

SANSA Matjiesfontien Soil Resistivity Report

Report Compiled by

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Introduction

Claassen Aurret requested a soil resistivity report and soil model from ULPS.

The four-pole Wenner test methodology as depicted by Figure 1 below, was performed and the measured results indicated in the tables below.

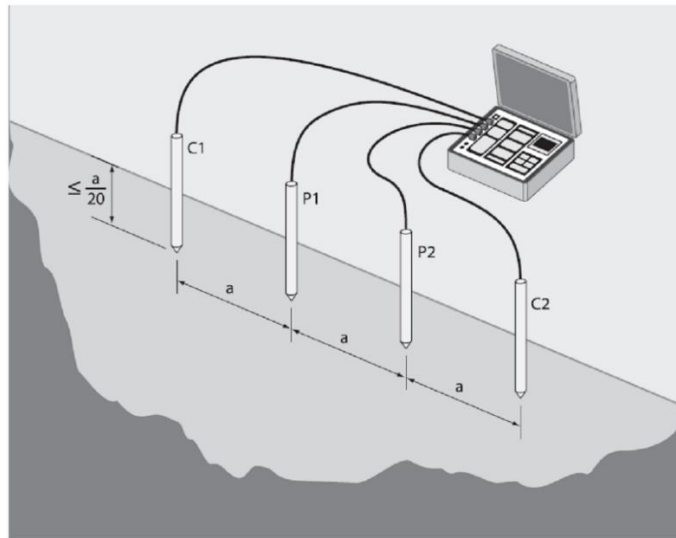


Figure 1 : Four Pole Wenner Method

DNS Antenna		
	Traverse 1	Traverse 2
Spacing a (m)	Apparent resistance (Ω)	
0.5	58	58
1	33.9	41
2	22.1	24
3	19	20
4	18	16
5	15	13
10	13	12
15	10	10
20	2.3	2.1

Gate House		
	Traverse 1	Traverse 2
Spacing a (m)	Apparent resistance (Ω)	
0.5	55.8	63.5
1	27.7	27.7
2	14	18
3	6.5	4.9
4	5.1	4.2
5	4.1	3.9
10	2.8	3.1
15	2.6	2.6
20	1.8	2.1
30	1.7	1.9
LEGS Antenna		
	Traverse 1	Traverse 2
Spacing a (m)	Apparent resistance (Ω)	
0.5	85.1	61
1	40.1	27.2
2	25.4	20.1
3	20.1	13
4	14	11
5	8.5	8
10	5.3	4.5
15	4.1	2.9
20	2.1	2.3
30	2.4	2.1

LEGS COMM Antenna		
	Traverse 1	Traverse 2
Spacing a (m)	Apparent resistance (Ω)	
0.5	90.1	101
1	45.2	28.6
2	23.5	19
3	18	17
4	16	11.2
5	7.9	9
10	5.1	4.6
15	4.3	0.4
20	3.2	3
30	2.5	2.1
OPS Building		
	Traverse 1	Traverse 2
Spacing a (m)	Apparent resistance (Ω)	
0.5	95.1	99.2
1	43.2	26.8
2	20.1	18
3	18	15
4	15	11.2
5	7.9	9.3
10	4.7	4.6
15	4	3.6
20	3.1	3
30	2.8	2.2

SANSA Antenna 1		
	Traverse 1	Traverse 2
Spacing a (m)	Apparent resistance (Ω)	
0.5	69.8	40.2
1	20	20
2	7.1	12
3	5.3	10
4	4.3	9.8
5	3.9	7
10	2.8	2.8
15	2.6	2.6
20	2.2	2.3
30	2.1	2.2
SANSA Antenna 1		
	Traverse 1	Traverse 2
Spacing a (m)	Apparent resistance (Ω)	
0.5	69.8	42
1	21	22
2	7.1	11
3	5.8	10
4	5	9.8
5	3.8	8
10	2.8	2.8
15	2.5	2.5
20	2.3	2.2
30	2.2	2.1

Energy Centre		
	Traverse 1	Traverse 2
Spacing a (m)	Apparent resistance (Ω)	
0.5	58	55.9
1	37.4	21.5
2	23.05	9.05
3	19.5	7.9
4	17	7.4
5	14	5.9
10	12.5	2.8
15	10	2.5
20	2.3	2.25
30		2.15

