

# Modernization of local public services in Republic of Moldova



## THE SECTORAL REGIONAL PROGRAM IN THE FIELD OF LOCAL AND REGIONAL ROAD INFRASTRUCTURE FOR UTA GĂGĂUZIA DEVELOPMENT REGION

(2018-2025)

### CORRIDOR # 2

## R29–Ferapontievca– Avdarma – Chiriet Lunga– R36

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# 1 INTRODUCTION

In this report, are presented the results of the technical inventory of the road #II **R29 – Ferapontievca – Avdarma – Chiriet Lunga – R36** (and preliminary design works for its rehabilitation). The project was identified in accordance with the methodology established in the Sectoral Regional Program for the development of regional and local roads in ATU Gagauzia and approved by the Working Group at the second meeting that took place on 11.04.2018 in Comrat. This report is part of the modernization project for local services in the Republic of Moldova, implemented by GIZ. It presents the results of the technical inventory and road state assessment as well as preliminary project solutions for rehabilitation

An improved road condition will contribute to reduced transport costs, reduced traffic time for traffic participants, improving traffic safety and in-traffic convenience. In general, access to public and social centers will be facilitated, the social conditions of the inhabitants of Ferapontievca, Avdarma and Chiriet Lunga will be improved.

The report contains the general description of the project, the technical solutions proposed for improving the road condition and considerations regarding environmental protection and social issues.

The technical condition of the road was visually determined. Particular attention has been paid to the condition of the road as a more important criterion, which influences the cost of transport, the safety and convenience of road traffic. Also, the elements of road arrangement (pavements, accesses and entrances to the yards), and rainwater capture and evacuation systems.

For an objective approach, the traffic intensity, state and construction of the existing road system have been taken into account.

At the selecting the road structure, has been considered the experience of implementing new technologies for the rehabilitation of local and regional roads.

Various rehabilitation technologies are provided for existing cement, gravel and asphalt concrete coverage. Within the limits of the localities are planned construction of pavements and the entrances to the courtyards, as well as the access to the main road. Recommendations are given for the repairs and maintenance of pluvial water capture and drainage constructions (cuvettes and culverts).

The ecological situation was assessed in the area of influence of the road before and after the rehabilitation of the corridor. Recommendations for environmental protection are made during the execution of the rehabilitation works.

Taking into account the necessary level of reliability, depending on traffic intensity and structure, as well as the increase of prices for materials in relation to the higher transport distance in the southern regions of the Republic of Moldova, the average costs of rehabilitation of one km of road is 260 000 Euro (VAT excluded). The cost of rehabilitation works for the corridor is 3 072 553 Euro, the average cost per 1 km – 194,588 Euro. At the current stage (preliminary project) the project is viable and can be implemented.

The cost assessment was calculate based on effective prices for materials, transport and works in the area of the corridor's location during the period of these studies.

## 2 DESCRIPTION OF THE PROJECT

Corridor II coincides with the regional road G129 **R29 – Ferapontievca – Avdarma – Chiriet Lunga – to the border with Ukraine**, with the exception of the non-consolidated (lftom the ground) sector from the Chiriet Lunga village to the border with Ukraine. The location of this road sector will be specified at the stage of the technical design.

Corridor II is located in the districts of Ciadir Lunga. The corridor connects the R36 Basarabeasca republican Road - Ciadir Lunga with the R29 Comrat - Ciadir Lunga republican Road. Corridor II serves the localities of Ferapontievca, Avdarma and Chiriet Lunga and liaises with the Basarabeasca and Ciadâr Lunga district centers as well as with the capital city of AT Gagauzia, Comrat, and the exit to expressway M3 Chisinau - Comrat - Giurgiulesti – border with Romania.

The length of the Corridor is 15.79 km, the technical category of the road - IV, the width of the carriageway 6.0 m outside the localities and 6.0 - 7.0 m through the localities. Over the 3, 45 km (22%) of the road, it passes through localities and 12,45 km (78%) outside the localities. During km 0, 00 – km 4,98 the road coverage is made of asphalt concrete gravel and from km 7,19 – to km 11.58 (8,60 km) - from gravel. On the road there are 4 bridges with the length from 20 to 40 m, 9 culvers with a diameter from 0.6070 m to 2.00 m with the number of openings from 1 to 3.

