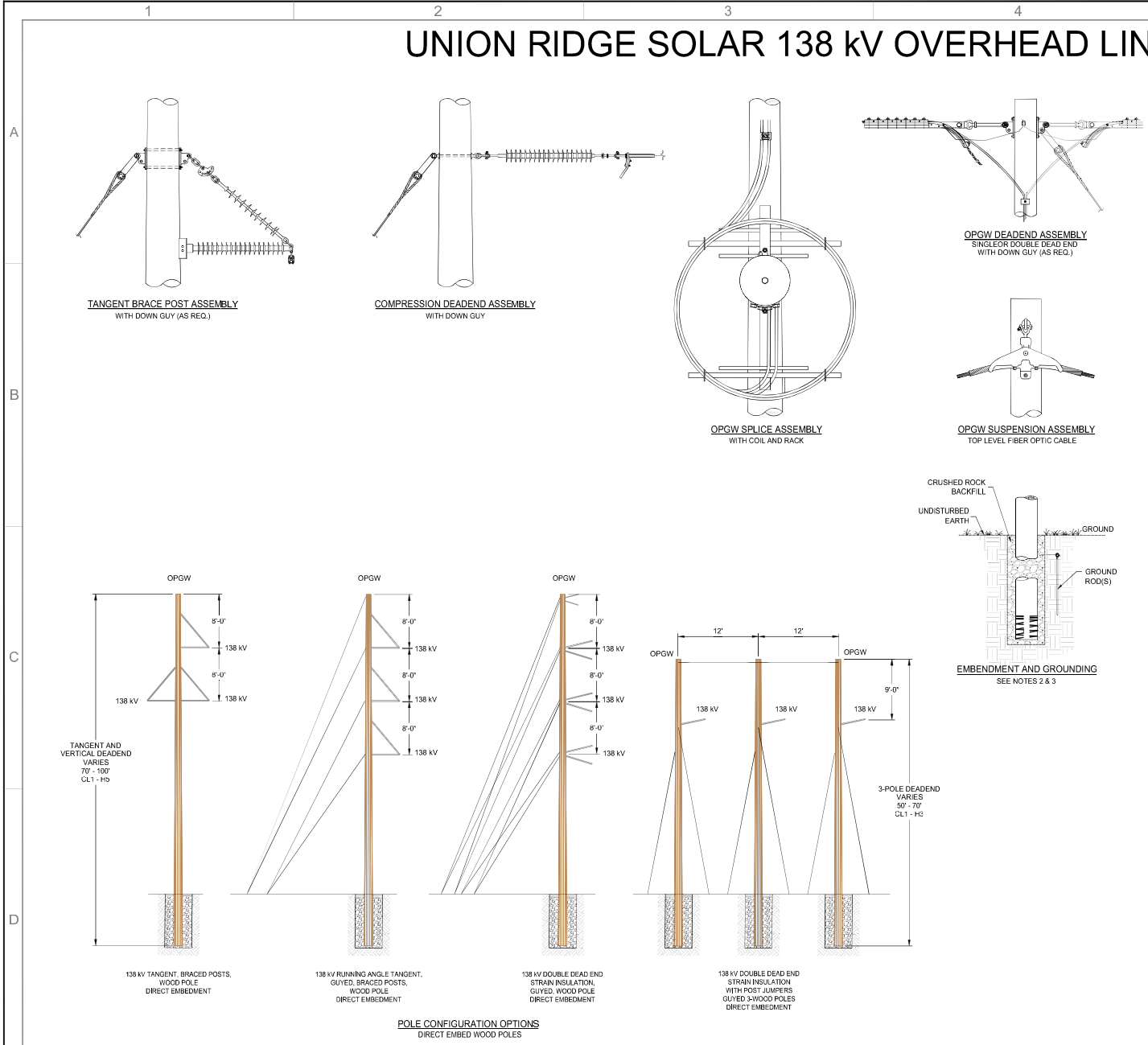


Union Ridge Solar, LLC, Case No. 20-1757-EL-BGN
Updated Responses to OPSB Staff Data Request - Part 2

