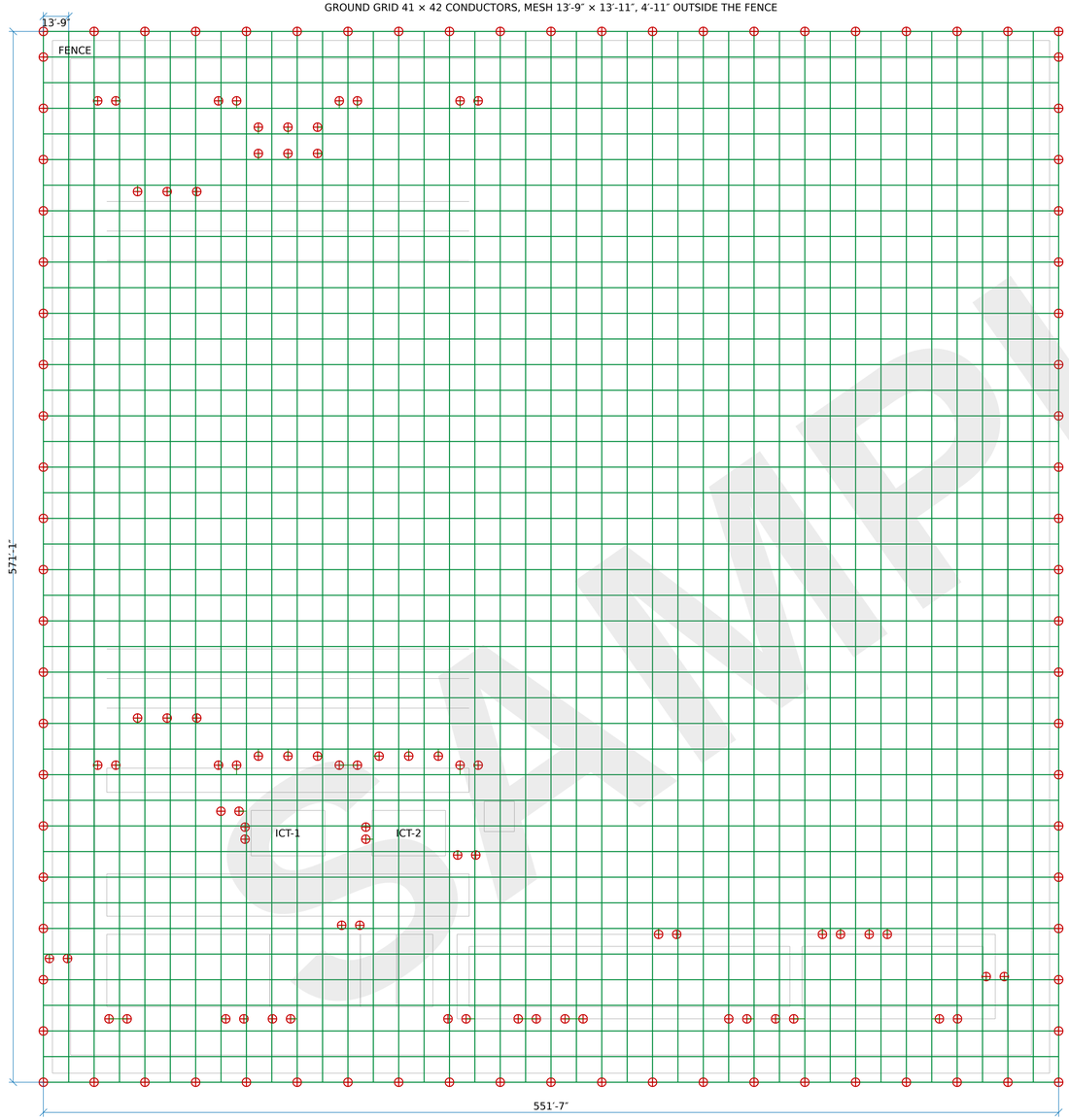
N

GROUND GRID LAYOUT (SCALE 1″ = 40′-0″)

0 25 50 ft

GROUND GRID 41 × 42 CONDUCTORS, MESH 13′-9″ × 13′-11″, 4′-11″ OUTSIDE THE FENCE



RESULTS (IEEE Std 80-2013)

Soil resistivity ρ 100 Ω·m (entered value) × season factor 1.5 = 150 Ω·m. Gravel 3000 Ω·m × 0′-4″, surface factor Cs 0.705.

Grid current IG = decrement factor Df 1.052 × split factor Sf 0.6 × 50.00 kA = 31.55 kA. Shock duration ts 0.50 s.

Grid resistance Rg 0.400 Ω (IEEE 80 Eq. 52). Ground potential rise GPR 12.62 kV.

Mesh (touch) voltage 820.5 V · limit 926.6 V (70 kg body, 50 kg: 684.6 V) · Pass

Step voltage 1426.6 V · limit 3040.3 V (70 kg body, 50 kg: 2246.3 V) · Pass

Conductor: 179.5 mm² (354.2 kcmil; Eq. 37, annealed copper, 1980 °F) → 400 kcmil bare copper.

QUANTITIES

Bare copper 400 kcmil, ground grid at 1′-6″: 46 580 ft

Copper-clad steel ground rod 0.75 in × 10′-0″: 154 ea

Bare copper 400 kcmil risers (≈2 × 10′-0″ per structure): 1940 ft

Gravel 314 984 ft² × 0′-4″: 3827 yd³

NOTES

1. Grid buried at 1′-6″. Connections exothermic, qualified to IEEE 837. Risers 400 kcmil bare copper, two per equipment structure.
2. Electrodes at the grid perimeter and at each surge arrester, CCVT, transformer HV neutral and NGR, bonded to the nearest grid conductor.
3. Fence bonded to the grid. Outer conductor 4′-11″ outside the fence.
4. Grid 551′-7″ × 571′-1″, 46 580 ft of conductor, 154 electrodes.

LEGEND

Green: ground grid conductor. Red circle with cross: ground electrode. Gray: yard outline for reference.

SAMPLE

SubstationLayout

REV	DATE	DESCRIPTION	BY
0	4 Nov 2026	Issued	Sample engineer

PROJECT	Sample 230/34.5 kV pooling substation
CLIENT	Sample client
LOCATION	Sample site
TITLE	GROUND GRID LAYOUT 230/34.5 kV POOLING SUBSTATION, 250 MW

	NAME	DATE
DRAWN	Sample engineer	4 Nov 2026
CHECKED	Sample engineer	4 Nov 2026
APPROVED	Sample engineer	4 Nov 2026

DRG. NO.	SSL-E-EAR-001	REV.	0
SCALE	1″ = 40′-0″	SIZE ANSI D	Sheet 1 of 1

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