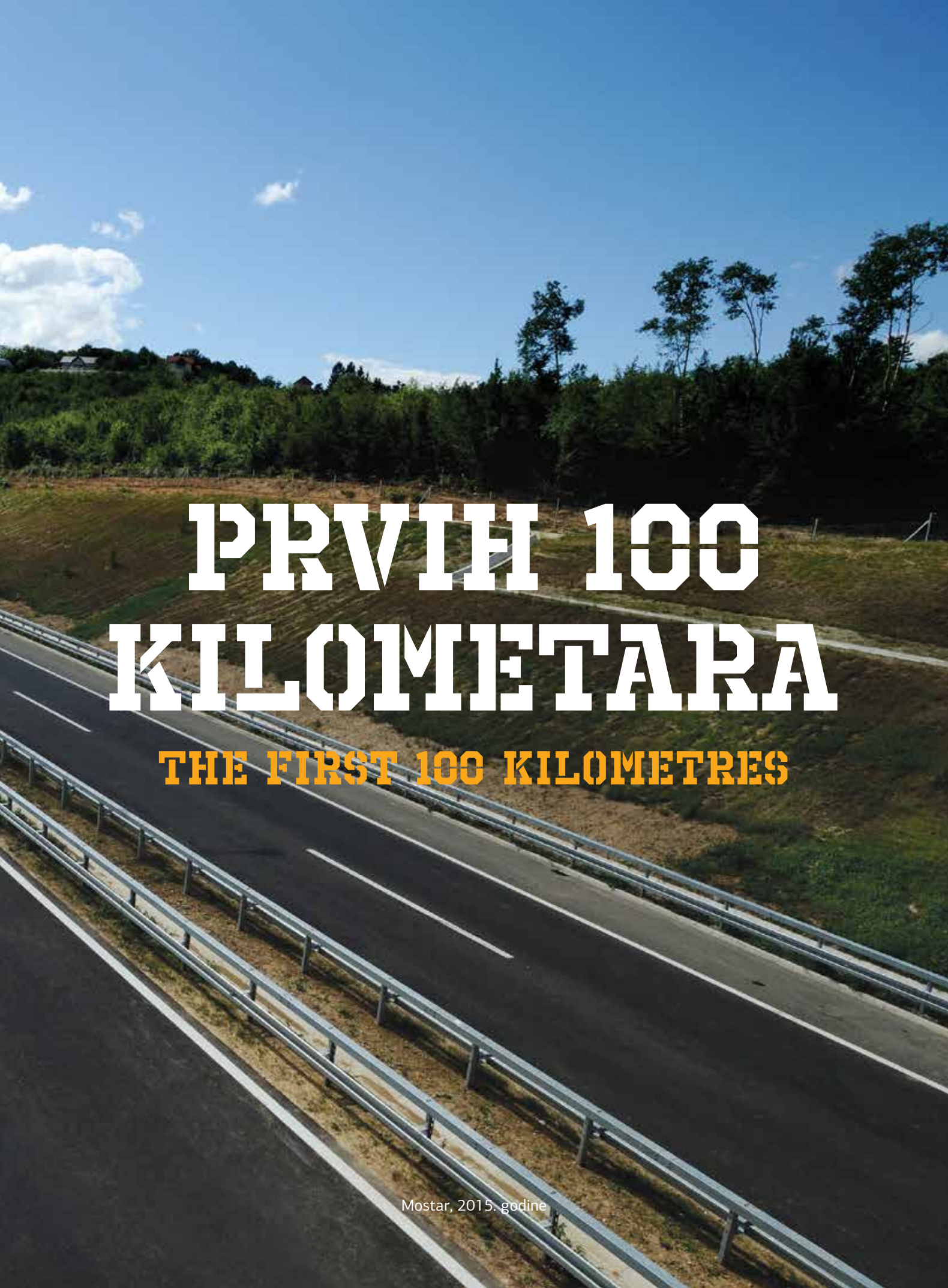


PRVIH 100 KILOMETARA

THE FIRST 100 KILOMETRES

Mostar, 2015. godine

SADRŽAJ CONTENT

U ime Uprave JP Autoceste FBiH d.o.o. Mostar
Direktor **mr. sci. Ensad Karić**

Uvodna riječ

Monografijom „Prvih 100 kilometara" želimo predstaviti najveći i najzahtjevniji investicijski i građevinski poduhvat u Bosni i Hercegovini – Koridor Vc.

Na izgradnji prvih 100 km autoceste bilo je angažovano 5.000 radnika i 90 domaćih kompanija. U protekle tri godine ovo preduzeće je investiralo 1,25 milijarde KM i realizovalo 11 projekata izgradnje autoceste na Koridoru Vc.

Proglašeni smo kompanijom koja je u 2012. i 2013. godini ostvarila najveće investicije u Bosni i Hercegovini.
Intenzivna izgradnja Koridora Vc značajno utječe na bruto društveni proizvod u Federaciji BiH, na rast zaposlenosti, ekspanziju građevinskog sektora, te veću proizvodnju i prodaju potrebnog građevinskog materijala.

U proteklom periodu izgradili smo prvi Centar za održavanje i kontrolu prometa u Bosni i Hercegovini, najvažniji objekat na autocesti A1, koji služi za smještaj jedinica za održavanje, nadzor i upravljanje prometom na autocesti u skladu sa direktivom Evropske komisije 2004/54/EC. Na ovaj način smo unaprijedili sigurnost i udobnost putovanja autocestom.

Mi smo preduzeće koje povezuje ljude, podržava društveno odgovorno poslovanje, unapređuje kvalitet življenja u našoj zemlji i otvara nove poslovne mogućnosti.
Čast mi je biti na čelu mladog, stručnog i odgovornog tima uposlenika JP Autocesta FBiH d.o.o. Mostar koji je zaslužan za realizaciju ovog velikog projekta koji će našim građanima omogućiti sigurniji i kvalitetniji život.

Ovu knjigu posvećujemo svim učesnicima u izgradnji autoceste na Koridoru Vc uz zahvalnost za do sada učinjeno i kao poticaj za budući rad.

Sarajevo, mart 2015.

On behalf of the management of JP Autoceste d.o.o. Mostar
Director **Ensad Karić MSc**

Introductory Statement

This monograph, titled "The First 100 Kilometres", is dedicated to the largest, most demanding investment and construction undertaking in Bosnia and Herzegovina - Corridor Vc.

Five thousand workers and ninety local companies were engaged on the construction of the first 100 km of the motorway. Over the last three years our company invested 1.25 billion BAM and completed 11 motorway construction projects on Corridor Vc.

We have received recognition as the company with highest investments in Bosnia and Herzegovina in 2012 and 2013.
Intensive construction on Corridor Vc made a significant impact on gross domestic product in the Federation BiH and resulted in growth of employment, expansion of the construction sector and increased production and sales of construction materials.
In the preceding period we constructed the first Traffic Maintenance and Control Centre in Bosnia and Herzegovina, the most important facility on the A1 motorway which houses the motorway maintenance, monitoring and management unit in compliance with the European Commission Directive 2004/54/EC, thus improving the safety and comfort of travel on the motorway.

We are a company that connects people, supports socially responsible business, improves the quality of life in our country and opens up new business opportunities. It is my honour to be at the head of the young, professional and responsible team of JP Autoceste FBiH d.o.o. Mostar that is responsible for implementation of this large project which will provide our citizens a safer and better life.

This book is dedicated to all those who took part in construction of the motorway on Corridor Vc, as an expression of our gratitude and encouragement for future efforts.

Sarajevo, March 2015

1.0

UVOD
INTRODUCTION

Razvoj svake države uvjetovan je razvojem transportne infrastrukture. Razvijenošću transportne infrastrukture mjeri se, vrlo često, i razvijenost same države. Zato je transportna politika i u njoj transportna infrastruktura nezaobilazan dio svih kratkoročnih, srednjoročnih i dugoročnih planova razvoja svake države, regije i kontinenta.

Bosna i Hercegovina planira i gradi svoju transportnu infrastrukturu s ciljem efikasnog zadovoljavanja transportnih potreba stanovništva i privrede. Pri tome se slijedi generalna transportna politika Evropske unije u okviru koje se kreira transportna politika Evrope kao kontinenta.

Transportna politika je politika koja je tijesno povezana s drugim ključnim politikama kao što su ekonomska, energetska, socijalna, regionalna politika i politika zaštite okoliša.

Transportna strategija EU 2050, usvojena 2011. godine, ima za cilj kreiranje zajedničkog evropskog transportnog prostora radi dalje integracije svih vidova transporta, te smanjenja emisije štetnih gasova za 60 % do 2050. godine. Nužno je dalje razvijati saobraćajnu infrastrukturu i osigurati buduću održivost transportnog sistema uzimajući u obzir zahtjeve za energetskom efikasnošću i zaštitom životne sredine.
U zadnjoj deceniji 20. stoljeća značajne institucije,

Development of any country depends on development of its transport infrastructure. The state of development of transport infrastructure is often used as an indicator of development of the country as a whole. This is why transport policy, and transport infrastructure as one of its components, represents a necessary part of all short-term, medium-term and long-term development plans for any country, region or continent.

Bosnia and Herzegovina is currently building its transport infrastructure in order to efficiently address the needs of its population and economy. This development follows the general transport policy of the European Union, which dictates the transport policy for Europe as a continent.

Transport policy is closely related to other key policies, such as the economic, energy, social, regional and environmental policies.

The EU 2050 transport policy was adopted in 2011 and its objective is to create a common European transport space that will further integrate all forms of transport and reduce emissions of harmful gasses by 60% until 2050. Transport infrastructure needs to continue to develop in order to secure future sustainability of the transport system, with a view of energy efficiency requirements and environmental concerns.

tijela i organizacije tretirale su dijelove ili cjelokupnu transportnu mrežu Evrope. Tako je budućnost evropske transportne mreže tretirana u:

- Evropskoj komisiji (EC) kroz radne grupe G-24 u čijem radu su učestvovali i predstavnici država srednje i istočne Evrope, međunarodnih institucija i organizacija iz domena transporta te finansijskih institucija,
- Evropskoj konferenciji ministara transporta (CEMT),
- Ekonomskoj komisiji za Evropu Ujedinjenih nacija (ECE-UN) u kojoj se realizuju projekti TEM (Trans – European Motorways) i TER (Trans-European Railways),
- Centralno-evropskoj inicijativi (CEI) preko komisije za transport,
- Jugoistočnoj kooperativnoj inicijativi (SECI).

Bosna i Hercegovina počela je učestvovati u radu svih navedenih organizacija, institucija, tijela, grupa, komisija i projekata od sredine 1996. godine.

Na drugoj Panevropskoj konferenciji o transportu Evropska unija je definisala prioritete Unije u domenu infrastrukture, te transportne koridore prema istoku za period do 2015. godine. Ti koridori, u načelu, predstavljaju historijske saobraćajne tokove.

Na trećoj Panevropskoj konferenciji o transportu održanoj u Helsinkiju juna 1997. godine povećan je broj koridora na deset i izvršene su određene izmjene na ranije prihvaćenim koridorima.
Jedna od tih izmjena bila je i uvođenje Koridora Vc (Budimpešta – Osijek – Sarajevo – Ploče) u osnovnu evropsku transportnu mrežu.

Svi koridoru uvršteni u panevropsku transportnu mrežu bili su u fazi predlaganja razmatrani s aspekta zrelosti projekta (tehničke, ekonomske, političke itd.), položaja u odnosu na druge transportne koridore u državi, te utjecaja na čovjekovu okolinu.

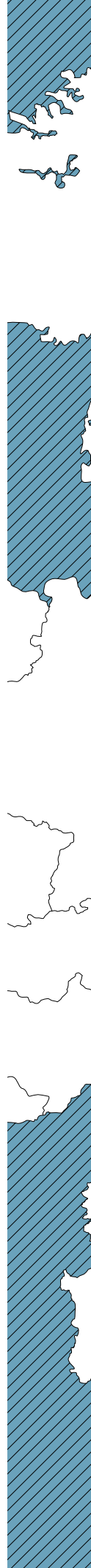
In the last decade of the 20th century, important institutions, bodies and organisations have reviewed certain parts and the overall European transport network. The future of the European transport network was considered by:

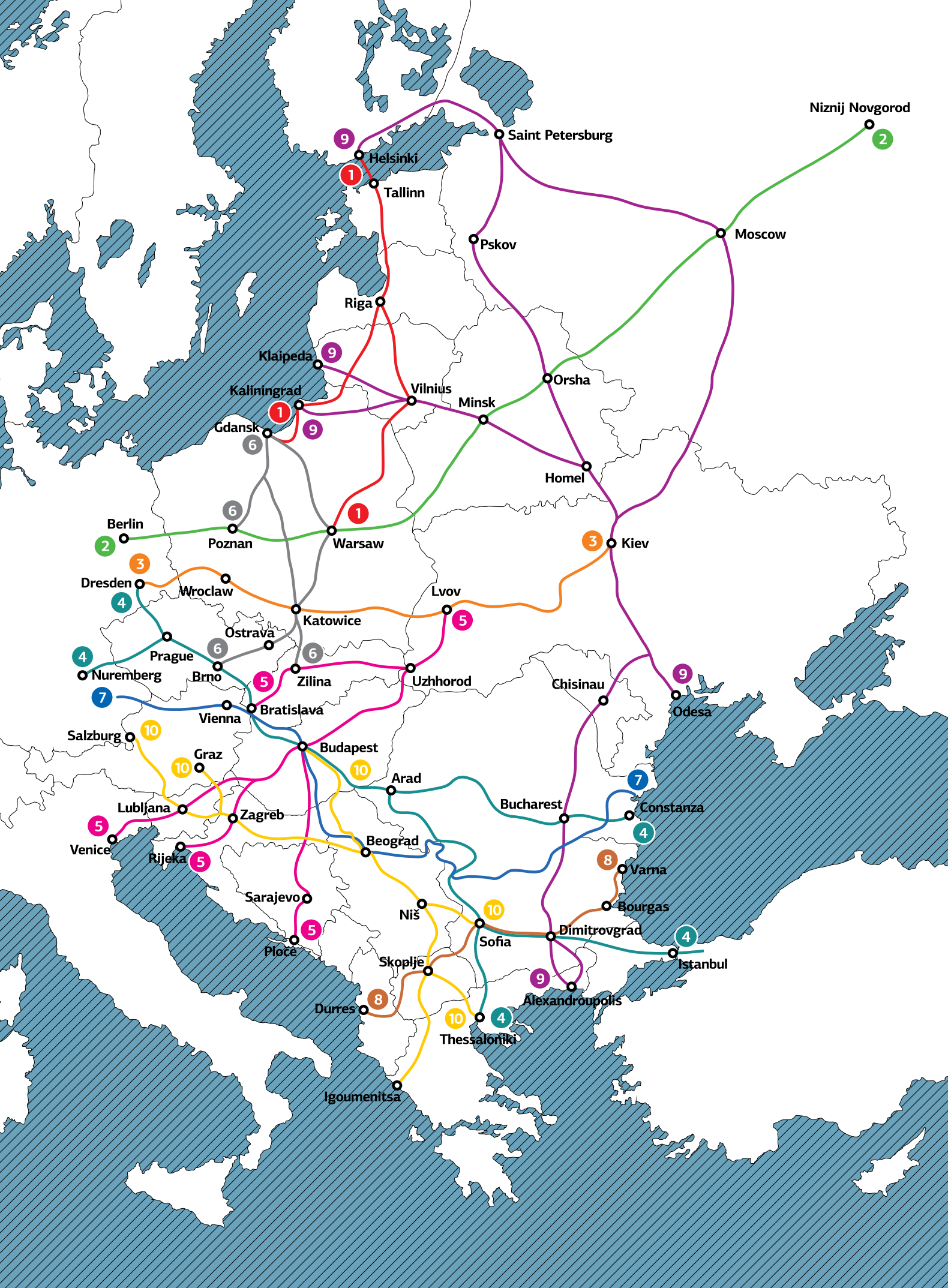
- the European Commission (EC), through G-24 working groups that included representatives from Central and Eastern European countries, international institutions and organisations from the transport sector, and financial institutions,
- the European Conference of Ministers of Transport (CEMT),
- the United Nations Economic Commission for Europe (UNECE), through TEM (Trans-European Motorways) and TER (Trans-European Railways) projects,
- the Central European Initiative (CEI), via the Transport Commission,
- the Southeast European Cooperation Initiative (SECI).

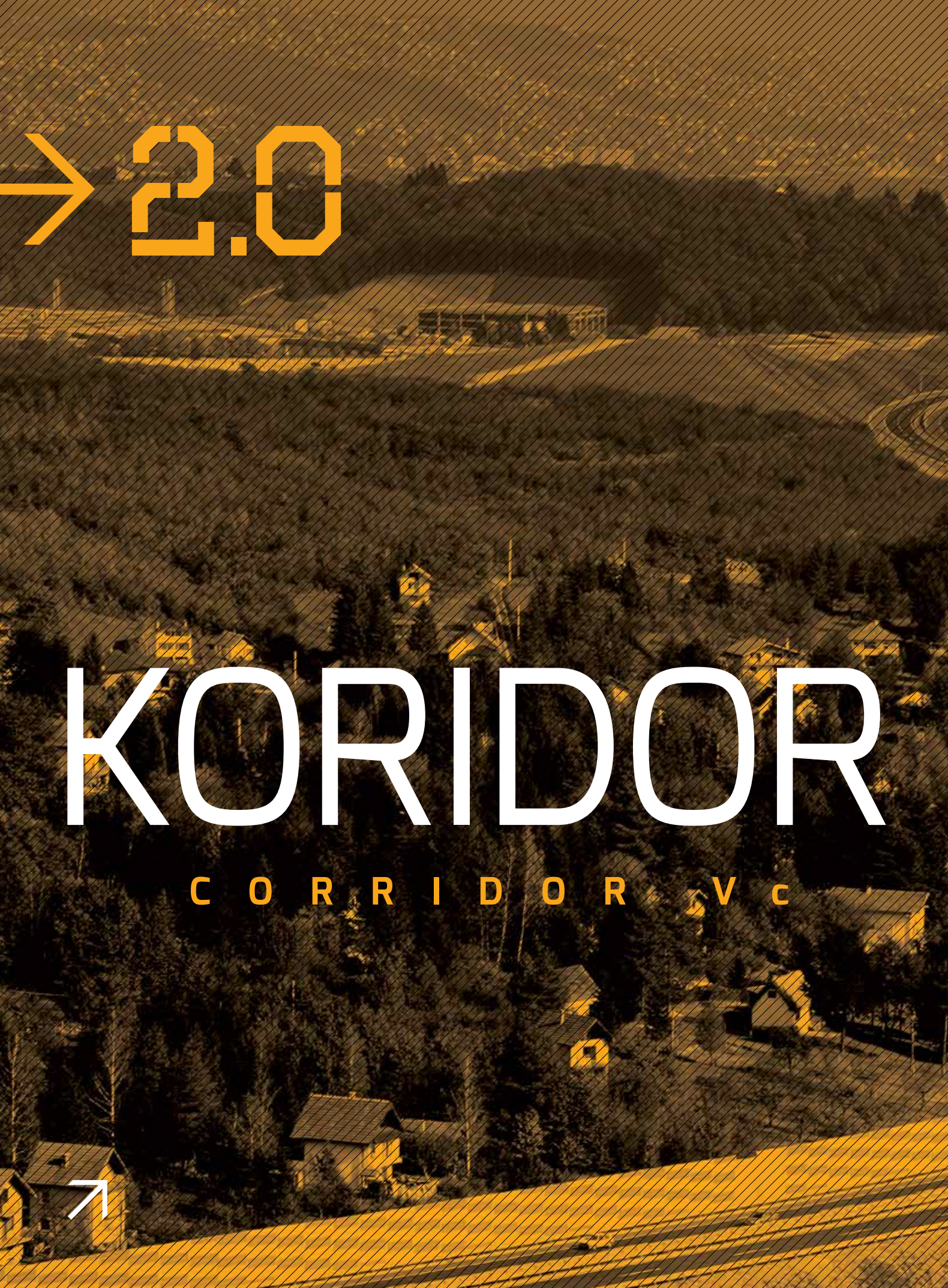
Bosnia and Herzegovina started to participate in the work of these institutions, bodies, groups, commissions and projects mid- 1996.

