING (UG SEC INST FROM 3P TRANS).dwg



TRUCK STOCK ITEMS

Stock #	Description
230500000	SPACER COMP TERM AL 2H
227275000	SLEEVE COMP 3/0-4/0 AL/CU
227280000	SLEEVE COMP 4/0-4/0 AL/CU
227300000	SLEEVE COMP 350-350 MCM AL/CU
227310000	SLEEVE COMP 500-500 MCM AL/CU
227320000	SLEEVE COMP 600-600 CU
231760000	TERM COMP 2-1 AL/CU 2H
231770000	TERM COMP 1/0 AL/CU 2H
231780000	TERM COMP 2/0 AL/CU 2H
231800000	TERM COMP 4/0 AL/CU 2H
231830000	TERM COMP 300 AL/CU 2H
231840000	TERM COMP 350 AL/CU 2H
231850000	TERM COMP 400 AL/CU 2H
231860000	TERM COMP 500 AL/CU 2H
231870000	TERM COMP 600 AL/CU 2H
231890000	TERM COMP 750 AL/CU 2H 700 OR 750 MCM
209700000	WASHER SS BVL SPG 1/2H
204330000	BOLT MACHINE SS 1/2X3/4
204340000	BOLT MACHINE SS 1/2X1
204360000	BOLT MACHINE SS 1/2X1 1/2
204370000	BOLT MACHINE SS 1/2X1 3/4
204372000	BOLT MACHINE SS 1/2X2
204380000	BOLT MACHINE SS 1/2X3
204384000	BOLT MACHINE SS 1/2X3 1/2
204440000	BOLT MACHINE SS 1/2X4 1/2
209740000	WASHER SS FLAT ROUND SS 1/2

Secondary cables are installed, owned and maintained by the customer.

Always mark the phase rotation on the inside of the transformer secondary bay.
C for clockwise
CC for counter clockwise
Always check the phase rotation before having the customer close in their main breaker.

Customers are informed that secondary wires must match the terminal lugs listed in the table on this page. They must to supply lugs if they choose to use a different wire size.

Transformer Replacement Note:

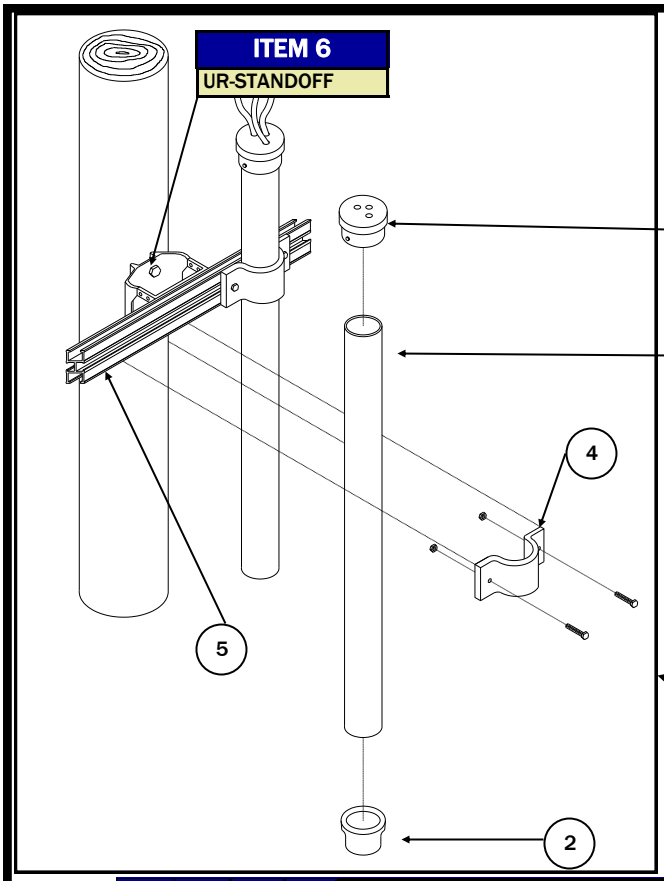
Copper bus plate drilled to match the spade should be used to compensate for changes in bushing elevation when replacing a transformer. The plate must match or exceed the spade's thickness and depth.
Use every bolt position on the spade when attaching the copper plate.

Standard Voltages as Designated by Tape
Tape: Grey, Brown, Orange and Yellow for 480y/277
Tape: White, Blue, Black And Red,
208y/120.

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	WMS	UPDATED TO BAYONET, REMOVED METER	1/25/18

NES

T&D SECONDARY STANDARDS
UNDERGROUND SECONDARY THREE PHASE FROM PAD



ITEM 1
UVTERM2-20T
UVTERM3-20T
UVTERM3-350T
UVTERM3-40T
UVTERM3-500T
UVTERM4-40Q
UVTERM4-500Q

ITEM 3
UVPVC80-2
UVPVC80-3
UVPVC80-4

ITEMS 2, 3, 4 AND 5	
UVRISER-2	RISER, SERVICE, PVC80, 2"
UVRISER-3	RISER, SERVICE, PVC80, 3"
UVRISER-4	RISER, SERVICE, PVC80, 4"

NOTE:
Item number one is not included in the UVRISER compatible units.

MAJOR AND MINOR MATERIAL ITEM LIST

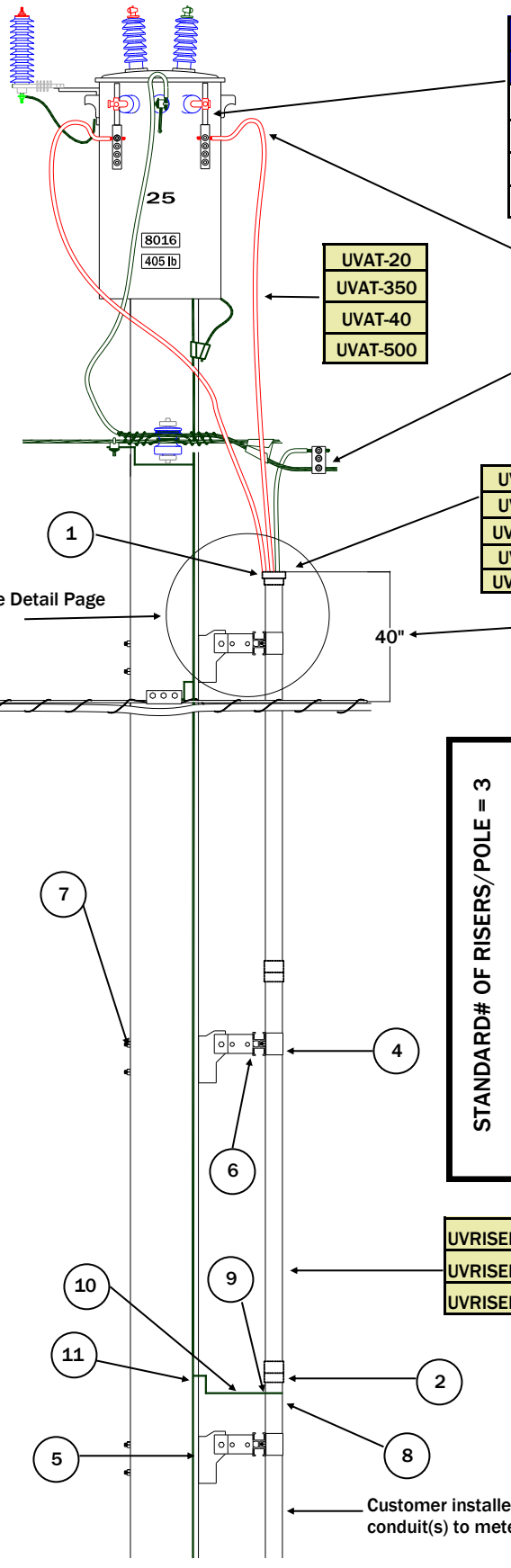
ITEM	Riser CU QTY UVRISER-2	UVRISER-3	UVRISER-4	DESCRIPTION	STOCK #	CU
1	-			TERMINATIONS, SERV, UGRD, 2" COND, 2/0AT	402490000	UVTERM2-20T
				TERMINATIONS, SERV, UGRD, 3" COND, 2/0AT	402530000	UVTERM3-20T
	-	-	-	TERMINATIONS, SERV, UGRD, 3" COND, 350AT	402540000	UVTERM3-350T
	-	-	-	TERMINATIONS, SERV, UGRD, 3" COND, 4/0AT	402530000	UVTERM3-40T
				TERMINATIONS, SERV, UGRD, 3" COND, 500AT	402540000	UVTERM3-500T
				TERMINATIONS, SERV, UGRD, 4" COND, 4/0AQ	402570000	UVTERM4-40Q
	-	-	-	TERMINATIONS, SERV, UGRD, 4" COND, 500AQ	402570000	UVTERM4-500Q
2	1	-	-	COND PLAS ADAP FEM 2	103290000	N/A
	-	1	-	COND PLAS ADAP FEM 3	103310000	N/A
	-	-	1	COND PLAS ADAP FEM 4	103315000	N/A
3	20'	-	-	CONDUIT PVC SCH 80 2'	103272000	UVPVC80-2
	-	20'	-	CONDUIT PVC SCH 80 3'	103273000	UVPVC80-3
	-	-	20'	CONDUIT PVC SCH 80 4'	103274000	UVPVC80-4
4	3	-	-	STRAP 2 INCH KIT/STANDOFF BRKT	062800000	N/A
	-	3	-	STRAP 3 INCH KIT/STANDOFF BRKT	062820000	N/A
	-	-	3	STRAP 4 INCH KIT/STANDOFF BRKT	062840000	N/A
5	3	3	3	BRACKET CONDUIT STANDOFF	060050000	UR-STANDOFF
TRUCK STOCK ITEMS THAT ARE NOT INCLUDED IN UVRISER CU'S						
6	10'	10'	10'	CHANNEL 4 WAY T-SLOT/10 FT	060070000	Truck Stock
7	6	6	6	NUT PALNUT GALV 5/8	206520000	Truck Stock
8	2'	2'	4'	BAR CU BUS 1/8 X 1 IN	320120000	Truck Stock
9	2	2	4	TERM COMP 2-1 AL/CU 2H	231760000	Truck Stock
10	4'	4'	4'	CABLE CU BSD 2 7S	011210000	Truck Stock
11	2	2	2	CONN GRD 4-2 TO 4-2 CU	223480000	Truck Stock

UG PLATE BOOK DRAWING (UG SEC INST RISER CU).dwg

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

NES

T&D SECONDARY STANDARDS
UNDERGROUND SECONDARY RISER MATERIALS AND INSTALATION



SECONDARY CONNECTION	
Stock Code	**Item Name/Description**
224163000	CONN TRANSF SPADE 3C ;TRANSFORMER SPADE
224166000	CONN TRANSF STUD 6 H #6-250 MCM
224167000	CONN TRANSF STUD 4 H 1/0-500 MCM
224168000	CONN TRANSF STUD 8 H #6- 250 MCM

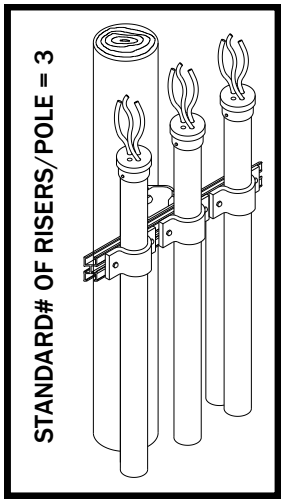
Note:
Always create a drip loop to minimize water absorption when using the multi-tap connectors.

UVAT-20
UVAT-350
UVAT-40
UVAT-500

NEUTRAL CONNECTION	
224165500	CONN TRANSF SLOT 4 H 3/0 - 250 MCM
223306000	CONN 5 HOLE 750-1/0

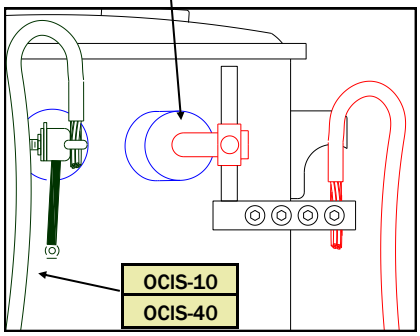
UVTERM2-20T
UVTERM3-20T
UVTERM3-350T
UVTERM3-40T
UVTERM3-500T

Minimum riser elevation is 29' above finished grade. Add conduit as necessary when 29' does not provide 40" of separation between the top of the riser and the top communications cable.



UG PLATE BOOK DRAWING (UG SEC INST RISER CU).dwg

NOTE:
Never install aluminum conductors in transformer bushing connectors.



90˚ Multi-tap connector with drip loops

UVRISER-2
UVRISER-3
UVRISER-4

Customer installed conduit(s) to meter.

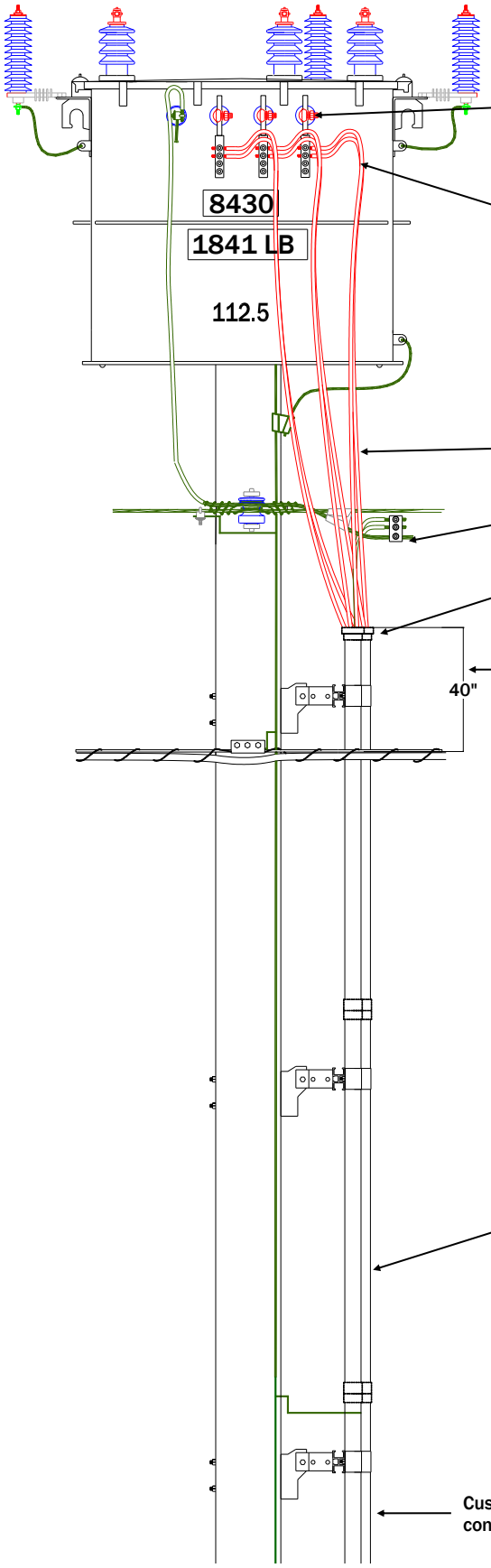
ELLIPSE STANDARD ESTIMATES	
ESTIMATE	DESCRIPTION
USD-1P-100A	RISER & SERVICE DROP TO 100A METER
USD-1P-200A	RISER & SERVICE DROP TO 200A METER
USD-1P-225A	RISER & SERVICE DROP TO 200A METER
USD-1P-400A	RISER & SERVICE DROP TO 300-400A METER
USD-1P-600A	RISER & SERVICE DROP TO 600A METER
USD-1P-800A	RISER & SERVICE DROP TO 800A METER
USD-1P-WPOLE	UG SERVICE DROP SINGLE PHASE W/POLE

UG PLATE BOOK DRAWING (UG SEC INST 1P OH TRANS).dwg

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

NES

T&D SECONDARY STANDARDS
UNDERGROUND SECONDARY SINGLE PHASE RISER INSTALLATION



SECONDARY CONNECTION	
Stock Code	**Item Name/Description**
224163000	CONN TRANSF SPADE 3C ;TRANSFORMER SPADE
224166000	CONN TRANSF STUD 6 H #6-250 MCM
224167000	CONN TRANSF STUD 4 H 1/0-500 MCM
224168000	CONN TRANSF STUD 8 H #6- 250 MCM

Note:
Always create a drip loop to minimize water absorption when using the multi-tap connectors.

UVAQ-40
UVAQ-500

NEUTRAL CONNECTION	
224165500	CONN TRANSF SLOT 4 H 3/0 - 250 MCM
223306000	CONN 5 HOLE 750-1/0

UVTERM4-40Q
UVTERM4-500Q

Minimum riser elevation is 29' above finished grade. Add conduit as necessary when 29' does not provide 40" of separation between the top of the riser and the top communications cable.

UVRISER-4 See Riser Detail in riser section

Customer installed conduit(s) to meter.

