

PROJECT DATA

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SITE LOCATION:

HWY 101 & DUCKABUSH RD.
BRINNON, WA

GENERAL NOTES

- 1 PLAN DRAWING EQUIPMENT LOCATIONS ARE APPROXIMATE. REFER TO STAKING SHEETS, DETAIL DRAWINGS, AND FIELD STAKES FOR EXACT LOCATIONS.
- 2 SEE STAKING SHEETS FOR MATERIAL SPECIFIC DETAILS AND INSTRUCTIONS.
- 3 VAULTS, J-BOXES, TEMP CABINETS, AND SEC PEDS ARE AS SHOWN AS EXISTING IN SYMBOL LEGEND. NEW UG INSTALLATIONS WILL FOLLOW COLOR CODING: RED FOR NORTH, BLUE FOR SOUTH, AND ORANGE FOR SECONDARY.
- 4 STUB COMMUNICATION CONDUITS NEAR EACH POWER LOCATION. COMMUNICATION COMPANIES ARE RESPONSIBLE FOR COORDINATING ADDITIONAL STUB LOCATIONS WITH CONTRACTOR.
- 5 REFER TO GUIDELINES AND SPECIFICATIONS FOR INSTALLATION AND MATERIAL HANDLING REQUIREMENTS.
- 6 PHASE 2 WILL BE COMPLETE BEFORE USACE BEGINS CONSTRUCTION. PHASE 1 CONTAINS TEMPORARY EQUIPMENT THAT WILL BE INSTALLED AND THEN REMOVED IN PHASE 2. THE INTENT OF THE PHASING IS TO ENSURE CONTINUITY OF POWER WHILE ALLOWING FOR SAFE REMOVAL OF EXISTING AND INSTALLATION OF TEMPORARY OVERHEAD LINES AFFECTED BY BRIDGE CONSTRUCTION.
- 7 THE APPROVED WORK WINDOW PER WAC 220-660-330 FOR WORK BELOW THE ORDINARY HIGH-WATER LINE IN THIS AREA IS JULY 15 - JANUARY 15 OF ANY YEAR. THE APPLICABILITY OF THIS WORK WINDOW MAY BE DEPENDENT OF THE TYPE OF WORK/EQUIPMENT TO BE USED (I.E., HAND TOOLS & ON FOOT VS WHEELED/TRACKED MACHINERY)



1 VICINITY MAP
Scale: NTS

ABBREVIATIONS

- OH: OVERHEAD
- UG: UNDERGROUND
- DE: DEADEND
- DDE: DOUBLE DEADEND
- XFMR: TRANSFORMER
- GOS: GROUP OPERATED SWITCH
- SEC: SECONDARY
- PRI: PRIMARY
- ANC: ANCHOR
- TAN: TANGENT
- DBL: DOUBLE
- CKT: CIRCUIT

DRAWING LEGEND

1. CV - COVER SHEET
2. P1.1 - PHASE 1: SECTION 1 - PLAN DRAWING
3. P1.2 - PHASE 1: SECTION 2 - PLAN DRAWING
4. P2.1 - PHASE 2 - PLAN DRAWING
5. D1.1 - DETAIL DRAWINGS
6. B1.1 - P1.1 - BORING AND TRENCHING DETAILS
7. B1.2 - P1.2 - BORING AND TRENCHING DETAILS

SYMBOL LEGEND

●	POLE NEW
○	POLE REPLACE
○	POLE EXISTING
⊗	POLE REMOVE
∇	UG VAULT
J	UG J-BOX/CABINET
T	UG TEMP CABINET (X DENOTES REMOVAL)
S	UG SEC PEDESTAL
⌒	GUY & ANCHOR
▶	OH XFMR NEW
◀	OH XFMR REPLACE
▽	OH XFMR EXISTING
▽	OH XFMR REMOVE
—	CONDUIT STUB
—	UG 3Ø NEW DBL CRK
—	UG 3Ø NEW NORTH FEEDER
—	UG 3Ø NEW SOUTH FEEDER
—	OH 3Ø NEW NORTH FEEDER
—	OH 3Ø NEW SOUTH FEEDER
—	UG 1Ø NEW NORTH FEEDER
—	UG 1Ø NEW SOUTH FEEDER
—	OH 1Ø NEW NORTH FEEDER
—	OH 1Ø NEW SOUTH FEEDER
—	UG SEC NEW
—	OH SEC NEW
—	UG 3Ø PRI EXISTING
—	UG 1Ø PRI EXISTING
—	OH PRI EXISTING
—	OH SEC EXISTING
—	OH SEC EXISTING
#####	OH AND UG REMOVALS

BID DRAWING



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BID DRAWING

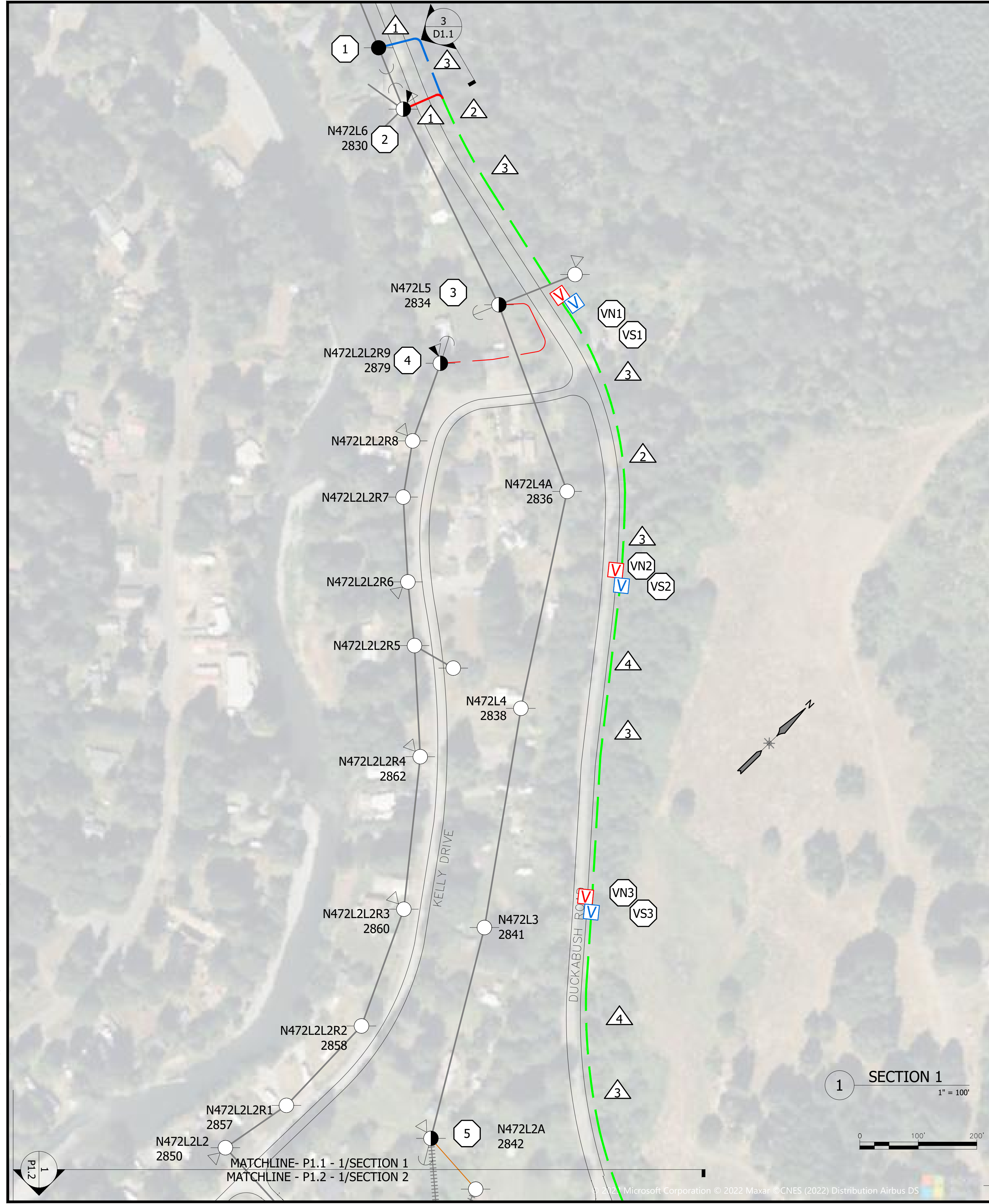


**DUCKABUSH LINE RELOCATION
PHASES 1 AND 2
COVER SHEET**

CURRENT REVISION: 0 WORK ORDER #: 21202

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POLE KEYED (OH & UG) NOTES: #

1. INSTALL NEW POLE. INSTALL TAN FRAMING TOP CIRCUIT PHASE CONDUCTORS (NORTH FEEDER). CUT INTO INSTALL DE AND STOP BOTTOM CIRCUIT PHASE CONDUCTORS (SOUTH CIRCUIT). NEUTRAL CONDUCTOR TO CARRY THROUGH. INSTALL GUYS AND ANCHORS. POLE BECOMES SOUTH FEEDER TAKE-OFF POLE. INSTALL 3-PHASE RISER. STUB(1) 7-WAY FOR HCC.
2. DEADEND BOTTOM CIRCUIT (DISCONNECTED FROM SOUTH FEEDER) CONTINUED DOWNSTREAM AS NORTH FEEDER TO PICKUP SERVICES. BOTTOM CIRCUIT BACK SPAN RETIRED. JUMPER/PARALLEL TOP (NORTH FEEDER) AND BOTTOM CIRCUITS. TOP AND BOTTOM CIRCUITS BECOME NORTH FEEDER ONLY. INSTALL OH XFMR. INSTALL ANCHORS AND GUYS. POLE BECOMES NORTH FEEDER TAKE-OFF POLE. INSTALL 3-PHASE RISER.
3. RETIRE AND REPLACE POLE. INSTALL DBL CKT TAN FRAMING. INSTALL 1Ø PRI DE. INSTALL ANCHOR AND GUY. INSTALL 1Ø PRI RISER.
4. RETIRE AND REPLACE POLE. INSTALL OH XFMR. INSTALL 1Ø PRI DE FRAMING. INSTALL GUY AND ANCHOR. INSTALL 1Ø PRI RISER - REVERSE FEED.
5. RETIRE AND REPLACE POLE. STOP DBL CKT OH. INSTALL DBL CKT DE FRAMING. INSTALL OH XFMR. INSTALL GUYS AND ANCHORS. INSTALL SEC DE FOR NEW SPAN TO 6.

UG KEYED NOTES: ###

- VS1. INSTALL VAULT. RUN (3) 3" CONDUIT FOR SOUTH FEEDER. RUN AND STUB (1) 7-WAY FOR HCC. FROM POLE 1: BORE UNDER ROAD AND CREEK, THEN OPEN TRENCH.
- VN1. INSTALL VAULT. RUN (6) 3" CONDUIT, (3) FOR NORTH FEEDER, (3) STUBBED FOR FUTURE. FROM POLE 2: BORE UNDER ROAD AND CREEK, THEN OPEN TRENCH.
- VS2. INSTALL VAULT. RUN (3) 3" CONDUIT FOR SOUTH FEEDER. BORE UNDER CREEK, THEN OPEN TRENCH. RUN AND STUB (1) 7-WAY FOR HCC.
- VN2. INSTALL VAULT. RUN (6) 3" CONDUIT, (3) FOR NORTH FEEDER, (3) STUBBED FOR FUTURE. BORE UNDER CREEK, THEN OPEN TRENCH.
- VS3. INSTALL VAULT. RUN (3) 3" CONDUIT FOR SOUTH FEEDER. RUN AND STUB (1) 7-WAY FOR HCC.
- VN3. INSTALL VAULT. RUN (6) 3" CONDUIT, (3) FOR NORTH FEEDER, (3) STUBBED FOR FUTURE.

BORING & TRENCHING NOTES: #

1. BORE ACROSS DUCKABUSH RD ~ 50'.
2. BORE UNDER CREEK. SEE B1.1 FOR CRITICAL ELEVATIONS.
3. TYPICAL TRENCH. SEE D1.1 DETAIL 4.
4. BORE SECTIONS AS NEEDED.

BID DRAWING

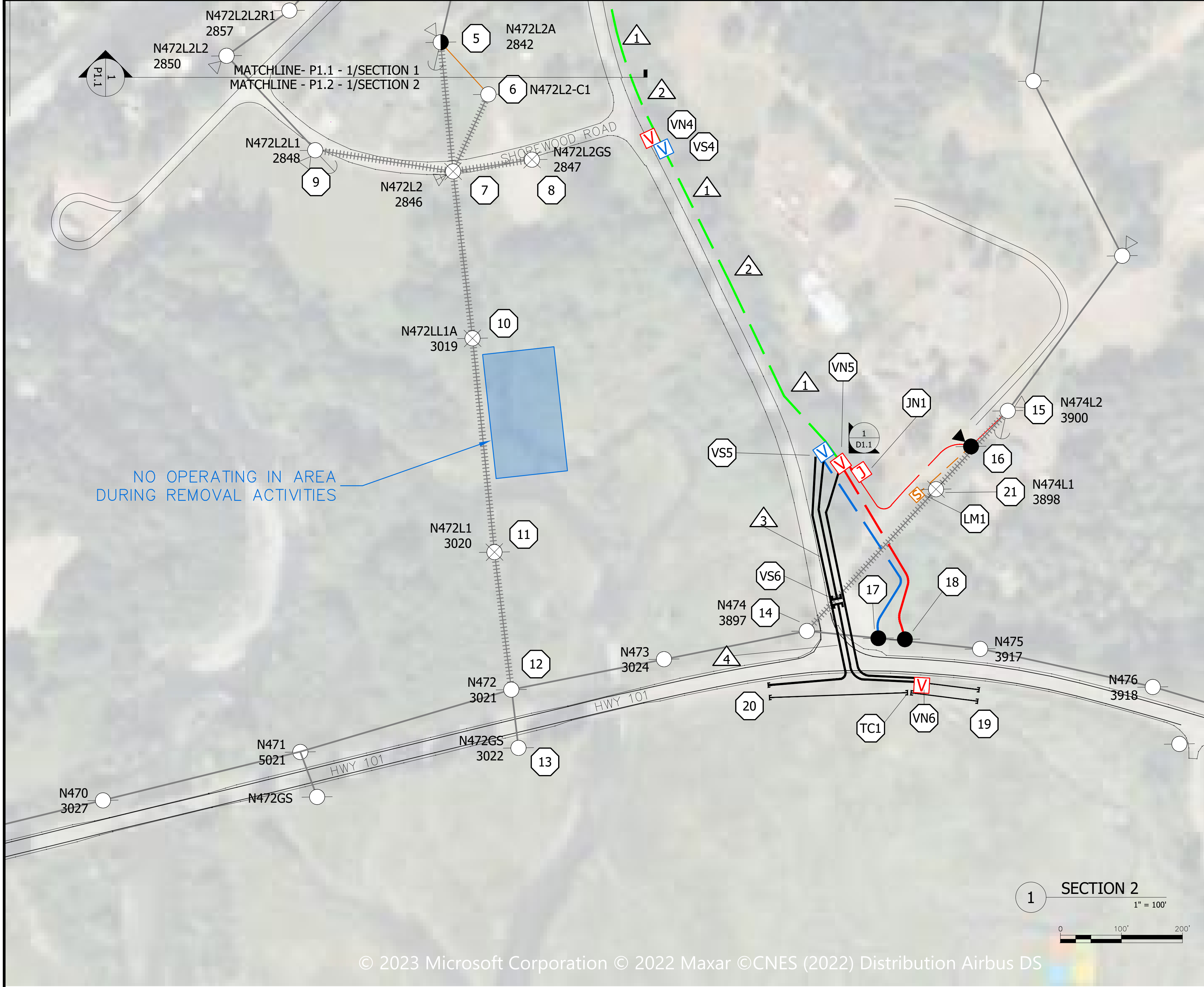
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DUCKABUSH LINE RELOCATION
 PHASE 1: SECTION 1
 PLAN DRAWING
 CURRENT REVISION: 0 WORK ORDER #: 21202

P1.1
 2 / 7



POLE KEYED (OH & UG) NOTES: ##

6. RETIRE OH SEC FROM 7. INSTALL OH SEC TO POLE 5.
7. RETIRE ALL
8. RETIRE ALL
9. RETIRE OH PRI AND FRAMING FROM POLE 7. REFRAME POLE WITH 1Ø PRI DE. INSTALL GUYS AND ANCHORS.
10. RETIRE ALL
11. RETIRE ALL
12. RETIRE DBL CKT DE FRAMING. OPEN POINT BETWEEN NORTH AND SOUTH FEEDERS TO MOVE TO POLES 17 AND 18. INSTALL PIN INSULATORS AND JUMPERS ON EXISTING DDE. BECOMES SOUTH FEEDER.
13. EXISTING TO REMAIN.
14. RETIRE 1Ø PRI DE FRAMING.
15. RETIRE BACK SPAN TO POLE 14. RETIRE 1Ø PRI TAN FRAMING. INTERCEPT EXISTING OH. INSTALL (2) PRI DE FRAMING, (1) FOR DARK RD OH, (1) FOR SLACK SPAN TO POLE 16. INSTALL ANCHOR AND GUY.
16. INSTALL NEW POLE. INSTALL 1Ø DE FRAMING. INSTALL SLACK SPAN TO POLE 15. INSTALL 1Ø PRI RISER - REVERSE FEED. INSTALL OH XFMR AND SEC RISER FOR COMMUNICATION CABINET.
17. INSTALL NEW POLE TO INTERCEPT OH. INSTALL TAN FRAMING WITH MID SPAN DDE BETWEEN POLES 17 AND 18. INSTALL 3Ø PRI RISER. RUN AND STUB (3) 3" CONDUIT FROM VS5. TO SERVE AS TEMPORARY SOUTH FEEDER TAKE-OFF POLE. RUN AND STUB (2) 2" HDPE (1) FOR HCC AND (1) FOR LUMEN FOR TEMP NORTH AND SOUTH FEEDS FROM VS5 STUB.
18. INSTALL NEW POLE TO INTERCEPT OH. INSTALL TAN FRAMING WITH MID SPAN DDE BETWEEN POLES 17 AND 18. INSTALL 3Ø PRI RISER. RUN AND STUB (3) 3" CONDUIT FROM VN5 TO SERVE AS TEMPORARY NORTH FEEDER TAKE-OFF POLE.
19. FUTURE POLE LOCATION. RUN AND STUB (3) 3" CONDUIT FOR NORTH FEEDER FROM VN6. (1) 3" CONDUIT FOR SECONDARY TO TC1. RUN AND STUB (4) 2" HDPE (2) FOR HCC AND (2) FOR LUMEN FROM VS5 STUB.
20. FUTURE POLE LOCATION. RUN AND STUB (3) 3" CONDUIT FOR TEMPORARY SOUTH FEEDER FROM VS5 AND (1) 1" CONDUIT FOR STREETLIGHT FROM TC1. RUN AND STUB (2) 2" HDPE, (1) FOR HCC AND (1) FOR LUMEN FROM VS5 STUB.
21. RETIRE ALL.

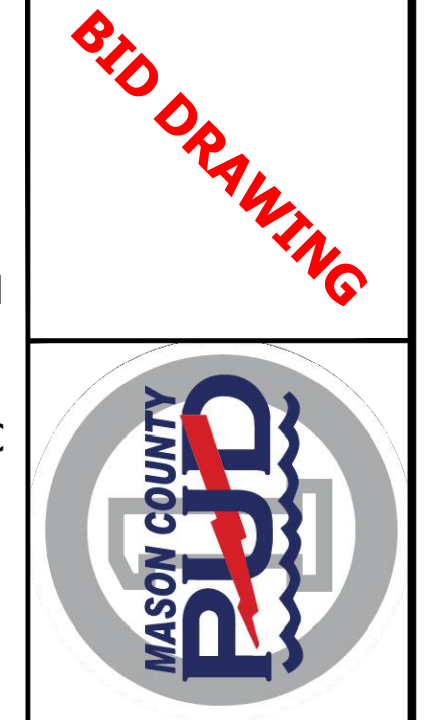
UG KEYED NOTES: ###

- VS4. INSTALL VAULT. RUN (3) 3" CONDUIT FOR SOUTH FEEDER. RUN AND STUB (2) 2" HDPE FOR LUMEN AND (1) 7-WAY FOR HCC.
- VN4. INSTALL VAULT. RUN (6) 3" CONDUIT, (3) FOR NORTH FEEDER, (3) STUBBED FOR FUTURE.
- VS5. INSTALL VAULT. RUN (3) 3" CONDUIT FOR SOUTH FEEDER. RUN AND STUB (2) 2" HDPE FOR LUMEN AND (1) 7-WAY FOR HCC.
- VN5. INSTALL VAULT. RUN (6) 3" CONDUIT, (3) FOR NORTH FEEDER, (3) STUBBED FOR FUTURE.
- JN1. INSTALL 1Ø J-BOX. NEW SOURCE FOR DARK RD. RUN (1) 2" CONDUIT, (1) FOR NORTH FEEDER 1Ø.
- VS6. FUTURE LOCATION OF PADMOUNT SWITCH. RUN AND STUB (3) 3" CONDUIT FOR SOUTH FEEDER. STUB (6) 3" CONDUIT, (3) FOR NORTH FEEDER (AHEAD TO VN6), (3) FOR FUTURE (AHEAD TO FUTURE STUB NEAR VN6); RUN AND STUB (4) 2" HDPE (2) FOR HCC, (2) FOR LUMEN.
- VN6. INSTALL VAULT. RUN (6) 3" CONDUIT FOR NORTH FEEDER: (3) FROM VN5, (3) FROM VS6; RUN STUB AND CAP (6) 3" CONDUIT (3) FOR FUTURE FROM STUB NEAR VN5, (3) FROM STUB AT VS6. BORE UNDER HIGHWAY. OPEN TRENCH THE REST.
- TC1. FUTURE SECONDARY PEDESTAL FOR TRAFFIC CONTROL. RUN AND STUB (1) 3" CONDUIT FROM FUTURE POLE LOCATION AT 19. STUB (1) 3" CONDUIT FROM FUTURE POLE AT LOCATION 20.
- LM1. RUN (1) 3" CONDUIT AND INSTALL SEC PED FOR LUMEN COMMUNICATION CABINET FROM POLE 16.

BORING & TRENCHING NOTES: #

1. TYPICAL TRENCH. SEE D1.1 DETAIL 4.
2. BORE SECTIONS AS NEEDED.
3. TRENCH WITH MINIMUM 10' TRENCH DEPTH. TO ALLOW FOR FUTURE STORM WATER CROSSING. SEE D1.1 DETAIL 2 FOR DETAILS AND B1.2 FOR CRITICAL ELEVATIONS.
4. BORE ACROSS HIGHWAY ~ 100'. SEE B1.2 FOR CRITICAL ELEVATIONS.

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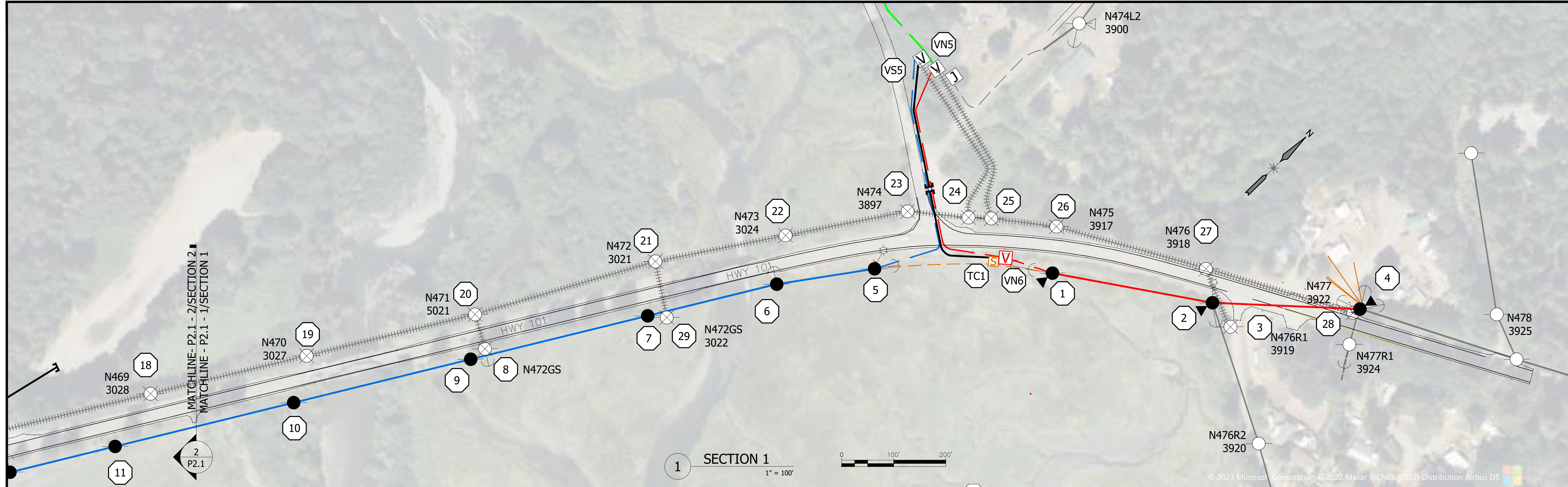


DUCKABUSH LINE RELOCATION
 PHASE 1: SECTION 2
 PLAN DRAWING

CURRENT REVISION: 0 WORK ORDER #: 21202

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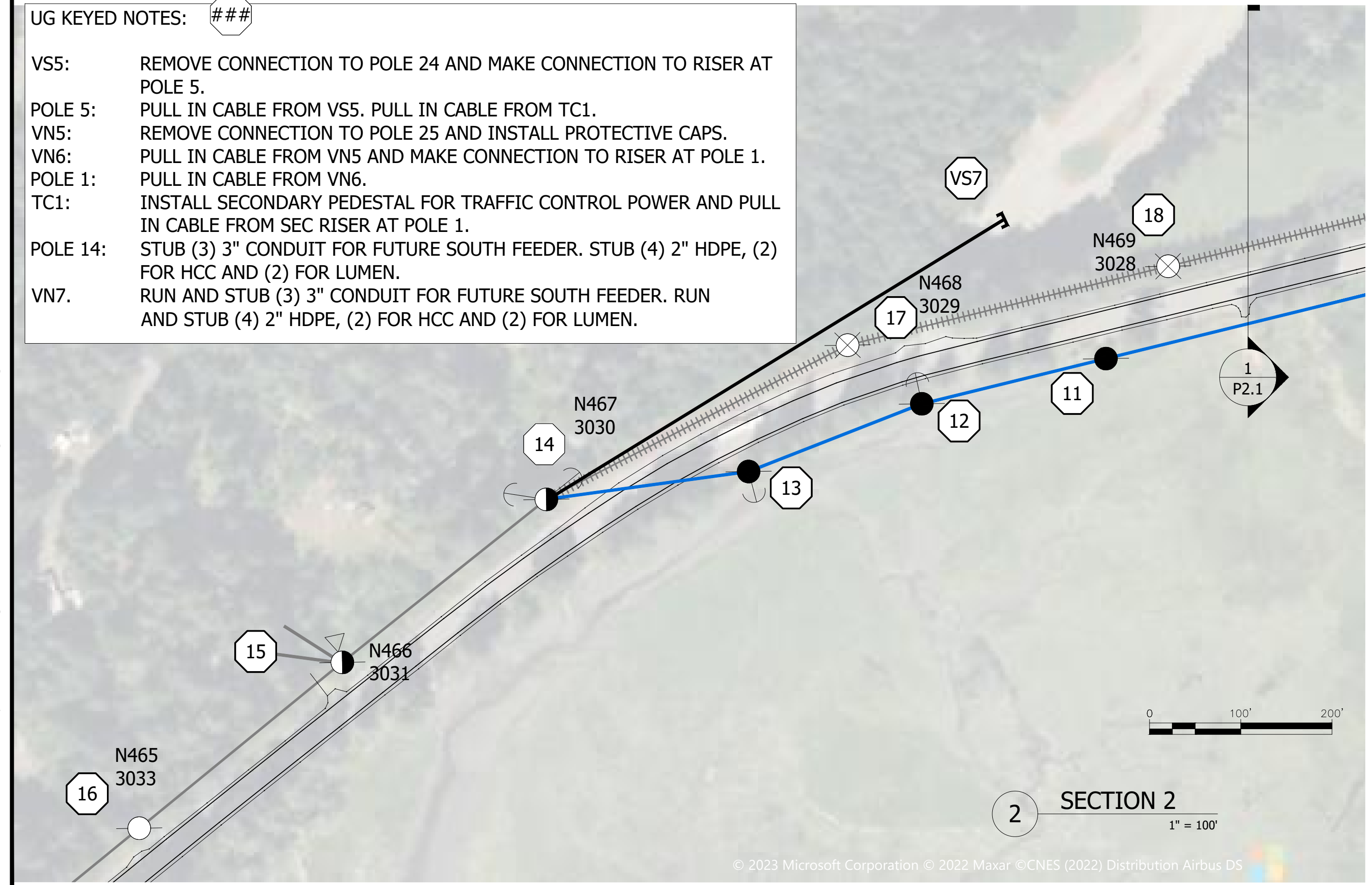
1 SECTION 1
1" = 100'

POLE KEYED (OH & UG) NOTES: ##

1. INSTALL NEW POLE WITH DE FRAMING. INSTALL REVERSE FEED PRI RISER WITH DISCONNECTS. INSTALL ANCHORS AND GUYS. INSTALL XFMR AND SEC RISER FOR TRAFFIC CONTROL.
2. INSTALL NEW POLE. INSTALL LIGHT ANGLE FRAMING. INTERCEPT AND TRANSFER EXISTING 1Ø OH FROM POLE 3 AND INSTALL 1Ø DE FRAMING WITH FUSED CUTOFF. INSTALL ANCHOR AND GUY. INSTALL OH XFMR AND STREET LIGHT.
3. RETIRE FRAMING AND POLE. TRANSFER 1Ø OH TO POLE 2.
4. INSTALL NEW POLE. INTERCEPT EXISTING 3Ø OH AND INSTALL BUCKARM FRAMING. INSTALL ANCHORS AND GUYS. INTERCEPT EXISTING 1Ø OH AND INSTALL 1Ø DE FRAMING WITH FUSED CUTOFF. TRANSFER OH XFMR AND OH SEC FROM POLE 28.
5. INSTALL NEW POLE WITH DE FRAMING. INSTALL REVERSE FEED PRI RISER WITH DISCONNECTS. INSTALL ANCHORS AND GUYS. INSTALL STREET LIGHT AND SECONDARY RISER. TO SERVE AS TEMPORARY SOUTH FEEDER UNTIL BRIDGE IS CONSTRUCTED.
6. INSTALL NEW POLE. INSTALL TAN FRAMING. INSTALL GUY AND ANCHOR.
7. INSTALL NEW POLE. INSTALL TAN FRAMING.
8. RETIRE ALL.
9. INSTALL NEW POLE. INSTALL TAN FRAMING.
10. INSTALL NEW POLE. INSTALL TAN FRAMING.
11. INSTALL NEW POLE. INSTALL TAN FRAMING.
12. INSTALL NEW POLE. INSTALL LIGHT ANGLE FRAMING. INSTALL GUY AND ANCHOR.
13. INSTALL NEW POLE. INSTALL LIGHT ANGLE FRAMING. INSTALL GUY AND ANCHOR.
14. RETIRE AND REPLACE POLE. INSTALL BUCKARM FRAMING. INSTALL GUYS AND ANCHORS.
15. RETIRE AND REPLACE POLE. REUSE EXISTING XFMR. TRANSFER SEC TO NEW POLE.
16. EXISTING TO REMAIN.
17. RETIRE ALL.
18. RETIRE ALL.
19. RETIRE ALL.
20. RETIRE ALL.
21. RETIRE ALL.
22. RETIRE ALL.
23. RETIRE ALL.
24. RETIRE ALL.
25. RETIRE ALL.
26. RETIRE ALL.
27. RETIRE ALL.
28. RETIRE FRAMING AND POLE. TRANSFER 1Ø AND 3Ø OH, XFMR AND SEC TO POLE 4.
29. RETIRE ALL.

UG KEYED NOTES: ###

- VS5: REMOVE CONNECTION TO POLE 24 AND MAKE CONNECTION TO RISER AT POLE 5.
- POLE 5: PULL IN CABLE FROM VS5. PULL IN CABLE FROM TC1.
- VN5: REMOVE CONNECTION TO POLE 25 AND INSTALL PROTECTIVE CAPS.
- VN6: PULL IN CABLE FROM VN5 AND MAKE CONNECTION TO RISER AT POLE 1.
- POLE 1: PULL IN CABLE FROM VN6.
- TC1: INSTALL SECONDARY PEDESTAL FOR TRAFFIC CONTROL POWER AND PULL IN CABLE FROM SEC RISER AT POLE 1.
- POLE 14: STUB (3) 3" CONDUIT FOR FUTURE SOUTH FEEDER. STUB (4) 2" HDPE, (2) FOR HCC AND (2) FOR LUMEN.
- VN7: RUN AND STUB (3) 3" CONDUIT FOR FUTURE SOUTH FEEDER. RUN AND STUB (4) 2" HDPE, (2) FOR HCC AND (2) FOR LUMEN.



2 SECTION 2
1" = 100'

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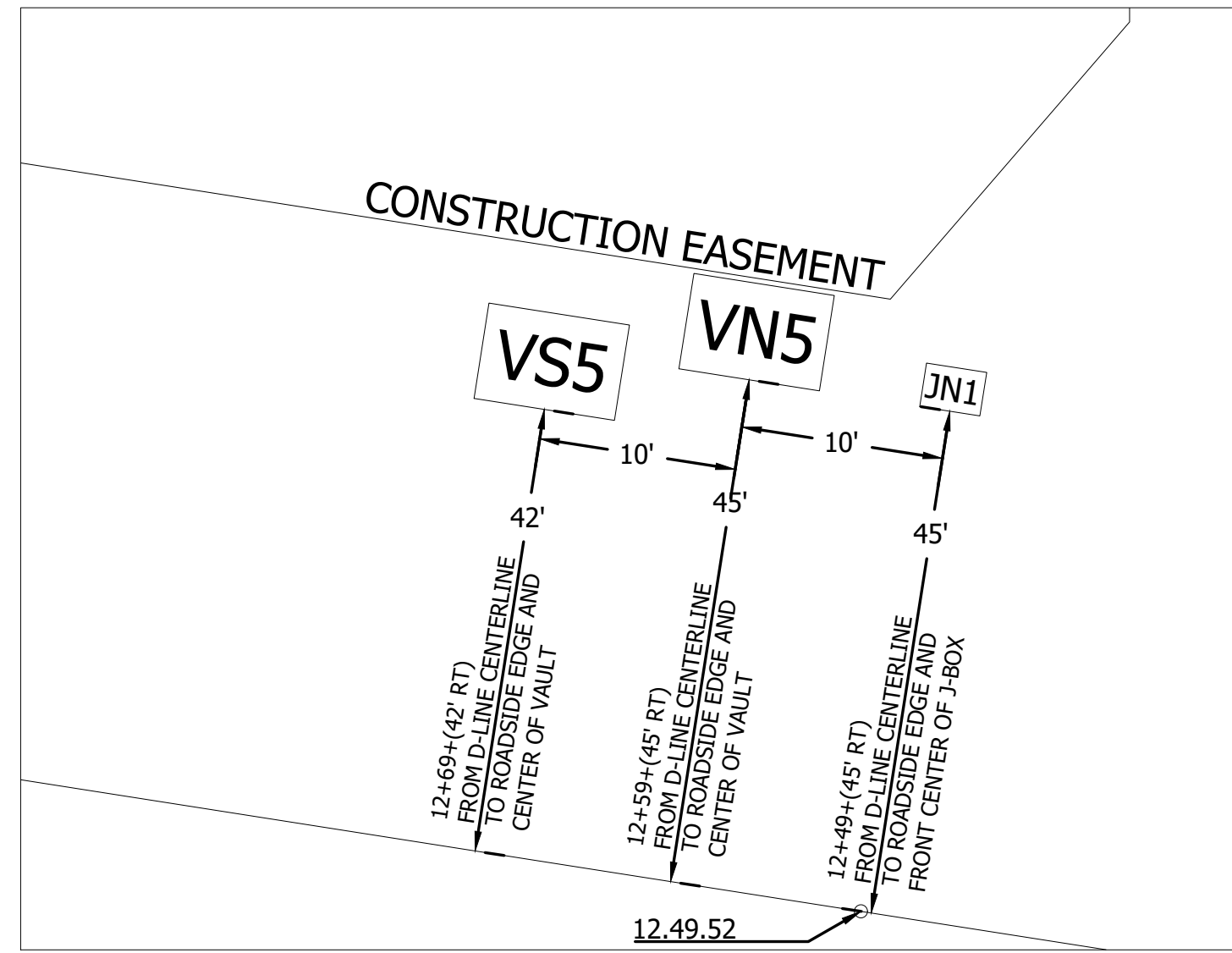
DUCKABUSH LINE RELOCATION
PHASE 2
SECTION 1 & SECTION 2

CURRENT REVISION: 0 WORK ORDER #: 21202

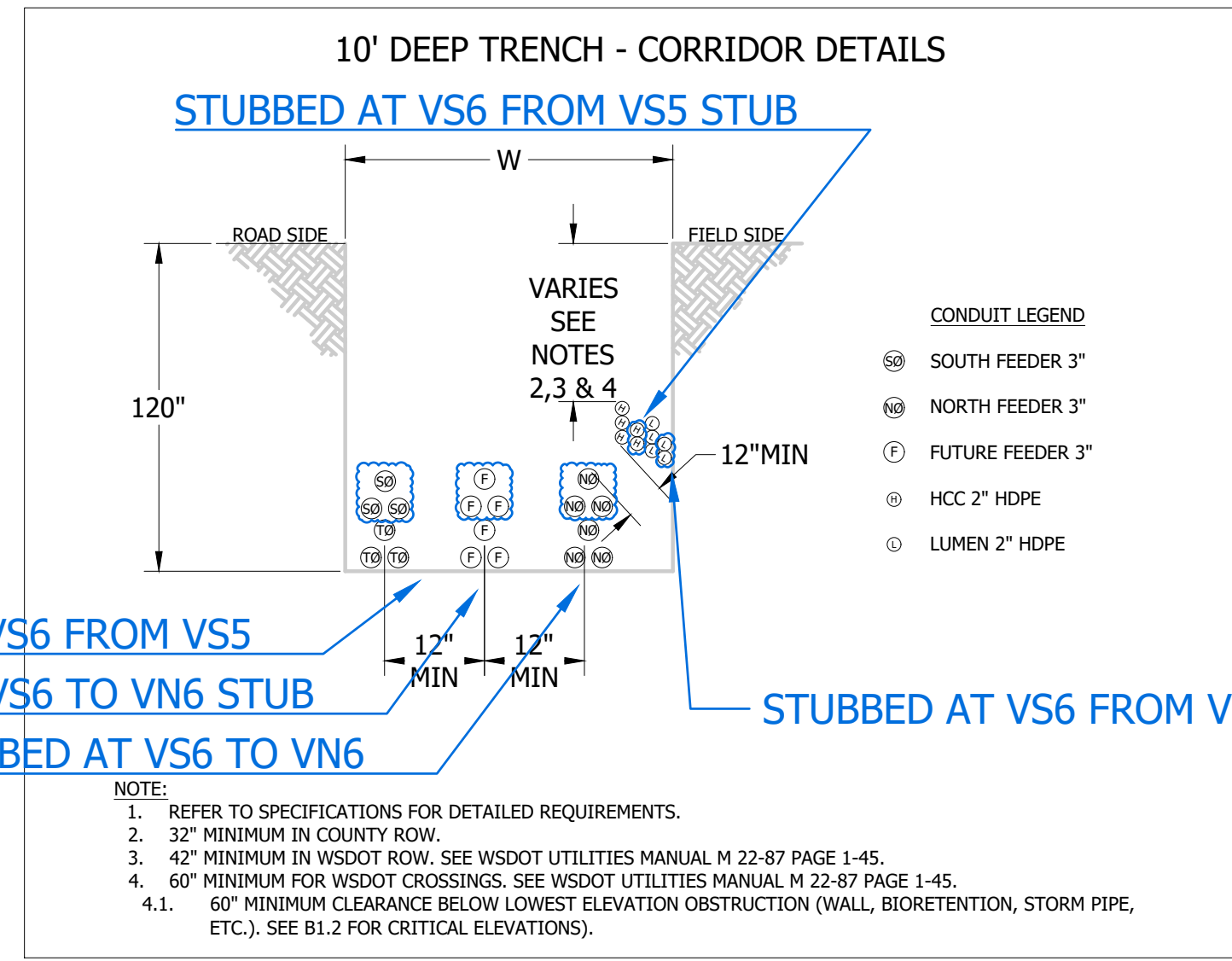
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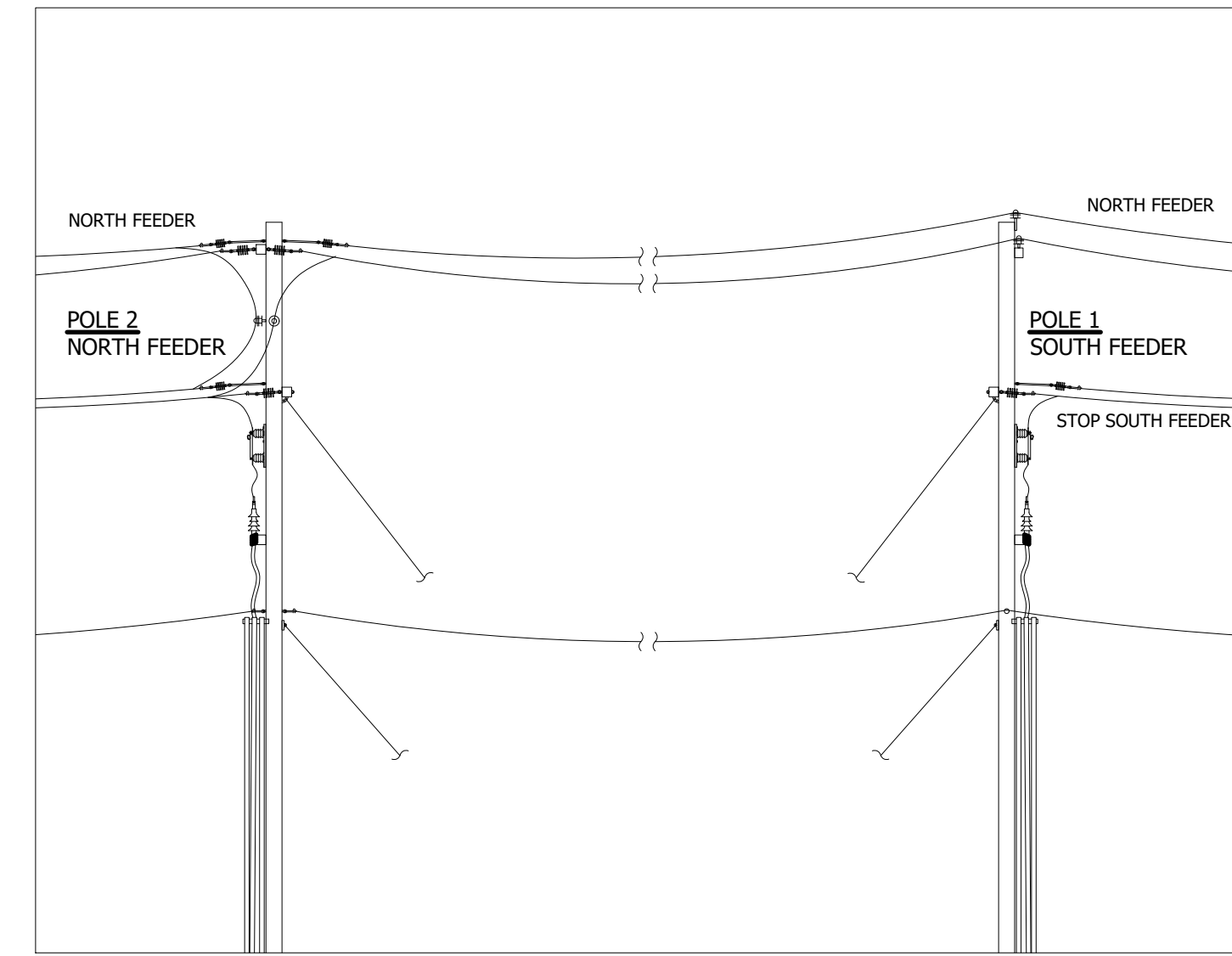
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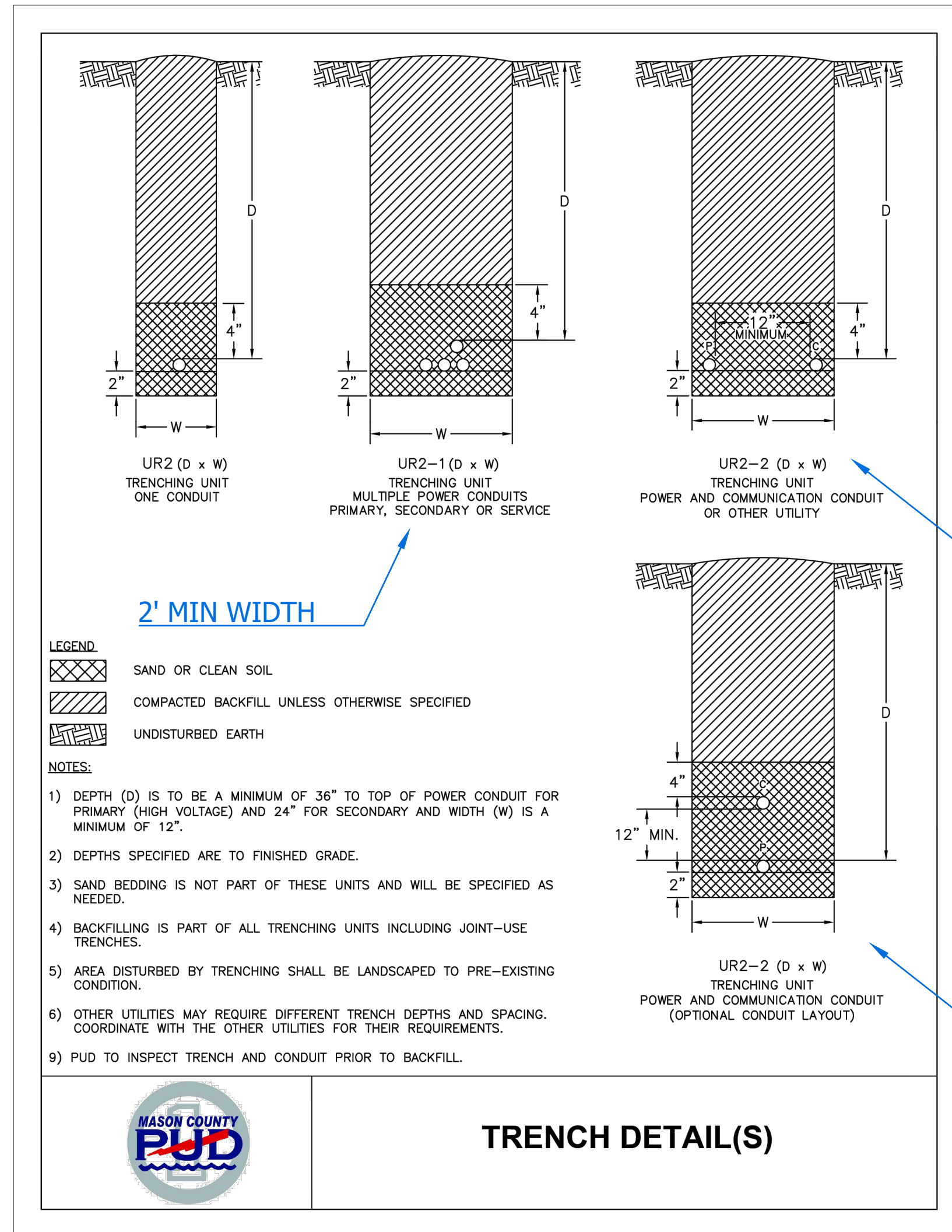
1 VAULT LAYOUT Scale: NTS



2 10' DEEP CORRIDOR TRENCH Scale: NTS



3 POLES 1 & 2 - PHASE 1 Scale: NTS



4 TYPICAL TRENCH Scale: NTS

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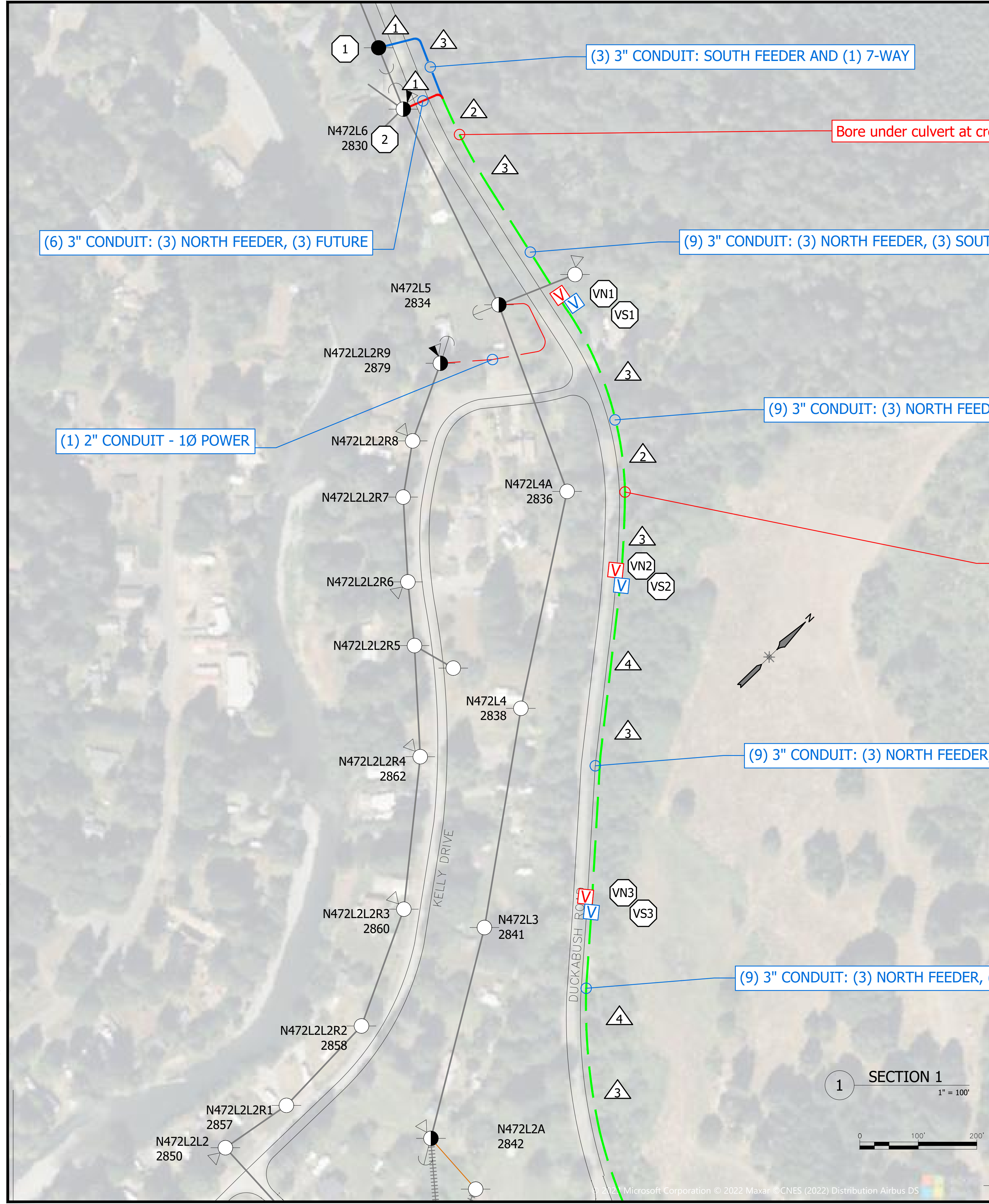


DUCKABUSH LINE RELOCATION
PHASES 1 AND 2
DETAIL DRAWINGS

CURRENT REVISION: 0 WORK ORDER #: 21202

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NOTE:

- 1 BLUE TEXT IS FOR GENERAL INFORMATION
- 2 RED TEXT IS FOR CRITICAL BORING ELEVATIONS

Bore under culvert at creek. Details TBD.

Bore under culvert at creek. Details TBD.

- BORING & TRENCHING NOTES:**
- 1. BORE ACROSS DUCKABUSH RD ~ 50'.
 - 2. BORE UNDER CREEK. CRITICAL ELEVATIONS TBD.
 - 3. TYPICAL TRENCH. SEE D1.1 DETAIL 4.
 - 4. BORE SECTIONS AS NEEDED.

1 SECTION 1
1" = 100'



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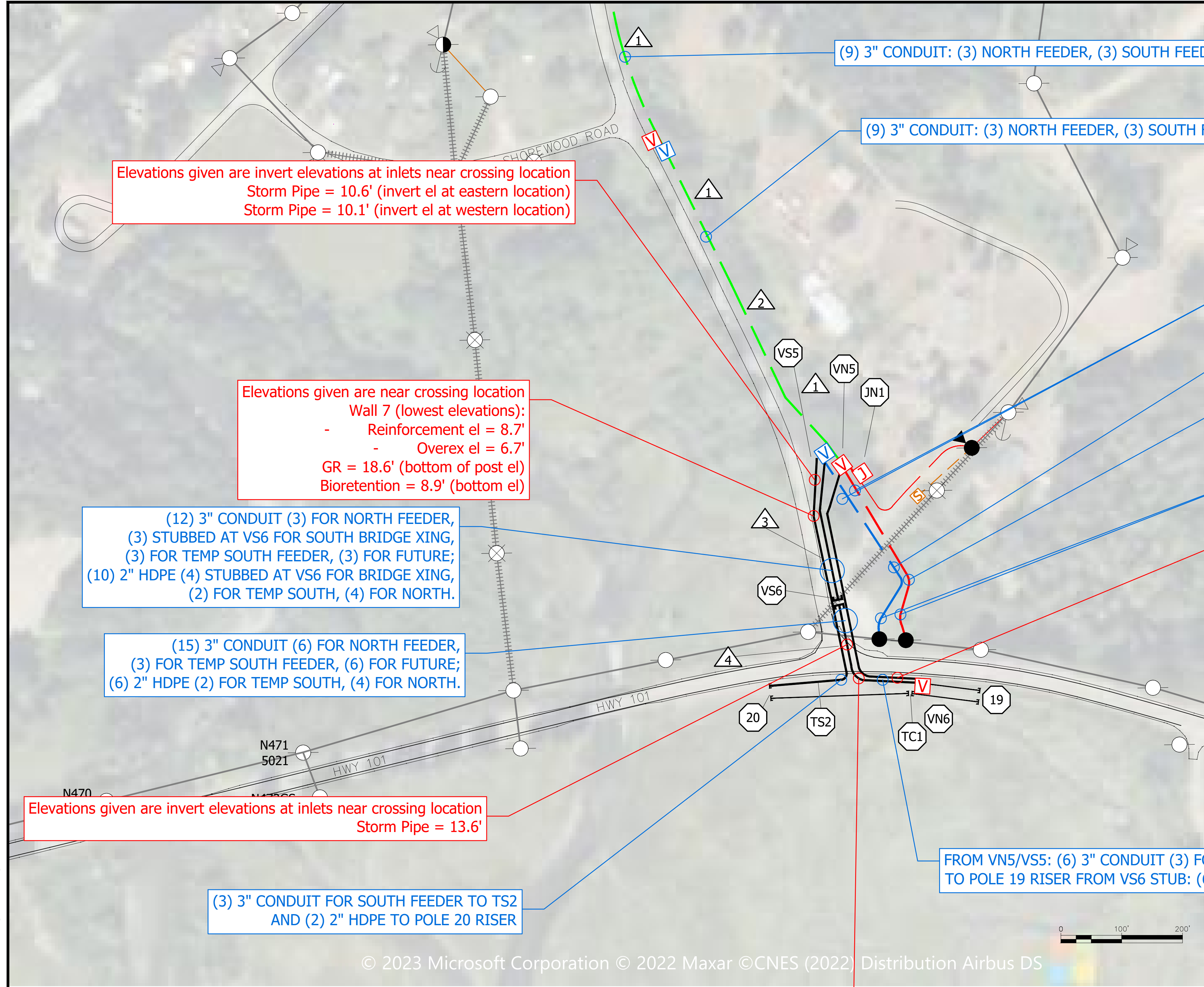
**DUCKABUSH LINE RELOCATION
PHASE 1: SECTION 1
BORING AND TRENCHING DETAILS**

CURRENT REVISION: 0 WORK ORDER #: 21202

B1.1
6 / 7

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Elevations given are invert elevations at inlets near crossing location
Storm Pipe = 10.6' (invert el at eastern location)
Storm Pipe = 10.1' (invert el at western location)

Elevations given are near crossing location
Wall 7 (lowest elevations):
- Reinforcement el = 8.7'
- Overex el = 6.7'
GR = 18.6' (bottom of post el)
Bioretention = 8.9' (bottom el)

(12) 3" CONDUIT (3) FOR NORTH FEEDER,
(3) STUBBED AT VS6 FOR SOUTH BRIDGE XING,
(3) FOR TEMP SOUTH FEEDER, (3) FOR FUTURE;
(10) 2" HDPE (4) STUBBED AT VS6 FOR BRIDGE XING,
(2) FOR TEMP SOUTH, (4) FOR NORTH.

(15) 3" CONDUIT (6) FOR NORTH FEEDER,
(3) FOR TEMP SOUTH FEEDER, (6) FOR FUTURE;
(6) 2" HDPE (2) FOR TEMP SOUTH, (4) FOR NORTH.

Elevations given are invert elevations at inlets near crossing location
Storm Pipe = 13.6'

(3) 3" CONDUIT FOR SOUTH FEEDER TO TS2
AND (2) 2" HDPE TO POLE 20 RISER

(9) 3" CONDUIT: (3) NORTH FEEDER, (3) SOUTH FEEDER, (3) FUTURE AND (1) 7-WAY

(9) 3" CONDUIT: (3) NORTH FEEDER, (3) SOUTH FEEDER, (3) FUTURE; (1) 7-WAY AND (2) 2" HDPE

PHASE 1 CONSTRUCTION ONLY. TEMPORARY CABINETS TN1 & TS1 TO BE
REMOVED BEFORE WSDOT BEGINS WORK. SEE D1.1 DETAILS 1 & 5
FOR PHASE 1 AND PHASE 2, RESPECTIVELY.

(3) 3" CONDUIT FOR SOUTH FEEDER AND (2) 2" HDPE

(3) 3" CONDUIT FOR NORTH FEEDER

PHASE 1 CONSTRUCTION ONLY. TEMPORARY UG CABLE
FROM VS5 AND VS6. TO BE REMOVED BEFORE WSDOT BEGINS WORK.

Elevations given are near crossing location
Bioretention = 11.1' (bottom el)

FROM VN5/VS5: (6) 3" CONDUIT (3) FOR NORTH FEEDER, (3) FOR FUTURE; (4) 2" HDPE. 2" GOES ALL THE WAY
TO POLE 19 RISER FROM VS6 STUB: (6) 3" CONDUIT (3) FOR NORTH FEEDER, (3) FOR FUTURE.

Elevations given are near crossing location
Bioretention = 10' (bottom el)



1 BLUE TEXT IS FOR GENERAL INFORMATION

2 RED TEXT IS FOR CRITICAL BORING ELEVATIONS

BORING & TRENCHING NOTES:

1. TYPICAL TRENCH. SEE D1.1 DETAIL 4.
2. BORE SECTIONS AS NEEDED.
3. TRENCH WITH MINIMUM 10' TRENCH DEPTH. TO ALLOW FOR FUTURE STORM WATER CROSSING. SEE D1.1 DETAIL 2 FOR DETAILS.
4. BORE ACROSS HIGHWAY ~ 100'.

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DUCKABUSH LINE RELOCATION
PHASE 1: SECTION 2 - WSDOT
BORING AND TRENCHING DETAILS
 CURRENT REVISION: 0 WORK ORDER #: 21202

MASON COUNTY PUD #1

PROJECT: <u>DUCKABUSH LINE RELOCATION PHASES 1 & 2</u>		WO # <u>21202</u>	LINE: _____
UG LOCATE TICKET # _____	BY _____	DETAIL MAP _____	COUNTY _____ SCHOOL DISTRICT _____
TWSP _____	RANGE _____	SECTION _____	NOTES _____ REVISION M _____
		STAKED BY _____	DATE _____
		REVISED BY _____	DATE _____
		CHECKED BY _____	DATE _____

NOTES - Refer to Specifications and Guidelines for Additional Information

All conduit (**except for in bores, sweeps, and conduit specified in the construction unit drawings eg: sch80 riser conduit**), cable, vaults, poles, conductors (**except for ground wire and jumpers specified in construction unit drawings eg: pole grounds, arrester grounds, vault asbury loops and vault grounding**), street lights, streetlight mast arms, and overhead transformers will be supplied by Mason PUD #1. All other material, specified or implied to be provided by contractor.

Riser construction units estimate riser conduit only. Ensure riser conduit lengths are appropriate for pole heights. The conduit shown for Hood Canal Communications (HCC) and Lumen is for reference only.

Refer to installation specifications for storage and installation of equipment and material. If there are competing specifications or guideline adhere to strictest one.

All 500 kcmil Al URD will be 1/3 neutral, EPR, 220 mil, jacketed.

All #2 Al URD shall be full neutral, EPR, 220 mil, jacketed.

All elbows for the 500 kcmil conductor to be 600A dead break, T-OP-II or equivalent.

All multi point junctions in vaults shall be feed thru, 600A rated, dead break with rotatable brackets.

All elbows shall be installed on multi point junctions from left to right (Source, Load, Tap, Tap).

All equipment shall be installed as staked.

All underground pulls shall be well lubricated.

All sweeps shall be long radius, except where specified otherwise in construction unit drawings.

Use plastic conduit plugs at each stub location.

All trenches shall have a minimum width of 2' unless specified otherwise.

All trenches shall be backfilled in accordance with drawing details, and specifications.

All conduit entances in to vaults shall be concrete grouted according to best practices.

All cable shall be phase marked and tagged with the destination (vault/cabinet #) of cable.

Refer to boring drawing B1 for critical boring depths.

All lightning arrestors shall be 10 kV MOV 8.4 kV MCOV.

Make arrester ground terminal-to-neutral (or concentric) jumper as short as possible.

All OH phase jumpers to be covered conductor.

All poles not designated "caisson" shall be installed per drawing TM-10-MA01 found in the OH Guidelines.

All poles designated as "caisson" shall be installed per drawing W4.1F found in the OH Guidelines.

All poles shall have split bolts at top of pole when not framed for two directions.

Poles shall be installed 10% + 2' in accordance with Pole Setting Specification.

Existing OH conductor material listed as 4/0 may be 3/0, ensure that material items are sized accordingly.

Double circuit clearances on poles shall be 4' from upper circuit to lower circuit.

Install cut-out covers on cut-outs.

Install arrester covers on arresters.

All 8' deadend crossarms shall be 3-position fiberglass with a minimum ultimate deadend strength of 13,900 lbs/position.

All pin insulators shall be Vise-top, polymer. (See PR units for vise-top installation.)

Use alternate backfill (ex: gravel) solutions according to best practices in swampy areas.

Use triple helix (swamp anchors) in swampy areas.

Technical Assumptions

Assumed Worst Case Tension (WCT) for 4/0 ACSR is 2662 ft-lbs.

Assumed Worst Case Tension (WCT) for 3/0 ACSR is 2142 ft-lbs.

Guying/Anchoring strengths based on anchor installation torque of 3000 ft-lbs.

