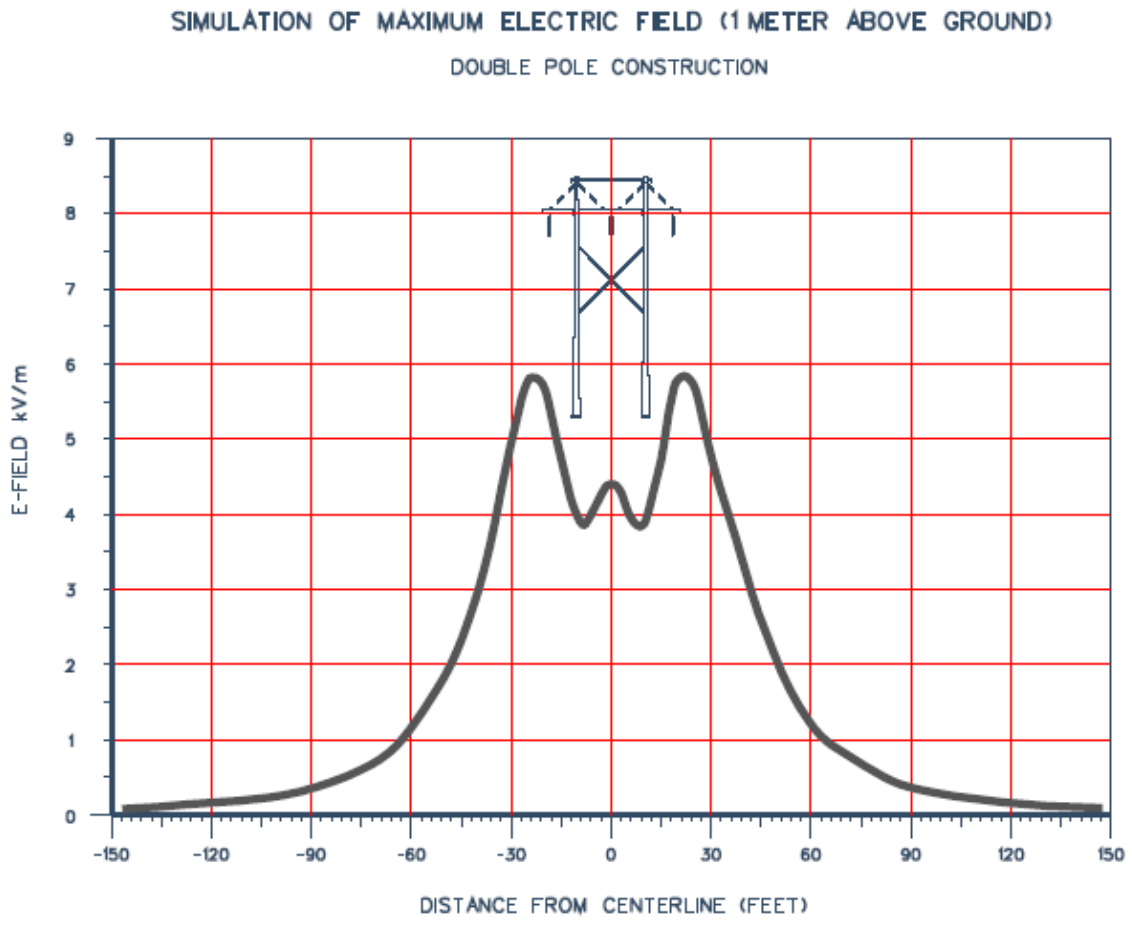


Figure 9
Simulation of Maximum Electric Field (1 Meter Above Ground) – H-Frame Construction

