

**MINISTRY OF REGIONAL DEVELOPMENT AND INFRASTRUCTURE
OF GEORGIA
ROADS DEPARTMENT**



**SAMTREDIA-GRIGOLETI ROAD
SECTION OF E-60 HIGHWAY**

**PREPARATION OF ENVIRONMENTAL IMPACT ASSESSMENT,
LAND ACQUISITION, RESETTLEMENT PLAN,
DETAILED ENGINEERING DESIGNS AND TENDER DOCUMENTS**

LOT 1. KM 0+000 – KM 11+500

FINAL REPORT

DRAWINGS

VOLUME VI

**RELOCATION OF GAZ PIPELINES AND
UNDERGROUND FIBRE CABLES**

PROJECT: GEORGIA EAST WEST HIGHWAY



TBILISI, 2013

COMPOSITION OF FINAL REPORT

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RELOCATION OF GAS-MAIN PIPELINE, AVERAGE- PRESSURE AND LOW-PRESSURE PIPELINES

VOLUMES OF WORKS

This project is released according to the gas industry regulations, instructions and state standards.
It provides safe exploitation and protection buildings from fire.

The explanatory report

The Project provided of SAMTRE DIA - LANCHXUTI - GRIGOLETI construction relocation of gas-main pipeline in building zone of autobahn (length of road 1 km+50 m and 8 km+336 m).

The project aims to build gas-main pipelines in connecting areas according to construction standards and rules.

The project is carried out by order of Georgian State Department of Roads.

The pipelines are crossing by building autobahn in some places, but in some case they're crossing by low category moto roads connecting to autobahn. "Crossing #1". belongs to this situation. (The designation for crossings is made by employer. See the plan for construction autobahn. Scale 1:1000). The junction takes place between km 6+372 – km 6+790 of building autobahn, that is connecting to village Pirveli Maisi with motor way. These are Qutaisi-Soxumi d=500 mm P=5,5 Mpa pressure and Samtredia-Senaki d=700 mm. P=5,5 Mpa pressure gas pipelines.

"Crossing #2". In this case, gas pipelines Qutaisi- Soxumi d=500 mm P=5,5 Mpa pressure is crossing in km8+336 and Samtredia-Senaki d=700 mm P=5,5 Mpa pressure is crossing in km8+300 by building autobahn.

"Crossing #3". In this case, at the area of Samtredia-Lanchxuti-Grigoleti in km1+50 by autobahn is crossing d=150 mm middle and high pressure over-ground gas pipelines of Auto gas station, that belongs to the one district of Samtredia.

The project includes the following starting data and materials:

- A) The technical condition of Georgian gas transport company about relocation of main pipelines.
- B) The plan of building autobahn. Scale 1:1000
- C) The datas of geological surveys of territory of building autobahn.

The relocation works of main pipelines should be made by special construction-building organization. Also it is necessary to have a written permission given by Department of sketch-exploitation of Terjola.

Building organisation must follow the approach norms to pipelines in construction process, when they use heavy machinery. (See the technical term of Georgian gas transport company).

Passages must be arranged in advance and then should cross the main pipeline by heavy machinery. (It should be arranged 0.5 meters of mounds and reinforced concrete slab with 200 mm. thickness should layout on it).

The project must be agreed to Georgian oil and gas corporation, but the building should be made by supervision of their representative.

Works should be done according to the building instructions in the protected zone of main pipelines.

Connecting works of relocated gas main pipelines makes Georgian gas transport company. High and middle above-ground gas pipelines relocation works should be performed by tips of Ltd "Samtredia gazı".

The project provides building of $d=700$ mm. $L=1380.0$ m. and $d=500$ mm. $L=1377.0$ m. gas main pipelines, $d=160$ mm. $L=267.0$ m. polyethylene high and middle pressure gas pipelines construction (relocations). The project also provides making encased pipes $d=1000$ mm. $L=139.0$ m. and $d=700$ mm. $L=139.0$ m. steel pipes on gas main pipelines. The disassembling needs to gas main pipelines $d=700$ mm. $L=1026.0$ m. and $d=500$ mm. $L=1025.0$ m. The disassembling needs also to the above-ground middle and high pressure pipelines with supports $d=150$ mm. by length $L=208.0$ m.

"Crossing #1"

Samtredia Senaki $d=700$ mm. $P=5.5$ Mpa pressure and Qutaisi Soxumi $d=500$ mm. $P=5.5$ Mpa pressure relocation of connecting intersection of roads between km6+372 and km6+790 of Samtredia-Lanchxuti-Grigoleti constructive autoban.

The project provides Samtredia Senaki $d=700$ mm. $P=5.5$ Mpa pressure and Qutaisi Soxumi $d=500$ mm. $P=5.5$ Mpa pressure relocation of connecting intersection of roads between km6+372 and km6+790 of Samtredia-Lanchxuti-Grigoleti constructive autoban.

