TA to Connectivity in the Western Balkans

EuropeAid/137850/IH/SER/MULTI

Sub-Project

Code: CONNECTA-TRA-CRM-REG-RS-DD-05
Area: Connectivity Transport Reform Measures

Preparation of selected main/detail designs for improving road safety conditions (risk elimination) along high risk sections in the TEN-T indicative core/comprehensive road networks in the Western Balkans

FINAL CONSOLIDATED REPORT

04 March 2020

MOTT MACDONALD CONNECTA CONSORTIUM

Issue and revision record

Revision	Date	Originator	Checker	Approver	Description
1	04/03/2021	Dusan Savkovic (Proj. Manager)	Giorgos Xanthakos (DTL-KE2)	Chris Germanacos (TL)	Draft Final Consolidated Report

Information Class: EU Standard

Contents

List of Abbreviations

ALB/AL	Albania
AO	Administrative Order
ARA	Albanian Roads Authority
BiH	Bosnia and Herzegovina
CA	Contracting Authority
CNC	Core Network Corridor
CONNECTA	Technical Assistance to Connectivity in the Western Balkans
CONNECTA	The MMD led Consortium implementing CONNECTA
CRM	Connectivity Reform Measures
CRMMP	Connectivity Reform Measures Management Plan
DG MOVE	Directorate-General for Mobility and Transport
DG NEAR	Directorate-General for Neighbourhood and Enlargement Negotiations
EBRD	European Bank for Reconstruction and Development
EC	European Commission
EU	European Union
EUR	Euro (currency)
EuroRAP	The European Road Assessment Programme
FBiH	Federation of BiH (entity)
FR	Final Report
ICJ	International Court of Justice
IFI	International Financing Institution
IFICO	International Financing Institution Coordination Office
IPA	Instrument for Pre-accession Assistance
IPF	Infrastructure Project Facility
ITS	Intelligent Transport Systems
IR	Inception Report
iRAP	The International Road Assessment Programme
KE	Key Expert
KfW	Kreditanstalt fur Wiederaufbau (Bank)
KoM	Kick-off-Meeting
KOS	Kosovo* (hereinafter referred to as Kosovo)
MAP	Multi Annual Plan
MED	Mediterranean (corridor)
MKD	North Macedonia
MMD	Mott MacDonald
MNE/MON	Montenegro
MoTC/MoI/MoCTI	Ministry related to Transport and Infrastructure
MTI	Ministry of Transport and Infrastructure
NIPAC	National IPA Coordinator
NKE	Non-Key Expert
OEM	Orient East Mediterranean (corridor)
PCRF	PC Roads of Federation of BiH

* This designation is without prejudice to positions on status and is in line with UNSCR 1244/1999 and the ICJ Opinion on the Kosovo declaration of independence.

PD	Preliminary Design
PDF	Project Description Form
PE	Public Enterprise
PERS	Public Enterprise Roads of Serbia
PESR	Public Enterprise for State Roads of North Macedonia
PM	Project Manager
REG	Regional
RFA	Request for Approval
RoS	Republic of Srpska (entity of BiH)
RP	Regional Participant
RS	Road Safety
RSA	Road Safety Audit
RSI	Road Safety Inspection
RSWG	Road Safety Working Group
SEETIS	South East Europe Transport Information System
SEETO	South East Europe Transport Observatory
SNKE	Senior Non-Key Expert
SRB/SER	Serbia
TA	Technical Assistance
TAIEX	Technical Assistance and Information Exchange instrument of the European Commission
TCPS	Transport Community Permanent Secretariat
TEN-T	Trans-European Network – Transport
TL	Team Leader
ToR	Terms of Reference
TRA	Transport
UNSCR	United Nations Security Council Resolutions
WB	Western Balkan
WB6	Western Balkans 6 countries
WB (G)	World Bank (Group)

EXECUTIVE SUMMARY

1. CONNECTA consortium ("the consultant") have been appointed by DG NEAR (or "DG") to provide consultancy services for Preparation of selected main/detail designs for improving road safety conditions (risk elimination) along high risk sections in the TEN-T indicative core/comprehensive road networks in the Western Balkans. The end beneficiaries for this sub-project are national Road Authorities/Enterprises.

2. This Final Consolidated Report is based on individual main/detailed designs developed and agreed with the end beneficiaries.

3. The objective of this report is to provide overview of agreed technical measures and their Cost estimates, which will lead in securing the funds for implementation. These measures are direct support to the Western Balkans' ministries responsible for transport and infrastructure and to road authorities for programming infrastructure maintenance.

4. This Final Consolidated Report contains the update of activities carried out, technical report for each section, Cost Estimates, next steps for implementation, conclusions and risks.

5. Cost Estimate is based on a detailed bill of quantities made for each section in each RP. The details of the comprehensive designs have been simplified in order to provide an overview for the purposes of this report. Detailed BoQ and Cost estimates are part of the detailed/main designs and some are presented in the Appendices.

6. The Total estimated costs needed for the implementation of feasible measures is **16,843,962** EUR. Using standard EU practise, this final estimate is based on estimated CAPEX, with an additional 5% of unforeseen works.

7. Summary of costs per section and RP is presented in chapter 5.

No.	RP	Section name	L (km)	Total Price (€)	Total Price (€)/km	TOTAL (€)/RP
1	**ALB**	Shkoder - Koplik	13	842,765	64,828	**2,906,009**
2	**ALB**	Fushe Kruje - Lezhe	35.9	2,063,245	57,472	
3	**BiH**	Ozimice - Topcic Polje	24	2,144,603	89,358	**4,604,738**
4	**BiH**	Jablanica - Potoci	36.3	2,460,135	67,772	
5	**MKD**	Bitola - Prilep	42	1,093,017	26,024	**1,093,017**
6	**KOS**	Fushe kosove - Gjurgjice	28	2,624,675	93,738	**2,624,675**
7	**MNE**	Podgorica - Mioska	54	2,085,682	38,624	**2,085,682**
8	**SRB**	Orlovaca - Stepojevac	44.2	1,820,018	41,177	**3,529,840**
9	**SRB**	Stepojevac - Celije				
10	**SRB**	Bubanj Potok - Mali Pozarevac	20.6	1,709,822	83,001	
		TOTAL	298	**16,843,962**	62,444 average	

1 SYNOPSIS

Project (sub-project) Title:	**Preparation of Road Safety Inspection (RSI) and Audit (RSA) Plans for core/comprehensive network in Western Balkans (WB6) and Pilots**
Project Code:	CONNECTA-TRA-CRM-REG-RS-DD-05
Area:	Connectivity Transport Reform Measures in WB6
Contracting Authority:	European Commission - DG NEAR
Main Beneficiary/Monitoring:	Transport Community the Permanent Secretariat - TCPS
End Beneficiaries:	Albania, Bosnia and Herzegovina, North Macedonia, Kosovo, Montenegro and Serbia
Context:	Regional (Western Balkan area)
Consultant:	Mott MacDonald Ltd. (UK) in Consortium with COWI A/S, WYG, CeSTRA, TRENECON, SYSTEMA
Administrative Order:	24 January 2020
Mobilisation of NKEs:	04 February 2020 (Kick-off Meeting with TCPS on 06 February 2020)
Sub-Project Duration:	13 months
Anticipated completion:	01 March 2021
Responsible Transport KE:	Giorgos Xanthakos (from 15/04/2020), Kostas Georgiou was Transport KE before the date

1.1 Project Purpose and Objectives

The purpose of this technical assistance (TA) is to prepare (main/detail) designs (where needed and feasible to be implemented in short term) along selected priority (in terms of safety risk – accidents prevention) road sections of Indicative Extension of the TEN-T Core/Comprehensive network of the Western Balkan, on the basis of recent road safety inspections (RSI) recommendations for needed interventions.

The objective is to provide direct support to the Western Balkans' ministries for transport and infrastructure and to road authorities for programming infrastructure maintenance and to assist the Transport Community Permanent Secretariat (TCPS) in monitoring the implementation of relevant transport measures in the framework of the Connectivity Agenda.

At a meeting in Ljubljana, on 25 April 2018, the Ministers of Transport of the Western Balkans endorsed a "Road Safety Declaration"[1] which reasserted commitments and set ambitious targets to be developed at regional level in the area of road safety.

Reducing by half the number of road fatalities (almost double the EU average in 2017) is the ambitious target that the Western Balkans have introduced in their National Strategies in line with the EU and global road safety policy.

Thanks to the support of the Technical Assistance for the Western Balkans provided (mid 2017 – mid 2018) by the European Commission (CONNECTA project), a three year Road Safety Inspection (RSI) regional plan was delivered and 580 km of roads were inspected (as pilot) on the Core and Comprehensive TEN-T Road Networks in the Western Balkans (monitored by SEETO).

A first series of projects (as following design studies) is ready for immediate financing with a view to respond to the objective to reduce the number of fatalities in the region.

In addition to these priority actions, a Technical Committee for Road Safety has been set up under the Permanent Secretariat of the Transport Community. A comprehensive action plan for road safety is developed. The role of the Permanent Secretariat will be to support and monitor the implementation this action plan, with a view to make roads in the Western Balkans safer for all users and to meet the standards and the objectives of the EU in this key area.

Hence this TA derives from the completed (July 2018) CONNECTA regional Study on Road Safety area (Preparation of Road Safety Inspections and Audit plans for the core/comprehensive road network in Western Balkans and Pilot them – CONNECTA-TRA-CRM-REG-01) where - among other tasks - actual RSIs were performed along 580km high risk sections of core/comprehensive network, hence it is a direct follow-up from it.

[1] https://www.wbif.eu/news-details/connectas-final-report-road-safety-inspection

The Study, together with all findings, recommendations, specific improvement proposals for inspected priority sections (as pilot) and annexes with reports for each individual road section are approved by all beneficiaries and archived by CONNECTA and TCPS. It was used for justification and support to the preparation of the Connectivity project fiches endorsed by the in Poznan summit.

Therefore, this TA stems directly from the Western Balkans summit in Poznan held in July 2019, where the Project on improving road safety conditions along core/comprehensive network in the Western Balkans was endorsed as one of the regional Transport Community (TC) priorities for which mobilisation of assistance will start immediately.

The related quotation in the Poznan summit conclusions reads: "…Improving connectivity within the Western Balkans as well as between the Western Balkans and the EU is a key factor for growth and jobs and brings clear benefits to the regions and the EU economies and citizens. In the areas of transport and energy, the Commission put forward a new Connectivity package worth 180 mil EUR to be implemented through the Western Balkans Investment Framework … Grants worth €15 million to improve road safety and the operation of border crossing points in the region. Aiming at improving road conditions on sections with high accident rates, whereas improvements on border crossing points will result in time-savings for citizens and heavy good vehicles.[2]"

The respective agreed Project Fiche prepared by the TCPS and approved by the Regional Steering Committee of the Transport Community was annexed to the Summit Conclusions.

Following that (and as per CONNECTA project procedures), a TA request application for the subject assignment was prepared jointly by the TCPS and CONNECTA, screened by the key stakeholders and eventually approved by DG NEAR (on 26- 11 - 2019) as a CONNECTA sub-project (code: CONN-TRA-CRM-REG-RS- DD-05)

1.2 Overview of Project Activities

The project activities are prescribed in the SoW. The scope of the CONNECTA TA is to develop a mature project documentation at the level of Detail Design for feasible and sustainable road safety interventions recommended in the RSI pilots reports.

Pilot road safety inspections

Result

- A total of 580 km Road Safety Inspections carried out in the WB6 Regional Participants
- 24 individual pilot reports prepared.

RSI reporting

	Corridor	Name	Section Start Node	Section End Node
ALB	E762 SH1	Shkoder-Koplik	Road Start Tuzit	Start of By Pass Koplik
ALB	E762	F. Kruje - Lezhe	Overpassing F. Kruje	r/a in Lezha exit
ALB	SH 2	Tirane - Durres	Overpassing Kamez	I/C of By Pass Shkozet
ALB	E 853	Fier - Vlore	I/C to Aulona Road	I/C to rd Sinan Ferhati
BIH	Route 2a	E-661 (M5)	Jajce Jug	Donji Vakuf
BIH	Corridor Vc	E-73 (M 17)	Karuše	Ozimica
BIH	Corridor Vc	E-73 (M 17)	Ozimica	Topčić Polje
BIH	Corridor Vc	E-73 (M 17)	Jablanica	Potoci
MKD	A3		Bitola	Prilep
MKD	A2		Stracin	Kriva Palanka
MKD	R-106		Prilep	Drenovo
MKD	R-106		Drenovo	Rosoman
KOS	R6b		Fushe Kosove	Gjurgjice/ R7-R6b I/C
KOS	R6b		Gjurgjice/ R7-R6b I/C	Kijeve
KOS	R6a		Vetemik/N-2 N-25.2 I/C	Lipjan/N-2 & N-25 r/a
MNE	Route 4		Podgorica	Mioska
SRB	Route 4	IB22	Orlovaca	Stepojevac
SRB	Route 4	IB22	Stepojevac	Celije
SRB	Route 5	IB23	Vrnjci(Ugljarevo)	Kamidzora
SRB	Route 5	IB22	Preljina	Mrcajevci
SRB	Route 9	IB21	Petrovaradin	Sremska Kamenica
SRB	Corridor X	A1	Bubanj Potok	Mali Pozarevac
SRB	Corridor X	A1	Beograd (Dobanovci)	Bubanj Potok
SRB	Corridor Xb	A1	Feketic	Sing

[2] https://ec.europa.eu/commission/presscorner/detail/en/IP_19_3669

By the term “feasible” interventions, it is meant that these:

- may be implemented in short (or at least medium) term
- may directly be designed at “detail design level”, as per national regulations

By the term “sustainable” interventions, it is meant that these would be adopted and supported by relevant stakeholders and road users.

Any interventions that might require land acquisition and extensions to existing built up road section areas, should be avoided as they would require (quite possibly, as per national regulations) firstly preliminary design, very possibly additional geo/topo surveys and more complicated and long-lasting review-approval procedures.

Based on the findings and recommendations from the CONNECTA regional Study (RSI individual reports), as well as on the Road Safety indicators, a list of priorities of road sections for immediate road safety improvements was identified by the TCPS. The list includes 10 road sections (across all SEE parties) of a total length of approximately 300 km.

The selection criteria for prioritisation of sections (among the 580km sections being inspected as pilots), include safety indicators (number of fatalities and serious injuries), consultation with RPs on plans for section improvements (hence avoiding any duplication of design-implementation initiatives) as well as on a corridor approach and in a geographic spread and balance of the road sections to be designed ensuring inclusion of each of the SEE parties.

The list of sections to be designed as well as respective map (including corridor/route and network – core/comprehensive), is as follows:

1. ALB Shkoder-Koplik (length 13km) – route 2b - core
2. ALB Fushe Kruje-Lezhe (length 35.9km) – route 2b - core
3. BiH Ozimice-Topcic Polje (24 km) – corridor Vc - core
4. BiH Jablanica-Potoci (36.3km) – corridor Vc – core
5. KOS Fushe Kosove -Gjurgjice (28km) – route 6b – comprehensive
6. MKD Bitola- Prilep (42 km) – corridor Xd - comprehensive
7. MNE Podgorica-Mioska (54 km) – route 4 - core
8. SRB Bubanj Potok-Mali Pozarevac (20.6 km) – corridor x - core
9. SRB Stepojevac -Celije (22.1 km) – route 4 – core
10. SRB Orlovaca-Stepojevac (22.1km) – route 4 – core

Bases of design, to be provided by beneficiaries with this assignment start, shall be recent geodetic maps along the sections preferably in digital formal (such as DTM).

1.3 Overview of Project Outputs and Milestones

The activities of the assignment shall include:

1. A scoping and needs assessment stage

Envisaged at the beginning of the TA and aiming to identify, among others:

- background documentation, especially geo/topo maps and DTM availability
- site inspections
- feasible measures to be designed (vis-à-vis the respective RSI proposals)
- new emerging TA needs (e.g. small scale topo/geo surveying, potential expropriation needs, environmental assessment/evaluation requirements
- design review and approval procedures (especially for specific interventions, such as street lighting)
- early identification of additional stakeholders when necessary (such as Ministries of Interior) across the region
- risks and uncertainties updating

The expected result from this activity is an agreed list of feasible interventions to be designed (at detail level) and any additional survey needs related to them.

2. Design preparatory works (potential need for surveys)

Shall include any needed (small scale and localised) geo/topo surveys, to allow selected interventions designs and the preparation of base drawings illustrating the current situation with respect to road alignment and related elements, adjacent facilities and accesses, etc.

These drawings (at proper scale, as per national rulebooks) will form bases for the designs.

3. Preparation of design documentation (draft – final)

Consists of the bulk and main task of the TA and shall include the design (ideally at detail level, where allowed by national regulations) of the agreed (after the scoping stage) interventions proposed in respective sections RSI reports.

The proposals in RSI reports are classified in short, medium and long term and for each improvement measure contain information on exact location/chainage, identified problem, risk rate (low, medium, high), proposed solution and implementation cost indication (low, medium, high).

The interventions to be designed are located either on open line and in built-up areas (sub-sections crossing villages or small towns).

They are related to a number or road features and user needs/behaviours, such as: alignment, cross sections, level intersections (signalised or not), accesses, structures and elements along the road, as well as obstacles/installations within the road safety zone.

Hence, the measures to be designed for road safety improvement concern in general: guardrails, crash cushions, access controls, lighting, signage and markings, speed management, pedestrian crossings and other facilities, bus stops, etc.

More specifically and indicatively:

- guardrails (installation, repair/replacement or improvement, as per RSI recommendations), especially ends and connections and especially at culverts and in locations with hard objects;

- signing and markings (installation, replacement or improvement), especially in sharp curves, intersections, accesses, and built-up areas (as well as advertising signs within road safety zone);
- road lighting (installation or improvement), especially in intersections, accesses and built-up-pedestrian areas;
- vehicles and pedestrian conflicts in built-up areas;
- pedestrian crossings and other related facilities in built-up areas;
- vehicles on street parking management-prohibition, especially in built-up areas;
- improvement of bus stops facilities and layouts;
- speed management, especially for conflicts among passing/interurban and local traffic;
- vehicles traffic and lanes management (especially left turn movements on main road);
- unpaved areas aside the main road with unregulated-unchanneled exits and entries.

  In addition, and if feasible for this TA (with respect to the aforementioned intervention design criteria):
- small scale improvements at level intersections;
- high risk road accesses (adjacent houses and commercial installations) improvements.

The resulting design drawings shall be at proper scales, as per national rulebooks (at each WB6 RP) for the specific design stages.

Design documentations shall be prepared at first as “draft”, subject to review and then as “final” incorporating agreed comments, subject to approval.

For each one of the 10 sections, individual stand-alone design documentation shall be prepared.

The foreseen deliverables, are:

- inception/scoping report (due 3 months after start) related to activity 1
- individual draft design documentation reports (per section) related to activities 2 and 3 (due 5 months after the approval of inception/scoping report -without accounting for any needed surveys- and expected to be submitted in stages/per section), subject to formal/external reviews/controls, as per national procedures
- individual final design documentation reports (per section) related to activity 3 (due 1.5 months after receipt of comments on drafts), subject to formal approval
- final consolidated report (due 0.5 months after approval of individual final design documentation reports), subject to TCPS review and acceptance

3 week -review duration is assumed for each inception/scoping report and final consolidated report and 6 weeks for formal/external review/control n of draft design documentation reports.

Based on the above assumptions on reviewing durations, it is expected that the sub-project may be completed within 13 months (at best) from its initiation (of which 10 months net duration), without accounting for any potential needed surveys ahead of any design preparation. However, review and approval-duration, are beyond the control of CONNECTA.

2 Activities Carried Out

2.1 Collaboration with Stakeholders

As agreed at KoM, some reasonable time after, the contact points provided by TCPS are the following:

- ALB Ms. Ariana Hasani (Albanian Road Authority, ARA)
- BiH Mr. Tomislav Bojic (for Federal Ministry of Transport and Communications) and Mr. Senad Smajlovic (PC Roads FBiH)
- MKD Ms. Mirjana Jankovic and Mr. Zoran Velkov (Public Enterprise for State Roads)
- KOS Mr. Emir Morina (Ministry of Infrastructure and Environment)
- MNE Mr. Nikola Arnaut (Transport administration)
- SRB Ms. Olivera Stevic Ledencan (Ministry of Construction, Transport and Infrastructure)

All of them have been contacted immediately by the PM and requested to organise an initial meeting with the proposed agenda. Dates for initial meetings with RPs are presented in the table below:

Table 2.1-1 ***Initial meetings***

RP	Initial meeting Proposed dates	Initial meeting Actual date	Venue
ALBANIA	February 19-20	February 20	MMD office in Tirana
BOSNIA AND HERZEGOVINA	March 31 or April 1	March 18	Tele-conference (Skype)
NORTH MACEDONIA	March 24-25	March 24	Tele-conference (Skype)
KOSOVO	March 10-11	not held	Email exchange of data
MONTENEGRO	March 4-5	March 5	MoTMA office in Podgorica
SERBIA	February 26-27	February 27	MoCTI office in Belgrade

The World Health Organisation on March 11th declared the rapidly spreading coronavirus outbreak a pandemic, acknowledging what has seemed clear for some time — the virus would likely spread to many countries on the globe. This unprecedent event challenged the proposed dates of meeting in usual vis-à-vis format in respective countries. Since travel restrictions followed immediately after the pandemic declaration, the CONNECTA team with the great assistance of TCPS managed to organise tele-conferences (Skype meetings) with representatives from Bosnia and Herzegovina and North Macedonia. The main objective was that the plan to progress was in line with the proposed programmes and the option of tele-conferencing ensured that. In email correspondence with the Kosovo representatives it was accepted that they did not have a capability at that moment to participate in such a meeting. Communication with them was based on email correspondence and request for the existing data, which was proven very efficient. After our request, all data needed from Kosovo have been promptly sent to the CONNECTA team.

It was accepted and well understood that CONNECTA is not responsible for engagement of the entities that will undertake the technical review (independent check) and that this does not come under the SoW. All regional beneficiaries agreed that they would hire a third-part company to perform the reviews. In some countries, laws and practice allow the technical control in parallel with the design process and in some others a reviewer is engaged once the draft final design is finished.

2.2 Review of previous RSIs

One of the main activities of this period for all NKEs was to have an in-depth analysis of all RSI reports that were produced in the previous CONNECTA sub-project (CONNECTA-TRA-CRM-REG-01)

In the previous pilot road safety inspections had been carried out by the team using SEETO's road safety inspection guidelines on 10% (about 580 km) of the core and comprehensive road network considered the highest risk portion of the network based on fatal crash data. Regional Participants prepared a list of their high-risk sections and the team compiled a list of about 550 km of these high-risk roads by maintaining a reasonable distribution among all RPs.

As listed in chapter 1.3, 10 sections in total length of 298km were selected for developing detailed designs of feasible measures. All reports were available to the team upon commencement of the project and they were analysed during this period.

2.3 Missions and Surveys

The general approach for all missions was to allocate 2 or 3 days per WB6 RP. Mission plan was first to have an internal meeting with the designer. After that to have site inspection and establish a common understanding between team members on feasible measures to be designed. These days also include participation at an initial meeting with beneficiaries and stakeholders. All the time available was used for initial surveys and scoping of measures.

The team performed missions in:

- Albania, 19-21 February
- Serbia, 26-28 February
- Montenegro, 4-6 March

As previously stated, since the pandemic was declared by WHO (11th March) travel restrictions from state to state followed successively, so the CONNECTA team was unable to perform missions in BiH, MKD, KOS. Despite this inability, local designers made quite an effort to prepare the information needed for this inception/scoping period, with assistance from the national road authorities/enterprises representatives. In all 3 aforementioned countries experts did a site inspection coordinating with PM and SNKEs. All following missions and surveys have continuously been performed by home based design teams.

2.4 Orthophoto Layouts and production of DTM

After scoping period, it was clear that none of the RPs has accurate and updated topographic data for each section.

Therefore, the CONNECTA team in cooperation with local licenced companies, performed detailed topographic surveys. The first stage was to deliver orthophoto layouts with horizontal accuracy of 2-4cm. The second was to obtain road limits (ROW).

Based on these layouts feasible measures are applied, checked and discussed with the beneficiaries.

Third stage is detailed surveys with Z-axis accuracy of 2 cm, for the development of detailed design. Sections were scanned with LIDAR technology. Production of DTM is developed only at the areas where measures are applied.

Table 2.4-1 **Additional topographic surveys**

Country	Section(s) Length (km)	Additional Geodetic Survey Needed (km)	Officially verified Topographic layouts
ALBANIA	48.9	16	No
BOSNIA AND HERZEGOVINA	60.3	20	No
NORTH MACEDONIA	42	19	No
KOSOVO	28	9	No
MONTENEGRO	54	40	Yes
SERBIA	64.8	20	No
TOTAL	298	125	

3 Agreed feasible measures - Technical report

3.1 Overall approach

It was agreed, as in SoW, that only a selection of short term, and in some cases even medium term, proposals identified and included at the pilot RSI reports would be included at the Scope of the current Project. The principle condition for selection is the ability to fulfil all required approvals by the relevant national legislation within the time frame of the Project, without demanding design studies and capabilities outside the Project Team capacities.

It was agreed that all submissions (designs) should have background / positioning information. The required surveys should be maintained at the minimum required level. Thus, when a small (point) intervention is proposed (e.g. a traffic sign) only a national survey will be requested, while when an intervention along the roadside is proposed, an area survey containing the intervention should be implemented.

Any interventions that require geotechnical, electrical or any other studies that could require time lengthy processes for approval from relevant authorities should not be included. Therefore, for short carriageway widening only one borehole at the existing pavement (small depth carrots) will be taken for geotechnical assessment and information needed for the design of the pavement. Moreover, traffic lights with self-sustainable power system (i.e. power supplied from solar panels), independent from the national electric network, could be included if stakeholders agree.

As far as rock falls, excavation works, intersection lighting, retaining walls or tunnel cross-section have been included as short-medium term proposals at the pilot RSI reports, these will not be included at the Project designs, due to time restrains (time consuming tests, designs, and approvals required).

Wherever a stakeholder's consent or approval is required (i.e. Municipality) the national road authorities and national contact/focal points will counteract with them.

For each section, the CONNECTA team prepared an excel spreadsheet with the list of all short and some mid-term measures from RSI reports. For each measure there were discussions at initial meetings and a list of feasible measures was agreed and distributed after the meetings. Overviews of status of agreed road safety measures are presented in the following sections per RP.

3.2 Technical Report per RP

3.2.1 Albania

Section: Fushe Kruje-Lezhe

Civil engineering

Fushe Kruje - Lezhe Road Section has a length of 35.9 km (codenamed SH1 / E762) and is partly the main interurban road to travel in the corridor Thumane - Milot with double carriages, and partly secondary interurban road for the remaining segment with a carriageway.

The road section is part of the main road corridor that connects the southern and northern part of Albania. The most difficult and unsafe segment is from Milot to Lezha, which is a road with a single carriageway.

This segment is characterised by high traffic volumes, which include all types of transport vehicles, i.e. cars, intercity buses, trucks, construction vehicles, trucks, agricultural vehicles as there is no alternative road.

Traffic is a mixture of local and transit movements. This road section is part of Corridor E-762 which serves as the shortest link between Tirana and Northern Europe (via Sarajevo, Bosnia and Herzegovina and Corridor Vc).

There are many activities near the road and there are many irregular entrances along the road, while the speed limit is 80 km /h and overtaking is allowed.

As already mentioned, the road section is divided into three separate road segments:

A) Single carriageway (one lane for guidance, with many intersections, many commercial activities, many entrances),

B) Highway section with a length of approximately 11 km, with dual carriageway and two lanes for steering and emergency lanes.

C) Single carriageway (one direction lane, with many intersections, many commercial activities, many entrances).

Cross Section

As mentioned above, the road section is divided into three segments (A, B and C).

Segment-A

Segment A is a single carriageway and is located between GPS points by latitude.41,480968; length = 19.710725 to width.41.540999; length.19,67505.

It is a single carriageway with a traffic lane for direction and has many at level intersections, many commercial activities besides the road and many entrances.

Traffic lanes are 3.5-3.75m wide.

Segment-B

Segment B is a dual carriageway and is located between GPS points by latitude.41,540999; length.19,67505 to width.41,658605; length.19,672688.

This highway segment has a length of approximately 11 km, with dual carriageway consisting of two lanes (3.75m wide) and emergency lanes (2.5m wide) for direction. A median separates the two carriageways and has guards on both sides.

Segment-C

Segment C is a single carriageway located between GPS points by latitude.41,658605; length.19,672688 to width.41.78051; length.19,64120.

It is a single carriageway with a traffic lane for direction and has many intersections, commercial activities and entrances.

The width of the traffic lane is 3.5m -3.75 (2x3.5 m)

Terrain extension

In general, the range is very good. The terrain is flat, and the road has no restricted or unsuitable built geometric elements which are not in line with the approved design speed.

The stretch consists of long passages of straight road and curves of large radius between them. All sections of the road have adequate stopping visibility and visibility ban on overtaking.

Intersections

Segment A

It should be noted that there have been a large number of problematic junctions mentioned in the RSI but since the inspection report was made until now some of these junctions have been improved by the interventions made by ARA in the framework of the RRMSP maintenance project which seems also in the photos below.

For this segment, in coordination with the ARA specialists, it was agreed after several field inspections to make improvement interventions in the Derven intersection, which is considered as a high-risk position.

1-**Intersection of Derveni** KM – 4+100

With the intervention and systematisation of this intersection, the obligation to use the crossings is realised, making the passage safe for the school children. The project envisages not only the redesign of the intersection but also the reconstruction of the Crossing platforms making it functional.

The barrier system is expected to be improved for the entire segment. In problematic places where the height of the slope is high, new barriers are added. And along the way suitable terminals are placed. The project for this segment also envisages additions to the vertical and horizontal signage.

The picture above shows the solution provided by the implementation project. As mentioned above, this project was designed based on consultations with the beneficiary and was prepared according to the final Project Idea approved by ARA.

Segment B

For this segment it has been decided not to intervene as this segment is included in another project of ARA.

Segment C

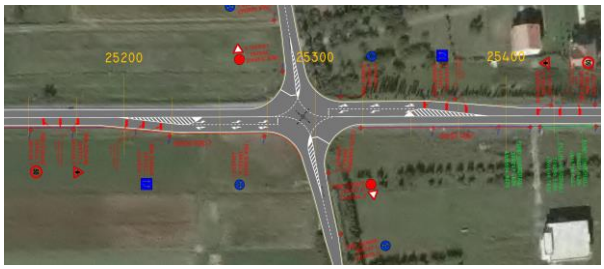
This road segment is similar to the first road segment (segment A), so the problems are of a common nature.

There are many small entrances to the main road. Intersections have only STOP signs without any other element of intersection (deceleration and acceleration lanes, lanes for left turns from the main road, traffic islands, warning signs, direction signs, etc.).

For this reason, it has been agreed to redesign five intersections which appear to be the most problematic.

2-Intersection Makaj

Intersection at KM-25 + 300 with coordinates (E 389311.24 N 4616576.37). At this intersection, the main road is interrupted by "Makaj" streets on the left and "Bajram Curri" on the right. On the left side of the road near the main road there is a concrete factory. The entrance and exit road for this factory is the street "Makaj" which has access to the main road. In many cases the number of trucks moving at

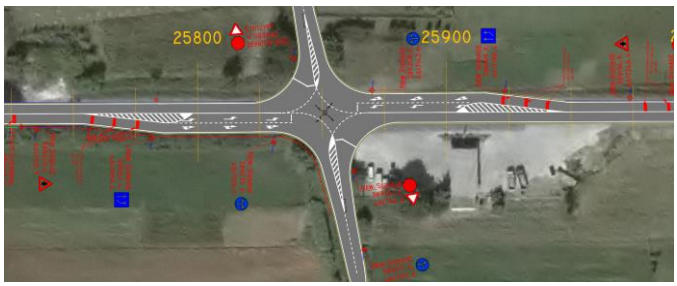


this intersection is relatively high, and this in many cases makes traffic on the main road difficult. Intervention at this intersection is seen as necessary. This intersection is shown in the picture below.

The solution offered by the project is given in the picture below

3-Intersection Gajush

Intersection at KM-25 + 850

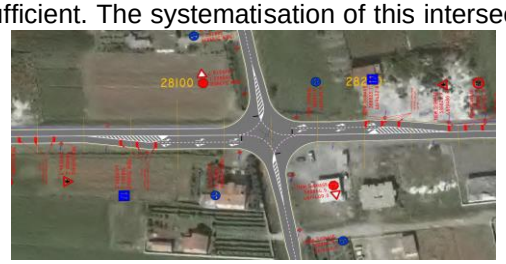


At this intersection, the main road is interrupted by "Ivanaj" streets on the left and "Prelashaj" streets on the right. The main problem at this intersection is the free view. The intersection is invisible. The other fact that increases the risk of this intersection is that the right entrance to the intersection overlaps with the entrance to the fuel, this makes the vehicles coming out of the road "Prelashaj" have significantly low visibility of the main road traffic.

The solution offered by the project not only stabilises the intersection geometrically by channelling traffic in a normal way but solves the problem of viewing distances.

4-Intersection Markatomaj KM-28+150, Coordinates (E 388843.67 N 4619391.89)

At this intersection, the main road is interrupted by Markatomaj Street. The main problem of this intersection is the traffic canalisation. The entrance and exit lanes being unsuitable (too short) create the possibility of entering the main axis at an inconvenient moment. The right side has a problem with the free view. The distance of free view is insufficient. The systematisation of this intersection is seen

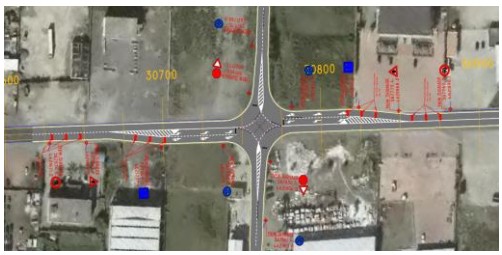


as necessary by the authorities.

The solution offered by the project is that of a Type junction shown in the figure below.

5-Intersection Tresh KM 30+760 Coordinates (E 387814.63 N 4621790.42)

At this intersection, the main road is interrupted by "Lekaj" street. The main problem of this junction is the same as the junction above. The entrance and exit lanes being unsuitable (too short) create the possibility of entering the main axis at an inconvenient moment. The systematisation of this



intersection was seen as necessary by the authorities.

The solution offered by the project is again that of a Type junction shown in the figure below.

6-Intersection Shengjin KM 35+650 Coordinates (E 386510.85 N 4625951.14)

This intersection connects the national road Lezhe-Tirana with the beach of Shengjin. It is a very important node in terms of traffic volume especially in the summer season. We are dealing with a skewed T intersection where in many cases the volume of traffic coming from the secondary road to the primary road is higher than that of the main road itself. This prevents the flow of traffic in both roads creating long queues. This is due to the fact that there is a lack of entry and exit lanes. (Auxiliary Lanes are missing) The return line at the exit is too small and unsuitable for long vehicles. (Corner Radius is not adequate especially for trucks and buses)

For this intersection, after discussing some variants with the representatives of ARA in the Technical Council of December 9, 2020, it was decided that this node will be realised with a roundabout shown in the figure below.

Guardrails

During the preparation of the project, attention was paid to the irregularities of the protective barriers such as unrelated and insufficient lengths, and their damage and collapse. For these reasons, in addition to installing new safety guardrails in places of unprotected solid barriers near the road, replacement of existing parts is planned. It has been taken into account that in some cases the vehicles move at speeds higher than 80 km / h and it can be very dangerous if the vehicles hit these obstacles. With regards to the characteristics of the traffic, for roads of type C, the norms consider a level of service B, which is 1000 vehicles per hour. Relevant elements characterising the project and the type for guardrails are:

- Slope angle for embankments, generally 2/3, with lateral bank; the protection at the base of embankment (or the top of the slope in case of section in cut) is done with road edge gutter;
- Road platform geometry maintains its dimensions also over the structure being overpassed; in this case a protection with steel grid panel should be installed;
- The structure overpassing the main road will be protected with adequate barriers, considering the work width available.

During the process for barrier project, the follow data were considered:

- drawing for road plan, road profile, typical cross section and cross section along the road, with definition of all the major information of:
  - embankments height, slope angle, width for banks;
  - geometric characteristics for kerbs in the major structures along and across the main road
- reference rules for road design.

Roads have to be protected with road guardrails at least in these situations:

- The border of the structures, like bridges, viaducts, overpasses and retaining walls along the carriageway (indifferently with their longitudinal extension or height from ground level);
- The guard-rails, always installed along the main road;
- The side part of the main road in embankment, where the distance between carriageway and ground level is more than 3.00m and the slope angle is more or equal to 2/3 (in agreement with Albanian Road Design Manual – ARDM 2 – Geometric Design);
- The side part of the main road, where the distance between the edge of carriageway and a critical point is less than 10m (critical point could be a fixed obstacle or a water obstruction with water depth of 2m minimum);

- The side part of the main road, where the distance between the edge of carriageway and another traffic area is less than 10m (could be a local road that runs parallel to the main road);
- Singular obstacles of structures overpass the main road.

In agreement with the Standard EN 1317-2 the minimum class “Lc” to be used for the barrier road, for every use (median guardrails, on-side board guardrails, bridge board guardrails) function of the traffic level, as reported in the following Table 3/I, referring to the road category adopted in project.

Road type	**Traffic**	**Destinations of the guardrails**		
		Median	**On side board guardrails**	**Bridge board guardrails**
Highways and main extra urban roads (A –B)	I II III	H2 H3 H3-H4	H1 H2 H2-H3	H2 H3 H3-H4
Secondary extra urban roads and urban roads	I II III	H1 H2 H3	N2 H1 H2	H2 H2 H3
Urban roads of neighbourhoods and local roads (F1-F2…)	I II III	N2 H1 H1	N1 N2 H1	H2 H2 H2

Table – Minimum containment class of the guardrails according to the requirements of the Standard EN 1317-2 referred to the different types of traffic and road classification

To define the functional class of the Fush Kruja-Lezhe road, it refers to:

- class C2 (“secondary extra-urban” road) for connections with the existing local road
- class F1 (local road – extra-urban location) for two-way ramp
- class F2 (local road – extra-urban location) for roundabout.
- Local roads are not envisaged with the installation of a road barrier due to the reduced velocity, in agreement with the executive design.

Types and designs of road safety guardrails are presented on the drawing sheets.

Terminals

The analysis of the current situation showed that the ends of the safety barriers do not ensure safe driving conditions. The terminals are not installed on a large number of barriers or are inappropriate, which can lead to the penetration of the barrier into the vehicle during the impact. In order to improve the road safety situation and reduce the consequences of traffic accidents as much as possible, vehicle restraint systems are considered.

A Terminal is the treatment of the beginning and/or end of a VRS. In addition, it can provide an anchorage for the safety barrier.

A crash cushion is a standalone device installed in front of an obstacle to protect the occupants of a vehicle from colliding with the roadside hazard. They may be provided where a suitable length or provision of VRS cannot be provided or is not appropriate. Roadside hazards for which the installation

of a crash cushion may be considered appropriate may include the ends of retaining walls, abutments, bridge piers, concrete safety barriers, tunnel portals and blunt walls in tunnels, concrete buffers at toll stations etc

Types and designs of road safety barriers terminals are presented on the drawing sheets.

Traffic Signs and markings

The improvement of road signs and markings are also foreseen in the Final Design. For this, the respective layout has been prepared, where the respective signs are positioned in accordance with the geometry of the road and its use. The plan is accompanied by the relevant details so that the contractor has a clear way of construction and placement of road signs. According to the project, horizontal and vertical signage is foreseen.

Types and designs of traffic signs and markings are presented on the drawing sheets.

Section: Shkodra - Koplik

Civil engineering

The road passes through urban, built and rural areas. The road is the main connection between Shkodra (Albania) and Podgorica (Montenegro). The asphalt layer and the shoulders are of inadequate quality.

The composition of traffic is mixed between local and transit traffic. This road section is part of the E-762 corridor which serves as the shortest connection between Tirana and the Vc corridor highway and through it to western and northern Europe (via Sarajevo, Bosnia and Herzegovina).

Speed often occurs because transit vehicles try to minimise travel time.

The road section has many intersections, but there is a lot of traffic in settlements and built-up areas, there are many entrances, etc. Within section in the city of Shkodra when sidewalks exist, they are often occupied by parked vehicles or by booths and collected products.

Common unsafe situations observed are places with a lot of activity on both sides of the road, while overtaking is allowed, and the speed limit is 80 km / h. Furthermore, access to the main road is possible at any point of the road. Furthermore, vehicles parked near the road reduce the viewing distance and block the pedestrian path. Moreover, the perimeter walls of the courtyard are made of concrete blocks and placed near the road, especially in built-up areas.

There are cyclists and pedestrians who use the sidewalks. It is unsafe as the allowed speed limit is 80 km / h. As shown in the photos below, the distances between vehicles and cyclists / pedestrians are not sufficient, so, unsafe.

Cross Section

The inspected road is inseparable with a traffic lane for direction and paved sidewalks. The traffic lane is 3.75m wide and the sidewalks are 1.65m wide.

For a specific section (from GPS point width.42.078951; length.19.514628 to GPS point width.42.106869; length, 19.503160) there are sidewalks for pedestrians.

The width of the carriageway (wide traffic lane and paved sidewalk) encourages speeding and overtaking.

The asphalt surface of the traffic lanes and sidewalks is of suitable quality.

Terrain extension

In general, the range is very good. The terrain is flat, and the road has no restricted or unsuitable built geometric elements which are not in line with the approved design speed.

The stretch consists of long passages of straight road and curves of large radius between them. All sections of the road have adequate stopping visibility and visibility ban on overtaking.

Intersections

Along the rural part of the road section, there are many small intersections where STOP or warning signs are missing. The vision problems at those intersections are not serious, but the mentioned missing traffic signs can cause unexpected driver behavior. For this reason, the project has revised this aspect.

1-Roundabout "Tek 5 Herojt e Vigut" KM-1+300 Coordinates (E 376558.58 N4660767.77)

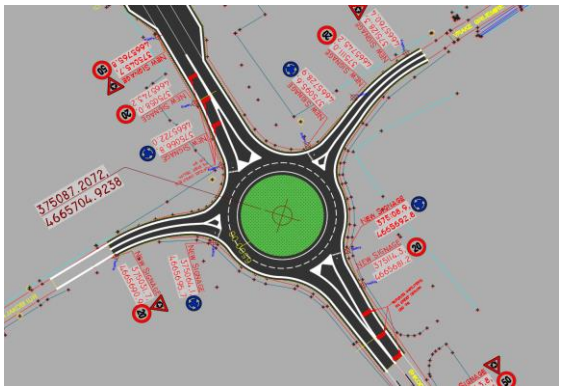
Based on the findings of RSI - September 2017 as well as from the observation in the country, in cooperation with the specialists of ARA, it was decided to intervene in the Roundabout at Heroes of Vigo.

The roundabout is without strong islands and consequently without mandatory signs on traffic islands. The deviation is not enough in the direction Koplik - Shkodër enabling very fast speed through the roundabout. Many irregular commercial activities are present at the roundabout, so there are many parking and pedestrian activities. An unsafe concrete wall is built at the north exit of the roundabout.

The solution offered by the project not only channels the traffic in a regular way but also provides solutions for pedestrians, anticipating the obstruction of pedestrian crossings in the country.

1-Roundabout "Gruemires" KM-6+500 Coordinates (E 375087.20 N4665704.92)

This roundabout has also been considered problematic by the authorities. It is without hard traffic



islands and without traffic signs on them. In addition, there is uncontrolled access from neighbouring parking places directly to the roundabout. There are no STOP signs on the secondary approach (connected to the west).

The redesign is shown in the figure below:

Guardrails

During the preparation of the project, attention was paid to the irregularities of the protective barriers such as unrelated and insufficient lengths, and their damage and collapse. For these reasons, in addition to installing new safety guardrails in places of unprotected solid barriers near the road, replacement of existing parts is planned. It has been taken into account that in some cases the vehicles move at speeds higher than 80 km / h and it can be very dangerous if the vehicles hit these obstacles. With regards to the characteristics of the traffic, for roads of type C, the norms consider a level of service B, which is 1000 vehicles per hour. Relevant elements characterising the project and the type for guardrails are:

- Slope angle for embankments, generally 2/3, with lateral bank; the protection at the base of embankment (or the top of the slope in case of section in cut) is done with road edge gutter;
- Road platform geometry maintains its dimensions also over the structure being overpassed; in this case a protection with steel grid panel should be installed;
- The structure overpassing the main road will be protected with adequate barriers, considering the work width available.

During the process for barrier project, the follow data were considered:

- drawing for road plan, road profile, typical cross section and cross section along the road, with definition of all the major information of:
  - embankments height, slope angle, width for banks;
  - geometric characteristics for kerbs in the major structures along and across the main road
- reference rules for road design.

Roads have to be protected with road guardrails at least in these situations:

- The border of the structures, like bridges, viaducts, overpasses and retaining walls along the carriageway (indifferently with their longitudinal extension or height from ground level);
- The guard-rails, always installed along the main road;

- The side part of the main road in embankment, where the distance between carriageway and ground level is more than 3.00m and the slope angle is more or equal to 2/3 (in agreement with Albanian Road Design Manual – ARDM 2 – Geometric Design);
- The side part of the main road, where the distance between the edge of carriageway and a critical point is less than 10m (critical point could be a fixed obstacle or a water obstruction with water depth of 2m minimum);
- The side part of the main road, where the distance between the edge of carriageway and another traffic area is less than 10m (could be a local road that runs parallel to the main road);
- Singular obstacles of structures overpass the main road.

In agreement with the Standard EN 1317-2 the minimum class “Lc” to be used for the barrier road, for every use (median guardrails, on-side board guardrails, bridge board guardrails) function of the traffic level, as reported in the following Table 3/I, referring to the road category adopted in project.

Road type	**Traffic**	**Destinations of the guardrails**		
		Median	**On side board guardrails**	**Bridge board guardrails**
Highways and main extra urban roads (A –B)	I II III	H2 H3 H3-H4	H1 H2 H2-H3	H2 H3 H3-H4
Secondary extra urban roads and urban roads	I II III	H1 H2 H3	N2 H1 H2	H2 H2 H3
Urban roads of neighbourhoods and local roads (F1-F2…)	I II III	N2 H1 H1	N1 N2 H1	H2 H2 H2

Table – Minimum containment class of the guardrails according to the requirements of the Standard EN 1317-2 referred to the different types of traffic and road classification

To define the functional class of the Shkodra-Kolpik road, it refers to:

- class C2 (“secondary extra-urban” road) for connections with the existing local road
- class F1 (local road – extra-urban location) for two-way ramp
- class F2 (local road – extra-urban location) for roundabout.
- Local roads are not envisaged with the installation of a road barrier due to the reduced velocity, in agreement with the executive design.

Types and designs of road safety guardrails are presented on the drawing sheets.

Terminals

The analysis of the current situation showed that the ends of the safety barriers do not ensure safe driving conditions. The terminals are not installed on a large number of barriers or are inappropriate, which can lead to the penetration of the barrier into the vehicle during the impact. In order to improve

the road safety situation and reduce the consequences of traffic accidents as much as possible, vehicle restraint systems are considered.

A Terminal is the treatment of the beginning and/or end of a VRS. In addition, it can provide an anchorage for the safety barrier.

A crash cushion is a standalone device installed in front of an obstacle to protect the occupants of a vehicle from colliding with the roadside hazard. They may be provided where a suitable length or provision of VRS cannot be provided or is not appropriate. Roadside hazards for which the installation of a crash cushion may be considered appropriate, may include the ends of retaining walls, abutments, bridge piers, concrete safety barriers, tunnel portals and blunt walls in tunnels, concrete buffers at toll stations etc

Types and designs of road safety barriers terminals are presented on the drawing sheets.

Traffic Signs and markings

The improvement of road signs and markings are also foreseen in the Final Design. For this, the respective layout has been prepared, where the respective signs are positioned in accordance with the geometry of the road and its use. The plan is accompanied by the relevant details so that the contractor has a clear way of construction and placement of road signs. According to the project, horizontal and vertical signage is foreseen.

Types and designs of traffic signs and markings are presented on the drawing sheets.

3.2.2 Bosnia and Herzegovina

Section: Ozimice – Topcic Polje

Civil engineering

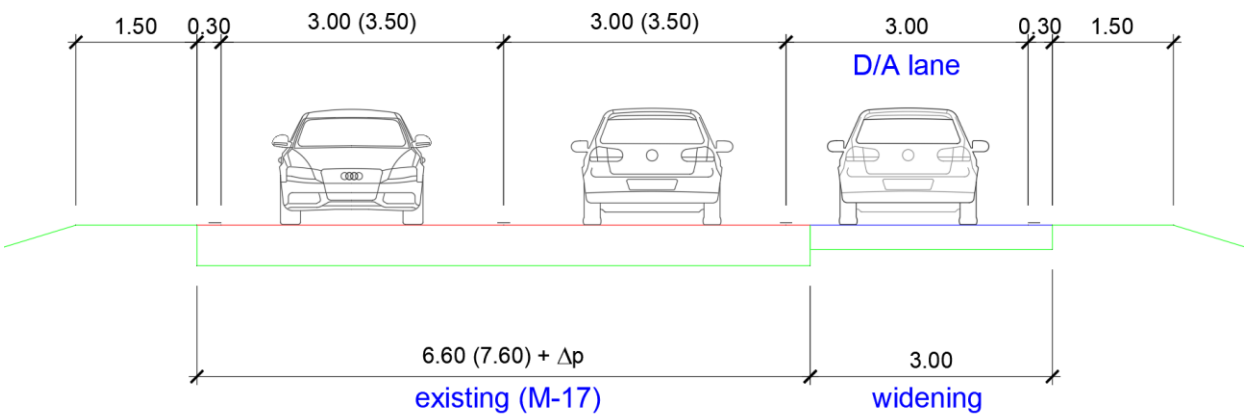
Based on the orthophoto layouts of the section Ozimice - Topčić Polje, possible solutions for the implementation of the measures proposed by the RSI report from 2017 are defined. Also, proposals for improving traffic safety have been defined at locations that are not covered by the mentioned RSI report, which primarily refers to bus stops.

Based on field visits and comprehensive analyses on orthophoto bases, preliminary solutions for improving traffic safety at individual connections, in the zones of gas stations, service facilities and parking lots, at bus stops and in zones with unprotected obstacles along the road have been defined.

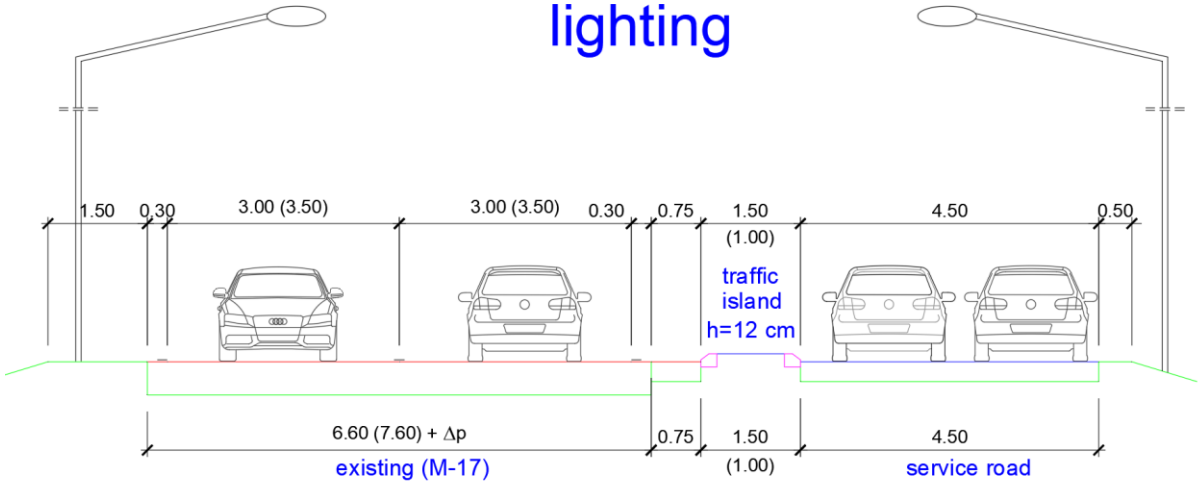
Traffic safety problems are dominant on this section and are related to access to individual private and commercial facilities. Therefore, most of the defined proposals for improving traffic safety relate to solving the access.

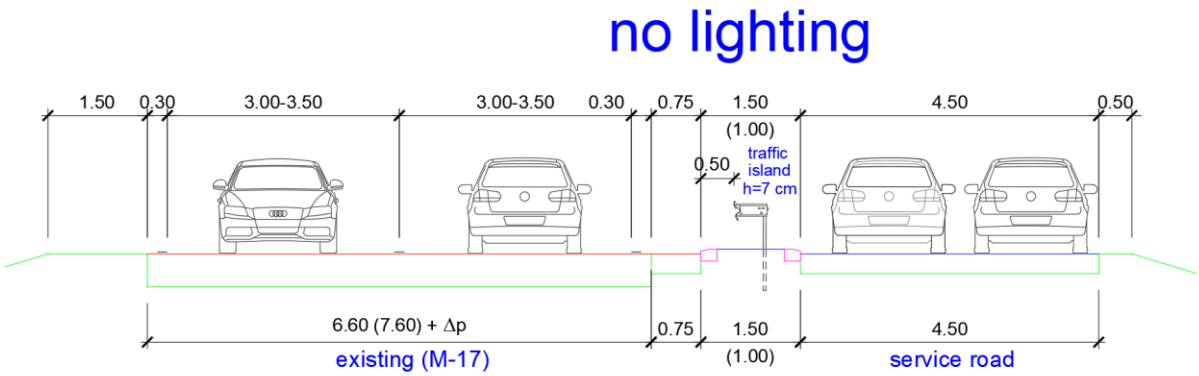
Regarding the applicability of the solution types defined by the RSI report, it was concluded that it is possible to apply type 2 or type 3 solutions of individual connection at certain locations.

Type 2 is characterised by a deceleration-acceleration lane 3.00 m wide in one or more close individual connections in case of space limitations and impossibility to apply the type 3 solution in the existing road zone. These are presented in the figure below.

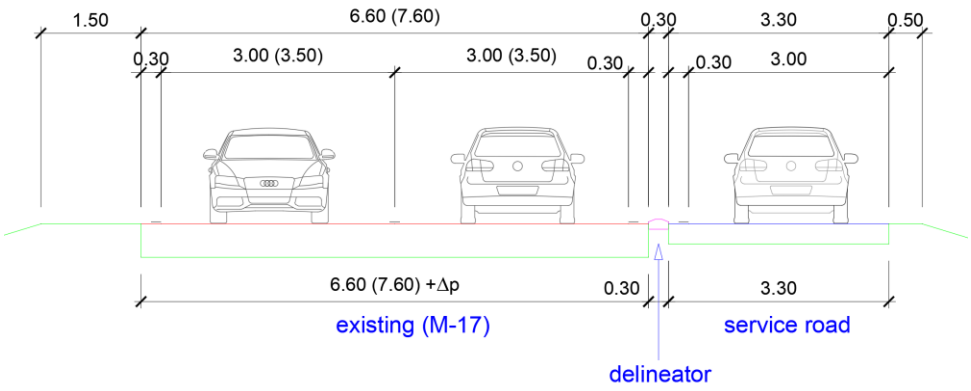


Type 3 is developed in two sub-variants, depending on the available space in the existing road zone. The basic solution is characterized by a service road 4.50 m wide, which is separated from the main road carriageway by a physical dividing island 1.50 (1.00) m wide. Presented in figure below.