ELLIPSE STANDARD ESTIMATES	
ESTIMATE	DESCRIPTION
USD-3P	UG SERVICE DROP THREE PHASE, 4/0-500AQ
USD-3P-WPOLE	UG SERVICE DROP THREE PHASE W/POLE

UG PLATE BOOK DRAWING (UG SEC INST 3P OH TRANS).dwg

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	WMS	UPDATED PAGE REFERENCE	1/25/16

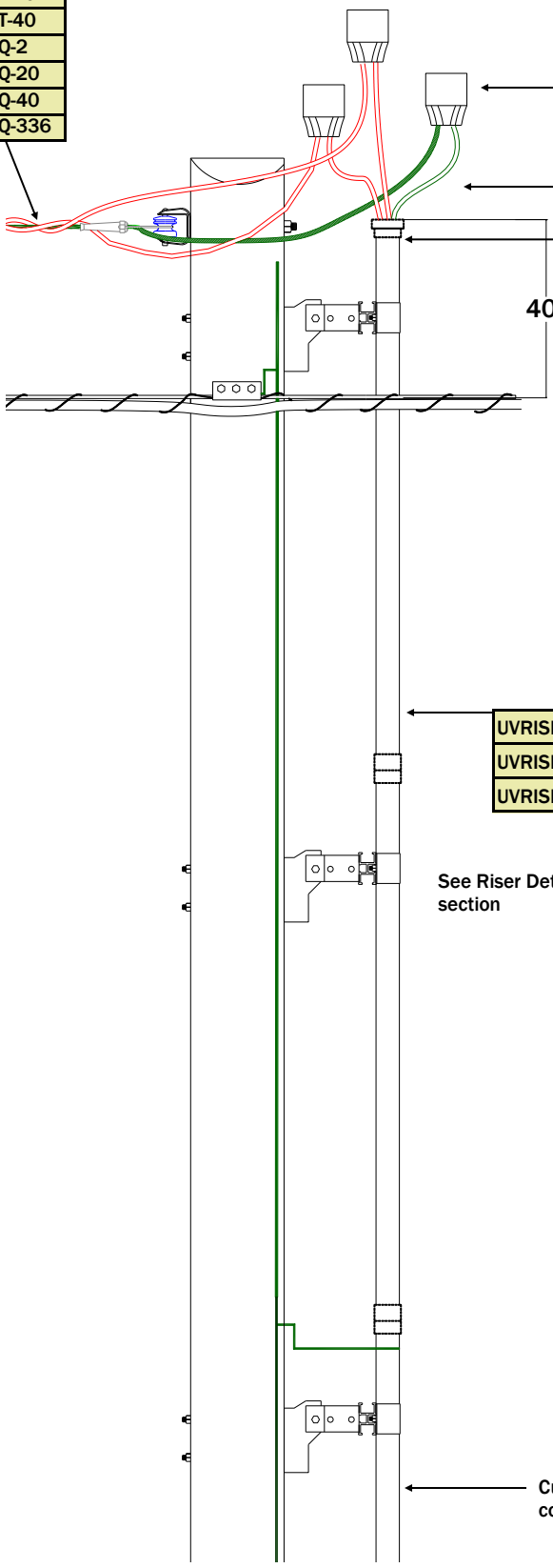
T&D SECONDARY STANDARDS
UNDERGROUND SECONDARY THREE PHASE RISER INSTALLATION

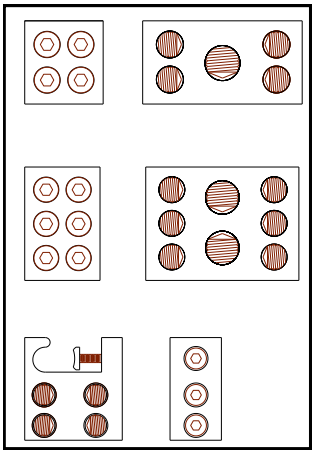
OCAT-2
OCAT-10
OCAT-40
OCAQ-2
OCAQ-20
OCAQ-40
OCAQ-336

SECONDARY CONNECTION	
Stock Code	**Description**
223306000	CONN 5 HOLE (1) 1/0-750 (4) #2-500
223308000	CONN 8 HOLE (2) 1/0-750 (6) #2-500
224165500	CONN TRANSF SLOT 4 H 3/0 - 250 MCM

UVAT-20
UVAT-40
UVAT-350
UVAT-500
UVAQ-40
UVAQ-500

UVTERM2-20T
UVTERM3-20T
UVTERM3-350T
UVTERM3-40T
UVTERM3-500T
UVTERM4-40Q
UVTERM4-500Q





Minimum riser elevation is 29' above finished grade. Add conduit as necessary when 29' does not provide 40" of separation between the top of the riser and the top communications cable.

UVRISER-2
UVRISER-3
UVRISER-4

See Riser Detail in riser section

Customer installed conduit(s) to meter.

UG PLATE BOOK DRAWING (CONN SEC. METER AND OH COMMERCIAL).dwg

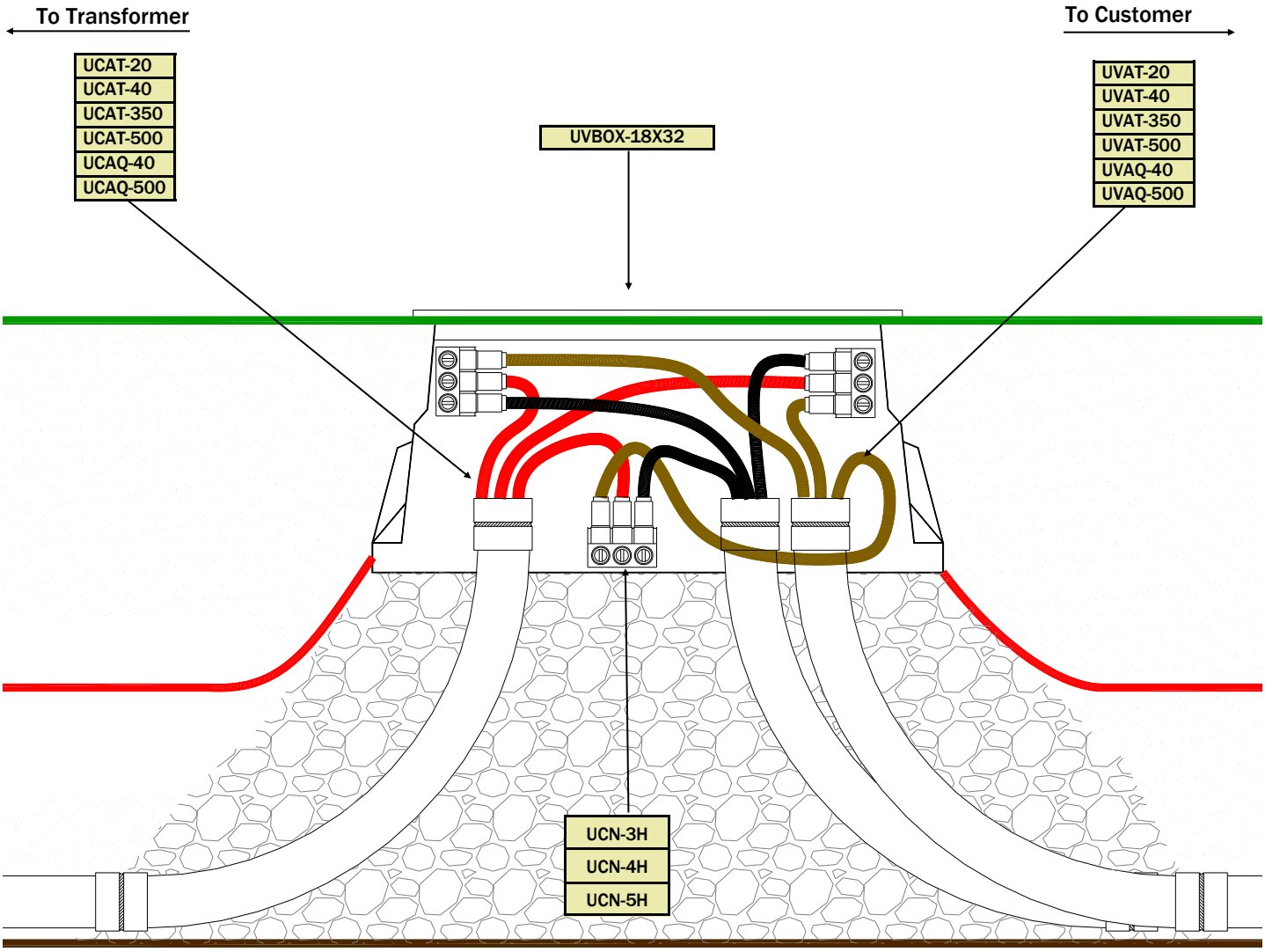
UG PLATE BOOK DRAWING (UG SEC INST SERV. POLE).dwg

ELLIPSE STANDARD ESTIMATES	
ESTIMATE	**DESCRIPTION**
USD-1P-100A	RISER & SERVICE DROP TO 100A METER
USD-1P-200A	RISER & SERVICE DROP TO 200A METER
USD-1P-225A	RISER & SERVICE DROP TO 200A METER
USD-1P-400A	RISER & SERVICE DROP TO 300-400A METER
USD-1P-600A	RISER & SERVICE DROP TO 600A METER
USD-1P-800A	RISER & SERVICE DROP TO 800A METER
USD-1P-WPOLE	UG SERVICE DROP SINGLE PHASE W/POLE
USD-3P	UG SERVICE DROP THREE PHASE, 4/0-500AQ
USD-3P-WPOLE	UG SERVICE DROP THREE PHASE W/POLE

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	WMS	UPDATED PAGE REFERENCE	1/25/18

T&D SECONDARY STANDARDS

UNDERGROUND SECONDARY
1P OR 3P RISER INSTALLATION
ON SERVICE POLE



SECONDARY CONNECTION						
Stock Code	CU	Description	Quantity required per service voltage			
			120/240	216y/125	480y/277	240Δ Or 480Δ
401000000	UCN-3H	URD CONNECTOR 3 HOLE	3	4	4	3
401002000	UCN-4H	URD CONNECTOR 4 HOLE	3	4	4	3
401004000	UCN-5H	URD CONNECTOR 5 HOLE	3	4	4	3
401006000	UCN-6H*	URD CONNECTOR 6 HOLE	3	4	4	3
401008000	UCN-7H*	URD CONNECTOR 7 HOLE	3	4	4	3

General Notes:

1. It is critical that the wire be properly seated inside of the connector. Always mark the wire's position when fully seated. This indicates if the wire backed out of the connector when the set screw was tightened. The set screw can be removed to see if the wire is seated.
2. Strip gauge is on the back of the connector.
3. The source wire must be installed in the center position on the connector. This minimizes connector heating during peak loads.

* Do not use in secondary pull boxes. These may be used at secondary riser poles and at the customer's weatherhead.

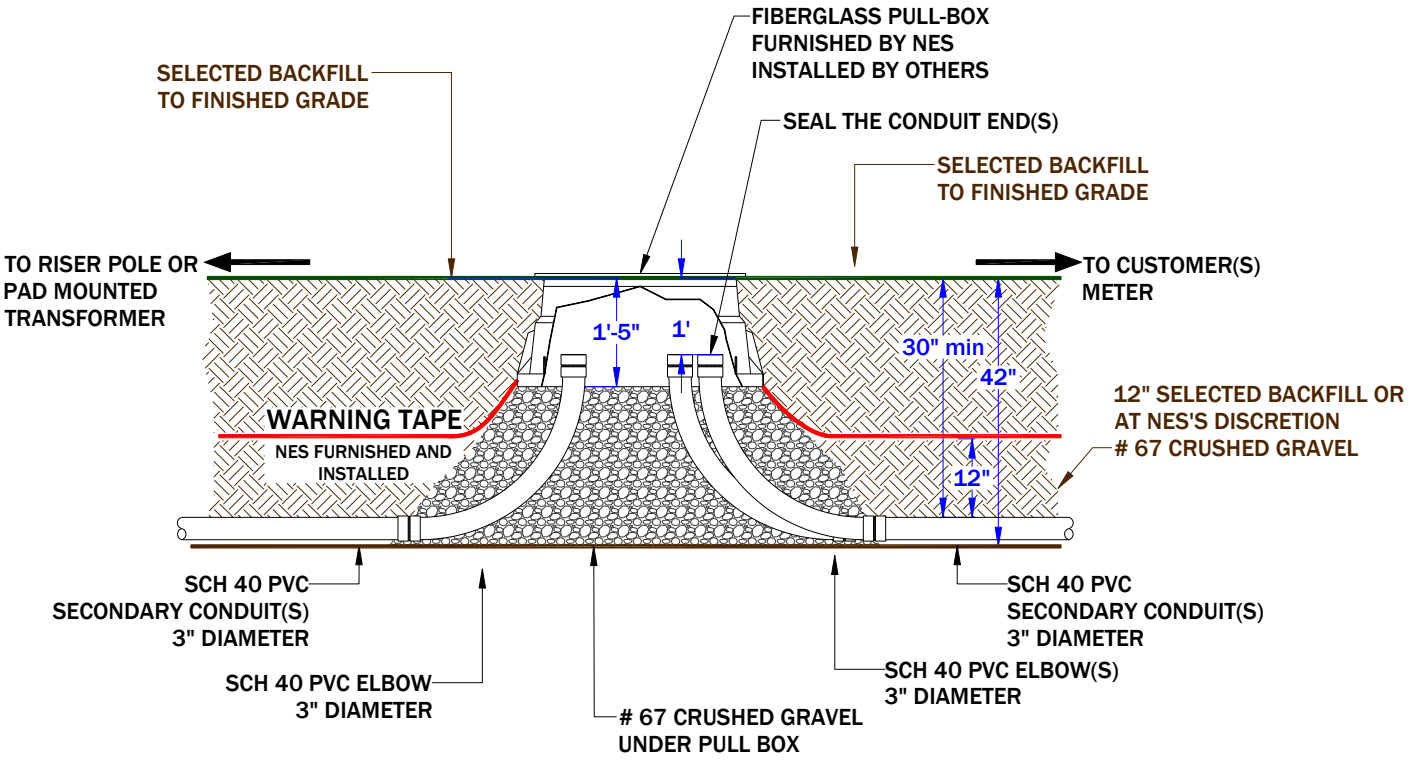
UG PLATE BOOK DRAWING (URD CONNECTOR INST).dwg

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

NES

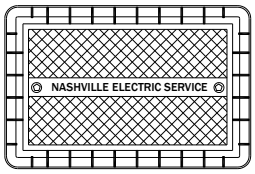
T&D SECONDARY STANDARDS

UNDERGROUND SECONDARY PULL BOX

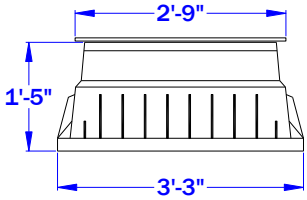


NOTE:
ALL MATERIALS, LABOR AND EQUIPMENT NECESSARY TO COMPLETE EXCAVATION, CONDUIT INSTALLATION, AND BACKFILLING SHALL BE FURNISHED BY THE CUSTOMER OR THE CUSTOMER'S REPRESENTATIVE(S) HEREIN REFERRED TO AS OTHERS OR CUSTOMER.

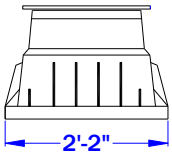
Top View



Side View



End View

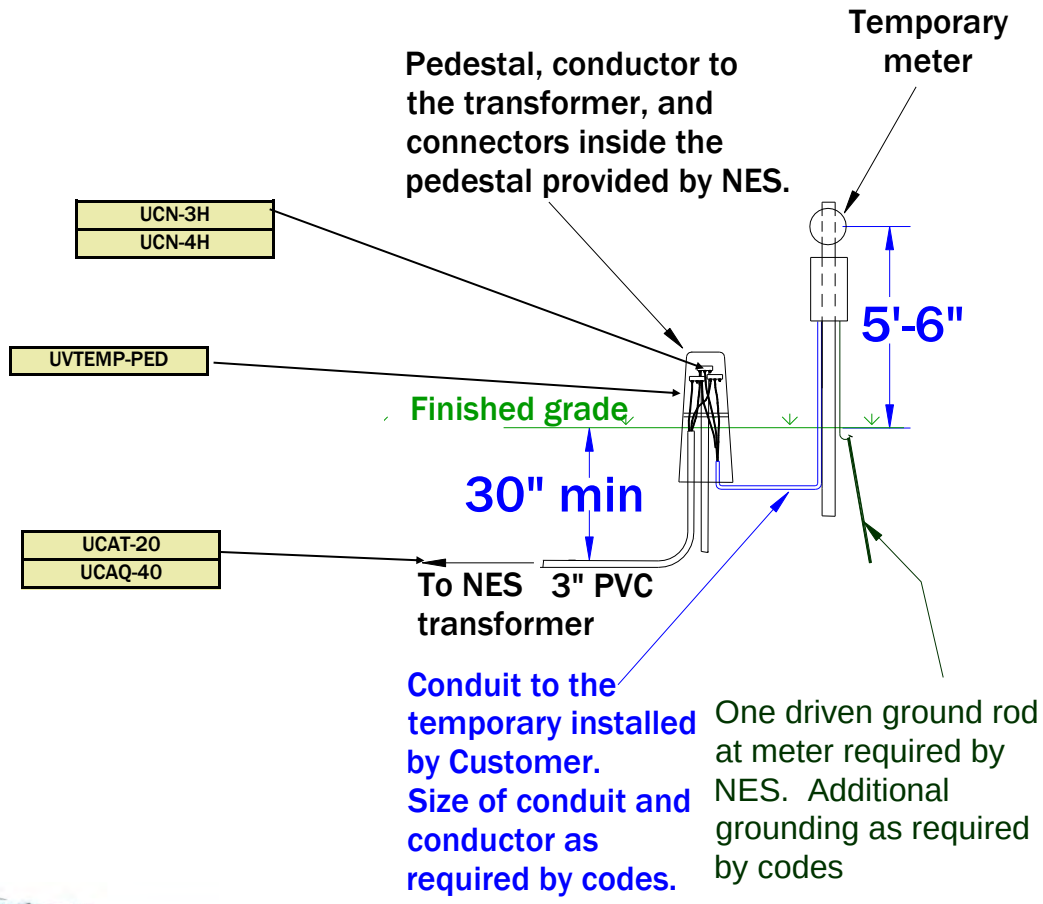


SECONDARY PULL BOX (DRAWING UGS0004)				
MATERIAL LIST				
CU CODE	STOCK #	DESCRIPTION	QTY	UNIT
UVBOX-18X32	060034000	BOX URD SERVICE 20"W X 32"L X 18"D ;POLY	1	EA