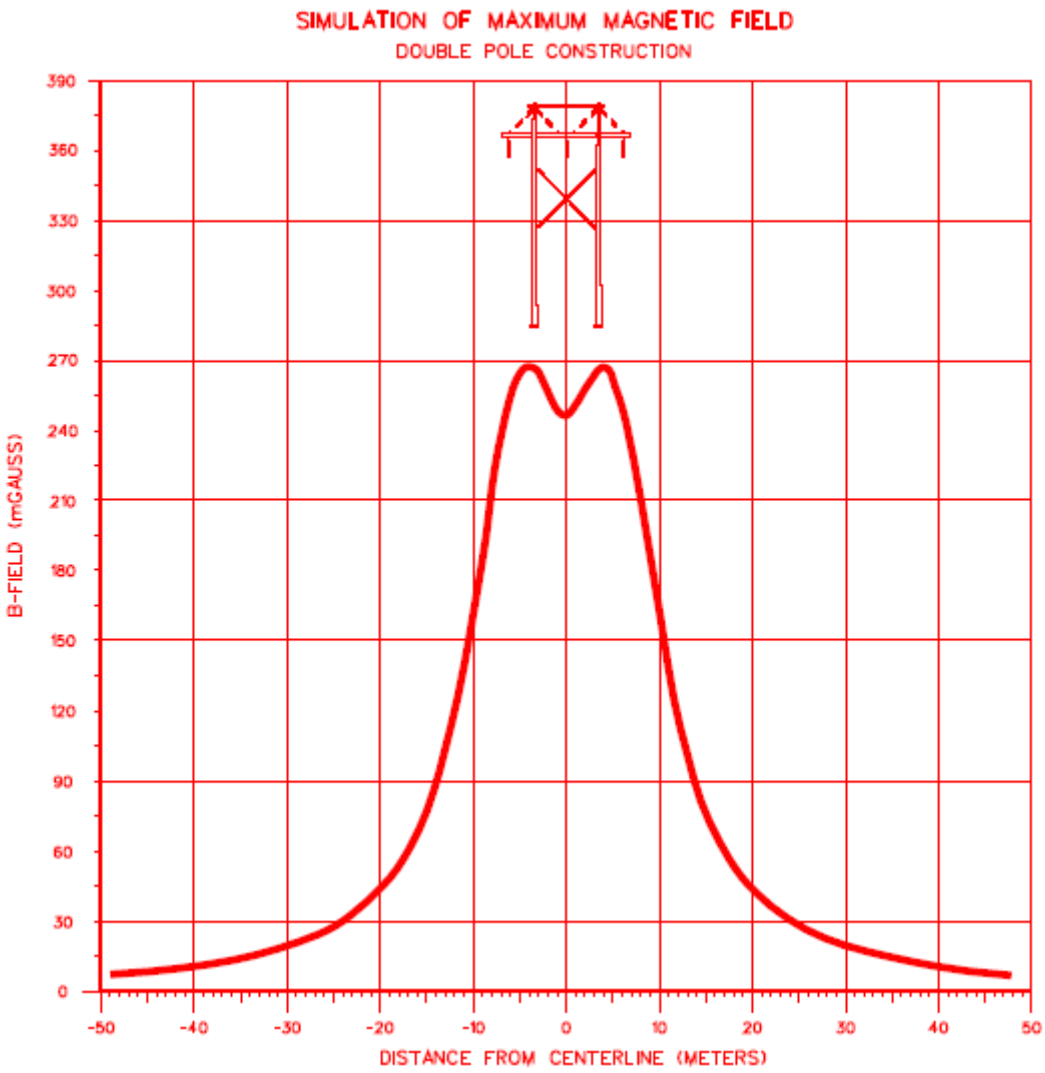


Figure 10
Simulation of Maximum Electric Field (1 Meter Above Ground) – H-Frame Construction

TABLE 4.5-1 – H-Frame EMF STRENGTH FOR MAXIMUM OPERATING CONDITIONS		
Distance from Centerline (feet)	**Magnetic Field Strength (mG)**	**Electric Field [a] Strength (kV/m)**
1,500	0.11	0
1,250	0.15	0
1,000	0.24	0
750	0.43	0.001
500	0.96	0.002
450	1.23	0.004
400	1.50	0.004
350	2.08	0.0089
300	2.66	0.009
250	3.84	0.015
200	6.01	0.029
175	7.89	0.043
150	10.73	0.068
125	15.60	0.15
100	24.43	0.23
90	30.29	0.32
80	38.54	0.45
70[b]	50.69	0.68
60	69.55	1.06
50	100.76	1.78
45	128.23	2.46
40	155.69	3.13
35	202.65	4.18
30	249.61	5.23
25	300.23	5.59
20	350.85	5.95
15	359.30	4.93
10	367.74	3.92
5	351.59	4.29
0	335.44	4.66

Notes:
[a] Electric field strength is not affected by the current load.
[b] Beyond edge of typical 125 ft ROW.
Source: SNC-LAVALIN, 2006a.