MASON COUNTY PUD #1

OVERHEAD PROJECT: DUCKABUSH LINE RELOCATION - PHASE 1
DRAWING #'S: P1.1 & P1.2

WO # 21202

ACTION LEGEND: E=EXISTING
R=REMOVE
A=ADD

DATE: 2/7/2024

REVISION: 0

Action	POLES						UNIT	CONDUCTOR			R-W CLEAR	LINE ANGLE (Deg)	GUY			ANCHOR		GROUND	#	MISC.	TRANSFORMER		SECONDARY			REMARKS	
	KEYED NOTE#	STR #	MAP #	HT-CL-TYPE				Back Span (Ft)	#	Size Type			#	Type	Lead (Ft)	#	Type				UNIT	KVA	#	Size	Span (Ft)		Unit
				HT	CL	TYPE																					
A	1			55	2		C7A		3	4-0 ACSR			1	G42												MOVE TANGENT NEUTRAL TO BOTTOM CIRCUIT NEUTRAL POSITION. 'REMOVE DE NEUTRAL FROM DE FRAMING. TANGENT NEUTRAL FROM TOP CIRCUIT USED HERE.4' SPACING BTN UPPER AND LOWER CIRCUITS.	
A	1						C50A		3	4-0 ACSR			2	GDG81	25 30	2	G2A	SEE UG								INSTALL NEW POLE. INSTALL TAN FRAMING TOP CIRCUIT PHASE CONDUCTORS (NORTH FEEDER). CUT INTO INSTALL DE AND STOP BOTTOM CIRCUIT PHASE CONDUCTORS (SOUTH CIRCUIT). NEUTRAL CONDUCTOR TO CARRY THROUGH. POLE BECOMES SOUTH FEEDER TAKE-OFF POLE. INSTALL 3Ø RISER (SEE UG STAKING SHEETS FOR UG MATERIAL). INSTALL ANCHORS AND GUYS.	
A	1								1	1-0 ACSR																	
R	2	N472L6	2830	45	3		C19B	80	3	4-0 ACSR											T3	15	2	#2TPX #1/0TPX	SE2B	(3) BOTTOM CIRCUIT PHASE CONDUCTORS BACK SPAN TO BE RETIRED.	
E	2							80	3	4-0 ACSR																(3) TOP CIRCUIT PHASE CONDUCTORS AND (1) NEUTRAL CONDUCTOR BACK SPAN TO REMAIN.	
E	2							80	1	1-0 ACSR																	
A	2			55	2		C51A						1	G42							3	PR20				MOVE TOP CIRCUIT DDE NEUTRAL TO BOTTOM CIRCUIT. 4' SPACING BTN UPPER AND LOWER CIRCUITS.	
A	2						C50A						2	GDG81	25 30	2	G2A	SEE UG			T3	25	2	#2TPX #1/0TPX	SE2B	DEADEND BOTTOM CIRCUIT (DISCONNECTED FROM SOUTH FEEDER) CONTINUED DOWNSTREAM AS NORTH FEEDER TO PICKUP SERVICES. BOTTOM CIRCUIT BACK SPAN RETIRED. JUMPER/PARALLEL TOP (NORTH FEEDER) AND BOTTOM CIRCUITS. TOP AND BOTTOM CIRCUITS BECOME NORTH FEEDER ONLY. INSTALL OH XFMR. INSTALL ANCHORS AND GUYS. POLE BECOMES NORTH FEEDER TAKE-OFF POLE. INSTALL 3-PHASE RISER.	
R	3	N472L5	2834	45	3		C19B																				
R	3						A42																				
E	3							362	6	4-0 ACSR																	
E	3							362	1	1-0 ACSR																	
A	3			55	2		C19B											SEE UG								REPLACE POLE. INSTALL DBL CKT TAN FRAMING. INSTALL 1Ø PRI RISER. SEE UG STAKING SHEETS FOR UG MATERIAL.	
A	3						A42						1	G42												INSTALL 1Ø PRI DE. INSTALL ANCHOR AND GUY.	
A	3												1	GDG81	15	1	G2A										
R	4	N472L2L2R9	2879	40	4		A41						1	G30		1	G2A					T3	15	2		SE1A	SEC SIZES.
A	4			45	2		A41		2	4 ACSR			1	G42				SEE UG			T3	25	2		SE1A	RETIRE AND REPLACE POLE. INSTALL OH XFMR. INSTALL 1Ø PRI DE FRAMING. INSTALL GUY AND ANCHOR. INSTALL 1Ø PRI RISER - REVERSE FEED. SEE UG STAKING SHEETS FOR UG MATERIAL.	
A	4	N472L2L2R9	2879										1	GDG81	20	1	G2A										
R	5	N472L2A	2842	45	4		C20B						4	G30		4	G2A					T3	15	4		SE1A	
A	5			55	2		C50A						3	GDG81	25 35 45	3	G2A				T3	25	5		SE1A	RETIRE AND REPLACE POLE. STOP DBL CKT OH. INSTALL DBL CKT DE FRAMING. INSTALL OH XFMR. INSTALL GUYS AND ANCHORS. INSTALL SEC DE FOR NEW SPAN TO 6	
A	5						C50A						1	G42													

MASON COUNTY PUD #1

OVERHEAD PROJECT: DUCKABUSH LINE RELOCATION - PHASE 1
DRAWING #'S: P1.1 & P1.2

WO # 21202

ACTION LEGEND: E=EXISTING
R=REMOVE
A=ADD

DATE: 2/7/2024

REVISION: 0

Action	POLES						UNIT	CONDUCTOR			R-W CLEAR	LINE ANGLE (Deg)	GUY			ANCHOR		GROUND	#	MISC.	TRANSFORMER		SECONDARY			REMARKS	
	KEYED NOTE#	STR #	MAP #	HT-CL-TYPE				Back Span (Ft)	#	Size Type			#	Type	Lead (Ft)	#	Type				UNIT	KVA	#	Size	Span (Ft)		Unit
				HT	CL	TYPE																					
R	6	N472L2-C1																			1	#2TPX	100	SE1A	RETIRE SPAN TO POLE 7		
A	6																				1	#2TPX	120	SE1A	NEW SPAN FROM POLE 5		
R	7	N472L2	2846	45	4		C19B	185	6	4-0 ACSR			1	G30							T3	10	2		SE1A		
R	7						A41	185	1	1-0 ACSR			1	GSG50													
R	8	N472L2GS	2847	35	4								1	G30		1	G2A										
E	9	N472L2L1	2848	40	2																T3	?	1		SE1A		
R	9						A2	215	2	4 ACSR			1	G30		1	G2A										
A	9						A41						1	G42												REFRAME POLE AS 1Ø DE. INSTALL ANCHORS AND GUYS. RETIRE SPAN FROM POLE 7.	
A	9												1	GDG81	15	1	G2A										
R	10	N472LL1A	3019	45	4		C19B	300	6	4-0 ACSR																RETIRE POLE AND FRAMING	
R	10							300	1	1-0 ACSR																	
R	11	N472L1	3020	45	4		C19B	300	6	4-0 ACSR																RETIRE POLE AND FRAMING	
R	11							300	1	1-0 ACSR																	
E	12	N472	3021	45	4		C51A																			EXISTING DDE ALONG HWY TO REMAIN	
R	12						C50A	300	6	4-0 ACSR																RETIRE DE FRAMING FROM DUCKBUSH SUB	
R	12						C50A	300	1	1-0 ACSR																RETIRE DE FRAMING FROM DUCKBUSH SUB	
A	12							10	3	4-0 ACSR											3	PR41				RETIRE DBL CKT DE FRAMING. OPEN POINT BETWEEN NORTH AND SOUTH FEEDERS TO MOVE TO POLES 17 AND 18. INSTALL PIN INSULATORS AND JUMPERS ON EXISTING DDE. BECOMES SOUTH FEEDER.	
E	13	N472GS	3022	40	4								6	G30		3	G2A										

MASON COUNTY PUD #1

OVERHEAD PROJECT: DUCKABUSH LINE RELOCATION - PHASE 1
DRAWING #'S: P1.1 & P1.2

WO # 21202

ACTION LEGEND: E=EXISTING
R=REMOVE
A=ADD

DATE: 2/7/2024

REVISION: 0

Action	POLES						UNIT	CONDUCTOR			R-W CLEAR	LINE ANGLE (Deg)	GUY			ANCHOR		GROUND	#	MISC.	TRANSFORMER		SECONDARY			REMARKS	
	KEYED NOTE#	STR #	MAP #	HT-CL-TYPE				Back Span (Ft)	#	Size Type			#	Type	Lead (Ft)	#	Type				UNIT	KVA	#	Size	Span (Ft)		Unit
				HT	CL	TYPE																					
E	14	N474	3897	40	4																						
R	14						A42																			RETIRE 1PH PRI DE TO POLE 15	
E	15	N474L2	3900	35	4																						
R	15						A2	175	2	6 HD																RETIRE 1 PH TANGENT FRAMING	
A	15						A41					1	G42													(6HD DE) CUT INTO EXISTING LINE DOWN DARK RD. INSTALL 1 PH DE FRAMING. DOWN GUY TO BACK UP DE.	
A	15						A41	60	2	4 ACSR		1	GDG81	15	1	G2A										RETIRE BACK SPAN TO POLES 21 & 14. RETIRE 1Ø PRI TAN FRAMING. INTERCEPT EXISTING OH.INSTALL (2) PRI DE FRAMING, (1) FOR DARK RD OH, (1) FOR SLACK SPAN TO POLE 16. INSTALL ANCHOR AND GUY.	
A	16			45	2		A41		2	4 ACSR									T3	25						INSTALL NEW POLE. INSTALL 1Ø DE FRAMING. INSTALL SLACK SPAN TO POLE 15. INSTALL 1Ø PRI RISER - REVERSE FEED. INSTALL OH XFMR AND SEC RISER FOR COMMUNICATION CABINET.	
A	17			45	2		C7A											3	PR24							INSTALL NEW POLE TO INTERCEPT OH. INSTALL TAN FRAMING WITH MID SPAN DDE BETWEEN POLES 17 AND 18. INSTALL 3Ø PRI RISER. TO SERVE AS TEMPORARY SOUTH FEEDER TAKE-OFF POLE.	
A	18			45	2		C7A											3	PR25							INSTALL NEW POLE TO INTERCEPT OH. INSTALL TAN FRAMING WITH MID SPAN DDE BETWEEN POLES 17 AND 18. INSTALL 3Ø PRI RISER. TO SERVE AS TEMPORARY NORTH FEEDER TAKE-OFF POLE.	
A	19																									FUTURE POLE LOCATION. RUN AND STUB (3) 3" CONDUIT FOR NORTH FEEDER FROM VN6. (1) 3" CONDUIT FOR SECONDARY TO TC1. RUN AND STUB (4) 2" HDPE (2) FOR HCC AND (2) FOR LUMEN FROM VS5 STUB.. SEE UG STAKING SHEETS FOR UG MATERIAL.	
A	20																									FUTURE POLE LOCATION. RUN AND STUB (3) 3" CONDUIT FOR TEMPORARY SOUTH FEEDER FROM VS5 AND (1) 1" CONDUIT FOR STREETLIGHT FROM TC1. RUN AND STUB (2) 2" HDPE, (1) FOR HCC AND (1) FOR LUMEN FROM VS5 STUB.SEE UG STAKING SHEETS FOR UG MATERIAL.	
R	21	N474L1	3898	30	4		A1	321	2	6 HD																RETIRE POLE AND FRAMING	

MASON COUNTY PUD #1

UNDERGROUND PROJECT: DUCKABUSH LINE RELOCATION - PHASE 1 WO#: 21202 ACTION LEGEND: E=EXISTING
 DRAWING #S: P1.1 & P1.2 R=REMOVE
 A=ADD
 DATE: 2/7/2024 REVISION: 0

Action	LOCATION	PRIMARY CONDUIT			PRIMARY CABLE			PRIMARY UNIT		PAD/VAULT		GROUND	TRANSFORMER		ELBOW		MULTI-PT. TERMIN.		CAP		MISC	CONDUIT ELBOWS		SEC/SVC CONDUIT		SECONDARY CABLE		SECONDARY UNIT		REMARKS	
		STR #	Distance Back (ft)	#	Size Type	Cable Length (Ft)	#	Size Type	#	Assy	#		Assy	UNIT	KVA	#	Size Type	#	Size Type	#		Size Type	#	Size Type	#	Per Primary or Sec Cond Size	Distance Back (ft)	#	Size Type		Cable Length (Ft)
A	1			3	3" SCH40		3	500MCM	1	UPR5			SEE UPR2									3	UP7.04.90								INSTALL 3-PHASE PRIMARY RISER. SOUTH FEEDER TAKEOFF POLE.
A	1			1	7-WAY																									COMMUNICATION STUB - (1) 7-WAY FOR HCC	
A	2			6	3" SCH40		3	500MCM	1	UPR5			SEE UPR2									6	UP7.04.90							INSTALL 3-PHASE PRIMARY RISER. NORTH FEEDER TAKEOFF POLE. STUB (3) 3" CONDUIT FOR FUTURE FEEDER.	
A	3								1	U1												1	UP7.04.90							INSTALL 1Ø PRI RISER.	
A	4	340		1	2" SCH40	420	1	#2	1	U1R												1	UP7.04.90							INSTALL 1Ø PRI RISER - REVERSE FEED.	
A	VS1	600		3	3" SCH40	660	3	500MCM	1		1	UV3P	UVG			6	USG1	3	UM6.JN666	6	UM6.C6	3	UM6.PK6								RUN (3) 3" CONDUIT FOR SOUTH FEEDER. FROM POLE 1: BORE UNDER ROAD AND CREEK, THEN OPEN TRENCH. INSTALL VAULT WITH FEED-THRU TO VS2.
A	VS1	600		1	7-WAY																									COMMUNICATION RUN & STUB (1) 7-WAY FOR HCC	
A	VN1	480		6	3" SCH40	510	3	500MCM	1		1	UV3P	UVG			6	USG1	3	UM6.JN666	6	UM6.C6	3	UM6.PK6	6	UP7.04.90						RUN (6) 3" CONDUIT, (3) FOR NORTH FEEDER, (3) STUBBED FOR FUTURE. FROM POLE 2: BORE UNDER ROAD AND CREEK, THEN OPEN TRENCH. INSTALL VAULT WITH FEED-THRU TO VN2.
A	VS2	500		3	3" SCH40	530	3	500MCM	1		1	UV3P	UVG			6	USG1	3	UM6.JN666	6	UM6.C6	3	UM6.PK6								RUN (3) 3" CONDUIT FOR SOUTH FEEDER. BORE UNDER CREEK, THEN OPEN TRENCH. INSTALL VAULT WITH FEED-THRU TO VS3.
A	VS2	500		1	7-WAY																									COMMUNICATION RUN & STUB (1) 7-WAY FOR HCC	
A	VN2	500		6	3" SCH40	530	3	500MCM	1		1	UV3P	UVG			6	USG1	3	UM6.JN666	6	UM6.C6	3	UM6.PK6	6	UP7.04.90						RUN (6) 3" CONDUIT, (3) FOR NORTH FEEDER, (3) STUBBED FOR FUTURE. BORE UNDER CREEK, THEN OPEN TRENCH. INSTALL VAULT WITH FEED-THRU TO VN3.
A	VS3	580		3	3" SCH40	620	3	500MCM	1		1	UV3P	UVG			6	USG1	3	UM6.JN666	6	UM6.C6	3	UM6.PK6								RUN (3) 3" CONDUIT FOR SOUTH FEEDER. INSTALL VAULT WITH FEED-THRU TO VS4.
A	VS3	580		1	7-WAY																									COMMUNICATION RUN & STUB (1) 7-WAY FOR HCC	
A	VN3	580		6	3" SCH40	620	3	500MCM	1		1	UV3P	UVG			6	USG1	3	UM6.JN666	6	UM6.C6	3	UM6.PK6	6	UP7.04.90						RUN (6) 3" CONDUIT, (3) FOR NORTH FEEDER, (3) STUBBED FOR FUTURE. INSTALL VAULT WITH FEED-THRU TO VN4.
A	VS4	580		3	3" SCH40	620	3	500MCM	1		1	UV3P	UVG			6	USG1	3	UM6.JN666	6	UM6.C6	3	UM6.PK6								RUN (3) 3" CONDUIT FOR SOUTH FEEDER. INSTALL VAULT WITH FEED-THRU TO VS5.
A	VS4	580		1	7-WAY																									COMMUNICATION RUN & STUB (1) 7-WAY FOR HCC	
A	VS4			2	2" HDPE																									COMMUNICATION STUB (2) 2" HDPE FOR LUMEN	
A	VN4	580		6	3" SCH40	620	3	500MCM	1		1	UV3P	UVG			6	USG1	3	UM6.JN666	6	UM6.C6	3	UM6.PK6	6	UP7.04.90						RUN (6) 3" CONDUIT, (3) FOR NORTH FEEDER, (3) STUBBED FOR FUTURE. INSTALL VAULT WITH FEED-THRU TO VN5.

MASON COUNTY PUD #1

UNDERGROUND PROJECT: DUCKABUSH LINE RELOCATION - PHASE 1
DRAWING #S: P1.1 & P1.2

WO#: 21202

ACTION LEGEND: E=EXISTING
R=REMOVE
A=ADD

DATE: 2/7/2024

REVISION: 0

Action	LOCATION	PRIMARY CONDUIT			PRIMARY CABLE			PRIMARY UNIT		PAD/VAULT		GROUND	TRANSFORMER		ELBOW		MULTI-PT. TERMIN.		CAP		MISC	CONDUIT ELBOWS		SEC/SVC CONDUIT		SECONDARY CABLE		SECONDARY UNIT		REMARKS		
		STR #	Distance Back (ft)	#	Size Type	Cable Length (Ft)	#	Size Type	#	Assy	#		Assy	UNIT	KVA	#	Size Type	#	Size Type	#		Size Type	#	Size Type	#	Per Primary or Sec Cond Size	Distance Back (ft)	#	Size Type		Cable Length (Ft)	#
A	VS5	600	3	3" SCH40	630	3	500MCM	1		1	UV3P	UVG			6	USG1	3	UM6.JN666	6	UM6.C6	3	UM6.PK6										RUN (3) 3" CONDUIT FOR SOUTH FEEDER. INSTALL VAULT WITH FEED-THRU TO POLE 17.
A	VS5	600	1	7-WAY																										COMMUNICATION RUN & STUB (1) 7-WAY FOR HCC		
A	VS5	600	2	2" HDPE																									COMMUNICATION RUN & STUB (2) 2" HDPE FOR LUMEN			
A	VN5	600	6	3" SCH40	630	3	500MCM	1		1	UV3P	UVG			6	USG1	3	UM6.JN666	5	UM6.C6	3	UM6.PK6	6	UP7.04.90							RUN (6) 3" CONDUIT, (3) FOR NORTH FEEDER, (3) STUBBED FOR FUTURE. INSTALL VAULT WITH FEED-THRU TO POLE 18 AND 19 TO JN1.	
A	VN5														1	USG2														INSTALL T-BODY WITHOUT CAP		
A	VN5				15	1	#2								1	UCA1														200A ELBOW ON T-BODY TO 2-WAY JUNCTION. 15' #2 FOR 2-WAY TO 4-WAY		
A	VN5														1	UCAF1	1	UM6.JN22												200A FUSED ELBOW (W/ 6A CURRENT LIMITING FUSE) ON 2-WAY JUNCTION TO FEED JN1		
A	JN1	10	1	2" SCH40	40	1	#2	1	UJM44	1	UJ1											2	UP7.04.90							RUN (1) 2" CONDUIT FOR 19 NORTH FEEDER TO DARK RD. INSTALL 19 PRI CABINET WITH FEED-THRU TO POLE 16.		
A	16	250	1	2" SCH40	305	1	#2	1	U1R													1	UP7.04.90							RUN (1) 2" CONDUIT FOR 19 PRI RISER. INSTALL 19 PRI RISER - REVERSE FEED AND SEC RISER		
A	LM1																					1	UP7.04.90	120	1	3" SCH40	170	1	4/0TPX	1	UE18	RUN (1) 3" CONDUIT FROM POLE 16 AND INSTALL SEC PED FOR COMMUNICATION CABINET.
A	18	320	3	3" SCH40	380	3	500MCM	1	UPR1													3	UP7.04.90								RUN (3) 3" CONDUIT. INSTALL TEMP 39 PRI RISER.	
A	17	320	3	3" SCH40	380	3	500MCM	1	UPR1													3	UP7.04.90								RUN (3) 3" CONDUIT. INSTALL TEMP 39 PRI RISER.	
A	17	320	1	2" HDPE																										COMMUNICATION RUN & STUB (1) 2" HDPE FOR HCC FROM VSS.		
A	17	320	1	2" HDPE																										COMMUNICATION RUN & STUB (1) 2" HDPE FOR LUMEN FROM VSS.		
A	VS6	240	3	3" SCH40																		12	UP7.04.90								STUB AND CAP (12) 3" CONDUIT, (3) FOR FUTURE SOUTH FEEDER (FROM VS5), (3) FOR SOUTH FEEDER TO FUTURE BRIDGE, (3) FOR NORTH FEEDER (TO VN6) AND (3) FOR FUTURE (TO STUB NEAR VN6).	
A	VS6	240	2	2" HDPE																											COMMUNICATION RUN & STUB (2) 2" HDPE FOR HCC.	
A	VS6	240	2	2" HDPE																											COMMUNICATION RUN & STUB (2) 2" HDPE FOR LUMEN.	
A	VN6	500	6	3" SCH40						1	UV3P	UVG										3	UP7.04.90								RUN (6) 3" CONDUIT FROM VN5/VS5, (3) FOR NORTH FEEDER AND (3) STUBBED FOR FUTURE FEEDER. INSTALL VAULT IN PREPARATION FOR PHASE 2.	
A	VN6	260	6	3" SCH40																		3	UP7.04.90								RUN (6) 3" CONDUIT FROM VS6, (3) FOR NORTH FEEDER AND (3) STUBBED FOR FUTURE FEEDER.	
A	19	100	3	3" SCH40																		3	UP7.04.90								FUTURE POLE LOCATION. RUN AND STUB (3) 3" CONDUIT FOR NORTH FEEDER FROM VN6. STUB (1) 3" CONDUIT FOR SECONDARY TO TC1.	
A	19	600	2	2" HDPE																											COMMUNICATION RUN & STUB (2) 2" HDPE FOR HCC FROM VSS.	
A	19	600	2	2" HDPE																											COMMUNICATION RUN & STUB (2) 2" HDPE FOR LUMEN FROM VSS.	
A	TC1																					1	UP7.04.90	120	1	3" SCH40					FOR FUTURE SECONDARY PEDESTAL. RUN AND STUB (1) 3" CONDUIT FROM POLE 19.	
A	20	530	3	3" SCH40																		3	UP7.04.90								RUN, STUB AND CAP (3) 3" CONDUIT FOR FUTURE PRIMARY RISER FROM VSS.	
A	20																							230	1	1" SCH40					RUN AND STUB (1) 1" CONDUIT FROM TC1 FOR FUTURE STREETLIGHT SECONDARY RISER.	
A	20	530	1	2" HDPE																											COMMUNICATION RUN & STUB (1) 2" HDPE FOR HCC FROM VSS.	
A	20	530	1	2" HDPE																											COMMUNICATION RUN & STUB (1) 2" HDPE FOR LUMEN FROM VSS.	

MASON COUNTY PUD #1

OVERHEAD PROJECT: DUCKABUSH LINE RELOCATION - PHASE 2
DRAWING #'S: P2.1

WO # 21202

ACTION LEGEND: E=EXISTING
R=REMOVE
A=ADD

DATE: 2/7/2024

REVISION: 0

Action	POLES							UNIT	CONDUCTOR			R-W CLEAR	LINE ANGLE (Deg)	GUY			ANCHOR		GROUND	#	MISC.	TRANSFORMER		SECONDARY				REMARKS
	KEYED NOTE # (PREVIOUS#)	STR #	MAP#	Mile / STR #	HT-CL-TYPE				Back Span (Ft)	#	Size Type			#	Type	Lead (Ft)	#	Type				UNIT	KVA	#	Size	Span (Ft)	Unit	
					HT	CL	TYPE																					
A	1 (19)				60	2		C50A		3	4-0 ACSR		DE	1	G42						T3	25					INSTALL NEW POLE WITH DE FRAMING. CAISSON.	
A	1 (19)									1	1-0 ACSR			2	GDG81	25 30	2	G2A									REVERSE FEED PRI RISER	
A	2				60	2		C11-LA	313	3	4-0 ACSR		9L								T3	25	1		SE1A	XFMR & SECONDARY FOR WSDOT LIGHT POLE		
A	2								313	1	1-0 ACSR								1	HILLED						NO DOWN GUY NEEDED DUE TO DE		
A	2							A41		2	4 ACSR								1	CO1						TRANSFER 1PH OH DE FROM POLE 3		
R	3	N476R1	3919		45	6		A47	115	2	4-0 ACSR			2	G42											REMOVE POLE AND FRAMING. TRANSFER 1Ø OH TO POLE 2		
A	4				60	2		C50A	284	3	4-0 ACSR		15R	2	GDG81	15 15	2	G2A			T3	25	2		SE2B	BUCKARM FRAMING. DE GUYS TO BE KICKED IN 18" FROM INLINE. INTERCEPT AND CUT-INTO EXISTING OH.		
A	4							C50A	284	1	1-0 ACSR			3	G42											TRANSFER XFMR AND SECONDARY FROM POLE 28		
A	4							A41		2	4 ACSR			1	GDG81	20	1	G2A		1	CO1					DOWN GUY PLACED AT BISECT. TRANSFER 1PH OH DE FROM POLE 28		
A	5 (20)				60	2		C50A		3	4-0 ACSR		DE	2	GDG81	25 30	2	G2A		1	HILLED					REVERSE FEED PRI RISER. CAISSON.		
A	5 (20)									1	1-0 ACSR			1	G42													
A	6				55	2		C11	190	3	4-0 ACSR		4L	1	G42											INSTALL ANCHOR AT BISECT. USE SWAMP ANCHOR IF NEEDED. CAISSON.		
A	6								190	1	1-0 ACSR			1	GDG81	7	1	G4A								SOFT SOIL		
A	7				55	2		C11	255	3	4-0 ACSR															CAISSON.		
A	7								255	1	1-0 ACSR																	
R	8	N472GS			30	6			75					1	G30		1	G2A								RETIRE STUB GUY POLE		
A	9				55	2		C11	350	3	4-0 ACSR															CAISSON.		
A	9								350	1	1-0 ACSR																	
A	10				65	2		C11	350	3	4-0 ACSR															RAISE NEUTRAL 2' FROM TYPICAL. CAISSON.		
A	10								350	1	1-0 ACSR																	
A	11				65	2		C11	353	3	4-0 ACSR															RAISE NEUTRAL 2' FROM TYPICAL CAISSON.		
A	11								353	1	1-0 ACSR															PARKING LOT TO BUILT UP UNDERNEATH BACKSPAN		
A	12				55	2		C11-LA	208	3	4-0 ACSR		8L	1	G42											INSTALL ANCHOR AT BISECT. USE SWAMP ANCHOR IF NEEDED. CAISSON.		
A	12								208	1	1-0 ACSR			1	GDG81	7	1	G4A								SOFT SOIL		
A	13				60	2		C11-LA	204	3	4-0 ACSR		14R	1	G42											INSTALL ANCHOR AT BISECT. USE SWAMP ANCHOR IF NEEDED. CAISSON.		
A	13								204	1	1-0 ACSR			1	GDG81	7	1	G4A								SOFT SOIL		
R	14	N467	3030		45	4		C11		3	4-0 ACSR			1	G42											RETIRE POLE AND FRAMING		
R	14									1	1-0 ACSR																	
A	14				60	2		C51A	218	3	4-0 ACSR		31L	4	G42											BUCKARM FRAMING		
A	14							C51A	218	1	1-0 ACSR			4	GDG81	15 15 25 25	4	G2A								FUTURE RISER POLE FOR SOUTH FEEDER		
R	15	N466	3031		40	4		C11	296	3	4-0 ACSR										T3	25	2		SE2B	RETIRE AND REPLACE POLE. REUSE EXISTING XFMR		
R	15								296	1	1-0 ACSR																	
A	15				45	2		C11		3	4-0 ACSR										T3	25	2		SE2B			
A	15									1	1-0 ACSR																	
E	16	N465	3033		45	4		C11	370	3	4-0 ACSR			1	G42											EXISTING TO REMAIN.		
E	16								370	1	1-0 ACSR																	

MASON COUNTY PUD #1

OVERHEAD PROJECT: DUCKABUSH LINE RELOCATION - PHASE 2
DRAWING #'S: P2.1

WO # 21202

ACTION LEGEND: E=EXISTING
R=REMOVE
A=ADD

DATE: 2/7/2024

REVISION: 0

Action	POLES							UNIT	CONDUCTOR			R-W CLEAR	LINE ANGLE (Deg)	GUY			ANCHOR		GROUND	#	MISC.	TRANSFORMER		SECONDARY			REMARKS	
	KEYED NOTE # (PREVIOUS#)	STR #	MAP#	Mile / STR #	HT-CL-TYPE				Back Span (Ft)	#	Size Type			#	Type	Lead (Ft)	#	Type				UNIT	KVA	#	Size	Span (Ft)		Unit
					HT	CL	TYPE																					
R	17	N468	3029		45	4		C11	370	3	4-0 ACSR			1	G42											RETIRE ALL		
R	17								370	1	1-0 ACSR																	
R	18	N469	3028		45	4		C11	365	3	4-0 ACSR															RETIRE ALL		
R	18								365	1	1-0 ACSR																	
R	19	N470	3027		45	4		C11	240	3	4-0 ACSR															RETIRE ALL		
R	19								240	1	1-0 ACSR																	
R	20	N471	5021		45	2		C11	335	3	4-0 ACSR			1	G42		1	GSG50								RETIRE ALL		
R	20								335	1	1-0 ACSR																	
R	21 (12)	N472	3021		45	4		C51	365	3	4-0 ACSR								3	PR41						RETIRE ALL		
R	21 (12)								365	1	1-0 ACSR																	
R	22	N473	3024		45	4		C11	260	3	4-0 ACSR															RETIRE ALL		
R	22								260	1	1-0 ACSR																	
R	23 (14)	N474	3897		40	4		C11	240	3	4-0 ACSR			1	G42				1	HLLED	T3	?				RETIRE ALL		
R	23 (14)								240	1	1-0 ACSR																	
R	24 (17)				45	2		C7A	120	3	4-0 ACSR								3	PR24						RETIRE ALL		
R	24 (17)								120	1	1-0 ACSR																	
R	25 (18)				45	2		C7A	50	3	4-0 ACSR								3	PR25						RETIRE ALL		
R	25 (18)								50	1	1-0 ACSR																	
R	26	N475	3917		?	?		C11	130	3	4-0 ACSR			1	G42											RETIRE ALL		
R	26								130	1	1-0 ACSR																	
R	27	N476	3918		45	4		C11	290	3	4-0 ACSR															RETIRE ALL		
R	27								290	1	1-0 ACSR																	
R	27							A41		2	4 ACSR			2	G42													
R	28	N477	3922		40	4		C11	290	3	4-0 ACSR										T3	?	2	?	SE2B	RETIRE/TRANSFER TO NEW POLE 4		
R	28								290	1	1-0 ACSR																	
R	28							A41		2	4 ACSR			2	G42													

MASON COUNTY PUD #1

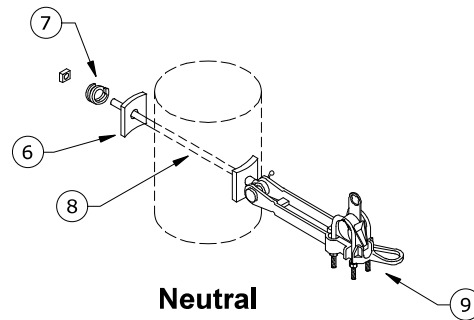
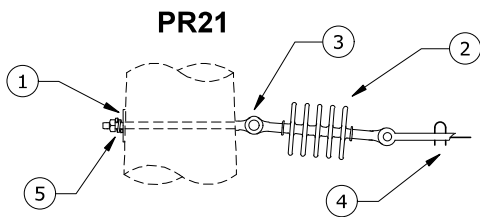
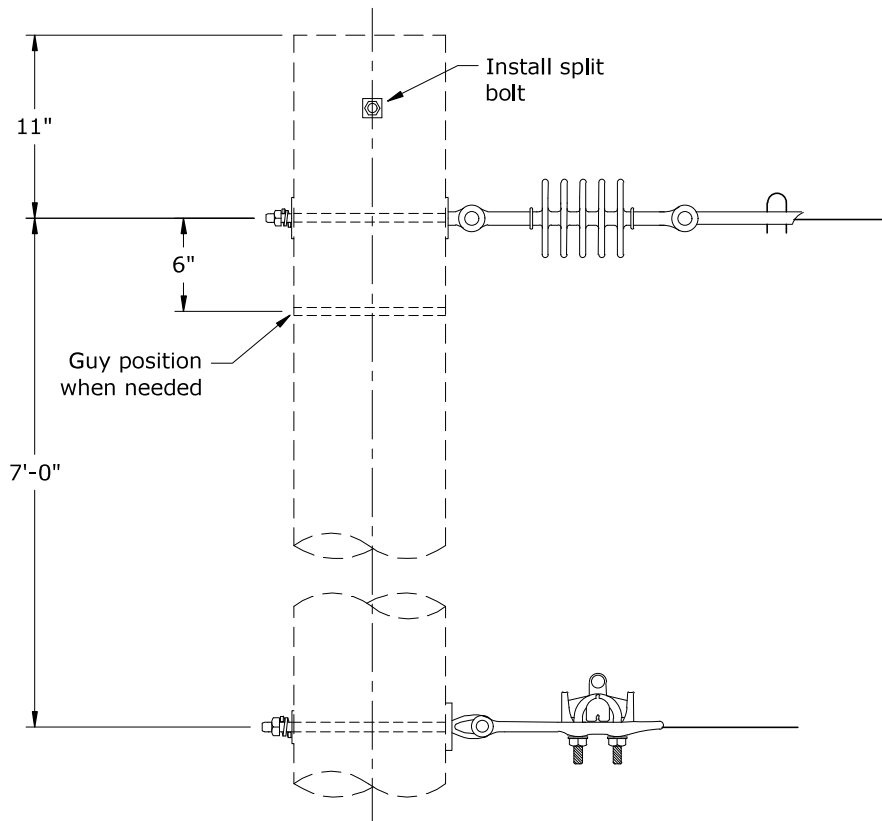
UNDERGROUND PROJECT: DUCKABUSH LINE RELOCATION - PHASE 2
DRAWING #'S: P2.1

WO#: 21202

ACTION LEGEND: E=EXISTING
R=REMOVE
A=ADD

DATE: 2/7/2024 REVISION: 0

Action	LOCATION	PRIMARY CONDUIT			PRIMARY CABLE			PRIMARY UNIT		PAD/VAULT	GROUND	TRANSFORMER		ELBOW		MULTI-PT. TERMIN.	CAP	MISC	CONDUIT ELBOWS	SEC/SVC CONDUIT		SECONDARY CABLE		SECONDARY UNIT		REMARKS			
		STR #	Distance Back (ft)	#	Size Type	Cable Length (Ft)	#	Size Type	#			Assy	UNIT	KVA	#					Size Type	#	Size Type	#	Per Primary or Sec Cond Size	Distance Back (ft)		#	Size Type	Cable Length (Ft)
E	VS5	600	4	3"SCH40	630	3	500MCM	1		1	UV3P	UVG																	
R	VS5													3	USG1													REMOVE CONNECTION TO TS1.	
A	VS5													3	USG1													MAKE CONNECTION TO TS2.	
E	VS5	600	1	7-WAY																							(1) 7-WAY FOR HCC		
E	VS5	600	2	2"HDPE																							(2) 2"HDPE FOR LUMEN		
E	VN5	600	6	3"SCH40	630	3	500MCM			1	UV3P	UVG																	
R	VN5													3	USG1													REMOVE CONNECTION TO TN1.	
A	VN5													3	USG1													MAKE CONNECTION TO VN6.	
R	24(17)	320	3	3"SCH40	380	3	500MCM	1	UPR1																			REMOVE TEMP SOUTH FEEDER 3Ø PRI RISER.	
R	24(17)	320	1	2"HDPE																								(1) 2" HDPE FOR HCC FROM VS5.	
R	24(17)	320	1	2"HDPE																								(1) 2" HDPE FOR LUMEN FROM VS5.	
R	25(18)	320	3	3"SCH40	380	3	500MCM	1	UPR1																			REMOVE TEMP SOUTH FEEDER 3Ø PRI RISER.	
E	VN6	500	6	3"SCH40						1	UV3P	UVG																	
A	VN6				430	3	500MCM							6	USG1	3	UM6.JN666	6	UM6.C6	3	UM6.PK6								PULL CABLE FROM VN5 AND MAKE NORTH FEEDER FEED-THRU CONNECTION TO POLE 1.
E	1 (19)	100	3	3"SCH40																3	UP7.04.90								
A	1 (19)				160	3	500MCM	1	UPR5																1	U83		PULL CABLE FROM VN6 AND INSTALL 3Ø PRI REVERSE FEED RISER. INSTALL SEC RISER.	
E	1 (19)	600	2	2"HDPE																								(2) 2" HDPE FOR HCC FROM VS5.	
E	1 (19)	600	2	2"HDPE																								(2) 2" HDPE FOR LUMEN FROM VS5.	
E	TC1																		1	UP7.04.90	120	1	3"SCH40					PULL CABLE AND INSTALL SECONDARY PEDESTAL (FOR WSDOT TRAFFIC CONTROL POWER) FEED FROM POLE 1.	
A	TC1																					170	1	4-0TPX	1	UE18H			
E	5 (20)	530	3	3"SCH40																3	UP7.04.90	230	1	1"SCH40					
A	5 (20)				590	3	500MCM	1	UPR5														280	1	6DPX	1	SLR		PULL CABLE FROM VS5 AND INSTALL 3Ø PRI REVERSE FEED RISER. PULL CABLE FROM TC1 AND INSTALL STREETLIGHT RISER.
E	5 (20)	530	1	2"HDPE																								(1) 2" HDPE FOR HCC FROM VS5.	
E	5 (20)	530	1	2"HDPE																								(1) 2" HDPE FOR LUMEN FROM VS5.	
A	14		3	3"SCH40																3	UP7.04.90								FOR FUTURE RISER FROM VS7 STUB
A	14		2	2"HDPE																								FOR FUTURE RISER FROM VS7 STUB	
A	14		2	2"HDPE																								FOR FUTURE RISER FROM VS7 STUB	
A	VN7	600	3	3"SCH40																3	UP7.04.90								RUN, STUB AND CAP (3) 3" CONDUIT FOR FUTURE SOUTH FEEDER. PROTECT STUBS AS THERE WILL BE A LOT OF TRAFFIC AND EQUIPMENT STORED IN THIS AREA.
A	VS7	600	2	2"HDPE																									RUN AND STUB (2) 2" HDPE FOR HCC.
A	VS7	600	2	2"HDPE																									RUN AND STUB (2) 2" HDPE FOR LUMEN.



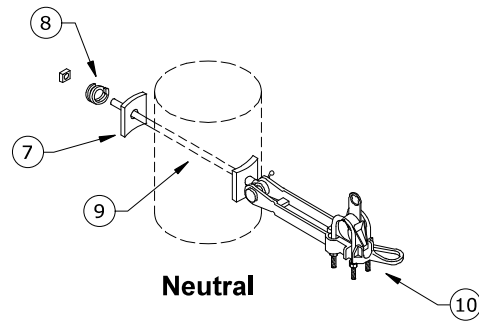
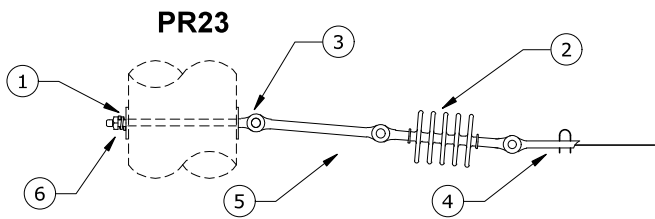
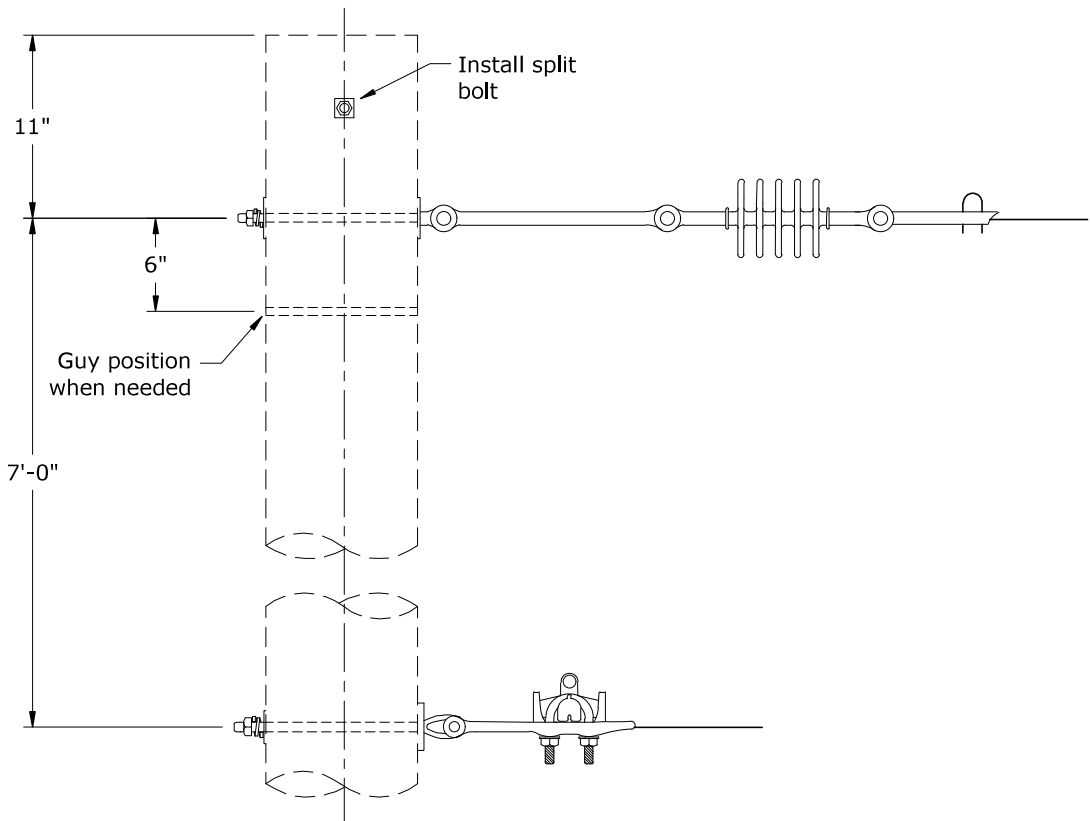
ITEM NO.	DESCRIPTION	A41	
		PR21	QTY.
1	Washer, Curved, Square, Cast, 3" x 3" x 3/8" Thick x 13/16" Hole		1
2	Insulator, Susp. 15 kV Clevis-Tongue, Polymer *		1
3	Bolt, Eye, 5/8" x 14", Galv., 12,400 lbs Ultimate Tensile *		1
4	Clamp, Strain, Distribution, #2 to 397,5 MCM		1
5	Washer, Lock, Spring, Double Coil, Galv., 5/8" *		1
ITEM NO.	DESCRIPTION	ADDITIONAL MATERIALS	
		QTY.	
6	Washer, Curved, Square, Cast, 3" x 3" x 3/8" Thick x 13/16" Hole	2	
7	Washer, Lock, Spring, Double Coil, Galv., 5/8" *	1	
8	Bolt, Eye, 5/8" x 14", Galv., 12,400 lbs Ultimate Tensile *	1	
9	Clamp, Strain #2	1	

CONSTRUCTION STANDARDS

1Ø VERTICAL DEADEND
2/0 ACSR MAX WIRE

REVISIONS

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1			
2			
3			
4			

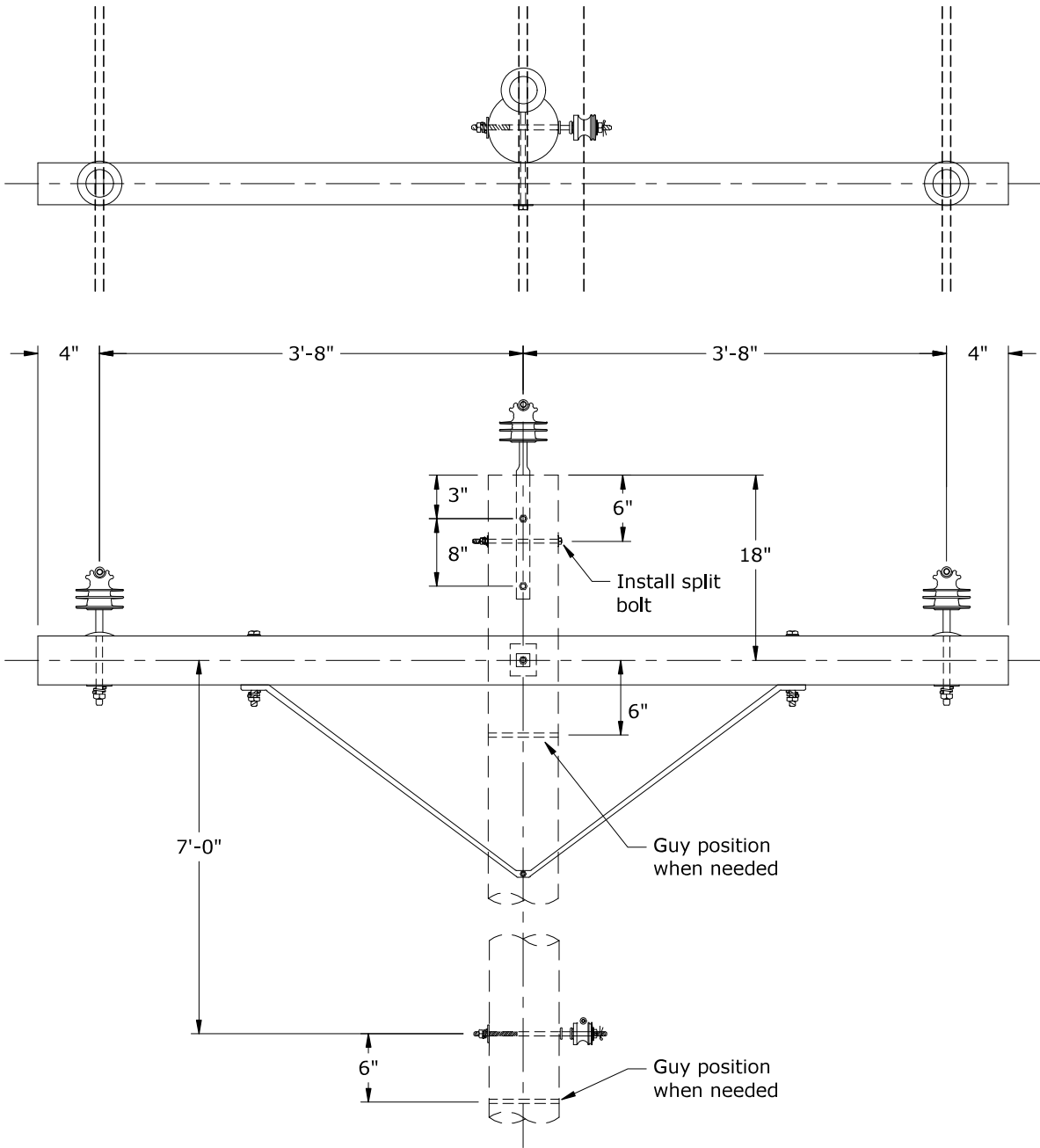


ITEM NO.	DESCRIPTION	A42	
		PR23	QTY.
1	Washer, Curved, Square, Cast, 3" x 3" x 3/8" Thick x 13/16" Hole		1
2	Insulator, Susp. 15 kV Clevis-Tongue, Polymer *		1
3	Bolt, Eye, 5/8" x 14" Galv., 12,400 lbs Ultimate Tensile		1
4	Clamp, Strain, Distribution, #4		1
5	Insulator, Guy Strain, Fiberglass, 20"		1
6	Washer, Lock, Spring, Double Coil, Galv., 5/8"		1
ITEM NO.	DESCRIPTION	ADDITIONAL MATERIALS	
		QTY.	
7	Washer, Curved, Square, Cast, 3" x 3" x 3/8" Thick x 13/16" Hole	2	
8	Washer, Lock, Spring, Double Coil, Galv., 5/8"	1	
9	Bolt, Eye, 5/8" x 14" Galv., 12,400 lbs Ultimate Tensile	1	
10	Clamp, Strain #4	1	

CONSTRUCTION STANDARDS

1Ø VERTICAL DEADEND
W/ EXTENSION LINK
2/0 ACSR MAX WIRE

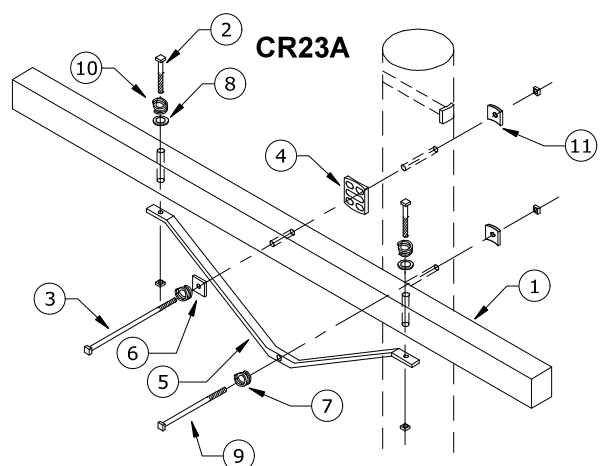
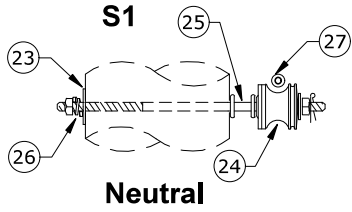
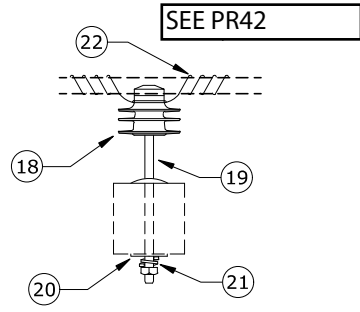
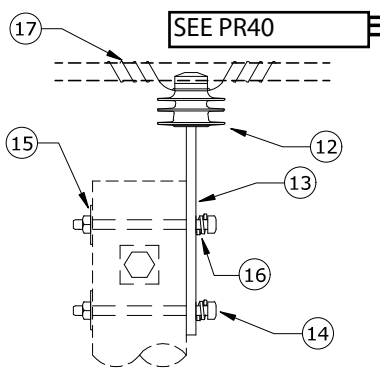
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CONSTRUCTION STANDARDS

3Ø SINGLE 8' CROSSARM W/ POLE TOP

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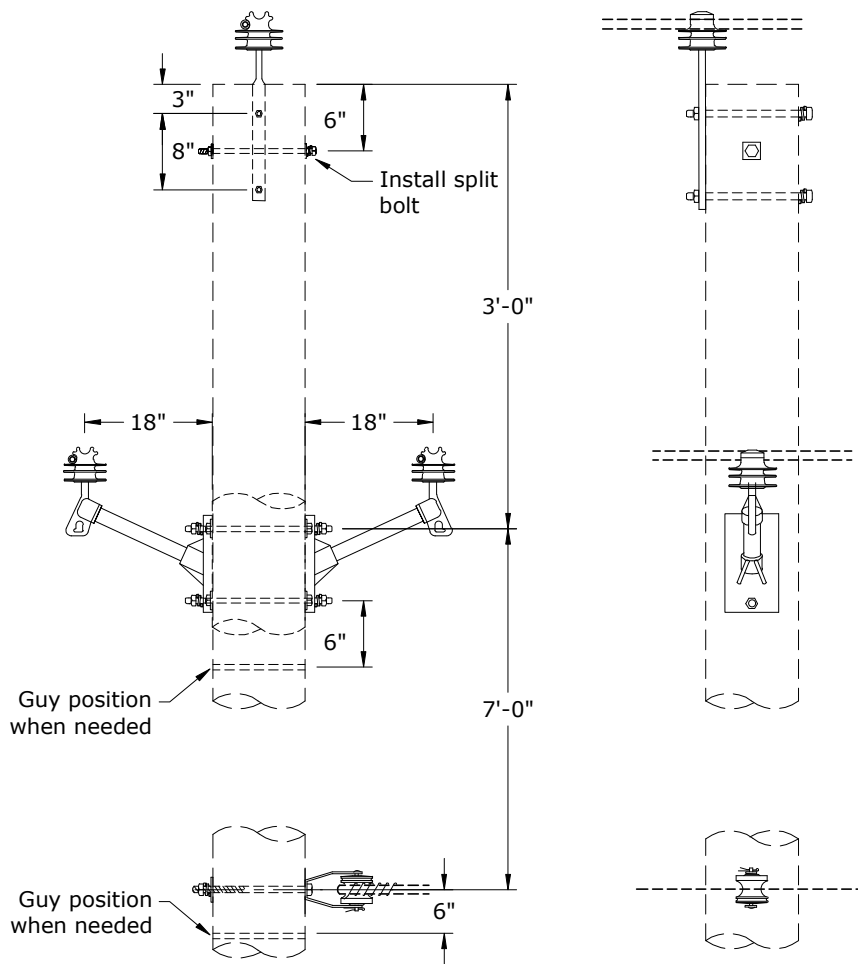


Rev. 3 - Eliminated porcelain pin insulators and added avian notes.

ITEM NO.	DESCRIPTION	C7A	
		CR23A	QTY.
1	Arm, Cross (Distr.), 8' x 3 3/4" x 4 3/4"	1	
2	Bolt, Machine, 1/2" x 7", Galv., 7800 lbs Ultimate Tensile	2	
3	Bolt, Machine, 5/8" x 16", Galv., 12,400 lbs Ultimate Tensile	1	
4	Gain, Pole Plastic	1	
5	Brace, Angle, 60"	1	
6	Washer, Square, Flat 5/8", 2 1/4" x 2 1/4"	1	
7	Washer, Lock, Spring, Double Coil, Galv., 5/8"	2	
8	Washer, Flat, Round, Galv., 1/2"	2	
9	Bolt, Machine, 5/8" x 12", Galv., 12,400 lbs Ultimate Tensile	1	
10	Washer, Lock, Spring, Double Coil, Galv., 1/2"	2	
11	Washer, Curved, Square, Cast, 3" x 3" x 3/8" Thick x 13/16" Hole	2	
ITEM NO.	DESCRIPTION	S1	
12	Insulator, Pin, Vise-top, Polymer	1	
13	Pin, Pole Top	1	
14	Bolt, Machine, 5/8" x 12", Galv., 12,400 lbs Ultimate Tensile	2	
15	Washer, Curved, Square, Cast, 3" x 3" x 3/8" Thick x 13/16" Hole	2	
16	Washer, Lock, Spring, Double Coil, Galv., 5/8"	2	
17			
ITEM NO.	DESCRIPTION	CR23A	
18	Insulator, Pin, Vise-top, Polymer	2	
19	Pin, Crossarm	2	
20	Washer, Square, Flat, 5/8", 2 1/4" x 2 1/4"	2	
21	Washer, Lock, Spring, Double Coil, Galv., 5/8"	2	
22			
ITEM NO.	DESCRIPTION	S1	
23	Washer, Curved, Square, Cast, 3" x 3" x 3/8" Thick x 13/16" Hole	1	
24	Insulator, Spool Clevis, Small, ANSI 53-2 Class	1	
25	Bolt, Double Upset, 5/8" x 14", Galv., 12,400 lbs Ultimate Tensile	1	
26	Washer, Lock, Spring, Double Coil, Galv., 5/8"	1	
27	Wire, Tie, AL Annealed #4 SD	10	

CONSTRUCTION STANDARDS
3Ø SINGLE 8' CROSSARM W/ POLE TOP

REVISIONS			
DATE	ENGR	OPS	



Notes:

1. Maximum line angle calculated for 3,000 lbs. MWT and 250-ft ruling span.
2. For C11-LA use PR41 (2) pole top insulators instead of PR40 (1) pole top insulator

CONSTRUCTION STANDARDS
 3Ø TWIGGY W/ POLE TOP
 -LA IS FOR LIGHT ANGLE

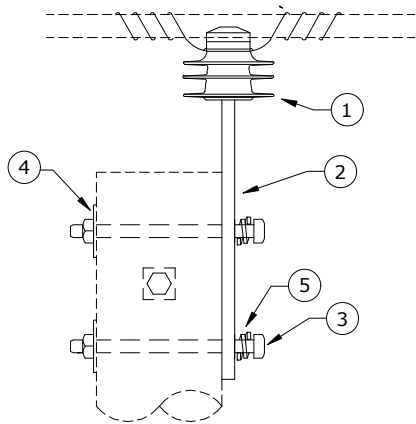
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1 of 2

C11 OR C11-LA

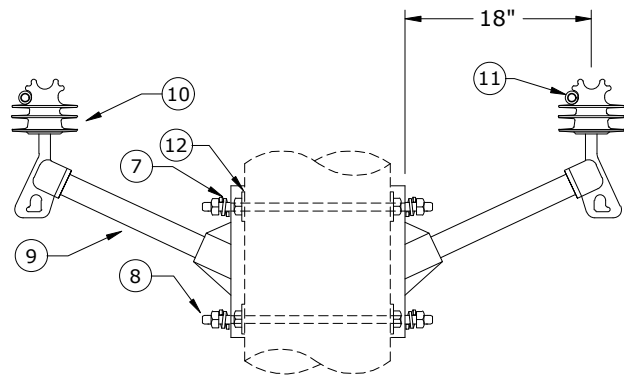
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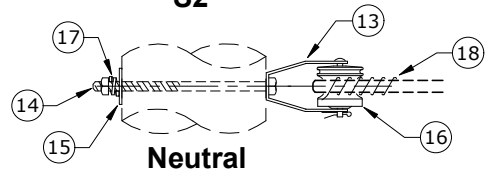
PR40



PR60V



S2



Neutral

ITEM NO.	DESCRIPTION	C11	C11-LA
		PR1	PR41
		QTY.	QTY.
1	Insulator, Pin, Vise-top, Polymer	1	2
2	Pin, Pole Top	1	2
3	Bolt, Machine, 5/8" x 12", Galv., 12,400 lbs Ultimate Tensile	2	2
4	Washer, Curved, Square, Cast, 3" x 3" x 3/8" Thick x 13/16" Hole	2	
5	Washer, Lock, Spring, Double Coil, Galv., 5/8"	2	2
ITEM NO.	DESCRIPTION	PR61	
		QTY.	QTY.
7	Washer, Lock, Spring, Double Coil, Galv., 5/8"	4	4
8	Bolt, Double Arm, 5/8" x 18", Galv., 12,400 lbs Ultimate Tensile	2	2
9	Arm, Epoxy 18" 2500 lbs	2	2
10	Insulator, Pin, Vise-top, Polymer	2	2
12	Washer, Flat Round Galv., 5/8"	4	4
ITEM NO.	DESCRIPTION	S2	
		QTY.	QTY.
13	Clevis, D.E. Insulator 1340	1	1
14	Bolt, Machine, 5/8" x 14", Galv., 12,400 lbs Ultimate Tensile	1	1
15	Washer, Curved, Square, Cast, 3" x 3" x 3/8" Thick x 13/16" Hole	1	1
16	Insulator, Spool Clevis, Small, ANSI 53-2 Class	1	1
17	Washer, Lock, Spring, Double Coil, Galv., 5/8"	1	1
18	Wire, Tie, AL Annealed #4 SD	10	10

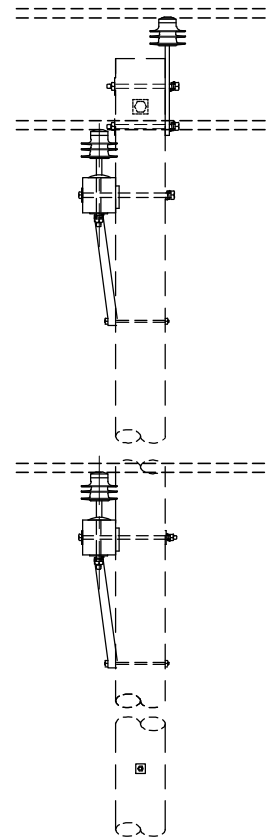
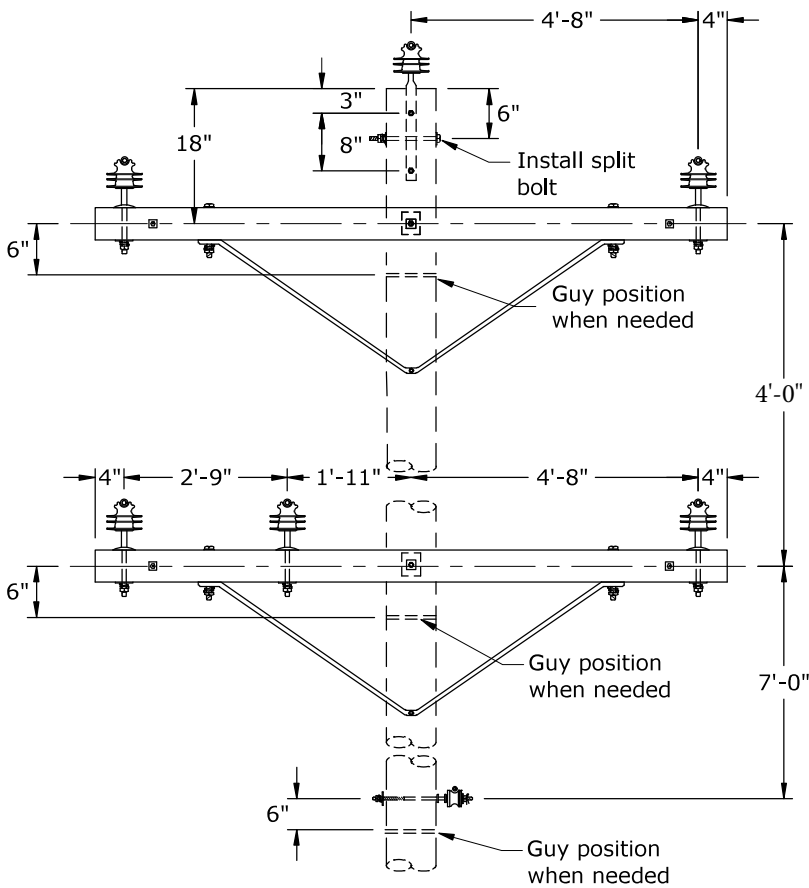
CONSTRUCTION STANDARDS
 3Ø TWIGGY W/ POLE TOP
 -LA IS FOR LIGHT ANGLE

PAGE:
2 of 2

C11 OR C11-LA

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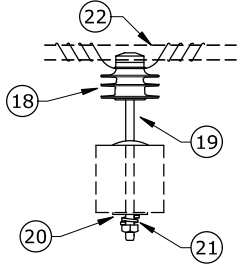
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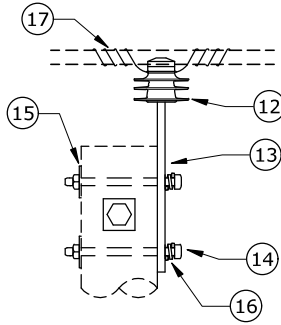
CONSTRUCTION STANDARDS
 3Ø SINGLE 10' CROSSARM
 DOUBLE CIRCUIT

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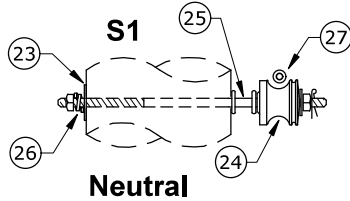
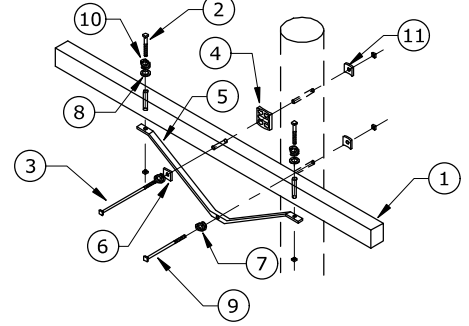
PR4,PR4TREE



PR1,PR1TREE



CR23B



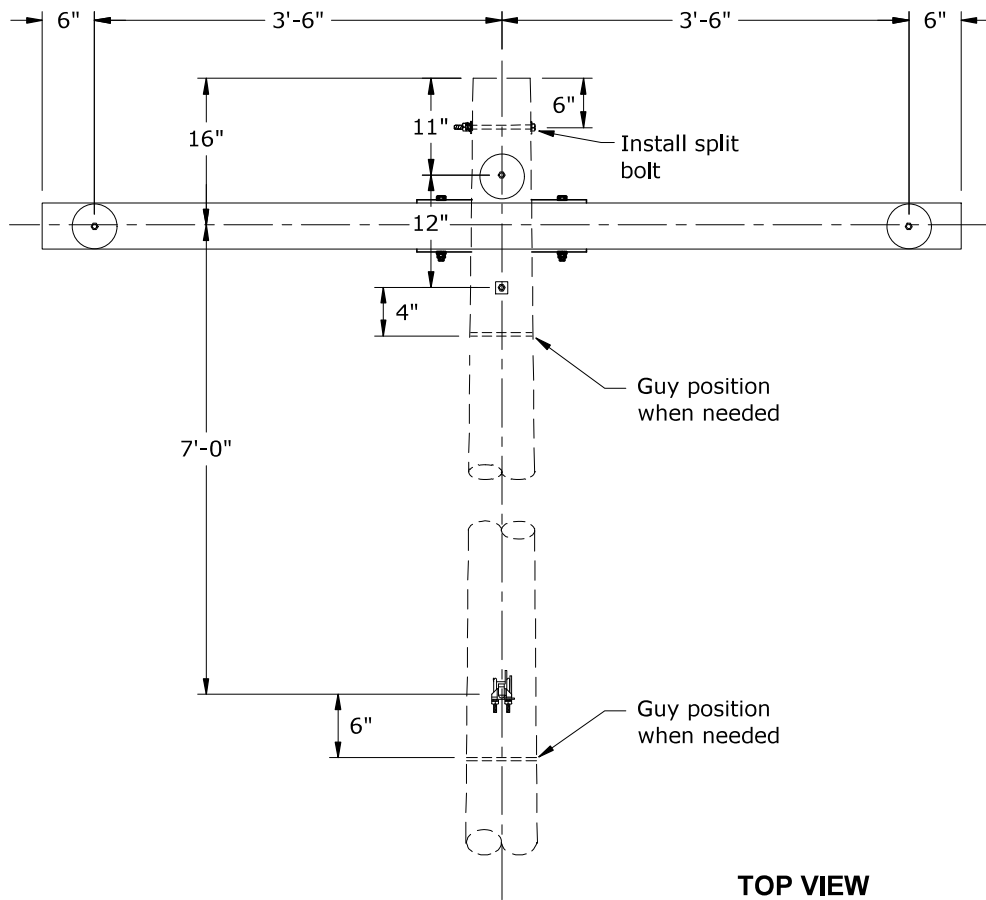
Rev. 1 - Eliminated porcelain pin insulators and added avian notes.

ITEM NO.	DESCRIPTION	C19B	
		CR23B (2)	QTY.
1	Arm, Cross (Distr.), 10' x 3 3/4" x 4 3/4"	2	
2	Bolt, Machine, 1/2" x 7", Galv., 7800 lbs Ultimate Tensile	4	
3	Bolt, Machine, 5/8" x 16", Galv., 12,400 lbs Ultimate Tensile	2	
4	Gain, Pole Plastic	2	
5	Brace, Angle, 72"	2	
6	Washer, Square, Flat, 5/8", 2 1/4" x 2 1/4"	2	
7	Washer, Lock, Spring, Double Coil, Galv., 5/8"	4	
8	Washer, Flat, Round, Galv., 1/2"	4	
9	Bolt, Machine, 5/8" x 12", Galv., 12,400 lbs Ultimate Tensile	2	
10	Washer, Lock, Spring, Double Coil, Galv., 1/2"	4	
11	Washer, Curved, Square, Cast, 3" x 3" x 3/8" Thick x 13/16" Hole	4	
ITEM NO.	DESCRIPTION	S1	
		QTY.	
12	Insulator, Pin, Vise-top, Polymer	1	
13	Pin, Pole Top	1	
14	Bolt, Machine, 5/8" x 12", Galv., 12,400 lbs Ultimate Tensile	2	
15	Washer, Curved, Square, Cast, 3" x 3" x 3/8" Thick x 13/16" Hole	2	
16	Washer, Lock, Spring, Double Coil, Galv., 5/8"	2	
17			
ITEM NO.	DESCRIPTION	S1	
		QTY.	
18	Insulator, Pin, Vise-top, Polymer	5	
19	Pin, Crossarm	5	
20	Washer, Square, Flat, 5/8", 2 1/4" x 2 1/4"	5	
21	Washer, Lock, Spring, Double Coil, Galv., 5/8"	5	
22			
ITEM NO.	DESCRIPTION	S1	
		QTY.	
23	Washer, Curved, Square, Cast, 3" x 3" x 3/8" Thick x 13/16" Hole	1	
24	Insulator, Spool Clevis, Small, ANSI 53-2 Class	1	
25	Bolt, Double Upset, 5/8" x 14", Galv., 12,400 lbs Ultimate Tensile	1	
26	Washer, Lock, Spring, Double Coil, Galv., 5/8"	1	
27	Wire, Tie, AL Annealed #4 SD	10	

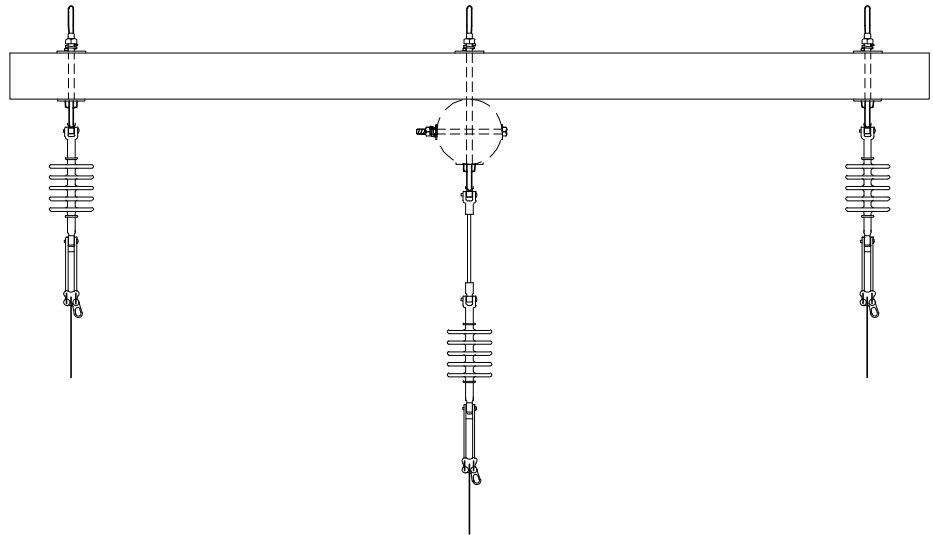
CONSTRUCTION STANDARDS
3Ø SINGLE 10' CROSSARM
DOUBLE CIRCUIT

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FRONT VIEW



TOP VIEW



CONSTRUCTION STANDARDS

8' PRE-ASSEMBLED DEADEND
397 AAC MAX WIRE

REVISIONS

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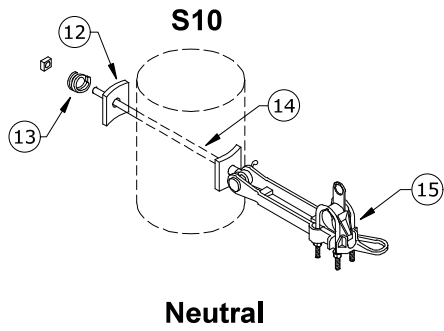
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C50A

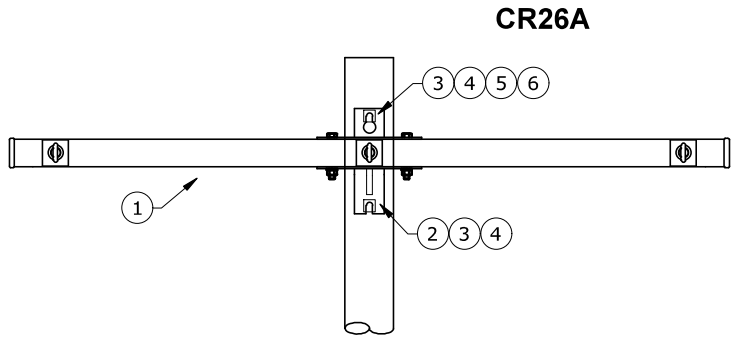
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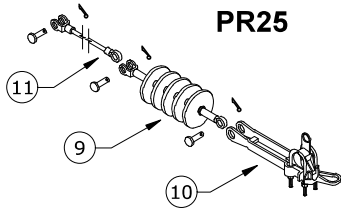
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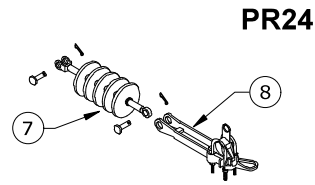
Neutral



Back View



Center Phase



Road & Field Phases

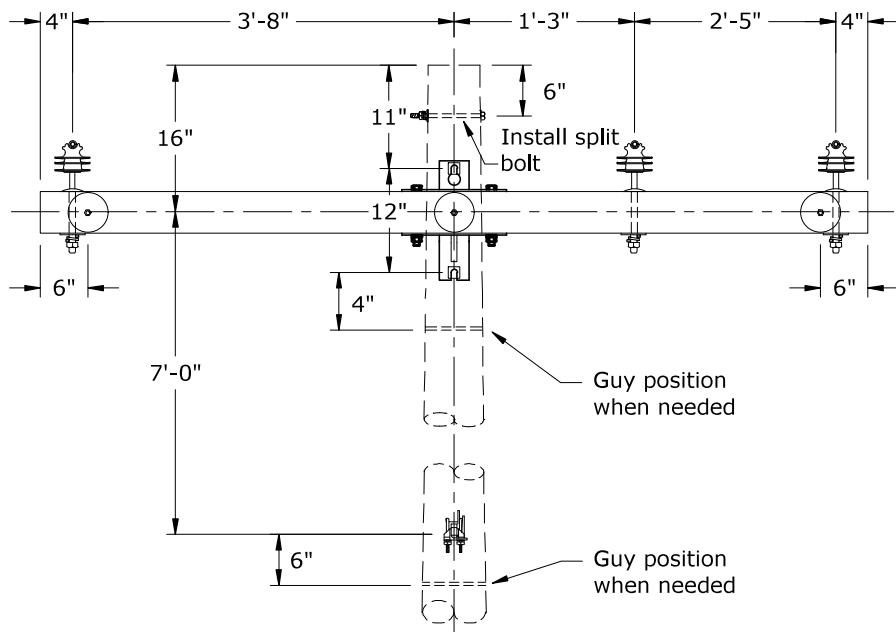
Rev. 4 - Added avian note.

ITEM NO.	DESCRIPTION	C50A	
		QTY.	CR26A
1	Arm, Deadend Assembly, 8', 3-position, 397 Max	1	
2	Bolt, Machine, 3/4" x 14", Galv., 18,350 lbs Ultimate Tensile	1	
3	Washer, Lock, Spring, Double Coil, Galv., 3/4"	2	
4	Washer, Curved, Square, Cast, 3" x 3" x 3/8" Thick x 13/16" Hole	2	
5	Nut, Eye Oval 3/4", Galv.	1	
6	Bolt, Machine, 3/4" x 16", Galv., 18,350 lbs Ultimate Tensile	1	
ITEM NO.	DESCRIPTION	PR24 (2)	
		QTY.	
7	Insulator, Suspension, 15 kV Clevis-Tongue, Polymer Type	2	
8	Clamp, Strain, Distribution, #2 to 397.5	2	
ITEM NO.	DESCRIPTION	PR25	
		QTY.	
9	Insulator, Suspension, 15 kV Clevis-Tongue, Polymer Type	1	
10	Clamp, Strain, Distribution, #2 to 397.5	1	
11	Insulator, Guy Strain, Fiberglass, 20"	1	
ITEM NO.	DESCRIPTION	S10	
		QTY.	
12	Washer, Curved, Square, Cast, 3" x 3" x 3/8" Thick x 13/16" Hole	2	
13	Washer, Lock, Spring, Double Coil, Galv., 5/8"	1	
14	Bolt, Eye, 5/8" x 14", Galv., 12,400 lbs Ultimate Tensile	1	
15	Clamp, Strain, Distribution, #2 - 397.5	1	

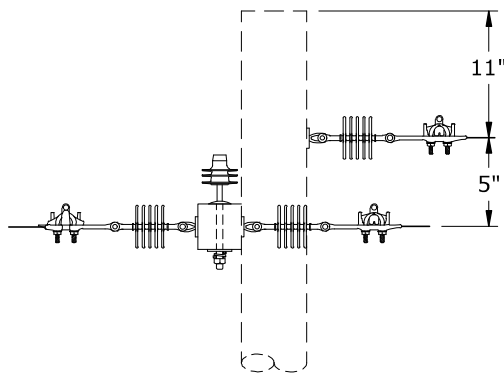
CONSTRUCTION STANDARDS
8' PRE-ASSEMBLED DEADEND
397 AAC MAX WIRE

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FRONT VIEW



SIDE VIEW



CONSTRUCTION STANDARDS
 8' PRE-ASSEMBLED DOUBLE DEADEND
 397 AAC MAX WIRE

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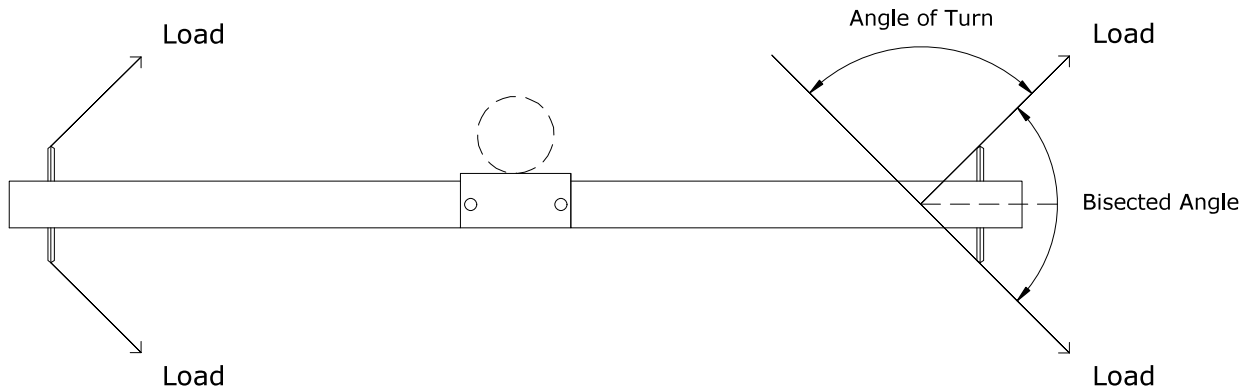
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DEADEND FOR ANGLED SPANS



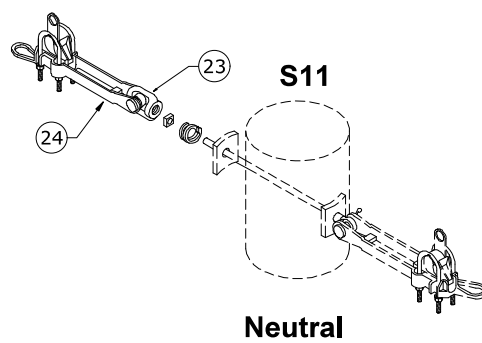
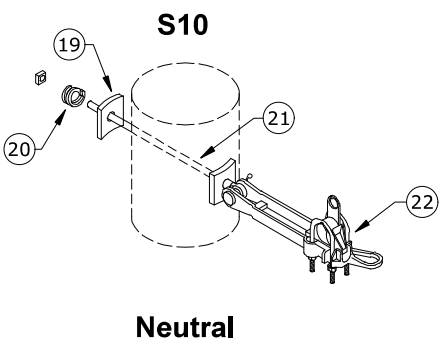
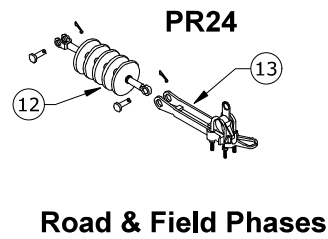
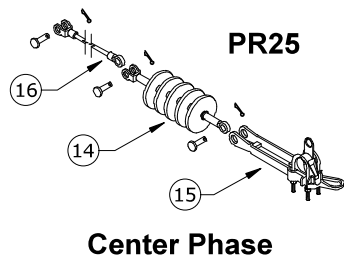
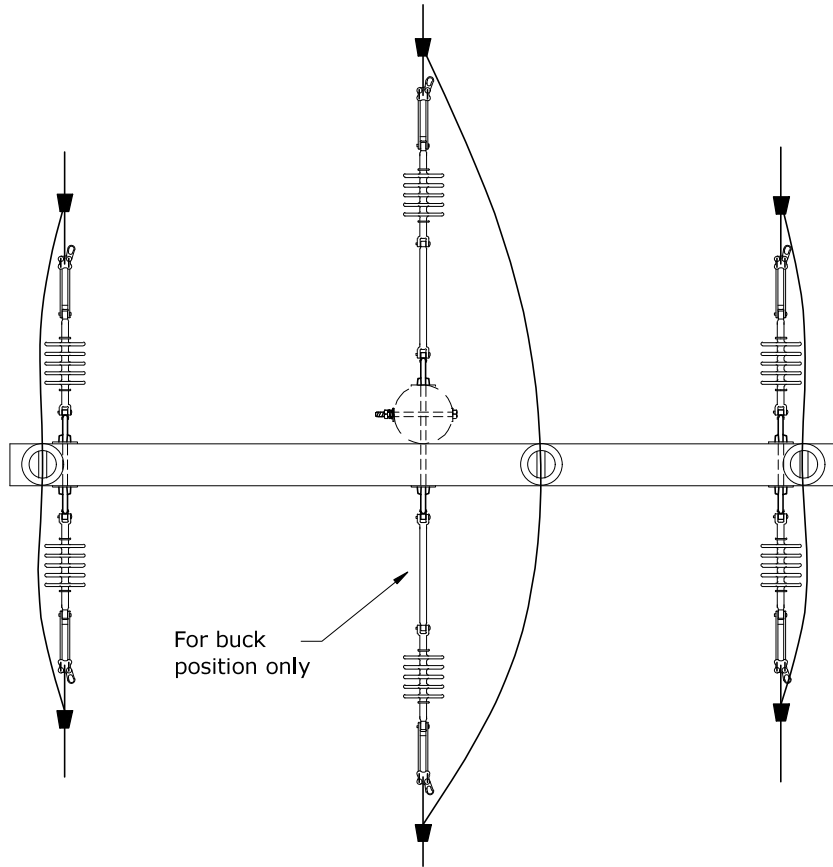
Notes:

1. Maximum angle with 397 is 60°, limited by the 3/4" machine bolt.
2. Angle must be bisected so that each eye-nut has half the angle.