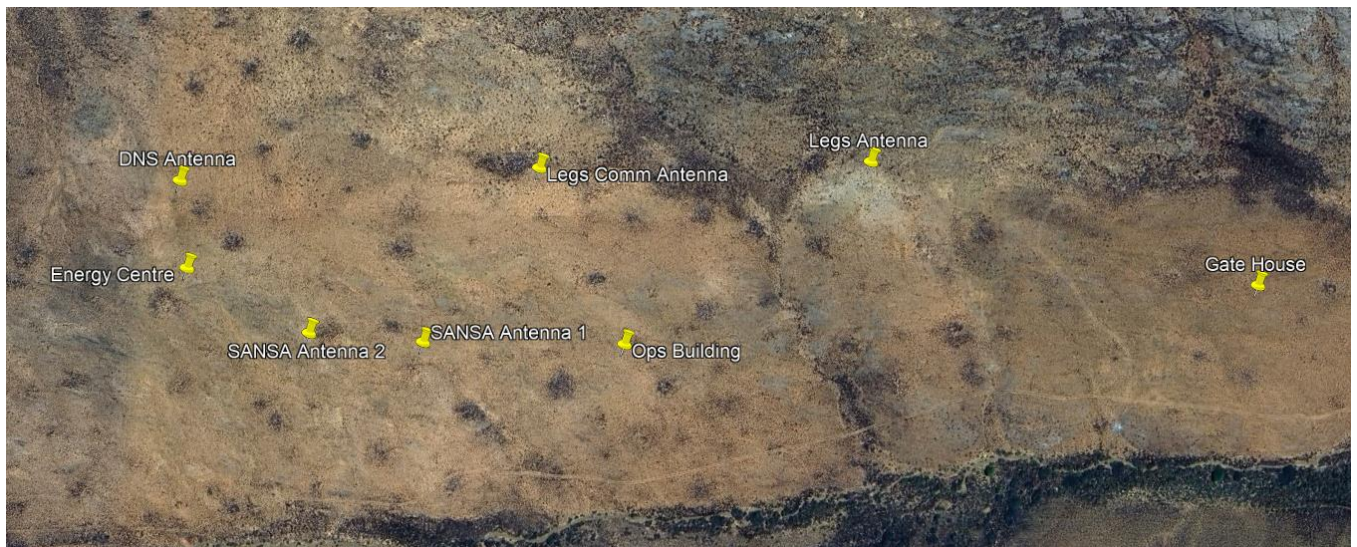


Figure 2 : Test Point Locations

Soil Model Generation

In total, 7 soil models were developed for the various areas on the site. The figures below indicate these models which in turn indicate the soil layers, layer thickness as well as the resistivity.