On the second Pan-European Transport Conference, the European Union defined its infrastructural priorities and eastern transport corridors for the period to 2015. These corridors, in principle, represent the historic traffic flows.

On the third Pan-European Transport Conference held in Helsinki in June 1997, the number of corridors was increased to ten and certain changes were made to the previously agreed corridors.
One of these changes was the introduction of Corridor Vc (Budapest – Osijek – Sarajevo – Ploče) as part of the essential European transport network.
In the evaluation stage, all corridors included in the Pan-European transport network were reviewed with regard to project maturity (technical, economic, political, etc.), position in relation to other transport corridors in the country, and environmental impact.




Niznij Novgorod
2
Saint Petersburg
9
Helsinki
1
Tallinn
Moscow
Pskov
Riga
Klaipeda
9
Orsha
Kaliningrad
1
Vilnius
Minsk
Gdansk
9
6
Homel
6
1
Berlin
2
Poznan
Warsaw
3
Kiev
3
Dresden
Wroclaw
Lvov
4
Katowice
5
Ostrava
6
Prague
6
4
Nuremberg
Brno
5
Zilina
Uzhhorod
Chisinau
9
7
Vienna
Bratislava
Odesa
Salzburg
10
Budapest
Graz
10
10
Arad
7
Bucharest
Constanza
Lubljana
Zagreb
5
4
Venice
Beograd
Rijeka
5
8
Varna
Sarajevo
Niš
10
Bourgas
5
Sofia
Dimitrovgrad
4
Ploče
Istanbul
Skoplje
9
Alexandroupolis
8
Durres
10
4
Thessaloniki
Igoumenitsa


2.0
KORIDOR
CORRIDOR VC


Vc

KORIDOR Vc
CORRIDOR Vc

Koridor Vc je multimodalni (cestovni i željeznički) transportni koridor koji povezuje Mađarsku, Hrvatsku i Bosnu i Hercegovinu na potezu Budimpešta – Osijek – Sarajevo – Ploče.

Trasa autoceste na Koridoru Vc (evropska cesta E73) se u Mađarskoj pruža pravcem: Budimpešta – Pečuh – Mohač – granica s Republikom Hrvatskom, dok se kroz Hrvatsku proteže od granice sa Mađarskom pravcem: Beli Manastir – Osijek – Đakovo – granica s Bosnom i Hercegovinom.

U Bosni i Hercegovini autocesta na Koridoru Vc od sjeverne granice s Republikom Hrvatskom pruža se pravcem: Svilaj – Odžak – Modriča – Doboj – Zenica – Kakanj – Visoko – Sarajevo – Konjic – Jablanica – Mostar – Čapljina – južna granice s Republikom Hrvatskom, u mjestu Bijača.

U Mađarskoj još nije izgrađena dionica Mohač – granica s Republikom Hrvatskom; u Hrvatskoj nije izgrađena dionica Osijek – Beli Manastir – granica sa Republikom Mađarskom i dionica Sredinci – granica s Bosnom i Hercegovinom.

Corridor Vc is a multimodal (road and rail) transport corridor linking Hungary, Croatia and Bosnia and Herzegovina via Budapest – Osijek – Sarajevo – Ploče.

The Corridor Vc alignment (European road E73) through Hungary is: Budapest – Pécs – Mohács – border with the Republic of Croatia, and through Croatia it proceeds from the border with Hungary through: Beli Manastir – Osijek – Đakovo – border with Bosnia and Herzegovina.

Through Bosnia and Herzegovina, the Corridor Vc motorway runs from the northern border with the Republic of Croatia and through: Svilaj – Odžak – Modriča – Doboj – Zenica – Kakanj – Visoko – Sarajevo – Konjic – Jablanica – Mostar – Čapljina – southern border with the Republic of Croatia in the village of Bijača.

The sections that remain to be built are: in Hungary the section Mohács – border with Croatia, in Croatia the section Osijek – Beli Manastir – border with the Republic of Hungary and the section Sredinci – border with Bosnia and Herzegovina.


SLOVAKIA
AUSTRIA
Budapest
HUNGARY
SLOVENIA
ROMANIA
CROATIA
Osijek
BOSNIA AND
HERZEGOVINA
SERBIA
Sarajevo
Ploče
MONTENEGRO
BULGARIA

KORIDOR Vc KROZ BiH
CORRIDOR Vc THROUGH BiH

Još od konca šezdesetih godina prošlog stoljeća pa do danas vršena su istraživanja koja su imala za cilj definisanje buduće transportne mreže u Bosni i Hercegovini. Neka od tih istraživanja su vršena na poticaj međunarodnih institucija i organizacija, a neka na inicijativu državnih institucija ili nekih drugih naučnih organizacija.

U tom periodu kao i ranije u BiH su tretirani transportni kopneni koridori koji:

- povezuju srednju Evropu s Jadranskim morem (sjever – jug) i
- protežu se od sjeverozapada ka jugoistoku

Izgradnja autoceste koja povezuje srednju Evropu s Jadranskim morem počela je izgradnjom autoceste Zenica – Sarajevo još 1975. godine.

U veoma kratkom vremenu nakon uvrštavanja Koridora Vc u mrežu panevropskih transportnih koridora (1997.), pristupilo se izradi Studije izbora trase autoceste na Koridoru Vc kroz BiH (1998. godine).

Upravo na osnovu te studije 2007. godine je izrađen Idejni projekat kao i Studija izvodljivosti autoceste na Koridoru Vc kroz BiH.

From the late 1960's to date, surveys were conducted with the objective to define the future transport network in Bosnia and Herzegovina. Some of these surveys were a result of incentives from international institutions and organisations and some were based on initiatives from state institutions and other scientific organisations.

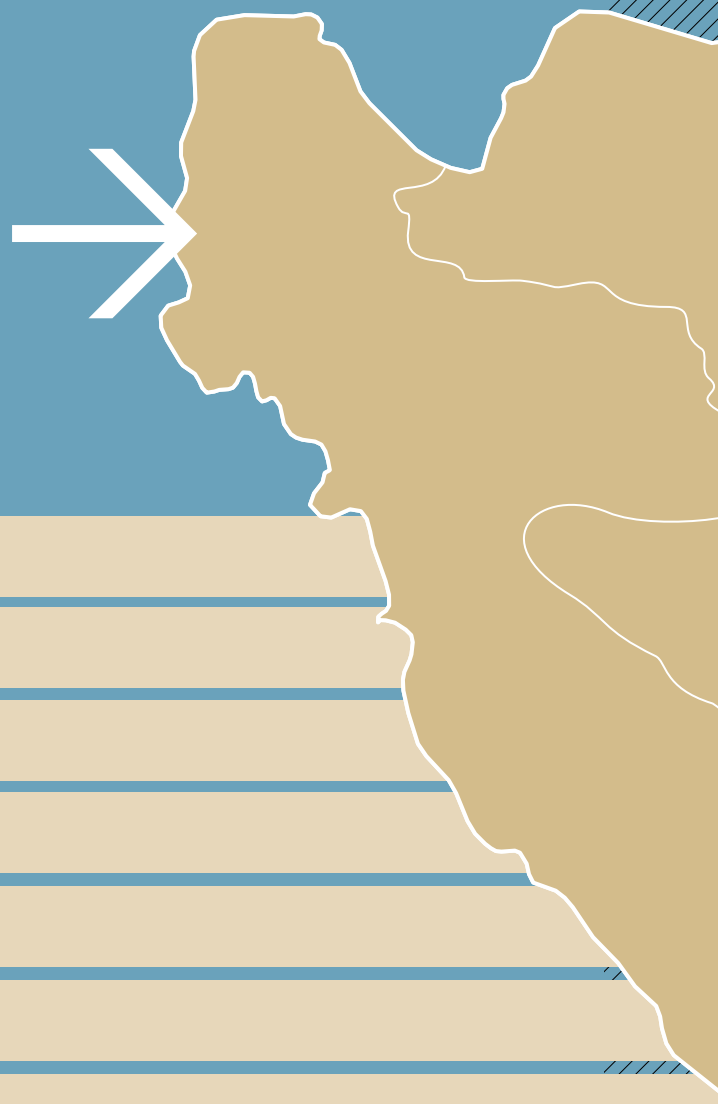
In this period research in BiH was focused on land transport corridors that:

- link Central Europe to the Adriatic Sea (north - south), and
- traverse in the direction from northwest to southeast.

Construction of the motorway linking Central Europe with the Adriatic Sea started in 1975, with the construction of the Zenica - Sarajevo motorway.
Preparation of the Study of Motorway Alignment on Corridor Vc through BiH (1998) was initiated shortly after Corridor Vc was added to the Pan-European transport network (1997).

This Study formed the basis for completion of the conceptual design and the Feasibility Study for the Corridor Vc motorway through BiH in 2007.

Stanje izgrađenosti do kraja 2014. godine:
Stage of completion at the end of 2014



Svilaj – Odžak – Vukosavlje

Vukosavlje – Johovac

Johovac – Doboj jug

Zenica Sjever – Zenica Jug

Zenica Jug – Kakanj

Kakanj – Visoko

Visoko – Sarajevo Sjever

Sarajevo Sjever – Sarajevo Zapad

Sarajevo Zapad – Tarčin

Tarčin – Konjic

Mostar sjever – Mostar jug

Mostar jug – Počitelj

Počitelj – Bijača (granica s Republikom Hrvatskom / border with the Republic of Croatia)


CROATIA
SVILAJ
ODŽAK
DOBOJ
KARUŠE
ŽEPČE
SERBIA
ZENICA
KLOPČE
DRIVUŠA
BILJEŠEVO
KAKANJ
LENGTH
335
KILOMETERS
JOŠANICA
BUTILA
SARAJEVO
VLAKOVO
TARČIN
KONJIC
ZUKIĆI
JABLANICA
MOSTAR SJEVER
ZVIROVIĆI
BLAGAJ
KRAVICE
POČITELJ
BIJAČA
NOVEMBER 2014
PRELIMINARY DESIGN
LAND ACQUISITION
CONSTRUCTION PERMITS
UNDER CONSTRUCTION
COMPLETED

Trasa autoceste na Koridoru Vc je projektovana u skladu s TEM standardima, s dvije odvojene kolovozne trake, svaka s po dvije saobraćajne trake (vozna i preticajna) za svaki smjer kretanja i po jednu zaustavnu traku za prinudno zaustavljanje u svakoj kolovoznoj traci.

Do sada je izgrađeno 92 kilometra autoceste na Koridoru Vc kroz BiH (Zenica Jug – Tarčin i Međugorje – Bijača).

U toku je izgradnja dionice Svilaj – Odžak, dužine 10,7 km. Završetak izgradnje se očekuje krajem 2015. godine, čime bi ukupna dužina izgrađene autoceste na Koridoru Vc u Federaciji iznosila 102 km. Također se izvode radovi na izgradnji dionice Zenica Sjever – Zenica Jug, poddionica Klopče – Zenica Jug. Planirani završetak radova na izgradnji ove poddionice je mart 2017. godine.

U nastavku monografije prikazane su dionice izgrađene do kraja 2014. godine.

The Corridor Vc motorway alignment was designed in accordance with TEM standards, with two separate carriageways, each with two traffic lanes (main and overtaking) in the given direction of traffic and one service lane for emergency stops on each carriageway.

To date we have completed construction of 92 kilometres of the Corridor Vc motorway through BiH (Zenica Jug – Tarčin and Međugorje – Bijača).

The 10.7 km long section Svilaj – Odžak is currently under construction. Completion of construction works is expected by the end of 2015, making the total length of constructed motorway on Corridor Vc in the Federation 102 km. Works are also under way on the section Zenica Sjever – Zenica Jug, sub-section Klopče – Zenica Jug. The planned completion date for this sub-section is March 2017.

The sections completed by the end of 2014 are presented in the remainder of this monograph.

JP Autoceste FBiH

JAVNO PREDUZEĆE AUTOCESTE FEDERACIJE BiH

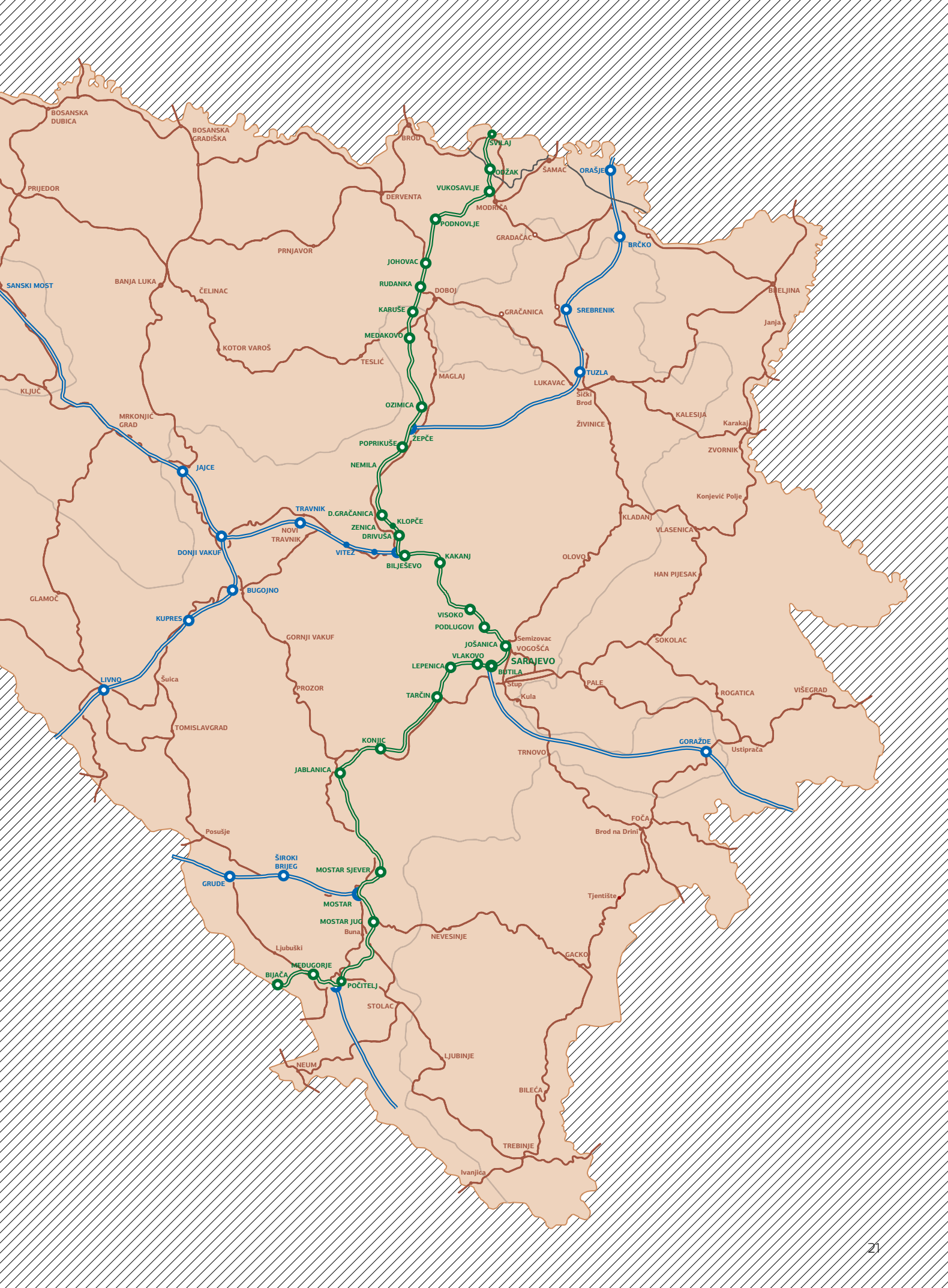
THE PUBLIC LIMITED COMPANY AUTOCESTE FEDERACIJE BOSNE I HERCEGOVINE

Javno preduzeće Autoceste Federacije Bosne i Hercegovine, društvo s ograničenom odgovornošću, osnovano je u skladu sa Zakonom o cestama Federacije Bosne i Hercegovine, a registrovano i započelo rad 1. januara 2011. godine, kao pravni sljednik Federalna direkcija za izgradnju, upravljanje i održavanje autocesta, organa u sastavu Ministarstva prometa i komunikacija Federacije BiH.

Osnovni zadatak JP Autoceste FBiH je izgradnja, upravljanje i održavanje autocesta i brzih cesta. Izgradnja autoceste na Koridoru Vc najveći je projekat transportne infrastrukture u BiH kroz koju prolazi najduži dio koridora. U ukupnoj dužini od oko 335 kilometara, izgradnja autoceste Koridora Vc unapređuje povezivanje BiH sa susjednim zemljama i poboljšava potencijal za privredni razvoj. Projekat ima snažnu potporu Vlade Federacije BiH, a očekuje se da će omogućiti

The public limited company Autoceste Federacije Bosne i Hercegovine was established under the Law on Roads of the Federation BiH and was registered and started to operate on 1 January 2011 as a legal successor to the Federal Directorate for Construction, Management and Maintenance of Motorways, a body operating as part of the Ministry of Transport and Communications of the Federation BiH.

The main task of JP Autoceste FBiH is construction, management and maintenance of motorways and expressways. Construction of the Corridor Vc motorway is the largest transport infrastructure project in BiH and covers the largest section of the Corridor. Construction of approximately 335 kilometres of the Corridor Vc motorway will improve traffic links between BiH and the neighbouring countries and promote economic growth potentials. The project is strongly


BOSANSKA DUBICA
BOSANSKA GRADIŠKA
BROD
SVILAJ
ODŽAK
SAMAC
ORAŠJE
PRIJEDOR
DERVENTA
VUKOSAVLJE
MODRIČA
PODNOVLJE
GRADAČAC
BRČKO
PRNJAVOR
JOHOVAC
SANSKI MOST
BANJA LUKA
ČELINAC
RUDANKA
DOBOJ
BIJELJINA
KARUŠE
GRAČANICA
SREBRENIK
Janja
MEDAKOVO
KOTOR VAROŠ
TESLIĆ
TUZLA
MAGLAJ
LUKAVAC
KLJUČ
Šićki Brod
OZIMICA
KALESIJA
MRKONJIĆ GRAD
ŽIVINICE
Karakaj
POPRIKUŠE
ŽEPČE
ZVORNIK
NEMILA
JAJCE
Konjević Polje
TRAVNIK
D.GRAČANICA
KLOPČE
KLADANJ
ZENICA
VLASENICA
NOVI TRAVNIK
DRIVUŠA
DONJI VAKUF
VITEZ
KAKANJ
OLOVO
BILJEŠEVO
HAN PIJESAK
BUGOJNO
GLAMOČ
VISOKO
KUPRES
PODLUGOVI
Semizovac
SOKOLAC
GORNJI VAKUF
JOŠANICA
VOGOŠĆA
VLAKOVO
SARAJEVO
LEPENICA
LIVNO
BOTILA
Šuica
Stup
PALE
PROZOR
TARČIN
Kula
ROGATICA
VIŠEGRAD
TOMISLAVGRAD
KONJIC
GORAŽDE
TRNOVO
Ustiprača
JABLANICA
FOČA
Posušje
Brod na Drini
ŠIROKI BRIJEG
MOSTAR SJEVER
GRUDE
MOSTAR
Tjentište
MOSTAR JUG
Buna
NEVESINJE
Ljubuški
GACKO
MEĐUGORJE
BIJAČA
POČITELJ
STOLAC
LJUBINJE
NEUM
BILEĆA
TREBINJE
Ivanjica

Bosni i Hercegovini bolju integraciju sa ekonomskim i socijalnim strukturama u Evropi.