Rev. 4 - Eliminated porcelain pin insulators and added avian notes.

	<h2 style="margin: 0;">CONSTRUCTION STANDARDS</h2> <p style="margin: 0;">8' PRE-ASSEMBLED DOUBLE DEADEND 397 AAC MAX WIRE</p>		REVISIONS		
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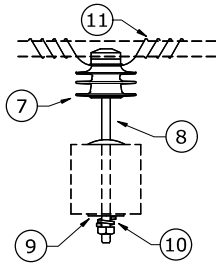
TOP VIEW



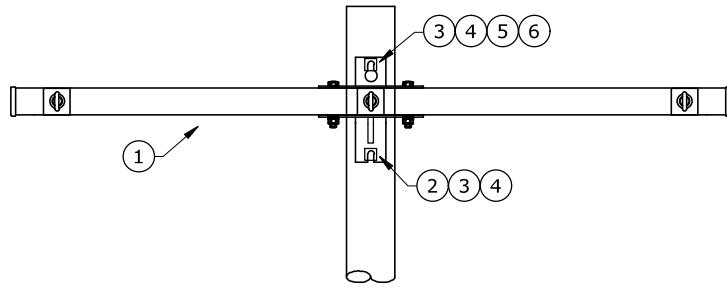
CONSTRUCTION STANDARDS
8' PRE-ASSEMBLED DOUBLE DEADEND
397 AAC MAX WIRE

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PR4,PR4TREE



CR26A



Front View

Rev. 4 - Eliminated porcelain pin insulators and added avian notes.

ITEM NO.	DESCRIPTION	C51A	
		QTY.	S/N
1	Arm, Deadend Assembly, 8', 3-position, 397 Max	1	2508
2	Bolt, Machine, 3/4" x 14", Galv., 18,350 lbs Ultimate Tensile	1	174
3	Washer, Lock, Spring, Double Coil, Galv., 3/4"	2	2218
4	Washer, Curved, Square, Cast, 3" x 3" x 3/8" Thick x 13/16" Hole	2	1392
5	Nut, Eye Oval 3/4"	1	914
6	Bolt, Machine, 3/4" x 16", Galv., 18,350 lbs Ultimate Tensile	1	175
ITEM NO.	DESCRIPTION	CR26A	
		QTY.	S/N
7	Insulator, Pin, Vise-top, Polymer	3	1968 *
8	Pin, Crossarm	3	961
9	Washer, Square, Flat, 5/8", 2 1/4" x 2 1/4"	3	1412
10	Washer, Lock, Spring, Double Coil, Galv., 5/8"	3	2217
11		30	1421
ITEM NO.	DESCRIPTION	PR4 (3)	
		QTY.	S/N
12	Insulator, Suspension, 15 kV Clevis-Tongue, Polymer Type	4	1967
13	Clamp, Strain, Distribution, #2 to 397.5	4	302
ITEM NO.	DESCRIPTION	PR24 (4)	
		QTY.	S/N
14	Insulator, Suspension, 15 kV Clevis-Tongue, Polymer Type	2	1967
15	Clamp, Strain, Distribution, #2 to 397.5	2	302
16	Insulator, Guy Strain, Fiberglass 20"	2	2909
ITEM NO.	DESCRIPTION	PR25 (2)	
		QTY.	S/N
17	Connector, Tap, Wedge, 4/0 to 4/0	8	2501
18	C		
ITEM NO.	DESCRIPTION	Additional Material	
		QTY.	S/N
19	Washer, Curved, Square, Cast, 3" x 3" x 3/8" Thick x 13/16" Hole	2	1392
20	Washer, Lock, Spring, Double Coil, Galv., 5/8"	1	2217
21	Bolt, Eye, 5/8" x 14", Galv., 12,400 lbs Ultimate Tensile	1	108
22	Clamp, Strain, Distribution, #2 - 397.5	1	302
ITEM NO.	DESCRIPTION	S10	
		QTY.	S/N
23	Nut, Eye Oval 5/8"	1	913
24	Clamp, Strain, Distribution, #2 - 397.5	1	302
ITEM NO.	DESCRIPTION	S11	
		QTY.	S/N
23	Nut, Eye Oval 5/8"	1	913
24	Clamp, Strain, Distribution, #2 - 397.5	1	302

CONSTRUCTION STANDARDS
8' PRE-ASSEMBLED DOUBLE DEADEND
397 AAC MAX WIRE

REVISIONS

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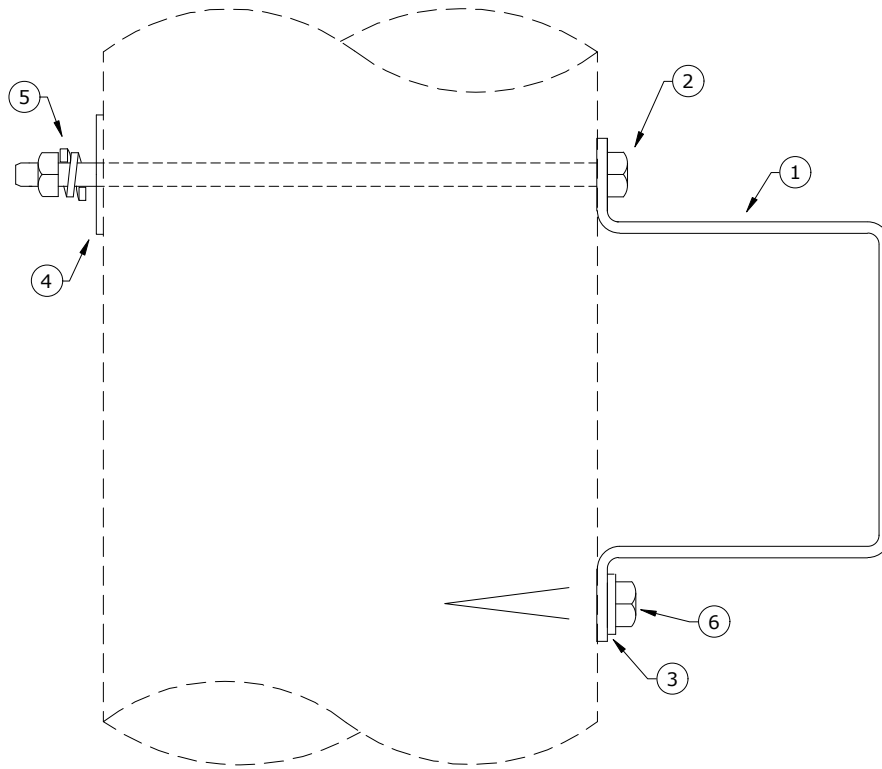
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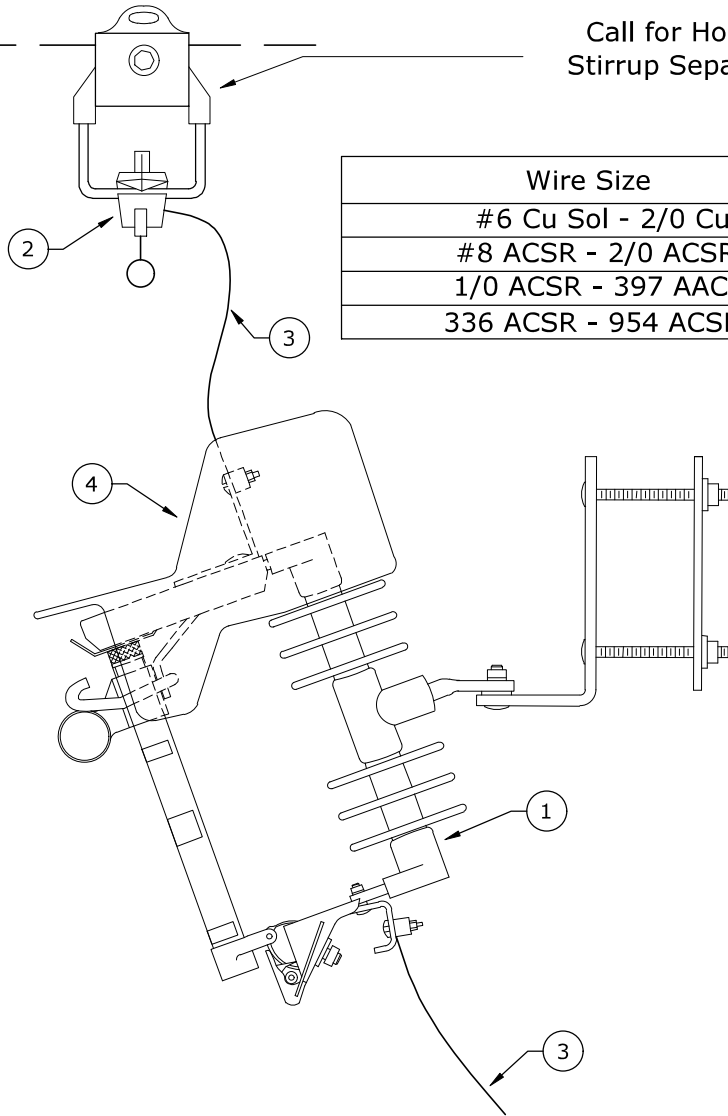


ITEM NO.	DESCRIPTION	CO1	
		QTY.	
1	Bracket, Pole Mount, Cutout	1	
2	Bolt, Machine 5/8" x 10" Galv.	1	
3	Washer, Flat Round Galv. 1/2"	1	
4	Washer, Square Flat 5/8" x 2 1/4" x 2 1/4"	1	
5	Washer, Double Ring 5/8"	1	
6	Screw, Lag 1/2" x 3" Drive Point	1	

CONSTRUCTION STANDARDS
POLE MOUNTING BRACKET FOR
CUTOUT & LIGHTNING ARRESTOR

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Call for Hot Line
Stirrup Separately.



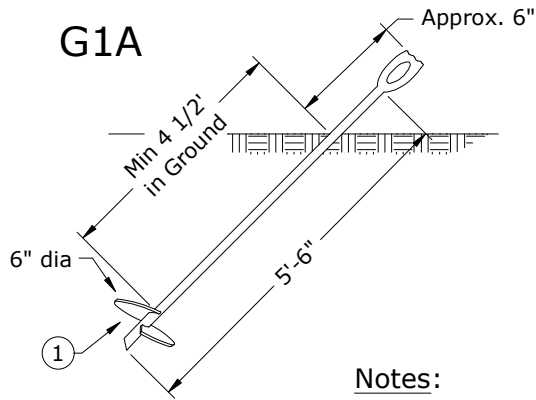
Wire Size	Bail Size	
#6 Cu Sol - 2/0 Cu	#1 Cu	
#8 ACSR - 2/0 ACSR	#1 Cu	
1/0 ACSR - 397 AAC	1/0 Cu	
336 ACSR - 954 ACSR	2/0 Cu	

- Notes:**
1. This cutout is rated up to 100 A.
 2. For loads greater than 100 A use Std CO200 - Universal Cutout 200 A.
 3. By replacing the tube with a slug (solid blade S/N 2168) this cutout becomes an unfused 300 A disconnect.
 4. The Loadbuster tool will allow interruption of currents up to 900 A.
 5. A linkbreak door (S/N 2533) is available for locations that prevent use of the Loadbuster tool for loads up to 100 A.

ITEM NO.	DESCRIPTION	CO100	
		QTY.	
1	Cutout, Polymer, Universal, 100A, 16kA Asymetrical	1	
2	Clamp, Hot Line, GP1530, Line #6 Solid - 400 MCM, Tap #6 Solid - 4/0 Str, Cu Only	1	
3	Conductor, OH, 600V, Cu, #4, 7-Str, XLPE, 60 mil, Soft-drawn, 1C, RHW-2	15	
4	Guard, Wildlife, Cutout, Polymer	1	

CONSTRUCTION STANDARDS
UNIVERSAL CUTOUT
100 AMP

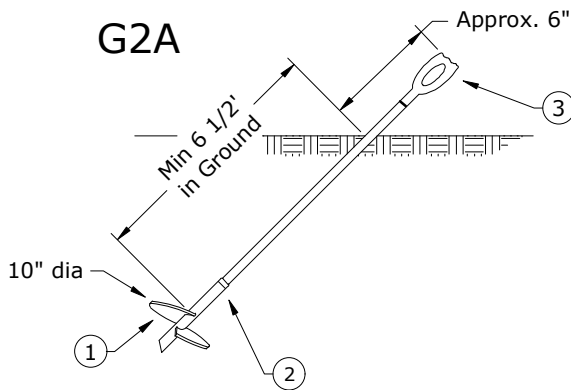
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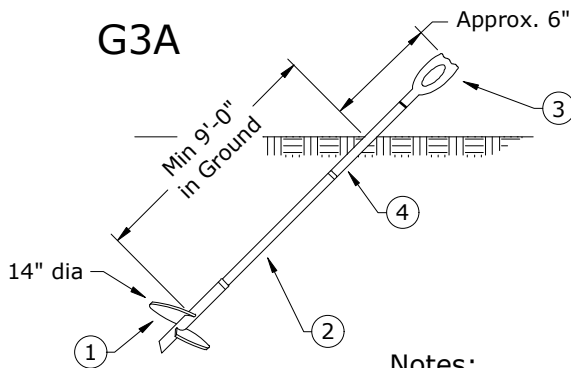
G1A	
ULTIMATE HOLDING CAPACITY	
Soil Class	(lbs)
7	2,500
6	5,000
5	6,500
Max Torque Rating is 400 ft.-lbs.	

Notes:

1. Only this anchor may be hand installed (use in #5 to #7 soil).
2. A minimum of 4 1/2' of the G1A anchor/rod from the top of the helix must be in the ground to obtain rated holding capacity.



ULTIMATE HOLDING CAPACITY		
Torque (ft.-lbs)	G2A	G3A
	(lbs)	
	10" Helix 1" x 7' Rod	14" Helix 1" x 7' Rod + 3 1/2' Rod
500	4,200	7,350
1,000	7,600	10,700
1,500	11,000	14,050
2,000	14,400	17,400
2,500	17,800	20,750
3,000	21,200	24,100
3,500	24,600	27,450
4,000	28,000	30,800
4,500	31,400	34,150
5,000	34,800	36,000



Notes:

1. A minimum of 6 1/2' of the G2A anchor/rod from the top of the helix must be in the ground to obtain the rated holding capacity.
2. A minimum of 9' of the G3A anchor/rod from the top of the helix must be in the ground to obtain the rated holding capacity.

CONSTRUCTION STANDARDS
SINGLE HELIX SCREW ANCHORS

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Notes:

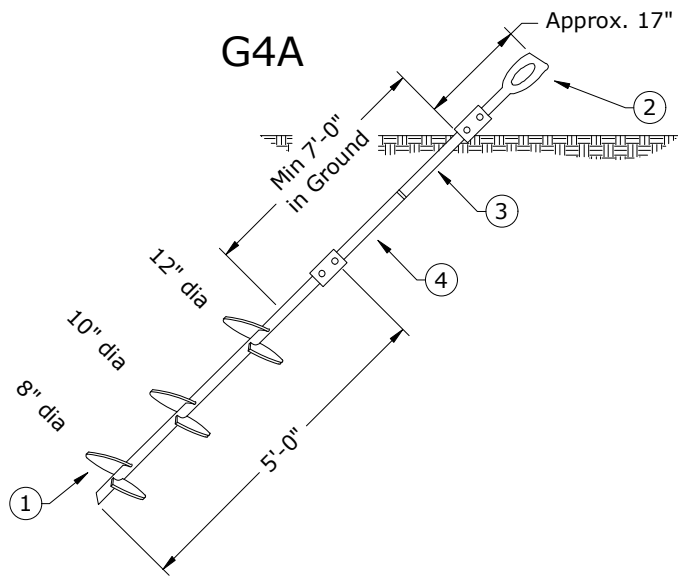
1. See Std. G for application guidelines.
2. Install anchor rods at the same slope as the guy strand.
3. G2A and G3A are rated 15,000* ft-lbs torque and 36,000 lbs. ultimate tensile strength.
4. Holding capacity based on Chance anchoring systems.

ITEM NO.	DESCRIPTION	G1A	
		QTY.	
1	6" Helix Screw Anchor	1	

ITEM NO.	DESCRIPTION	G2A	
		QTY.	
1	10" Helix Screw Anchor, 15,000 ft-lbs.	1	
2	Anchor Rod 1" x 7' - 36,000 lbs. Ultimate Tensile	1	
3	Triple Eye Anchor Nut 1"	1	

ITEM NO.	DESCRIPTION	G3A	
		QTY.	
1	14" Helix Screw Anchor, 15,000 ft-lbs.	1	
2	Anchor Rod 1" x 7' - 36,000 lbs. Ultimate Tensile	1	
3	Triple Eye Anchor Nut 1"	1	
4	Anchor Rod 1" x 3 1/2' - 36,000 lbs. Ultimate Tensile	1	

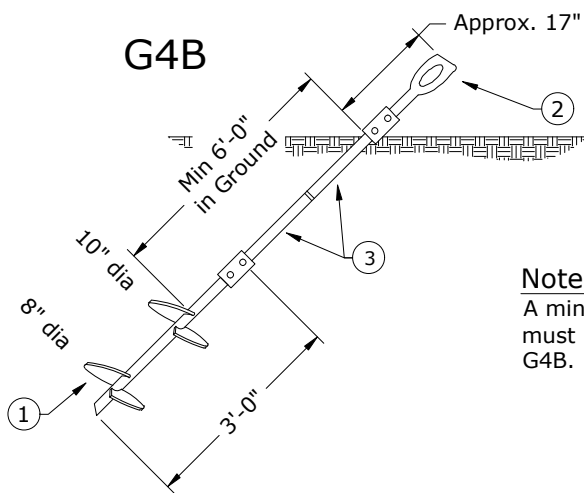
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	SINGLE HELIX SCREW ANCHORS		△	DATE	ENGR	OPS
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PAGE: 2 of 2	G1A,G2A,G3A	CAD FILE:	APP:	SECTION		
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Note:

A minimum of 7' of the anchor/rod from the top of the 12" helix must be in the ground to obtain the rated holding capacity for G4A.

ULTIMATE HOLDING CAPACITY		
Torque (ft-lbs)	G4A	G4B
	(lbs)	
	8-10-12" (3) 1 3/4" x 3 1/2' Rod	8"-10" (2) 1 3/4" x 3 1/2' Rod
500	NA	NA
1,000	NA	NA
1,500	19,000	17,000
2,000	25,000	23,000
2,500	31,000	29,000
3,000	38,000	34,000
3,500	44,000	40,000
4,000	50,000	46,000
4,500	56,000	52,000
5,000	62,000	58,000
5,500	69,922	64,140
6,000	76,279	69,971
6,500	82,635	75,802
7,000	88,992	81,633
7,500	95,348	87,464
8,000	100,000	93,295
8,500	100,000	99,126
9,000	100,000	100,000



Note:

A minimum of 6' of the anchor/rod from the top of the 10" helix must be in the ground to obtain the rated holding capacity for G4B.

Notes:

1. See Std. G for application guidelines.
2. Install anchor rods at the same slope as the guy strand.
3. The G4A is for use in soft soils and G4B can be used in hard or rocky soils. They will hold up to 100,000 lbs ultimate and can be installed with torque up to 11,000 ft-lbs (22 pins). Rod is 1 3/4" square shaft.
4. Use as many extensions as needed to obtain the desired torque.
5. Holding capacity based on Chance anchoring system.

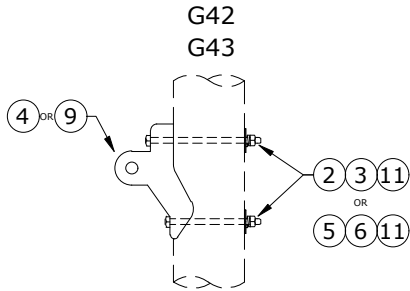
ITEM NO.	DESCRIPTION	G4A	
		QTY.	S/N
1	8-10-12" Helix Screw Anchor, 100,000 lbs. Ultimate	1	
2	Triple Eye 1 3/4" Guy Attachment	1	
3	3 1/2' Anchor Rod, 1 3/4" Square Shaft, 11,000 ft-lbs. Ultimate	1	
4	7' Anchor Rod, 1 3/4" Square Shaft, 11,000 ft-lbs. Ultimate	1	

ITEM NO.	DESCRIPTION	G4B	
		QTY.	S/N
1	8-10" Helix Screw Anchor, 100,000 lbs. Ultimate	1	
2	Triple Eye 1 3/4" Guy Attachment	1	
3	3 1/2' Anchor Rod, 1 3/4" Square Shaft, 11,000 ft-lbs. Ultimate	2	

CONSTRUCTION STANDARDS
MULTI-HELIX SCREW ANCHORS

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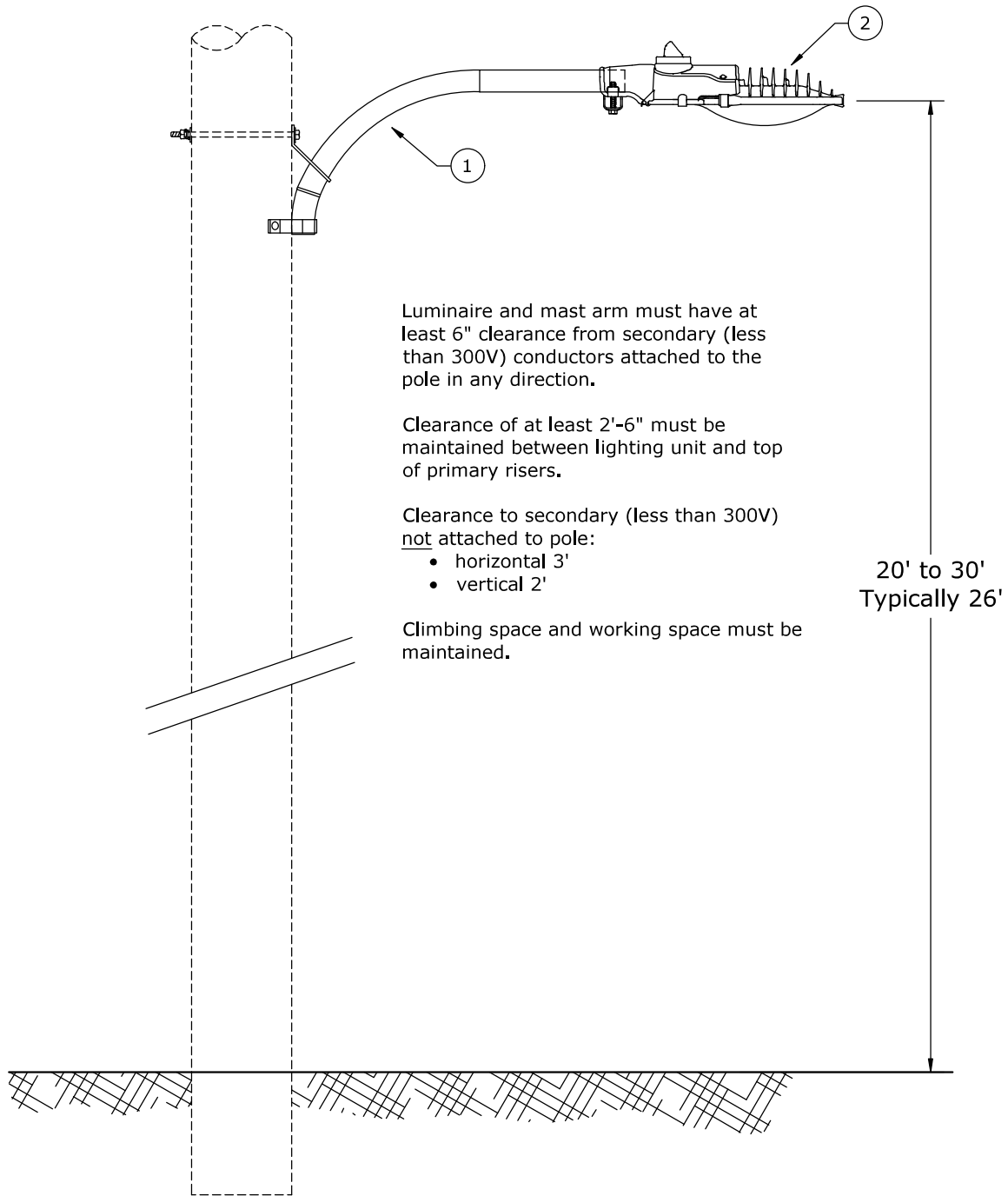
Note: For a head guy, turn attachment upside down.



ITEM NO.	DESCRIPTION	G42	
		QTY.	S/N
2	Machine Bolt, 3/4" x 14", 18,350 lbs. Ultimate Tensile	2	174
3	Curved Washer, Cast, 4" x 4"	2	1910
4	Pole Eye Plate, 21,000 lbs. Ultimate Tensile	1	988
11	Double Coil Spring Lock Washer 3/4"	2	2218

CONSTRUCTION STANDARDS
SINGLE GUY ATTACHMENTS

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Luminaire and mast arm must have at least 6" clearance from secondary (less than 300V) conductors attached to the pole in any direction.

Clearance of at least 2'-6" must be maintained between lighting unit and top of primary risers.

Clearance to secondary (less than 300V) not attached to pole:

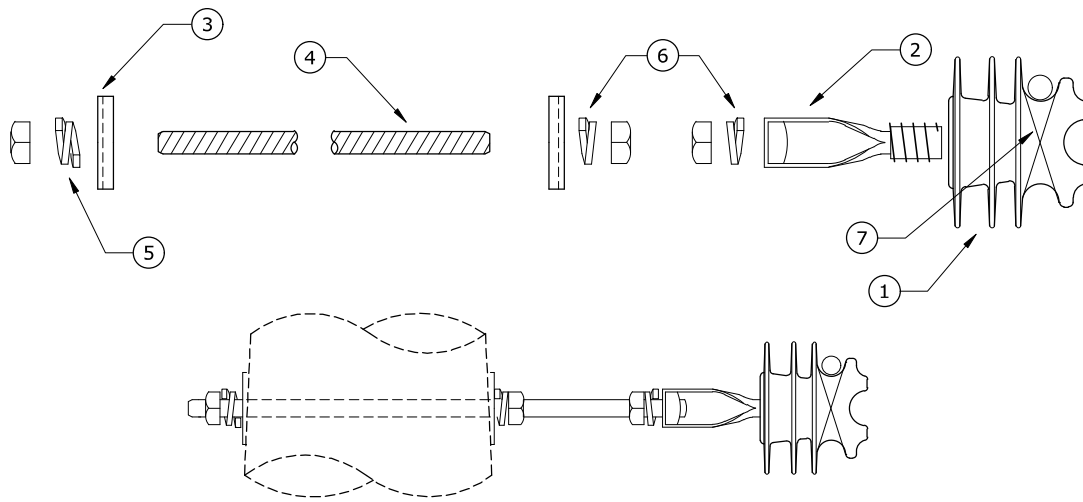
- horizontal 3'
- vertical 2'

Climbing space and working space must be maintained.

20' to 30'
Typically 26'

Notes: Installation meets NESC not NEC.

ITEM NO	DESCRIPTION	HLLED	
		QTY	
1	Arm, Mast, Al, 4', 6', or 12'	1	
2	Evluma Areamax-AX 30-50-5-D-P-STD-10 30 Watt, 5000k	1	
CONSTRUCTION STANDARDS AREA LED LIGHT HIGH LIGHT WOOD POLE MOUNTED		REVISIONS	
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PR20 - for bare wire- use bare tie wire
PR20TREE - for tree wire- use covered tie wire

Note: See Std TI4 - Conductor Tying Guide.

ITEM NO.	DESCRIPTION	PR20	
		QTY.	
1	Insulator, Pin, C Neck, Polymer	1	
2	Pin, Adapter	1	
3	Washer, Curved, Square, Cast, 3" x 3" x 3/8" Thick x 13/16" Hole	2	
4	Bolt, Double Arm, 5/8" x 16" Galv., 12,400 lbs Ultimate Tensile *	1	
5	Washer, Lock, Spring, Double Coil, Galv., 5/8"	1	
6	Washer, Lock, Spring, Single Coil, Galv., 5/8"	2	
7	Wire, Tie, AL Annealed #4 SD	10	

CONSTRUCTION STANDARDS
 BASIC UNITS
 HORIZONTAL JUMPER SUPPORT

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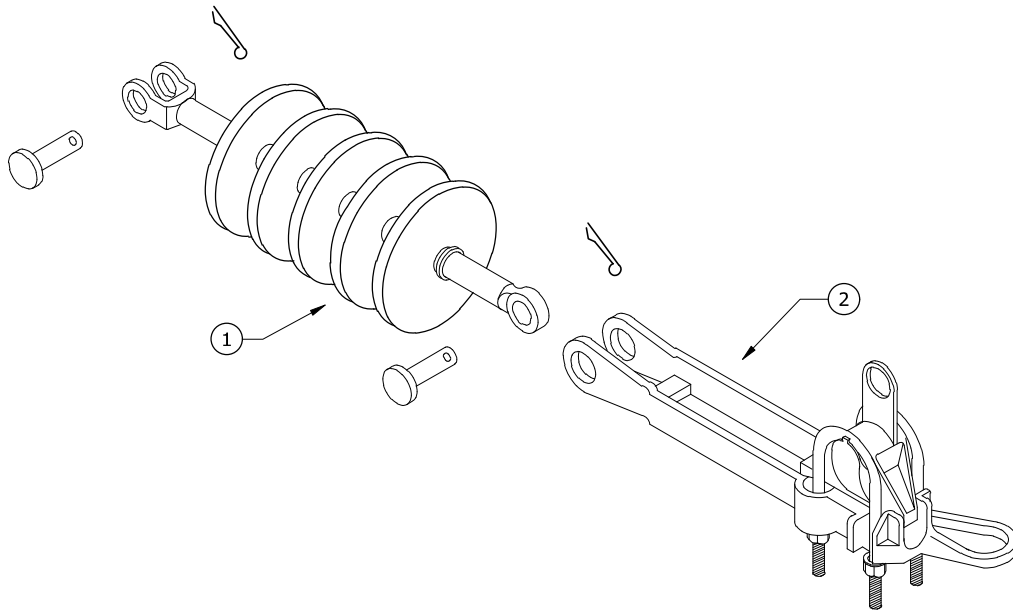
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PR20

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ITEM NO.	DESCRIPTION	PR24	
		QTY.	
1	Insulator, Susp. 15 kV Clevis-Tongue, Polymer ✱	1	
2	Clamp, Strain, Distribution, #2 to 397.5 MCM	1	

CONSTRUCTION STANDARDS
BASIC UNITS
DEADEND

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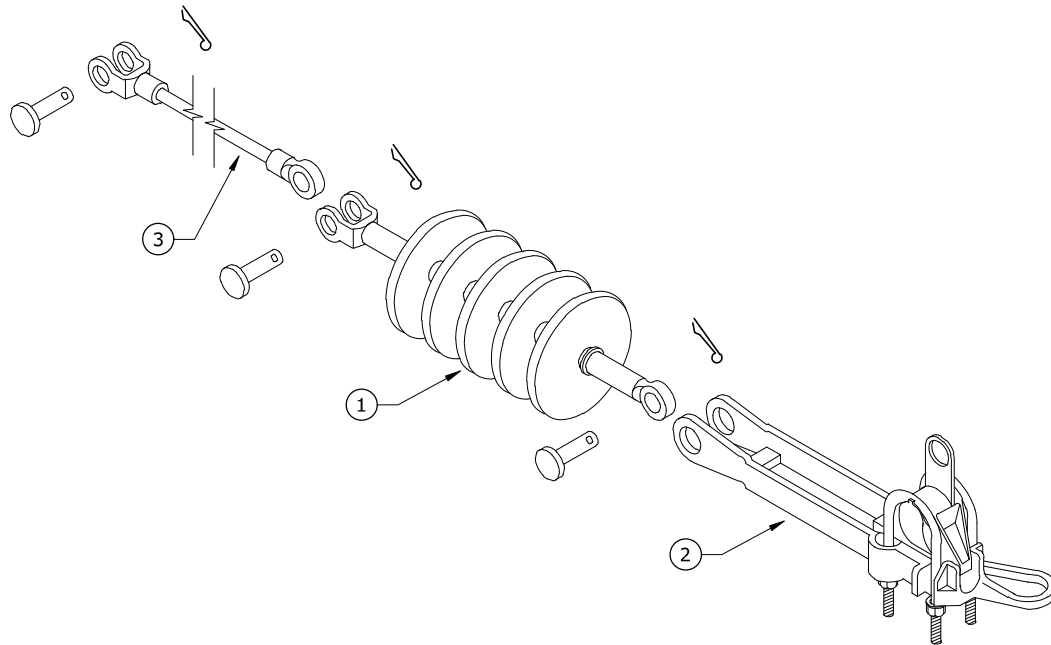
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SECTION



NOTE:
 BETWEEN POLES 17 & 18, P1.2 USE EITHER A TOUNGUE-TOUNGUE SUSPENSION
 OR STRAIN INSULATOR FOR MIDLINE DOUBLE DEADEND

ITEM NO.	DESCRIPTION	PR25	
		QTY.	
1	Insulator, Susp. 15 kV Clevis-Tounge, Polymer ✱	1	
2	Clamp, Strain, Distribution, #2 to 397.5 MCM	1	
3	Insulator, Guy Strain, Fiberglass, 20"	1	

CONSTRUCTION STANDARDS
 BASIC UNITS
 DEADEND WITH EXTENSION

REVISIONS			
△	DATE	ENGR	OPS

PAGE:
1 of 1

PR25

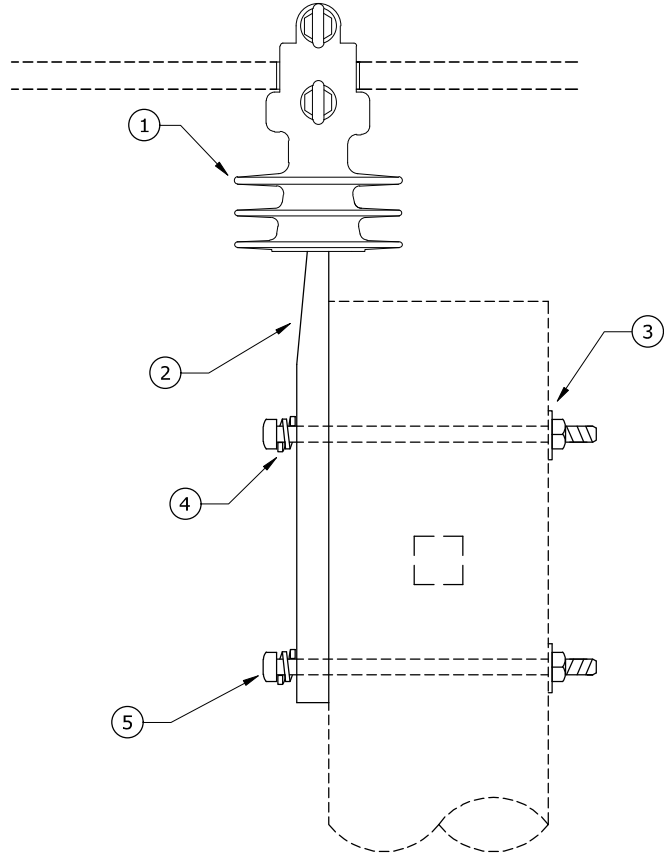
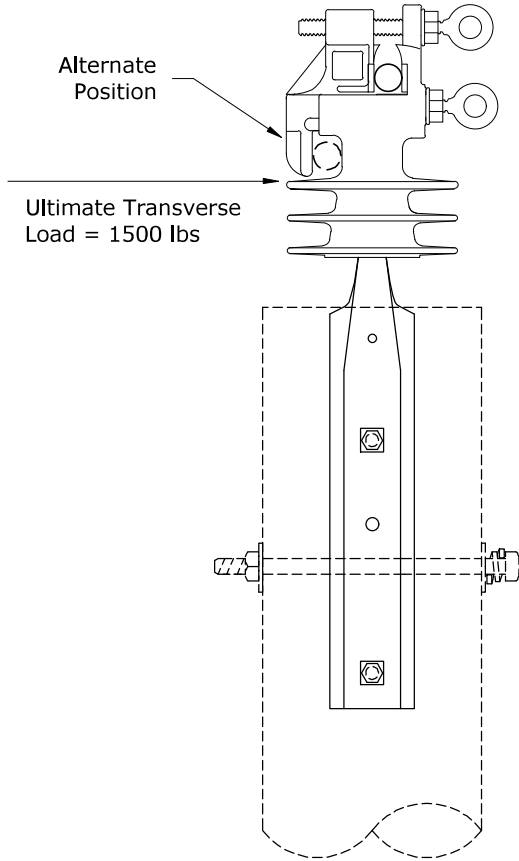
CAD FILE:

APP:
DATE:

SECTION

Installation:

- 1st tighten the bottom bolt until ring breaks off
- 2nd tighten the top bolt until ring breaks off
- Remove bolts with socket stick
- Do not reuse bolts after rings have broken off



- Notes:**
1. Ultimate transverse load = 1,500 lbs. Ultimate longitudinal load = 1,200 lbs.
 2. Replacement vise-top insulator bolts

ITEM NO.	DESCRIPTION	PR40	
		QTY.	
1	Insulator, Vise-Top, Polymer ✱	1	
2	Pin, Pole Top ✱	1	
3	Washer, Curved, Square, 3" x 3" x 3/8" Thick x 13/16" Hole	2	
4	Washer, Lock, Spring, Double Coil, Galv., 5/8" ✱	2	
5	Bolt, Machine, 5/8" x 12", Galv., 12,400 lbs. Ultimate Tensile ✱	2	

CONSTRUCTION STANDARDS

BASIC UNITS
POLE-TOP PIN
SINGLE VISE-TOP INSULATOR

PAGE:
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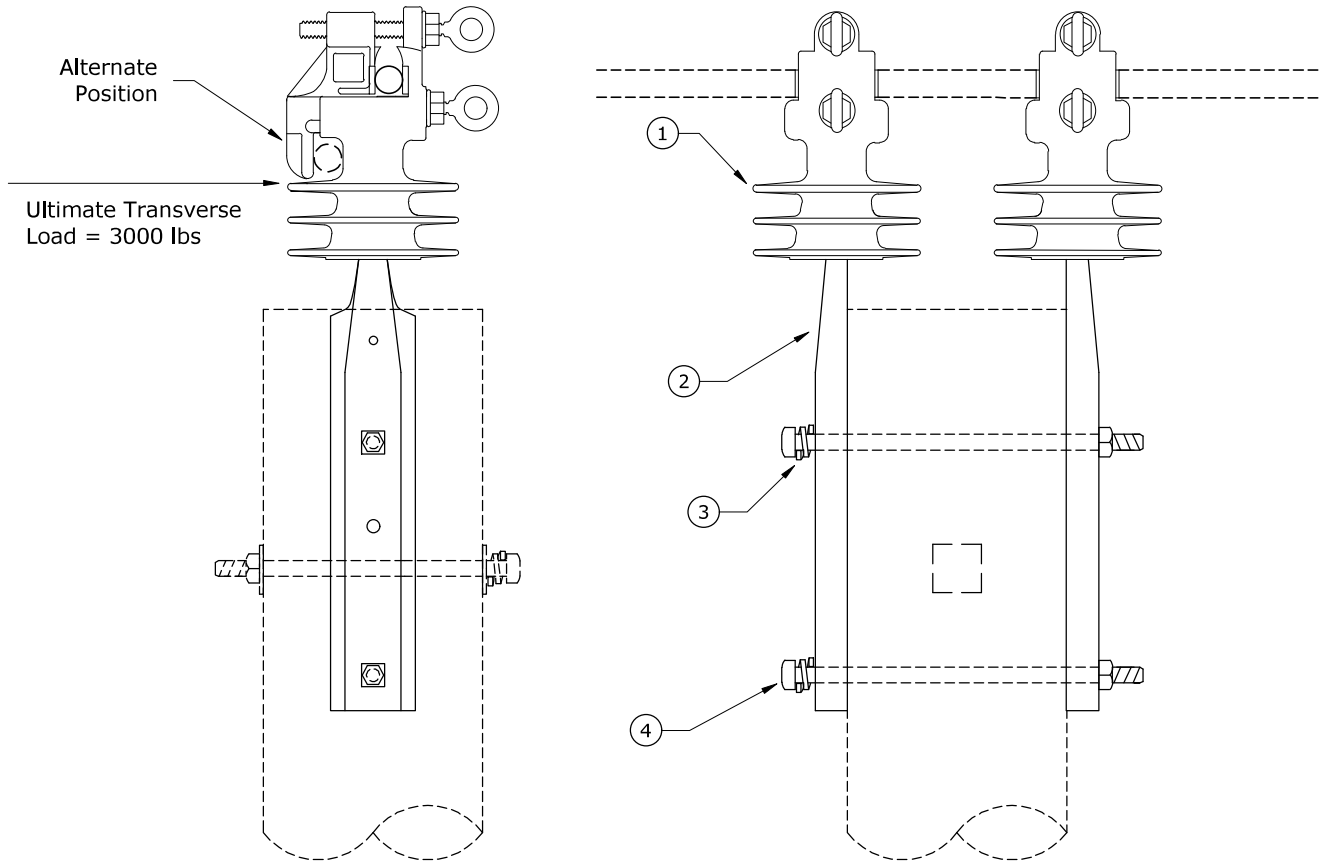
PR40

CAD FILE:

REVISIONS			
△	DATE	ENGR	OPS
3			
4			
5			
6			
△			
APP:	SECTION		
DATE:			

Installation:

- 1st tighten the bottom bolt until ring breaks off
- 2nd tighten the top bolt until ring breaks off
- Remove bolts with socket stick
- Do not reuse bolts after rings have broken off



- Notes:**
1. Ultimate transverse load = 3,000 lbs. Ultimate longitudinal load = 2,400 lbs.
 2. Replacement vise-top insulator bolts

ITEM NO.	DESCRIPTION	PR41	
		QTY.	
1	Insulator, Vise-Top, Polymer ✱	2	
2	Pin, Pole Top ✱	2	
3	Washer, Lock, Spring, Double Coil, Galv., 5/8" ✱	2	
4	Bolt, Machine, 5/8" x 14", Galv., 12,400 lbs. Ultimate Tensile ✱	2	

CONSTRUCTION STANDARDS

BASIC UNITS
POLE-TOP PIN
DOUBLE VISE-TOP INSULATOR

REVISIONS

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3			
4			
5			
6			

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PR41

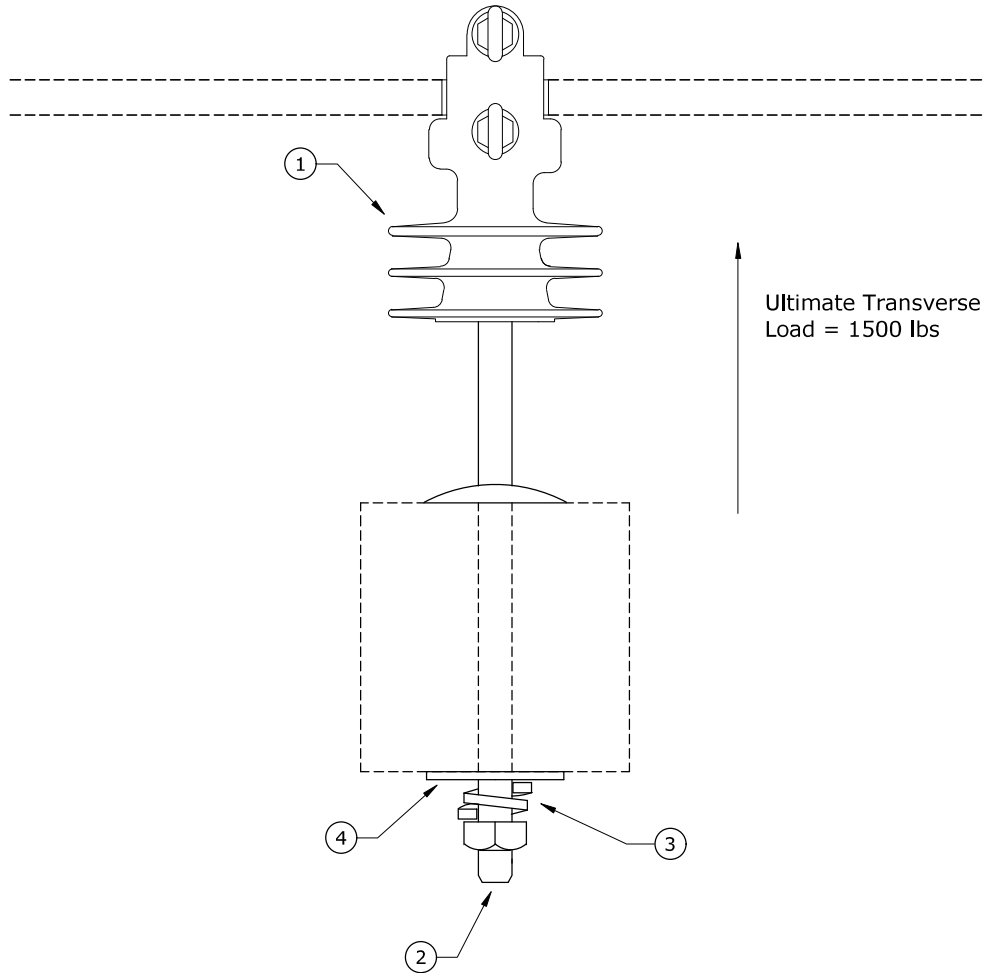
CAD FILE:
PR41

APP: ELM
DATE: 1/31/80

SECTION
200

Installation:

- 1st tighten the bottom bolt until ring breaks off
- 2nd tighten the top bolt until ring breaks off
- Remove bolts with socket stick
- Do not reuse bolts after rings have broken off

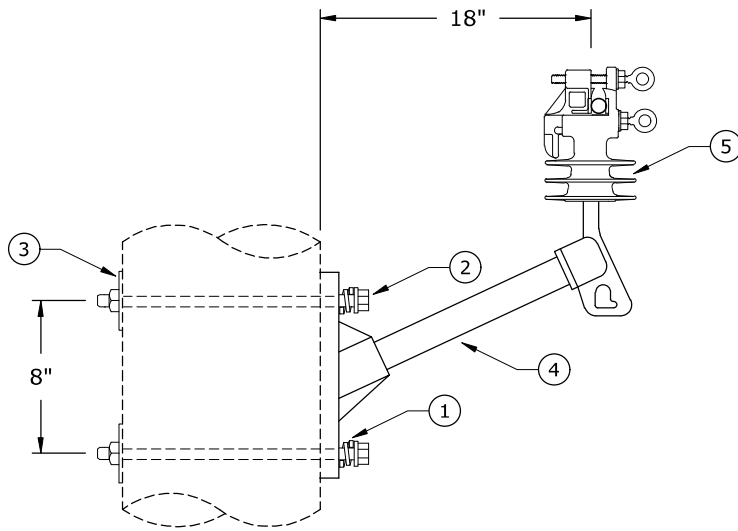


- Notes:**
1. Ultimate longitudinal load = 1,000 lbs.
 2. Replacement vise-top insulator bolts

ITEM NO.	DESCRIPTION	PR42	
		QTY.	
1	Insulator, Vise-Top, Polymer *	1	
2	Pin, Crossarm *	1	
3	Washer, Lock, Spring, Double Coil, Galv., 5/8" *	1	
4	Washer, Square Flat, 5/8", 2 1/4" x 2 1/4"	1	

CONSTRUCTION STANDARDS
BASIC UNITS
SINGLE VISE-TOP
INSULATOR ON CROSSARM

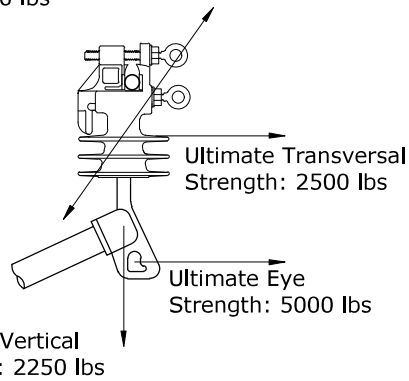
REVISIONS			
DATE	ENGR	OPS	



Installation:

- 1st tighten the bottom bolt until eye breaks off
- 2nd tighten the top bolt until eye breaks off
- Remove bolts with socket stick
- Do not reuse bolts after rings have broken off

Ultimate Longitudinal Strength: 1900 lbs



Note: Replacement vise-top insulator bolts

ITEM NO.	DESCRIPTION	PR60V	
		QTY.	
1	Washer, Lock, Spring, Double Coil, Galv., 5/8"	2	
2	Bolt, Machine, 5/8" x 16" Galv., 12,400 lbs. Ultimate Tensile	2	
3	Washer, Curved, Square, Cast, 3" x 3" x 3/8" Thick x 13/16" Hole	2	
4	Arm, Epoxy 18" 2500 lbs	1	
5	Insulator, Vise-Top, Polymer	1	

CONSTRUCTION STANDARDS

BASIC UNITS
SINGLE TWIGGY ARM 18"
VISE-TOP INSULATOR

REVISIONS

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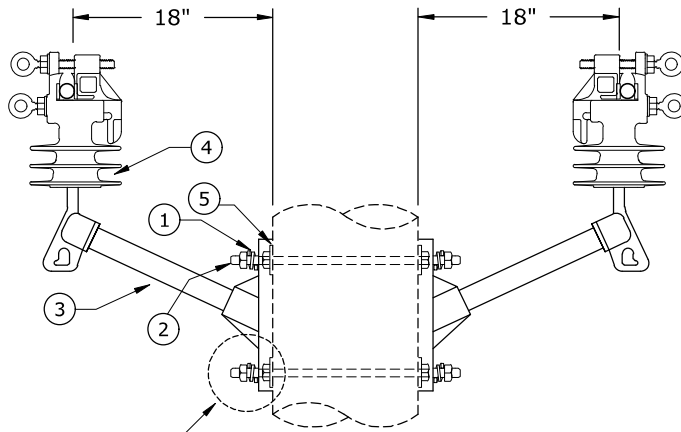
PR60V

CAD FILE:

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SECTION

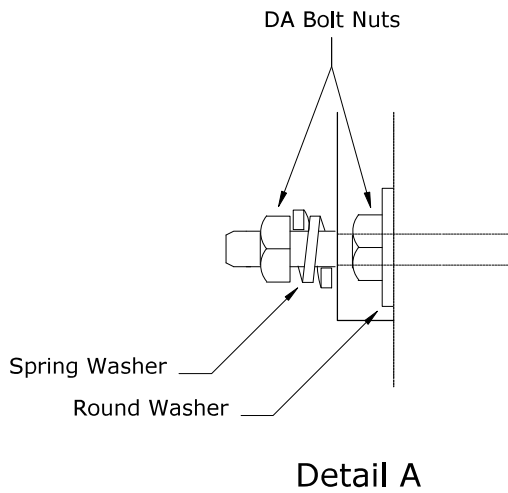
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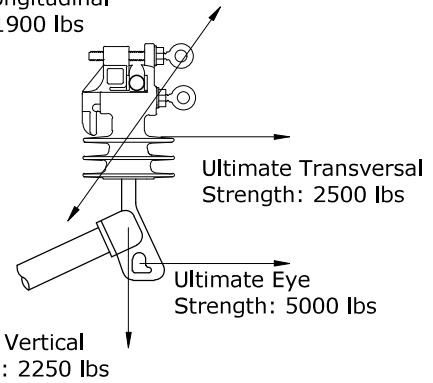
See Detail A

Installation:

- 1st tighten the bottom bolt until ring breaks off
- 2nd tighten the top bolt until ring breaks off
- Remove bolts with socket stick
- Do not reuse bolts after rings have broken off



Ultimate Longitudinal Strength: 1900 lbs



Note: Replacement vise-top insulator bolts

ITEM NO.	DESCRIPTION	PR61V	
		QTY.	
1	Washer, Lock, Spring, Double Coil, Galv., 5/8"	4	
2	Bolt, Double Arm, 5/8" x 18" Galv., 12,400 lbs Ultimate Tensile	2	
3	Arm, Epoxy 18" 2500 lbs	2	
4	Insulator, Vise-Top, Polymer	2	
5	Washer, Flat Round Galv., 5/8"	4	

CONSTRUCTION STANDARDS

BASIC UNITS
DOUBLE TWIGGY ARM 18"
VISE-TOP INSULATOR

REVISIONS

DATE	ENGR	OPS

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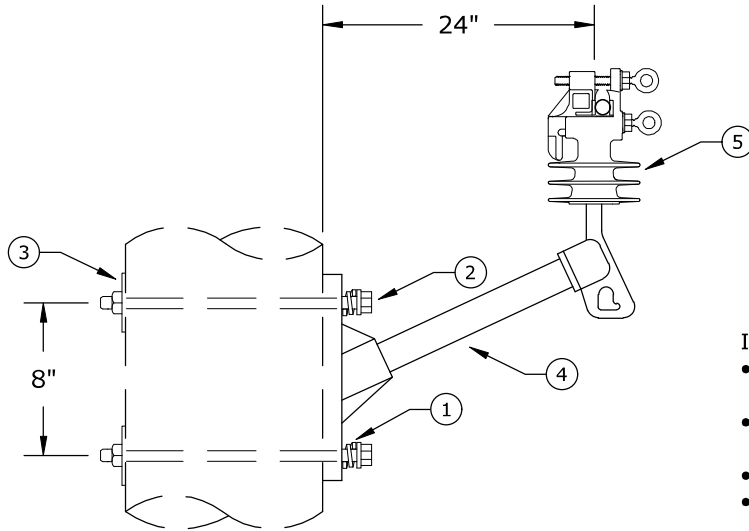
PR61V

CAD FILE:

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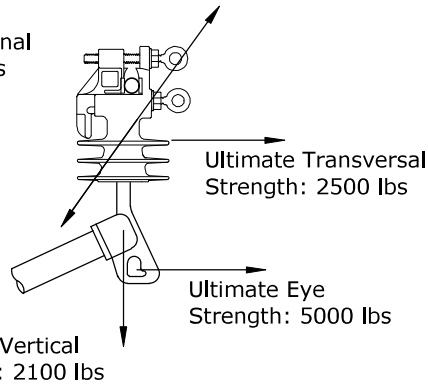
SECTION

DATE:



- Installation:
- 1st tighten the bottom bolt until ring breaks off
 - 2nd tighten the top bolt until ring breaks off
 - Remove bolts with socket stick
 - Do not reuse bolts after rings have broken off

Ultimate Longitudinal Strength: 1850 lbs

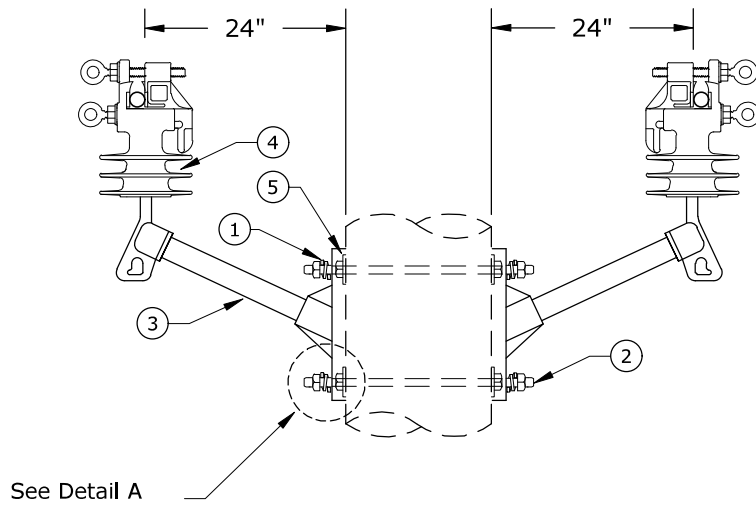


Note: Replacement vise-top insulator bolts S/N 2888.

ITEM NO.	DESCRIPTION	PR62V	
		QTY.	
1	Washer, Lock, Spring Double Coil, Galv., 5/8"	2	
2	Bolt, Machine, 5/8" x 16" Galv., 12,400 lbs Ultimate Tensile	2	
3	Washer, Curved, Square, Cast, 3" x 3" x 3/8" Thick x 13/16" Hole	2	
4	Arm, Epoxy 24" 2500 lbs	1	
5	Insulator, Vise-Top, Polymer	1	

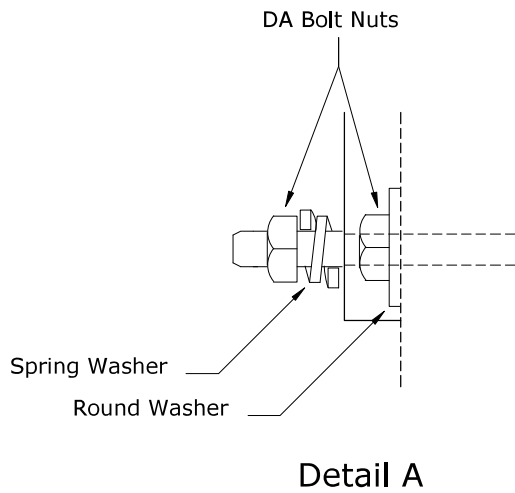
CONSTRUCTION STANDARDS
 BASIC UNITS
 SINGLE TWIGGY ARM 24"
 VISE-TOP INSULATOR

REVISIONS			
DATE	ENGR	OPS	

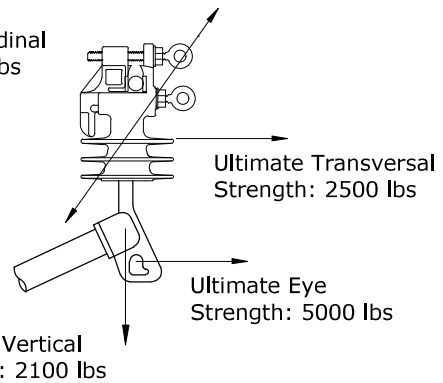


Installation:

- 1st tighten the bottom bolt until ring breaks off
- 2nd tighten the top bolt until ring breaks off
- Remove bolts with socket stick
- Do not reuse bolts after rings have broken off



Ultimate Longitudinal Strength: 1850 lbs

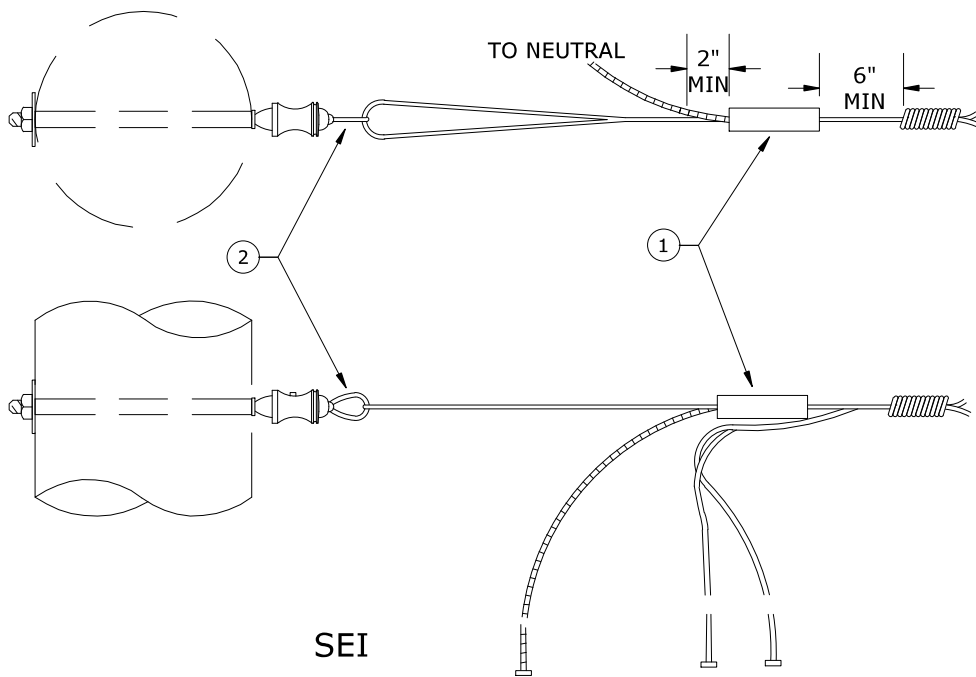


Note: Replacement vise-top insulator bolts

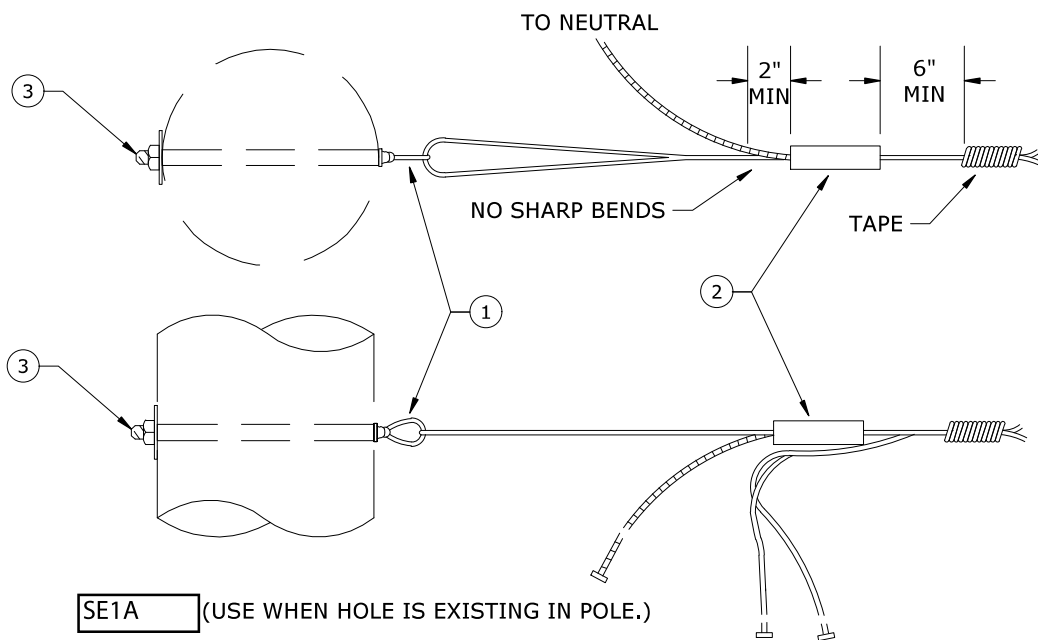
ITEM NO.	DESCRIPTION	PR63V	
		QTY.	
1	Washer, Lock, Spring, Double Coil, Galv., 5/8"	4	
2	Bolt, Double Arm, 5/8" x 18" Galv., 12,400 lbs Ultimate Tensile	2	
3	Arm, Epoxy 24" 2500 lbs	2	
4	Insulator, Vise-Top, Polymer	2	
5	Washer, Flat Round Galv., 5/8"	4	

CONSTRUCTION STANDARDS
 BASIC UNITS
 DOUBLE TWIGGY ARM 24"
 VISE-TOP INSULATORS

REVISIONS			
△	DATE	ENGR	OPS
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	DATE:		



SEI



SE1A (USE WHEN HOLE IS EXISTING IN POLE.)

CONSTRUCTION STANDARDS
 SERVICE ASSEMBLIES
 CABLE TERMINATIONS

REVISIONS

DATE	ENGR	OPS
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
*TRUCK STOCK

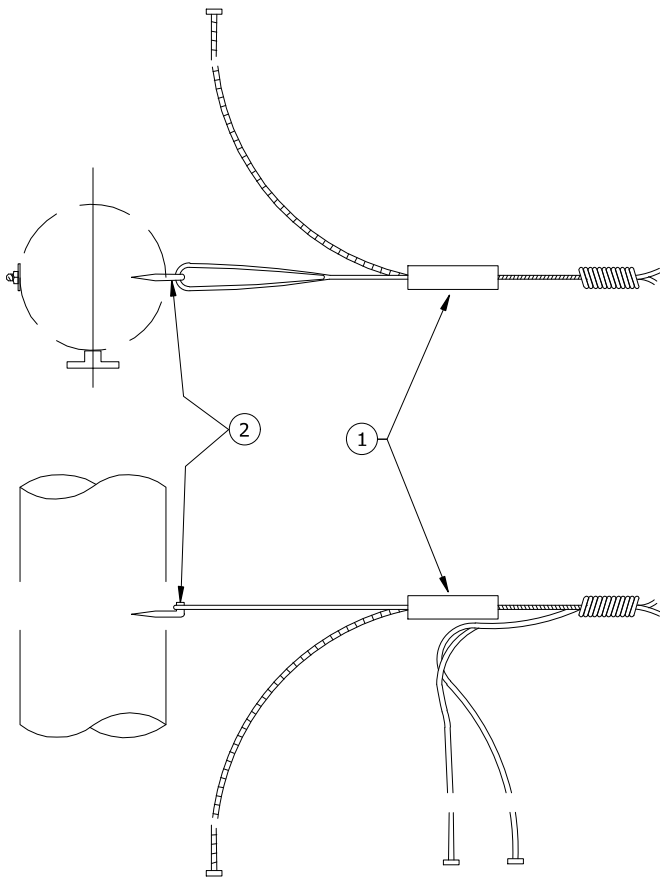
MATERIAL LIST

ITEM NO.	DESCRIPTION	SE1	
		QTY.	S/N
1	CLAMP, WEDGE	1	AS REQ*
2	NUT, EYE OVAL 5/8" GALV.	1	913

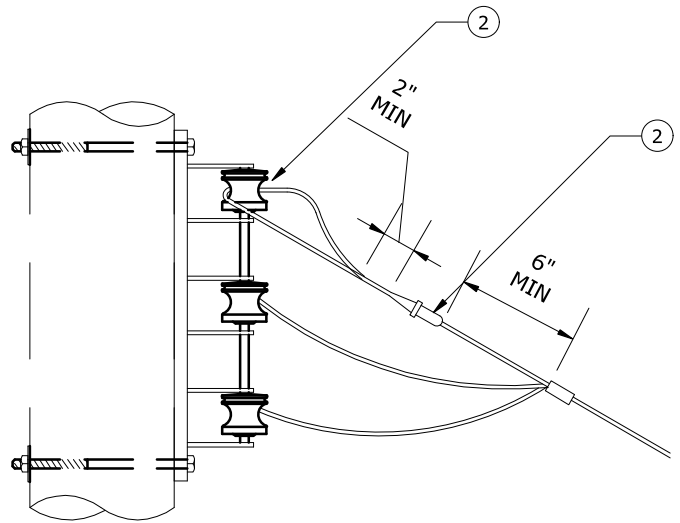
ITEM NO.	DESCRIPTION	SE1A	
		QTY.	S/N
1	BOLT, EYE 5/8" x _____" GALV.	1	AS REQ
2	CLAMP, WEDGE	1	AS REQ*
3	WASHER, SQ. FLAT, 5/8"	2	1412

CONSTRUCTION STANDARDS
 SERVICE ASSEMBLIES
 CABLE TERMINATIONS

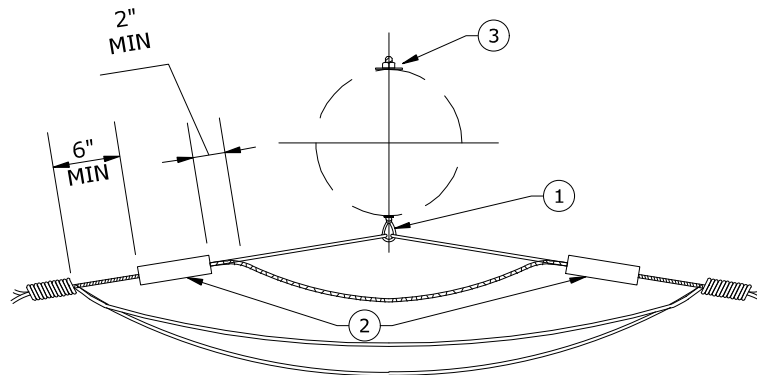
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SE2, USE WHEN HOLE IS NOT EXISTING IN POLE



SE2A, TYPICAL SERVICE CONNECTION TO ROCK.