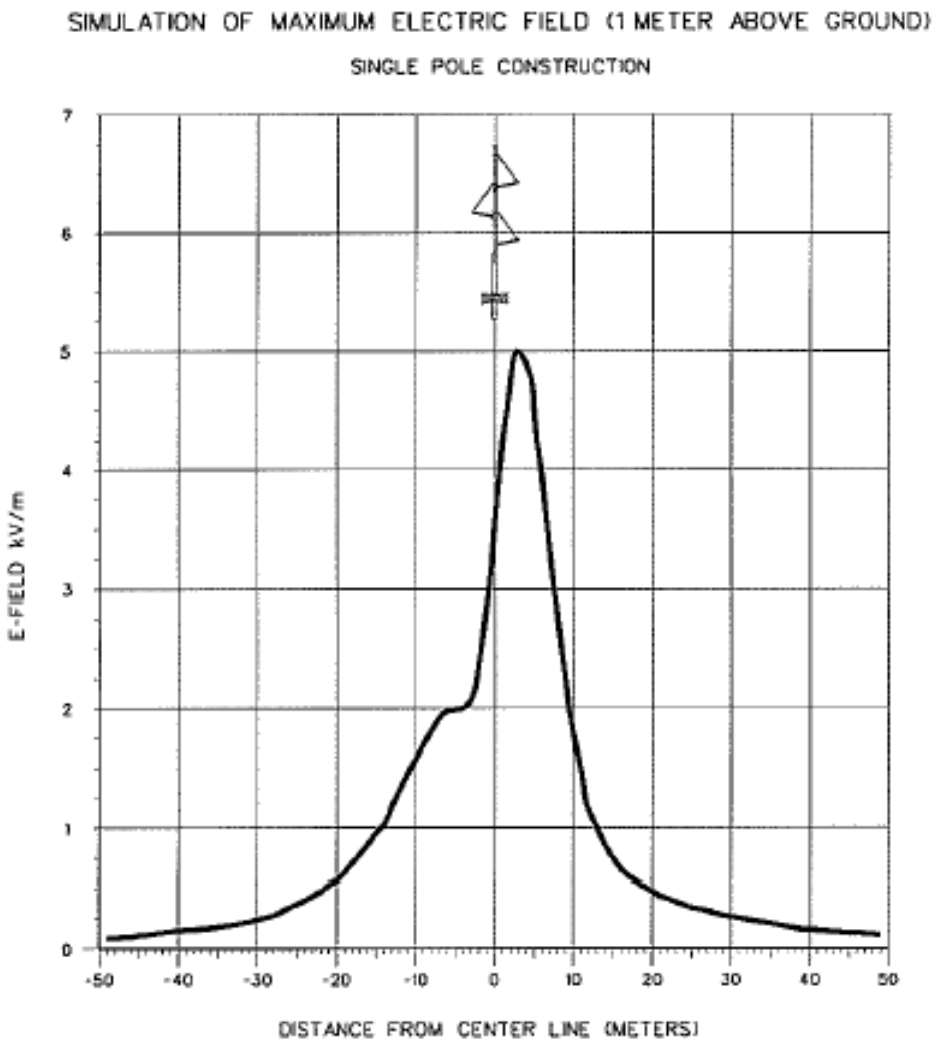


Figure 11
Simulation of Maximum Electric Field (1 Meter Above Ground) – Single Pole Construction

