VOLUME D29
GEOPHYSICAL INVESTIGATION
RESISTIVITY SURVEY

Volum	Km from	Km to	Task	Length	Survey Type
D01	800	1+300	i	0.5	Seismic
D02	27+200	27+500	i	0.3	Seismic
D03	28+400	28+600	i	0.2	Seismic
D04	28+600	29+600	i	1	Resistivity
D05	36+800	37+300	i	0.5	Resistivity
D06	37+300	37+800	i	0.5	Seismic
D07	37+800	38+900	i	1.2	Resistivity
D08	10+200	10+700	iii LLR	0.5	Seismic
D09	300	900	iii	0.6	Resistivity
D10	900	1+300	iii	0.4	Seismic
D11	1+300	2+700	iii	1.4	Resistivity
D12	2+700	3+100	iii	0.4	Seismic
D13	3+100	5+300	iii	3.2	Resistivity
D14	8+500	11+000	iii	2.5	Resistivity
D15	12+000	13+000	iii	1	Resistivity
D16	15+000	18+000	iii	3	Resistivity
D17	20+000	21+000	iii	1	Resistivity
D18	25+200	25+900	iii	0.7	Resistivity
D19	29+500	30+700	iii	1.2	Resistivity
D20	36+400	36+800	iii	0.4	Seismic
D21	38+600	39+300	iii	0.7	Resistivity
D22	39+300	39+700	iii	0.4	Seismic
D23	39+800	41+300	iii	0.5	Resistivity
D24	43+200	43+500	iii	0.3	Seismic
D25	51+700	55+300	iii	3.6	Seismic
D26	68+600	69+800	iii	0.2	Seismic
D27	70+800	71+600	iii	0.8	Resistivity
D28	90+700	91+300	iii	0.6	Seismic
D29	**91+800**	**92+600**	**iii**	**0.8**	**Resistivity**
D30	96+200	98+200	iii	2	Resistivity
D31	1+000	1400	ii	0.4	Seismic
D32	9+000	10+000	ii	1	Seismic
D33	14+500	14+900	ii	0.4	Seismic
D34	20+900	21+600	ii	0.7	Seismic
D35	27+300	27+700	ii	0.4	Seismic
D36	29+500	29+900	ii	0.4	Seismic
D37	32+000	32+400	ii	0.4	Seismic
D38	27+700	29+000	ii	1.3	Resistivity
D39	62+500	64+000	ii	1.5	Seismic
D40	71+000	71+700	ii	0.7	Seismic
D41	73+000	73+400	ii	0.4	Seismic

Introduction

Geophysical Survey presented within this report is part of *Geotechnical Investigation Works in Connection with the Technical Assistance for the Preparation of Road Project Pipeline for the cohesion Fund Contract No.1: Package D.*

Package D comprises delineation by geophysical means of depth to bedrock, bedrock profile as well as nature and extent of the overburden.

Volume D29 requirements: Resistivity Measurements within the area delineated by Task iii, Km 91.800 – 92.600 of projected motorway route.

Present report will describe data processing workflow and results within D29 area, as well as recommendation regarding expected nature and extent of overburden and bedrock as well as other detected sources.

Chargeability measurements were acquired as additional data and have been used to constrain interpretation within this report.

Site overview

D29 Area is located east of *Branisca* village and north of Mures River. Terrain morphology is flat, being covered by agriculture land.

According to available geological information, within D29 Survey Area Quaternary fluvial deposits are expected, most likely clay, sand and gravel. In the surroundings of D29 area, the geology comprises Proterozoic crystalline schist and Cretaceous sandstone.

Fieldwork

In order to acquire a reliable resistivity data set, considering project requirements, pole-dipole array was used, being easy to implement and having proven results. Successive resistivity and chargeability measurements, at 20 meters spacing and 16 levels up to 40 meters depth, insured reliable information on the electric characteristics of the surveyed area.

Workflow

To proceed to interpretation on the nature of the detected sources, resistivity values have been linked to the geological data using Rock Resistivity Tables like the one bellow:

Material	Resistivity Range (Ωm)
Clay	$1 – 10^2$
Sand	$1 – 10^3$
Gravel	$10 - 10^4$
Sandstone	$1 – 10^8$
Dolomite	$10^2 - 10^4$
Limestone	$50 – 10^7$
Basalt	$10 – 10^7$
Gabbro	$10^3 – 10^6$
Granite	$10^2 – 10^6$

Often the resistivity ranges overlap requiring additional data to pin-point the exact nature of the source. Variations in resistivity ranges are caused by moisture and general structural integrity of the detected source.

Measured resistivity values are subject to data inversion having as result an easily interpretable geophysical model of the surveyed area. Over this model, considering distribution of resistivity and chargeability, primary and secondary lithological lines were drawn in order to delineate intercepted sources/layers.

Primary lithological lines were placed especially on high gradient zones, thus representing high contrast limits.

Secondary lithological lines were placed in areas where more subtle changes in geophysical parameters distribution are visible. These lines represent a less precise delineation of sources.

Data Interpretation

Given the above considerations, within D29 Area the following sources have been detected (see Annex 29/41):

Source Type	Resistivity Signature	Chargeability Signature	Position / Dimensions	Expected source
So	Inhomogeneous either low (<60 or very high values (>200 Ωm)	Very low values (<5 mV/v)	Quasi-horizontal layered source, 0.5-10 meters thick continuously present near surface	Soil + Clays ± Sand and Gravel
Sch-1	High values (150-400 Ωm)	Medium (10-35 mV/V)	Source extending from ~5 meters deep up to maximum investigation depth. Intermittently visible throughout the section	Weathered schist?
Sch-2	Very high values (400-1000 Ωm)	High values, (35-70 mV/V)	Isolated quasi isometric sources, extending deeper than maximum investigation depth	Massive schist?

Conclusions and Recommendations

Resistivity values measured in D29 area are not characteristic to sedimentary deposits (high values). Considering available geological information, the survey line has intercepted bedrock likely comprising weathered crystalline schist formations. The source for chargeability in depth is uncertain (Proterozoic schist is not typically chargeable).

Resistivity as well as chargeability characteristic values for the near surface layer (*source type So*) indicate this as being overburden layer (expected to have weak structural integrity).

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