SE2B
TYPICAL GUIDE FOR SWING SERVICE

CONSTRUCTION STANDARDS
SERVICE ASSEMBLIES
CABLE TERMINATIONS



REVISIONS

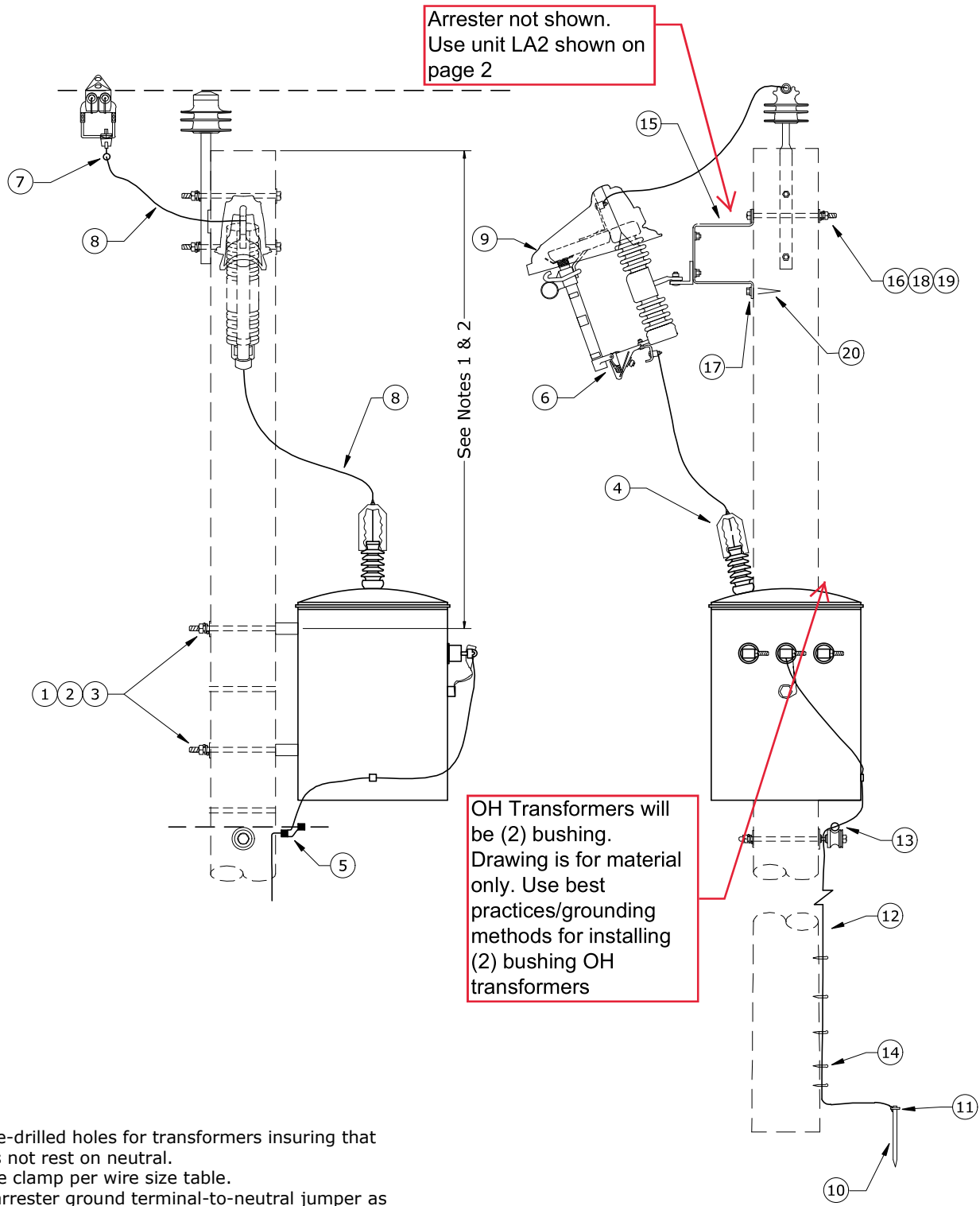
DATE	ENGR	OPS

MATERIAL LIST

ITEM NO.	DESCRIPTION	SE2	
		QTY.	S/N
1	CLAMP, WEDGE	1	AS REQ*
2	HOOK, DRIVE SCREW	1	751
* TRUCK STOCK			
ITEM NO.	DESCRIPTION	SE2A	
		QTY.	S/N
1	CLAMP, WEDGE	1	AS REQ*
2	CONNECTOR	1	AS REQ*
* TRUCK STOCK			
ITEM NO.	DESCRIPTION	SE2B	
		QTY.	S/N
1	BOLT, EYE, 5/8" x _____", GALV.	1	AS REQ*
2	CLAMP, WEDGE	2	AS REQ*
3	WASHER, SQ. FLAT, 5/8"	2	1412

CONSTRUCTION STANDARDS
SERVICE ASSEMBLIES
CABLE TERMINATIONS

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Arrester not shown.
Use unit LA2 shown on
page 2

OH Transformers will
be (2) bushing.
Drawing is for material
only. Use best
practices/grounding
methods for installing
(2) bushing OH
transformers

- Notes:**
1. Use pre-drilled holes for transformers insuring that tank does not rest on neutral.
 2. Hot line clamp per wire size table.
 3. Make arrester ground terminal-to-neutral jumper as short as possible.

WIRE SIZE
#6 SLD-#6 STR Cu
#4-2/0 Al/Cu
397 MCM Al/Cu
795 MCM Al/Cu

CONSTRUCTION STANDARDS

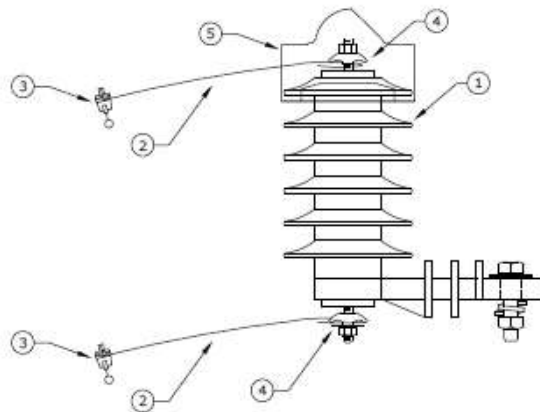
POLE MOUNTED TRANSFORMER AND CUTOUT ON POLE

REVISIONS			
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T3,T3H

CAD FILE:



Rev 3: Added Hotline Clamps, Wildlife Guard, One-Hole Compression Lugs, and increased amount of #4 red wire.

ITEM NO.	DESCRIPTION	LA2	
		QTY.	
1	Arrester, Surge, 9kV, MOV, Riser Pole	1	
2	Conductor, Cu, 1/C, #4, 7-Str, 600V, Red, THW	7	*
3	Clamp, Hotline GP 1520, #8 to 2/0 Str, Cu Only	2	
4	Connector, Compression Lug, #4, Cu/Al, One-Hole, Tin-Plated, For Arrester	2	
5	Guard, Wildlife, Polymer Arrester	1	

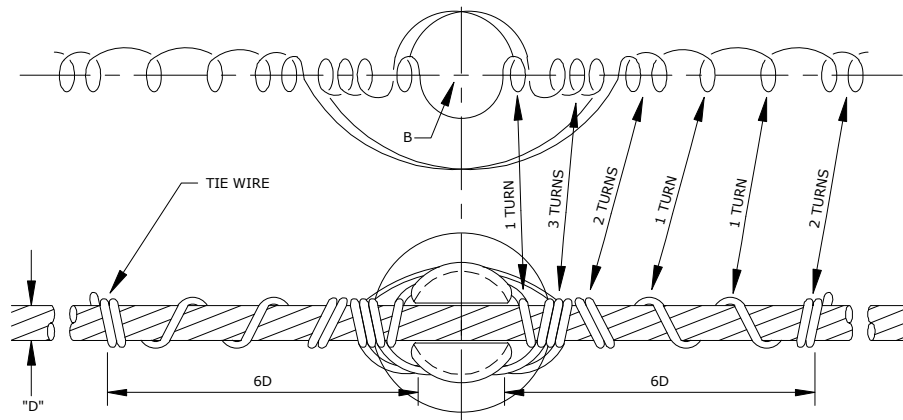
Rev 3: Changed to copperweld ground and corrections.

ITEM NO.	DESCRIPTION	T3	
		QTY.	S/N
1	Washer, Sq. Flat 5/8" x 2 1/4" x 2 1/4" (3/4" For T3H)	2	1412
2	Bolt, Machine 5/8" x 14" Galv. (3/4" For T3H)	2	156
3	Washer, Lock, Spring, Double Coil 5/8" (3/4" For T3H)	2	2217*
4	Wildlife Guard, Transformer Bushing	1	721
5	Connector, Crimpet, Cu 6/4-4/4 (4C4)	1	450
ITEM NO.	DESCRIPTION	CO100	
		QTY.	S/N
6	Cutout 100 Amp.	1	2532
7	Clamp Hot Line, GP1530	1	284
8	Conductor, Wire Cu 1/C #4 7STR, Insulated, Red	15	2512
9	Wildlife Guard, Cutout (Non-loadbreak), Gray	1	2547
ITEM NO.	DESCRIPTION	N1	
		QTY.	S/N
10	Ground Rod 5/8" x 8'	1	1124
11	Ground Rod Clamp, 5/8", Bronze, Small	1	281
12	Conductor, Copperweld #4	36	1512*
13	Connector, Cabelock YP26 AU 2 Al/Cu 2/0 - #2 STR	1	413
14	Staple, Ground Wire, Barbed, Galv., 1 1/2"	10	2707*
ITEM NO.	DESCRIPTION	CO1	
		QTY.	S/N
15	Bracket, Arrester/Cutout Mounting, 1ø Fiberglass 18"	1	219
16	Machine Bolt 5/8" x 10" Galv.	1	154
17	Washer, Flat Round Galv. 1/2"	1	1394
18	Washer, Square Flat 5/8" x 2 1/4" x 2 1/4"	1	1412
19	Washer, Spring 5/8"	1	2217
20	Screw, Lag 1/2" x 3" Drive Point	1	1131

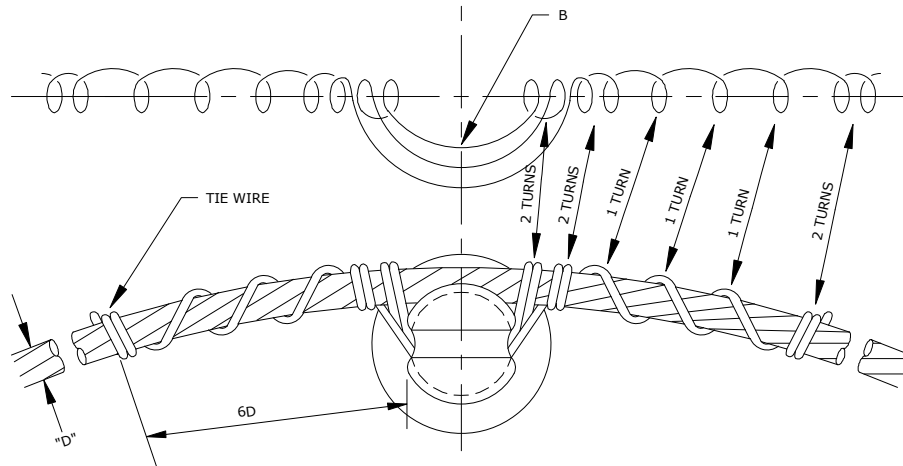
CONSTRUCTION STANDARDS

POLE MOUNTED TRANSFORMER AND CUTOUT ON POLE

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DATE	ENGR	OPS	
APP:		SECTION	
DATE:			



TOP GROOVE DOUBLE TIE



SIDE GROOVE TIE

NOTES:

1. IN MAKING TIES, START WITH MIDDLE OF LENGTH OF TIE WIRE AT POSITION MARKED "B".
2. TO COMPLETE TIE, CINCH UP LAST TWO TURNS AT EACH END WITH PLIARS UNTIL TIE WIRE IS SNUG AND TIGHT.

A.C.S.R.	
SIZE	DIAM. INCHES
4/0	.563
3/0	.502
2/0	.477

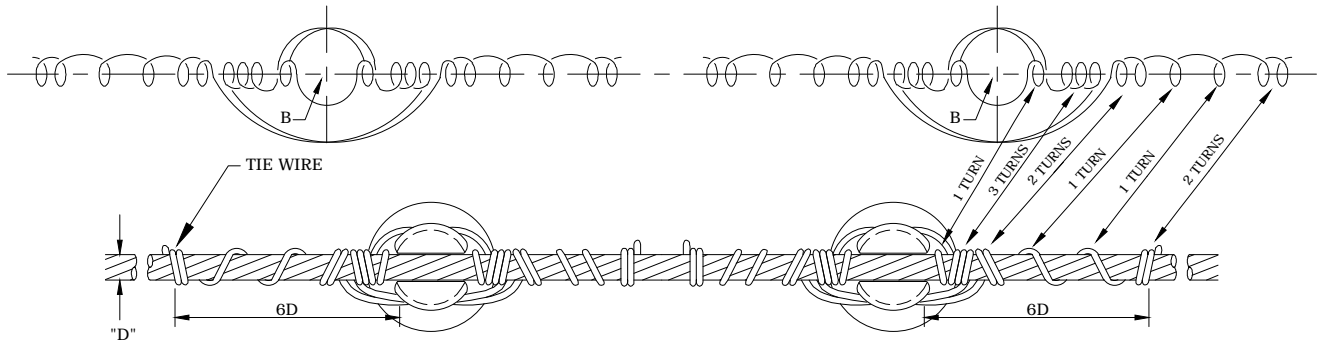
TIE WIRE ALUMINUM	
SIZE	LENGTH FEET
4	9'-3"
4	8'-9"
4	8'-3"

A.C.S.R.	
SIZE	DIAM. INCHES
1/0	.398
2	.325
4	.257

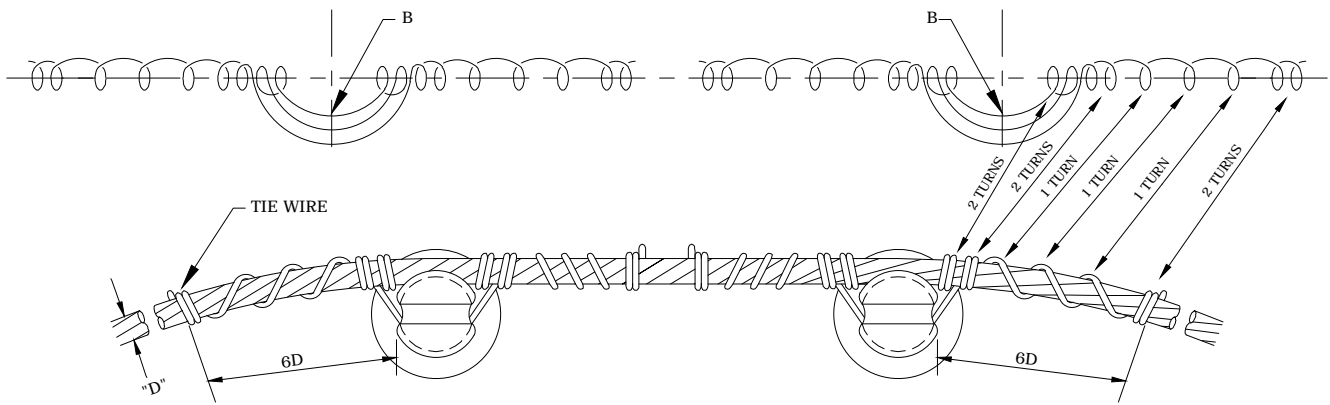
TIE WIRE ALUMINUM ALLOY	
SIZE	LENGTH FEET
6	8'-3"
6	7'-5"
6	7'-3"

CONSTRUCTION STANDARDS
 SINGLE INSULATOR
 ALUMINUM ALLOY, ACSR CONDUCTOR,
 STRAIGHT OR PREFORMED ARMOR RODS

REVISIONS			
△	DATE	ENGR	OPS



TOP GROOVE DOUBLE TIE



SIDE GROOVE TIE

NOTES:

1. IN MAKING TIES, START WITH MIDDLE OF LENGTH OF TIE WIRE AT POSITION MARKED "B".
2. TO COMPLETE TIE, CINCH UP LAST TWO TURNS AT EACH END WITH PLIARS UNTIL TIE WIRE IS SNUG AND TIGHT.
3. USE THE FLAT FACE OF THE PLIARS AGAINST THE AMOR RODS.

A. C. S. R.	
SIZE	DIAM. INCHES
4/0	.563
3/0	.502
2/0	.477

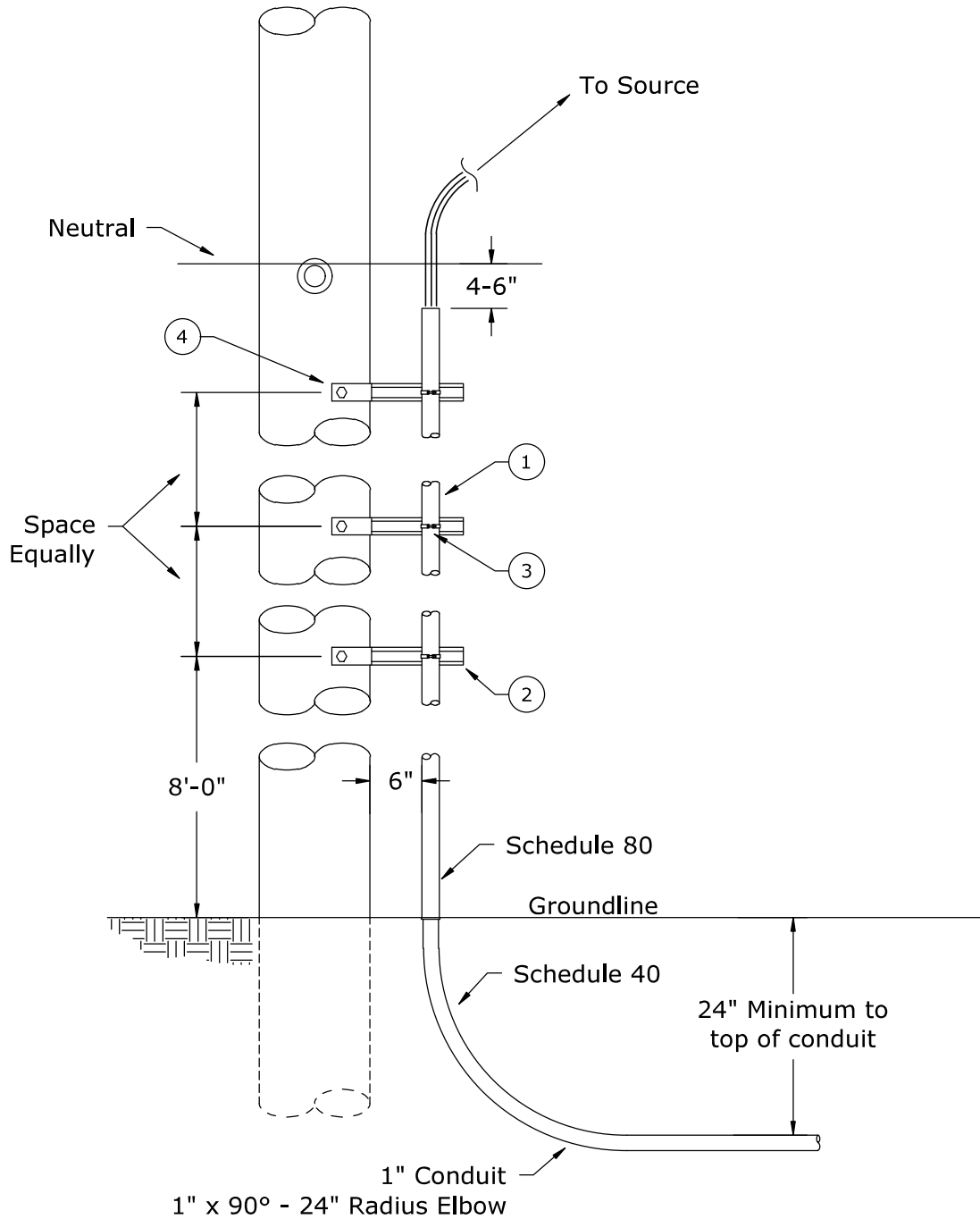
TIE WIRE ALUMINUM	
SIZE	LENGTH FEET
4	9'-3"
4	8'-9"
4	8'-3"

A. C. S. R.	
SIZE	DIAM. INCHES
1/0	.398
2	.325
4	.257

TIE WIRE ALUMINUM ALLOY	
SIZE	LENGTH FEET
6	8'-3"
6	7'-5"
6	7'-3"

CONSTRUCTION STANDARDS
 DOUBLE INSULATOR
 ALUMINUM ALLOY, ACSR CONDUCTOR,
 STRAIGHT OR PREFORMED ARMOR RODS

REVISIONS			
△	DATE	ENGR	OPS



ITEM NO	DESCRIPTION	SLR	
		QTY	
1	Conduit, PVC, 1" x 10', Sch 80, (1) Bell End	30*	
2	Bracket, Standoff, 10.5", w/Stop	3 *	
3	Clamp, Standoff Bracket, 1" Conduit	3	
4	Screw, Lag, 1/2" x 3", Fetter Drive, Drive Point	6	

CONSTRUCTION STANDARDS

SECONDARY OVERHEAD TO
UNDERGROUND RISER ASSEMBLY
FOR STREETLIGHT FEEDER

REVISIONS

Δ	DATE	ENGR	OPS
1			
2			
3			

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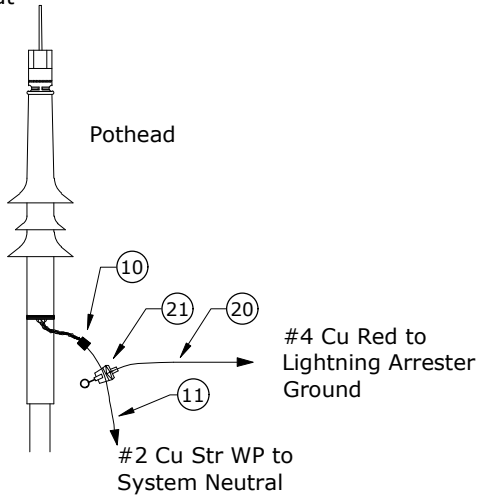
SLR

CAD FILE:

APP:
DATE:

SECTION

To Cutout



Pothead
Connection Detail

Notes:

4. Connect concentric neutrals to arrester ground using #4 Cu, Red.
5. Make arrester ground terminal-to-concentric neutral jumper as short as possible.

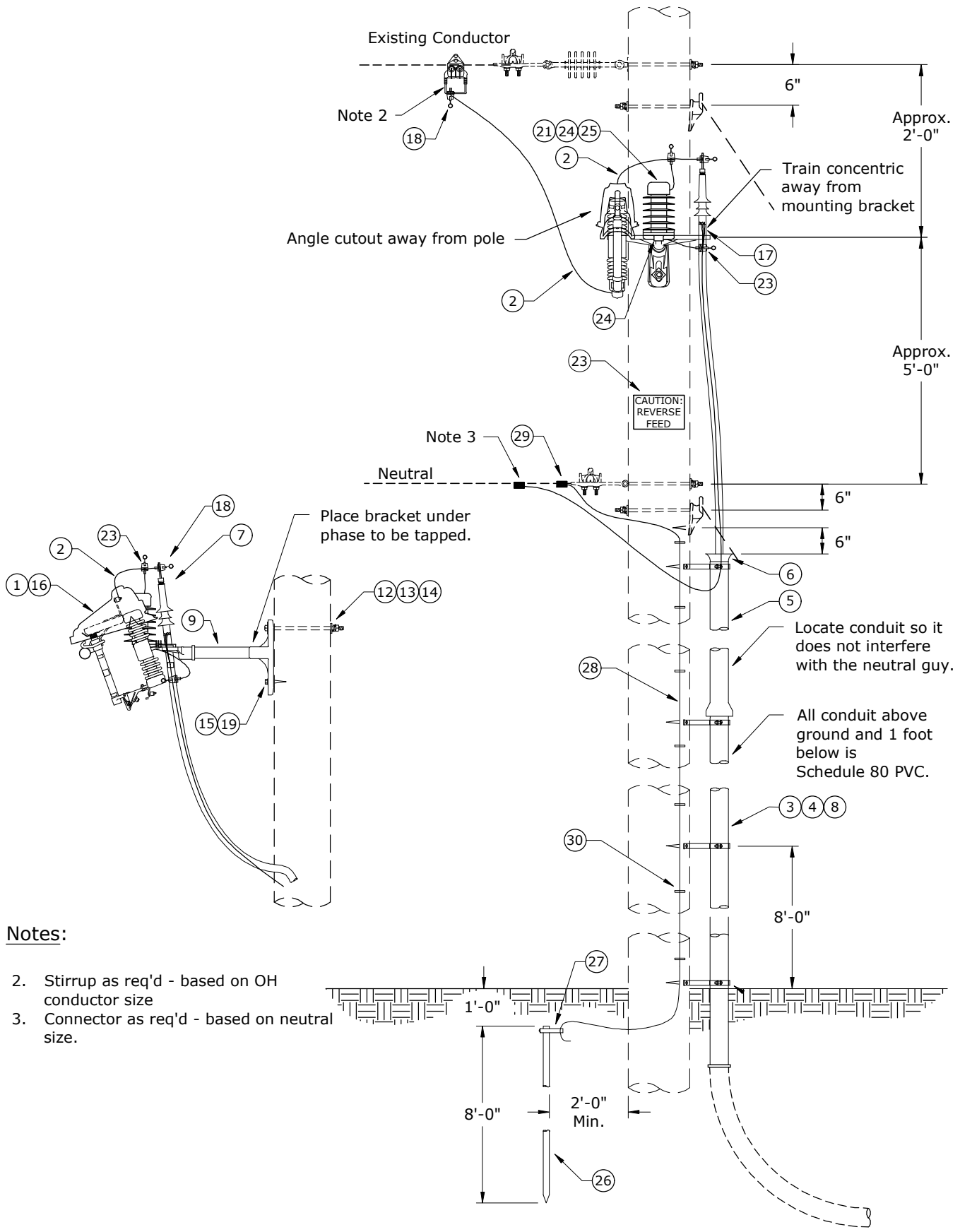
Rev. 6 - Corrected drawing and material.

ITEM NO.	DESCRIPTION	U1	
		QTY.	Additional Material
1	Cutout, Polymer, Universal, 100A, 16kA Asym.	1	
2	Clamp, Hotline, GP 1520, #8 to 2/0 Str, Cu Only	1	*
3	Screw, Lag, 1/2" x 3", Fetter Drive, Drive Point	6	
4	Bracket, Standoff Riser, 10 1/2"	3	
5	Conduit, PVC, 2" X 10', Sch 80	30	*
6	End Bell, 2", Sch 40	1	*
7	Terminator, 15kV, Cold-Shrink JCN & CN, #2	1	
8	Clamp, Standoff Bracket, Conduit, 2"	3	
9	Bracket, Arrester/Cutout Mounting, 1ø Fiberglass 18"	1	
10	Connector, Crimpet, Cu 2/2 - 2/2 (2C2)	1	
11	Conductor, Cu #2, 1/C, 7-Str, SD, 600V, HMP	10	
12	Bolt, Machine, 5/8" x 12", 12,400 lbs. Ultimate Tensile	1	
13	Washer, Curved, Square, Cast, 3" x 3" x 3/8" Thick x 13/16" Hole	1	
14	Washer, Lock, Spring, Double Coil, Galv. 5/8"	1	
15	Screw, Lag, 1/2" x 4 1/2", Twist Drive, Drive Point	1	
16	Washer, Flat, Round Galv., 1/2"	1	
17	Guard, Wildlife, Cutout, Polymer	1	*
18	Conductor, Cu 1/C #2, 7-Str, 600V, Red, THW	3	
ITEM NO.	DESCRIPTION	LA2	
		QTY.	
19	Arrester, Surge, 9kV, MOV, Riser Pole	1	
20	Conductor, Cu 1/C #4, 7-Str, 600V, Red, THW	7	
21	Clamp, Hotline, GP 1520, #8 to 2/0 Str, Cu Only	2	
22	Connector, Compression Lug, #4, Cu/Al, One-Hole, Tin-Plated, For Arrester	2	
23	Guard, Wildlife, Polymer Arrester	1	
ITEM NO.	DESCRIPTION	N1	
		QTY.	
24	Rod, Ground, 5/8" x 8'	1	
25	Clamp, Ground Rod, 5/8", Bronze Small	1	
26	Conductor, Copper-Clad Steel, #4 Cu Equivalent, Covered	40	
27	Connector, Cabelok, Al/Cu, #2-2/0 Run, #6-#1 Tap	1	
28	Staple, Ground, Barbed, Galv. 1 1/2"	24	

CONSTRUCTION STANDARDS
SINGLE PHASE
PRIMARY RISER

REVISIONS

DATE	ENGR	OPS
3		
4		
5		
6		



Notes:

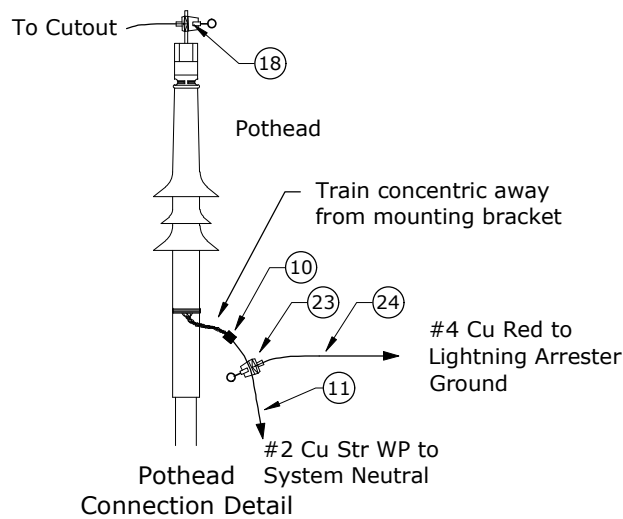
- 2. Stirrup as req'd - based on OH conductor size
- 3. Connector as req'd - based on neutral size.

CONSTRUCTION STANDARDS

SINGLE PHASE
PRIMARY RISER
REVERSE FEED

REVISIONS

REV	DATE	ENGR	OPS
1			
2			



Notes:

4. Connect concentric neutrals to arrester ground using #4 Cu, Red.
5. Make arrester ground terminal-to-concentric neutral jumper as short as possible.

Rev. 2 - Moved arrester to middle of bracket, added cutout direction note, and updated materials.

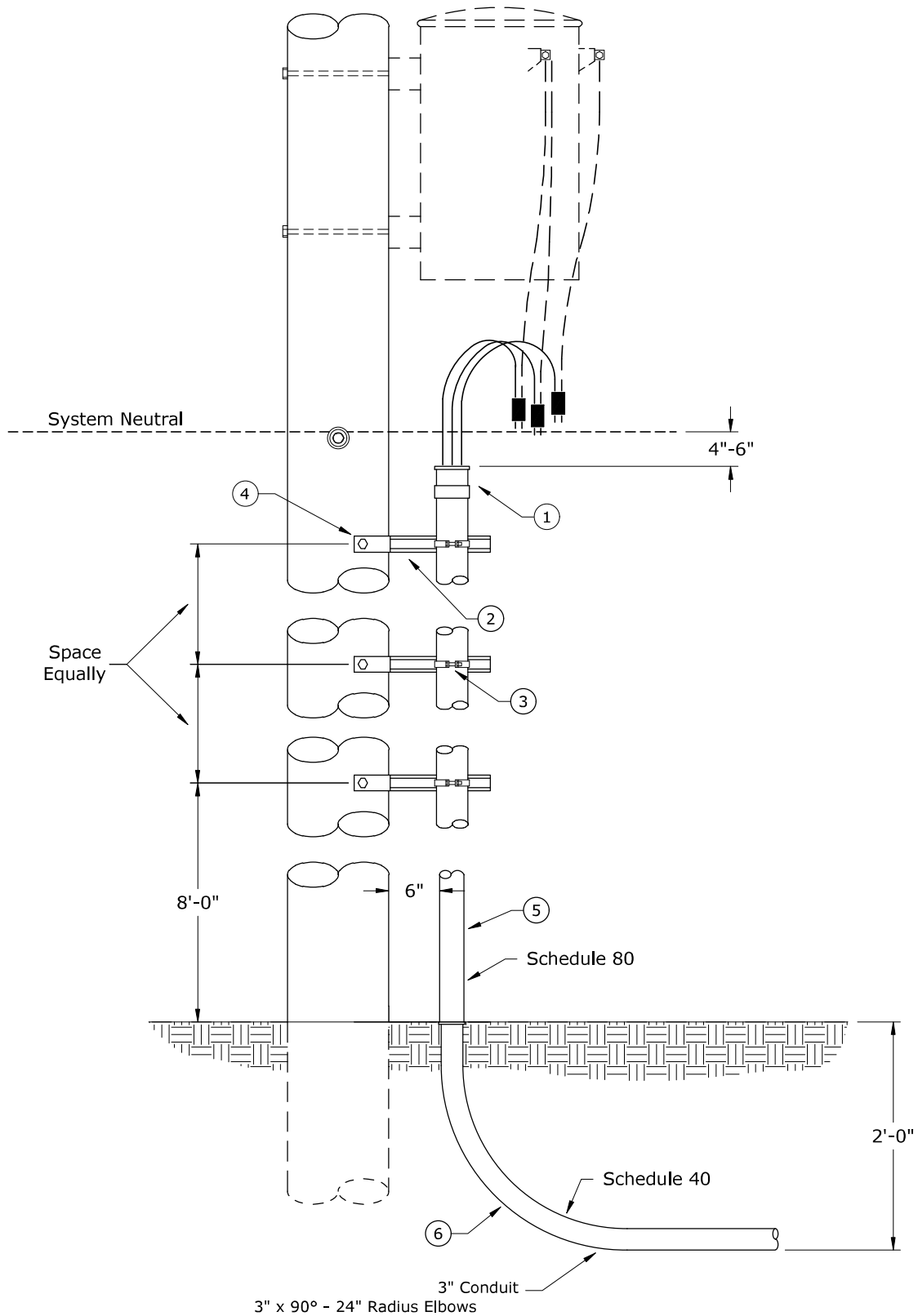
ITEM NO.	DESCRIPTION	U1R	
		QTY.	Additional Material
1	Cutout, Polymer, Universal, 100A, 16kA Asym.	1	
2	Conductor, Cu 1/C #2, 7 Str, 600V, Red, THW	6	
3	Screw, Lag, 1/2" x 3", Fetter Drive, Drive Point	6	
4	Bracket, Standoff Riser, 10 1/2"	3	
5	Conduit, PVC, 2" x 10', Sch 80	30	
6	End Bell, 2", Sch 40	1	
7	Terminator, 15kV, Cold-Shrink JCN & CN, #2	1	
8	Clamp, Standoff Bracket, 2" Conduit	3	
9	Bracket, Arrester/Cutout Mounting, 1Ø, Fiberglass 18"	1	
10	Connector, Crimpet, Cu, 2/2 - 2/2 (2C2)	1	
11	Conductor, Cu #2, 1/C, 7-Str, SD, 600V, HMP	10	
12	Bolt, Machine 5/8" x 12", 12,400 lbs. Ultimate Tensile	1	
13	Washer, Curved, Square, Cast, 3" x 3" x 3/8" Thick x 13/16" Hole	1	
14	Washer, Lock, Spring, Double Coil, Galv. 5/8"	1	
15	Screw, Lag 1/2" x 4 1/2", Twist Drive, Drive Point	1	
16	Guard, Wildlife, Cutout, Polymer	1	
17	Clamp, 2-Bolt, for 1/0 Terminator	1	
18	Clamp, Hotline, GP 1520, #8 to 2/0 Str, Cu Only	2	
19	Washer, Flat, Round Galv. 1/2"	1	
20	Sign, "Caution: Reverse Feed"	1	
ITEM NO.	DESCRIPTION	LA2	
		QTY.	
21	Arrester, Surge, 9kV, MOV, Riser Pole	1	
22	Conductor, Cu 1/C #4, 7-Str, 600V, Red, THW	7	
23	Clamp, Hotline, GP 1520, #8 to 2/0 Str, Cu Only	2	
24	Connector, Compression Lug, #4, Cu/Al, One-Hole, Tin-Plated, For Arrester	2	
25	Guard, Wildlife, Polymer Arrester	1	
ITEM NO.	DESCRIPTION	N1	
		QTY.	
26	Rod, Ground, 5/8" x 8'	1	
27	Clamp, Ground Rod, 5/8", Bronze Small	1	
28	Conductor, Copper-Clad Steel, #4 Cu Equivalent, Covered	40	
29	Connector, Cabelok, Al/Cu, #2-2/0 Run, #6-#1 Tap	1	
30	Staple, Ground, Barbed, Galvanized, 1 1/2"	24	

CONSTRUCTION STANDARDS

SINGLE PHASE
PRIMARY RISER
REVERSE FEED

REVISIONS

DATE	ENGR	OPS
1		
2		




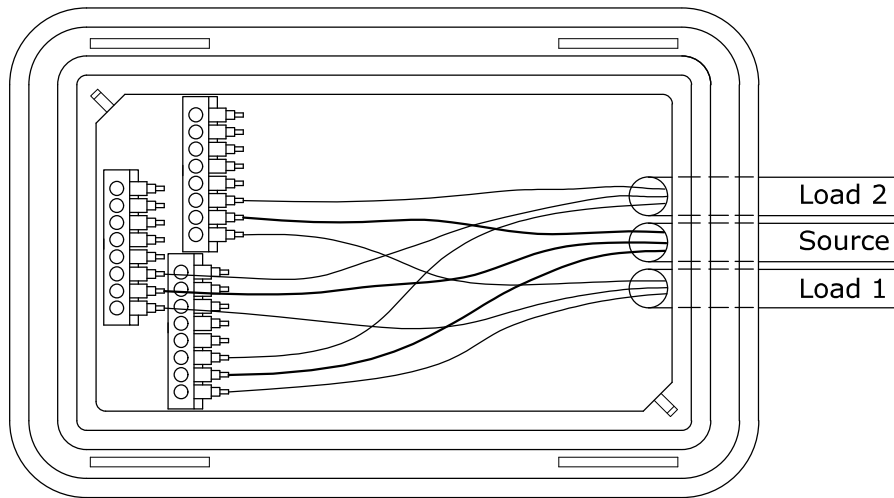
CONSTRUCTION STANDARDS
 SECONDARY OVERHEAD TO
 UNDERGROUND RISER ASSEMBLY

REVISIONS

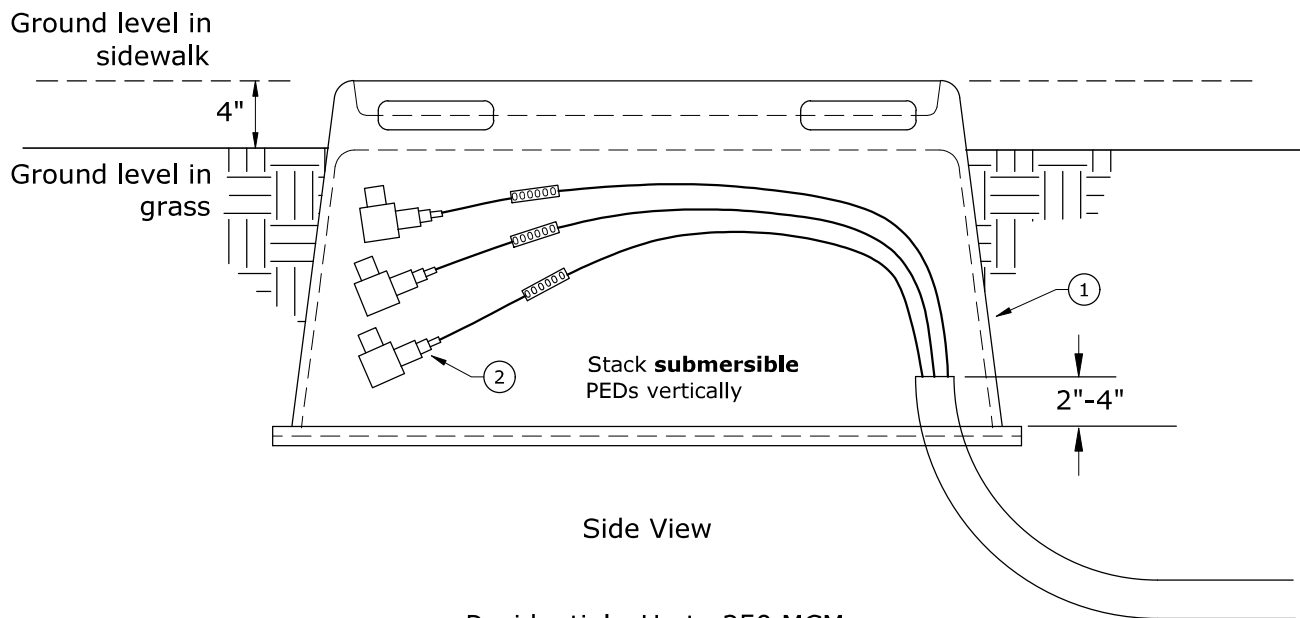
REVISIONS	DATE	ENGR	OPS
1			
2			

ITEM NO.	DESCRIPTION	U83	
		QTY.	
1	End Bell, 3", Sch 40	1	
2	Bracket, Standoff Riser 10 1/2"	3	
3	Clamp, Standoff Bracket, 3" Conduit	3	
4	Screw, Lag 1/2" X 3", Fetter Drive, Drive Point	6	
5	Conduit, PVC, 3" x 10', Sch 80	30	
6	Elbow, PVC, 3", 90°, 24" Radius, Sch 40	1	

	CONSTRUCTION STANDARDS SECONDARY OVERHEAD TO UNDERGROUND RISER ASSEMBLY	REVISIONS			
			DATE	ENGR	OPS
		1			
PAGE: 2 of 2	U83	CAD FILE:	APP:	SECTION	
			DATE:		



Top View



Side View

Residential - Up to 350 MCM
Commercial - Up to 500 MCM

Notes:

1. Do not install (10k lb) in streets, alleys, or highways.
2. Cut all cables long enough to allow makeup to be done above the box top with cables in an approximately vertical position.
3. Bend cables down after makeup so that lid can be installed.
4. Use silicone grease on all allen wrench plugs and cable boots (both ends).
5. if additional depth is needed, place one box upside down, bolt the 2 boxes together and salvage one lid.

CONSTRUCTION STANDARDS

SECONDARY JUNCTION BOX
17" x 30" x 18" DEEP (LIGHT DUTY)
24" x 36" x 18" DEEP (HEAVY DUTY)

REVISIONS

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5			
6			

PAGE:
1 of 2

UE18,UE38

CAD FILE:

APP:
DATE:

SECTION

Occasional Traffic Areas

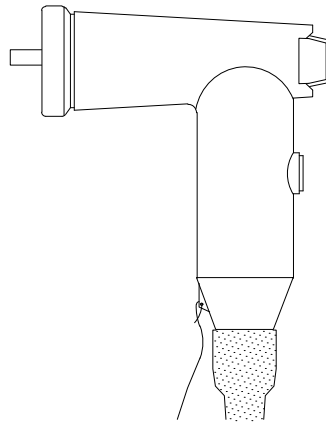
- Rated 10,000 pounds
- This box is NOT for use in streets, alley or highways. Do NOT use in driveways if location is part of the normal traveled way

Heavier Traffic Areas

- Rated 20,000 pounds
- This box is 24" x 36" x 18"
- May be used in alleys or driveways-only rated 20k
- Do NOT use in streets or highways

Rev. 6 - Updated drawing and material list.

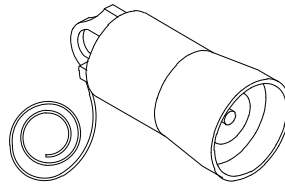
ITEM NO.	DESCRIPTION	UE18																				
		QTY																				
1	Box, Junction, Secondary, Composite, Light Duty (10k lb) with Cover, 17" x 30" x 18" with Pentabolts	1																				
2	Connector, Submersible, Sec., 8 Position, #12 to 500 MCM Al/Cu	3																				
ITEM NO.	DESCRIPTION	UE18H																				
		QTY																				
1	Box, Junction, Secondary, Composite, Heavy Duty (20k lb) with Cover, 24" x 36" x 18" with Pentabolts	1																				
2	Connector, Submersible, Sec., 8 Position, #12 to 500 MCM Al/Cu	3																				
ITEM NO.	DESCRIPTION	UE38																				
		QTY																				
1	Box, Junction, Secondary, Composite, Light Duty (10k lb) with Cover, 17" x 30" x 18" with Pentabolts	1																				
2	Connector, Submersible, Sec., 8 Position, #12 to 500 MCM Al/Cu	4																				
ITEM NO.	DESCRIPTION	UE38H																				
		QTY																				
1	Box, Junction, Secondary, Composite, Heavy Duty (20k lb) with Cover, 24" x 36" x 18" with Pentabolts	1																				
2	Connector, Submersible, Sec., 8 Position, #12 to 500 MCM Al/Cu	4																				
<p style="text-align: center;">CONSTRUCTION STANDARDS</p> <p style="text-align: center;">SECONDARY JUNCTION BOX 17" x 30" x 18" DEEP (LIGHT DUTY) 24" x 36" x 18" DEEP (HEAVY DUTY)</p>		REVISIONS																				
		<table border="1"> <thead> <tr> <th>△</th> <th>DATE</th> <th>ENGR</th> <th>OPS</th> </tr> </thead> <tbody> <tr> <td>3</td> <td></td> <td></td> <td>DK</td> </tr> <tr> <td>4</td> <td></td> <td></td> <td></td> </tr> <tr> <td>5</td> <td></td> <td></td> <td></td> </tr> <tr> <td>6</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	△	DATE	ENGR	OPS	3			DK	4				5				6			
△	DATE	ENGR	OPS																			
3			DK																			
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5																						
6																						
PAGE: 2 of 2		SECTION																				
UE18,UE38		CAD FILE:	APP: DATE:																			



MATERIAL LIST

UCA1,UCAF1

ITEM	QTY.	DESCRIPTION
UCA1	1	TERMINATOR, ELBOW, L.B. #2 220MIL
UCAF1	1	TERMINATOR, ELBOW, FUSED. #2 220MIL



MATERIAL LIST

UCA4

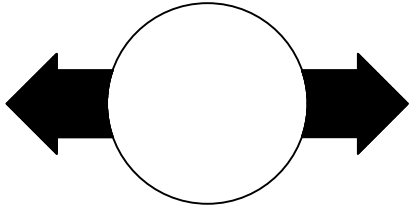
ITEM	QTY.	DESCRIPTION
UCA4	1	CAP, PROTECTIVE GRD. 200A

CONSTRUCTION STANDARDS
 UNDERGROUND PRIMARY
 CABLE ACCESSORIES
 200A

REVISIONS

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0			

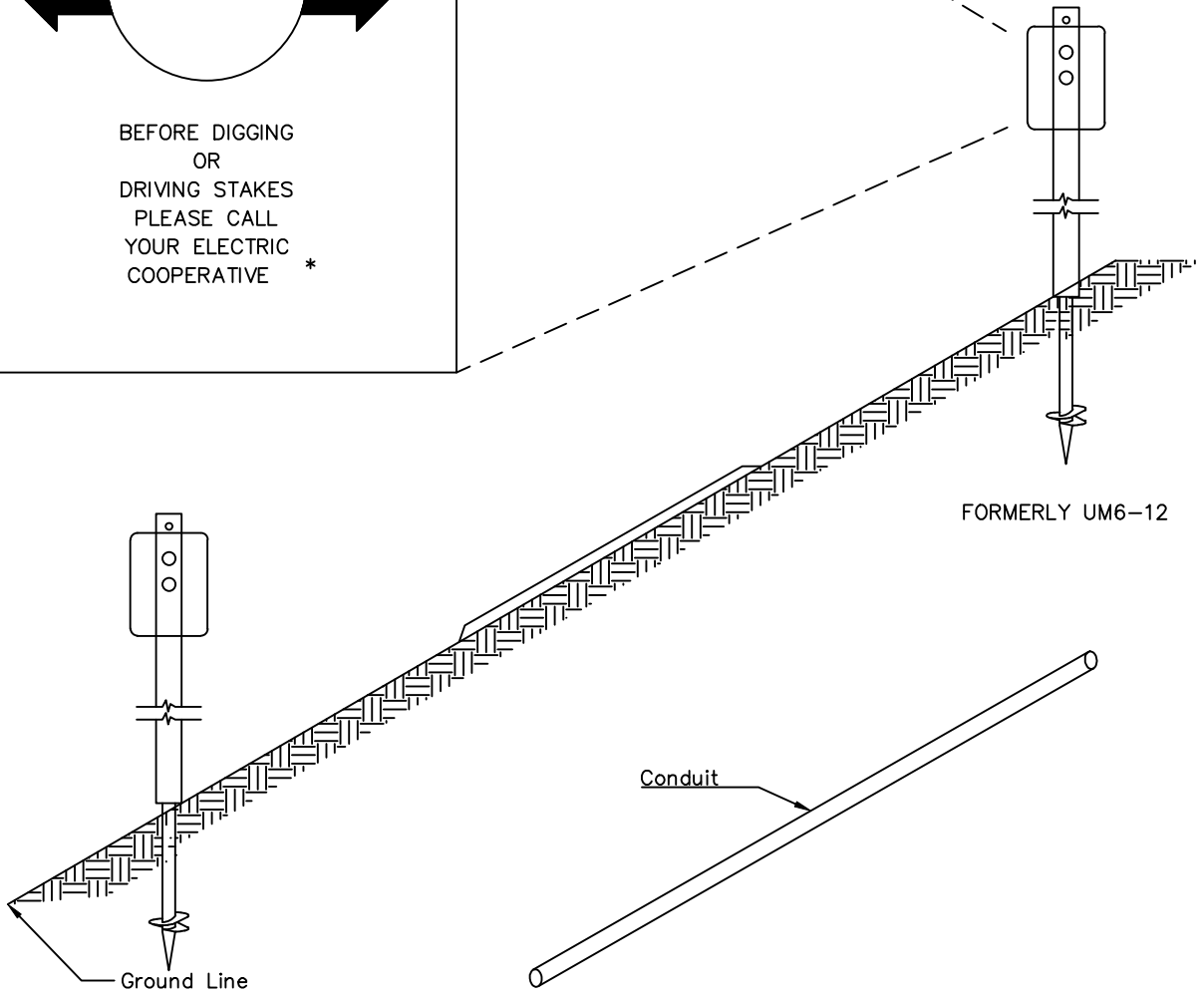
WARNING



BEFORE DIGGING
OR
DRIVING STAKES
PLEASE CALL
YOUR ELECTRIC
COOPERATIVE *

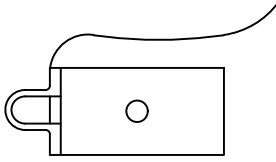
1. SIGN SHALL BE SUPPORTED AND DISPLAYED AS SPECIFIED BY OWNER.
2. SIGN SHALL MEET ANSI-Z535 STANDARD.

* COOPERATIVE NAME AND TELEPHONE NUMBER MAY BE INSERTED AS AN ALTERNATE

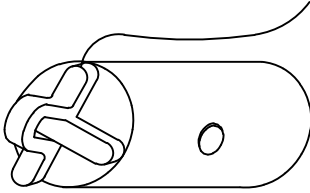


ITEM	QTY.	MATERIAL
Uhx	1	Cable Route Marker

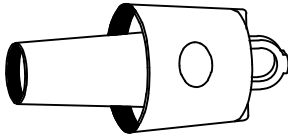
		CABLE ROUTE MARKER	
		AUG 2016	
		RUS	UM2



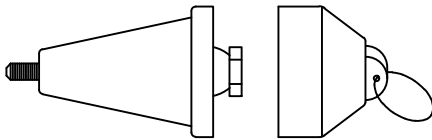
UM6.C2 INSULATED PROTECTIVE CAP
200 AMP LOAD BREAK (FORMERLY UM6-10)



UM6.C6 INSULATED PROTECTIVE CAP
600 AMP DEAD BREAK (FORMERLY UM6-11)



UM6.PL2 BUSHING WELL PLUG
200 AMP LOAD BREAK (FORMERLY UM6-7)



UM6.PL6 INSULATING PLUG TEE CONNECTOR
600 AMP DEAD BREAK (FORMERLY UM6-17)

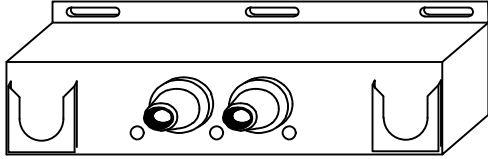
NOTES:

UM6.C (CAP DESCRIPTION)
2 FOR 200 AMP LOAD BREAK CAP
6 FOR 600 AMP DEAD BREAK CAP

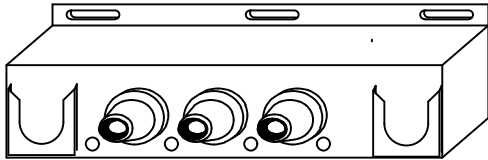
UM6.PL (PLUG DESCRIPTION)
2 FOR 200 AMP BUSHING WELL INSERTS
6 FOR 600 AMP TEE CONNECTOR

ITEM	MATERIAL	UM6.C2	UM6.C6	UM6.PL2	UM6.PL6
Uhb	Insulated protective cap, 200 AMP	1			
Uhb	Insulated protective cap, 600 AMP		1		
Uhb	Bushing well plug, 200 AMP			1	
Uhb	Insulating plug tee connector, 600 AMP				1

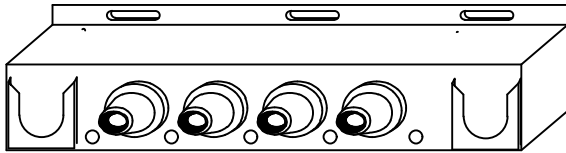
		CAPS AND PLUGS	
		AUG 2016	UM6.C UM6.PL
		RUS	



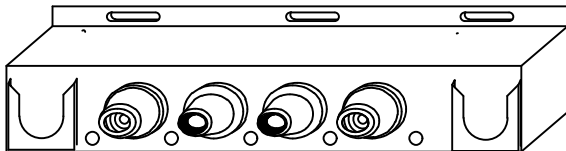
UM6.JN22 TWO POINT TERMINATION
2-200 AMP LOAD BREAK (FORMERLY UM6-20)



UM6.JN222 THREE POINT TERMINATION
3-200 AMP LOAD BREAK (FORMERLY UM6-21)



UM6.JN2222 FOUR POINT TERMINATION
4-200 AMP LOAD BREAK (FORMERLY UM6-22)

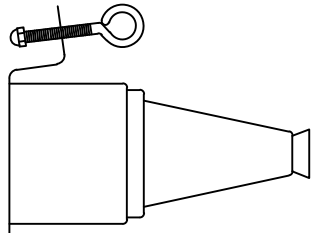


UM6.JN6226 FOUR POINT TERMINATION
2-600 AMP DEAD BREAK
2-200 AMP LOAD BREAK

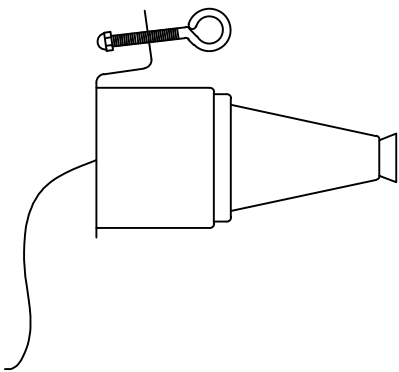
ITEM	QTY.	MATERIAL
Uhq	1	Multipoint junction

DEFINE THE NUMBER OF POINTS
AND TYPE OF POINT FOR EACH MODULE
2 FOR 200 AMP LOAD BREAK
6 FOR 600 AMP DEAD BREAK
9 FOR 900 AMP DEAD BREAK

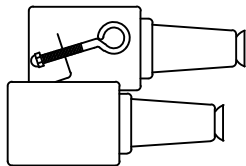
		MULTIPOINT JUNCTIONS	
		AUG 2016	
		RUS	UM6.JN



UM6.PK2 STAND OFF INSULATOR
INSULATED (FORMERLY UM6-15)



UM6.PKGD ONE POINT GROUND
GROUNDED

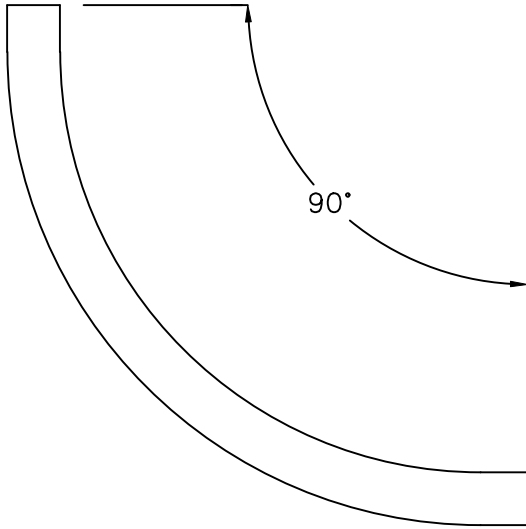


UM6.PK22 STAND-OFF INSULATOR
FEED THROUGH 200 AMP (FORMERLY UM6-19)

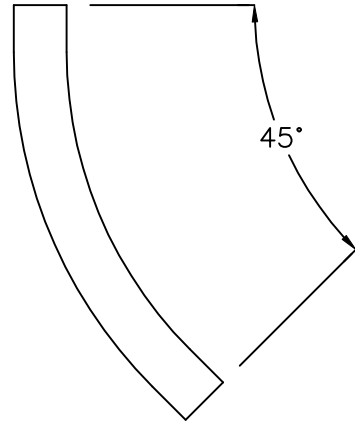
ITEM	QTY.	MATERIAL
Uhq	1	Parking stand

DEFINE THE NUMBER AND TYPE OF POINTS FOR EACH MODULE
 2 FOR 200 AMP LOAD BREAK
 6 FOR 600 AMP DEAD BREAK
 GP FOR POINT WITH GROUND JUMPER
 22 FOR 200 AMP FEED THROUGH

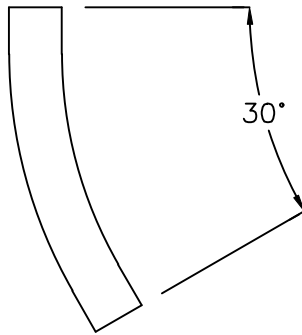
		PARKING STANDS	
		AUG 2016	
		RUS	UM6.PK



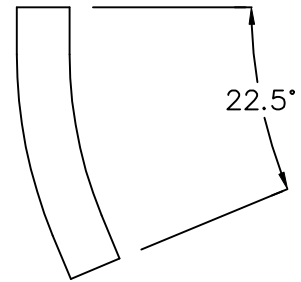
UP7.04.90



UP7.04.45



UP7.04.30



UP7.04.22

ITEM	QTY.	MATERIAL
	1	Conduit, elbow

DESIGN PARAMETERS:

SEE SECTION 8.1 FOR
MINIMUM BENDING RADIUS.

CONDUIT ELBOW

AUG 2016

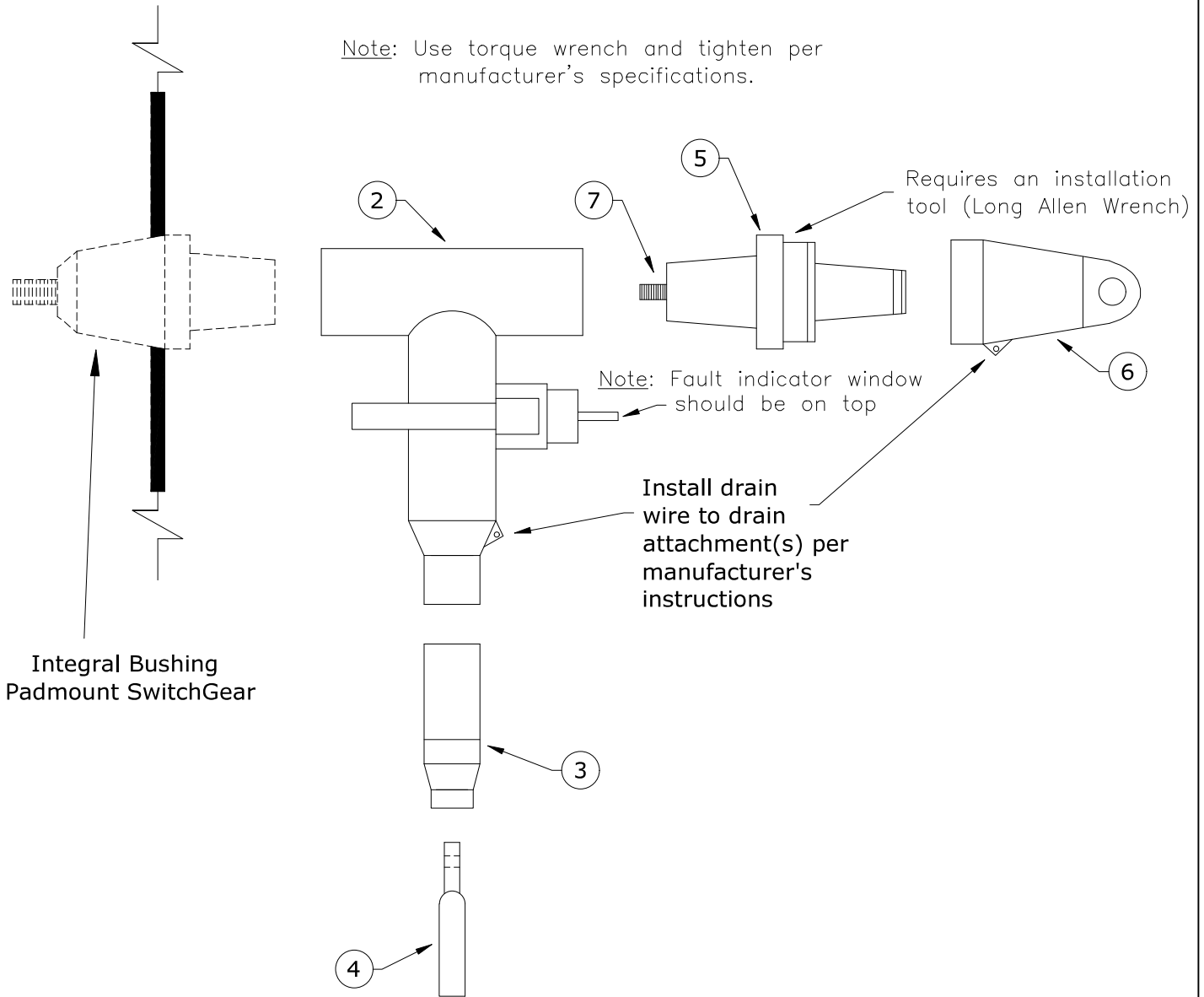
RUS

UP7.04

ASSEMBLY DIAGRAM

ONE ASSEMBLY PER 600A PHASE

Note: Use torque wrench and tighten per manufacturer's specifications.



Rev 3: Added torque requirements and material corrections.

ITEM NO.	DESCRIPTION	USG1	
		QTY.	
1			
2	Housing, Elbow, 600A	1	
3	Adapter, Cable, 500 MCM	1	
4	Contact, Compression, 500 MCM, Al, Non-Threaded Hole	1	
5	Plug, Loadbreak Reducing Tap, 600A-200A	1	
6	Cap, Protective Insulated, 200A, 15kV	1	
7	Stud, Al, 600A, T-Body to Reducer Plug	1	
8	600A Elbow Sealing Kit	1	

CONSTRUCTION STANDARDS

600 AMP ELBOW - 500MCM CABLE

REVISIONS

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0			
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1 of 1

USG1

CAD FILE:
USG1

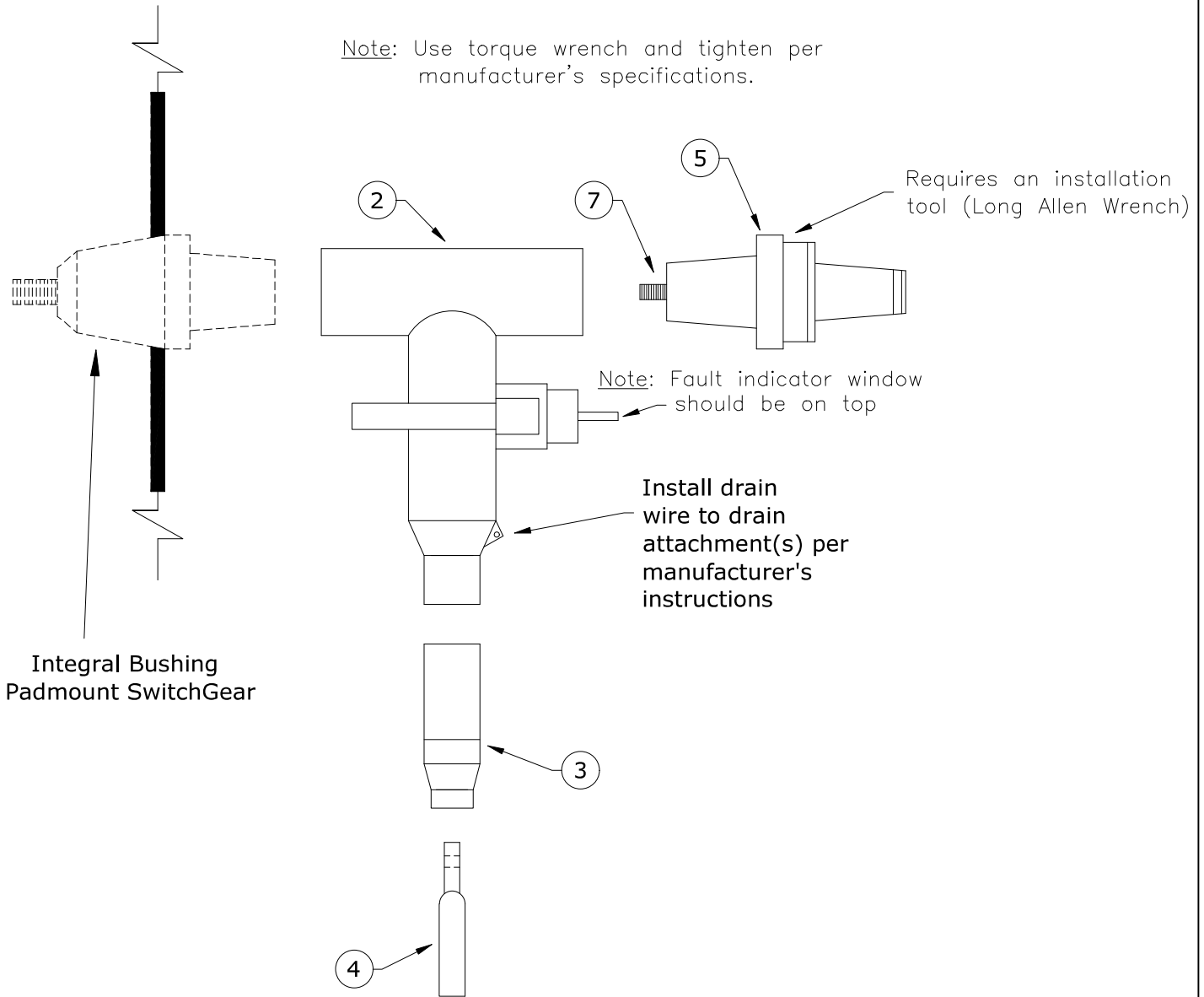
APP:
DATE:

SECTION

ASSEMBLY DIAGRAM

ONE ASSEMBLY PER 600A PHASE

Note: Use torque wrench and tighten per manufacturer's specifications.



Rev 3: Added torque requirements and material corrections.

ITEM NO.	DESCRIPTION	USG1	
		QTY.	
1			
2	Housing, Elbow, 600A	1	
3	Adapter, Cable, 500 MCM	1	
4	Contact, Compression, 500 MCM, Al, Non-Threaded Hole	1	
5	Plug, Loadbreak Reducing Tap, 600A-200A	1	
6			
7	Stud, Al, 600A, T-Body to Reducer Plug	1	
8	600A Elbow Sealing Kit	1	

CONSTRUCTION STANDARDS

600 AMP ELBOW - 500MCM CABLE

REVISIONS

A	DATE	ENGR	OPS
0			
1			
2			
3			

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1 of 1

USG2

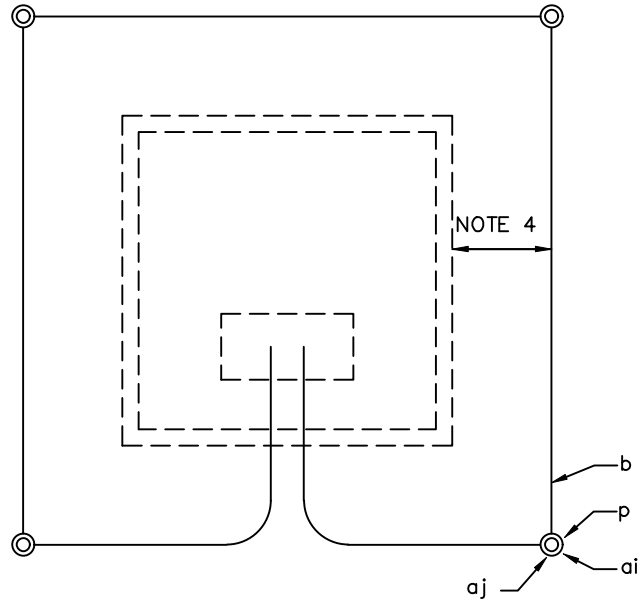
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SECTION

DATE:

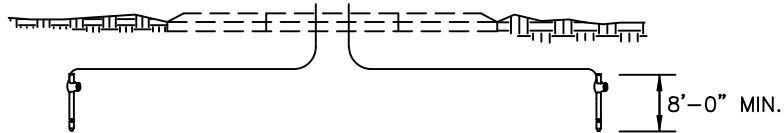
TOP VIEW



NOTE:

IF USED, CONNECT ANODE LEAD INSIDE PAD MOUNTED ENCLOSURES FOR TESTING PURPOSES.

FRONT VIEW



NOTES:

1. PLACE ONE GROUND ROD AT EACH CORNER.
2. GROUNDING GRID BARE COPPER BURIED 6" BELOW GROUND, RUN WIRE INTO BASEMENT AND ALLOW 5'-0" FOR GROUNDING LIVE FRONT SWITCH / FUSE ENCLOSURES.
3. PAD OR BOX PAD IS NOT PART OF THIS UNIT.
4. PLACE GROUND WIRE A MINIMUM OF 24" AWAY FROM THE SIDE OR SIDES OF PAD THAT A PERSON WOULD STAND TO OPERATE THE EQUIPMENT. THE GROUND WIRE MAY BE PLACED WITHIN 12" OF THE OTHER SIDES.
5. SPECIFY LENGTH OF GROUND RODS AT EACH CORNER.