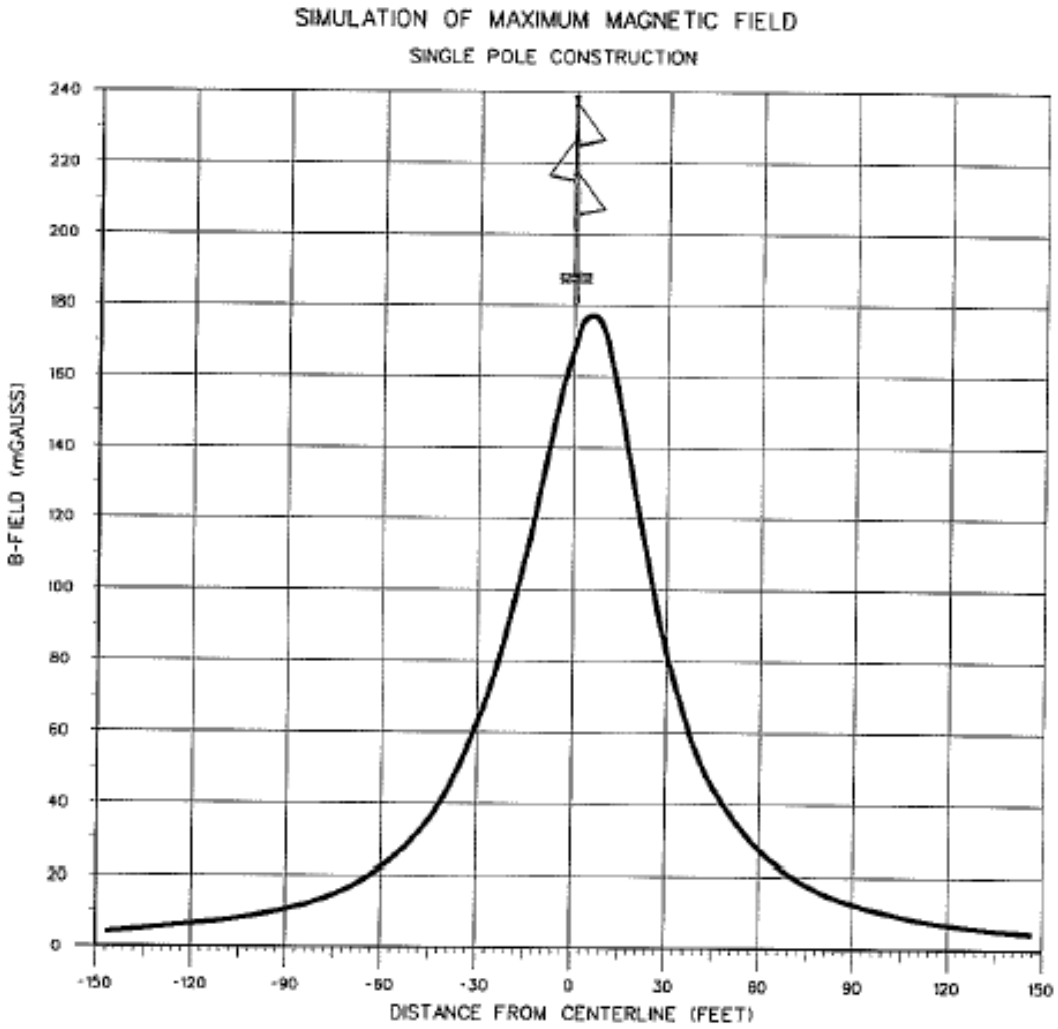
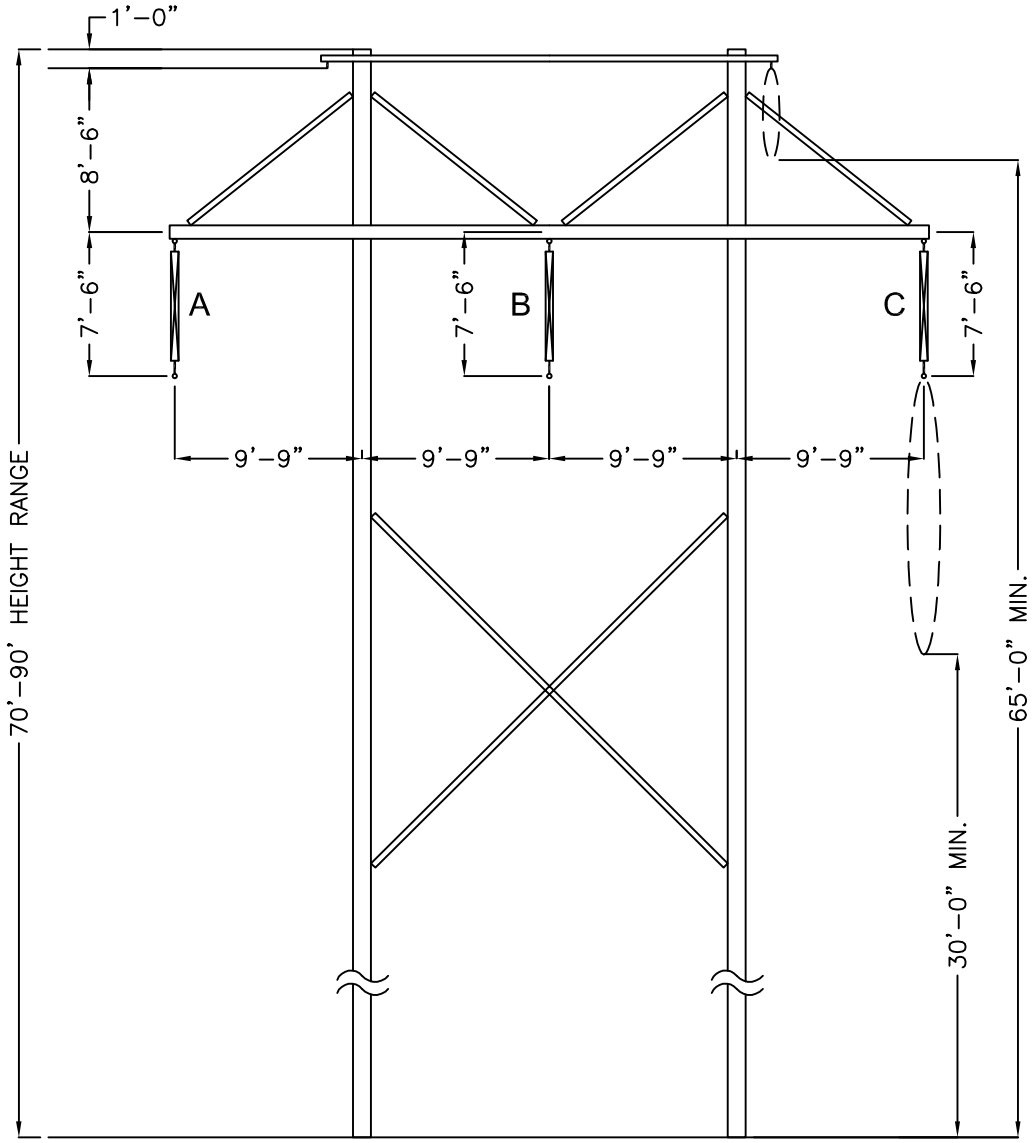


