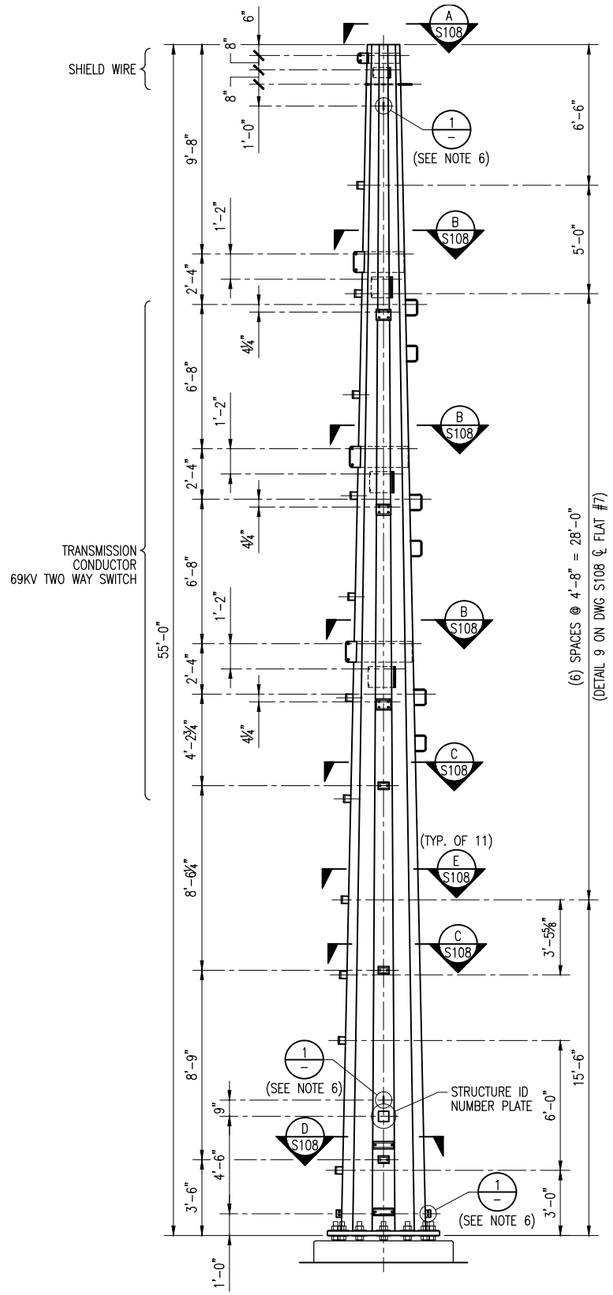
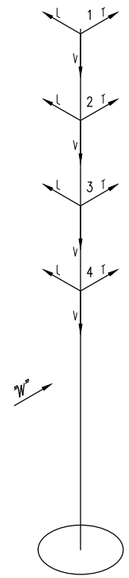
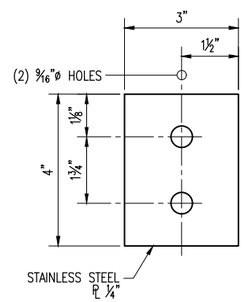


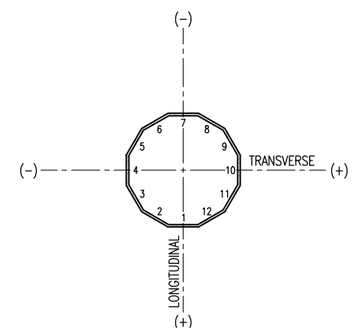
STRUCTURE #11
SCALE: NTS



LOADING DIAGRAM
SCALE: NTS



DETAIL 1
SCALE: NTS
GROUND PLATE



ORIENTATION OF AXES
SCALE: NTS

STRUCTURE POINT LOADS

1: NESC MEDIUM				
DESCRIPTION	POSITION	TRANSVERSE	LONGITUDINAL	VERTICAL
SHIELD WIRE	1	−2.21	1.68	1.08
TRANSMISSION CONDUCTOR	2, 3, 4	−12.05	5.52	1.02
2: HIGH WIND				
DESCRIPTION	POSITION	TRANSVERSE	LONGITUDINAL	VERTICAL
SHIELD WIRE	1	−1.72	0.99	0.87
TRANSMISSION CONDUCTOR	2, 3, 4	−6.74	2.98	0.85
3: CAMBER				
DESCRIPTION	POSITION	TRANSVERSE	LONGITUDINAL	VERTICAL
SHIELD WIRE	1	−0.63	0.39	0.29
TRANSMISSION CONDUCTOR	2, 3, 4	−3.76	1.63	0.50
4: BROKEN WIRE				
DESCRIPTION	POSITION	TRANSVERSE	LONGITUDINAL	VERTICAL
SHIELD WIRE	1	−2.54	1.09	0.37
TRANSMISSION CONDUCTOR	2, 3, 4	−8.53	3.64	0.89
5: STRINGING				
DESCRIPTION	POSITION	TRANSVERSE	LONGITUDINAL	VERTICAL
SHIELD WIRE	1	−1.10	0.48	0.18
TRANSMISSION CONDUCTOR	2, 3, 4	−5.08	2.17	4.58

DESIGN APPLICATION

WIRE DATA

SHIELD WIRE: OPGW SX-29/61/512 (DNO-11127)
TRANSMISSION WIRE: 795 kcmil ACSR "DRAKE"

MECHANICAL LOADING CRITERIA

CASE 1: NESC MEDIUM (RULE 250B):
4 psf WIND @ 15°F, 1/4" ICE ON WIRES, CONDUCTORS AND STRUCTURE.
OLF: VERTICAL 1.5, WIND 2.5, TENSION 1.65.