UG PLATE BOOK DRAWING (UGS0004 SecondaryPullBox).dwg

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

T&D SECONDARY STANDARDS
UNDERGROUND SECONDARY PULL BOX INSTALLATION DETAILS

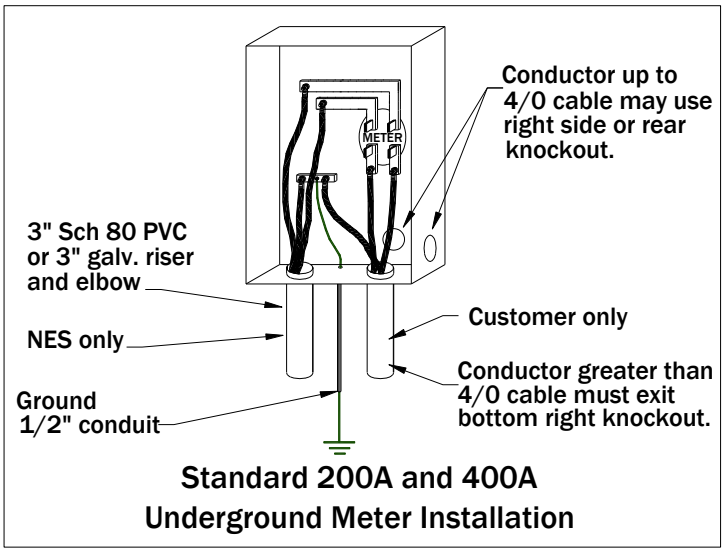


TEMPORARY SERVICE PEDESTAL (DRAWING UGS0005)				
MATERIAL LIST				
CU CODE	STOCK #	DESCRIPTION	QTY	UNIT
UVTEMP-PED	060395000	FIBERGLASS TEMPORARY SERVICE PEDESTAL	1	EA

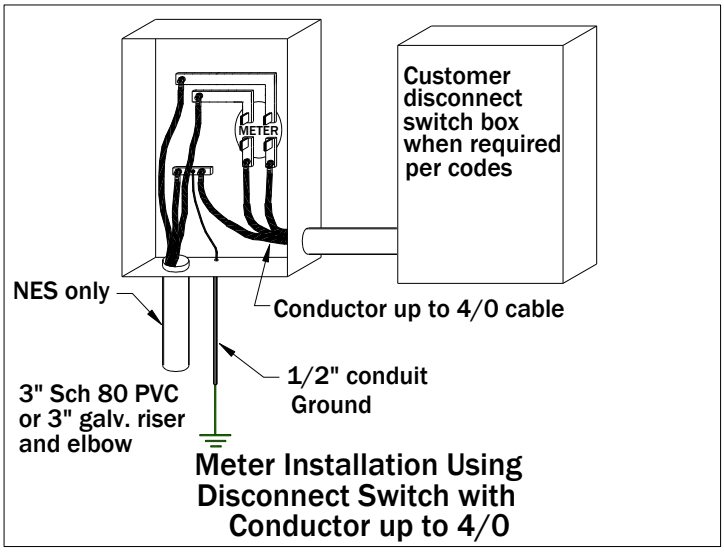
UG PLATE BOOK DRAWING (UG SEC INST 1P TEMPORARY).dwg

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

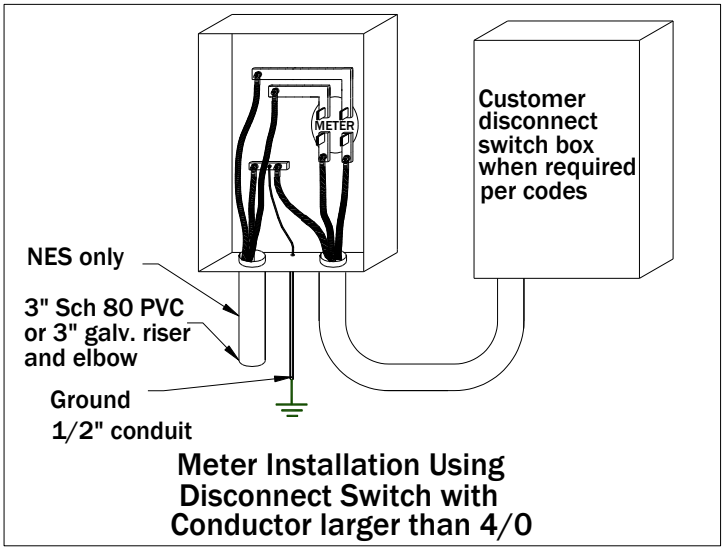
T&D SECONDARY STANDARDS
UNDERGROUND SECONDARY TEMPORARY PULL BOX



Standard 200A and 400A Underground Meter Installation



Meter Installation Using Disconnect Switch with Conductor up to 4/0



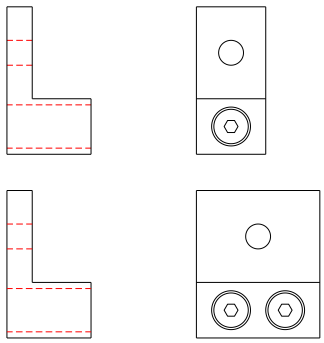
Meter Installation Using Disconnect Switch with Conductor larger than 4/0

Note:
These drawings are instructions for the customer on how to bring their service wires into the meter base.

The wire size limits refer to the customer's wire.

TRUCK STOCK ITEMS

Stock #	Description
400900000	CONN 500 MCM 1 COND AL/CU
400809000	CONN 350 MCM 2 COND AL/CU
400800000	INHIBITING COMPOUND



UG PLATE BOOK DRAWING (CONN SEC. METER AND OH COMMERCIAL).dwg

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	MTE	UPDATED TO MATCH CUSTOMER HANDBOOK	10/19/17

NES

T&D SECONDARY STANDARDS

UNDERGROUND SECONDARY METER BASE TERMINATIONS (UGS0003)

UNDERGROUND SECONDARY CABLE INFORMATION TABLE											
SINGLE PHASE; TWO CONDUCTOR WITH NEUTRAL ; 600V INSULATION										Ampacity	
Stock Num-ber	CU Trans or Pull Box to Meter	CU Trans to Pull Box	Size (AWG/ kcmil)	No. of Strands	Neutral Wires AWG)	Insulation Thickness (mils)	Cable Weight (lbs./kft)	ft / full reel (42"dia)	ft / full reel (68"dia)	Direct Burial	PVC Conduit
020350000	UVAT-20	UCAT-20	2/0	19	1	80	501	1500	5000	245	180
020381000	UVAT-40	UCAT-40	4/0	19	2/0	80	737	1000	3000	315	240
020395000	UVAT-350	UCAT-350	350	37	4/0	80	1157	N/A	1000	415	320
020410000	UVAT-500	UCAT-500	500	37	350	95	1646	N/A	1000	495	395
THREE PHASE; THREE CONDUCTOR WITH NEUTRAL; 600V INSULATION										Ampacity	
NES Stock Number	CU Trans or Pull Box to Meter	CU Trans to Pull Box	Size (AWG/ kcmil)	No. of Strands	Neutral Wires AWG)	Insulation Thickness (mils)	Cable Weight (lbs./kft)	ft / full reel (42"dia)	ft / full reel (68"dia)	Direct Burial	PVC Conduit
020382000	UVAQ-40	UCAQ-40	4/0	19	2/0	80	974	N/A	1000	290	225
020430000	UVAQ-500	UCAQ-500	500	37	350	90	2163	N/A	750	465	370

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

T&D SECONDARY STANDARDS
UNDERGROUND SECONDARY CONDUCTOR PROPERTIES

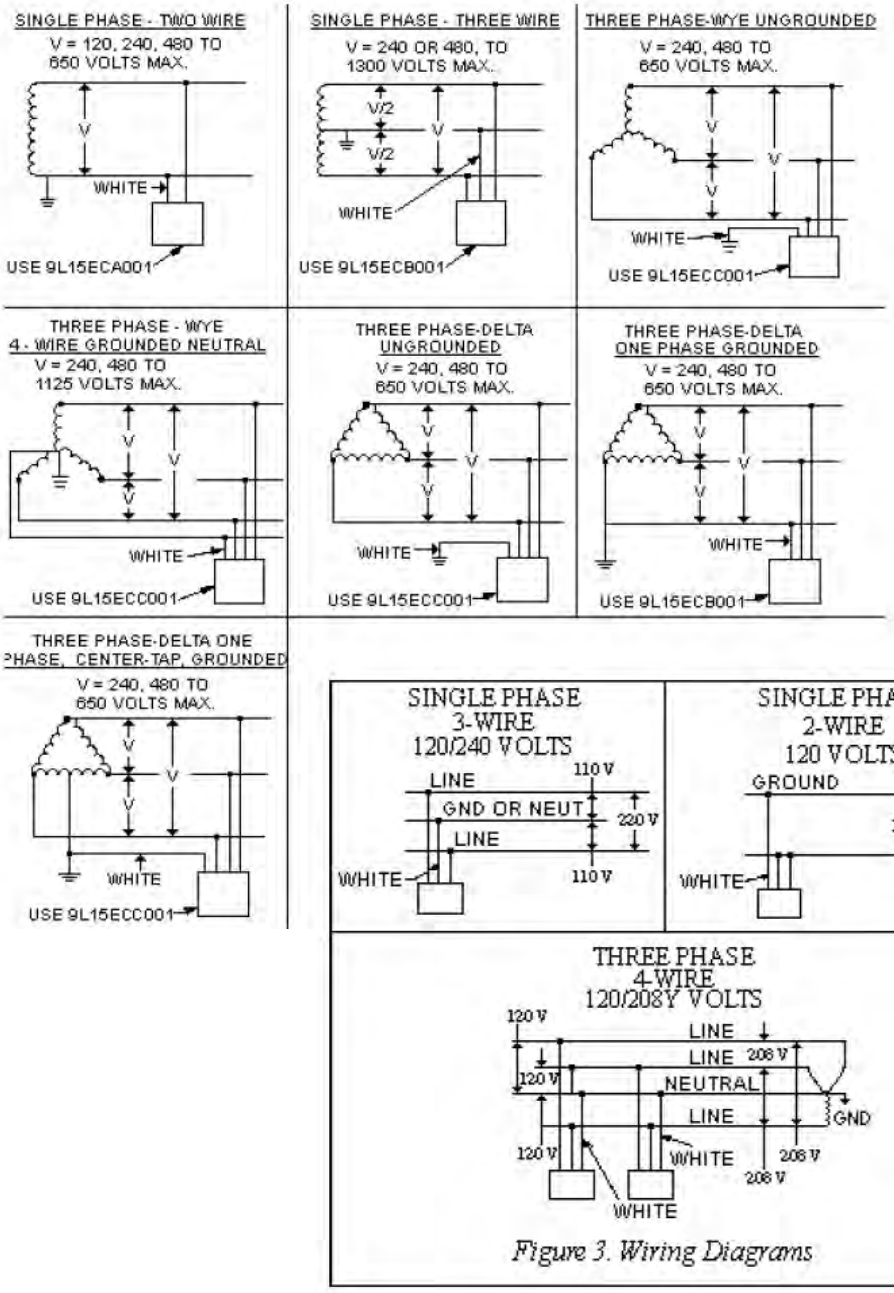


Figure 3. Wiring Diagrams

- 120/240 Single Phase Protection
- 150,000 AMP Total Surge Current
- Diagnostic Light

GE Model

GENERAL NOTES:

Wiring diagram source is General Electric Company. These are for reference only. Schematics may vary from different manufacturers therefore always check the wiring instructions furnished with each arrester.

Install secondary arresters on all power sources feeding NES electronic controls.

SECONDARY ARRESTERS				
MATERIAL LIST				
CU CODE	**STOCK #**	**DESCRIPTION**	**QTY**	**UNIT**
UVLA-240	140100000	ARRESTER, SURGE, SECONDARY, 120/240V	1	EA
UVLA-380	140105000	ARRESTER, SURGE, SECONDARY, 380V	1	EA
UVLA-600	140110000	ARRESTER, SURGE, SECONDARY, 650V	1	EA

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

NES

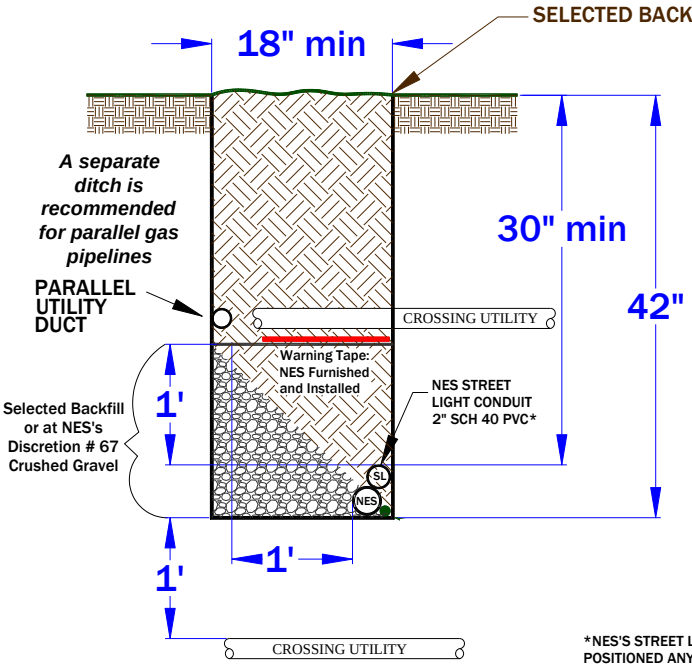
T&D SECONDARY STANDARDS
SECONDARY ARRESTERS

DITCH DETAIL STANDARDS

APPROVALS			
ISSUE DATE	ENGINEER	SUPERVISOR	MANAGER
2/15/06	FRED FRITON	RON DAVIDSON	NICK THOMPSON
9/29/17	MIKE EDWARDS		

TABLE OF CONTENTS

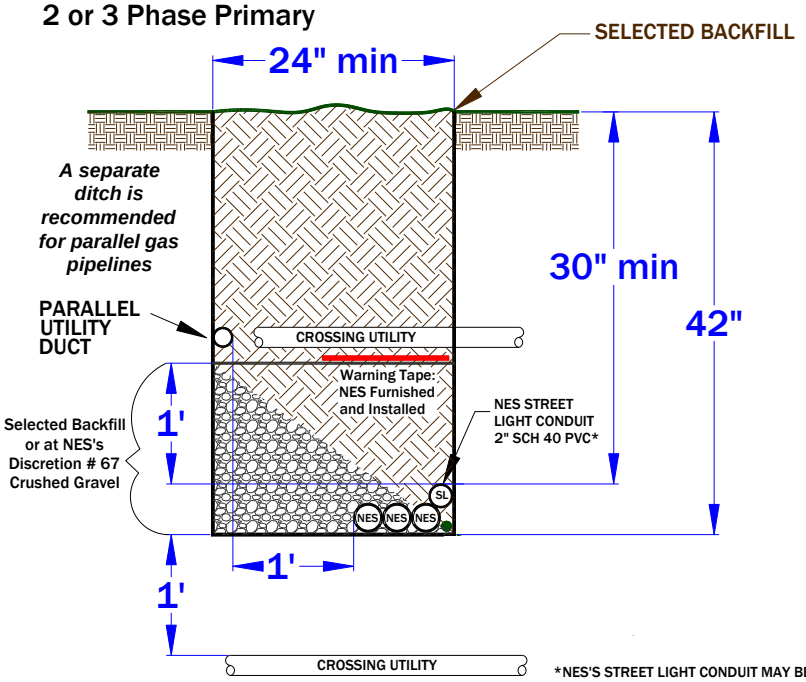
Residential Customer Ditch Detail for Primary Lines
(1) 2-1/2" Diameter Schedule 40 PVC Conduit
Single (1) Phase Primary



NES conduit (single phase lines)
Provided and installed by the Customer

*NES'S STREET LIGHT CONDUIT MAY BE POSITIONED ANYWHERE ABOVE OR ADJACENT TO NES'S PRIMARY CABLE. IT MAY NOT BE BELOW NES'S PRIMARY.

Residential Subdivision Ditch Detail For Primary Lines
(1) 4", (1) 3" or (2 to 3) 2-1/2" diameter conduits"
Schedule 40 PVC
2 or 3 Phase Primary



NES conduit (multi-phase lines or spare conduit)
Provided and installed by the Customer

*NES'S STREET LIGHT CONDUIT MAY BE POSITIONED ANYWHERE ABOVE OR ADJACENT TO NES'S PRIMARY CABLE. IT MAY NOT BE BELOW NES'S PRIMARY.