Figure 12
Simulation of Maximum Magnetic Field – Single Pole Construction

TABLE 4.5-2 – Single-Pole Structure EMF STRENGTH FOR MAXIMUM OPERATING CONDITIONS		
Distance from Centerline (feet)	**Optimized Phase Configuration**	
	Magnetic Field Strength (mG)	**Electric Field [a] Strength (kV/m)**
1,500	0.11	0
1,250	0.15	0
1,000	0.24	0
750	0.43	0.001
500	0.96	0.002
450	1.23	0.004
400	1.50	0.004
350	2.08	0.0089
300	2.66	0.009
250	3.84	0.015
200	6.01	0.029
175	7.89	0.043
150	10.73	0.068
125	15.60	0.15
100	24.43	0.23
90	30.29	0.32
80	38.54	0.45
70 [b]	50.69	0.68
60	69.55	1.06
50	100.76	1.78
45	128.23	2.46
40	155.69	3.13
35	202.65	4.18
30	249.61	5.23
25	300.23	5.59
20	350.85	5.95
15	359.30	4.93
10	367.74	3.92
5	351.59	4.29
0	335.44	4.66

Notes:
[a] Electric field strength is not affected by the current load.
[b] Beyond edge of typical 125 ft right of way.
Source: SNC-LAVALIN, 2006.

230 kV H–Frame



NOTE: WE ANTICIPATE THAT THE PROJECT WOULD USE 795 ACSR (ALUMINUM CONDUCTOR, STEEL REINFORCED, NON–BUNDLED), WITH A CAPACITY OF APPROXIMATELY 440 MVA (MEGA VOLT AMPERES).