Corridor II serves 7,3 thousand inhabitants, 7 social institutions, 130 economic agents, 9 industrial enterprises and 33 commercial enterprises. The layout of Corridor I is shown in Figure 2.1

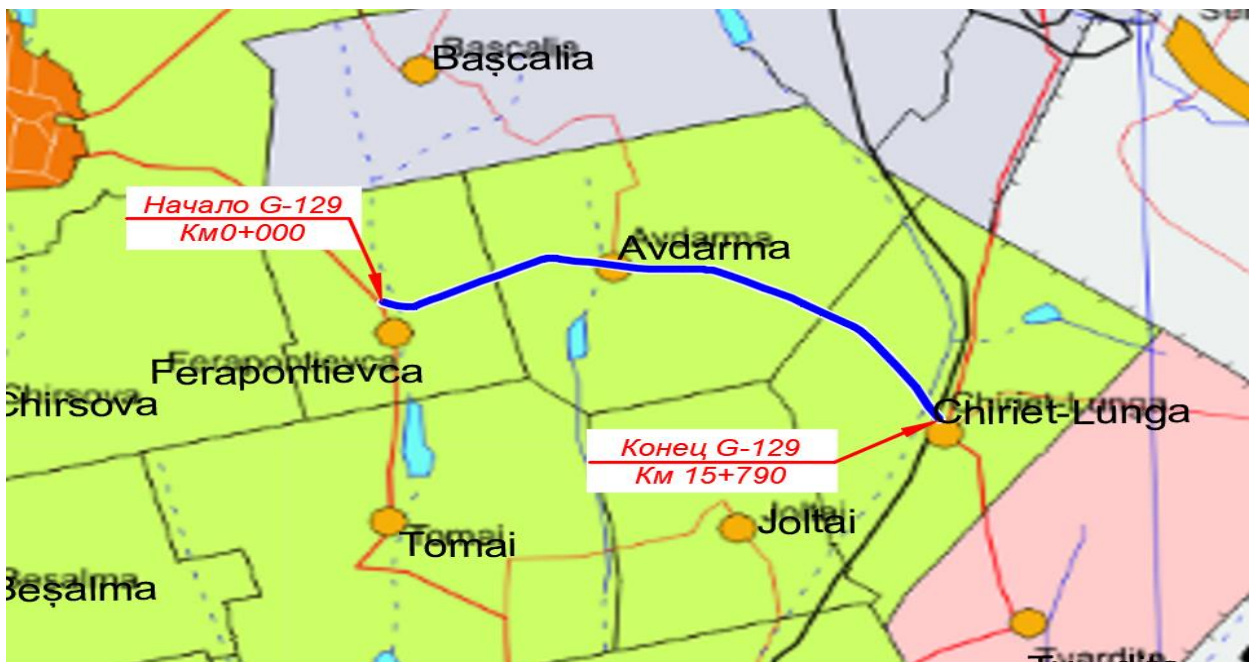


Figure 2.1 Scheme of Corridor II R29 - Ferapontievca - Avdarma - Chiriet Lunga – R36

## 3 THE EXISTING SITUATION

### 3.1 CLIMATE CONDITIONS.

The road is located in the climatic road zone - IV and has a seismicity of 8 degrees on the Richter scale.

#### **The relief**

The UTA Gagauzia territory is located in Stepa Bugeacului, which is a part of the Moldavian South Plain Plateau. Its surface is separated by wide valleys, and the slopes are blunted by multiple ravines. The relief of the region is steppe with insignificant heights. The maximum elevation is 160 m above sea level, the minimum height is 70 m.