In case of spatial limitations and impossibility of applying the basic solution, a solution with a delineator in the form of a prefabricated curb 7 cm high is planned. The curb is placed between the main road carriageway and the service road 3.30 m wide. These are presented in the figure below.



Interventions in the zones of commercial facilities access along the road, besides providing possible deceleration-acceleration lanes, are reflected in defining additional physical central reserves along the main road carriageway, in order to reduce the length of conflict zones and prevent illegal (unsafe) vehicle manoeuvres.

At the bus stops, through the proposed solutions, the aim was to establish the application of a unified type of bus stop, in accordance with the applicable Ordinance. The proposed project solution provides relocation of individual bus stops in order to achieve the correct mutual position of the stop, ie to first encounter a stop in the opposite direction in the direction of travel, which is important from the pedestrian safety point of view and the possibility of safe crossing in the zone between opposite stops.

Special attention was paid to defining the position of the missing protective guardrails along the route of the subject section, where the recommendations from the RSI report were maximally respected, with additional consideration given to locations that were not covered by the mentioned report.

Cost estimate for the proposed solutions application for improving traffic safety on the subject section was performed based on defined geometry on orthophoto bases, i.e. transverse profiles generated from geodetic bases with elevation representation (TIN terrain model).

PROPOSED SOLUTIONS ON LOCATIONS ALONG THE ROUTE

Location 01 - Service road (Type 3.1) on the right and the access regulation on the left (Type 2 / Type 3.2), locations: km 6 + 395 - km 6 + 470 (service road on the right), km 6 + 810 - km 7 + 095 (accesses from the left).

The construction of service road would improve traffic safety on the accesses in the zone of the existing acceleration lane at the levelled intersection of Žepče. The projected traffic island prevents direct connection of two accesses to the main road, which reduces the risk of traffic accidents in the area of the inflow to the main road.

Location 02 – Access regulation on the right side and bus stops on the left and right side, locations: km 8 + 500 - km 9 + 025 (access on the right), km 9 + 125 - km 9 + 180 (bus on the left) and km 9+ 290 - km 9 + 350 (right bus).

The construction of traffic islands would improve traffic safety on the right-side accesses between km 8 + 500 - km 9 + 025 by increasing access control and reducing conflict zones. At the existing bus stops in the traffic connection zone for Papratnica, pedestrian paths are planned for safer access to the stops.

Location 03 - Parking lot on the left and deceleration lane on the right, location: km 9 + 680 - km 9 + 750 (P left), km 9 + 850 - km 9 + 895 (deceleration lane right).

At the location of km 9 + 680 - km 9 + 750, the asphalting of the existing parking area is planned, and in front of the traffic connection on the right side at km 9 + 900, the construction of an deceleration lane is planned, which improves traffic safety and flow.

Location 04 - Regulation of traffic connection on the right side and bus stops on the left and right side, locations: km 11 + 425 - km 11 + 545 (connection on the right), km 11 + 645 - km 11 + 700 (bus on the left) and km 11 +700 - km 11 + 755 (bus right).

The existing traffic connection is being improved by adding a deceleration and acceleration lane with the necessary widening of the carriageway on the side road. There are pedestrian paths at the existing bus stops for safer access to the stops.

Location 05 - Regulation of the traffic connection on the right side, location: km 12 + 200 - km 12 + 400.

The new position of the traffic connection has been defined with the application of the deceleration and acceleration lanes, while the existing accesses to the main road are being abolished and redirected to the new location of the traffic connection.

Location 06 - Regulation of traffic connections and dislocation of bus stops on the left and right side, locations: km 12 + 930 - km 13 + 065 (connections left and right), km 13 + 065 - km 13 + 120 (bus left), km 13 +125 - km 13 + 180 (bus on the right), km 13 + 140 - km 13 + 205 (connection on the left).

The geometry of the traffic connection on the right side is being rearranged in accordance with the needs of safer manoeuvring of the relevant vehicles. The use of a deceleration - acceleration lane is provided. To improve traffic safety on the accesses to the left, the use of a deceleration and acceleration lane is also provided. Due to the acceleration lane on the right side, it is planned to move the existing bus stop to a new location. Due to the deceleration lane on the left side, it is planned to relocate the existing bus stop to a new location so that the new bus stop locations have a proper mutual layout.

Location 07 - Upgrading of the acceleration - deceleration lane on the right side, location: km 13 + 975 - km 14 + 030.

At this location, it is planned to upgrade the acceleration - deceleration lane in order to make it safer to access from the km 13 + 975.

Location 08 - Bus stops on the left and right, locations: km 14 + 695 - km 14 + 750 (displaced bus stop on the left), km 14 + 780 - km 14 + 835 (displaced bus stop on the right).

The relocation of the existing bus stop on the left side is planned to increase the safety of pedestrians accessing the stops, through the achievement of an optimal mutual arrangement of opposite stops.

Location 09 - Regulation of the access (Type 2) and extension of the acceleration lane on the left side, locations: km 15 + 220 - km 15 + 395 (accesses), km 15 + 470 - km 15 + 520 (acceleration lane from the gas station).

Improving traffic safety on the accesses to the left is achieved by an additional deceleration/acceleration lane (Type 2). Also, by upgrading the acceleration lane between km 15 + 470 - km 15 + 520, traffic safety is improved in the zone of the existing gas station on the left side.

Location 10 - Regulation of access and traffic connections on the left and right side, locations: km 15 + 655 - km 15 + 890 (accesses on the left), km 15 + 775 - km 15 + 890 (traffic connection on the right), km 15 + 995 - km 16 + 040 (traffic island on the right), km 16 + 020 - km 16 + 120 (traffic island on the left), km 16 + 135 - km 16 + 265 (accesses on the left).

Improving traffic safety on the accesses and traffic connections on the left side is achieved by an additional deceleration/acceleration lane (Type 2). Due to the extremely unfavourable angle of connection, the traffic connection on the right side is moved to a new location, which enables safer manoeuvres of the relevant vehicles. The rearrangement of the connection geometry is planned with the construction of a traffic island.

Location 11 - Regulation of the access on the left, location: km 16 + 485 - km 16 + 675.

Improving traffic safety on the accesses and traffic connections on the left side is achieved by an additional deceleration/acceleration lane (Type 2). Access control is provided by the construction of continuous traffic islands along the left edge of the road.

Location 12 - Regulation of the parking lot on the left side, location: km 16 + 865 - km 17 + 025.

Improving traffic safety in the existing parking lot on the left side is achieved by building an deceleration and acceleration lane.

Location 13 - Regulation of the traffic connection on the right side, location: km 17 + 485 - km 17 + 635.

Improving traffic safety on the right-hand traffic junction is achieved by an additional deceleration/acceleration lane (Type 2).

Location 14 - Regulation of the traffic connection on the right side, location: km 18 + 080 - km 18 + 215.

Improving traffic safety on the right-hand traffic junction is achieved by an additional deceleration/acceleration lane (Type 2).

Location 15 - Bus stops on the right and left, location: Begov Han, km 19 + 125 - km 19 + 180 (bus on the right), km 19 + 225 - km 19 + 180 (bus on the right - pedestrian path).

The improvement of traffic safety at the existing bus stops in the area of the Begov Han traffic connection is planned through the upgrade of pedestrian paths for access to the stops.

Location 16 - Regulation of the traffic connection on the right side, location: G. Golubinja, km 20 + 050 - km 20 + 225.

Improving traffic safety on the right-hand traffic junction is achieved by an additional deceleration/acceleration lane (Type 2).

Location 17 - Regulation of the access on the left side (Type 2), extension of the traffic island next to the gas station on the left side and extension of the traffic island next to the gas station on the right side, locations: km 20 + 745 - km 20 + 920 (approaches left), km 21 + 000 - km 21 + 025 (BS left), km 21 + 270 - km 21 + 360 (BS right).

Improving traffic safety on the accesses to the left is achieved by an additional deceleration/acceleration lane (Type 2). In the area of the gas station on the left side, the extension of the existing traffic island is planned in order to reduce the conflict zone at the entrance from the direction of Topčić Polje. In the area of the gas station on the right side, the connection and extension of the existing traffic islands is planned in order to establish appropriate access control.

Location 18 - Regulation of access on the left side, location: km 21 + 665 - km 21 + 760.

Improving traffic safety in the driveway on the left is achieved by an additional deceleration/acceleration lane (Type 2).

Location 19 - Acceleration lane of the road for oversized transport on the left side, location: km 22 + 700 - km 22 + 880.

Improving traffic safety at the road junction for oversized transport at an extremely unfavourable angle on the left side is achieved by an additional acceleration lane (Type 2).

Location 20 - Deceleration lane of the road for oversized transport and service road (Type 3.1) on the left side, locations: km 23 + 175 - km 23 + 325 (exclusive lane), km 23 + 325 - km 23 + 720 (service road).

Improving traffic safety at the road junction for oversized transport at an extremely unfavourable angle on the left side is achieved by an additional deceleration lane (Type 2). The service road (Type 3.1) improves traffic safety on the accesses to the left side between km 23 + 325 - km 23 + 720.

Location 21 - Regulation of the access on the left side (Type 2), relocation of the bus stop on the right side, new parking lot on the right side and regulation of the access on the left side (Type 3.2), locations: km 0 + 165 - km 0 + 305 - Type 2), km 0 + 175 - km 0 + 235 (relocated bus stop right), km 0 + 235 - km 0 + 395 (new parking lot right), km 0 + 400 - km 0 + 630 (accesses left - Type 3.2).

The basic improvement of traffic safety on this route line is reflected in the definition of a regulated parking lot for passenger and cargo vehicles, considering the location of nearby catering facilities. Due to the need to build an exclusive lane towards the new parking lot, it was necessary to move the existing bus stop on the right side. Improving traffic safety on the approaches on the left side is achieved by an additional deceleration/acceleration lane and a service road (Type 3.2).

Location 22 - Regulation of the traffic connection on the left side, location: km 1 + 045 - km 1 + 095.

The improvement of traffic safety at this location is reflected in the definition of a drop-shaped physical island for channelling traffic flows on the opposite direction of the left side access. Appropriate reshaping of the deceleration geometry from main direction is also envisaged.

Location 23 - Regulation of the traffic access on the left side, location: km 1 + 415 - km 1 + 560.

Improving traffic safety at the left side traffic junction is achieved by an additional deceleration/acceleration lane (Type 2).

Traffic signalisation and equipment

The subject of this project is the section of the main road M17 Ozimica-Topčić Polje (Figure 1). The length of the section is about 24 km and is located in Zenica-Doboj Canton. The road from Doboj to Sarajevo (E73, M17) is a parallel route to the future Corridor Vc which is part of the core network of the Western Balkans.

The route of this section goes on the right side of the river Bosna. This section passes by populated places: Papratnica, Brezovo Polje, Želeća, Golubinja and Begov Han. There are three bridges over the Bosna River on the section.

According to the data from the "Study on the counting of traffic on the main roads in the Federation of BiH in 2017", on the main road M 17 section Ozimica-Nemila AADT is 10,562 veh / day.

Based on the data obtained by the "CONNECTA" consortium, it was concluded that there are shortcomings on the considered section that reduce road safety. Namely, the ends of the existing guardrails are not safe, some protective guardrails have very short lengths, as well as that there are unsafe gaps in the guardrails or unconnected connections between the two elements of the guardrail.

During the development of the project, attention was given to the irregularities of the existing guardrails installed on the considered section, such as separation and insufficient length, as well as damage and deterioration of safety guardrails. For these reasons, in addition to the installation of new safety guardrails in places of unprotected solid obstacles near the road, it is also planned to replace some existing ones. At speeds above 80 km/h it could be very dangerous if vehicles hit these obstacles.

The main disadvantages related to the built-in existing safety guardrails are:

- The level of protection of safety guardrails along the edge of the road is N1 and N2, which practically ensures that only passenger cars are kept on the road;

• On retaining walls, a safety guardrail is installed behind the head beams over 7 cm high at a distance of more than 15 cm, which can result in (most often) overturning of the vehicle over the guardrail,

• The working width of safety guardrails on sidewalks and retaining walls is usually smaller than prescribed, which will practically not keep the vehicle on the road;

• The widths of retaining walls are often insufficient for the installation of a safety guardrail (30 - 40 cm), which can result in the vehicle flying off the road;

• A large number of safety guardrails have been installed next to open manholes and traffic counters. Their length is 4 m;

• A large number of semi circular ends and oblique ends of the 4m long guardrail were installed, which is not in accordance with the regulations, placed parallel to the axis of the road;

• On a large number of safety guardrails, the ends of the guardrails are not installed, which can lead to the penetration of the guardrail into the vehicle during an impact;

• As a result of improper reconstruction of the road and coating of asphalt in several layers, safety guardrails do not have the prescribed height, which can result in the vehicle turning over the guardrail;

• There are banks with a width (50-90 cm) which do not meet the minimum requirements for the installation of security guardrails;

• On the section of the main road in question, there are numerous sections of the road where no protection object has been installed;

• Safety guardrails on bridges are not connected to guardrails in front of and behind bridges.

Guardrails

Safety guardrails are made of steel, concrete (New Jersey type) or a combination. There are several classes of guardrails that depend on the category of road. Since the subject of this project is the main road, according to EN and local standards, H1 and H2 vehicle containment level of safety guardrails were used.

The following criteria were applied in the design of guardrails:

- The current state of construction of guardrails on the road;
- Distance of the dangerous obstacle from the edge of the road;
- Characteristics of the dangerous obstacle with regard to the consequences of the vehicle flying off the road;
- Available width of the place for installation of the guardrails;
- Prescribed level of protection of the guardrails;
- Prescribed working width of the guardrails;
- Prescribed dynamic deflection of the guardrails.

In the cross-section profile, the position of the guardrails is at a distance of at least 0.5 m in relation to the edge of the road. Depending on the type and location of the guardrail (behind the gutter, on the shoulder, on the existing wall), the project used 4 types of protective guardrails, with the details and technical specifications.

Working width (W1-W8) indicates the width of the guardrail movement during the impact test, which affects the determination of the cross-section profile of the road. Due to the current situation in the project, working widths from W1 to W4 have been applied.

Vehicle restraint systems

The analysis of the current situation showed that the ends of the guardrails do not ensure safe driving conditions. The ends are not installed on a large number of guardrails, which can lead to the penetration of the guardrail into the vehicle during the impact. In order to improve the road safety and to reduce the consequences of traffic accidents as much as possible, vehicle restraint systems are envisaged. The term Vehicle restraint systems according to European terminology includes various constructions, according to EN 1317 defined as:

- Protective devices (BAS EN 1317: 2);
- Shock absorbers (BAS EN 1317: 3);
- Initial and final constructions (BAS EN 1317: 4);
- Transitional structures (BAS EN 1317: 4).

Impact absorber is a technical construction that is placed in particularly dangerous places on parts of the road where there is a danger of vehicles crashing into solid construction, i.e. on all parts of the road where drivers due to poor visibility, narrow passages and high speeds have a greater chance of misjudging the situation. In order to reduce the consequences of traffic accidents, shock absorbers should also be installed on dividing islands, walls of road structures, cantilever poles and similar places in the direction of travel in order to reduce the consequences of impact on passengers, vehicles or buildings.

Figure 3 Shock absorber

Figure 4: The start-end construction

Due to its steel base, the shock absorber does not have to be attached to the ground. It can stand independently untied to the guardrail.

The start-end constructions are placed at the ends of the protective guardrail, as a replacement for the sloping ends. Since the traffic on the main road runs in two directions, the construction is placed at both ends of the guardrail. They are most often placed in places of failure. It is built of steel. The front panel, or bumper, is a rigid connection between the sliding side panels that deform after impact.

The increase in the number of vehicles on the roads and the increase in the speed of vehicles directly affect the state of traffic safety. Road safety devices play an important role in the safe flow of traffic. Based on the data obtained from the field and by the *Connecta Consortium*, it was concluded that the Ozimice-Topčić Polje section lacks protective guardrails and vehicle restraint systems in locations where there is a possibility of impact with solid objects, and that some existing guardrails are insufficient and do not provide adequate protection. Accordingly, the Designer prepared the project documentation to supplement the design of guardrails on the main road M 17.

Horizontal traffic signs

The following lines and arrows are provided in the project documentation:

- full longitudinal line (dividing and edging) VI-1, width 15 cm, white;

- short broken line VI-4, 15 cm wide, white, with a field grid of 1 + 1 m;

- arrows for turning traffic VI-25; white,

- traffic direction fields, VI-27, white,

- broken stop line (VI-12), white,

- broken stop line (VI-12);

- pedestrian crossing (VI-18).

The separation line is used to separate two-way traffic areas according to the directions of movement, and the edge line marks the edge of the road surface.

Vertical traffic signals:
Standard traffic signs are made according to BAS standards, and according to the Rulebook on traffic signs and signalisation on roads, the way of marking works and obstacles on the road and signs given to traffic participants by an authorised person ("Official Gazette of BiH", No. 16/07).
All planned traffic signs are made of aluminum sheet. Signs must be secured against vertical and horizontal rotation and shear. Traffic sign carriers must be protected against corrosion by galvanising. On the upper side, the column must be closed either with a cover or welded. Vertical traffic signal support posts must be grounded in a concrete foundation, and protected from turning by anchors.
Given the characteristics and width of the road, the dimensions of the raised traffic islands in the project are the following dimensions of the signs:
- signs of explicit orders and notices, circle shape, diameter d = 60 cm (settlement);
- notice signs, rectangular in shape, measuring 60 x 90 cm;
- "guidance boards" measuring 50x50 cm,
- traffic sign II-4 has a diameter of d = 40 cm, and sign VIII-6 has dimensions of 20 x 60 cm since they are placed on narrow raised traffic islands, and thus do not interfere with traffic(see draft below).

Public lightning

In order to solve the problem of the power supply for the bus stop, as well as the measuring and paying bills for the consumed electricity, it is envisaged to install solar powered lamps with an integrated solar panel, battery and sensor to reduce the luminous flux.

ARRANGEMENT OF PILLARS AT THE STOP

It is planned to install the absorption conical steel lighting poles with a height of 7 m.

The poles are mounted on AB foundations with frame dimensions of 80x80x90 cm in which anchor bolts adapted to the anchor plate of the selected lighting pole are installed.

LAMP CHARACTERISTICS

All-in-one off-grid solar LED lamps for public lighting, total maximum power ≤ 26W, minimum luminous flux of the lamp 4,500lm, neutral white light temperature 4,000K, with colour reproduction index ≥ 70 were selected for the purpose of lighting the bus stop. The durability of LED sources is minimum 50,000 hours of operation with a minimum requirement of L70. The efficiency of the lamp should be at least 175 lm / W, supply voltage 12.8V, operating temperature from -20 ° C to + 35 ° C. The base of the lamp is made of cast, non-corrosive, aluminium, with a protector made of UV-resistant polycarbonate, IP65, IK08, with the possibility of universal mounting on a vertical pole or horizontal lyre with a diameter of 48 - 60 mm, adjustable tilt angle with an interval of 5 ° . Minimum manufacturer's warranty is 3 years. The "all in one off-grid" solar lamp means that a solar panel with a capacity of at least 60 W comes integrated in the lamp base, as well as a battery made of lithium ferro phosphate with a capacity of at least 380 Wh. There is also a motion sensor in the lamp base that controls the luminous flux of the lamp in such a way that when motion is detected, the lamp emits 100% light flux, or 30% light flux without motion detection, thus maximising the lamp operating time. The lamp base is also equipped with a LED indicator of the battery charge status.

Locations of Public lightning applied on Bus stops are presented in the table below

	RIGHT SIDE	LEFT SIDE
No.	CHAINAGE – CENTER OF THE BUS STOP	
1	0+206	
2		0+359
3		9+148
4	9+324	
5		11+668
6	11+732	
7		13+085
8	13+157	
9		14+719
10	14+810	
11	19+158	
12		**19+308**

Section: Jablanica - Potoci

Civil engineering

PROPOSED SOLUTIONS ON LOCATIONS ALONG THE ROUTE

Location 01 - Traffic island along the left edge of the road, location: restaurant "Zdrava voda", km 1 + 470 - km 1 + 530.

The designed traffic island enables control of access from the restaurant parking lot to the main road (and vice versa), which reduces the risk of traffic accidents in this zone.

Location 02 - Traffic islands along the left and right edge of the road, location: restaurant "Kod Gojka", km 2 + 400 - km 2 + 445 (left side), km 2 + 460 - km 2 + 515 (right side).

The designed traffic islands enable the control of access from the restaurant parking lot to the main road (and vice versa), which reduces the risk of traffic accidents in this zone.

Location 03 - Regulation of traffic connection, location: restaurant "Begović", km 2 + 705 - km 2 + 760.

The existing traffic connection is located on the outside of the horizontal curve of small radius, in the parking zone of the catering facility. Improving traffic safety at this location is envisaged by designing and marking the exclusion and inclusion lanes through which the traffic connection will be defined and access to parking spaces for passenger vehicles will be given.

Location 04 - Traffic islands along the left and right edge of the road, locations: km 3 + 015 - km 3 + 085 (left side), km 3 + 155 - km 3 + 180 (right side) and km 3 + 220 - km 3+ 233 (extension of the existing island on the left).

The designed traffic islands enable better control of access and reduction of conflict zones, which reduces the risk of traffic accidents in this zone. The existing islands next to the gas station and the commercial facility on the left are being extended.

Location 05 - Bus stops, locations: km 3 + 490 - km 3 + 550 (left side), km 3 + 660 - km 3 + 710 (right side).

The existing bus stop on the right is located in the narrower zone of an unsafe "Y" surface intersection with two-way connecting branches to the main road. The problem of solving these crossroads goes beyond the scope of the project in question and a broader view of the problem is needed in the cooperation of the state road manager and local self-government bodies.

Location 06 - Traffic islands along the left edge of the road, locations: km 4 + 335 - km 4 + 435 (restaurant “Kovačević”), km 4 + 575 - km 4 + 600 (restaurant “Prenj”).

The designed traffic islands enable the control of access from the restaurant parking lot to the main road (and vice versa), which reduces the risk of traffic accidents in this zone.

Location 07 - Traffic island along the left edge of the road, location: km 6 + 620 - km 6 + 635 (restaurant on the right).

The designed traffic island enables control of access from the restaurant parking lot to the main road (and vice versa), which reduces the risk of traffic accidents in this zone.

Location 08 - Traffic island and regulation of the exclusive / inclusive parking lane on the right side, location: km 8 + 895 - km 9 + 010.

The existing geometry on the right side is redefined with edge geometry in order to clearly define the deceleration-acceleration lane. Due to the provision of the required length of the deceleration lane, the existing central reserve is partially removed.

Location 09 - Parking on the right, location: km 10 + 130 - km 10 + 275.

The existing geometry on the right side is redefined with edge geometry in order to clearly define deceleration-acceleration lane.

Location 10 - Traffic island along the left edge of the road, location: km 11 + 905 - km 11 + 920.

The designed central reserve enables better control of access from the access and traffic connection from / to the carriageway (and vice versa), which reduces the risk of traffic accidents in this zone.

Location 11 - Bus stops on the left and right, locations: km 12 + 085 - km 12 + 140 (left side), km 12 + 120 - km 12 + 175 (right side).

It is planned to move the existing bus stops in order to get the correct mutual position of the stops on the left and right.

Location 12 - Parking on the left, location: km 14 + 460 - km 14 + 545.

The designed central reserve enables control of access from the parking lot to the carriageway (and vice versa), which reduces the risk of traffic accidents in this zone.

Location 13 - Traffic island along the right edge of the road, location: km 16 + 955 - km 17 + 025 (existing parking lot on the right).

The central reserve enables control of access from the parking lot to the main road (and vice versa), which reduces the risk of traffic accidents in this zone.

Location 14 - Extension of the existing parking lot on the right, location: km 20 + 425 - km 20 + 500.

In order to have safer access to the existing parking lot and facilities along the banks of the Neretva, it is planned to extend the existing deceleration-acceleration lane.

Location 15 - Bus stops on the left and right, locations: km 22 + 910 - km 22 + 985 (left side), km 23 + 120 - km 23 + 190 (right side).

At the existing bus stops, it is planned to arrange pedestrian paths to access the stops.

Location 16 - Bus stop on the left, location: km 26 + 185 - km 26 + 275.

At the existing bus stop, a pedestrian path will be arranged to access the stop on the left.

Location 17 - Bus stop on the right, location: km 26 + 635 - km 26 + 690.

At the existing bus stop, it is planned to arrange a pedestrian path to access the stop on the right side.

Location 18 - Bus stops on the left and right, location: km 32 + 235 - km 32 + 290 (bus left), km 32 + 350 - km 32 + 410.

It is planned to move the bus stop from the existing (unmarked) location on the left side (km 32 + 320).

At the existing stop on the right, it is planned to arrange a pedestrian path to access the stop.

Location 19 - Bus stop on the left, location: km 33 + 100 - km 33 + 150.

At the existing stop on the left, there is a pedestrian path to access the stop.

Location 20 - Bus stop on the right and arrangement of the approach on the left (Type 3.2), locations: km 34 + 070 - km 34 + 135 (bus stop), km 34 + 085 - km 34 + 180 (approaches on the left) .

At the existing stop on the right, it is planned to arrange a pedestrian path to access the stop. On the left side, it is planned to relocate the existing stop due to the formation of deceleration lane - service road (Type 3.2) for closely located approaches on the left side.

Location 21 - Arrangement of the approach on the left side (Type 3.2) and the bus stop on the right side, locations: km 34 + 720 - km 35 + 620 (approaches on the left), km 35 + 310 - km 35 + 370 (bus stop on the right).

On the left side, the formation of a long service road (Type 3.2) is planned for arranging numerous accesses on the left side. In order to improve traffic safety in the zone of the existing bus stop on the right side (km 35 + 310 - km 35 + 370), it is planned to set up central reserve that would have the

function of pedestrian paths to access the stop. The newly designed central reserve would also be in the function of controlling access to the arranged parking lot in the narrower zone of the stop.

Location 22 - Regulation of traffic connection, location: km 35 + 800 - km 35 + 890.

Improving traffic safety at the right-hand traffic junction is achieved by an additional deceleration-acceleration lane (Type 2).

Location 23 - Bus stops on the left and right, locations: km 36 + 250 - km 36 + 300 (left side), km 36 + 280 - km 36 + 340 (right side).

At the existing bus stops, it is planned to arrange pedestrian paths to access the stops.

Location 24 - Traffic island along the left edge of the road, location: km 36 + 570 - km 36 + 590.

The designed central reserve enables control of access from the arranged parking lot to the carriageway (and vice versa), which reduces the risk of traffic accidents in this zone.

Traffic signalization and equipment

The subject of this project is the section Jablanica - Potoci (Figure 1), length L = 36,312 km. It is located in the Herzegovina-Neretva Canton. It is part of the main road from Sarajevo to Mostar (E73, M17) and is a parallel route to the future Corridor Vc which is part of the core network of the Western Balkans.

The route of this section goes on the right side of the river Neretva, and on the bridge of Begić and Begović it crosses on the left side of the Neretva. This section passes by populated places: Jablanica, Donja Jablanica, Grabovica, Željuša, Potoci. There are nine tunnels on this section: Prenjska vrata L = 45 m, Grabovica IL = 53 m, Grabovica II L = 25 m, Vidikovac L = 130, Jasen L = 76 m, Bijela L = 96 m, Salakovac II L = 26 m, Salakovac IL = 110 m, Salakovac L = 650 m and three bridges over the river Neretva.

According to the data from the "Study on traffic counting on main roads in the Federation of BiH in 2016", prepared by the Institute for Roads of the Faculty of Civil Engineering in Sarajevo, main road M 17, section 013 at Salakovac, AADT is 7,378 veh / day. The end of the section is at the junction M17 and R435a Potoci-Rujišta.

The same design principles as for previous sections were applied. All is presented in detail in the Main design.

Public lightning

Locations of Public lightning applied on Bus stops are presented in the table below.

	RIGHT SIDE	LEFT SIDE
No.	CHAINAGE – CENTER OF THE BUS STOP	
1		3+518
2	3+689	
3		6+516
4		12+086
5	12+133	
6		15+401
7	15+532	
8		18+259
9	18+396	
10		22+952

	RIGHT SIDE	LEFT SIDE
11	23+156	
12		26+203
13	26+659	
14		32+252
15	32+373	
16		33+200
17		34+054
18	34+102	
19		35+203
20		35+342
21		36+273
22	**36+309**	

3.2.3 North Macedonia

Section: Prilep - Bitola

Civil engineering

Agreed design solutions are:

- extension of the lanes for deceleration and acceleration,
- bus stops at the junction Topollcani, and
- parking space in front of the tunnel in Bitola.

The subject of the task is the preparation of project documentation in the phase of the basic project (construction part) for the extension of the lanes for deceleration and acceleration, as well as bus stops at the junction Topolcani, as well as a parking space in front of the tunnel. This project is also the basis for the preparation of an Infrastructure Project that is required in the process of obtaining a building permit. The purpose of the task is to obtain sufficient input data as well as define the program conditions and parameters for the preparation of the Basic Design.

For the preparation of the Basic Project, a geodetic survey was used which was made on the basis of geodetic surveys with detailed points both positional and elevation oriented. The field data was recorded with a dystomat with automatic software registration, and the data with software processed with the PLATEIA software package.

The designed elements for which there is data in the project will be used as a base for removing the axis of the access road.

The Parking Axis is designed on the existing road and is composed of one element of horizontal curvature.

The level of the main route at the junction Toplochani is designed to preserve the existing condition, because the extension of the lanes follows the levels and the transverse slope of the existing road. The bus stops are designed with levels for better alignment with the existing road, because they are physically separated from the main route, and from the aspect of drainage.

Level violations are rounded with vertical curves. The transverse slope of is one-sided i = 2.50%

Designed pavement for bus stops and lane extensions has been adopted from empirical indicators and similar projects

For bus stops and lanes:

- AB 16s with polymer — d = 6 cm
- BNS 32cA — d = 8 cm
- Crushed stone buffer — d = 30 cm

For parking lot:

- AB 16 — d = 5 cm
- BNS 32 — d = 7 cm
- Crushed stone buffer — d = 30 cm

For the separation islands and the bus plateau:

- Behaton tiles — d = 6 cm
- Fine sand — d = 3-5cm
- Buffer from natural crushed stone — d = 20 cm

Surface water drainage is designed as natural outflow with longitudinal and transverse grades.

Traffic signalisation and equipment

The design solution fully complies with the EN 1317 standards as well as Technical Instructions for the Implementation of the Vehicle Retention System on the State Roads of the Republic of Northern Macedonia issued by the Public Enterprise for State Roads of 2018 in accordance with this standard. The protection devices containment difference, according to MKS EN 317-2, is based on three crucial criteria:

- Restraint rate
- Performance area
- Impact severity level

The guardrail as part of the vehicle restraint system is the most commonly used element of road equipment that directly and extremely significantly influences the realisation of passive road safety.

It is planned according to the Design to install H1W2, H1W3, H1W4, H1W5, H2W4 safety barrier in the road shoulder, H1W2 on the structure, H2W4 on the building structure and transitional element between the safety barrier H1 and H2. The barrier is placed on places and in lengths determined in Location Plans. The guardrail was placed 60 m in front and 30 m behind a dangerous location wherever conditions of the site allowed. The length of terminals of 12 m is not included in the indicated length.

The details of safety barrier installation are shown in detailed drawings. The end and the beginning of the guardrail/safety barrier are defined by chainage in the Location Plan.

Slant terminals of restraint systems are made by lowering sloped by 1:12 in relation to the edge of the carriageway, according to detailed drawings.

Reflecting bodies (catadiopters) are built into the groove of the safety barrier, whose color is like directional posts.

<u>In accordance with the Terms of Reference, the existing guardrail on the subject road section is completely removed and sets new with appropriate certificates proving its conformity with the standard EN 1317.</u>

When installing a safety barrier, attention must be paid to the sewage and other ducts/lines along the carriageway and the safety barrier posts must be fixed so that the lines/ducts are not damaged.

<u>Bridges and Overpasses with Steel Guardrail/Safety Barrier</u>

The H1 or H2 are foreseen on bridges and overpasses, depending on whether third parties are endangered underneath structures. There are not necessary conditions for installation of a guardrail/safety barrier on most bridges and overpasses (structures). Inspection paths are not wide enough for the installation of a safety barrier of required containment level and dynamic dent, while concrete of inspection paths is in poor condition on some structures. The condition for installation of necessary guardrail/safety barrier on these structures is reconstruction of bridge inspection paths. Structures, where inspection paths are to be reconstructed, are marked in the Location Plan.

<u>Large Open Concrete Drains</u>

In case of large open drains, it is foreseen to install appropriate guardrail H1. Due to the impossibility of fixing posts of guardrail next to drains themselves, it is necessary to strengthen the guardrail before and after the drain setting posts at a short distance. However, in most cases, the most acceptable solution for the reconstruction of drains/gullies should be reduced to the level of surrounding terrain and cover from the top. For this solution, the minimum repair costs and potential maintenance costs are minimum. It is not necessary to install a protective guardrail if drains are reconstructed in the indicated way. Drains that can be reconstructed are marken in the Location Plan.

Retaining Walls under Carriagaway

The appropriate guardrail H1 is foreseen on retaining walls below the carriageway. The installation of the guardrail is possible only after the reconstruction of the crown of retaining wall where the guardrail should be placed. The Location Plan indicates the retaining walls that need to be reconstructed before the guardrail is set.

Steep slopes in the cut and fill slopes

Steep slopes that are uneven and "sharp" rock masses located in the immediate vicinity of the carriageway pose a danger to road users. It is quite common that they are so close that there is no space to install appropriate guardrail. The solution is demolition and shaping of slopes to increase the berm in which a safety barrier could be placed. The design and stabilisation of slopes would reduce the possibility of rockfalls. This solution is extremely expensive due to a large number of such stretches and large scope of earthworks.

Narrow shoulders

The problem is a narrow road shoulder on certain stretches where it is necessary to install a safety barrier. A safety barrier with a dynamic dent is required for the existing width of the road shoulder in the Location Plan. The proposal is to widen the existing road shoulder and install a safety barrier with a larger dynamic dent. It is necessary to construct concrete linear foundation where the safety barrier will be installed in places where it is not possible to install a safety barrier. Before that, it is necessary to remove stone walls that are taller than the carriageway. The stretches where these problems occur are highlighted in the situation.

High curbs

The method of installation of safety barriers when curbs are high depends on the type of safety barrier and is shown in detail. Replacement of the existing curbs with curbs in height of up to 7cm and installation of a barrier 50cm away from the edge of the carriageway should be applied when the guardrail is set next to the overtaking lane or the driving lane when there is no emergency lane, in case there is not a gutter next to the carriageway, which is marked in the situation.

Trees along the Carriageway and in the Central Reserve

There are trees on both sides of the carriageway and in the central reserve zone on the whole road section. The Design foresees installation of a guardrail in case all trees are removed along the carriageway and in the central reserve. Stretches where trees should be removed are indicated in the Location plan. If trees are not removed, marked stretches should be protected with the H1-W5 guardrail on the outer side of carriageway and H2-W4 in the central reserve.

Advertising Billboards and Totems

Regarding advertising billboards and totems, an appropriate safety barrier H1 is installed next to the carriageway and it is not necessary to remove them.

Crash cushions

Setting the crash cushion is provided at the top of the central reserve, where there are non-deformable obstacle or third-party threats (trapezoidal crash cushions) and between ramps at toll stations (flat crash cushions).

Crossfall of the Central Reserve

In the central reserve, when there are not other obstacles, when the crossfall is less than 1:10, a guardrail H1 is provided on both sides of the central reserve (which in a joint operation, makes a system with a retention level as barrier H2). If crossfall is greater than 1:10, it is necessary to install barrier H2 on the higher lane and barrier H1 on the lower lane.

Arranged and Unarranged Access Roads to the Highway

There are arranged and unarranged access roads to the highway in the zone of certain overpasses where H2 guardrail is foreseen. Due to the need to install a guardrail on structures as well as install a guardrail of a certain length before and after the structure, some access roads are closed by guardrail on the highway.

Entrance to a Tunnel

It is planned to install safety barrier H2 on both sides of the carrigeway and adjoin with transition element on tunnel entrances and exits at front part of the wall.

Road Signs with Truss Constructions next to the Carriageway

Regarding road signs that are set on truss posts, it is foreseen to set H1 guardrail. All road signs placed near the edge of the carriageway or along the edge of the carriageway must be moved to 2,7 m from the edge of the carriageway or at 1,7 m from the gutter.

Bridges with a Concrete Guardrail

Before and after bridges with a concrete guardrail, the installation of H2-W4 guardrail is foreseen. The transition element shown in detail was used to fit steel into concrete guardrail.

Retaining Walls above the Carriageway

It is envisaged to set H2-W4 guardrail in front of the retaining wall and fit steel guardrail into the front part of the retaining walls. The transition element shown in detail was used to fit steel guardrail into concrete wall.

Portals for Poles Carrying Road Signs

Portals for poles carrying road signs represent a non-deformable obstacle that can endanger third parties where installation of H2-W4 guardrail is foreseen. The problem is that some portals for poles carrying road signs and concrete bases are quite close to the edge of the carriageway or along the edge of the carriageway, which is why it is not physically possible to place the required guardrail. In order to install the necessary guardrail with these portals for poles carrying road signs, it is necessary to remove them. The portals for poles carrying road signs that should be moved are indicated on the drawings.

Lighting Poles

Lighting poles represent a non-deformable obstacle and it is planned to place a guardrail H1. The problem is that some of lighting poles are quite close to the edge of the carriageway, which is why it is necessary to set up a stronger barrier and in some cases closer to the edge of the carriageway.The method of setting a guardrail is shown in detail and in cases where poles are close to the edge of carriageway, the barrier should be placed closer to the edge of the carriageway, as shown in the details.

NOTE:

The preliminary work necessary for the installation of a safety barrier that should be installed in accordance with EN 1317, as well as preliminary works required to provide conditions for the installation of a weaker (cheaper) guardrail, must be the subject of separate engineering documents.

3.2.4 Kosovo

Section: Fushe Kosove - Gjurgjica

Civil engineering

The road section is part of the R6b national highway, with a high number of accidents.

The main safety issue is the high number of entrances to the main road. The posted speed limit is from 80k / h to 100k / h, which is relatively high for a road with such circumstances. All intersections are divided into levels except for local accesses (individual settlements, commercial, etc.) which are not in line with the road category. A good situation is with U-turns separated at regular distances.

There are many local accesses (roads and individual accesses) so it is almost impossible to do anything to improve this situation, other than adjusting the speed limit throughout the section and increasing implementation.

Another safety issue is traffic congestion. The concept of this type of road should be at least one road for motor vehicles. This may eliminate the possibility of using slow vehicles in this section such as vehicles crashing into animals, tractors and bicycles.

Cross Section

The road section inspected is a double carriageway with 2 + 2 traffic lanes. The width of the road varies from 8.9 to 10.7 m per carriageway in this section. The width of the traffic lane varies, but at some points, it was measured 4.65m. This is too wide for all types of roads especially for this type of road and creates unsafe conditions.

On both sides of the road, in some parts of the section there is a drainage system as open channels as water intake from the carriageway in case of rain. All private entrances have access to the canal under the road. These channels are a very unsafe barrier with concrete walls. These walls near the carriageway are dangerous roadside obstacles.

Alignment

Overall, the alignment is good for this road and there are no safety issues within this area.

Intersections

Almost all intersections are divided into levels, but the width and length of the acceleration and deceleration lanes are inadequate and unsafe.

Adhering to the recommendations of the RSI as well as the requirements of the authorities, the project has reviewed the reconstruction of all lanes according to the appropriate geometry together with the appropriate signage. The following is a list of interventions for deceleration and acceleration lanes:

1- From KL 0+050 to KL 0+200

2- From KL 0+850 to KL 1+175

3- From KL 1+875 to KL 2+175

4- From KL 2+450 to KL 2+750

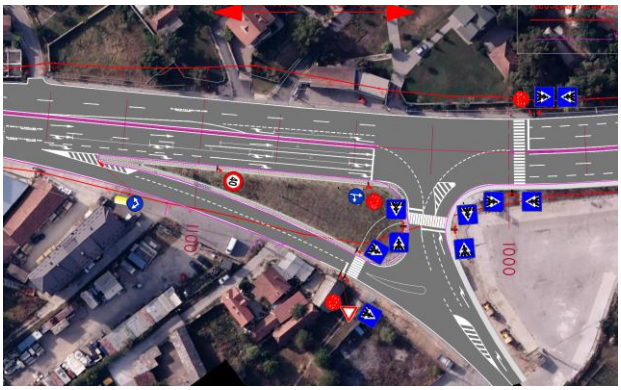
5- From KL 3+850 to KL 4+150

6- From KL 3+850 to KL 4+150

7- From KL 6+800 to KL 7+075

8- From KL 7+350 to KL 7+575

9- From KL 8+600 to KL 8+800



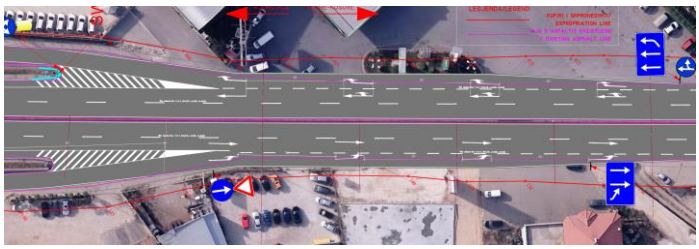
10- From KL 9+000 to KL 9+200

11- From KL 13+350 to KL 13+575

12- From KL 13+825 to KL 14+050

13- From KL 16+125 to KL 16+275

14- From KL 16+550 to KL 16+775



15- From KL 18+825 to KL 19+050

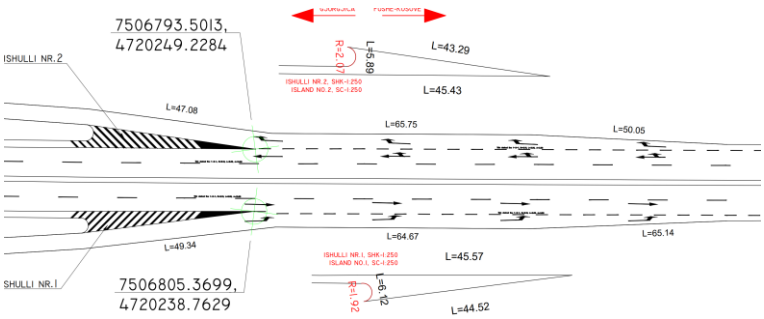
16- From KL 21+000 to KL 21+200

17- From KL 21+350 to KL 21+550

18- From KL 22+500 to KL 22+675

19- From KL 22+750 to KL 22+900

20- From KL 25+125 to KL 25+325



All deceleration and acceleration lanes are designed in accordance with geometric norms to enable drivers to see traffic signs in time and have the right time to react. This will make it possible to avoid conflicts that occur in the intersection.

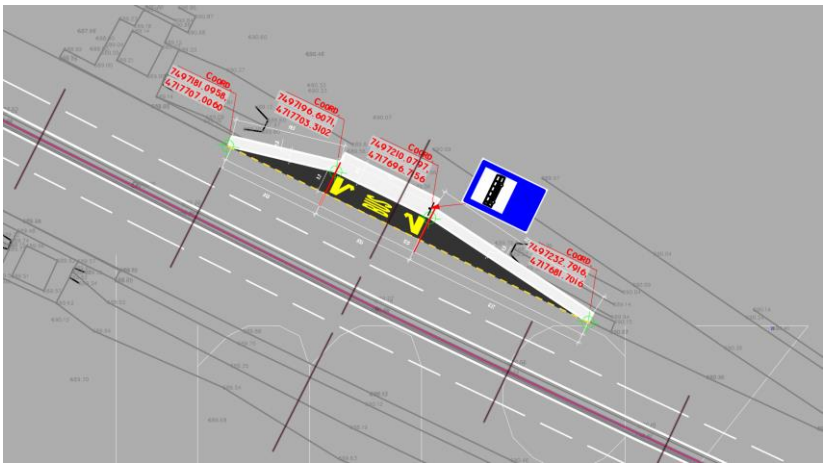
On exit ramps, the ramp length is provided to adequately serve the anticipated queue storage at the ramp terminal intersection and provide adequate sight distance and deceleration lengths to the back of that queue.

The exit ramp is provided to have sufficient tangent length beyond the physical gore to meet deceleration requirements for the controlling curve just as the entrance ramp is provided to have sufficient tangent length (or transition curve) to facilitate acceleration after the controlling entry curve.

All the measures taken are in consistency with local authority transportation and land-use plans.

Below are some illustrations with pictures from the design:

BUS STOPS AND PEDESTRIANS



Most bus stops on the road section have safety problems. Some of them are located in emergency lanes of unsuitable width for buses. In such cases, buses must stop at the main carriageway, occupying part of the traffic lane and emergency lane.

In cooperation with the authorities, safe places have been determined for the placement of bus stations and safe bus stations have been designed, with acceleration-deceleration lanes, appropriate signs, according to the standard and requirements of the authorities.

Determining the positions of BUS-STOP

7 BUS-STOP are designed as follows:

1- 2 BUS-STOPs at KL 0+900

2- 1 BUS-STOP at KL 5+600

3- 2 BUS-STOPs at KL 7+700

4- 1 BUS-STOP at KL 12+500

5- 1 BUS-STOP at KL12+600

One of the main issues identified in the RSI is the fact that in some parts of the road, it is noticed that pedestrians are crossing unsafe roads even if the pedestrian overpass is nearby. This problem becomes very worrying as we are dealing with high speeds in the section with two lanes for direction.

As recommended by the RSI and the authorities, the project envisages placing a guardrail in the middle of barriers as a barrier to direct pedestrians to the available overpasses.

Traffic signalisation and equipment

Barriers

During the preparation of the project, attention was paid to the irregularities of the protective barriers such as unrelated and insufficient lengths, and their damage and collapse. For these reasons, in addition to installing new safety guardrails in places of unprotected solid barriers near the road, replacement of the existing parts is planned. It has been taken into account that in some cases the vehicles move at speeds higher than 80 km / h and it can be very dangerous if the vehicles hit these obstacles.

Regarding traffic characteristics for roads of type B, the norms consider a level of service B, which is 1000 vehicles per hour. Relevant elements characterising the project and the type for barriers are:

- Slope angle for embankments, generally 2/3, with lateral bank; the protection at the base of embankment (or the top of the slope in case of section in cut) is done with road edge gutter;
- Road platform geometry maintains its dimensions also over the structure being overpassed; in this case a protection with steel grid panel should be installed;
- The structure overpassing the main road will be protected with adequate barriers, considering the work width available.

During the process for barrier project, the follow documents have been taken into account:

- drawing for road plan, road profile, typical cross section and cross section along the road, with definition of all the major information of:
  - embankment height, slope angle, width for banks;
  - geometric characteristics for kerbs in the major structures along and across the main road
- reference rules for road design.

Roads have to be protected with road barriers at least in these situations:

- The border of the structures, like bridges, viaducts, overpasses and retaining walls along the carriageway (regardless of their longitudinal extension or height from ground level);
- The guard-rails, always installed along the main road;
- The side part of the main road in embankment, where the distance between carriageway and ground level is more than 3.00m and the slope angle is more or equal to 2/3.
- The side part of the main road, where the distance between the edge of carriageway and a critical point is less than 10m (critical point could be a fixed obstacle or a water obstruction with water depth of 2m minimum);
- The side part of the main road, where the distance between the edge of carriageway and another traffic area is less than 10m (could be a local road that runs parallel to the main road);
- Singular obstacles of structures overpass the main road.

In agreement with the Standard EN 1317-2 the minimum class “Lc” to be used for the barrier road, for every use (median barriers, on-side board barriers, bridge board barriers) function of the traffic level, as reported in the following Table 3/I, referring to the road category adopted in project.

To define the functional class of the Fushe Kosove-Gjurgjica road, it refers to:

- class B2 (“main extra-urban” road) for connections with the existing local road
- class F1 (local road – extra-urban location) for two- way ramp
- class F2 (local road – extra-urban location) for roundabout.
- Local roads are not affected by the installation of road barrier due to the reduced velocity, in agreement with the executive design.

Types and designs of road safety barriers are presented on the drawing sheets.

<u>Terminals</u>

The analysis of the current situation showed that the ends of the safety barriers do not ensure safe driving conditions. The terminals are not installed on a large number of barriers or are inappropriate, which can lead to the penetration of the barrier into the vehicle during the impact. In order to improve the road safety situation and reduce the consequences of traffic accidents as much as possible, vehicle restraint systems are considered.

A Terminal is the treatment of the beginning and/or end of a VRS. In addition, it can provide an anchorage for the safety barrier.

A crash cushion is a standalone device installed in front of an obstacle to protect the occupants of a vehicle from colliding with the roadside hazard. They may be provided where a suitable length or provision of VRS cannot be provided or is not appropriate. Roadside hazards for which the installation of a crash cushion may be considered appropriate, may include the ends of retaining walls, abutments, bridge piers, concrete safety barriers, tunnel portals and blunt walls in tunnels, concrete buffers at toll stations etc.

Types and designs of road safety barriers terminals are presented on the drawing sheets

Traffic Signs and markings

The improvement of road signs and markings are also foreseen in the Final Design. For this, the respective layout has been prepared, where the respective signs are positioned in accordance with the geometry of the road and its use. The plan is accompanied by the relevant details so that the contractor has a clear way of construction and placement of road signs. According to the project, horizontal and vertical signage is foreseen.

Types and designs of traffic signs and markings are presented on the drawing sheets

3.2.5 Montenegro

Section: Podgorica - Mioska

At the initial meeting it was agreed that the section of the road that will be covered by this technical documentation differs in the initial part from the RSI report. Considering that the RSI report analysed and covered the city part of Willy Brandt Boulevard, and that the reconstruction and continuation of this boulevard to the highway loop is planned, this part is excluded from the subject technical documentation and the start of the route was moved after the highway loop. The total length of the section of the main road M-2 Podgorica-Kolašin, section Podgorica - Mioska is 47.2 km.
Based on the orthophoto layout, the axis was drawn according to the existing condition of the complete route in order to list the locations where interventions are planned. The layout contains ROW line (cadastral line of road area). Based on the field visits, analyses of the measures proposed by the RSI report and the cadastral line of road area, the locations where safety improvement measures will be designed and elaborated at the level of the Main Project.

Civil engineering

The construction project envisages works on extensions and intersections, as well as lighting of the pedestrian crossing near the school at km 7 + 073.70. Traffic signalisation and road equipment is a special part of the technical documentation given in book 3.

As stated in the terms of reference, construction interventions are planned at locations where it was possible to intervene within the ROW line. Certain localities that are evident on the road in question and which would require certain measures of improvement and intervention from the aspect of safety and are in private ownership have not been treated, for the above reasons. Also, it was concluded that in the extension / parking lot near the Morača Monastery (location 31), the optimal design solution in order to improve security would be to design a lane for left-hand sketching and a "T" intersection, which would limit the number of conflict points. Considering that the road belt is very narrow and limited at the location in question, and that the stated solution cannot be done with this technical documentation, an island has been designed to channel the entrances and exits to the subject parking space.

The civil design envisages works on extensions, of which a total of 39 and one intersection have been recorded. The levelling fit with the main road is envisaged, and the works are planned only on the part of the extension, in all respects according to the given cross-sections. Banks or gutters are designed as needed, depending on the location and situation on the ground. Depending on the location, three types of extensions are envisaged, i.e. extension without island, extension with boundary or extension with island, according to the given normal transverse profiles and details.

The designed locations are shown below:

· location 1 – km 7+073.70 - 7+170.00	· location 21- km 33+705.90 – 33 + 765.15
· location 2 – km 7+533.15	· location 22- km 34+170.00 – 34+244.50
· location 3 – km 10+425.89 - 10+469.61	· location 23- km 34+538.75 – 34+606.35
· location 4 - km 12+865.06 - 12+959.60	· location 24- km 34+950.00 – 35+000.00
· location 5- km 13+460.00 – 13+557.80	· location 25- km 36+918.00 – 36+984.50
· location 6- km 13+810.00 – 13+867.90	· location 26- km 37+520.90 – 37+571.50
· location 7-left km14+325.9-14+400.45	· location 27- km 37+885.82 – 37+955.45
right km 14+340.0-14+474.30	· location 28- km 38+826.00 – 38+874.29
· location 8- km 15+820.00 – 15+881.20	· location 29- km 39+180.00 – 39+233.10
· location 9- km 17+250.00 – 17+378.75	· location 30- km 39+290.00 - 39+421.00
· location 10- km 17+445.90 –17+543.80	· location 31- km 39+925.20 – 39+958.75
· location 11- km 17+718.50 - 17+765.00	· location 32- km 40+907.80 – 41+000.00
· location 12- km 18+301.20 – 18+370.00	· location 33- km 41+700.89 - 41+864.75
· location 13- km 18+800.00 – 18+850.00	· location 34- km 42+580.00 – 42+664.50
· location 14- km 20+710.90 – 20+771.00	· location 35- km 42+947.90 – 42+995.50
· location 15- km 21+621.90 – 21+661.50	· location 36- km 44+811.90 – 44+861.80
· location 16- km 23+475.00 – 23+540.00	· location 37- km 45+015.85 – 45+102.90
· location 17- km 24+075.00 – 24+145.55	· location 38- km 45+767.85 – 45+835.75
· location 18- km 25+851.50 – 25+940.00	· location 39- km 46+150.90 – 46+309.10
· location 19- km 31+820.89 – 31+884.50	· location 40- km 46+480.90 - 46+530.00
· location 20- km 32+289.40 - 32+317.40	

Also, on the layout, the coordinates of the points for marking the widening and the intersection are given. At the extensions where there were spatial possibilities to project the island, marking points were given.

At the designated locations, construction works are planned in order to obtain more precise calculations, more frequent cross-sections are given - at 10 m. They are marked with the symbol 1_order number of the previous profile.

Typical cross section

The cross-section is mostly in a slight embankment. The fitting with the main road was made and the shoulder with a width of 1.0 m and the slope of the embankment were designed with gradient 1: 1.50. 75 cm wide drain flumes and 20/20 curbs were designed. All designed solutions are given in a special graphic part Characteristic cross-section.

Road construction

The following layers of the road construction were adopted:

- Asphalt concrete AB 11s.....4 cm
- Bituminised base coat BNS 22sA.....2x6 cm
- Crushed stone DK 0/31.5.....20 cm
- Crushed stone DK 0/63.....20 cm

Traffic signalisation and equipment

Traffic signalisation and equipment is designed in accordance with the valid Law on road traffic safety, the Law on Roads, the Rulebook on Traffic signalling, as well as appropriate technical instructions and standards.

The following was done with the designed solution:

- At all junctions on the route that have a modern road, signs are placed for marking the priority of. passage, and accordingly it has been harmonised with existing traffic signals on the main route (reduction signs have been installed speeds, crossing announcement, etc).
- Missing signs II-30 ("speed limit") have been installed, with some corrections of existing signs II-30.
- The missing signs III-32 ("parking lot") were placed next to the additional board with an arrow to the right, at all extensions along the main road.
- Signs from group III-64 for marking dangerous curves were placed on a fluorescent green-yellow background.
- The sections where overtaking is allowed have been corrected, in such a way that there have been abolished locations that we consider unsafe to overtake.
- The school zone was marked with appropriate traffic and technical measures. Other missing traffic signs have been installed.
- New protective fences have been designed as follows:
    - all steel guardrails that do not meet the requirements of standard EN1317 were replaced by new ones, including fences on the sidewalks, on the crowns of the walls as well as on bridges;

- oblique ends of 4m, 12m and absorbers were installed on the sections where a speed 70km / h is allowed;
- concrete (stone) fences and pillars were abolished, and steel guardrail was designed instead;
- steel protective fence is designed on other sections on which it is necessary to be set.