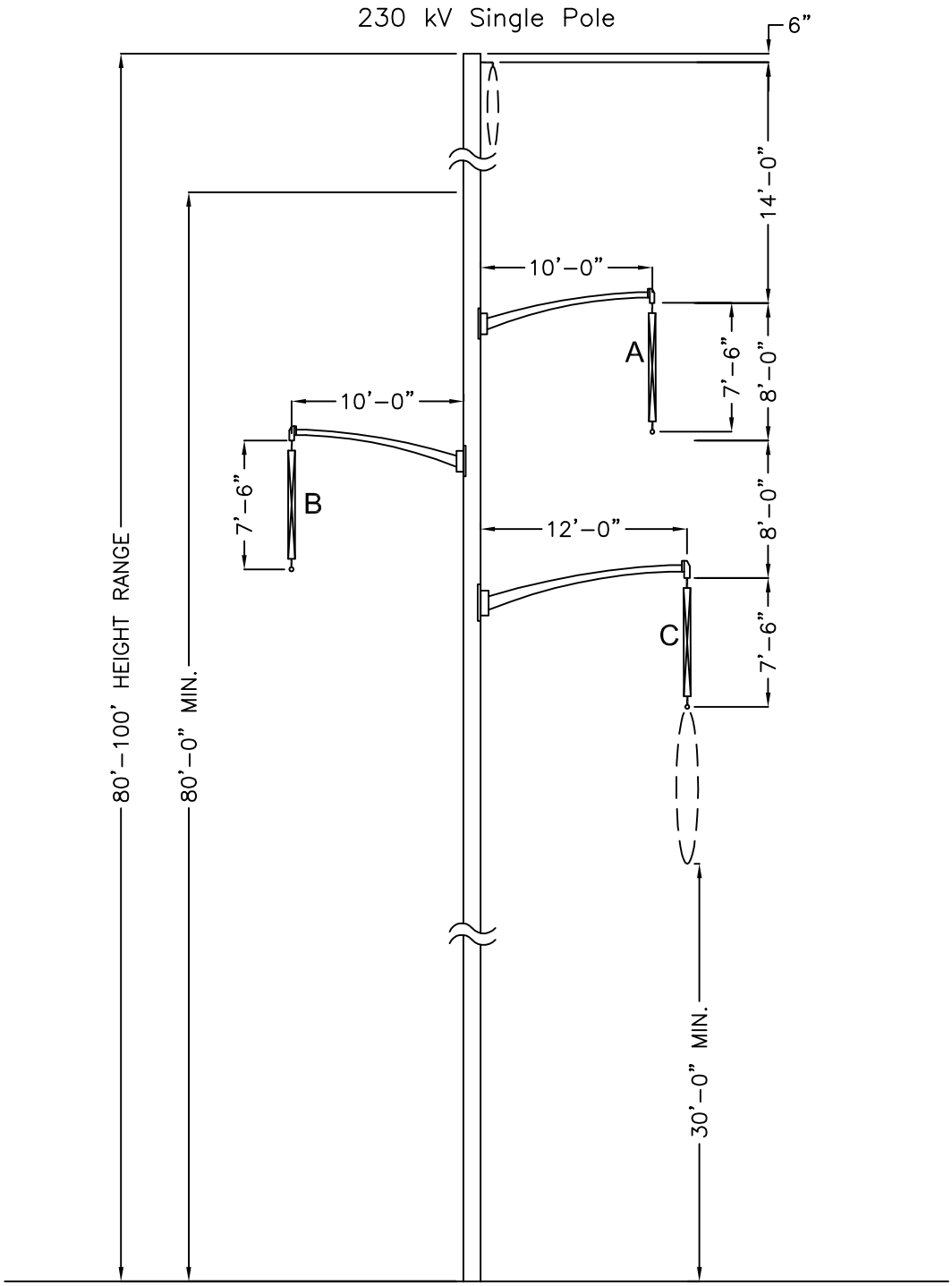
NOT TO SCALE

Noble ENVIRONMENTAL POWER

NOBLE FLAT HILL WIND PARK I
GLYNDON, CLAY COUNTY, MN

GRAPHIC 4–1
TYPICAL 230 kV H–FRAME

TETRA TECH EC, INC.



NOTE: WE ANTICIPATE THAT THE PROJECT WOULD USE 795 ACSR (ALUMINUM CONDUCTOR, STEEL REINFORCED, NON–BUNDLED), WITH A CAPACITY OF APPROXIMATELY 440 MVA (MEGA VOLT AMPERES).