#### **Climate**

The climate is warm, 10 degrees Celsius and more and it is kept for 179 - 187 days, which is much warmer than in other parts of Moldova. The maximum reached temperature was 42 ° C, the lowest temperatures between 27 - 29 ° C. The average annual temperature is 10 ° C, the maximum frost depth 60 - 65 cm, the average frost depth 30 - 35 cm

#### **Hydrology**

The water resources of Gagauzia are generally presented by groundwater sources. Surface sources are limited. There are insignificant rivers: Ialpuș, Lunga, Lunguța, and Avdarma. On the territory of Gagauzia are also two water basins: Comrat (1.7 km<sup>2</sup>) and Congaz 4.9 km<sup>2</sup>). Corridor I is located in the Ialpuș river Basin. The corridor intersects Lunga River and the tributaries of Lunguța and Avdarma. The length of the Lunga river is 78 km, the surface of the basin - 1060 km<sup>2</sup>, the difference from the beginning (Ciocmaidan village) to the Ialpuș spill - 123 m. The average flow rate is 0.18 m<sup>3</sup> / sec.

#### **Geology**

On the territory of Gagauzia sandy clays predominate, as well as significant reserves of brown coal, which are in the form of thin and low-grade layers, the extraction of this ore is not profitable. The ground on the route consists of sandy clay and clayey sands.

### 3.2 PLAN OF THE ROUTE

The beginning of the corridor II km 0,00 coincides with the edge of the republican road R29 Comrat – Ciadâr Lunga. Over 1.20 km (from km 0,06. until km 1,26) the road passes through streets of Ferapontievca village. On km 0.59 the route intersects the Lunguța river, where a 40 m long bridge is built. From km 1.20 to km 4.97 the road passes the villages of Ferapontievca and Avdarma. Further on, over 2,93 km the road passes on the central street of the Avdarma village. At km 5,82 and km 6,25 route intersects Avdarma river and its tributary where bridges with the length of 40 and 30 m respectively. From km 7.19 to km 15.46, the road passes land coverages of the Avdarma and Chiriet Lunga villages, where they are planted with vineyards, and over 30 m the road passes through the village of Chiriet Lunga until the intersection with the Republican road R36 Basarabeasca - Ciadâr Lunga - R29 (end of the route). At km 15.68, the road intersects Lunga, where a 40 m long bridge is built. The end of the route, km 15.79, is on the edge of the R36 road.

In general, the route passes on a reliable relief. The geometric elements in the plan correspond to NCM D. 02.01-2015 and SNIP 02.07.01 - 89.

### 3.3 LONGITUDINAL PROFILE

The route is located on an uniform relief. The elements of the longitudinal profile (longitudinal gradients, vertical curves) correspond to the requirements of NCM D. 02.01-2015 and SNIP 02.07.01 - 89 for the

technical category IV of the road. Non-essential changes in the longitudinal profile are possible at the stage of the technical design.

### 3.4 CROSS-SECTIONAL PROFILES

The width of the embankment outside the settlements is 10 m, the width of the carriageway is 6-8 m (it is difficult to determine the width of the carriageway on the sectors with gravel coverage. In localities the width of the carriageway is 6 - 7 m, the total length of the sidewalks is only 0,259 km (7%) out of the 3.45 required in localities. Existing sidewalks are in bad condition and require repair works (tab.1 annex 1). In order to ensure the safety of pedestrians, in localities where they are missing, it is necessary to build new sidewalks. Existing cross-sections generally meet the requirements of NCM D. 02.01-2015 and SNIP 02.07.01 – 89.

### 3.5 ROAD STRUCTURE

The road structure of the corridor consists of three types: concrete cement 5,13 km, or 32% of the length (from km 0,00 to km 5,13 asphalt concrete 2,06 km or 13% of the length (from km 5,13 to km 7,19) and gravel and pebble 8,60 km or 55% of the length (from km 7,19 to km 15,79). The cement concrete cover sector consists of a layer of cement concrete with a thickness of 18 cm and a base layer of 20 cm of crushed stone, the asphalt concrete cover sector consists of a layer of asphalt concrete with a thickness of 5 to 10 cm on a 15 to 25 cm thick broken stone base layer, the gravel and pebble sector cover has a thickness of 15 - 25 cm. The state of the road cover was determined by video footage: 5,13 km (32,9%) - is in very good condition, 4,30 km (27,2%) is in good condition, 5,90 km ( 37.3%) - mediocre and 0.4 km (2.5%) are in bad conditions. Taking into account the ones exposed, the need to rehabilitate the road is justified. More detailed information about road conditions is shown in table 2 Annex 1.