UG PLATE BOOK DRAWING (UGS0051 Ditch details 3-28-2006).dwg

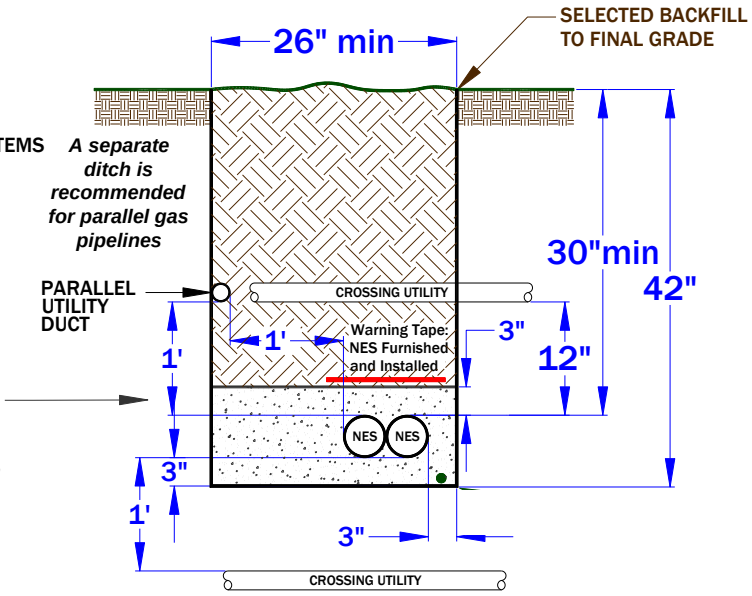
REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

T&D DITCH STANDARDS
UNDERGROUND DITCH DETAILS (UGS0051)
RESIDENTIAL PRIMARY DITCH
CROSS SECTION

Commercial Customer Ditch Detail
Using Concrete Encased
(2) 4" Diameter
Schedule 40 PVC

DITCH INSTALLATION PROCESS
1. EXCAVATE DITCH
2. INSTALL CONDUIT AND GROUND WIRE SYSTEMS
3. CALL FOR INSPECTION
4. POUR CONCRETE,
5. CALL FOR INSPECTION
6. AFTER WARNING TAPE IS INSTALLED, BACKFILL TO FINISHED GRADE

A separate ditch is recommended for parallel gas pipelines

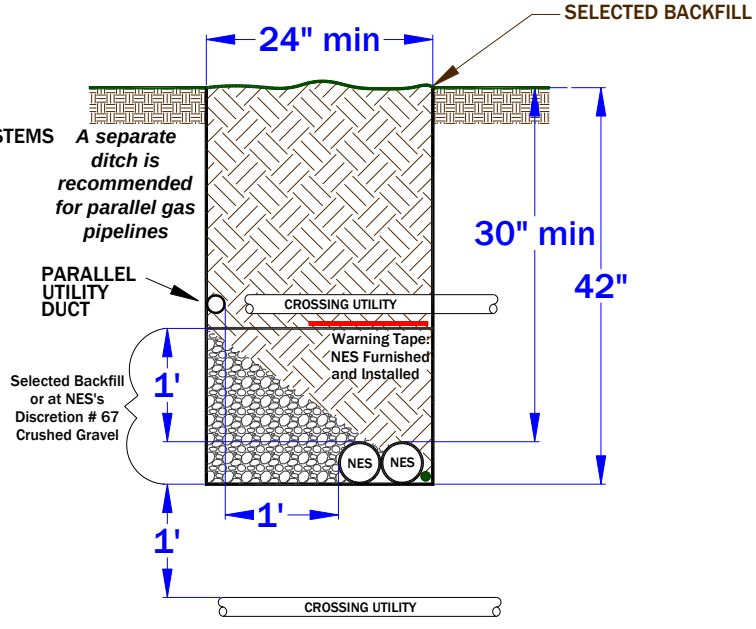


NES conduit(s) (plus spare conduit if required)
Provided and installed by the Customer

Commercial Customer Ditch Detail
(2) 4" Diameter
Using Rigid Galvanized Duct

DITCH INSTALLATION PROCESS
1. EXCAVATE DITCH
2. INSTALL CONDUIT AND GROUND WIRE SYSTEMS
3. CALL FOR INSPECTION
4. BACKFILL 12'
5. CALL FOR INSPECTION
6. AFTER WARNING TAPE IS INSTALLED, BACKFILL TO FINISHED GRADE

A separate ditch is recommended for parallel gas pipelines

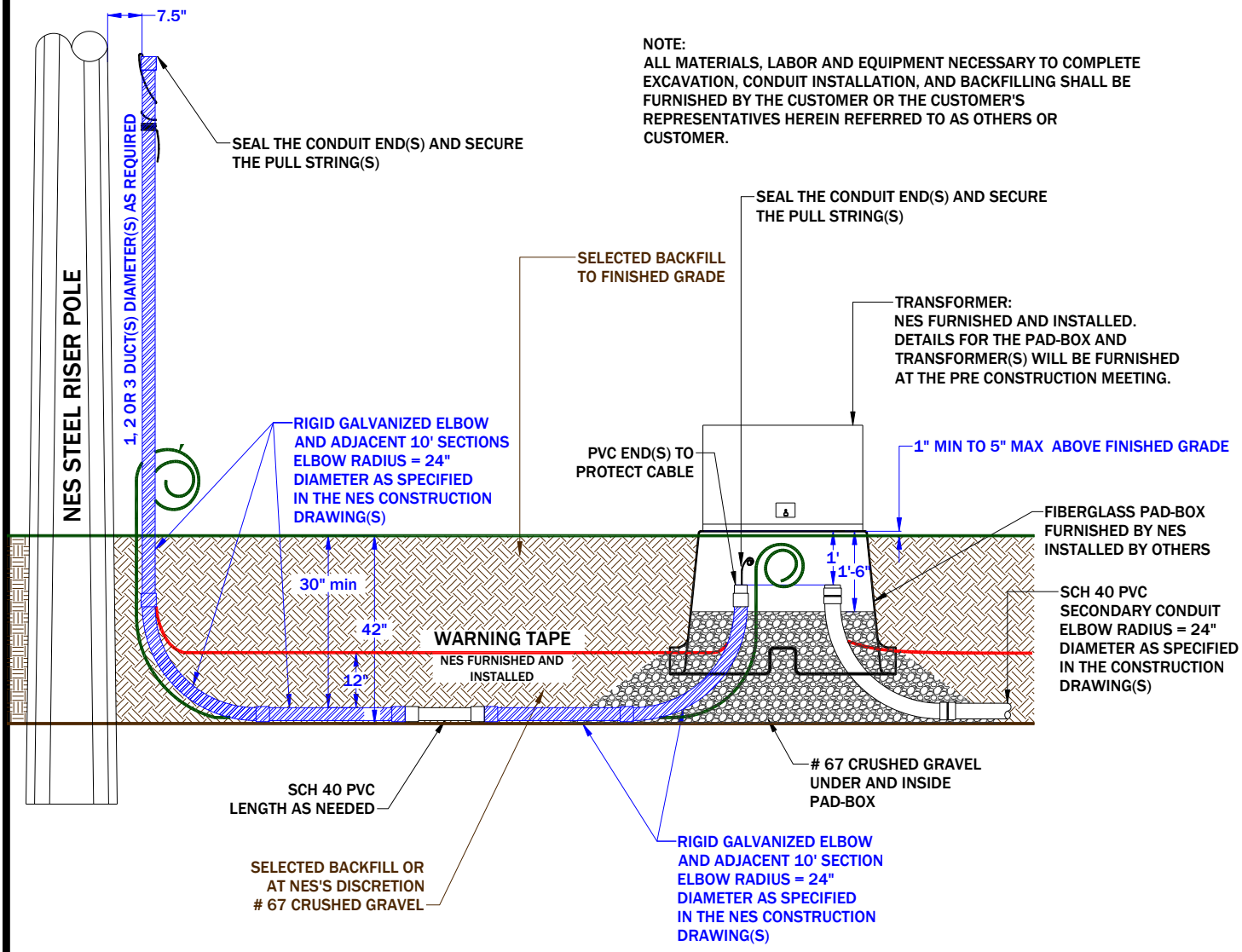


NES conduit (plus spare conduit if required)
Provided and installed by the Customer

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	MTE	FIXED ERROR	929/17

T&D DITCH STANDARDS
UNDERGROUND DITCH DETAILS (UGS0051)
COMMERCIAL PRIMARY DITCH CROSS SECTION

SINGLE PHASE RESIDENTIAL DITCH DETAIL (SCH 40 PVC)



NOTE:
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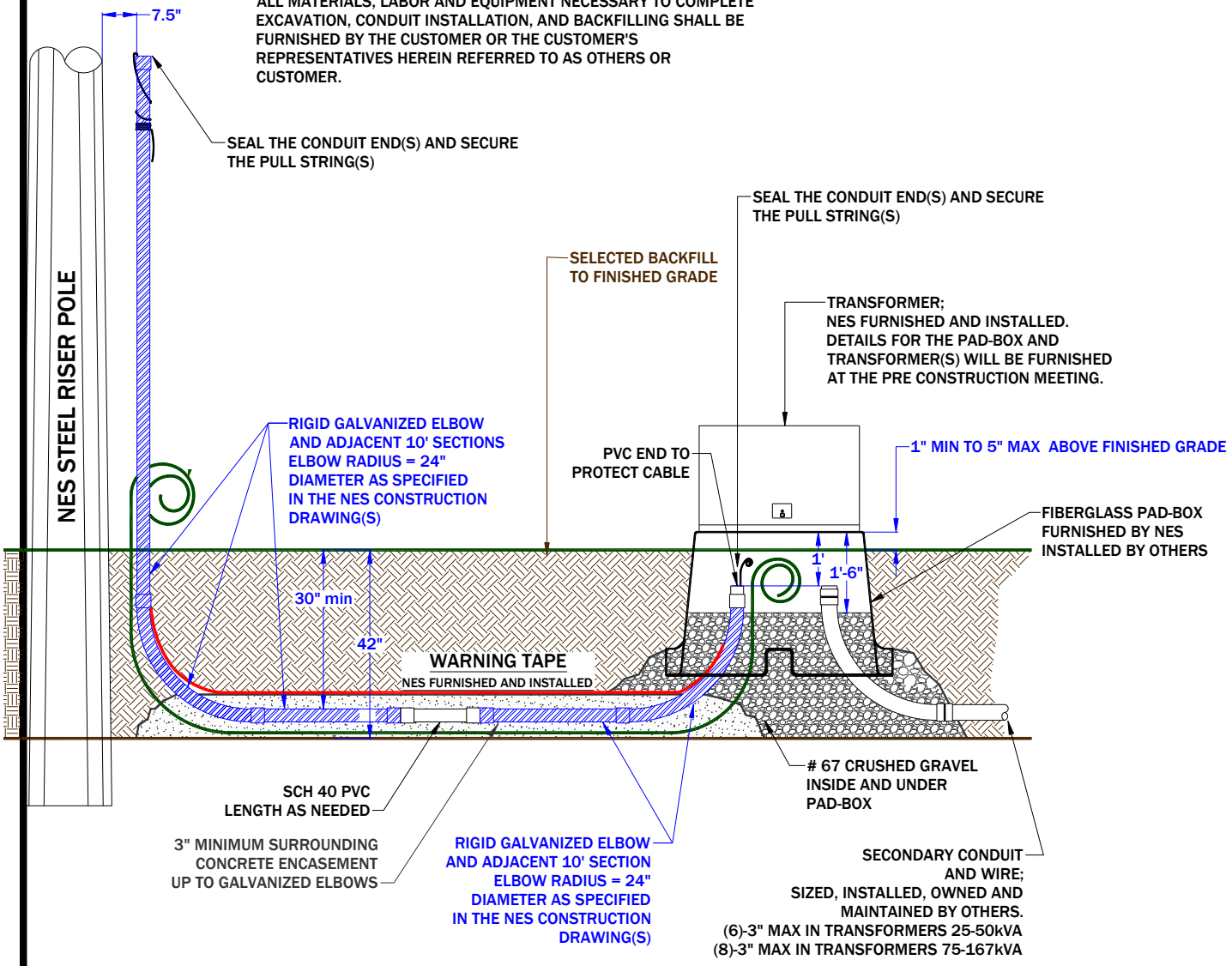
REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

T&D DITCH STANDARDS
UNDERGROUND DITCH DETAILS (UGS0051)
RESIDENTIAL PVC PRIMARY DITCH DETAIL

SINGLE PHASE COMMERCIAL DITCH DETAIL (SCH 40 PVC)

NOTE:
ALL MATERIALS, LABOR AND EQUIPMENT NECESSARY TO COMPLETE EXCAVATION, CONDUIT INSTALLATION, AND BACKFILLING SHALL BE FURNISHED BY THE CUSTOMER OR THE CUSTOMER'S REPRESENTATIVES HEREIN REFERRED TO AS OTHERS OR CUSTOMER.



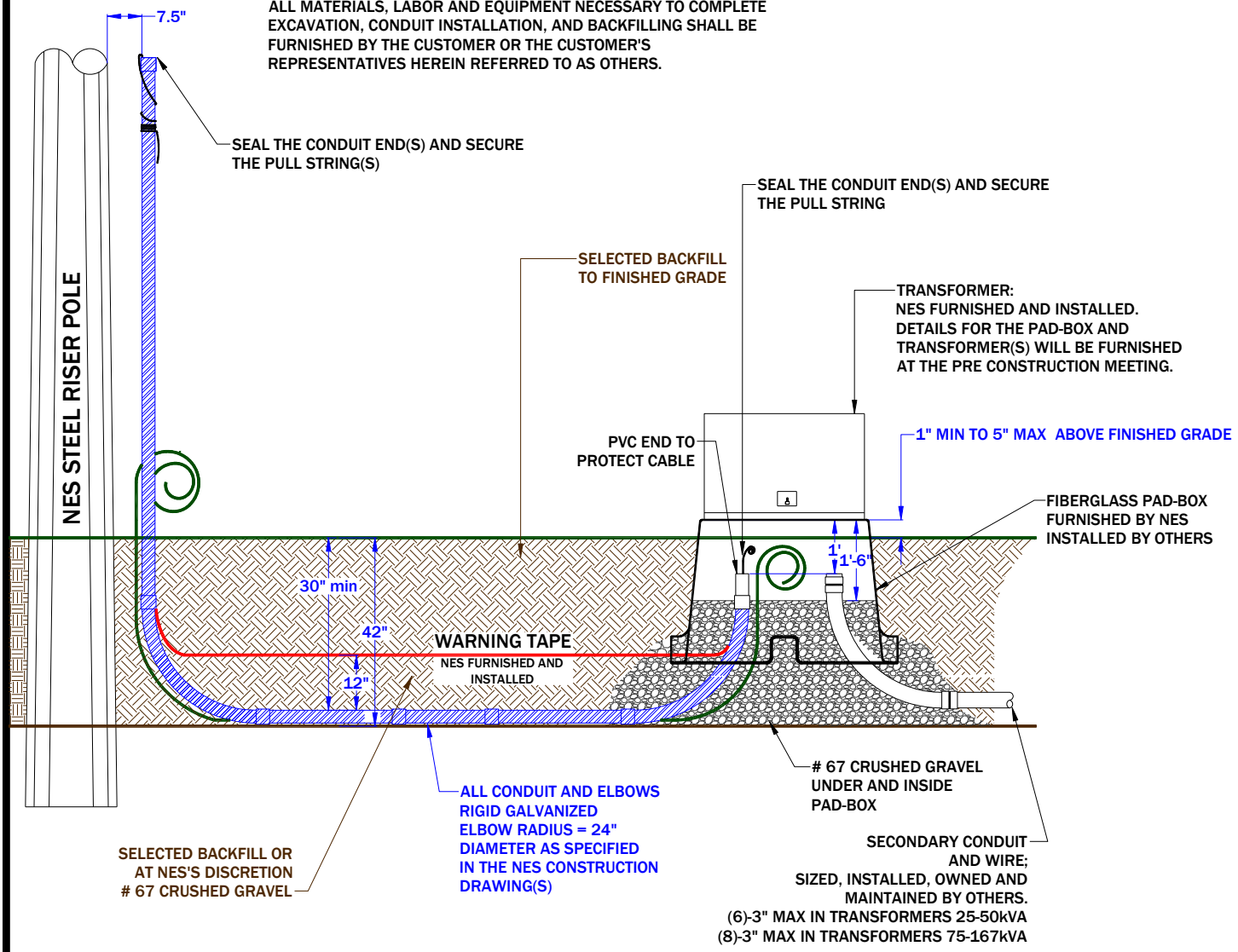
REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

NES

T&D DITCH STANDARDS
UNDERGROUND DITCH DETAILS (UGS0051)
COMMERCIAL PRIMARY 1P
PVC DITCH DETAIL

SINGLE PHASE COMMERCIAL DITCH DETAIL (RIGID CONDUIT)

NOTE:
ALL MATERIALS, LABOR AND EQUIPMENT NECESSARY TO COMPLETE EXCAVATION, CONDUIT INSTALLATION, AND BACKFILLING SHALL BE FURNISHED BY THE CUSTOMER OR THE CUSTOMER'S REPRESENTATIVES HEREIN REFERRED TO AS OTHERS.

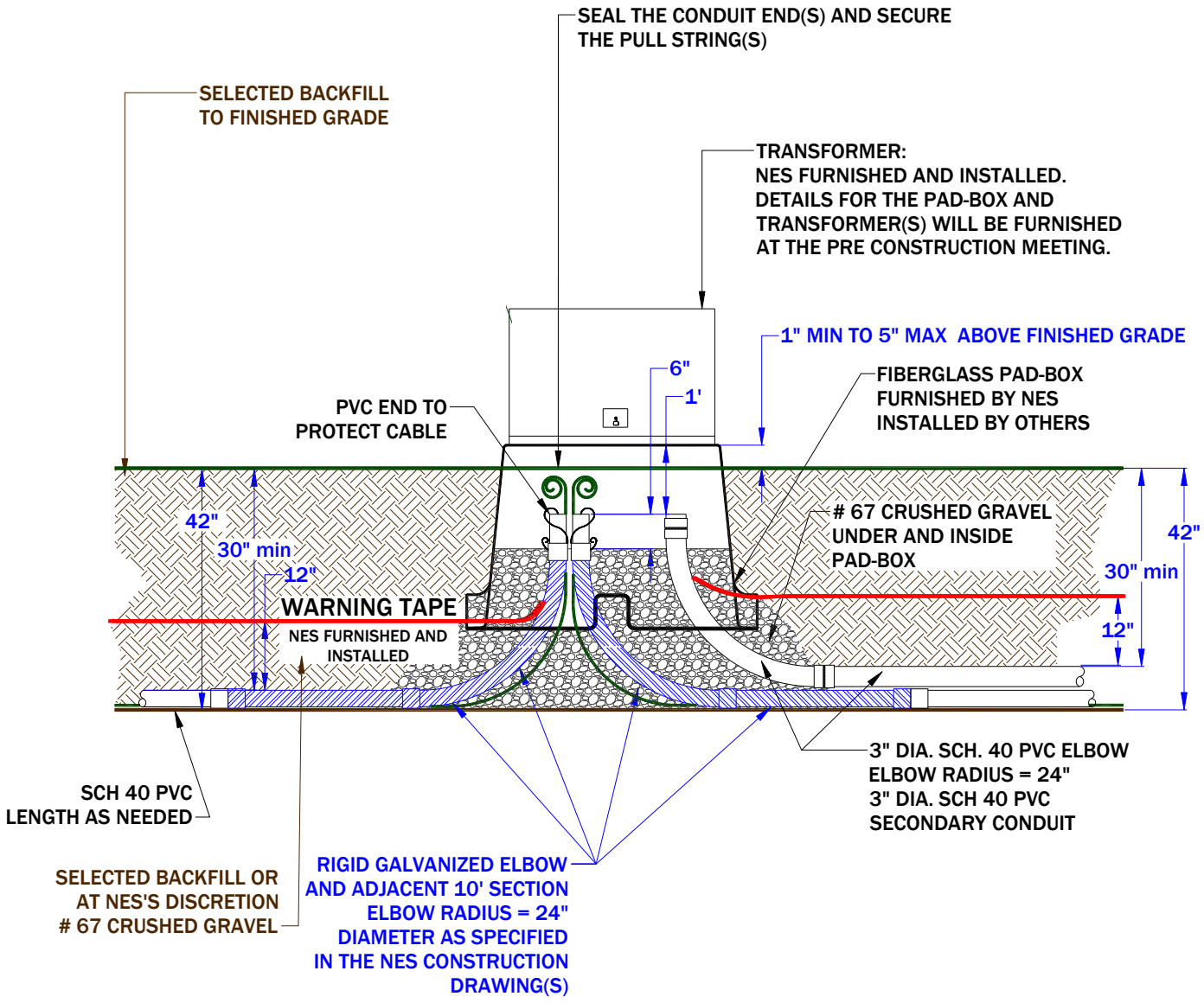


REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	MTE	FIXED ERROR	9/29/17

T&D DITCH STANDARDS
UNDERGROUND DITCH DETAILS (UGS0051)
COMMERCIAL PRIMARY 1P
RIGID DITCH DETAIL

SINGLE PHASE RESIDENTIAL DITCH DETAIL (SCH 40 PVC) LOOP FEED PRIMARY

NOTE:
ALL MATERIALS, LABOR AND EQUIPMENT NECESSARY TO COMPLETE EXCAVATION, CONDUIT INSTALLATION, AND BACKFILLING SHALL BE FURNISHED BY THE CUSTOMER OR THE CUSTOMER'S REPRESENTATIVES HEREIN REFERRED TO AS OTHERS OR CUSTOMER.