CASE 2: HIGH WIND – 90 MPH (RULE 250C):
19.9 psf @ 60°F, NO ICE ON SHIELD WIRE AND TRANSMISSION CONDUCTORS,
21.2 psf @ 60°F, NO ICE ON STRUCTURE.
OLF: 1.1 – ALL LOADS.

CASE 3: 60°F CAMBER (FINAL TENSION):
NO WIND @ 60°F, NO ICE ON WIRES, CONDUCTORS AND STRUCTURE.
OLF: 1.0 – ALL LOADS.

CASE 4: BROKEN WIRE – ALL WIRES AND CONDUCTORS TO SUBSTATION STRUCTURE BROKEN (NESC SPANS AND TENSIONS):
4 psf WIND @ 15°F, 1/4" ICE ON WIRES AND STRUCTURE.
OLF: 1.1 – ALL LOADS.

CASE 5: STRINGING:
2.0 psf @ 60°F, NO ICE ON WIRES, CONDUCTORS AND STRUCTURE.
OLF: 1.1 – ALL LOADS

DESIGN DATA

DESIGN TENSIONS (lbs.)

WIRE	NESC			HIGH WIND			CAMBER			STRINGING		
	BACK	AHEAD	SUB	BACK	AHEAD	SUB	BACK	AHEAD	SUB	BACK	AHEAD	SUB
SHIELD WIRE	1765	1765	500	1530	1495	260	710	710	140	770	780	145
TRANSMISSION CONDUCTOR	6000	6000	500	4895	4735	365	3120	3055	205	3585	3595	205

SPAN AND ANGLE DATA

DESCRIPTION	NESC			HIGH WIND			CAMBER			STRINGING		
	BACK	AHEAD	SUB	BACK	AHEAD	SUB	BACK	AHEAD	SUB	BACK	AHEAD	SUB
HORIZONTAL SPAN	145	110	15	145	110	15	145	110	15	145	110	15
VERTICAL SPAN SHIELD	135	190	225	125	255	265	135	180	150	135	185	155
VERTICAL SPAN TRANSMISSION	150	185	−70	150	200	−80	150	165	−40	150	180	−40
LINE ANGLE	67	21	90	67	21	90	67	21	90	67	21	90

GENERAL NOTES

1. THE LOADS IN THE LOADING TABLE ARE ULTIMATE LOADS AND INCLUDE ALL OVERLOAD FACTORS. ALL LOADS IN KIPS EXCEPT WIND "W" IN psf.
2. THE VERTICAL LOADS (V) INCLUDE ONLY DEAD WEIGHT OF THE WIRE AND WEIGHT OF THE INSULATORS. THE DEAD WEIGHT OF THE STRUCTURE SHALL BE CALCULATED BY THE POLE MANUFACTURER AND USED IN THE DESIGN. THE OVERLOAD FACTOR APPLIED TO THE DEAD WEIGHT SHALL BE AS LISTED FOR EACH CASE.
3. FOR STRUCTURAL DESIGN, THE LONGITUDINAL, TRANSVERSE AND VERTICAL LOADS SHALL BE CONSIDERED TO ACT SIMULTANEOUSLY WITH THE WIND AND THE DEAD WEIGHT OF THE STRUCTURE.
4. APPLY STRUCTURE WIND "W" IN THE DIRECTION WHICH PRODUCES THE MAXIMUM STRESS.
5. STRUCTURE SHALL BE DESIGNED TO BE SELF SUPPORTING, GUYS ARE NOT PERMITTED.
6. ATTACH GROUNDING PLATES (DETAIL 1 ON THIS DRAWING) 2'-10" BELOW TOP OF POLE ON FLATS #1 AND #7, 6'-6" ABOVE BASE PLATE ON FLATS #1 AND #7 AND 1'-0" ABOVE BASE PLATE ON FLATS #4 AND #10.
7. CLIMBING LADDER CLIPS (DETAIL 10 ON DRAWING S108) TO BE INSTALLED ON FLAT #5. WORKING LADDER CLIPS TO BE INSTALLED BELOW EACH SHIELD WIRE ATTACHMENT AND BELOW EACH TRANSMISSION CONDUCTOR ATTACHMENT.
8. APPLY SWITCH WEIGHT OF 1000 lbs. AT EACH SWITCH LOCATION. THE CENTER OF GRAVITY FOR THE SWITCH IS 2'-3" FROM FACE OF THE SWITCH BRACKET. THE WIND AREA OF THE SWITCH IS 14 sq. ft. THE OVERLOAD FACTORS APPLIED TO THE SWITCH SHALL BE AS LISTED FOR EACH CASE.
9. FINISH SHALL BE HOT DIP GALVANIZING PER ASTM A123, A143, A153, A384 AND A385. (C)

No.	DATE	BY	APP	REVISION	REFERENCE DRAWING	NUMBER
C	12/09/24	KAC	ML	REVISED STRUCTURE #11 FINISH		
B	11/27/24	KAC	ML	90% REVIEW		
A	08/23/24	BDP	ML	60% REVIEW		

Washington City
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Des By:	BDP	Date	08/23/24
Drawn By:	BDP	Date	08/23/24
Chk'd. By:	KAC	Date	08/23/24
ENGR.	BDP	Date	08/23/24
APPD.	–	Date	–
APPD.	–	Date	–

NOT FOR CONSTRUCTION

WASHINGTON CITY
GRAPEVINE SUBSTATION – PARKWAY TAP
138KV TRANSMISSION LINE
STRUCTURE #11 – DESIGN DATA

SCALE: NTS
Project No. 071-079
DRAWING No. 071-079-S107
REVISION C