### 3.6 EMBANKMENT, ROADWAY VERGES AND WATER EVACUATION SYSTEMS

The width of the **embankment** is 10 m, which corresponds to the NCM requirements D.02.01-2015 for the technical category IV. In some places, deformations in the form of erosions and sediments are found near the culverts. The width of the **verges** is around 2.0 m, which also meets the normative requirements in force. There is an insufficient level of maintenance. In several sectors (km 11,40 – 14,30), the verges are agglomerated with shrubs; on the 5,30 - 5,70 km and 15,28 – 15,44 sectors, due to the difficult water evacuation conditions, the left lane is subject to erosion. The **water evacuation system** consists of 5,611 km of cuvettes, including 0.541 km of cement concrete and 5.070 of land. There is an insufficient level of maintenance of rainwater evacuation systems.

### 3.7 ART WORKS

Works of art are represented by 4 bridges with the length of 12 to 40 m and 9 culverts with a diameter from 0.60 m to 2.0 m and from one to three openings, of which 7 (78%) are silted at the level of 20 -100%. Totally silted culverts on km 7,10; 9,30 and 14,80. Entrances and exits to some culverts are crowded with shrubs (km 7.10; 9.10; 14.80; etc.), which substantially diminishes the capacity of the culvert. Also, the erosion and the degradation of the consolidations at the exit of the culverts (km 7.10; 9.10; etc.), which represent a threat to the integrity of the embankment. More detailed information on the state of the culverts is provided in Table 3, Annexes 1 and 2.

### 3.8 ACCESSES, COURTYARDS' ENTRANCES, MEANS TO ENSURE ROAD SAFETY

Over the route there are **64 accesses**, including: 10 with asphalt concrete, 14 with gravel, and 40 with land coverage. On the km 0,00 - km 5,13 all the accesses are (3) are arranged and do not require repair. The state of access along the rest of the road is generally bad. Detailed access information is given in Table 4, Annex 1.

In the localities it is necessary to arrange **58 entrances in the courtyard**. At present, the built-in arranged entries are only on asphalted sectors and with curbs. It is evidenced the fitting of the entrances to the yards with different materials (pavements, cement concrete, etc.) by the inhabitants of the villages. Entrance to existing yards is mediocre and poor. This report provides for the arrangement of all entries into the courtyard. Detailed information about the entrances to the courtyard is given in Table 5, Annex 1.

**The road safety and assurance system** is at an insufficient level. Missing guiding pillars, pre-flashing signs, curves, intersections. On asphalted sectors, there is no horizontal marking.

### 3.9 ECOLOGICAL SITUATION

The technical condition of the road essentially influences the environment. Road unevenness (pits, subsidence, etc.) stimulate noise and vibration increase as well as fuel consumption (up to 20%), which increases the amount of harmful emissions in the atmosphere. Roads with gravel coverage are sources of dust, which negatively affect the area around the road (50-100 m). In particular, this is evidenced during the summer, when the plantations are covered with dust, which essentially diminishes the photosynthesis process, thus reducing the harvest of the agricultural crops. It also negatively affects the localities, where dust clouds settle in the households of the inhabitants.



Figure 3.9.1. Dust clouds formation on the gravel roads

The unsatisfactory level of maintenance of art works has contributed to the erosion of downstream alluviums to some culverts, as well as the mudslide of an essential part of the culverts. This has contributed to the acceleration of the erosion process and the flooding of the neighboring territory.



Figure 3.9.2. Silting an essential part of the culvert

## 4 PROPOSALS FOR ROAD REHABILITATION

### 4.1 PLAN OF THE ROUTE

As outlined in Chapter 3.1, the geometric elements of the route plan correspond to the requirements of NCM D.02.01-2015 and SNiP 2.07.01-89 for technical category IV and require changes. The scheme of the route plan is shown in figure 1, annex 3.