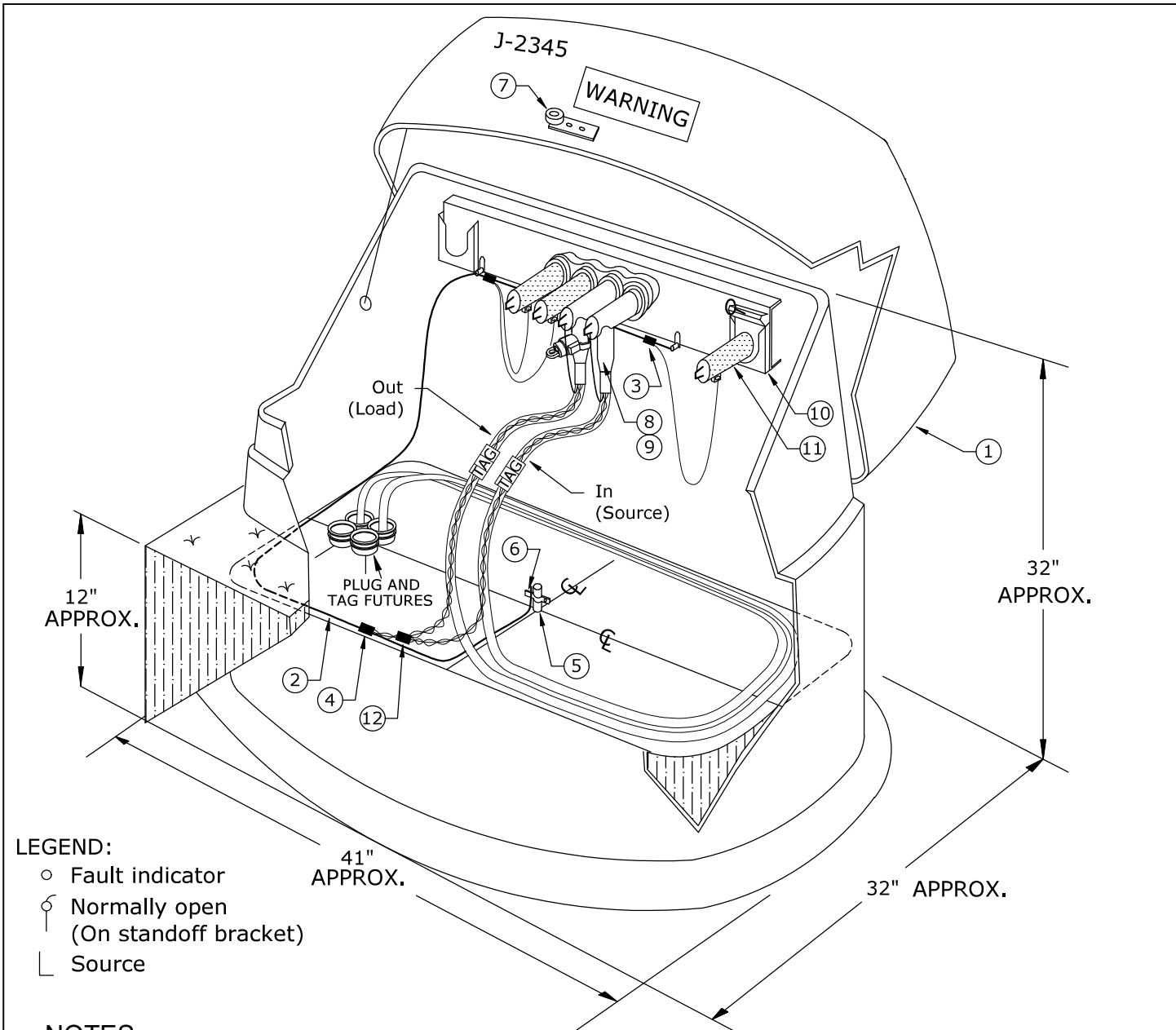
ITEM	QTY.	MATERIAL
p		Connector, as required
ai	4	Rod, ground
aj	4	Clamp, ground rod
cj		Wire, ground, bare copper, as required

GROUNDING ASSEMBLY FOR
PADMOUNTED TRANSFORMERS AND ENCLOSURES
(4 RODS)

AUG 2016

RUS

UH1.4



LEGEND:

- Fault indicator
- ⊕ Normally open (On standoff bracket)
- ⊥ Source

NOTES:

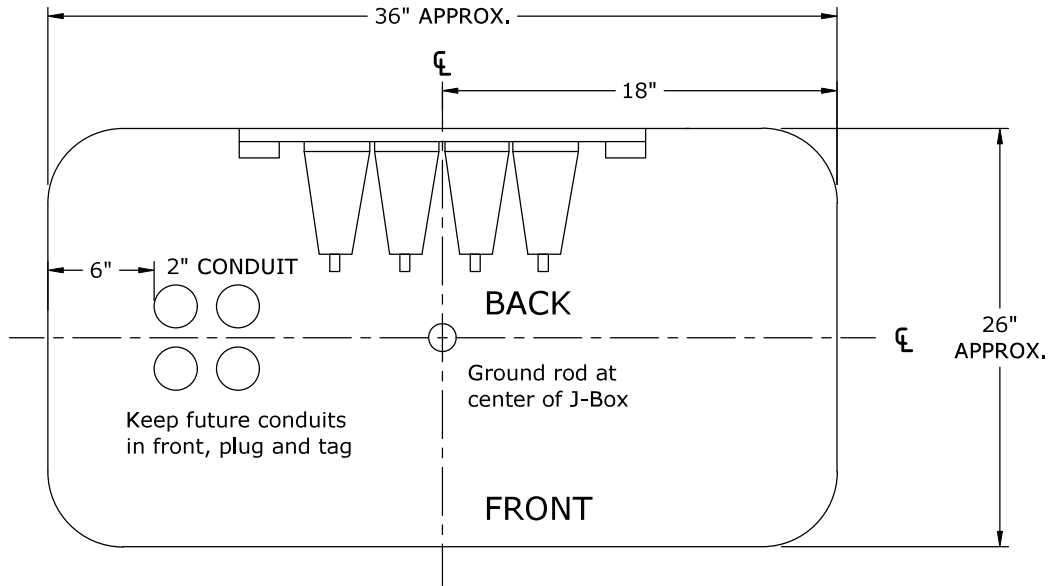
All elbows shall be installed on multi point junctions from left to right (Source, Load, Tap, Tap).

UJM4	UJM41	UJM42	UJM44	UJM45	UJM46	UJM47	UJM48	UJM49

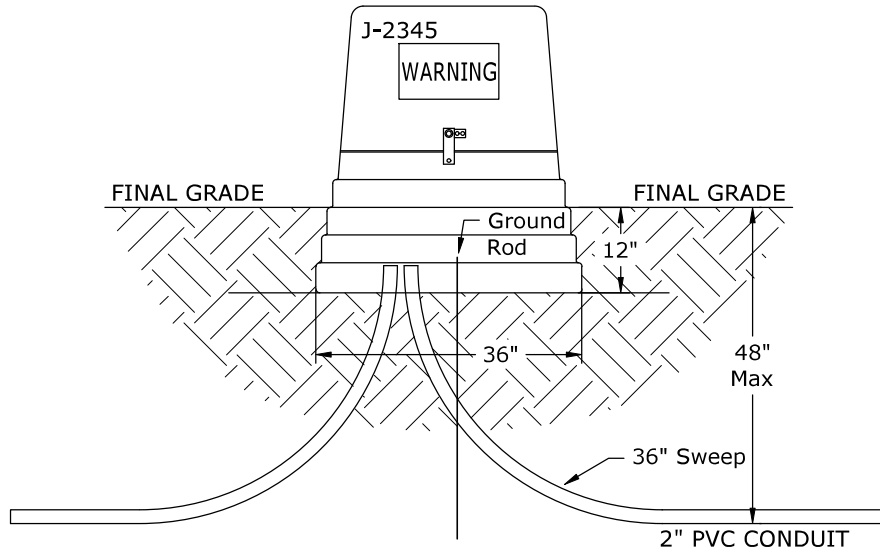
ITEM NO.	DESCRIPTION	QTY
1	Box, Junction, 1Ø, Fiberglass w/LBC4 Installed	1
2	Conductor, Cu, #4 Solid, 1C, Bare, Soft-Drawn	15
3	Connector, Crimpet, Cu, Run & Tap #6 Sol - #4 Str (4C4)	3
4	Connector, Crimpet, Cu, Run #4 Sol - #2 Str, Tap #8 Sol - #4 Str (2C4)	1
5	Rod, Ground 5/8" x 8'	1
6	Clamp, Ground Rod, 5/8", Bronze, Small	1
7	Lock, Equipment, UG	1

CONSTRUCTION STANDARDS
1Ø JUNCTION BOX
4-WAY

REVISIONS			
△	DATE	ENGR	OPS
2			
3			
4			
5			



Plan View 1-Phase J-Box



Primary J-Box Conduit Arrangement

Notes:

1. Typical elbow arrangement is shown.
2. Do not put dirt inside junction box. Space is required for cable slack and operating clearance.
3. Leave cable slack for future operations.
4. Future conduits shall be plugged w/
 - 2" plastic conduit plug, or
 - 4" plastic conduit plug.
5. Futures should be tagged with direction and length of conduit.
6. Proof conduit and install sequentially numbered, 2500 lb mule tape in all futures.

CONSTRUCTION STANDARDS

1Ø JUNCTION BOX
4-WAY

REVISIONS

△/R	DATE	ENGR	OPS
2			
3			
4			
5			

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2 of 2

UJ1

CAD FILE:

APP:
DATE:

SECTION

LEGEND:

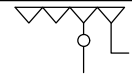
- Fault indicator
- ⊔ Normally open
(On standoff bracket)
- └ Source

The following are for Standards UJ1, UJ3, and UJ3F:

NOTES:

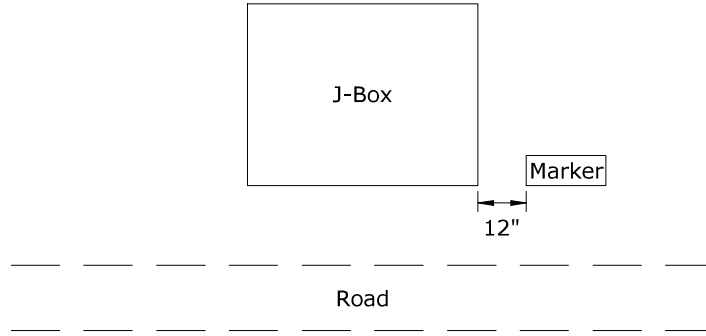
All elbows shall be installed on multi point junctions from left to right (Source, Load, Tap, Tap).

ITEM NO.	DESCRIPTION	UJM44	
		QTY.	
8	Elbow, 200A, LB, 2AL, 220 mil, Test Point, 15kV, w/Jacket Seal	2	
9	Indicator, Fault, UG, 400A, Test Point, Voltage Reset, 1Ø	1	
10	Bushing, Standoff Insulated, 200A	1	
11	Cap, Protective Insulated, 200A, 15kV UG	3	
12	Connector, Crimpet, Cu, Run & Tap #2 Sol - #2 Str (2C2)	2	

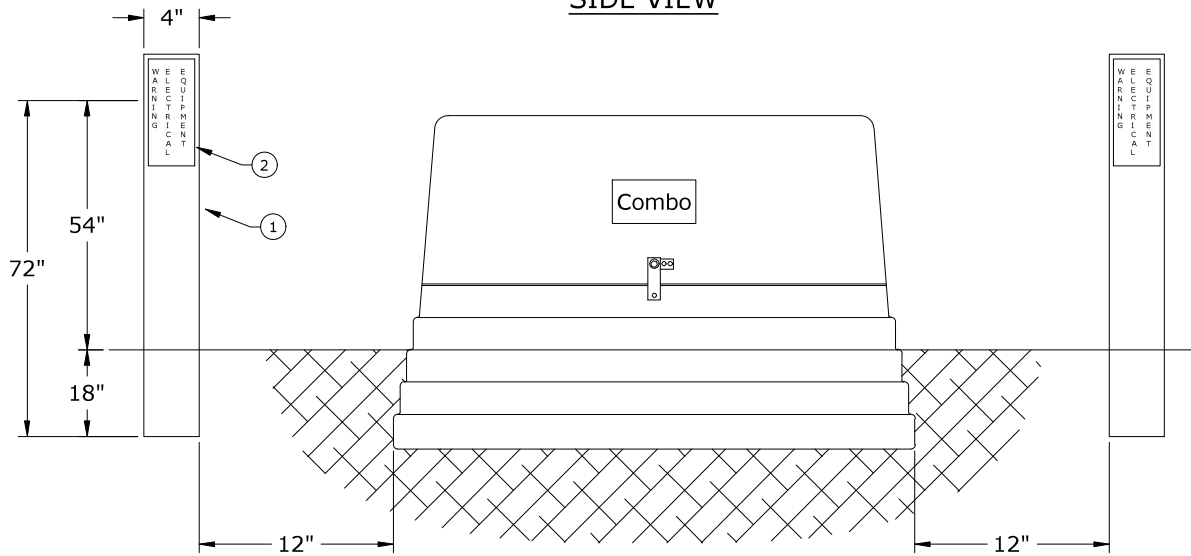


	<p>CONSTRUCTION STANDARDS</p> <p>PRIMARY JUNCTION BOX SINGLE AND THREE PHASE MATERIAL LIST</p> <p style="font-size: 1.5em;">UJM44</p>	REVISIONS			
		△	DATE	ENGR	OPS
		1			
		2			
		3			
		4			
APP:					
DATE:					

TOP VIEW



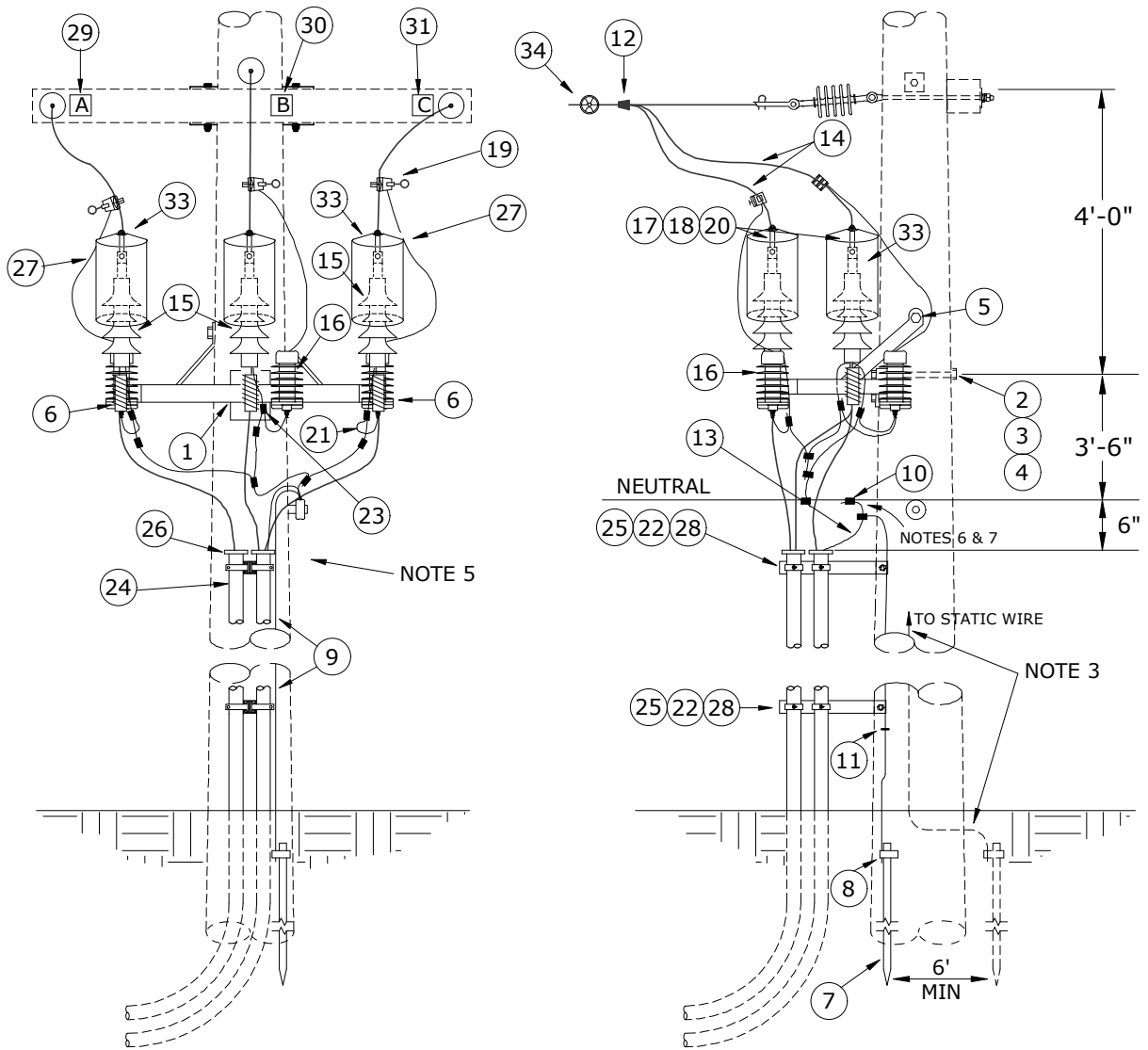
SIDE VIEW



Notes:

1. Use marker when view of J-box may be obscured by terrain or foliage.
2. Call for locates before installing.

ITEM NO.	DESCRIPTION	UJMP																
		QTY.																
1	Marker, Post, Red, 6', Electrical Equipment	2																
2	Marker, Post, Marker, Electrical Equipment	2																
<p>CONSTRUCTION STANDARDS</p> <p>JUNCTION BOX MARKER</p>		REVISIONS																
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 5%;"></th> <th style="width: 30%;">DATE</th> <th style="width: 20%;">ENGR</th> <th style="width: 20%;">OPS</th> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>		DATE	ENGR	OPS												
	DATE	ENGR	OPS															
PAGE: 1 of 1		CAD FILE:	SECTION															
UJMP		APP:	SECTION															
		DATE:																



Notes:

1. See UPR2 for grounding details.
2. All ground wire is #4 solid copper covered.
3. Avoid sharp turns in lightning arrester grounds and primary leads.

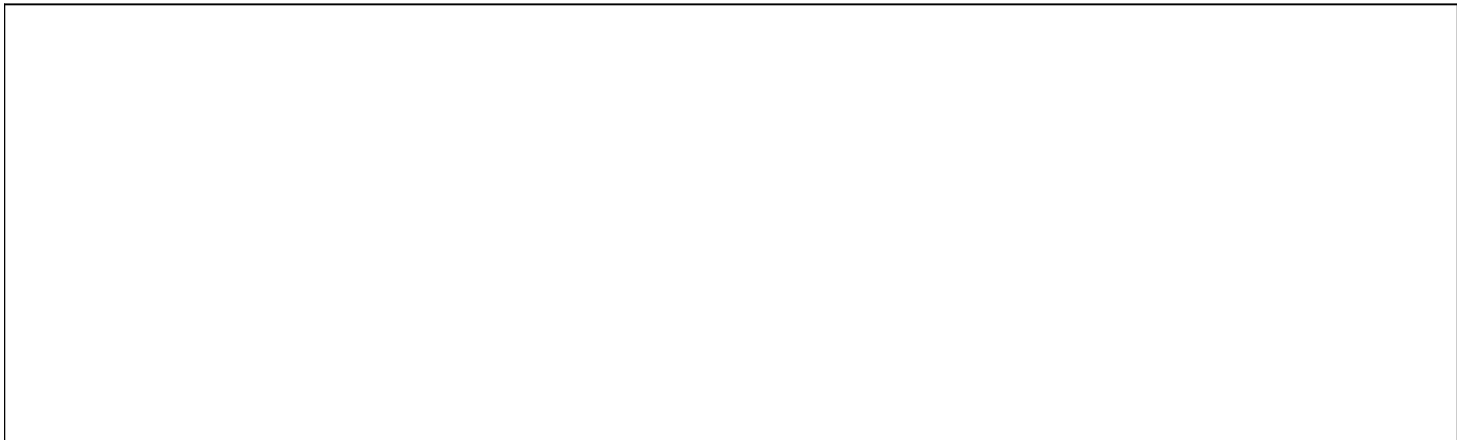
CONSTRUCTION STANDARDS
500 MCM CABLE RISER

PAGE:
1 of 2

UPR1

CAD FILE:

REVISIONS			
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APP:	SECTION		
DATE:			

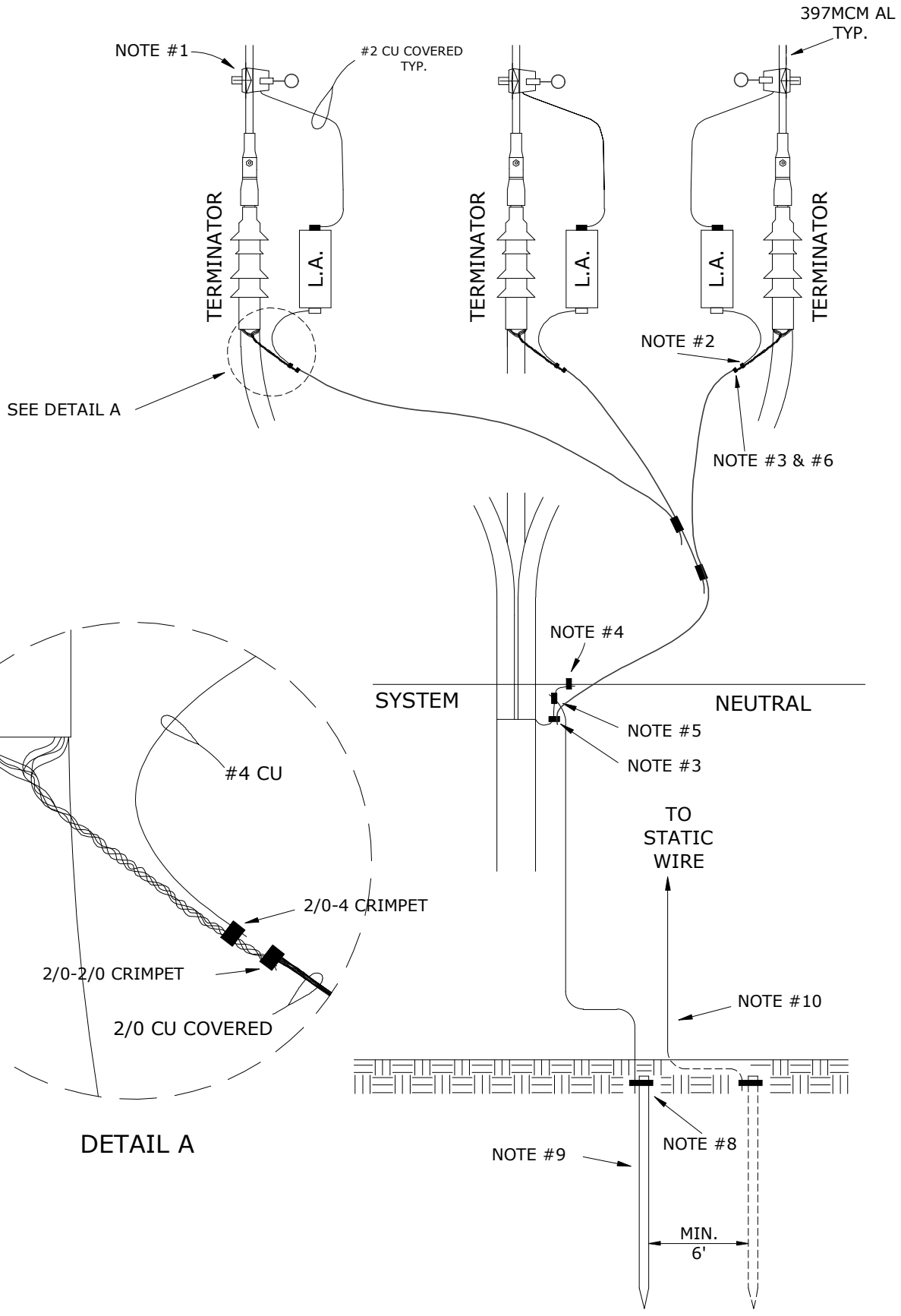


ITEM NO.	DESCRIPTION	UPR1 BR10	
		QTY.	
1	Bracket, Term, Mount 500 MCM Cable	1	
2	Bolt, Machine, 5/8" x 14"	1	
3	Washer, Sq., Curved, Cast, 3" x 3" x 3/8" Thick x 13/16" Hole	1	
4	Washer, Spring, 5/8"	1	
5	Screw, Lag, 1/2" x 4 1/2"	3	
6	Cable Positioner	3	

ITEM NO.	DESCRIPTION	N1	
		QTY.	
7	Rod, Ground, 5/8" x 8'	1	
8	Clamp, Ground rod, 5/8", Small, Bronze	1	
9	Conductor, Cu #4 SLD 1/C	36	
10	Connector, Compression, Cu/Al, Neutral	1	
11	Staple, Ground Wire	10	

ITEM NO.	DESCRIPTION	ADDITIONAL MATERIAL	
		QTY.	
12	Connector, Tap, Power Booster, 4/0 to 4/0	3	
13	Conductor, Cu, 2/0 STR, 600v, XLP	30	
14	Conductor, 4/0 AL	30	
15	Terminator, 500 MCM	3	
16	Arrester, 9 kV MCOV, Riser Pole	3	
17	Connector, Comp., Lug, AL, 4/0	3	
18	Connector, Comp., Lug, AL, 500 MCM	3	
19	Hot Line Clamp	3	
20	Bolt, Machine, 1/2" x 2" Assembly	6	
21	Conductor, #4 BSDC, 1/C	10	
22	Screw, Lag, 1/2" x 4 1/2"	6	
23	Connector, Crimpet, Cu 2/0-C-4	3	
24	Conduit, 3" x 10', Sch 80	9	
25	Clamp, Standoff Bracket, 3"	9	
26	3" End Bell, Sch 40	3	
27	Conductor, #2 Cu Covered, 1/C, 600v HMP	15	
28	Standoff Bracket, 15"	3	
29	Phase A Tag	1	
30	Phase B Tag	1	
31	Phase C Tag	1	
32	Connector, Crimpet, Cu, 2/0-2/0	6	
33	Wildlife Guard	3	
34			

	CONSTRUCTION STANDARDS		REVISIONS			
	500 MCM CABLE RISER		△	DATE	ENGR	OPS
		△				
PAGE: 2 of 2	UPR1	CAD FILE:	APP:	SECTION		
			DATE:			



CONSTRUCTION STANDARDS
500 MCM CABLE RISER
GROUNDING DETAIL

REVISIONS			
DATE	ENGR	OPS	

PAGE:
1 of 2

UPR2

CAD FILE:

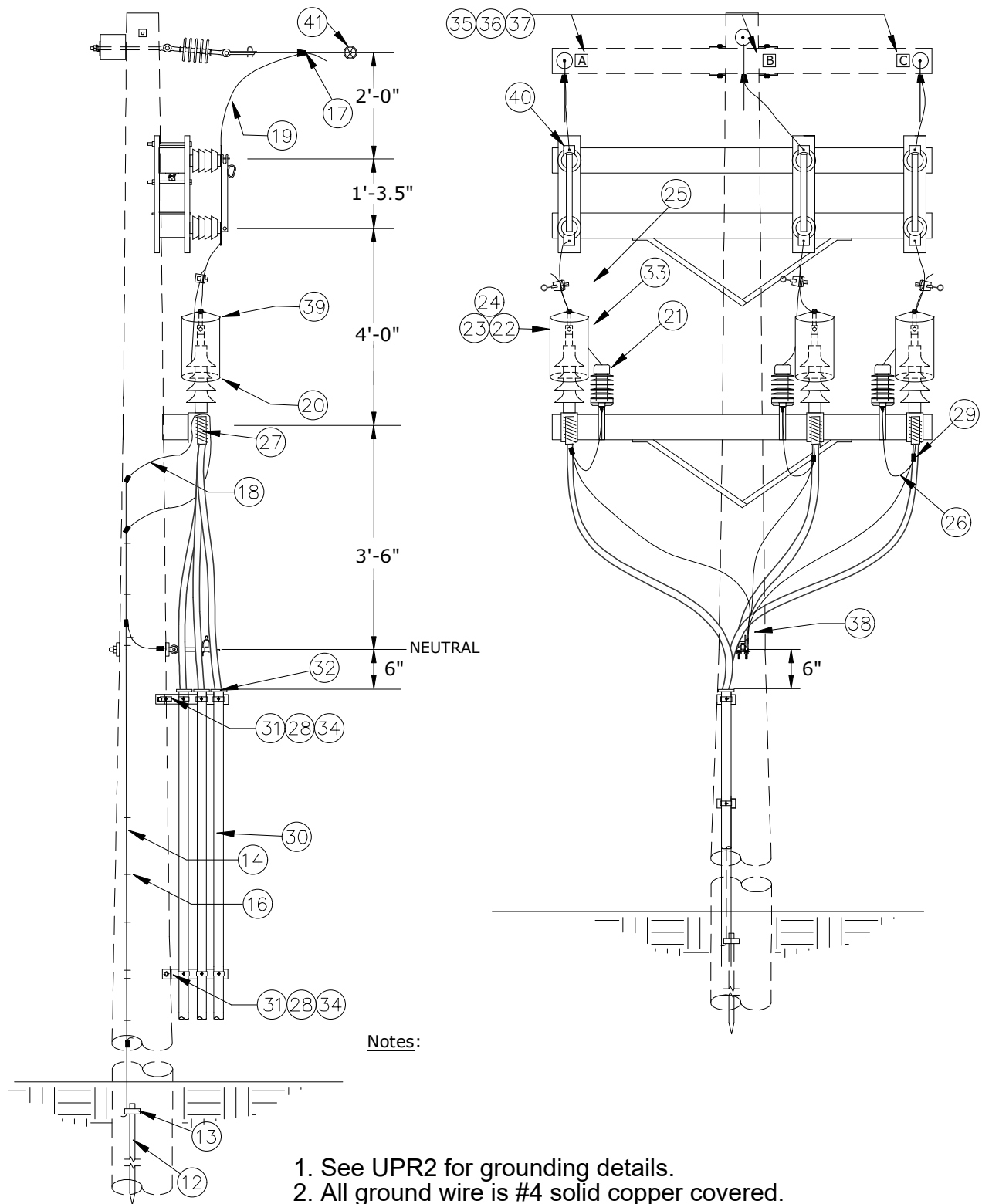
APP:
DATE:

SECTION

NOTES:

1. Make connections as close to terminator as possible but DO NOT make a sharp bend. Use hot line clamp for easy removal.
2. Connect surge arrester lead to concentric neutral.
3. Connect concentric neutral wires (twist together) to 2/0 stranded copper with 2/0 crimpet. Connect separate 2/0 runs, as per drawing, from each concentric neutral to the system neutral. Use 2/0 covered conductor and train this conductor back down along the 1000MCM cable for appearance.
4. Connect 2/0 copper riser neutral to system neutral only. This riser neutral is only used for substation get-a-ways.
5. Use separate ground lead for system neutral grounding connection. Any other equipment grounds may be connected to this ground lead also.
WAC 296-44-02335 (1) (a) & (b)
6. Do not connect arrester grounds separately to system neutral. Connect to concentric neutral as near to the terminator as possible.
7. Do not ground equipment mounting bracket per 2002 NESC 123A.
8. Top of ground rod must be underground. WAC 296-44-02319-(2)(c)
9. If more than one ground rod is required they must be separated by at least 6 feet. WAC 296-44-02319-(2)(B)
10. Static wire ground when required. DO NOT connect neutral. See t-N1 to T-N4 for static wire details.

	CONSTRUCTION STANDARDS		REVISIONS		
	<div style="border: 1px solid black; padding: 2px; display: inline-block;">500 MCM CABLE RISER</div> GROUNDING DETAIL		△	DATE	ENGR
PAGE: 2 of 2	UPR2		CAD FILE:	APP:	SECTION
				DATE:	



CONSTRUCTION STANDARDS

500 MCM CABLE RISER
WITH 600 AMP DISCONNECTS

REVISIONS

△	DATE	ENGR	OPS

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1 of 2

UPR5

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DATE:

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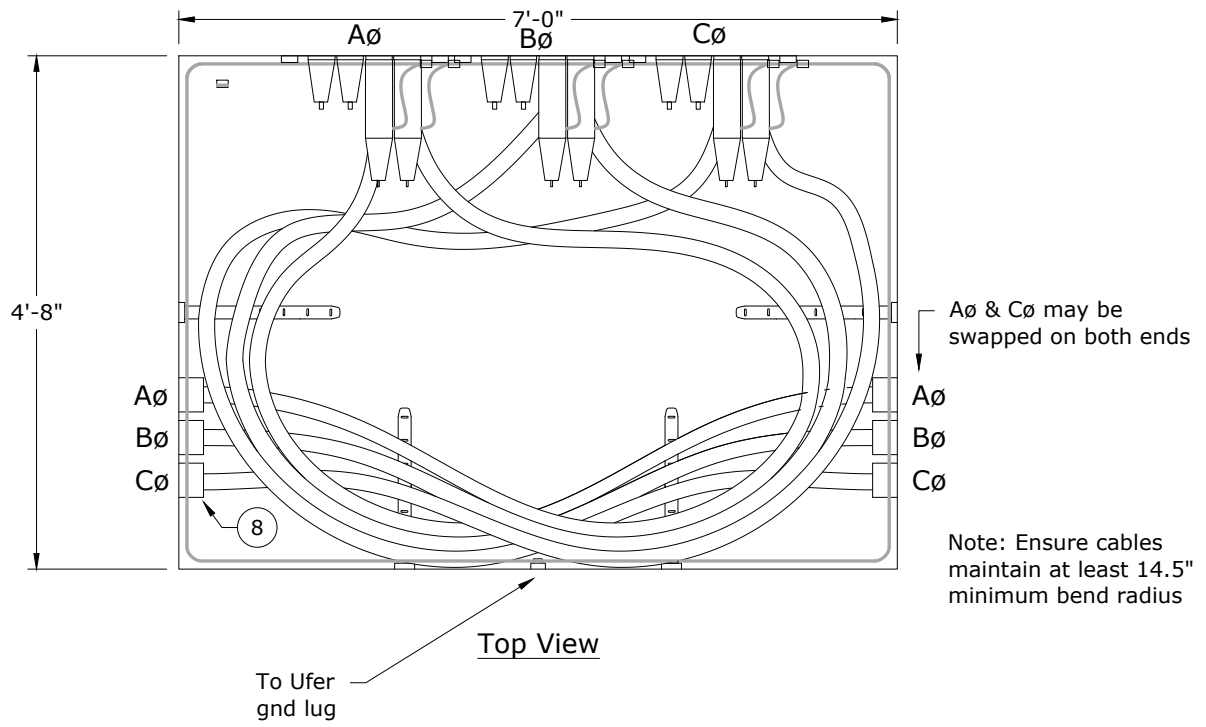
		UPR5
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ITEM NO.	DESCRIPTION	UPR5
		CR24B (3)
		QTY.
1	Crossarm (Distr.) 3 3/4" x 4 3/4" x 10'	6
2	Bolt, Machine, 1/2" x 7"	12
3	Not Used	-
4	Bolt, Double, Arm, 5/8" x 20"	9
5	Gain, Pole Plastic	3
6	Brace, Angle, 72"	6
7	Washer, Spring, 5/8"	18
8	Washer, Spring, 1/2"	12
9	Washer, Sq. Flat 5/8", 2 1/4" x 2 1/4"	30
10	Bolt Machine, 5/8" x 12"	3
11	Washer, Round, Flat 1/2"	12

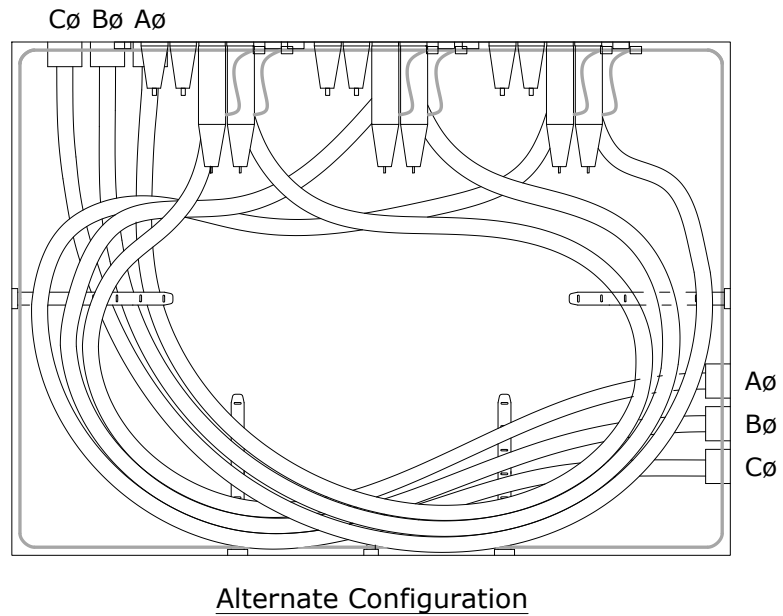
ITEM NO.	DESCRIPTION	N1
		QTY.
12	Rod, Ground, 5/8" x 8'	1
13	Clamp, Ground rod, 5/8", Small, Bronze	1
14	Conductor, Cu #4 SLD 1/C	36
15	Connector, Compression, Cu/Al, Neutral	1
16	Staple, Ground Wire	10

ITEM NO.	DESCRIPTION	ADDITIONAL MATERIAL
		QTY.
17	Connector, Tap, Power Booster, 4/0 to 4/0	3
18	Conductor, Cu, 2/0 STR, 600v, XLP	30
19	Conductor, 4/0 AL	30
20	Terminator, 500 MCM	3
21	Arrester, 9 kV MCOV, Riser Pole	3
22	Connector, Comp., Lug, AL, 4/0	3
23	Connector, Comp., Lug, AL, 500 MCM	3
24	Hot Line Clamp	3
25	Bolt, Machine, 1/2" x 2" Assembly	6
26	Conductor, #4 BSDC, 1/C	10
27	Cable Positioner	3
28	Screw, Lag, 1/2" x 4 1/2"	6
29	Connector, Crimpet, Cu 2/0-C-4	3
30	Conduit, 3" x 10', Sch 80	9
31	Clamp, Standoff Bracket, 3"	9
32	3" End Bell, Sch 40	3
33	Conductor, #2 Cu Covered, 1/C, 600v HMP	15
34	Standoff Bracket, 15"	3
35	Phase A Tag	1
36	Phase B Tag	1
37	Phase C Tag	1
38	Connector, Crimpet, CU, 2/0-2/0	6
39	Wildlife Guard	3
40	Disconnect, 600 Amp, Single Blade	3
41		

	CONSTRUCTION STANDARDS	REVISIONS			
	500 MCM CABLE RISER WITH 600 AMP DISCONNECTS	△	DATE	ENGR	OPS
	PAGE: 2 of 2	UPR5	CAD FILE:	APP:	SECTION
				DATE:	

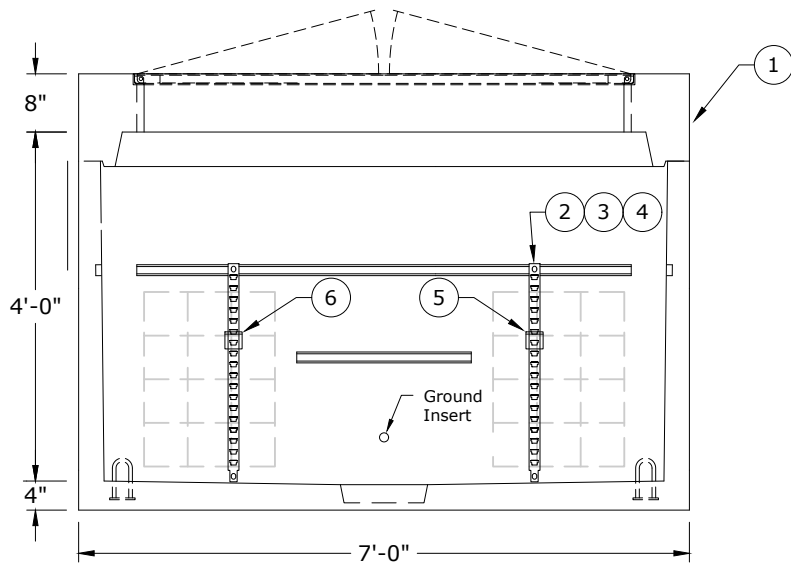


See UVG for Grounding

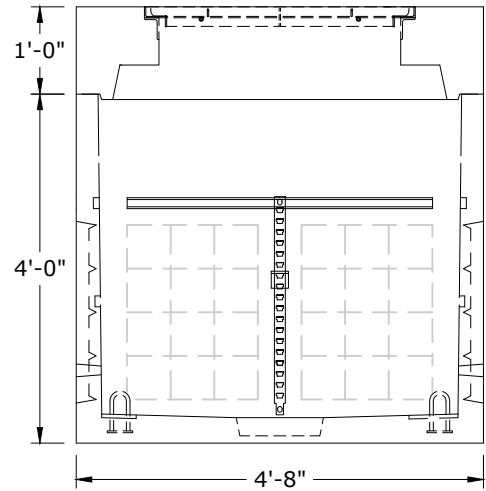


3-PHASE FEED-THRU VAULT

UV3P



Front View (Inside)

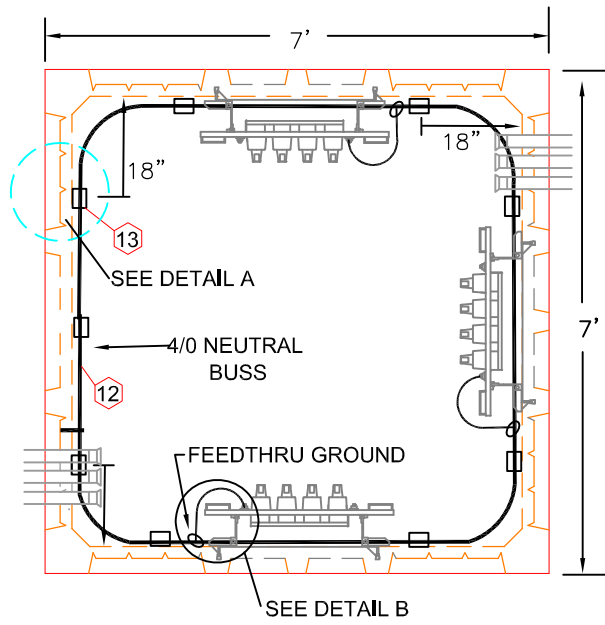


Side View (Inside)

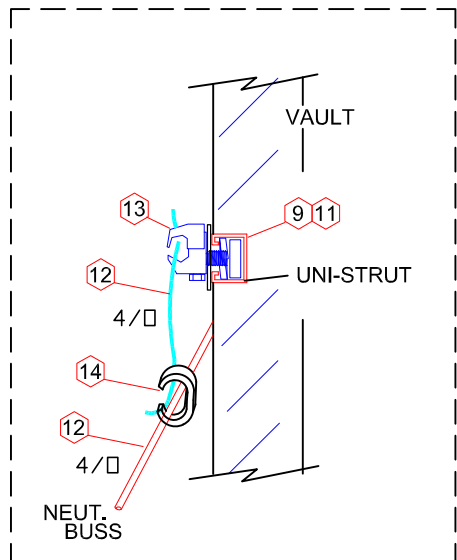
ITEM NO.	DESCRIPTION	UV3P
		QTY.
1	Vault, 575LA, Flush-Mount J-Box or EE, Ufer Ground, Non-Slip Lid	1
2	Bolt, Machine, 1/2" x 1-1/2" SS	6
3	Nut, Spring-Loaded Galv. 1/2"	6
4	Washer, Flat, 1/2", SS	6
5	Bracket, Mounting, Vault, 30"	6
6	Arm, Vault, Cable, 18"	6
7	Tie Wrap, Plastic, Releasable, 1/2" W x 19" L	21
8	Seal, 3" Conduit,	

3-PHASE FEED-THRU VAULT

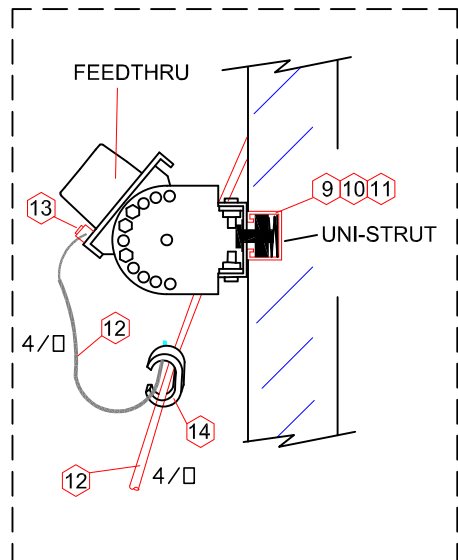
UV3P



VAULT SHOWN AS AN EXAMPLE ONLY.



DETAIL A
NEUTRAL BUSS TO VAULT

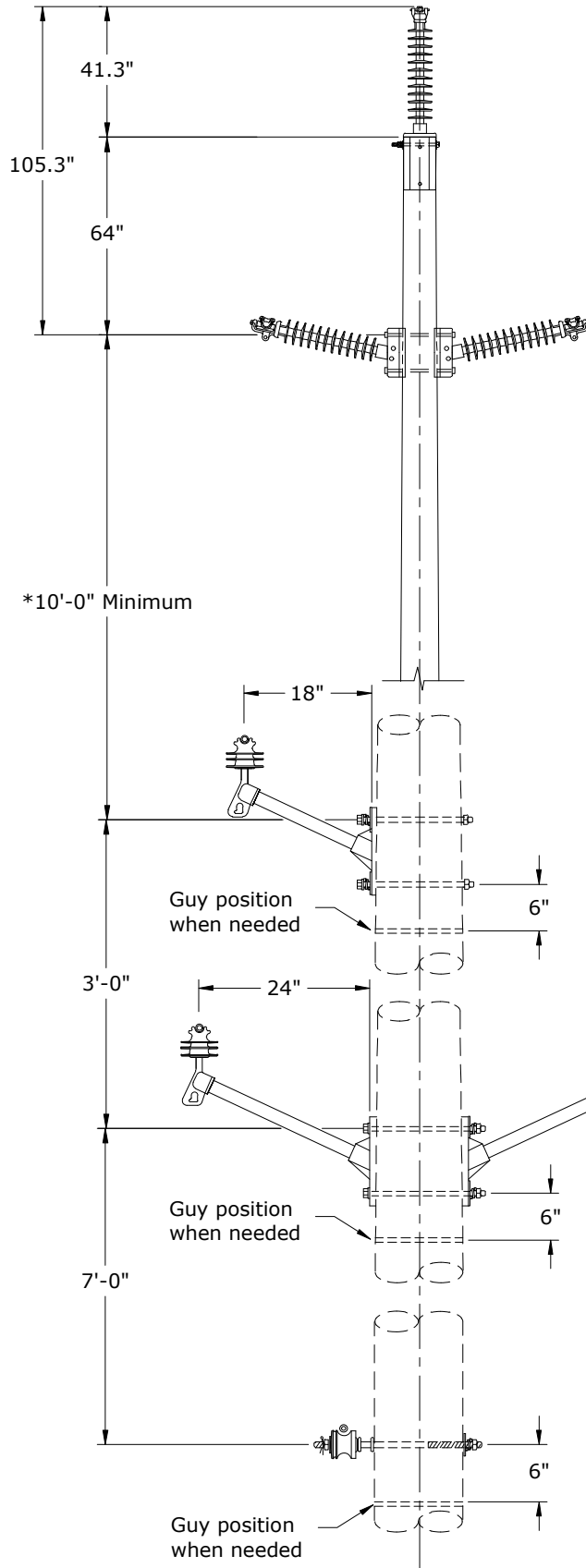


DETAIL B
FEEDTHRU GROUNDING

ITEM	DESCRIPTION	QUANTITY	
		UVG	
GROUNDING			
9	XXX - SS WASHER - 1/2" ROUND	10	
10	XXX - SS BOLT 3/4" x 1/2"	6	
11	XXX - UNI STRUT NUT 1/2"	14	
12	4/0 COPPER S/D 19 STRAND	40'	
13	xxx GROUND CONNECTOR 4/0	8	
14	COPPER CRIMP (4/0-4/0)	14	

ADDITIONAL MATERIAL NOT SHOWN:
 30' - Conductor, Cu, #4 Solid, 1C, Bare, Soft-Drawn (For equipment elbows, Grd caps, etc)
 Qty as reqd - Connector, Crimpet, Cu, 4/0 to #6 Sol - #4 Str
 Qty as reqd - Connector, Crimpet, Cu, 4/0 to 4/0 concentric to neutral
 Qty as reqd - Lug, grounding See UV3P

UVG

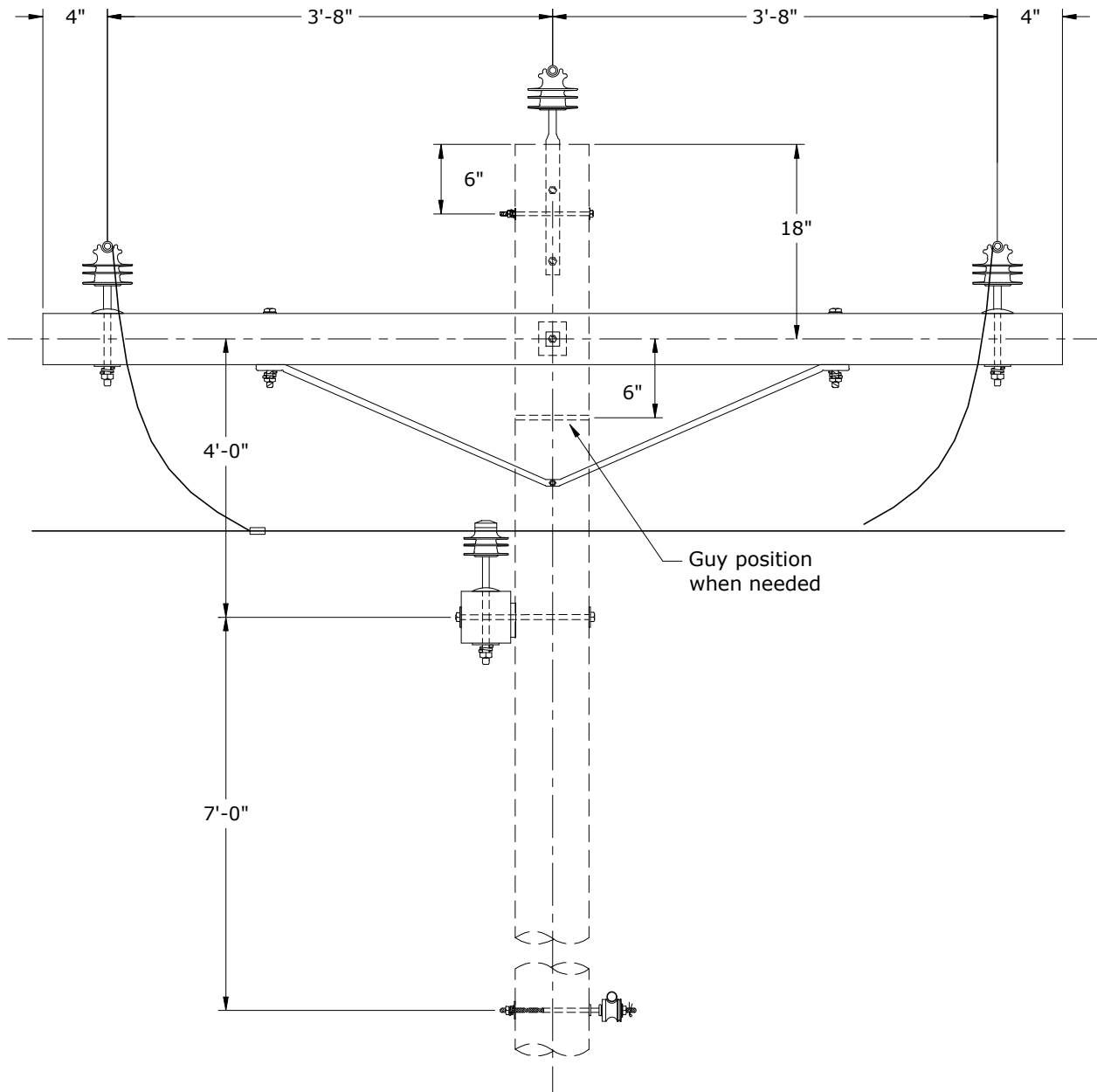


* For tall poles, make sure the distribution can be reached by a service/line truck.

CONSTRUCTION STANDARDS

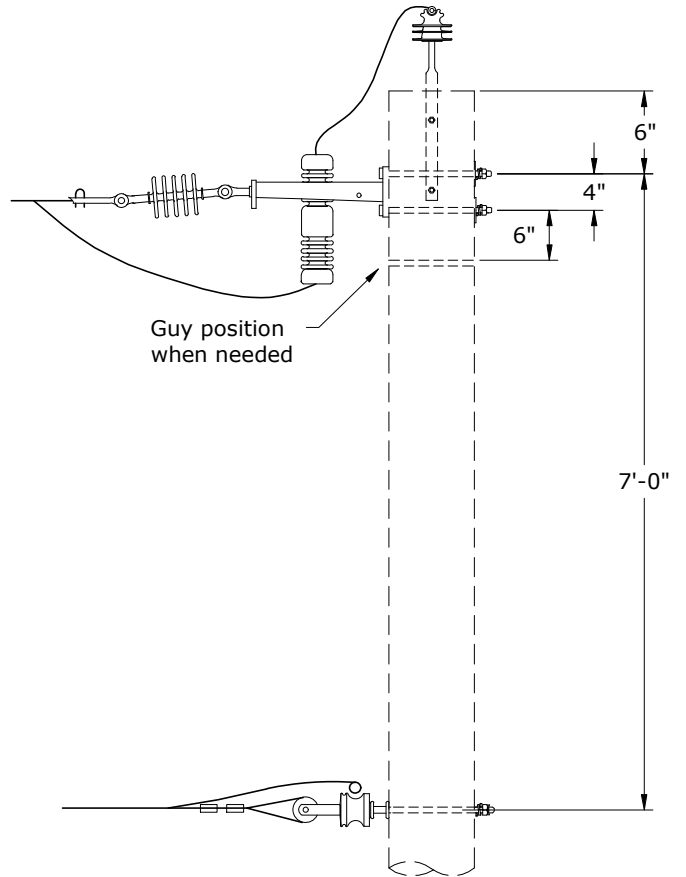
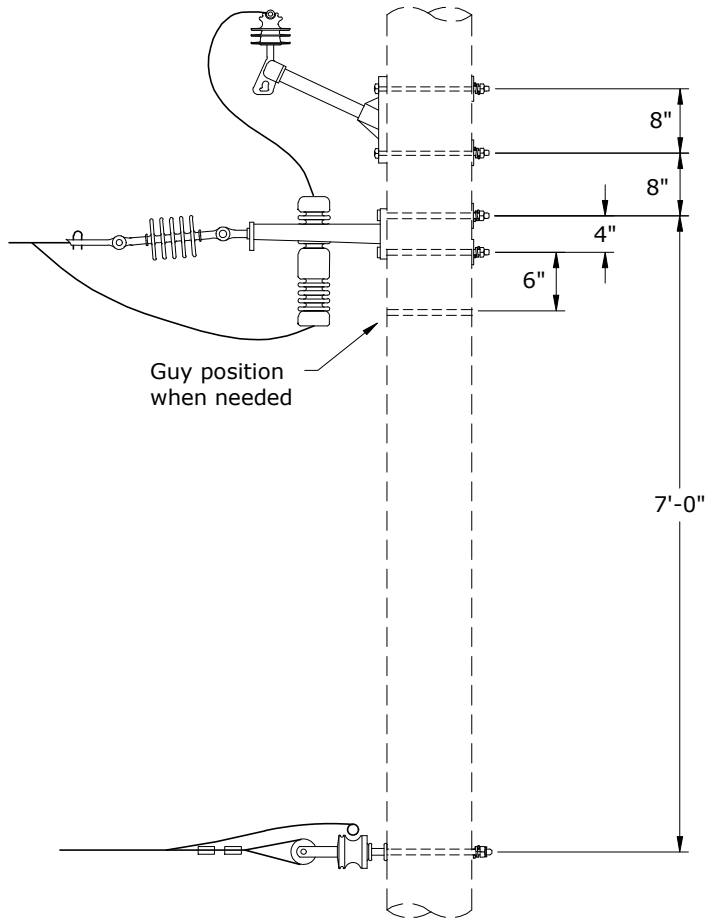
CONSTRUCTION FRAMING GUIDE TRANSMISSION UNDERBUILD

REVISIONS			
△	DATE	ENGR	OPS



CONSTRUCTION STANDARDS
 CONSTRUCTION FRAMING GUIDE
 INTERSECTION

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APP:			SECTION
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Alternate
for 1Ø

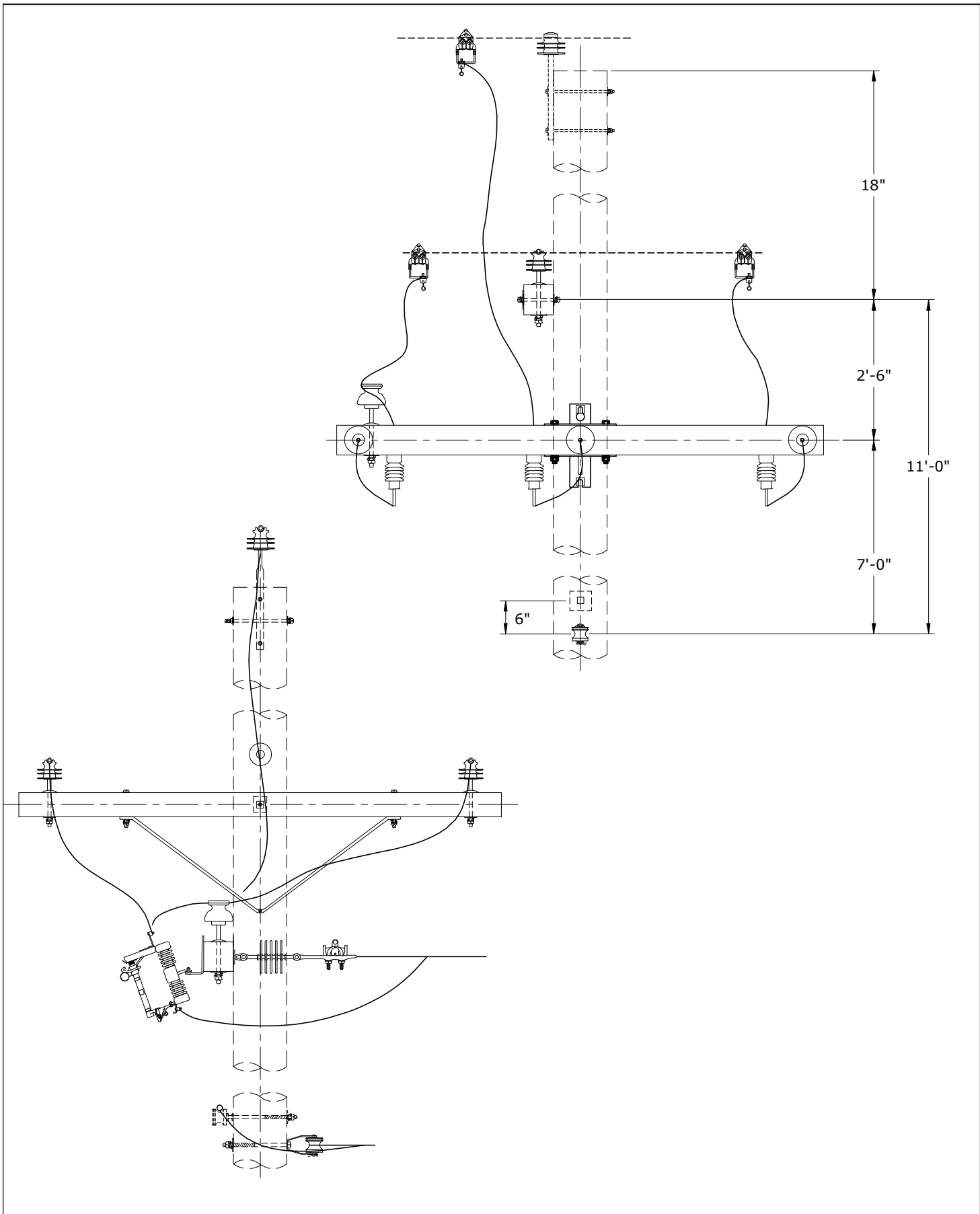
CONSTRUCTION STANDARDS
 CONSTRUCTION FRAMING GUIDE
 1Ø FUSED TAP

PAGE:
3 of 6

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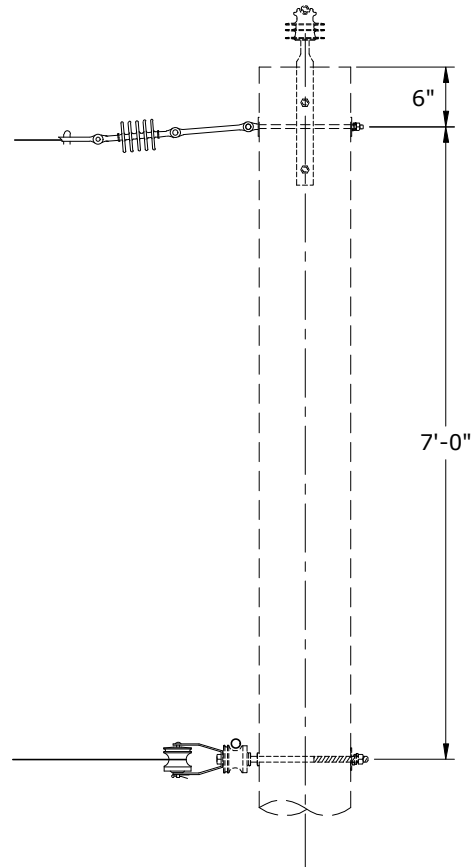
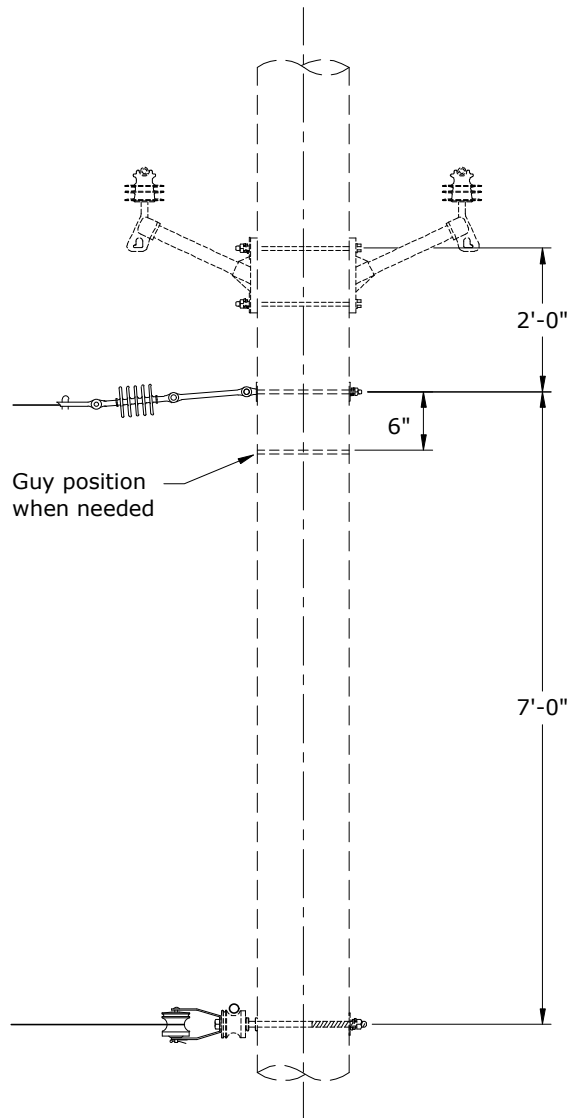
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CONSTRUCTION STANDARDS
 CONSTRUCTION FRAMING GUIDE
 BUCKARM

REVISIONS			
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Alternate
for 1Ø

CONSTRUCTION STANDARDS
 CONSTRUCTION FRAMING GUIDE
 UNFUSED 1Ø TAP

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WEATHER CRITERIA

PUD1
5/1/2023

Description	Air Density Factor (Q) (psf/mph^2)	Wind Velocity (mph)	Wind Pressure (psf)	Wire Ice Thickness (in)	Wire Ice Density (lbs/ft^3)	Wire Ice Load (lbs/ft)	Wire Temp. (deg F)	NESC Constant (lbs/ft)	Wire Gust Response Factor
NESC Medium (250B)	0.00256	39.5285	4	0.25	57	0	0	0.2	1
Extreme Wind (250C)	0.00256	85	18.496	0	0	0	60	0	NESC 2017
Concurrent Ice/Wind (250D)	0.00256	50	6.4	0.25	57	0	15	0	1
Extreme Ice	0.00256	0	0	0.5	57	0	30	0	1
Uplift	0.00256	0	0	0	0	0	-5	0	1
Maximum Operating	0.00256	0	0	0	0	0	167	0	1
NESC Blowout 6PSF	0.00256	48.4123	6	0	0	0	60	0	1
No Wind (SWING 1)	0.00256	0	0	0	0	0	60	0	1
Moderate Wind (SWING 2)	0.00256	48.4123	6	0	0	0	32	0	1
Moderate Wind (SWING 3)	0.00256	48.4123	6	0	0	0	60	0	1
High Wind (SWING 4)	0.00256	90	20.736	0	0	0	60	0	1
GALLOPING (SWING)	0.00256	27.9508	2	0.5	57	0	32	0	1
GALLOPING (SAG)	0.00256	0	0	0.5	57	0	32	0	1
-20 Deg F	0.00256	0	0	0	0	0	-20	0	1
0 Deg F	0.00256	0	0	0	0	0	0	0	1
30 Deg F	0.00256	0	0	0	0	0	30	0	1
32 Deg F	0.00256	0	0	0.5	57	0	32	0	1
60 Deg F	0.00256	0	0	0	0	0	60	0	1
90 Deg F	0.00256	0	0	0	0	0	90	0	1
120 Deg F	0.00256	0	0	0	0	0	120	0	1
167 Deg F	0.00256	0	0	0	0	0	167	0	1
212 Deg F	0.00256	0	0	0	0	0	212	0	1

SAFETY FACTORS

PUD1
5/1/2023

Overload Factors

	Grade B	Grade C
Vertical loads	1.50	1.90
Transverse loads (wind)	2.50	2.20
Transverse loads (wire tension)	1.65	1.30
Longitudinal loads (wire tension at angles)	1.33	1.10
Longitudinal loads (wire tension at deadends)	1.65	1.30
Strength factor for wood	0.65	0.85

Data source:

1. Vertical loads: NESC table 253-1.
2. Transverse loads (wind): NESC table 253-1.
3. Transverse loads (wire tension): NESC table 253-1. [Crossing span safety factor is used for grade C construction]
4. Longitudinal loads (wire tension at angles): NESC table 253-1 for grade C, RUS bulletin #1724E-200 table 11-6 for grade B
5. Longitudinal loads (wire tension at deadends): NESC table 253-1.
6. Strength factor for wood: NESC table 261-1A.

OVERHEAD VERTICAL WIRE CLEARANCES OVER GROUND
lowest point on the conductor during worst case sag condition

Nature of surface underneath wires, conductors, or cables	Ins. Comm. Cable, multi-grounded neutrals, grounded guys & triplex serv. Cable			NESC RUS PUD1
	23.5 25.5 27	24 26 27.5	24.5 26.5 28.5	
1. Track rails of railroads (except electrified railroads using overhead trolley conductors)	15.5 17.5 19	16 18 19	18.5 20.5 20.5	NESC RUS PUD1
2. Public roads, streets, alleys and other areas subject to truck traffic.	15.5 17.5 17.5	16 18 18	18.5 20.5 20.5	NESC RUS PUD1
3. Private roads and other land traversed by vehicles (cultivated, grazing, forest, etc.)	9.5 11.5 11.5	12 14 14	14.5 16.5 16.5	NESC RUS PUD1
4. Spaces and ways for pedestrians only (cannot ride horses). Spaces created by fences/gates do not qualify *	24 24***	24 24	30 30	WSDOT PUD1
5. INTERSTATES & STATE HIGHWAYS (crossings) **				

Where wires, conductors, or cables run along and within the limits of highways or other road rights-of-way but do not overhang the roadway

6. Public roads, streets or alleys	15.5 17.5 17.5	16 18 18	18.5 20.5 20.5	NESC RUS PUD1
7. INTERSTATES & STATE HIGHWAYS (longitudinal)	20 20	24 24	27 27	WSDOT PUD1

* These spaces must be the result of a physical terrain feature (a steep bank) where vehicles or horses cannot traverse or a man made feature not easily modified for vehicles (a cat walk)

** Refer to WAC 468-34-290 for more information

*** Communication joint use with electrical may be 20' per WAC 468-34-290

GENERAL STRINGING OUTSIDE OF STRINGING SPECIFICATION

SPIDA®silk v7.3.2									
Report Date: 02/01/2022									
3/0 PIGEON (6/1) - Initial Sags and Tensions									
Ruling Span: 250'									
Temperature (°F)	20	30	40	50	60	70	80	90	100
Horizontal Tension (lbf)	1730	1607	1483	1359	1237	1118	1004	898	801
Span Distance (ft)	Sag (inches)								
150	4	5	5	5	6	7	7	8	9
200	8	8	9	10	11	12	13	15	16
250	12	13	14	15	17	18	20	23	26
300	17	18	20	22	24	26	29	33	37
350	23	25	27	30	33	36	40	45	50

Wire Properties	
Size	3/0 PIGEON
Diameter	0.502"
Weight Per Length	0.219 lbf/ft
Description	PIGEON
Stranding	6/1
Number of Conductors	1
Strength	6300 lbf

GUYING AND ANCHORING

PUD1
05/01/23

Conductor size & type	3/0 ACSR 6/1 Pigeon	
Maximum conductor tension	2142	Lbs
Number of conductors	4	
Telephone	Yes	
Phase to neutral distance	7	Ft
NESC Grade of Construction	C	
Working guy tension	15597.5	Lbs
Working anchor tension	21200	Lbs

Number of Guy Leads and Anchors

Dead-end	Pole Height		
Shortest lead length	45	50	55
5	N/A	N/A	N/A
10	3,3	3,3	3,3
15	2,2	3,3	3,3
20	2,2	2,2	2,2
25	2,2	2,2	2,2
35	2,1	2,1	2,2
40	2,1	2,1	2,1

Angles		Pole Height= 45 Ft							
Shortest lead length	Angle=	5	10	15	20	30	40	50	60
5		1,1	2,1	2,2	2,2	3,3	3,3	3,3	N/A
10		1,1	1,1	1,1	2,1	2,2	2,2	3,3	3,3
15		1,1	1,1	1,1	1,1	2,1	2,2	2,2	2,2
20		1,1	1,1	1,1	1,1	1,1	2,1	2,2	2,2
25		1,1	1,1	1,1	1,1	1,1	2,1	2,1	2,2
35		1,1	1,1	1,1	1,1	1,1	1,1	2,1	2,1

Angles		Pole Height= 50 Ft							
Shortest lead length	Angle=	5	10	15	20	30	40	50	60
5		1,1	2,1	2,2	2,2	3,3	3,3	N/A	N/A
10		1,1	1,1	1,1	2,1	2,2	2,2	3,3	3,3
15		1,1	1,1	1,1	1,1	2,1	2,2	2,2	3,3
20		1,1	1,1	1,1	1,1	2,1	2,1	2,2	2,2
25		1,1	1,1	1,1	1,1	1,1	2,1	2,2	2,2
35		1,1	1,1	1,1	1,1	1,1	1,1	2,1	2,1

Angles		Pole Height= 55 Ft							
Shortest lead length	Angle=	5	10	15	20	30	40	50	60
5		1,1	2,1	2,2	2,2	3,3	3,3	N/A	N/A
10		1,1	1,1	2,1	2,1	2,2	3,3	3,3	3,3
15		1,1	1,1	1,1	1,1	2,2	2,2	2,2	3,3
20		1,1	1,1	1,1	1,1	2,1	2,2	2,2	2,2
25		1,1	1,1	1,1	1,1	1,1	2,1	2,2	2,2
35		1,1	1,1	1,1	1,1	1,1	2,1	2,1	2,2

Output information is in the format of <# of down guys>, <# of anchors>. Minimum guy spacing is 5'.