Djelatnosti JP Autoceste FBiH d.o.o. Mostar su definisane Statutom preduzeća kao poslovi i zadaci na autocestama i brzim cestama u Federaciji i to:

- priprema dugoročnih, srednjoročnih i godišnjih planova i programa razvoja, održavanje, zaštita. Izgradnja, obnova cesta i objekata na cestama kao i izvještaji o realizaciji tih planova i programa;
- obavljanje poslova održavanja autoceste;
- investitorski poslovi za studije i projekte, obnovu, izgradnju, rekonstrukciju i održavanje na autocestama i objektima;
- predlaganje finansijskih planova i poboljšanje načina prikupljanja sredstava namijenjenih za potrebe izgradnje autocesta;
- vođenje evidencije (baze podataka) autocesta, objekata, saobraćajne signalizacije i opreme na autocestama i katastra autocestovnog zemljišnog pojasa;
- ustupanje radova na rekonstrukciji, izgradnji, obnovi i održavanju autocesta;
- priprema i praćenje realizacije programa mjera i aktivnosti za unapređenje sigurnosti saobraćaja na autocestama kojima upravlja;
- priprema podloga za dodjelu koncesija i osiguranje stručno-tehničkog nadzora;
- organizacija sistema naplate cestarine;
- prikupljanje podataka i obavještavanje javnosti o stanju autocesta i načinu odvijanja saobraćaja;
- poduzimanje potrebnih mjera za očuvanje i zaštitu okoliša;
- organizovanje i pružanje usluga korisnicima autocesta i brzih cesta i dr.

supported by the FBiH Government and is expected to result in better integration of BiH into European economic and social structures.

Business activities of JP Autoceste FBiH are defined by the company statute, as operations and tasks related to motorways and expressways in Federation BiH, as follows:

- preparation of long-term, medium-term, short-term and annual plans and development programmes, maintenance, protection, reconstruction, construction and refurbishment of roads and road infrastructure, together with progress reporting on the same;
- motorway maintenance works;
- investor functions related to studies and projects, refurbishment, construction, reconstruction and maintenance of motorways and facilities;
- drafting and proposing financial plans and improving fundraising activities for construction of motorways;
- recording and documenting (database) of motorways, facilities, traffic signage and installed equipment, and the cadastre of land belts assigned to motorways;
- contracting of works on reconstruction, construction, refurbishment and maintenance of motorways;
- preparation and monitoring of traffic safety measures and activities on motorways under its management;
- preparation of documentation for concessions and professional/technical supervision;
- organisation of the toll collection system;
- information gathering and public notices concerning motorway and traffic status;
- undertaking of required environmental protection and conservation measures;
- organisation and provision of services to motorway and expressway users, etc.

VIZIJA

Stvoriti cestovnu infrastrukturu najvišeg ranga, ekvivalentnu najsavremenijim saobraćajnicama u svijetu.

VISION

Our vision is to create road infrastructure of the highest rank, equivalent to the most modern roads in the world.


Odmorište
Lepenica
Одмориште
Лепеница
P

MISIJA

Gradimo, upravljamo i održavamo cestovnu infrastrukturu najvišeg ranga, društveno odgovorno djelujući s posebnim fokusom na usklađenost s okolišem i sa sigurnošću prometa.

MISSION

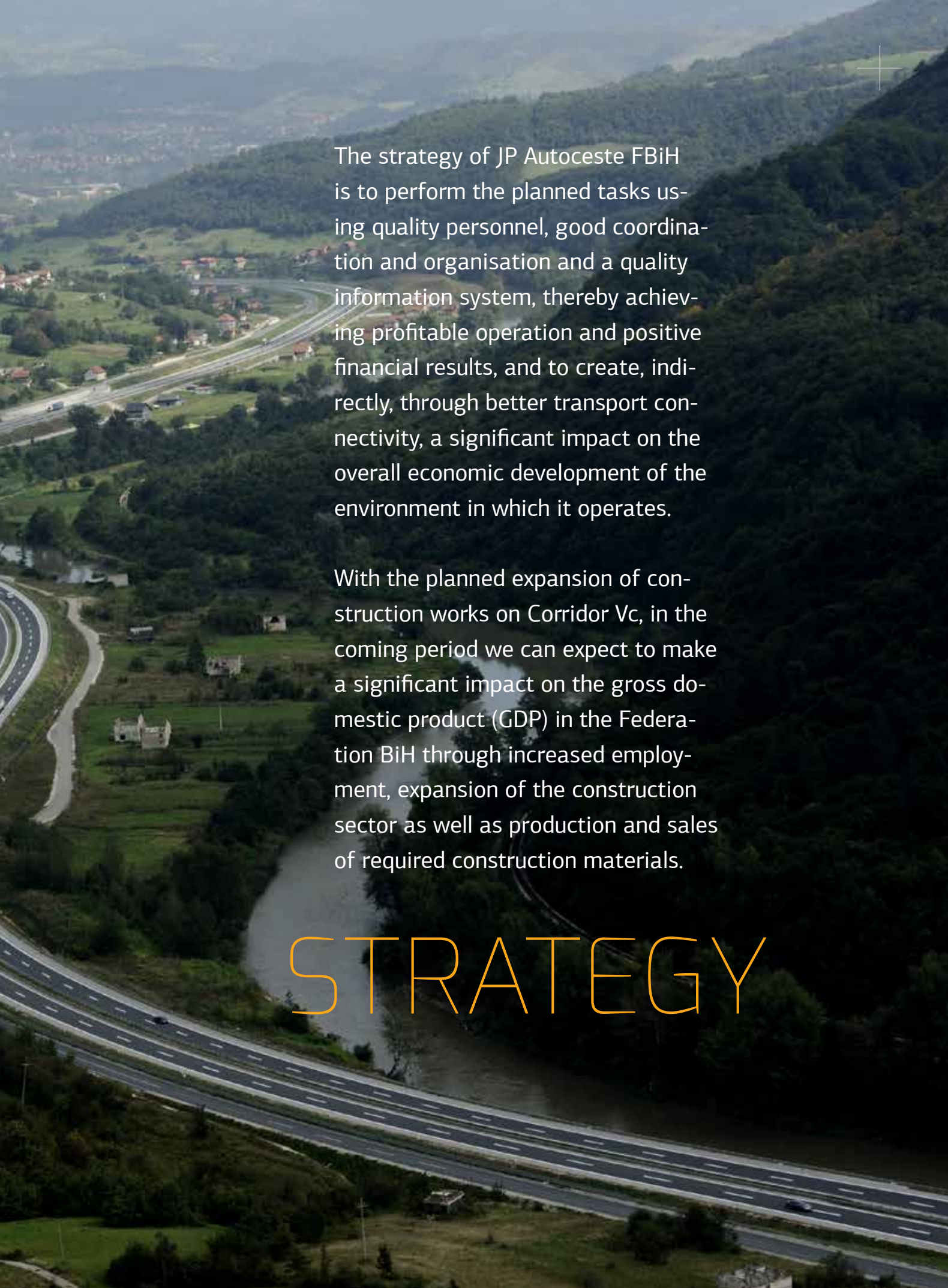
We build, operate and maintain road infrastructure of the highest rank, acting socially and responsibly, with particular focus on compliance with environmental and traffic safety.


14°C

STRATEGIJA

Strategija JP Autoceste FBiH je da ostvarujući planirane zadatke, uz kvalitetne kadrove, dobru koordinaciju i organizaciju, kvalitetan informacioni sistem ostvari profitabilno poslovanje i pozitivne finansijske rezultate, a posredno kroz bolju prometnu povezanost ostvari značajan utjecaj na cjelokupni privredni razvoj u okruženju na kojemu se nalazi.

Budući da je planirana ekspanzija u gradnji na području Koridora Vc, u narednom periodu može se očekivati značajan utjecaj na bruto društveni proizvod (BDP) u Federaciji BiH kroz povećanje zaposlenosti, ekspanziju građevinskog sektora, te proizvodnju i prodaju građevinskog materijala potrebnog za gradnju.



The strategy of JP Autoceste FBiH is to perform the planned tasks using quality personnel, good coordination and organisation and a quality information system, thereby achieving profitable operation and positive financial results, and to create, indirectly, through better transport connectivity, a significant impact on the overall economic development of the environment in which it operates.

With the planned expansion of construction works on Corridor Vc, in the coming period we can expect to make a significant impact on the gross domestic product (GDP) in the Federation BiH through increased employment, expansion of the construction sector as well as production and sales of required construction materials.

STRATEGY

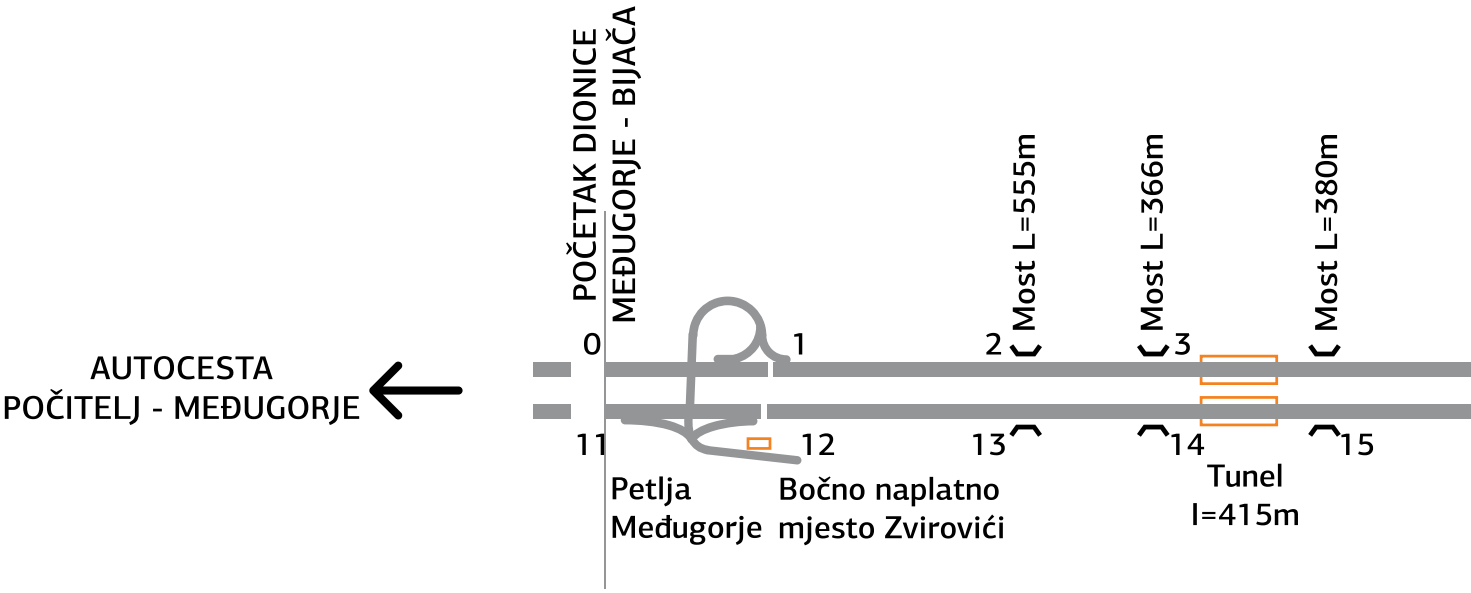

AUTOC
MOTORWAY A1
3.0


ESTA A1

3.1

POČITELJ → BIJAČA

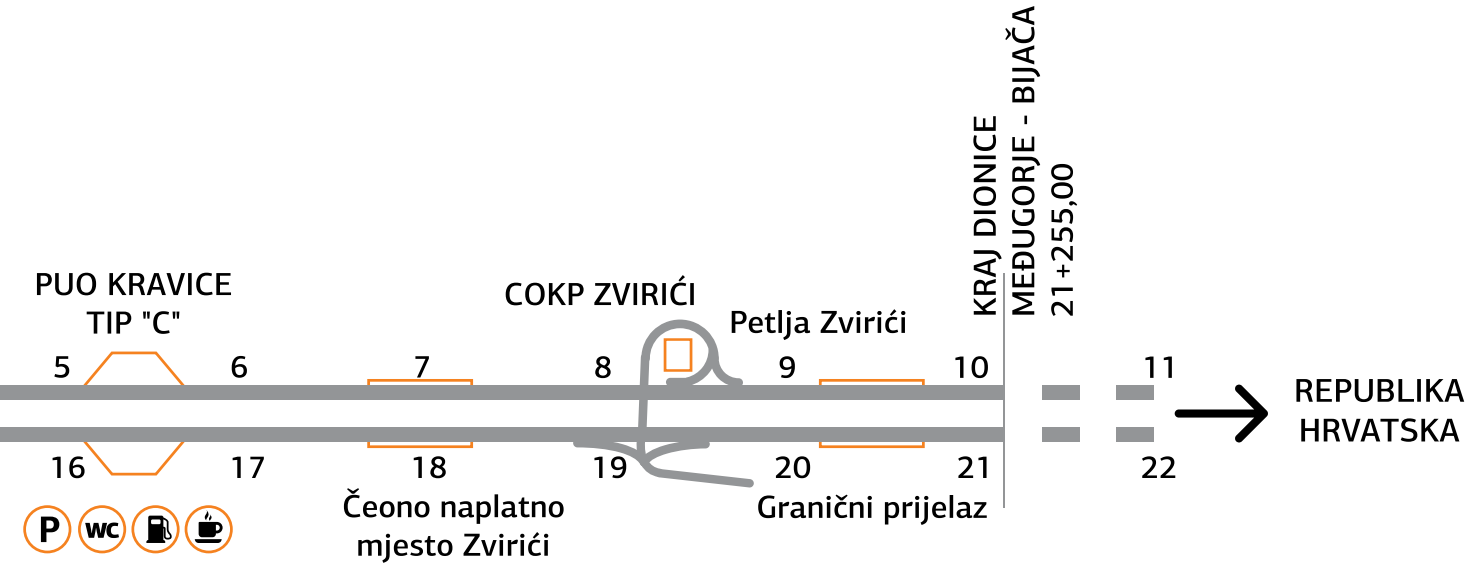
DIONICA SECTION



Dionica Počitelj – Bijača

Najjužnija dionica autoceste na Koridoru Vc je podijeljena na dvije poddionice i to:

- Počitelj – Međugorje
- Međugorje – Bijača



Section Počitelj – Bijača

The southernmost section of the Corridor Vc motorway is divided into two sub-sections:

- Počitelj – Međugorje
- Međugorje – Bijača

Most Studenčica

Poddionica Počitelj – Međugorje

Da bi se očuvalo kulturno-historijsko nasljeđe grada Počitelja, trasa ove poddionice je pretrpjela izvjesna pomjeranja. Izrada glavnog projekta je u završnoj fazi kao i priprema tenderske dokumentacije, a izgradnja ove poddionice očekuje se u drugoj polovini 2015. godine.

Poddionica Međugorje – Bijača

Međugorje – Bijača je najjužnija poddionica autoceste na Koridoru Vc kroz Bosnu i Hercegovinu, duga 10,25 km i pruža se od Zvirovića do južne granice s Republikom Hrvatskom, u Bijači. Početak dionice je u naselju Bitunjani (Zvirovići) odakle se trasa proteže na zapad, prema magistralnoj cesti M-6 Čapljina – Ljubuški i rijeci Studenčici, koju savladava istoimenim mostom. Trasa autoceste dalje premoštava široku dolinu vijaduktom Pavlovići i manjim tunelom probija kroz brdo Bijela Vlaka. Autocesta dalje izbija na kanjon rijeke Trebižat kojeg savladava mostom i dolazi na zaravan koja se pruža do same granice sa Republikom Hrvatskom. Na tom potezu trase izgrađeno je dvostrano odmorište Kravice sa pratećim objektima, čeono naplatno mjesto, Centar za održavanje i kontrolu prometa, kao i međudržavni granični prijelaz Bijača. Granični prijelaz je u ovom projektu lociran i dimenzioniran kao samostalna jedinica na području BiH. Nakon graničnog prijelaza Bijača autocesta se veže na dio Koridora Vc u Hrvatskoj do petlje Ploče, a preko njega na mrežu autocesta u Republici Hrvatskoj. Na poddionici Međugorje - Bijača izgrađeno je i nekoliko manjih objekata koji služe za provođenje lokalnih saobraćajnica, manjih vodnih tokova i pješaka.

Na trasi je ugrađen zatvoreni sistem odvodnje sa separatorima ulja i masti, te zaštitnom građevinom visokog učinka čišćenja. Autocesta je opremljena najsavremenijom opremom za praćenje, nadzor i upravljanje prometom.

U nastavku je dat pregled najznačajnijih objekata.

Sub-section Počitelj – Međugorje

In order to preserve the historical and cultural heritage of the town of Počitelj, the alignment for this sub-section had to undergo some changes. The main design and tender documents are almost complete and construction of this sub-section can be expected in the second half of 2015.

Sub-section Međugorje - Bijača

Međugorje – Bijača is the southernmost sub-section on the Corridor Vc motorway in Bosnia and Herzegovina. It is 10.25 km long and stretches from Zvirovići to the southern border with the Republic of Croatia in Bijača. This sub-section starts in the village of Bitunjani (Zvirovići) from where it proceeds west towards the trunk road M-6 Čapljina – Ljubuški and the Studenčica river, crossing it over a bridge bearing the same name. The alignment then crosses the wide valley via the Pavlovići viaduct and passes under the Bijela Vlaka hill through a small tunnel. From there the motorway proceeds to bridge the Trebižat river canyon and reaches the plains that stretch all the way to the border with the Republic of Croatia. This part of the alignment contains the two-sided Kravice service area, mainline toll plaza, maintenance and traffic control centre, and the international border crossing Bijača. The border crossing in this project is located and dimensioned as a standalone facility on the territory of BiH. After the Bijača border crossing, the motorway connects to the Croatian part of the Corridor Vc through to the Ploče interchange and onward to the motorway network in the Republic of Croatia. The sub-section Međugorje – Bijača contains a number of smaller structures for crossing local roads, lesser waterways and pedestrian traffic.

The alignment was constructed with a closed drainage system with oil and grease separators and a protective structure with high cleaning performance. The motorway is equipped with the most modern equipment for traffic monitoring, surveillance and management.

The following part provides an overview of the most significant structures.

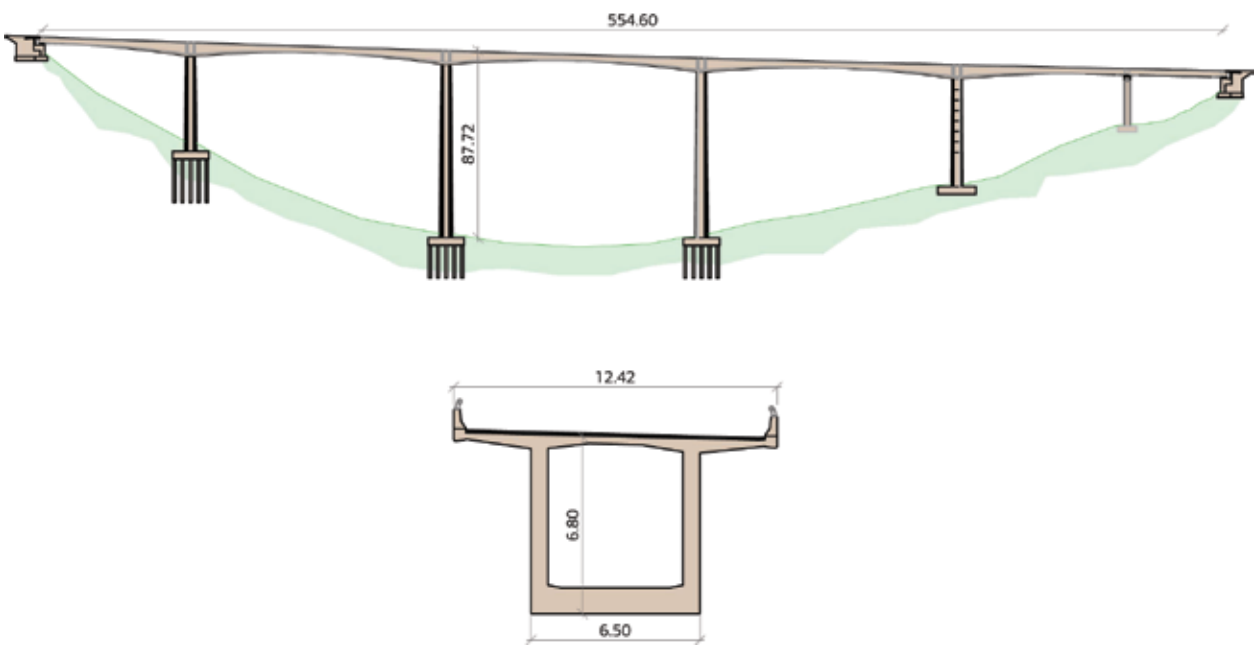
Odmorište Kravice

Most Studenčica

Most Studenčica je najveći objekat na poddionici Međugorje – Bijača. Premoštava udolinu kojom protiče rijeka Studenčica. Dužina mosta je 555 m, a najveća visina oko 90 m, što ga svrstava među najveće objekte ove vrste u BiH. Glavni rasponi su 120 m. Stubovi su sandučasti temeljeni dijelom na plitkim temeljima, a najviši stubovi na pilotima dužine 15-20 metara. Na konstrukciji od 40 pilota rađena je zajednička naglavna ploča 30x20 m i debljine 3,5 metar za oba kraka autoceste. Zbog velike visine stubova i velikog raspona izabrana je monolitna, prednapregnuta rasponska konstrukcija sandučastog presjeka promjenljivog presjeka (od 7 m visine iznad stubova do 3,5 m u sredini raspona) koja je izvođena sistemom slobodne konzolne gradnje. Izazov u gradnji predstavljala je i činjenica da se most nalazi i u vertikalnoj i u dvije horizontalne krivine, što dovodi do vitoperenja kolovoza i konstrukcije.