### 4.2 LONGITUDINAL PROFILE

Elements of the corridor longitudinal profile meet the requirements of NCM D.02.01-2015 and SNiP 2.07.01-89 for technical category IV roads and do not require special modifications. Changes are possible due to the equalization and increase of the road structure thickness

### 4.3 CROSS-SECTIONAL PROFILES

Outside the localities the cross-sections do not require any improvement, the width of the road section meets the normative requirements. Within the limits of localities, for the safety of pedestrians, it is proposed to build new sidewalks with a total length of 2,580 km. In some sectors, due to the unsatisfactory condition, 0,259 km of sidewalks are rearranged. Through the localities, the transverse profile with borders was established to ensure water evacuation. It is planned to demolish 1,875 km of existing borders and to install 2,580 km of new borders. Detailed information on the construction of new sidewalks, the demolition of existing borders and the installation of new ones is given in Tables 1, 2, 3, of Annex 3.

The characteristic cross-sections profiles for each sector of road are shown in Figure 2, Annex 3.

### 4.4 ROAD STRUCTURE

Variants of rehabilitation have been selected as a result of the analysis (comparison) of traditional technologies and new technologies used in recent years for local and regional roads. Gravel roads are proposed to pass from temporary to light or capital coverage. Repairing gravel clothing by adding a broken stone layer is characterized by a lower service life (7-9 years depending on traffic and land-use), lower average speed, less comfort and safety. Gravel coverage has a negative impact on the environment due to dust, vibration and higher noise.

For sectors with asphalt concrete clothing in bad and very bad condition it is proposed to be used maximum of the material of the existing structure. For this reason, it is proposed to mash the existing asphalt concrete, its kneading with bituminous emulsion and additional gravel (if necessary). For the mediocre and good sectors, is proposed the use of traditional technologies.

**The following project solutions are proposed for the rehabilitation of Corridor II:**

**For gravel sectors** (km 0,00 – 0,580; km 2,150 – 6,540) the next construction of the road structure was established:

#### **Type 1**

- Layer of crushed stone fr. 20 – 40 mm, 10 -20 mm and 5 -10 mm with an average thickness of 12.5 cm by the spin method;
- Vibro-cladded concrete layer with a thickness of 14 cm.

**For sectors with asphalt concrete coverage in mediocre condition** (km 5,13 – 5,26)

## **Type 2**

- Sealing the potholes;
- Equalization layer with average thickness of 2,5 cm;
- Asphalt concrete layer with a thickness of 4 cm.

**For sectors with asphalt concrete coverage in bad and very bad condition (km 5,26 – 7,19):**

## **Type 3**

- Milling of existing asphalt concrete coverage;
- Mixing of milling material with the bituminous emulsion with addition of crushed stone (if necessary) with a thickness of 12 cm;
- Asphalt concrete layer with a thickness of 4 cm.

**For sectors with asphalt concrete coverage in good condition (km 0,00 – 5,13):**

## **Type 4**

- Double bituminous treatment.

Detailed information on proposed road structures as well as work volumes is given in Table 5, Annex 3  
The following sidewalk road structure has been established:

- Drainage layer made of sand – 5,0 cm;
- Base of broken stone - 10,0 cm;
- Asphalt concrete coverage – 3 cm.

## **4.5 EMBANKMENT, ROADWAY VERGES AND WATER EVACUATION SYSTEMS**

In general, the parameters of the embankment correspond to the requirements of the technical regulations in force. When performing repair works in connection with the elevating the carriageway edge, it would be necessary to fill and strengthen the verges. In some sectors, the geometric parameters of the cuvettes must be brought into line with the requirements of the normative and prolonged documents until the works of art. On some sectors it is necessary to repair the concrete cuvettes.