GENERAL STRINGING OUTSIDE OF STRINGING SPECIFICATION

SPIDA®silk v7.3.2									
Report Date: 02/01/2022									
4/0 PENGUIN (6/1) - Initial Sags and Tensions									
Ruling Span: 250'									
Temperature (°F)	20	30	40	50	60	70	80	90	100
Horizontal Tension (lbf)	2107	1952	1797	1642	1489	1342	1203	1074	960
Span Distance (ft)	Sag (inches)								
150	4	5	5	6	6	7	8	9	10
200	8	9	9	10	11	12	14	15	17
250	12	13	14	16	17	19	22	24	27
300	18	19	21	23	25	28	31	35	39
350	24	26	28	31	34	38	42	47	53

Wire Properties	
Size	4/0 PENGUIN
Diameter	0.563"
Weight Per Length	0.277 lbf/ft
Description	PENGUIN
Stranding	6/1
Number of Conductors	1
Strength	7690 lbf

GUYING AND ANCHORING

PUD1
05/01/23

Conductor size & type	4/0 ACSR 6/1 Penguin	
Maximum conductor tension	2662	Lbs
Number of conductors	4	
Telephone	Yes	
Phase to neutral distance	7	Ft
NESC Grade of Construction	C	
Working guy tension	15597.5	Lbs
Working anchor tension	21200	Lbs

Number of Guy Leads and Anchors

Dead-end	Pole Height		
Shortest lead length	45	50	55
5	N/A	N/A	N/A
10	3,3	N/A	N/A
15	3,3	3,3	3,3
20	2,2	3,3	3,3
25	2,2	2,2	3,3
35	2,2	2,2	2,2
40	2,2	2,2	2,2

Angles		Pole Height= 45 Ft							
Shortest lead length	Angle=	5	10	15	20	30	40	50	60
5		1,1	2,1	2,2	2,2	3,3	3,3	N/A	N/A
10		1,1	1,1	2,1	2,1	2,2	3,3	3,3	3,3
15		1,1	1,1	1,1	2,1	2,2	2,2	3,3	3,3
20		1,1	1,1	1,1	1,1	2,1	2,2	2,2	2,2
25		1,1	1,1	1,1	1,1	2,1	2,1	2,2	2,2
35		1,1	1,1	1,1	1,1	1,1	2,1	2,1	2,2

Angles		Pole Height= 50 Ft							
Shortest lead length	Angle=	5	10	15	20	30	40	50	60
5		1,1	2,2	2,2	2,2	3,3	N/A	N/A	N/A
10		1,1	1,1	2,1	2,2	2,2	3,3	3,3	N/A
15		1,1	1,1	1,1	2,1	2,2	2,2	3,3	3,3
20		1,1	1,1	1,1	1,1	2,1	2,2	2,2	3,3
25		1,1	1,1	1,1	1,1	2,1	2,2	2,2	2,2
35		1,1	1,1	1,1	1,1	1,1	2,1	2,2	2,2

Angles		Pole Height= 55 Ft							
Shortest lead length	Angle=	5	10	15	20	30	40	50	60
5		1,1	2,2	2,2	3,3	3,3	N/A	N/A	N/A
10		1,1	1,1	2,1	2,2	3,3	3,3	3,3	N/A
15		1,1	1,1	1,1	2,1	2,2	2,2	3,3	3,3
20		1,1	1,1	1,1	1,1	2,1	2,2	3,3	3,3
25		1,1	1,1	1,1	1,1	2,1	2,2	2,2	3,3
35		1,1	1,1	1,1	1,1	1,1	2,1	2,2	2,2

Output information is in the format of <# of down guys>, <# of anchors>. Minimum guy spacing is 5'.

GENERAL STRINGING OUTSIDE OF STRINGING SPECIFICATION

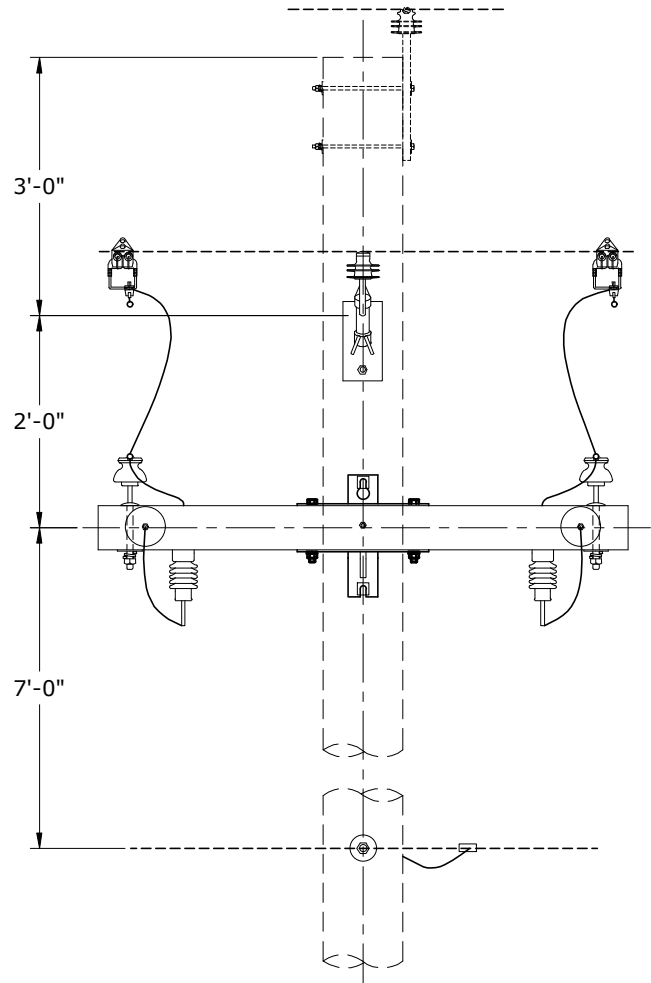
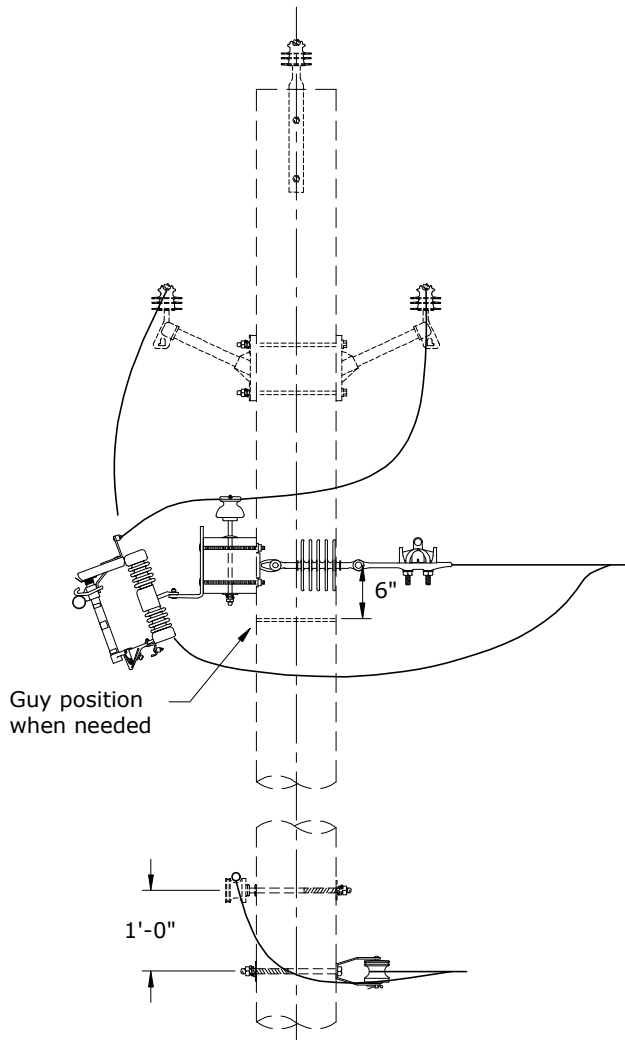
SPIDA®silk v7.3.2									
Report Date: 02/01/2022									
1/0 RAVEN (6/1) - Initial Sags and Tensions									
Ruling Span: 250'									
Temperature (°F)	20	30	40	50	60	70	80	90	100
Horizontal Tension (lbf)	1173	1096	1019	940	862	785	709	637	570
Span Distance (ft)	Sag (inches)								
150	4	4	5	5	5	6	7	7	8
200	7	8	8	9	10	11	12	13	15
250	11	12	13	14	15	16	18	20	23
300	16	17	18	20	22	24	26	29	33
350	22	23	25	27	29	32	36	40	45

Wire Properties	
Size	1/0 RAVEN
Diameter	0.398"
Weight Per Length	0.138 lbf/ft
Description	RAVEN
Stranding	6/1
Number of Conductors	1
Strength	4250 lbf

GUY AND ANCHOR ASSEMBLY STRENGTH SUMMARY

PUD1
05/01/23

Hardware Description	Manufacturer Name	Part #	Ultimate Strength (lbs.)	Grade B Strength Factor	Grade B Working Strength (lbs.)	Grade C Strength Factor	Grade C Working Strength (lbs.)
Guy working strength							
Pole eye	G42		21,000	0.65	13650	0.85	17850
(2) Washer, Curved 4"x4"	G42		28,400	0.80	22720	0.80	22720
(2) Bolt, 5/8"	G42		18,350	0.65	11927.5	0.85	15597.5
18M	GDG81		18,000	0.9	16200	0.9	16200
Insulator, Fiberglass, 2 Wheel, 7'	GDG81		21,000	1	21000	1	21000
Automatic Deadend	GDG81		18,000	0.9	16200	0.9	16200
Preformed Deadend	GDG81		18,000	0.9	16200	0.9	16200
Anchor working strength							
Anchor Rod, 1"			36,000	1	36000	1	36000
Cross Plate Anchor Rod, 1-1/4"			56,000	1	56000	1	56000
10" single Helix Screw Anchor installed at 3000 ft-lb torque	G2A		21,200	1	21200	1	21200
14" single Helix Screw Anchor installed at 3000 ft-lb torque	G3A		24,100	1	24100	1	24100
24" Cross Plate Anchor (class 5 soil assumed)	G4		26,500	1	26500	1	26500



CONSTRUCTION STANDARDS

CONSTRUCTION FRAMING GUIDE TWIGGY TO TAP ON CROSSARM

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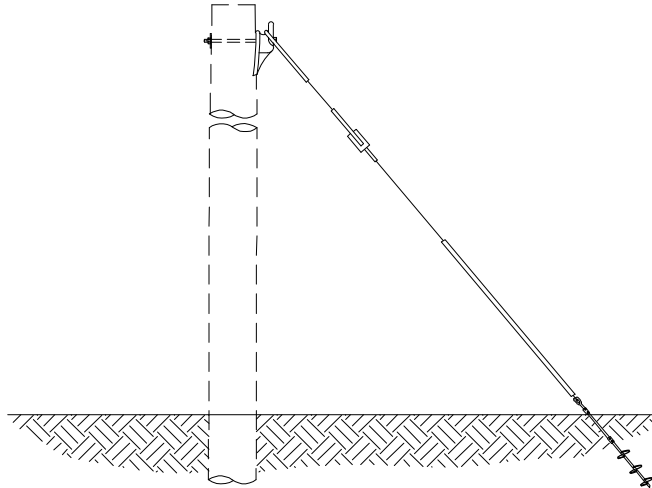
SCOPE

This section covers selection of down guys, span guys, sidewalk guys, push braces and anchors. The selections are based upon wood strengths, guy component strengths, anchor strengths and soil holding power of anchors.

DEFINITIONS (Taken from The Lineman's and Cableman's Handbook, Seventh Edition)

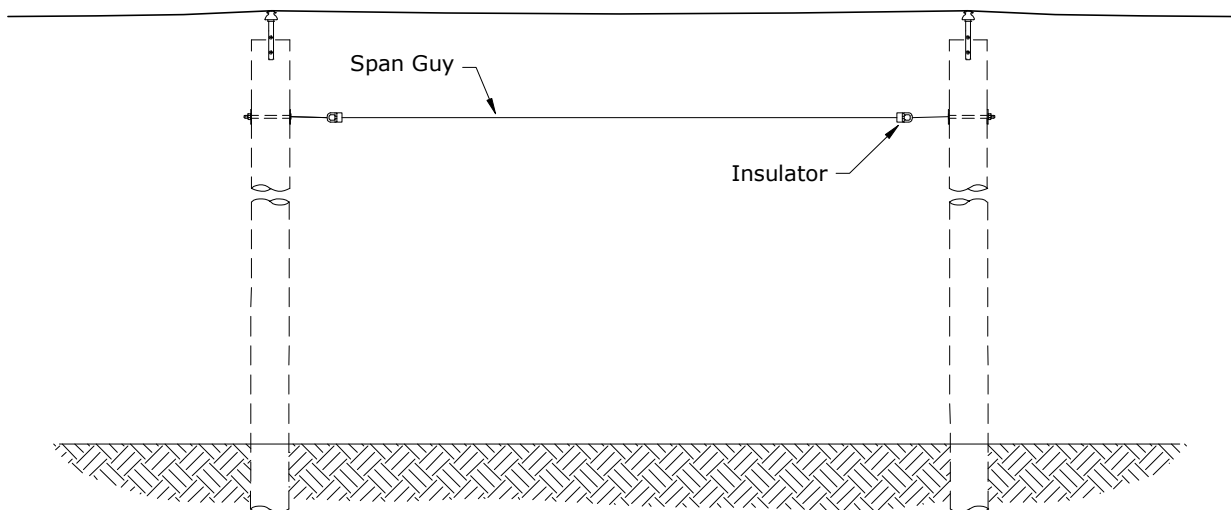
1. Down Guy-

Consists of a wire running from the attachment near the top of the pole to a rod and anchor installed in the ground.



2. Span Guy-

Consists of a guy wire installed from the top of a pole to the top of an adjacent pole to remove the strain from the line conductors.

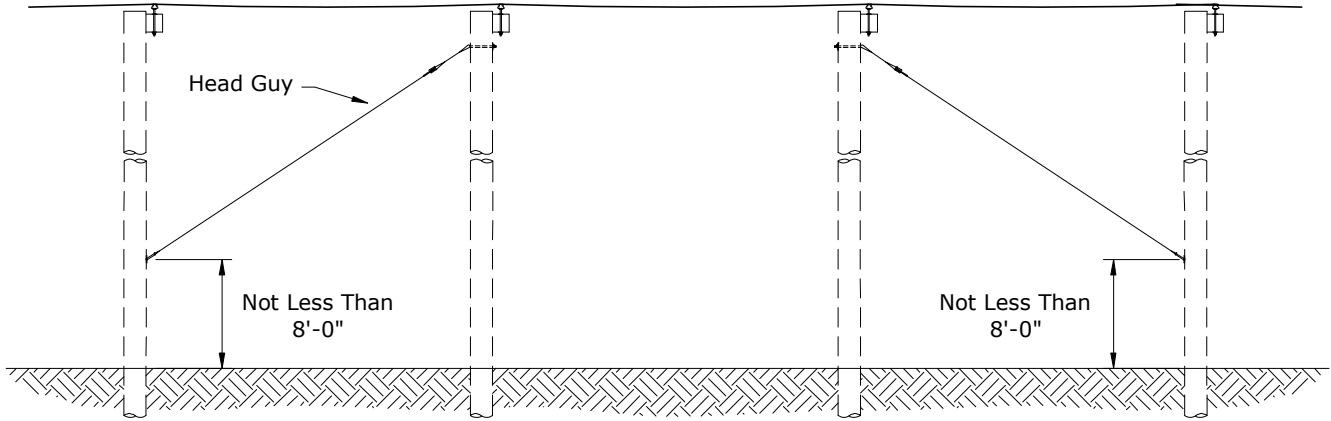


Rev 2: Added definitions and updated to 2007 NESC.

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		GUY & ANCHOR SELECTION		
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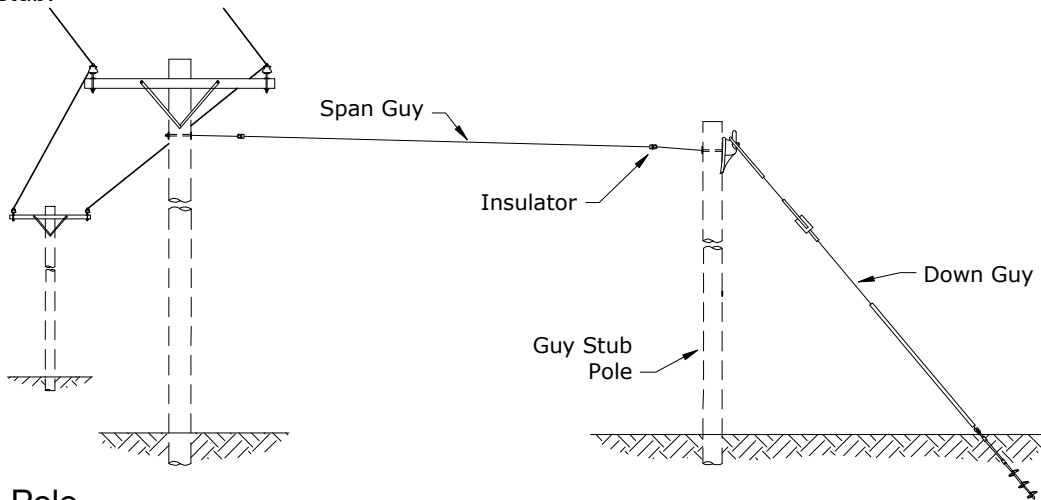
3. Head Guy-

A guy wire running from the top of a pole to a point below the top of the adjacent pole.



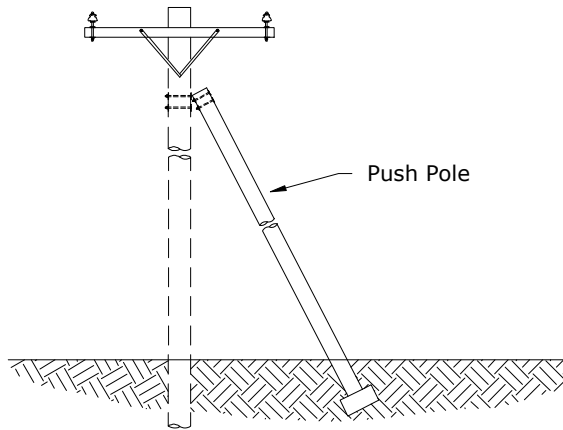
4. Guy Stub-

A guy wire installed between a line pole and a stub pole. The span guy, guy stub pole, and the down guy make up the guy stub.



5. Push Pole-

A pole used as a brace to a line pole.



CONSTRUCTION STANDARDS

GUY & ANCHOR SELECTION

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GENERAL

1. Guying

a) Guying assemblies include down, span and sidewalk types. A push brace consisting of a pole and attachment fittings may be used in place of tensioned wire guying only where tension guying is impossible by reason of location or rights-of-way.

b) Guying requirements can often be advantageously combined on a deadend pole, a span or more away by extending the circuit or by use of span guys in order to provide a reduced combined guying load on the same pole. A sidewalk guy is an expensive method of guying and provides limited support, particularly on taller poles, due to the comparatively short guy lead. DO NOT use a sidewalk guy if a down or span guy is possible.

c) Guy assemblies are designed for the maximum allowable load which may be supported by the pole and the related hardware. Heavy duty guying will normally require the use of multiple guying attachments.

d) A guy marker shall be used on all down guy and sidewalk guy locations. A minimum of one marker per anchor is required. It should be noted that guy markers DO NOT PROTECT OR "GUARD" a down/sidewalk guy, but rather warn the public of its presence.

2. Sidewalk Guy Insulation

Sidewalk guys shall have guy insulators installed in the guy strand above the horizontal guy strut. The breakers should be at a point that will allow at least 6" clearance between the breaker and the strut attachment to the pole, should the guy wire become broken.

3. Grounded Guys

Grounded guys shall not be used. All guys on transmission and distribution circuits shall have insulation sections (Johnny balls or fiberglass rods) installed on all new and rebuilt circuits. Grounded guys are to be replaced by insulated guys when work is done on that pole.

4. Application of Guy Insulators



It is impractical to show every NESC requirement for applying guy strain insulators. A clear understanding of the rules will provide for the correct applications. These guidelines will help in understanding the requirements.

Guideline 1 (see figure #1) - All down guys shall have a minimum of one guy insulator. (NESC 215C2)

Guideline 2 - All span guys will have a minimum of two guy insulators. (NESC 215C5)

Guideline 3 (see figure #2) - On jointly used poles, down guys that pass within 12 inches of supply conductors, and also pass within 12 inches of communication cables, shall be insulated with a guy insulator at a point below the lowest supply conductor and above the highest communication cable. (NESC 235I)

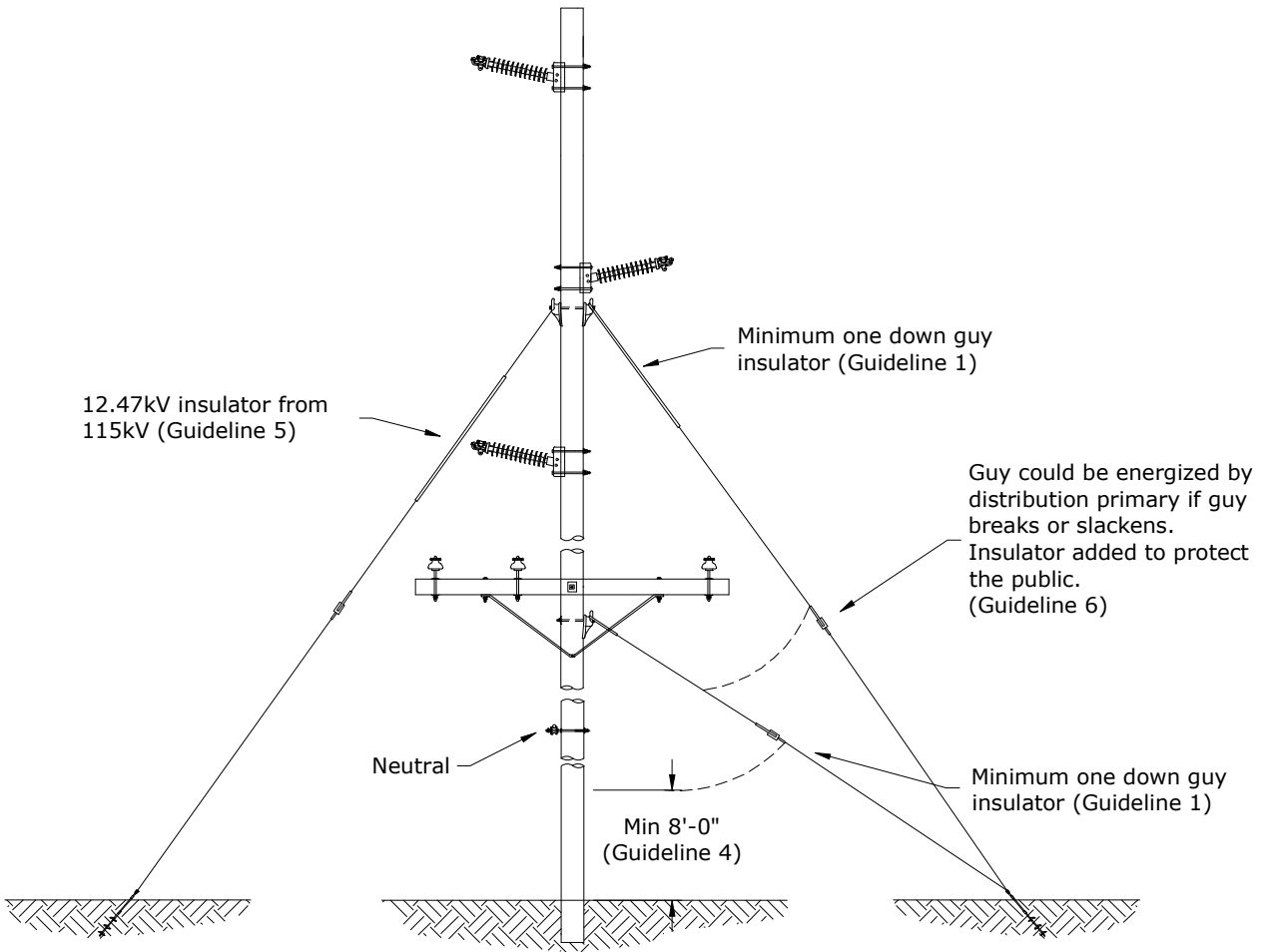
Guideline 4 (see figure #1) - All guy insulators shall be located at least 8 feet above the ground including when the guy would sag or break. (NESC 215C5a)

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Guideline 5 (see figure #1) - Guy insulators shall be placed so that in case any guy wire contacts, or is contacted by an energized conductor or part, the voltage will not be transferred to other facilities on the structure. (NESC 215C5b)

Guideline 6 (see figure #3) - Guys may sag or break, bringing them into contact with energized conductors, jumpers, or bushings to create a hazard to the public. Guy insulators shall be placed so that when any guy sags down or falls upon another facility, the insulators will remain effective. (NESC 215C5c)

Figure 1: Guidelines 1, 4, 5, and 6



CONSTRUCTION STANDARDS

GUY & ANCHOR SELECTION

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Figure 2: Guying near communication cable (Guideline 3)

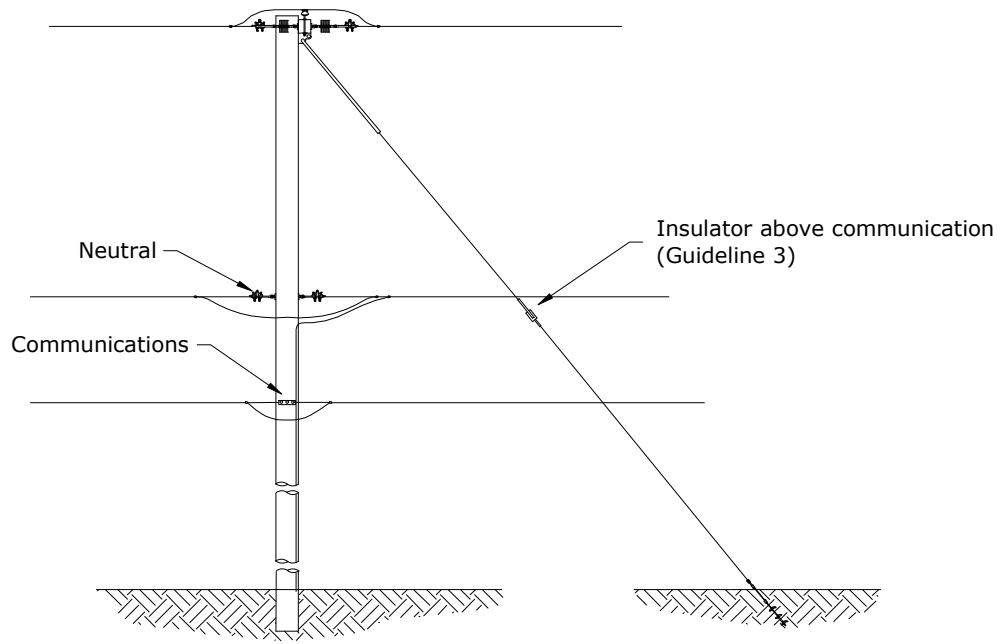
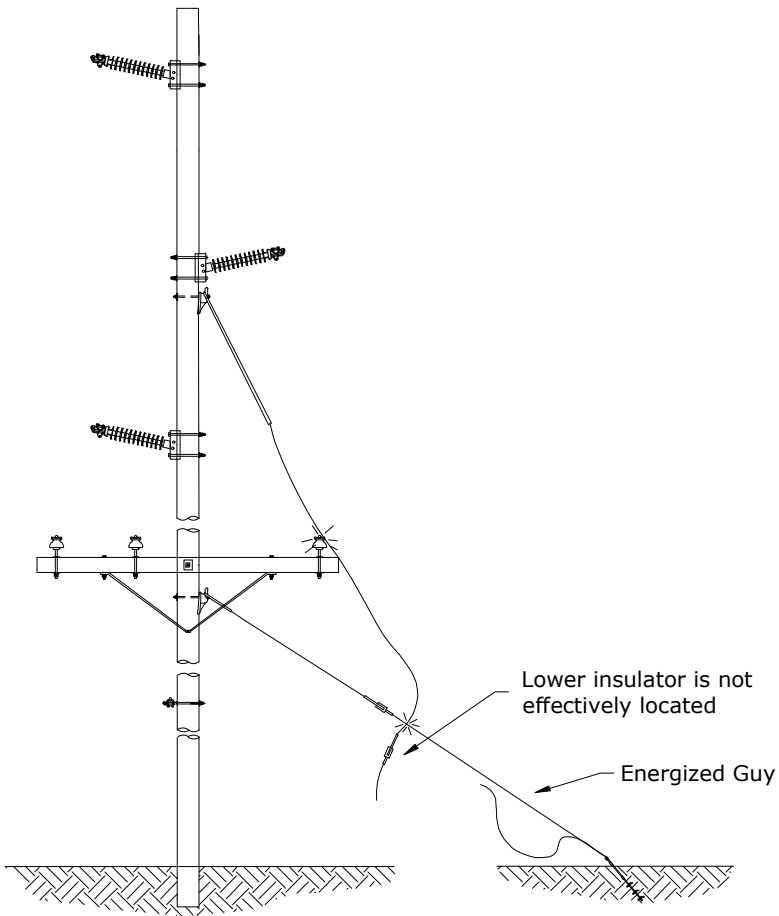


Figure 3: Allow for guys to sag or break (Guideline 6)



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GUY & ANCHOR SELECTION

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5. Anchors

Anchors shall be located so as to provide as large a lead over height ratio with as little interference to the public as possible.

ANCHOR SELECTION

1. Anchor Selection in General

- a. Anchor selection is based upon guy tension, type of soil, available installation equipment and location.
- b. Power installed screw anchors are the best choice if soil and location permit their use.
- c. A plate anchor may be used if a hole can be dug either by machine or blasting or hand dug at inaccessible locations.
- d. If solid rock is encountered, specify one of the rock anchors.
- e. Some swamp areas cannot be covered by these anchors and must have special design consideration.

2. Soil Classification

The table of soil classification data which follows is for general use in specifying anchors.

SOIL CLASSIFICATION DATA			
CLASS	PROBE VALUE	COMMON SOIL-TYPE DESCRIPTION	GEOLOGICAL SOIL CLASSIFICATION
0		Sound hard rock, unweathered	Granite, Basalt, Massive Limestone
1	750-1600 in-lbs	Very dense and/or cemented sands; coarse gravel and cobbles	Caliche, (nitrate-bearing gravel/rock)
2	600-750 in-lbs	Dense fine sand; very hard silts and clays (may be preloaded)	Basal Till; Boulder Clay; Caliche; Weathered Laminated Rock
3	500-600 in-lbs	Dense sands and gravel; hard silts and clays	Glacial Till; Weathered Shales, Schist, Gneiss and Siltstone
4	400-500 in-lbs	Medium dense sand and gravel; very stiff to hard silts and clays	Glacial Till, Hardpan and Marls
5	300-400 in-lbs	Medium dense coarse sands and sandy gravels; stiff to very stiff silts and clays	Saprolites, Residual Soils
6	200-300 in-lbs	Loose to medium dense fine to coarse sands to stiff clays and silts	Dense Hydraulic Fill; Compacted Fill; Residual Soils
7	100-200 in-lbs	Loose fine sand; alluvium; loess; medium-stiff and varied clays; fill	Flood Plain Soils; Lake Clays; Adobe; Gumbo, Fill
8	< 100 in-lbs	Peat, organic silts; inundated silts, fly ash, very loose sands, very soft to soft clays	Miscellaneous Fill, Swamp Marsh

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CONVERTING HYDRAULIC PRESSURE TO TORQUE

If a shear pin torque indicator is not going to be used, the operator can make a conversion chart so that pounds per square inch of system hydraulic pressure can be converted to torque at the anchor. This chart can be made by temporarily using a shear pin torque indicator and recording maximum hydraulic pressure readings when various numbers of pins shear. Each pin is equal to 500 ft-lb of torque. After the conversion chart is completed, it is not necessary to use the shear pin torque indicator. Any changes in the hydraulic motor system will require a new conversion chart. Check the accuracy of the chart annually, after any hydraulic system repairs, or before critical anchor installation such as mainline, distribution lines, or transmission lines.

TRUCK # _____		CHART DATE _____	OPERATOR _____
SYSTEM HYDRAULIC PRESSURE LBS./SQ. IN.	TORQUE IN FT. LBS	NUMBER OF SHEARED PINS	NOTES
	500	1	
	1000	2	
	1500	3	
	2000	4	
	2500	5	
	3000	6	
	3500	7	
	4000	8	
	4500	9	
	5000	10	
	5500	11	
	6000	12	
	6500	13	
	7000	14	

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Grounding Installations - Distribution Circuits

The minimum requirements for grounding assemblies are specified in the National Electrical Safety Code (IEEE C2-2017).

Rule #93-A: Copper-clad steel ground without joint or splice, if possible, free from sharp bends and as short as possible.

Rule #93-C-2: Ground for AC distribution shall have not less than 1/5 of the line conductance. (#4 Cu-equivalent copper-clad steel).


Rule #94-B: Driven electrodes, if practicable, shall be below permanent moisture level, minimum size 5/8" x 8', driven eight (8) feet deep. When rod cannot be driven eight (8) feet deep, install second rod on opposite side of pole and interconnect ground wire. The top of the ground rod shall be flush with or below the ground level unless suitably protected.

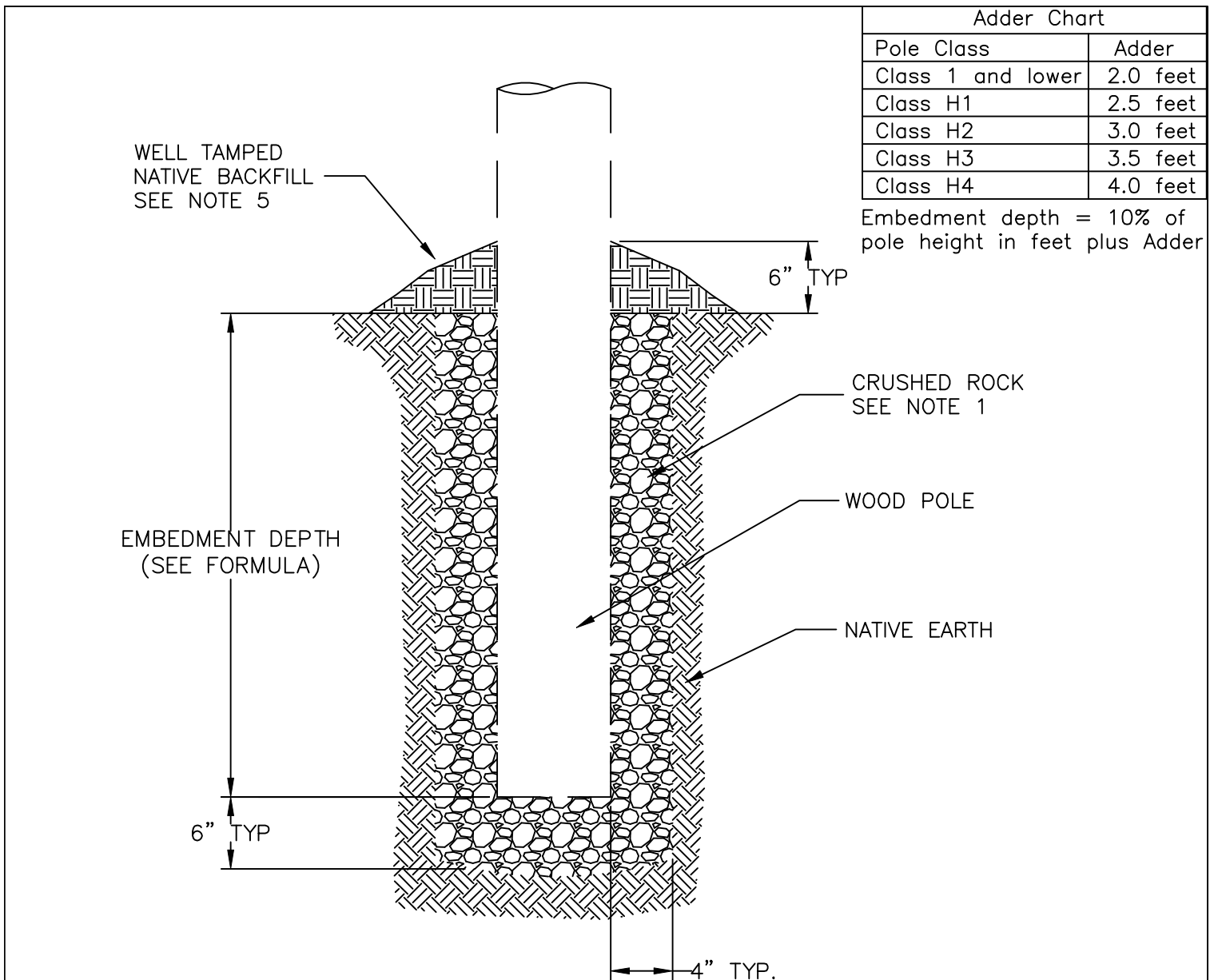
Rule #97-A: Ground conductors shall be run separately to ground for:

- Surge Arresters over 750v and frames of any equipment operating over 750v (see exceptions below).
- Lighting and power circuits under 750v.
- Shield wires of power circuits

Rule #97-B: An interconnection of primary surge arrester ground and primary and secondary neutral is permitted on a multi-grounded system. This solid interconnection shall be made since surge current is routed through several parallel ground impedances and the danger of insulation damage no longer exists even under conditions of high surge current and high ground impedance.

Rule #215-C: Non-current-carrying parts shall be grounded unless they are 8 feet or more above readily accessible surfaces or they are otherwise isolated or guarded.

<h3 style="margin: 0;">CONSTRUCTION STANDARDS</h3> <p style="margin: 0;">INSTALLATION OF GROUNDING ASSEMBLIES</p>		REVISIONS			
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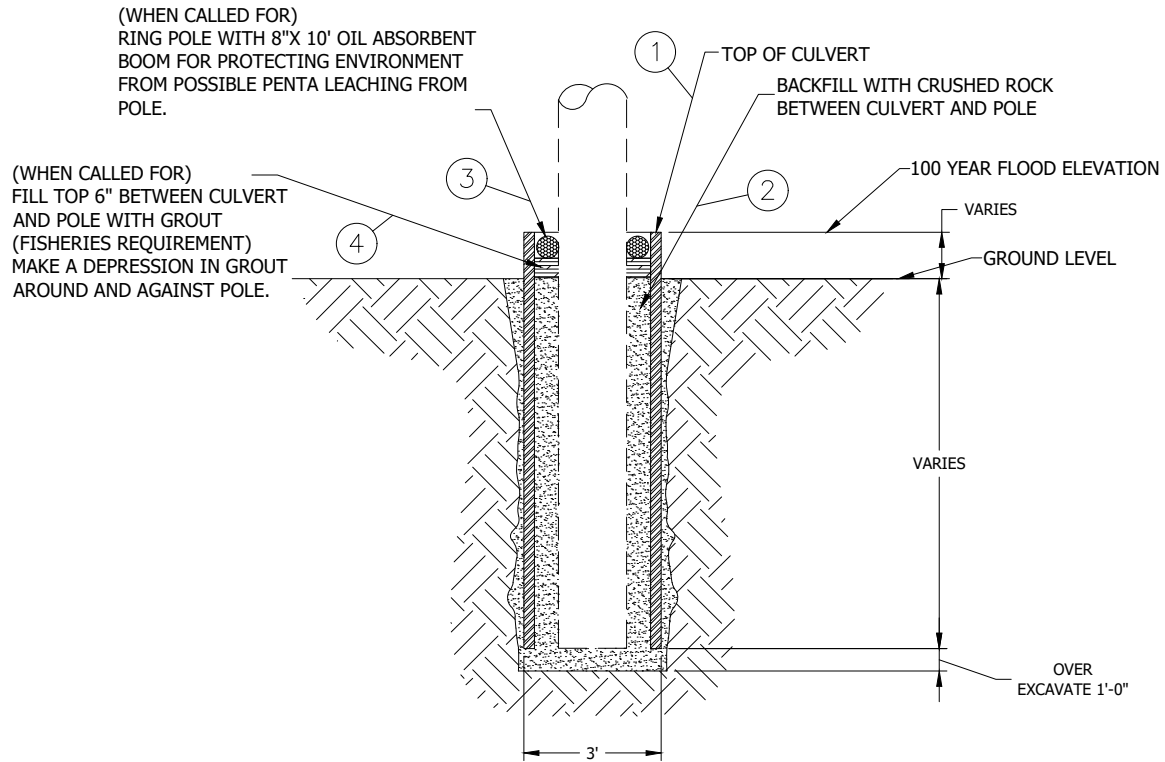
Adder Chart	
Pole Class	Adder
Class 1 and lower	2.0 feet
Class H1	2.5 feet
Class H2	3.0 feet
Class H3	3.5 feet
Class H4	4.0 feet

Embedment depth = 10% of pole height in feet plus Adder

NOTES:

1. CRUSHED ROCK BACKFILL: 3/4-INCH MINUS WITH SUFFICIENT FINES FOR PROPER COMPACTION. IN AREAS WHERE SMALLER FINES ARE AVAILABLE AT COMPARABLE COST, THE USE OF SMALLER FINES IS RECOMMENDED. BACKFILL SHALL BE FREE OF ROOTS, CLAY BALLS AND ORGANIC MATERIALS.
2. BACKFILL SHALL BE PLACED IN 6-IN LIFTS AND PNEUMATICALLY TAMPED.
3. IT SHALL BE CONTRACTOR'S RESPONSIBILITY TO DETERMINE IF CASING IS REQUIRED FOR HOLE EXCAVATION. IF CASING IS REQUIRED, THE CONTRACTOR SHALL PROVIDE CASING AT NO EXTRA COST.
4. WELL TAMPED NATIVE BACKFILL SHALL BE PLACED AT GRADE AROUND THE POLE AS SHOWN.

<p>CONSTRUCTION STANDARD POLE HOLE DEPTH AND BACKFILL REQUIREMENTS</p> <p>TM-10-MA01 SHEET 1 OF 1</p>	DATE	REVISION
	7/20/15	0
DESIGN BY: ADB	DRAWN BY: ADB	
APPROVED BY: <u>MHK</u>	Drawing No.	
DATE: 06/29/15	TM-10-MA01	



ITEM	QUANTITY	DESCRIPTION
1	OR 1	CULVERT 36"X 10' CORRUGATED GALV.
1	1	CULVERT 36"X 15' CORRUGATED GALV.
2	2	ROCK 5/8" MINUS CRUSHED (BAYVIEW BY THE YARD)
(WHEN CALLED FOR)		
3	1	8"X10' OIL ABSORBENT BOOM (SOCK & NET TYPE)
4	1	GROUT PRECO PLUG 5 GAL CONTAINER

CULVERT NOTES:

- 2'-2/3" X 1/2" 16 GAUGE GALVANIZED STEEL CULVERT
- DIAMETER 36" LENGTH: 120"
- (4) EACH 1 3/8" HOLES EVENLY SPACED 4" FROM TOP
- ALL CUTS AND WELDS TO BE PAINTED WITH GALVANIZED RICH PAINT"



W4.1F - POLE CAISSON FOR SOFT SOILS

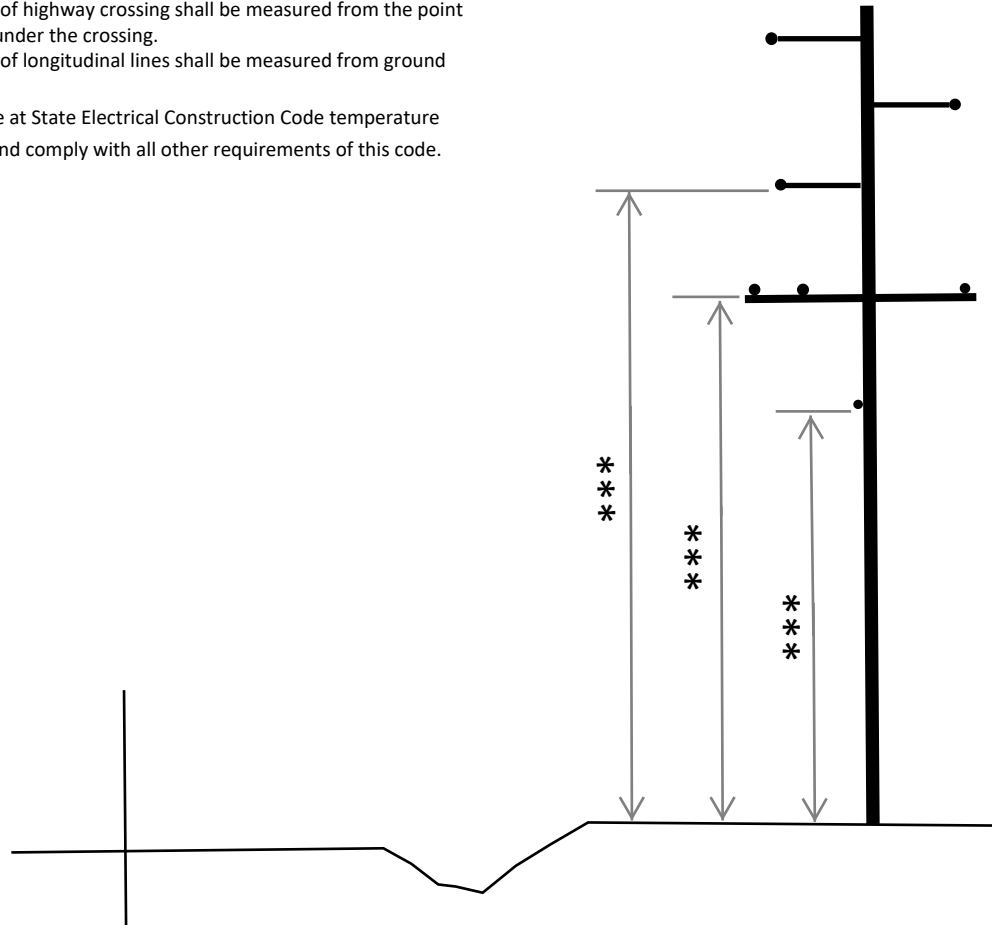
*** HOA to provide the WAC required minimum vertical clearance.

468-34-290 Vertical clearance.

The vertical clearance for overhead power and communication lines above the highway and the lateral and vertical clearance from bridges shall conform with the National Electrical Safety Code and/or with the clearances as shown below, whichever is greater.

TYPE OF UTILITY LINE LINES	CROSSING ROADWAYS	LONGITUDINAL
Communications and Cable Television	24'	20'
Communications and/or Cable Television joint usage with electrical	20'	20'
ELECTRICAL		
0 - 750 volts	24'	24'
751 - 15,000 volts	30'	27'
15,001 - 50,000 volts	32'	32'
50,001 volts and over	34'	32'

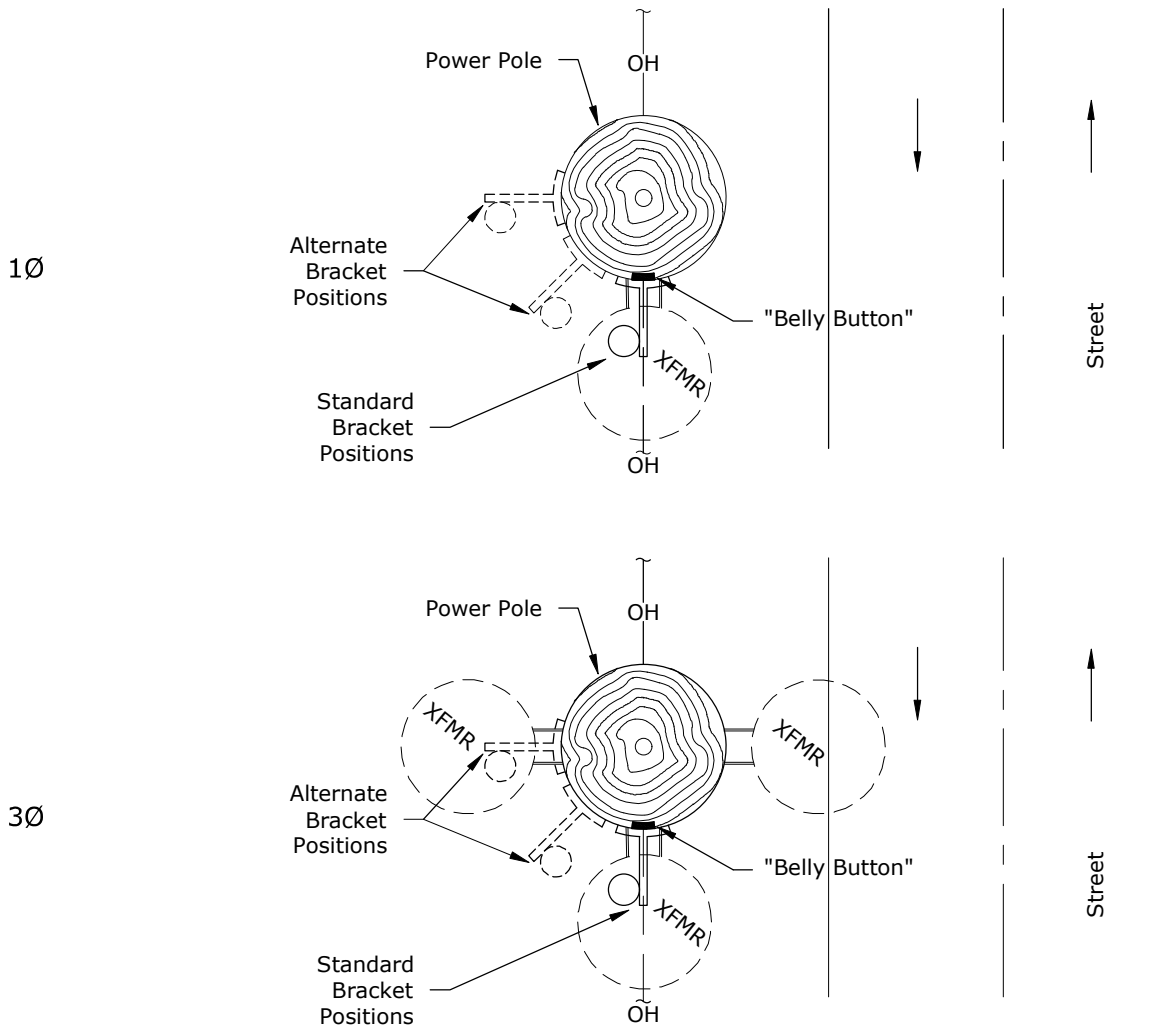
- (1) The minimum height of highway crossing shall be measured from the point of the roadway directly under the crossing.
- (2) The minimum height of longitudinal lines shall be measured from ground line.
- (3) All clearances shall be at State Electrical Construction Code temperature and loading standards, and comply with all other requirements of this code.



Minimum Vertical Clearance Requirements

STANDOFF BRACKET PLACEMENT

- 1) Basic Rule: On poles without anchors or existing clean poles, 1Ø primary and secondary riser brackets should be installed on the "belly button" side of the pole. Typically, a transformer would also be installed on the "belly button" side above the 1Ø primary or secondary riser.
- 2) On poles with an existing transformer or transformer bank, the bracket should be installed under the transformer or center transformer on a bank with the alternative position being 45°-90° away from street side. If the existing transformer is located on the opposite side of the "belly button," place the bracket under the transformer.
- 3) Standoffs are typically not installed under guy wires no matter where the "belly button" is located.
- 4) Standoffs and risers should be placed to avoid conflict with overhead communication wires and guy wires.
- 5) For poles with an existing riser, use the brackets that are installed to maintain climbing space.



CONSTRUCTION STANDARDS

1Ø PRIMARY (U1) & SECONDARY (U8) RISER GUIDELINES

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
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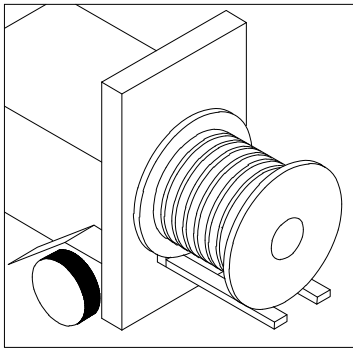
SECTION

ALL CONDUIT SHALL BE GRAY ELECTRICAL CONDUIT AND SHALL BE UL LISTED AND NEMA TC-2 OR TC-3 LABELED -- NO OTHER PIPE IS ACCEPTABLE.

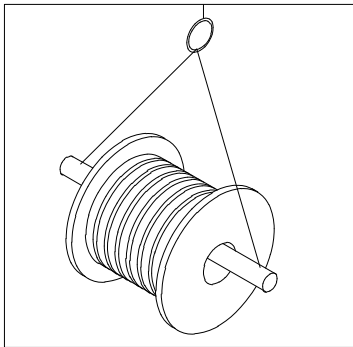
1. All primary and secondary cables shall be in conduit.
2. All road and street crossings shall be in schedule 40, PVC, gray electrical conduit or polyethylene of equal or greater strength specifications. Pipe with other designated use is not acceptable.
3. All risers above finished grade shall be in schedule 80 PVC.
4. Acceptable conduit sizes are as follows:
 - 1-PH #2 primary cable in 1-2" conduit
 - Triplex secondary cable in 1-3" conduit
 - 3-PH 500MCM primary cable in 3-3" conduits
5. Where rock is encountered and the depths shown on D1.1 cannot be accomplished, a lesser depth with schedule 80 conduit* and/or control density fill (CDF) may be approved.* Contact Mason PUD #1 Engineering.
6. All conduit terminations shall have end bells or bushings.
7. All conduits that terminate into energized enclosures shall be installed by qualified personnel with a Mason PUD #1 standby person.
8. All conduit runs shall be designed to limit pulling tension to the values specified on UCP1.
9. All conduit ends shall be chamfered 45° x 1/4" internally at all straight ends (not belled ends).
10. All conduits installed for future use shall be marked with 3M electrical markers within six inches at both ends. All ends shall be elbowed up. The elbow shall NOT be glued to the conduit.
11. Sufficient select backfill shall be placed to prevent crushing of the conduits due to trucks and other heavy equipment.
12. Unused conduits shall have removable plugs designed for that purpose in both ends.
13. Road and street crossings may be either trenched and backfilled, bored or pushed whichever is acceptable to the governing agency.
14. All street and road crossings shall be at property lines.
15. Where conduit bends are required, they shall meet the requirements for cable pulling in the construction specifications. Only manufactured radii are acceptable. No heated bends.
16. A condulet (LB) shall never be used.
17. Conduit sweeps shall be 24" secondary* and 36" primary radius.
18. Conduits installed for futures should be plumbed into transformer with elbows and capped. Flex pipe is not acceptable.
19. Conduits shall be installed so that cable is pulled toward the end bells to avoid scraping cable on sharp edges of conduit.
20. All cut ends of conduits shall be square.
21. Steel mandrels shall be pulled through the conduits to detect damage and debris.

CONSTRUCTION STANDARDS CONDUIT REQUIREMENTS

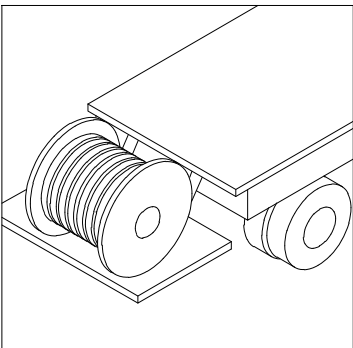
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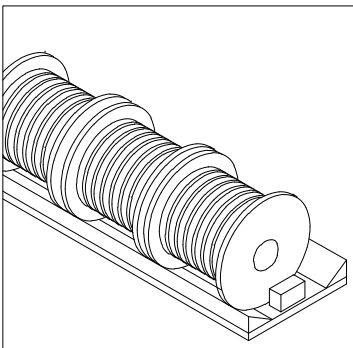
CRADLE BOTH REEL FLANGES BETWEEN FORKS.



REELS CAN BE HOISTED WITH A SHAFT EXTENDING THROUGH BOTH FLANGES.



LOWER REELS FROM TRUCK USING HYDRAULIC GATE, HOIST OR FORK LIFT. (LOWER CAREFULLY)

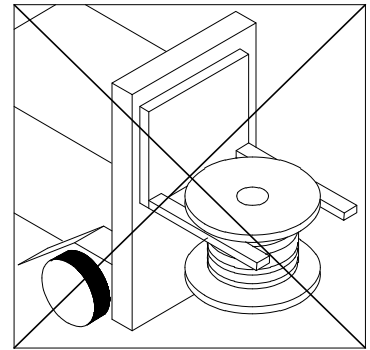


ALWAYS LOAD WITH FLANGES ON EDGE AND CHOCK AND BLOCK SECURELY.

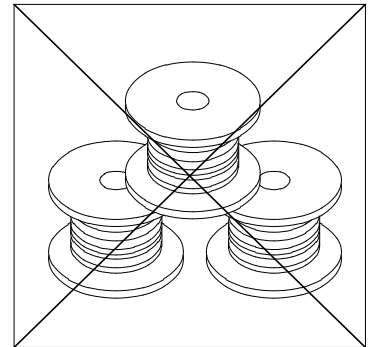
HOW TO HANDLE CABLE REELS

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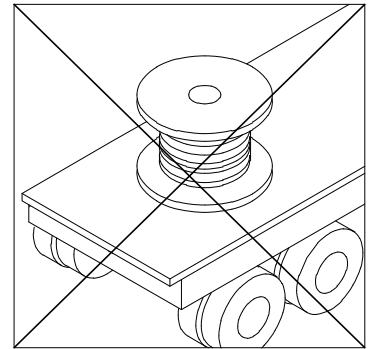
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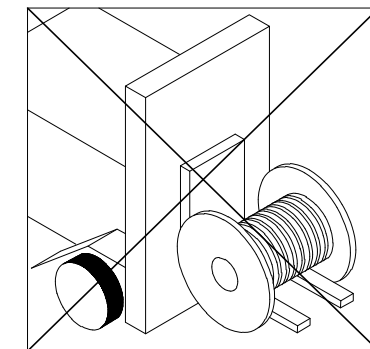
DO NOT LIFT BY TOP FLANGE. CABLE OR REEL WILL BE DAMAGED.



UPENDED HEAVY REELS WILL OFTEN ARRIVE DAMAGED. REFUSE OR RECEIVE SUBJECT TO INSPECTION FOR HIDDEN DAMAGE.



DO NOT UPEND REELS



NEVER ALLOW FORKS TO TOUCH CABLE SURFACE OR REEL WRAP.

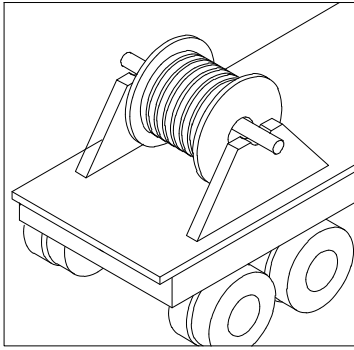
CONSTRUCTION STANDARDS

UNDERGROUND CABLE REEL HANDLING

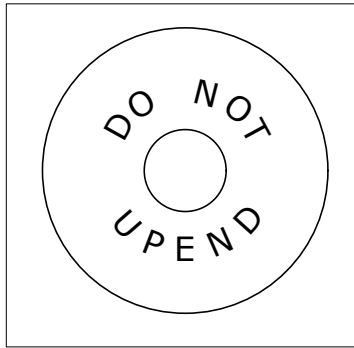
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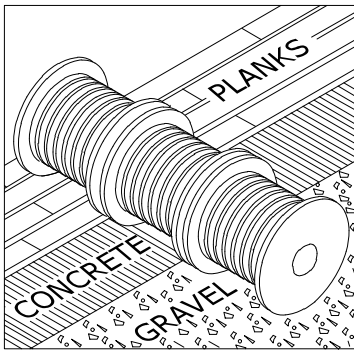
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REELS GOING TO JOBS SHALL ALWAYS BE MOUNTED ON A HORIZONTAL AXLE.



THIS SIGN APPLIES FOR ANY REEL HANDLING. NOT JUST FACTORY DELIVERY.

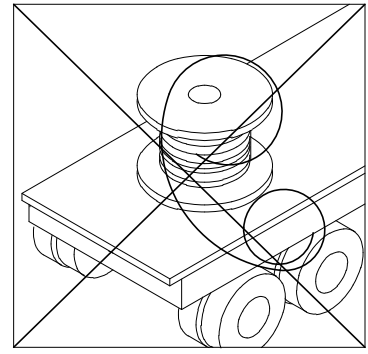


ALWAYS STORE REELS ON A HARD SURFACE.

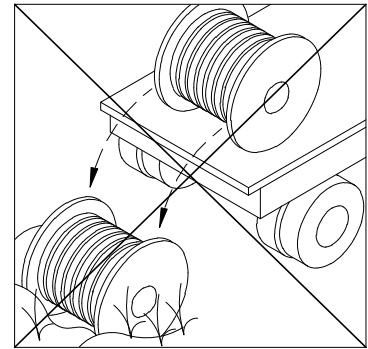
HOW TO HANDLE CABLE REELS

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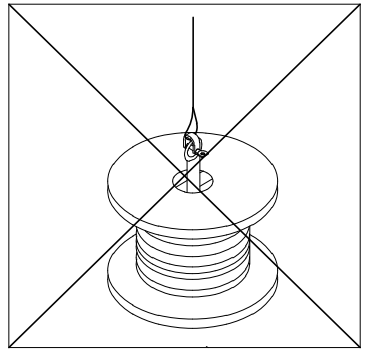
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NEVER REMOVE CABLE FROM A REEL THIS WAY. IT WILL KINK.



NEVER DROP A CABLE REEL FROM ANY HEIGHT WITH EVEN A SMALL AMOUNT OF CABLE ON THE REEL.



NEVER USE A SWIVEL TO REMOVE CABLE FROM A REEL.

CONSTRUCTION STANDARDS

UNDERGROUND CABLE REEL HANDLING

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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 HEAD.
 - B) FORK LIFT TYPE OF EQUIPMENT MAY BE USED TO MOVE SMALLER, NARROWER WIDTH REELS. FORK TINES SHALL BE PLACED SO THAT LIFT PRESSURE IS ON REEL HEADS, NOT ON CABLE, AND MUST REACH ALL THE WAY ACROSS REELS SO LIFT IS AGAINST BOTH REEL HEADS.
3. REELS MAY BE MOVED SHORT DISTANCES BY ROLLING. REELS SHOULD BE ROLLED IN THE DIRECTION INDICATED BY ARROWS PAINTED ON REEL HEADS. SURFACES OVER WHICH THE REELS ARE TO BE ROLLED SHALL 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 CUT OFF, NEW SEALS MUST BE APPLIED TO PREVENT MOISTURE ENTRY INTO CABLE.
2. WHENEVER POSSIBLE, THE FACTORY APPLIED PROTECTIVE COVER SHOULD BE LEFT IN PLACE UNTIL REMOVAL IS ABSOLUTELY NECESSARY. 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 SHALL 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.
6. NEVER STORE REELS ON END.

CONSTRUCTION STANDARDS
UNDERGROUND CABLE
HANDLING & STORAGE

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HANDLING DURING INSTALLATION



1. COLD WEATHER HANDLING AND PULLING-IN 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 PRECEDING 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.

2. FACTORY APPLIED SEALS ON CABLE ENDS 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 ENCLOSURES WHICH ARE SUBJECT TO FLOODING.
3. THE CABLES SHOULD BE LAID INTO THE TRENCH BEING CAREFUL NOT TO TWIST OR KINK THEM. CARE SHOULD BE TAKEN NOT TO ABRASE OR IMPACT THE CABLE SURFACE AS IT LEAVES THE PAY-OFF EQUIPMENT AND ENTERS THE TRENCH. OVER-BENDING THE CABLE TO A POINT LESS THAN THE RECOMMENDED MINIMUM BENDING RADIUS ALSO SHALL BE AVOIDED. CABLES CAN BECOME EASILY OVER-BENT AT GUIDE POINTS SUCH AS SMALL SHEAVES OR ROLLERS LOCATED ON THE CABLE LAYING EQUIPMENT.

AFTER LAYING THE CABLES INTO THE TRENCH, THEY SHOULD BE COVERED WITH A LAYER OF SELECTED BACKFILL TO A LEVEL OF APPROXIMATELY THREE TO FOUR INCHES ABOVE THE CABLES' SURFACES. "SELECTED BACKFILL" IS DEFINED AS EITHER THERMAL SAND OR SAND-CLAY-GRAVEL MIXTURE CONTAINING SOME SMALL STONES NO GREATER IN SIZE THAN ONE-QUARTER TO ONE-HALF INCH ACROSS AT THEIR LARGEST DIMENSION.



CONSTRUCTION STANDARDS
 UNDERGROUND CABLE
 HANDLING & STORAGE

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FOLLOWING ARE THE MINIMUM REQUIREMENTS FOR ANY CABLE PULL:

1. THE ENTIRE CONDUIT LENGTH INCLUDING BENDS AND RISERS SHALL BE CLEAN AND SMOOTH. THE TOTAL NUMBER OF ANGLES SHALL NOT EXCEED 270° * WITHOUT PRIOR CPU ENGINEERING APPROVAL.
2. THE ENTIRE CONDUIT LENGTH INCLUDING BENDS AND RISERS SHALL BE SECURED IN THE FINAL LOCATION WITH ALL ACCESSORIES FIRMLY ATTACHED.
3. A PULLING TENSION CALCULATION SHALL BE COMPLETED TO ASSURE THAT MAXIMUM TENSION LIMITS WILL NOT BE EXCEEDED. SEE TABLE 1 FOR LIMITS.
4. SUFFICIENT APPROVED CABLE LUBRICANT SHALL BE USED AT THE START OF THE PULL.
5. THE CABLE SHALL NEVER BE BENT TO A RADIUS LESS THAN 12 TIMES THE CABLE DIAMETER. ALL SHEAVES SHALL HAVE A GROOVE DIAMETER OF NOT LESS THAN 24 TIMES THE CABLE DIAMETER.
6. NEVER ALLOW CABLE TENSION AT THE CABLE REELS. THE REELS SHALL BE TURNED BY HAND OR BY A POWER DEVICE SO THAT THE CABLE IS SLACK GOING INTO THE CONDUIT ENTRANCE.
7. LUBRICANT SHALL BE APPLIED TO THE CONDUIT BEFORE THE CABLE ENTERS THE CONDUIT. IT MAY BE POURED IN OR A PLASTIC BAG OF LUBRICANT MAY BE ATTACHED TO THE PULLING LINE AHEAD OF THE CABLE.
8. ALL CABLE ENDS SHALL BE SEALED TO PREVENT THE ENTRY OF MOISTURE OR DIRT.
9. FOR 1000 MCM CABLE, THE PULLING LINE SHALL BE 2500 LB, SEQUENTIALLY-NUMBERED, CONTINUOUS MULE TAPE.
10. CABLE ATTACHMENT MAY BE WITH KELLEMS (CABLE OR BASKET)* GRIP OR CONDUCTOR (PULLING EYE) GRIP WHICHEVER THE PULLING TENSION CALCULATION DICTATES.
11. ALL CONDUIT ENTRANCES AND EXITS SHALL HAVE PROTECTIVE BUSHINGS IN PLACE THAT WILL ASSURE THAT CABLE DAMAGE DOES NOT OCCUR DURING THE PULL. AT RISER LOCATIONS, DO NOT GLUE PROTECTIVE BUSHING TO CONDUIT.
12. CABLE PULLING SPEED SHALL NOT EXCEED 50 FEET PER MINUTE.
13. ALL CABLE ENDS SHALL BE EITHER TERMINATED OR SEALED IMMEDIATELY AFTER THE PULL. NO CABLE ENDS SHALL BE LEFT EXPOSED OVER NIGHT OR DURING INCLEMENT WEATHER.

CONSTRUCTION STANDARDS
 UNDERGROUND CABLE
 PULLING REQUIREMENTS

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14. IT SHALL BE THE RESPONSIBILITY OF THE DESIGNER TO AVOID UNFAVORABLE SIDEWALL PRESSURES. THE SIDEWALL PRESSURES SHALL BE CALCULATED USING THE FOLLOWING EQUATIONS:

(A.) THE SIDEWALL PRESSURE (P) IN GENERAL IS DEFINED AS THE TENSION OUT OF A BEND EXPRESSED IN POUNDS DIVIDED BY THE INSIDE RADIUS OF THE BEND EXPRESSED IN FEET. EQUATIONS 1A AND 1B ARE FOR THE "WORST CASE" CABLE.

EQ 1: $P = \frac{T_0}{r}$ (ONE SINGLE CABLE)

1A: $P = \frac{(3c - 2)}{3} \frac{T_0}{r}$ (TWO OR THREE SINGLE CABLES - CRADLE CONFIGURATION) WHERE $c = 1 + \frac{4}{3} \left(\frac{d}{D - d} \right)^2$

1B: $P = \frac{c T_0}{2r}$ (TRIANGULAR CONFIGURATION) WHERE $c = \sqrt{1 - \left(\frac{d}{D - d} \right)^2}$

P = SIDEWALL PRESSURE, LBS PER FOOT OF RADIUS
 T₀ = TENSION (LEAVING THE BEND), POUNDS
 c = WEIGHT CORRECTION FACTOR (EQ. 7 AND 8)
 r = INSIDE RADIUS OF CONDUIT IN FEET
 d = CABLE O.D. IN INCHES
 D = CONDUIT I.D. IN INCHES

THE MAXIMUM SIDEWALL PRESSURE SHALL NOT EXCEED 500 LB/FT FOR 1 CABLE OR 1000 LB/FT FOR 2 OR 3 CABLES.

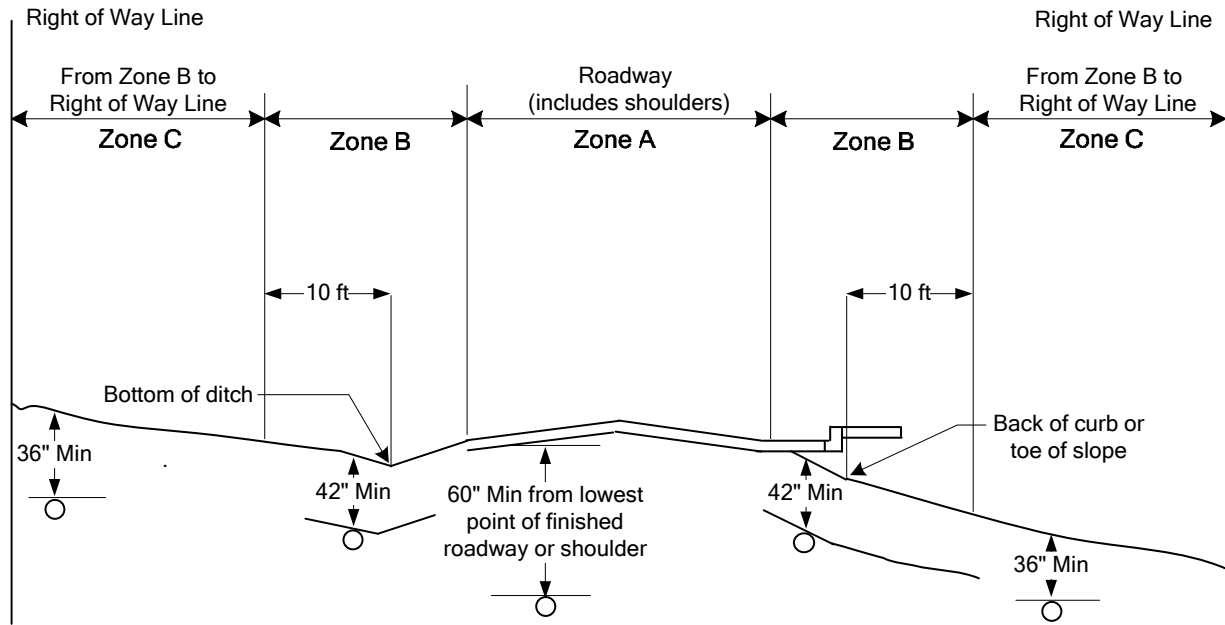
TABLE 1 CABLE PULLING LINE TENSION LIMITS		
CABLE	KELLEMS (BASKET) GRIP TENSION (POUNDS)	CONDUCTOR (PULLING EYE) GRIP TENSION (POUNDS)
1 - 1/0 PRIMARY	845 *	845
2 - 1/0 PRIMARY	845 *	845 *
3 - 1/0 PRIMARY	1690 *	1690
1 - 1000 MCM PRIMARY	1000	5000 *
2 - 1000 MCM PRIMARY	1000 *	5000 *
3 - 1000 MCM PRIMARY	2000	5000 *
4/0 - 4/0 - 2/0 SEC.	3000 *	4450
350 - 350 - 4/0 SEC.	3000 *	5000 *

KELLEMS GRIP IS OVER THE CABLE JACKET. ALSO CALLED "CABLE GRIP" OR "BASKET GRIP." *

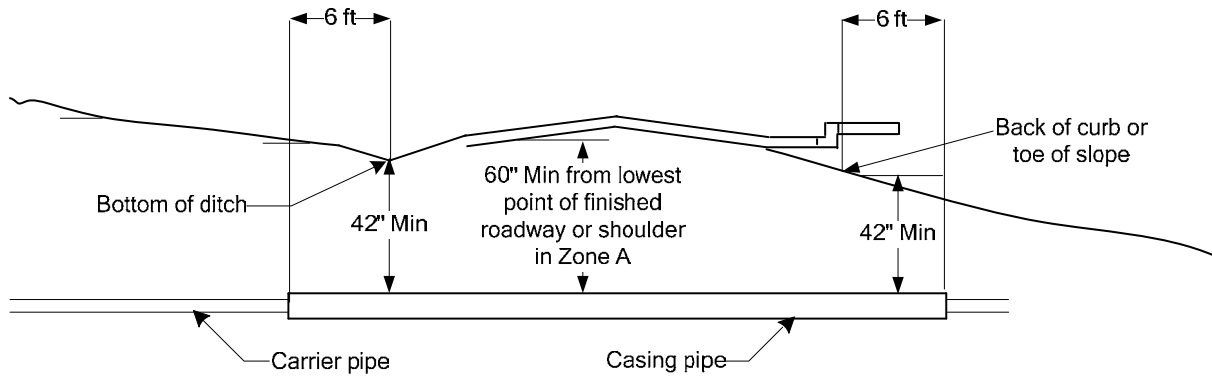
NOTE: 5000 LB LIMIT DUE TO EQUIPMENT LIMITS.