Appendix A

UNION RIDGE SOLAR 138 kV OVERHEAD LINE



- NOTES:**
- POLES SHALL BE STANDARD GLASSED WOOD OR STEEL STRUCTURES SELECTED FOR THE LOADING REQUIREMENTS OF EACH STRUCTURE FOR DIRECT EMBED FOUNDATIONS. BACKFILL SHALL BE 4:1:1 TO 4:1:7 GRAVEL AND SHALL BE COMPACTED TO 95% MAXIMUM DRY DENSITY PER ASTM D 1557.
 - POLES WILL BE DIRECTLY EMBEDDED IN THE SOIL AT A DEPTH REQUIRED TO SUPPORT THE POLE BASED ON THE GEOTECHNICAL INVESTIGATION DATA. THE MINIMUM EMBEDMENT WILL BE 10% OF THE POLE LENGTH PLUS TWO FEET. THE DIAMETER OF THE EXCAVATED HOLE WILL BE SUFFICIENT TO ALLOW FOR PROPER PLACEMENT OF BACKFILL.
 - CONTACT MIGRATORY BIRD PERMIT EXAMINER LOCATED IN THE USFWS REGION FOR AVIAN CONSIDERATION RECOMMENDATIONS.
 - LINE DESIGN ENGINEER SHALL COORDINATE WITH SUBSTATION, LAND, CIVIL PERMITTING, CONSTRUCTION, VEGETATION MANAGEMENT, THIRD-PARTY/JOINT USE OWNERS, AND OTHER PERSONNEL REQUIRED TO COORDINATE ALL REQUIREMENTS FOR THE PROJECT. THIS SHALL INCLUDE CONDUCTOR AND COMMUNICATION CONNECTIONS AT SUBSTATIONS.
 - FAA WORKING AND LIGHTING SCREENING IS REQUIRED AND STRUCTURES MAY REQUIRE FAA NOTIFICATION.
 - UNIT OF MEASURE FOR SPAN LENGTHS, DISTANCES, AND ELEVATIONS IS FEET.
 - CONTRACTOR MUST COMPLY WITH ALL ENVIRONMENTAL REGULATIONS DURING THE CONSTRUCTION OF THIS PROJECT.
 - CONTACT STATE ONE CALL SYSTEM (811) BEFORE DIGGING.
 - ADHERE TO ALL AGREEMENT REGULATIONS FOR ALL OVERHEAD AND UNDERGROUND CROSSINGS.
- CRITERIA:**
- POLE DESIGNS SHALL HAVE A MAXIMUM POLE DEFLECTION OF 1% OF THE POLE HEIGHT ABOVE GROUND AT 60 °F. NO WIND, NO ICE, AFTER CREEP. POLES SHALL HAVE A MAXIMUM POLE DEFLECTION OF 5% THE POLE HEIGHT ABOVE GROUND AT ALL REQUIRED LOAD CASES.
 - OPGW AND STATIC SHIELD GROUND WIRE SHALL MATCH 80% SAG OF CONDUCTOR AT 60 °F. NO WIND, NO ICE, INITIAL CREEP, AND LOAD CONDITIONS.
 - STRUCTURE LOAD REQUIREMENTS SHALL INCLUDE A MINIMUM ADDITIONAL 5% CONSTRUCTION TOLERANCE LOAD FACTOR BUFFER.
 - BROKEN WIRE LOADING SHALL BE CONSIDERED FOR ALL DEADEND STRUCTURES AND UNDER ALL LOAD CASES.
 - STRUCTURES SHALL BE DESIGNED FOR CONSTRUCTION AND MAINTENANCE LOADS UNDER 3 PSF WIND AND 60 °F. INITIAL CONDITIONS CONSTRUCTION AND MAINTENANCE LOADS SHALL INCLUDE A LOAD FACTOR OF 1.5 PLUS 250 LBS FOR WORKERS & TOOLS.
 - CLEARANCES REQUIREMENTS TO GROUND AND OTHER STRUCTURES SHALL INCLUDE A MINIMUM ADDITIONAL 5% CONSTRUCTION TOLERANCE BUFFER, AND NO LESS THAN 6 INCHES.