Of this section it is provided to build $d=700$ mm. gas main pipeline by length 409.0 m. The pipe thickness is 8 mm. It should reinforced antirust insulation shall applied on the pipe. Same enhanced anti-corrosive insulation shall be applied when overlapping and on case pipes.

Gas pipeline shall be passed through the cased pipe at crossing places $d=1000$ mm. by length $L=60$ m. The cased pipe shall go to the both side of road by 25.0 m. Dielectric material shall be applied on case pipes. Steel insulated exhaust pipe $d=80$ mm length 25 m shall be constructed on one end.

The exhaust pipe shall be raised by 5 m above the ground and shall have concrete foundation (volume of concrete 0.29 m³).

Insulated lined gas pipeline shall be passed through the cased pipe along its total length. Lining shall be done of timber, width 10 cm and thickness 3 cm. Boarding shall be done into the perimeter of the pipeline and shall be attached to it with $\Phi 6$ mm wire every 1 m.

Project pipeline shall be connected to the existing active pipeline at both ends upon the completion of construction, testing and earthworks. Connection shall be done by the expert assigned by Gas and Oil Corporation.

Dismantling of the cancelled section of the pipeline $\Phi=700$ mm (length 301,0 m) shall be done upon the completion of relocation and cutting into the active pipeline. The dismantled pipeline shall be cut into 12-meter sections and transported to the site assigned by Gas and Oil Corporation.

The relocation of the second $d=500$ mm. gas main pipe line shall be relocated along to the $d=700$ mm. gas main pipe line and it shall be removed from the relocated $d=700$ mm gas main pipe line by 20 meter. Relocation works shall be done by order as it is above. The project provides of building $d=500$ mm $L=427,0$ m. gas pipe line, but $d=500$ mm. $L=319,0$ m gas main pipe line shall be demounted.

Gas pipeline shall be passed through the cased pipe at crossing places $d=700$ mm. by length $L=60$ m. The cased pipe shall go to the both side of road by 25,0 m. Electric material shall be applied on case pipes. Steel insulated exhaust pipe $d=80$ mm length 25 m shall be constructed on one end. The exhaust pipe shall be raised by 5 m above the ground and shall have concrete foundation (volume of concrete 0.29 m³).

Insulated lined gas pipeline shall be passed through the cased pipe along its total length. Lining shall be done of timber, width 10 cm and thickness 3 cm. Boarding shall be done into the perimeter of the pipeline and shall be attached to it with $\Phi 6$ mm wire every 1 m.

In both case corner of gas pipe lines shall be done by pipe bends which are made by the same pipe.

Demounted $d=500$ mm. $L=319,0$ m. gas pipe line shall be transported to the site assigned by Gas and Oil Corporation.

“Crossing #2”

Samtredia Senaki $d=700$ mm. $P=5.5$ Mpa pressure and Qutaisi Soxumi $d=500$ mm. $P=5.5$ Mpa pressure relocation of gas-main pipeline between km 8+300 and km8+336 of Samtredia-Lanchxuti- Grigoleti constructive autoban.

The project provides Samtredia Senaki $d=700$ mm. $P=5.5$ Mpa pressure and Qutaisi Soxumi $d=500$ mm. $P=5.5$ Mpa pressure relocation of gas-main pipeline between km8+300 and km 8+336 of Samtredia-Lanchxuti- Grigoleti constructive autoban.

The gas pipe line $d=700$ mm by length is 971 m. shall be relocated, length of case pipe is 79,0 m, $d=1000$ mm.

The gas pipe line $d=500$ mm by length is 950 m. shall be relocated, length of case pipe is 79,0 m, $d=700$ mm.

The main gas pipe line $d=700$ mm by length is 725,0 m. and the main gas pipe line $d=500$ mm by length is 706 m. shall be demounted.

The relocation and demounte works is similar to previous relocation works.

“Crossing #3”

High and Average pressure above-ground gas pipelines relocation in km1+50 of Samtredia-Lanchxuti-Grigoleti constructive autoban.

The project provides high and average pressure above-ground $d=150$ mm. gas pipelines relocation in km1+50 of Samtredia-Lanchxuti-Grigoleti constructive autoban.

The one district of Samtredia takes gas from the average pressure above-ground gas pipe line, but the high pressure above-ground gas pipe line is a source of auto gas station. Both gas pipe lines are crossing by building roads.

The aim of gas pipe lines relocation is design of crossing placeses according to SNIP 2.04.08-87*.

