

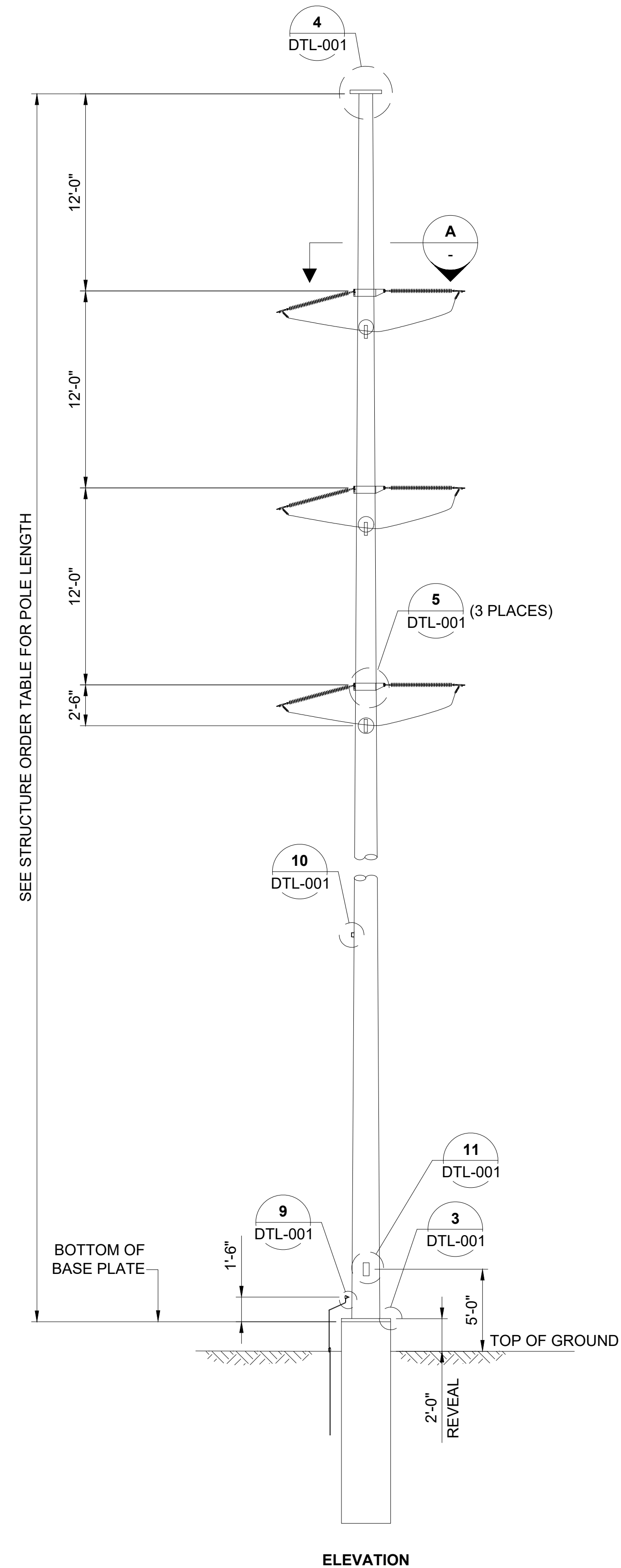
POLE TOP ORIENTATION

Load Case	Description	Overload Capacity Factors	Conductor Ahead (KIPS)			Conductor Back (KIPS)			Shield Wire Ahead (KIPS)			Shield Wire Back (KIPS)			W (PSF)	Remarks
			Vca	Tca	Lca	Vcb	Tcb	Lcb	Vsa	Tsa	Lsa	Vsb	Tsb	Lsb		
1	NESC HEAVY DISTRICT (1/2" ICE, 4 PSF WIND, 0°F)	VERTICAL: 1.5 TENSION: 1.65 WIND: 2.5	1.1	5.7	-6.3	0.6	8.3	9.2	0.5	3.2	-3.1	0.3	4.7	5.3	10	
2	EXTREME WIND 100 MPH (NO ICE, 25.6 PSF WIND, 60°F)	VERTICAL: 1.1 TENSION: 1.1 WIND: 1.1	0.5	1.9	-1.9	0.3	3.1	3.3	0.2	1.2	-1.1	0.2	1.9	2.2	28.2	
3	1" ICE (1" ICE, 0 PSF NO WIND, 30°F)	VERTICAL: 1.1 TENSION: 1.1	0.7	2.4	-2.7	0.4	3.8	4.3	0.3	1.4	-1.3	0.2	2.2	2.5	0	
4	1" ICE + 40 MPH WIND (1" ICE, 4 PSF WIND, 15°F)	VERTICAL: 1.1 TENSION: 1.1 WIND: 1.1	1	3.6	-4	0.6	5.1	5.7	0.5	2.2	-2.3	0.4	3	3.4	4.5	
5	NORMAL (0" ICE, 0 PSF NO WIND, 60°F)	VERTICAL: 1 TENSION: 1	0.4	1.2	-1.3	0.3	2.4	2.7	0.2	0.6	-0.7	0.1	1.4	1.6	0	
6	CONSTRUCTION (0" ICE, 2 PSF WIND, 30°F)	VERTICAL: 1.5 TENSION: 1.5 WIND: 1.5	0.9	3.5	-3.9	0.6	5.7	6.4	0.4	2	-2	0.3	3.3	3.7	3	