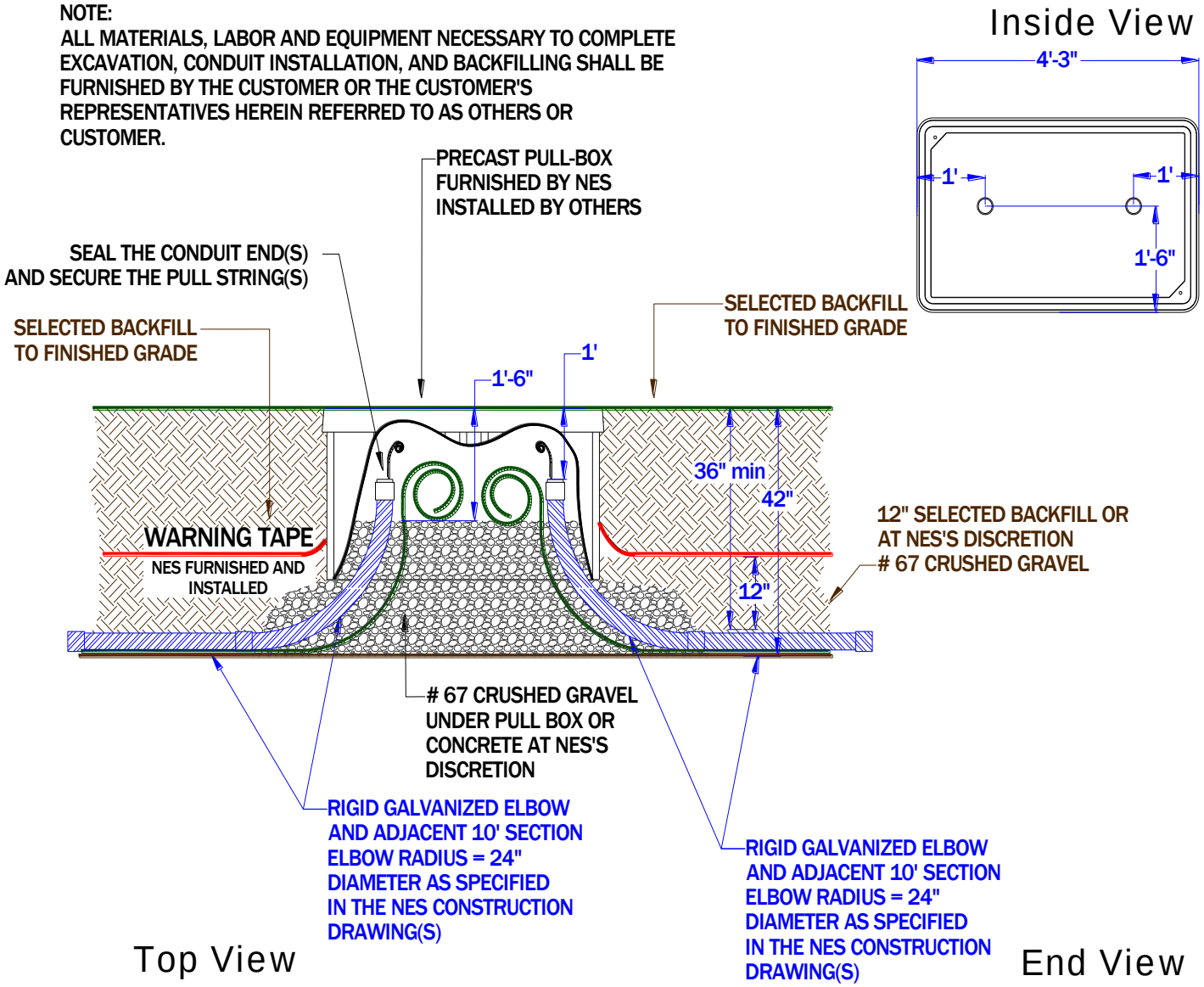
REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	MTE	FIXED ERROR	9/29/17

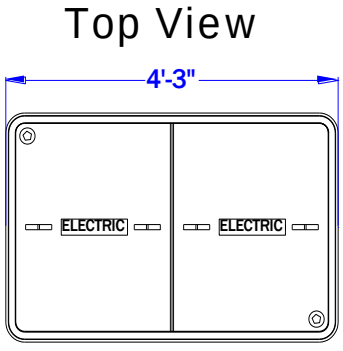
NES

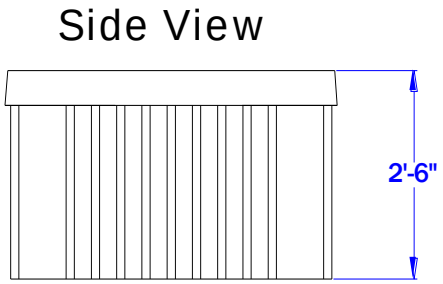
T&D DITCH STANDARDS
UNDERGROUND DITCH DETAILS (UGS0051)
LOOP FEED 1P TRANSFORMER
DITCH DETAIL

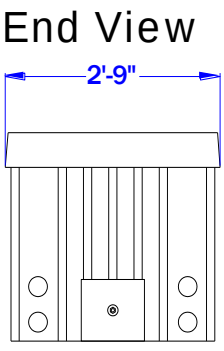
DITCH DETAIL
PRIMARY PULL BOX
RIGID GALVANIZED CONDUIT

NOTE:
ALL MATERIALS, LABOR AND EQUIPMENT NECESSARY TO COMPLETE EXCAVATION, CONDUIT INSTALLATION, AND BACKFILLING SHALL BE FURNISHED BY THE CUSTOMER OR THE CUSTOMER'S REPRESENTATIVES HEREIN REFERRED TO AS OTHERS OR CUSTOMER.





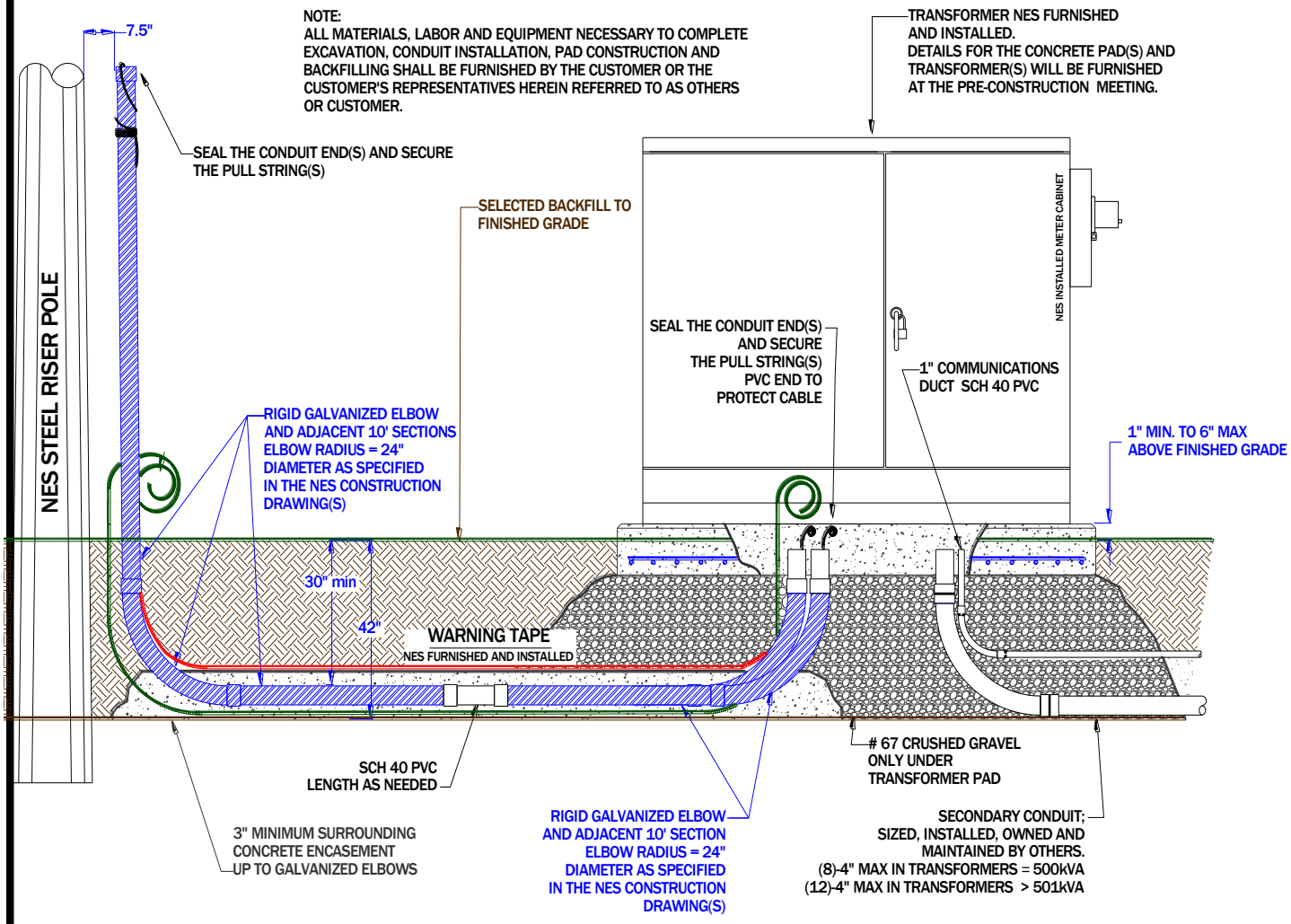




REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

T&D DITCH STANDARDS
UNDERGROUND DITCH DETAILS (UGS0051)
PRIMARY PULL BOX DITCH DETAIL

3PHASE COMMERCIAL DITCH DETAIL (SCH 40 PVC)



REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

T&D DITCH STANDARDS

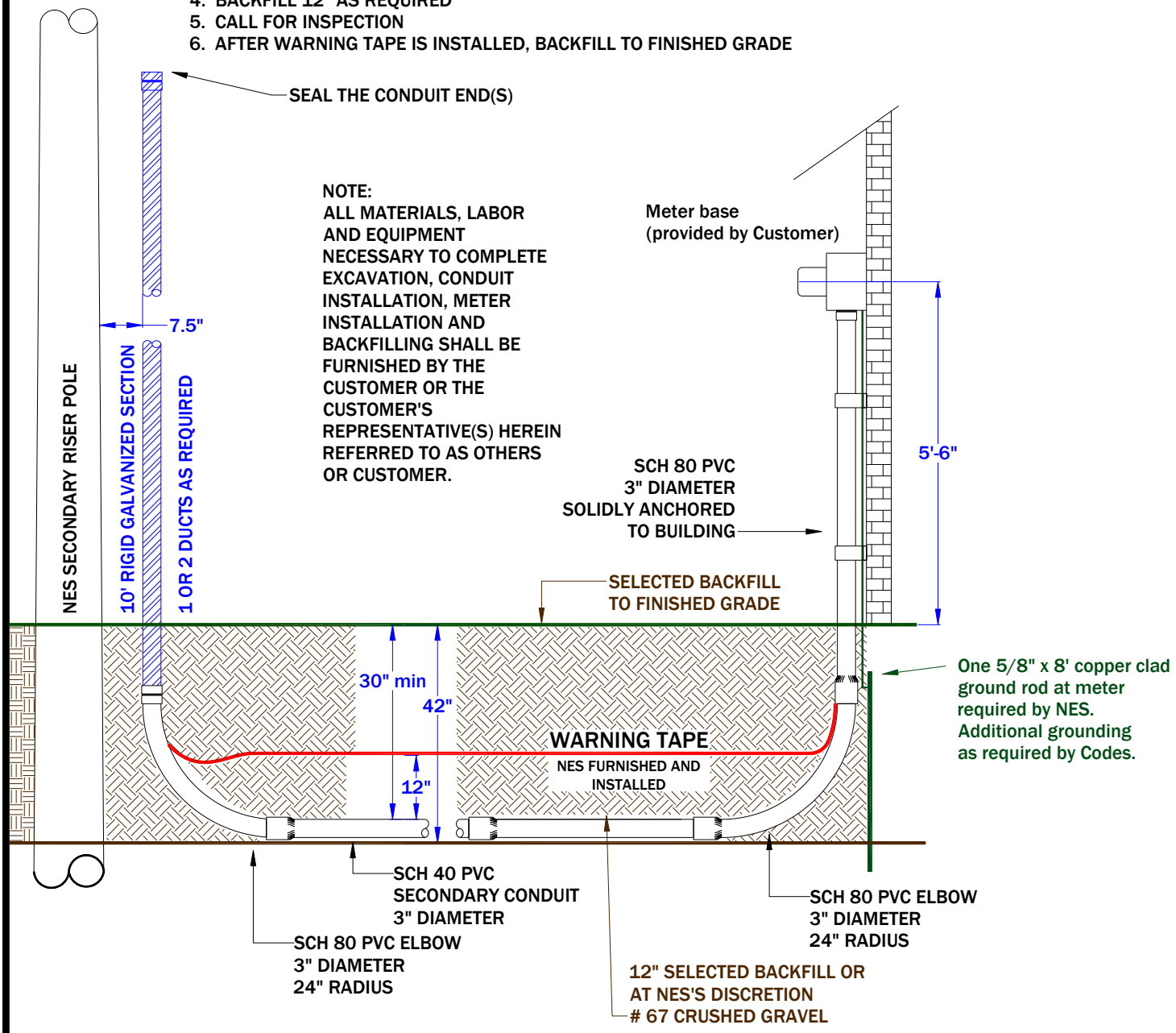
UNDERGROUND DITCH DETAILS (UGS0051)

COMMERCIAL PRIMARY 3P

PVC DITCH DETAIL

RESIDENTIAL SECONDARY DITCH DETAIL
FOR SERVICES UP TO 400A AND (1) 3" CONDUIT
PVC AS INDICATED OR RIGID GALVANIZED CONDUIT

DITCH INSTALLATION PROCESS
1. EXCAVATE DITCH
2. INSTALL CONDUIT
3. CALL FOR INSPECTION
4. BACKFILL 12" AS REQUIRED
5. CALL FOR INSPECTION
6. AFTER WARNING TAPE IS INSTALLED, BACKFILL TO FINISHED GRADE

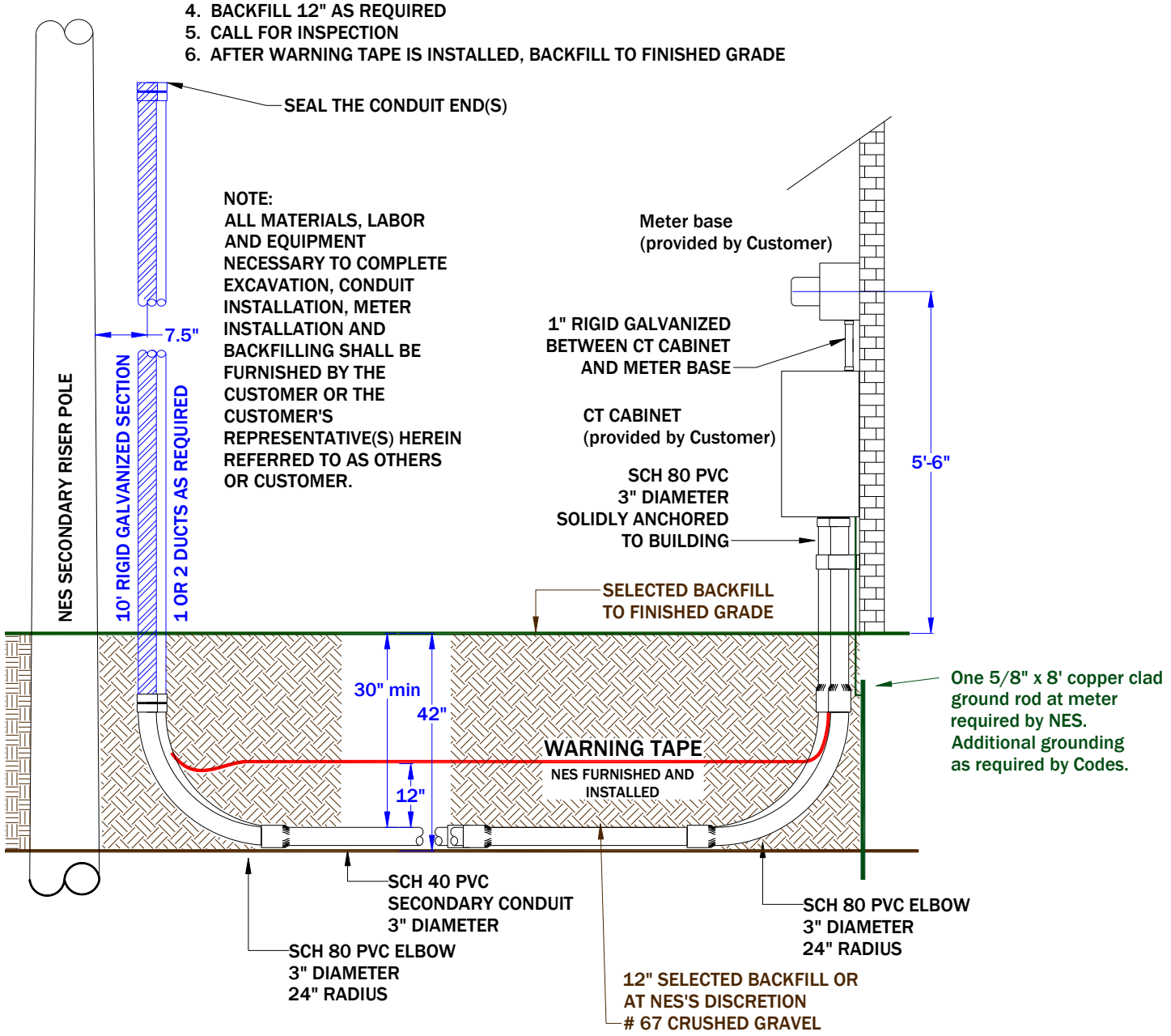


REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

T&D DITCH STANDARDS
UNDERGROUND DITCH DETAILS (UGS0051)
0-400A UPR2 RESIDENTIAL DITCH DETAIL

RESIDENTIAL SECONDARY DITCH DETAIL
FOR SERVICES GREATER THAN 400A AND (1) OR (2) 3" CONDUIT(S) PVC AS INDICATED OR RIGID GALVANIZED CONDUIT