Studenčica Bridge

The Studenčica bridge is the largest structure in the Međugorje – Bijača sub-section. It crosses the Studenčica river valley. The bridge is 555 m long and 90 m high at its highest point, making it one of the largest structures of this type in BiH. The main spans are 120 m long. Box-type piers are placed mainly on shallow footings, while the highest piers rest on 15-20 metre long piles. The structure consists of 40 piles capped with a 30x20 m, 3.5 m thick common pile cap for both carriageways. Due to the height of the piers and long spans, a monolithic, pre-tensioned box superstructure with a variable cross section was selected (from 7 m high above the piers to 3.5 m in the centre of the span) and it was executed using the free cantilever construction system. Another construction challenge was the fact that the bridge includes a vertical and two horizontal curves, which may lead to distortion of the carriageway and the structure.



Most Studenčica

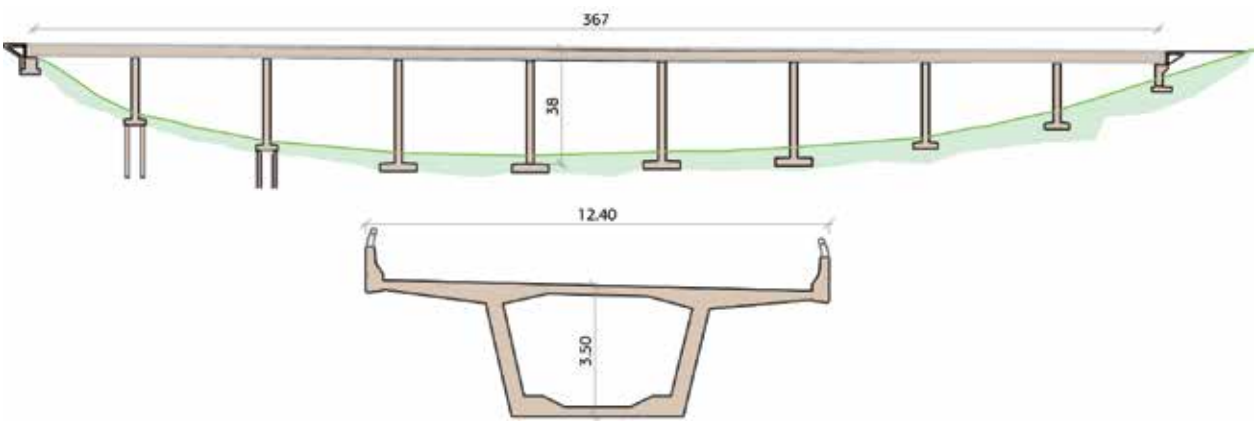
Most Studenčica

Vijadukt Pavlovići

Nakon mosta Studenčica i usjeka dugog 300 m, javlja se udolina koja vodi sve do ušća Studenčice u Trebižat. Udolina je premoštena vijaduktom Pavlovići. Zbog relativno male visine, do 38 m, i pristupačnog terena izabrani su rasponi od 43 m. Vijadukt je dužine 360 m. Stubovi su sandučasti male krutosti, temeljeni uglavnom na plitkim temeljima izuzev prva dva para stubova gdje je temeljenje vršeno na pilotima dužine do 12 m. Raspored i visina stubova diktirali su izbor sandučaste rasponske konstrukcije konstantne visine od 3,5 m. Rasponska konstrukcija je izvedena tehnologijom postupnog potiskivanja. Raspon od 9x43 m savladan je u 17 taktova po 23 m. Vijadukt se nalazi u horizontalnoj krivini.

Pavlovići Viaduct

After the Studenčica bridge and a 300 m long cut, the motorway enters a valley leading all the way to the estuary where Studenčica joins the Trebižat river. The valley was bridged by the Pavlovići viaduct. Its relatively low height, not exceeding 38 metres, and accessible terrain resulted in selection of 43 m long spans. The total length of the viaduct is 360 metres. Low stiffness box piers are placed mainly on shallow foundations, except for the first two pairs of piers which rest on piles up to 12 m long. The distribution and height of the piers dictated the use of a box superstructure with constant height of 3.5 metres. The superstructure was constructed using free cantilevering technology. The total 9x43 m length was executed in 17 segments, each 23 metres long. The viaduct curves along the horizontal plane.



Vijadukt Pavlovići

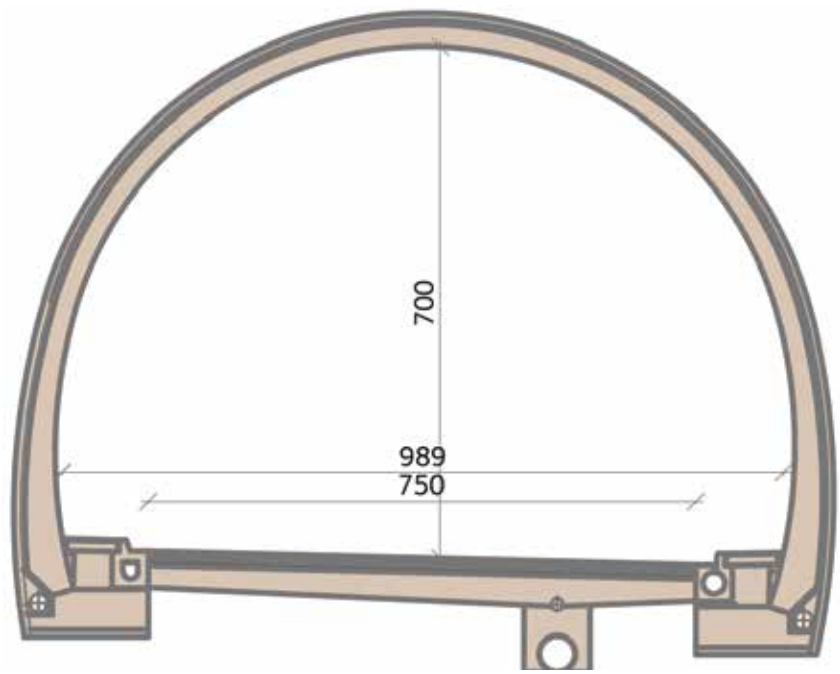
Vijadukt Pavlovići

Tunel Bijela Vlaka

Neposredno iza vijadukta Pavlovići trasa autoceste prodire kroz brdo Bijela Vlaka istoimenim tunelom. Dužina tunela je 413 m, što ne iziskuje poprečne spojeve niti značajniju opremu, izuzev rasvjete, vatrodojave i videonadzora. Radi se o klasičnom cestovnom tunelu s dvije cijevi s po dvije vozne trake širine 3,75 m i servisnim stazama iznad energetskih kanala. Najveći nadsloj je do 30 m, što je za posljedicu imalo okršenost, u osnovi solidne, krečnjačke stijene. Razmak osi cijevi je minimalno 23 m. Pri gradnji su ispoštovani najviši standardi za ovu vrstu objekata.

Bijela Vlaka Tunnel

Directly after the Pavlovići viaduct, the motorway alignment passes under the Bijela Vlaka hill through a tunnel bearing the same name. The tunnel is 413 m long and does not require cross passages and other significant equipment, other than lighting, fire alarm and video surveillance. This is a classic twin road tunnel with two 3.75 m wide traffic lanes in each tube and service pathways over the energy conduits. The highest overburden is 30 m, resulting in weathering of the essentially solid limestone rock. The distance between the central axes of the tunnel tubes is minimum 23 m. It was constructed in accordance with the highest standards applicable to this type of structure.



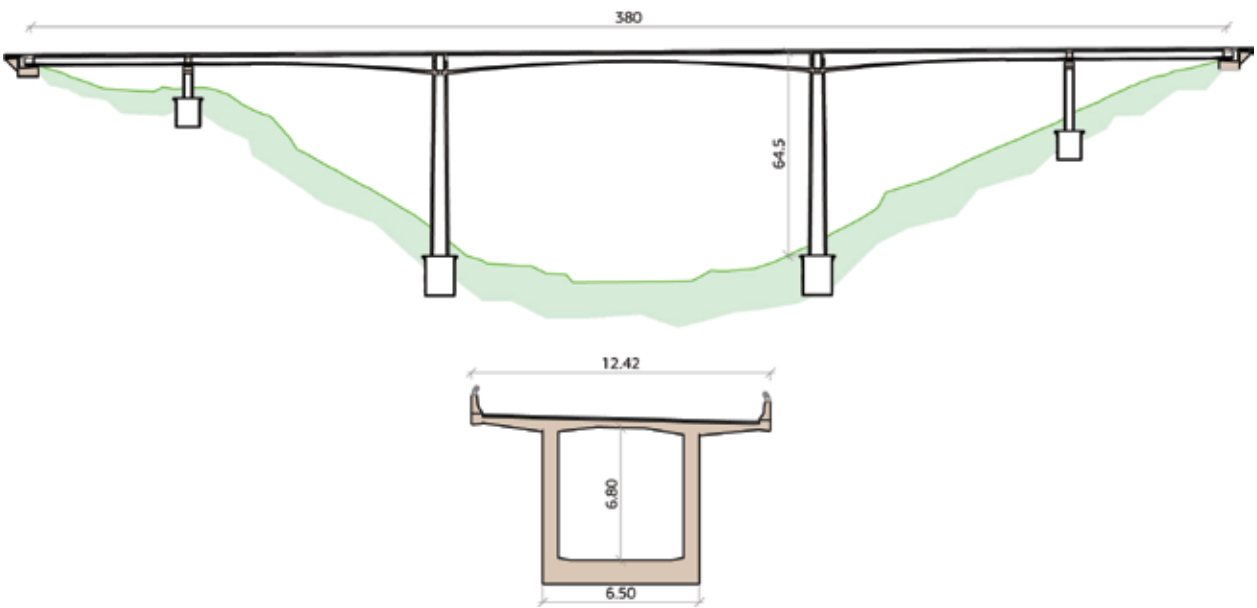
Tunel Bijela Vlaka

Most Trebižat

Kanjon rijeke Trebižat autocesta prelazi mostom 500 m nizvodno od vodopada Kravice na koji se pruža prekrasan pogled s desnog mosta. Položaj karakterišu velika udolina, strm i nepristupačan teren te zahtjev za što manji utjecaj na okoliš zbog gotovo nedirnute prirode. Ove činjenice su diktirale i izbor konstrukcije: sandučasti kvadratni stubovi, sandučasta raspona konstrukcija promjenljivog presjeka izvođena sistemom slobodne konzolne gradnje. Glavni rasponi iznose 120 m. Dužina mosta je 380 m, a visina do 65 m. Geološki uvjeti i strm, nepristupačan teren su diktirali temeljenje na okruglim bunarima promjera 9 m i dubine 12,5 m.

Trebižat Bridge

The motorway crosses the Trebižat river canyon over a bridge located 500 m downstream from the Kravice waterfall, offering a lovely view of the waterfalls from the right bridge. The site is characterised by a deep valley, steep and inaccessible terrain and a need for minimum environmental impact due to almost unspoiled surroundings. These characteristic dictated the choice of structure: square box piers and a box superstructure with a variable cross section constructed using the free cantilever construction system. The main spans are 120 m long. The length of the bridge is 380 m with a maximum height of 65 m. The geological conditions and the steep, inaccessible terrain dictated that the footing be executed with round wells, 9 m in diameter and 12.5 m deep.



Most Trebižat

Most Trebižat

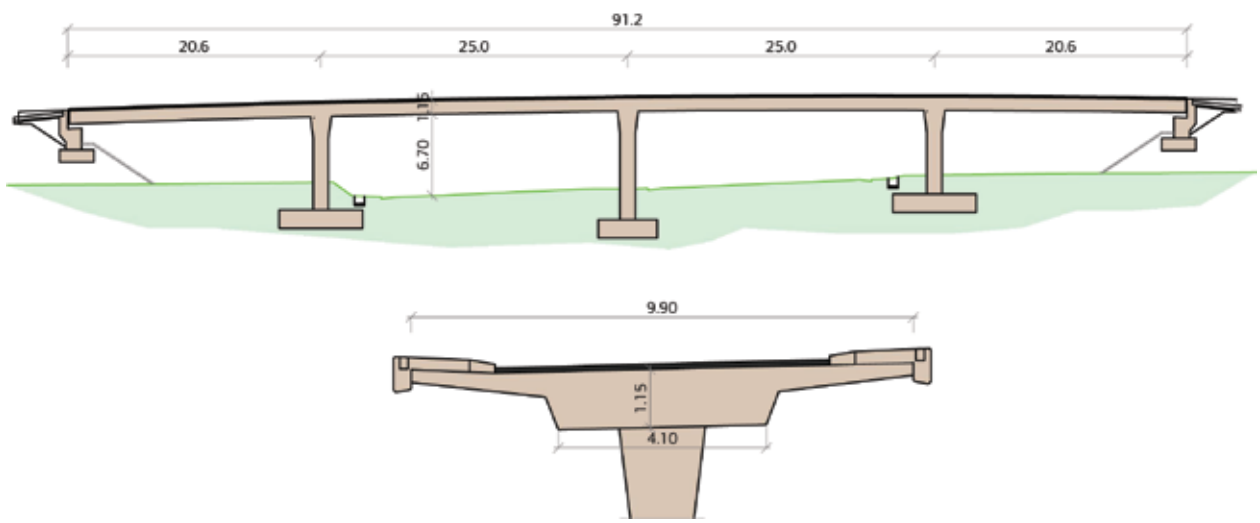
Nadvožnjak Zvirići

Nadvožnjak Zvirići

Kolizija autoceste i regionalne ceste R-423 Ljubuški – Metković riješena je izgradnjom nadvožnjaka Zvirići kao dio regionalne ceste i istoimene petlje na autocesti. Rasponski sklop čini monolitna armirano-betonska kontinuirana ploča sa preko 4 raspona. Ploča je kontinuirane debljine od 115 cm. Na rubovima završava bočnim konzolama promjenljive debljine. Kruta ploča sa stubovima manje krutosti čini okvirnu konstrukciju. Vrlo slični, sa gotovo identičnom konstrukcijom su i ostali nadvožnjaci na poddionici Međugorje – Bijača: Podine i Zvirovići u petlji Međugorje.

Zvirići Overpass

The collision of the motorway and the regional road R-423 Ljubuški – Metković was resolved by constructing the Zvirići overpass as a part of the regional road and the interchange. The superstructure consists of a monolithic reinforced concrete slab stretching over 4 spans. The thickness of the slab is a constant 115 cm. The edges are finished with side cantilevers of varying thickness. A stiff slab with less rigid piers forms the supporting structure. The same, almost identical structure is used in other overpasses on the Međugorje – Bijača sub-section: Podine and Zvirovići on the Međugorje interchange.



Odmorište Kravice

Dvostarno odmorište sa pratećim i uslužnim objektima se nalazi na dijelu trase iza mosta Trebižat. Smješteno je južno od vodopada Kravice. Izgrađeno je unutar ograđenog dijela autoceste i dio je sadržaja autoceste. Platoi odmorišta, na kojim su izgrađeni, nalaze se jedan nasuprot drugoga čime se postiglo pojeftinjenje izvođenja infrastrukturnih objekata. Sam plato je u vrlo blagom uzdužnom nagibu – dijelom na niskom nasipu, a dijelom u plitkom usjeku. Opremljeno je svim sadržajima koji su neophodni za zadovoljavanje potreba ljudi i vozila. Pored parkinga za putnička vozila, kamione, autobuse i drugih tipova vozila, nalazi se i prostor za odmor, prostor za dječju igru, a predviđena je i benzinska stanica s pratećim sadržajima (restoran, kafe bar, trgovina, sanitarije, info centa). Korisnicima će usluge biti dostupne 24 sata dnevno.

Odmorište (PUO) Kravice

Kravice Service Area

A two-sided service station with service facilities is located on the alignment behind the Trebižat bridge. It lies southwest of the Kravice waterfall. It was built within the fenced perimeter of the motorway and represents one of the motorway facilities. Service area plateaus are located opposite one another as this was the most cost-effective solution for infrastructural facilities. The plateau itself rests on a slight incline - partially on a low embankment and partially in a shallow cut. The service area is equipped for content that will address all vehicular and passenger needs. In addition to parking for personal vehicles, trucks, busses and other types of vehicles, it contains a rest area and children's playground and space is provided for a petrol station with auxiliary services (restaurant, cafe, shop, toilets, information centre). Services will be available to users 24 hours a day.

COKP Zvirići

COKP Zvirići

Kilometar prije graničnog prijelaza Bijača, izgrađen je Centar za održavanje i kontrolu prometa (COKP) Zvirići. Zauzima površinu od 15.700 m^2. Smješten je u samoj petlji Zvirići, između autoceste, regionalne ceste R-423 Ljubuški – Metković te rampe kojom su ove dvije prometnice povezane. Time je Centru osiguran pristup s autoceste, ali i s regionalne ceste R-423. Centar je opremljen svim sadržajima potrebnim za kvalitetno održavanje te potpunu kontrolu i upravljanje prometom, te posjeduje i objekat za smještaj osoblja zaduženog za održavanje autoceste sa svim sadržajima (spavaonice, kupatila, kuhinja, restoran), zatim objekat za smještaj vatrogasne jedinice, radionicu za popravak vozila, kotlovnicu, autopraonicu, objekat za smještaj i pripremu soli, garaže za strojeve i vozila te vlastitu benzinsku stanicu. Centar je opremljen najsavremenijom opremom, a predviđeno je da pokriva oko 40 km autoceste, od južne granice prema Mostaru.

MTCC Zvirići

The Maintenance and Traffic Control Centre (MTCC) Zvirići was constructed one kilometre ahead of the Bijača border crossing. It occupies an area of 15,700 m2. It is located on the Zvirići interchange, between the motorway, regional road R-423 Ljubuški – Metković and the ramp that connects these two roads. This ensures that the Centre can be accessed both from the motorway and from the R-423 regional road. The Centre is provided with everything required for proper maintenance and complete traffic control and management and includes a fully equipped housing facility for motorway maintenance personnel (with bedrooms, bathrooms, kitchen and restaurant), premises for the fire unit, vehicle repair workshop, boiler room, car wash, building for storage and preparation of salt, garage for vehicles and equipment and its own petrol station. The Centre is equipped with the most modern equipment and is planned to cover a 40 km section of the motorway, from the southern border towards Mostar.

Granični prijelaz Bijača

Pola kilometra prije mjesta Bijača, gdje autocesta siječe državnu granicu s Republikom Hrvatskom, izgrađen je savremeni granični prijelaz, jedini takve vrste prema Evropskoj uniji na jugu, te jedan od dva uopće na čitavoj granici prema Republici Hrvatskoj. Nakon graničnog prijelaza autocesta se veže na mrežu autocesta u Republici Hrvatskoj, odnosno na autocestu A1 i spojnu cestu prema luci Ploče, koja je od graničnog prijelaza udaljena 20 km. S obzirom na to da je rad luke Ploče uglavnom vezan za privredu Bosne i Hercegovine, značaj ovog prijelaza je veliki.