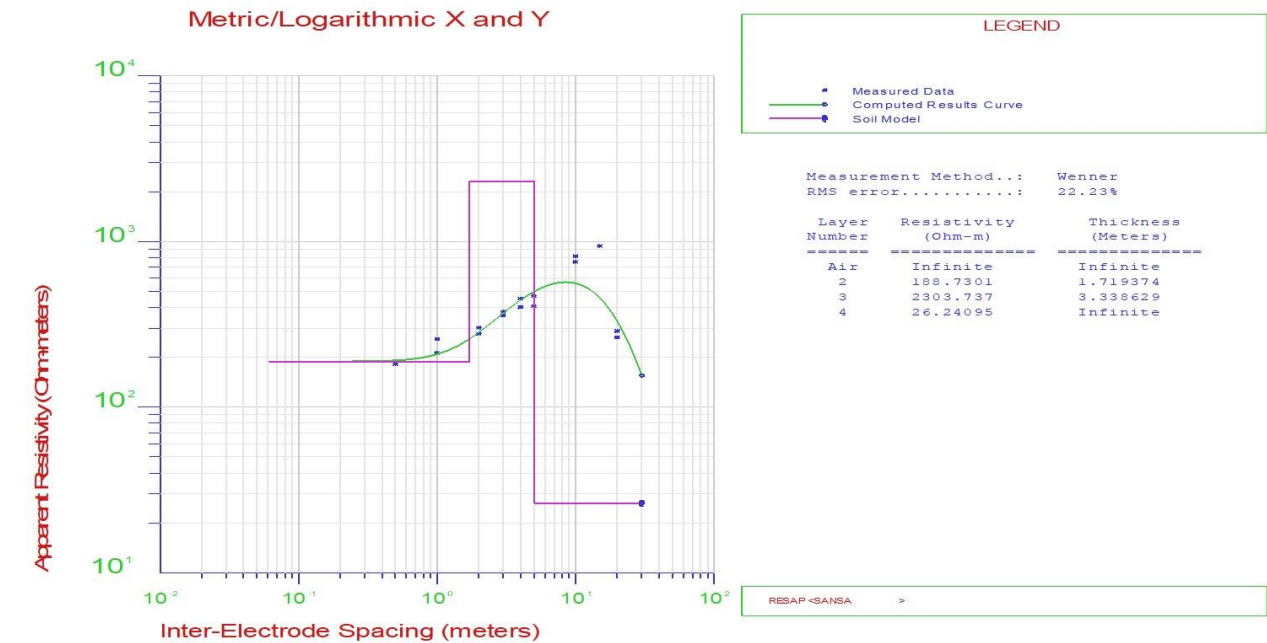


Figure 3 DNS Antenna

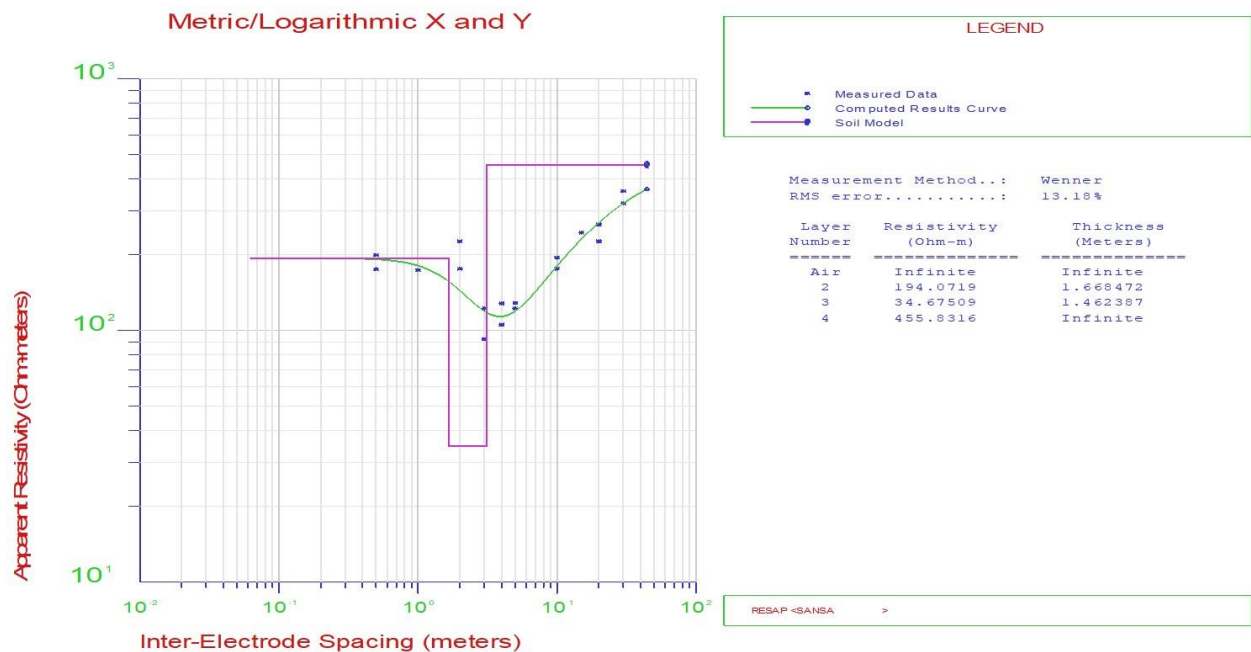


Figure 4 : Gate House

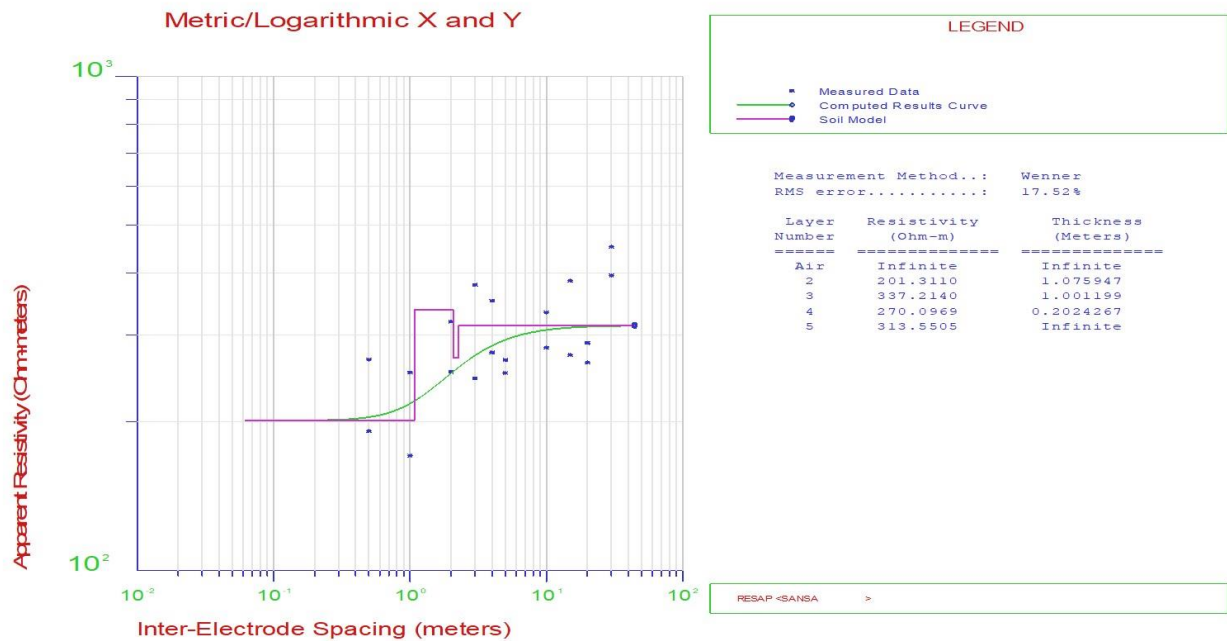


Figure 5: LEGS Antenna

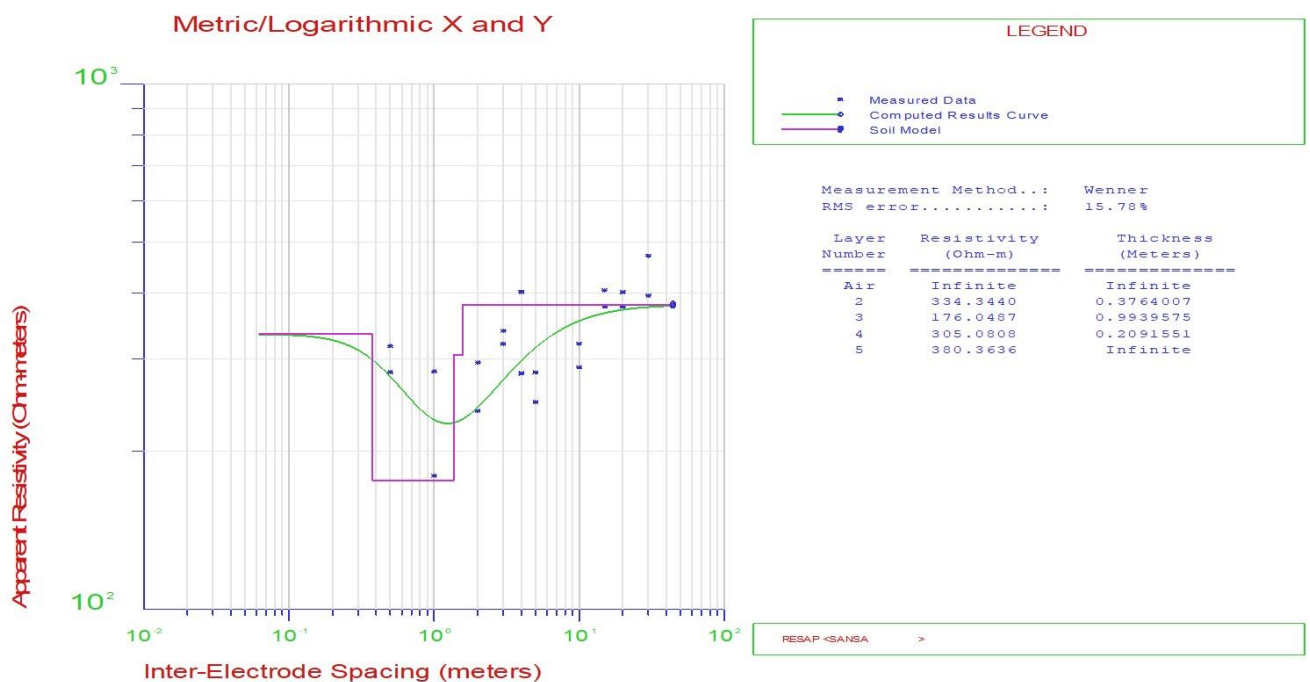