DITCH INSTALLATION PROCESS
1. EXCAVATE DITCH
2. INSTALL CONDUIT
3. CALL FOR INSPECTION
4. BACKFILL 12" AS REQUIRED
5. CALL FOR INSPECTION
6. AFTER WARNING TAPE IS INSTALLED, BACKFILL TO FINISHED GRADE

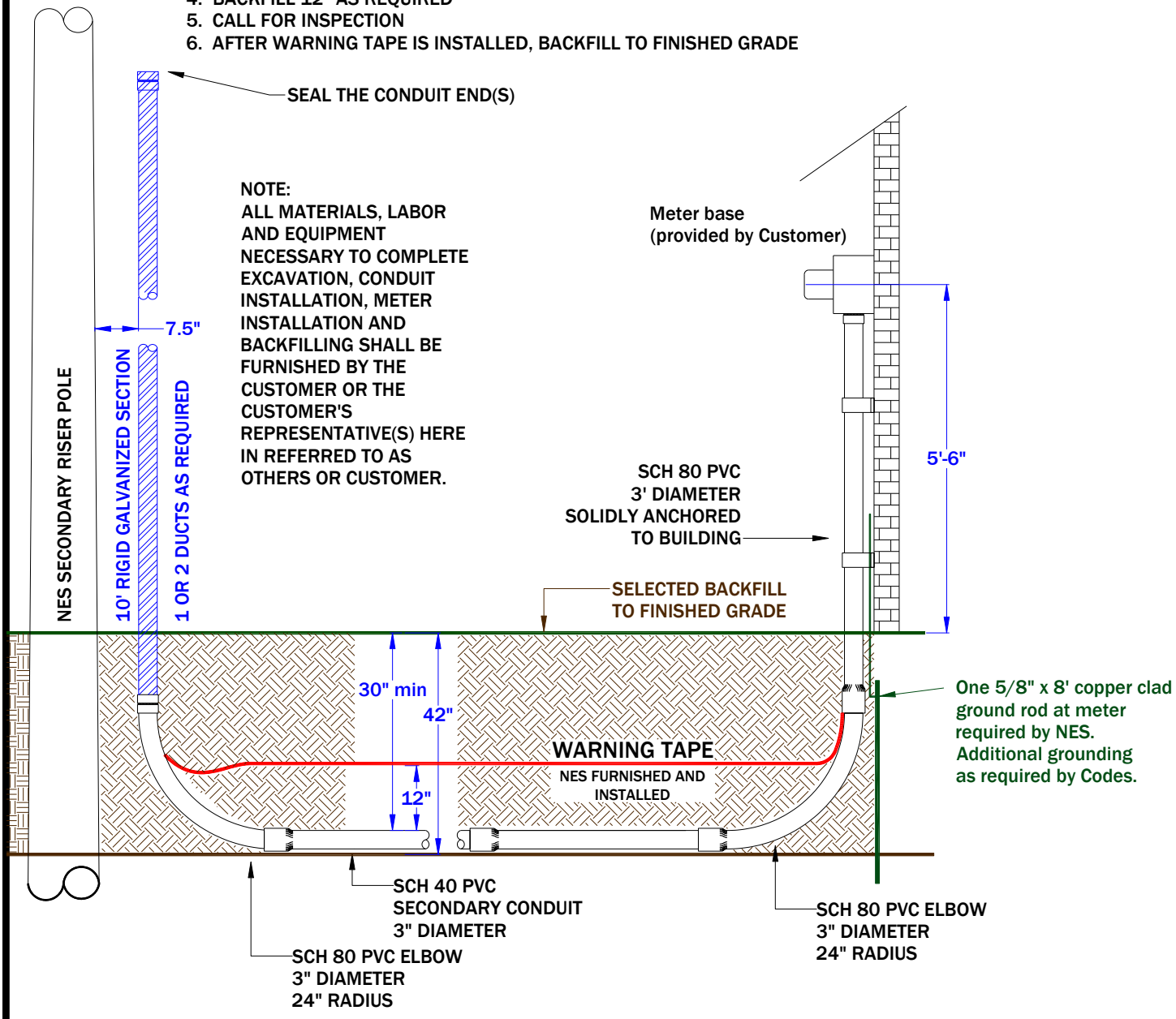


REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	MTE	FIXED ERROR	9/29/17

T&D DITCH STANDARDS
UNDERGROUND DITCH DETAILS (UGS0051)
> 400A UPR2 RESIDENTIAL DITCH DETAIL

COMMERCIAL LIGHTING OR RESIDENTIAL CUSTOMER SECOND SERVICE SECONDARY DITCH DETAIL
SERVICES 400A OR LESS
PVC AS INDICATED OR RIGID GALVANIZED CONDUIT

DITCH INSTALLATION PROCESS
1. EXCAVATE DITCH
2. INSTALL CONDUIT
3. CALL FOR INSPECTION
4. BACKFILL 12" AS REQUIRED
5. CALL FOR INSPECTION
6. AFTER WARNING TAPE IS INSTALLED, BACKFILL TO FINISHED GRADE

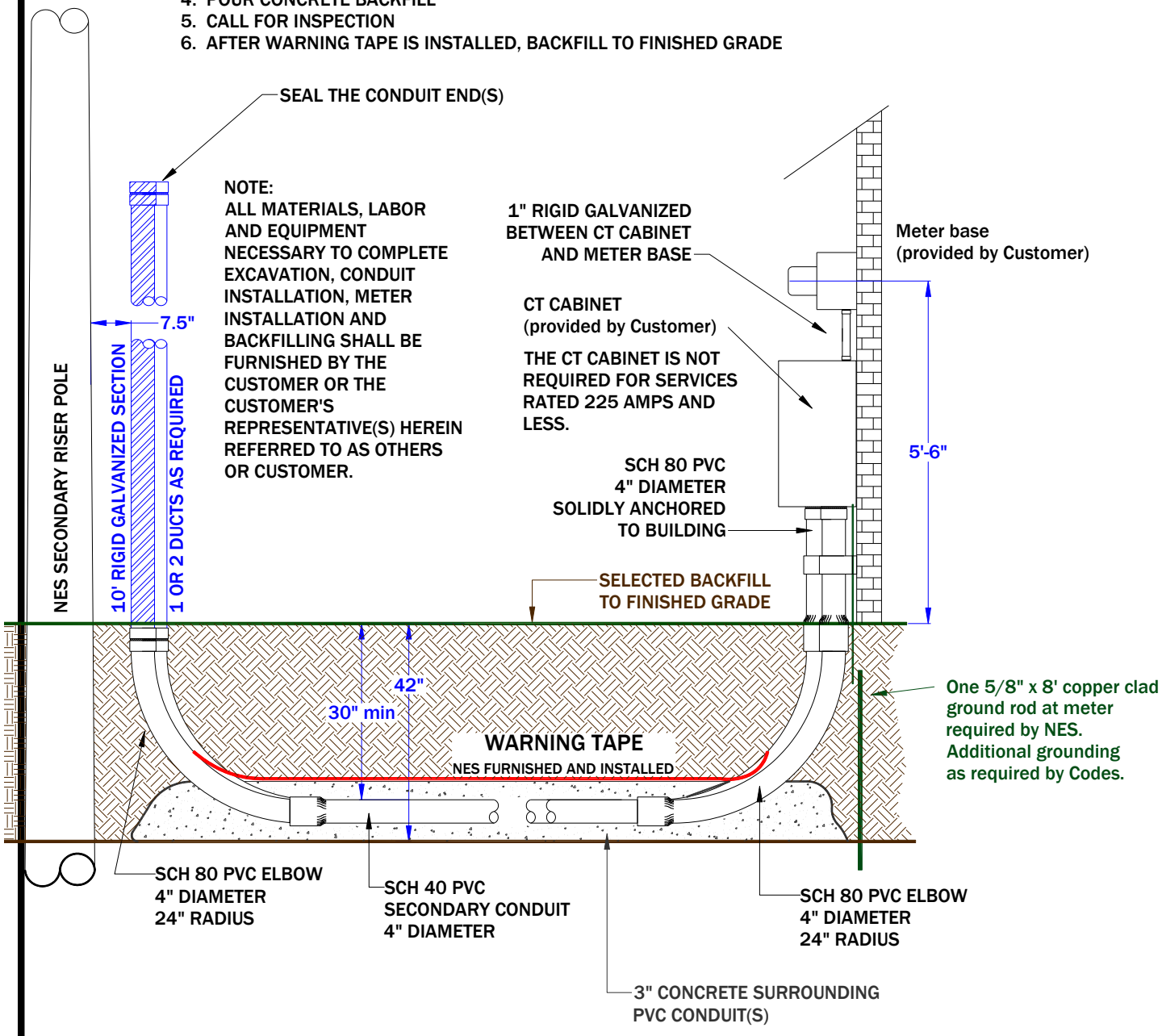


REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

T&D DITCH STANDARDS
UNDERGROUND DITCH DETAILS (UGS0051)
0-400A UPR2 COMM./LIGHTING
DITCH DETAIL

COMMERCIAL BUSINESS SECONDARY DITCH DETAIL FOR SERVICES GREATER THAN 400A (1) OR (2) 3" OR 4" CONDUIT(S) PVC AS INDICATED OR RIGID GALVANIZED CONDUIT

DITCH INSTALLATION PROCESS
1. EXCAVATE DITCH
2. INSTALL CONDUIT
3. CALL FOR INSPECTION
4. POUR CONCRETE BACKFILL
5. CALL FOR INSPECTION
6. AFTER WARNING TAPE IS INSTALLED, BACKFILL TO FINISHED GRADE



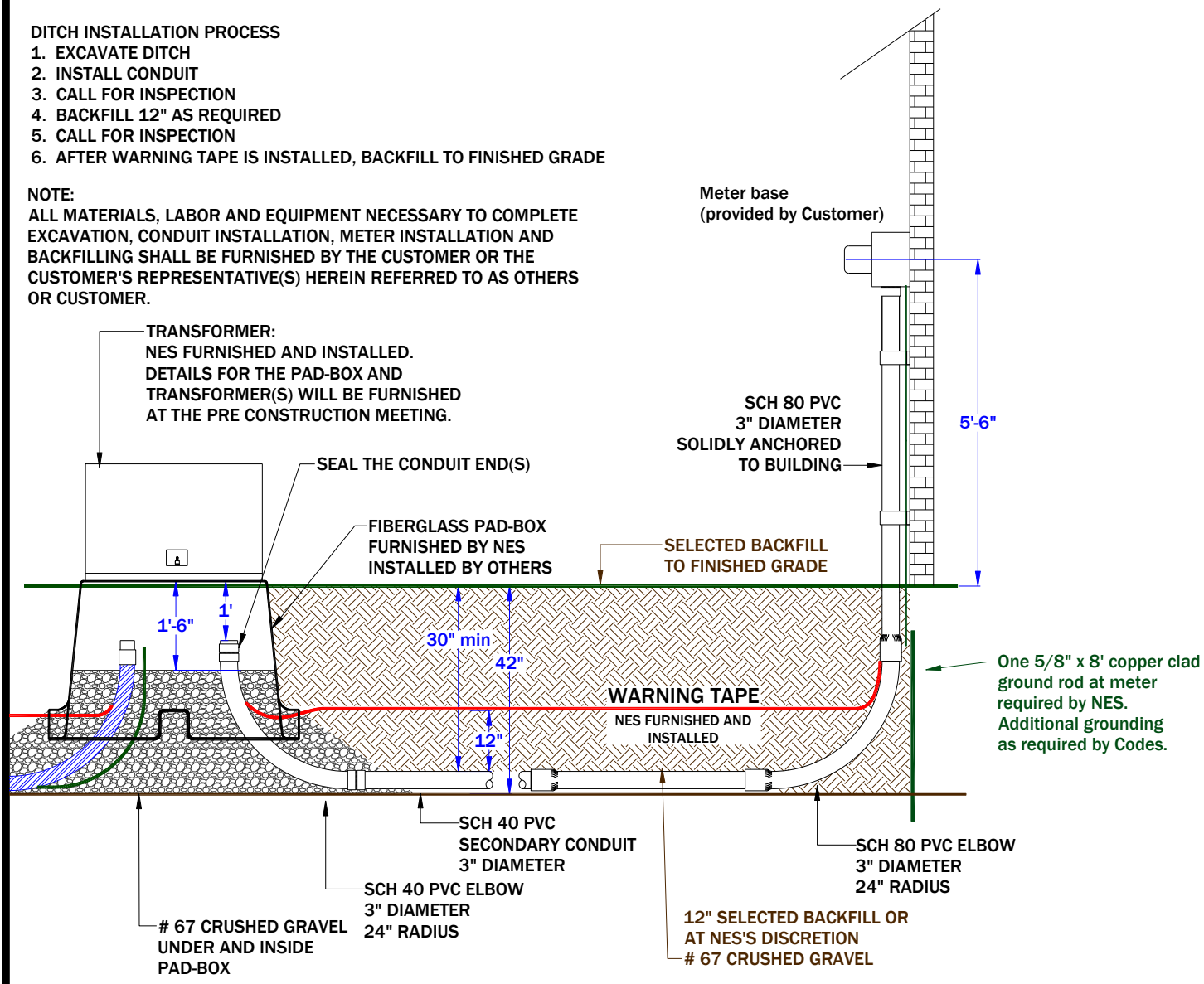
REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

T&D DITCH STANDARDS
UNDERGROUND DITCH DETAILS (UGS0051)
>400A UPR2 COMMERCIAL DITCH DETAIL

RESIDENTIAL SECONDARY DITCH DETAIL
PVC AS INDICATED OR RIGID GALVANIZED CONDUIT

DITCH INSTALLATION PROCESS
1. EXCAVATE DITCH
2. INSTALL CONDUIT
3. CALL FOR INSPECTION
4. BACKFILL 12" AS REQUIRED
5. CALL FOR INSPECTION
6. AFTER WARNING TAPE IS INSTALLED, BACKFILL TO FINISHED GRADE

NOTE:
ALL MATERIALS, LABOR AND EQUIPMENT NECESSARY TO COMPLETE EXCAVATION, CONDUIT INSTALLATION, METER INSTALLATION AND BACKFILLING SHALL BE FURNISHED BY THE CUSTOMER OR THE CUSTOMER'S REPRESENTATIVE(S) HEREIN REFERRED TO AS OTHERS OR CUSTOMER.

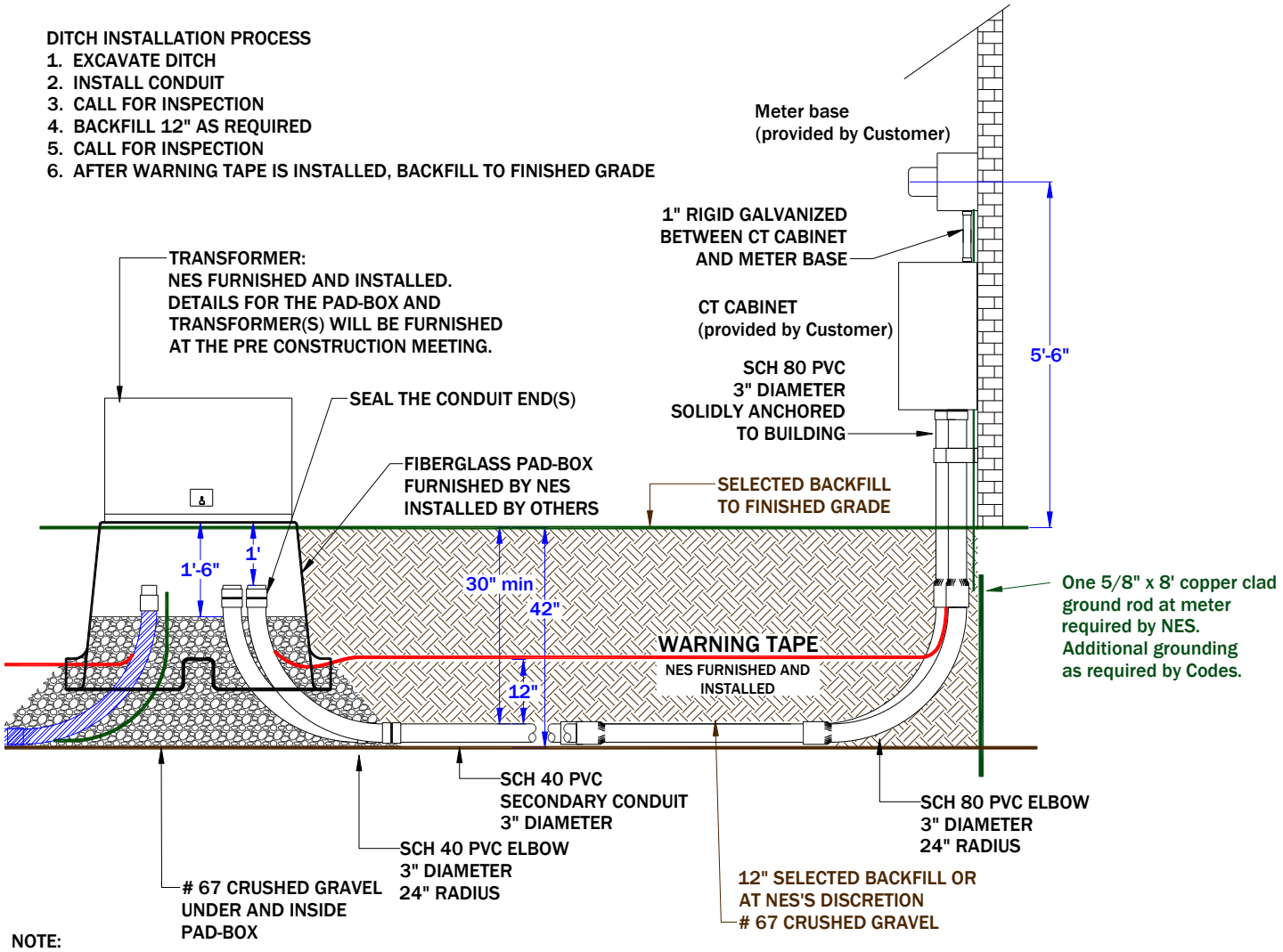


REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

T&D DITCH STANDARDS
UNDERGROUND DITCH DETAILS (UGS0051)
0-400A RESIDENTIAL
DITCH DETAIL FROM PAD

RESIDENTIAL SECONDARY DITCH DETAIL
FOR SERVICES GREATER THAN 400A AND (1) OR (2) 3" CONDUITS PVC AS INDICATED OR RIGID GALVANIZED CONDUIT

DITCH INSTALLATION PROCESS
1. EXCAVATE DITCH
2. INSTALL CONDUIT
3. CALL FOR INSPECTION
4. BACKFILL 12" AS REQUIRED
5. CALL FOR INSPECTION
6. AFTER WARNING TAPE IS INSTALLED, BACKFILL TO FINISHED GRADE



NOTE:
ALL MATERIALS, LABOR AND EQUIPMENT NECESSARY TO COMPLETE EXCAVATION, CONDUIT INSTALLATION, METER INSTALLATION AND BACKFILLING SHALL BE FURNISHED BY THE CUSTOMER OR THE CUSTOMER'S REPRESENTATIVE(S) HEREIN REFERRED TO AS OTHERS OR CUSTOMER.