*

	CONSTRUCTION STANDARDS UNDERGROUND CABLE PULLING REQUIREMENTS		REVISIONS			
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Longitudinal Coverage Detail

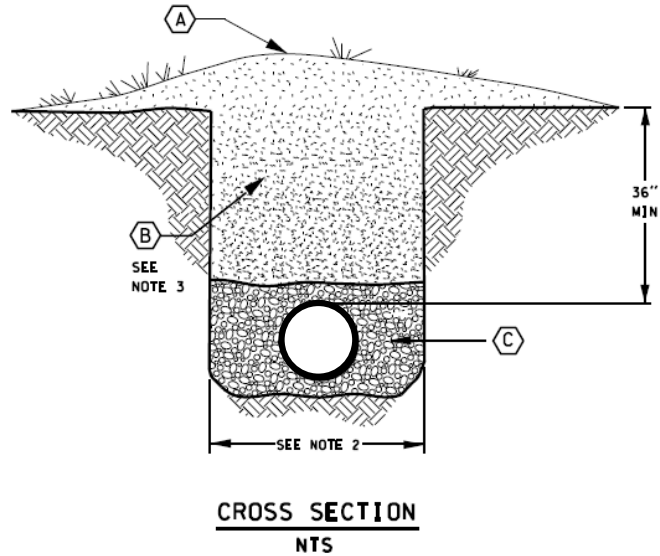


Note:
Casing pipes shall extend a minimum of 6 feet beyond the toe of fill slopes, or bottom of ditch line, or outside curb.

Crossing Coverage Detail

Minimum Cover for Pipe Installation

Figure 120-3

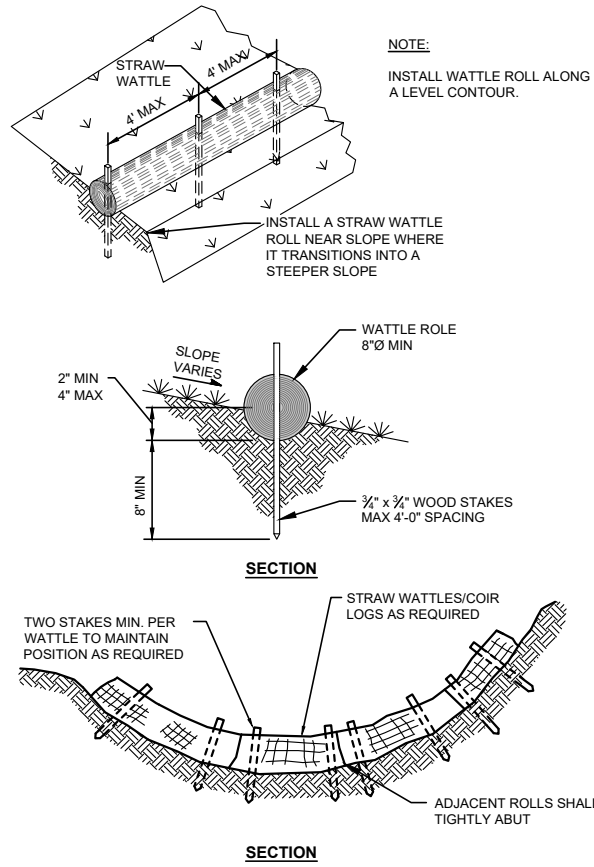
**LEGEND**

- (A) Surface treatment to restore existing to match adjacent (seeding, bark, etc.).
- (B) Native material or as directed by WSDOT.
- (C) Bedding material. Bedding material depth over and beneath pipe casing shall be half the diameter of pipe casing or 6 inches, whichever is less.

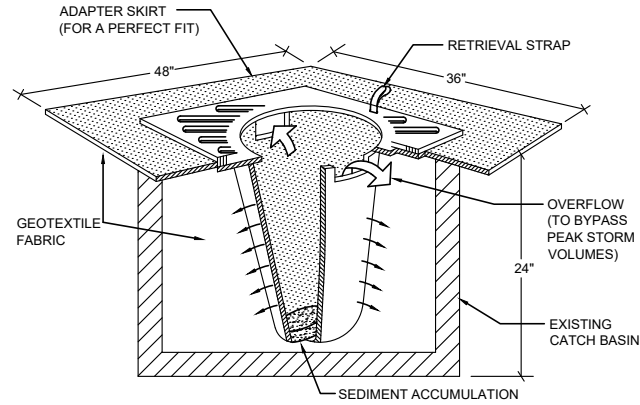
GENERAL NOTES

1. Trenching and pipe installation shall meet the requirements of WSDOT Standard Specification 7-08.
2. Maximum trench width shall be outside casing pipe width plus 1 foot either side of casing pipe.
3. Compaction shall be method _____ per Standard Specification Section 2-03.3 (14) C.
4. When connecting to an existing facility under the pavement, pavement restoration may, at the department's discretion, include the full lane width and encroached shoulder.
5. Casing pipes shall extend a minimum of six (6) feet beyond the toe of fill slopes, bottom of ditchline, or outside of curb.

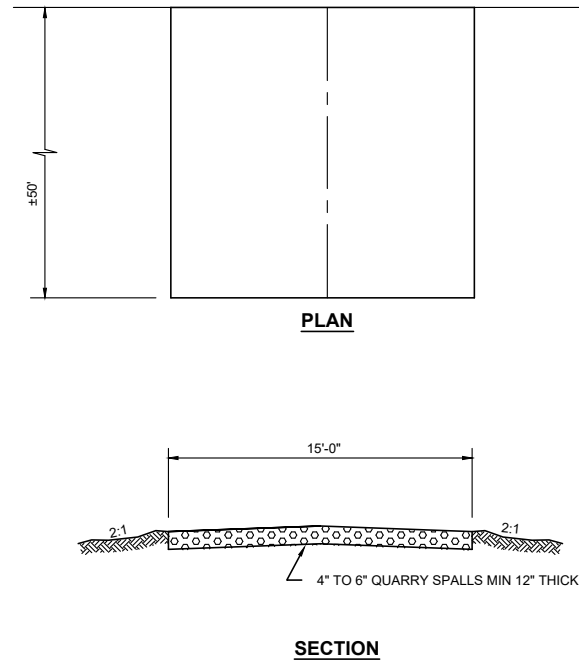
Open Trench Detail
Figure 120-4b



1 STRAW WATTLE ROLL DETAIL
TYP NOT TO SCALE



2 INLET PROTECTION DETAIL
TYP NOT TO SCALE

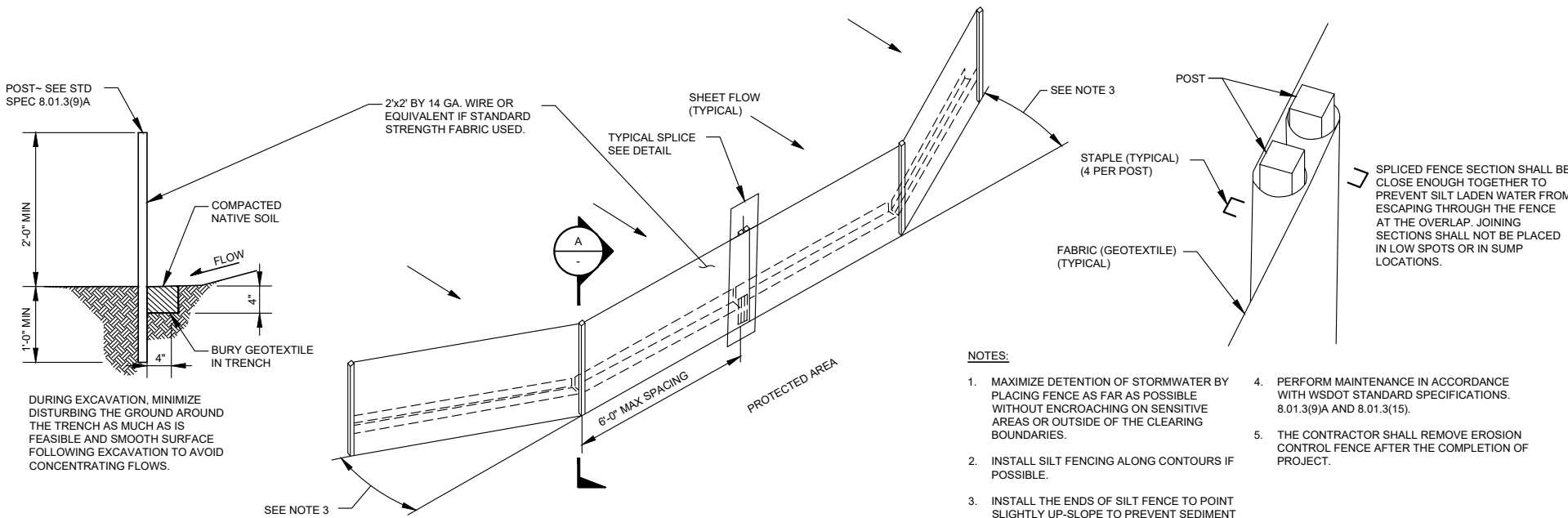


3 CONSTRUCTION ENTRANCE DETAIL
TYP NOT TO SCALE

EROSION/SEDIMENTATION CONTROL NOTES:

THE CONTRACTOR SHALL PROVIDE EROSION CONTROL METHODS ACCORDING TO THE WASHINGTON STATE DEPARTMENT OF ECOLOGY'S (WSDOE) "STORMWATER MANAGEMENT MANUAL FOR WESTERN WASHINGTON", VERSION 2012 AND 2014 AMENDMENTS. THE FOLLOWING ARE A FEW OF THE MINIMUM REQUIREMENTS AND SHOULD NOT BE INTERPRETED TO EXCLUDE ANY EROSION CONTROL PRACTICES AS SPECIFIED IN THE WSDOE STORMWATER MANUAL.

- ALL LIMITS OF CLEARING AND AREAS OF VEGETATION PRESERVATION SHALL BE OBSERVED DURING CONSTRUCTION.
- ALL REQUIRED SEDIMENTATION/EROSION CONTROL FACILITIES MUST BE IN OPERATION PRIOR TO LAND CLEARING AND/OR OTHER CONSTRUCTION TO INSURE THAT SEDIMENT LADEN WATER DOES NOT ENTER THE DRAINAGE SYSTEM. ALL EROSION AND SEDIMENT FACILITIES SHALL BE MAINTAINED IN A SATISFACTORY CONDITION UNTIL SUCH TIME THAT CLEARING AND /OR CONSTRUCTION IS COMPLETED AND THE POTENTIAL FOR ON-SITE EROSION HAS PASSED. THE IMPLEMENTATION, MAINTENANCE, REPLACEMENT AND ADDITIONS TO EROSION/SEDIMENTATION CONTROL SYSTEMS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
- THE EROSION AND SEDIMENTATION CONTROL SYSTEMS DEPICTED ON THE DRAWINGS ARE IDENTIFIED IN SENSITIVE AREAS. NOT ALL EROSION CONTROL MEASURE ARE DEPICTED ON THE DRAWINGS. THE CONTRACTOR SHALL FOLLOW THE REQUIREMENTS OF THE BMPS THROUGHOUT THE ENTIRE PROJECT. AS CONSTRUCTION PROGRESSES AND AS UNEXPECTED OR SEASONAL CONDITIONS DICTATE, THE CONTRACTOR SHOULD ANTICIPATE THAT MORE EROSION AND SEDIMENTATION CONTROL FACILITIES WILL BE NECESSARY TO INSURE COMPLETE SILTATION CONTROL ON THE PROPOSED SITE. DURING THE COURSE OF CONSTRUCTION, IT SHALL BE THE OBLIGATION AND RESPONSIBILITY OF THE CONTRACTOR TO ADDRESS ANY NEW CONDITIONS THAT MAY BE CREATED BY HIS ACTIVITIES AND TO PROVIDE ADDITIONAL FACILITIES, OVER AND ABOVE THE MINIMUM REQUIREMENTS, AS MAY BE NEEDED TO PROTECT ADJACENT PROPERTIES AND THE WATER QUALITY OF THE RECEIVING DRAINAGE SYSTEM.
- AT NO TIME SHALL MORE THAN ONE FOOT OF SEDIMENT BE ALLOWED TO ACCUMULATE WITHIN A CATCH BASIN INLET PROTECTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVING AND PROPERLY DISPOSING OF THE SEDIMENT. ALL CATCH BASINS, CONVEYANCE LINES AND DITCHES ALONG CIVIC DRIVE SHALL BE CLEANED PRIOR TO PAVING.
- THE CONTRACTOR SHALL REMOVE MATERIAL DROPPED, WASHED OR TRACKED FROM VEHICLES ONTO THE CITY RIGHT-OF-WAY OR INTO THE EXISTING STORM DRAINAGE SYSTEM. DEBRIS SHALL NOT BE WASHED INTO THE STORM DRAINAGE SYSTEM ON CIVIC DRIVE.
- TEMPORARY EROSION CONTROL FACILITIES SHALL BE INSPECTED WEEKLY AND MAINTAINED WITHIN 24 HOURS FOLLOWING A STORM EVENT. SEDIMENT SHALL BE REMOVED TO INSURE THE FACILITIES WILL FUNCTION PROPERLY. THE FACILITIES SHALL BE SATISFACTORILY MAINTAINED UNTIL CONSTRUCTION IS COMPLETED AND THE POTENTIAL FOR ON-SITE EROSION HAS PASSED.
- ALL STORM DRAIN INLETS MADE OPERABLE DURING CONSTRUCTION SHALL BE PROTECTED SO THAT STORMWATER RUNOFF SHALL NOT ENTER THE CONVEYANCE SYSTEM WITHOUT FIRST BEING FILTERED OR OTHERWISE TREATED TO REMOVE SEDIMENT.
- NO DISTURBED SOIL SHALL REMAIN UNSTABILIZED FOR MORE THAN TWO DAYS.
- SEDIMENT TRAP/POND BAFFLES SHALL BE EMBEDDED IN SIDE SLOPES.



NOTES:

- MAXIMIZE DETENTION OF STORMWATER BY PLACING FENCE AS FAR AS POSSIBLE WITHOUT ENCROACHING ON SENSITIVE AREAS OR OUTSIDE OF THE CLEARING BOUNDARIES.
- INSTALL SILT FENCING ALONG CONTOURS IF POSSIBLE.
- INSTALL THE ENDS OF SILT FENCE TO POINT SLIGHTLY UP-SLOPE TO PREVENT SEDIMENT FROM FLOWING AROUND THE ENDS OF THE FENCE.
- PERFORM MAINTENANCE IN ACCORDANCE WITH WSDOT STANDARD SPECIFICATIONS. 8.01.3(9)A AND 8.01.3(15).
- THE CONTRACTOR SHALL REMOVE EROSION CONTROL FENCE AFTER THE COMPLETION OF PROJECT.

4 SILT FENCE DETAILS
TYP NOT TO SCALE

**MASON COUNTY PUD 1
DUCKABUSH LINE RELOCATION PHASE 1
EROSION CONTROL DETAILS**



INADVERTENT DISCOVERY PLAN AND PROCEDURES OF CULTURAL RESOURCES AND HUMAN SKELETAL REMAINS

DUCKABUSH ROAD POWER LINE INSTALLATION, JEFFERSON COUNTY WASHINGTON

1. INTRODUCTION

The Mason County PUD No. 1 plans to install underground power lines along the utility right-of-way on Duckabush Road in Jefferson County. The following Inadvertent Discovery Plan (IDP) outlines procedures to follow, in accordance with state and federal laws, if archaeological materials or human remains are discovered.

2. RECOGNIZING CULTURAL RESOURCES

A cultural resource discovery could be prehistoric or historic. Examples include, but are not limited to:

- a. An accumulation of shell, burned rocks, or other food related materials
- b. Bones or small pieces of bone,
- c. An area of charcoal or very dark stained soil with artifacts,
- d. Stone tools or waste flakes (i.e. an arrowhead, or stone chips),
- e. Clusters of tin cans or bottles, logging or agricultural equipment that appears to be older than 50 years,
- f. Buried railroad tracks, decking, or other industrial materials.

When in doubt, assume the material is a cultural resource.

3. ON-SITE RESPONSIBILITIES

STEP 1: STOP WORK. If any Mason County PUD No. 1 employee, contractor or subcontractor believes that he or she has uncovered a cultural resource at any point in the project, all work adjacent to the discovery must stop. The discovery location should be secured at all times.

STEP 2: NOTIFY ARCHAEOLOGICAL MONITOR OR LICENSED ARCHAEOLOGIST. If there is an archaeological monitor for the project, notify that person. If there is a monitoring plan in place, the monitor will follow its provisions.

STEP 3: NOTIFY PROJECT MANAGEMENT AND CULTURAL RESOURCES PROGRAM. Contact the Project Manager and the Cultural Resources (CR) Program Manager:

Project Manager:
Kristin Masteller
(360) 877-5249, x. 220
kristinm@mason-pud1.org

CR Program Manager:
N/A

If you can't reach the CR Program manager, contact your project's assigned Cultural Resources Specialist or an alternate:

Assigned CR Specialist:
N/A

Alternate CR Specialist:
N/A

The Project Manager or the Cultural Resources Program will make all other calls and notifications.

IF HUMAN REMAINS ARE ENCOUNTERED, treat them with dignity and respect at all times. Cover the remains with a tarp or other materials (not soil or rocks) for temporary protection in place and to shield them from being photographed.

Call your non-emergency number to report the discovery. Use 911 only if a non-emergency number is not available.

Do not report the discovery to the media or you will put the site at risk for looting.

Do not take pictures unless directed to do so by DAHP. See Section 5.

4. FURTHER CONTACTS AND CONSULTATION

A. Project Manager's Responsibilities:

- Protect Find: The Project Manager is responsible for taking appropriate steps to protect the discovery site. All work will stop in an area adequate to provide for the total security, protection, and integrity of the resource. Vehicles, equipment, and unauthorized personnel will not be permitted to traverse the discovery site. Work in the immediate area will not resume until treatment of the discovery has been completed following provisions for treating archaeological/cultural material as set forth in this document.
- Direct Construction Elsewhere On-site: The Project Manager may direct construction away from cultural resources to work in other areas prior to contacting the concerned parties.
- Contact CR Manager: If the CR Program Manager has not yet been contacted, the Project Manager will do so.

B. CR Program Manager's Responsibilities:

- Identify Find: The CR Program Manager (or a CR Specialist if so delegated), will ensure that a qualified professional archaeologist examines the find to determine if it is archaeological.
 - If it is determined not archaeological, work may proceed with no further delay.
 - If it is determined to be archaeological, the CR Manager or CR Specialist will continue with notification.
 - If the find may be human remains or funerary objects, the CR Manager or CR Specialist will ensure that a qualified physical anthropologist examines the find. **If it is determined to be human remains, the procedure described in Section 5 will be followed.**
- Notify DAHP: The CR Program Manager (or a CR Specialist if so delegated) will contact the involved federal agencies, including the Department of Health, Drinking Water State Revolving Fund (DOH, DWSRF) and the Department of Archaeology and Historic Preservation (DAHP).
- Notify Tribes: If the discovery may relate to Native American interests, the Manager or Specialist will also contact the project's Tribal Liaison, or, if the project is not assigned a Liaison, the Executive Tribal Liaison.

Federal/State Agencies:

The Department of Health
Scott Kugel
Cultural and Environmental Program
Specialist
509.329.2117
scott.kugel@doh.wa.gov

Department of Archaeology and Historic Preservation:

Dr. Allyson Brooks
State Historic Preservation Officer
360-586-3066

Rob Whitlam, Ph.D.
Staff Archaeologist
360-586-3050

Human Remains:
Dr. Guy Tasa
State Physical Anthropologist
360-586-3534
Guy.Tasa@dahp.wa.gov

Assigned Alternate:
Stephanie Jolivette
Local Governments Archaeologist
(360) 586-3088
Stephanie.Jolivette@dahp.wa.gov

The CR Program Manager or Specialist, will contact the interested and affected Tribes if the DOH Cultural and Environmental Program Specialist is unavailable.

Tribes consulted on this project are:

Jamestown S'kallam Tribe:
Allie Taylor, THPO Office
Phone: (360) 681-4638
ataylor@jamestowntribe.org
1033 Old Blyn Hwy
Sequim, WA 98382-9342

Port Gamble S'kallam tribe:
Misty Ives, Tribal Historic
Preservation Officer
pgst-thpo@pgst.nsn.us
Phone: (360) 297-6359
Cell: (360) 516-0329

Skokomish Indian Tribe:
Kris Miller
THPO
(360) 426-4232 x2015
kmiller@skokomish.org

Lower Elwha Kallam tribe:
Bill White, Archaeologist,
Cultural Resources Phone: (360)
460-1617
bill.white@elwha.nsn.us

Suquamish Tribe:
Dennis Lewarch
THPO
(360) 394-8529
dlewarch@suquamish.nsn.us

C. Further Activities

- Archaeological discoveries will be documented as described in Section 6.
- Construction in the discovery area may resume as described in Section 7.

5. SPECIAL PROCEDURES FOR THE DISCOVERY OF HUMAN SKELETAL MATERIAL

Any human skeletal remains, regardless of antiquity or ethnic origin, will at all times be treated with dignity and respect.

If the project occurs on federal lands (e.g., national forest or park, military reservation) the provisions of the Native American Graves Protection and Repatriation Act of 1990 apply, and the responsible federal agency will follow its provisions. Note that state highways that cross federal lands are on an easement and are not owned by the state.

If the project occurs on non-federal lands, Mason County PUD No. 1 will comply with applicable state and federal laws, and the following procedure:

A. In all cases you must notify a law enforcement agency or Medical Examiner/Coroner's Office:

In addition to the actions described in Sections 3 and 4, the Project Manager will immediately notify the local law enforcement agency or medical examiner/coroner's office.

The medical examiner/coroner (with assistance of law enforcement personnel) will determine if the remains are human, whether the discovery site constitutes a crime scene, and will notify DAHP.

- Sherriff or Police Department Non-emergency: (360) 426-4441
- Coroner or Medical Examiner: (360) 427-9670 ext. 752

B. Participate in Consultation:

Per RCW 27.44.055, RCW 68.50, and RCW 68.60, DAHP will have jurisdiction over non-forensic human remains. Mason County PUD No. 1 personnel will participate in consultation.

C. Further Activities:

- Documentation of human skeletal remains and funerary objects will be agreed upon through the consultation process described in RCW 27.44.055, RCW 68.50, and RCW 68.60.
- When consultation and documentation activities are complete, construction in the discovery area may resume as described in Section 7.

6. DOCUMENTATION OF ARCHAEOLOGICAL MATERIALS

Archaeological deposits discovered during construction will be assumed eligible for inclusion in the National Register of Historic Places under Criterion D until a formal Determination of Eligibility is made.

Cultural Resources Program staff will ensure the proper documentation and assessment of any discovered cultural resources in cooperation with the federal agencies, including the DOH, DWSRF, DAHP, affected tribes, and a contracted consultant (if any).

All prehistoric and historic cultural material discovered during project construction will be recorded by a professional archaeologist on State of Washington cultural resource site or isolate form using standard techniques. Site overviews, features, and artifacts will be

photographed; stratigraphic profiles and soil/sediment descriptions will be prepared for subsurface exposures. Discovery locations will be documented on scaled site plans and site location maps.

Cultural features, horizons and artifacts detected in buried sediments may require further evaluation using hand-dug test units. Units may be dug in controlled fashion to expose features, collect samples from undisturbed contexts, or interpret complex stratigraphy. A test excavation unit or small trench might also be used to determine if an intact occupation surface is present. Test units will be used only when necessary to gather information on the nature, extent, and integrity of subsurface cultural deposits to evaluate the site's significance. Excavations will be conducted using state-of-the-art techniques for controlling provenience.

Spatial information, depth of excavation levels, natural and cultural stratigraphy, presence or absence of cultural material, and depth to sterile soil, regolith, or bedrock will be recorded for each probe on a standard form. Test excavation units will be recorded on unit-level forms, which include plan maps for each excavated level, and material type, number, and vertical provenience (depth below surface and stratum association where applicable) for all artifacts recovered from the level. A stratigraphic profile will be drawn for at least one wall of each test excavation unit.

Sediments excavated for purposes of cultural resources investigation will be screened through 1/8-inch mesh, unless soil conditions warrant 1/4-inch mesh.

All prehistoric and historic artifacts collected from the surface and from probes and excavation units will be analyzed, catalogued, and temporarily curated. Ultimate disposition of cultural materials will be determined in consultation with the federal agencies, DAHP, and the affected tribes.

Within 90 days of concluding fieldwork, a technical report describing any and all monitoring and resultant archaeological excavations will be provided to the Project Manager, who will forward the report to the DOH DWSRF program for review and delivery to the federal agencies (if any), SHPO, and the affected tribe(s).

If assessment activity exposes human remains (burials, isolated teeth, or bones), the process described in Section 5 above will be followed.

7. PROCEEDING WITH CONSTRUCTION

Project construction outside 100 feet of the discovery location may continue while documentation and assessment of the cultural resources proceed. A CR Specialist must determine the boundaries of the discovery location with consultation of the DOH. In consultation with DOH, DAHP and affected tribes, Project Manager and Cultural Resources Program staff will determine the appropriate level of documentation and treatment of the resource. If federal agencies are involved, the agencies will make the final determinations about treatment and documentation.

Construction may continue at the discovery location only after the process outlined in this plan is followed and DOH, DWSRF (and the federal agencies, if any) determine that compliance with state and federal laws is complete.

8. CR PROGRAM MANAGER RESPONSIBILITY

An IDP does not replace consultation or tribal consent. The IDP must be immediately available onsite, be implemented to address any discovery, and be available by request by any party. The CR Program Manager and staff will review the IDP during a project kickoff or pre-construction meeting.

Implement the IDP / UDP if ...

You see chipped stone artifacts.



- Glass-like material
- Angular
- “Unusual” material for area
- “Unusual” shape
- Regularity of flaking
- Variability of size



We recommend printing in color for accuracy

Implement the IDP / UDP if ...

You see ground or pecked stone artifacts.



- Striations or scratching
- Unusual or unnatural shapes
- Unusual stone
- Etching
- Perforations
- Pecking
- Regularity in modifications
- Variability of size, function, and complexity

Implement the IDP / UDP if ...

You see bone or shell artifacts.



- Often smooth
- Unusual shape
- Carved
- Often pointed if used as a tool
- Often wedge shaped like a “shoehorn”



Implement the IDP / UDP if ...

You see bone or shell artifacts.



- Often smooth
- Unusual shape
- Perforated
- Variability of size



Implement the IDP / UDP if ...

You see fiber or wood artifacts.



- Wet environments needed for preservation
- Variability of size, function, and complexity
- Rare



Implement the IDP / UDP if ...

You see historic period artifacts.



Implement the IDP / UDP if ...

You see strange, different or interesting looking dirt, rocks, or



- Human activities leave traces in the ground that may or may not have artifacts associated with them
- “Unusual” accumulations of rock (especially fire-cracked rock)
- “Unusual” shaped accumulations of rock (e.g., similar to a fire ring)
- Charcoal or charcoal-stained soils
- Oxidized or burnt-looking soils
- Accumulations of shell
- Accumulations of bones or artifacts
- Look for the “unusual” or out of place (e.g., rock piles or accumulations in areas with few rock)

Implement the IDP / UDP if ...

You see strange, different or interesting looking dirt, rocks, or



- “Unusual” accumulations of rock (especially fire-cracked rock)
- “Unusual” shaped accumulations of rock (e.g., similar to a fire ring)
- Look for the “unusual” or out of place (e.g., rock piles or accumulations in areas with few rock)

Implement the IDP / UDP if ...

You see strange, different or interesting looking dirt, rocks, or



Layers of shell
midden

Historic Debris

- Often have a layered or “layer cake” appearance
- Often associated with black or blackish soil
- Often have very crushed and compacted shells



Implement the IDP / UDP if ...

You see historic foundations or buried structures.



1.0 ANCHORING SPECIFICATION

1.1 GENERAL REQUIREMENTS

- 1.1.1 CONTRACTOR shall be responsible for installing the proper type of anchor at each anchor location.
- 1.1.2 Anchors shall be installed so approximately six inches of the rod remains above ground.
- 1.1.3 In cultivated fields, the projection of the anchor rod above ground may be increased to a maximum of 12 inches to prevent burial of the rod eye.
- 1.1.4 All anchor holes must be backfilled and thoroughly tamped over the full depth of the hole.

1.2 INSTALLATION SPECIFICATIONS PER ANCHOR TYPE

1.2.1 EXPANDING ROCK ANCHORS

- A. A hole—one-quarter inch in diameter larger than the unexpanded anchor—shall be bored into competent rock with a hand or power drill.
- B. Place the anchor into the bored hole.
- C. Put a bar through the large eye of the anchor rod.
- D. Turn the rod until the anchor is firmly expanded against the sides of the hole.
- E. Grouting shall be added to the hole if the rock exhibits weathering characteristics.

1.2.2 SCREW ANCHOR

- A. The anchor shall be installed with a torque indicator. Shear bolts shall not be used.
- B. The anchor shall be installed so the departure angle between the anchor rod and guy strand is less than five degrees.
- C. Minimum required installed torque is 2,500 ft-lbs.

1.2.3 CROSS-PLATE ANCHORS

- A. Cross plate anchors shall only be installed where it is not practical to install power-installed screw anchors or where power-installed screw anchors cannot be driven. Attempt should first be made to install power-installed screw anchors.
- B. Anchor plate shall be installed perpendicular to the guy strand.
- C. The anchor rod shall be installed in a rod trench or bore hole so the rod is aligned with the guy strand.

1.3 PULL TESTING

1.3.1 REQUIRED EQUIPMENT

- A. Dynamometer rated no less than 30,000 pounds with an appropriate rigging attachment able to connect to the anchor rod and hydraulic equipment.
- B. Hydraulic equipment capable of pulling greater than 30,000 pounds in various positions.

1.3.2 TESTING

- A. All rock and cross-plate anchors shall be tested to maximum required holding capacity as indicated on the construction unit drawings. Screw anchors are not required to be tested.
- B. Anchor shall be loaded evenly and in a direct line with the axis of the anchor rod.
- C. If creep exceeds four inches, the anchor has failed and test shall be terminated.
- D. If anchor creep does not exceed four inches under maximum tension, the installation shall be accepted.
- E. Failed anchors shall be removed and replaced.

2.0 CONDUCTOR STRINGING SPECIFICATION

2.1 SCOPE

2.1.1 This specification covers the handling, stringing, sagging and clip-in of ACSR, ACSR/AW, and AAC conductors up to 1272 KCM. This specification adopts the provisions of IEEE Standard 524-2003.

2.2 PULLING POINTS AND STRINGING CHARTS

2.2.1 Contractor to reuse existing conductor for this project where applicable. In these cases re-sag to match pre-existing sag.

2.2.2 Conductor usage has been determined based on the following pulling points, and an allowance of 3% for conductor makeup (+300' for longer conductor pulls only):

TABLE 1a: NEW PULLING POINTS AND CONDUCTOR LENGTHS						
STRUCTURE		PULLING LENGTH			CONDUCTOR	
FROM	TO	SPAN	+3%	+300'	3Ø PRIMARY	1Ø NEUTRAL
5	14	2128		2428	4/0	1/0
1	4	596	614		4/0	1/0

2.2.3 Stringing Chart Information

A. Sagging tensions for 4/0 ACSR (Penguin) by conductor section and temperature are shown in the following table 1b:

TABLE 1b: 4/0 ACSR (PENGUIN) SAGGING TENSION (POUNDS)									
POLE RANGE	WIRE TEMPERATURE (°F)								
	20	30	40	50	60	70	80	90	100
5 - 14	2136	1976	1814	1652	1489	1329	1174	1028	895
1 - 4	2071	1922	1775	1630	1489	1355	1231	1117	1016

B. Sagging tensions for 1/0 ACSR (Raven) by conductor section and temperature are shown in the following table 1b:

TABLE 1b: 1/0 ACSR (RAVEN) CREEP SAGGING TENSION (POUNDS)									
POLE RANGE	WIRE TEMPERATURE (°F)								
	20	30	40	50	60	70	80	90	100
5 - 14	1182	1104	1024	944	862	780	699	620	544
1 - 4	1160	1086	1011	936	862	790	720	655	594

2.3 STRINGING AND SAGGING

2.3.1 Stringing Travelers

- A. Semiconducting linings shall not be relied upon for grounding conductors during stringing and sagging.
- B. Travelers shall have dimensions compatible with the conductor and stringing conditions. Acceptable traveler dimensions are:

TABLE 2: ACCEPTABLE TRAVELER DIMENSIONS								
CONDUCTOR	#4 - #4/0	336.4	397.5	477	556	795	954	1272
CONDUCTOR DIA. (IN)	<.74	.74	.78	.88	.95	1.09	1.19	1.38
¹ Minimum sheave dia. (in.)	<8.9	8.9	9.4	10.3	11.0	14.0	15.0	19.0
² Minimum sheave dia. (in.)	<14.8	14.8	15.7	17.7	19.1	21.8	23.8	27.6
Minimum groove dia. (in.)	<.82	.925	.975	1.10	1.19	1.36	1.49	1.73
Maximum groove dia. (in.)	<1.80	1.85	1.95	2.20	2.38	2.73	2.98	3.45
¹ Short spans, level terrain								
² Long spans, steep terrain								

2.3.2 Tensioners

- A. Braked Reel Tensioners are acceptable for stringing tensions less than 500 lbs. Reels must be in satisfactory condition and of sufficient strength to withstand the conductor load.

- B. Bull Wheel Tensioners shall be required for stringing tensions over 500 lbs. Bull Wheels shall be multiple groove with the following acceptable wheel diameters and groove dimensions:

TABLE 3: WHEEL DIAMETERS AND GROOVE DIMENSIONS								
CONDUCTOR	#4 - #4/0	336.4	397.5	477	556	795	954	1272
CONDUCTOR DIA. (IN)	<0.74	0.74	0.78	0.88	0.95	1.09	1.19	1.38
Minimum wheel dia. (in.)	<27	27	28	31	33	37	43	51
Minimum groove dia. (in.)	<0.78	0.78	0.82	0.93	1.00	1.15	1.25	1.45
Maximum groove dia. (in.)	<0.93	0.93	0.98	1.10	1.19	1.36	1.49	1.73

2.3.3 Pullers

- A. Pullers can be either drum or bull-wheel type. Pullers shall have sufficient capacity for the stringing load and shall be able to control the stringing load through the range of pulling speeds.

2.3.4 Communications Equipment

- A. Reliable communications shall be established between puller site, tensioner site, and at all points in between where an observer follows the conductor stringing.

2.3.5 Stringing Operations

- A. The selection of the puller location, snub structure, guard structures, and the tensioner location for each stringing section shall be reviewed by OWNER’s representative prior to stringing.
- B. The alignment of the tensioner and conductor reels shall be such to prevent abrasion of the conductor on the reel flanges, fairleads, and bullwheel groove edges. The reel tender shall remove any nails, staples, or other projections on the reels that may damage the conductor.
- C. Conductor shall be from matched reel lengths. CONTRACTOR shall ensure the conductor is not damaged during stringing.
- D. Conductors shall be handled with care and shall not be trampled on or run over by vehicles. Each reel shall be examined and the wire shall be inspected for cuts, kinks, or other damage. Damaged portions shall be cut out and the conductor spliced after the conductor is strung.
- E. Conductors shall be pulled through travelers, other suitable rollers, or stringing blocks properly mounted on the pole or crossarm to prevent binding or damage while stringing.
- F. Conductor shall not be dragged along the ground or other surfaces that would be abrasive to the conductor. Any conductor dragged on the ground shall be replaced at the CONTRACTOR’s expense.

- G. Stringing tension shall be even and consistent to prevent conductor undulation. In no case shall the stringing tension exceed the specified initial sagging tension.
- H. Tension splices shall not be pulled through the travelers.
- I. A low friction swivel shall be installed between the pulling line and the conductor being pulled.

2.3.6 Sagging and Clip-In

- A. Conductors shall be sagged evenly and in accordance with the MANUFACTURER's recommendations.
- B. Sagging shall be completed using dynamometers that are accurate, calibrated, and sized for the appropriate load range. Before sagging, a conductor thermometer shall be placed in the same exposure to sunlight and wind as the sagging conductor. The conductor thermometer reading shall be the referenced conductor temperature for sagging.
- C. Sagging may also be completed using the stopwatch method. Sagging and timing data will be provided if the stopwatch method is used.
- D. Conductor shall not be allowed to hang in the travelers for more than 72 hours.
- E. Before clipping in conductors, CONTRACTOR shall visually verify conductor sag by inspecting the conductors from the side. OWNER's representative will also visually verify conductor sag from the side.
- F. Clip-in of conductors shall be in accordance to the MANUFACTURER's instructions for the hardware utilized.
- G. All conductors shall be cleaned thoroughly by wire brushing before splicing or installing connectors or clamps. A suitable oxidation inhibitor shall be applied before splicing or applying connectors over aluminum conductor.

2.3.7 Tying

- A. All insulators not within a vise-top pin insulator vise shall be hand tied with aluminum tie wire per construction units TI4 -T15 or as otherwise instructed.
- B. With post or pin type insulators, the conductor shall be tied to the top groove of the insulator on tangent poles and on the side of the insulator away from the strain at angles. Insulators must be tight on the pins or studs and the top groove must be in line with the conductor after tying.

2.3.8 Splices

- A. Splices shall not be spaced less than 1,000 feet apart.
- B. There shall not be more than three splices per mile in any primary conductor.
- C. Splices shall not be located within 10 feet of any supporting structure.
- D. Splices are not allowed in Grade B crossing spans or in adjacent spans.
- E. Splices shall be installed in accordance with the MANUFACTURER's specifications and recommendations.

3.0 CONDUIT INSTALLATION SPECIFICATION

3.1 GENERAL

- 3.1.1 This specification describes the requirements for the installation of conduit for use with electric underground cables.

3.2 SITE CONDITIONS

- 3.2.1 The ground area along the route for the conduit installation shall be clear of obstructions that may impact safety.
- 3.2.2 Sufficient area shall be allowed for excavated material to be set back from the excavation or material shall be removed from the immediate area.
- 3.2.3 Sufficient area shall be provided for safe and unimpeded access by workers installing the conduit.

3.3 EXCAVATION SIZE AND CLEARANCE

- 3.3.1 The excavation shall allow for the overall dimensions of the specified conduit spacing or duct bank. When determining the dimensions, space for workers and bedding material shall be included.
- 3.3.2 The excavation shall comply with safety standards for slope and worker access as necessary. Shoring shall be provided when required to meet safety codes or regulations.

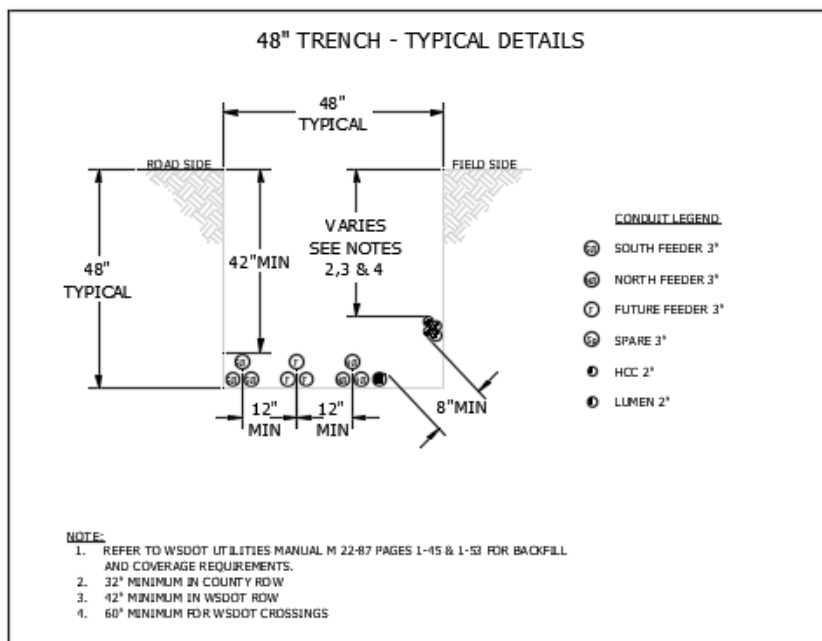
3.4 BORING

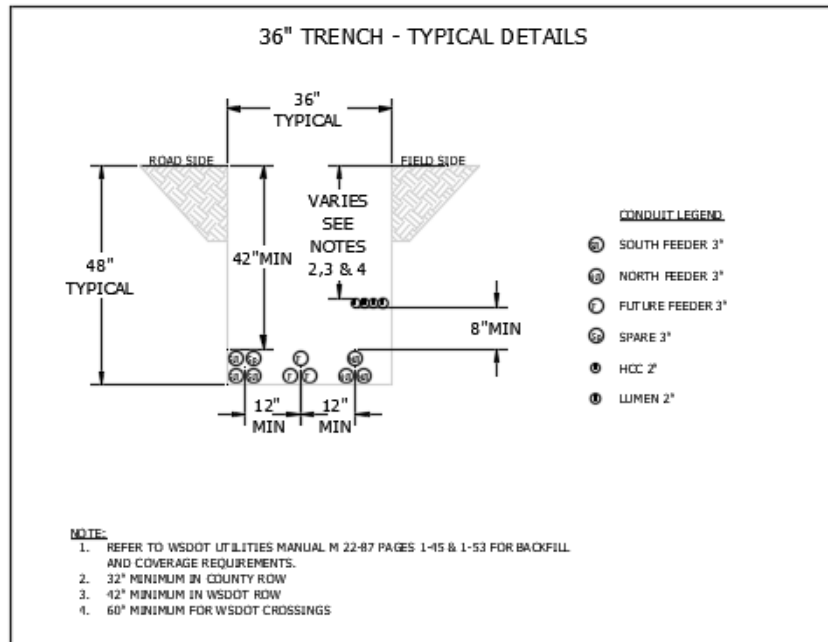
- 3.4.1 Drilling methods shall generally consist of drilling a pilot hole the length of the bore, followed by reaming and pullback of the pipeline. Ream borehole multiple times, as necessary. The equipment and methods used to complete the bore and install piping shall be determined by the Contractor.
- 3.4.2 The drill staging area shall be kept neat and orderly and disturb as little area as possible. The pipe staging area shall disturb as little area as needed to accommodate workers and equipment, and to string, fuse, and inspect the pipe.
- 3.4.3 Install all pulleys, rollers, bumpers, alignment control devices and other equipment required to support and protect the new pipe from damage during installation.
- 3.4.4 Utilize a drilling fluid cleaning/recycling system. Entry and exit pits shall be sized and constructed to completely contain drilling fluid.
- 3.4.5 Borehole survey instrumentation shall be used to monitor line and grade of the pilot hole. Contractor shall maintain records documenting the line and grade of the pilot hole.
- 3.4.6 Pilot hole shall be back-reamed to accommodate pipe. Contractor shall select the reamer size and number of passes required.

- 3.4.7 Monitor tension forces on pipe during pullback. Do not exceed maximum stresses recommended by the pipe supplier.

3.5 TRENCHING

- 3.5.1 Construction shall be arranged so that trenches may be left open for the shortest practical time to avoid creating a hazard to the public and to minimize the likelihood of collapse of the trench due to other construction activity, rain, accumulation of water in the trench, etc.
- 3.5.2 All trench depths are at a minimum as measured from final grade to the top of the conduit. The routing shall be as shown on the staking sheets and drawings, unless approved by the OWNER. If rock or other difficult digging is involved, the CONTRACTOR shall determine the nature and difficulty, and the OWNER shall determine whether re-routing, rock trenching, plowing, or other changes are necessary. Loose soil or crumbly rock shall not be considered as difficult digging. The trench widths, if specified, are at a minimum and should be increased as necessary to obtain the required depth in loose soils.
- 3.5.3 Where multiple facilities are to be installed in one trench, extra width and depth shall be provided to accommodate proper separation and allow for soil falling into the trench during the installation of the first facility.
- 3.5.4 Care shall be exercised to minimize the likelihood of water flow since this may cause trench damage and reduction in trench depth. If water flow occurs, the trench shall be cleared to the specified depth before installing any facilities.
- 3.5.5 All trenches shall follow straight lines between staked points to the greatest extent possible. The trenches shall be dug so that the bottom has a smooth grade. Large rocks, stones, and gravel in excess of one inch shall be removed from the bottom of the trench. Where this cannot be accomplished, bedding material shall be placed in the bottom of the trench.
- 3.5.6 Conduit shall be installed a minimum of 42" below grade with 48" as the preferred depth, unless otherwise noted (see typical trench details below):





3.6 BEDDING MATERIAL AND PREPARATION

- 3.6.1 Bedding material shall be sand, crushed rock less than 1.5 inches, pea gravel or, when approved by the OWNER's representative, native soil.
- 3.6.2 Bedding material shall be installed to cover the entire bottom of the excavation to a depth of two inches and be graded level.
- 3.6.3 Bedding material shall be graded level and compacted.

3.7 CONDUIT INSTALLATION

- 3.7.1 Care shall be taken to ensure conduit is not damaged during installation.
- 3.7.2 Conduit shall be protected from site materials or water entering ends of the conduit.
- 3.7.3 Joints shall be made in accordance with manufacturer's specifications. Glue and adhesives shall be uniformly distributed along the surface of the conduit joint. Care shall be taken to prevent excessive glue or adhesive from being left on the interior surface of the conduit.
- 3.7.4 Conduit shall be inserted the full length of couplers. Threaded joints shall be fully threaded onto the conduit ends.
- 3.7.5 Spacing between conduits within the trench shall be maintained in a uniform manner.
- 3.7.6 When parallel with or crossing other utility lines or culverts, spacing shall be maintained as specified on the drawings.

3.8 BACKFILLING

- 3.8.1 Trenches shall be backfilled only after the conduit is completely assembled.
- 3.8.2 Backfill material up to a level of six inches above the top of the largest conduit shall be free of rocks and debris larger than one inch.
- 3.8.3 Backfill material shall be sand, pea gravel, crushed rock, or native soil when approved by the OWNER's representative.
- 3.8.4 Backfill material shall not be saturated with water.
- 3.8.5 Trenches shall be backfilled and compacted such that in the top 2 feet, horizontal layers shall not exceed 4 inches in depth before compaction. No layer below the top 2 feet shall exceed 8 inches in depth before compaction. See WSDOT Std Spec 2-03.3(14)C, Method C compaction.

3.9 WARNING TAPE

- 3.9.1 Red warning tape, three inches wide with a locating strip, shall be installed six inches above all conduit, cable, or duct, if placed by trenching, or plowing.

3.10 PULL TAPE

- 3.10.1 Upon completion of the conduit installation, a pull tape shall be installed by use of compressed air and a mandrel. Integrity of the conduit must be demonstrated.
- 3.10.2 The pull tape ends shall be secured in a vault or at a pole riser so as to be available for conductor installation at a later time.
- 3.10.3 Rated strength of the pull tape (mule tape) shall be 2,500 pounds minimum.

3.11 FINISHING

- 3.11.1 All exposed ends of conduit shall be plugged to prevent the entrance of foreign matter and moisture into the conduit. Burrs or sharp projections which might damage cable shall be removed. End bells shall be installed on the ends of all conduit.

4.0 ELECTRICAL CONNECTION SPECIFICATION

4.1 GENERAL

- 4.1.1 MANUFACTURER name, part number, and cable or tube range shall appear and be clearly legible on all connectors.
- 4.1.2 All connector bolts shall be properly torqued with a torque wrench to MANUFACTURER requirements. Use the recommended torque table below if no recommendation is provided by the MANUFACTURER. The electrical connections to be ½” stainless steel bolts, Bellville washers, and a Silicon Bronze nut.

Bolt Diameter	Non-lubricated steel and silicone bronze	Aluminum, lubricated steel, and lubricated silicone bronze
5/16”	15	10
3/8”	20	14
1/2”	40	25
5/8”	55	40
3/4”	70	60

4.2 OXIDATION PROTECTION

- 4.2.1 Wire brush all contact areas of a connector and it’s mating part thoroughly to remove any oxidation. Do not brush tinned or tin-plated connections.
- 4.2.2 Immediately after wire brushing, apply proper antioxidant compound (inhibitor) to connections of either aluminum or copper, bolted or crimped.
- 4.2.3 Wire brush a second time to work the inhibitor into the connector after applying the antioxidant compound. Do not brush tinned or tin-plated connections.
- 4.2.4 Oxide inhibitor that DOES NOT contain metal particles shall be applied to all flat-to-flat surfaces to be connected.
- 4.2.5 Oxide inhibitor that DOES contain metal particles shall be applied to all connectors for cables, whether applied mechanically or by compression. The oxide inhibitor shall be worked in between the strands of the cable where it is to be connected.
- 4.2.6 Antioxidant compound shall meet ANSI C119.4 specs with an applicable temperature rating from -40°C to +250°C.
- 4.2.7 Antioxidant compound shall be Anderson/Fargo HTJC (dual rated for both gritted and non-gritted applications) or pre-approved equal.

4.3 BOLTED ELECTRICAL CONNECTIONS

- 4.3.1 Each bolted fastener assembly shall consist of one hex head bolt, two flat washers (one on each side of connection), one Belleville washer on the bolt head side of the connection, and one hex nut. For grounding connections, split lock washers may be substituted for Belleville washers.
- 4.3.2 Bolts shall be hex head, $\frac{1}{2}$ "-13 thread pattern, 18-8 stainless steel, full thread, length as required. Protrusion of bolt from completed connection shall not be greater than $\frac{1}{4}$ ".
- 4.3.3 Flat washers shall be 18-8 stainless steel, with outside diameter 1.25" and inside diameter 0.515".
- 4.3.4 Belleville washers shall be 17-7 stainless steel, with outside diameter 1.00" and inside diameter 0.515".
- 4.3.5 Nuts shall be hex, $\frac{1}{2}$ "-13 thread pattern, silicon bronze or 18-8 stainless steel. Silicon bronze shall not be used in corrosive environments.

5.0 GUY INSTALLATION SPECIFICATION

5.1 GENERAL

- 5.1.1 Guy wire shall consist of 18M, Aluminum-clad steel guy strand.
- 5.1.2 Guys shall be installed before conductors are strung.
- 5.1.3 A guy locator (or marker) shall be installed on all down guys.
- 5.1.4 RUS required bonding clamps are to be securely installed between the anchor rod and the guy wire attached to the anchor rod.
- 5.1.5 CONTRACTOR shall note any possible guy conflicts with the design prior to stringing wire and preferably prior to installing the anchors/guys. CONTRACTOR will be required to correct guys contacting neutral conductors at CONTRACTOR cost if not brought to the engineer's attention prior to stringing conductor.
- 5.1.6 Single deadend structure guys shall be installed, as nearly as practicable, in line with the pull of conductors. Double deadend structures on angles shall be installed with the anchor kicked in by two feet to prevent the pole from leaning if a bisect guy is not installed. Bisect guys at line angle structures shall be installed as nearly as practicable to the true bisector of the line angle.
- 5.1.7 If the separation on the pole between any guy attachment bolt or hardware and any phase conductor attachment bolt is less than 15 inches, then a guy strain insulator assembly shall be installed at the top of the guy. Alternatively, an insulated extension link shall be installed in the primary conductor tap, deadend, or suspension angle subassembly where it attaches to the pole.

5.2 GROUNDING

- 5.2.1 Down guy and overhead guy wires shall be effectively grounded in accordance with Rule 215C2 of the NESC and in accordance with the assembly drawings, unless specified otherwise.

5.3 INSULATION

- 5.3.1 Fiberglass guy strain insulators shall be used to electrically insulate each guy strand which extends above a current-carrying wire. Insulators shall be installed at the top of the guy wire.
- 5.3.2 Additional insulators may be necessary to minimize the potential of any portion of a guy assembly from becoming energized within eight feet of the ground in the event the guy becomes slack or breaks below the lowest guy insulator.
- 5.3.3 Guys installed on tangent, double deadend assemblies shall have a minimum clearance to the neutral conductor of six inches and shall have a guy strain insulator(s) installed at the top of the guy that extends from the pole attachment to at least 12 inches past the neutral conductor. Alternatively, two guys without guy strain insulators may be installed, one on each side of the neutral, such that clearance between each guy wire and the neutral conductor is a minimum of 12 inches. For either of the above designs, the guy wire shall be effectively

bonded to ground in accordance with the NESC.

6.0 OVERHEAD DISTRIBUTION GROUNDING SPECIFICATION

6.1 INSTALLATION

- 6.1.1 Where practicable, ground rods shall be driven to their full length in undisturbed earth. Ground rods shall be installed at least two feet from the face of the pole, with the tops of the rods at least 12 inches below ground.
- 6.1.2 At locations where ground rods cannot be driven the full length of the rod, rods may be bent (only if copper-coated) or cut in two and attached to the ground wire either in series or in parallel.
- 6.1.3 Ground rods placed in the pole hole must be in good contact with the pole backfill. Pole backfill in this instance shall contain sufficient fine material to prevent voids from forming near or around the ground rod.
- 6.1.4 The pole ground wire shall be #4 solid. Pole ground wire shall be attached to the rod with a ground rod clamp and shall be secured to the pole with staples. Staples shall be spaced two feet apart, except for the first eight feet above the ground and the top eight feet of the ground wire where spacing of staples shall be every six inches.

6.2 BONDING

- 6.2.1 Bonding between the ground rod and the system neutral shall be made by one continuous piece of ground wire in the most direct path.
- 6.2.2 Connections to the system neutral, and splices (if required), shall use compression-type connectors.
- 6.2.3 All equipment shall have at two connections from the frame, case, or tank to the system neutral or pole ground wire.

6.3 CONSTRUCTION SPECIFICATIONS FOR GROUNDING

- 6.3.1 All neutral conductors on the pole shall be bonded directly to each other, and connected to the pole ground wire if present. All equipment ground wires, neutral conductors, down guys, messenger wires, and surge-protection ground wires shall be interconnected and attached to a common (pole) ground wire in accordance with the requirements of the National Electrical Safety Code (NESC).
- 6.3.2 RUS borrowers shall install effectively grounded driven ground rods (assembly H1.1) or trench type grounding assemblies (assembly H2.1) a maximum of 1,320 feet (433 meters) apart along overhead distribution lines. Customer-owned or other installed electric service grounds shall not be counted in the above minimum grounding assembly requirement.

7.0 POLE SETTING SPECIFICATION

7.1 GENERAL REQUIREMENTS

- 7.1.1 Unless specifically detailed on construction drawings to be otherwise, pole setting depth shall be 10 percent of the pole length plus two feet for classes of poles less than "H" class. "H" class poles shall be 10 percent of the pole length plus two feet plus ½ foot for each increase in "H" class. For example, a 70-H4 shall be buried 10 percent of the pole length plus two feet plus 4/2 feet for a total burial depth of 11 feet.
- 7.1.2 Rake all angle and dead-end poles away from the conductor pull such that after sagging the conductor the pole top will be nine inches raked on angle poles and 12 inches raked on deadend poles. Raking refers to setting poles with a lean rather than leaning poles by tensioning guys after the pole is set and backfilled.
- 7.1.3 Pole stakes marking pole locations shall be preserved to the extent practicable by CONTRACTOR. Prior to removing pole stakes and drilling pole holes, CONTRACTOR shall establish reference offset marks to maintain proper pole alignment.
- 7.1.4 The CONTRACTOR shall ensure tangent poles are set plumb and in-line with poles behind and ahead.
- 7.1.5 Compaction of backfill material shall be adequate to prevent future settling of the ground surface at the base of the pole.
- 7.1.6 All field-drilled holes shall be treated with OSMOSE CU-89-RTU preservative in accordance with the MANUFACTURER's recommendations, prior to installing bolts or other attachment hardware. Use of other preservatives must be approved by OWNER.

7.2 HANDLING & DELIVERY

- 7.2.1 Poles shall not be dragged on the ground. Cant hooks, pole tongs, or other pointed tools shall not be applied to the ground line section of any pole.
- 7.2.2 Poles containing indentations one-quarter inch or more deep over 20 percent or more of the pole circumference or more than one-half inch deep at any point that can be attributed to loading or handling slings shall be rejected.
- 7.2.3 Other indentations or abrasions (e.g., forklift damage, chain-saw damage) shall not be more than one tenth of the diameter of the pole at the point of damage; in no case shall indentations or abrasions exceed one inch in depth. Such damage is only permitted in an oversized section, where the excess of wood shall be taken into consideration in evaluating the effects of the damage. In any case, the remaining circumference shall meet or exceed the minimum requirements.
- 7.2.4 Backfill with 1-1/4" minus gravel.

7.3 POLE GAINS

- 7.3.1 Poles shall be set so that the crossarm gains face in opposite directions on every other pole, except where noted below.
- 7.3.2 On sloping terrain, the crossarms shall be installed on the uphill side of the pole.
- 7.3.3 At stringing deadends, the last two poles shall be set so that the pole gains face the deadend.
- 7.3.4 On long spans, the poles shall be set so that the crossarm is located on the side of the pole away from the long span.
- 7.3.5 Pole top insulator brackets and pole top pins shall be installed on the side of the pole opposite the gain.
- 7.3.6 A pole gain shall be installed for all crossarms that are installed on poles without a gain already cut into the pole by the pole supplier prior to treatment.

7.4 CROSSARMS

- 7.4.1 DEADEND BUCKARM STRUCTURE LOCATIONS
 - A. Standard crossarm framing shall be upper arms for back span (source) conductors and lower arms for ahead (load) conductors.
 - B. Crossarms shall be mounted on the side of the pole opposite the conductors being supported.
 - C. Crossarms shall be mounted perpendicular to the pole and to the alignment of the conductors.
- 7.4.2 LINE ANGLE BISECT STRUCTURES
 - A. Crossarms shall be mounted on the pole such that the crossarms bisect the primary line angle.
 - B. Crossarms shall be mounted perpendicular to the pole.
- 7.4.3 Crossarms that are damaged during pole framing, pole setting, or conductor stringing, tensioning, clipping, and tying shall be replaced by CONTRACTOR.

7.5 REMOVED POLES

- 7.5.1 Removed poles and wood crossarms may be made available to local landowners on a first-come-first-serve basis. CONTRACTOR shall be responsible for coordination with landowners, loading, transporting, and unloading poles and crossarms, obtaining signatures from recipient landowners on the "Disposition of Wood Products" release form furnished by OWNER, and providing a copy of the "Consumer Information Report" on Pentachlorophenol Pressure Treated Wood to recipient landowners. Poles or crossarms not given to local landowners shall become the property of the CONTRACTOR.

8.0 UNDERGROUND CABLE INSTALLATION

8.1 GENERAL

- 8.1.1 This specification describes the requirements for the installation of underground distribution medium voltage cable as specified.
- 8.1.2 All construction work shall be accomplished in a thorough and workmanlike manner in accordance to the plans, specifications, and the construction drawings.
- 8.1.3 All material and equipment used in the construction shall be stored so as to be protected from deteriorating effects of the elements.

8.2 HANDLING OF CABLE

- 8.2.1 The cable shall be handled carefully at all times to avoid damage, and shall not be dragged across the ground, fences, or sharp objects. Care shall be exercised to avoid excessive bending of the cable. The ends of the cable shall be sealed at all times against moisture with suitable end caps. Where it is necessary to cut the cable, the ends shall be terminated or sealed immediately after the cutting operation.
- 8.2.2 The CONTRACTOR shall ensure that the minimum bending radius of primary cable is a minimum of 12 times the overall diameter of the cable. The minimum bending radius of secondary and service cable is six times the overall diameter of the cable. In all cases, the minimum radius specified is measured to the surface of the cable on the inside of the bend. Cable bends shall not be made within six inches of the cable terminal base.
- 8.2.3 Splices are not allowed unless specifically approved by the OWNER's representative in writing.

8.3 CABLE INSTALLATION IN CONDUIT AND DUCT

- 8.3.1 All pulling operations shall use at least 2,500-lb mule-tape; rope is not allowed.
- 8.3.2 All burrs and obstructions shall be cleared from duct or conduit by pulling a mandrel approximating the inside diameter of the conduit prior to pulling any cable.
- 8.3.3 To avoid abrasion and damage of the cable jacket when guiding the cable from the reel to the duct mouth, all guides should be in the form of large diameter, smooth-surfaced, free turning sheaves or rollers. If guide tubes or chutes must be used, they should have smooth, burr-free working surfaces, well flared entrances, largest possible bend radii, and shall be securely anchored so that cable passes smoothly over them. Cable tension going into the guides shall be kept as low as possible, by mounting the cable reel in sturdy jacks, carefully leveling the reel shaft, and lubricating the reel arbor holes and shaft with grease. Braking of the reel should be done only to prevent reel over-run when the pull is slowed or stopped, or on steep downhill runs where cable weight is enough to overcome cable-duct friction.

- 8.3.4 Water based cable lubricants shall be used when pulling in any cable into duct or conduit. Grease, oil, or wax-based lubricants are expressly prohibited. The lubricant shall be American Polywater type J or similar. Use liberally, but not less than that recommended by the lubricant manufacturer.
- 8.3.5 Woven wire pulling grips or “baskets” may be used to pull in easy pulls. The ends of the cable shall be sealed prior to pulling. Since the compressive force applied by the pulling grip may damage or disturb the underlying cable, CONTRACTOR shall cut off the cable in the grip and approximately three feet behind the grip.
- 8.3.6 If pulling tensions exceed 1,500 pounds, the CONTRACTOR shall stop and consult with the OWNER’s representative as to the best course of action to limit the pulling tension.

8.4 INSTALLATION OF CABLE AND DUCT IN TRENCH

- 8.4.1 All cable and duct must be placed in the trench as soon after trenching as feasible. The duct placement shall be done by hand, under the constant supervision by the OWNER’s representative, assuring no damage to the cable occurs.
- 8.4.2 Cable and duct shall be carefully inspected as it is removed from the reel to be certain it is free from visible defects. The OWNER will decide upon corrective action when defects are discovered.
- 8.4.3 Where more than one duct is to be placed in a trench, the spacing required on the drawings or by the OWNER shall be observed. Care shall be taken that any soil falling into the trench during the laying of the first duct does not reduce the clearances of the last duct below that specified. Should this occur, the excess soil shall be removed carefully by hand or with equipment that will not damage the installed cable.
- 8.4.4 Cable trench shall be mechanically compacted at least 36 inches from all riser poles, pads, pedestals, and terminal points.
- 8.4.5 If direct bury cable is specified, sufficient slack, and in no case less than 24 inches, shall be left at all risers, transformers, pads, pedestals, and terminal points so that movements of cable after backfilling will not cause damaging strain on the cable or terminals.
- 8.4.6 During placement of duct, the duct shall be pulled straight in the trench prior to backfilling with very minimal or no side-to-side waviness, to facilitate ease of pulling in cable.

8.5 PLOWING EQUIPMENT REQUIREMENTS

- 8.5.1 A prime mover with a minimum of 50,000 foot-lbs. drawbar pull and equipped with rubber pads for operating on oiled or paved roads and/or grousers for gravel roads is required. Rubber-tired grader or parsons-type plows are not allowed. Rubber-tired pull equipment will be allowed in addition to a track-type prime mover. Equipment for compaction after plow will be provided by the CONTRACTOR and will be available at the job site.
- 8.5.2 All plowing equipment will be equipped with a vibratory attachment as needed to ease drawbar pull, bed cables, and relieve cable tension as required by the OWNER.

- 8.5.3 The plow shall be capable of placing cable up to four feet beyond the edge of the road and three feet in a ditch line and still plow the cable in a minimum of six inches below the specified depth under all terrain conditions of plow utilization.
- 8.5.4 The plow shall be provided with separate reel carriers for placing four power cables or ducts and one communication duct and cable.
- 8.5.5 The feed shoe shall have rollers to conform to the cable or duct at a radius of not less than 15 times the diameter of the cable or duct.
- 8.5.6 The cable shall *not* pass over stationary guides, rollers or sheaves which will permit a bend radius of less than 15 times cable or duct diameter.
- 8.5.7 The width of the tooth and feed shoe shall not exceed the cable or duct diameter by more than two inches.
- 8.5.8 The plow shall be provided with a means to assure positive hold-down of the plow blade to provide proper depth at all times.

8.6 PLOWING PROCEDURES

- 8.6.1 An OWNER's representative will be on-site at all times during plowing operation to assure compliance with these specifications.
- 8.6.2 Starting and termination points of the plowing operation shall be excavated prior to the cable installation to reduce possible cable damage and to assure sufficient burial depth. The slot made in the soil by the plow shall be closed immediately by driving a vehicle track or wheel over the slot or by other suitable means.
- 8.6.3 Care shall be exercised to feed the cable or duct into the ground through the plow loosely and at minimum tension.
- 8.6.4 If, during the plowing operation, the plow should strike a buried object or rock that would stop the equipment and necessitate removal of the plow from the ground, the plow shall be removed from the ground carefully and without backing the plow. If backing the plow cannot be avoided, the cable shall be uncovered a sufficient distance behind the plow so that the cable and/or duct can be easily lifted from the trench with the plow.
- 8.6.5 Cable and/or duct shall be inspected carefully as it is paid out from the reel to be certain that it is free from visible defects. Every instance of damaged cable observed at any time, whether prior to installation, during installation, or when discovered by test or observation subsequent to installation, shall be immediately called to the attention of the OWNER. Repair, correction, or replacement of such damage shall be completed promptly and in accordance with the written instruction of the OWNER.

8.7 SPECIAL COORDINATION REQUIREMENTS DURING PLOWING

- 8.7.1 The CONTRACTOR shall review the staking sheets and the site with the OWNER prior to the start of construction. The CONTRACTOR, at that time, shall propose any desirable changes or clarifications. These changes, if approved by the OWNER, shall be made and recorded on the staking sheets.

- 8.7.2 In the event that rock is encountered during the plowing operation so that the buried cable cannot be installed to the required minimum depths in soil, the CONTRACTOR shall determine for the OWNER the nature and extent of the rock encountered. Based on this information, the OWNER will determine whether the cable or duct is to be rerouted or trenched in rock.
- 8.7.3 Due to the necessity of making on-the-spot corrections and changes on staking sheets, it may not be possible for the OWNER to issue revised staking sheets to the CONTRACTOR in all cases. When changes are made, dated, and initialed by the OWNER on a set of the CONTRACTOR's staking sheets, it shall be the CONTRACTOR's responsibility to transfer these changes to all other sets of staking sheets being used by the CONTRACTOR for construction purposes.

8.8 TAGGING OF CABLE

- 8.8.1 The cables shall be tagged as they are being laid. The identification shall be of a permanent type, such as plastic or corrosion resistant metal tags. The tag must be securely attached to the cable. Paper or cloth tags are not acceptable.

8.9 PRIMARY CABLE TERMINATIONS AND ELBOWS

- 8.9.1 All cable terminals shall be installed in accordance with the manufacturer's instructions. They must be suitable for the size and type of cable that they are used with and for the environment in which they will operate. Any indication of misfit, such as a loose or exceptionally tight fit, must be called to the OWNER's attention. The outer conductive surface of the termination must be bonded to the system neutral. A heat-shrink or cold-shrink must be installed to seal between the body of the termination and the cable jacket.
- 8.9.2 A portable cover or shelter shall be available for use when terminations are being prepared, to keep rain, snow, and windblown debris off the insulating surfaces of cable and terminations. Since cleanliness is essential in the preparation and installation of primary cable fittings, care shall be exercised to prevent the transfer of conducting particles from the hands to insulating surfaces. Mating surfaces shall be wiped with a solvent such as denatured alcohol to remove any possibly accumulation of dirt, moisture, or other conducting materials. A silicone grease or similar lubricant should be applied afterwards in accordance with the manufacturer's recommendations. Whenever prefabricated cable devices are opened, the de-energized mating surfaces shall be lubricated with silicone grease before the fittings are reconnected.

8.10 SECONDARY AND SERVICE CONNECTIONS

- 8.10.1 The ends of all secondary cables terminated below ground shall be long enough to reach at least 12 inches above the top of the underground enclosure.
- 8.10.2 A suitable inhibiting compound shall be used with all secondary and service connections.
- 8.10.3 All secondary cable connections located below grade or in secondary pedestals shall be made with pre-insulated secondary connector blocks. Diving bells with open terminals or any other connection that depends on tape is not acceptable.

- 8.10.4 All transformer secondary phase terminal connections shall be completely insulated. If the secondary phase terminals are threaded studs, the connection shall be made with a pre-insulated secondary transformer connection block. If the transformer has secondary spades, the spades shall be covered with insulating boots. Boots used for insulation shall be taped so that they cannot be readily slipped off.
- 8.10.5 Secondary connections to terminals of pole-mounted transformers shall be made so that moisture cannot get inside the cable insulation. This may be accomplished by covering the terminals and bare conductor ends with an appropriate moisture sealant or providing a drip loop.

8.11 INSPECTION AND INVENTORY OF BURIED UNITS

- 8.11.1 Before any backfilling operations commence, the CONTRACTOR and the OWNER's representative shall jointly inspect all trenches, cable placement, risers, pedestals, and other construction that will not be accessible after backfilling, and an inventory of units shall be taken. If corrections are required, a second inspection shall be made after completion of the changes.

8.12 EQUIPMENT PADS

- 8.12.1 The site shall be cleared of all debris and excavated to the specified depth. Gravel or sand may be added to the site and thoroughly compacted. The pad shall be installed level at finished grade.

8.13 EQUIPMENT ENCLOSURES

- 8.13.1 Excavations for "sleeves" and other below-grade enclosures shall be made so as to disturb the surrounding earth as little as practicable. When enclosures are of fiber, plastic, or other semi-flexible material, backfilling shall be done with covers in place and with careful tamping so as to avoid distortion of the enclosure. When installation is complete, the cover of the enclosure shall not be lower than two inches above final grade and shall not be higher than four inches above final grade. Soil in the immediate vicinity shall be tamped and sloped away from the enclosure. At the OWNER's option, the soil shall be removed from the site or spread evenly over the surface of the ground to the satisfaction of the OWNER.

8.14 UTILITY SAFETY SIGNS

- 8.14.1 A "Warning" sign shall be installed on the outside of each piece of equipment and a "Danger" sign on the inside of each piece of equipment. The signage shall be compliant with ANSI Z535.2, Environmental Safety Signs.