Figure 6 : LEGS COMM Antenna

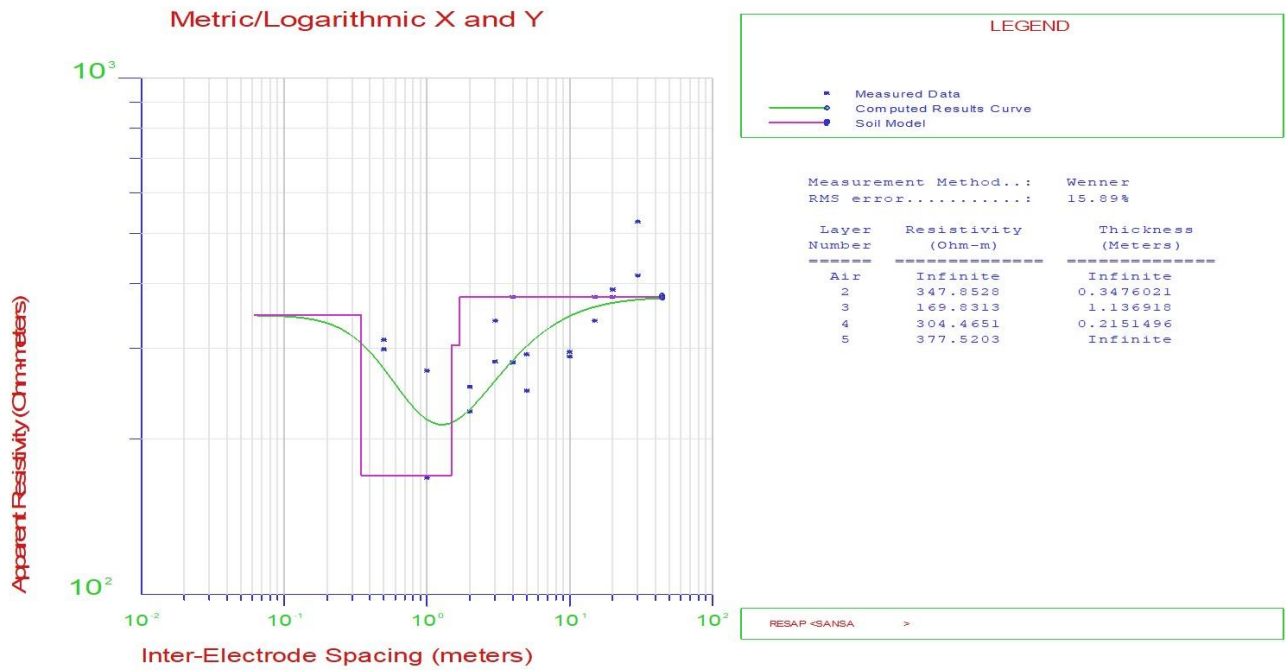


Figure 7 : OPS Building

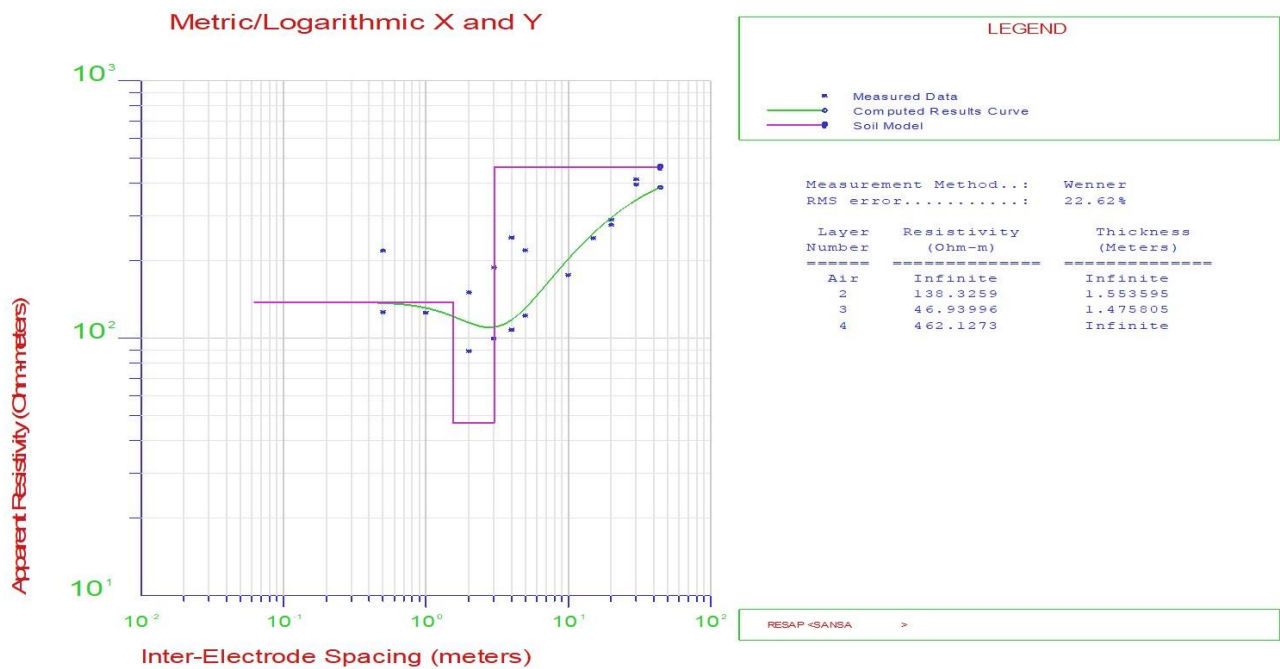


Figure 8 : SANS Antenna 1

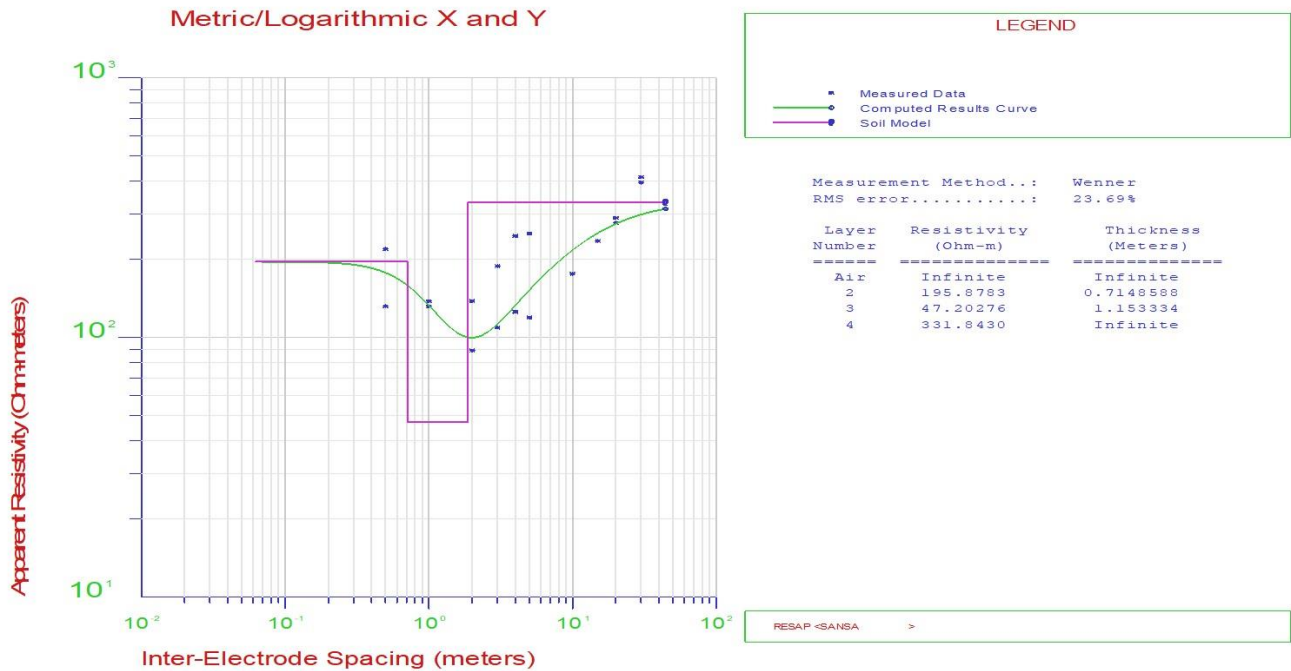


Figure 10 : SANSA Antenna 2

Conclusion

The generated soil modelS indicates that the top layer has a relatively high resistivity and extends about 1.2m from the natural ground level.

The second layer has a resistivity approximately ten times lower than the first layer. It is therefore recommended to install an earthing electrode deeper than 1.2m in order to achieve a lowresistance path to natural earth for lightning and power fault currents.