Vertical signalling

The designed vertical signalisation consists of standard traffic signs dimensions, from the group Ø900mm and must be made with retroreflective foil class 3., except on access roads where the dimension from the group Ø600mm was used.

Signs II-2 determine the priority of vehicle movement on the main road M-2 on all intersections that are not with a macadam curtain or individual approaches to buildings, as well as in areas not used for traffic.

All intersections where a sign II-2 is placed on the side road are on the main road marked with the appropriate sign announcing a merger or crossing, I-27, I-28, I-28.1, I-29 and I-29.1, as well as their variations in accordance with the actual situation of the connection on the ground and marked labels a, b, c and d.

On the subject section, the maximum speed is 70 km / h, except in curves with lower radius or some other specific circumstances they require reduction. At the approaches to intersections, the maximum speed of movement is determined by the sign on 50km / h.

All car parks and rest areas are marked with sign III-32 and an additional chevrons. Traffic signs III-25 and II-28 indicate the beginnings and endings of where it is allowed to overtake in places where the conditions for overtaking are satisfied. It should be noted that this project did not calculate the excess visibility for each section, but it only performed elimination of overtaking sections that were assessed as unsafe.

Dangerous curves on the route are marked with traffic signs from group III-64. In accordance with Technical instructions, position of marks are positioned in places where the speed of the vehicle at the approach to the curve for at least 20km / h higher than the defined speed for safe passage through the curve, as on others places for which the need for installation was assessed due to some specificity. Characters from the group III-64 are placed so that the driver must see at least 3 adjacent signs at all times. Signs for both directions should be placed on one pillar, as shown in the next pictures:

Each projected sign is shown on the Traffic Signalling and Equipment Plan with the following data:

• Schematic symbol of pillar and sign
• graphic representation of the sign (appearance of the face of the sign),
• character dimensions (mm)
• class of retroreflective foil
• code of the traffic sign according to the Rulebook on traffic signalisation
• Orientation stationing on which the pillar is placed

All projected traffic signs are given within the bill of quantities and estimates of standard dimensions, with name, dimensions and quantities. All standard traffic signs should be made according to the appropriate standards that contain all the elements necessary for their graphic representation.
The graphics in Detailed design show the position of the vertical signalisation in the transverse profile and the details of the installation of the traffic signs .

Horizontal signalling

For the projected longitudinal line separating the driving directions on the entire route, there is an unbroken white line 0.15 m wide which is at the places of permitted turning on connecting roads interrupted by line 1 + 1.
With a stop line 0.50 m wide (with sign II-2) at the intersections of connecting roads with the right of priority of movement is defined at the main road.

Traffic equipment

In accordance with EN 1317 standards, a protective elastic baffle for vehicles has been designed. A detailed presentation of the adopted types of fences is given in the graphic attachment. Material quality, workmanship and delivery conditions must be in accordance with standard EN 1317.
Stationary marked on the layout of traffic signals, three types were adopted for steel guardrails, in accordance with standard EN 1317, as follows:

- H1-W3. For certain sections, and in accordance with the Technical Instructions, it was adopted retention degree H1 and area of action W3 (WN = 0.80m).
- H1-W4. For certain sections, and in accordance with the Technical Instructions, it was adopted retention degree H1 and area of action W4 (WN = 1.20m).
- Steel was adopted on culverts and along atmospheric drainage channels protective fence N2-W5.

For this section, in accordance with the Technical Instructions the degree of retention N2 and the area of action W5 (WN = 1.60 m) were adopted.
The choice of the mentioned types of fencing was conditioned by the predicted width of the bank or the crown of the support wall (available space for the area of operation of the protective fence). In addition, the criteria for the choices were the degree of danger, speed of movement (Vmax), average daily traffic (PDS), share heavy traffic (TS) and probability of turning. Details of all fences used and position in the transverse profile is given in the graphics.
On all bridges on the route, a suitable protective elastic buffer fence has been designed for vehicles. The graphic attachment shows the detail of the installation of the fence on the bridges.
Pillars (supports) for the installation of a protective fence are installed on the sidewalks or by attaching the pillars with the foundation slab to the already concreted anchors in the building using screws, or in concrete using dowels and screws. For steel guardrails, in smaller radii from R = 30m it is necessary to do pre-bending of elements (guards) for all levels of retention, before galvanising.
On the front side of the protective fence (face), it is obligatory to place the reflectors on the prescribed distance.
Given the non-existence of the Main Structural design of the route and static calculations, before installation of all protective fences it is necessary to re-examine the stability of slopes, supporting crowns walls and bridge concrete parts on which the fence is placed.

Public Lightning

Based on requests to increase the safety of traffic near the school in Bioče, which is located on the subject road Podgorica-Mioska, a solution was proposed involving lighting the pedestrian crossing that will be located near the school. Having in mind the request of the investor that the lighting be achieved based on solar energy ,in order to avoid greater excavation of existing surfaces and cable laying, which would require lengthy and complex procedures in terms of providing conditions for performing works of a larger scope in that sense, the proposed solution is based on the most modern approach, which brings safety of location and traffic participants to a significantly high level. The solution offered includes several optional elements, which the investor should consider based on the available information and based on estimation of actual needs and costs and choose the model that suits requirements the best. In that sense, the attached technical conditions are general, and in case mains cables need to be used, they are mandatory.

The proposed solution covers only one pedestrian crossing near the school in Bioče, and all equipment was selected in accordance with the requirements of investors for the increase of safety and security of all traffic participants at this location. The area includes roads Podgorica - Mioska with signs M2, i.e E65 and E80, in accordance with the fact that the road is part of an international path. On one side of the road, closer to the school, there is an extension for the stop of the school minibus, and a slightly wider unarranged pedestrian area. On the other side of the road there is also a somewhat narrower unarranged pedestrian area. It is noticeable that there is no public lighting nearby. In a convenient place, as shown in the graphic part, the pedestrian crossing should be located to be illuminated and made safe for crossing the road, so for that purpose, as the most expedient experience ,the proposed solution includes installation of two poles with LED lighting and additional signalisation (one on each side of the road), all in accordance with the explanations given in the technical description.

Traffic signs and equipment that are placed along the road with their type, meaning, shape, colour, size and manner of installation, must be performed and placed in accordance with the applicable regulations and standards governing the area. Code determining the position of poles and lighting equipment should take into account the spatial micro location characteristics. In that sense and in this solution the position to- set lighting, i.e. the pedestrian crossing itself that is illuminated, should ensure good visibility of traffic signs and signals from the driver's perspective, and at the same time properly and in accordance with the standards illuminate and mark the pedestrian crossing. In addition to the above, care should be taken that all components of the system to be installed (foundation, column and other equipment) fit into the available space in the road zone, so as not to encroach on free road profile, also neither obscure the visibility of other signs nor reduce visibility to drivers.

Pillars are placed on both sides of the road as given in the technical description and in the attached pictures so that the axes of the pillars, if possible, are 1.5m - 2m away from the edge of the road. The project envisages hot dip galvanised Fe for installation 6m high poles mounted with photovoltaic panels. The pillars must fully meet all static calculations, and must be certified on load-bearing capacity and compliance with project requirements, and it is necessary to carry out control and obtain evidence of mechanical resistance and stability, and prepare the foundation accordingly and anchors (and possibly provide for connection to the mains and earthing system).

The graphic attachments show the recommended column details, and position suggestions on where to install lighting, but the exact position of the markers and poles is necessary to be determined after the position of the pedestrian crossing has been definitively approved. If they are purchased before the beginning of the works, the investor eventually decides to install the pillars that give possibility of connection to the electrical network, it is necessary as part of the installation work equipment to perform the necessary works of electrical installation and cabling, professionally and in accordance with applicable regulations and given conditions. In that case, the type and dimensions of the laid cables and other equipment, the contractor is obliged to show in the as-built drawings. For this case, it is obligatory to adhere to the part of the project concerning the conditions of execution in the case of electrical networks.

It is important to note that any work must not be started without prior obtained consents and permits from the competent authorities. Also, the contractor is obliged to take all necessary measures to ensure uninterrupted traffic during the execution of works.

3.2.6 Serbia

Section: Orlovaca – Stepojevac - Celije

Civil engineering – Bus stop km 7+956.81

Layout plans of the recorded existing and projected conditions are shown in the scale R=1: 500. The location of the subject bus stop on the state road IB number 22, which is being reconstructed, is at the chaining km 7+956.81, along the right edge of the road in the direction of chainage growth. The chainage of the subject stop was determined by measuring on site, concerning the known chainage of junctions defined in the valid Reference System of State Roads (coordinates of junctions can be found on the website of PE "Roads of Serbia").

The projected bus stop/niche is 3.50m wide, the associated space for gathering pedestrians waiting for the bus is 1.6m wide and 14m long, which is then connected to the existing pedestrian path that leads users to the existing footbridge across the state road. The platform for waiting for the bus is raised from the level of the stop by 12-15cm. The length of the stop is planned for one bus and is L=14m.

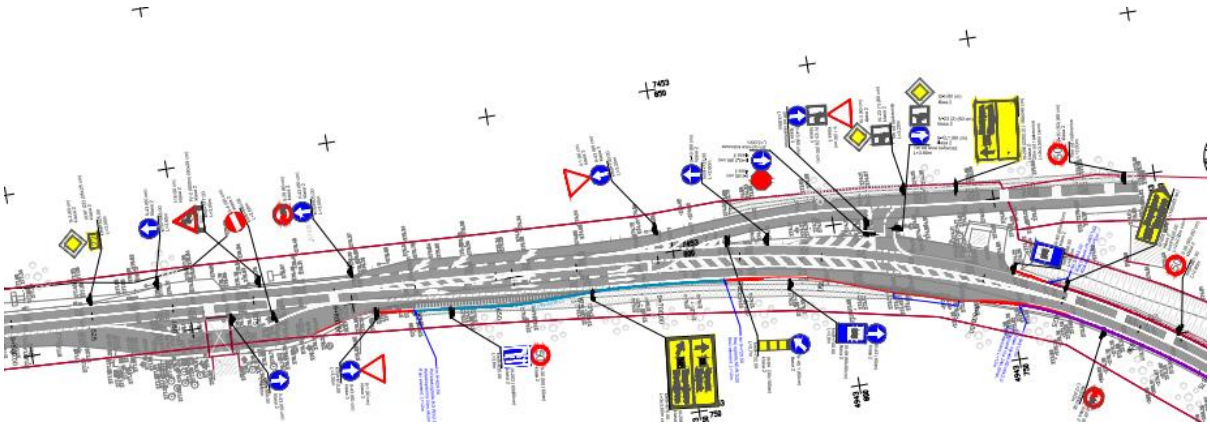
The newly designed solution envisages a physical island 0.5m wide, away from the existing edge of the road and 1.5m wide, which aims to increase the safety and protection of users of the bus stop. After the completed works, the re-assembly of the previously removed canopy is planned, which must be placed at the prescribed distance of at least 0.75 m from the carriageway.

Civil engineering – Acceleration/Deceleration lanes and Bus stop km 9+560

Current state

At the subject location along the state road IB22 on the right side in the chainage increase direction at km 9+560, a gas station was recorded, which was assessed as unsafe because it does not have adequate access in terms of insufficient length of lanes acceleration and deceleration to the state road.

The current state road pavement width at this location is 7.50-7.80 m with traffic lanes for each driving direction 3.50 m wide, and side lanes on both sides 0.35 m wide.



At the subject location along the state road IB22 on the right side in the chainage increase direction at km 9+783.65, a bus stop was noted, which was assessed as an unsafe place because it does not have adequate access. It is a dirt, gravel bus stop, there is neither a bus niche nor pedestrian platforms.

New design

The layout of the recorded current and projected state is shown in the scale R=1:500. The proposed design plan is given within the state road right of way and is harmonised with the current state of the facilities on the site.

According to the recommendation of the traffic safety analysis report, it was adopted that the geometric design of the acceleration lane from the gas station and the bus stop should be designed based on the relevant speed V_{ras}=50 km/h. The works are planned at c.p 5164 C.M. Barajevo. These plans would increase traffic safety in the area of the gas station and bus stop, which would reduce the number of conflict points when entering and exiting the state road IB-22. The elements of the bus stop and the acceleration lane are defined based on valid standards and regulations. A pedestrian platform 1.5 m wide and 20 m long has been designed. The width of the bus stop is 3.10 m and the length is 77 m. The niche of the bus stop is rounded with radii R=20-80m. The designed acceleration lane is of variable width, the width in the straight direction is 3.5 m and the length is 107 m. The acceleration/deceleration lanes on the state road are rounded with radii R=40-120m.

The newly designed sections on the state road IB number 22 are planned at the chainages from km 9+592 to km 9+690 and from km 9+744 to km 9+821 along the right pavement edge in the chainage increase direction of the state road IB22. The chainages of the sections are determined by site measuring, concerning the known node points chainages defined in the valid Reference system of state roads (coordinates of the node points which can be found on the site of PE "Roads of Serbia").

Civil engineering – Intersection redesign km 15+000

Current state

The current state of the state road in this part of the section consists of one traffic lane for each driving direction, 3.25 m wide, with widths of edge lanes of 0.35 m, while the total width of the state road is 7.20 m. On the right side in the chainage increase direction from km 14+697.89 to km 15+009.17 in the length of L~310 m, there is a large number of private driveways built of concrete, asphalt concrete, and

gravel, which are used as access to facilities and as parking spaces. Drainage of these areas was done partly through line drains which were re-asphalted, so in the current state, it is solved by transverse and longitudinal pavement slopes that drain atmospheric water into the surrounding greenery and ground canals.

New design

The layout of the recorded current and projected state is shown in the scale R=1:500. The proposed design plan is given within the state road right of way and is harmonised with the current state of the facilities on the site. The traffic safety analysis report recommends that in case there are three or more car approaches at a distance of less than 100m, it is necessary to provide access control to the state road.

The newly designed plan for the safe junction of vehicles from individual plots implies the construction of a service road on c.p. 2127 KO Bacevac, which will unite the accesses to the state road and reduce the number of conflict points with it. The designed 4.5m wide service road is physically separated from the main route by a 1.5m wide bordered traffic island. The acceleration and deceleration lanes of the service road on the state road are rounded with radii R = 60-120m.

Layouts of the recorded current and designed state are shown in the scale R=1:500. The location of the newly designed service road on the state road IB number 22 is planned at the chainage from km 14+698 to km 15+010, along the right edge of the pavement in the chainage increase direction. The chainage of the service road was determined by site measurements, about the known chainage of junctions defined in the valid Reference System of State Roads (coordinates of node points can be found on the website of PE "Roads of Serbia").

The designed service road is 4.50 m wide and 312 m long. The newly designed solution envisages a 1.5m wide physical island away from the current road edge by 1.00m, which aims to increase the safety and protection of service road users by physically separating vehicle movements on the state road from vehicle traffic on the service road.

Civil engineering – Intersection rearrangement km 15+470

Current state

The location is on the state road IB row number 22, in the zone of junction point 2204 Meljak (Barajevo). It includes cadastral plots 869, 861/5, 202/6, 861/4, 861/3, 808/21, 808/22 C.M. Meljak, and 2127 C.M. Bacevac.

In the current state, there are several junctions to the state road, some of which are at a sharp angle. At the chainage km 15+494 there is a crossroads with the state road IIB number 344 Drazevac-Meljak-Barajevo-Ralja (node point 2204 Meljak). No intersection at the location has manipulative lanes for left turns. There is also a bus stop and public lighting in the area of this intersection.

The current width of the state road IB order no. 22 pavement is 7.50 - 7.60m.

New design

The layout of the recorded current and designed state is shown on the scale R 1:500. The proposed design plan is given within the right of way of the state road and is harmonised with the current state of the facilities on the site.

This design envisages the abolition of the intersection with the junction at a sharp angle, at the chainage km 15+470, with the curb raising, to completely prevent the passage of vehicles. Instead of the mentioned intersection, it is planned to build a new junction between the state road and Marsala Tita Street at km 15+425, to significantly increase the safety of all traffic participants.

At the three-lane intersection, at the crossroad of two state roads (IB-22 and IIB-344), it is planned to channel traffic flows to the islands to separate them. A special manipulative lane, 3.25 m wide, was designed for left turns from the state road IB 22 on the state road IIB 344. From the opposite direction, a lane was designed for right turns from the state road, 3.50 m wide.

The construction of an island in the shape of a “drop” is planned on the state road IIB 344, physically raised from the pavement, bordered by curbs 18/24 with an elevation of +12cm.

Physical islands flow channeling on the state road IB no. 22 (so-called “false islands”) will be bordered by a curb 24/18 with an elevation of +3cm.

A couple of bus stops have also been designed, with a pavement width of 3.10m and passenger platforms, 2.0m wide. When it comes to the stops, in the direction of Lazarevac – Belgrade, a sidewalk, 1.5 wide, has been designed, which leads from the platform to the current pedestrian underground passage.

Civil engineering – New service road km 16+454 to km 16+646

Current state

In its current state, the state road IB22 has one traffic lane for each driving direction, 3.25 m wide, while the width of the edge lane for both directions is variable and the minimum width is 0.35m. The total width of the state road is a minimum width of 7.2m. On the right side of the state road in the direction of the chainage growth, there is a large number of individual road approaches built of concrete and gravel. Drainage of traffic areas at the subject location is gravitational to the surrounding greenery or current ground canals.

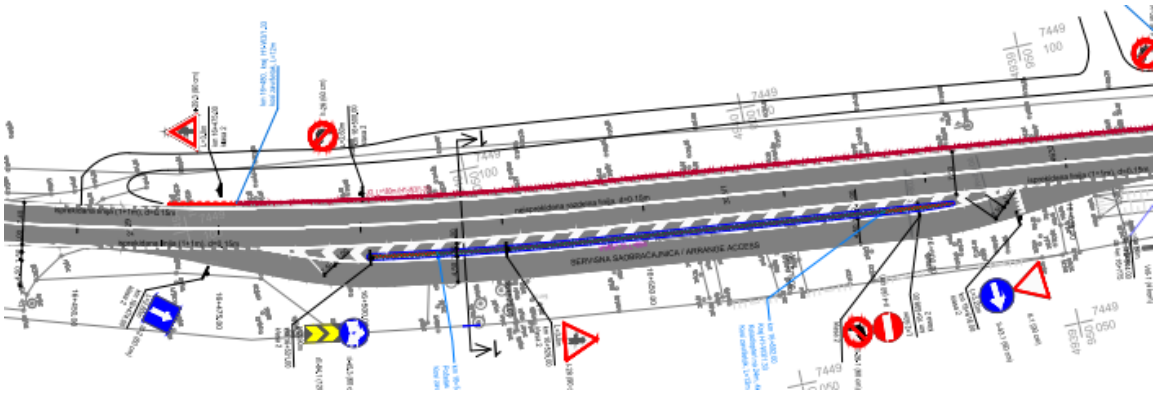


Figure 1 *Before/After*

New design

The situation of the recorded current and projected state is shown in the scale R=1:500. The proposed design plan is given within the state road right of way and is harmonised with the current state of the facilities on the site.

The traffic safety analysis report recommends that in case there are three or more car approaching at a distance of less than 100m, it is necessary to provide access control to the state road. The newly designed plan for safe vehicle junctions from individual plots implies the construction of a service road on c.p. 356/1, 2129 C.M. Bacevac, c.p. 4620/1, 4632 C.M. Vranic, which will unite the approaches to the state road and reduce the number of the conflict points. The designed 4.5m wide service road is physically separated from the main route by a 1.5m wide bordered traffic island. The service road acceleration and deceleration lanes on the state road are rounded with radii R=60-80m.

Layouts of the recorded existing and designed state are shown in the scale R=1:500. The location of the newly designed service road on the state road IB number 22 is planned at the chainage from km 16+454 to km 16+646, along the right edge of the road in the direction of chainage growth. The chainage of the service road was determined by site measurements, concerning the known chainage of junctions defined in the valid Reference System of State Roads (coordinates of junctions which can be found on the website of PE “Roads of Serbia”).

The designed service road is 4.50m wide and 192m long. The newly designed plan envisages a 1.5m wide physical island away from the existing road edge by 1.00m, which aims to increase the safety and protection of service road users by physically separating vehicle traffic on the state road with vehicle traffic on the service road.

Civil engineering – Intersection redesign km 19+500

Current State

One of the locations on the subject section included in these measures extends from km 19+496.82 to km 19+802.83. On that section on the left side in the chainage increase direction, there is a junction, more precisely Radovan Marinkovic Street. Public transport buses operate on the mentioned section, which means that passengers are waiting for transport at improvised bus stops. In the current state, the

state road IB22 has one traffic lane for each driving direction, 3.25 m wide, while the minimum width of the edge lane is 0.25 m. The total width of the state road is ~ 7.50m.

New design

The layout of the recorded current and projected state is shown in the scale R=1:500. The proposed design plan is given within the state road right of way and is harmonised with the current state of the facilities on the site.

Reconstruction measures envisage the formation of a 3.25m wide lane on the state road. The position of the traffic directing island, as well as the left and right turns at the intersection, are defined by the passage of the relevant vehicle that is expected at the intersection.

Reconstruction of the current bus stops is also planned; their locations are conditioned by the needs of public transport and their users. The first bus stop is located at the chainage 19+598.45 on the left side in the chainage direction, and the width of the niche is 3.10m, the appropriate space for pedestrians is 1.50m wide and 20.0m long. The footpath is connected with the current improvised path along the junction street. The second newly designed bus stop is located at the chainage 19+732.67 on the right side in the chainage increase direction. The subject bus stop is 3.10m wide, while next to the bus stop, suitable space for passengers, 1.50m wide and 18.00m long, has been designed.

The planned works on this location are on c.p. 4630/3, 4632 C.M. Vranic, and c.p. 1620 C.M. Siljakovac.

Civil engineering – Intersection redesign km 22+750

Current condition

The current condition of the state road in this part of the section consists of one traffic lane for each driving direction, 3.25 m wide, with widths of edge lanes of 0.35 m, while the total width of the state road is 7.20 m. On the left side of the state road in the direction of the chainage growth from km 22+726.29 to km 22+769.36 in the length of L~45 m, there is a bus stop built of gravel. At the location of this bus stop, it is noticeable that in addition to its projected function it is also used as access to the state road. This bus stop is located at the intersection of the state road IB-22 and Bratstva i jedinstva Street (chainage at the intersection km 22+733.64). On the other side of bus stop is Bratstva i jedinstva Street, so the connection to Bratstva i jedinstva Street on the right side of the road is observed in the direction of chainage growth.

In the continuation on the right side of the road in the direction of chainage growth from km 22+765.93 to km 22+811.93 in the length of L~45 m, there is a bus stop built of gravel (not clearly defined and geometrically noticeable). At the location of this bus stop, it is noticeable that, in addition to its basic function, it is also used as a connection to Bratstva i jedinstva Street, which is inadmissible from the aspect of safety and traffic functionality at this location. Drainage of all surfaces is done by the gravitational transverse and longitudinal slope of the road into the surrounding greenery and ground canals. Water retention was noticed in the edge zones of the road on the parts of the transition from the state road to the bus stops and the connection of Bratstva i jedinstva Street.

Figure 1 *Intersection with Bratstva i jedinstva Street and bus stops on the state road IB-22 (in 2015, view from chainage growth).*

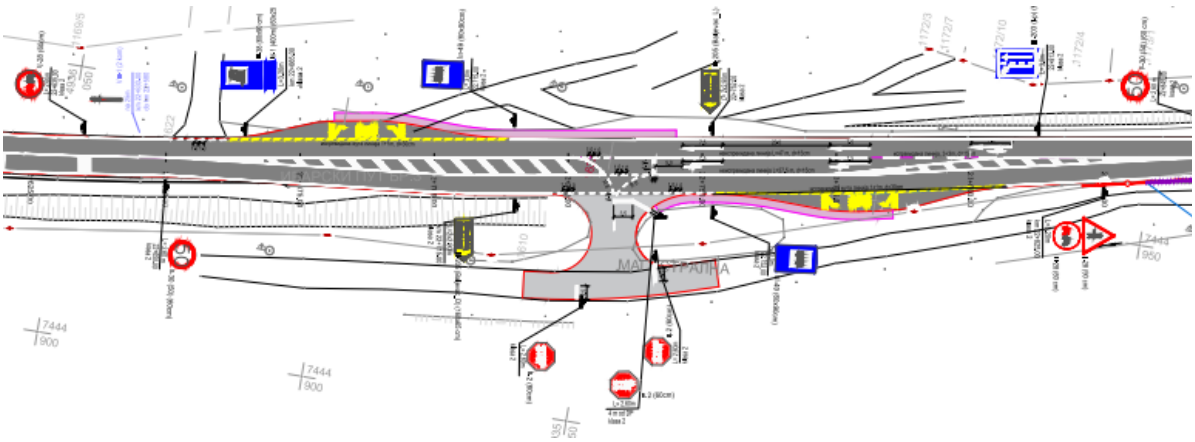


Figure 2 *Intersection with Bratstva i jedinstva Street and bus stops on the state road IB-22 (in 2015, view from chainage declining).*

New design

The situation of the recorded existing and projected condition is shown in the scale R=1: 500. The proposed project solution is given within the road belt of the state road and is harmonised with the existing condition of the facilities on the site.

According to the recommendation of the traffic safety analysis report, it was adopted that the geometric shaping of left turns on the main direction be projected based on the relevant speed in the zone of the intersection V_{cross}=50 km/h.

At the subject location, it is proposed to build a surface intersection with the widening of the road for the needs of left turns (**type 3**), as well as the arrangement of two bus stops in the intersection zone. Such a solution would increase traffic safety in the intersection zone, which would reduce the number of conflict points when connecting and disconnecting from the state road IB-22. The works are planned on c.p. 1622, 1610 CM Siljakovac, c.p. 1268/2 CM Vrbovno.

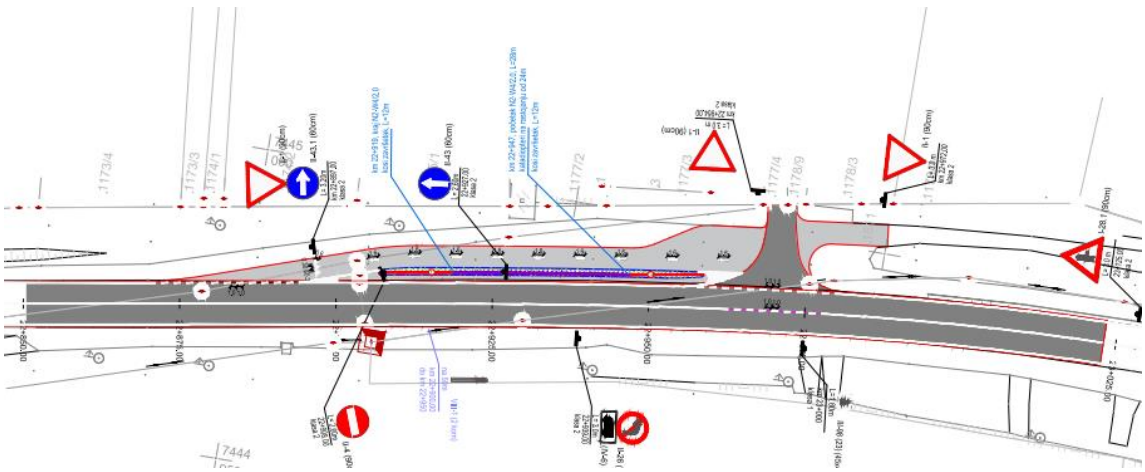
The location and elements of bus stops in the intersection zone are defined based on applicable standards and regulations. Pedestrian accesses to bus stops have also been designed in the form of a footpath integrated with a 1.5 m wide platform. In this way, the connection of vehicles to the state road and movement through bus niches was physically prevented.

Civil engineering – Parking lot – access control km 22+900

Current state

In its current state, the state road IB22 has one traffic lane for each driving direction, 3.25 m wide, while the width of the edge lane for both directions is variable and the minimum width is 0.35m. The total width of the state road is a minimum width of 7.2m. On the right side in the direction of chainage growth from km 22+863.93 to km 22+986.35 in the length of L~120 m there is a large number of parking lots both arranged, marked, asphalt parking lots, and unarranged, gravel parking lots, which are used as accesses to facilities and as parking spaces. This is where a service/access road is planned, to influence the reduction of traffic accidents by channeling traffic from these access areas. It should be emphasized that these junctions are located in the transition curve, which is an additional reason for construction interventions at this location. Also, in this section, there is a junction of Raska Street with the state road as well as with other junctions and parking lots.

Drainage of these areas is done partly through a concrete canal, and partly through transverse and longitudinal slopes that lead water into the surrounding greenery and ground canals.



New design

The layout of the current recorded and designed state is shown in the scale R=1:500, while the plan itself was made and harmonized with the recorded geodetic base.

In the part of the subject section, a service/access road has been proposed and it will be physically separated by the island from the state road and will reduce the number of conflict points when entering/exiting from it. The traffic safety analysis report recommends that in case of three or more road accesses at a distance of less than 100m, a service/access road is to be provided. The same case with the additional parking lot in this section for access to local facilities, and a 3.50 m wide service road is planned, which is to be physically separated by a 1.15 m wide traffic island from the traffic on the state road. The acceleration and deceleration service road lanes are rounded with radii in the range R=60-120 m for a more comfortable exit or entrance.

Civil engineering – Bus stop km 25+003

Situations of the recorded existing and projected conditions are shown in the scale R=1:500.

The location of the subject bus stop on the state road IB number 22, which is being reconstructed, is at the chainage km 25+023, along the left edge of the pavement in the direction of chainage growth. The chainage of the subject stop was determined by site measuring, concerning the known chainage of junctions defined in the valid Reference System of State Roads (coordinates of junctions can be found on the website of PE "Roads of Serbia"). The projected bus stop/niche is 3.50 m wide, the corresponding space for pedestrian gathering for waiting for the bus is 2.0m wide and 14m long. The bus waiting platform is raised 12cm from the stop level. The length of the stop is planned for one bus and it is L=14m. The newly designed solution envisages a physical island 2.0m wide away from the existing edge of the road for 1.0m, to increase the safety and protection of users of the stop. The installation of a canopy is planned after the completion of the works, which must be placed at the prescribed distance of at least 0.75m from the pavement.

Pavement layout elements (widths, curve radii), pedestrian areas are completely designed as on the attached layout plan of the projected state (Annex No.2.7.2). All detailed points are determined in the absolute coordinate system and their transfer to the site should be done from the Marking Plan (Annex No. 2.7.7) and according to the attached list of coordinates of detailed points.

Civil engineering – Bus stops km 26+195 and km 26+250

The layout of the current recorded and designed state is shown in the scale R=1:500.

The proposed design plan is given within the state road right of way and is harmonized with the current state of the facilities on the site. The location of the subject bus stops on the state road IB number 22 that is being reconstructed is at the chainage km 26+195.00, along the left edge of the road in the direction of chainage growth and at the station km 26+250.00, along the right edge of the road. The chainage of the subject stop was determined by site measurements, in relation to the known nodes chainage defined in the valid Reference System of State Roads (coordinates of nodes can be found on the website of PE "Roads of Serbia"). The designed stops are conditioned by the needs of public

transport and its users, and in accordance with the technical elements of the road. At the chainage km 26+210.41 on the left side there is a junction with unfavorable geometry. With the newly designed plan, the junction is reconstructed to follow the geometry of the newly designed bus stop at km 26+195.00, which is formed as a semi-berth.

The designed bus stop/berth is 3.10m wide, the footpath is 1.50m wide, which leads to the corresponding area for pedestrians waiting for buses, also 1.50m wide and 14.0m long. The applied horizontal elements of the berth are a=17.0m, b=12.0m with the length of the stop L=14.0m. The bus waiting platform is raised by 12 cm from the pavement level. After the completed works, the re-assembly of the previously removed canopy is planned, which must be placed at the prescribed distance of at least 0.75m from the pavement.

At the bus stop at the chainage km 26+195.00 there is a plot no. 147/3, which is private property and its exit to the state road is blocked by the newly built space for pedestrians, i.e. a bus berth.

A new concrete approach is planned from plot no. 147/3 to the uncategorised junction at km 26+210.41, which further leads to the state road IB no. 22.

Layout elements (widths, radii of curves) of the road, pedestrian areas are completely designed as in the attached layout plan of the projected condition (Annex No.2.7.2).

All detailed points are determined in the absolute coordinate system and their transfer to the site should be done from the Marking Plan (Annex No. 2.7.7) and according to the attached list of detailed points coordinates

Civil engineering – Intersection redesign km 29+600

The considered section is L~352m long. The covered locations represent two close intersections. At location 4 (Figure 1), the width of the traffic lanes for each driving direction on the state road is 3.25 m, while the width of the edge lanes is 0.25 m. Additional areas were made on both sides of the pavement, with the same transverse slope as on the main road, 0.85 m wide, and curbs on the outside, which have the function of collection and longitudinal drainage of atmospheric water. The total width of the pavement on this section is 8.70m. The junction on the right side of the state road pavement in the chainage increase direction is at km 29+625.00 and from it, the left turn on the state road is prohibited. At km 29+635.00, the left turn of the vehicle from the state road into Nikola Jovanovic Street was prevented by the current guardrail. The current area for directing vehicles in the intersection zone is approximately 75.0m long and 2.0m wide. After the painted surface, a 2.60m wide left turn lane "separates" from the 3.25m wide continuous lane.

At the chainage 29+725.00 location 5 (Figure 2) there is the junction on the left side of the pavement of the state road in the chainage increase direction. The junction connects the state road IB number 22, with the state road IIA number 148 (Meljak). The junction in its current state has a drop-shaped physical island and two-way directing painted areas.

New design

The layout of the recorded current and projected state is shown in the scale R=1:500. The proposed design plan is given within the state road right of way and is harmonised with the current state of the facilities on the site.

The ban on left turns from the junction to the main road is clearly emphasised at location 4, by applying the so-called "false" island on the state road. The designed fake island is 80m long and 1.75m wide. In the zone of widening the intersection and opening the lane for the left turn, its width was corrected to 3.0m. The lane for continuous driving is 3.25m wide with the edge lane 0.25m wide.

Construction of new triangular physical islands is planned at the location 5, km 29+737.50 at the intersection of the state road IB22 and the road IIA row number 148, on the site of the currently painted surfaces, as well as the correction of the drop-like island, which will make the intersection safer and will lead tobetter channeling traffic flows at the intersection. The position of the additional islands is defined based on the curvature of the authoritative vehicle.

Civil engineering – Gas station access km 34+240

CURRENT STATE

The subject location is located on the left side of the state road IB number 22, between the junction points 2208 Lazarevac (Ibarski put) and 2209 Celije, at km 34+240. These are areas for the arrival and departure of vehicles from the gas station, which also serve as approaches to other auxiliary facilities located there.

Between the state road and the gas station itself, there is a dividing island, physically elevated with a green area 61m long and of variable width.

NEW DESIGN

Construction interventions are planned on the cadastral parcel c.p. 2082 C.M. Veliki Crljeni. Considering the widths of the subject areas and the two-way flow of traffic, it is necessary to regulate, that is, direct the vehicles to a narrower zone, from which the vehicles would later join the state road.

To achieve that, it is planned to extend the existing dividing island from the north side, to reduce the width of the inflow and thus increase the safety of all traffic participants.

The current dividing island is extended on one side by 12.50m and is 5.9m wide. The new island is 5.9m wide and 12.50m long. The island is planned to be bordered by a curb 18/24, with an elevation of +12cm concerning the road.

No construction interventions are planned on the state road

Civil engineering – Gas station access km 44+600

The subject location is located on the left side of the state road IB number 22, between the junction points 2208 Lazarevac (Ibarski put) and 2209 Celije, at km 44+600. These are areas for the arrival and departure of vehicles from the fuel supply station, which also serves as approaches to other auxiliary facilities located there. Between the state road and the gas station itself, there is a separate, physically elevated island with a green area, 42m long and 13m wide.

NEW DESIGN

Construction interventions are planned on cadastral parcel 3401 C.M. Petka. Considering the widths of the subject areas and the two-way flow of traffic, it is necessary to regulate, that is, direct the vehicles to narrower zones, from which the vehicles would be connected to the state road in the continuation.

To achieve this, it is projected to extend the current dividing island on both sides, as well as to build a new one, to reduce the width of the inflow/outflow, and thus increase the safety of all road users.

The current dividing island is extended from one (northeast) side by 15m and is 5.3m wide, and from the opposite (southwest) side by 10m in width 5.9m. The new island is 5.5m wide and 17m long. The islands are planned to be bordered by a curb 18/24, with an elevation of +12cm concerning the pavement.

No construction interventions are planned on the state road.

Civil engineering – Intersection redesign km 46+750

The current condition of the state road in this part of the subject section consists of one traffic lane for each driving direction, 3.25 m wide, with widths of edge lanes of 0.35 m, while the total width of the state road is 7.20 m. On the left side of the state road pavement in the direction of chainage growth at km 46+750.00 there is a three-way unregulated "Y" intersection, with a large undefined asphalt surface, without guiding islands or painted fields, which would specify the movement of vehicles in the intersection. Drainage of this surface intersection is done by the transverse and longitudinal slope of the road into the surrounding greenery.

NEW DESIGN

The situation of the recorded current and projected state is shown in the scale R 1:500. The proposed project solution is given within the road belt of the state road and is harmonised with the current state of the facilities on the location.

At km 46+750.00 of the subject section, construction interventions are planned on c.p. 1048 C.M. Celije, in the sense of using a physical island with a curb elevation of +12 cm, which has the role of separating and directing traffic flows at the subject intersection. Left turns from the state road to the connection were canceled due to heavy daily traffic (AADT=1700 veh/day).

Public lightning

At km 46 + 750.00 of the section, the traffic safety audit report recorded an unsafe intersection / intersection of the state road IB-22 with Vladike Nikolaja Velimirovića Street. The mentioned street leads to the settlement of Lazarevac, which is also the seat of the city municipality of Lazarevac and

administratively makes it one of the 17 municipalities of the city of Belgrade. The location (location 53) is a dangerous place where accidents have occurred before. It was decisive that this problematic place regulates the movement of vehicles at the intersection by building interventions through forming a physical island at the connection.

This project envisages the lighting of the intersection in question with solar lamps with a hybrid power supply. For the needs of public lighting, it is planned to install 10 pillars, 9 m high. 7 lamps were placed on the right side of the state road IB 22, and 3 along the connection in the intersection zone (all details are presented in final design).

Traffic signalization and equipment

In addition to the civil engineering nterventions, the design also includes traffic technical regulation on each point, which is incorporated into the traffic regime defined by the Traffic and Traffic Signaling Project on state road 22, road section Belgrade - Ljig for sections outside the settlement and traffic nodes of the reference system (L = 60.870 km), (Project was carried out by the company “S PROJEKT” LTD, 11dj, Djordja Stanojevica Street; project number 01/2017).

The design plan represents the installation of traffic signs, road signs marking, and installation of the necessary equipment (guardrails, reflectors, signposts). When it comes to the traffic signs, it is planned to place standard and traffic signs for traffic management, with their holders.

The standard traffic signs have dimensions harmonised with the rank of the road and traffic conditions. The following dimensions of traffic signs were adopted: a triangle with sides of 900mm, a circle with a diameter of 600mm, and a rectangular with the sides of 600x900mm. The material for making the front sides of the signs has retroreflective properties of class 2. Since the location is outside the settlement, the signs are placed at a height of 1.20m and 1.40m, respectively.

Standard signs are made according to detailed drawings in Serbian standards (SRPS Z.S2. from no. 301 to 309), under names, code, and with appearance according to the Rulebook on traffic signalisation, (“Off. Gazette of RS”, no.85/2017). Placed signs must be secured against turning and shearing.

The position of the signaling elements is determined by the chainage of the road which is inscribed next to them and related to the chainage of the road axis along which the sign is placed.

For standard traffic signs, single-column pipe beams are provided, the length of which depends on the size and number of signs on the same pillar, as well as the characteristics of the terrain. Holder length defined for each of the signs is shown on the layout plan and calculated by the estimate.

The design includes the following road markings:

- Longitudinal markings: solid and dashed dividing and border lines, with a width of 15cm.
- Transverse markings: solid stop line with a width of 0.50m.
- Other markings: hatched areas for the traffic direction, wedges, bus stop markings.

The prices of road marking works are calculated per m^2 of the painted area.

The specification and estimate include all positions of works, which refer to traffic signals, represented in the technical documentation.

An integral part of the technical documentation is the descriptions of the work positions, i.e. the technical conditions for their completion.

The prices of the determined works are approximately market prices at the time of design development.

Section: Bubanj Potok – Mali Pozarevac

According to the position and function in the road network, i.e. the place it has in the plans of a higher order, state road A1 (state border with Hungary (border crossing Horgos) - Novi Sad - Belgrade - Nis - Vranje - state border with North Macedonia (border crossing Presevo)), it is a type of a long-distance road of the highest rank in the current, as well as each of the previous categorisations of the road network of Serbian state roads, forming part of the network of European roads.
As part of the technical assistance support for the Western Balkans which was (mid-2017 – mid-2018) provided by the European Commission (the CONNECTA project), a three-year regional road safety inspection plan (RSI) was delivered and 580 km of roads were inspected (as a pilot project) on the basic/comprehensive TEN-T road networks in the Western Balkans (supervised by SEETO). Technical assistance derives from the completed CONNECTA regional road safety study (Preparation of Traffic Safety Inspections and Audit Plans for the Western Balkans basic/comprehensive road network - CONNECTA-TRA-CRM-REG-01, July 2018) where, among other tasks, traffic safety checks were done along 580 km of high-risk sections of the basic/comprehensive network. Accordingly, the project represents a direct continuation of the expected goals and benefits, aimed at improving security conditions, by designing identified feasible interventions along with the basic/comprehensive WB6 network (consisting of 10 sections). This includes the following:
- controlling feasible interventions to be designed
- carrying out any necessary (small) topographic surveys
- preparation of project documentation and technical specifications of selected interventions for each road section.

Expected benefits follow:
• Reducing the number of traffic accidents;
• Reducing the severity of traffic accidents, hence their consequences (cases of death and serious injuries);
• Improved safety indices;
• Lower risk factors;
• Safer infrastructure
For the completion of the stated goals, CONNECTA technical assistance is, among other things, directed towards the formation of project documentation at the level of the Main design, for feasible and sustainable road safety interventions, recommended in the RSI pilot reports.

Within 580 km of high-risk sections of the basic/comprehensive network, a part of the state road A1 is included, between the Bubanj Potok interchange and the Mali Pozarevac interchange, from km 216+300 to km 236+650.

In addition to reports on traffic safety inspections and Audit plans of the basic/comprehensive road network in the Western Balkans - CONNECTA-TRA-CRM-REG-01, as well as individual reports on traffic safety checks along 580km of high-risk sections of the basic/comprehensive network (ROAD SAFETY INSPECTION REPORT, Road: Corridor X - A1, Section: Bubanj Potok - Mali Pozarevac), the starting point for the project preparation, is also the project-technical documentation, prepared independently of the mentioned report. The mentioned project documentation, at the level of the Main design, i.e. the Traffic and Traffic Signalling Project, for the needs of the PE "Roads of Serbia", was prepared by the company "S PROJEKT“ LTD Belgrade, 11dj, Djordja Stanojevica Street (project number 15/2019, May 2019). This project covered the route of the state road A1, from km 174+162 to km 195+000, and from km 218+000 to km 348+000 (L = 150.838 km), including sections that were the subject of ROAD SAFETY INSPECTION REPORT, Road: Corridor X - A1, Section: Bubanj Potok - Mali Pozarevac. According to the valid legal procedure, it received a decision from the Ministry of Construction, Transport, and Infrastructure (decision number: 344-03-41293/2020-03 on July 22, 2020). In the following text, the mentioned project documentation is marked as "current project".
Taking into account the above, as well as the legal basis for the preparation of this type of documentation and obtaining a plan for completion, PE "Roads of Serbia“, as a road manager, defined the terms of reference, which took into account the specifics of the legal procedure of the Republic of Serbia, as well as the general Terms of reference (CONNECTA sub-project: TP code: CONNECTA-TRA-CRM-REG-RS-DD-05), which as an appendix, forms its integral part.

Under the initial basis, and according to the requirements of "Connecta“, the compliance of the mentioned - current traffic project was checked with the requirements of ROAD SAFETY INSPECTION REPORT, Road: Corridor X - A1, Section: Bubanj Potok - Mali Pozarevac, covering the section of km 218+000 to km 236+650. Since most of the deficiencies listed in the traffic safety inspection report are covered by the current project, the subject project was developed as its logical sequence, including the elimination of other deficiencies, which are listed in the traffic safety inspection report and not covered by the current project.
All measures aimed at improving traffic safety conditions, which are in the domain of traffic signals, are consistently applied in each of the project documentation, without compromising the basic goal of the technical agreement, which includes project documentation for further application, according to individual pilot reports RSI for CONNECTA, June 2018.
According to the decision and agreement with PERS, no project documentation was done for the first 1700m of the highway (from km 216+300 to km 218+000).

TRAFFIC AND TRAFFIC SIGNALING PROJECT ON THE STATE ROAD IA 1:
Although it represents a change to the current project documentation, the subject project has all the necessary components, harmonized with Article 5 of the Rulebook on Traffic Signalisation ("Official

Gazette of RS“ No. 85/2017) and the requirements of the Terms of Reference. Accordingly, the overview map shows all the locations where the deficiencies listed in the traffic safety inspection report were identified, which need to be corrected. They are systematised according to the attached key, depending on the fact whether the interventions on them are carried out (not to be done), whether they are included in the current traffic project, or are the subject of this project.

4 Cost Estimate

NOTE: DETAILED BoQ AND COST ESTIMATES ARE PART OF MAIN DETAILED DESIGNS, SOME PRESENTED IN APPENDIX A

4.1 Albania

Country **Albania**
Section **Shkoder- Koplik, L= 13.5 km**

Item no.	Description	Unit	Quantity	Unit price (€)	Total (€)
A	**Guardrails**				
A.1	**Unsafe guardrail ends/ terminals replacement**				
	S.I Terminal tip P-4 (according the design sheet)	pcs	4	3100	12400
	S.I Terminal tip T-2(according the design sheet)	pcs	32	3900	124800
A.2	**Additional guardrails**				
	H2,W4+accessories	m'	1650	60	99000
				TOTAL GUARDRAILS	**236200**
B	**Traffic Signage**				
B.1	**Traffic signs**	pcs			
	S.I Circular traffic signs D=60cm, Sign reflectivity class II.		22	120	2640
	S.I Triangular traffic signs A=90cm, Sign reflectivity class II.		42	195	8190
	S.I Square traffic signs A=90cm, Sign reflectivity class II.		28	195	
	S.I Octagonal traffic signs AB 90-30 cm, Sign reflectivity class II.		12	195	2340
B.2	**Road markings**				
	Median and side strips 15 cm wide. Thermoplastic (spray)	m'	41600	2.2	91520
	Median and side strips 30 cm wide. Thermoplastic (paste paint)	m'	6600	12	79200
	Speed decelerator in the form of strips, with listening effect (with two-component paste paint)	m2	1490	40	59600
B.3	**Other equipment**				
	Plastic bump indicator	pcs	2	900	1800
	Catseyes	pcs	3000	3.4	10200
	Dual-sided Reflectors for Impact Barriers Folds at 90 degrees White, Red.	pcs	480	3.8	1824
	Side normal Delineator	pcs	400	35	14000
				TOTAL TRAFFIC SIGNAGE	271314
C	**Civil works**				
C.1	**Reconstruction of intersection -** Per detailed BoQ and Cost estimate in appendix A.1				
C.1.1	Intersection 1	pcs	1	164682	164682

C.1.2	Intersection 2	pcs	1	108037	108037
				TOTAL CIVIL WORKS	272719
D	**Bus stops**				
D.1	Lighting of BUS stops	pcs			0
D.2	Additional BUS stop facilities	pcs			0
				TOTAL BUS STOPS	0
E	**Parking along the road**	pcs			0
				TOTAL PARKINGS	0
F	**Built-up Area Gates**	pcs			0
				TOTAL BUILT-UP AREA GATES	0
G	**Pedestrian facilities**				
G.1	**Lighting of pedestrian crossings**				
G.1.1	S.I Solar light ,75W -Led,320 W solar panel	pcs	8	2800	22400
				TOTAL PEDESTRIAN FACILITIES	22400
				TOTAL	802,633.00
				UNFORESEEN WORKS (5%)	40,131.65
				GRAND TOTAL	842,764.65

Country **Albania**
Section **Fushe Kruje - Lezhe, L= 35.9km**

Item no.	Description	Unit	Quantity	Unit price (€)	Total (€)
A	**Guardrails**				
A.1	**Unsafe guardrail ends/ terminals replacement**				
	S.I Terminal tip P-4 (according the design sheet)	pcs	41	3100	127100
	S.I Terminal tip T-2(according the design sheet)	pcs	8	3900	31200
A.2	**Additional guardrails**				
	H2,W4+accessories	m'	3825	60	229500
				TOTAL GUARDRAILS	**387800**
B	**Traffic Signage**				
B.1	**Traffic signs**	pcs			
	S.I Circular traffic signs D=60cm, Sign reflectivity class II.		39	120	4680
	S.I Triangular traffic signs A=90cm, Sign reflectivity class II.		24	195	4680
	S.I Square traffic signs A=90cm, Sign reflectivity class II.		9	195	

	S.I Octagonal traffic signs AB 90-30 cm, Sign reflectivity class II.		9	195	1755
B.2	**Road markings**				
	Median and side strips 15 cm wide. Thermoplastic (spray)	m'	72000	2.2	158400
	Median and side strips 30 cm wide. Thermoplastic (paste paint)	m'	5600	12	67200
	Speed decelerator in the form of strips, with listening effect (with two-component paste paint)	m2	1490	40	59600
B.3	**Other equipment**				
	Plastic bump indicator	pcs	2	900	1800
	Catseyes	pcs	3000	3.4	10200
	Dual-sided Reflectors for Impact Barriers Folds at 90 degrees White, Red.	pcs	580	3.8	2204
	Flexible bollard at center line	pcs	200	11	2200
				TOTAL TRAFFIC SIGNAGE	312719
C	**Civil works**				
C.1	**Reconstruction of intersection -** Per detailed BoQ and Cost estimate in appendix A.1				
C.1.1	Intersection 1	pcs	1	176432	176432
C.1.2	Intersection 2	pcs	1	188720	188720
C.1.3	Intersection 3	pcs	1	192652	192652
C.1.4	Intersection 4	pcs	1	193168	193168
C.1.5	Intersection 5	pcs	1	179076	179076
C.1.6	Intersection 6	pcs	1	256028	256028
				TOTAL CIVIL WORKS	1186076
D	**Bus stops**				
D.1	Lighting of BUS stops	pcs			0
D.2	Additional BUS stop facilities	pcs			0
				TOTAL BUS STOPS	0
E	**Parking along the road**	pcs			0
				TOTAL PARKINGS	0
F	**Built-up Area Gates**	pcs			0
				TOTAL BUILT-UP AREA GATES	0
G	**Pedestrian facilities**				
G.1	**Lighting of pedestrian crossings**				
G.1.1	S.I Solar light ,75W -Led,320 W solar panel	pcs	28	2800	78400
				TOTAL PEDESTRIAN FACILITIES	78400
				TOTAL	1,964,995.00
				UNFORESEEN WORKS (5%)	98,249.75
				GRAND TOTAL	2,063,244.75

4.2 Bosnia and Herzegovina

Country **Bosnia and Herzegovina**
Section **Ozimice - Topcic Polje, L= 24 km**

Cost Estimation

Item no.	Description	Unit	Quantity	Unit price (€)	Total (€)
A	**Guardrails**				
A.1	**Unsafe guardrail ends/ terminals replacement**				
	Per detailed BoQ and Cost estimate in appendix A.2				
A.2	**Additional guardrails**				
	Per detailed BoQ and Cost estimate in appendix A.2				
				TOTAL GUARDRAILS	**677,676**
B	**Traffic Signage**				
B.1	**Traffic signs**				
	Per detailed BoQ and Cost estimate in appendix A.2				15611
B.2	**Road markings**				
	Per detailed BoQ and Cost estimate in appendix A.2				19174
B.3	**Other equipment**				
	Per detailed BoQ and Cost estimate in appendix A.2				1024
				TOTAL TRAFFIC SIGNAGE	**35,809**
C	**Civil works**				
C.1	**Reconstruction of designed locations** - per detailed BoQ and Cost estimate in appendix A.2				
C.1.1	Location 1	pcs	1	98943	98943
C.1.2	Location 2	pcs	1	122424	122424
C.1.3	Location 3	pcs	1	21065	21065
C.1.4	Location 4	pcs	1	45778	45778
C.1.5	Location 5	pcs	1	35862	35862
C.1.6	Location 6	pcs	1	101835	101835
C.1.7	Location 7	pcs	1	10866	10866
C.1.8	Location 8 - estimated in Bus stops D.2	pcs	1	0	0
C.1.9	Location 9	pcs	1	44092	44092
C.1.10	Location 10	pcs	1	126844	126844
C.1.11	Location 11	pcs	1	12312	12312
C.1.12	Location 12	pcs	1	25999	25999
C.1.13	Location 13	pcs	1	29583	29583
C.1.14	Location 14	pcs	1	19606	19606
C.1.15	Location 15	pcs	1	17292	17292
C.1.16	Location 16	pcs	1	29910	29910
C.1.17	Location 17	pcs	1	71623	71623
C.1.18	Location 18	pcs	1	14774	14774
C.1.19	Location 19	pcs	1	29411	29411

C.1.20	Location 20	pcs	1	78701	78701
C.1.21	Location 21	pcs	1	130835	130835
C.1.22	Location 22	pcs	1	17813	17813
C.1.23	Location 23	pcs	1	27248	27248
				TOTAL CIVIL WORKS	**1,112,816**
D	**Bus stops -** per detailed BoQ and Cost estimate in appendix A.2				
D.1	Lighting of BUS stops	pcs	1	96171	96171
D.2	Civil works BUS stop rearrangement	pcs	1	120008	120008
				TOTAL BUS STOPS	**216,179**
E	**Parking along the road**	pcs			0
				TOTAL PARKINGS	0
F	**Built-up Area Gates**	pcs			0
				TOTAL BUILT-UP AREA GATES	0
G	**Pedestrian facilities**				
G.1	**Lighting of pedestrian crossings**				
				TOTAL PEDESTRIAN FACILITIES	0
				TOTAL	**2,042,479**
				UNFORESEEN WORKS (5%)	102,124
				GRAND TOTAL	**2,144,603**

Country **Bosnia and Herzegovina**
Section **Jablanica - Potoci, L= 36.3 km**

Item no.	Description	Unit	Quantity	Unit price (€)	Total (€)
A	**Guardrails**				
A.1	**Unsafe guardrail ends/ terminals replacement**				
	Per detailed BoQ and Cost estimate in appendix A.2				
A.2	**Additional guardrails**				
	Per detailed BoQ and Cost estimate in appendix A.2				
				TOTAL GUARDRAILS	**1,681,468**
B	**Traffic Signage**				
B.1	**Traffic signs**				
	Per detailed BoQ and Cost estimate in appendix A.2				8824
B.2	**Road markings**				
	Per detailed BoQ and Cost estimate in appendix A.2				9884
B.3	**Other equipment**				
	Per detailed BoQ and Cost estimate in appendix A.2				1213