In fact, it shall be rearranged 4 sections of gas pipe lines. Building of each section shall be constructed by polyethylene $d=160$ mm. pipes under ground. It shall be arranged adapter connector – polyethylene steel $d=160-6''$ at the top and bottom of $d=150$ mm. gas pipe lines in each section. It shall be arranged encased pipe $d=250$ mm. $L=1,0$ m. below the ground level and elevation above the ground level $h=1,0$ m. In cutting places it shall be done steel knees $d=150$ mm. At the crossing of roads gas pipeline shall be passed through the steel cased pipe $d=300$ mm. Dielectric material shall be applied on the both end of case pipes. Steel insulated exhaust pipe $d=50$ mm length 50 m shall be constructed on one end. The exhaust pipe shall be raised by 5 m above the ground.

Gas pipeline construction requires $d=160$ mm. $L=267,0$ m polyethylene, $d=150$ mm. $L=8,0$ m. steel pipes and $d=250$ mm. $L=8,0$ m and $d=300$ mm. $L=60$ m steel pipes for encased.

The project provides demountable works of abolished above-ground gas pipe lines $d=150$ mm. by length 208,0 m. with supports.

Volumes of works for relocation of gas-main, high and average pressure gas pipelines (approximate)

N	Names of works	Meas. unit	Qunaity	Notes
1	2	3	4	5
1	Cleaning of pipeline construction zone from trees and bushes	m ²	1540	
2	Cutting fertile soil in pipeline agricultural zone by bulldozer in 10 m wide section of road with depth 0.3 m and move 30 m wide section	m ³	1680	
3	Leveling of gas pipeline site with bulldozer, transportation to 30 m, width of site 15 m	m ³	3390	
4	Manual excavation of trench soil group III (at the top and bottom of the road)	m ³	160	
5	Excavation of soil with excavator soil group III	m ³	8769	
6	Excavation of soil with hand soil group III	m ³	134	
7	Leveling of trench bottom, reshaping manually, construction of bed from local soft soil, thickness 0.1 m, watering and compaction	m ³	16	
8	Welded Polyethylene pipe $\Phi 160$ by using boxes and putting in trench D=160 mm. – SDR11 PE100	m	267	SDR11
9	D=160 mm Polyethylene pipe pass through cased pipe and maiking rubber rings on it in each 1,5 m	m	68	SDR11
10	Bends on Average pressure Steel bend D=150 mm $\alpha = 90^\circ$ Polyethylene bend D=160 mm $\alpha = 90^\circ$ $\alpha = 45^\circ$	unit	8 9 6	
11	Installation of steel pipes D=159x4,5	m	8	without insulation
12	Making D=50 mm steel insulated pipe for exhaust pipe	m	204	
13	The same without insulation D=57x4	“	14	---“---
14	Polyethylene on steel adaptord = 160x6" at the top and bottom of the road	unit	8	
15	Four unit D=50 mm steel bend $\alpha = 90^\circ$ on the exhaust pipe	“	8	
16	Polyethylene damper at the top and bottom of Polyethylene pipe of average pressure gas pipe line. It shall be removed after finishing the building	unit	8	D=160 mm
17	Strength and air-tightness test of gas d=160 mm pipeline	L.m	267	P=4.5kg/cm ²
18	Sand surface above Polyethylene pipe 0,2 mm.	m ³	51	
19	Polyethylene band 0,25 m above through Polyethylene pipe	L. m.	267	Caption with "gas"
20	Delivery of river gravel and filling of trench at the junction with the road of autobahn	m ³	25	
21	Delivery gravel and filling of trench above 0,15 m with mechanism and gradually compaction at the crossing places	m ³	6	
22	Leveling of trench bottom, reshaping manually, construction of bed from local soft soil, thickness 0.1 m, watering and compaction	m ³	430	
23	Welding of pipes and placing in trench, $\Phi 700$ mm installation $\Phi 500$ mm	L.m	1241 1238	Apart from cased pipe (at the intersection with the road)

