# ROAD INFRASTRUCTURE FOR TOURISM IMPROVEMENT FOR THE KAZBEGI REGION IN GEORGIA

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## ABSTRACT

Road infrastructure for tourism improvement is primarily meant to better respond to a safe and comfortable environment for residents and tourists. Regarding roads it means new approach to achieve value for money objectives and to reduce the administrative effort for road agencies. also, for ensuring more stable funding for road maintenance and to create incentives for technical innovation and higher efficiency.

Agencies need to predict the remaining service period of a roads in order to forecast, budget, and plan for future repairs. The remaining service life concept provided a simple way to do that, often based on the design of the pavement. In the absence of other information, the design period of the road pavement might be treated as equivalent to the remaining life. For pavement management purposes, however, the as-designed road pavement is less significant than the performance and properties of the as-constructed pavement. It is important that all policy, standards and guidelines for performing asset management activities are up to date and has adopted and ratified by the government. Legal standards for asset management activities are important to estimate residual service life or life cycle cost of an asset. Without legal standards it will b mpossible to compare quality with price.

**Keywords**: Road network; Maintenance; Rehabilitation; Road pavement.

## INTRODUCTION

Today Stepantsminda is the administrative centre of Kazbegi historical-cultural region of Georgia - “Khevi”. Also, in the historic retrospect other villages in turn were performing the functions of “Khevi” ceter - “Khevi” Community Council (Council) has been arranged first in the village Satargmno, later in the villages Garbansa and Sioni. Stepantsminda history comes from the ancient period, as evidenced by the rich archaeological material discovered in 1877 that is known as "Kazbegi treasure". Treasures are dated back to First Millennium BC. About two hundred works of Achaemenid art, including a silver bowl, bronze dishes, fibulas, deer sculpture, the human image, scepter tops were among the treasure. Items are dated VI-V century BC. Treasure is considered to be one of the largest in the Caucasus region. According to one of the versions, the toponim Stepantsminda comes from the name of Georgian Orthodox monk Stephe, who built a monastery in the vicinity of the Georgian Military Highway. Khevi

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region and Stepantsminda are mentioned in the Georgian chronicles rarely, so data on the region dated back to XVIII century are of the great importance. Officially the village "Kazbegi" was named in the Soviet period, in 1925. In 1966, the village Kazbegi received a status of township. According to the Presidential Decree No. 14 of 2006, township of Kazbegi has changed its name and was called "Stepantsminda", however, the municipality remained name Kazbegi.


***Figure. 1 - Map of Georgia, with Kazbegi area***

Kazbegi had the special importance from ancient times because of the roads connecting with the north neighbours. The development of the village Stepantsminda was connected with this roads. In the late middle ages this roads came under the control the local nobility. The settlements included in one daba cannot be viewed as one whole in terms of socioeconomic conditions. Stepantsminda and Gergeti generally differ considerably from other settlements of Kazbegi. While the population of Kazbegi is greatly dependent upon small-scale agriculture, only sufficient for sustenance, the population of Stepantsminda and Gergeti is benefitting considerably from the quickly growing tourism sector.

**MAIN PART**

The main choices for tourism improvement regarding road infrastructure should be oriented to provide a clear vision that can be integrated into the road component. Roads and streets should be designed and operated to enable safe, attractive and comfortable access and travel for all users, including pedestrians, bicyclists, motorists and public transport users of all ages and abilities.

As a result of the available information at the inception stage a number of preliminary notes have been made in order to highlight issues that may adversely impact the preparation of detail design. These issues are summarized below for further actions to mitigate the potential impacts they could have in future:

- Poor workmanship of renewed roads;
- Lack of the road maintenance;
- Damages of renewed roads pavement

Based on the above, the following conceptual notes should be taking into account:

**Stepantsminda Roads**

Roads of Stepantsminda can be divided into two types: Perpendicular to the military road and parallel to the military road. As an exception can be considered the new access road to hotel.

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Rehabilitation of two perpendicular Roads (Stepantsminda street and Tbilisi Street) can be planned with stones bricks pavement. Parallel roads and the new access road to hotel can be planned to be rehabilitated with asphalt pavement.

The main plan for Stepantsminda roads is given bellow:

***Figure. 2 – Road Types in Stepantsminda***

The existing roads/streets of Stepantsminda can be divided into the two main categories (Types) and three subcategories:

- Type 1: No action is needed (Turquoise colour)
- Type 2: Full renewal
  - Type 2.1: Main Roads (Orange colour)
  - Type 2.2: Secondary Roads (Yellow colour)
  - Type 2.4: New access Road to Hotels (Purple colour)
- Type 4: Future renewal or New Roads (Grey colour)