				TOTAL TRAFFIC SIGNAGE	**19,921**
C	**Civil works**				
C.1	**Reconstruction of designed locations** - per detailed BoQ and Cost estimate in appendix A.2				
C.1.1	Location 1	pcs	1	5083	5083
C.1.2	Location 2	pcs	1	6028	6028
C.1.3	Location 3	pcs	1	14891	14891
C.1.4	Location 4	pcs	1	8872	8872
C.1.5	Location 5- estimated in Bus stops D.2	pcs	1	0	0
C.1.6	Location 6	pcs	1	10792	10792
C.1.7	Location 7	pcs	1	1579	1579
C.1.8	Location 8	pcs	1	15000	15000
C.1.9	Location 9	pcs	1	18783	18783
C.1.10	Location 10	pcs	1	1811	1811
C.1.11	Location 11- estimated in Bus stops D.2	pcs	1	0	0
C.1.12	Location 12	pcs	1	1579	1579
C.1.13	Location 13	pcs	1	4848	4848
C.1.14	Location 14	pcs	1	14023	14023
C.1.15	Location 15- estimated in Bus stops D.2	pcs	1	0	0
C.1.16	Location 16- estimated in Bus stops D.2	pcs	1	0	0
C.1.17	Location 17- estimated in Bus stops D.2	pcs	1	0	0
C.1.18	Location 18- estimated in Bus stops D.2	pcs	1	0	0
C.1.19	Location 19	pcs	1	22913	22913
C.1.20	Location 20	pcs	1	16024	16024
C.1.21	Location 21	pcs	1	183400	183400
C.1.22	Location 22	pcs	1	17769	17769
C.1.23	Location 23- estimated in Bus stops D.2	pcs	1	0	0
C.1.24	Location 24	pcs	1	1686	1686
				TOTAL CIVIL WORKS	**345,080**
D	**Bus stops**				
D.1	Lighting of BUS stops	pcs	1	106985	106985
D.2	Civil works BUS stop rearrangement	pcs	1	189532	189532
				TOTAL BUS STOPS	**296,517**
E	**Parking along the road**	pcs			0
				TOTAL PARKINGS	0
F	**Built-up Area Gates**	pcs			0
				TOTAL BUILT-UP AREA GATES	0
G	**Pedestrian facilities**				
G.1	**Lighting of pedestrian crossings**				
				TOTAL PEDESTRIAN FACILITIES	0
				TOTAL	**2,342,985.51**
				UNFORESEEN WORKS (5%)	117,149.28
				GRAND TOTAL	**2,460,134.79**

4.3 North Macedonia

Country **North Macedonia**
Section **Prilep - Bitola, L= 45km**

Item no.	Description	Unit	Quantity	Unit price (€)	Total (€)
A	**Guardrails**				
A.1	Terminals	pcs	4	10000	40,000
A.2	Crush cushion	pcs	2	14751	29,502
A.3	Start and end construction / L=12m	pcs	54	449	24,246
A.4	Guardrails / Type - H1AW2, on structure	m'	800	49	39,200
A.5	Guardrails / Type - H1AW3, on shoulder	m'	10800	45	486,000
A.6	Guardrails / Type - H2AW4, on structure	m'	250	154	38,500
A.7	Guardrails / Type - H2AW4, on shoulder	m'	1956	107	209,292
A.8	Translation element from H1 to H2 L=12m	pcs	18	1065	19,170
A.9	Translation element from H1/H2 to retaining wall L=2m	pcs	4	75	300
				TOTAL GUARDRAILS	**886,210**
B	**Traffic Signage**				
B.1	Standard Traffic signs (Supply and installation)	pcs	11	165	1,815
B.2	Non-Standard Traffic signs (Supply and installation)	pcs	4	1150	4,600
B.3	Road markings with colour	m^2	560	6	3,360
B.4	Road markings with thermoplastic	m^2	345	40.65	14,024
B.5	Other equipment	pcs	2	1000	2,000
				TOTAL TRAFFIC SIGNAGE	**25,799**
C	**Civil works**				
C.1	Reconstruction of intersection (right side for bus station and line for deceleration)	pcs	1	20183	20,183
C.2	Reconstruction of intersection (left side for bus station and line for acceleration)	pcs	1	28193	28,193
C.3	Specific access regulation	pcs			0
C.4	Agriculture accesses	pcs			0
				TOTAL CIVIL WORKS	**48,376**
D	**Bus stops**				
D.1	Lighting of two (left and right) BUS stops	pcs	1	31127	31,127
D.2	Additional BUS stop facilities (both sides)	pcs	1	30081	30,081
				TOTAL BUS STOPS	**61,208**

E	**Parking along the road in front of tunnel Bitola**	pcs	1	19376	19,376
				TOTAL PARKINGS	**19,376**
F	**Built-up Area Gates**	pcs			0
				TOTAL BUILT-UP AREA GATES	0
G	**Pedestrian facilities**				
G.1	Lighting of pedestrian crossings	pcs			0
G2	Additional pedestrian facilities	pcs			0
				TOTAL PEDESTRIAN FACILITIES	0
				TOTAL	1,040,969
				UNFORESEEN WORKS (5%)	52,048.44
				GRAND TOTAL	**1,093,017.30**

4.4 Kosovo

Country **Kosovo**
Fushe Kosove - Gjurgjice, L=
Section **27km**

Item no.	Description	Unit	Quantity	Unit price (€)	Total (€)
A	**Guardrails**				
A.1	**Unsafe guardrail ends/ terminals replacement**				
	S.I Terminal tip P-4 (according to the design sheet)	pcs	101	3100	313100
	S.I Terminal tip T-2(according to the design sheet)	pcs	7	3900	27300
	S.I Crash Cushion (according to the design sheet)	pcs	14	8000	112000
A.2	**Additional guardrails**				
	H2, W4+accessories	m'	8300	60	498000
				TOTAL GUARDRAILS	**950400**
B	**Traffic Signage**				
B.1	**Traffic signs**	pcs			
	Supply, transport and installation of vertical signs (This position includes the concrete base, installation of the signboard with all the necessary elements). According to traffic standards. Sign reflectivity class II.		198	125	24750
B.2	**Road markings**				
	Median and side strips 15 cm wide. Thermoplastic (spray)	m'	82000	2.2	180400
	Median and side strips 30 cm wide. Thermoplastic (paste paint)	m'	5600	12	67200
B.3	**Other equipment**				
	Dual-sided Reflectors for Impact Barriers Folds at 90 degrees White, Red.	pcs	580	3.8	2204
	Side normal Delineator	pcs	490	11	5390
				TOTAL TRAFFIC SIGNAGE	279944
C	**Civil works**				
C.1	**Reconstruction of Ramp -** Per detailed BoQ and Cost estimate in appendix A.4				
C.1.1	Ramp 1	pcs	1	72,444	72444
C.1.2	Ramp 2	pcs	1	111,221	111221.1
C.1.3	Ramp 3	pcs	1	39,701	39701.1
C.1.4	Ramp 4	pcs	1	37,784	37783.5
C.1.5	Ramp 5	pcs	1	38,207	38206.5
C.1.6	Ramp 6	pcs	1	38,981	38981.1
C.1.7	Ramp 7	pcs	1	56,850	56850.2
C.1.8	Ramp 8	pcs	1	40,882	40882.4
C.1.9	Ramp 9	pcs	1	30,165	30165.4

C.1.10	Ramp 10	pcs	1	33,164	33164.4
C.1.11	Ramp 11	pcs	1	30,163	30163
C.1.12	Ramp 12	pcs	1	38,986	38985.8
C.1.13	Ramp 13	pcs	1	37,407	37407.4
C.1.14	Ramp 14	pcs	1	36,326	36326.4
C.1.15	Ramp 15	pcs	1	40,958	40958.4
C.1.16	Ramp 16	pcs	1	30,937	30937.4
C.1.17	Ramp 17	pcs	1	35,134	35134.3
C.1.18	Ramp 18	pcs	1	30,031	30031.4
C.1.19	Ramp 19	pcs	1	62,691	62691
C.1.20	Ramp 20	pcs	1	74,166	74166
				TOTAL CIVIL WORKS	916,201
D	**Bus stops**				
D.1	Reconstruction of Bus Stop	pcs	7	25378	177646
D.2	**Lighting of BUS stops**				
D.1.1	S.I Solar light ,75W -Led,320 W solar panel	pcs	14	2800	39200
				TOTAL BUS STOPS	216846
E	**Parking along the road**	pcs			0
				TOTAL PARKINGS	0
F	**Built-up Area Gates**	pcs			0
				TOTAL BUILT-UP AREA GATES	0
G	**Pedestrian facilities**				
G.1	**Additional pedestrian facilities**				
G.1.1	Fencing in the median barrier	m'	2900	47	136300
				TOTAL PEDESTRIAN FACILITIES	136300
				GRAND TOTAL	2,499,690.80
				UNFORESEEN WORKS (5%)	124,984.54
				GRAND TOTAL	**2,624,675.34**

4.5 Montenegro

Country **Montenegro**
Section **Podgorica – Mioska, L=47.2 km**

Item no.	Description	Unit	Quantity	Unit price (€)	Total (€)
A	**Guardrails**				
A.1	**Unsafe guardrail ends/ terminals replacement**				
	Per detailed BoQ and Cost estimate in appendix A.5	pcs	1	86320	86320
A.2	**Additional guardrails**				
	Per detailed BoQ and Cost estimate in appendix A.5	pcs	1	1390960	1390960
				TOTAL GUARDRAILS	**1,477,280**
B	**Traffic Signage**				
B.1	**Traffic signs**				
	Per detailed BoQ and Cost estimate in appendix A.5	pcs	1	46130	46130
B.2	**Road markings**				
	Per detailed BoQ and Cost estimate in appendix A.5	pcs	1	385	385
B.3	**Other equipment**				
	Per detailed BoQ and Cost estimate in appendix A.5	pcs	1	300	300
				TOTAL TRAFFIC SIGNAGE	**46,815**
C	**Civil works**				
C.1	**Reconstruction of designed locations -** per detailed BoQ and Cost estimate in appendix A.5				
C.1.1	All locations	pcs	1	35711	35711
				TOTAL CIVIL WORKS	**35,711**
D	**Bus stops** - per detailed BoQ and Cost estimate in appendix A.5				
D.1	Lighting of BUS stops	pcs	0	0	0
D.2	Additional BUS stop facilities	pcs	0	0	0
				TOTAL BUS STOPS	**0**
E	**Parking along the road**- per detailed BoQ and Cost estimate in appendix A.5	lump sum	1	419102	419102
				TOTAL PARKINGS	**419102**
F	**Built-up Area Gates**	pcs			0
				TOTAL BUILT-UP AREA GATES	0
G	**Pedestrian facilities**				
G.1	**Lighting of pedestrian crossings**	lump sum	1	7456	7456
				TOTAL PEDESTRIAN FACILITIES	**7456**
				TOTAL	**1,986,364.00**
				UNFORESEEN WORKS (5%)	99,318.20
				GRAND TOTAL	**2,085,682.20**

4.6 Serbia

Country **Serbia**
Section **Orlovaca-Stepojevac- Celije, L =44.2km**

Item no.	Description	Unit	Quantity	Unit price (€)	Total (€)
A	**Guardrails**				
A.1	**Unsafe guardrail ends/ terminals replacement**				
	Per detailed BoQ and Cost estimate in appendix A.6				
A.2	**Additional guardrails**				
	Per detailed BoQ and Cost estimate in appendix A.6				
				TOTAL GUARDRAILS	**246,498**
B	**Traffic Signage**				
B.1	**Traffic signs**				
	Per detailed BoQ and Cost estimate in appendix A.6				34433
B.2	**Road markings**				
	Per detailed BoQ and Cost estimate in appendix A.6				32381
B.3	**Other equipment**				
	Per detailed BoQ and Cost estimate in appendix A.6				5566
				TOTAL TRAFFIC SIGNAGE	**72,381**
C	**Civil works**				
C.1	**Reconstruction of designed locations** - per detailed BoQ and Cost estimate in appendix A.6				
883-C	BUS STOP 1 km 7+956.81	pcs	1	72817	72817
888-C	ACCELERATION LANE FROM THE GAS STATION from km 9+592 to km 9+690 AND THE BUS STOP from km 9+744 to km 9+821	pcs	1	96723	96723
890-C	INTERSECTION 1 at km 15+494	pcs	1	171152	171152
892-C	INTERSECTION 2 at km 19+645	pcs	1	156057	156057
893-C	INTERSECTION 3 at km 22+732	pcs	1	158918	158918
895-C	BUS STOP 2 km 25+023.00	pcs	1	68851	68851
896-C	BUS STOP 3 km 26+195.00 I km 26+250.00	pcs	1	49781	49781
897-C	INTERSECTION 4 at km 29+737.50	pcs	1	30182	30182
C.3	**Specific access regulation**- per detailed BoQ and Cost estimate in appendix A.6				
889-C	SERVICE ROAD 1 from km 14+698 to km 15+010	pcs	1	152743	152743
891-C	SERVICE ROAD 2 from km 16+454 to km 16+646	pcs	1	123589	123589
894-C	SERVICE ROAD 3 from km 22+864.42 to km 23+005.26	pcs	1	88115	88115
898-C	TRAFFIC ISLAND 1 at km 34+240	pcs	1	23654	23654
899-C	TRAFFIC ISLAND 2 at km 44+600	pcs	1	27009	27009

C.4	**Lighting of intersection**- per detailed BoQ and Cost estimate in appendix A.6				
900-C	INTERSECTION 5 at km 46+750.00	pcs	1	19588	19588
				TOTAL CIVIL WORKS	**1,239,181**
D	**Bus stops**				
D.1	Lighting of BUS stops	pcs			0
D.2	Additional BUS stop facilities	pcs			0
				TOTAL BUS STOPS	**0**
E	**Parking along the road**	pcs			0
				TOTAL PARKINGS	0
F	**Built-up Area Gates**	pcs			0
				TOTAL BUILT-UP AREA GATES	0
G	**Pedestrian facilities**				
G.1	**Lighting of pedestrian crossings**				
				TOTAL PEDESTRIAN FACILITIES	0
				TOTAL	1,558,059
				UNFORESEEN WORKS (5%)	77,903
				GRAND TOTAL	**1,635,962**

Country **Serbia**

Section **Bubanj Potok, km 216+607 - Mali Pozarevac, km 238+156 L= 21.549km**

Item no.	Description	Unit	Quantity	Unit price (€)	Total (€)
A	**Guardrails**				
A.1	**Unsafe guardrail ends/ terminals replacement**				
	Per detailed BoQ and Cost estimate in appendix A.6				
A.2	**Additional guardrails**				
	Per detailed BoQ and Cost estimate in appendix A.6				
				TOTAL GUARDRAILS	**1,628,402**
B	**Traffic Signage**				
B.1	**Traffic signs**				
B.2	**Road markings**				
B.3	**Other equipment**				
				TOTAL TRAFFIC SIGNAGE	**0**
				TOTAL	1,628,402
				UNFORESEEN WORKS (5%)	81,420
				GRAND TOTAL	**1,709,822**

5 Cost overview by sections

Cost Estimate is based on bill of quantities made for each section in each RP.

Total estimated costs needed for implementation of feasible measures is **16,843,962** EUR. Using standard EU practise, this final estimate is based on estimated CAPEX, with 5% of unforeseen works.

Unit prices per RP are different and reflect the researched market values. All prices where commented and approved by beneficiaries after the draft design stage.

All calculated prices are without VAT.

No.	RP	Section name	L (km)	CAPEX (€)	Unforeseen works 5%	TOTAL (€)/Section	TOTAL (€)/RP
1	ALB	Shkoder - Koplik	13	802,633	40,132	842,765	**2,906,009**
2	ALB	Fushe Kruje - Lezhe	35.9	1,964,995	98,250	2,063,245	
3	BiH	Ozimice - Topcic Polje	24	2,042,479	102,124	2,144,603	**4,604,738**
4	BiH	Jablanica - Potoci	36.3	2,342,986	117,149	2,460,135	
5	MKD	Bitola - Prilep	42	1,040,969	52,048	1,093,017	**1,093,017**
6	KOS	Fushe kosove - Gjurgjice	28	2,499,691	124,985	2,624,675	**2,624,675**
7	MNE	Podgorica - Mioska	54	1,986,364	99,318	2,085,682	**2,085,682**
8	SRB	Orlovaca - Stepojevac -Celije	44.2	1,733,350	86,668	1,820,018	**3,529,840**
9	SRB						
10	SRB	Bubanj Potok - Mali Pozarevac	20.6	1,628,402	81,420	1,709,822	
		TOTAL	298	16,041,869	802,093	**16,843,962**	

No.	RP	Section name	L (km)	Total Price (€)	Total Price (€)/km	TOTAL (€)/RP
1	**ALB**	Shkoder - Koplik	13	842,765	64,828	**2,906,009**
2	**ALB**	Fushe Kruje - Lezhe	35.9	2,063,245	57,472	
3	**BiH**	Ozimice - Topcic Polje	24	2,144,603	89,358	**4,604,738**
4	**BiH**	Jablanica - Potoci	36.3	2,460,135	67,772	
5	**MKD**	Bitola - Prilep	42	1,093,017	26,024	**1,093,017**
6	**KOS**	Fushe kosove - Gjurgjice	28	2,624,675	93,738	**2,624,675**
7	**MNE**	Podgorica - Mioska	54	2,085,682	38,624	**2,085,682**
8	**SRB**	Orlovaca - Stepojevac	44.2	1,820,018	41,177	**3,529,840**
9	**SRB**	Stepojevac - Celije				
10	**SRB**	Bubanj Potok - Mali Pozarevac	20.6	1,709,822	83,001	
		TOTAL	298	**16,843,962**	62,444 average	

6 Next steps for implementation of the project

6.1 Albania

Final design documentation is delivered to the beneficiary in PDF format. For the purpose of future implementation ARA is responsible for the production of tender documents, official validation and print-offs.

6.2 Bosnia and Herzegovina

Final design documentation is delivered to the beneficiary in PDF format. For the purpose of future implementation “JP Ceste FBiH” is responsible for the production of tender documents, official validation and print-offs.

6.3 North Macedonia

Final design documentation is delivered to the beneficiary in PDF format. For the purpose of future implementation PESR is responsible for the production of tender documents, technical review, official validation and print-offs.

6.4 Kosovo

Final design documentation is delivered to the beneficiary in PDF format. For the purpose of future implementation, the Ministry of Infrastructure and Environment is responsible for the production of tender documents, official validation and print-offs.

6.5 Montenegro

Final design documentation is delivered to the beneficiary in PDF format. For the purpose of future implementation Transport Administration is responsible for the production of tender documents, technical review, official validation and print-offs.

6.6 Serbia

Final design documentation is delivered to the beneficiary in PDF format. For the purpose of future implementation, PERS is responsible for the production of tender documents, technical review, official validation and print-offs.

7 Conclusions and risks

Overall objective to provide direct support to the Western Balkans' ministries for transport and infrastructure and to road authorities for programming infrastructure maintenance is accomplished. CONNECTA with previous involvement and production of RSI reports and action plan has smoothly continued work on detail designing of most critical and feasible measures.

As described in chapter 2, all activities were carried out in close collaboration with the end beneficiaries. Findings from RSI reports per section and per RP were jointly analysed and agreed which measures should be carried out for further development and design. Some of the unexpected issues that occurred are actual overlapping of the plans and stages of improvement of particular road sections. Therefore, special effort was taken to align current situation, which differ from RSI findings, and future plans which was unknown at the time. All of this led to final decisions of selection of feasible measures and presented in the Draft Design Report. Later in parallel with the development of detailed designs some of the measures were reconsidered and polished to fit needs of end beneficiaries.

Since all measures are inside road preserved area (ROW), major risks are not foreseen during construction period. Some of the risks that might occur are access control management measures, where it is designed to close some accesses, grouping them to one safe entrance/exit. Before implementation of those measure these plans must be presented with diligence to all stakeholders and owners of those individual/commercial accesses.

To achieve strategic objective – increase road safety, funding and implementation of these designs should begin as soon as possible after this report is delivered. Any delay can jeopardize implementation of proposed measures since some routine maintenance works can change current state of the road sections. Therefore, all the findings and future steps, needs to be carefully planned with end beneficiaries.

Any interventions which required land acquisition and extensions to existing built up road section areas, have been avoided as they were considered as long-term process. In some RPs, review-approval procedures need to be finalised, therefore one of the items in BoQ is dedicated to securing amount for those activities, to ensure their preparedness before implementation.

During development of Draft Design Report, costs were estimated from 16,4M – 18M EUR, due to 10% contingency applied related to lower level of details designed. After production of detailed BoQs, the total estimated costs needed for the implementation of feasible measures are 16,843,962 EUR.

The Study, together with all findings, designed solutions and specific improvement proposals for each individual road section are approved by all beneficiaries and archived by CONNECTA and TCPS.

A. Detailed Cost estimate per RP

A.1 Albania

Country **Albania**
Section **Shkoder- Koplik, L= 13.5 km** **Intersection 1** **5 Herojte-KL 1+300**

Cost Estimation Civil works

Nr	Nr. An.	Work process	Unit	Quantity	Price	Value
		1. Earthworks				
1	3.104/b	Excavation with chain excavator 0.5 m³, ordinary soil, category IV, with vehicle unloading	m³	224.00	**235**	52,640
2	An-49	Demolition of concrete structures	m3	8.10	**2,366**	19,165
3	An	Scaling of asphalt layer with machinery (milling)	m2	5,400.00	**290**	1,566,000
4	An	Existing Guardrail dismantling	ml	0.00	**850**	0
5	An	Removal and placement of electrical poles + accessories, h = 8 ÷ 10 m	pcs	0.00	**31,312**	0
6	An	Disassembly of Al-Ç wire, s = 35mm² and pole accessories	km	0.00	**14,750**	0
7	3.549/2	Extension and traction 3 wires (conductors) with machinery, al-steel, section 35 m / m²	km	0.00	**189,188**	0
8	3.158/5a	Earth transport by car up to 5.0 km	m³	324.00	**266**	86,184
		Sum 1	**ALL**			**1,723,989**
		2. Layer works and asphalting on the road				
1	3.197	Breakage of ballast layer t = 10 cm, with machinery	m2	237.00	**104**	24,648
2	3.198	Compaction with roller	m2	237.00	**29**	6,873
3	An164/1b	Granular filling in the body of the road, spread and compacted by machinery	m³	346.00	**1,441**	498,586
4	3.212/c	Stabilizer layer t = 15cm	m²	237.00	**617**	146,229
5	An	Spraying with bituminous emulsion 1l / m2	m2	5,400.00	**171**	923,400
6	3.211	Gravel layer of waste kave t = 20cm, spread and compacted machinery	m2	237.00	**904**	214,248
7	3.229/2	Binder layer with washing machine shingles, 6cm, with machinery	m²	4,800.00	**1,576**	7,564,800
8	3.233/1	Asphalt concrete layer with washing machine shingles, 4cm, with machinery	m²	5,400.00	**1,293**	6,982,200
		Sum 2	**ALL**			**16,360,984**
		3.Various works				

4	3.617/2	S.I concrete kerbs 15x35 cm	ml	189.00	**1,180**	223,020
8	3.247	Concrete C 25/30 for ditches	m³	92.00	**14,851**	1,366,292
5	An	Metal railings h=1m (on the sidewalk)	ml	150.00	**6,000**	900,000
6	3.An/53	S.I metal poles for lighting, H = 7m, d = 160mm	pcs	4.00	**2,740**	10,960
		Sum 3				**2,500,272**
		Sum(1÷3)	**ALL**			**20,585,245**

euro **164,682**

Country Albania

Section **Shkoder- Koplik, L= 13.5 km** **Intersection 2** **Gruemire-KL 6+500**

Cost Estimation Civil works

Nr	Nr. An.	Work process	Unit	Quantity	Price	Value
		1. Earthworks				
1	3.104/b	Excavation with chain excavator 0.5 m³, ordinary soil, category IV, with vehicle unloading	m³	85.00	**235**	19,975
2	An-49	Demolition of concrete structures	m3	8.10	**2,366**	19,165
3	An	Scaling of asphalt layer with machinery (milling)	m2	3,400.00	**290**	986,000
4	An	Existing Guardrail dismantling	ml	0.00	**850**	0
5	An	Removal and placement of electrical poles + accessories, h = 8 ÷ 10 m	pcs	0.00	**31,312**	0
6	An	Disassembly of Al-Ç wire, s = 35mm² and pole accessories	km	0.00	**14,750**	0
7	3.549/2	Extension and traction 3 wires (conductors) with machinery, al-steel, section 35 m / m²	km	0.00	**189,188**	0
8	3.158/5a	Earth transport by car up to 5.0 km	m³	324.00	**266**	86,184
		Sum 1	**ALL**			**1,111,324**
		2. Layer works and asphalting on the road				
1	3.197	Breakage of ballast layer t = 10 cm, with machinery	m2	135.00	**104**	14,040
2	3.198	Compaction with roller	m2	135.00	**29**	3,915
3	An164/1 b	Granular filling in the body of the road, spread and compacted by machinery	m³	135.00	**1,441**	194,535
4	3.212/c	Stabilizer layer t = 15cm	m²	237.00	**617**	146,229
5	An	Spraying with bituminous emulsion 1l / m2	m2	3,400.00	**171**	581,400
6	3.211	Gravel layer of waste kave t = 20cm, spread and compacted machinery	m2	237.00	**904**	214,248
7	3.229/2	Binder layer with washing machine shingles, 6cm, with machinery	m²	3,400.00	**1,576**	5,358,400

8	3.233/1	Asphalt concrete layer with washing machine shingles, 4cm, with machinery	m²	3,400.00	**1,293**	4,396,200
		Sum 2	**ALL**			**10,908,967**
		3.Various works				
4	3.617/2	S.I concrete kerbs 15x35 cm	ml	100.00	**1,180**	118,000
8	3.247	Concrete C 25/30 for ditches	m³	92.00	**14,851**	1,366,292
5	An	Metal railings h=1m (on the sidewalk)	ml	0.00	**6,000**	0
6	3.An/53	S.I metal poles for lighting, H = 7m, d = 160mm	pcs	0.00	**2,740**	0
		Sum 3				**1,484,292**
		Sum(1÷3)	**ALL**			**13,504,583**
			EURO			**108,037**

Country **Albania**
Section **Fushe Kruje - Lezhe, L= 35.9km** **Intersection 1** **Derveni-KL 4+100**

Cost Estimation Civil works

Nr	Nr. An.	Work process	Unit	Quantity	Price	Value
		1. Earthworks				
1	3.104/b	Excavation with chain excavator 0.5 m³, ordinary soil, category IV, with vehicle unloading	m³	1,124.00	**235**	264,140
2	An-49	Demolition of concrete structures	m3	8.10	**2,366**	19,165
3	An	Scaling of asphalt layer with machinery (milling)	m2	3,999.00	**290**	1,159,710
4	An	Existing Guardrail dismantling	ml	40.00	**850**	34,000
5	An	Removal and placement of electrical poles + accessories, h = 8 ÷ 10 m	pcs	0.00	**31,312**	0
6	An	Disassembly of Al-Ç wire, s = 35mm² and pole accessories	km	0.00	**14,750**	0
7	3.549/2	Extension and traction 3 wires (conductors) with machinery, al-steel, section 35 m / m²	km	0.00	**189,188**	0
8	3.158/5a	Earth transport by car up to 5.0 km	m³	324.00	**266**	86,184
		Sum 1	**ALL**			**1,563,199**
		2. Layer works and asphalting on the road				
1	3.197	Breakage of ballast layer t = 10 cm, with machinery	m2	937.00	**104**	97,448
2	3.198	Compaction with roller	m2	1,037.00	**29**	30,073
3	An164/1 b	Granular filling in the body of the road, spread and compacted by machinery	m³	1,946.00	**1,441**	2,804,186
4	3.212/c	Stabilizer layer t = 15cm	m²	2,180.00	**617**	1,345,060

5	An	Spraying with bituminous emulsion 1l / m2	m2	3,990.00	**171**	682,290
6	3.211	Gravel layer of waste kave t = 20cm, spread and compacted machinery	m2	897.00	**904**	810,888
7	3.229/2	Binder layer with washing machine shingles, 6cm, with machinery	m²	2,180.00	**1,576**	3,435,680
8	3.233/1	Asphalt concrete layer with washing machine shingles, 4cm, with machinery	m²	3,990.00	**1,293**	5,159,070
		Sum 2	**ALL**			**14,364,695**
		3.Various works				
1	3.104/a	Excavation with chain excavator 0.5 m³, ordinary soil, category IV, with vehicle unloading	m³	14.60	**261**	3,811
2	3.158/5a	Earth transport by car up to 5.0 km	m³	80.60	**266**	21,440
3	3.62	Pavement, with 6 cm of concrete, with tiles	m2	744.00	**1,305**	970,920
4	3.617/2	S.I concrete kerbs 15x35 cm	ml	180.00	**1,180**	212,400
5	An	Metal railings h=1m (on the sidewalk)	ml	160.00	**6,000**	960,000
6	3.An/53	S.I metal poles for lighting, H = 7m, d = 160mm	pcs	4.00	**2,740**	10,960
7	An-23	Concrete manholes for rain water 40 x 60, cm h = 100 cm, with cast lid	pcs	0.00	**18,871**	0
8	3.247	Concrete structure C 25/30	m³	220.00	**14,851**	3,267,220
9	3.289	S.I. Steel rebars S 500 ≥ Ø 12	ton	6.51	**104,357**	679,364
		Sum 3				**6,126,114**
		Sum(1÷3)	**ALL**			**22,054,008**
			EURO			**176,432**

Country **Albania**
Section **Fushe Kruje - Lezhe, L= 35.9km** **Intersection 2** **Makaj-KL 25+300**

Cost Estimation Civil works

Nr	Nr. An.	Work process	Unit	Quantity	Price	Value
		1. Earthworks				
1	3.104/b	Excavation with chain excavator 0.5 m³, ordinary soil, category IV, with vehicle unloading	m³	1,124.00	**235**	264,140
2	An-49	Demolition of concrete structures	m3	8.10	**2,366**	19,165
3	An	Scaling of asphalt layer with machinery (milling)	m2	5,240.00	**290**	1,519,600
4	An	Existing Guardrail dismantling	ml	140.00	**850**	119,000
5	An	Removal and placement of electrical poles + accessories, h = 8 ÷ 10 m	pice	3.00	**31,312**	93,936

6	An	Disassembly of Al-Ç wire, s = 35mm² and pole accessories	km	1.00	**14,750**	14,750
7	3.549/2	Extension and traction 3 wires (conductors) with machinery, al-steel, section 35 m / m²	km	1.00	**189,188**	189,188
8	3.158/5a	Earth transport by car up to 5.0 km	m³	324.00	**266**	86,184
		Sum 1	**ALL**			**2,305,963**
		2. Layer works and asphalting on the road				
1	3.197	Breakage of ballast layer t = 10 cm, with machinery	m2	1,254.00	**104**	130,416
2	3.198	Compaction with roller	m2	1,350.00	**29**	39,150
3	An164/1 b	Granular filling in the body of the road, spread and compacted by machinery	m³	1,146.00	**1,441**	1,651,386
4	3.212/c	Stabilizer layer t = 15cm	m²	1,680.00	**617**	1,036,560
5	An	Spraying with bituminous emulsion 1l / m2	m2	5,240.00	**171**	896,040
6	3.211	Gravel layer of waste kave t = 20cm, spread and compacted machinery	m2	1,360.00	**904**	1,229,440
7	3.229/2	Binder layer with washing machine shingles, 6cm, with machinery	m²	4,180.00	**1,576**	6,587,680
8	3.233/1	Asphalt concrete layer with washing machine shingles, 4cm, with machinery	m²	5,240.00	**1,293**	6,775,320
		Sum 2	**ALL**			**18,345,992**
		3.Various works				
1	3.104/a	Excavation with chain excavator 0.5 m³, ordinary soil, category IV, with vehicle unloading	m³	14.60	**261**	3,811
2	3.158/5a	Earth transport by car up to 5.0 km	m³	80.60	**266**	21,440
3	3.62	Pavement, with 6 cm of concrete, with tiles	m2	0.00	**1,305**	0
4	3.617/2	S.I concrete kerbs 15x35 cm	ml	0.00	**1,180**	0
5	An	Metal railings h=1m (on the sidewalk)	ml	0.00	**6,000**	0
6	3.An/53	S.I metal poles for lighting, H = 7m, d = 160mm	pice	4.00	**2,740**	10,960
7	An-23	Concrete manholes for rain water 40 x 60, cm h = 100 cm, with cast lid	pice	0.00	**18,871**	0
8	3.367	Culverts concrete pipes Ø 1000 mm	ml	30.00	**13,195**	395,850
9	3.247	Concrete structure C 25/30	m³	123.00	**14,851**	1,826,673
10	3.289	I.P. Steel rebars S 500 ≥ Ø 12	ton	6.51	**104,357**	679,364
		Sum 3				**2,938,097**
		Sum(1÷3)	**ALL**			**23,590,052**
			EURO			**188,720**

Country **Albania**
Section **Fushe Kruje - Lezhe, L= 35.9km** **Intersection 3** **Gajush-KL 25+850**

Cost Estimation Civil works

Nr	Nr. An.	Work process	Unit	Quantity	Price	Value
		1. Earthworks				
1	3.104/b	Excavation with chain excavator 0.5 m³, ordinary soil, category IV, with vehicle unloading	m³	1,124.00	**235**	264,140
2	An-49	Demolition of concrete structures	m3	8.10	**2,366**	19,165
3	An	Scaling of asphalt layer with machinery (milling)	m2	5,190.00	**290**	1,505,100
4	An	Existing Guardrail dismantling	ml	140.00	**850**	119,000
5	An	Removal and placement of electrical poles + accessories, h = 8 ÷ 10 m	pice	4.00	**31,312**	125,248
6	An	Disassembly of Al-Ç wire, s = 35mm² and pole accessories	km	1.00	**14,750**	14,750
7	3.549/2	Extension and traction 3 wires (conductors) with machinery, al-steel, section 35 m / m²	km	1.00	**189,188**	189,188
8	3.158/5a	Earth transport by car up to 5.0 km	m³	324.00	**266**	86,184
		Sum 1	**ALL**			**2,322,775**
		2. Layer works and asphalting on the road				
1	3.197	Breakage of ballast layer t = 10 cm, with machinery	m2	1,132.00	**104**	117,728
2	3.198	Compaction with roller	m2	1,490.00	**29**	43,210
3	An164/1 b	Granular filling in the body of the road, spread and compacted by machinery	m³	1,152.00	**1,441**	1,660,032
4	3.212/c	Stabilizer layer t = 15cm	m²	1,290.00	**617**	795,930
5	An	Spraying with bituminous emulsion 1l / m2	m2	5,187.00	**171**	886,977
6	3.211	Gravel layer of waste kave t = 20cm, spread and compacted machinery	m2	1,290.00	**904**	1,166,160
7	3.229/2	Binder layer with washing machine shingles, 6cm, with machinery	m²	4,256.00	**1,576**	6,707,456
8	3.233/1	Asphalt concrete layer with washing machine shingles, 4cm, with machinery	m²	5,187.00	**1,293**	6,706,791
		Sum 2	**ALL**			**18,084,284**
		3.Various works				
1	3.104/a	Excavation with chain excavator 0.5 m³, ordinary soil, category IV, with vehicle unloading	m³	120.00	**261**	31,320
2	3.158/5a	Earth transport by car up to 5.0 km	m³	112.00	**266**	29,792
3	3.62	Pavement, with 6 cm of concrete, with tiles	m2	0.00	**1,305**	0
4	3.617/2	S.I concrete kerbs 15x35 cm	ml	0.00	**1,180**	0

5	An	Metal railings h=1m (on the sidewalk)	ml	0.00	**6,000**	0
6	3.An/53	S.I metal poles for lighting, H = 7m, d = 160mm	pice	4.00	**2,740**	10,960
7	An-23	Concrete manholes for rain water 40 x 60, cm h = 100 cm, with cast lid	pice	0.00	**18,871**	0
8	3.367	Culverts concrete pipes Ø 1000 mm	ml	28.00	**13,195**	369,460
9	3.247	Concrete structure C 25/30	m³	186.00	**14,851**	2,762,286
10	3.289	I.P. Steel rebars S 500 ≥ Ø 12	ton	4.51	**104,357**	470,650
		Sum 3				**3,674,468**
		Sum(1÷3)	**ALL**			**24,081,527**
			EURO			**192,652**

Country **Albania**
Section **Fushe Kruje - Lezhe, L= 35.9km** **Intersection 4** **Markatomaj-KL 28+150**

Cost Estimation Civil works

Nr	Nr. An.	Work process	Unit	Quantity	Price	Value
		1. Earthworks				
1	3.104/b	Excavation with chain excavator 0.5 m³, ordinary soil, category IV, with vehicle unloading	m³	1,234.00	**235**	289,990
2	An-49	Demolition of concrete structures	m3	8.10	**2,366**	19,165
3	An	Scaling of asphalt layer with machinery (milling)	m2	5,101.00	**290**	1,479,290
4	An	Existing Guardrail dismantling	ml	110.00	**850**	93,500
5	An	Removal and placement of electrical poles + accessories, h = 8 ÷ 10 m	pice	4.00	**31,312**	125,248
6	An	Disassembly of Al-Ç wire, s = 35mm² and pole accessories	km	1.00	**14,750**	14,750
7	3.549/2	Extension and traction 3 wires (conductors) with machinery, al-steel, section 35 m / m²	km	1.00	**189,188**	189,188
8	3.158/5a	Earth transport by car up to 5.0 km	m³	654.00	**266**	173,964
		Sum 1	**ALL**			**2,385,095**
		2. Layer works and asphalting on the road				
1	3.197	Breakage of ballast layer t = 10 cm, with machinery	m2	1,122.00	**104**	116,688
2	3.198	Compaction with roller	m2	1,125.00	**29**	32,625
3	An164/1b	Granular filling in the body of the road, spread and compacted by machinery	m³	1,152.00	**1,441**	1,660,032
4	3.212/c	Stabilizer layer t = 15cm	m²	1,125.00	**617**	694,125
5	An	Spraying with bituminous emulsion 1l / m2	m2	5,101.00	**171**	872,271
6	3.211	Gravel layer of waste kave t = 20cm, spread and compacted machinery	m2	1,286.00	**904**	1,162,544

7	3.229/2	Binder layer with washing machine shingles, 6cm, with machinery	m²	4,101.00	**1,576**	6,463,176
8	3.233/1	Asphalt concrete layer with washing machine shingles, 4cm, with machinery	m²	5,101.00	**1,293**	6,595,593
		Sum 2	**ALL**			**17,597,054**
		3.Various works				
1	3.104/a	Excavation with chain excavator 0.5 m³, ordinary soil, category IV, with vehicle unloading	m³	230.00	**261**	60,030
2	3.158/5a	Earth transport by car up to 5.0 km	m³	112.00	**266**	29,792
3	3.62	Pavement, with 6 cm of concrete, with tiles	m2	0.00	**1,305**	0
4	3.617/2	S.I concrete kerbs 15x35 cm	ml	0.00	**1,180**	0
5	An	Metal railings h=1m (on the sidewalk)	ml	0.00	**6,000**	0
6	3.An/53	S.I metal poles for lighting, H = 7m, d = 160mm	pice	4.00	**2,740**	10,960
7	An-23	Concrete manholes for rain water 40 x 60, cm h = 100 cm, with cast lid	pice	0.00	**18,871**	0
8	3.367	Culverts concrete pipes Ø 1000 mm	ml	42.00	**13,195**	554,190
9	3.247	Concrete structure C 25/30	m³	192.00	**14,851**	2,851,392
10	3.289	I.P. Steel rebars S 500 ≥ Ø 12	ton	6.30	**104,357**	657,449
		Sum 3				**4,163,813**
		Sum(1÷3)	**ALL**			**24,145,962**
			EURO			**193,168**

Country **Albania**

Section **Fushe Kruje - Lezhe, L= 35.9km** **Intersection 5** **Tresh-KL 30+760**

Cost Estimation Civil works

Nr	Nr. An.	Work process	Unit	Quantity	Price	Value
		1. Earthworks				
1	3.104/b	Excavation with chain excavator 0.5 m³, ordinary soil, category IV, with vehicle unloading	m³	1,134.00	**235**	266,490
2	An-49	Demolition of concrete structures	m3	8.10	**2,366**	19,165
3	An	Scaling of asphalt layer with machinery (milling)	m2	4,856.00	**290**	1,408,240
4	An	Existing Guardrail dismantling	ml	89.00	**850**	75,650
5	An	Removal and placement of electrical poles + accessories, h = 8 ÷ 10 m	pice	3.00	**31,312**	93,936
6	An	Disassembly of Al-Ç wire, s = 35mm² and pole accessories	km	1.00	**14,750**	14,750
7	3.549/2	Extension and traction 3 wires (conductors) with machinery, al-steel, section 35 m / m²	km	1.00	**189,188**	189,188
8	3.158/5a	Earth transport by car up to 5.0 km	m³	593.00	**266**	157,738
		Sum 1	**ALL**			**2,225,157**
		2. Layer works and asphalting on the road				

1	3.197	Breakage of ballast layer t = 10 cm, with machinery	m2	1,122.00	**104**	116,688
2	3.198	Compaction with roller	m2	1,048.00	**29**	30,392
3	An164/1b	Granular filling in the body of the road, spread and compacted by machinery	m³	1,187.00	**1,441**	1,710,467
4	3.212/c	Stabilizer layer t = 15cm	m²	1,048.00	**617**	646,616
5	An	Spraying with bituminous emulsion 1l / m2	m2	4,856.00	**171**	830,376
6	3.211	Gravel layer of waste kave t = 20cm, spread and compacted machinery	m2	1,336.00	**904**	1,207,744
7	3.229/2	Binder layer with washing machine shingles, 6cm, with machinery	m²	3,865.00	**1,576**	6,091,240
8	3.233/1	Asphalt concrete layer with washing machine shingles, 4cm, with machinery	m²	4,865.00	**1,293**	6,290,445
		Sum 2	**ALL**			**16,923,968**
		3.Various works				
1	3.104/a	Excavation with chain excavator 0.5 m³, ordinary soil, category IV, with vehicle unloading	m³	230.00	**261**	60,030
2	3.158/5a	Earth transport by car up to 5.0 km	m³	132.00	**266**	35,112
3	3.62	Pavement, with 6 cm of concrete, with tiles	m2	0.00	**1,305**	0
4	3.617/2	S.I concrete kerbs 15x35 cm	ml	0.00	**1,180**	0
5	An	Metal railings h=1m (on the sidewalk)	ml	0.00	**6,000**	0
6	3.An/53	S.I metal poles for lighting, H = 7m, d = 160mm	pice	4.00	**2,740**	10,960
7	An-23	Concrete manholes for rain water 40 x 60, cm h = 100 cm, with cast lid	pice	0.00	**18,871**	0
8	3.367	Culverts concrete pipes Ø 1000 mm	ml	28.00	**13,195**	369,460
9	3.247	Concrete structure C 25/30	m³	150.00	**14,851**	2,227,650
10	3.289	I.P. Steel rebars S 500 ≥ Ø 12	ton	5.10	**104,357**	532,221
		Sum 3				**3,235,433**
		Sum(1÷3)	**ALL**			**22,384,557**
			EURO			**179,076**

Country **Albania**
Section **Fushe Kruje - Lezhe, L= 35.9km** **Intersection 6** **Shengjin-KL 36+950**

Cost Estimation Civil works

Nr	Nr. An.	Work process	Unit	Quantity	Price	Value
		1. Earthworks				
1	3.104/b	Excavation with chain excavator 0.5 m³, ordinary soil, category IV, with vehicle unloading	m³	1,246.00	**235**	292,810
2	An-49	Demolition of concrete structures	m3	658.10	**2,366**	1,557,065
3	An	Scaling of asphalt layer with machinery (milling)	m2	5,534.00	**290**	1,604,860
4	An	Existing Guardrail dismantling	ml	189.00	**850**	160,650
5	An	Removal and placement of electrical poles + accessories, h = 8 ÷ 10 m	pice	8.00	**31,312**	250,496

6	An	Disassembly of Al-Ç wire, s = 35mm² and pole accessories	km	0.00	**14,750**	0
7	3.549/2	Extension and traction 3 wires (conductors) with machinery, al-steel, section 35 m / m²	km	0.00	**189,188**	0
8	3.158/5a	Earth transport by car up to 5.0 km	m³	654.00	**266**	173,964
		Sum 1	**ALL**			**4,039,845**
		2. Layer works and asphalting on the road				
1	3.197	Breakage of ballast layer t = 10 cm, with machinery	m2	1,122.00	**104**	116,688
2	3.198	Compaction with roller	m2	1,048.00	**29**	30,392
3	An164/1b	Granular filling in the body of the road, spread and compacted by machinery	m³	1,187.00	**1,441**	1,710,467
4	3.212/c	Stabilizer layer t = 15cm	m²	1,048.00	**617**	646,616
5	An	Spraying with bituminous emulsion 1l / m2	m2	5,534.00	**171**	946,314
6	3.211	Gravel layer of waste kave t = 20cm, spread and compacted machinery	m2	1,336.00	**904**	1,207,744
7	3.229/2	Binder layer with washing machine shingles, 6cm, with machinery	m²	4,534.00	**1,576**	7,145,584
8	3.233/1	Asphalt concrete layer with washing machine shingles, 4cm, with machinery	m²	5,534.00	**1,293**	7,155,462
		Sum 2	**ALL**			**18,959,267**
		3.Various works				
1	3.104/a	Excavation with chain excavator 0.5 m³, ordinary soil, category IV, with vehicle unloading	m³	330.00	**261**	86,130
2	3.158/5a	Earth transport by car up to 5.0 km	m³	232.00	**266**	61,712
3	3.62	Pavement, with 6 cm of concrete, with tiles	m2	1,300.00	**1,305**	1,696,500
4	3.617/2	S.I concrete kerbs 15x35 cm	ml	820.00	**1,180**	967,600
5	An	Metal railings h=1m (on the sidewalk)	ml	180.00	**6,000**	1,080,000
6	3.An/53	S.I metal poles for lighting, H = 7m, d = 160mm	pice	8.00	**2,740**	21,920
7	An-23	Concrete manholes for rain water 40 x 60, cm h = 100 cm, with cast lid	pice	18.00	**18,871**	339,678
8	3.An/1t	S.I ribbed pipes HDPE SN8 d = 315 mm	ml	222.00	**1,960**	435,120
9	3.367	Culverts concrete pipes Ø 1000 mm	ml	28.00	**13,195**	369,460
10	2.262/4	Concrete layer C 16/20	m3	120.00	**8,525**	1,023,000
11	3.247	Concrete structure C 25/30	m³	161.00	**14,851**	2,391,011
12	3.289	S.I Steel rebars S 500 ≥ Ø 12	ton	5.10	**104,357**	532,221
		Sum 3				**9,004,352**
		Sum(1÷3)	**ALL**			**32,003,463**
			EURO			**256,028**

A.2 Bosnia and Herzegovina

BILL OF QUANTITIES- INTERCHANGE "Ozimice- Topčić Polje" / PREDMJER RADOVA "Ozimice-Topčić Polje"						
Nr.	**POZ. OPISA / ITEM**	**VRSTA RADOVA / DESCRIPTION OF WORKS**	**JED. MJ. / UNIT**	**KOLIČINA / QUANTITY**	**JED. CIJENA / UNIT PRICE (€)**	**UKUPNA VRIJEDNOST/ TOTAL PRICE (€)**
		1. PRIPREMNI RADOVI / PREPARATORY WORKS				
	12 231. 1	Demontaža čelične bezbjednosne ograde na bankini i odvoz na deponiju Izvođača radova redovnog održavanja na predmetnoj dionici magistralne ceste M17. / Dismantling of the steel safety fence on the shoulder and transport to the landfill of the Contractor of regular maintenance works on the subject section of the main road M17.	m^1	1,312.00	4.06	5,327.92
	12 231. 2	Demontaža čelične bezbjednosne ograde na betonskom zidu i odvoz na deponiju Izvođača radova redovnog održavanja na predmetnoj dionici magistralne ceste M17./ Dismantling of the steel safety fence on the concrete wall and transport to the landfill of the Contractor of regular maintenance works on the subject section of the main road M17.	m^1	42.00	5.08	213.20
	12 373	Rezanje i odvoženje asfaltnih zastora (pješačka staza), transportna dužina 4-5 km u debljini 8-10 cm. / Cutting and removal of asphalt (sidewalk), transport length 4-5 km in thickness 8-10 cm	m^2	0.00	5.08	0.00
	12 477	Rušenje i uklanjanje armiranog zida od ojačanog cementnog betona i odvoz materijala na deponiju, transportna dužina 4 -5 km/ Demolition and removal of reinforced wall made of reinforced cement concrete and removal of material to the landfill, transport length 4 -5 km	m^3	9.50	25.38	241.12

	14 951	Bušenje rupa u ojačanom cementnom betonu, površina horizontalna ili nagnuta do 45° u odnosu na horizontalu, promjera do 30 mm. / Drilling holes in reinforced cement concrete, horizontal surface or inclined up to 45 ° in relation to the horizontal, up to 30 mm in diameter	m^1	38.00	3.05	115.74
	21 317	Iskop u materijalu 3-4 kategorije za temelje betonskih zidova širine do 1,00 m, dubine 1,10 do 2,00 m i odvoz materijala na deponiju, transportna dužina 4 -5 km. / Excavation in 3-4 category material for foundations of concrete walls up to 1.00 m wide, 1.10 to 2.00 m deep and transport of material to the landfill, transport length 4 -5 km	m^3		10.15	0.00
		Ostali pripremni radovi/ Other preparatory works				
	13 141	Uređenje i preusmjeravanje saobraćaja po jednoj voznoj traci sa semaforima i pripadajućom horizontalnom i vertikalnom signalizacijom prema revidovanom projektu odvijanja saobraćaja za vrijeme izvođenja radova na ugradnji sigurnosnih ograda na cesti M17, dionica 013: Jablanica 1 - Potoci, dužine 36,312 km / Arrangement and redirection of traffic on one lane with traffic lights and horizontal and vertical signalization according to the revised project of traffic during the installation of safety fences on the road M17, section 013: Jablanica 1 - Potoci, length 36,312 km	paušal / lump			
		SVEGA PRIPREMNI RADOVI / TOTALY PREPARATORY WORKS:				**5,897.97**
		2. ZEMLJANI RADOVI I TEMELJENJE / EARTHWORKS AND FOUNDATION				
	24 217	Nasipanje materijalom iz iskopa i nabijanje do potrebnog modula stišljivosti / Filling in with excavated material and compaction to the required compressibility modulus	m^3	0.00	2.54	0.00
	24 218	Dovoz materijala iz pozajmišta i nabijanje do potrebnog modula stišljivosti / Delivery and compaction of materials to the required compressibility modules	m^3	0.00	4.06	0.00
		Kolovozne konstrukcije/ Road constructions				

		UKUPNO ZEMLJANI RADOVI I TEMELJENJE/ TOTAL EARTHWORKS AND FOUNDATION:				**0.00**
		3. ODVODNJAVANJE/ DRAINAGE				
		Površinsko odvodnjavanje/ Surface drainage				
	44 929	Nabavka i ugradnja poklopca od ojačanog cementnog betona (C30/37; Bst 500s),presjeka 200/200 cm / Supply and installation of a cover made of reinforced cement concrete (C30 / 37; Bst 500s), cross section 200/200 cm	kom/ pcs	18	152.28	2,741.12
		Propusti/ Culverts				
		UKUPNO ODVODNJAVANJE/ TOTALY DRAINAGE:				**2,741.12**
		4. ZANATSKI RADOVI / CRAFT WORKS				
		Tesarski radovi / Carpentry works				
	51 331	Izrada dvostrane vezane oplate za ravan zid, visine do 2 m / Production of double sided plywood formwork for a flat wall, height up to 2 m	m^2	0.00	25.38	0.00
	51 821	Izrada poduprte oplate za konzolu na potpornom zidu, raspona do 1,0 m, podupiranje u potpornu konstrukciju/ Production of supported formwork for the console on the retaining wall, span up to 1.0 m, support in the supporting structure	m^2	30.40	15.23	462.94
		Radovi sa čelikom za ojačanje-armirački radovi/ Reinforcement works				
	52 253	Doprema i postavljanje rebraste armature od visokokvalitetnog tvrdog čelika Bst 500-s. Dodatak zbog sječenja i preklapanja armature 5% / Delivery and installation of ribbed reinforcement made of high quality Bst 500-s hard steel. Addition due to cutting and overlapping of reinforcement 5%	kg	1,166.98	1.02	1,184.75

	52 316	Doprema i postavljanje amiranih čeličnih mreža Bst 500-M. Dodatak zbog sječenja i preklapanja armature 5% / Delivery and installation of reinforced steel nets Bst 500-M. Addition due to cutting and overlapping of reinforcement 5%	kg	0.00	1.02	0.00
		Radovi sa cementnim betonom / Cement concrete works				
	53 168	Doprema i ugrađivanje podložnog cementnog betona C 16/20 iznad 0,15 m3/m2 / Delivery and installation of cement-based concrete C 16/20 above 0.15 m3 / m2	m^3	0.00	76.14	0.00
	53 348	Doprema i ugrađivanje ojačanog cementnog betona C30/37 u potporne zidove ugrađene u bankinu / Delivery and installation of reinforced cement concrete C30 / 37 in retaining walls installed in the shoulder	m^3	0.00	91.37	0.00
	53 366	Doprema i ugrađivanje ojačanog cementnog betona C 30/37 u konzolu (naglavna greda) na potpornom zidu / Delivery and installation of reinforced cement concrete C 30/37 in the cantilever on the retaining wall	m^3	15.20	91.37	1,388.83
		UKUPNO ZANATSKI RADOVI / TOTAL CRAFT WORKS:				**3,036.53**
		5. PROMETNA OPREMA I SIGNALIZACIJA / TRAFFIC EQUIPEMENT AND SIGNALING				
		Oprema za usmjeravanje saobraćaja / Traffic routing equipement				
		Oprema za osiguranje saobraćaja / Traffic insurance equipment				

	64 211. 1	Nabavka i ugradnja u bankinu kompletne jednostrane sigurnosne ograde za vozila, nivo zaštite H1, klasa radne širine W2, stepen žestine udara A, dinamički ugib Du=0,70 m u skladu sa BAS EN 1317-2. U ovu poziciju ulazi i cinčanje ograde./ Supply and installation in the shoulder of a complete one-sided safety fence for vehicles, vehicle containment level H1, working width class W2, impact strength A, dynamic deflection Du = 0.70 m in accordance with BAS EN 1317-2. This position also includes galvanizing the fence.	m^1	3,955.00	76.14	301,142.13
	64 211. 3	Nabavka i ugradnja u bankinu kompletne jednostrane sigurnosne ograde za vozila, nivo zaštite H1, klasa radne širine W4, stepen žestine udara A, dinamički ugib Du=1,00 m u skladu sa EN 1317. U ovu poziciju ulazi i cinčanje ograde./ Supply and installation in the shoulder of a complete one-sided safety fence for vehicles, vehicle containment level H1, working width class W4, impact strength A, dynamic deflection Du = 1.00 m in accordance with EN 1317. This position also includes galvanizing the fence.	m^1	1,157.00	76.14	88,096.45
	64 211. 4	Nabavka i ugradnja u bankinu kompletne jednostrane sigurnosne ograde za vozila , nivo zaštite H1, klasa radne širine W4, stepen žestine udara A, dinamički ugib Du=1,10 m u skladu sa EN 1317. U ovu poziciju ulazi i cinčanje ograde./ Supply and installation in the shoulder of a complete one sided safety fence for vehicles, vehicle containment level H1, working width class W4, impact strength A, dynamic deflection Du = 1.10 m in accordance with EN 1317. This position also includes galvanizing the fence.	m^1	0.00	76.14	0.00