## **4.6 ART WORKS**

There are 4 bridges on the route, 3 of which require mud and shrub cleaning, as well as local repair works. The bridge at km 0.590 was rebuilt in 2016 and is in good condition. 7 of 9 culverts require cleaning and repair of portals and wings. Expenditures for the cleaning of works of art has been estimated and included in other expenses of the estimations. The proposed solution for art works is shown in Table 7 of Annex 3. The volumes of works for repairing the culverts are shown in Table 8, Annex 3.

## **4.7 ACCESSES, COURTYARDS' ENTRANCES, MEANS TO ENSURE ROAD SAFETY.**

It is planned to arrange 53 accesses to Corridor II. The access length is 15 m. The structure of the coverage accesses is analogical to the roadway of corridor. Structure of non-consolidated accesses (from the land) has additional sand drainage layer and crushed stone base layer. Detailed information on the road structure of accesses and work volumes are shown in Table 8, Annex 3.

In addition, it is foreseen improvement for 52 entrances to the courtyards. The road structure at the entrances to the yards is the following: sand drainage layer – 10 cm; base layer of broken stone – 15 cm; coverage of asphalt concrete – 5 cm. Detailed information on sidewalks is given in Table 6, Annex 3.

The installation of road signs and marking shall be carried out in accordance with the applicable regulatory requirements. There is no need for road traffic organization work on km 0,00 - 5,13. For the rest of the sectors it is necessary to install the necessary means to guide the road traffic: signs, metallic parapets, the execution of the horizontal marking.

## **5 CONSIDERATIONS ON ENVIRONMENTAL PROTECTION AND SOCIAL ISSUES**

### **5.1 ENVIRONMENTAL PROTECTION**

In general, rehabilitation of the corridor will lead to a significant improvement in the roadside environment.

#### **5.1.1 Dust reduction**

Changing gravel coverage into cement concrete coverage will significantly reduce dust concentration in the 50-100m area of the road. In particular, this will be emphasized in localities, where dust clouds were sitting in the households of the inhabitants.



Figure 5.1.1.1 Dust clouds formation on the gravel roads.

#### **5.1.2 Reduction of erosion and land flooding.**

Due to defects in capture and evacuation systems of rainwater, there are cases of soil erosion with the tendency of forming the ravines, which in the future can lead to the destruction of the road embankment. In the place where are culverts with sludge, there is evidence of the flooding of the adjacent land with the subsequent formation of a sludge layer on the roadside and around it.



Figure 5.1.2. silted culvert on km 14,800

### **5.1.3 Reduction of vibration, noise and harmful emissions.**

Improving the flatness of the tread surface will contribute to the reduction of vibration and noise in the area of influence of the road, especially when passing heavy trucks. Optimizing the operation of motor vehicles with improved traffic conditions will reduce fuel consumption and thus reduce harmful emissions to the atmosphere (in an average of 10 to 20%)

### **5.1.4 Environmental protection measures during the execution of the rehabilitation works.**

The technological process of road rehabilitation are characterized by the use of large quantities of construction materials, special machines for loading, transporting, distributing and compacting the road structure materials. Lately, mechanisms and installations are used to move materials directly to the site. During the execution of works, it is necessary to permanently monitoring the observance of the environmental protection requirements by limiting and excluding the negative effects on the environment until the admissible norms.

For the stationing of machines and mechanisms it is necessary to arrange special reinforced lands with waterproofing materials to exclude soil pollution. Carrying out the machines will be done in special places.

During operation of the mechanisms, vibration and noise must not exceed the limits set by the rules in force.

When vibrating compacters work in localities, it must be borne in mind that the frequency of the oscillations of the foundations of the constructions is close to the frequency of vibration of the compactor. The distance to houses should not be less than 10m.

Storage of building materials need to be carried out on specially designed land. Keeping bituminous materials in open containers is forbidden.

Once the construction works have been completed, the land for storing materials and stationing the machinery must be re-cultivated.

## **5.2 IMPACT ON SOCIAL STATUS**

Particular attention in the rehabilitation of the corridor are landscaping works of localities: construction of sidewalks, entrance to the courtyards, entrance design, organizing pluvial water evacuation by building of sinks and profile curbs.