Svojom veličinom i obuhvatom zadovoljava budući teretni i putnički promet. Opremljen je svim sadržajima koje, prema schengenskom sporazumu, granični prijelaz mora imati da bi se osigurao nesmetan promet, kako ljudi, tako i svih roba u i iz EU. Granični prijelaz je oblikovna cjelina sastavljena iz različitih objekata na platou. Individualno svaki od tih objekata predstavlja funkcionalnu cjelinu za sebe.

Predviđeno je desetak različitih objekata, kao što su:

- Glavna zgrada za putnički promet s glavnom nadstrešnicom iznad kontrole putničkih vozila,
- Glavna zgrada za teretni promet (špedicija),
- Zgrada policije i carine za kontrolu izlaza teretnih vozila iz zemlje,
- Sanitarije za vozače i putnike,
- Kontrola ulaza teretnih vozila na parkiralište,
- Parkiralište za vozila s opasnim teretom,
- Zgrada veterinarske i fitopatološke kontrole,
- Kompleks objekata za prihvat živih životinja,
- Zgrada detaljne kontrole vozila,
- Zadnja kontrola ulaza teretnih vozila u zemlju,
- Kotlovnica, trafostanica, agregatska stanica i ostali.

Saobraćajni plato graničnog prijelaza organizovan je u tri nivoa:

1. Putnički promet,
2. Izlazni plato teretnih vozila,
3. Ulazni plato teretnih vozila.

Bijača Border Crossing

This modern border crossing was constructed in the village of Bijača, half a kilometre before the actual state border with the Republic of Croatia and is the only border crossing of this type on the south border with the European Union and one of only two crossings to the Republic of Croatia. After the border crossing, the motorway connects to the motorway network in the Republic of Croatia, namely motorway A1 and the connecting road to the Ploče harbour which is located 20 km from the border crossing. Considering that the harbour in Ploče is very important for the economy of Bosnia and Herzegovina, this border crossing is therefore of major strategic significance.
Its size and scope are adequate for the future cargo and vehicular traffic. It is equipped with all facilities required by the Schengen Agreement for uninterrupted flow of persons and goods to and from the EU. The border crossing consists of a number of different structures grouped together on a plateau; however each of these structures represents a functional unit on its own.

The plan foresees approximately ten different structures, such as:

- main passenger traffic building with the main canopy over the passenger checkpoint,
- main cargo traffic building (freight forwarding),
- police and customs building for exit control of cargo vehicles leaving the country,
- toilets for drivers and passengers,
- control of entry of cargo vehicles to the parking lot,
- parking lot for vehicles carrying hazardous cargo,
- veterinary and phytopathology control building,
- set of structures for reception of live animals,
- detailed vehicle control building,
- final control of cargo vehicles entering the country,
- boiler room, transformer station, generator building, etc.

The traffic plateau on the border crossing is organised in three levels:

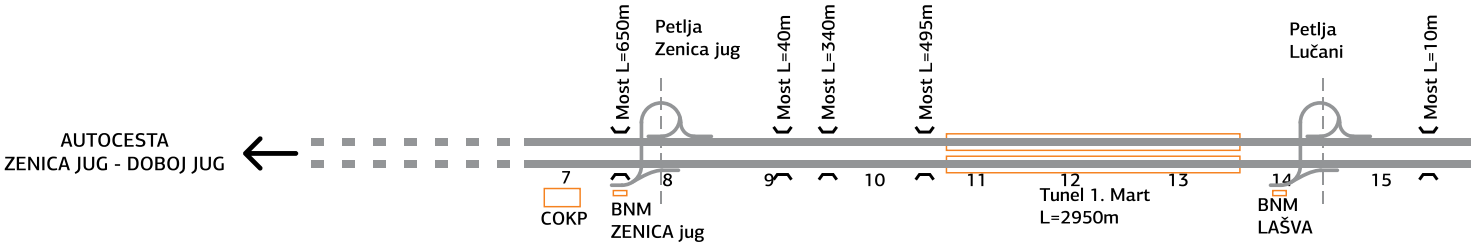
1. Passenger traffic,
2. Exit plateau for cargo vehicles,
3. Entry plateau for cargo vehicles.

Granični prijelaz Bijača

DIONICA SECTION

ZENICA JUG → KAKANJ

3.2



Dionica: Zenica Jug – Kakanj

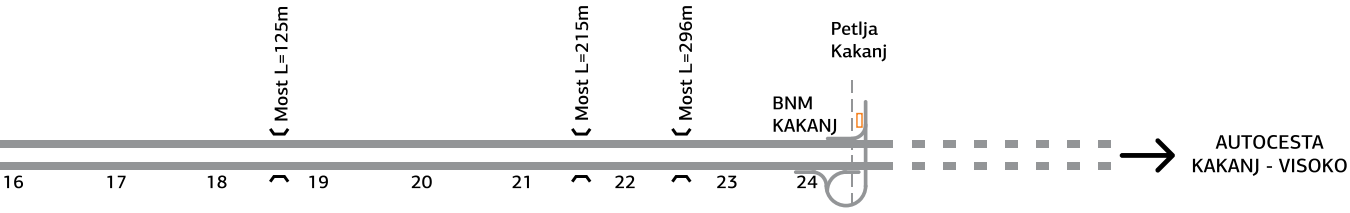
Izgradnja dionice Zenica Jug – Kakanj, dužine 15,5 km, trajala je od 2010. do 2014. godine, a sastoji se iz tri poddionice:

- Zenica Jug – Gorica
- Gorica – Lašva / Tunel 1. mart
- Lašva – Kakanj

Trasa ove autoceste obuhvata područje od južne zeničke petlje u naselju Drivuša do petlje Kakanj, najvećim dijelom prolazi padinskim terenom uz desnu obalu rijeke Bosne, izuzimajući jedan prelazak na lijevu obalu na početku dionice u Drivuši i dva uzastopna prelaska na istu stranu na kraju dionice kod petlje Kakanj. Spoj zeničke i kakanjske doline je ostvaren tunelom dužine tri kilometra.

Na dionici su izgrađene dvije petlje i jedna polupetlja s tri bočna naplatna mjesta – Zenica Jug, Lašva i Kakanj, te Centar za upravljanje prometom (COKP) Drivuša.

U nastavku je dat pregled najznačajnijih objekata po poddionicama.



Section: Zenica Jug – Kakanj

Construction of the 15.5 km long section Zenica Jug – Kakanj lasted from 2010 until 2014. It consists of three sub-sections:

- Zenica Jug – Gorica
- Gorica – Lašva / Tunel 1. mart
- Lašva – Kakanj

The alignment of this motorway covers the area from the southern Zenica interchange in the village of Drivuša to the Kakanj interchange, passing mainly over sloping terrain along the right bank of river Bosna, except for one crossing to the left bank at the beginning of the Drivuša section and two consecutive crossings to the same side at the end of the section by the Kakanj interchange. The connection between Zenica and Kakanj valleys was achieved with a 3 km long tunnel.

This section contains two complete interchanges and one partial interchange with three ramp toll plazas – Zenica Jug, Lašva and Kakanj, and the Traffic Maintenance and Control Centre (MTCC) Drivuša.

The following is an overview of the most significant structures on each sub-section.

Most M4 Zli Brijeg

Poddionica Zenica Jug – Gorica

Smještena tri kilometra južno od grada Zenice, poddionica počinje petljom Zenica Jug i pruža se lijevom obalom rijeke Bosne, prateći postojeći magistralni put M-17 do mosta M2, gdje prelazi na desnu stranu rijeke Bosne. Trasa prati desnu obalu rijeke i završava vijaduktom M3, na sjevernom ulazu u tunel 1. mart. Ukupna dužina dionice iznosi 2,9 km, bez pristupne ceste koja povezuje magistralni put s autocestom.

Autocesta je projektovana s dva kolovoza s po tri trake, širine 10 m, za računsku brzinu 130 km/h. S aspekta odvodnje otpadnih voda ispoštovani su svi uvjeti propisani okolišnom dozvolom. Izveden je zatvoreni sistem odvodnje sa separatorima ulja i masti, te odvodnjom prečišćene vode do recipijenta.

Sub-section Zenica Jug – Gorica

Located three kilometres south of the city of Zenica, this sub-section starts at the Zenica Jug interchange and proceeds along the left bank of the Bosna river, following the existing trunk road M-17 to the M2 bridge where it crosses over to the right river bank. The alignment then follows the right river bank and ends with the M3 viaduct, at the northern entrance to the 1. mart tunnel. The total length of this section is 2.9 km, not including the access road connecting the trunk road to the motorway.

The motorway was designed with two 10 m wide carriageways with three lanes each, for nominal speed 130 km/h. All requirements concerning waste water drainage stated in the environmental permit were respected. The motorway was constructed with a closed drainage system with oil and grease separators and distribution of treated waste water to the recipient.

Petlja Zenica Jug

Petlja predstavlja krajnju tačku dionice Kakanj – Zenica Jug i omogućava vezu grada Zenice i okoline s autocestom. Veza s magistralnim putem M-17 ostvarena je prilaznom saobraćajnicom kao T priključak. Petlja ima oblik trube s kosim položajem u odnosu na autocestu. U sklopu petlje izgrađena su tri kraka i potputnjak Drivuša.

Most M1

Mosta presijeca postojeću lokalnu saobraćajnicu koja predstavlja vezu magistralnog puta M-17 i lokalnih naselja. Most M1 je kontinualni nosač na tri polja ukupne dužine 39 m. U poprečnom smislu rasponska konstrukcija je formirana kao puna ploča debljine 0,75 m i ukupne širine 12,9 m. Obalni i srednji stubovi su kruto vezani za rasponsku konstrukciju. Srednji stubovi su dvojni, kružnog poprečnog presjeka 1,2 m prosječne visine 6 m, bez poprečnih nosača.

Most M2

Most se nalazi na prelazu autoceste preko rijeke Bosne i dug je 340 m. Most M2 ima 11 raspona od montažnih prenapregnutih nosača T oblika s monolitnom kolovoznom pločom. Početni rasponi iznose 26 m, a srednji 32 m. Konstrukcija u poprečnom presjeku sa sastoji od 5 prednapregnutih montažnih nosača visine 190 cm, sa rebarima širine 40 cm koji se proširuju u zoni oslonaca. Montažni nosači su monolitizirani AB pločom debljine 25 cm. Srednji stubovi su kružnog poprečnog presjeka 230 cm, s konzolnim riglama za oslanjanje montažnih nosača.

Most M3

Riječ je o prvom objektu te vrste u BiH koji je izgrađen tehnologijom postupnog naguravanja, a sastoji se od dva mosta. Ova tehnologija je zahtijevala da na jednoj strani mosta bude izgrađena tehnološka stanica na kojoj je vršeno betoniranje punog profila mosta po segmentima dužine 21,5 m, nakon čega je posebnom presom naguravana rasponska konstrukcija preko izgrađenih stubova te je tako kompletirana osnovna konstrukcija mosta. Most povezuje sjeverni ulaz tunela 1. mart s ostatkom trase. Razlika u dužini lijevog (378,4 m), odnosno desnog (494,5 m) objekta je uvjetovana konfiguracijom terena i neposrednom blizinom rijeke Bosne. Rasponska konstrukcija desnog mosta je kontinuirani nosač s 12 polja. Početni rasponi iznose 32,25 m, odnosno srednji rasponi 43 m. Mostovska konstrukcija je u poprečnom presjeku sandučasti nosač ukupne širine 12,6 m i visine 3,2 m, sa zakošenim vertikalnim rebrima debljine 40 cm. Gornja i donja ploča su debljine 25 cm, s odgovarajućim ojačanjima u zoni oslonaca. Tijelo centralnih stubova je

Zenica Jug - Kakanj Interchange

This interchange is the last point on the Zenica Jug – Kakanj section and connects the city of Zenica and the surrounding areas to the motorway. The connection to the M-17 trunk road was implemented via an access road, in the form of a T slip road. The interchange is trumpet-shaped and positioned oblique to the motorway. The interchange includes three ramps and the Drivuša underpass.

M1 Bridge

The bridge crosses the existing local road that links the trunk road M-17 and the local settlements. The M1 bridge is a continuous structure along three segments with a total length of 39 m. The cross section of the superstructure consists of a full slab 0.75 m thick and 12.9 m wide. Shore and central piers are attached to the superstructure using stiff connections. The central piers are double with a circular diameter of 1.2 m and average height of 6 m, without cross girders.

M2 Bridge

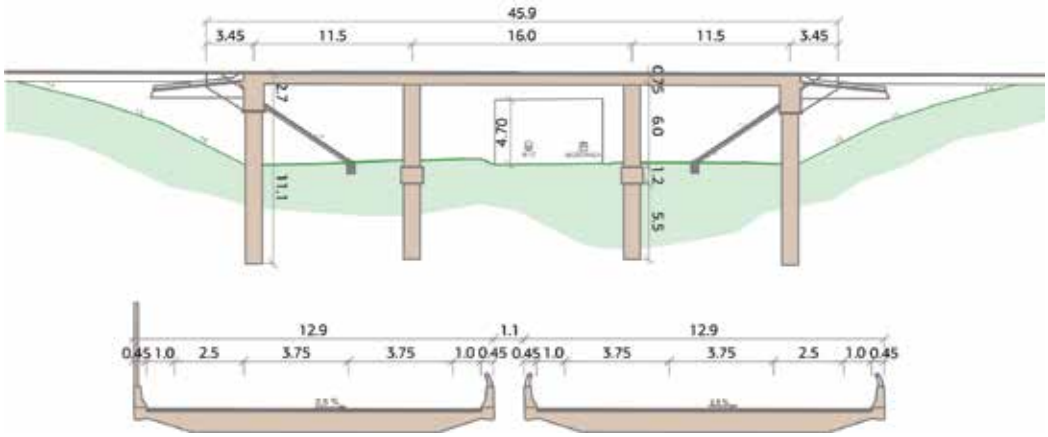
The bridge crosses over the Bosna river and is 340 m long. The M2 bridge consists of 11 spans constructed with prefabricated prestressed T-girders with a monolithic pavement slab. The initial spans are 26 m long while the central spans are 32 m long. The cross section of the structure consists of 5 prestressed prefabricated girders 190 cm high, with 40 cm wide rebar expanding at the supports. The prefabricated girders are compounded with a 25 cm reinforced concrete slab. The central piers are circular, 230 cm in diameter, with cantilever brackets for placement of prefabricated girders.

M3 Bridge

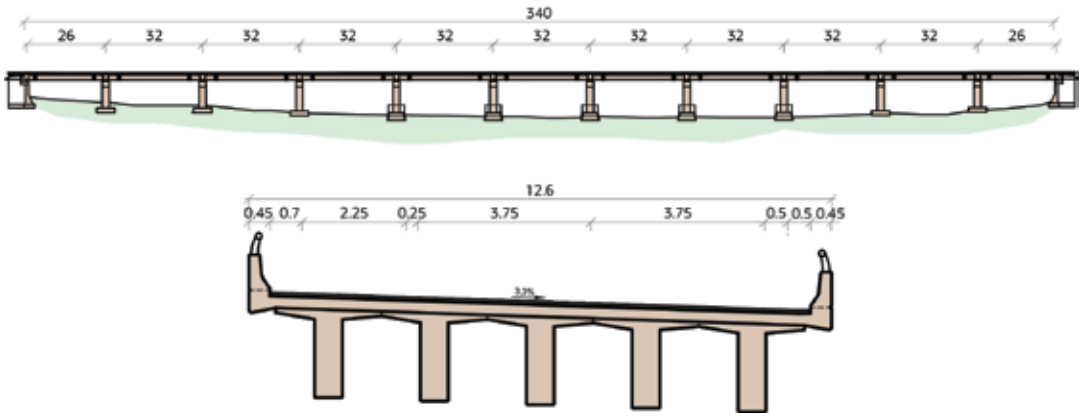
This is the first structure of this kind in BiH, constructed using the incremental launching technology, and consists of two bridges. This technology required construction of a technology station on one side of the bridge for concreting the full bridge profile in 21.5 m segments, and then using a special press to push the superstructure over the constructed piers, thus completing the basic bridge structure. The bridge connects the northern entrance to the 1. mart tunnel with the rest of the alignment. The difference in length between the left (378.4 m) and the right (494.5 m) structure was necessary due to terrain configuration and immediate proximity to the Bosna river. The right bridge superstructure is a continuous girder with 12 segments. The initial spans are 32.25 m long and the central ones are 43 m long. The cross section of the bridge consists of a box girder 12.6 m wide and 3.2 m high, with skewed vertical ribs 40 cm wide. Top and bottom slabs are 25 cm thick and

šestougaono s dubokim kanelurama. Na vrhovima tijelo stuba se rastavlja u V oblik s čeličnom zategom. Ukupne dimenzije srednjih stubova iznose 3,20 x 2,10 m.

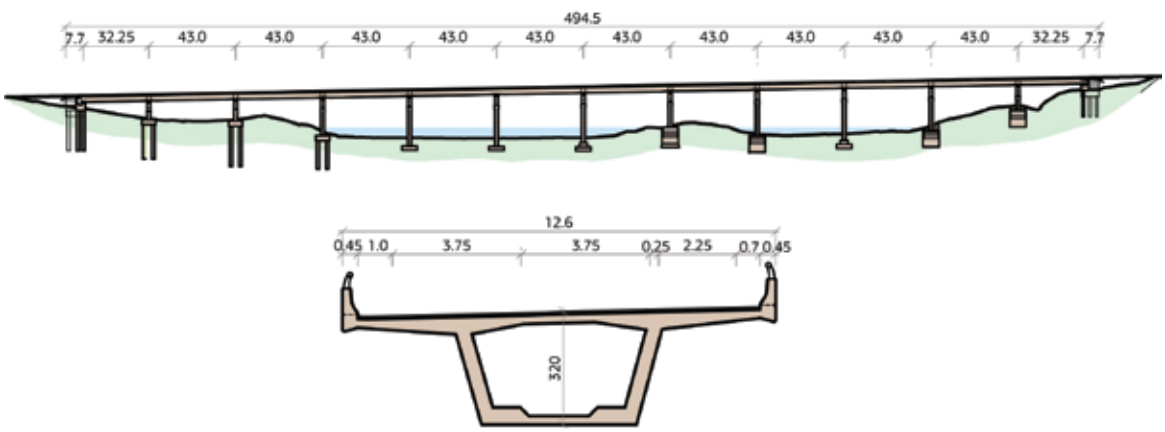
with appropriate reinforcements at the supports. Body of the central piers is hexagonal in shape, with deep flutes. At the top the body of the piers splits into a V-shape, with steel ties. The total dimensions of central piers are 3.20 x 2.10 m.



Most M1



Most M2



Most M3

Poddionica Gorica – Lašva / Tunel 1. mart

Tunel 1. mart je jedan od značajnijih objekata na Koridoru Vc. Dužine gotovo tri kilometra svrstan je među najduže cestovne tunele u BiH. Građen je Novom austrijskom tunelskom metodom (NATM). To je postupak gradnje tunela temeljen na znanstveno utvrđenim i u praksi potvrđenim idejama i principima, kako bi se mobilizovanjem nosivog kapaciteta stijenske mase, ostvarivala optimalna sigurnost i ekonomičnost.

Riječ je o najsavremenijem tunelu u regionu, a opremljen je pored brojnih sistema i led rasvjetom kao i videonadzorom koji prati i detektuje sve potencijalne probleme u tunelu i to 24 sata dnevno 365 dana u godini iz Centra za održavanje i kontrolu prometa (COKP) Drivuša.