	64 214. 1	Nabavka i ugradnja na betonski zid kompletne jednostrane sigurnosne ograde za vozila, nivo zaštite H1, klasa radne širine W2, stepen žestine udara A, dinamički ugib Du=0,60 m u skladu sa EN 1317. U ovu poziciju ulazi i cinčanje ograde. / Supply and installation on the concrete wall complete one sided safety fence for vehicles, vehicle containment level H1, working width class W2, impact strength A, dynamic deflection Du = 0,60 m in accordance with EN 1317. This position also includes galvanizing the fence.	m^1	0.00	81.22	0.00
	64 214. 3	Nabavka i ugradnja na betonski zid kompletne jednostrane sigurnosne ograde za vozila, nivo zaštite H2, klasa radne širine W1, stepen žestine udara A, dinamički ugib Du=0,40 m u skladu sa BAS EN 1317-2. U ovu poziciju ulazi i cinčanje ograde. / Supply and installation on the concrete wall of a complete one-sided safety fence for vehicles, vehicle containment level H2, working width class W1, impact strenghtA, dynamic deflection Du = 0.40 m in accordance with BAS EN 1317-2. This position also includes galvanizing the fence.	m^1	38.00	126.90	4,822.34
	64 281	Nabavka i ugradnja u bankinu kosog završetka jednostrane sigurnosne ograde od čelika dužine 4,00 m, uz ogradu nivoa zaštite H1, u skladu sa BAS EN 1317-4. Kosi završetak zakrenuti u odnosu na os ceste u odnosu 1:20. U ovu poziciju ulazi i cinčanje ograde. / Supply and installation in the shoulder of the sloping end of the one-sided safety fence made of 4.00 m long steel, protection level H1, in accordance with BAS EN 1317-4. Oblique end rotate relative to the axis of the road in a ratio of 1:20. This position also includes galvanizing the fence.	kom/ pcs	18	203.05	3,654.82

	64 283	Nabavka i ugradnja u bankinu kosog završetka jednostrane sigurnosne ograde od čelika dužine 12,00 m, uz ogradu nivoa zaštite H1, u skladu sa BAS EN 1317-4. Kosi završetak zakrenuti u odnosu na os ceste u odnosu 1:20. U ovu poziciju ulazi i cinčanje ograde. / Supply and installation in the shoulder of the sloping end of the one-sided safety fence made of 12,00 m long steel, protection level H1, in accordance with BAS EN 1317-4. Oblique end rotate relative to the axis of the road in a ratio of 1:20. This position also includes galvanizing the fence.	kom/ pcs	0	812.18	0.00
	64 284	Nabavka i ugradnja u bankinu polukružnog završetka jednostrane sigurnosne ograde od čelika dužine 0,50 m, uz ogradu nivoa zaštite H1, u skladu sa BAS EN 1317-4. U ovu poziciju ulazi i cinčanje ograde. / Supply and installation in the shoulder of a semicircular end of a one - sided safety fence made of steel, 0.50 m long, vehicle containment level H1, in accordance with BAS EN 1317-4. This position also includes galvanizing the fence.	kom/ pcs	90	25.38	2,284.26
	64 333	Nabavka i ugradnja naletne sigurnosne ograde iz prefabrikovanih elemenata iz cementnog betona (kosog završetka betonske ograde), visoke 0,80 m, dužine 4,00 m,u skladu sa BAS EN 1317-4, bez priključka na čeličnu sigurnosnu ogradu / Supply and installation of a collision safety fence made of cement concrete prefabricated elements (sloping end of the concrete fence), height 0.80 m, length 4.00 m, in accordance with BAS EN 1317-4, without connection to the steel safety fence	kom/ pcs	0	203.05	0.00
		Nabavka i ugradnja nove betonske sigurnosne ograde na kamenom zidu, H2, W1 / Supply and installation of a concrete safety fence on a stone wall, H2, W1	m^1	0	81.22	0.00
		Nabavka i ugradnja nove betonske sigurnosne ograde na bankini, H2, W1 / Supply and installation concrete safety fence on a stone wall H2, W1	m^1	0	81.22	0.00
		Nabavka i ugradnja veze čelične ograde sa ogradom na mostu / Supply and installation of a connection between the steel fence and the fence on the bridge	kom/ pcs	0	76.14	0.00

		Nabavka i ugradnja ublaživača udara ispred betonskog zida / Supply and installation crash cushion in front of a concrete wall	kom/ pcs	5	8,000.00	40,000.00
		Nabavka i ugradnja ublaživača udara / Supply and installation of shock apsorber	kom/ pcs	2	8,000.00	16,000.00
		Nabavka i ugradnja početno-završne konstrukcije / Supply and installation of end terminal	kom/ pcs	84	2,500.00	210,000.00
		SVEGA PROMETNA OPREMA I SIGNALIZACIJA / TOTAL TRAFFIC EQUIPEMENT AND SIGNALING :				**666,000.00**
		OSTALI RADOVI / VARIOUS WORKS				
		Izrada saobraćajnog projekta - Glavni projekat odvijanja saobraćaja za vrijeme izvođenja radova na ugradnji sigurnosnih ograda na cesti M17, dionica 012: Jablanica 1 - Potoci, dužine 36,312 km / Development of traffic project - Main project of traffic during the execution of works on the installation of safety fences on the road M17, section 012: Jablanica 1 - Potoci, length 36,312 km	pauš al/ lump			
		UKUPNO OSTALI RADOVI / TOTAL VARIOUS WORKS :				**0.00**

REKAPITULACIJA / SUMMARY		
I	**RADOVA NA TRASI / WORKS ON ALIGNMENT**	(€)
1.	PRIPREMNI RADOVI / PREPARATORY WORKS	5,897.97
2.	ZEMLJANI RADOVI I TEMELJENJE / EARTHWORKS AND FOUNDATION	0.00
3.	ODVODNJAVANJE/ DRAINAGE	2,741.12
4.	ZANATSKI RADOVI / CRAFT WORKS	3,036.53
5.	PROMETNA OPREMA I SIGNALIZACIJA / TRAFFIC EQUIPEMENT AND SIGNALING	666,000.00
6.	OSTALI RADOVI / VARIOUS WORKS	0.00
	UKUPNO RADOVI NA TRASI 1 - 6 / TOTAL WORKS ON ALIGNMENT 1-6	**677,675.61**
II	**NEPREDVIĐENI RADOVI 5% / CONTINGENCY WORKS 5%**	33,883.78
	UKUPNO I + II / TOTAL I + II	**711,559.39**
	PDV (17%) / VAT (17%)	120,965.10

	UKUPNO SA PDV-om / TOTAL WITH VAT	**832,524.49**

Nr.	**Item**/ *Poz*	**DESCRIPTION OF WORKS** *VRSTA RADA*	**Unit** *J/M*	**Quantity** *Količina*	**Unit price** J/C(€)	**TOTAL PRICE** *UKUPNO (€)*
BILL OF QUANTITIES- INTERCHANGE "P_Žepče Topčić P" / PREDMJER RADOVA "P. Žepče - T. Polje"						
2.2.6.8. SAOBRAĆAJNA OPREMA I SIGNALIZACIJA PUTA / TRAFFIC EQUIPMENT AND SIGNALISATION						
2.2.6.8.1. VERTIKALNA SAOBRAĆAJNA OPREMA / ROADSIDE AND OVERHEAD ROAD FURNITURE						
		Standardni saobraćajni znakovi / Standard traffic signs				
		klasa II / classe II				
	61452	**trouglasti** / triangle (stranice 900mm)	kom.	25	58.00	1,450.00
	61653	**okrugli /** circular (d= 900mm)	kom.	28	60.40	1,691.20
	61652	**okrugli /** circular (d= 600mm)	kom.	34	52.00	1,768.00
	61724	**pravougaoni /** square (600x900 mm)	kom.	37	65.00	2,405.00
	61726	**pravougaoni /** square (900 mm)	kom.	9	60.00	540.00
	61723	**kvadratnii /** square (600 mm)	kom.	22	55.00	1,210.00
		klasa III / classe III				
		Znaci vođenja i specijalni znaci / Direction signs and special signs				
		klasa II / classe II				
	61725	**pravougaoni /** square (1300x550 mm)	kom.	4	58.00	232.00
		Nosači saobraćajnih znakova / Supports of traffic signs				
	61215	**Jednostubni cijevni nosači L=1800/2 mm /** Single pole pipes	pcs/kom	15	25.00	375.00
	61216	**Jednostubni cijevni nosači L=2800 mm /** Single pole pipes	pcs/kom	60	31.00	1,860.00
	61216	**Jednostubni cijevni nosači L=3200 mm /** Single pole pipes	pcs/kom	87	36.00	3,132.00
	61385	**Temelj-osnova za nosac za saobracajni znak/** pole pipes basis	kom	158	6.00	948.00

		TOTAL VERTICAL SIGNALING UKUPNO VERTIKALNA SIGNALIZACIJA:				**15,611.20**
2.2.6.8.2. OZNAKE NA KOLOVOZU / ROAD MARKINGS						
		Podužne linije bijele boje/ White longitudinal line				
	62133	**Razdjelne uzdužne oznake d=0,15 m /** Partition longitudinal line thickness d=0,15 m	m1	1,440.00	1.10	1,584.00
	62131	**Razdjelne isprekidana uzdužne oznake d=0,15 m /** Partition longitudinal line thickness d=0,15 m	m1	3,640.00	0.90	3,276.00
	62133	**Ivične linije debljine d=0,15 m /** Edge line thickness d=0,15 m	m1	750.00	1.10	825.00
		Poprečne oznake / Transverse signs				
	62178	**Šrafure /** Hatches	m2	86.00	35.00	3,010.00
	62178	**Strelice za označavanje smjera kretanja dužine 5 m, pravo 5.0 kom, desno 5 kom /** Arrows for marking the direction in length 7,5 m, straight 5 pcs, straight right 5 pcs	m2	256.00	35.00	8,960.00
	62284	**Dodatak na ručnu izradu ostalih oznaka na kolovozu, pojedinačna površina oznake oznake više od 1,5m2** / Extra payment for manual execution of other markings, area above 1.5 m2	m2	217.00	7.00	1,519.00
9-56		**TOTAL HORIZONTAL SIGNALING** *UKUPNO HORIZONTALNA SIGNALIZACIJA:*				**19,174.00**
2.2.6.8.3. OPREMA ZA USMJERAVANJE SAOBRAĆAJA / TRAFFIC GUIDING FURNITURE						
		Tabla za označavanje vrha saobraćajnog ostrva na površinskim raskrsnicama / Signboard for marking the top of a traffic island at surface intersections				
	63311	**pravougaoni /** square (200x600 mm)	pcs/kom	12	27.00	324.00
		Oprema za označavanje ivice kolovoza / Road edge marking equipment				

	63111	**VIII-1 Smjerokazni stubići, klasa II /** VIII-1 Signposts, class II	pcs/kom	20	35.00	700.00
		UKUPNO OPREMA ZA USMJERAVANJE/ TOTAL TRAFFIC GUIDING FURNITURE				**1,024.00**

		SUMMARY OF SIGNALING AND EQUIPEMENT *REKAPITULACIJA SIGNALIZACIJA I OPREMA*				**PRICE** *CIJENA*
	2.2.6.8.1.	**VERTIKALNA SAOBRAĆAJNA OPREMA /** ROADSIDE AND OVERHEAD ROAD FURNITURE				15,611.20
	2.2.6.8.2.	**OZNAKE NA KOLOVOZU /** ROAD MARKINGS				19,174.00
	2.2.6.8.3.	**OPREMA ZA USMJERAVANJE SAOBRAĆAJA /** TRAFFIC GUIDING FURNITURE				1,024.00
		UKUPNO SIGNALIZACIJA I OPREMA / TOTAL EQUIPMENT AND SIGNALLING				**35,809.20**
		VAT/ PDV **17%**				**6,087.56**
		TOTAL WORKS with VAT/ UKUPNO RADOVI sa PDV-om :				**41,896.76**

	RASVJETA BUS STAJLIŠTA M17 / BUS STOP LIGHTING M 17 (Dionica / Section: Ozimica-Topčić Polje)					
Šifra radova / Code	**Nr.**	**Opis stavke / Description of works**	**Jedinica mjere / Unit**	**Količina / Quantity**	**Jedinična cijena/ Unit price (€)**	**Ukupno / Total price (€)**
	1.GRAĐEVINSKI RADOVI / CONSTRUCTION WORKS					
	1.1	Iskop zemlje u tlu III kategorije za izradu temelja stubova, komplet sa odvozom viška zemlje na deponiju (12 bus stajališta). 12x4,00= 48,00 m3 / Excavation of soil in the soil of the III category for the construction of the foundations of the pillars, complete with the removal of excess soil to the landfill (22 bus stops). 12x4,00= 48 m3	m^3	48.00	7.61	365.48

	1. 2	Nabavka betona MB30 i izrada temelja za stubove visine 7m. Temelji su okvirnih dimenzija 80x80x90cm. Sve komplet sa nabavkom i ugradnjom odgovarajućih anker vijaka. Poslije odabira stubova Izvođač je dužan izraditi statičke proračune stubova i temelja (12 bus stajališta). 12x4= 48 kom. /Procurement of concrete MB30 and production of foundations for pillars 7 m high. Foundation dimensions 80x80x90cm. All complete with procurement and installation of appropriate anchor bolts. After selecting the pillars, the Contractor is obliged to make static calculations of the pillars and foundations (12 bus stops). 12x4=48 pcs.	kom	48	65.99	3,167.51
	1. UKUPNO GRAĐEVINSKI RADOVI I MATERIJAL / TOTAL CONSTRUCTION WORKS AND MATERIAL:					**3,532.99**
	2. MONTAŽNI RADOVI / ASSEMBLY WORKS					
	2. 1	Nabavka i montaža na već pripremljen temelj čeličnog konusnog rasvjetnog stuba zaštićenog vrućim cinčanjem prema EN 1461 (debljina sloja cinka od 85µm), visine 7 m. Stub treba biti apsorpcijski prema standardu EN 12767, 100HE1-3. Obaveza Izvođača radova je pribavljanje radioničkih nacrta i statičkog proračuna stuba i temelja. Komplet. (12 bus stajališta) 12x4 = 48 kom. / Supply and installation on an already prepared foundation of a steel conical lighting pole protected by hot-dip galvanizing according to EN 1461 (zinc layer thickness of 85µm), height 7 m. The pole should be absorbent according to standard EN 12767, 100HE1-3. The Contractor's obligation is to obtain workshop drawings and a static calculation of the columns and foundations. Set. (22 bus stops) 12x4 = 48 pcs.	kom	48	253.81	12,182.74

	2.2	Nabavka i montaža "all in one off-grid" solarne LED svjetiljke za javno osvjetljenje, ukupne maksimalne snage ≤ 26W, minimalnog svjetlosnog toka svjetiljke 4.500lm, neutralno bijele boje svjetlosti temperature 4.000K, s indeksom reprodukcije boje ≥ 70, trajnosti LED izvora minimalno 50.000 sati rada uz uslov minimalno L70. Efikasnost svjetiljke treba biti najmanje 175 lm/W, napon napajanja 12.8V, radna temperature od -20°C do +35°C. Kućište svjetiljke je izrađeno od lijevanog, nekorozivnog, aluminijuma, sa protektorom od polikarbonata otpornog na UV zračenje, IP65, IK08, s mogućnošću univerzalne montaže na vertikalni stub ili horizontalnu liru promjera 48 - 60 mm, s mogućnošću podešavanja ugla nagiba sa intervalom od 5°. Minimalna garancija proizvođača 3 godine. Solarna svjetiljka "all in one off-grid" sistema podrazumijeva da solarni panel kapaciteta minimalno 60 W dolazi integrisan na kućištu svjetiljke, kao i baterija napravljena od litijum-fero-fosfata kapaciteta minimalno 380 Wh. Na kućištu svjetiljke se nalazi i senzor pokreta koji upravlja svjetlosnim tokom svjetiljke na način da prilikom detekcije pokreta svjetiljka emituje 100% svjetlosnog fluksa, odnosno 30% svjetlosnog fluksa bez detekcije pokreta, čime se maksimizira vrijeme rada svjetiljke. Kućište svjetiljke je opremljeno i LED indikatorom stanja napunjenosti baterije. Tip kao PHILIPS SunStay ili jednakovrijedna svjetiljka koja zadovoljava sve tehničke karakteristike. U slučaju nuđenja drugog tipa svjetiljki potrebno je ispuniti polje "Nudi se:" i navesti tačan tip, model i proizvođača opreme te dostaviti fotometrijski dijagram (ldt. file) zbog provjere fotometrijskih karakteristika od strane projektanta. Potrebno je priložiti originalne kataloške podatke proizvođača uz obavezan prijevod na B/H/S jezike kojima se dokazuje zadovoljavanje navedenih tehničkih karakteristika. Kataloški podaci i fotometrijske krive moraju biti javno dostupne na web stranicama proizvođača (potrebno je priložiti popis web adresa na kojima su dostupni podaci), a kataloški podaci ne smiju biti izdati od strane uvoznika, distributera i sl. Investitor prije odabira najpovoljnijeg ponuđača ima pravo tražiti uzorke nuđenih proizvoda zbog ocjene jednakovrijednosti. Iste je Ponuđač dužan dostaviti u roku od 7 dana. (12 bus stajališta) 12x4= 48 kom. / / Procurement and installation of "all in one off-grid" solar LED lamps for public lighting, total maximum power ≤ 26W, minimum luminous flux of the lamp 4.500lm, neutral white color light temperature 4.000K, with color reproduction	kom	48	1600.00	76,800.00

		index ≥ 70, LED durability source a minimum of 50,000 hours of operation provided a minimum of L70. The efficiency of the lamp should be at least 175 lm / W, supply voltage 12.8V, operating temperature from -20 ° C to + 35 ° C. The housing of the lamp is made of cast, non-corrosive, aluminum, with a protector made of UV-resistant polycarbonate, IP65, IK08, with the possibility of universal mounting on a vertical pole or horizontal lyre with a diameter of 48 - 60 mm, adjustable tilt angle with an interval of 5 ° . Minimum manufacturer's warranty 3 years. The "all in one off-grid" solar lamp means that a solar panel with a capacity of at least 60 W comes integrated on the lamp housing, as well as a battery made of lithium ferrophosphate with a capacity of at least 380 Wh. The lamp housing also has a motion sensor that controls the luminous flux of the lamp in such a way that when motion is detected, the lamp emits 100% light flux or 30% light flux without motion detection, thus maximizing the lamp's operating time. The lamp housing is also equipped with an LED indicator of the battery charge status. A type like PHILIPS SunStay or an equivalent lamp that meets all technical characteristics.In case of offering another type of lamps, it is necessary to fill in the field "Offered:" and state the exact type, model and manufacturer of the equipment and submit a photometric diagram (ldt. File) to check the photometric characteristics by the designer. It is necessary to enclose the original catalog data of the manufacturer with the obligatory translation into B / H / S languages which prove the satisfaction of the stated technical characteristics. Catalog data and photometric curves must be publicly available on the manufacturer's website (a list of web addresses where data are available must be attached), and catalog data must not be issued by importers, distributors, etc. The investor has the right to request before selecting the most favorable bidder. samples of products offered for the purpose of equivalence assessment. The Bidder is obliged to submit the same within 7 days. (12 bus stops) 12x4 = 48 pcs.				
	2.3	Instaliranje i programiranje svjetiljki, testiranje sistema i izdavanje atesta. (12 bus stajališta) / Installation and programming of lamps, system testing and issuance of certificates. (12 bus stops)	paušal / lump sum	12	253.81	3,045.69
	2.4	Svjetlotehničko mjerenje (12 bus stajališta) / Lighting measurement (12 bus stops)	paušal / lump sum	12	50.76	609.14
	2. UKUPNO MONTAŽNI RADOVI I MATERIJAL / TOTAL ASSEMBLY WORKS AND MATERIAL:					**92,637.56**
	REKAPITULACIJA /RECAPITULATION					

	1.	**GRAĐEVINSKI RADOVI I MATERIJAL / CONSTRUCTION WORKS AND MATERIAL**	3,532.99
	2.	**MONTAŽNI RADOVI I MATERIJAL / ASSEMBLY WORKS AND MATERIAL**	92,637.56
		UKUPNO / TOTAL (€)	**96,170.56**
		NEPREDVIĐENI RADOVI 5% / CONTINGENCY WORKS 5% (€)	480.00
		UKUPNO SA NEPREDVIĐENIM RADOVIMA / TOTAL WITH CONTINGENCY WORKS (€)	**96,650.56**
		PDV 17% / VAT 17 % (€)	16,430.59
		SVE UKUPNO SA PDV-om / TOTAL WITH VAT(€)	**113,081.15**

BILL OF QUANTITIES- INTERCHANGE "Jablanica - Potoci" / PREDMJER RADOVA "Jablanica - Potoci"

Nr.	**POZ. OPISA / ITEM**	**VRSTA RADOVA / DESCRIPTION OF WORKS**	**JED. MJ. / UNIT**	**KOLIČINA / QUANTITY**	**JED. CIJENA / UNIT PRICE (€)**	**UKUPNA VRIJEDNOST/ TOTAL PRICE (€)**
		1. PRIPREMNI RADOVI / PREPARATORY WORKS				
	12 231.1	Demontaža čelične bezbjednosne ograde na bankini i odvoz na deponiju Izvođača radova redovnog održavanja na predmetnoj dionici magistralne ceste M17. / Dismantling of the steel safety fence on the shoulder and transport to the landfill of the Contractor of regular maintenance works on the subject section of the main road M17.	m^1	2,521.00	4.06	10,237.56
	12 231.2	Demontaža čelične bezbjednosne ograde na betonskom zidu i odvoz na deponiju Izvođača radova redovnog održavanja na predmetnoj dionici magistralne ceste M17./ Dismantling of the steel safety fence on the concrete wall and transport to the landfill of the Contractor of regular maintenance works on the subject section of the main road M17.	m^1	1,568.00	5.08	7,959.39
	12 373	Rezanje i odvoženje asfaltnih zastora (pješačka staza), transportna dužina 4-5 km u debljini 8-10 cm. / Cutting and removal of asphalt (sidewalk), transport length 4-5 km in thickness 8-10 cm	m^2	38.40	5.08	194.92

	12 477	Rušenje i uklanjanje armiranog zida od ojačanog cementnog betona i odvoz materijala na deponiju, transportna dužina 4 -5 km/ Demolition and removal of reinforced wall made of reinforced cement concrete and removal of material to the landfill, transport length 4 -5 km	m^3	475.78	25.38	12,075.63
	14 951	Bušenje rupa u ojačanom cementnom betonu, površina horizontalna ili nagnuta do 45° u odnosu na horizontalu, promjera do 30 mm. / Drilling holes in reinforced cement concrete, horizontal surface or inclined up to 45 ° in relation to the horizontal, up to 30 mm in diameter	m^1	1,115.00	3.05	3,395.94
	21 317	Iskop u materijalu 3-4 kategorije za temelje betonskih zidova širine do 1,00 m, dubine 1,10 do 2,00 m i odvoz materijala na deponiju, transportna dužina 4 -5 km. / Excavation in 3-4 category material for foundations of concrete walls up to 1.00 m wide, 1.10 to 2.00 m deep and transport of material to the landfill, transport length 4 -5 km	m^3	356.20	10.15	3,616.24
		Ostali pripremni radovi/ Other preparatory works				
	13 141	Uređenje i preusmjeravanje saobraćaja po jednoj voznoj traci sa semaforima i pripadajućom horizontalnom i vertikalnom signalizacijom prema revidovanom projektu odvijanja saobraćaja za vrijeme izvođenja radova na ugradnji sigurnosnih ograda na cesti M17, dionica 013: Jablanica 1 - Potoci, dužine 36,312 km / Arrangement and redirection of traffic on one lane with traffic lights and horizontal and vertical signalization according to the revised project of traffic during the installation of safety fences on the road M17, section 013: Jablanica 1 - Potoci, length 36,312 km	pauš al / lump			
		SVEGA PRIPREMNI RADOVI / TOTALY PREPARATORY WORKS:				**37,479.70**
		2. ZEMLJANI RADOVI I TEMELJENJE / EARTHWORKS AND FOUNDATION				

	24 217	Nasipanje materijalom iz iskopa i nabijanje do potrebnog modula stišljivosti / Filling in with excavated material and compaction to the required compressibility modulus	m^3	109.60	2.54	278.17
	24 218	Dovoz materijala iz pozajmišta i nabijanje do potrebnog modula stišljivosti / Delivery and compaction of materials to the required compressibility modules	m^3	82.20	4.06	333.81
		Kolovozne konstrukcije/ Road constructions				
		UKUPNO ZEMLJANI RADOVI I TEMELJENJE/ TOTAL EARTHWORKS AND FOUNDATION:				**611.98**
		3. ODVODNJAVANJE/ DRAINAGE				
		Površinsko odvodnjavanje/ Surface drainage				
	44 929	Nabavka i ugradnja poklopca od ojačanog cementnog betona (C30/37; Bst 500s),presjeka 200/200 cm / Supply and installation of a cover made of reinforced cement concrete (C30 / 37; Bst 500s), cross section 200/200 cm	kom/ pcs	81	152.28	12,335.03
		Propusti/ Culverts				
		UKUPNO ODVODNJAVANJE/ TOTALY DRAINAGE:				**12,335.03**
		4. ZANATSKI RADOVI / CRAFT WORKS				
		Tesarski radovi / Carpentry works				
	51 331	Izrada dvostrane vezane oplate za ravan zid, visine do 2 m / Production of double sided plywood formwork for a flat wall, height up to 2 m	m^2	356.20	25.38	9,040.61
	51 821	Izrada poduprte oplate za konzolu na potpornom zidu, raspona do 1,0 m, podupiranje u potpornu konstrukciju/ Production of supported formwork for the console on the retaining wall, span up to 1.0 m, support in the supporting structure	m^2	913.80	15.23	13,915.74
		Radovi sa čelikom za ojačanje-armirački radovi/ Reinforcement works				

	52 253	Doprema i postavljanje rebraste armature od visokokvalitetnog tvrdog čelika Bst 500-s. Dodatak zbog sječenja i preklapanja armature 5% / Delivery and installation of ribbed reinforcement made of high quality Bst 500-s hard steel. Addition due to cutting and overlapping of reinforcement 5%	kg	44,161.90	1.02	44,834.42
	52 316	Doprema i postavljanje amiranih čeličnih mreža Bst 500-M. Dodatak zbog sječenja i preklapanja armature 5% / Delivery and installation of reinforced steel nets Bst 500-M. Addition due to cutting and overlapping of reinforcement 5%	kg	5,206.00	1.02	5,285.28
		Radovi sa cementnim betonom / Cement concrete works				
	53 168	Doprema i ugrađivanje podložnog cementnog betona C 16/20 iznad 0,15 m3/m2 / Delivery and installation of cement-based concrete C 16/20 above 0.15 m3 / m2	m^3	19.18	76.14	1,460.41
	53 348	Doprema i ugrađivanje ojačanog cementnog betona C30/37 u potporne zidove ugrađene u bankinu / Delivery and installation of reinforced cement concrete C30 / 37 in retaining walls installed in the shoulder	m^3	230.16	91.37	21,029.85
	53 366	Doprema i ugrađivanje ojačanog cementnog betona C 30/37 u konzolu (naglavna greda) na potpornom zidu / Delivery and installation of reinforced cement concrete C 30/37 in the cantilever on the retaining wall	m^3	558.00	91.37	50,984.77
		UKUPNO ZANATSKI RADOVI / TOTAL CRAFT WORKS:				**146,551.07**
		5. PROMETNA OPREMA I SIGNALIZACIJA / TRAFFIC EQUIPEMENT AND SIGNALING				
		Oprema za usmjeravanje saobraćaja / Traffic routing equipement				
		Oprema za osiguranje saobraćaja / Traffic insurance equipment				

	64 211. 1	Nabavka i ugradnja u bankinu kompletne jednostrane sigurnosne ograde za vozila, nivo zaštite H1, klasa radne širine W2, stepen žestine udara A, dinamički ugib Du=0,70 m u skladu sa BAS EN 1317-2. U ovu poziciju ulazi i cinčanje ograde./ Supply and installation in the shoulder of a complete one-sided safety fence for vehicles, vehicle containment level H1, working width class W2, impact strength A, dynamic deflection Du = 0.70 m in accordance with BAS EN 1317-2. This position also includes galvanizing the fence.	m^1	11,026 .00	76.1 4	839,543. 15
	64 211. 3	Nabavka i ugradnja u bankinu kompletne jednostrane sigurnosne ograde za vozila, nivo zaštite H1, klasa radne širine W4, stepen žestine udara A, dinamički ugib Du=1,00 m u skladu sa EN 1317. U ovu poziciju ulazi i cinčanje ograde./ Supply and installation in the shoulder of a complete one-sided safety fence for vehicles, vehicle containment level H1, working width class W4, impact strength A, dynamic deflection Du = 1.00 m in accordance with EN 1317. This position also includes galvanizing the fence.	m^1	622.00	76.1 4	47,360.4 1
	64 211. 4	Nabavka i ugradnja u bankinu kompletne jednostrane sigurnosne ograde za vozila , nivo zaštite H1, klasa radne širine W4, stepen žestine udara A, dinamički ugib Du=1,10 m u skladu sa EN 1317. U ovu poziciju ulazi i cinčanje ograde./ Supply and installation in the shoulder of a complete one sided safety fence for vehicles, vehicle containment level H1, working width class W4, impact strength A, dynamic deflection Du = 1.10 m in accordance with EN 1317. This position also includes galvanizing the fence.	m^1	452.00	76.1 4	34,416.2 4

	64 214. 1	Nabavka i ugradnja na betonski zid kompletne jednostrane sigurnosne ograde za vozila, nivo zaštite H1, klasa radne širine W2, stepen žestine udara A, dinamički ugib Du=0,60 m u skladu sa EN 1317. U ovu poziciju ulazi i cinčanje ograde. / Supply and installation on the concrete wall complete one sided safety fence for vehicles, vehicle containment level H1, working width class W2, impact strength A, dynamic deflection Du = 0,60 m in accordance with EN 1317. This position also includes galvanizing the fence.	m^1	210.00	81.22	17,055.84
	64 214. 3	Nabavka i ugradnja na betonski zid kompletne jednostrane sigurnosne ograde za vozila, nivo zaštite H2, klasa radne širine W1, stepen žestine udara A, dinamički ugib Du=0,40 m u skladu sa BAS EN 1317-2. U ovu poziciju ulazi i cinčanje ograde. / Supply and installation on the concrete wall of a complete one-sided safety fence for vehicles, vehicle containment level H2, working width class W1, impact strenghtA, dynamic deflection Du = 0.40 m in accordance with BAS EN 1317-2. This position also includes galvanizing the fence.	m^1	1,742.00	126.90	221,065.99
	64 281	Nabavka i ugradnja u bankinu kosog završetka jednostrane sigurnosne ograde od čelika dužine 4,00 m, uz ogradu nivoa zaštite H1, u skladu sa BAS EN 1317-4. Kosi završetak zakrenuti u odnosu na os ceste u odnosu 1:20. U ovu poziciju ulazi i cinčanje ograde. / Supply and installation in the shoulder of the sloping end of the one-sided safety fence made of 4.00 m long steel, protection level H1, in accordance with BAS EN 1317-4. Oblique end rotate relative to the axis of the road in a ratio of 1:20. This position also includes galvanizing the fence.	kom/ pcs	41	203.05	8,324.87

	64 283	Nabavka i ugradnja u bankinu kosog završetka jednostrane sigurnosne ograde od čelika dužine 12,00 m, uz ogradu nivoa zaštite H1, u skladu sa BAS EN 1317-4. Kosi završetak zakrenuti u odnosu na os ceste u odnosu 1:20. U ovu poziciju ulazi i cinčanje ograde. / Supply and installation in the shoulder of the sloping end of the one-sided safety fence made of 12,00 m long steel, protection level H1, in accordance with BAS EN 1317-4. Oblique end rotate relative to the axis of the road in a ratio of 1:20. This position also includes galvanizing the fence.	kom/ pcs	24	812.18	19,492.39
	64 284	Nabavka i ugradnja u bankinu polukružnog završetka jednostrane sigurnosne ograde od čelika dužine 0,50 m, uz ogradu nivoa zaštite H1, u skladu sa BAS EN 1317-4. U ovu poziciju ulazi i cinčanje ograde. / Supply and installation in the shoulder of a semicircular end of a one - sided safety fence made of steel, 0.50 m long, vehicle containment level H1, in accordance with BAS EN 1317-4. This position also includes galvanizing the fence.	kom/ pcs	32	25.38	812.18
	64 333	Nabavka i ugradnja naletne sigurnosne ograde iz prefabrikovanih elemenata iz cementnog betona (kosog završetka betonske ograde), visoke 0,80 m, dužine 4,00 m,u skladu sa BAS EN 1317-4, bez priključka na čeličnu sigurnosnu ogradu / Supply and installation of a collision safety fence made of cement concrete prefabricated elements (sloping end of the concrete fence), height 0.80 m, length 4.00 m, in accordance with BAS EN 1317-4, without connection to the steel safety fence	kom/ pcs	1	203.05	203.05
		Nabavka i ugradnja nove betonske sigurnosne ograde na kamenom zidu, H2, W1 / Supply and installation of a concrete safety fence on a stone wall, H2, W1	m^1	180	81.22	14,619.29
		Nabavka i ugradnja nove betonske sigurnosne ograde na bankini, H2, W1 / Supply and installation concrete safety fence on a stone wall H2, W1	m^1	258	81.22	20,954.31
		Nabavka i ugradnja veze čelične ograde sa ogradom na mostu / Supply and installation of a connection between the steel fence and the fence on the bridge	kom/ pcs	15	76.14	1,142.13

		Nabavka i ugradnja ublaživača udara ispred betonskog zida / Supply and installation crash cushion in front of a concrete wall	kom/ pcs	7	8,000.00	56,000.00
		Nabavka i ugradnja ublaživača udara / Supply and installation of shock apsorber	kom/ pcs	2	8,000.00	16,000.00
		Nabavka i ugradnja početno-završne konstrukcije / Supply and installation of end terminal	kom/ pcs	75	2,500.00	187,500.00
		SVEGA PROMETNA OPREMA I SIGNALIZACIJA / TOTAL TRAFFIC EQUIPEMENT AND SIGNALING :				**1,484,489.85**
		OSTALI RADOVI / VARIOUS WORKS				
		Izrada saobraćajnog projekta - Glavni projekat odvijanja saobraćaja za vrijeme izvođenja radova na ugradnji sigurnosnih ograda na cesti M17, dionica 012: Jablanica 1 - Potoci, dužine 36,312 km / Development of traffic project - Main project of traffic during the execution of works on the installation of safety fences on the road M17, section 012: Jablanica 1 - Potoci, length 36,312 km	paušal/ lump			
		UKUPNO OSTALI RADOVI / TOTAL VARIOUS WORKS :				**0.00**

REKAPITULACIJA / SUMMARY

I	**RADOVA NA TRASI / WORKS ON ALIGNMENT**	(€)
1.	PRIPREMNI RADOVI / PREPARATORY WORKS	37,479.70
2.	ZEMLJANI RADOVI I TEMELJENJE / EARTHWORKS AND FOUNDATION	611.98
3.	ODVODNJAVANJE/ DRAINAGE	12,335.03
4.	ZANATSKI RADOVI / CRAFT WORKS	146,551.07
5.	PROMETNA OPREMA I SIGNALIZACIJA / TRAFFIC EQUIPEMENT AND SIGNALING	1,484,489.85
6.	OSTALI RADOVI / VARIOUS WORKS	0.00
	UKUPNO RADOVI NA TRASI 1 - 6 / TOTAL WORKS ON ALIGNMENT 1-6	**1,681,467.61**
II	**NEPREDVIĐENI RADOVI 5% / CONTINGENCY WORKS 5%**	84,073.38
	UKUPNO I + II / TOTAL I + II	**1,765,540.99**
	PDV (17%) / VAT (17%)	300,141.97
	UKUPNO SA PDV-om / TOTAL WITH VAT	**2,065,682.96**

BILL OF QUANTITIES- INTERCHANGE "Jablanica - Potoci" / PREDMJER RADOVA "Jablanica - Potoci"						
Nr.	**Item**/ *Poz*	**DESCRIPTION OF WORKS** *VRSTA RADA*	**Unit** *J/M*	**Quantity** *Količina*	**Unit price** J/C (€)	**TOTAL PRICE** *UKUPNO (€)*
2.2.6.8. SAOBRAĆAJNA OPREMA I SIGNALIZACIJA PUTA / TRAFFIC EQUIPMENT AND SIGNALISATION						
2.2.6.8.1. VERTIKALNA SAOBRAĆAJNA OPREMA / ROADSIDE AND OVERHEAD ROAD FURNITURE						
		Standardni saobraćajni znakovi / Standard traffic signs				
		klasa II / classe II				
	61652	**okrugli /** circular (d= 600mm)	pcs/kom	57	52.00	2,964.00
	61724	**pravougaoni /** square (600x900 mm)	pcs/kom	22	65.00	1,430.00
	61726	**pravougaoni /** square (600 mm)	pcs/kom	12	60.00	720.00
	61723	**pravougaoni /** square (500 mm)	pcs/kom	8	55.00	440.00
		Nosači saobraćajnih znakova / Supports of traffic signs				
	61215	**Jednostubni cijevni nosači L=1800/2 mm /** Single pole pipes	pcs/kom	8	25.00	200.00
	61216	**Jednostubni cijevni nosači L=3000 mm /** Single pole pipes	pcs/kom	4	34.00	136.00
	61216	**Jednostubni cijevni nosači L=3200 mm /** Single pole pipes	pcs/kom	19	36.00	684.00
	61217	**Jednostubni cijevni nosači L=3400 mm /** Single pole pipes	pcs/kom	48	38.00	1,824.00
	61385	**Temelj-osnova za nosac za saobracajni znak/** pole pipes basis	kom/pcs	71	6.00	426.00
		TOTAL VERTICAL SIGNALING UKUPNO VERTIKALNA SIGNALIZACIJA:				**8,824.00**
2.2.6.8.2. OZNAKE NA KOLOVOZU / ROAD MARKINGS						
		Podužne linije bijele boje/ White longitudinal line				

	62133	**Razdjelne uzdužne oznake d=0,15 m /** Broken longitudinal line thickness d=0,15 m	m1	1,600.00	1.10	1,760.00
	62133	**Ivične linije debljine d=0,15 m /** Edge line thickness d=0,15 m	m1	2,320.00	1.10	2,552.00
		Poprečne oznake / Transverse signs				
	62178	**Šrafure /** Hatches	m2	64.00	35.00	2,240.00
	62178	**Strelice za označavanje smjera kretanja dužine 5 m, pravo 5.0 kom, desno 5 kom /** Arrows for marking the direction in length 7,5 m, straight 5 pcs, straight right 5 pcs	m2	48.00	35.00	1,680.00
	62284	**Dodatak na ručnu izradu ostalih oznaka na kolovozu, pojedinačna površina oznake oznake više od 1,5m2** / Extra payment for manual execution of other markings, area above 1.5 m2	m2	236.00	7.00	1,652.00
9-56		**TOTAL HORIZONTAL SIGNALING** *UKUPNO HORIZONTALNA SIGNALIZACIJA:*				**9,884.00**
2.2.6.8.3. OPREMA ZA USMJERAVANJE SAOBRAĆAJA / TRAFFIC GUIDING FURNITURE						
		Tabla za označavanje vrha saobraćajnog ostrva na površinskim raskrsnicama / Signboard for marking the top of a traffic island at surface intersections				
	63311	**pravougaoni /** square (200x600 mm)	pcs/kom	19	27.00	513.00
		Oprema za označavanje ivice kolovoza / Road edge marking equipment				
	63111	**VIII-1 Smjerokazni stubići, klasa II /** VIII-1 Signposts, class II	pcs/kom	20	35.00	700.00
		UKUPNO OPREMA ZA USMJERAVANJE/ TOTAL TRAFFIC GUIDING FURNITURE				**1,213.00**

		SUMMARY OF SIGNALING AND EQUIPEMENT *REKAPITULACIJA SIGNALIZACIJA I OPREMA*	**PRICE** *CIJENA*

	2.2.6.8.1.	**VERTIKALNA SAOBRAĆAJNA OPREMA /** ROADSIDE AND OVERHEAD ROAD FURNITURE				8,824.00
	2.2.6.8.2.	**OZNAKE NA KOLOVOZU /** ROAD MARKINGS				9,884.00
	2.2.6.8.3.	**OPREMA ZA USMJERAVANJE SAOBRAĆAJA /** TRAFFIC GUIDING FURNITURE				1,213.00
		UKUPNO SIGNALIZACIJA I OPREMA / TOTAL EQUIPMENT AND SIGNALLING				**19,921.00**
		VAT/ PDV **17%**				**3,386.57**
		TOTAL WORKS with VAT/ UKUPNO RADOVI sa PDV-om :				**23,307.57**

	RASVJETA BUS STAJLIŠTA M17 / BUS STOP LIGHTING M 17 (Dionica/ Section: Jablanica-Potoci)					
Šifra radova / Code	**Nr.**	**Opis stavke / Description of works**	**Jedinica mjere / Unit**	**Količina / Quantity**	**Jedinična cijena/ Unit price (€)**	**Ukupno / Total price (€)**
	1.GRAĐEVINSKI RADOVI / CONSTRUCTION WORKS					
	1.1	Iskop zemlje u tlu III kategorije za izradu temelja stubova, komplet sa odvozom viška zemlje na deponiju (22 bus stajališta). 22x4,00= 88,00 m3 / Excavation of soil in the soil of the III category for the construction of the foundations of the pillars, complete with the removal of excess soil to the landfill (22 bus stops). 22x4.00 = 88.00 m3	m^3	88.00	7.61	670.05
	1.2	Nabavka betona MB30 i izrada temelja za stubove visine 7m. Temelji su okvirnih dimenzija 80x80x90cm. Sve komplet sa nabavkom i ugradnjom odgovarajućih anker vijaka. Poslije odabira stubova Izvođač je dužan izraditi statičke proračune stubova i temelja (22 bus stajališta). 22x4= 88 kom. /Procurement of concrete MB30 and production of foundations for pillars 7 m high. Foundation dimensions 80x80x90cm. All complete with procurement and installation of appropriate anchor bolts. After selecting the pillars, the Contractor is obliged to make static calculations of the pillars and foundations (22 bus stops). 22x4 = 88 pcs.	kom / pcs	88	65.99	5,807.11

		1. UKUPNO GRAĐEVINSKI RADOVI I MATERIJAL / TOTAL CONSTRUCTION WORKS AND MATERIAL:				**6,477.16**
	2. MONTAŽNI RADOVI / ASSEMBLY WORKS					
	2.1	Nabavka i montaža na već pripremljen temelj čeličnog konusnog rasvjetnog stuba zaštićenog vrućim cinčanjem prema EN 1461 (debljina sloja cinka od 85µm), visine 7 m. Stub treba biti apsorpcijski prema standardu EN 12767, 100HE1-3. Obaveza Izvođača radova je pribavljanje radioničkih nacrta i statičkog proračuna stuba i temelja. Komplet. (22 bus stajališta) 22x4 = 88 kom. / Supply and installation on an already prepared foundation of a steel conical lighting pole protected by hot-dip galvanizing according to EN 1461 (zinc layer thickness of 85µm), height 7 m. The pole should be absorbent according to standard EN 12767, 100HE1-3. The Contractor's obligation is to obtain workshop drawings and a static calculation of the columns and foundations. Set. (22 bus stops) 22x4 = 88 pcs.	kom/ pcs	88	253.81	22,335.03

	2.2	Nabavka i montaža "all in one off-grid" solarne LED svjetiljke za javno osvjetljenje, ukupne maksimalne snage ≤ 26W, minimalnog svjetlosnog toka svjetiljke 4.500lm, neutralno bijele boje svjetlosti temperature 4.000K, s indeksom reprodukcije boje ≥ 70, trajnosti LED izvora minimalno 50.000 sati rada uz uslov minimalno L70. Efikasnost svjetiljke treba biti najmanje 175 lm/W, napon napajanja 12.8V, radna temperature od -20°C do +35°C. Kućište svjetiljke je izrađeno od lijevanog, nekorozivnog, aluminijuma, sa protektorom od polikarbonata otpornog na UV zračenje, IP65, IK08, s mogućnošću univerzalne montaže na vertikalni stub ili horizontalnu liru promjera 48 - 60 mm, s mogućnošću podešavanja ugla nagiba sa intervalom od 5°. Minimalna garancija proizvođača 3 godine. Solarna svjetiljka "all in one off-grid" sistema podrazumijeva da solarni panel kapaciteta minimalno 60 W dolazi integrisan na kućištu svjetiljke, kao i baterija napravljena od litijum-fero-fosfata kapaciteta minimalno 380 Wh. Na kućištu svjetiljke se nalazi i senzor pokreta koji upravlja svjetlosnim tokom svjetiljke na način da prilikom detekcije pokreta svjetiljka emituje 100% svjetlosnog fluksa, odnosno 30% svjetlosnog fluksa bez detekcije pokreta, čime se maksimizira vrijeme rada svjetiljke. Kućište svjetiljke je opremljeno i LED indikatorom stanja napunjenosti baterije. Tip kao PHILIPS SunStay ili jednakovrijedna svjetiljka koja zadovoljava sve tehničke karakteristike. U slučaju nuđenja drugog tipa svjetiljki potrebno je ispuniti polje "Nudi se:" i navesti tačan tip, model i proizvođača opreme te dostaviti fotometrijski dijagram (ldt. file) zbog provjere fotometrijskih karakteristika od strane projektanta. Potrebno je priložiti originalne kataloške podatke proizvođača uz obavezan prijevod na B/H/S jezike kojima se dokazuje zadovoljavanje navedenih tehničkih karakteristika. Kataloški podaci i fotometrijske krive moraju biti javno dostupne na web stranicama proizvođača (potrebno je priložiti popis web adresa na kojima su dostupni podaci), a kataloški podaci ne smiju biti izdati od strane uvoznika, distributera i sl. Investitor prije odabira najpovoljnijeg ponuđača ima pravo tražiti uzorke nuđenih proizvoda zbog ocjene jednakovrijednosti. Iste je Ponuđač dužan dostaviti u roku od 7 dana. (22 bus stajališta) 22x4= 88 kom. / Procurement and installation of "all in one off-grid" solar LED lamps for public lighting, total maximum power ≤ 26W, minimum luminous flux of the lamp 4.500lm, neutral	kom	88	812.18	71,472.08

		white color light temperature 4.000K, with color reproduction index ≥ 70, LED durability source a minimum of 50,000 hours of operation provided a minimum of L70. The efficiency of the lamp should be at least 175 lm / W, supply voltage 12.8V, operating temperature from -20 ° C to + 35 ° C. The housing of the lamp is made of cast, non-corrosive, aluminum, with a protector made of UV-resistant polycarbonate, IP65, IK08, with the possibility of universal mounting on a vertical pole or horizontal lyre with a diameter of 48 - 60 mm, adjustable tilt angle with an interval of 5 ° . Minimum manufacturer's warranty 3 years. The "all in one off-grid" solar lamp means that a solar panel with a capacity of at least 60 W comes integrated on the lamp housing, as well as a battery made of lithium ferrophosphate with a capacity of at least 380 Wh. The lamp housing also has a motion sensor that controls the luminous flux of the lamp in such a way that when motion is detected, the lamp emits 100% light flux or 30% light flux without motion detection, thus maximizing the lamp's operating time. The lamp housing is also equipped with an LED indicator of the battery charge status. A type like PHILIPS SunStay or an equivalent lamp that meets all technical characteristics.In case of offering another type of lamps, it is necessary to fill in the field "Offered:" and state the exact type, model and manufacturer of the equipment and submit a photometric diagram (ldt. File) to check the photometric characteristics by the designer. It is necessary to enclose the original catalog data of the manufacturer with the obligatory translation into B / H / S languages which prove the satisfaction of the stated technical characteristics. Catalog data and photometric curves must be publicly available on the manufacturer's website (a list of web addresses where data are available must be attached), and catalog data must not be issued by importers, distributors, etc. The investor has the right to request before selecting the most favorable bidder. samples of products offered for the purpose of equivalence assessment. The Bidder is obliged to submit the same within 7 days. (22 bus stops) 22x4 = 88 pcs.				
	2.3	Instaliranje i programiranje svjetiljki, testiranje sistema i izdavanje atesta. (22 bus stajališta) / Installation and programming of lamps, system testing and issuance of certificates. (22 bus stops)	paušal / lump sum	22	253.81	5,583.76
	2.4	Svjetlotehničko mjerenje (22 bus stajališta) / Lighting measurement (22 bus stops)	paušal / lump sum	22	50.76	1,116.75
	2. UKUPNO MONTAŽNI RADOVI I MATERIJAL / TOTAL ASSEMBLY WORKS AND MATERIAL:					**100,507.61**

	REKAPITULACIJA /RECAPITULATION					
	1.	**GRAĐEVINSKI RADOVI I MATERIJAL / CONSTRUCTION WORKS AND MATERIAL**				6,477.16
	2.	**MONTAŽNI RADOVI I MATERIJAL / ASSEMBLY WORKS AND MATERIAL**				100,507.61
					UKUPNO / TOTAL (€)	**106,984.77**
					NEPREDVIĐENI RADOVI 5% / CONTINGENCY WORKS 5% (€)	480.00
					UKUPNO SA NEPREDVIĐENIM RADOVIMA / TOTAL WITH CONTINGENCY WORKS (€)	**107,464.77**
					PDV 17% / VAT 17 % (€)	18,269.01
					SVE UKUPNO SA PDV-om / TOTAL WITH VAT(€)	**125,733.78**

A.3 North Macedonia

Extract from detailed design

1. STANDARD AND NON-STANDARD TRAFFIC SIGNS (Supply and installation) / 1. Стандардни и нестандардни сообраќајни знаци - Набавка, транспорт и поставување									
Items Број		**Description of works / Опис**	**Unit Единица**	**Quantity Количина**	**Unit rate (MKD without VAT) Ед.Цена (MKD без ДДВ)**	**Unit rate (EUR without VAT) Ед.Цена (EUR без ДДВ)**	**Total in MKD without VAT Вкупно во MKD без ДДВ**	**Total in EUR without VAT Вкупно во EUR без ДДВ**
1		 Warning signs / designation: 101-201, **a=1,2m** / Знаци за опасност/ ознака: 101-201, **a=1,2m**	pcs парче	4.00	3,500.00	56.91	14,000.00	227.64
2		 Mandatory signs / designation: 245 , **Ø=0.9m** / Знаци за изречни наредби/ ознака: 202-310, **Ø=0.9m**	pcs парче	2.00	3,500.00	56.91	7,000.00	113.82
3		 Informatory signs /designation: 325.1, **a*b=0,9*0,9m** / Знаци за известување/ознака:325.1, **a*b=0,9*0,9m**	pcs парче	2.00	3,500.00	56.91	7,000.00	113.82
4		 Informatory signs/Знаци за известување/designation/ознака: 330, **a*b=0,6*0,9m**	pcs парче	2.00	4,000.00	65.04	8,000.00	130.08
5		 Additional board / Дополнителна табла, designation/ознака: 505, **a*b=0,30*0,60m (Тип 2)**	pcs парче	1.00	1,200.00	19.51	1,200.00	19.51
6		 Pipe posts, foundations and building in, (for standard traffic signs) / Метални столбови, фундаменти и поставување, (за стандардни сообраќајни знаци)	pcs парче	11.00	1,700.00	27.64	18,700.00	304.07
		Metal steel construction, foundations and building in,(for non-standard traffic signs) / Метални челична конструкција, фундаменти и поставување, (за нестандардни сообраќајни знаци)	pcs парче	4.00	62,000.00	1,008.13	248,000.00	4,032.52
7		 Informatory non-standard sign boards / Знаци за известување не-стадардни	pcs парче	2.00	50,000.00	813.01	100,000.00	1,626.02
8			pcs парче	2.00	30,000.00	487.80	60,000.00	975.61
9		Ископ со бетон / Excavation with concrete	m^3	3.00	18,000.00	292.68	54,000.00	878.05
Sub-Total of standard and non-standard traffic signs (without VAT): / Пресметка за стандардни и нестандардни сообраќајни знаци (без ДДВ)							**517,900.00**	**8,421.14**
Sub-Total of standard and non-standard traffic signs (with 18% VAT): / Пресметка за стандардни и нестандардни сообраќајни знаци (со 18% ДДВ)							**611,122.00**	**9,936.94**

2. ROAD MARKINGS/ 2. Хоризонтална сигнализација								
Items број		**Description of works/Опис**	**Unit Единица**	**Quantity Количина**	**Unit rate (MKD without VAT) Ед.Цена (MKD без ДДВ)**	**Unit rate (EUR without VAT) Ед.Цена (EUR без ДДВ)**	**Total in MKD without VAT Вкупно во MKD без ДДВ**	**Total in EUR without VAT Вкупно во EUR без ДДВ**
1		Осовинска полна вибро линија / Middle Continuous vibro line, d=15cm	m^2	345.00	2,500.00	40.65	862,500.00	14,024.39
2		white continuous line / Бела полна линија d=15cm	m^2	50.00	350.00	5.69	17,500.00	284.55
3		white dashed line (1+1) / Бела испрекината линија (1+1) - d=50cm	m^2	25.00	350.00	5.69	8,750.00	142.28
4		white dashed line (3+3) / Бела испрекината линија (3+3) - d=50cm	m^2	125.00	350.00	5.69	43,750.00	711.38
5		white dashed line (5+10) / Бела испрекината линија (5+10) - d=15cm	m^2	20.00	350.00	5.69	7,000.00	113.82
		white dashed line (10+5) / Бела испрекината линија (10+5) - d=15cm	m^2	40.00	350.00	5.69	14,000.00	227.64
		Fill areas BUS Stop / Ознаки на коловоз за стојалиште за автобус	m^2	50.00	350.00	5.69	17,500.00	284.55
6		Fill areas (hatch, posts, etc.) / Други ознаки на коловоз (полиња за насочување на сообраќај, натписи и сл.)	m^2	250.00	350.00	5.69	87,500.00	1,422.76
Sub-Total of Road Markings (without VAT): / Вкупно за хоризонтална сигнализација (без ДДВ)							**1,058,500.00**	**17,211.38**
Sub-Total of Road Markings (with 18% VAT): / Вкупно за хоризонтална сигнализација (со 18% ДДВ)							**1,249,030.00**	**20,309.43**