Because of these measures, dust formation, noise and vibration in the road area will reduce substantially. All these complex measures will contribute to the improvement of the social conditions of the inhabitants of the villages Ferapontievca, Avdarma and Chiriet Lunga. Landscaping will positively influence the attractiveness of investment in the region. Implementation of the project will have a positive impact on:

- The health of the inhabitants of the adjacent territory;
- Creating additional jobs;
- Improving the quality of transport services;
- Reduction of transportation costs.

In general, the project will contribute to improving the quality of life of the inhabitants of Ferapontievca, Avdarma and Chiriet Lunga.

### **5.3 ISSUES OF LAND EXPROPRIATION AND DEMOLITION OF BUILDINGS**

Throughout the corridor, the existing road area is sufficient to accommodate all road elements. There is no need for land expropriation and construction demolition.

### **5.4 GENDER ASPECTS**

The corridor passes through three villages with a total population of 7 346 inhabitants, including 49% men and 51% women, so women will have more opportunities. Road rehabilitation will help improve living conditions for residents and especially women. Pavement landscaping will allow children to ride in comfortable and safe conditions. Decreasing the concentration of dust will reduce the workload of women in sanitation and washing.

## 6 COSTS EVALUATION

In the report were determined the volumes of the basic works: the rehabilitation of the road structure, the landscaping of the sidewalks, the accesses and the entrances to the yards. The volume art repair works (culverts) was determined roughly, because a more detailed assessment, require additional studies. The costs were assessed based on the prices for works and materials in the road rehabilitation area at the time of this report. The volume of works and the indicative costs are shown in the table 6.1.

Table 6.1: The estimated cost of the rehabilitation of road corridor II

№	Name of the works	Units cost	The volume	Sum, Euro	Sum, lei	
1.	<b>Rehabilitation of the road structure:</b>					
	- Type 1	396,73 mdl /m <sup>2</sup>	60200,00 /m <sup>2</sup>	1204382,51	23882905,20	
	- Type 2	290,73 mdl /m <sup>2</sup>	910,00 /m <sup>2</sup>	13341,76	264567,03	
	- Type 3	471,08 mdl /m <sup>2</sup>	11930,00 /m <sup>2</sup>	283408,19	5619984,40	
	- Type 4	79,73 mdl /m <sup>2</sup>	35910,00 /m <sup>2</sup>	144380,66	2863068,39	
	<b>TOTAL:</b>		<b>108950,00 /m<sup>2</sup></b>	<b>1645513,11</b>	<b>m<sup>2</sup></b>	
2.	<b>Demolition of existing curbs БР100.30.15</b>	20,00 mdl /m	1875,00 /m	1891,07	37500,00	
3.	<b>Instalation of curbs БР100.30.15</b>	245,00 mdl /m	2580,00 /m	31875,95	632100,00	
4.	<b>Building access to the main road</b>					
	- Type 1	396,73 mdl /m <sup>2</sup>	88,50 /m <sup>2</sup>	2709,54*	53730,25*	
	- Type 2	290,73 mdl /m <sup>2</sup>	421,50 /m <sup>2</sup>	7588,20*	150473,96*	
	- Type 3	471,08 mdl /m <sup>2</sup>	1195,50 /m <sup>2</sup>	38024,77*	754031,14*	
	- Type 4	79,73 mdl /m <sup>2</sup>	1416,00 /m <sup>2</sup>	5693,21	112896,26	
	- Type 5	472,49 mdl /m <sup>2</sup>	2655,00 /m <sup>2</sup>	65372,92*	1296345,00*	
	- Type 6	437,83 mdl /m <sup>2</sup>	442,50 /m <sup>2</sup>	9770,05*	193740,00*	
	<b>TOTAL:</b>		<b>6219,00 /m<sup>2</sup></b>	<b>162925,7</b>	<b>3230816,61</b>	
5.	<b>Demolition of existing pavement</b>	8,00 lei /m <sup>2</sup>	- /m <sup>2</sup>	-	-	
6.	<b>Building new sidewalk</b>	250,00 lei /m <sup>2</sup>	38855,42 /m <sup>2</sup>	489856,54	9713855,25	
7.	<b>Arrangement of entries in the yards</b>	300,00 lei /m <sup>2</sup>	6162,65 /m <sup>2</sup>	93232,22	1848795,00	
<b>Repair of artificial structures</b>						
8.	<b>Repair of culverts, m<sup>3</sup> reinforced concrete</b>	1 X Ø0,6m	4600,00 lei /m <sup>3</sup>	5,95 /m <sup>3</sup>	1380,23	27370,00
		2 X Ø1,0m	4600,00 lei /m <sup>3</sup>	11,90 /m <sup>3</sup>	2760,46	54740,00
		1 X Ø1,5m	4600,00 lei /m <sup>3</sup>	9,82 /m <sup>3</sup>	2277,96	45172,00
		1 X 1,0x1,0m	4600,00 lei /m <sup>3</sup>	5,95 /m <sup>3</sup>	1380,23	27370,00
		1 X 2,5x2,0m	4600,00 lei /m <sup>3</sup>	10,60 /m <sup>3</sup>	2458,90	48760,00
9.	<b>Repairing of bridges</b>	11898,00 lei /m <sup>2</sup>	450,00 /m <sup>2</sup>	270000,00	5354100,00	
<b>TOTAL</b>				<b>15,790 km</b>	<b>2671785,37</b>	<b>52981503,88</b>
<b>Means of organization of road traffic, restoring the cuvettes, cleaning of man-made structures and filling up of roadside - 15%</b>				<b>15,790 Km</b>	<b>400767,81</b>	<b>7947225,58</b>
<b>GRAND TOTAL</b>				<b>15,790 km</b>	<b>3072553,18</b>	<b>60928729,46</b>
				<b>1,00 km</b>	<b>194588,55</b>	<b>3858690,91</b>