Trasa poddionice tunel 1. mart prolazi kroz brdo Vijenac u pravcu sjever - jug. Tunel je projektovan kao dvocijevni, s po dvije saobraćajne trake u svakoj cijevi. Osovinski razmak tunelskih cijevi je 25 m. Dužina desne tunelske cijevi, uključujući portalnu građevinu, je 2.914 m, dok je lijeva tunelska cijev duga 2.949 m. Ulazni portal tunela nalazi se na nadmorskoj visini od 359 m, a izlazni na visini od 383 m. Visina nadsloja iznosi oko 325 m. Tunel ima 11 poprečnih veza između tunelskih cijevi, i to devet pješačkih i dvije za motorna vozila. Maksimalna dozvoljena brzina vožnje u tunelu je 100 km/h. U svakoj cijevi su predviđene po dvije parkirne niše. Ulazni portali su smaknuti i u potpunosti prilagođeni konfiguraciji terena.

Sub-section Gorica – Lašva / Tunel 1. mart

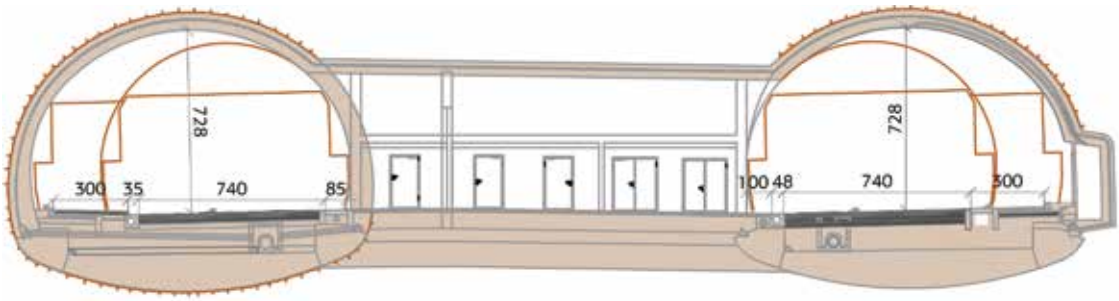
The 1. mart tunnel is one of the more significant structures on the Corridor Vc. It is nearly three kilometres long and represents one of the longest road tunnels in BiH. It was built using the New Austrian Tunnelling Method (NATM). This method of tunnelling is based on scientifically and practically validated ideas and principles and relies on mobilisation of the load bearing capacity of groundmass to ensure optimal safety and cost-effectiveness.

This is the most modern tunnel in the region and it is equipped with, amongst numerous other systems, led lighting and video surveillance for tracking and detection of any potential issues in the tunnel, operated 24 hours a day and 365 days a year from the Drivuša Maintenance and Traffic Control Centre (MTCC).

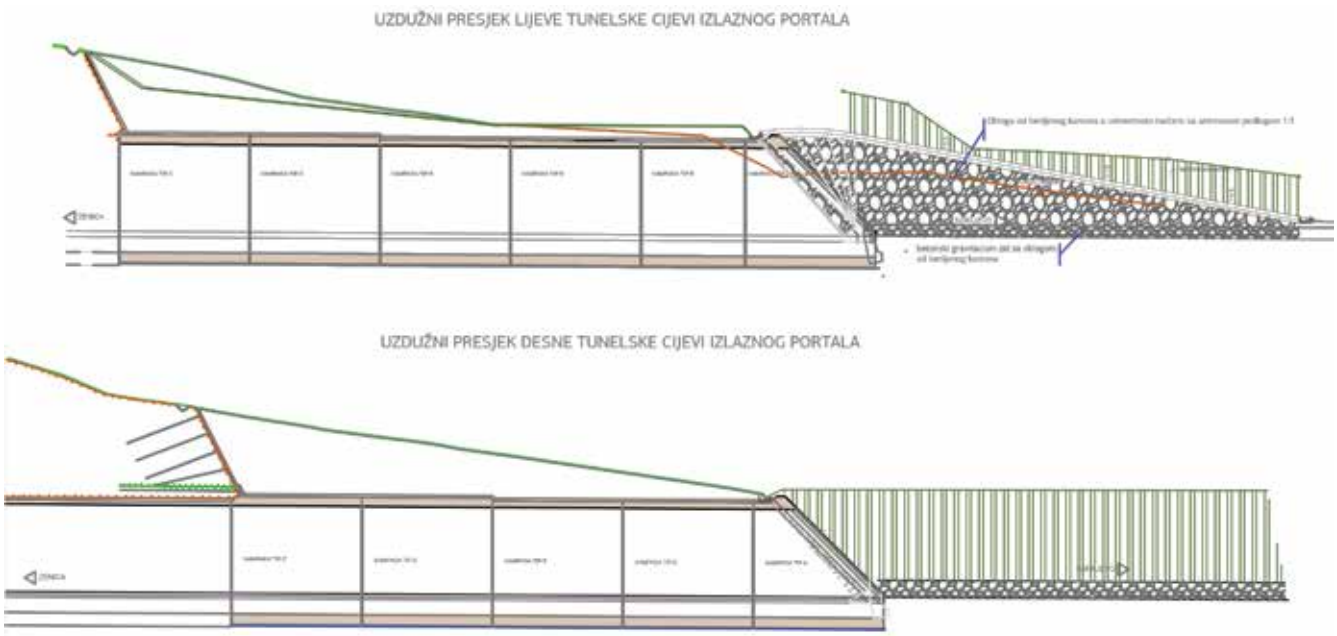
The alignment of the sub-section Gorica – Lašva / 1. mart tunnel passes through the Vijenac hill in the direction north - south. The tunnel was designed as a twin tunnel, with two traffic lanes in each tube. The distance between the central axes of the tunnel tubes is 25 m. The length of the right tunnel tube, including the portal, is 2,914 m, while for the left tunnel tube it is 2,949 m. The tunnel entry portal lies at an altitude of 359 m and the exit portal at 383 m. The height of the overburden is approximately 325 m. The tunnel contains eleven cross passages between the tunnel tubes, of which nine pedestrian and two motor vehicle passages. The maximum speed in the tunnel is 100 km/h. Each tube contains two parking niches. Entrance portals are staggered and fully adjusted to the configuration of the terrain.

Tunel 1. mart - sjeverni portal

Tunel 1. mart - južni portal



Tunel 1. mart



Tunel 1. mart - Portali

Tunel 1. mart - sjeverni portal

Tunel 1. mart - južni portal


100

Tunel 1. mart

Poddionica Lašva – Kakanj

Poddionica se proteže od polupetlje Lašva, u naselju Donji Lučani, do petlje Kakanj s ukupnom dužinom od 10 km. Gradila se u periodu od 2010. do 2013. godine. Najvećim dijelom trasa je smještena u podnožju padine, neposredno uz obalu rijeke Bosne. Izvedena je u relativno povoljnim uvjetima na visokim nasipima, osim u srednjoj trećini gdje se mjestimično usijeca u nestabilnu padinu. Projektovana je za računsku brzinu 120 km/h, s izuzetkom dvije krivine u srednjem dijelu trase (zona klizišta Tičići), koje su projektovane za računsku brzinu 110 km/h.

U toku izgradnje autoceste izvršeno je i saniranje klizišta Tičići, u zahvatu od 700 m autoceste, što je najskuplji i najsloženiji objekat na ovoj trasi.
Također je izgrađeno nekoliko manjih objekata koji služe za provođenje lokalnih saobraćajnica, manjih vodnih tokova i pješaka.

Sub-section Lašva – Kakanj

This sub-section stretches from the Lašva partial interchange located in the village of Donji Lučani to the Kakanj interchange, with a total length of 10 km. It was built in the period from 2010 to 2013. The alignment mostly follows the base of the slope adjacent to the Bosna river. It was constructed under relatively favourable conditions on high embankments, except in the middle third where it partially cuts into an unstable slope. It was designed for a nominal speed of 120 km/h, with the exception of two bends in the central part of the alignment (in the landslide zone Tičići) designed for a nominal speed of 110 km/h.

Construction efforts included the stabilisation of the Tičići landslide zone along the motorway in the length of approximately 700 m, which was the most costly and complex undertaking on this alignment.
This sub-section contains several smaller structures for crossing local roads, lesser waterways and pedestrian traffic.

Most Zli Brijeg

Karakteristično za mostove M2, M3 i M4 je to što su za jednu kolovoznu traku autoceste korišteni postojeći mostovi magistralne ceste M-17, bez zaustavne trake, na kojim je izvršena rekonstrukcija, dok su za drugu kolovoznu traku izgrađeni novi paralelni mostovi s punim profilom saobraćajnice. Sistem rasponske konstrukcije kod svih mostova je sličan, a radi se o prednapregnutim nosačima T presjeka s armirano-betonskom pločom preko njih. Temelji mostova su urađeni na šipovima, bunarima ili direktno zavisno od geološke građe tla na kojem su fundirani.

Most M1 preko Repovačkog potoka, je jednostavna ramovska armirano-betonska konstrukcije, raspona 9 m.

Most M2 nalazi se u Donjem Kaknju i premoštava rijeku Bosnu. Na lijevoj kolovoznoj traci je rađena rekonstrukcija postojećeg mosta sa 3 raspona, dužine 95 m, a na desnoj traci je izgrađen novi most s 4 raspona, dužine 125 m.

Most M3 nalazi u mjestu Donji Kakanj i premoštava rijeku Bosnu. Na lijevoj kolovoznoj traci je urađena rekonstrukcija postojećeg mosta sa 6 raspona, dužine rasponske konstrukcije 185 m. Na desnoj traci je izgrađen novi most sa 7 raspona, dužine rasponske konstrukcije 215 m.

Most M4 (Zli Brijeg) nalazi se u blizini petlje Kakanj i premoštava rijeku Bosnu. Na lijevoj kolovoznoj traci je izgrađen novi most s 9 raspona, dužine 275 m. Na desnoj traci je urađena rekonstrukcija postojećeg mosta s 8 raspona, dužine rasponske konstrukcije 245 m. Most premoštava i željezničku prugu Šamac – Sarajevo.

Vijadukt Bilješevo se nalazi u istoimenom naselju. Izgrađen je na desnoj kolovoznoj traci autoceste s 9 ra-spona, rasponska konstrukcija kontinuirana prednapregnuta ploča, ukupne dužine 225 m.

A feature of the M2, M3 and M4 bridges is that one carriageway was built on reconstructed existing bridges on the M-17 trunk road, without a service lane, and new bridges with a complete profile were constructed for the other carriageway. The superstructure system is similar in all bridges, consisting of prestressed T-girders covered by a reinforced concrete slab. The footing was constructed using piles, wells or direct foundations, depending on the geological characteristics of the terrain.

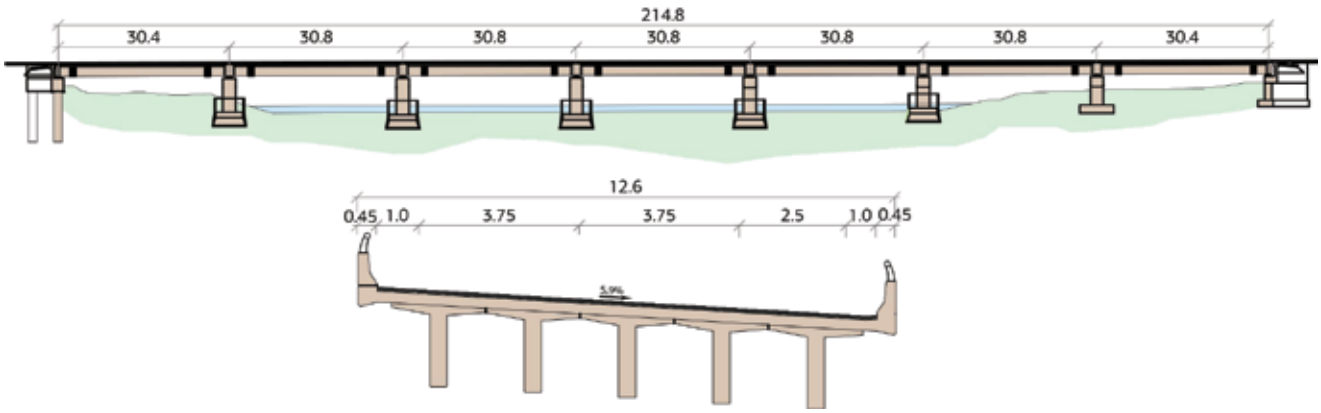
The M1 bridge, which crosses the Repovački Potok stream, is a simple reinforced concrete frame structure with a 9 m span.

The M2 bridge is situated in Donji Kakanj and bridges the Bosna river. The left carriageway is a reconstructed existing bridge with 3 spans and length of 95 m, and the right carriageway required construction of a new bridge with 4 spans and length of 125 m.

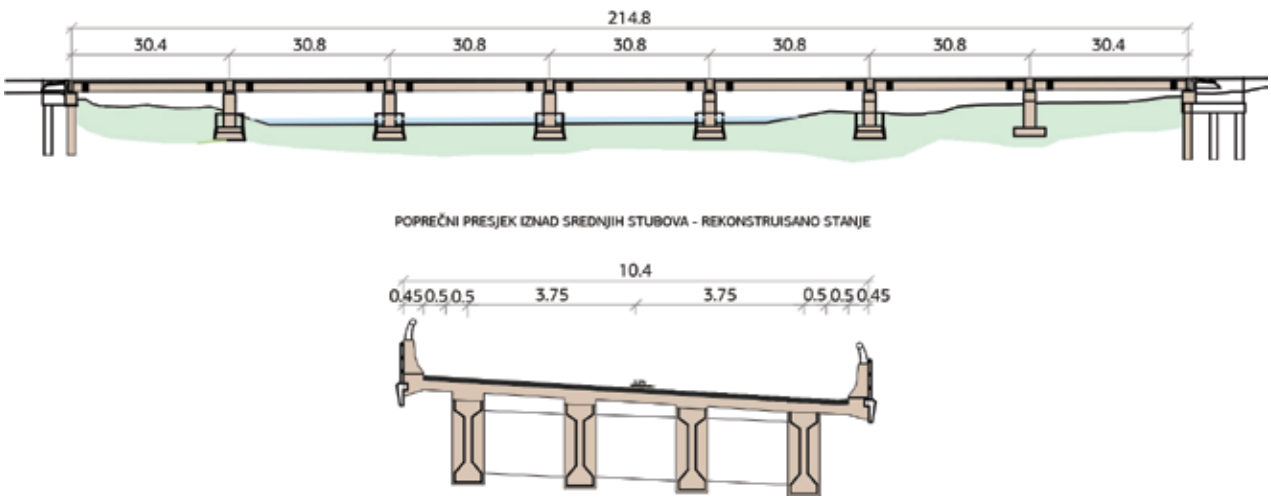
The M3 bridge is situated in the village of Donji Kakanj and crosses the Bosna river. The left carriageway is a reconstructed existing bridge with 6 spans and superstructure length of 185 m, and the right carriageway required construction of a new bridge with 7 spans and superstructure length of 215 m.

The M4 bridge (Zli Brijeg) is situated close to the Kakanj interchange and crosses the Bosna river. The left carriageway required construction of a new bridge with 9 spans and length of 275 m. The right carriageway is a reconstructed existing bridge with 8 spans and superstructure length of 245 m. The bridge also crosses over the Šamac – Sarajevo railway line.

The Bilješevo viaduct is located in the village of Bilješevo. It was built on the right motorway carriageway with 9 spans, with a continuous prestressed slab superstructure and total length of 225 m.



Most M3



Most M3

Potputnjak PP1 nalazi se u naselju Donji Lučani i urađen je kao otvorena AB ramovska konstrukcija s dva otvora i pregradom u sredini, 2 x 8,5 x 5 m. Jedan otvor služi za isključni krak polupetlje prema naplatnom mjestu Lašva, a drugi za lokalnu cestu prema naselju Donji Lučani. Ukupna dužina potputnjaka je 80 m.

Potputnjak PP2 nalazi se u naselju Bajrak i urađen kao otvorena armirano-betonska ramovska konstrukcija svijetlog otvora 8 m i dužine 65 m. Služi za prolaz regionalne ceste R-445 kroz trup autoceste.

Sanacija klizišta Tičići je najvažniji i najsloženiji poduhvat u toku izgradnje ove poddionice. Sanacija je podrazumijevala, između ostalog, izradu AB potporne konstrukcija dužine cca 600 m i visine do 13 m, iskop oko 115.000 m^3 zemljanog materijala i ugradnju oko 15.000 m^3 betona, 770.000 kg betonskog čelika i oko 65.000 m^3 kamenog nasipa.

Polupetlja u Donjim Lučanima zbog svog specifičnog položaja u saobraćajnoj mreži, ima samo dva saobraćajna toka: isključenje s autoceste iz pravca Sarajeva i uključenje na autocestu u pravcu Sarajeva.

Bočno naplatno mjesto Lašva je vezano za polupetlju u Donjim Lučanima. Ovo naplatno mjesto je izvedeno sa šest protočnih traka i jednom trakom za vangabaritna vozila.

Bočno naplatno mjesto Kakanj je izvedeno sa četiri protočne trake i jednom trakom za vangabaritna vozila.

Manji objekti: tri mosta, tri prolaza za lokalne saobraćajnice, četiri prolaza za poljoprivredne mašine i pješake, hidrotehnički tunel i prolaz za pješake.

The PP1 underpass is located in the village of Donji Lučani and was constructed as a reinforced concrete frame structure with two openings and a central partition, 2 x 8.5 x 5 m. One opening serves the exit slip road from the partial interchange leading to the Lašva toll plaza and the other is used for the local road to Donji Lučani. The total length of the underpass is 80 m.

The PP2 underpass is located in the village of Bajrak and is constructed as a reinforced concrete open frame structure, 65 m long and with an 8 m wide clear opening. It is used to pass the regional road R-445 through the base of the motorway.

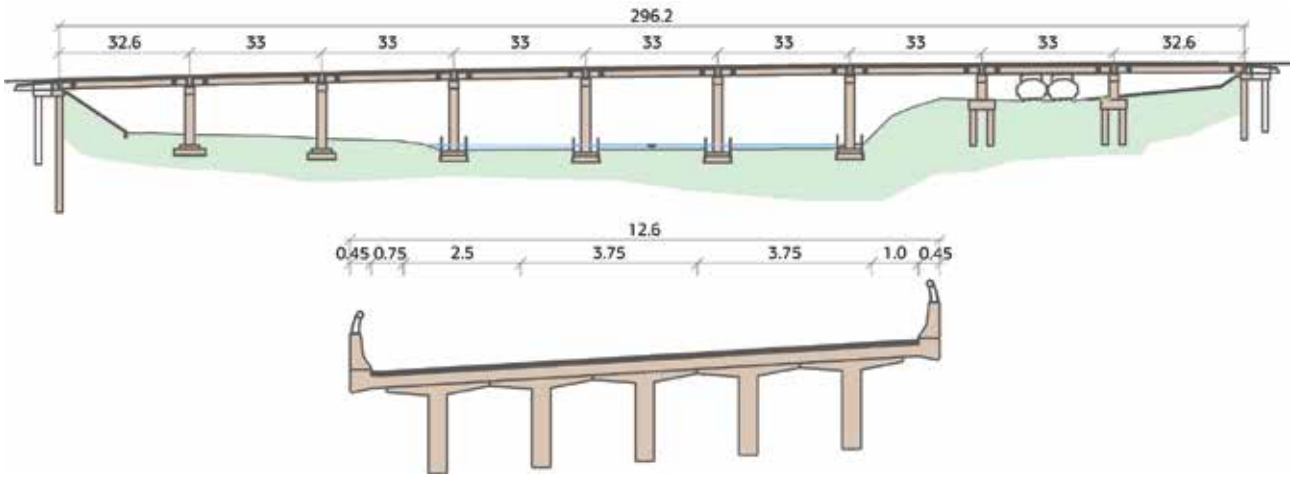
Stabilisation of the Tičići landslide was the most costly and complex undertaking on this sub-section. Stabilisation works included, amongst other works, construction of a reinforced concrete retaining wall approximately 600 m long and reaching up to 13 m in height, excavation of approx. 115,000 m^3 of material and installation of approx. 15,000 m^3 of concrete, 770,000 kg of concrete reinforcing steel and approx. 65,000 m^3 of rock embankments.

Partial interchange in Donji Lučani, due to its specific position in the road network, foresees only two traffic flows: exit from the motorway from the direction of Sarajevo and access to the motorway in the direction towards Sarajevo.