3. ROAD EQUIPMENT (Supply and installation) / 3. Опрема на патот - Набавка, транспорт и поставување								
Items Број	**Tech. Specs. Техничка спецификација**	**Description of works / Опис**	**Unit Единица**	**Quantity Количина**	**Unit rate (MKD without VAT) Ед.Цена (MKD без ДДВ)**	**Unit rate (EUR without VAT) Ед.Цена (EUR без ДДВ)**	**Total in MKD without VAT Вкупно во MKD без ДДВ**	**Total in EUR without VAT Вкупно во EUR без ДДВ**
1		 Board to indicate traffic island / Табла за означување на сообраќаен остров/ designation / ознака 9.09, **a*b=0.5*1.0**	pcs парче	4.00	12,500.00	203.25	50,000.00	813.01
4		 Обележување на знакот 235 на коловозот (брзина 80km/h), термопластика / Marking of the traffic sign 235 on the road (speed limit 80 km/h), thermoplastic	pcs парче	4.00	62,000.00	1,008.13	248,000.00	4,032.52
		Набавка, транспорт и монтажа на челична заштитна ограда / Procurement, transport and placing of steel guardrail / Type - **H1AW2,** на објект/on structure	m	800.00	3,000.00	48.78	2,400,000.00	39,024.39
		Набавка, транспорт и монтажа на челична заштитна ограда / Procurement, transport and placing of steel guardrail / Type - **H1AW3,** на банкина/on shoulder	m	10,800.00	2,700.00	43.90	29,160,000.00	474,146.34
		Набавка, транспорт и монтажа на челична заштитна ограда / Procurement, transport and placing of steel guardrail / Type - **H2AW4,** на објект/on structure	m	250.00	9,500.00	154.47	2,375,000.00	38,617.89
		Набавка, транспорт и монтажа на челична заштитна ограда / Procurement, transport and placing of steel guardrail / Type - **H2AW4,** на на банкина/on shoulder	m	1,956.00	6,500.00	105.69	12,714,000.00	206,731.71
		Преоден елемент / Translation element H1 › H2 L=12m	pcs парче	54.00	65,500.00	1,065.04	3,537,000.00	57,512.20
		Преоден елемент / Translation element H1/H2 › retaining wall L=2m	pcs парче	4.00	4,500.00	73.17	18,000.00	292.68

3. ROAD EQUIPMENT (Supply and installation) / 3. Опрема на патот - Набавка, транспорт и поставување								
Items Број	**Tech. Specs. Техничка спецификација**	**Description of works / Опис**	**Unit Единица**	**Quantity Количина**	**Unit rate (MKD without VAT) Ед.Цена (MKD без ДДВ)**	**Unit rate (EUR without VAT) Ед.Цена (EUR без ДДВ)**	**Total in MKD without VAT Вкупно во MKD без ДДВ**	**Total in EUR without VAT Вкупно во EUR без ДДВ**
		 Апсорбер / Crush cusion V=50km/h	pcs парче	2.00	800,000.00	13,008.13	1,600,000.00	26,016.26
		 Терминал / Start-End terminal V=80km/h	pcs парче	4.00	600,000.00	9,756.10	2,400,000.00	39,024.39
Sub-Total of Road Equipment(without VAT): / Вкупно за опрема на патиштата (без ДДВ)							**54,502,000.00**	**886,211.38**
Sub-Total of Road Equipment(with 18% VAT): / Вкупно за опрема на патиштата (со 18% ДДВ)							**64,312,360.00**	**1,045,729.43**

РЕКАПИТУЛАР ЗА СООБРАЌАЈНИ ЗНАЦИ И ОЗНАКИ НА КОЛОВОЗ TOTAL FOR TRAFFIC SIGNS AND ROAD MARKINGS			
	Description of works / Опис	Unit rate (MKD without VAT) Цена (MKD без ДДВ)	Unit rate (EUR without VAT) Цена (EUR без ДДВ)
1.	STANDARD AND NON-STANDARD TRAFFIC SIGNS (Supply and installation) / Стандардни и нестандардни сообраќајни знаци - Набавка, транспорт и поставување	517,900.00	8,421.14
2.	ROAD MARKINGS / Хоризонтална сигнализација	1,058,500.00	17,211.38
3.	ROAD EQUIPMENT (Supply and installation) / Опрема на патот - Набавка, транспорт и поставување	54,502,000.00	886,211.38
	Вкупно:/Total:	**56,078,400.00**	**911,843.90**

1. Steel Guardrail (Supply and installation) / 1. Челична заштитна ограда - Набавка, транспорт и поставување							
Items Број	**Description of works / Опис**	**Unit Единица**	**Quantity Количина**	**Unit rate (MKD without VAT) Ед.Цена (MKD без ДДВ)**	**Unit rate (EUR without VAT) Ед.Цена (EUR без ДДВ)**	**Total in MKD without VAT Вкупно во MKD без ДДВ**	**Total in EUR without VAT Вкупно во EUR без ДДВ**
1	Procurement, transport and placing of steel guardrail / Набавка, транспорт и поставување на челична заштитна ограда, Тип/Type **H1W2 на банкина/ on shoulder**	m	44,883.00	2,850.00	46.34	127,916,550.00	2,079,943.90
2	Procurement, transport and placing of steel guardrail / Набавка, транспорт и поставување на челична заштитна ограда, Тип/Type **H1W2 на објект/ on structure**	m	4,137.00	2,955.00	48.05	12,224,835.00	198,777.80
3	Procurement, transport and placing of steel guardrail / Набавка, транспорт и поставување на челична заштитна ограда, Тип/Type **H1W3 на банкина/ on shoulder**	m	6,713.00	2,030.00	33.01	13,627,390.00	221,583.58
4	Procurement, transport and placing of steel guardrail / Набавка, транспорт и поставување на челична заштитна ограда, Тип/Type **H1W4 на банкина/ on shoulder**	m	5,239.00	1,675.00	27.24	8,775,325.00	142,688.21
5	Procurement, transport and placing of steel guardrail / Набавка, транспорт и поставување на челична заштитна ограда, Тип/Type **H1W5 на банкина/ on shoulder**	m	249,803.00	2,185.00	35.53	545,819,555.00	8,875,114.72
6	Procurement, transport and placing of steel guardrail / Набавка, транспорт и поставување на челична заштитна ограда, Тип/Type **H1W5 анкерисана, on structure**	m	589.00	3,505.00	56.99	2,064,445.00	33,568.21
7	Procurement, transport and placing of steel guardrail / Набавка, транспорт и поставување на челична заштитна ограда, Тип/Type **H2W2 на банкина/ on shoulder**	m	19,701.00	7,575.00	123.17	149,235,075.00	2,426,586.59
8	Procurement, transport and placing of steel guardrail / Набавка, транспорт и поставување на челична заштитна ограда, Тип/Type **H2W4 на банкина/ on shoulder**	m	123,672.00	3,755.00	61.06	464,388,360.00	7,551,030.24
9	Procurement, transport and placing of steel guardrail / Набавка, транспорт и поставување на челична заштитна ограда, Тип/Type **H2W4 анкерисана, on structure**	m	1,750.00	5,180.00	84.23	9,065,000.00	147,398.37
10	Procurement, transport and placing of steel guardrail / Набавка, транспорт и поставување на челична заштитна ограда, Тип/Type **H2W4 двострана / two - sided, монтажно – демонтажна / mounting - dismounting**	m	3,112.00	5,305.00	86.26	16,509,160.00	268,441.63

1. Steel Guardrail (Supply and installation) / 1. Челична заштитна ограда - Набавка, транспорт и поставување							
Items Број	**Description of works / Опис**	**Unit Единица**	**Quantity Количина**	**Unit rate (MKD without VAT) Ед.Цена (MKD без ДДВ)**	**Unit rate (EUR without VAT) Ед.Цена (EUR без ДДВ)**	**Total in MKD without VAT Вкупно во MKD без ДДВ**	**Total in EUR without VAT Вкупно во EUR без ДДВ**
11	Procurement, transport and placing of beginning and ending construction / Набавка, транспорт и поставување на почетна и завршна конструкција, **L=12m**	pcs парче	1,383.00	26,600.00	432.52	36,787,800.00	598,175.61
12	Procurement, transport and placing of transition construction / Набавка, транспорт и поставување на преодна конструкција, од H2W4, **L=2m**	pcs парче	574.00	3,700.00	60.16	2,123,800.00	34,533.33
13	Procurement, transport and placing of transition construction / Набавка, транспорт и поставување на преодна конструкција, од H2W3, **L=8m**	pcs парче	220.00	59,580.00	968.78	13,107,600.00	213,131.71
14	Procurement, transport and placing of transition construction / Набавка, транспорт и поставување на преодна конструкција, од H1W4, **L=12m**	pcs парче	946.00	67,980.00	1,105.37	64,309,080.00	1,045,676.10
15	Procurement, transport and placing of transition construction / Набавка, транспорт и поставување на преодна конструкција, **H2W4-Y, L=13m**	pcs парче	108.00	107,050.00	1,740.65	11,561,400.00	187,990.24
16	 Procurement, transport and placing of Crash cushions / Набавка, транспорт и поставување на ублажувачи на удар, Тип/Type **почетен елемент / starting construction**	pcs парче	10.00	585,900.00	9,526.83	5,859,000.00	95,268.29
17	 Procurement, transport and placing of Crash cushions / Набавка, транспорт и поставување на ублажувачи на удар, Тип/Type **80km/h**	pcs парче	25.00	738,000.00	12,000.00	18,450,000.00	300,000.00
18	 Procurement, transport and placing of Crash cushions / Набавка, транспорт и поставување на ублажувачи на удар, Тип/Type **120km/h**	pcs парче	32.00	861,000.00	14,000.00	27,552,000.00	448,000.00
19	 Procurement, transport and placing of Catadioptric reflectors / Рефлектирачки ознаки on guardrails	pcs парче	12,500.00	360.00	5.85	4,500,000.00	73,170.73
Sub-Total of Road Equipment(without VAT): / Вкупно за опрема на патиштата (без ДДВ)						**1,533,876,375.00**	**24,941,079.27**
Sub-Total of Road Equipment(with 18% VAT): / Вкупно за опрема на патиштата (со 18% ДДВ)						**1,809,974,122.50**	**29,430,473.54**

2. Dismounting / 2. Демонтажа							
Items број	**Description of works/Опис**	**Unit Единица**	**Quantity Количина**	**Unit rate (MKD without VAT) Ед.Цена (MKD без ДДВ)**	**Unit rate (EUR without VAT) Ед.Цена (EUR без ДДВ)**	**Total in MKD without VAT Вкупно во MKD без ДДВ**	**Total in EUR without VAT Вкупно во EUR без ДДВ**
1	Демонтажа на челична заштитна ограда и транспорт до депо / Dismounting of steel guardrail and transport to depot	m	328,501.00	420.00	6.83	137,970,420.00	2,243,421.46
Sub-Total for dismounting (without VAT): / Вкупно за демонтажа (без ДДВ)						**137,970,420.00**	**2,243,421.46**
Sub-Total for dismounting (with 18% VAT): / Вкупно за демонтажа (со 18% ДДВ)						**162,805,095.60**	**2,647,237.33**

A.4 Kosovo

Country **Kosovo**
Section **Fushe Kosove - Gjurgjice, L= 27km** **Intersection** **KL 0+050 to KL 0+200**

Cost Estimation Civil works

Nr		Work process	Unit	Quantity	Price	Value
		1. Earthworks				
1		Excavation, ordinary soil, category IV, with vehicle unloading	m³	640.00	**2.5**	1,600
2		Demolition of concrete structures	m3	658.10	**14.0**	9,213
3		Scaling of asphalt layer with machinery (milling)	m2	3,000.00	**2.0**	6,000
4		Existing Guardrail dismantling	ml	189.00	**4.2**	794
5		Escaving material transport by car up to the landfill designated by the authority body	m³	654.00	**3.0**	1,962
		Sum 1	**EURO**			**19,569**
		2. Layer works and asphalting on the road				
1		Breakage of ballast layer t = 10 cm, with machinery	m2	648.00	**0.8**	518
2		Compaction with roller	m2	648.00	**0.2**	130
3		Supply, transportation, and working of 0-63mm gravel layer. The gravel is placed in layers from 20.0cm , while the compression module Ev2 should be ≥65MN / m².	m³	87.00	**8.0**	696
4		Stabilizer layer t = 15cm (0-30 mm) while the compression module Ev2 should be ≥65MN / m².	m²	148.00	**9.0**	1,332
5		Spraying with bituminous emulsion 1l / m2	m2	3,039.00	**1.2**	3,647
6		Binder layer, paving, 6 cm, with machinery	m²	934.00	**9.0**	8,406
7		Asphalt concrete layer, paving, 5cm, with machinery	m²	3,039.00	**6.0**	18,234
		Sum 2	**EURO**			**32,963**
		3.Various works				
1		Excavation, ordinary soil, category IV, with vehicle unloading	m³	330.00	**2.5**	825
2		Earth transport by car up to the landfill designated by the authority body	m³	232.00	**3.0**	696
3		Pavement, with 6 cm of concrete, with tiles	m2	250.00	**11.3**	2,825
4		S.I concrete kerbs 18x24 cm	ml	346.00	**10.0**	3,460
5		S.I concrete kerbs 8x15 cm	ml	346.00	**5.0**	1,730
6		Concrete manholes for rain water 40 x 60, cm h = 100 cm, with cast lid	pice	18.00	**120.0**	2,160
7		S.I ribbed pipes HDPE SN8 d = 315 mm	ml	222.00	**18.0**	3,996

8		Concrete layer C 16/20	m3	40.00	**60.0**	2,400
9		S.I Steel rebars S 500 ≥ Ø 12	ton	2.60	**700.0**	1,820
		Sum 3	**EURO**			**19,912**
		Sum(1÷3)	**EURO**			**72,444**

Country **Kosovo**
Fushe Kosove - Gjurgjice, L=
Section **27km** **Intersection** **KL 0+850 to KL 1+175**

Cost Estimation Civil works

Nr		Work process	Unit	Quantity	Price	Value
		1. Earthworks				
1		Excavation, ordinary soil, category IV, with vehicle unloading	m³	140.00	**2.5**	350
2		Demolition of concrete structures	m3	658.10	**14.0**	9,213
3		Scaling of asphalt layer with machinery (milling)	m2	8,100.00	**2.0**	16,200
4		Existing Guardrail dismantling	ml	0.00	**4.2**	0
5		Escaving material transport by car up to the landfill designated by the authority body	m³	654.00	**3.0**	1,962
		Sum 1	**EURO**			**27,725**
		2. Layer works and asphalting on the road				
1		Breakage of ballast layer t = 10 cm, with machinery	m2	225.00	**0.8**	180
2		Compaction with roller	m2	225.00	**0.2**	45
3		Supply, transportation, and working of 0-63mm gravel layer. The gravel is placed in layers from 20.0cm , while the compression module Ev2 should be ≥65MN / m².	m³	87.00	**8.0**	696
4		Stabilizer layer t = 15cm (0-30 mm) while the compression module Ev2 should be ≥65MN / m².	m²	225.00	**9.0**	2,025
5		Spraying with bituminous emulsion 1l / m2	m2	8,100.00	**1.2**	9,720
6		Binder layer, paving, 6 cm, with machinery	m²	934.00	**9.0**	8,406
7		Asphalt concrete layer, paving, 5cm, with machinery	m²	8,100.00	**6.0**	48,600
		Sum 2	**EURO**			**69,672**
		3.Various works				
1		Excavation, ordinary soil, category IV, with vehicle unloading	m³	290.00	**2.5**	725
2		Earth transport by car up to the landfill designated by the authority body	m³	240.00	**3.0**	720
3		Pavement, with 6 cm of concrete, with tiles	m2	199.00	**11.3**	2,249
4		S.I concrete kerbs 18x24 cm	ml	346.00	**10.0**	3,460

5		S.I concrete kerbs 8x15 cm	ml	346.00	**5.0**	1,730
6		Concrete layer C 16/20	m3	52.00	**60.0**	3,120
7		S.I Steel rebars S 500 ≥ Ø 12	ton	2.60	**700.0**	1,820
		Sum 3	**EURO**			**13,824**
		Sum(1÷3)	**EURO**			**111,221**

Country **Kosovo**
Fushe Kosove - Gjurgjice, L=
Section **27km** **Ramp** **KL 1+875 to KL 2+175**

Cost Estimation Civil works

Nr		Work process	Unit	Quantity	Price	Value
		1. Earthworks				
1		Excavation, ordinary soil, category IV, with vehicle unloading	m³	140.00	**2.5**	350
2		Demolition of concrete structures	m3	658.10	**14.0**	9,213
3		Scaling of asphalt layer with machinery (milling)	m2	680.00	**2.0**	1,360
4		Existing Guardrail dismantling	ml	0.00	**4.2**	0
5		Escaving material transport by car up to the landfill designated by the authority body	m³	654.00	**3.0**	1,962
		Sum 1	**EURO**			**12,885**
		2. Layer works and asphalting on the road				
1		Breakage of ballast layer t = 10 cm, with machinery	m2	580.00	**0.8**	464
2		Compaction with roller	m2	580.00	**0.2**	116
3		Supply, transportation, and working of 0-63mm gravel layer. The gravel is placed in layers from 20.0cm , while the compression module Ev2 should be ≥65MN / m².	m³	87.00	**8.0**	696
4		Stabilizer layer t = 15cm (0-30 mm) while the compression module Ev2 should be ≥65MN / m².	m²	580.00	**9.0**	5,220
5		Spraying with bituminous emulsion 1l / m2	m2	680.00	**1.2**	816
6		Binder layer, paving, 6 cm, with machinery	m²	680.00	**9.0**	6,120
7		Asphalt concrete layer, paving, 5cm, with machinery	m²	680.00	**6.0**	4,080
		Sum 2	**EURO**			**17,512**
		3.Various works				
1		Excavation, ordinary soil, category IV, with vehicle unloading	m³	330.00	**2.5**	825
2		Earth transport by car up to the landfill designated by the authority body	m³	300.00	**3.0**	900
3		Pavement, with 6 cm of concrete, with tiles	m2	199.00	**11.3**	2,249

4		S.I concrete kerbs 18x24 cm	ml	146.00	**10.0**	1,460
5		S.I concrete kerbs 8x15 cm	ml	146.00	**5.0**	730
6		Concrete layer C 16/20	m3	22.00	**60.0**	1,320
7		S.I Steel rebars S 500 ≥ Ø 12	ton	2.60	**700.0**	1,820
		Sum 3	**EURO**			**9,304**
		Sum(1÷3)	**EURO**			**39,701**

Country **Kosovo**
Fushe Kosove - Gjurgjice, L=
Section **27km** **Ramp** **KL 2+450 to KL 2+750**

Cost Estimation Civil works

Nr		Work process	Unit	Quantity	Price	Value
		1. Earthworks				
1		Excavation, ordinary soil, category IV, with vehicle unloading	m³	140.00	**2.5**	350
2		Demolition of concrete structures	m3	658.10	**14.0**	9,213
3		Scaling of asphalt layer with machinery (milling)	m2	612.00	**2.0**	1,224
4		Existing Guardrail dismantling	ml	0.00	**4.2**	0
5		Escaving material transport by car up to the landfill designated by the authority body	m³	654.00	**3.0**	1,962
		Sum 1	**EURO**			**12,749**
		2. Layer works and asphalting on the road				
1		Breakage of ballast layer t = 10 cm, with machinery	m2	512.00	**0.8**	410
2		Compaction with roller	m2	512.00	**0.2**	102
3		Supply, transportation, and working of 0-63mm gravel layer. The gravel is placed in layers from 20.0cm , while the compression module Ev2 should be ≥65MN / m².	m³	87.00	**8.0**	696
4		Stabilizer layer t = 15cm (0-30 mm) while the compression module Ev2 should be ≥65MN / m².	m²	512.00	**9.0**	4,608
5		Spraying with bituminous emulsion 1l / m2	m2	612.00	**1.2**	734
6		Binder layer, paving, 6 cm, with machinery	m²	612.00	**9.0**	5,508
7		Asphalt concrete layer, paving, 5cm, with machinery	m²	612.00	**6.0**	3,672
		Sum 2	**EURO**			**15,730**
		3.Various works				
1		Excavation, ordinary soil, category IV, with vehicle unloading	m³	330.00	**2.5**	825
2		Earth transport by car up to the landfill designated by the authority body	m³	300.00	**3.0**	900

3		Pavement, with 6 cm of concrete, with tiles	m2	199.00	**11.3**	2,249
4		S.I concrete kerbs 18x24 cm	ml	146.00	**10.0**	1,460
5		S.I concrete kerbs 8x15 cm	ml	146.00	**5.0**	730
6		Concrete layer C 16/20	m3	22.00	**60.0**	1,320
7		S.I Steel rebars S 500 ≥ Ø 12	ton	2.60	**700.0**	1,820
		Sum 3	**EURO**			**9,304**
		Sum(1÷3)	**EURO**			**37,784**

Country **Kosovo**
Fushe Kosove - Gjurgjice, L=
Section **27km** **Ramp** **KL 3+850 to KL 4+150**

Cost Estimation Civil works

Nr		Work process	Unit	Quantity	Price	Value
		1. Earthworks				
1		Excavation, ordinary soil, category IV, with vehicle unloading	m³	140.00	**2.5**	350
2		Demolition of concrete structures	m3	658.10	**14.0**	9,213
3		Scaling of asphalt layer with machinery (milling)	m2	627.00	**2.0**	1,254
4		Existing Guardrail dismantling	ml	0.00	**4.2**	0
5		Escaving material transport by car up to the landfill designated by the authority body	m³	654.00	**3.0**	1,962
		Sum 1	**EURO**			**12,779**
		2. Layer works and asphalting on the road				
1		Breakage of ballast layer t = 10 cm, with machinery	m2	527.00	**0.8**	422
2		Compaction with roller	m2	527.00	**0.2**	105
3		Supply, transportation, and working of 0-63mm gravel layer. The gravel is placed in layers from 20.0cm , while the compression module Ev2 should be ≥65MN / m².	m³	87.00	**8.0**	696
4		Stabilizer layer t = 15cm (0-30 mm) while the compression module Ev2 should be ≥65MN / m².	m²	527.00	**9.0**	4,743
5		Spraying with bituminous emulsion 1l / m2	m2	627.00	**1.2**	752
6		Binder layer, paving, 6 cm, with machinery	m²	627.00	**9.0**	5,643
7		Asphalt concrete layer, paving, 5cm, with machinery	m²	627.00	**6.0**	3,762
		Sum 2	**EURO**			**16,123**
		3.Various works				
1		Excavation, ordinary soil, category IV, with vehicle unloading	m³	330.00	**2.5**	825

2		Earth transport by car up to the landfill designated by the authority body	m³	300.00	**3.0**	900
3		Pavement, with 6 cm of concrete, with tiles	m2	199.00	**11.3**	2,249
4		S.I concrete kerbs 18x24 cm	ml	146.00	**10.0**	1,460
5		S.I concrete kerbs 8x15 cm	ml	146.00	**5.0**	730
6		Concrete layer C 16/20	m3	22.00	**60.0**	1,320
7		S.I Steel rebars S 500 ≥ Ø 12	ton	2.60	**700.0**	1,820
		Sum 3	**EURO**			**9,304**
		Sum(1÷3)	**EURO**			**38,207**

Country **Kosovo**

Section **Fushe Kosove - Gjurgjice, L= 27km** **Ramp** **KL 3+850 to KL 4+150**

Cost Estimation Civil works

Nr		Work process	Unit	Quantity	Price	Value
		1. Earthworks				
1		Excavation, ordinary soil, category IV, with vehicle unloading	m³	140.00	**2.5**	350
2		Demolition of concrete structures	m3	658.10	**14.0**	9,213
3		Scaling of asphalt layer with machinery (milling)	m2	468.00	**2.0**	936
4		Existing Guardrail dismantling	ml	0.00	**4.2**	0
5		Escaving material transport by car up to the landfill designated by the authority body	m³	654.00	**3.0**	1,962
		Sum 1	**EURO**			**12,461**
		2. Layer works and asphalting on the road				
1		Breakage of ballast layer t = 10 cm, with machinery	m2	368.00	**0.8**	294
2		Compaction with roller	m2	368.00	**0.2**	74
3		Supply, transportation, and working of 0-63mm gravel layer. The gravel is placed in layers from 20.0cm , while the compression module Ev2 should be ≥65MN / m².	m³	87.00	**8.0**	696
4		Stabilizer layer t = 15cm (0-30 mm) while the compression module Ev2 should be ≥65MN / m².	m²	368.00	**9.0**	3,312
5		Spraying with bituminous emulsion 1l / m2	m2	4,850.00	**1.2**	5,820
6		Binder layer, paving, 6 cm, with machinery	m²	468.00	**9.0**	4,212
7		Asphalt concrete layer, paving, 5cm, with machinery	m²	468.00	**6.0**	2,808
		Sum 2	**EURO**			**17,216**
		3.Various works				

1		Excavation, ordinary soil, category IV, with vehicle unloading	m³	330.00	**2.5**	825
2		Earth transport by car up to the landfill designated by the authority body	m³	300.00	**3.0**	900
3		Pavement, with 6 cm of concrete, with tiles	m2	199.00	**11.3**	2,249
4		S.I concrete kerbs 18x24 cm	ml	146.00	**10.0**	1,460
5		S.I concrete kerbs 8x15 cm	ml	146.00	**5.0**	730
6		Concrete layer C 16/20	m3	22.00	**60.0**	1,320
7		S.I Steel rebars S 500 ≥ Ø 12	ton	2.60	**700.0**	1,820
		Sum 3	**EURO**			**9,304**
		Sum(1÷3)	**EURO**			**38,981**

Country **Kosovo**
Section **Fushe Kosove - Gjurgjice, L= 27km** **Ramp** **KL 6+800 to KL 7+075**

Cost Estimation Civil works

Nr		Work process	Unit	Quantity	Price	Value
		1. Earthworks				
1		Excavation, ordinary soil, category IV, with vehicle unloading	m³	140.00	**2.5**	350
2		Demolition of concrete structures	m3	658.10	**14.0**	9,213
3		Scaling of asphalt layer with machinery (milling)	m2	1,150.00	**2.0**	2,300
4		Existing Guardrail dismantling	ml	39.00	**4.2**	164
5		Escaving material transport by car up to the landfill designated by the authority body	m³	654.00	**3.0**	1,962
		Sum 1	**EURO**			**13,989**
		2. Layer works and asphalting on the road				
1		Breakage of ballast layer t = 10 cm, with machinery	m2	1,150.00	**0.8**	920
2		Compaction with roller	m2	1,150.00	**0.2**	230
3		Supply, transportation, and working of 0-63mm gravel layer. The gravel is placed in layers from 20.0cm , while the compression module Ev2 should be ≥65MN / m².	m³	115.00	**8.0**	920
4		Stabilizer layer t = 15cm (0-30 mm) while the compression module Ev2 should be ≥65MN / m².	m²	1,150.00	**9.0**	10,350
5		Spraying with bituminous emulsion 1l / m2	m2	1,150.00	**1.2**	1,380
6		Binder layer, paving, 6 cm, with machinery	m²	1,150.00	**9.0**	10,350
7		Asphalt concrete layer, paving, 5cm, with machinery	m²	1,150.00	**6.0**	6,900
		Sum 2	**EURO**			**31,050**

		3.Various works				
1		Excavation, ordinary soil, category IV, with vehicle unloading	m³	330.00	**2.5**	825
2		Earth transport by car up to the landfill designated by the authority body	m³	300.00	**3.0**	900
3		Pavement, with 6 cm of concrete, with tiles	m2	120.00	**11.3**	1,356
4		S.I concrete kerbs 18x24 cm	ml	110.00	**10.0**	1,100
5		S.I concrete kerbs 8x15 cm	ml	110.00	**5.0**	550
6		Concrete layer C 16/20	m3	41.00	**60.0**	2,460
7		S.I Steel rebars S 500 ≥ Ø 12	ton	6.60	**700.0**	4,620
		Sum 3	**EURO**			**11,811**
		Sum(1÷3)	**EURO**			**56,850**

Country **Kosovo**

Section **Fushe Kosove - Gjurgjice, L= 27km** **Ramp** **KL 7+350 to KL 7+575**

Cost Estimation Civil works

Nr		Work process	Unit	Quantity	Price	Value
		1. Earthworks				
1		Excavation, ordinary soil, category IV, with vehicle unloading	m³	140.00	**2.5**	350
2		Demolition of concrete structures	m3	658.10	**14.0**	9,213
3		Scaling of asphalt layer with machinery (milling)	m2	630.00	**2.0**	1,260
4		Existing Guardrail dismantling	ml	0.00	**4.2**	0
5		Escaving material transport by car up to the landfill designated by the authority body	m³	654.00	**3.0**	1,962
		Sum 1	**EURO**			**12,785**
		2. Layer works and asphalting on the road				
1		Breakage of ballast layer t = 10 cm, with machinery	m2	510.00	**0.8**	408
2		Compaction with roller	m2	510.00	**0.2**	102
3		Supply, transportation, and working of 0-63mm gravel layer. The gravel is placed in layers from 20.0cm , while the compression module Ev2 should be ≥65MN / m².	m³	510.00	**8.0**	4,080
4		Stabilizer layer t = 15cm (0-30 mm) while the compression module Ev2 should be ≥65MN / m².	m²	510.00	**9.0**	4,590
5		Spraying with bituminous emulsion 1l / m2	m2	630.00	**1.2**	756
6		Binder layer, paving, 6 cm, with machinery	m²	630.00	**9.0**	5,670
7		Asphalt concrete layer, paving, 5cm, with machinery	m²	630.00	**6.0**	3,780

		Sum 2	**EURO**			**19,386**
		3.Various works				
1		Excavation, ordinary soil, category IV, with vehicle unloading	m³	330.00	**2.5**	825
2		Earth transport by car up to the landfill designated by the authority body	m³	300.00	**3.0**	900
3		Pavement, with 6 cm of concrete, with tiles	m2	120.00	**11.3**	1,356
4		S.I concrete kerbs 18x24 cm	ml	130.00	**10.0**	1,300
5		S.I concrete kerbs 8x15 cm	ml	130.00	**5.0**	650
6		Concrete layer C 16/20	m3	31.00	**60.0**	1,860
7		S.I Steel rebars S 500 ≥ Ø 12	ton	2.60	**700.0**	1,820
		Sum 3	**EURO**			**8,711**
		Sum(1÷3)	**EURO**			**40,882**

Country **Kosovo**
Fushe Kosove - Gjurgjice, L=
Section **27km** **Ramp** **KL 8+600 to KL 8+800**

Cost Estimation Civil works

Nr		Work process	Unit	Quantity	Price	Value
		1. Earthworks				
1		Excavation, ordinary soil, category IV, with vehicle unloading	m³	156.00	**2.5**	390
2		Demolition of concrete structures	m3	158.10	**14.0**	2,213
3		Scaling of asphalt layer with machinery (milling)	m2	420.00	**2.0**	840
4		Existing Guardrail dismantling	ml	25.00	**4.2**	105
5		Escaving material transport by car up to the landfill designated by the authority body	m³	654.00	**3.0**	1,962
		Sum 1	**EURO**			**5,510**
		2. Layer works and asphalting on the road				
1		Breakage of ballast layer t = 10 cm, with machinery	m2	320.00	**0.8**	256
2		Compaction with roller	m2	320.00	**0.2**	64
3		Supply, transportation, and working of 0-63mm gravel layer. The gravel is placed in layers from 20.0cm , while the compression module Ev2 should be ≥65MN / m².	m³	630.00	**8.0**	5,040
4		Stabilizer layer t = 15cm (0-30 mm) while the compression module Ev2 should be ≥65MN / m².	m²	320.00	**9.0**	2,880
5		Spraying with bituminous emulsion 1l / m2	m2	420.00	**1.2**	504
6		Binder layer, paving, 6 cm, with machinery	m²	420.00	**9.0**	3,780

7		Asphalt concrete layer, paving, 5cm, with machinery	m²	420.00	**6.0**	2,520
		Sum 2	**EURO**			**15,044**
		3.Various works				
1		Excavation, ordinary soil, category IV, with vehicle unloading	m³	230.00	**2.5**	575
2		Earth transport by car up to the landfill designated by the authority body	m³	300.00	**3.0**	900
3		Pavement, with 6 cm of concrete, with tiles	m2	120.00	**11.3**	1,356
4		S.I concrete kerbs 18x24 cm	ml	80.00	**10.0**	800
5		S.I concrete kerbs 8x15 cm	ml	80.00	**5.0**	400
6		Concrete layer C 16/20	m3	51.00	**60.0**	3,060
7		S.I Steel rebars S 500 ≥ Ø 12	ton	3.60	**700.0**	2,520
		Sum 3	**EURO**			**9,611**
		Sum(1÷3)	**EURO**			**30,165**

Country **Kosovo**
Section **Fushe Kosove - Gjurgjice, L= 27km** **Ramp** **KL 9+000 to KL 9+200**

Cost Estimation Civil works

Nr		Work process	Unit	Quantity	Price	Value
		1. Earthworks				
1		Excavation, ordinary soil, category IV, with vehicle unloading	m³	240.00	**2.5**	600
2		Demolition of concrete structures	m3	558.10	**14.0**	7,813
3		Scaling of asphalt layer with machinery (milling)	m2	490.00	**2.0**	980
4		Existing Guardrail dismantling	ml	0.00	**4.2**	0
5		Escaving material transport by car up to the landfill designated by the authority body	m³	654.00	**3.0**	1,962
		Sum 1	**EURO**			**11,355**
		2. Layer works and asphalting on the road				
1		Breakage of ballast layer t = 10 cm, with machinery	m2	310.00	**0.8**	248
2		Compaction with roller	m2	310.00	**0.2**	62
3		Supply, transportation, and working of 0-63mm gravel layer. The gravel is placed in layers from 20.0cm , while the compression module Ev2 should be ≥65MN / m².	m³	310.00	**8.0**	2,480
4		Stabilizer layer t = 15cm (0-30 mm) while the compression module Ev2 should be ≥65MN / m².	m²	310.00	**9.0**	2,790
5		Spraying with bituminous emulsion 1l / m2	m2	490.00	**1.2**	588
6		Binder layer, paving, 6 cm, with machinery	m²	490.00	**9.0**	4,410

7		Asphalt concrete layer, paving, 5cm, with machinery	m²	490.00	**6.0**	2,940
		Sum 2	**EURO**			**13,518**
		3.Various works				
1		Excavation, ordinary soil, category IV, with vehicle unloading	m³	330.00	**2.5**	825
2		Earth transport by car up to the landfill designated by the authority body	m³	300.00	**3.0**	900
3		Pavement, with 6 cm of concrete, with tiles	m2	120.00	**11.3**	1,356
4		S.I concrete kerbs 18x24 cm	ml	130.00	**10.0**	1,300
5		S.I concrete kerbs 8x15 cm	ml	130.00	**5.0**	650
6		Concrete layer C 16/20	m3	24.00	**60.0**	1,440
7		S.I Steel rebars S 500 ≥ Ø 12	ton	2.60	**700.0**	1,820
		Sum 3	**EURO**			**8,291**
		Sum(1÷3)	**EURO**			**33,164**

Country **Kosovo**

Section **Fushe Kosove - Gjurgjice, L= 27km** **Ramp** **KL 13+350 to KL 13+575**

Cost Estimation Civil works

Nr		Work process	Unit	Quantity	Price	Value
		1. Earthworks				
1		Excavation, ordinary soil, category IV, with vehicle unloading	m³	125.00	**2.5**	313
2		Demolition of concrete structures	m3	456.00	**14.0**	6,384
3		Scaling of asphalt layer with machinery (milling)	m2	390.00	**2.0**	780
4		Existing Guardrail dismantling	ml	20.00	**4.2**	84
5		Escaving material transport by car up to the landfill designated by the authority body	m³	654.00	**3.0**	1,962
		Sum 1	**EURO**			**9,523**
		2. Layer works and asphalting on the road				
1		Breakage of ballast layer t = 10 cm, with machinery	m2	290.00	**0.8**	232
2		Compaction with roller	m2	290.00	**0.2**	58
3		Supply, transportation, and working of 0-63mm gravel layer. The gravel is placed in layers from 20.0cm , while the compression module Ev2 should be ≥65MN / m².	m³	290.00	**8.0**	2,320
4		Stabilizer layer t = 15cm (0-30 mm) while the compression module Ev2 should be ≥65MN / m².	m²	290.00	**9.0**	2,610
5		Spraying with bituminous emulsion 1l / m2	m2	390.00	**1.2**	468

6		Binder layer, paving, 6 cm, with machinery	m²	390.00	**9.0**	3,510
7		Asphalt concrete layer, paving, 5cm, with machinery	m²	390.00	**6.0**	2,340
		Sum 2	**EURO**			**11,538**
		3.Various works				
1		Excavation, ordinary soil, category IV, with vehicle unloading	m³	330.00	**2.5**	825
2		Earth transport by car up to the landfill designated by the authority body	m³	284.00	**3.0**	852
3		Pavement, with 6 cm of concrete, with tiles	m2	135.00	**11.3**	1,526
4		S.I concrete kerbs 18x24 cm	ml	140.00	**10.0**	1,400
5		S.I concrete kerbs 8x15 cm	ml	140.00	**5.0**	700
6		Concrete layer C 16/20	m3	33.00	**60.0**	1,980
7		S.I Steel rebars S 500 ≥ Ø 12	ton	2.60	**700.0**	1,820
		Sum 3	**EURO**			**9,103**
		Sum(1÷3)	**EURO**			**30,163**

Country **Kosovo**

Section **Fushe Kosove - Gjurgjice, L= 27km** **Ramp** **KL 13+825 to KL 14+050**

Cost Estimation Civil works

Nr		Work process	Unit	Quantity	Price	Value
		1. Earthworks				
1		Earth transport by car up to the landfill designated by the authority body	m³	240.00	**2.5**	600
2		Demolition of concrete structures	m3	658.10	**14.0**	9,213
3		Scaling of asphalt layer with machinery (milling)	m2	590.00	**2.0**	1,180
4		Existing Guardrail dismantling	ml	22.00	**4.2**	92
5		Escaving material transport by car up to the landfill designated by the authority body	m³	654.00	**3.0**	1,962
		Sum 1	**EURO**			**13,048**
		2. Layer works and asphalting on the road				
1		Breakage of ballast layer t = 10 cm, with machinery	m2	640.00	**0.8**	512
2		Compaction with roller	m2	360.00	**0.2**	72
3		Supply, transportation, and working of 0-63mm gravel layer. The gravel is placed in layers from 20.0cm , while the compression module Ev2 should be ≥65MN / m².	m³	460.00	**8.0**	3,680
4		Stabilizer layer t = 15cm (0-30 mm) while the compression module Ev2 should be ≥65MN / m².	m²	360.00	**9.0**	3,240

5		Spraying with bituminous emulsion 1l / m2	m2	590.00	**1.2**	708
6		Binder layer, paving, 6 cm, with machinery	m²	590.00	**9.0**	5,310
7		Asphalt concrete layer, paving, 5cm, with machinery	m²	590.00	**6.0**	3,540
		Sum 2	**EURO**			**17,062**
		3.Various works				
1		Excavation, ordinary soil, category IV, with vehicle unloading	m³	310.00	**2.5**	775
2		Earth transport by car up to the landfill designated by the authority body	m³	295.00	**3.0**	885
3		Pavement, with 6 cm of concrete, with tiles	m2	120.00	**11.3**	1,356
4		S.I concrete kerbs 18x24 cm	ml	128.00	**10.0**	1,280
5		S.I concrete kerbs 8x15 cm	ml	128.00	**5.0**	640
6		Concrete layer C 16/20	m3	33.00	**60.0**	1,980
7		S.I Steel rebars S 500 ≥ Ø 12	ton	2.80	**700.0**	1,960
		Sum 3	**EURO**			**8,876**
		Sum(1÷3)	**EURO**			**38,986**

Country **Kosovo**

Section **Fushe Kosove - Gjurgjice, L= 27km** **Ramp** **KL 16+125 to KL 16+275**

Cost Estimation Civil works

Nr		Work process	Unit	Quantity	Price	Value
		1. Earthworks				
1		Excavation, ordinary soil, category IV, with vehicle unloading	m³	140.00	**2.5**	350
2		Demolition of concrete structures	m3	658.10	**14.0**	9,213
3		Scaling of asphalt layer with machinery (milling)	m2	485.00	**2.0**	970
4		Existing Guardrail dismantling	ml	0.00	**4.2**	0
5		Escaving material transport by car up to the landfill designated by the authority body	m³	654.00	**3.0**	1,962
		Sum 1	**EURO**			**12,495**
		2. Layer works and asphalting on the road				
1		Breakage of ballast layer t = 10 cm, with machinery	m2	385.00	**0.8**	308
2		Compaction with roller	m2	385.00	**0.2**	77
3		Supply, transportation, and working of 0-63mm gravel layer. The gravel is placed in layers from 20.0cm , while the compression module Ev2 should be ≥65MN / m².	m³	630.00	**8.0**	5,040

4		Stabilizer layer t = 15cm (0-30 mm) while the compression module Ev2 should be ≥65MN / m².	m²	485.00	**9.0**	4,365
5		Spraying with bituminous emulsion 1l / m2	m2	485.00	**1.2**	582
6		Binder layer, paving, 6 cm, with machinery	m²	485.00	**9.0**	4,365
7		Asphalt concrete layer, paving, 5cm, with machinery	m²	485.00	**6.0**	2,910
		Sum 2	**EURO**			**17,647**
		3.Various works				
1		Excavation, ordinary soil, category IV, with vehicle unloading	m³	250.00	**2.5**	625
2		Earth transport by car up to the landfill designated by the authority body	m³	220.00	**3.0**	660
3		Pavement, with 6 cm of concrete, with tiles	m2	0.00	**11.3**	0
4		S.I concrete kerbs 18x24 cm	ml	230.00	**10.0**	2,300
5		S.I concrete kerbs 8x15 cm	ml	0.00	**5.0**	0
6		Concrete layer C 16/20	m3	31.00	**60.0**	1,860
7		S.I Steel rebars S 500 ≥ Ø 12	ton	2.60	**700.0**	1,820
		Sum 3	**EURO**			**7,265**
		Sum(1÷3)	**EURO**			**37,407**

Country **Kosovo**

Section **Fushe Kosove - Gjurgjice, L= 27km** **Ramp** **KL 16+550 to KL 16+775**

Cost Estimation Civil works

Nr	Nr. An.	Work process	Unit	Quantity	Price	Value
		1. Earthworks				
1		Excavation, ordinary soil, category IV, with vehicle unloading	m³	240.00	**2.5**	600
2		Demolition of concrete structures	m3	658.10	**14.0**	9,213
3		Scaling of asphalt layer with machinery (milling)	m2	480.00	**2.0**	960
4		Existing Guardrail dismantling	ml	0.00	**4.2**	0
5		Escaving material transport by car up to the landfill designated by the authority body	m³	654.00	**3.0**	1,962
		Sum 1	**ALL**			**12,735**
		2. Layer works and asphalting on the road				
1		Breakage of ballast layer t = 10 cm, with machinery	m2	380.00	**0.8**	304
2		Compaction with roller	m2	380.00	**0.2**	76

3		Supply, transportation, and working of 0-63mm gravel layer. The gravel is placed in layers from 20.0cm , while the compression module Ev2 should be ≥65MN / m².	m³	480.00	**8.0**	3,840
4		Stabilizer layer t = 15cm (0-30 mm) while the compression module Ev2 should be ≥65MN / m².	m²	480.00	**9.0**	4,320
5		Spraying with bituminous emulsion 1l / m2	m2	480.00	**1.2**	576
6		Binder layer, paving, 6 cm, with machinery	m²	480.00	**9.0**	4,320
7		Asphalt concrete layer, paving, 5cm, with machinery	m²	480.00	**6.0**	2,880
		Sum 2	**ALL**			**16,316**
		3.Various works				
1		Excavation, ordinary soil, category IV, with vehicle unloading	m³	296.00	**2.5**	740
2		Earth transport by car up to the landfill designated by the authority body	m³	285.00	**3.0**	855
3		Pavement, with 6 cm of concrete, with tiles	m2	0.00	**11.3**	0
4		S.I concrete kerbs 18x24 cm	ml	230.00	**10.0**	2,300
5		S.I concrete kerbs 8x15 cm	ml	0.00	**5.0**	0
6		Concrete layer C 16/20	m3	26.00	**60.0**	1,560
7		S.I Steel rebars S 500 ≥ Ø 12	ton	2.60	**700.0**	1,820
		Sum 3				**7,275**
		Sum(1÷3)	**EURO**			**36,326**

Country **Kosovo**

Section **Fushe Kosove - Gjurgjice, L= 27km** **Ramp** **KL 18+825 to KL 19+050**

Cost Estimation Civil works

Nr		Work process	Unit	Quantity	Price	Value
		1. Earthworks				
1		Excavation, ordinary soil, category IV, with vehicle unloading	m³	240.00	**2.5**	600
2		Demolition of concrete structures	m3	658.10	**14.0**	9,213
3		Scaling of asphalt layer with machinery (milling)	m2	590.00	**2.0**	1,180
4		Existing Guardrail dismantling	ml	0.00	**4.2**	0
5		Escaving material transport by car up to the landfill designated by the authority body	m³	654.00	**3.0**	1,962
		Sum 1	**EURO**			**12,955**
		2. Layer works and asphalting on the road				
1		Breakage of ballast layer t = 10 cm, with machinery	m2	410.00	**0.8**	328

2		Compaction with roller	m2	410.00	**0.2**	82
3		Supply, transportation, and working of 0-63mm gravel layer. The gravel is placed in layers from 20.0cm , while the compression module Ev2 should be ≥65MN / m².	m³	510.00	**8.0**	4,080
4		Stabilizer layer t = 15cm (0-30 mm) while the compression module Ev2 should be ≥65MN / m².	m²	510.00	**9.0**	4,590
5		Spraying with bituminous emulsion 1l / m2	m2	590.00	**1.2**	708
6		Binder layer, paving, 6 cm, with machinery	m²	590.00	**9.0**	5,310
7		Asphalt concrete layer, paving, 5cm, with machinery	m²	590.00	**6.0**	3,540
		Sum 2	**EURO**			**18,638**
		3.Various works				
1		Excavation, ordinary soil, category IV, with vehicle unloading	m³	330.00	**2.5**	825
2		Earth transport by car up to the landfill designated by the authority body	m³	300.00	**3.0**	900
3		Pavement, with 6 cm of concrete, with tiles	m2	0.00	**11.3**	0
4		S.I concrete kerbs 18x24 cm	ml	330.00	**10.0**	3,300
5		S.I concrete kerbs 8x15 cm	ml	0.00	**5.0**	0
6		Concrete layer C 16/20	m3	42.00	**60.0**	2,520
7		S.I Steel rebars S 500 ≥ Ø 12	ton	2.60	**700.0**	1,820
		Sum 3	**EURO**			**9,365**
		Sum(1÷3)	**EURO**			**40,958**

Country **Kosovo**

Section **Fushe Kosove - Gjurgjice, L= 27km** **Ramp** **KL 21+000 to KL 21+200**

Cost Estimation Civil works

Nr		Work process	Unit	Quantity	Price	Value
		1. Earthworks				
1		Earth transport by car up to the landfill designated by the authority body	m³	240.00	**2.5**	600
2		Demolition of concrete structures	m3	258.10	**14.0**	3,613
3		Scaling of asphalt layer with machinery (milling)	m2	485.00	**2.0**	970
4		Existing Guardrail dismantling	ml	0.00	**4.2**	0
5		Escaving material transport by car up to the landfill designated by the authority body	m³	654.00	**3.0**	1,962
		Sum 1	**EURO**			**7,145**
		2. Layer works and asphalting on the road				

1		Breakage of ballast layer t = 10 cm, with machinery	m2	385.00	**0.8**	308
2		Compaction with roller	m2	385.00	**0.2**	77
3		Supply, transportation, and working of 0-63mm gravel layer. The gravel is placed in layers from 20.0cm , while the compression module Ev2 should be ≥65MN / m².	m³	485.00	**8.0**	3,880
4		Stabilizer layer t = 15cm (0-30 mm) while the compression module Ev2 should be ≥65MN / m².	m²	485.00	**9.0**	4,365
5		Spraying with bituminous emulsion 1l / m2	m2	485.00	**1.2**	582
6		Binder layer, paving, 6 cm, with machinery	m²	485.00	**9.0**	4,365
7		Asphalt concrete layer, paving, 5cm, with machinery	m²	485.00	**6.0**	2,910
		Sum 2	**EURO**			**16,487**
		3.Various works				
1		Excavation, ordinary soil, category IV, with vehicle unloading	m³	330.00	**2.5**	825
2		Earth transport by car up to the landfill designated by the authority body	m³	300.00	**3.0**	900
3		Pavement, with 6 cm of concrete, with tiles	m2	0.00	**11.3**	0
4		S.I concrete kerbs 18x24 cm	ml	130.00	**10.0**	1,300
5		S.I concrete kerbs 8x15 cm	ml	0.00	**5.0**	0
6		Concrete layer C 16/20	m3	41.00	**60.0**	2,460
7		S.I Steel rebars S 500 ≥ Ø 12	ton	2.60	**700.0**	1,820
		Sum 3	**EURO**			**7,305**
		Sum(1÷3)	**EURO**			**30,937**

Country **Kosovo**

Section **Fushe Kosove - Gjurgjice, L= 27km** **Ramp** **KL 21+350 to KL 21+550**

Cost Estimation Civil works

Nr		Work process	Unit	Quantity	Price	Value
		1. Earthworks				
1		Excavation, ordinary soil, category IV, with vehicle unloading	m³	240.00	**2.5**	600
2		Demolition of concrete structures	m3	258.10	**14.0**	3,613
3		Scaling of asphalt layer with machinery (milling)	m2	612.00	**2.0**	1,224
4		Existing Guardrail dismantling	ml	10.00	**4.2**	42
5		Escaving material transport by car up to the landfill designated by the authority body	m³	654.00	**3.0**	1,962
		Sum 1	**EURO**			**7,441**

		2. Layer works and asphalting on the road				
1		Breakage of ballast layer t = 10 cm, with machinery	m2	512.00	**0.8**	410
2		Compaction with roller	m2	512.00	**0.2**	102
3		Supply, transportation, and working of 0-63mm gravel layer. The gravel is placed in layers from 20.0cm , while the compression module Ev2 should be ≥65MN / m².	m³	612.00	**8.0**	4,896
4		Stabilizer layer t = 15cm (0-30 mm) while the compression module Ev2 should be ≥65MN / m².	m²	612.00	**9.0**	5,508
5		Spraying with bituminous emulsion 1l / m2	m2	612.00	**1.2**	734
6		Binder layer, paving, 6 cm, with machinery	m²	612.00	**9.0**	5,508
7		Asphalt concrete layer, paving, 5cm, with machinery	m²	612.00	**6.0**	3,672
		Sum 2	**EURO**			**20,830**
		3.Various works				
1		Excavation, ordinary soil, category IV, with vehicle unloading	m³	345.00	**2.5**	863
2		Earth transport by car up to the landfill designated by the authority body	m³	300.00	**3.0**	900
3		Pavement, with 6 cm of concrete, with tiles	m2	0.00	**11.3**	0
4		S.I concrete kerbs 18x24 cm	ml	130.00	**10.0**	1,300
5		S.I concrete kerbs 8x15 cm	ml	0.00	**5.0**	0
6		Concrete layer C 16/20	m3	33.00	**60.0**	1,980
7		S.I Steel rebars S 500 ≥ Ø 12	ton	2.60	**700.0**	1,820
		Sum 3	**EURO**			**6,863**
		Sum(1÷3)	**EURO**			**35,134**

Country **Kosovo**

Section **Fushe Kosove - Gjurgjice, L= 27km** **Ramp** **KL 22+500 to KL 22+675**

Cost Estimation Civil works

Nr		Work process	Unit	Quantity	Price	Value
		1. Earthworks				
1		Excavation, ordinary soil, category IV, with vehicle unloading	m³	140.00	**2.5**	350
2		Demolition of concrete structures	m3	158.10	**14.0**	2,213
3		Scaling of asphalt layer with machinery (milling)	m2	530.00	**2.0**	1,060
4		Existing Guardrail dismantling	ml	0.00	**4.2**	0
5		Escaving material transport by car up to the landfill designated by the authority body	m³	654.00	**3.0**	1,962

		Sum 1	**EURO**			**5,585**
		2. Layer works and asphalting on the road				
1		Breakage of ballast layer t = 10 cm, with machinery	m2	430.00	**0.8**	344
2		Compaction with roller	m2	430.00	**0.2**	86
3		Supply, transportation, and working of 0-63mm gravel layer. The gravel is placed in layers from 20.0cm , while the compression module Ev2 should be ≥65MN / m².	m³	530.00	**8.0**	4,240
4		Stabilizer layer t = 15cm (0-30 mm) while the compression module Ev2 should be ≥65MN / m².	m²	530.00	**9.0**	4,770
5		Spraying with bituminous emulsion 1l / m2	m2	530.00	**1.2**	636
6		Binder layer, paving, 6 cm, with machinery	m²	530.00	**9.0**	4,770
7		Asphalt concrete layer, paving, 5cm, with machinery	m²	530.00	**6.0**	3,180
		Sum 2	**EURO**			**18,026**
		3.Various works				
1		Excavation, ordinary soil, category IV, with vehicle unloading	m³	252.00	**2.5**	630
2		Earth transport by car up to the landfill designated by the authority body	m³	230.00	**3.0**	690
3		Pavement, with 6 cm of concrete, with tiles	m2	0.00	**11.3**	0
4		S.I concrete kerbs 18x24 cm	ml	130.00	**10.0**	1,300
5		S.I concrete kerbs 8x15 cm	ml	0.00	**5.0**	0
6		Concrete layer C 16/20	m3	33.00	**60.0**	1,980
7		S.I Steel rebars S 500 ≥ Ø 12	ton	2.60	**700.0**	1,820
		Sum 3	EURO			**6,420**
		Sum(1÷3)	**EURO**			**30,031**

Country **Kosovo**

Section **Fushe Kosove - Gjurgjice, L= 27km** **Ramp** **KL 22+750 to KL 22+900**

Cost Estimation Civil works

Nr		Work process	Unit	Quantity	Price	Value
		1. Earthworks				
1		Excavation, ordinary soil, category IV, with vehicle unloading	m³	145.00	**2.5**	363
2		Demolition of concrete structures	m3	169.00	**14.0**	2,366
3		Scaling of asphalt layer with machinery (milling)	m2	400.00	**2.0**	800
4		Existing Guardrail dismantling	ml	0.00	**4.2**	0

5		Escaving material transport by car up to the landfill designated by the authority body	m³	654.00	**3.0**	1,962
		Sum 1	**EURO**			**5,491**
		2. Layer works and asphalting on the road				
1		Breakage of ballast layer t = 10 cm, with machinery	m2	285.00	**0.8**	228
2		Compaction with roller	m2	285.00	**0.2**	57
3		Supply, transportation, and working of 0-63mm gravel layer. The gravel is placed in layers from 20.0cm , while the compression module Ev2 should be ≥65MN / m².	m³	385.00	**8.0**	3,080
4		Stabilizer layer t = 15cm (0-30 mm) while the compression module Ev2 should be ≥65MN / m².	m²	385.00	**9.0**	3,465
5		Spraying with bituminous emulsion 1l / m2	m2	400.00	**1.2**	480
6		Binder layer, paving, 6 cm, with machinery	m²	400.00	**9.0**	3,600
7		Asphalt concrete layer, paving, 5cm, with machinery	m²	400.00	**6.0**	2,400
		Sum 2	**EURO**			**13,310**
		3.Various works				
1		Excavation, ordinary soil, category IV, with vehicle unloading	m³	285.00	**2.5**	713
2		Earth transport by car up to the landfill designated by the authority body	m³	250.00	**3.0**	750
3		Pavement, with 6 cm of concrete, with tiles	m2	0.00	**11.3**	0
4		S.I concrete kerbs 18x24 cm	ml	230.00	**10.0**	2,300
5		S.I concrete kerbs 8x15 cm	ml	0.00	**5.0**	0
6		Concrete layer C 16/20	m3	42.00	**60.0**	2,520
7		S.I Steel rebars S 500 ≥ Ø 12	ton	2.60	**700.0**	1,820
		Sum 3	**EURO**			**8,103**
		Sum(1÷3)	**EURO**			**26,903**