The list of the roads/streets for each of the categories (Types) are following:

| **Type 1** | **Type 2.1** | **Type 2.2** | **Type 2.4** |
|---|---|---|---|
| Giorgi Saakadze St. | Stepantsminda St. | Ilia II St. | New access Road to Hotels |
| V.Pitskhelaui St. | Tblisi St. | Tabidze St. | |
| Baratashvili St. | | K.Marjanishvili St. | |
| Vaja-Pshavela St. | | O.Gudushauri St. | |
| I.Chavchavadze St. | | V. Gorgasali St. | |
| Kostava St. | | Aprili 9 St. | |
| Tamar Mepe St. | | Old Town roads | |
| Ilia II St (Until V.Pitskhehelaun St west) | | | |
| D.Agmashenebeli St. | | | |
| Alibegashvili St. | | | |
| Tergdaleulebi St. | | | |
| Kazbegi St. | | | |

***Table 1 - Overview of Stepantsminda roads***

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The pavement design for each of the categories can be following:

Type 1 - This classification refers to the streets where no action is not needed - either because they are in fair condition or there is a plan or renewing them within a few years.

Type 2.1 - 25 cm sand/gravel subbase with a 20 cm base made of aggregate on top of it. These layers serve as a bed for the pavement surface, made of basalt stone bricks. In order to avoid any problem with slope, the pavement is enclosed with concrete frame.

Type 2.2 and Type 2.4 - 25 cm subbase sand gravel layer, a Base aggregate layer of 15 cm and a final pavement layer made by Asphalt concrete hot mix of 4+6 cm as a road surface. The same pavement design is considered for parking places

**Gergeti Roads**

Conversely to the roads of Stepantsminda, the roads of Gergeti are arranged chaotically.

The main plan for Gergeti roads is given bellow:

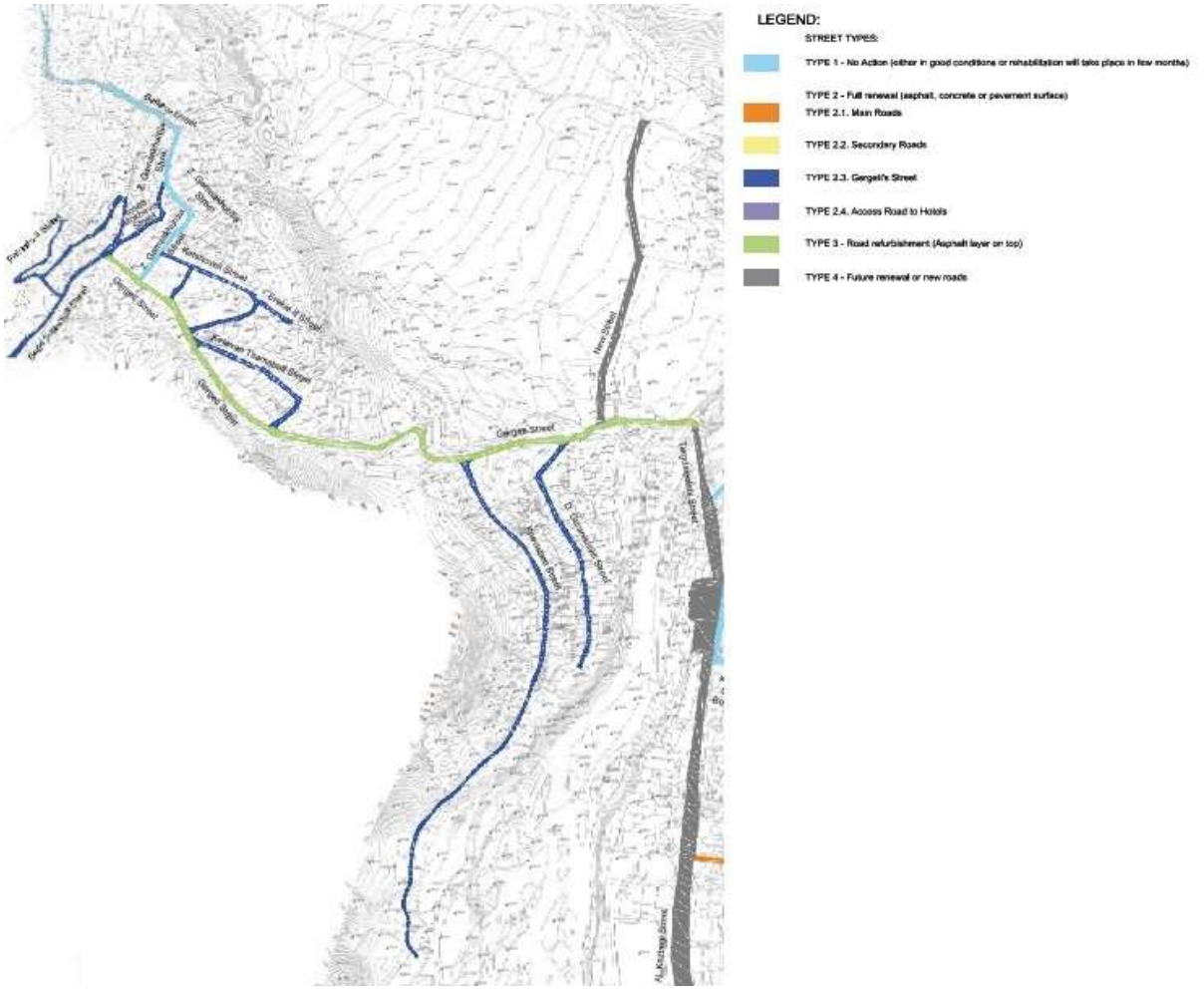


***Figure. 3 – Road Types in Gergeti***

The existing roads/streets of Gergeti can be divided into the three main categories (Types) and one subcategory:

- Type 1: No action is needed (Turquoise colour)
- Type 2: Full renewal
  - Type 2.3: Gergeti's street (Dark Blue colour)
- Type 3: Surface renewal (Light Green colour)

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| Type 1 | Type 2.3 | Type 3 |
|---|---|---|
| Z.Gamsakhurdia St. | Erekle II St. | Gergeti St. |
| Betlemi St. | Ketskhoveli St. | |
| | Badri Sujashvili St. | |
| | Paliashvili St. | |
| | D. Guramishvili St. | |
| | Ioseb Mokheve St. | |
| | Ketevan Tsamebuli St. | |
| | Khevisberi St. | |

***Table 2 - Overview of Gergeti roads***

The pavement design (According the typical Cross Section) for each of the categories can be following:

Type 1 - This classification refers to the streets where no action is not needed - either because they are in fair condition or there is a plan or renewing them within a few years. Some examples of this type of roads are listed below

Type 2.3 - 28 cm of concrete. This layer will lay on top of a 30 cm base surface of crashed material with CBR>80% and a 30 cm subbase sand-gravel material with a CBR>80%.

Type 3 - Main Street with reinforced concrete pavement (deteriorated) planned to be overlaid by asphalt. For the renewal a surface layer of asphalt will be placed on top of the existing concrete pavement, acting this last as a base layer.

**Preliminary budget assessment**

The cost estimate for rehabilitation and expansion of roads (streets) are given bellow:

| Road | Type | Cost Estimate [EUR] |
|---|---|---|
| Stepantsminda St | Type 2.1 | 906,000 |
| Tblisi St | Type 2.1 | 796,000 |
| Ilia II St (After V.Pitskhehelaun St east) | Type 2.2 | 373,000 |
| Tabidze St | Type 2.2 | 840,000 |
| K.Marjanishvili St. | Type 2.2 | 140,000 |
| O.Gudushauri St. | Type 2.2 | 113,000 |
| V. Gorgasali St. | Type 2.2 | 151,000 |
| Aprili 9 St | Type 2.2 | 178,000 |
| Kura St | Type 2.2 | 83,000 |
| Unnamed Road I | Type 2.2 | 65,000 |
| Unnamed Road II | Type 2.2 | 49,000 |
| Gergeti St | Type 3 | 222,000 |
| Erekie II St | Type 2.3 | 19,000 |
| Metshaveli St | Type 2.3 | 86,000 |
| Paliashvili St | Type 2.3 | 144,000 |
| Badri Sujashuili St | Type 2.3 | 67,000 |
| Ioseb Mokhevis St | Type 2.3 | 54,000 |
| Ketevan Tsamebuli St | Type 2.3 | 69,000 |
| Khevisben St | Type 2.3 | 144,000 |

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| Road | Type | Cost Estimate [EUR] |
|---|---|---|
| D. Guranishivili St | Type 2.3 | 332,000 |
| New access road to hotels | Type 2.4 | 836,000 |
| New Parking Lots | | 380,000 |
| Sub-total 1 | | 6,046,000 |
| General items (18%) | | 1,088,000 |
| Sub-total 2 | | 7,135,000 |
| Contingencies (10%) | | 713,000 |
| Total (incl. Contingencies) excl. VAT and other duties | | 7,848,000 |

***Table 3 - Cost estimate of Stepantsminda and Gergeti roads***

**CONCIUSION**

Pavement loading for design purposes is expressed in terms of cumulative Equivalent Standard Axles (ESA). The total number of ESAs which the pavement is required to withstand during its design life. Preferability, certain calculations (including bearing capacity of existing subgrade) should be considered. Also, It is recommended Create a Stepantsminda and Gergeti roads inventory (condition rating) on the basis of a comprehensive physical survey to determine the overall condition of the roads (streets) network and identify areas that require renewal or rehabilitation.

Maintenance works are to be carried out in intervals of years, that are of large-scale, and that are aimed at preserving the structural integrity of the road. This mainly involves activities aimed at rejuvenating the road surface and carrying out repairs over long stretches of road. Maintenance of road is of a great importance in this area due to heavy winter conditions.

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