- REFERENCES:**
- RUS BULLETIN 1724E-200, DESIGN MANUAL FOR HIGH VOLTAGE TRANSMISSION LINES
 - NATIONAL ELECTRICAL SAFETY CODE (NEC 2017)
 - ASCE MANUALS AND REPORTS ON ENGINEERING PRACTICE NO. 74 GUIDELINES FOR ELECTRICAL TRANSMISSION LINE STRUCTURAL LOADING
 - IEEE 13.13-1898 IEEE GUIDE FOR THE APPLICATION OF INSULATION COORDINATION

DESIGN PARAMETERS	
LINE RATING (MW)	125
LINE VOLTAGE (kV)	138
PHASE AMPERAGE (A)	556
CONDUCTOR TYPE	795 KCMIL ACSR "DRAKE"
CONDUCTOR AMPACITY AT 75 °C (A)	905
MAX CONDUCTOR OPERATING TEMP (°F)	212
AVERAGE SPAN LENGTH (FT)	350-400
LEVEL SPAN AVG SAG AT MAX OP TEMP (FT)	10-12
BLOWOUT - 3 PSF WIND (FT)	15
BLOWOUT - EXTREME WIND	23
RIGHT-OF-WAY WIDTH (FT)	100

138 kV INSULATOR REQUIREMENTS		
	SUSP/DE	POST
LEAKAGE DISTANCE (IN)	140	138
50 HZ DRY FLASHOVER (kV)	502	461
50 HZ WET FLASHOVER (kV)	447	427
CRITICAL IMPULSE FLASHOVER, POSITIVE (kV)	857	800
CRITICAL IMPULSE FLASHOVER, NEGATIVE (kV)	906	854

CONDUCTOR AND OPGW SPECIFICATIONS					
NAME	SIZE (KCMIL)	STRANDING	RTS (LBS)	DIA. (IN)	WEIGHT (LBS/FT)
ACSR "DRAKE"	795	61	31,500	1.108	1,094
OPGW	SI-9043	24 FIBER	18,089	0.612	0.377

138 kV CLEARANCE REQUIREMENTS* (FT)			NEC MIN.
GROUND	23	20.7	
RAILROAD	33	28.7	
WATER	47	42.7	
ROAD	23	20.7	
PARALLEL WIRE (233B,C)	10	7.2	
CROSSING WIRE (233C,G)	7	6.5	
OTHER STRUCTURE (234B/C)	10	6.7	
OTHER PHASE (235B/C)	8	5.0	
SUPPORT STRUCTURE (235E)	4	3.8	
*INCLUDES BUFFER (SEE CRITERIA NOTE 3)			

WIRE TENSION LIMITS - GRADE B			
CONDITION	%UTS		
	250B	250C/D	INITIAL
*	INITIAL	80%	80%
*	INITIAL	35%	35%
*	FINAL	25%	25%
* 10 °F HVY, 15 °F MED, 30 °F LIGHT			

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PREPARED FOR:

PRELIMINARY
NOT FOR CONSTRUCTION

REV#	DATE	ISSUE DESCRIPTION
A	04/28/2021	ISSUE FOR PRELIM REVIEW

APPROVED BY:	SSE
CHECKED BY:	SSE
DESIGNED BY:	AKR
DRAWN BY:	AKR

PROJECT NUMBER: -
DRAWING NAME:
**UNION RIDGE SOLAR
138 kV OVERHEAD LINE**

**PRELIMINARY
PROJECT DETAILS
AND GENERAL NOTES**

DRAWING No.	SHEET	REVISION
UNRS-T-000-00	1 OF 1	A

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Case No(s). 20-1757-EL-BGN

Summary: Text Response of Union Ridge Solar, LLC to OPSB Staff First Data Request Part 2 - Appendix A electronically filed by Teresa Orahod on behalf of Dylan F. Borchers