NOT TO SCALE

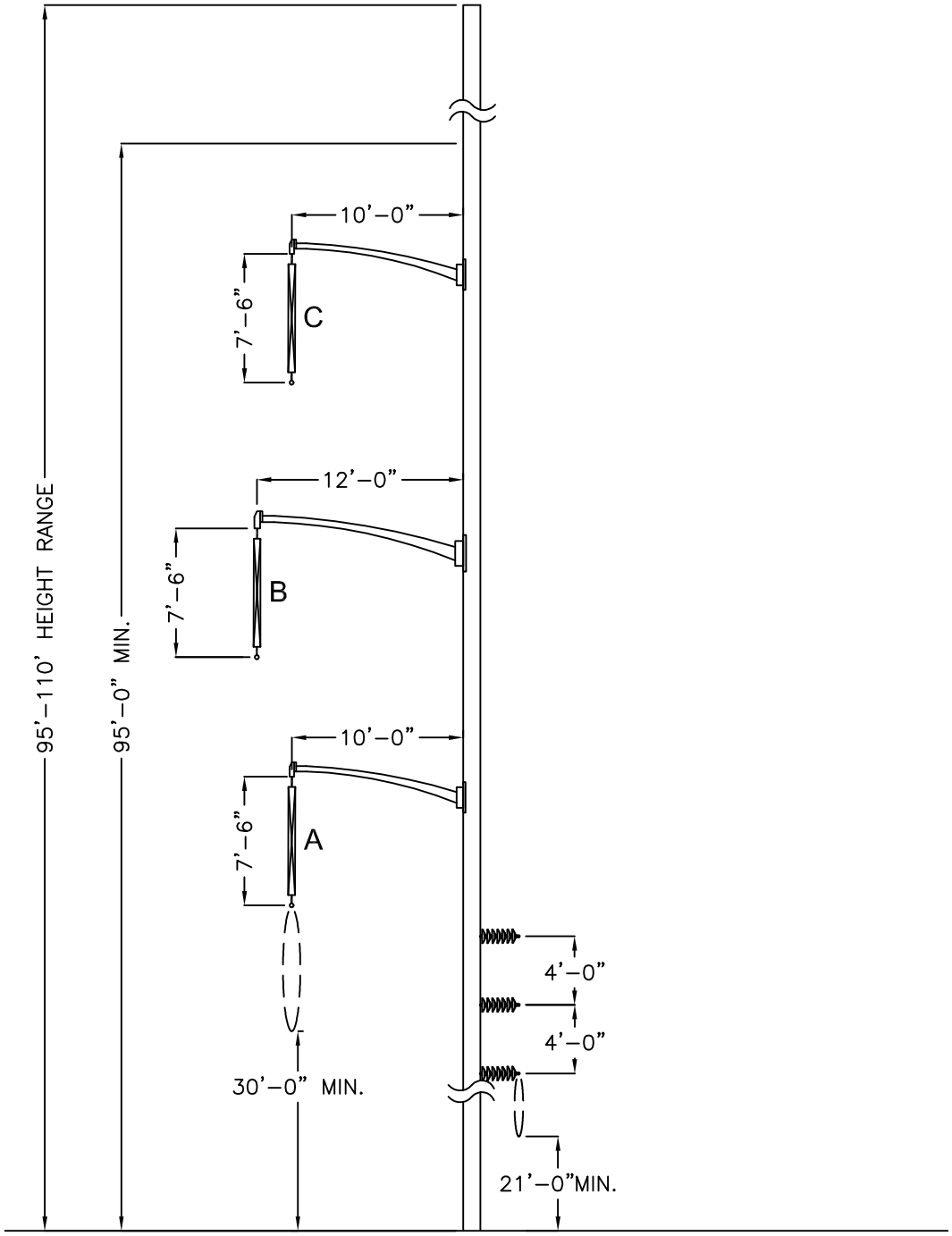
Noble ENVIRONMENTAL POWER

NOBLE FLAT HILL WIND PARK I
GLYNDON, CLAY COUNTY, MN

GRAPHIC 4–2
TYPICAL 230 kV SINGLE POLE STRUCTURE

TETRA TECH EC, INC.

230/23.5 kV Single Steel Pole Double Curcuit



NOTE: WE ANTICIPATE THAT THE PROJECT WOULD USE 795 ACSR (ALUMINUM CONDUCTOR, STEEL REINFORCED, NON–BUNDLED), WITH A CAPACITY OF APPROXIMATELY 440 MVA (MEGA VOLT AMPERES).

NOT TO SCALE

Noble ENVIRONMENTAL POWER

NOBLE FLAT HILL WIND PARK I
GLYNDON, CLAY COUNTY, MN

GRAPHIC 4–3
TYPICAL 230/23.5 kV SINGLE STEEL POLE DOUBLE CURCUIT

TETRA TECH EC, INC.