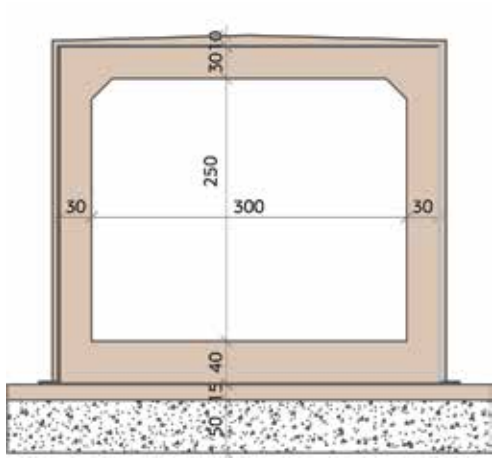
Ramp toll plaza Lašva is attached to the partial interchange in Donji Lučani. This toll plaza was constructed with six through lanes and one lane for large vehicles.

Ramp toll plaza Kakanj was constructed with four through lanes and one lane for large vehicles.

Smaller structures include: three bridges, three crossings for local roads, four crossings for agricultural machinery and pedestrians, a water engineering tunnel and a pedestrian crossing.



Most M4 Zli Brijeg

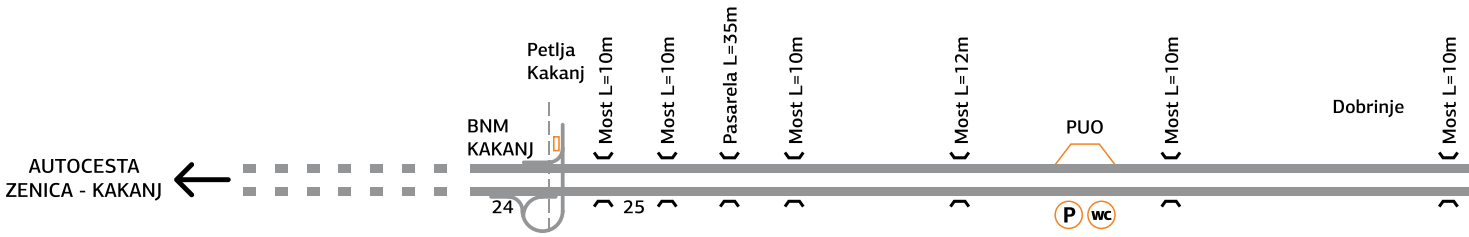


Potputnjak

3.3

DIONICA SECTION

KAKANJ → VISOKO



Dionica: Kakanj - Visoko

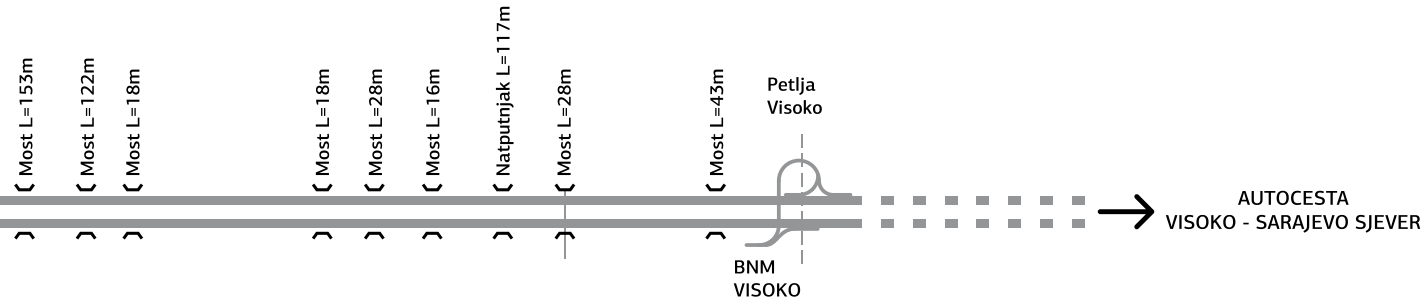
Dionica obuhvata potez autoceste od petlje Kakanj do petlje Visoko i duga je 16,5 km. Izgradnja je trajala od 2006. do 2009. godine. Finansiranje radova ove dionice je obezbjeđeno iz budžetskih sredstava Vlade Federacije BiH.

Sastoji se iz dvije poddionice:

- Kakanj – Dobrinje
- Dobrinje – Visoko

Za izgradnju ove dionice je korišten trup postojeće magistralne ceste M-17 kao i već izgrađeni objekti na njoj. Trasa je locirana najvećim dijelom u ravnom terenu visočke i kakanjske doline s izuzetkom jednog kraćeg poteza na srednjoj trećini dionice, gdje je provedena zasijecanjem u padinu na uskom prostoru uz obalu rijeke Bosne. Na srednjem dijelu dionice trasa autoceste dva puta prelazi rijeku Bosnu, s dva dugačka mosta koji su ujedno i najvažniji objekti na trasi.

U nastavku je dat pregled najznačajnijih objekata po poddionicama.



Section: Kakanj - Visoko

This section covers the motorway alignment from the Kakanj interchange to the Visoko interchange, with a total length of 16.5 km. It was constructed in the period from 2006 to 2009. Financing for this section was provided from the Federation BiH Government budget.

It consists of two sub-sections:

- Kakanj – Dobrinje
- Dobrinje – Visoko

This section was built over the body of the existing trunk road M-17 and the auxiliary structures. The alignment is situated mainly on the flat plateaus of the Visoko and Kakanj valleys, with the exception of one shorter piece in the middle third of this section where a side cut was required to pass the alignment through the narrow space along the Bosna river bank.

In the central part, the motorway alignment crosses the Bosna river two times, over two long bridges which are also the most important structures on this alignment.

The following part provides an overview of the most significant structures in each sub-section.

Podionica Kakanj – Dobrinje

Poddionica obuhvata potez autoceste od petlje Kakanj do naselja Dobrinje. Duga je 9 km, a građena je u periodu 2008 - 2009. godine. Trasa je položena koridorom postojeće magistralne ceste M-17, s minimalnim odstupanjima u cilju poboljšanja saobraćajnih elemenata. Projektovana za računsku brzinu 120 km/h, osim dvije krivine u srednjem dijelu trase, uz termoelektranu Kakanj, koje su projektovane za računsku brzinu 110 km/h. Prva polovina trase je položena u ravnom dijelu kakanjske doline s trupom izvedenim uglavnom na nasipima, dok je druga polovina trase locirana u mnogo težim terenskim prilikama, sa zasijecanjem u padinu na uskom obalnom pojasu uz lijevu obalu rijeke Bosne. Zbog relativno uskog prostora na tom dijelu trase, u dužini od 4 km, nožica nasipa je osigurana visokim armirano-betonskim L potpornim zidovima.

Sub-section Kakanj - Dobrinje

This sub-section covers the motorway alignment from the Kakanj interchange to the village of Dobrinje. It is 9 km long and was constructed in the period 2008-2009. The alignment follows the corridor of the existing trunk road M-17, with minimal deviations required for improved traffic elements. Designed for a nominal speed of 120 km/h, with the exception of two bends in the central part of the alignment next to the Kakanj thermal power plant which were designed for a nominal speed of 110 km/h. The first half of the alignment is situated in the flat part of the valley of Kakanj with the body constructed mostly on embankments, while the other half flows through much more difficult terrain which required cutting into the slope along the narrow bank of the Bosna river. Due to the relatively narrow space on this part of the alignment, in the length of 4 km the toe of the embankment had to be secured with high, reinforced concrete L-shaped retaining walls.

Kakanj - Dobrinje

Petlja Kakanj

Natputnjak na petlji Kakanj
Naputnjak služi za prelaz krakova petlje preko autoceste koji vode prema bočnom naplatnom mjestu Kakanj. Na objektu je izvršena rekonstrukcija postojećeg natputnjaka. Rasponska konstrukcija je olakšana armirano-betonska ploča, a sastoji se od 4 raspona. Ukupna dužina objekta je 50 m.

Pasarela u naselju Doboj
Pasarela je izgrađana za potrebe pješačkog saobraćaja koji od centra grada Kaknja vodi prema prigradskim naseljima. Rasponska konstrukcija je izvedena od varenih čeličnih limova i ima samo 1 raspon dužine 33 m.

Betonski zidovi
Na dijelu trase uz lijevu obalu rijeke Bosne, u blizini termoelektrane Kakanj, zbog nepovoljnih terenskih uvjeta i suženog prostora, trup autoceste je osiguran s armirano-betonskim potpornim i obložnim zidovima. Ukupna dužina zidova je 4 km.

Petlja u Kakanju
Urađena je rekonstrukcija postojeće petlje u Kaknju, što je podrazumijevalo proširenje krakova petlje i izradu potpuno nove kolovozne konstrukcije.

Manji objekti na trasi: šest prolaza za lokalne saobraćajnice, četiri prolaza za poljoprivredne mašine i pješake i prolaz za pješake.

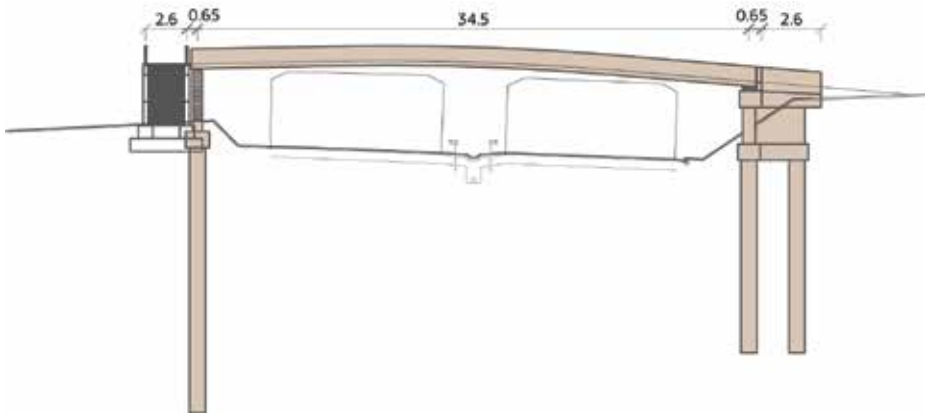
Overpass on the Kakanj Interchange
The overpass carries the interchange ramps leading to the Kakanj toll plaza over the motorway. This structure included a reconstruction of the existing overpass. The superstructure consists of a lightened reinforced concrete slab implemented in 4 spans. The total length of the structure is 50 m.

Footbridge in the Village of Doboj
The footbridge was constructed for pedestrian traffic from the centre of Kakanj towards the outlying settlements. The superstructure was made from welded steel sheets in a single 33 m long span.

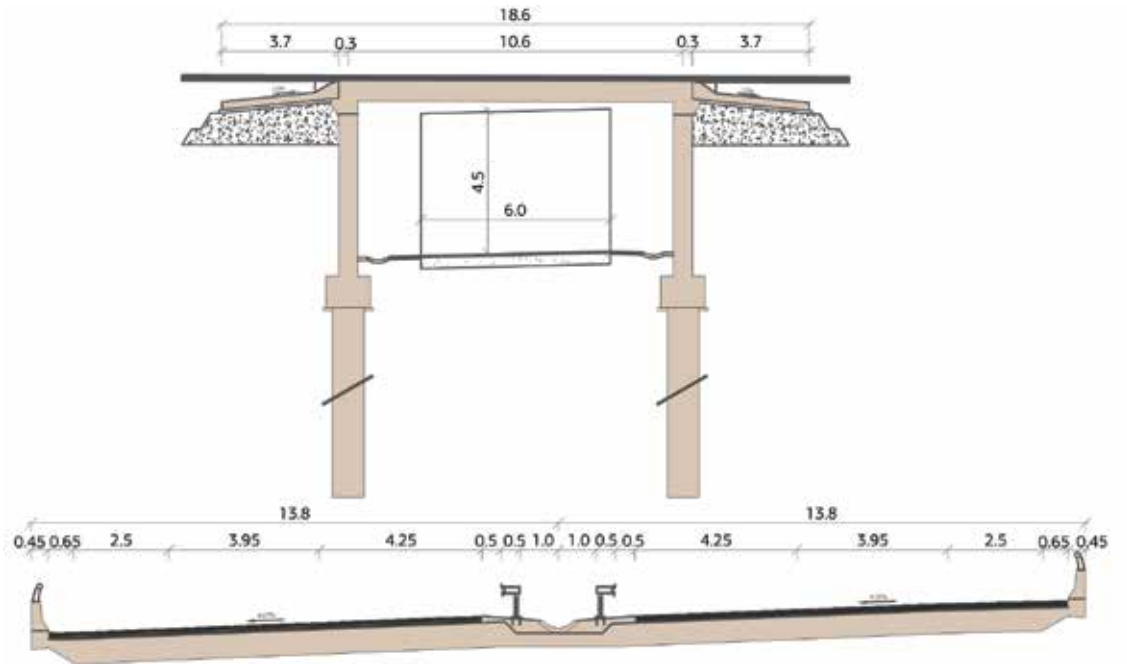
Concrete Walls
On the part of the alignment along the Bosna river, in the vicinity of the Kakanj thermal power plant, due to unfavourable terrain and narrow space the body of the motorway had to be supported with reinforced concrete retaining and lining walls. The total length of these walls is 4 km.

Kakanj Interchange
The existing interchange in Kakanj was reconstructed, requiring an expansion of the interchange ramps and construction of completely new carriageways.

Smaller structures on the alignment include: six passageways for local roads, four passageways for agricultural machinery and pedestrians and a pedestrian passageway.



Pasarela



Mostovi L=10.6m

Poddionica Dobrinje – Visoko

Poddionica je građena u periodu 2005-2006. godine. Obuhvata potez autoceste od granice općina Kakanj i Visoko u naselju Dobrinje do petlje Visoko. Duga je 7,5 km. Kao i kod ostalih poddionica na potezu od Lašve do Sarajevo Sjever, pri izgradnji autoceste se koristio trup postojeće magistralne ceste M-17. Tako je ostvarena značajna ušteda u vremenu i novcu potrebnom za eksproprijaciju zemljišta. Dodatna ušteda je ostvarena korištenjem već izgrađenih objekata na magistralnoj cesti. Trasa autoceste je položena, najvećim dijelom, u ravnom terenu uz rijeku Bosnu s dva prelaza preko iste, bez značajnijih zasijecanja u više padinske dijelove terena. Projektovana je za računsku brzinu 120 km/h .

Sub-section Dobrinje - Visoko

This subsection was built in the period 2005-2006. It covers the part of the motorway from the border with Kakanj and Visoko municipalities in the village of Dobrinje to the Visoko interchange. It is 7.5 km long. Same as on the other sub-sections between Lašva and Sarajevo Sjever, the body of the existing trunk road M-17 was used for construction of the motorway. This resulted in substantial savings in terms of time and money required for expropriation of land. Additional savings were achieved by utilising the existing structures on the trunk road. The motorway alignment lies, for the most part, on flat terrain along river Bosna and crosses the river two times without any major slope cuttings. It was designed for a nominal speed of 120 km/h.

Natputnjak Donje Moštre

Most M5 nalazi se u naselju Dobrinje i premoštava rijeku Bosnu. Na lijevoj kolovoznoj traci je urađena rekonstrukcija postojećeg mosta sa 4 raspona, ukupne dužine rasponske konstrukcije 120 m, dok je na desnoj kolovoznoj traci autoceste izgrađen novi most s 5 raspona i ukupnom dužinom konstrukcije od 150 m.

Most M6 nalazi se u naselju Dobrinje i premoštava rijeku Bosnu. Na lijevoj kolovoznoj traci autoceste je izgrađen novi most s 4 raspona, ukupne dužine 120 m. Na desnoj traci je urađena rekonstrukcija postojećeg mosta s 4 raspona, ukupne dužine rasponske konstrukcije 120 m.

Most M8 nalazi se u naselju Donje Moštre i premoštava rijeku Radovljanku. Za obje kolovozne trake je izvedena zajednička rasponska konstrukcija s 1 rasponom. Rasponska konstrukcija se sastoji od prednapregnutih nosača manje statičke visine koji su monolitizirani punom armirano-betonskom pločom. Ukupna dužina rasponske konstrukcije iznosi 20 m.

Most M10 nalazi se u naselju Donje Moštre i premoštava rijeku Zimašnicu. Izvedena je zajednička rasponska konstrukcija za lijevu i desnu kolovoznu traku. Rasponska konstrukcija se sastoji od prednapregnutih nosača manje statičke visine koji su monolitizirani punom armirano-betonskom pločom. Ukupna dužina rasponske konstrukcije iznosi 20 m.

Vijadukt V11 nalazi se u naselju Biskupići preko regionalne ceste R-445. Na lijevoj i na desnoj strani izgrađeni su novi paralelni objekti s rasponskom konstrukcijom tipa prednapregnute armirano-betonske ploče sa jednim rasponom dužine 20 m.

Natputnjak u Donjim Moštrama izgrađen je za potrebe prijelaza lokalne saobraćajnice kojim će se budući aerodrom Visoko povezati s regionalnom cestom R-445. Rasponska konstrukcija natputnjaka je prednapregnuta armirano-betonska ploča sa 6 raspona, ukupne dužine 110 m.

Manji objekti na trasi: šest objekta za prijelaz lokalnih saobraćajnica.

The M5 bridge is situated in the village of Dobrinje and bridges the Bosna river. The left carriageway uses the reconstructed existing bridge with 4 spans, with total superstructure length of 120 m, and a new bridge was constructed for the right carriageway with 5 spans and total superstructure length of 150 m.

The M6 bridge is situated in the village of Dobrinje and bridges the Bosna river. A new bridge was constructed for the left carriageway, with 4 spans and total superstructure length of 120 m. The right carriageway uses a reconstructed existing bridge with 4 spans and superstructure length of 120 m.

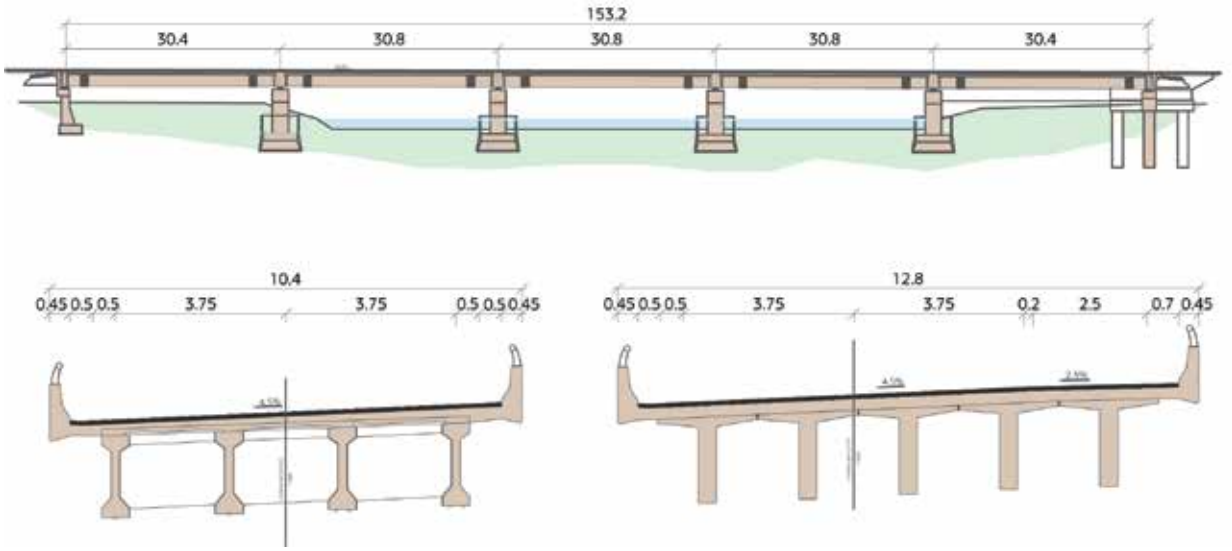
The M8 bridge is situated in the village of Donje Moštre and bridges the Radovljanka river. A joint superstructure was constructed for both carriageways, in a single span. The superstructure was constructed with prestressed concrete girders of lower static height, compounded with a monolithic reinforced concrete slab. The total length of the superstructure is 20 m.