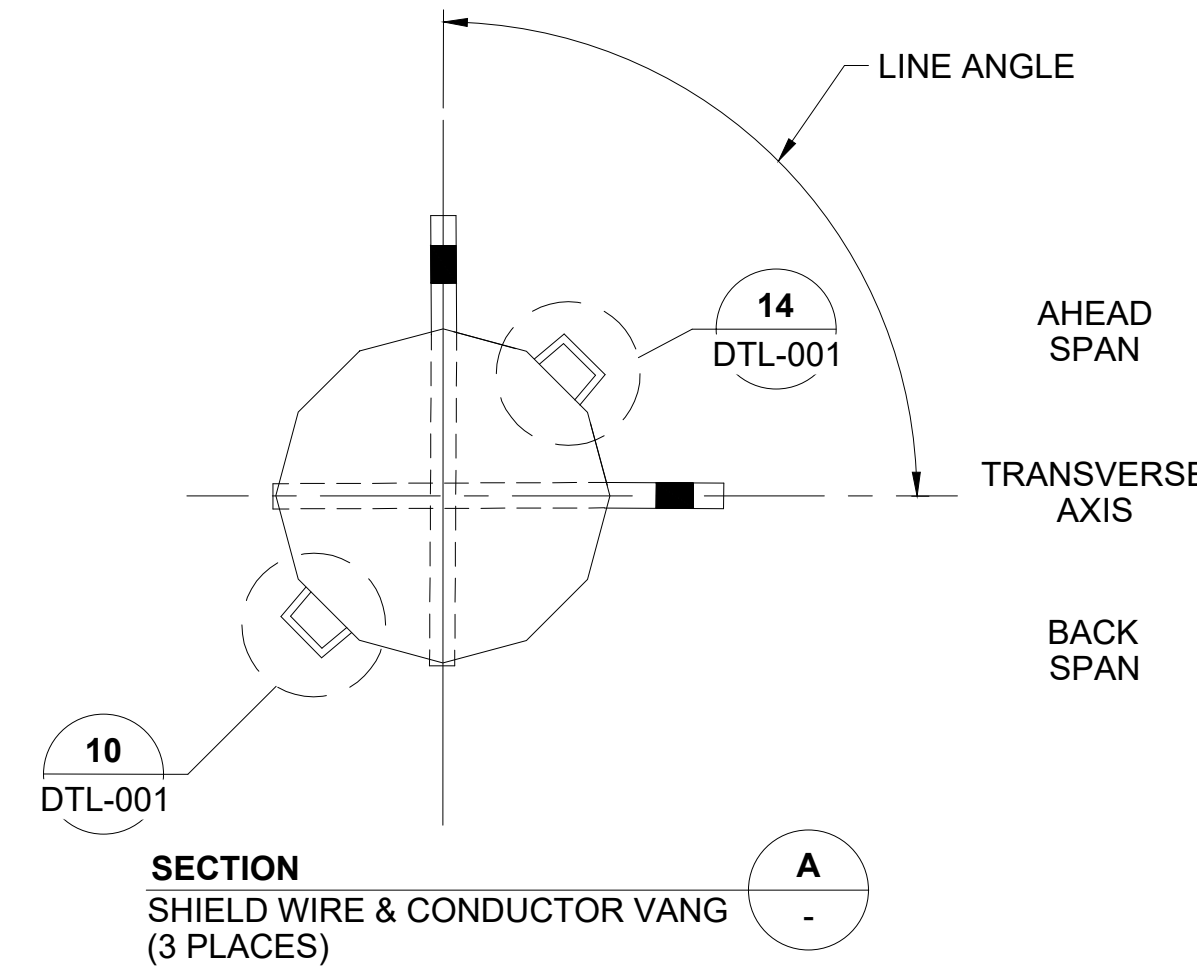
STRUCTURE DESIGN CRITERIA
 CONDUCTOR AHEAD (3): 795 ACSR "DRAKE"
 CONDUCTOR BACK (3): 795 ACSR "DRAKE"
 SHIELD WIRE AHEAD (2): 3/8" EHS
 SHIELD WIRE BACK (2): 3/8" EHS