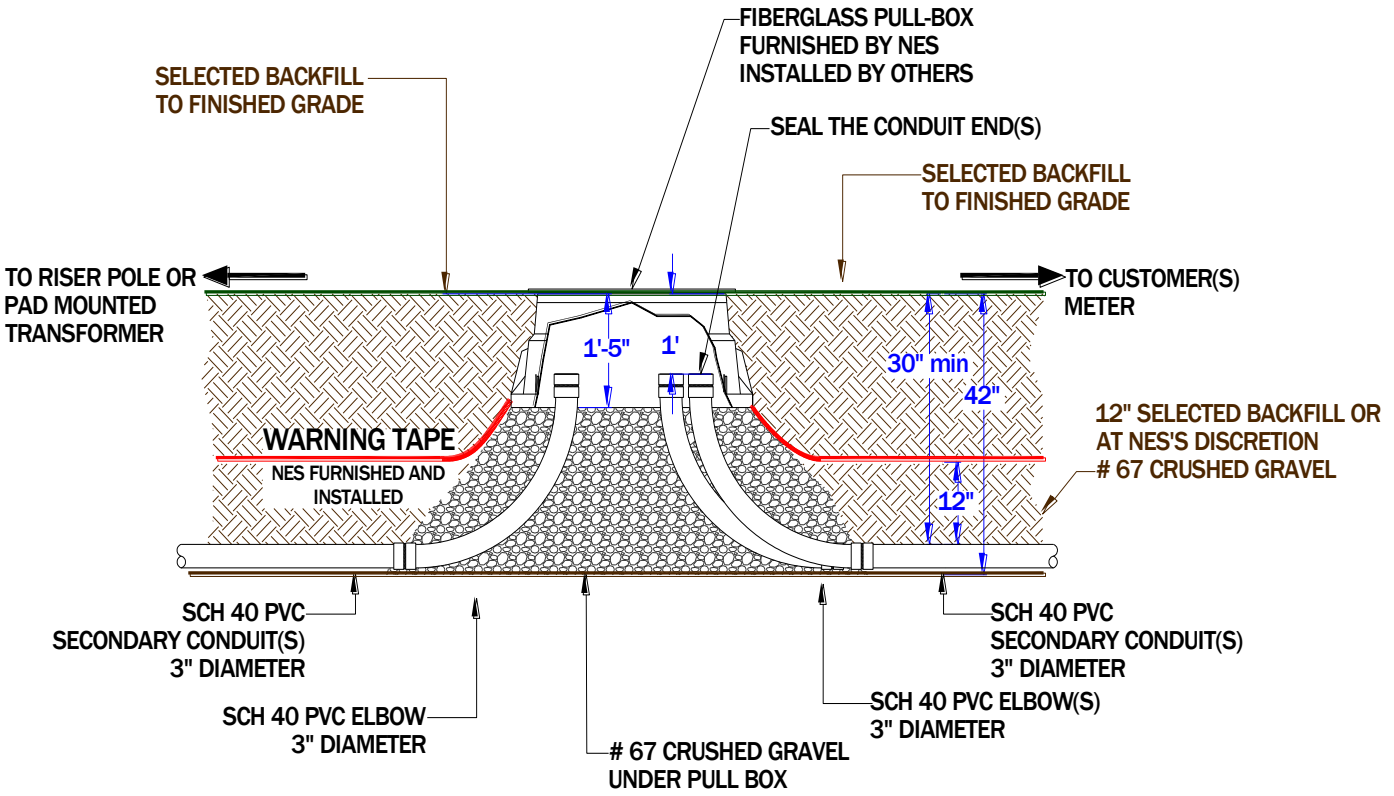
REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	MTE	FIXED ERROR	9/29/17

NES

T&D DITCH STANDARDS
UNDERGROUND DITCH DETAILS (UGS0051)
>400A RESIDENTIAL DITCH
DETAIL FROM PAD

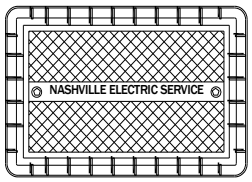
RESIDENTIAL SECONDARY DITCH DETAIL
SECONDARY PULL BOX INSTALLATION
PVC AS INDICATED OR RIGID GALVANIZED CONDUIT

DITCH INSTALLATION PROCESS
1. EXCAVATE DITCH
2. INSTALL CONDUIT
3. CALL FOR INSPECTION
4. BACKFILL 12" AS REQUIRED
5. CALL FOR INSPECTION
6. AFTER WARNING TAPE IS INSTALLED, BACKFILL TO FINISHED GRADE

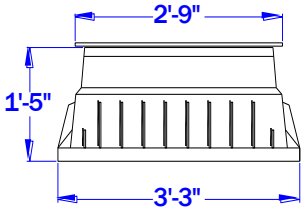


NOTE:
ALL MATERIALS, LABOR AND EQUIPMENT NECESSARY TO COMPLETE EXCAVATION, CONDUIT INSTALLATION, AND BACKFILLING SHALL BE FURNISHED BY THE CUSTOMER OR THE CUSTOMER'S REPRESENTATIVE(S) HEREIN REFERRED TO AS OTHERS OR CUSTOMER.

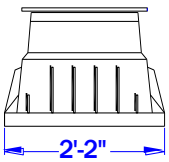
Top View



Side View



End View



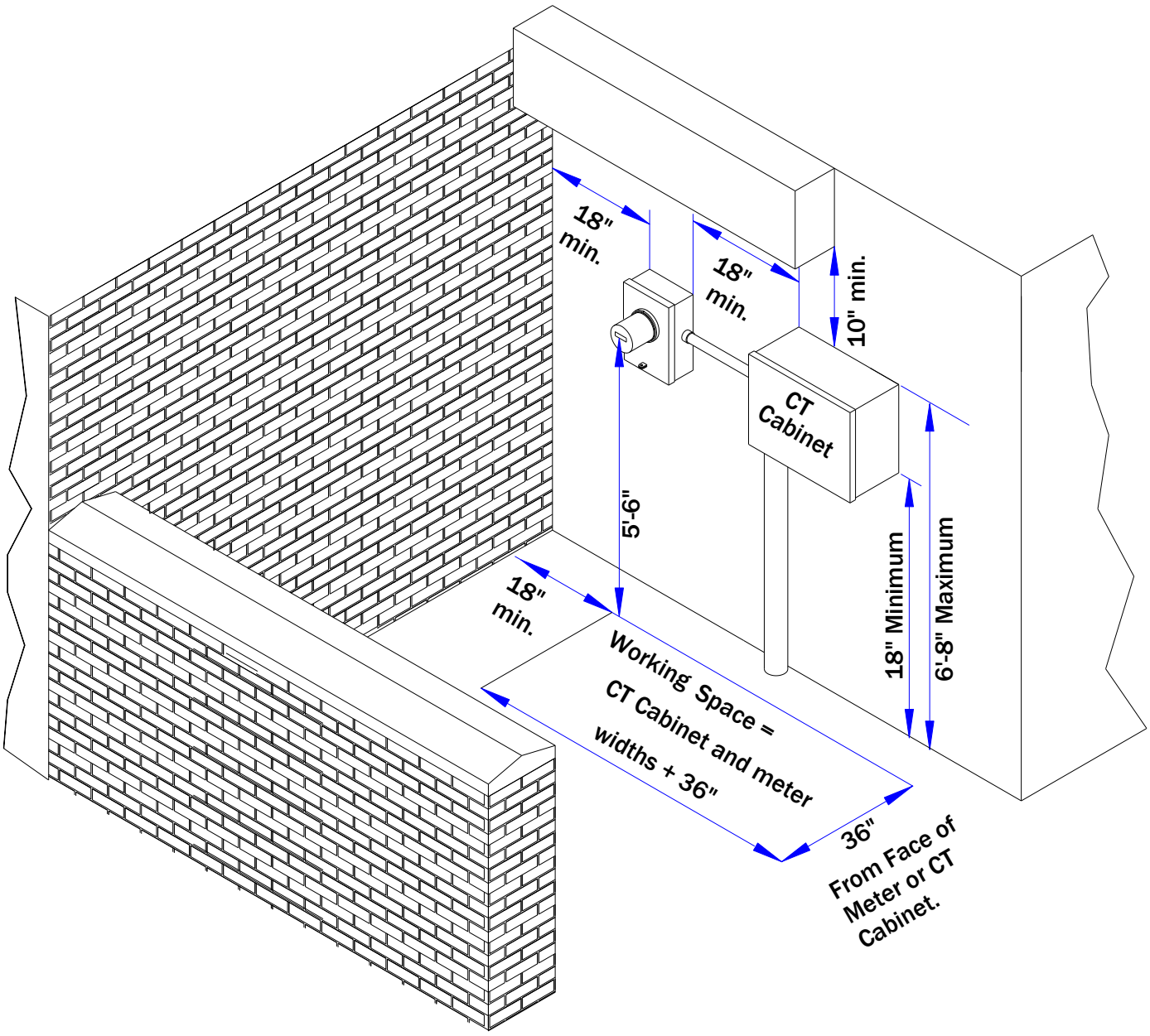
REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

T&D DITCH STANDARDS
UNDERGROUND DITCH DETAILS (UGS0051)
SECONDARY PULL BOX

METER PLACEMENT STANDARDS

APPROVALS			
ISSUE DATE	ENGINEER	SUPERVISOR	MANAGER
2/15/06	FRED FRITON	RON DAVIDSON	NICK THOMPSON
10/3/17	MIKE EDWARDS		

TABLE OF CONTENTS



REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	MTE	UPDATED	10/3/17

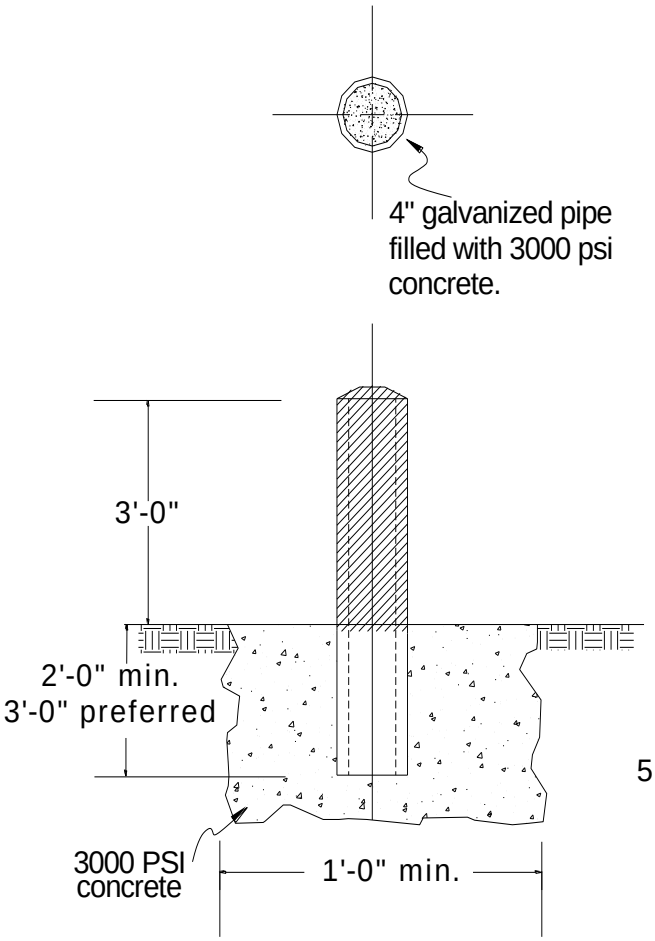
T&D METER STANDARDS
METER PLACEMENT DRAWING
(UGS0052)

BARRIERS & ROADS

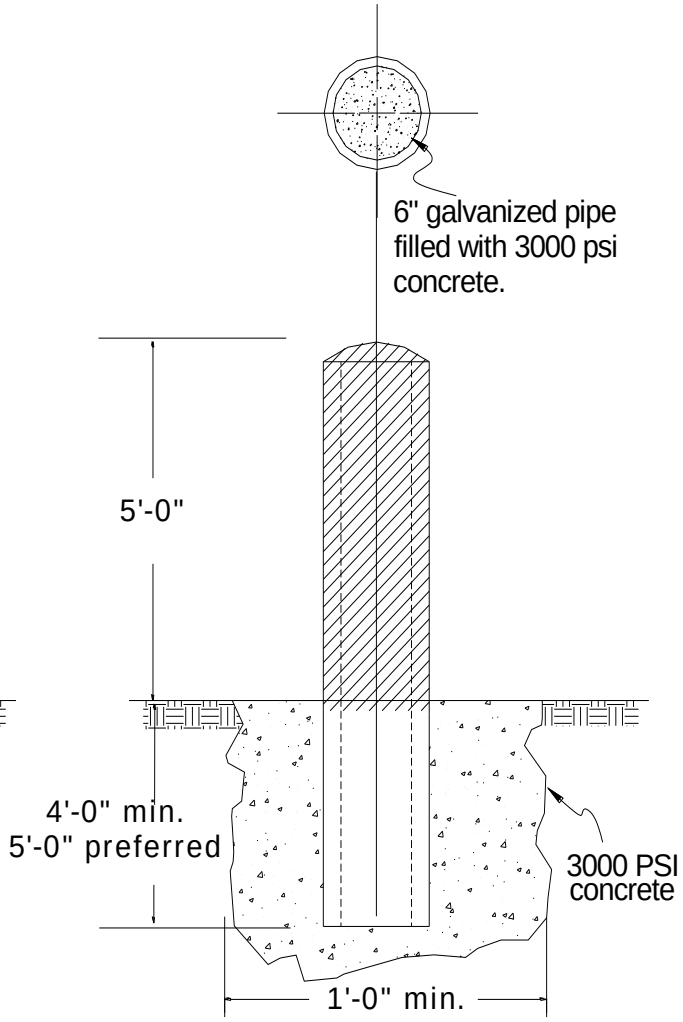
STANDARDS

APPROVALS			
ISSUE DATE	ENGINEER	SUPERVISOR	MANAGER
2/15/06	*FRED FRITON*	*RON DAVIDSON*	*NICK THOMPSON*
1/25/18	*WES SUDDARTH*		

TABLE OF CONTENTS



STANDARD BOLLARD INSTALLATION



INDUSTRIAL AREA BOLLARD INSTALLATION

STANDARD BOLLARD:

This bollard guard post is acceptable in most situations where NES equipment is subject to automobile and light truck traffic.

INDUSTRIAL AREA/HEAVY DUTY BOLLARD:

This is to be installed where NES equipment is subject to frequent exposure to heavy truck or bus traffic. The additional height is for better visibility.