Notes

\* The cost of the congresses, entrances to yards and sidewalks includes the cost of installing side stones and curbs.

\*\* The exchange rate in accordance with the data of the National Bank on 15.05.2018, 1 Euro=19.83 mdl

Table 6.2: Estimated cost excluding VAT

Details	Euro	MDL
<b>Total costs</b>	<b>3 072 553.18</b>	<b>60 928 729.46</b>
<b>The cost of 1 km</b>	<b>194 588.55</b>	<b>3 858 690.91</b>
<b>Cost per 1 person</b>	<b>407</b>	<b>8 074</b>

The calculation of the estimate cost did not include VAT, the expenses for the elaboration of the feasibility study, technical project, technical supervision and others.

## 7 FINAL STATEMENTS

The purpose of this report is to assess the technical condition of the road **CORRIDOR II R29 –Ferapontievca – Avdarma – Chiriet Lunga – R36** to determine the type of works required their volume, as well as evaluation of rehabilitation costs. These studies as well as the results of previous evaluations (in RSP) will facilitate decision-making process on the prioritization of the road corridor.

Field studies have highlighted the level of degradation of the road, works of art, collecting and drainage systems, as well as landscaping elements (entrances to courtyards, sidewalks, etc.).

The accumulated information has allowed the determination of the technical solutions for each type of existing road structure depending on its technical condition and traffic. It has also helped to determine the solutions for access, courtyard entry, sidewalks and repair of art works. As a result, the cost assessment was made based on the technical solutions proposed by multiplying unit costs to their volume.

Costs by types of works were determined according to the prices set at the time of the studies in the area of the road corridor. For cleaning and repairing drainage ditches, cleaning works, installing road signs, and so on. It was difficult to determine volumes at this stage. These expenses were included in the estimate with a weight of 15%.

It is necessary to mention that the cost estimates will be specified when the technical project will be elaborated.

The project's rehabilitation will allow: to reduce transport costs, to improve the social conditions for the inhabitants of Ferapontievca, Avdarma and Chiriet Lunga villages, to improve the environmental status of the road, to increase traffic safety and in general to increase the living standards and the health of the inhabitants.

The cost of rehabilitation of the **15.79 km** long corridor constitutes **3 072 553 Euro, 194 588 Euro/km and 407 Euro/inhabitant.**