MAX TENSION 250D
 5.0 KIPS
 7.6 KIPS
 3.0 KIPS
 4.5 KIPS

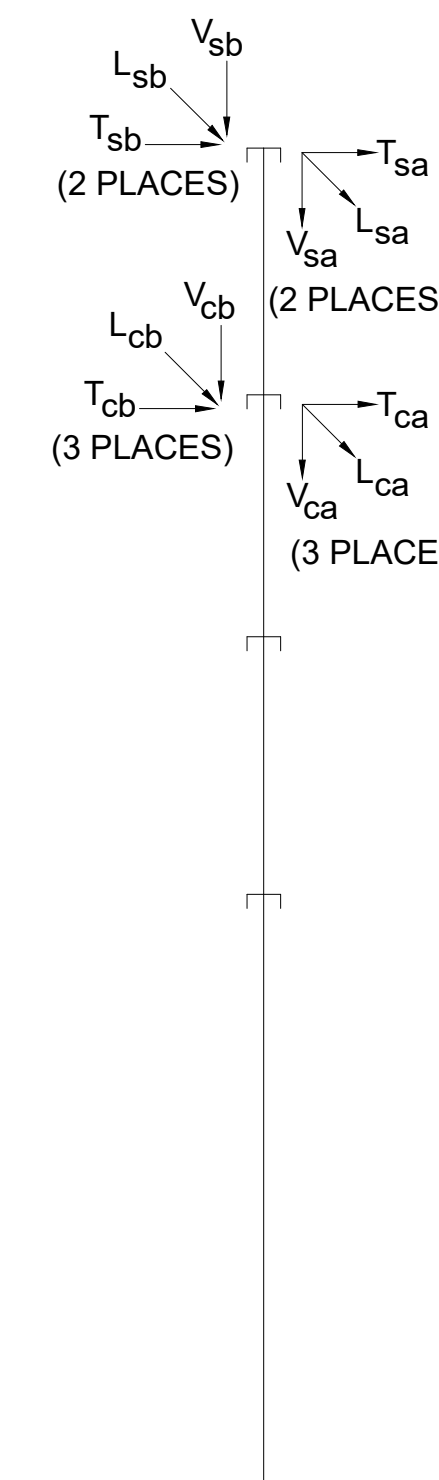
STRUCTURE ORDER TABLE			
LENGTH	STR. NO.	LINE ANGLE	QTY
70	5	90°	1



ELEVATION



SECTION SHIELD WIRE & CONDUCTOR VANG (3 PLACES)



LOAD TREE
SEE NOTE 12

NOTES

- ALL INDICATED DESIGN & FABRICATION SHALL BE IN ACCORDANCE WITH GRDA SPECIFICATIONS.
- W=WIND ON PROJECTED AREA OF POLE, INCLUDING OVERLOAD FACTORS. WIND SHALL BE APPLIED IN DIRECTION OF MAXIMUM STRUCTURE LOADING.
- INCREASE W BY APPLICABLE SHAPE FACTOR FOR POLES.
1.1 = 12 SIDED
1.4 = 8 SIDED
- STRUCTURE SHALL BE DESIGNED FOR THE FOLLOWING COMBINATIONS.
A. ALL WIRES AHEAD ONLY.
B. ALL WIRES BACK ONLY.
C. ALL WIRES ATTACHED
D. ALL COMBINATIONS OF AHEAD & BACK WIRES THAT MAY GOVERN.
- V, T, & L ARE RESPECTIVELY: VERTICAL, TRANSVERSE, & LONGITUDINAL WIRE LOADS IN KIPS.
- THE DEAD LOAD OF THE STRUCTURE SHALL BE MULTIPLIED BY THE VERTICAL OVERLOAD FACTOR.
- CONDUCTOR & SHIELD WIRE LOADS ARE PER ATTACHMENT & INCLUDE OVERLOAD FACTORS.
- POLE TOP DEFLECTION SHALL NOT EXCEED THE DISTANCE OF ONE POLE TOP DIAMETER UNDER NORMAL LOAD CASE 5 ALL WIRES ATTACHED & NORMAL LOAD CASE 5 ALL WIRES BACK ONLY.
- STRUCTURE & ATTACHMENTS SHALL BE DESIGNED FOR THE SIMULTANEOUS APPLICATION OF WIND ON THE STRUCTURE & WIRE LOADS FOR EACH LOADING CASE.
- STRUCTURE SHALL BE HOT DIP GALVANIZED STEEL OR WEATHERING.
- GROUNDING PADS SHALL BE PLACED 1'-6" ABOVE THE BASEPLATE & 1'-6" BELOW THE TOP OF THE POLE ON OPPOSITE POLE FACE OF AHEAD SPAN. SEE DRAWING DTL-001 FOR OTHER GROUNDING PAD LOCATIONS. GROUNDING PAD HOLES SHALL BE PLUGGED DURING GALVANIZING.