8.15 GROUNDING

- 8.15.1 All neutral conductors, grounding electrodes, and groundable parts of equipment shall be interconnected. A minimum of one copper-clad ground rod with a minimum length of eight feet shall be installed at all equipment locations, vaults, and taps.
- 8.15.2 All pad-mount equipment enclosures, including transformers, shall be grounded in such a manner that two separate grounding paths exist between enclosure and the grounding rod(s).

8.16 CABLE LOCATION MARKERS

- 8.16.1 Permanent cable locations markers shall be installed as shown on the staking sheets, but in no case shall they be more than 500 feet apart or 500 feet from a piece of electrical equipment.

8.17 CABLE ACCEPTANCE TESTS

- 8.17.1 Continuity: After installation of the cable and prior to the high potential test specified below, authorized personnel shall perform a simple continuity test on the system. This can easily be accomplished by grounding the conductor at the source and checking for continuity at the end of each tap with an ohmmeter.
- 8.17.2 Megger: After successful continuity tests, authorized personnel shall perform megger tests (either 1kV or 5kV) on each length of cable, with terminations in place, but disconnected from the system. The values for each phase shall be recorded and shall be within 10% of each other.



Department of Public Works

Jefferson County, Washington
623 Sheridan Street, Port Townsend, WA 98368 (360) 385-9160



Know what's below.
Call before you dig

UTILITY PERMIT

Case Number: UTL2023-00023 Road #:

Job #: 21202

Jeremiah Waugh, PE Mason County PUD#1
21971 N Hwy 101
Shelton, WA 98584

In accordance with all applicable Revised Code of Washington and amendments thereto, and subject to all the terms, conditions and provisions written or printed below or on any part of this form, permission is hereby granted to:

- 1.) The applicant has permission to bore under two creeks along Duckabush Rd. at mile post 0.42 right and mile post 0.55 right.
- 2.) The Applicant may place utilities in a trench along the back edge of the right-of-way of Duckabush Rd. from mile post 0.008 right to mile post 0.53 right.

Conditions

- 1.) The utility trench shall be backfilled with imported gravel borrow per WSDOT Standard Spec 9-03.14(1) and mechanically compacted in 12 inch lifts to 95% density.
- 2.) The vaults, junction boxes and cabinets being placed on the right-of-way shall be a minimum of 10 feet from the fog line or edge of pavement or constructed to WSDOT requirements for a break away structure.
- 3.) The applicant shall be responsible for the cost to repair any and all damage to the county roadway and rights-of-way, including the integrity of all survey monuments or boundary markers.
- 4.) This permit must be located on site when any work encompassed by the permit is being performed. Failure to do so may result in suspension of all work.
- 5.) 30 is the minimum cover allowed over all utility lines placed across or parallel to the roadway, or across or within the ditch.
- 6.) The Applicant shall submit a Traffic Control Plan which shall follow the standards of the Manual on Uniform Traffic Control Devices (MUTCD) any time that workers are on the county right-of-way or equipment must enter onto the right-of-way.
- 7.) Applicant must give Jefferson County Public Works office (360-385-9160) a minimum of 7 working days notice prior to beginning work. An on-site pre-construction conference shall be scheduled by the applicant and will include Public Works and the contractor who will be performing the work. Prior to this meeting, any utility locate marks shall be done (Call 811 48 hours before you dig)
- 8.) The Applicant must contact the Public Works Department for a final inspection upon completion of the installation.
- 9.) Any work within the shoulder, including the bore pits, shall be backfilled with imported gravel borrow per WSDOT Standard Spec 9-03.14(1) and compacted in 12 inch lifts. The surface of the shoulder shall be finished with a minimum of 2 compacted crushed granite gravel meeting WSDOT Standard Spec 9-03.9(3)

The applicant, by signing the permit application, has agreed to all of the conditions in the permit including the provisions on the back of this form. This permit shall be void unless the work herein contemplated shall have been completed before May 27, 2025. The Department of Public Works may revoke, amend or cancel this permit or any of the provisions thereof at any time by giving written notice to the grantee. The grantee, upon notification, shall immediately remove all of his equipment and facilities from the County right of way. Any equipment or facilities remaining upon the County right of way 30 days after written notice of cancellation shall be removed by the County at the sole expense of the grantee.

In accepting this permit the grantee, his successors and assigns, agree that any damage or injury done to the property of the grantee or any expense incurred by him through the operation of a contractor, working for the County or any County employee shall be at the sole expense of the grantee, his successors and assigns.

 2-8-2024
For Jefferson County Date

GENERAL PROVISIONS APPLICABLE TO ALL PERMITS

This permit is subject to all applicable provisions of the Revised Code of Washington and all of the applicable provisions of Washington law. This permit is also subject to all applicable provisions of Chapter 13.56 of the Jefferson County Code, Accommodations of Utilities upon Jefferson County Rights-of-Way, Ordinance No. 01-0103-00; and Ordinance No. 09-0727-92 Regulating Jefferson County Road Approach Permits.

During the progress of the work such barriers and/or traffic control devices shall be erected and maintained as may be necessary or as may be directed by the Public Works Department for the protection of the traveling public; all traffic control devices shall be properly lighted at night and shall comply with all specifications of the Manual of Uniform Traffic Control Devices.

In accepting this permit, the Applicant shall indemnify and hold the County, and its officers, employees, and agents harmless from and shall process and defend at its own expense, including all costs, attorney fees and expenses relating thereto, all claims, demands, or suits at law or equity arising in whole or in part, directly or indirectly, from the Applicant's negligence or breach of any of its obligations under this Agreement; provided that nothing herein shall require a Applicant to indemnify the County against and hold harmless the County from claims, demands of suits based solely upon the conduct of the County, its officers, employees and agents, and; provided further that if the claims or suits are caused by or result from the concurrent negligence of: (a) the Applicant's agents or employees; and, (b) the County, its officers, employees and agents, this indemnity provision with respect to claims or suits based upon such negligence, and/or the costs to the County of defending such claims and suits, etc., shall be valid and enforceable only to the extent of the Applicant's negligence, or the negligence of the Applicant's agents or employees.

Except as herein authorized by the county Public Works Department, no excavation shall be made or obstacle placed within the limits of a county road in such a manner as to interfere with the travel over said road and shall not be within four (4) feet of the edge of the pavement. If the work done under this permit interferes in any way with the drainage of the county road, the grantee shall wholly and at his own expense make such provision as the County Engineer may direct to take care of said drainage. On completion of said work all rubbish and debris shall be immediately removed and the roadway and roadside shall be left neat and presentable and satisfactory to the County Engineer.

All of the work herein contemplated shall be under the supervision of the County Engineer and the entire expense of said supervision shall be borne by the grantee to whom this permit is issued, or his successors and assigns. The Department of Public Works hereby reserves the right to order the change of location or the removal of any structure or structures authorized by this permit at any time, said change or removal to be made at the sole expense of the grantee to whom this permit is issued, or his successors and assigns.

All such changes, reconstruction or relocation by the grantee shall be done in such a manner as will cause the least interference with any of the County's work and the County of Jefferson shall in no way be held liable for any damage to the grantee by reason of any such work by the County of Jefferson, its agents or representative, or by the exercise of any rights by the County upon roads, streets, public places or structures in question.

This permit or privilege shall not be deemed or held to be an exclusive one and shall not prohibit the County from granting other permits or franchise rights of like or other nature to other public or private utilities, nor shall it prevent the County from using any of its roads, streets, or public places, or affect its right to full supervision and control over all or any part of them, none of which is hereby surrendered.

Federal Endangered Species Act Disclaimer:

Jefferson County makes no assurances to the applicant that the actions undertaken because this permit has been issued will not violate 16 U.S.C section 1531 et seq. (the federal Endangered Species Act of 1973 or ESA). The applicant acknowledges that they are solely responsible for adhering to and complying with the ESA.

Cultural Resources Disclaimer:

Jefferson County makes no assurances to the applicant that the actions undertaken because this permit has been issued will not violate federal, state, or local cultural resources laws and regulations, including but not limited to 54 U.S.C. section 3001 et seq. (the federal National Historic Preservation Act of 1966), Chapter 27.34 RCW (Historic Preservation), Chapter 27.44 RCW (Indian Graves and Records), the Washington State Governors Executive Order 21-02, or any applicable treaty between the United States and any Indian tribe. The applicant acknowledges that they are solely responsible for adhering to and complying with all federal, state, or local cultural resources laws and regulations, including all applicable treaties between the United States and any Indian tribe.

SEPA¹ Environmental Checklist

¹ <https://ecology.wa.gov/Regulations-Permits/SEPA/Environmental-review/SEPA-guidance/Checklist-guidance>

Purpose of checklist

Governmental agencies use this checklist to help determine whether the environmental impacts of your proposal are significant. This information is also helpful to determine if available avoidance, minimization, or compensatory mitigation measures will address the probable significant impacts or if an environmental impact statement will be prepared to further analyze the proposal.

Instructions for applicants

This environmental checklist asks you to describe some basic information about your proposal. Please answer each question accurately and carefully, to the best of your knowledge. You may need to consult with an agency specialist or private consultant for some questions. **You may use “not applicable” or “does not apply” only when you can explain why it does not apply and not when the answer is unknown.** You may also attach or incorporate by reference additional studies reports. Complete and accurate answers to these questions often avoid delays with the SEPA process as well as later in the decision-making process.

The checklist questions apply to **all parts of your proposal**, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

Instructions for lead agencies

Please adjust the format of this template as needed. Additional information may be necessary to evaluate the existing environment, all interrelated aspects of the proposal and an analysis of adverse impacts. The checklist is considered the first but not necessarily the only source of information needed to make an adequate threshold determination. Once a threshold determination is made, the lead agency is responsible for the completeness and accuracy of the checklist and other supporting documents.

Use of checklist for nonproject proposals

For nonproject proposals (such as ordinances, regulations, plans and programs), complete the applicable parts of sections A and B, plus the Supplemental Sheet for Nonproject Actions (Part D). Please completely answer all questions that apply and note that the words "project," "applicant," and "property or site" should be read as "proposal," "proponent," and "affected geographic area," respectively. The lead agency may exclude (for non-projects) questions in “Part B: Environmental Elements” that do not contribute meaningfully to the analysis of the proposal.

A. Background

[Find help answering background questions](#)²

1. Name of proposed project, if applicable:

Duckabush Road Power Reroute

2. Name of applicant:

Mason County Public Utility District No. 1

3. Address and phone number of applicant and contact person:

Kristin Masteller
General Manager, Mason County PUD 1
21971 N. Hwy. 101, Shelton, WA 98584
(360) 877-5249 ext. 202 – Office

4. Date checklist prepared:

December 8, 2023

5. Agency requesting checklist:

Mason County Public Utility District No. 1

6. Proposed timing of schedule (including phasing, if applicable):

April 2024 – December 2024

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.

No.

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

Puget Sound Nearshore Ecosystem Restoration Final Integrated Feasibility Report and Environmental Impact Statement (EIS), July 2016. This document was the result of the Seattle District Corps of Engineers (Corps), collaborating with the Washington Department of Fish and Wildlife (WDFW) as local sponsor, along with many other regional partners to conduct a General Investigation (GI) to evaluate problems and potential solutions to ecosystem degradation and habitat loss in Puget Sound, Washington. The Corps and local sponsor recommended implementation of restoration actions at three sites throughout the study area as the outcome of the Nearshore Study. One of the three study locations was the Duckabush Estuary.

² <https://ecology.wa.gov/Regulations-Permits/SEPA/Environmental-review/SEPA-guidance/SEPA-checklist-guidance/SEPA-Checklist-Section-A-Background>

The proposed project lies outside but adjacent to the study area delineated in the above referenced EIS.

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.

None known.

10. List any government approvals or permits that will be needed for your proposal, if known.

Boring or directional drilling for a utility line under a waterbody requires federal, state, and local permits. To streamline the environmental permitting process, multiple regulatory agencies joined forces to create one application that can be used to apply for more than one permit at a time. This is the Joint Aquatic Resources Permit Application (JARPA).

Jefferson County Department of Community Development

US Army Corps of Engineers

Discharge of Dredge or Fill (Section 404)

Coastal Zone Management (CZM)

User Guide: Nationwide Permits in Washington State

Contact the Jefferson County Project Manager: Pam Sanguinetti at (206) 764-6904 or email pamela.sanguinetti@usace.army.mil.

Dept. of Natural Resources

Aquatic Use Authorization

Contact your Aquatic District: Orca Straights District at 360-856-3500 or email aquaticleasing.orca@dnr.wa.gov.

Dept. of Fish & Wildlife

Hydraulic Project Approval (HPA)

Contact your local Habitat Biologist [here](#).

Dept. of Ecology

Section 401 Water Quality Certification

Contact the Federal Permit Coordinator at 360-407-6076 or email ecyrefedpermits@ecy.wa.gov.

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.)

The proposed project install underground power line along the north side of Duckabush Road. The underground electric distribution line will cross under two streams that are tributary to the Duckabush River.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.

The proposed project would begin approximately 300 feet northwest of Highway 101 along the north side of Duckabush Road tying into the location where the PUD will be completing power utility replacement work covered in the EIS documentation detailed in question no. 8. From that location the power line will underground to its termination approximately 0.53 miles up valley. The proposed project is located in Jefferson County in Township 25N, Range 2W, and Section 16. See attached Preliminary Plan Sheets.

B.Environmental Elements

1. Earth

[Find help answering earth questions³](#)

a. General description of the site:

The proposed project begins adjacent to the Duckabush Estuary on the upslope side (north) of Duckabush Road. The elevation is approximately 40 feet above mean sea level (MSL). The road trends to the northwest paralleling the Duckabush River in a rural residential area, terminating at an elevation of 22 feet above MSL. The area of proposed work is a mix of smaller residential parcels to the south between Duckabush Road and the Duckabush River and larger parcels to the north of the road that are a mosaic of pasture and timbered land.

Circle or highlight one: Flat, rolling, hilly, steep slopes, mountainous, other:

The proposed project site is undulating by a few feet up and down but the overall elevation is relatively flat.

b. What is the steepest slope on the site (approximate percent slope)?

5%.

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them, and note any agricultural land of long-term commercial significance and whether the proposal results in removing any of these soils.

³ <https://ecology.wa.gov/regulations-permits/sepa/environmental-review/sepa-guidance/sepa-checklist-guidance/sepa-checklist-section-b-environmental-elements/environmental-elements-earth>

Belfast silt loam (Bg) approximately 38%. This soil type is located up the valley beginning around the intersection of Duckabush Road and Kelly Drive. All areas are prime farmland; however, all work will occur within the Duckabush Road right-of-way.

Grove very gravelly sandy loam, 15 to 30 percent slopes (GrD) approximately 62%. This soil type is found at the projects beginning near the intersection of Duckabush Road and Highway 101, moving up the valley to Kelly Drive. Not prime farmland.

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.

None known.

e. Describe the purpose, type, total area, and approximate quantities and total affected area of any filling, excavation, and grading proposed. Indicate source of fill.

The proposed project will bore for underground electric utility placement under the two creeks crossing the electric utility installation. The remainder of the installation will be open cut and backfilled with native material; therefore, no fill will be required.

f. Could erosion occur because of clearing, construction, or use? If so, generally describe.

Bore pits will be required at each terminal end of a bore; however, these are generally very small and localized. The remainder of the electrical distribution main installation will be open cut immediately adjacent to the existing Duckabush Road. No clearing is required.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?

None; 0%.

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any.

Best Management Practices for erosion control surrounding the bore pits and along the open cut sections will be included in the plans and specifications. This will include silt fencing to exclude any sediment laden water from entering the two creeks that will be crossed by the electrical distribution main.

2. Air

[Find help answering air questions](#)⁴

a. What types of emissions to the air would result from the proposal during construction, operation, and maintenance when the project is completed? If any, generally describe and give approximate quantities if known.

⁴ <https://ecology.wa.gov/Regulations-Permits/SEPA/Environmental-review/SEPA-guidance/SEPA-checklist-guidance/SEPA-Checklist-Section-B-Environmental-elements/Environmental-elements-Air>

Diesel powered bore machine will be required. Typically, borings of this length and complexity require about one week of work. In addition to the boring machine, trench open cuts will require a backhoe or similar piece of equipment. There will also be a need for accessory vehicles such as conduit/wire delivery trucks and personnel work vehicles. Once the project is completed there will be no air emissions generated from the project.

- b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.**

No.

- c. Proposed measures to reduce or control emissions or other impacts to air, if any:**

None associated with this proposal.

3. Water

[Find help answering water questions](#)⁵

- a. Surface:**

[Find help answering surface water questions](#)⁶

- 1. Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.**

Flowing parallel to Duckabush Road and the proposed project location is the Duckabush River, which is located on the opposite side of the roadway from the electric utility distribution installation. This river flows through the Duckabush Estuary and into Hood Canal. Two small streams cross Duckabush Road and the proposed project location and discharge to the Duckabush River.

- 2. Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.**

The proposed project will bore under the two streams that cross under Duckabush Road. The attached site plan shows the location of the streams.

- 3. Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.**

None.

⁵ <https://ecology.wa.gov/Regulations-Permits/SEPA/Environmental-review/SEPA-guidance/SEPA-checklist-guidance/SEPA-Checklist-Section-B-Environmental-elements/Environmental-elements-3-Water>

⁶ <https://ecology.wa.gov/Regulations-Permits/SEPA/Environmental-review/SEPA-guidance/SEPA-checklist-guidance/SEPA-Checklist-Section-B-Environmental-elements/Environmental-elements-3-Water/Environmental-elements-Surface-water>

- 4. Will the proposal require surface water withdrawals or diversions? Give a general description, purpose, and approximate quantities if known.**

No.

- 5. Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.**

No. See attached FEMA flood map.

- 6. Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.**

No.

b. Ground:

[Find help answering ground water questions](#)⁷

- 1. Will groundwater be withdrawn from a well for drinking water or other purposes? If so, give a general description of the well, proposed uses and approximate quantities withdrawn from the well. Will water be discharged to groundwater? Give a general description, purpose, and approximate quantities if known.**

No.

- 2. Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (domestic sewage; industrial, containing the following chemicals...; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.**

None.

c. Water Runoff (including stormwater):

- 1. Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.**

The proposed project will install an electrical distribution line below grade. All work will occur during dry weather. Open cut for distribution installation will utilize best management practices for stormwater runoff. Silt-fencing will be installed in areas that will exclude stormwater from entering the two creeks that will be crossed by boring or directional drilling.

- 2. Could waste materials enter ground or surface waters? If so, generally describe.**

No. Best Management Practices will be utilized for all construction equipment and spill prevention kits will be required to be on site while construction is underway.

⁷ <https://ecology.wa.gov/Regulations-Permits/SEPA/Environmental-review/SEPA-guidance/SEPA-checklist-guidance/SEPA-Checklist-Section-B-Environmental-elements/Environmental-elements-3-Water/Environmental-elements-Groundwater>

3. Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? If so, describe.

The proposed project will not affect drainage patterns. An electrical distribution line will be installed below grade and will not alter surface topography.

d. Proposed measures to reduce or control surface, ground, and runoff water, and drainage pattern impacts, if any:

The proposed project will be constructed during dry weather so as to minimize the likelihood of any runoff. Silt fencing will be installed as will other measures such as hay bales or straw wattles to isolate any runoff from entering the two creeks that cross the proposed electric distribution line.

4. Plants

[Find help answering plants questions](#)

a. Check the types of vegetation found on the site:

- deciduous tree: alder, maple, aspen, other**
- evergreen tree: fir, cedar, pine, other**
- shrubs**
- grass**
- pasture**
- crop or grain**
- orchards, vineyards, or other permanent crops.**
- wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other**
- water plants: water lily, eelgrass, milfoil, other**
- other types of vegetation**

b. What kind and amount of vegetation will be removed or altered?

The proposed project will be constructed immediately adjacent to the north side of the Duckabush Road. This is the location of the drainage ditch running alongside the roadway. Grasses, buttercup, skunk cabbage will be temporarily removed to install the electrical distribution line. The narrow trench (estimated to be 12-inches wide) will be backfilled with native material and shaped to pre-existing contours. Disturbed soils will be hydroseeded with plant seed native to this environment along the road side. Existing vegetation will also be allowed to re-colonize the site.

c. List threatened and endangered species known to be on or near the site.

Following review of the Priority Habitat Species database on the Washington Department of Fish and Wildlife website, no listed threatened or endangered plant species were indicated. The Duckabush River, which is located to the south of

Duckabush Road and the proposed project site is noted a Freshwater Forested/Shrub Wetland.

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any.

The proposed construction area that is open cut will be reseeded with native plant species.

e. List all noxious weeds and invasive species known to be on or near the site.

None known.

5. Animals

[Find help answering animal questions](#)⁸

a. List any birds and other animals that have been observed on or near the site or are known to be on or near the site.

Examples include:

- **Birds:** hawk, heron, eagle, songbirds, other:
- **Mammals:** deer, bear, elk, beaver, other:
- **Fish:** bass, salmon, trout, herring, shellfish, other:

b. List any threatened and endangered species known to be on or near the site.

According to the Priority Habitat Species (PHS) database on the Washington Department of Fish and Wildlife website noted the following listed aquatic species in the adjacent Duckabush River: Coho (Federal Candidate for Occurrence), Steelhead (Federal Threatened for Occurrence), Chinook (Federal Threatened for Occurrence), Chum (Federal Threatened for Occurrence).

The unnamed creek furthest west along the proposed corridor where the project proposes to bore or directional drill under includes: Coho (Federal Candidate for Occurrence) and Steelhead (Federal Threatened for Occurrence).

The creek furthest east along the proposed corridor (Pierce Creek, also known locally as Salmon Creek) that the project proposes to bore or directional drill under includes: Coho (Federal Candidate for Occurrence) and Steelhead (Federal Threatened for Occurrence).

The PHS listed the terrestrial species Northern Spotted Owl (Federal Threatened, State Endangered).

c. Is the site part of a migration route? If so, explain.

⁸ <https://ecology.wa.gov/Regulations-Permits/SEPA/Environmental-review/SEPA-guidance/SEPA-checklist-guidance/SEPA-Checklist-Section-B-Environmental-elements/Environmental-elements-5-Animals>

The proposed location is part of the Pacific Flyway, a major north-south flyway for migratory birds in the Americas, extending from Alaska to Patagonia. Additionally, the Duckabush River is home to a number of salmonids that utilize the river for part of their life cycle.

d. Proposed measures to preserve or enhance wildlife, if any.

The proposed project will utilize silt fencing and other Best Management Practices including dry weather construction to eliminate the possibility of sediment entering the Duckabush River. The WDFW has identified July 15 to January 15 as the construction window in this area. Construction within 200 feet to either side of either creek will be undertaken during this “window”.

e. List any invasive animal species known to be on or near the site.

None known.

6. Energy and natural resources

[Find help answering energy and natural resource questions](#)⁹

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.

The proposed project is rerouting power to residents already receiving power. This reroute will improve electric service to customers by eliminating the potential for power outages due to falling limbs/trees or ice storms. It also increases serviceability by the PUD since access through the Duckabush Estuary power lines is difficult and there is no access road and the area is intermittently inundated by water. The electrical power reroute will serve the same electrical needs of the system’s customers that currently exist.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.

No. The proposed project will reroute and underground power and will not affect the potential use of solar energy.

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any.

The project will conserve energy by reducing the need for the PUD to service overhead electrical lines. The PUD will also be installing the latest electrical equipment and vaults to maximize energy efficiency.

7. Environmental health

[Health Find help with answering environmental health questions](#)¹⁰

⁹ <https://ecology.wa.gov/Regulations-Permits/SEPA/Environmental-review/SEPA-guidance/SEPA-checklist-guidance/SEPA-Checklist-Section-B-Environmental-elements/Environmental-elements-6-Energy-natural-resou>

- a. **Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur because of this proposal? If so, describe.**

Unlikely. Electrical energy always carries a slight risk; however, undergrounding power reduces the likelihood of fire or explosion.

- 1. Describe any known or possible contamination at the site from present or past uses.**

None known. The Duckabush Road and area is relatively remote and is managed for timber production and recreation in those areas that are not rural residential.

- 2. Describe existing hazardous chemicals/conditions that might affect project development and design. This includes underground hazardous liquid and gas pipelines located within the project area and in the vicinity.**

None know.

- 3. Describe any toxic or hazardous chemicals that might be stored, used, or produced during the project's development or construction, or at any time during the operating life of the project.**

None.

- 4. Describe special emergency services that might be required.**

No special emergency services are required. Accidents are possible during construction; however, the area is served by emergency fire and medical personnel.

- 5. Proposed measures to reduce or control environmental health hazards, if any.**

None proposed.

b. Noise

- 1. What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?**

There are no existing sources of noise that would affect the proposed project.

- 2. What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site)?**

Construction associated with undergrounding of power would be present on a short-term basis; however, construction should proceed quickly and impacts in a single area would likely be limited to one or two days. The entire project is expected to be complete in less than four weeks.

- 3. Proposed measures to reduce or control noise impacts, if any:**

¹⁰ <https://ecology.wa.gov/Regulations-Permits/SEPA/Environmental-review/SEPA-guidance/SEPA-checklist-guidance/SEPA-Checklist-Section-B-Environmental-elements/Environmental-elements-7-Environmental-health>

Construction will take place during regular working hours from 7am to 6pm.

8. Land and shoreline use

[Find help answering land and shoreline use questions](#)¹¹

- a. What is the current use of the site and adjacent properties? Will the proposal affect current land uses on nearby or adjacent properties? If so, describe.**

The current land use where the proposed project will be located is the Jefferson County Duckabush Road right-of-way. The lower Duckabush basin is zoned for rural residential and some forestry use. The rural residential zoning (RR-5) is located both north and south of Duckabush Road with Olympic Canal Tracts located predominantly south of the road and to the north of the road are larger residential lots. There is one lot north and contiguous with Duckabush Road and the proposed project that is zoned RR-20.

- b. Has the project site been used as working farmlands or working forest lands? If so, describe. How much agricultural or forest land of long-term commercial significance will be converted to other uses because of the proposal, if any? If resource lands have not been designated, how many acres in farmland or forest land tax status will be converted to nonfarm or nonforest use?**

No, the proposed project is within the Duckabush Road right-of-way.

- 1. Will the proposal affect or be affected by surrounding working farm or forest land normal business operations, such as oversize equipment access, the application of pesticides, tilling, and harvesting? If so, how?**

No.

- c. Describe any structures on the site.**

The crossing of the two creeks will bore or directional drill under the creek bed and likely under the existing culvert for each creek. The culvert located at Pierce Creek has filled with gravel and sediment over the years, significantly reducing the capacity of the culvert and stream channel.

- d. Will any structures be demolished? If so, what?**

No.

- e. What is the current zoning classification of the site?**

Rural Residential (RR-5 and RR-20).

- f. What is the current comprehensive plan designation of the site?**

Rural, according to the Jefferson County Community Development, BERK, 2018.

- g. If applicable, what is the current shoreline master program designation of the site?**

¹¹ <https://ecology.wa.gov/Regulations-Permits/SEPA/Environmental-review/SEPA-guidance/SEPA-checklist-guidance/SEPA-Checklist-Section-B-Environmental-elements/Environmental-elements-8-Land-shoreline-use>

According to the Jefferson County Shoreline Master Program Periodic Review 2020 ([Jefferson County Shoreline Master Program Periodic Review 2020 \(arcgis.com\)](https://arcgis.com)), all area north of the Duckabush Road is not located within a shoreline designated area. The proposed project is located entirely north of the Duckabush Road.

h. Has any part of the site been classified as a critical area by the city or county? If so, specify.

Critical areas mapping was accessed from the Jefferson County Public Land Records website <https://gisweb.jeffcowa.us/LandRecords/>, which identified the following critical areas in the proposed project area:

- Wetland – located at the crossing of Pierce Creek
- Geohazard Areas – Two areas indicating a Seismic Hazard in the area of Kelly Road and River Road.
- Shoreline Slope Stability Intermediate slope – in the area north of Duckabush Road from the proposed project beginning to approximately Kelly Road. Landslide Hazard is Slight.
- Critical Aquifer Recharge Areas (CARA) – designation along either side of the proposed project area is a Susceptible Aquifer Recharge Area (SUSC).
- Seawater Intrusion Protection Zone (SIPZ) – from proposed project beginning to approximately Kelly Road is designated Coastal SIPZ<100 ppm chloride and ¼ mile from shoreline.
- Flooding Hazard Zone – the entire proposed project area appears to be the terminal northern edge of the designations 1 ft Sea-Level Rise (SLR) and 5 ft SLR. There are two deeper incursions north of Duckabush Road at Kelly Road and River Road.

i. Approximately how many people would reside or work in the completed project?

None within the Duckabush Road right-of-way, where the proposed project will be constructed. The area to the south and north of the roadway is rural residential.

j. Approximately how many people would the completed project displace?

None.

k. Proposed measures to avoid or reduce displacement impacts, if any.

None needed with this proposed project.

l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any.

The proposed project will not alter existing land use or plans; the project is rerouting power from overhead poles out of the Duckabush Estuary to below ground level along the right-of-way of Duckabush Road.

- m. **Proposed measures to reduce or control impacts to agricultural and forest lands of long-term commercial significance, if any:**

None needed.

9. Housing

[Find help answering housing questions](#)¹²

- a. **Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.**

None associated with the proposed project.

- b. **Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.**

None associated with the proposed project.

- c. **Proposed measures to reduce or control housing impacts, if any:**

None needed.

10. Aesthetics

[Find help answering aesthetics questions](#)¹³

- a. **What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?**

The proposed project will remove overhead power lines from the Duckabush Estuary and re-install them in conduit below grade.

- b. **What views in the immediate vicinity would be altered or obstructed?**

None.

- c. **Proposed measures to reduce or control aesthetic impacts, if any:**

None needed.

11. Light and glare

[Find help answering light and glare questions](#)¹⁴

- a. **What type of light or glare will the proposal produce? What time of day would it mainly occur?**

None. All infrastructure will be below grade.

- b. **Could light or glare from the finished project be a safety hazard or interfere with views?**

¹² <https://ecology.wa.gov/Regulations-Permits/SEPA/Environmental-review/SEPA-guidance/SEPA-checklist-guidance/SEPA-Checklist-Section-B-Environmental-elements/Environmental-elements-9-Housing>

¹³ <https://ecology.wa.gov/Regulations-Permits/SEPA/Environmental-review/SEPA-guidance/SEPA-checklist-guidance/SEPA-Checklist-Section-B-Environmental-elements/Environmental-elements-10-Aesthetics>

¹⁴ <https://ecology.wa.gov/Regulations-Permits/SEPA/Environmental-review/SEPA-guidance/SEPA-checklist-guidance/SEPA-Checklist-Section-B-Environmental-elements/Environmental-elements-11-Light-glare>

No.

- c. **What existing off-site sources of light or glare may affect your proposal?**

None.

- d. **Proposed measures to reduce or control light and glare impacts, if any:**

None needed.

12. Recreation

[Find help answering recreation questions](#)

- a. **What designated and informal recreational opportunities are in the immediate vicinity?**

Bicycle riding, jogging, hiking/walking, and fishing.

- b. **Would the proposed project displace any existing recreational uses? If so, describe.**

No.

- c. **Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:**

None needed or proposed.

13. Historic and cultural preservation

[Find help answering historic and cultural preservation questions](#)¹⁵

- a. **Are there any buildings, structures, or sites, located on or near the site that are over 45 years old listed in or eligible for listing in national, state, or local preservation registers? If so, specifically describe.**

An extensive review of buildings, structures, and sites was performed for the Puget Sound Nearshore Ecosystem Restoration Final Integrated Feasibility Report and Environmental Impact Statement (July 2016). The findings indicated one archaeological site (remnants of a historic fence and fruit tree) has been recorded in the Duckabush River Estuary but has not been formally evaluated. Also located near the proposed project is the Highway 101 causeway, including two bridges; one of which (the Duckabush Bridge) is listed in the National Register of Historic Places (NRHP). The second bridge has been inventoried and recommended ineligible but has not been formally evaluated.

Both the historic orchard (tree and fence) and NRHP listed bridge is not within the proposed project Area of Potential Effect (APE).

- b. **Are there any landmarks, features, or other evidence of Indian or historic use or occupation? This may include human burials or old cemeteries. Are there any material**

¹⁵ <https://ecology.wa.gov/Regulations-Permits/SEPA/Environmental-review/SEPA-guidance/SEPA-checklist-guidance/SEPA-Checklist-Section-B-Environmental-elements/Environmental-elements-13-Historic-cultural-p>

evidence, artifacts, or areas of cultural importance on or near the site? Please list any professional studies conducted at the site to identify such resources.

None known within the north right-of-way of Duckabush Road, the proposed project area.

- c. Describe the methods used to assess the potential impacts to cultural and historic resources on or near the project site. Examples include consultation with tribes and the department of archeology and historic preservation, archaeological surveys, historic maps, GIS data, etc.**

To date no assessment of potential impacts to cultural and historic resources have been made with relation to relocating the electric distribution line below ground surface within the right-of-way of Duckabush Road. An Environmental Impact Statement for an immediately adjacent project was reviewed with their findings detailed in response 13a above.

- d. Proposed measures to avoid, minimize, or compensate for loss, changes to, and disturbance to resources. Please include plans for the above and any permits that may be required.**

Mason County PUD No. 1 will be submitting this SEPA Checklist to the Department of Archaeology and Historic Preservation (DAHP) and the Tribes denoted on DAHP's Interactive Map of Tribal Areas of Interest. These Tribes include: Suquamish Tribe, Skokomish Indian Tribe, Lower Elwha Klallam Tribe, Jamestown S'Klallam Tribe, and the Port Gamble S'Klallam Tribe. An Inadvertent Discovery Plan (IDP) has been appended to this SEPA Checklist and will be included in the project's Specifications.

14. Transportation

[Find help with answering transportation questions](#)¹⁶

- a. Identify public streets and highways serving the site or affected geographic area and describe proposed access to the existing street system. Show on site plans, if any.**

All proposed work will occur within the Duckabush Road right-of-way. The road is accessed from Highway 101 to the east. There are three roads that connect to the Duckabush Road (within the project area) from the south. These include, from east to west, Shorewood Road, Kelly Road, and River Road. All three roads provide access to the residential Olympic Canal Tracts.

- b. Is the site or affected geographic area currently served by public transit? If so, generally describe. If not, what is the approximate distance to the nearest transit stop?**

¹⁶ <https://ecology.wa.gov/Regulations-Permits/SEPA/Environmental-review/SEPA-guidance/SEPA-checklist-guidance/SEPA-Checklist-Section-B-Environmental-elements/Environmental-elements-14-Transportation>

Yes. Jefferson Transit serves the Brinnon/Quilcene/Tri Area Route with service along Highway 101. The closest stop to the proposed project site is Black Point Road located on Highway 101 approximately 0.7 miles to the north.

- c. **Will the proposal require any new or improvements to existing roads, streets, pedestrian, bicycle, or state transportation facilities, not including driveways? If so, generally describe (indicate whether public or private).**

No.

- d. **Will the project or proposal use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.**

No.

- e. **How many vehicular trips per day would be generated by the completed project or proposal? If known, indicate when peak volumes would occur and what percentage of the volume would be trucks (such as commercial and nonpassenger vehicles). What data or transportation models were used to make these estimates?**

None associated with the proposed project.

- f. **Will the proposal interfere with, affect, or be affected by the movement of agricultural and forest products on roads or streets in the area? If so, generally describe.**

No.

- g. **Proposed measures to reduce or control transportation impacts, if any:**

None proposed.

15. Public services

[Find help answering public service questions¹⁷](#)

- a. **Would the project result in an increased need for public services (for example: fire protection, police protection, public transit, health care, schools, other)? If so, generally describe.**

No, the relocation of the power line will not result in an increased need for public services.

- b. **Proposed measures to reduce or control direct impacts on public services, if any.**

None needed.

16. Utilities

[Find help answering utilities questions¹⁸](#)

¹⁷ <https://ecology.wa.gov/regulations-permits/sepa/environmental-review/sepa-guidance/sepa-checklist-guidance/sepa-checklist-section-b-environmental-elements/environmental-elements-15-public-services>

¹⁸ <https://ecology.wa.gov/regulations-permits/sepa/environmental-review/sepa-guidance/sepa-checklist-guidance/sepa-checklist-section-b-environmental-elements/environmental-elements-16-utilities>

- a. Circle utilities currently available at the site: electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other:
- b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.

The proposed project will reroute electric power lines from current overhead power in the Duckabush Estuary to underground lines along Duckabush Road. The work will be conducted by Mason County PUD No. 1 and their subcontractors.

C. Signature

[Find help about who should sign](#)¹⁹

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.



Type name of signee: Kristin Masteller

Position and agency/organization: General Manager, Mason County PUD No. 1

Date submitted: 12-18-2023

¹⁹ <https://ecology.wa.gov/Regulations-Permits/SEPA/Environmental-review/SEPA-guidance/SEPA-checklist-guidance/SEPA-Checklist-Section-C-Signature>



**PUBLIC UTILITY DISTRICT NO. 1
OF MASON COUNTY**

N. 21971 Hwy. 101
Shelton, Washington 98584

BOARD OF COMMISSIONERS

MIKE SHEETZ, Commissioner
JACK JANDA, Commissioner
RON GOLD, Commissioner

STATE ENVIRONMENTAL POLICY ACT

Determination of NonSignificance

December 18, 2023

Lead agency: Mason County PUD No. 1

Agency Contact: Kristin Masteller, General Manager
Mason County PUD 1
21971 N. Hwy. 101, Shelton, WA 98584
(360) 877-5249 ext. 202
kristinm@mason-pud1.org

Agency File Number: MA17-013

Description of proposal – The proposed project would install new power lines underground along the north side of Duckabush Road within right-of-way. The project will bore or directional drill where the underground electric distribution line crosses under two streams that are tributary to the Duckabush River.

Location of proposal – Jefferson County, Duckabush Road between Highway 101 and River Road within right-of-way.

Name, phone, e-mail of applicant/proponent – same as Agency Contact, above.

Mason County PUD No. 1 has determined that this proposal will not have a probable significant adverse impact on the environment. An environmental impact statement (EIS) is not required under RCW 43.21C.030. We have reviewed the attached Environmental Checklist and supporting material. This information is available at: www.mason-pud1.org or by contacting the District office for a copy.

This determination is based on the following findings and conclusions:

The proposed project will not negatively impact the environment since the project will be constructed during the dry season with Best Management Practices for erosion control in place and the PUD and its subcontractors will ensure spill kits are required during any construction.

Appeal process: There is no Agency Appeal for this DNS.

This DNS is issued under WAC 197-11-340(2) and the comment period will end on January 2, 2024. Comments on this DNS must be submitted by January 2, 2024 and must be sent to:

Kristin Masteller, General Manager
Mason County PUD No. 1
21971 N. Hwy 101, Shelton, WA 98584,



PUBLIC UTILITY DISTRICT NO. 1
OF MASON COUNTY
N. 21971 Hwy. 101
Shelton, Washington 98584

BOARD OF COMMISSIONERS
MIKE SHEETZ, Commissioner
JACK JANDA, Commissioner
RON GOLD, Commissioner

(360) 877-5249, x. 202
kristinm@mason-pud1.org

Kristin Masella

Date: 12/19/2023

Mason County PUD No. 1

Duckabush Road - Power Distribution Reroute Project

Approx. End of Project

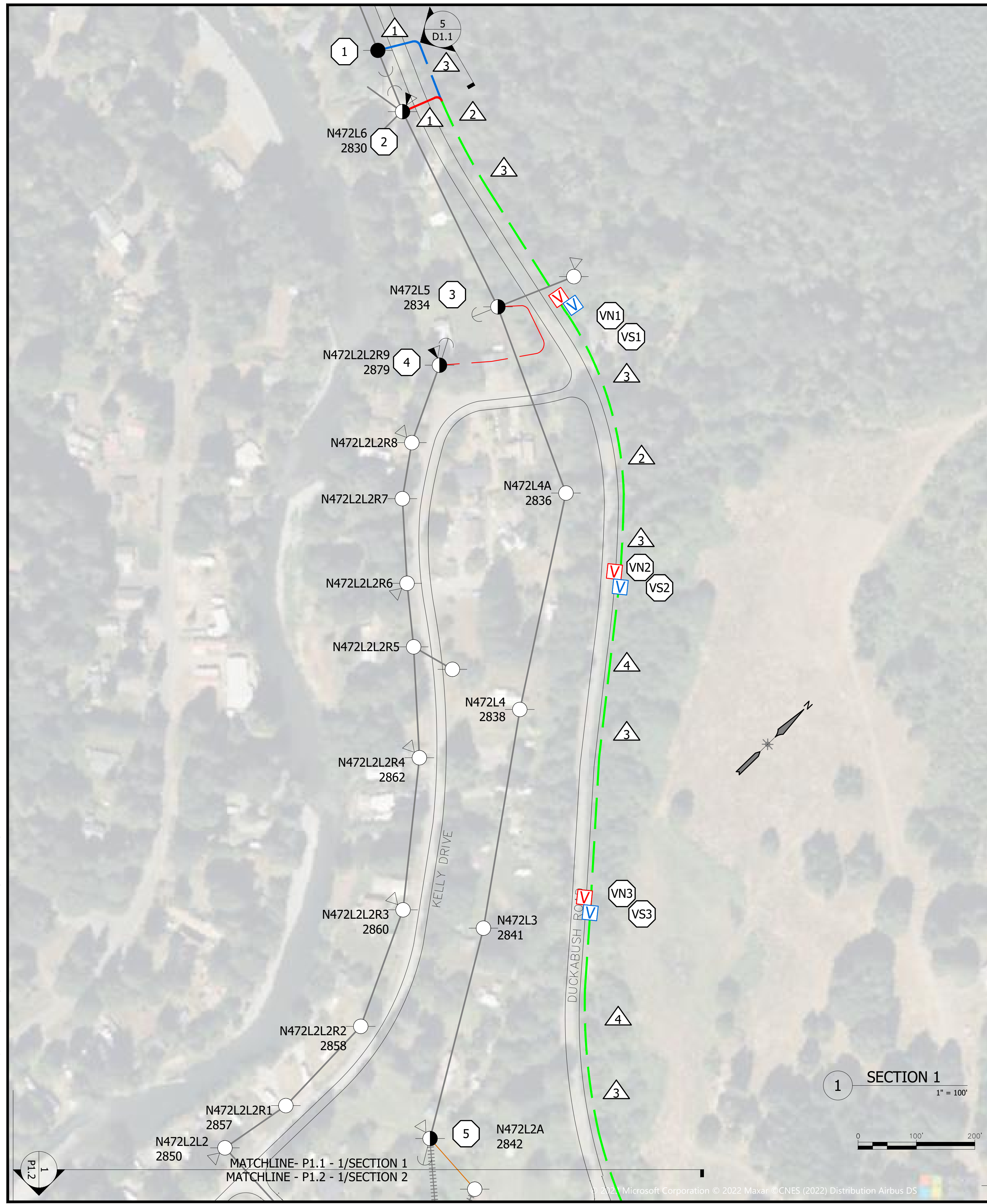
Creek crossing

Creek crossing

Approx. Start of Project



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POLE KEYED (OH & UG) NOTES: #

1. INSTALL NEW POLE. INSTALL TAN FRAMING TOP CIRCUIT PHASE CONDUCTORS (NORTH FEEDER). CUT INTO INSTALL DE AND STOP BOTTOM CIRCUIT PHASE CONDUCTORS (SOUTH CIRCUIT). NEUTRAL CONDUCTOR TO CARRY THROUGH. INSTALL GUYS AND ANCHORS. POLE BECOMES SOUTH FEEDER TAKE-OFF POLE. INSTALL 3-PHASE RISER. STUB(1) 7-WAY FOR HCC.
2. DEADEND BOTTOM CIRCUIT (DISCONNECTED FROM SOUTH FEEDER) CONTINUED DOWNSTREAM AS NORTH FEEDER TO PICKUP SERVICES. BOTTOM CIRCUIT BACK SPAN RETIRED. JUMPER/PARALLEL TOP (NORTH FEEDER) AND BOTTOM CIRCUITS. TOP AND BOTTOM CIRCUITS BECOME NORTH FEEDER ONLY. INSTALL OH XFMR. INSTALL ANCHORS AND GUYS. POLE BECOMES NORTH FEEDER TAKE-OFF POLE. INSTALL 3-PHASE RISER.
3. RETIRE AND REPLACE POLE. INSTALL DBL CKT TAN FRAMING. INSTALL 1Ø PRI DE. INSTALL ANCHOR AND GUY. INSTALL 1Ø PRI RISER.
4. RETIRE AND REPLACE POLE. INSTALL OH XFMR. INSTALL 1Ø PRI DE FRAMING. INSTALL GUY AND ANCHOR. INSTALL 1Ø PRI RISER - REVERSE FEED.
5. RETIRE AND REPLACE POLE. STOP DBL CKT OH. INSTALL DBL CKT DE FRAMING. INSTALL OH XFMR. INSTALL GUYS AND ANCHORS. INSTALL SEC DE FOR NEW SPAN TO 6.

UG KEYED NOTES: ###

- VS1. INSTALL VAULT. RUN (3) 3" CONDUIT FOR SOUTH FEEDER. RUN AND STUB (1) 7-WAY FOR HCC. FROM POLE 1: BORE UNDER ROAD AND CREEK, THEN OPEN TRENCH.
- VN1. INSTALL VAULT. RUN (6) 3" CONDUIT, (3) FOR NORTH FEEDER, (3) STUBBED FOR FUTURE. FROM POLE 2: BORE UNDER ROAD AND CREEK, THEN OPEN TRENCH.
- VS2. INSTALL VAULT. RUN (3) 3" CONDUIT FOR SOUTH FEEDER. BORE UNDER CREEK, THEN OPEN TRENCH. RUN AND STUB (1) 7-WAY FOR HCC.
- VN2. INSTALL VAULT. RUN (6) 3" CONDUIT, (3) FOR NORTH FEEDER, (3) STUBBED FOR FUTURE. BORE UNDER CREEK, THEN OPEN TRENCH.
- VS3. INSTALL VAULT. RUN (3) 3" CONDUIT FOR SOUTH FEEDER. RUN AND STUB (1) 7-WAY FOR HCC.
- VN3. INSTALL VAULT. RUN (6) 3" CONDUIT, (3) FOR NORTH FEEDER, (3) STUBBED FOR FUTURE.

BORING & TRENCHING NOTES: #

1. BORE ACROSS DUCKABUSH RD ~ 50'.
2. BORE UNDER CREEK. SEE B1.1 FOR CRITICAL ELEVATIONS.
3. TYPICAL TRENCH. SEE D1.1 DETAIL 3.
4. BORE SECTIONS AS NEEDED.

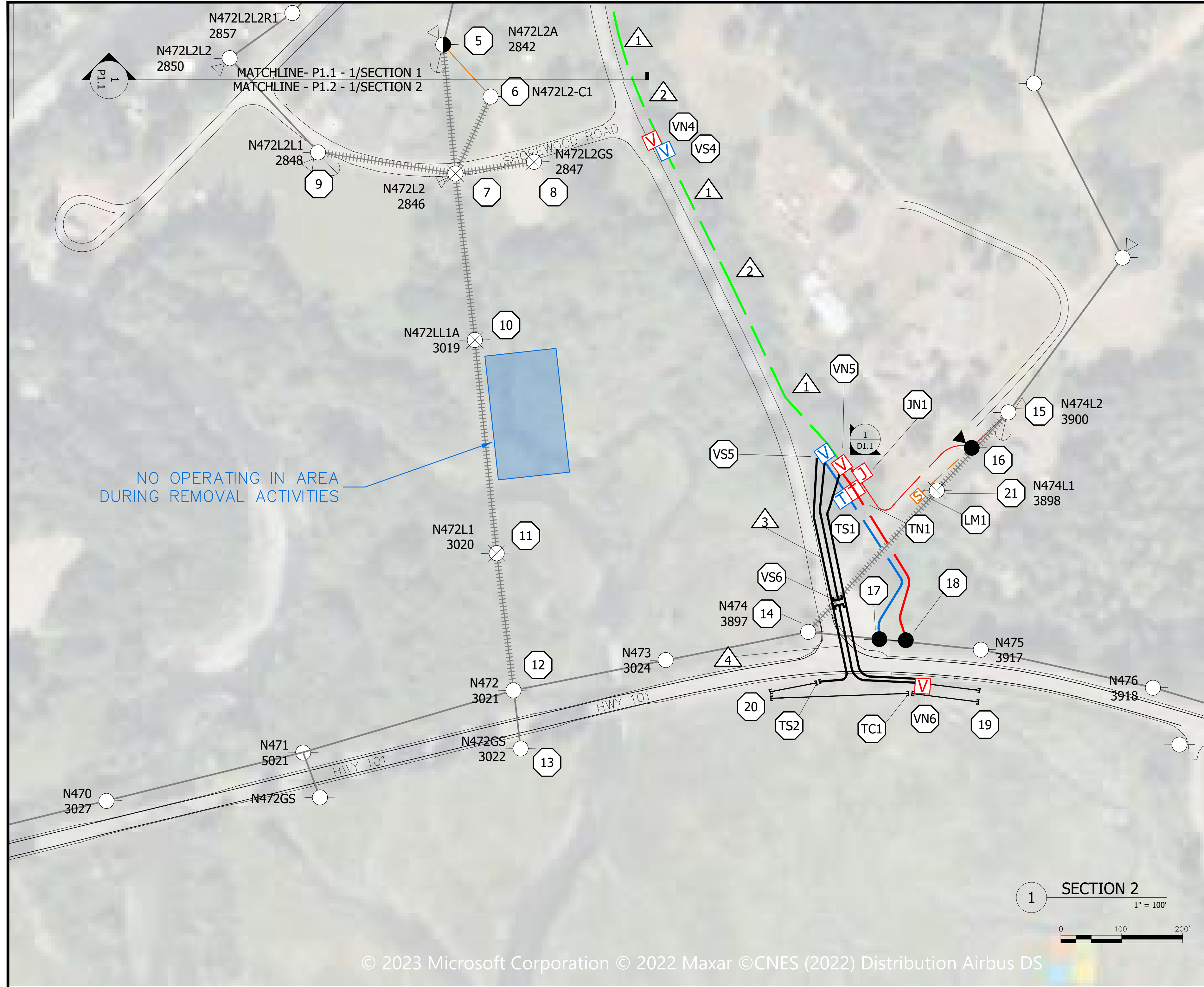
PRELIMINARY

REV	DATE	DESCRIPTION	DESIGNER
Y	12/14/2023	WSDOT REVIEW REV	JW



DUCKABUSH LINE RELOCATION
 PHASE 1
 SECTION 1
 CURRENT REVISION: Y WORK ORDER #: 21202

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PRELIMINARY

POLE KEYED (OH & UG) NOTES: ##

6. RETIRE OH SEC FROM 7. INSTALL OH SEC TO POLE 5.
7. RETIRE ALL
8. RETIRE ALL
9. RETIRE OH PRI AND FRAMING FROM POLE 7. REFRAME POLE WITH 1Ø PRI DE. INSTALL GUYS AND ANCHORS.
10. RETIRE ALL
11. RETIRE ALL
12. RETIRE DBL CKT DE FRAMING. OPEN POINT BETWEEN NORTH AND SOUTH FEEDERS TO MOVE TO POLES 17 AND 18. INSTALL PIN INSULATORS AND JUMPERS ON EXISTING DDE. BECOMES SOUTH FEEDER.
13. EXISTING TO REMAIN.
14. RETIRE 1Ø PRI DE FRAMING.
15. RETIRE BACK SPAN TO POLE 14. RETIRE 1Ø PRI TAN FRAMING. INTERCEPT EXISTING OH. INSTALL (2) PRI DE FRAMING, (1) FOR DARK RD OH, (1) FOR SLACK SPAN TO POLE 16. INSTALL ANCHOR AND GUY.
16. INSTALL NEW POLE. INSTALL 1Ø DE FRAMING. INSTALL SLACK SPAN TO POLE 15. INSTALL 1Ø PRI RISER - REVERSE FEED. INSTALL OH XFMR AND SEC RISER FOR COMMUNICATION CABINET.
17. INSTALL NEW POLE TO INTERCEPT OH. INSTALL TAN FRAMING WITH MID SPAN DDE BETWEEN POLES 17 AND 18. INSTALL 3Ø PRI RISER. TO SERVE AS TEMPORARY SOUTH FEEDER TAKE-OFF POLE. RUN AND STUB (2) 2" HDPE (1) FOR HCC AND (1) FOR LUMEN FOR TEMP NORTH AND SOUTH FEEDS FROM VS5 STUB.
18. INSTALL NEW POLE TO INTERCEPT OH. INSTALL TAN FRAMING WITH MID SPAN DDE BETWEEN POLES 17 AND 18. INSTALL 3Ø PRI RISER. TO SERVE AS TEMPORARY NORTH FEEDER TAKE-OFF POLE.
19. FUTURE POLE LOCATION. RUN AND STUB (3) 3" CONDUIT FOR NORTH FEEDER FROM VN6. (1) 3" CONDUIT FOR SECONDARY TO TC1. RUN AND STUB (4) 2" HDPE (2) FOR HCC AND (2) FOR LUMEN FROM VS5 STUB.
20. FUTURE POLE LOCATION. RUN AND STUB (3) 3" CONDUIT FOR TEMPORARY SOUTH FEEDER FROM TS2 AND (1) 1" CONDUIT FOR STREETLIGHT FROM TC1. RUN AND STUB (2) 2" HDPE, (1) FOR HCC AND (1) FOR LUMEN FROM VS5 STUB.
21. RETIRE ALL.

UG KEYED NOTES: ###

- VS4. INSTALL VAULT. RUN (3) 3" CONDUIT FOR SOUTH FEEDER. RUN AND STUB (2) 2" HDPE FOR LUMEN AND (1) 7-WAY FOR HCC.
- VN4. INSTALL VAULT. RUN (6) 3" CONDUIT, (3) FOR NORTH FEEDER, (3) STUBBED FOR FUTURE.
- VS5. INSTALL VAULT. RUN (3) 3" CONDUIT FOR SOUTH FEEDER. RUN AND STUB (2) 2" HDPE FOR LUMEN AND (1) 7-WAY FOR HCC.
- VN5. INSTALL VAULT. RUN (6) 3" CONDUIT, (3) FOR NORTH FEEDER, (3) STUBBED FOR FUTURE.
- JN1. INSTALL 1Ø J-BOX. NEW SOURCE FOR DARK RD. RUN (1) 2" CONDUIT, (1) FOR NORTH FEEDER 1Ø.
- TS1. INSTALL TEMPORARY FEED-THRU CABINET. RUN (3) 3" CONDUIT FOR TEMP SOUTH FEEDER.
- TN1. INSTALL TEMPORARY FEED-THRU CABINET. RUN (3) 3" CONDUIT FOR TEMP NORTH FEEDER.
- VS6. FUTURE LOCATION OF PADMOUNT SWITCH. RUN AND STUB (3) 3" CONDUIT FOR SOUTH FEEDER. STUB (6) 3" CONDUIT, (3) FOR NORTH FEEDER (AHEAD TO VN6), (3) FOR FUTURE (AHEAD TO FUTURE STUB NEAR VN6); RUN AND STUB (4) 2" HDPE (2) FOR HCC, (2) FOR LUMEN.
- TS2. RUN AND STUB (3) 3" CONDUIT FOR TEMP SOUTH FEEDER. BORE 80' UNDER HIGHWAY. OPEN TRENCH THE REST.
- VN6. INSTALL VAULT. RUN (6) 3" CONDUIT FOR NORTH FEEDER: (3) FROM VN5, (3) FROM VS6; RUN STUB AND CAP (6) 3" CONDUIT (3) FOR FUTURE FROM STUB NEAR VN5, (3) FROM STUB AT VS6. BORE UNDER HIGHWAY. OPEN TRENCH THE REST.
- TC1. FUTURE SECONDARY PEDESTAL FOR TRAFFIC CONTROL. RUN AND STUB (1) 3" CONDUIT FROM FUTURE POLE LOCATION AT 19. STUB (1) 3" CONDUIT FROM FUTURE POLE AT LOCATION 20.
- LM1. RUN (1) 3" CONDUIT AND INSTALL SEC PED FOR LUMEN COMMUNICATION CABINET FROM POLE 16.

BORING & TRENCHING NOTES: #

1. TYPICAL TRENCH. SEE D1.1 DETAIL 3.
2. BORE SECTIONS AS NEEDED.
3. TRENCH WITH MINIMUM 10' TRENCH DEPTH. TO ALLOW FOR FUTURE STORM WATER CROSSING. SEE D1.1 DETAIL 2 FOR DETAILS AND B1.2 FOR CRITICAL ELEVATIONS.
4. BORE ACROSS HIGHWAY ~ 100'. SEE B1.2 FOR CRITICAL ELEVATIONS.

REV	DATE	DESCRIPTION	DESIGNER
Y	12/14/2023	WSDOT REVIEW REV	JW
		REVISION DESCRIPTION	



DUCKABUSH LINE RELOCATION
 PHASE 1
 SECTION 2
 CURRENT REVISION: Y WORK ORDER #: 21202

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duckabush road Search



Whether you are in a high risk zone or not, you may need [flood insurance](#) because most homeowners insurance doesn't cover flood damage. If you live in an area with low or moderate flood risk, you are 5 times more likely to experience flood than a fire in your home over the next 30 years. For many, a National Flood Insurance Program's flood insurance policy could cost less than \$400 per year. Call your insurance agent today and protect what you've built.

Learn more about [steps you can take](#) to reduce flood risk damage.



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<p>PIN</p> <ul style="list-style-type: none"> Approximate location based on user input and does not represent an authoritative property location <p>MAP PANELS</p> <ul style="list-style-type: none"> Selected FloodMap Boundary Digital Data Available No Digital Data Available Unmapped <p>OTHER AREAS</p> <ul style="list-style-type: none"> Area of Minimal Flood Hazard <i>Zone X</i> Effective LOMRs Area of Undetermined Flood Hazard <i>Zone D</i> Otherwise Protected Area Coastal Barrier Resource System Area 	<p>SPECIAL FLOOD HAZARD AREAS</p> <ul style="list-style-type: none"> Without Base Flood Elevation (BFE) <i>Zone X, X, A99</i> With BFE or Depth Regulatory Floodway <i>Zone AE, AD, AH, VE, AR</i> <p>OTHER AREAS OF FLOOD HAZARD</p> <ul style="list-style-type: none"> 0.2% Annual Chance Flood Hazard. Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile <i>Zone X</i> Future Conditions 1% Annual Chance Flood Hazard <i>Zone X</i> Area with Reduced Flood Risk due to Levee. See Notes. <i>Zone X</i> Area with Flood Risk due to Levee <i>Zone D</i> 	<p>OTHER FEATURES</p> <ul style="list-style-type: none"> Cross Sections with 1% Annual Chance Water Surface Elevation Coastal Transact Elevation Base Flood Elevation Line (BFE) Limit of Study Jurisdiction Boundary Coastal Transact Baseline Profile Baseline Hydrographic Feature <p>GENERAL STRUCTURES</p> <ul style="list-style-type: none"> Channel, Culvert, or Storm Sewer Levee, Dike, or Floodwall
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INADVERTENT DISCOVERY PLAN AND PROCEDURES OF CULTURAL RESOURCES AND HUMAN SKELETAL REMAINS

DUCKABUSH ROAD POWER LINE INSTALLATION, JEFFERSON COUNTY WASHINGTON

1. INTRODUCTION

The Mason County PUD No. 1 plans to install underground power lines along the utility right-of-way on Duckabush Road in Jefferson County. The following Inadvertent Discovery Plan (IDP) outlines procedures to follow, in accordance with state and federal laws, if archaeological materials or human remains are discovered.

2. RECOGNIZING CULTURAL RESOURCES

A cultural resource discovery could be prehistoric or historic. Examples include, but are not limited to:

- a. An accumulation of shell, burned rocks, or other food related materials
- b. Bones or small pieces of bone,
- c. An area of charcoal or very dark stained soil with artifacts,
- d. Stone tools or waste flakes (i.e. an arrowhead, or stone chips),
- e. Clusters of tin cans or bottles, logging or agricultural equipment that appears to be older than 50 years,
- f. Buried railroad tracks, decking, or other industrial materials.

When in doubt, assume the material is a cultural resource.

3. ON-SITE RESPONSIBILITIES

STEP 1: STOP WORK. If any Mason County PUD No. 1 employee, contractor or subcontractor believes that he or she has uncovered a cultural resource at any point in the project, all work adjacent to the discovery must stop. The discovery location should be secured at all times.

STEP 2: NOTIFY ARCHAEOLOGICAL MONITOR OR LICENSED ARCHAEOLOGIST. If there is an archaeological monitor for the project, notify that person. If there is a monitoring plan in place, the monitor will follow its provisions.

STEP 3: NOTIFY PROJECT MANAGEMENT AND CULTURAL RESOURCES PROGRAM. Contact the Project Manager and the Cultural Resources (CR) Program Manager:

Project Manager:
Kristin Masteller
(360) 877-5249, x. 220
kristinm@mason-pud1.org

CR Program Manager:
N/A

If you can't reach the CR Program manager, contact your project's assigned Cultural Resources Specialist or an alternate:

Assigned CR Specialist:
N/A

Alternate CR Specialist:
N/A

The Project Manager or the Cultural Resources Program will make all other calls and notifications.

IF HUMAN REMAINS ARE ENCOUNTERED, treat them with dignity and respect at all times. Cover the remains with a tarp or other materials (not soil or rocks) for temporary protection in place and to shield them from being photographed.

Call your non-emergency number to report the discovery. Use 911 only if a non-emergency number is not available.

Do not report the discovery to the media or you will put the site at risk for looting.

Do not take pictures unless directed to do so by DAHP. See Section 5.

4. FURTHER CONTACTS AND CONSULTATION

A. Project Manager's Responsibilities:

- Protect Find: The Project Manager is responsible for taking appropriate steps to protect the discovery site. All work will stop in an area adequate to provide for the total security, protection, and integrity of the resource. Vehicles, equipment, and unauthorized personnel will not be permitted to traverse the discovery site. Work in the immediate area will not resume until treatment of the discovery has been completed following provisions for treating archaeological/cultural material as set forth in this document.
- Direct Construction Elsewhere On-site: The Project Manager may direct construction away from cultural resources to work in other areas prior to contacting the concerned parties.
- Contact CR Manager: If the CR Program Manager has not yet been contacted, the Project Manager will do so.

B. CR Program Manager's Responsibilities:

- Identify Find: The CR Program Manager (or a CR Specialist if so delegated), will ensure that a qualified professional archaeologist examines the find to determine if it is archaeological.
 - If it is determined not archaeological, work may proceed with no further delay.
 - If it is determined to be archaeological, the CR Manager or CR Specialist will continue with notification.
 - If the find may be human remains or funerary objects, the CR Manager or CR Specialist will ensure that a qualified physical anthropologist examines the find. **If it is determined to be human remains, the procedure described in Section 5 will be followed.**
- Notify DAHP: The CR Program Manager (or a CR Specialist if so delegated) will contact the involved federal agencies, including the Department of Health, Drinking Water State Revolving Fund (DOH, DWSRF) and the Department of Archaeology and Historic Preservation (DAHP).
- Notify Tribes: If the discovery may relate to Native American interests, the Manager or Specialist will also contact the project's Tribal Liaison, or, if the project is not assigned a Liaison, the Executive Tribal Liaison.

Federal/State Agencies:

The Department of Health
Scott Kugel
Cultural and Environmental Program
Specialist
509.329.2117
scott.kugel@doh.wa.gov

Department of Archaeology and Historic Preservation:

Dr. Allyson Brooks
State Historic Preservation Officer
360-586-3066

Rob Whitlam, Ph.D.
Staff Archaeologist
360-586-3050

Human Remains:
Dr. Guy Tasa
State Physical Anthropologist
360-586-3534
Guy.Tasa@dahp.wa.gov

Assigned Alternate:
Stephanie Jolivette
Local Governments Archaeologist
(360) 586-3088
Stephanie.Jolivette@dahp.wa.gov

The CR Program Manager or Specialist, will contact the interested and affected Tribes if the DOH Cultural and Environmental Program Specialist is unavailable.

Tribes consulted on this project are:

Jamestown S'kallam Tribe:
Allie Taylor, THPO Office
Phone: (360) 681-4638
ataylor@jamestowntribe.org
1033 Old Blyn Hwy
Sequim, WA 98382-9342

Port Gamble S'kallam tribe:
Misty Ives, Tribal Historic
Preservation Officer
pgst-thpo@pgst.nsn.us
Phone: (360) 297-6359
Cell: (360) 516-0329

Skokomish Indian Tribe:
Kris Miller
THPO
(360) 426-4232 x2015
kmiller@skokomish.org

Lower Elwha Kallam tribe:
Bill White, Archaeologist,
Cultural Resources Phone: (360)
460-1617
bill.white@elwha.nsn.us

Suquamish Tribe:
Dennis Lewarch
THPO
(360) 394-8529
dlewarch@suquamish.nsn.us

C. Further Activities

- Archaeological discoveries will be documented as described in Section 6.
- Construction in the discovery area may resume as described in Section 7.

5. SPECIAL PROCEDURES FOR THE DISCOVERY OF HUMAN SKELETAL MATERIAL

Any human skeletal remains, regardless of antiquity or ethnic origin, will at all times be treated with dignity and respect.

If the project occurs on federal lands (e.g., national forest or park, military reservation) the provisions of the Native American Graves Protection and Repatriation Act of 1990 apply, and the responsible federal agency will follow its provisions. Note that state highways that cross federal lands are on an easement and are not owned by the state.

If the project occurs on non-federal lands, Mason County PUD No. 1 will comply with applicable state and federal laws, and the following procedure:

A. In all cases you must notify a law enforcement agency or Medical Examiner/Coroner's Office:

In addition to the actions described in Sections 3 and 4, the Project Manager will immediately notify the local law enforcement agency or medical examiner/coroner's office.

The medical examiner/coroner (with assistance of law enforcement personnel) will determine if the remains are human, whether the discovery site constitutes a crime scene, and will notify DAHP.

- Sherriff or Police Department Non-emergency: (360) 426-4441
- Coroner or Medical Examiner: (360) 427-9670 ext. 752

B. Participate in Consultation:

Per RCW 27.44.055, RCW 68.50, and RCW 68.60, DAHP will have jurisdiction over non-forensic human remains. Mason County PUD No. 1 personnel will participate in consultation.

C. Further Activities:

- Documentation of human skeletal remains and funerary objects will be agreed upon through the consultation process described in RCW 27.44.055, RCW 68.50, and RCW 68.60.
- When consultation and documentation activities are complete, construction in the discovery area may resume as described in Section 7.

6. DOCUMENTATION OF ARCHAEOLOGICAL MATERIALS

Archaeological deposits discovered during construction will be assumed eligible for inclusion in the National Register of Historic Places under Criterion D until a formal Determination of Eligibility is made.

Cultural Resources Program staff will ensure the proper documentation and assessment of any discovered cultural resources in cooperation with the federal agencies, including the DOH, DWSRF, DAHP, affected tribes, and a contracted consultant (if any).

All prehistoric and historic cultural material discovered during project construction will be recorded by a professional archaeologist on State of Washington cultural resource site or isolate form using standard techniques. Site overviews, features, and artifacts will be

photographed; stratigraphic profiles and soil/sediment descriptions will be prepared for subsurface exposures. Discovery locations will be documented on scaled site plans and site location maps.

Cultural features, horizons and artifacts detected in buried sediments may require further evaluation using hand-dug test units. Units may be dug in controlled fashion to expose features, collect samples from undisturbed contexts, or interpret complex stratigraphy. A test excavation unit or small trench might also be used to determine if an intact occupation surface is present. Test units will be used only when necessary to gather information on the nature, extent, and integrity of subsurface cultural deposits to evaluate the site's significance. Excavations will be conducted using state-of-the-art techniques for controlling provenience.

Spatial information, depth of excavation levels, natural and cultural stratigraphy, presence or absence of cultural material, and depth to sterile soil, regolith, or bedrock will be recorded for each probe on a standard form. Test excavation units will be recorded on unit-level forms, which include plan maps for each excavated level, and material type, number, and vertical provenience (depth below surface and stratum association where applicable) for all artifacts recovered from the level. A stratigraphic profile will be drawn for at least one wall of each test excavation unit.

Sediments excavated for purposes of cultural resources investigation will be screened through 1/8-inch mesh, unless soil conditions warrant 1/4-inch mesh.

All prehistoric and historic artifacts collected from the surface and from probes and excavation units will be analyzed, catalogued, and temporarily curated. Ultimate disposition of cultural materials will be determined in consultation with the federal agencies, DAHP, and the affected tribes.

Within 90 days of concluding fieldwork, a technical report describing any and all monitoring and resultant archaeological excavations will be provided to the Project Manager, who will forward the report to the DOH DWSRF program for review and delivery to the federal agencies (if any), SHPO, and the affected tribe(s).

If assessment activity exposes human remains (burials, isolated teeth, or bones), the process described in Section 5 above will be followed.

7. PROCEEDING WITH CONSTRUCTION

Project construction outside 100 feet of the discovery location may continue while documentation and assessment of the cultural resources proceed. A CR Specialist must determine the boundaries of the discovery location with consultation of the DOH. In consultation with DOH, DAHP and affected tribes, Project Manager and Cultural Resources Program staff will determine the appropriate level of documentation and treatment of the resource. If federal agencies are involved, the agencies will make the final determinations about treatment and documentation.

Construction may continue at the discovery location only after the process outlined in this plan is followed and DOH, DWSRF (and the federal agencies, if any) determine that compliance with state and federal laws is complete.

8. CR PROGRAM MANAGER RESPONSIBILITY

An IDP does not replace consultation or tribal consent. The IDP must be immediately available onsite, be implemented to address any discovery, and be available by request by any party. The CR Program Manager and staff will review the IDP during a project kickoff or pre-construction meeting.

Implement the IDP / UDP if ...

You see chipped stone artifacts.



- Glass-like material
- Angular
- “Unusual” material for area
- “Unusual” shape
- Regularity of flaking
- Variability of size



We recommend printing in color for accuracy

Implement the IDP / UDP if ...

You see ground or pecked stone artifacts.



- Striations or scratching
- Unusual or unnatural shapes
- Unusual stone
- Etching
- Perforations
- Pecking
- Regularity in modifications
- Variability of size, function, and complexity

Implement the IDP / UDP if ...

You see bone or shell artifacts.



- Often smooth
- Unusual shape
- Carved
- Often pointed if used as a tool
- Often wedge shaped like a “shoehorn”



Implement the IDP / UDP if ...

You see bone or shell artifacts.



- Often smooth
- Unusual shape
- Perforated
- Variability of size



Implement the IDP / UDP if ...

You see fiber or wood artifacts.



- Wet environments needed for preservation
- Variability of size, function, and complexity
- Rare



Implement the IDP / UDP if ...

You see historic period artifacts.



Implement the IDP / UDP if ...

You see strange, different or interesting looking dirt, rocks, or



- Human activities leave traces in the ground that may or may not have artifacts associated with them
- “Unusual” accumulations of rock (especially fire-cracked rock)
- “Unusual” shaped accumulations of rock (e.g., similar to a fire ring)
- Charcoal or charcoal-stained soils
- Oxidized or burnt-looking soils
- Accumulations of shell
- Accumulations of bones or artifacts
- Look for the “unusual” or out of place (e.g., rock piles or accumulations in areas with few rock)

Implement the IDP / UDP if ...

You see strange, different or interesting looking dirt, rocks, or



- “Unusual” accumulations of rock (especially fire-cracked rock)
- “Unusual” shaped accumulations of rock (e.g., similar to a fire ring)
- Look for the “unusual” or out of place (e.g., rock piles or accumulations in areas with few rock)

Implement the IDP / UDP if ...

You see strange, different or interesting looking dirt, rocks, or



Layers of shell
midden

Historic Debris

- Often have a layered or “layer cake” appearance
- Often associated with black or blackish soil
- Often have very crushed and compacted shells



Implement the IDP / UDP if ...

You see historic foundations or buried structures.