BOLLARD MATERIALS (USE ONLY IN THE EVENT THAT NES MUST INSTALL OR REPLACE A POST UNDER MAINTENANCE)

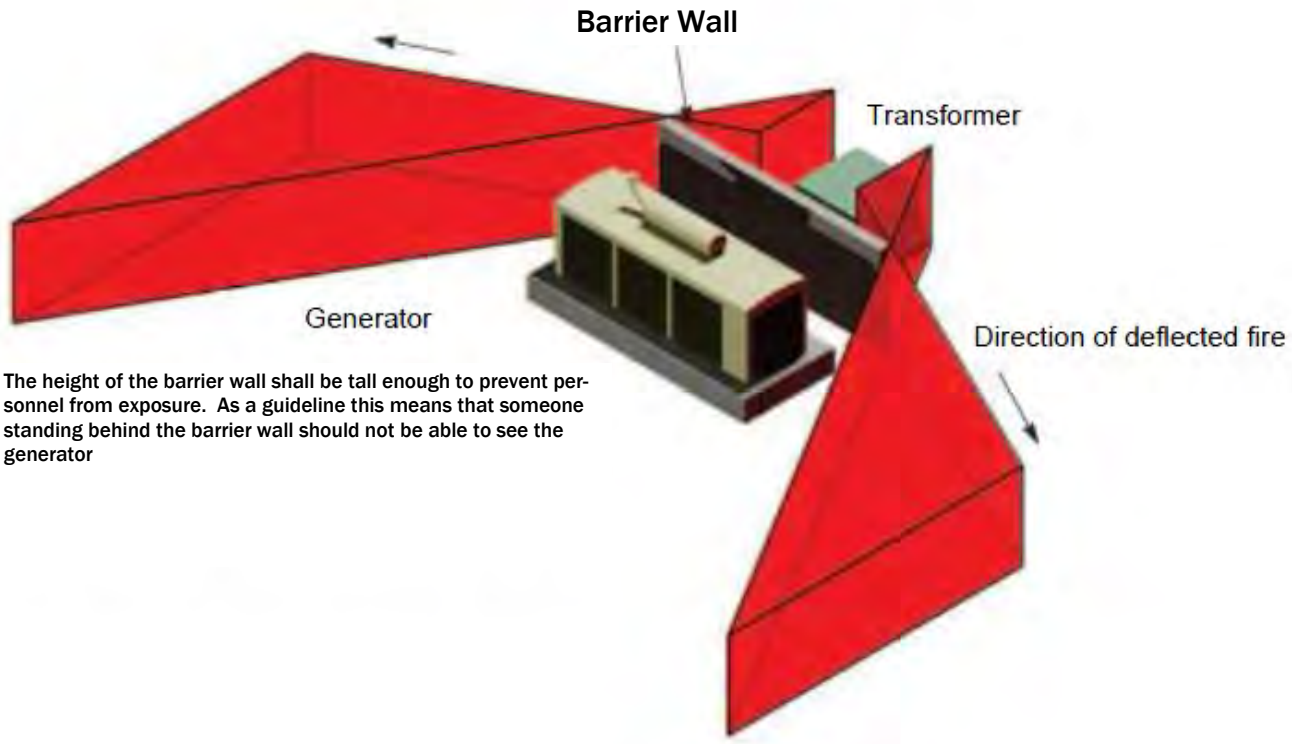
MATERIAL LIST

CU CODE	STOCK #	DESCRIPTION	QTY	UNIT
UCONCRETE	509000000	CONCRETE 1 CUBIC YARD	1	YD^3
UGAL4	101280000	CONDUIT GALV 4	6	FT
UGAL6	101310000	CONDUIT GALV 6	10	FT
ULAB-CONST		LABOR TO BUILD THE POST 1HR/PERSON	30	HR

UG PLATE BOOK DRAWING (UGS0031 Guard Post).dwg

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

T&D BARRIERS & RD STANDARDS
GUARD POST
BOLLARD INSTALLATION (UGS0031)



The height of the barrier wall shall be tall enough to prevent personnel from exposure. As a guideline this means that someone standing behind the barrier wall should not be able to see the generator

Drawing Notes:

1. A minimum of twenty feet (20') of clearance is required between transformers and any fuel sources ie; generator fuel tanks, propane tanks, gas meters etc. The clearance may be reduced to three feet (3') if an appropriate barrier wall is built between the transformer and fuel source.
2. The barrier wall shall be constructed of non-combustible material so it will qualify as a 4-hour fire wall (solid concrete block, reinforced concrete, steel or eight inch (8") brick).
3. The height and width of the barrier wall should be built so that no part of the fuel equipment is visible from the transformer.

DISTANCE A	
TRANSFORMER kVA	DISTANCE
0-75kVA	10'
100-333kVA	20'
500kVA AND LARGER	30'

UG PLATE BOOK DRAWING (UGS0028B Fire Barrier Wall).dwg

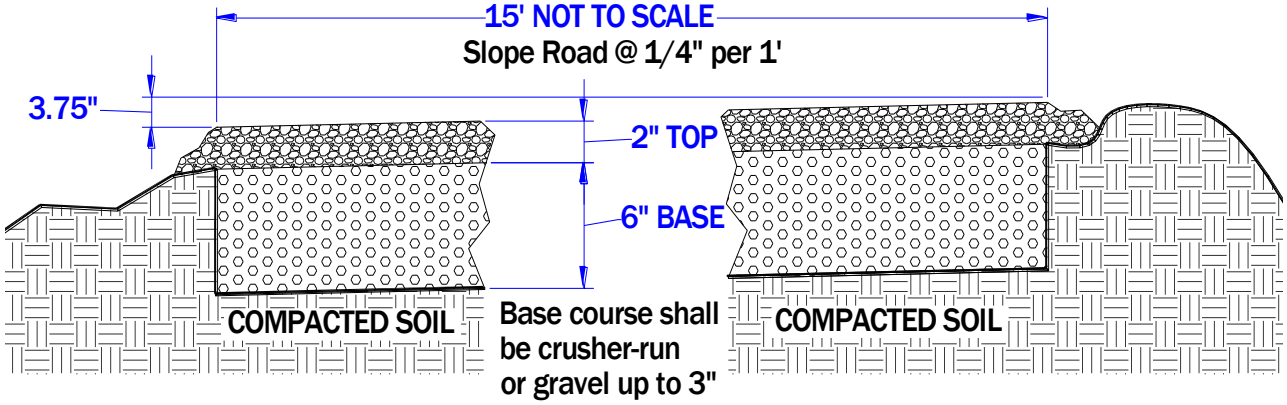
REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06
B	WMS	UPDATED FIGURE	1/25/18

NES

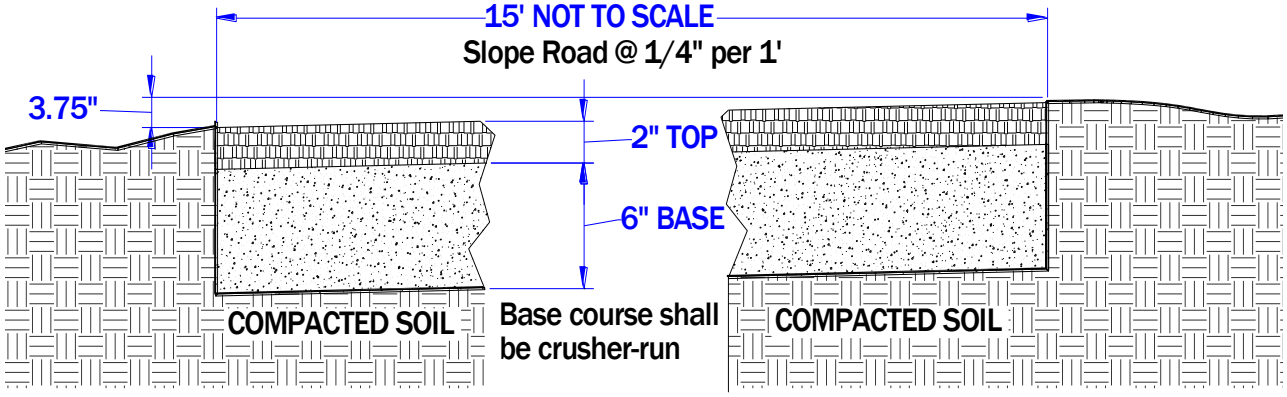
T&D BARRIERS & RD STANDARDS
TRANSFORMER BARRIER WALL

GRAVEL ROAD

Top course shall be screened
gravel under 1-1/4" and 10%
to 15% gravel dust.



Top course shall be a modified soil mixture
consiting of:
70% Sand; 15% Topsoil; 15% Peat Moss
Mulch or seed with grass.



GRASS ROAD

UG PLATE BOOK DRAWING (UGSO023 Gravel Road).dwg

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

T&D BARRIERS & RD STANDARDS
ALL WEATHER ROADS

APPENDIX A

CABLE PULLING

APPROVALS			
ISSUE DATE	ENGINEER	SUPERVISOR	MANAGER
2/15/06	*FRED FRITON*	*RON DAVIDSON*	*NICK THOMPSON*

TABLE OF CONTENTS

PULLING TENSIONS

The information provided herein may serve as a guide to installing cables in ducts or conduits and is based in part on industry studies. Where experience has justified it, we have included our own figures. Two tension calculations are required for each cable installation. First must be calculated the MAXIMUM ALLOWABLE TENSION for the particular cable that is to be installed. This value is dependent upon the method of attaching to the cable, the allowable sidewall bearing pressure and the construction of the cable. Second, knowing the weight of the cable and the details of the conduit run the ESTIMATED PULLING TENSION that can occur during installation is calculated and compared with the MAXIMUM ALLOWABLE TENSION. The following gives details for calculating each of the above tension values.

Maximum Allowable Tension

(1) Based on pull by conductor:

Tm = .008 x n x CM (applies to both annealed copper and hard drawn aluminum conductors)

Tm = maximum allowable tension in lbs.
n = number of conductors in cable (assumes equal tension in each conductor)
CM = circular mil area of each conductor.

(2) Based on pull by Kellems grip over lead sheath:

Tm = 4712 x t(D-t)

D = outside diameter of cable in inches
t = lead sheath thickness in inches.

(3) Based on pull by Kellems grip applied over:

Non-shielded, jacketed cables - 2000 lbs.*
Shielded, jacketed cables - 1000 lbs.*
* Do not exceed tension limit of Condition 1 above.

(4) Based on pull by Kellems grip applied directly on the insulation or outer Permashield® layer of Kerite Double Permashield® cables after removing the shielding: 3,000 lbs. per inch of conductor diameter.*
* Do not exceed tension limit of Condition 1 above.

(5) Based on maximum allowable side bearing pressure when pulling around a conduit bend:

(a) Single conductor or multi-conductor

Tm = 450 x D x R
Tm = maximum allowable tension on cable in lbs.
D = outside diameter of cable in inches
R = radius of bend in feet

(b) Three conductor twisted

Tm = 225 x D1 x R

(c) Three 1/C cables in parallel

Tm = 675 x D1 x R

For (b) and (c)

Tm = maximum allowable tension on three cables
D1 = diameter of one individual cable in inches
R = radius of bend in feet

The actual allowable tension will be governed by the lowest of the above calculated tensions for the method of pull selected.

All information in Appendix A is copied from Kerite Cable's Published information.

Example:
Determine the maximum allowable pulling tension on three 1/C 500 kcmil copper, 15kV, 175 mil, 100% insulation wall, copper tape shield, PVC jacketed cable, paralleled, to be pulled around a 3 ft. radius bend by Kellems grip applied over outer jackets.
Limit by Condition 1
Tm = .008 x n x CM
Tm = .008 x 3 x 500,000
Tm = 12,000 lbs.
Condition 2 does not apply
Limit by Condition 3-shielded, jacketed-1,000 lbs.
Condition 4 does not apply.
Limit by Condition 5-side bearing pressure
Tm = 675 x D1 x R
D1 = 1.51
Tm = 675 x 1.51 x 3
Tm = 3,058 lbs.
The maximum pulling tension is limited by Condition 3 -1,000 lbs.

Example:
Determine the maximum allowable pulling tension on three 1/C 500 kcmil copper, 15kV, 175 mil, 100% insulation wall, copper tape shield, PVC jacketed cable, paralleled, to be pulled by conductor around a 3 ft. radius bend.
Limit by Condition 1
Tm = .008 x n x CM
Tm = .008 x 3 x 500,000
Tm = 12,000 lbs.
Conditions 2, 3 and 4 do not apply.
Limit by Condition 5-side bearing pressure
Tm = 675 x D1 x R
D1 = 1.51
Tm = 675 x 1.51 x 3
Tm = 3,058 lbs.
The maximum pulling tension is limited by Condition 5 -3,058 lbs.
Estimated pulling tension must be calculated to ensure it does not exceed the maximum allowable pulling tension.

Estimated Pulling Tension

Pulling tensions anticipated for an installation are governed by cable size and weight, length of run, number and angle of bends. Usually only approximations can be made, the following simple assumptions provide safe guideline limits.

Calculation of Tension

(1) Straight horizontal run:
T = W x L x n x C.F.

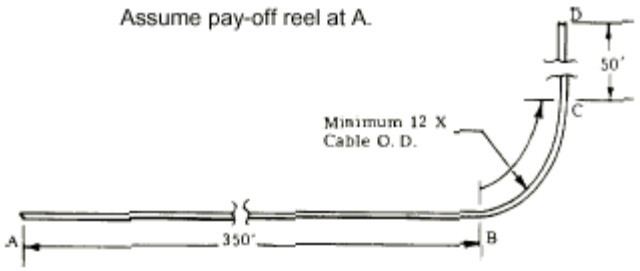
where:
T = tension in lbs.
W = cable weight in lbs./ft.
L = length of run in ft.
n = number of cables
C.F.= coefficient of friction
The coefficient of friction will vary between 0.3 for well lubricated cables pulled into new, smooth wall conduits to 0.5 for lubricated cables pulled into rough or dirty conduits or ducts.

(2) Pulls around **static** bends:
Multiplying factors, shown below, must be used to estimate the increase in tension due to pulling around bends. The tension at the point just ahead of the bend is multiplied by the appropriate factor from the table below, the product being the tension that exists immediately past the bend. This factor must be applied in the calculation of the estimated pulling tension at each point where the cable encounters a bend as it is pulled through the duct or conduit run.

Multiplying Factor
Angle of Bend in Degrees

Coefficient of Friction	15	30	45	60	75	90
0.30	1.08	1.17	1.27	1.37	1.48	1.60
0.40	1.11	1.23	1.37	1.52	1.69	1.87
0.50	1.14	1.30	1.48	1.69	1.92	2.19

Example:
Determine the tension required to pull three 1/C 500 kcmil copper, 15kV, 175 mil insulation wall, copper tape shield, PVC jacketed cable, in a horizontal duct as shown below.



For pull A to B:
TB = W x L x n x C.F.
W = 2.346 lbs./ft. of 1/C cable
L = 350 ft.
n =3
C.F.= 0.4 (assume average condition of duct wall)
TB = 2.346 x 350 x 3 x 0.4 = 985 lbs.

For pull B to C:
TC =TB x Multiplying Factor for 90° Bend
TC = 985 x 1.87
TC = 1,842 lbs.

For pull C to D:
TD = W x L x n x C.F. + TC
TD = 2.346 x 50 x 3 x 0.4 + 1.842
TD = 141 + 1,842 = 1,983 lbs.

FOR VERTICAL PULLS UP RISERS ADD:
TENSION VERTICAL = W x L x n

Alternative Set-up
Assume pay off reel at D.

For pull D to C:
TC = W x L x n x C.F.
TC = 2.346 x 50 x 3 x 0.4
TC = 141 lbs.

For pull C to B:
TB =TC x Multiplying Factor for 90° Bend
TB = 141 x 1.87
TB = 264 lbs.

For pull B to A:
TA = W x L x n x C.F. + TB
TA = 2.346 x 350 x 3 x 0.4 + 264
TA = 985 + 264 + 1,249 lbs.

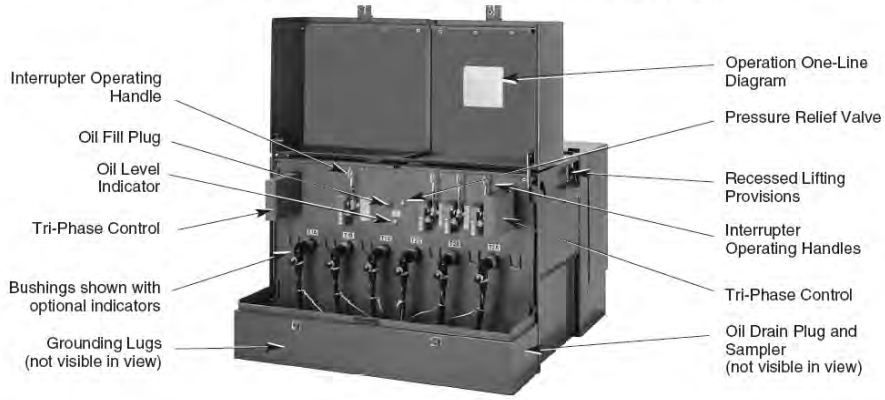
Result:
Pull by Kellems grip over the jacket is not allowed (1,000 lbs. maximum versus calculated pulling tension of 1,983 lbs. or 1,249 lbs. depending upon direction of pull). Pull by conductor is allowed. Tension is less when pay-off reel is at the "D" end nearest the bend location. The above calculations are based on the use of an approved pulling compound on the entire surface of the cable with approximately 1/16 " layer of compound to be applied as the cable enters the duct or conduit.

APPENDIX B

OBSOLETE MATERIALS

APPROVALS			
ISSUE DATE	ENGINEER	SUPERVISOR	MANAGER
2/15/06	*FRED FRITON*	*RON DAVIDSON*	*NICK THOMPSON*

TABLE OF CONTENTS



Padmounted Switchgear COOPER Power Systems

Service Information

Type VFI, Oil-Insulated, Vacuum Fault Interrupter; Installation, Operation, and Maintenance Instructions S285-10-1

OBSOLETE (REPLACE WITH PMH SWITCHES: May require cable replacement.)			
USW-RVAC9	PAD MTD SWITCH DF RVAC9 200A	965955000	

NO DATA AVAILABLE AT TIME OF PRINT

OBSOLETE (REPLACE WITH PMH SWITCHES)			
USW-PMU6M	PAD MTD SWITCH LF PMU-6M 600A	965913000	

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	FAF	CREATED	2/15/06

NES

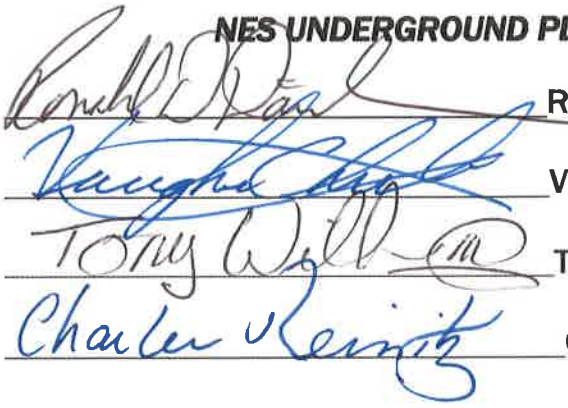
T&D UG STANDARDS
APPENDIX C
PMU & RVAC SWITCHES

APPENDIX C APPROVALS

APPROVALS			
ISSUE DATE	ENGINEER	SUPERVISOR	MANAGER
1/31/18	*MIKE EDWARDS*		

TABLE OF CONTENTS

NES UNDERGROUND PLATE BOOK APPROVALS



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Vaughan Charles (Customer Engineering)

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UNDERGROUND PLATE BOOK CONTRIBUTORS

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John Sipes (Customer Engineering)

REV.	ENG.	DESCRIPTION OF CHANGE	DATE
A	MTE	CREATED	1/31/18

NES

T&D UG STANDARDS
APPENDIX B
APPROVAL AND REVIEW