REFERENCE DRAWINGS

DRAWING #	DRAWING NAME
DTL-001	DETAIL SHEET

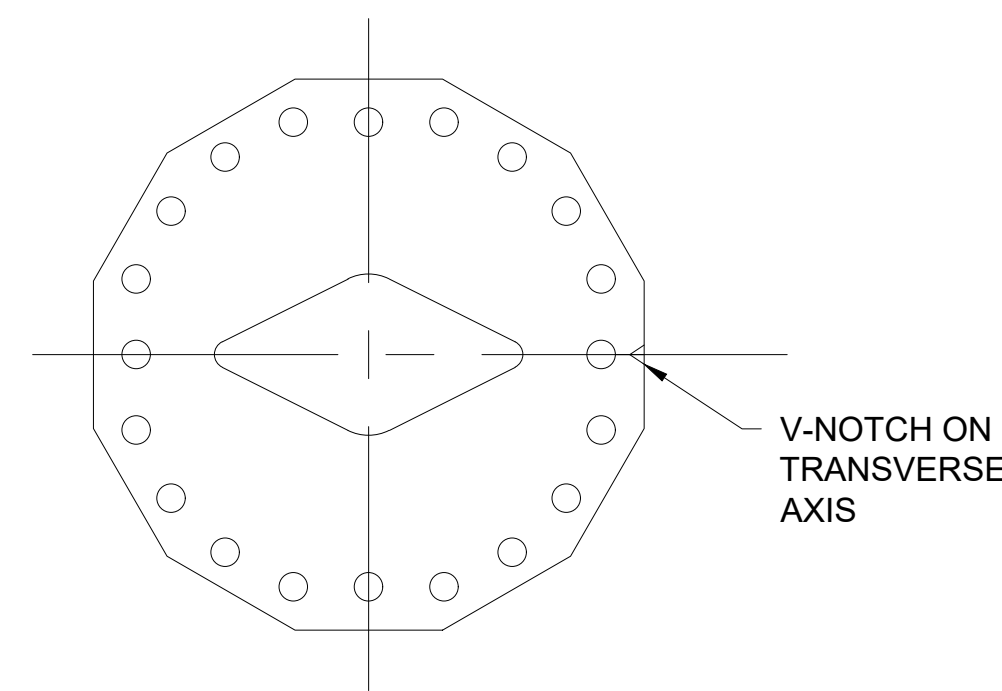
DESCRIPTION: ISSUED FOR BID						
REV. NO.	JOB NO.	DATE	DESIGN ENGR.	DFTR	DESIGN CHECK	ISSUE APPROV.
0	RF025-01361	28AUG25	CI	DK	CI	CI

GRAND RIVER DAM AUTHORITY
 TONNECE SUBSTATION S877
 DELAWARE, COUNTY 345/161/69kV

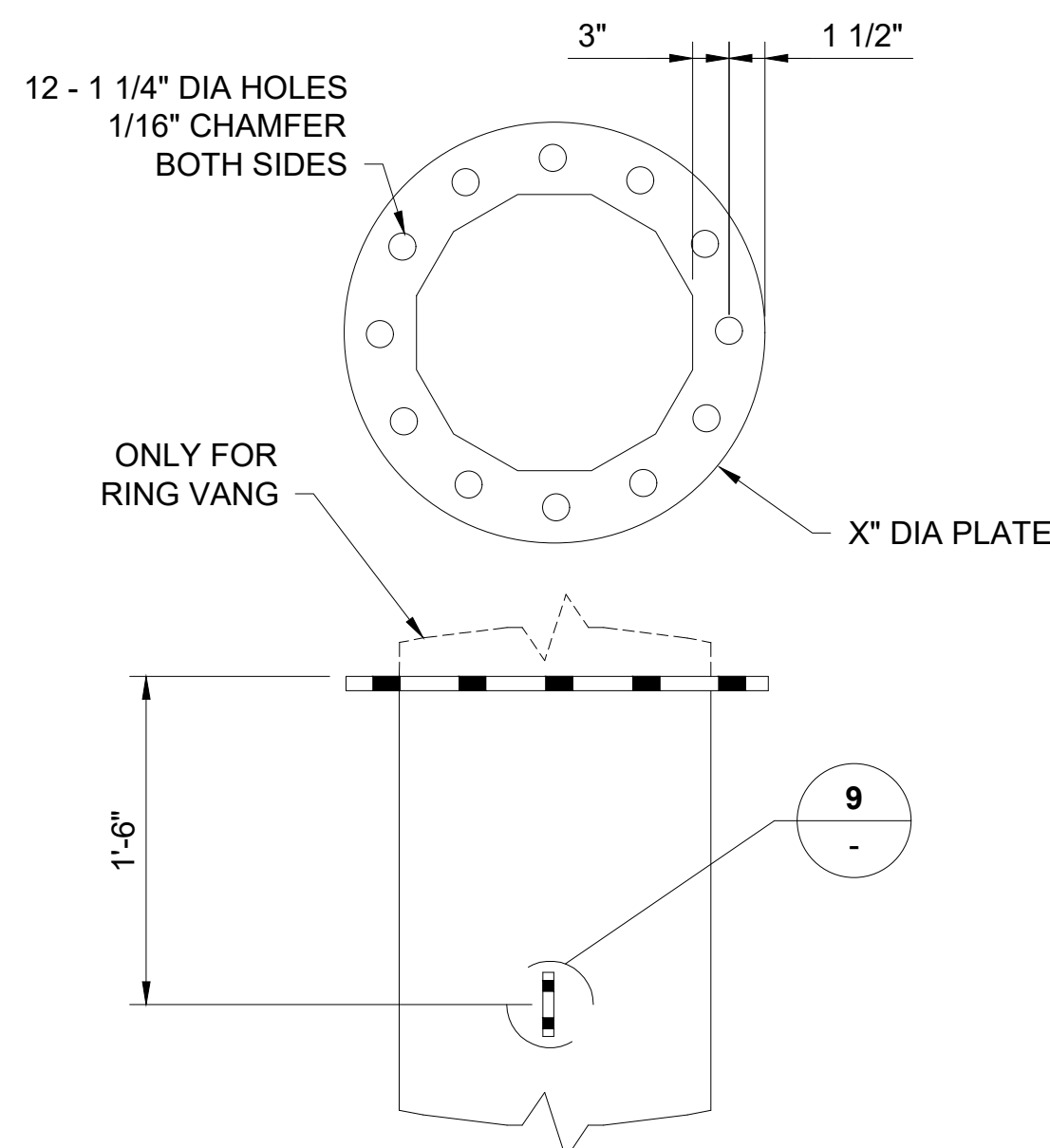
69kV SINGLE CIRCUIT
 DEADEND STEEL SINGLE POLE