1	2	3	4	5
24	Installation of cased pipes	”	139 139 60 8	Φ100000 Φ70000 Φ30000 Φ25000
25	Driving of lined gas pipeline into cased pipe	”	139 139	Φ70000 Φ50000
26	Wooden lining of insulated pipeline and fixing with Φ6 mm wire each 1,0 m	”	141 141	Φ70000 Φ50000
27	Application of dielectric on both ends of cased pipes	unit	4 4 4 8	Φ100000 Φ70000 Φ30000 Φ25000
28	Loading of excavated soil on dump trucks and transportation to 7 km	m ³	508	
29	Cleaning of site of construction from excavated excess soil transportation to 5 km	“	47	
30	Delivery of river gravel and filling of trench at the junction with the road, watering and compaction	m ³	435	
31	Installation of turning angles on pipeline D=700 mm α =50° =55° =56° =62° =70° =90° D=500 mm α =50° =55° =56° =63° =70° =90°	unit	1 2 1 1 1 1 1 1 2 1 1 1 1 1	
32	Application of enhanced antirust insulation on welding joints on pipeline on pipeline – Φ700 on casing – Φ1000 on pipeline – Φ500 on casing – Φ700	”	152 13 152 13	
33	Construction of spheric damper on both sides if the pipeline	”	4 4	Φ72000 Φ53000
34	Strength and air-tightness test of gas Φ720 mm pipeline Φ530 mm	L.m	1380 1377	P=55x1,25= =68,75kg/cm ²
35	Project gas pipeline shall be connected with the existing gas pipeline at the beginning and at the end	unit	4 4	D=720x72000 D=530x53000
36	Examining of welding joints – magnetic testing or γ rays	”	152 152	D=720 100% D=530 100%
37	Filling of trench with local soil, watering and compaction	m ³	7622	
38	Cleaning of site from construction waste, transportation to 7 km	m ³	60	
39	Connecting of average pressure gas pipe line to above-ground gas pipe line D=150x150 mm	place	8	
40	Leveling of extra soil on site	”	1468	
41	Installation of exhaust steel pipe at the end of cased pipe D=80 mm, length 50 m	unit	4	
42	Concreting of foundation from where the exhaust pipe rises above the ground	m ³	2,4	
43	Painting of above-ground exhaust pipe with oil paint (2 times)	m ²	13,6	
44	Installation of measuring check point at the pipeline (C3K-4)	unit	4	(КНП)

1	2	3	4	5
45	Dismantling of the existing average pressure above-ground gas pipeline with supports D=150 mm	L.m	208	D=150 mm.
46	Cutting of dismantled pipes d=150 mm into sections 12,0 m, loading and transportation from production base (to 7 km)	L. m.	208	D=150 mm.
47	Dismantling of the existing underground gas pipeline	L.m	1026 1025	D=70000 D=50000
48	Cutting of dismantled pipes Φ 500 mm into sections 12,0 m, loading and transportation to Terjola regional production base (to 40 km)	„	1026 1025	Φ 70000 Φ 50000

Specification for relocation of gas-main, high and average pressure gas pipelines
(approximate)

Specification							
N	Names of works	Material	Meas. unit	Quantity	Weight kg		Grade
					Unit	Total	
1	2	3	4	5	6	7	8
1	Welded steel pipe D=700(720x10) with enhanced antirust insulation	Steel	Linear m	1380	175.10	241638	20295-85
2	Steel welded pipe for casing D=1000(1020x10) with enhanced antirust insulation	„	„	139	249.1	34625	---“---
3	Welded steel pipe D=500(530x8) with enhanced antirust insulation	Steel	Linear m	1377	102.99	141817	20295-85
4	Steel welded pipe for casing D=700(720x10) with enhanced antirust insulation	„	„	139	175.10	24339	---“---
5	Steel welded pipe for casing D=300(325x8) with enhanced antirust insulation	„	„	60	62,54	3752,4	20295-85
6	Steel welded pipe for casing D=250(273x6) with enhanced antirust insulation	„	„	8	31,52	316,08	---“---
7	Seamless steel pipe D=80(89x6) with enhanced antirust insulation for the construction of exhaust pipe	„	„	104	12.57	1307	8732-78
8	Seamless steel pipe D=80(89x6) without insulation	„	„	20	12.57	251	---“---
9	Seamless steel pipe D=50(57x4) with enhanced antirust insulation for the construction of exhaust pipe	„	„	204	5,21	1062,84	8732-78
10	Seamless steel pipe D=50(57x4) without insulation	„	„	14	5,21	72,94	---“---
11	Steel bend D=50 mm $\alpha = 90^\circ$ for the construction of exhaust pipe	steel	unit	8	0,5	0,4	17375-74
12	Steel bend D=700 mm $\alpha = 50^\circ$ 55° 56° 62° 70° 90°	„	unit	1 2 1 1 1 1			
13	Steel bend D=500 mm $\alpha = 50^\circ$ 55° 56° 63° 70° 90°	„	unit	1 2 1 1 1 1			
14	Steel bend D=80 mm $\alpha = 90^\circ$	„	unit	8			
15	Seam steel pipe D=150(159x4,5) without insulation	steel	m	8	17,15	137	10704-76
16	Steel bend D=150 mm $\alpha = 90^\circ$	„	unit	8	8,0	64	17375-74
17	Polyethylene on steel adaptord = 160x6"	P/Steel	unit	8	27,80	222	32.GKO.00 .11.16.16
18	Polyethylene pipe d=160 mm. PE100 SDR11 PN16	Pol	"	267	6,67	1780,89	7.500.176. 160