Country **Kosovo**

Section **Fushe Kosove - Gjurgjice, L= 27km** **Ramp** **KL 25+125 to KL 25+325**

Cost Estimation Civil works

Nr		Work process	Unit	Quantity	Price	Value
		1. Earthworks				
1		Excavation, ordinary soil, category IV, with vehicle unloading	m³	261.00	**2.5**	653
2		Demolition of concrete structures	m3	258.10	**14.0**	3,613
3		Scaling of asphalt layer with machinery (milling)	m2	410.00	**2.0**	820

4		Existing Guardrail dismantling	ml	30.00	**4.2**	126
5		Escaving material transport by car up to the landfill designated by the authority body	m³	654.00	**3.0**	1,962
		Sum 1	**EURO**			**7,174**
		2. Layer works and asphalting on the road				
1		Breakage of ballast layer t = 10 cm, with machinery	m2	310.00	**0.8**	248
2		Compaction with roller	m2	310.00	**0.2**	62
3		Supply, transportation, and working of 0-63mm gravel layer. The gravel is placed in layers from 20.0cm , while the compression module Ev2 should be ≥65MN / m².	m³	410.00	**8.0**	3,280
4		Stabilizer layer t = 15cm (0-30 mm) while the compression module Ev2 should be ≥65MN / m².	m²	410.00	**9.0**	3,690
5		Spraying with bituminous emulsion 1l / m2	m2	410.00	**1.2**	492
6		Binder layer, paving, 6 cm, with machinery	m²	410.00	**9.0**	3,690
7		Asphalt concrete layer, paving, 5cm, with machinery	m²	410.00	**6.0**	2,460
		Sum 2	**EURO**			**13,922**
		3.Various works				
1		Excavation, ordinary soil, category IV, with vehicle unloading	m³	330.00	**2.5**	825
2		Earth transport by car up to the landfill designated by the authority body	m³	300.00	**3.0**	900
3		Pavement, with 6 cm of concrete, with tiles	m2	0.00	**11.3**	0
4		S.I concrete kerbs 18x24 cm	ml	230.00	**10.0**	2,300
5		S.I concrete kerbs 8x15 cm	ml	0.00	**5.0**	0
6		Concrete layer C 16/20	m3	29.00	**60.0**	1,740
7		S.I Steel rebars S 500 ≥ Ø 12	ton	2.60	**700.0**	1,820
		Sum 3	**EURO**			**7,585**
		Sum(1÷3)	**EURO**			**28,681**

Country **Kosovo**
Fushe Kosove - Gjurgjice, L=
Section **27km** **BUSS-STOP**

Cost Estimation Civil works

Nr		Work process	Unit	Quantity	Price	Value
		1. Earthworks				
1		Excavation, ordinary soil, category IV, with vehicle unloading	m³	245.00	**2.5**	613
2		Demolition of concrete structures	m3	58.60	**14.0**	820

3		Scaling of asphalt layer with machinery (milling)	m2	355.00	**2.0**	710
4		Escaving material transport by car up to the landfill designated by the authority body	m³	654.00	**3.0**	1,962
		Sum 1	**EURO**			**4,105**
		2. Layer works and asphalting on the road				
1		Breakage of ballast layer t = 10 cm, with machinery	m2	255.00	**0.8**	204
2		Compaction with roller	m2	255.00	**0.2**	51
3		Supply, transportation, and working of 0-63mm gravel layer. The gravel is placed in layers from 20.0cm , while the compression module Ev2 should be ≥65MN / m².	m³	375.00	**8.0**	3,000
4		Stabilizer layer t = 15cm (0-30 mm) while the compression module Ev2 should be ≥65MN / m².	m²	255.00	**9.0**	2,295
5		Spraying with bituminous emulsion 1l / m2	m2	355.00	**1.2**	426
6		Binder layer, paving, 6 cm, with machinery	m²	255.00	**9.0**	2,295
7		Asphalt concrete layer, paving, 5cm, with machinery	m²	355.00	**6.0**	2,130
		Sum 2	**EURO**			**10,401**
		3.Various works				
1		Excavation, ordinary soil, category IV, with vehicle unloading	m³	38.00	**2.5**	95
2		Earth transport by car up to the landfill designated by the authority body	m³	120.00	**3.0**	360
3		Pavement, with 6 cm of concrete, with tiles	m2	255.00	**11.3**	2,882
4		Pavement with tiles anti-sliping	m2	8.00	**22.0**	176
5		S.I concrete kerbs 18x24 cm	ml	86.00	**10.0**	860
6		S.I concrete kerbs 8x15 cm	ml	86.00	**5.0**	430
7		Metal railings h=1m (on the sidewalk)	ml	30.00	**60.0**	1,800
8		S.I metal poles for lighting, H = 7m, d = 160mm	pice	2.00	**150.0**	300
9		Concrete layer C 16/20	m3	35.00	**60.0**	2,100
10		Concrete structure C 25/30	m³	5.00	**80.0**	400
11		S.I Steel rebars S 500 ≥ Ø 12	ton	2.10	**700.0**	1,470
		Sum 3	EURO			**10,873**
		Sum(1÷3)	**EURO**			**25,378**

A.5 Montenegro

Country **Montenegro**
Section **Podgorica - Mioska, L=47.2 km**

Item no.	Description	Unit	Quantity	Unit price (€)	Total (€)
A	**Guardrails**				
A.1	Unsafe guardrail ends/ terminals replacement				
	final constructions of the guardrail L = 12m	pcs	65.00	500.00	32,500.00
	final constructions of the guardrail L = 4m	pcs	111.00	120.00	13,320.00
	final constructions terminal T2 (70i)	pcs	27.00	1,500.00	40,500.00
A.2	Additional guardrails				
A.2.1.	Concrete guardrail replacement				
	H1-W3, details given in the graphic attachment	m'	3,000.00	40.00	120,000.00
A.2.2.	Existing guardrails that is not in accordance with EN1317 / Postojeća čelična zaštitna ograda koja nije u skladu sa EN1317	m'	17,500.00	40.00	700,000.00
A.2.3.	Guardrail on bridges / Ograda na mostovima				
	H1-W3, details given in the graphic attachment	m'	4,000.00	40.00	160,000.00
A.2.4.	Additional guardrails (missing) / Postavljanje dodatne čelične zaštitne ograde (nedostajuće)	m'			
	H1-W3, details given in the graphic attachment	m'	6,960.00	40.00	278,400.00
	H1-W4, details given in the graphic attachment	m'	3,224.00	40.00	128,960.00
	N2-W5, details given in the graphic attachment	m'	120.00	30.00	3,600.00
				TOTAL GUARDRAILS	**1,477,280.00**
B	**Traffic Signage**				
B.1	Traffic signs				
B.1.1.	**Preparation works**				
	Removal of traffic signs and support poles, the removal of which is envisaged by the project. The position includes removing all elements of the sign, removing the girder posts, loading, transport and restoring the flank. **-** Removing traffic sign post posts along with signs	pcs	36.00	10.00	360.00
B.1.2.	**Vertical signalization**				
	Standard traffic sign of retroreflective properties: The position includes the procurement and delivery of a traffic sign to the place of installation with all fastening elements for the bracket (reinforcement, clamps, screws, cuffs, etc.),				

	as well as the installation of the sign on the built-in bracket:				
	Signs of danger				
	I-1 ("left curve"), triangular side shape a=1200mm, class 3	pcs	2.00	95.00	190.00
	I-1.1 ("right curve"), triangular side shape a=1200mm, class 3	pcs	2.00	95.00	190.00
	I-2 ("double curve or more consecutive curves of which the first is to the right"), triangle side shape a = 1200mm, class 3	pcs	1.00	95.00	95.00
	I-24 ("tunnel"), triangular side shape a=1200mm, class 3	pcs	1.00	95.00	95.00
	I-25 ("danger on road"), triangular side shape a=1200mm, class 3	pcs	1.00	95.00	95.00
	I-27 ("intersection with a side road at right angles "), trangular side shape a=1200mm, class 3	pcs	2.00	95.00	190.00
	I-28 ("connecting to the side road at right angles to the left"), triangle side shape a=1200mm, class 3	pcs	10.00	95.00	950.00
	I-28.1 ("connecting to a side road at right angles to the right"), triangle side shape a=1200mm, class 3	pcs	9.00	95.00	855.00
	I-29 ("connecting to the side road at a sharp angle to the left"), triangle side shape a=1200mm, class 3	pcs	1.00	95.00	95.00
	I-29.1a ("connecting with the side road at a sharp angle to the right - up"), triangular side shape a=1200mm, class 3. The appearance of the sign given in the graphic attachment	pcs	1.00	95.00	95.00
	I-29a ("connecting with the side road at a sharp angle to the left"), - triangle side shape a=1200mm, class 3. The appearance of the sign given in the graphic attachment	pcs	3.00	95.00	285.00
	I-29.1 ("connecting with the side road at a sharp angle to the right"),	pcs	3.00	95.00	285.00
	I-41 ("pedestrians on the road"), triangular side shape a=1200mm, class 3	pcs	1.00	95.00	95.00
	Signs of explicit orders				
	II-2 ("mandatory stop"), octagonal shape Ø600mm, class 3	pcs	11.00	85.00	935.00
	II-28 ("ban on overtaking all motor vehicles except motorcycles without trailers and mopeds "), octogonal shape Ø900mm, class 3	pcs	27.00	95.00	2,565.00
	II-30 (30km/h) ("speed limit 30km/h"), round shape Ø900mm, class 3	pcs	2.00	95.00	190.00
	II-30 (40km/h) ("speed limit 40km/h"), round shape Ø900mm, class 3	pcs	7.00	95.00	665.00
	II-30 (50km/h) ("speed limit 50km/h"), round shape Ø900mm, class 3	pcs	28.00	95.00	2,660.00
	II-30 (60km/h) ("speed limit 60km/h"), round shape Ø900mm, class 3	pcs	13.00	95.00	1,235.00

	II-30 (70km/h) ("speed limit 70km/h"), round shape Ø900mm, class 3	pcs	8.00	95.00	760.00
	II-45 ("obligatory detour on the right "), round shape Ø600mm, class 2	pcs	2.00	60.00	120.00
	Notice signs				
	III-11.2 ("vehicle rearrangement"), rectangular shape 900x1350mm, class 3	pcs	2.00	110.00	220.00
	III-25 ("termination of the ban on overtaking all motor vehicles"), round shape Ø900mm, class 3	pcs	5.00	95.00	475.00
	III-32 ("parking lot"), square shape a=900mm, class 3	pcs	44.00	90.00	3,960.00
	III-64 ("signposts - left"), square shape 750x750mm, on fluorescent green-yellow background, class 3	pcs	72.00	110.00	7,920.00
	III-64.2 ("signposts - right"), square shape 750x750mm, on fluorescent green-yellow background, class 3	pcs	72.00	110.00	7,920.00
	III-79 ("an obstacle to slowing down traffic"), class 3	pcs	2.00	90.00	180.00
	III-82 ("school zone"), class 3	pcs	2.00	170.00	340.00
	III-82.1 ("end of school zone"), class 3	pcs	2.00	170.00	340.00
	Additional boards				
	IV-8 (right arrow), rectangular shape 900x300mm, class 3	pcs	44.00	45.00	1,980.00
	Traffic sign of specially designed dimensions				
	Reflective properties, procurement and delivery to the place of installation with all fastening elements for the bracket (reinforcement, clamps, screws, cuffs, etc.), as well as the installation of the sign on the built-in bracket. **NT-1** (" I-15 ("children on the road") and II-30 ("speed limit 40km / h") on a fluorescent green-yellow background of the diamond grade class"), class 3	pcs	2.00	250.00	500.00
	Pillar - traffic sign carrier				
	From steel drawn pipes of uniform cross-section and thickness 2 "in diameter, painted with metal primer and covered with dark gray varnish, procurement and delivery to the installation site with the production of concrete foundation and installation of girder columns in concrete foundation.				
	Traffic sign pole L= 3,00 m	pcs	71.00	30.00	2,130.00
	Traffic sign pole L= 3,50 m	pcs	74.00	35.00	2,590.00
	Traffic sign pole L= 4,0 m	pcs	40.00	39.00	1,560.00
	Traffic sign pole L= 4,20 m	pcs	10.00	40.00	400.00
	Traffic sign pole L= 4,50 m	pcs	2.00	45.00	90.00
	Pillar support 2 of the traffic sign III-63 i III-64.2, L= 1.8 m	pcs	72.00	35.00	2,520.00
B.2	Road markings				
	Marking road				

	Color reflective properties with prior cleaning and degreasing of the pavement, sizing of painted surfaces and painting of the pavement. The price includes the purchase and delivery of paint and beads to the place of marking.				
	Longitudinal lines of width b=0,15 m :				
	Uninterrupted line (uninterrupted dividing and edge lines).	m2	30.00	7.00	210.00
	Intermittent grid line 1.0 + 1.0m	m2	5.00	7.00	35.00
	Transverse lines :				
	Stop line (b = 0,5 m)	m2	20.00	7.00	140.00
B.3	Other equipment				
	Traffic mirror				
	round shape Ø900mm	pcs	1.00	300.00	300.00
				TOTAL TRAFFIC SIGNAGE	***46,815.00***
C	**Civil works**				
C.1	Reconstruction of intersection				
C.1.1	*PREPARATION WORKS*				
	Marking the route before the start of works	km	0.10	355.00	35.50
	Land cleaning with transport to the landfill, STD 5km: position includes: all work and transportation	m3	47.34	8.50	402.39
	Cutting of the pavement due to fitting to the existing condition roads, up to 6 cm thick	m1	85.25	3.00	255.75
C.1.2.	*EARTHWORKS*				
	Mechanical excavation of earth - excavation in wide excavation: in material of III and IV category, with transport to STD 10000m according to the survey of earthworks:	m3	161.11	5.00	805.55
C.1.3.	*SUB-BASE LAYERS*				
	Planning and rolling the placenta- according to tabular bills of exchange	m2	284.73	1.00	284.73
	Making a base layer of crushed stone aggregate 0/63mm - according to the bill of quantities of the road construction	m3	56.37	14.50	817.37
	Making a base layer of crushed stone aggregate 0/31.5mm - according to the bill of quantities of the road construction	m3	55.22	15.95	880.76
C.1.4.	*SUPER STRUCTURE*				
	Making of raised curbs 20/24 - according to the individual bill of quantites	m	26.25	28.50	748.13
	Construction of a stabilized flank, width 1.00 m - according to tabular bills of exchange	m2	2.75	2.00	5.50
C.1.5.	*ASPHALT ROAD*				
	Spraying with bitumen emulsion the project envisages	m2	269.75	0.80	215.80

	Production of bituminous bearing layer BNS 22sA BIT 50/70, in all respects according to the technical conditions for preforming the works - according to the bill of quantities of the road construction, d=2x6 cm	m2	270.92	20.40	5,526.77
	Production of a wearing layer of asphalt concrete in all respects according to the technical conditions for preforming the works - according to the bill of quantities of the road construction thickness d = 4 cm	m2	269.75	8.00	2,158.00
C.2	Gas station's access layout	pcs	0	0	0
C.3	Specific access regulation				
C.3.1.	*PREPARATION WORKS*				
	Marking the route before the start of works	km	0.90	355.00	319.50
	Land cleaning with transport to the landfill, STD 5km: position includes: all work and transportation	m3	490.43	8.50	4,168.66
	Cutting of the pavement due to fitting to the existing condition roads, up to 6 cm thick	m1	774.60	3.00	2,323.80
C.3.2.	*EARTHWORKS*				
	Mechanical excavation of earth - excavation in wide excavation: in material of III and IV category, with transport to STD 10000m according to the survey of earthworks:	m3	125.11	5.00	625.55
	Making embankments - according to the survet of earthworks	m3	0.80	3.90	3.12
	Humusification of slopes by detail form the project in layer of thickness d= 20 cm: - according to the bill of quantities	m2	123.80	1.00	123.80
C.3.3.	*SUB-BASE LAYERS*				
	Planning and rolling the placenta- according to tabular bills of exchange	m2	2,054.21	1.00	2,054.21
	Making a base layer of crushed stone aggregate 0/63mm - according to the bill of quantities of the road construction	m3	42.11	14.50	610.60
	Making a base layer of crushed stone aggregate 0/31.5mm - according to the bill of quantities of the road construction	m3	39.90	15.95	636.41
C.3.4.	*SUPER STRUCTURE*				
	Making of raised curbs 20/24 - according to the individual bill of quantites	m	249.20	28.50	7,102.20
	Construction of a stabilized flank, width 1.00 m - according to tabular bills of exchange	m2	5.05	2.00	10.10
C.3.5.	*ASPHALT ROAD*				
	Spraying with bitumen emulsion the project envisages	m2	191.75	0.80	153.40
	Production of bituminous bearing layer BNS 22sA BIT 50/70, in all respects according to the technical conditions for preforming the works - according to the bill of quantities of the road construction, d=2x6 cm	m2	191.65	20.40	3,909.66

	Production of a wearing layer of asphalt concrete in all respects according to the technical conditions for preforming the works - according to the bill of quantities of the road construction thickness d = 4 cm	m2	191.75	8.00	1,534.00
C.4	Agriculture accesses	pcs	0	0	0
				TOTAL CIVIL WORKS	35,711
D	**Bus stops**				
D.1	Lighting of BUS stops	pcs	0	0	0
D.2	Additional BUS stop facilities	pcs	0	0	0
				TOTAL BUS STOPS	0
E	**Parking along the road**				
E.1.	*PREPARATION WORKS*				
	Marking the route before the start of works	km	2.50	355.00	887.50
	Removal of bushes and trees, position includes: all work and transportation	m2	1,341.80	0.20	268.36
	Land cleaning with transport to the landfill, STD 5km: position includes: all work and transportation	m3	1,918.32	8.50	16,305.72
	Cutting of the pavement due to fitting to the existing condition roads, up to 6 cm thick	m1	2,547.65	3.00	7,642.95
E.2.	*EARTHWORKS*				
	Mechanical excavation of earth - excavation in wide excavation: in material of III and IV category, with transport to STD 10000m according to the survey of earthworks:	m3	7,387.80	5.00	36,939.00
	Making embankments - according to the survet of earthworks	m3	88.25	3.90	344.18
	Humusification of slopes by detail form the project in layer of thickness d= 20 cm: - according to the bill of quantities	m2	60.60	1.00	60.60
E.3.	*DRAINAGE AND DEWATERING*				
	Production of concrete channel, concrete brand MB 30, on a layer of stone chips in the thickness of d = 10cm according to project details: - according to individual bill of quantities	m3	2.00	130.00	260.00
E.4.	*SUB-BASE LAYERS*				
	Planning and rolling the placenta- according to tabular bills of exchange	m2	10,441.22	1.00	10,441.22
	Making a base layer of crushed stone aggregate 0/63mm - according to the bill of quantities of the road construction	m3	2,355.82	14.50	34,159.39
	Making a base layer of crushed stone aggregate 0/31.5mm - according to the bill of quantities of the road construction	m3	2,092.21	15.95	33,370.75
E.5.	*SUPER STRUCTURE*				
	Making of raised curbs 20/24 - according to the individual bill of quantites	m	196.25	28.50	5,593.13
	Making of delimiters according to the details from the project - according to the individual bill of quantities	m	117.50	35.00	4,112.50
	Production of concrete drain flumes d=0.75m - according to the bill of quantities	m	190.00	35.00	6,650.00

	Construction of a stabilized flank, width 1.00 m - according to tabular bills of exchange	m2	630.70	2.00	1,261.40
E.6.	*ASPHALT ROAD*				
	Spraying with bitumen emulsion the project envisages	m2	8,712.30	0.80	6,969.84
	Production of bituminous bearing layer BNS 22sA BIT 50/70, in all respects according to the technical conditions for preforming the works - according to the bill of quantities of the road construction, d=2x6 cm	m2	9,026.33	20.40	184,137.13
	Production of a wearing layer of asphalt concrete in all respects according to the technical conditions for preforming the works - according to the bill of quantities of the road construction thickness d = 4 cm	m2	8,712.30	8.00	69,698.40
				TOTAL PARKINGS	419,102
F	**Built-up Area Gates**	pcs	0	0	0
				TOTAL BUILT-UP AREA GATES	0
G	**Pedestrian facilities**				
G.1	Lighting of pedestrian crossings				
G.1.1.	**LAMPS:**				
	LED Lamp Detas STRATOS N: Power supply 12VDC VAC, 18W; Dual asymmetric optics, 4500K. Price complete with photovoltaic module	pcs	2	-	-
G.1.2.	**PHOTOVOLTAIC MODULE:**				
	PHOTOVOLTAIC KIT: Power 140W; Pb AGM 90Ah battery, charging regulator, mounting bracket for Ø90 mm pole	pcs	2	1,760.00	3,520.00
G.1.3.	**LED FLASH:**				
	FLASH MODULE: Dimensions 650X160 mm; Power supply 12VDC-15W In accordance with EN 12352 L2H, Side brackets.	pcs	2	236.80	473.60
G.1.4.	**STEEL PILLAR**				
	Steel column 6 m high: Cylindrical column made of steel and hot-dip galvanized. The pole is statically calculated for the purpose of carrying the lamp and the sign. A template for foundation bolts is supplied with the column. Excavation for foundation pits for 2 pillars 6 m high (excavation max 2x2 m3, max. 4 m3). Making wooden formwork for the foundation according to the design. Installation of templates and foundation screws, and installation of PVC pipes for cables (optional, if necessary - 20m). Concreting the foundation of the column with fresh concrete C25 / 30 (MB30), a total of 2m3 Removal of excess excavated material and restoration of works.	pcs	2	396.00	792.00

	Temporary regulation of traffic with traffic lights				
G.1.5.	***CONSTRUCTION WORKS AND INSTALLATION***				
	CONSTRUCTION WORKS: Tour of the location of works and introduction to works. Securing work sites in accordance with work requirements in a safe manner. Excavation for foundation pits for 2 pillars 6 m high (excavation max 2x2 m3, max. 4 m3). Making wooden formwork for the foundation according to the design. Installation of templates and foundation screws, and installation of PVC pipes for cables (optional, if necessary - 20m). Concreting the foundation of the column with fresh concrete C25 / 30 (MB30), a total of 2 m3. Removal of excess excavated material and restoration of works. Temporary regulation of traffic with traffic lights	Set	1	-	-
	ASSEMBLY WORKS: Tour of the location of works and introduction to works. Securing work sites in accordance with work requirements in a safe manner. Delivery of poles to the construction site. Lifting and fixing of a 6 m high pillar with mounting on a prepared concrete foundation. Installation of the Safe Pedestrian Crossing to the pole, wiring and connection set in electrical cabinets and junction boxes (optional). Connecting the ground strip to the SPP cantilever pole (optional). Production of protective coating of the column with bitumen, up to a height of 0.5 m from the substrate. Commissioning of equipment Safe Pedestrian Crossing. Performance check. Measurement of resistance of earthing protection points (optional), testing and development of protocols according to regulations	Set	1	-	-
	TOTAL ASSEMBLY AND CONSTRUCTION WORKS:				*1,500.00*
G2	Additional pedestrian facilities				

	Vibro tapes that are placed in the school area in accordance with the attached details	m1	117.00	10.00	1,170.00
				TOTAL PEDESTRIAN FACILITIES	**7,455.60**
				TOTAL	**1,986,364**
				UNFORESEEN WORKS(5%)	99,318
				GRAND TOTAL	**2,085,682**

A.6 Serbia

ESTIMATE OF WORKS FOR TRAFFIC SIGNALING AND EQUIPMENT

Section 5, from km 29+565 to km 29+640, from km 29+850 to km 32+350, from km 32+750 to km 42+025, from km 42+235 to km 48+225

No.	Position no.	POSITION DESCRIPTION	Measure unit	QUANTITY	Unit price [EUR]	TOTAL [EUR]
		TRAFFIC SIGNS				
	1.1	**Standard traffic signs**				
2	**1.1.1**	**Cautionary signs purchase**				
		I-11 (triangle sides 90cm), class 2	pc	8	37.27	298.17
		I-14 (triangle sides 90cm), class 2	pc	1	37.28	37.28
		I-18 (triangle sides 90cm), class 2	pc	11	37.27	409.98
		I-27 (triangle sides 90cm), class 2	pc	16	37.27	596.34
		I-27.2 (triangle sides 90cm), class 2	pc	2	37.27	74.54
		I-28 (triangle sides 90cm), class 2	pc	8	37.27	298.17
		I-28.1 (triangle sides 90cm), class 2	pc	8	37.27	298.17
3	*1.1.2*	*Mandatory signs purchase*				
		II-1 (triangle sides 90cm), class 2	pc	1	37.27	37.27
		II-1 (triangle sides 90cm), class 3	pc	1	44.72	44.72
		II-2 (circle diameter 60cm), class 2	pc	21	35.57	746.92
		II-2 (circle diameter 60cm), class 3	pc	2	42.68	85.36
		II-4 (circle diameter 60cm), class 2	pc	2	35.57	71.14
		II-26 (circle diameter 60cm), class 2	pc	1	35.57	35.57
		II-28 (circle diameter 60cm), class 2	pc	33	35.57	1,173.74
		II-29 (circle diameter 60cm), class 2	pc	1	35.57	35.57
		II-30 (60km/h) (circle diameter 60cm), class 2	pc	17	35.57	604.65
		II-34 (circle diameter 60cm), class 2	pc	4	35.57	142.27
		II-43 (circle diameter 60cm), class 2	pc	4	35.57	142.27
		II-43.1 (circle diameter 60cm), class 2	pc	1	35.57	35.57
		II-43.1 (circle diameter 60cm), class 3	pc	1	42.68	42.68
		II-43.2 (circle diameter 60cm), class 3	pc	1	42.68	42.68
		II-45 (circle diameter 60cm), class 2	pc	2	35.57	71.14
4	*1.1.3*	*Informative signs purchase*				
		III-3 (square sides 60cm), class 2	pc	7	35.50	248.53
		III-3 (square sides 60cm), class 3	pc	4	42.61	170.44
		III-12 (circle diameter 60cm), class 3	pc	21	35.57	746.92

		III-30 (square sides 60cm), class 2	pc	4	35.50	142.02
		III-38 (rectangular 60x90cm), class 2	pc	5	37.27	186.36
		III-49 (rectangular 60x90cm), class 2	pc	1	37.27	37.27
		III-84 (rectangular 30x100cm), class 2	pc	2	27.03	54.07
		III-84.1 (rectangular 60x120cm), class 2	pc	8	64.88	519.05
		III-97 (22) (rectangular 35x25cm), class 2	pc	7	9.03	63.18
		III-23 (Stepojevac) (rectangular 160x100cm), class 2	pc	1	208.52	208.52
		III-23.1 (Stepojevac) (rectangular 160x100cm), class 2	pc	1	208.52	208.52
		III-23 (Ćelije) (rectangular 130x100cm), class 2	pc	1	169.42	169.42
		III-23.1 (Ćelije) (rectangular 130x100cm), class 2	pc	1	169.42	169.42
		III-23 (Lazarevac) (rectangular 150x100cm), class 2	pc	1	195.48	195.48
		III-23.1 (Lazarevac) (rectangular 150x100cm), class 2	pc	1	195.48	195.48
		III-61 (Lukavica) (rectangular 120x100cm), class 2	pc	2	156.39	312.77
		III-61 (Peštan) (rectangular 100x100cm), class 2	pc	2	130.32	260.64
		III-203 (l-п) (rectangular 60x90cm), class 2	pc	3	48.66	145.98
		III-203 (п-д) (rectangular 60x90cm), class 2	pc	1	48.66	48.66
5	*1.1.4*	Additional boards purchase				
		IV-1 (100m) (rectangular 90x25cm), class 2	pc	1	19.75	19.75
		IV-1 (350m) (rectangular 90x25cm), class 2	pc	1	19.75	19.75
		IV-2 (300m) (rectangular 90x25cm), class 2	pc	2	19.75	39.51
		IV-2 (400m) (rectangular 90x25cm), class 2	pc	2	19.75	39.51
		IV-2 (8км) (rectangular 90x25cm), class 2	pc	2	19.75	39.51
		IV-2 (4км) (rectangular 90x25cm), class 2	pc	1	19.75	19.75
		IV-2 (3км) (rectangular 90x25cm), class 2	pc	3	19.75	59.26
		IV-2 (1500m) (rectangular 90x25cm), class 2	pc	1	19.75	19.75
		IV-2 (1000m) (rectangular 90x25cm), class 2	pc	3	19.75	59.26
		IV-2 (600m) (rectangular 90x25cm), class 2	pc	2	19.75	39.51
		IV-2 (500m) (rectangular 90x25cm), class 2	pc	1	19.75	19.75
		IV-2 (350m) (rectangular 90x25cm), class 2	pc	1	19.75	19.75
		IV-1 (500m) (rectangular 60x25cm), class 2	pc	9	12.89	116.01
		IV-2 (50m) (rectangular 60x25cm), class 2	pc	4	12.89	51.56
		Traffic signs installation				
		Installation of traffic signs and the additional boards on installed holders	pc	260	1.53	396.52
					Total standard signs:	**10,366.10**
6	**1.2**	**Informative signs for traffic management**				
	1.2.1	*Intersection*				
		III-201 (2208.1) (280x300cm), class 2	$м^2$	8.4	145.08	1,218.71
		III-201 (2208.2) (290x300cm), class 2	$м^2$	8.7	145.08	1,262.24

		III-201 (2208.2) (280x170cm), class 2	м^2	4.76	145.08	690.60
		III-201 (2209.1) (240x300cm), class 2	м^3	7.2	145.08	1,044.61
		III-201 (2209.2) (250x300cm), class 2	м^4	7.5	145.08	1,088.14
		III-201 (2209.2) (290x170cm), class 2	м^5	4.93	145.08	715.27
	1.2.2	*Signposts and signpost boards*				
		III-206 (2208.1) (260x210cm), class 2	м^2	5.46	145.08	792.16
		III-206 (2208.2) (260x210cm), class 2	м^2	5.46	145.08	792.16
		III-206 (2208.3) (200x150cm), class 2	м^2	3	145.08	435.25
		III-206 (2209.1) (210x210cm), class 2	м^3	4.41	145.08	639.82
		III-206 (2209.2) (210x210cm), class 2	м^4	4.41	145.08	639.82
		III-206 (2209.3) (200x150cm), class 2	м^5	3	145.08	435.25
	1.2.3	*Signposts and signpost boards*				
		III-205 (Петка_Д) (130x65 cm)	м^2	0.845	145.08	122.60
		III-205 (Вреоци_Д) (130x65 cm)	м^2	0.845	145.08	122.60
	1.2.4	*Direction confirmation*				
		III-218 (2209.1) (330x260cm), class 2	м^2	8.58	145.08	1,244.83
		III-218 (2209.2) (290x260cm), class 2	м^2	7.54	145.08	1,093.94
		III-218 (2209.3) (270x290cm), class 2	м^2	7.83	145.08	1,136.01
		Traffic signs installation				
		traffic board installation on pipe holders	pc	4	1.92	7.70
		traffic board installation on lattice girders				
		boards up to 5 m2	м^2	26.2	28.14	737.15
		boards from 5 m2 to 10 m2	м^2	66.67	22.41	1,493.86
		Total informative signs for the management:				**15,712.73**
7	**1.3**	Traffic sign holders				
8	*1.3.1*	Single column pipe holders				
		Single column pipe holders with the length of 2.50m	pc	8	14.83	118.64
		Single column pipe holders with the length of 2.60m	pc	73	15.42	1,125.93
		Single column pipe holders with the length of 2.90m	pc	3	17.20	51.61
		Single column pipe holders with the length of 3.00m	pc	73	17.80	1,299.15
		Single column pipe holders with the length of 3.20m	pc	37	18.98	702.37
		Single column pipe holders with the length of 3.50m	pc	3	20.76	62.29
		Single column pipe holders with the length of 3.60m	pc	6	21.36	128.14
		Single column pipe holders with the length of 3.80m	pc	1	22.54	22.54

		Single column pipe holders with the length of 4.00m	pc	2	23.73	47.46
		Purchase and transport of concrete for traffic signs installation				
		Purchase and transportation of "MB-15" concrete for single column traffic sign holders	pc	206	4.66	960.17
		Traffic signs installation				
		single column traffic sign holders installation in oversite concrete "MB-15"	pc	206	6.21	1,279.64
9	*1.3.2*	Lattice girders				
		Lattice girders purchase L=4.0м (R 60-30)	м^1	16	20.62	329.90
		Lattice girders purchase L=4.40м (R 60-30)	м^1	35.2	20.62	725.78
		Lattice girders purchase L=5.10м (R 60-30)	м^1	10.2	20.62	210.31
		Lattice girders purchase L=5.30м (R 60-30)	м^1	31.8	20.62	655.67
		Purchase and transport of concrete for traffic signs installation				
		Purchase and transportation of "MB-30" for lattice girders installation	pc	26	21.19	550.85
		Lattice girders installation				
		Lattice girders of traffic signs installation in oversite concrete "MB-30"	pc	26	7.80	202.71
					Total traffic sign holders:	**8,354.52**
	2.	**PAVEMENT MARKINGS**				
10	**2.1**	***Work on making longitudinal pavement markings SRPS У.С4.221 - SRPS У.С4.223***				
		Marking longitudinal pavement marks				
		Solid line, white, with the width of d=15cm	м^1	6371.80	0.44	2,834.91
		Duble combined line (5+10+5m), white, with the width of d=15cm	м^1	2060.00	0.44	916.53
		Regular dashed line (5+10+5m), white, with the width of d=15cm	м^1	1890.00	0.44	840.89
		Warning line (10+5+10m), white, with the width of d=15cm	м^1	1348.50	0.44	599.97
		Short, dashed (1+1+1m), white, with the width of d=15cm	м^1	204.40	0.44	90.94
		Short, dashed (3+3+3m), white, with the width of d=15cm	м^1	277.20	0.44	123.33
		Border lines				
		Solid line, white, with the width of d=15cm	м^1	31889.55	0.44	14,188.15
		Wide, solid, white, with the width of d=30cm	м^1	27.60	0.44	12.28

		Short, dashed (1+1+1m), white, with the width of d=15cm	м1	1580.65	0.44	703.26
		Wide, dashed (1+1+1m), white, with the width of d=30cm	м1	655.70	0.44	291.73
		Wide, dashed (1+1+1m), yellow, with the width of d=30cm	м1	24.00	0.44	10.68
11	**2.2**	***Work on making transverse pavement markings SRPS Y.C4.225 - SRPS Y.C4.228***				
		Solid stop line V-1, white areas, with the width of d=50cm	м2	14	2.97	41.53
		Dashed stop line V-1.1, white triangle, with the width of d=50cm	м2	1.4	2.97	4.15
		Pedestrian crossing, hite areas, with the width of d=50cm	м2	33	2.97	98.16
12	**2.3**	***Work on making other markings SRPS Y.C4.229 - SRPS Y.C4.232***				
		hatched and non-hatched, white areas	м2	647.53	2.97	1,920.64
		Areas reserved for the bus stop, yellow, L=24m	м2	60	2.97	177.97
		"STOP" sign white, height 4.0m	м2	3.5	2.97	10.38
		Material for making pavement markings				
		Paint purchase for making pavement markings (consumption of 0,65 kg/m2)	kg	4788.41	1.61	7,710.15
		thinner purchase for making pavement markings (consumption of 0,065 L/m2)	L	478.84	1.23	588.41
		glass bead purchase for making pavement markings (consumption of 0,195 kg/m2)	kg	1436.52	0.85	1,217.39
					Total pavement markings:	**32,381.43**
	3.	**TRAFFIC EQUIPMENT**				
13	**3.1**	**Light markings on the road SRPS 3.C2.235**				
		Signposts and reflectors purchase				
	3.1.1	Signposts purchase	pc	591	2.29	1,352.29
	3.1.2	Red/white reflectors purchase on the guardrail, class 2	pc	558	3.98	2,222.54
		Signposts and reflectors installation				
		Signposts installation	pc	591	1.65	975.76
		Reflectors installation	pc	558	0.53	297.68
					Total road light markings:	**4,848.27**
14	**3.2**	**Guardrail SRPS EH 1317**				
		Guardrail purchase				
		complete JO N2-W3/2.0 purchase	м1	1272	26.38	33,555.36
		complete JO N2-W3/1.33 purchase	м1	100	30.13	3,012.71
		complete JO N2-W4/2.0 purchase	м1	608	24.92	15,148.47
		complete JO N2-W5/4.0 purchase	м1	191	20.08	3,836.19

		complete JO H1-W3/1.33 purchase	м1	1500	26.38	39,570.00
		complete ЈДО H1-W4/1.33 purchase	м1	80	47.04	3,763.20
		complete JOO N2-W1/1.33 purchase	м1	412	40.57	16,714.84
		complete ЈДОО H1-W5/1.33 purchase	м1	240	36.99	8,877.97
		complete BKO SR H2-W4/1.33 purchase	м1	312	100.00	31,200.00
		complete BKOO SR Eco H2-W4/1.33 purchase	м1	176	49.50	8,712.00
		complete transitional element "Flextra" purchase, with the length of 12m	pc	8	855.00	6,840.00
		complete oblique endings purchase with the length of 12m	pc	60	322.17	19,330.20
		complete oblique endings purchase with the length of 4m	pc	69	148.00	10,212.00
		complete round endings purchase	pc	43	94.92	4,081.36
		Guardrail installation work				
		complete JO N2-W3/2.0 installation	м1	1272	5.00	6,360.00
		complete JO N2-W3/1.33 installation	м1	100	5.08	508.47
		complete JO N2-W4/2.0 installation	м1	608	5.00	3,040.00
		complete JO N2-W5/4.0 installation	м1	191	3.39	647.46
		complete JO H1-W3/1.33 installation	м1	1500	5.08	7,627.12
		complete ЈДО H1-W4/1.33 installation	м1	80	5.20	416.00
		complete JOO N2-W1/1.33 installation	м1	412	5.20	2,142.40
		complete ЈДОО H1-W5/1.33 installation	м1	240	5.59	1,342.37
		complete BKO SR H2-W4/1.33 installation	м1	312	18.31	5,711.19
		complete BKOO SR Eco H2-W4/1.33 installation	м1	176	18.31	3,221.69
		complete transitional element "Flextra" installation, with the length of 12m	pc	8	180.00	1,440.00
		complete oblique endings installation with the length of 12m	pc	60	88.00	5,280.00
		complete oblique endings installation with the length of 4m	pc	69	45.00	3,105.00
		complete round endings installation	pc	43	18.64	801.69
					Total guardrail:	**246,497.69**
15	**3.3**	**Kilometer markings SRPS 3.C2.320**				
		kilometer markings purchase, rectangular 45x40cm, class 1	pc	15	22.74	341.08
		single column pipe holders purchase with the length of 1.8m	pc	18	8.47	152.39
		Purchase and transportation of "MB-15" concrete for single column traffic sign holders	pc	18	4.66	83.90
		installation of single column traffic sign holders in "MB-15" oversite concrete	pc	18	5.38	96.77
		Installation of traffic signs on installed holders	pc	18	2.42	43.63
					Total kilometer markings:	**717.77**
		Section 5, from km 29+565 to km 29+640, from km 29+850 to km 32+350, from km 32+750 to km 42+025, from km 42+235 to km 48+225				**318,878.52**

3.3 ESTIMATE OF WORKS FOR TRAFFIC SIGNALING AND EQUIPMENT

CONNECTA-TRA-CRM-REG-RS-DD-05
Bubanj Potok, km 216+607 - Mali Pozarevac, km 238+156 L= 21.549km

Position no.	POSITION DESCRIPTION	Measure unit	QUANTITY	Unit price [EUR]	TOTAL [EUR]
4.	**TRAFFIC EQUIPMENT**				
4.1	**Guardrail**				
4.1.1	*Guardrail purchase*				
	H1-W4/2.0 Eco Safe	m^1	10024	22.00	220,528.00
	H1-W3/1.33 Eco Safe	m^1	980	26.50	25,970.00
	H1-W2/1.33 Bw Eco Safe	m^1	36	40.50	1,458.00
	EDSP H1-W4/1.33	m^1	1372	47.00	64,484.00
	EDSP H1-W5/2.0	m^1	1932	30.00	57,960.00
	EDSP H1-W5/1.33 Bw	m^1	492	47.00	23,124.00
	H2-W2/0.5 SR Eco	m^1	316	109.50	34,602.00
	H2-W4/2.0 SR Eco	m^1	15216	49.50	753,192.00
	H2-W1/1.0 Bw SR Eco	m^1	308	129.50	39,886.00
	H2-W4/1.33 Bw SR	m^1	132	100.00	13,200.00
4.1.2	*Transitional constructions purchase*				
	transitional construction, with the length of 12m, Flextra H1-H2	pc	59	855.00	50,445.00
	transitional construction, with the length of 8m, Flextra H2-H2	pc	7	50.00	350.00
	transitional construction, with the length of 4m, Flextra H2-H2	pc	8	49.50	396.00
4.1.3	*Reflectors purchase*				
	Red-white, class 3	pc	1018	9.90	10,078.20
	Red-red, class 3	pc	956	9.90	9,464.40
4.1.4	*nitial-final guardrail constructions purchase*				
	oblique elements, with the length of 4m	pc	11	148.00	1,628.00
	oblique elements, with the length of 12m	pc	101	322.00	32,522.00
	Round finish	pc	8	95.00	760.00
	Shock absorber 110 SW-S-R	pc	1	11170.00	11,170.00
	Shock absorbers 110 W-XL	pc	1	11170.00	11,170.00
	Shock absorbers 110 SW - R	pc	1	11170.00	11,170.00
	Shock absorbers 110 WS	pc	2	11170.00	22,340.00
	Guardrail installation work				

	H1-W4/2.0 Eco Safe	m1	10024	3.80	38,091.20
	H1-W3/1.33 Eco Safe	m1	980	5.00	4,900.00
	H1-W2/1.33 Bw Eco Safe	m1	36	6.00	216.00
	EDSP H1-W4/1.33	m1	1372	5.20	7,134.40
	EDSP H1-W5/2.0	m1	1932	4.20	8,114.40
	EDSP H1-W5/1.33 Bw	m1	492	7.00	3,444.00
	H2-W2/0.5 SR Eco	m1	316	10.00	3,160.00
	H2-W4/2.0 SR Eco	m1	15216	9.00	136,944.00
	H2-W1/1.0 Bw SR Eco	m1	308	13.50	4,158.00
	H2-W4/1.33 Bw SR	m1	132	18.00	2,376.00
	Transitional construction installation work				
	transitional construction, with the length of 12m, Flextra H1-H2	pc	59	180.00	10,620.00
	transitional construction, with the length of 8m, Flextra H2-H2	pc	7	10.00	70.00
	transitional construction, with the length of 4m, Flextra H2-H2	pc	8	13.50	108.00
	Reflector installation work				
	Red-white, class 3	pc	1018	0.55	559.90
	Red-red, class 3	pc	956	0.55	525.80
	Initial-final guardrail constructioninstallation work				
	oblique elements, with the length of 4m	pc	11	45.00	495.00
	oblique elements, with the length of 12m	pc	101	88.00	8,888.00
	Round finish	pc	8	25.00	200.00
	Shock absorber 110 SW-S-R	pc	1	500.00	500.00
	Shock absorbers 110 W-XL	pc	1	500.00	500.00
	Shock absorbers 110 SW - R	pc	1	500.00	500.00
	Shock absorbers 110 WS	pc	2	500.00	1,000.00
					1,628,402.30

2.6.5.2 ESTIMATE OF CONSTRUCTION WORKS - 883

Position no.	Position description	Unit meas.	Quantity	Price unit (RSD)	Total (RSD)
1. Preparation works					
1.01	**Staking out and marking of the route and objects (according to an individual BoQ)**	m1	110.00	70.00	7,700.00

1.02	**Shrub removal (by an individual BoQ)**	m^2	62.00	55.00	3,410.00
1.03	**Carriageway demolition (by an individual BoQ)**	m^2	313.00	600.00	187,800.00
1.04	**Curb demolition (by and individual BoQ)**	m^1	80.00	400.00	32,000.00
1.05	**Demolition of footways (by an individual BoQ)**	m^2	77.00	550.00	42,350.00
1.06	**Demolition of other traffic areas (by an individual BoQ)**				
	a) gravel area, d=30 cm	m^2	42.00	650.00	27,300.00
1.07	**Preparation of working joints for the continuation of asphalt works (by an individual BoQ)**	m^1	112.00	500.00	56,000.00
1.08	**Scraping the asphalt layer (by an individual BoQ)**	m^3	8.25	2,800.00	23,100.00
1.09	**Protection of current installations**		lump sum	500,000.00	500,000.00
1.10	**Displacement of current installation**		lump sum	1,000,000.00	1,000,000.00
1.11	**Preparation of technical documentation needed for the project implementation to obtain all legally prescribed conditions and permits**		lump sum	1,500,000.00	1,500,000.00
1.12	**Development of technical control necessary for the project implementation**		lump sum	150,000.00	150,000.00
1.13	**Geodetic survey of the constructed object (by an individual BoQ)**	pc.	1	80,000.00	80,000.00
1.14	**Project development of the constructed object (by an individual BoQ)**	pc.	1	250,000.00	250,000.00
	T O T A L 1.				**3,859,660.00**
2. Ground works					
2.01	**Excavation of humus (by an individual BoQ)**	m^3	90.74	320.00	29,036.80
2.02	**Wide excavation of all material categories (by an individual BoQ)**	m^3	241.96	330.00	79,846.80
2.03	**Compaction of the subsoil (by an individual BoQ)**	m^2	589.00	60.00	35,340.00
2.04	**Making a sand embankment (by an individual BoQ)**				
	a) on the part of the projected bus stop (by the tabular BoQ), d=30cm	m^3	107.40	1,450.00	155,730.00
	b) on the part of the projected physical island (by the tabular BoQ), d=4cm	m^3	1.00	1,450.00	1,450.00
2.05	**Making embankments from ground material (by the tabular BoQ)**	m^3	221.25	900.00	199,125.00
2.06	**Planning and rolling the formation level (by an individual BoQ)**	m^2	589.00	60.00	35,340.00
2.07	**Resoiling flat and slope surfaces and road shoulders (by an individual BoQ)**				
	Resoiling road shoulders and slopes by humus from excavation in the layer d=20cm				
	a) on the part of the projected bus stop (by the tabular BoQ)	m^2	295.00	320.00	94,400.00
2.08	**Transport of the ground material (by an individual BoQ)**				
	at the distance of 3.0km-5.0km	m^3	52.45	450.00	23,602.50
2.09	**Spreading of soil material at the landfill (by an individual BoQ)**	m^3	52.45	70.00	3,671.50

	T O T A L 2.				**657,542.60**
3. Pavement construction					
3.01	**Formation of a bearing layer from mechanically compacted granular stone material 0/63 mm (by an individual BoQ)**				
	a) crushed stone agregate 0/63 mm on the part of the projected bus stop (by the tabular BoQ), d=25cm	m^3	103.25	4,150.00	428,487.50
3.02	**Formation of a bearing layer from mechanically compacted granular stone material 0/31.5 mm (by an individual BoQ)**				
	a) crushed stone agregate 0/31.5 mm on the part of the projected footpath (by the tabular BoQ), d=15cm	m^3	16.50	4,150.00	68,475.00
	b) crushed stone agregate 0/31.5 mm on the part of the projected physical island (by the tabular BoQ), d=15cm	m^3	3.75	4,150.00	15,562.50
	c) crushed stone agregate 0/31.5 mm on the part of the projected bus stop (by the tabular BoQ), d=20cm	m^3	66.60	4,150.00	276,390.00
3.03	**Formation of the upper bituminized base layer (BNS 22sA) (by an individual BoQ)**				
	a) on the part of the projected bus stop (by the tabular BoQ), d=6cm	m^2	388.00	1,600.00	620,800.00
3.04	**Formation of the upper bituminized base layer (BNS 22A) (by an individual BoQ)**				
	a) on the part of the projected footpath (by the tabular BoQ), d=5cm	m^2	110.00	1,400.00	154,000.00
3.05	**Formation of the wearing layer asphalt concrete (AB11s) (by an individual BoQ)**				
	a) on the part of the projected bus stop (by the tabular BoQ), d=4cm	m^2	388.00	1,200.00	465,600.00
3.06	**Formation of the wearing layer asphalt concrete (AB8) (by an individual BoQ)**				
	a) on the part of the projected footpath (by the tabular BoQ), d=3cm	m^2	110.00	700.00	77,000.00
3.07	**Making a physical island from prefabricated concrete elements (by an individual BoQ)**	m^2	25.00	2,200.00	55,000.00
3.08	**Placing concrete curbs (by an individual BoQ)**				
	a) 18/24cm (+12cm)	m^1	162.00	1,800.00	291,600.00
	b) 12/18cm	m^1	92.00	1,600.00	147,200.00
	T O T A L 3.				**2,600,115.00**
4. Drainage					
4.01	**Placing the ready-made concrete elements along the slope of the embankment on a gravel base of d=15cm - making the flumebe**	m^1	6.00	1,800.00	10,800.00
4.02	**Purchase, transport and installation of galvanized grilles for sewers**	pc	1.00	4,500.00	4,500.00

4.03	**Making concrete sewers**	m^3	0.20	13,500.00	2,700.00
	T O T A L 4.				**18,000.00**
5. Other works					
5.01	**Installation of a previously removed canopy on the part of the pedestrian bus stop (by an individual BoQ)**	pc.	1.00	25,000.00	25,000.00
	T O T A L 5.				**25,000.00**

Construction works summary

	1. Preparation works				**3,859,660.00**
	2. Ground works				**657,542.60**
	3. Pavement construction				**2,600,115.00**
	4. Drainage				**18,000.00**
	5. Other works				**25,000.00**
				base:	**7,160,317.60**
				VAT 20%:	**1,432,063.52**
				TOTAL:	**8,592,381.12**

2.6.5.2 ESTIMATE OF CONSTRUCTION WORKS - 888

Position no.	Position description	Unit meas.	Quantity	Price unit (RSD)	Total (RSD)
1. Preparation works					
1.01	**Staking out and marking of the route and objects**				
	by an individual BoQ	m^1	175.00	70.00	12,250.00
1.02	**Cutting shrubs**				
	by an individual BoQ	m^2	350.00	55.00	19,250.00
1.03	**Cutting asphalt layers**				
	by an individual BoQ	m^1	184.00	470.00	86,480.00
1.04	**Carriageway demolition**				
	by the tabular BoQ	m^3	195.19	650.00	126,873.50
1.05	**Protection of current installations**		lump sum	500,000.00	500,000.00
1.06	**Displacement of current installation**		lump sum	1,000,000.00	1,000,000.00
1.07	**Preparation of technical documentation needed for the project implementation to obtain all legally prescribed conditions and permits**		lump sum	1,100,000.00	1,500,000.00

1.08	**Development of technical control necessary for the project implementation**		lump sum	110,000.00	150,000.00
1.09	**Geodetic survey of the constructed object**		lump sum	80,000.00	80,000.00
1.10	**Project development of the constructed object**		lump sum	250,000.00	250,000.00
	T O T A L 1.				**3,724,853.50**
2.	**Ground works**				
2.01	**Humus excavation**				
	by the tabular BoQ	m^3	282.38	320.00	90,361.60
2.02	**Wide excavation**				
	by the tabular BoQ	m^3	315.57	300.00	94,671.00
2.03	**Excavation of new canals**				
	Ground canals (by the tabular BoQ)	m^3	63.78	750.00	47,835.00
2.04	**Stepwise slope incision**				
	by the tabular BoQ	m^3	28.76	850.00	24,446.00
2.05	**Compaction of the subsoil**				
	by the tabular BoQ	m^2	911.24	60.00	54,674.40
2.06	**Making a sand embankment**				
	by the tabular BoQ	m^3	281.12	1,450.00	407,624.00
2.07	**Making an embankmentof soil material**				
	by the tabular BoQ	m^3	149.21	400.00	59,684.00
2.08	**Planning and rolling the formation level**				
	by the tabular BoQ	m^2	647.20	60.00	38,832.00
2.09	**Resoiling flat and slope surfaces and road shoulders d=20cm**				
	by the tabular BoQ	m^2	699.58	320.00	223,865.60
2.10	**Transport of soil material**				
	by an individual BoQ - at the distance of 3.0km-5.0km	m^3	401.36	450.00	180,613.80
2.11	**Spreading of soil material at the landfill**				
	by an individual BoQ	m^3	401.36	70.00	28,095.48
	T O T A L 2.				**1,250,702.88**
3.	**Pavement construction**				
3.01	**Formation of a bearing layer from mechanically compacted granular stone material 0/63 mm**				
	by the tabular BoQ	m^3	148.59	4,150.00	616,648.50
3.02	**Formation of a bearing layer from mechanically compacted granular stone material 0/31.5 mm**				
	by the tabular BoQ	m^3	116.50	4,150.00	483,475.00
3.03	**Preparation of working joints for the continuation of asphalt works**				

	by an individual BoQ	m^1	184.00	500.00	92,000.00
3.04	**Formation of the upper bituminized base layer (BNS 22sA)**				
	by the tabular BoQ	m^3	65.99	27,000.00	1,781,730.00
3.05	**Formation of the upper bituminized base layer (BNS 22A) (by an individual BoQ)**				
	by the tabular BoQ	m^3	2.46	28,000.00	68,880.00
3.06	**Formation of the wearing layer asphalt concrete (AB11s) (by an individual BoQ)**				
	by the tabular BoQ	m^2	1,093.99	1,200.00	1,312,788.00
3.07	**Formation of the wearing layer asphalt concrete (AB8)**				
	by the tabular BoQ	m^2	87.06	700.00	60,942.00
3.08	**Placing concrete curbs**				
	a) 18/24cm - by an individual BoQ	m^1	33.00	1,800.00	59,400.00
	b) 12/18cm - by an individual BoQ	m^1	24.00	1,600.00	38,400.00
	T O T A L 3.				**4,514,263.50**
4. Drainage					
4.01	**Purchase, transport and installation of galvanized grilles for sewers**	pc	1.00	4,500.00	4,500.00
4.02	**Making galvanized grilles**	m^3	0.04	13,500.00	540.00
4.03	**Placing the ready-made concrete elements along the slope of the embankment on a gravel base of d=15cm - Making the flume**	m^1	9.00	1,800.00	16,200.00
	T O T A L 4.				**21,240.00**

Construction works summary

	1. Preparation works				**3,724,853.50**
	2. Ground works				**1,250,702.88**
	3. Pavement construction				**4,514,263.50**
	4. Drainage				**21,240.00**
				base:	**9,511,059.88**
				VAT 20%:	**1,902,211.98**
				TOTAL:	**11,413,271.86**

2.6.6.2 ESTIMATE OF CONSTRUCTION WORKS -889

Position no.	Position description	Unit meas.	Quantity	Price unit (RSD)	Total (RSD)
1.	**Preparation works**				