ENGINEER: CI SCALE: NONE DATE: 28AUG25 REV.
 DRAWN BY: DK DRAWING NO.
 CHECKED BY: CI 69-1-DDE-ST_TA-S 0
 APPROVED BY: CI

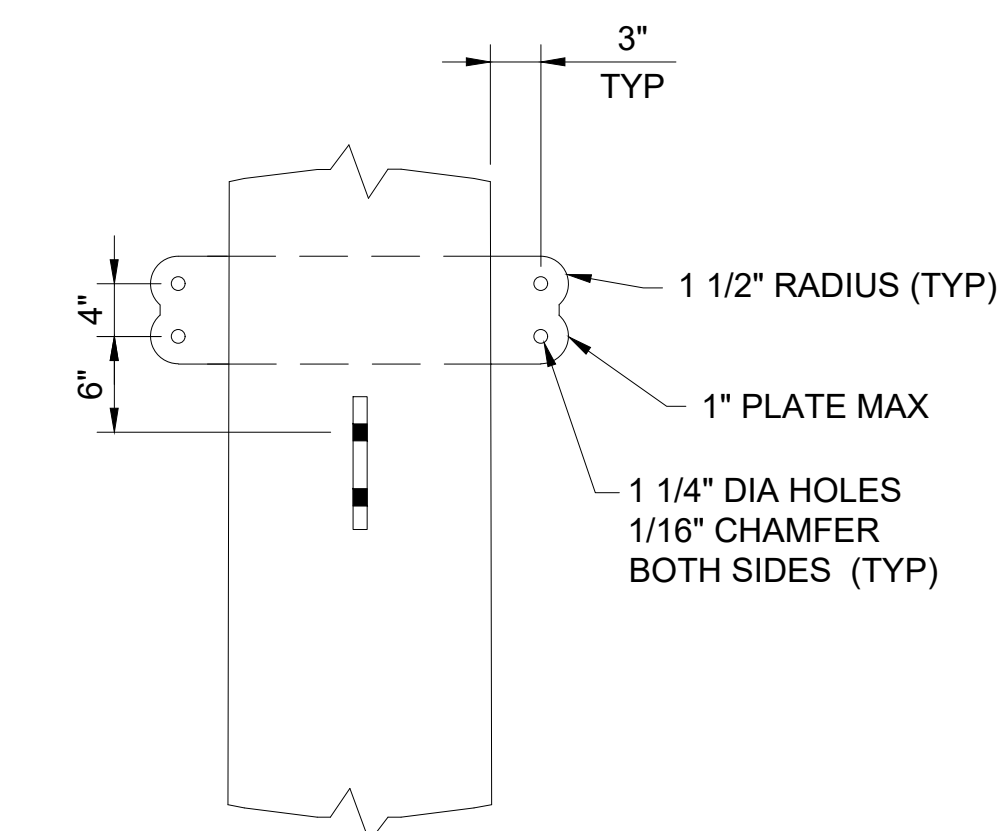
GRDA
 P.O. BOX 669
 CHOUTEAU, OK 74337



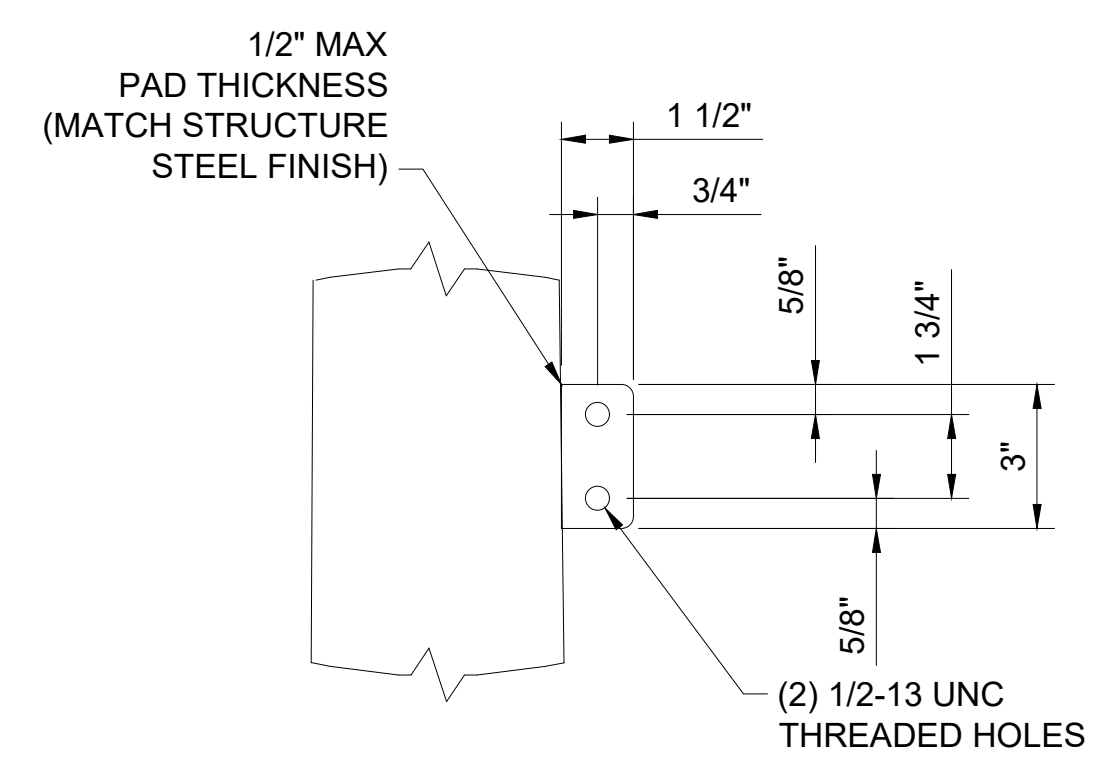
DETAIL
BASE PLATE CONFIGURATION
(SEE NOTE 8 & 11)



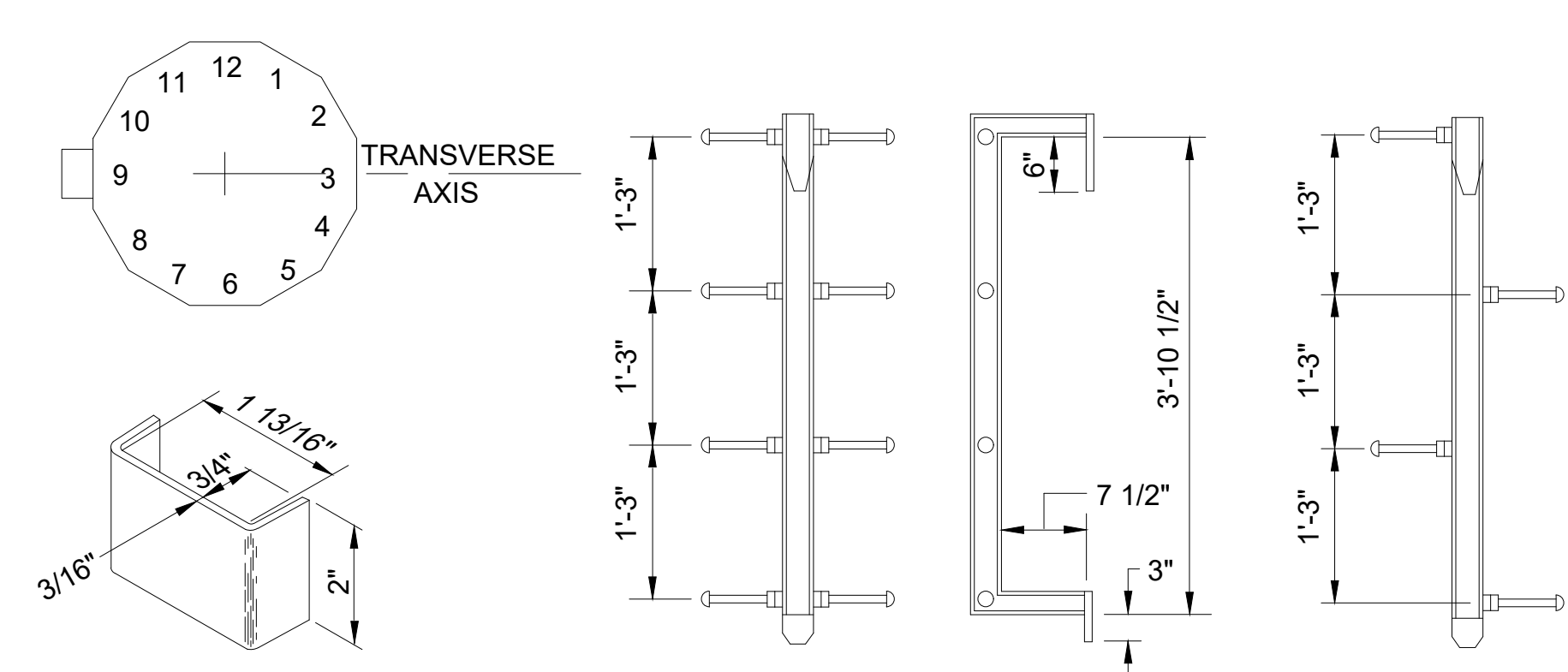
DETAIL
RING VANG / SHIELD WIRE PLATE
(SEE NOTE 6 & 7)