1.01	**Staking out and marking of the route and objects**				
	(by an individual BoQ)	m^1	312.00	70.00	21,840.00
1.02	**Carriageway demolition**				
	(by the tabular BoQ)	m^3	32.43	650.00	21,079.50
1.03	**Demolition of other traffic areas**				
	- concrete, d=30cm (by an individual BoQ)	m^3	702.00	900.00	631,800.00
	- gravel, d=30cm (by an individual BoQ)	m^3	948.00	600.00	568,800.00
1.04	**Cutting asphalt layers**				
	(by an individual BoQ)	m^1	312.00	470.00	146,640.00
1.05	**Protection of current installations**		lump sum	500,000.00	500,000.00
1.06	**Displacement of current installation**		lump sum	1,000,000.00	1,000,000.00
1.07	**Preparation of technical documentation needed for the project implementation to obtain all legally prescribed conditions and permits**		lump sum	1,500,000.00	1,500,000.00
1.08	**Development of technical control necessary for the project implementation**		lump sum	150,000.00	150,000.00
1.09	**Geodetic survey of the constructed object**		lump sum	80,000.00	80,000.00
1.10	**Project development of the constructed object**		lump sum	250,000.00	250,000.00
	T O T A L 1.				**4,870,159.50**
2. Ground works					
2.01	**Humus excavation**				
	(by an individual BoQ)	m^3	263.00	320.00	84,160.00
2.02	**Wide excavation**				
	(by the tabular BoQ)	m^3	1,112.42	300.00	333,726.00
2.03	**Compaction of the subsoil**				
	(by the tabular BoQ)	m^2	2,095.10	60.00	125,706.00
2.04	**Making a sand embankment**				
	- pavement construction sand (by the tabular BoQ)	m^3	746.02	1,450.00	1,081,729.00
	- sand embankment (by the tabular BoQ)	m^3	279.26	1,450.00	404,927.00
2.05	**Planning and rolling the formation level**				
	(by the tabular BoQ)	m^2	1,991.02	60.00	119,461.20
2.06	**Resoiling flat and slope surfaces and road shoulders d=20cm**				
	(by an individual BoQ)	m^2	768.00	320.00	245,760.00
2.07	**Transport of soil material**				
	at the distance of 3.0km-5.0km (by an individual BoQ)	m^3	1,221.82	450.00	549,819.00
2.08	**Spreading of soil material at the landfill**				
	(by an individual BoQ)	m^3	1,221.82	70.00	85,527.40
	T O T A L 2.				**3,030,815.60**

3. Pavement construction					
3.01	**Formation of a bearing layer from mechanically compacted granular stone material 0/63 mm**				
	(by the tabular BoQ)	m^3	438.13	4,150.00	1,818,239.50
3.02	**Formation of a bearing layer from mechanically compacted granular stone material 0/31.5 mm**				
	- on the part of a service road (by the tabular BoQ)	m^3	315.85	4,150.00	1,310,777.50
	- on the part of a concrete access (by an individual BoQ)	m^3	38.40	4,150.00	159,360.00
	- on the part of an island (by an individual BoQ)	m^3	46.32	4,150.00	192,228.00
3.03	**Preparation of working joints for the continuation of asphalt works**				
	(by an individual BoQ)	m^1	312.00	500.00	156,000.00
3.04	**Formation of the upper bituminized base layer (BNS 22sA)**				
	- d=8cm (by the tabular BoQ)	m^2	122.57	1,800.00	220,626.00
3.05	**Formation of the wearing layer asphalt concrete (AB11s)**				
	- d=4cm (by the tabular BoQ)	m^2	1,637.26	1,200.00	1,964,712.00
3.06	**Placing concrete curbs**				
	- 18/24cm (by an individual BoQ)	m^1	436.00	1,800.00	784,800.00
3.07	**Making pavement concrete overlay on the part of the driveway**				
	- d=15cm (by an individual BoQ)	m^2	256.00	2,000.00	512,000.00
	T O T A L 3.				**7,118,743.00**

Construction works summary

	1. Preparation works				**4,870,159.50**
	2. Ground works				**3,030,815.60**
	3. Pavement construction				**7,118,743.00**
				base:	**15,019,718.10**
				VAT 20%:	**3,003,943.62**
				TOTAL:	**18,023,661.72**

2.6.6.2 ESTIMATE OF CONSTRUCTION WORKS - 890

Position no.	Position description	Unit meas.	Quantity	Price unit (RSD)	Total (RSD)
1. Preparation works					
1.01	**Staking out and marking of the route and objects**	m^1	336.00	70.00	23,520.00
1.02	**Cutting shrubs**	m^2	120.00	55.00	6,600.00

1.03	**Preparation of work joints for continuation of asphalt works**	m^1	52.00	470.00	24,440.00
1.04	**Carriageway demolition**				
	- by the graphic evidence, d_{pr}=50cm	m^3	405.00	650.00	263,250.00
1.05	**Demolition and removal of the current gutter drainage system parts**	m^1	126.00	850.00	107,100.00
1.06	**Demolition of other traffic areas (gravel areas)**				
	- by the graphic evidence dpr=30cm	m^3	12.00	600.00	7,200.00
1.07	**Scraping the asphalt layer**				
	- by the tabular BoQ	m^3	84.00	2,800.00	235,200.00
1.08	**Curb demolition**	m^1	50.00	450.00	22,500.00
1.09	**Linear lattice demolition**	m^1	40.00	500.00	20,000.00
1.10	**Footpaths demolition**	m^2	60.00	500.00	30,000.00
1.11	**Protection of current installations**		lump sum	500,000.00	500,000.00
1.12	**Displacement of current installation**		lump sum	1,000,000.00	1,000,000.00
1.13	**Preparation of technical documentation needed for the project implementation to obtain all legally prescribed conditions and permits**		lump sum	1,500,000.00	1,500,000.00
1.14	**Development of technical control necessary for the project implementation**		lump sum	150,000.00	150,000.00
1.15	**Geodetic survey of the constructed object**	lump sum	1	80,000.00	80,000.00
1.16	**Project development of the constructed object**	lump sum	1	250,000.00	250,000.00
	T O T A L 1.				**4,219,810.00**
2. Ground works					
2.01	**Humus excavation**				
	by the tabular BoQ and graphical annex	m^3	308.00	320.00	98,560.00
2.02	**Wide excavation**				
	State road (by the tabular BoQ)	m^3	900.00	300.00	270,000.00
2.03	**Excavation of new canals**				
	Ground canals (by the tabular BoQ)	m^3	191.10	750.00	143,325.00
2.04	**Compaction of the subsoil**				
	State road (by the tabular BoQ)	m^2	1,008.00	60.00	60,480.00
2.05	**Making a sand embankment**				
	State road (by the tabular BoQ)	m^3	324.75	1,450.00	470,887.50
	Footpaths and platforms (by the tabular BoQ)	m^3	28.00	1,450.00	40,600.00
	False islands	m^3	7.65	1,450.00	11,092.50
2.06	**Making a soil material embankment**				
	- by the tabular BoQ	m^3	335.10	400.00	134,040.00
2.07	**Planning and rolling the formation level**				
	State road and junctions (by the tabular BoQ)	m^2	943.44	60.00	56,606.40
	Footpaths (by the tabular BoQ)	m^2	154.00	60.00	9,240.00

2.08	**Resoiling flat and slope surfaces and road shoulders d=20cm**				
	- by the tabular BoQ	m^2	861.00	320.00	275,520.00
	- physical island	m^2	35.00	320.00	11,200.00
2.09	**Transport of the soil material**				
	at the distance of 3.0km-5.0km	m^3	872.90	450.00	392,805.00
2.10	**Spreading of soil material at the landfilli**	m^3	872.90	70.00	61,103.00
	T O T A L 2.				**2,035,459.40**
3. Pavement construction					
3.01	**Formation of a bearing layer from mechanically compacted granular stone material 0/63 mm**				
	-State roads and junctions (by the tabular BoQ) d=25cm	m^3	219.00	4,150.00	908,850.00
3.02	**Formation of a bearing layer from mechanically compacted granular stone material 0/31.5 mm**				
	State roads and junctions (by the tabular BoQ) d=20cm	m^3	149.00	4,150.00	618,350.00
	Footpaths (by the tabular BoQ)	m^3	21.00	4,150.00	87,150.00
	False islands (by an individual BoQ) d=20cm	m^3	30.00	4,150.00	124,500.00
3.03	**Formation of the upper bituminized base layer (BNS 22sA)**				
	State road (by the tabular BoQ)	m^3	105.85	27,000.00	2,857,950.00
3.04	**Formation of the upper bituminized base layer (BNS 22A)**				
	Footpaths (by the tabular BoQ)	m^3	7.00	28,000.00	196,000.00
3.05	**Formation of the wearing layer asphalt concrete (AB11s)**				
	State road (by the tabular BoQ)	m^2	3,155.00	1,200.00	3,786,000.00
3.06	**Formation of the wearing layer asphalt concrete (AB8)**				
	bus stop platforms d=3cm (by an individual BoQ)	m^2	50.00	700.00	35,000.00
	Footpaths d=3cm (by an individual BoQ)	m^2	90.00	700.00	63,000.00
3.07	**Placing cubes (false islands) 10x10x10**	m^2	127.00	2,000.00	254,000.00
3.08	**Placing concrete curbs**				
	a) 18/24cm (+12cm)	m^1	247.00	1,800.00	444,600.00
	b) 12/18cm	m^1	102.00	1,600.00	163,200.00
	c) 18/24 (+3cm)	m^1	127.00	1,800.00	228,600.00
	c) 24/18 (+6cm)	m^1	74.00	1,800.00	133,200.00
	T O T A L 3.				**9,900,400.00**
4. Drainage					
4.01	**Purchase, transport and installation of the linear lattice**	m^1	22.00	8,000.00	176,000.00
4.02	**Making a concrete gutter with a curb**	m^1	151.00	3,300.00	498,300.00

	T O T A L 4.				**674,300.00**

Construction works summary

	1. Preparation works				**4,219,810.00**
	2. Ground works				**2,035,459.40**
	3. Pavement construction				**9,900,400.00**
	4. Drainage				**674,300.00**
				base:	**16,829,969.40**
				VAT 20%:	**3,365,993.88**
				TOTAL:	**20,195,963.28**

2.6.5.2 ESTIMATE OF CONSTRUCTION WORKS -891

Position no.	Position description	Unit meas.	Quantity	Price unit (RSD)	Total (RSD)
1.	**Preparation works**				
1.01	**Staking out and marking of the route and objects**				
	(by an individual BoQ)	m^1	192.00	70.00	13,440.00
1.02	**Displacement the current guardrail**				
	(by an individual BoQ)	m^1	16.00	300.00	4,800.00
1.03	**Replacing the bilboard**				
	(by an individual BoQ)	pc	2.00	10,000.00	20,000.00
1.04	**Cutting trees and stump removal**				
	(by an individual BoQ)	pc	1.00	13,000.00	13,000.00
1.05	**Carriageway demolition**				
	(by the tabular BoQ)	m^3	19.76	650.00	12,844.00
1.06	**Demolition of other traffic areas**				
	- concrete, d=30cm (by an individual BoQ)	m^3	125.00	900.00	112,500.00
	- gravel, d=30cm (by an individual BoQ)	m^3	1,006.00	600.00	603,600.00
1.07	**Cutting asphalt layers**				
	(by an individual BoQ)	m^1	192.00	470.00	90,240.00
1.08	**Protection of current installations**		lump sum	500,000.00	500,000.00
1.09	**Displacement of current installation**		lump sum	1,000,000.00	1,000,000.00
1.10	**Preparation of technical documentation needed for the project implementation to obtain all legally prescribed conditions and permits**		lump sum	1,500,000.00	1,500,000.00
1.11	**Development of technical control necessary for the project implementation**		lump sum	150,000.00	150,000.00
1.12	**Geodetic survey of the constructed object**		lump sum	80,000.00	80,000.00
1.13	**Project development of the constructed object**		lump sum	250,000.00	250,000.00
	T O T A L 1.				**4,350,424.00**

2. Ground works					
2.01	**Humus excavation**				
	(by an individual BoQ)	m^3	129.00	320.00	41,280.00
2.02	**Wide excavation**				
	(by the tabular BoQ)	m^3	818.29	300.00	245,487.00
2.03	**Excavation of new canals**				
	(by an individual BoQ)	m^3	46.00	750.00	34,500.00
2.04	**Compaction of the subsoil**				
	(by the tabular BoQ)	m^2	1,222.97	60.00	73,378.20
2.05	**Making a sand embankment**				
	- sand of the pavement construction (by the tabular BoQ)	m^3	416.96	1,450.00	604,592.00
	- sand embankment (by the tabular BoQ)	m^3	145.14	1,450.00	210,453.00
	- sand on a part of the island (by an individual BoQ)	m^3	22.30	1,450.00	32,335.00
2.06	**Planning and rolling the formation level**				
	(by the tabular BoQ)	m^2	1,152.18	60.00	69,130.80
2.07	**Resoiling flat and slope surfaces and road shoulders d=20cm**				
	(by an individual BoQ)	m^2	426.00	320.00	136,320.00
2.08	**Transport of the soil material**				
	at the distance of 3.0km-5.0km (by an individual BoQ)	m^3	1,078.49	450.00	485,320.50
2.09	**Spreading of soil material at the landfill**				
	(by an individual BoQ)	m^3	1,078.49	70.00	75,494.30
	T O T A L 2.				**2,008,290.80**
3. Pavement construction					
3.01	**Formation of a bearing layer from mechanically compacted granular stone material 0/63 mm**				
	(by the tabular BoQ)	m^3	228.19	4,150.00	946,988.50
3.02	**Formation of a bearing layer from mechanically compacted granular stone material 0/31.5 mm**				
	- on a part of the service road (by the tabular BoQ)	m^3	178.11	4,150.00	739,156.50
	- on a part of the concrete access (by an individual BoQ)	m^3	9.45	4,150.00	39,217.50
	- on a part of the gravel access (by an individual BoQ)	m^3	48.00	4,150.00	199,200.00
3.03	**Preparation of working joints for the continuation of asphalt works**				
	(by an individual BoQ)	m^1	192.00	500.00	96,000.00
3.04	**Formation of the upper bituminized base layer (BNS 22sA)**				
	- d=8cm (by the tabular BoQ)	m^3	73.18	27,000.00	1,975,860.00
3.05	**Formation of the wearing layer asphalt concrete (AB11s)**				
	- d=4cm (by the tabular BoQ)	m^2	919.16	1,200.00	1,102,992.00
3.06	**Placing concrete curbs**				

	- 18/24cm (by an individual BoQ)	m^1	312.00	1,800.00	561,600.00
3.07	**Making the pavement overlay of concrete on a part of driveways**				
	- d=15cm (by an individual BoQ)	m^2	63.00	2,000.00	126,000.00
	T O T A L 3.				**5,787,014.50**
4. Drainage					
4.01	**Placing the ready-made concrete elements along the slope of the embankment on a gravel base of d=15cm - making the flume**	m^1	4.00	1,800.00	7,200.00
	T O T A L 4.				**7,200.00**

Construction works summary

	1. Preparation works				**4,350,424.00**
	2. Ground works				**2,008,290.80**
	3. Pavement construction				**5,787,014.50**
	4. Drainage				**7,200.00**
				base:	**12,152,929.30**
				VAT 20%:	**2,430,585.86**
				TOTAL:	**14,583,515.16**

2.6.6.2 ESTIMATE OF CONSTRUCTION WORKS - 892

Position no.	Position description	Unit meas.	Quantity	Price unit (RSD)	Total (RSD)
1. Preparation works					
1.01	**Staking out and marking of the route and objects**	m^1	306.00	70.00	21,420.00
1.02	**Displacement of the current guardrail**	m^1	20.00	300.00	6,000.00
1.03	**Cutting asphalt layers**	m^1	298.00	470.00	140,060.00
1.04	**Carriageway demolition**				
	- by the tabular BoQ	m^3	71.00	650.00	46,150.00
	- by an individual BoQ	m^3	478.20	650.00	310,830.00
1.05	**Curb demolition**	m^1	85.00	400.00	34,000.00
1.06	**Demolition of other traffic areas**				
	- concrete (by an individual BoQ)	m^3	15.55	900.00	13,995.00
	- gravel (by an individual BoQ)	m^3	292.20	600.00	175,320.00
1.07	**Scraping the asphalt layer**				
	- by the tabular BoQ	m^3	55.00	2,800.00	154,000.00
	- by an individual BoQ	m^3	2.67	2,800.00	7,476.00
1.08	**Protection of current installations**		lump sum	500,000.00	500,000.00
1.09	**Displacement of current installation**		lump sum	1,000,000.00	1,000,000.00

1.10	**Preparation of technical documentation needed for the project implementation to obtain all legally prescribed conditions and permits**		lump sum	1,800,000.00	1,800,000.00
1.11	**Development of technical control necessary for the project implementation**		lump sum	180,000.00	180,000.00
1.12	**Geodetic survey of the constructed object**		lump sum	80,000.00	80,000.00
1.13	**Project development of the constructed object**		lump sum	250,000.00	250,000.00
	T O T A L 1.				**4,719,251.00**
2. Ground works					
2.01	**Humus excavation**				
	-by an individual BoQ	m^3	212.10	320.00	67,872.00
2.02	**Wide excavation**				
	-by the tabular BoQ	m^3	485.00	300.00	145,500.00
2.03	**Excavation of new canals**				
	-by an individual BoQ	m^3	259.00	750.00	194,250.00
2.04	**Compaction of the subsoil**				
	-by the tabular BoQ	m^2	752.00	60.00	45,120.00
2.05	**Making a sand embankment**				
	-by the tabular BoQ	m^3	264.00	1,450.00	382,800.00
	-by an individual BoQ	m^3	57.36	1,450.00	83,172.00
2.06	**Making an embankmentof soil material**				
	-by the tabular BoQ	m^3	244.00	400.00	97,600.00
2.07	**Planning and rolling the formation level**				
	-by the tabular BoQ	m^2	678.00	60.00	40,680.00
2.08	**Resoiling flat and slope surfaces and road shoulders d=20cm**				
	-by an individual BoQ	m^2	1,671.00	320.00	534,720.00
2.09	**Transport of soil material**				
	at the distance of 3.0km-5.0km	m^3	377.90	450.00	170,055.00
2.10	**Spreading of soil material at the landfill**	m^3	377.90	70.00	26,453.00
	T O T A L 2.				**1,788,222.00**
3. Pavement construction					
3.01	**Formation of a bearing layer from mechanically compacted granular stone material 0/63 mm**				
	-by the tabular BoQ	m^3	165.00	4,150.00	684,750.00
	-by an individual BoQ	m^3	26.75	4,150.00	111,012.50
3.02	**Formation of a bearing layer from mechanically compacted granular stone material 0/31.5 mm**				
	-by the tabular BoQ	m^3	120.00	4,150.00	498,000.00
	-by an individual BoQ	m^3	73.19	4,150.00	303,738.50

3.03	**Preparation of working joints for the continuation of asphalt works**	m^1	298.00	500.00	149,000.00
3.04	**Formation of the upper bituminized base layer (BNS 22sA)**				
	-by the tabular BoQ	m^3	80.00	27,000.00	2,160,000.00
	-by an individual BoQ	m^3	12.84	27,000.00	346,680.00
3.05	**Formation of the upper bituminized base layer (BNS 22A)**				
	-by an individual BoQ	m^3	7.80	28,000.00	218,400.00
3.06	**Formation of the wearing layer asphalt concrete (AB11s)**				
	-by the tabular BoQ	m^2	2,970.00	1,200.00	3,564,000.00
	-by an individual BoQ	m^2	173.00	1,200.00	207,600.00
3.07	**Formation of the wearing layer asphalt concrete (AB8)**				
	-by an individual BoQ	m^2	132.00	700.00	92,400.00
3.08	**Placing concrete curbs**				
	18/24cm -by an individual BoQ	m^1	123.00	1,800.00	221,400.00
	12/18cm -by an individual BoQ	m^1	107.00	1,600.00	171,200.00
3.09	**Making pavement concrete overlay on the part of the driveway**				
	-by an individual BoQ	m^2	50.50	2,000.00	101,000.00
	T O T A L 3.				**8,829,181.00**
4. Drainage					
4.01	**Placing the ready-made concrete elements along the slope of the embankment on a gravel base of d=15cm - Making the flume**	m^1	5.00	1,800.00	9,000.00
	T O T A L 4.				**9,000.00**
5. Other works					
5.01	**Installation of a previously removed canopy on the pedestrian part of the bus stop**	m^1	2.00	25,000.00	50,000.00
	T O T A L 5.				**50,000.00**

Construction works summary

	1. Preparation works				**4,719,251.00**
	2. Ground works				**1,788,222.00**
	3. Pavement construction				**8,829,181.00**
	4. Drainage				**9,000.00**
	5. Other works				**50,000.00**
				base:	**15,345,654.00**
				VAT 20%:	**3,069,130.80**

				TOTAL:	**18,414,784.80**

2.6.5.2 ESTIMATE OF CONSTRUCTION WORKS -893

Position no.	Position description	Unit meas.	Quantity	Price unit (RSD)	Total (RSD)
1. Preparation works					
1.01	**Staking out and marking of the route and objects (according to an individual BoQ)**	m^1	215.00	70.00	15,050.00
1.02	**Shrub removal (by an individual BoQ)**	m^2	430.00	55.00	23,650.00
1.03	**Cutting asphalt layers (by an individual BoQ)**	m^1	30.00	470.00	14,100.00
1.04	**carriageway demolition**				
	State road (by the tabular BoQ)	m^3	12.16	650.00	7,904.00
	Connection (by an individual BoQ)	m^3	7.00	650.00	4,550.00
1.05	**Demolition and removal of parts of the existing gutter drainage system (by an individual BoQ)**	m^1	38.00	850.00	32,300.00
1.06	**Demolition of other traffic surfaces (gravel surfaces)**				
	State road (by the tabular BoQ)	m^3	337.85	600.00	202,710.00
	Connection (by an individual BoQ)	m^3	64.00	600.00	38,400.00
1.07	**Scraping the asphalt layer**				
	State road (by the tabular BoQ)	m^3	70.38	2,800.00	197,064.00
	Connection (by an individual BoQ)	m^3	9.72	2,800.00	27,216.00
1.07	**Protection of current installations**		lump sum	500,000.00	500,000.00
1.08	**Displacement of current installation**		lump sum	1,000,000.00	1,000,000.00
1.09	**Preparation of technical documentation needed for the project implementation to obtain all legally prescribed conditions and permits**		lump sum	1,500,000.00	1,500,000.00
1.10	**Development of technical control necessary for the project implementation**		lump sum	150,000.00	150,000.00
1.08	**Geodetic survey of the constructed object (by an individual BoQ)**	l.sum	1	80,000.00	80,000.00
1.09	**Project development of the constructed object (by an individual BoQ)**	l.sum	1	250,000.00	250,000.00
	T O T A L 1.				**4,042,944.00**
2. Ground works					
2.01	**Humus excavation (by an individual BoQ)**				
	State road (by the tabular BoQ)	m^3	349.26	320.00	111,763.20
	Connection (by an individual BoQ)	m^3	7.80	320.00	2,496.00
2.02	**Wide excavation**				
	State road (by the tabular BoQ)	m^3	861.98	300.00	258,594.00
	Connection (by an individual BoQ)	m^3	162.24	330.00	53,539.20

2.03	**Excavation of new canals**				
	Ground canals (by the tabular BoQ)	m^3	203.81	750.00	152,857.50
2.04	**Compaction of the subsoil**				
	State road (by the tabular BoQ)	m^2	1,178.77	60.00	70,726.20
	Connection (by an individual BoQ)	m^2	224.00	60.00	13,440.00
2.05	**Making a sand embankment**				
	State road (by the tabular BoQ)	m^3	319.40	1,450.00	463,130.00
	Footpaths (by the tabular BoQ)	m^3	16.34	1,450.00	23,693.00
	Connection (by an individual BoQ)	m^3	67.44	1,450.00	97,788.00
2.06	**Making embankments from ground material**				
	State road (by the tabular BoQ)	m^3	334.78	400.00	133,912.00
	Connection (by an individual BoQ)	m^3	33.60	400.00	13,440.00
2.07	**Planning and rolling the formation level**				
	State road (by the tabular BoQ)	m^2	880.00	60.00	52,800.00
	Footpaths (by the tabular BoQ)	m^2	172.37	60.00	10,342.20
	Connection (by an individual BoQ)	m^2	218.00	60.00	13,080.00
2.08	**Resoiling flat and slope surfaces and road shoulders d=20cm**				
	State road (by the tabular BoQ)	m^2	977.29	320.00	312,732.80
	Ground canals (by the tabular BoQ)	m^2	503.60	320.00	161,152.00
	Connection (by an individual BoQ)	m^2	56.00	320.00	17,920.00
2.09	**Transport of the ground material (by an individual BoQ)**				
	at the distance of 3.0km-5.0km	m^3	909.33	450.00	409,199.40
2.10	**Spreading of soil material at the landfill (by an individual BoQ)**	m^3	909.33	70.00	63,653.24
	T O T A L 2.				**2,436,258.74**
3. Pavement construction					
3.01	**Formation of a bearing layer from mechanically compacted granular stone material 0/63 mm**				
	State road (by the tabular BoQ) d=30cm	m^3	210.30	4,150.00	872,745.00
	Connection (by an individual BoQ) d=30cm	m^3	52.54	4,150.00	218,041.00
3.02	**Formation of a bearing layer from mechanically compacted granular stone material 0/31.5 mm (by an individual BoQ)**				
	State road (by the tabular BoQ) d=20cm	m^3	153.76	4,150.00	638,104.00
	Footpaths (by the tabular BoQ)	m^3	36.85	4,150.00	152,927.50
	Connection (by an individual BoQ) d=20cm	m^3	41.57	4,150.00	172,515.50
3.03	**Preparation of working joints for the continuation of asphalt works**	m^1	51.00	500.00	25,500.00
3.04	**Formation of the upper bituminized base layer (BNS 22sA)**				
	State road (by the tabular BoQ)	m^3	91.11	27,000.00	2,459,970.00
	Connection (by an individual BoQ)	m^3	28.36	27,000.00	765,720.00

3.05	**Formation of the upper bituminized base layer (BNS 22A) (by an individual BoQ)**				
	Footpaths (by the tabular BoQ)	m^3	8.83	28,000.00	247,240.00
3.06	**Formation of the wearing layer asphalt concrete (AB11s) (by an individual BoQ)**				
	State road (by the tabular BoQ)	m^2	2,222.44	1,200.00	2,666,928.00
	Connection (by an individual BoQ)	m^2	350.00	1,200.00	420,000.00
3.07	**Formation of the wearing layer asphalt concrete (AB8)**				
	Footpaths d=3cm (by the tabular BoQ)	m^2	151.24	700.00	105,868.00
3.08	**Placing concrete curbs (by an individual BoQ)**				
	a) 18/24cm (+12cm)	m^1	108.85	1,800.00	195,930.00
	b) 12/18cm	m^1	111.12	1,600.00	177,792.00
	T O T A L 3.				**9,119,281.00**
4. Drainage					
4.01	**Purchase, transport and installation of galvanized grilles for sewers**	kom	3.00	4,500.00	13,500.00
4.02	**Making the concrerte sewers**	m^3	0.11	13,500.00	1,485.00
4.03	**Placing the ready-made concrete elements along the slope of the embankment on a gravel base of d=15cm - making the flume**	m^1	7.50	1,800.00	13,500.00
	T O T A L 4.				**28,485.00**

Construction works summary

	1. Preparation works				**4,042,944.00**
	2. Ground works				**2,436,258.74**
	3. Pavement construction				**9,119,281.00**
	4. Drainage				**28,485.00**
				base:	**15,626,968.74**
				VAT 20%:	**3,125,393.75**
				TOTAL:	**18,752,362.49**

2.6.6.2 ESTIMATE OF CONSTRUCTION WORKS - 894

Position no.	Position description	Unit meas.	Quantity	Price unit (RSD)	Total (RSD)
1. Preparation works					
1.01	**Staking out and marking of the route and objects**	m^1	131.00	70.00	9,170.00
1.02	**Cutting asphalt layers**	m^1	329.00	470.00	154,630.00
1.03	**Carriageway demolition**				

	(by the tabular BoQ)	m^3	11.43	650.00	7,429.50
	(by an individual BoQ)	m^3	63.81	650.00	41,476.50
1.04	**Curb demolition**	m^1	36.00	400.00	14,400.00
1.05	**Demolition of other traffic areas (gravel area)**				
	(by the tabular BoQ)	m^3	123.51	600.00	74,106.00
1.06	**Scraping the asphalt layer**				
	(by an individual BoQ)	m^3	4.74	2,800.00	13,272.00
1.07	**Protection of current installations**		lump sum	500,000.00	500,000.00
1.08	**Displacement of current installation**		lump sum	1,000,000.00	1,000,000.00
1.09	**Preparation of technical documentation needed for the project implementation to obtain all legally prescribed conditions and permits**		lump sum	1,500,000.00	1,500,000.00
1.10	**Development of technical control necessary for the project implementation**		lump sum	150,000.00	150,000.00
1.11	**Geodetic survey of the constructed object**		lump sum	80,000.00	80,000.00
1.12	**Project development of the constructed object**		lump sum	250,000.00	250,000.00
	T O T A L 1.				**3,794,484.00**
2.	**Ground works**				
2.01	**Humus excavation**				
	(by the tabular BoQ)	m^3	18.47	320.00	5,910.40
	(by an individual BoQ)	m^3	47.06	320.00	15,059.20
2.02	**Wide excavation**				
	(by the tabular BoQ)	m^3	458.23	300.00	137,469.00
	(by an individual BoQ)	m^3	55.00	330.00	18,150.00
2.03	**Excavation of new canals**				
	(by an individual BoQ)	m^3	17.00	750.00	12,750.00
2.04	**Compaction of the subsoil**				
	(by the tabular BoQ)	m^2	670.00	60.00	40,200.00
	(by an individual BoQ)	m^2	146.56	60.00	8,793.60
2.05	**Making a sand embankment**				
	(by the tabular BoQ)	m^3	288.41	1,450.00	418,194.50
	(by an individual BoQ)	m^3	43.22	1,450.00	62,669.00
2.06	**Making a ground material embankment**				
	(by the tabular BoQ)	m^3	94.00	400.00	37,600.00
	(by an individual BoQ)	m^3	22.51	400.00	9,004.00
2.07	**Planning and rolling the formation level**				
	(by the tabular BoQ)	m^2	597.75	60.00	35,865.00
	(by an individual BoQ)	m^2	144.07	60.00	8,644.20
2.08	**Resoiling flat and slope surfaces and road shoulders d=20cm**				
	(by the tabular BoQ)	m^2	237.82	320.00	76,102.40
	(by an individual BoQ)	m^2	165.23	320.00	52,873.60

2.09	**Transport of the ground material**				
	at the distance of 3.0km-5.0km	m^3	398.64	450.00	179,388.00
2.10	**Spreading of soil material at the landfill**	m^3	398.64	70.00	27,904.80
	T O T A L 2.				**1,146,577.70**
3. Pavement construction					
3.01	**Formation of a bearing layer from mechanically compacted granular stone material 0/63 mm**				
	(by the tabular BoQ)	m^3	116.88	4,150.00	485,052.00
	(by an individual BoQ)	m^3	27.64	4,150.00	114,706.00
3.02	**Formation of a bearing layer from mechanically compacted granular stone material 0/31.5 mm**				
	(by the tabular BoQ)	m^3	96.04	4,150.00	398,566.00
	(by an individual BoQ)	m^3	26.65	4,150.00	110,597.50
3.03	**Preparation of working joints for the continuation of asphalt works**	m^1	126.25	500.00	63,125.00
3.04	**Formation of the upper bituminized base layer (BNS 22sA)**				
	(by the tabular BoQ)	m^3	40.00	27,000.00	1,080,000.00
	(by an individual BoQ)	m^3	10.26	27,000.00	277,020.00
3.05	**Formation of the wearing layer asphalt concrete (AB11s)**				
	(by the tabular BoQ)	m^2	510.00	1,200.00	612,000.00
	(by an individual BoQ)	m^2	206.49	1,200.00	247,788.00
3.06	**Placing concrete curbs**				
	18/24cm (+12cm)	m^1	38.51	1,800.00	69,318.00
	18/24cm (+4cm) - downed	m^1	133.22	1,800.00	239,796.00
	T O T A L 3.				**3,697,968.50**
4. Drainage					
4.01	**Placing ready-made concrete elements (canals) on a previously prepared base**	m^1	4.50	4,500.00	20,250.00
4.02	**Placing the ready-made concrete elements along the slope of the embankment on a gravel base of d=15cm - making the flume**	m^1	3.00	1,800.00	5,400.00
	T O T A L 4.				**25,650.00**
Construction works summary					
	1. Preparation works				**3,794,484.00**
	2. Ground works				**1,146,577.70**
	3. Pavement construction				**3,697,968.50**
	4. Drainage				**25,650.00**
				base:	**8,664,680.20**

VAT 20%:	**1,732,936.04**
TOTAL:	**10,397,616.24**

2.6.5.2 ESTIMATE OF CONSTRUCTION WORKS - 895

Position no.	Position description	Unit meas.	Quantity	Price unit (RSD)	Total (RSD)
1.	**Preparation works**				
1.01	**Staking out and marking of the route and objects (according to an individual BoQ)**	m^1	110.00	70.00	7,700.00
1.02	**Shrub removal (by an individual BoQ)**	m^2	41.00	55.00	2,255.00
1.03	**Carriageway demolition (by an individual BoQ)**	m^2	41.00	600.00	24,600.00
1.04	**Demolition of other traffic surfaces (by an individual BoQ)**				
	a) gravel surface, d=30 cm	m^2	760.00	650.00	494,000.00
1.05	**Preparation of working joints for the continuation of asphalt works (by an individual BoQ)**	m^1	110.00	500.00	55,000.00
1.06	**Scraping the asphalt layer (by an individual BoQ)**	m^3	8.55	2,800.00	23,940.00
1.07	**Protection of current installations**		lump sum	500,000.00	500,000.00
1.08	**Displacement of current installation**		lump sum	1,000,000.00	1,000,000.00
1.09	**Preparation of technical documentation needed for the project implementation to obtain all legally prescribed conditions and permits**		lump sum	1,500,000.00	1,500,000.00
1.10	**Development of technical control necessary for the project implementation**		lump sum	150,000.00	150,000.00
1.11	**Geodetic survey of the constructed object (by an individual BoQ)**	pc.	1	80,000.00	80,000.00
1.12	**Project development of the constructed object (by an individual BoQ)**	pc.	1	250,000.00	250,000.00
	T O T A L 1.				**4,087,495.00**
2.	**Ground works**				
2.01	**Humus excavation (by an individual BoQ)**	m^3	24.00	320.00	7,680.00
2.02	**Wide excavation (by an individual BoQ)**	m^3	64.00	330.00	21,120.00
2.03	**Excavation of new ground canals (by an individual BoQ)**	m^3	169.00	330.00	55,770.00
2.04	**Compaction of the subsoil (by an individual BoQ)**	m^2	353.00	60.00	21,180.00
2.05	**Making a sand embankment (by an individual BoQ)**				
	a) on the part of the projected bus stop (by the tabular BoQ), d=30cm	m^3	110.70	1,450.00	160,515.00
	b) on the part of the projected physical island (by the tabular BoQ), d=4cm	m^3	1.60	1,450.00	2,320.00

2.06	**Making embankments from ground material (by the tabular BoQ)**	m^3	40.00	900.00	36,000.00
2.07	**Planning and rolling the formation level (by an individual BoQ)**	m^2	353.00	60.00	21,180.00
2.08	**Resoiling flat and slope surfaces and road shoulders (by an individual BoQ)**				
	resoiling road shoulders and slopes with excavated humus from in the layer d=20cm				
	a) on the part of the projected bus stop (by the tabular BoQ)	m^2	490.00	320.00	156,800.00
2.09	**Transport of the ground material (by an individual BoQ)**				
	at the distance of 3.0km-5.0km	m^3	119.00	450.00	53,550.00
2.10	**Spreading of soil material at the landfill (by an individual BoQ)**	m^3	119.00	70.00	8,330.00
	T O T A L 2.				**544,445.00**
3. Pavement construction					
3.01	**Formation of a bearing layer from mechanically compacted granular stone material 0/63 mm (by an individual BoQ)**				
	a) crushed stone aggregate 0/63 mm on the part of the projected bus stop (by the tabular BoQ), d=25cm	m^3	92.50	4,150.00	383,875.00
3.02	**Formation of a bearing layer from mechanically compacted granular stone material 0/31.5 mm (by an individual BoQ)**				
	a) crushed stone aggregate 0/31.5 mm on the part of the projected platform (by the tabular BoQ), d=15cm	m^3	3.60	4,150.00	14,940.00
	b) crushed stone aggregate 0/31.5 mm on the part of the projected physical island (by the tabular BoQ), d=15cm	m^3	6.00	4,150.00	24,900.00
	c) crushed stone aggregate 0/31.5 mm on the part of the projected bus stop (by the tabular BoQ), d=20cm	m^3	74.00	4,150.00	307,100.00
3.03	**Formation of the upper bituminized base layer (BNS 22sA) (by an individual BoQ)**				
	a) on the part of the projected bus stop (by the tabular BoQ), d=6cm	m^2	383.00	1,600.00	612,800.00
3.04	**Formation of the upper bituminized base layer (BNS 22A) (by an individual BoQ)**				
	a) on the part of the projected platform (by the tabular BoQ), d=5cm	m^2	24.00	1,400.00	33,600.00
3.05	**Formation of the wearing layer asphalt concrete (AB11s) (by an individual BoQ)**				
	a) on the part of the projected bus stop (by the tabular BoQ), d=4cm	m^2	383.00	1,200.00	459,600.00
3.06	**Formation of the wearing layer asphalt concrete (AB8) (by an individual BoQ)**				
	a) on the part of the projected platform (by the tabular BoQ), d=3cm	m^2	24.00	700.00	16,800.00
3.07	**Making a physical island from prefabricated concrete elements (by an individual BoQ)**	m^2	40.00	2,200.00	88,000.00

3.08	**Placing concrete curbs (by an individual BoQ)**				
	a) 18/24cm (+12cm)	m^1	79.00	1,800.00	142,200.00
	b) 12/18cm	m^1	14.00	1,600.00	22,400.00
	T O T A L 3.				**2,106,215.00**
4. Drainage					
4.01	**Placing the ready-made concrete elements along the slope of the embankment on a gravel base of d=15cm - making the flume**	m^1	4.00	1,800.00	7,200.00
	T O T A L 4.				**7,200.00**
5. Other works					
5.01	**Installation of a canopy on the part of the bus stop for pedestrians (by an individual BoQ)**	pc.	1.00	25,000.00	25,000.00
	T O T A L 5.				**25,000.00**

Construction works summary

	1. Preparation works				**4,087,495.00**
	2. Ground works				**544,445.00**
	3. Pavement construction				**2,106,215.00**
	4. Drainage				**7,200.00**
	5. Other works				**25,000.00**

base:	**6,770,355.00**
VAT 20%:	**1,354,071.00**
TOTAL:	**8,124,426.00**

2.6.5.2 ESTIMATE OF CONSTRUCTION WORKS OF THE BUS STOP AT KM 26+195.00 AND NON-CATEGORIZED JUNCTION AT 26+210.41 - 896

Position no.	Position description	Unit meas.	Quantity	Price unit (RSD)	Total (RSD)
1. Preparation works					
1.01	**Staking out and marking of the route and objects (by an individual BoQ)**				
	a) bus stop at km 26+195.00	m^1	52.00	70.00	3,640.00
	b) non-categorized junction at km 26+210.41	m^1	25.00	70.00	1,750.00
1.02	**Cutting asphalt layers (by an individual BoQ)**				
	a) bus stop at km 26+195.00	m^1	52.00	470.00	24,440.00
	b) non-categorized junction at km 26+210.41	m^1	4.00	470.00	1,880.00

1.03	**Carriageway demolition (by an individual BoQ)**				
	a) bus stop at km 26+195.00	m^2	97.00	650.00	63,050.00
	b) non-categorized junction at km 26+210.41	m^2	65.00	650.00	42,250.00
1.04	**Demolition of other traffic areas (by an individual BoQ)**				
	a) gravel area, d=30 cm	m^2	99.00	600.00	59,400.00
1.05	**Scrapin the asphalt layer (by an individual BoQ)**				
	a) bus stop at km 26+195.00	m^3	4.16	2,800.00	11,648.00
	b) non-categorized junction at km 26+210.41	m^3	3.16	2,800.00	8,848.00
1.06	**Protection of current installations**		lump sum	500,000.00	500,000.00
1.07	**Displacement of current installation**		lump sum	1,000,000.00	1,000,000.00
1.08	**Preparation of technical documentation needed for the project implementation to obtain all legally prescribed conditions and permits**		lump sum	1,500,000.00	1,500,000.00
1.09	**Development of technical control necessary for the project implementation**		lump sum	150,000.00	150,000.00
1.10	**Geodetic survey of the constructed object (by an individual BoQ)**	pc	1	80,000.00	80,000.00
1.11	**Project development of the constructed object (by an individual BoQ)**	pc	1	250,000.00	250,000.00
	T O T A L 1.				**3,696,906.00**
2. Ground works					
2.01	**Humus excavation (by an individual BoQ)**	m^3	24.60	320.00	7,872.00
2.02	**Wide excavation (by an individual BoQ)**	m^3	11.00	330.00	3,630.00
2.03	**Excavation of new ground canals (by an individual BoQ)**	m^3	4.20	330.00	1,386.00
2.04	**Compaction of the subsoil (by an individual BoQ)**				
	a) bus stop at km 26+195.00	m^2	90.00	60.00	5,400.00
	b) non-categorized junction at km 26+210.41	m^2	101.00	60.00	6,060.00
2.05	**Making a sand embankment (by an individual BoQ)**				
	a) in the area of the designed bus stop (by the tabular BoQ), d=30cm	m^3	54.90	1,450.00	79,605.00
	b) in the area of the non-categorized junction at km 26+210.41 (by the tabular BoQ), d=30cm	m^3	7.50	1,450.00	10,875.00
	c) in the area of the designed footpath (by the tabular BoQ), d=20cm	m^3	6.20	1,450.00	8,990.00
2.06	**Making a soil material embankment (by the tabular BoQ)**	m^3	14.70	900.00	13,230.00
2.07	**Planning and rolling the formation level (by an individual BoQ)**				
	a) bus stop at km 26+195.00	m^2	90.00	60.00	5,400.00
	b) non-categorized junction at km 26+210.41	m^2	101.00	60.00	6,060.00
2.08	**Resoiling flat and slope surfaces and road shoulders (by an individual BoQ)**				

	Resoiling flat and slope surfaces and road shoulders with the excavated matierial in the layer d=20cm				
	a) bus stop at km 26+195.00	m^2	61.00	320.00	19,520.00
	b) non-categorized junction at km 26+210.41	m^2	53.00	320.00	16,960.00
2.09	**Transport of the soil material (by an individual BoQ)**				
	at the distance of 3.0km-5.0km	m^3	2.30	450.00	1,035.00
2.10	**Spreading of soil material at the landfill (by an individual BoQ)**	m^3	2.30	70.00	161.00
	T O T A L 2.				**186,184.00**
3.	**Pavement construction**				
3.01	**Formation of a bearing layer from mechanically compacted granular stone material 0/63 mm (by an individual BoQ)**				
	a) crushed stone aggregate 0/63 mm in the area of the designed bus stop (by the tabular BoQ), d=25cm	m^3	40.50	4,150.00	168,075.00
	b) crushed stone aggregate 0/63 mm in the area of the non-categorized junction (by the tabular BoQ), d=25cm	m^3	6.25	4,150.00	25,937.50
3.02	**Formation of a bearing layer from mechanically compacted granular stone material 0/31.5 mm)**				
	a) crushed stone aggregate 0/31.5 mmin the area of the designed footpath (by the tabular BoQ), d=15cm	m^3	4.65	4,150.00	19,297.50
	b) crushed stone aggregate 0/31.5 mm in the area of the designed bus stop (by the tabular BoQ), d=20cm	m^3	28.20	4,150.00	117,030.00
	c) crushed stone aggregate 0/31.5 mm in the area of the non-categorized junction (by the tabular BoQ), d=20cm	m^3	5.00	4,150.00	20,750.00
	d) crushed stone aggregate 0/31.5 mm in the newly designed gravel areas, d=30cm	m^3	18.00	4,150.00	74,700.00
	e) crushed stone aggregate 0/31.5 mm in the area of the newly designed concrete access, d=15cm	m^3	1.05	4,150.00	4,357.50
3.03	**Formation of the upper bituminized base layer (BNS 22sA) (by an individual BoQ)**				
	a) in the area of the designed bus stop (by the tabular BoQ), d=6cm	m^2	232.00	1,600.00	371,200.00
	b) in the area of the non-categorized junction (by the tabular BoQ), d=6cm	m^2	50.00	1,600.00	80,000.00
3.04	**Formation of the upper bituminized base layer (BNS 22A) (by an individual BoQ)**				
	a) in the area of the designed footpath (by the tabular BoQ), d=5cm	m^2	31.00	1,400.00	43,400.00
3.05	**Formation of the wearing layer asphalt concrete (AB11s) (by an individual BoQ)**				
	a) in the area of the designed bus stop (by the tabular BoQ), d=4cm	m^2	90.00	1,200.00	108,000.00
	b) in the area of the non-categorized junction (by the tabular BoQ), d=6cm	m^2	101.00	1,200.00	121,200.00

3.06	**Formation of the wearing layer asphalt concrete (AB8) (by an individual BoQ)**				
	a)in the area of the designed footpath (by the tabular BoQ), d=3cm	m^2	31.00	700.00	21,700.00
3.07	**Making a concrete road overlay on the part of the car driveway**	m^2	7.00	2,000.00	14,000.00
3.08	**Placing concrete curbs (by an individual BoQ)**				
	a) 18/24cm (+12cm)	m^1	29.00	1,800.00	52,200.00
	b) 12/18cm	m^1	47.00	1,600.00	75,200.00
	T O T A L 3.				**1,317,047.50**
4. Drainage					
4.01	**Placing the ready-made concrete elements along the slope of the embankment on a gravel base of d=15cm - making the flumebe**	m^1	2.00	1,800.00	3,600.00
4.02	**Purchase, transport and installation of galvanized grilles for sewers**	pc	1.00	4,500.00	4,500.00
4.03	**Making concrete sewers**	m^3	0.20	13,500.00	2,700.00
	T O T A L 4.				**10,800.00**
5. Other works					
5.01	**Installation of a canopy on the part of the bus stop for pedestrians (by an individual BoQ)**	pc	1.00	25,000.00	25,000.00
	T O T A L 5.				**25,000.00**

Construction works summary

	1. Preparation works				**3,696,906.00**
	2. Ground works				**186,184.00**
	3. Pavement construction				**1,317,047.50**
	4. Drainage				**10,800.00**
	5. Other works				**25,000.00**
				base:	**5,235,937.50**
				VAT 20%:	**1,047,187.50**
				TOTAL:	**6,283,125.00**

2.6.6.2 ESTIMATE OF CONSTRUCTION WORKS - 897

Posit. no.	Position description	Unit meas.	Quantity	Price unit (RSD)	Total (RSD)

1. Preparation works					
1.01	**Staking out and marking of the route and objects**	m^1	160.00	70.00	11,200.00
1.02	**Cutting asphalt layers**	m^1	212.40	470.00	99,828.00
1.03	**Carriageway demolition**	m^3	53.60	650.00	34,840.00
1.04	**Curb demolition**	m^1	12.30	400.00	4,920.00
1.05	**Protection of the current installations**		lump sum	500,000.00	500,000.00
1.06	**Preparation of technical documentation needed for the project implementation to obtain all legally prescribed conditions and permits**		lump sum	1,200,000.00	1,200,000.00
1.07	**Development of technical control necessary for the project implementation**		lump sum	120,000.00	120,000.00
1.08	**Geodetic survey of the constructed object**		lump sum	80,000.00	80,000.00
1.09	**Project development of the constructed object**		lump sum	250,000.00	250,000.00
	TOTAL 1. PREPARATION WORKS				**2,300,788.00**
2. Ground works					
2.01	**Humus excavation**	m^3	3.52	320.00	1,126.40
2.02	**Planning and rolling the formation level**	m^2	110.03	60.00	6,601.80
2.03	**Making a sand embankment**	m^3	17.25	1,450.00	25,012.50
2.04	**Resoiling flat and slope surfaces and road shoulders d=20cm**	m^2	86.22	320.00	27,590.40
	TOTAL 2. GROUND WORKS				**60,331.10**
3. Pavement construction					
3.01	**Formation of a bearing layer from mechanically compacted granular stone material 0/31,5 mm**	m^3	11.25	4,150.00	46,687.50
3.02	**Placing concrete curbs**				0.00
	18/24 cm (+12 cm)	m^1	62.00	1,800.00	111,600.00
	18/24 cm (+3 cm) - downed	m^1	145.00	1,800.00	261,000.00
3.03	**Placing a small stone cube 10/10/10 cm on a sand layer 0/4, d=4 cm**	m^2	75.00	2,500.00	187,500.00
	TOTAL 3. PAVEMENT CONSTRUCTION				**606,787.50**

Construction works summary

	1. Preparation works				**2,300,788.00**
	2. Ground works				**60,331.10**
	3. Pavement construction				**606,787.50**
				base:	**2,967,906.60**

VAT 20%:	**593,581.32**
TOTAL:	**3,561,487.92**

2.6.5.2 BILL OF QUANTITIES FOR CONSTRUCTION WORKS - 898

Position no.	Position description	Unit meas.	Quantity	Price unit (RSD)	Total (RSD)
1. Preparation works					
1.01	**Staking out and marking of the route and objects**	m^1	13.00	70.00	910.00
1.02	**Cutting asphalt layers**	m^1	34.00	470.00	15,980.00
1.03	**Carriageway demolition**	m^3	31.00	650.00	20,150.00
1.04	**Curb demolition**	m^1	10.00	400.00	4,000.00
1.05	**Protection of current installations**		lump sum	500,000.00	500,000.00
1.06	**Preparation of technical documentation needed for the project implementation to obtain all legally prescribed conditions and permits**		lump sum	1,200,000.00	1,200,000.00
1.07	**Development of technical control necessary for the project implementation**		lump sum	120,000.00	120,000.00
1.08	**Geodetic survey of the constructed object**		lump sum	80,000.00	80,000.00
1.09	**Project development of the constructed object**		lump sum	250,000.00	250,000.00
	TOTAL 1. PREPARATION WORKS				**2,191,040.00**
2. Ground works					
2.01	**Making a sand embankment**	m^3	24.00	1,450.00	34,800.00
2.02	**Planning and rolling the formation level**	m^2	77.50	60.00	4,650.00
2.03	**Resoiling flat and slope surfaces and road shoulders d=20cm**	m^2	72.00	320.00	23,040.00
	TOTAL 2. GROUND WORKS				**62,490.00**
3. Pavement construction					
3.01	**Formation of a bearing layer from mechanically compacted granular stone material 0/31,5 mm**	m^3	2.72	4,150.00	11,288.00
3.02	**Placing concrete curbs**	m^1	34.00	1,800.00	61,200.00
	TOTAL 3. PAVEMENT CONSTRUCTION				**72,488.00**

Construction works summary

	1. Preparation works				**2,191,040.00**
	2. Ground works				**62,490.00**
	3. Pavement construction				**72,488.00**
				base:	**2,326,018.00**
				VAT 20%:	**465,203.60**
				TOTAL:	**2,791,221.60**

2.6.5.2 BILL OF QUANTITIES FOR CONSTRUCTION WORKS - 899

Position no.	Position description	Unit meas.	Quantity	Price unit (RSD)	Total (RSD)
1. Preparation works					
1.01	**Staking out and marking of the route and objects**	m^1	97.00	70.00	6,790.00
1.02	**Cutting asphalt layers**	m^1	103.00	470.00	48,410.00
1.03	**Carriageway demolition**	m^3	90.00	650.00	58,500.00
1.04	**Curb demolition**	m^1	15.00	400.00	6,000.00
1.05	**Protection of current installations**		lump sum	500,000.00	500,000.00
1.06	**Preparation of technical documentation necessary for the project implementation in order to obtain all legally prescribed conditions and permits**		lump sum	1,200,000.00	1,200,000.00
1.07	**Development of technical control necessary for project implementation**		lump sum	120,000.00	120,000.00
1.08	**Geodetic survey of the constructed object**		lump sum	80,000.00	80,000.00
1.09	**Project development of the constructed object**		lump sum	250,000.00	250,000.00
	TOTAL 1. PREPARATION WORKS				**2,269,700.00**
2. Ground works					
2.01	**Making a sand embankment**	m^3	70.00	1,450.00	101,500.00
2.02	**Planning and rolling the formation level**	m^2	207.00	60.00	12,420.00
2.03	**Resoiling flat and slope surfaces and road shoulders d=20cm**	m^2	207.00	320.00	66,240.00
	TOTAL 2. GROUND WORKS				**180,160.00**
3. Pavement construction					
3.01	**Formation of a bearing layer from mechanically compacted granular stone material 0/31,5 mm**	m^3	8.00	4,150.00	33,200.00
3.02	**Placing concrete curbs**	m^1	96.00	1,800.00	172,800.00

	TOTAL 3. PAVEMENT CONSTRUCTION				**206,000.00**

Construction works summary

	1. Preparation works				**2,269,700.00**
	2. Ground works				**180,160.00**
	3. Pavement construction				**206,000.00**
				base:	**2,655,860.00**
				VAT 20%:	**531,172.00**
				TOTAL:	**3,187,032.00**

2.6.5.2 BILL OF QUANTITIES FOR CONSTRUCTION WORKS-900

Position no.	Position description	Unit meas.	Quantity	Price unit (RSD)	Total (RSD)
1. Preparation works					
1.01	**Staking out and marking of the route and objects**	m^1	75.00	70.00	5,250.00
1.02	**Cutting asphalt layers**	m^1	40.90	470.00	19,223.00
1.03	**Carriageway demolition**	m^3	23.40	650.00	15,210.00
1.04	**Protection of current installations**		lump sum	100,000.00	100,000.00
1.05	**Preparation of technical documentation necessary for the project implementation in order to obtain all legally prescribed conditions and permits**		lump sum	1,200,000.00	1,200,000.00
1.06	**Development of technical control necessary for project implementation**		lump sum	120,000.00	120,000.00
1.07	**Geodetic survey of the constructed object**		lump sum	80,000.00	80,000.00
1.08	**Project development of the constructed object**		lump sum	250,000.00	250,000.00
	TOTAL 1. PREPARATION WORKS				**1,789,683.00**
2. Ground works					
2.01	**Making a sand embankment**	m^3	18.00	1,450.00	26,100.00
2.02	**Planning and rolling the formation level**	m^2	58.50	60.00	3,510.00
2.03	**Resoiling flat and slope surfaces and road shoulders d=20cm**	m^2	58.50	320.00	18,720.00
	TOTAL 2. GROUND WORKS				**48,330.00**

3. Pavement construction					
3.01	**Formation of a bearing layer from mechanically compacted granular stone material 0/31,5 mm**	m^3	3.50	4,150.00	14,525.00
3.02	**Placing concrete curbs**	m^1	40.90	1,800.00	73,620.00
	TOTAL 3. PAVEMENT CONSTRUCTION				**88,145.00**

Construction works summary

	1. Preparation works				**1,789,683.00**
	2. Ground works				**48,330.00**
	3. Pavement construction				**88,145.00**
				base:	**1,926,158.00**
				VAT 20%:	**385,231.60**
				TOTAL:	**2,311,389.60**