DETAIL
CONDUCTOR THRU VANGS
(SEE NOTE 1, 3, & 6)



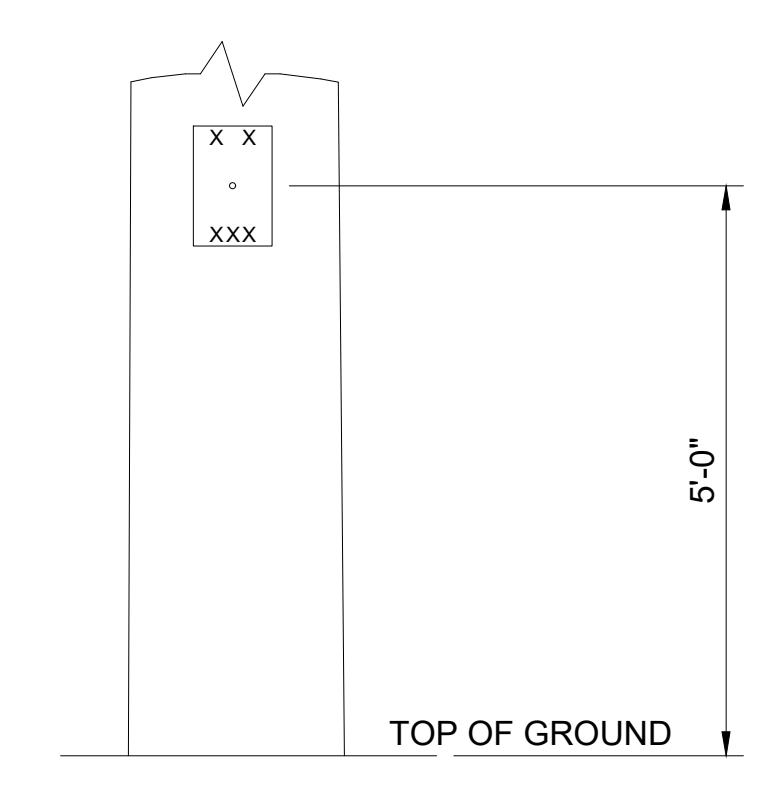
DETAIL
GROUND PAD



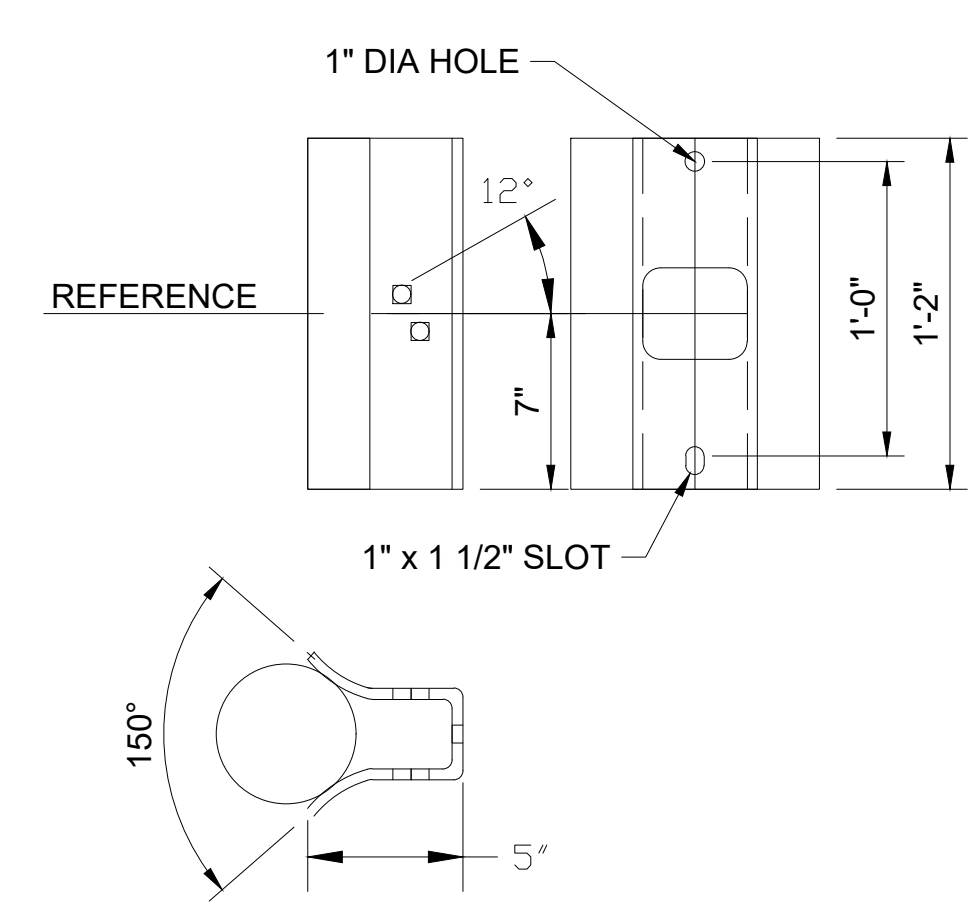
DETAIL
LADDER CLIPS (SPACE TO ACCOMMODATE LADDERS)
(SEE NOTE 9)

WORKING LADDER

CLIMBING LADDER



DETAIL
NAMEPLATE
(SEE NOTE 4)



DETAIL
UPSWEPT GAIN BASE MOUNTING BRACKET
(SEE NOTES 1 & 12)

NOTES

1. MANUFACTURER SHALL REFER TO SECTION VIEWS FOR VANG, MOUNTING BRACKET, & THRU HOLE ORIENTATIONS.
2. GROUNDING PADS SHALL BE WELDED TO THE POLE FACE. GROUNDING PAD STEEL FINISH SHALL MATCH POLE SHAFT STEEL FINISH.
3. VANGS SHALL BE DESIGNED TO WITHSTAND UP TO ±7.5 DEGREE PULL OFF.
4. NAMEPLATE SHALL ATTACH AT 5'-0" ABOVE GROUND LINE. ASSUME 2'-0" FOUNDATION REVEAL ON BASE PLATED STRUCTURES. NAMEPLATE SHALL INDICATE STRUCTURE TOTAL WEIGHT, STRUCTURE HEIGHT, ULTIMATE GROUND LINE MOMENT CAPACITY, MANUFACTURER'S NAME, MANUFACTURING SITE, & THE DATE OF MANUFACTURE.
5. STRUCTURE SHALL BE DESIGNED FOR ERECTION BY CRANE. LIFT POINTS SHALL BE DESIGNATED FOR CRANE PICKUP. MANUFACTURE SHALL UTILIZE VANGS FOR EACH LIFTING POINT.
6. MANUFACTURER SHALL DETERMINE PLATE THICKNESS TO MATCH LOADING. MAXIMUM MATERIAL THICKNESS FOR PLATE SHALL BE 1".
7. MANUFACTURE SHALL DESIGN SHIELD WIRE PLATE TO BE USED BY CRANE FOR LIFTING.
8. FOR ALL STRUCTURES, MANUFACTURE SHALL UTILIZE A 12 SIDED BASE PLATE WITH EQUAL & SYMMETRICAL SPACING BETWEEN ALL BOLTS. THE NUMBER OF BOLTS SHALL BE DETERMINED BY THE MANUFACTURER.
9. MANUFACTURE SHALL PROVIDE PERMANENT LADDER CLIPS SUITABLE FOR USE WITH MACGREGOR TYPE (3'-10 1/2") CLIMBING LADDERS. CLIPS SHALL BE WELDED TO THE FACE OF THE PLATE BEGINNING 8'-0" ABOVE GROUND LEVEL & EXTENDING TO THE TOP OF THE STRUCTURE. MANUFACTURE SHALL ENSURE CLIPS PROVIDE ADEQUATE CLEARANCE BETWEEN CLIMBER & ENERGIZED PARTS. CLIPS MUST CONFORM TO LOADING AS STATED IN OSHA 3124-12R. LADDERS SHOWN FOR DIMENSIONING ONLY & SHALL NOT BE PROVIDED BY MANUFACTURER.
10. MANUFACTURE SHALL INCLUDE POLE TOP PLATE FOR EACH POLE.
11. MANUFACTURE SHALL DESIGN ALL POLES, GALVANIZED & WEATHERING STEEL TO HAVE ADEQUATE VENTILATION & DRAINING.
12. MANUFACTURE SHALL PRE-DRILL 1" THRU HOLES & PROVIDE MOUNTING BOLTS Ø7/8" x REQUIRED LENGTH, INCLUDING NUTS, WASHERS, & LOCK WASHERS FOR GAIN BASE DETAIL. ON DOUBLE CIRCUIT STRUCTURES, ADDITIONAL NUTS, WASHERS, & LOCK WASHERS SHALL BE PROVIDED TO ALLOW REMOVAL OF ONE SIDE OF GAIN BASES WITHOUT AFFECTING THE OTHER SIDE. GAIN BASE DETAIL SHOWN FOR DIMENSION PURPOSES ONLY & SHALL NOT BE PROVIDED BY POLE MANUFACTURER.

DESCRIPTION: ISSUED FOR BID						GRAND RIVER DAM AUTHORITY			
0	RF025-01361	28AUG25	CI	DK	CI	CI	TONNECE SUBSTATION S877		
						DELAWARE, COUNTY 345/161/69kV			
						STRUCTURE DETAILS			
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REV. NO.	JOB NO.	DATE	DESIGN ENGR.	DFTG	DESIGN CHECK	ISSUE APPROV.	P.O. BOX 669 CHOUTEAU, OK 74337		