The M10 bridge is situated in the village of Donje Moštre and bridges the Zimašnica river. A joint superstructure was constructed for both carriageways. The superstructure was constructed with prestressed concrete girders of lower static height, compounded with a monolithic reinforced concrete slab. The total length of the superstructure is 20 m.

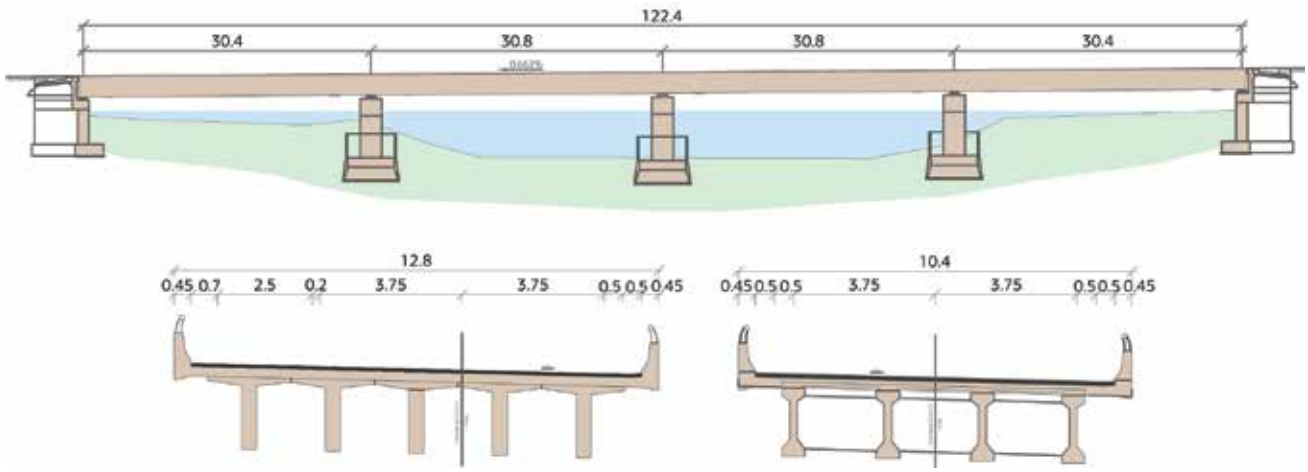
The V11 viaduct is situated in the village of Biskupići and crosses over the regional road R-445. New, parallel structures were erected on the left and right side, with a superstructure consisting of a prestressed reinforced concrete slab in a single 20 m span.

The overpass in Donje Moštre was built for the local road which will be linking the future airport in Visoko to the regional road R-445. The superstructure of this overpass is a prestressed reinforced concrete slab with 6 spans and total length of 110 m.

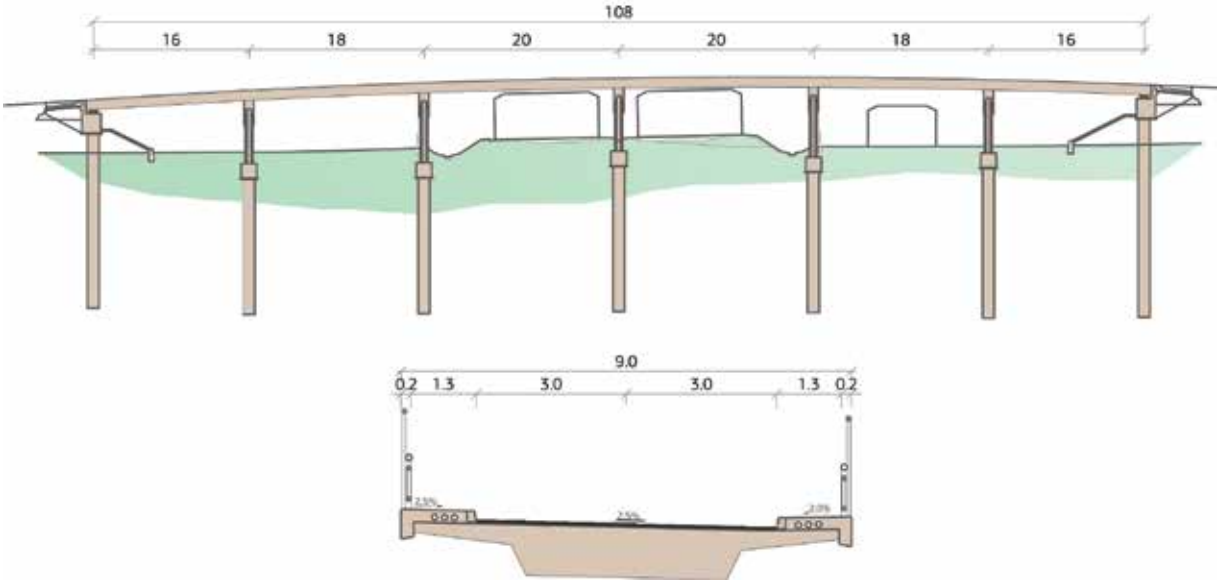
Smaller structures on the alingment include: six structures for crossing local roads.



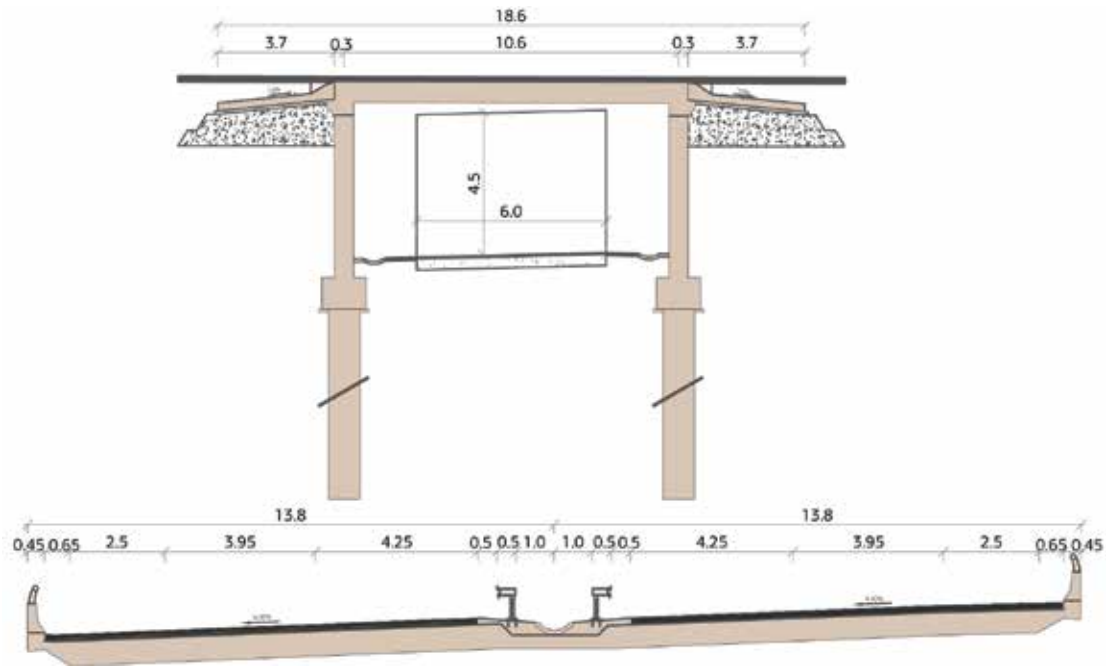
Most M5



Most M6



Natputnjak

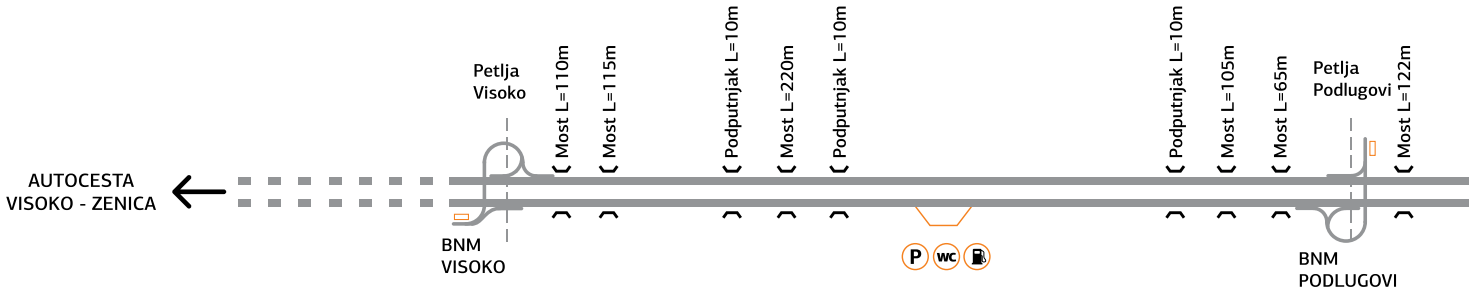


Mali mostovi

3.4

DIONICA SECTION

VISOKO → SARAJEVO SJEVER



Dionica: Visoko – Sarajevo Sjever

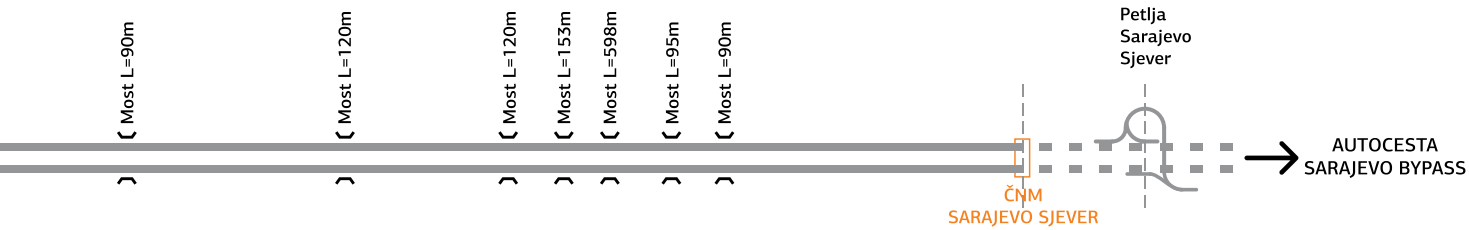
Godine 2001. izgradnjom dionice Visoko – Sarajevo Sjever započet je projekat autoceste na Koridoru Vc. Izgradnja je finansirana iz budžeta Vlade Federacije BiH. Trasa je smještena uglavnom na ravnom terenu uz rijeku Bosnu i samo na nekoliko mjesta dotiče okolne padine. Pruža se od petlje Visoko do petlje Sarajevo Sjever i duga je 19,5 km.

Sastoji se iz dvije poddionice:

- Visoko – Podlugovi
- Podlugovi - Sarajevo Sjever

Karakteristično za ovu dionicu je da ima 11 ukrštanja s rijekom Bosnom. Postojeći mostovi na magistralnoj cesti M-17 su iskorišteni za jednu kolovoznu traku autoceste, dok su za drugu kolovoznu traku izgrađeni novi paralelni mostovi. Pošto su trasa magistralne ceste i mostovi izgrađeni prije skoro 30 godina, bila je neophodna detaljna rekonstrukcija, uz prethodnu demontažu dotrajalih elemenata, kao što su elastično-odbojna ograda, zamjena elemenata za odvodnju, dilatacionih naprava, ležišta itd. Rekonstrukcija je obuhvatala i ojačanje temelja i stubova, ojačanje prednapregnutih nosača rasponske konstrukcije upotrebom karbonskih traka, zatim ojačanje kolovozne ploče dodatnom armaturom i novim slojem betona, nakon što je prethodno odstranjen asfaltni zastor, stara hidroizolacija i oštećeni gornji sloj stare kolovozne ploče. Rekonstrukcija je podrazumijevala i izradu nove odbojne ograde tipa New Jersey, nove mostovske slivnike, kolektor, hidroizolaciju i asfaltni zastor.

U nastavku je dat pregled najznačajnijih objekata po poddionicama.



Section: Visoko – Sarajevo Sjever

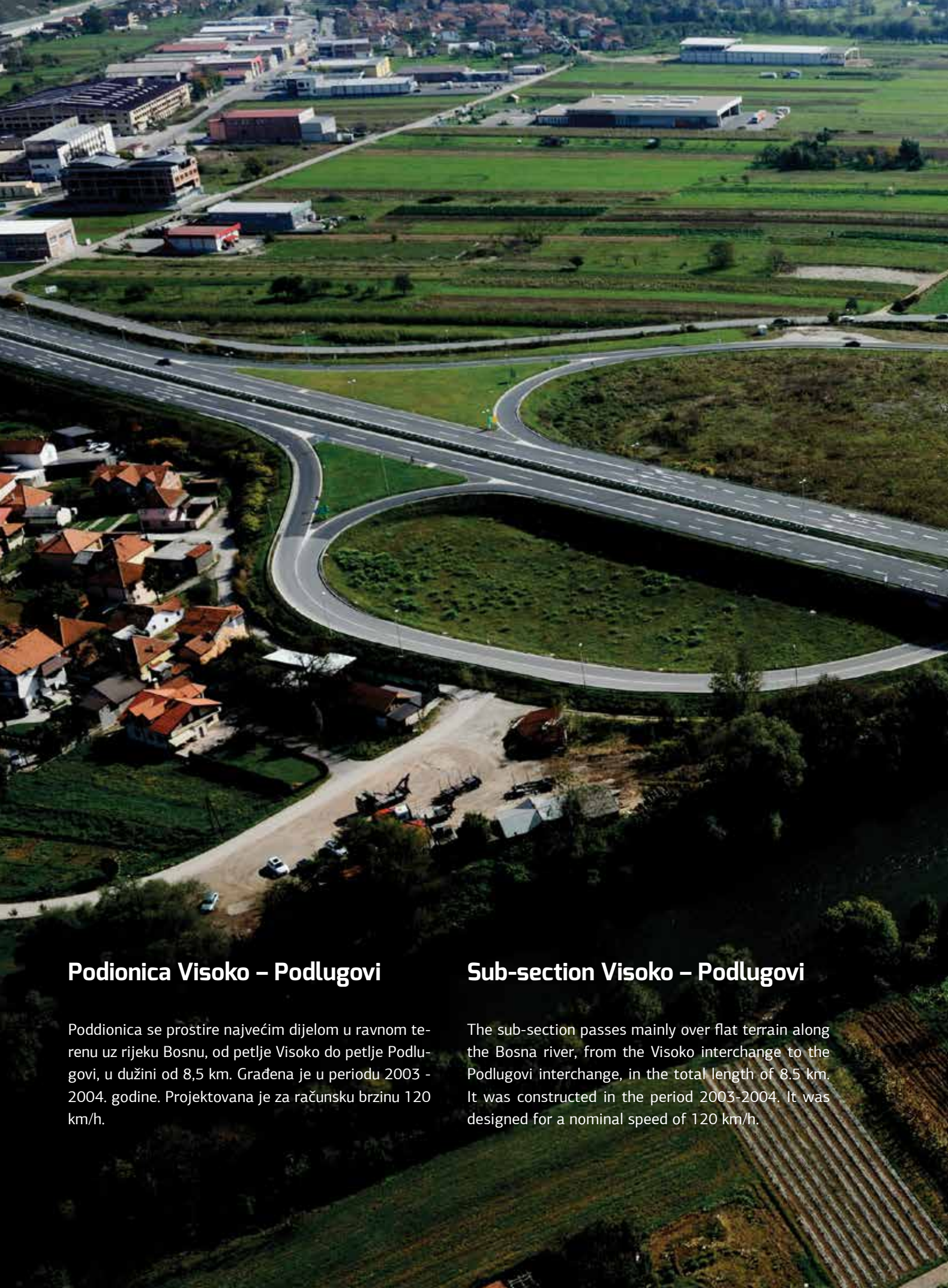
The Corridor Vc motorway project was started with the construction of the section Visoko – Sarajevo Sjever in 2001. Construction was financed from the Federation BiH Government budget. The alignment is situated mostly on flat terrain along the Bosna river and comes into contact with the nearby slopes only in several places. It is 19.5 km long and stretches from the Visoko interchange to the Jošanica interchange.

It consists of two sub-sections:

- Visoko – Podlugovi
- Podlugovi - Sarajevo Sjever

A distinctive feature of this section is that it crosses river Bosna 11 times. Existing bridges on the M-17 trunk road were used for one carriageway of the motorway and new, parallel bridges were constructed for the other carriageway. As the trunk road and bridges were built almost 30 years ago, a thorough reconstruction was necessary, with dismantling and replacement of deteriorated elements such as traffic barriers, drainage elements, expansion devices, beds, etc. The reconstruction included fortification of foundations and piers, reinforcement of prestressed girders supporting the superstructure with carbon strips, reinforcement of the carriageway with additional rebar and a new layer of concrete after first removing the bituminous overlay, old waterproofing and the damaged top layer of the pavement slab. Reconstruction also included construction of new Jersey-type traffic barriers, new bridge gutters, collector, waterproofing and bituminous overlay.

The following part provides an overview of the most significant structures in each sub-section.



Podionica Visoko – Podlugovi

Poddionica se prostire najvećim dijelom u ravnom terenu uz rijeku Bosnu, od petlje Visoko do petlje Podlugovi, u dužini od 8,5 km. Građena je u periodu 2003 - 2004. godine. Projektovana je za računsku brzinu 120 km/h.

Sub-section Visoko – Podlugovi

The sub-section passes mainly over flat terrain along the Bosna river, from the Visoko interchange to the Podlugovi interchange, in the total length of 8.5 km. It was constructed in the period 2003-2004. It was designed for a nominal speed of 120 km/h.

Petlja Visoko

Most M1 nalazi se uz petlju Visoko i premoštava rijeku Bosnu. Na lijevoj kolovoznoj traci je urađena rekonstrukcija postojećeg mosta, dok je na desnoj kolovoznoj traci izgrađen novi most. Konstrukcije mostova su paralelne s 4 raspona i ukupne dužine 105 m.

Nadvožnjak M2 nalazi se u naselju Arnautovići preko željezničke pruge. Na lijevoj kolovoznoj traci je urađena rekonstrukcija, dok je na desnoj kolovoznoj traci izgrađen potpuno novi objekat. Konstrukcije su paralelne s po 5 raspona, s tim da je lijevi objekat dug 110 m, a desni 115 m.

Most M3 nalazi se u naselju Čekrečije i premoštava rijeku Bosnu. Na lijevoj kolovoznoj traci je rađena rekonstrukcija postojećeg mosta s 8 raspona, dužine 220 m. Na desnoj traci je izgrađen most s 9 raspona, dužine 250 m.

Most M4 nalazi se u Ljubnićima i premoštava rijeku Bosnu. Na lijevoj kolovoznoj traci je izgrađen most s 3 raspona, dužine 90 m. Na desnoj traci je urađena rekonstrukcija postojećeg mosta s 4 raspona, dužine 105 m.

Most M5 nalazi se u Podlugovima i premoštava rijeku Stavnju. Na lijevoj kolovoznoj traci je izgrađen most s 3 raspona, dužine 65 m. Na desnoj traci je urađena rekonstrukcija postojećeg mosta s 3 raspona, dužine 55 m.

Petlja Visoko izvršena je rekonstrukcija postojeće petlje, što je podrazumijevalo proširenje krakova i izradu potpuno nove kolovozne konstrukcije.

Bočno naplatno mjesto Visoko je izvedeno sa četiri protočne saobraćajne trake i jednom trakom za vangabaritna vozila.

Manji objekti: tri mosta i dva prolaza za lokalne saobraćajnice te pet prolaza za poljoprivredne mašine i pješake.

The M1 bridge is situated adjacent to the Visoko interchange and bridges the Bosna river. The left carriageway uses the reconstructed existing bridge and a new bridge was constructed for the right carriageway. Bridge structures are parallel, with 4 spans and total length of 105 m.

The M2 overpass is located in the village of Arnautovići and crosses over railway tracks. The left carriageway was reconstructed and a new structure was constructed for the right carriageway. The structures are parallel, with 5 spans each; however the length of the left structure is 110 m long and of the right 115 m.

The M3 bridge is situated in the village of Čekrečije and bridges the Bosna river. The left carriageway is a reconstructed existing bridge with 8 spans and length of 220 m. The right carriageway required construction of a new bridge with 9 spans and length of 250 m.

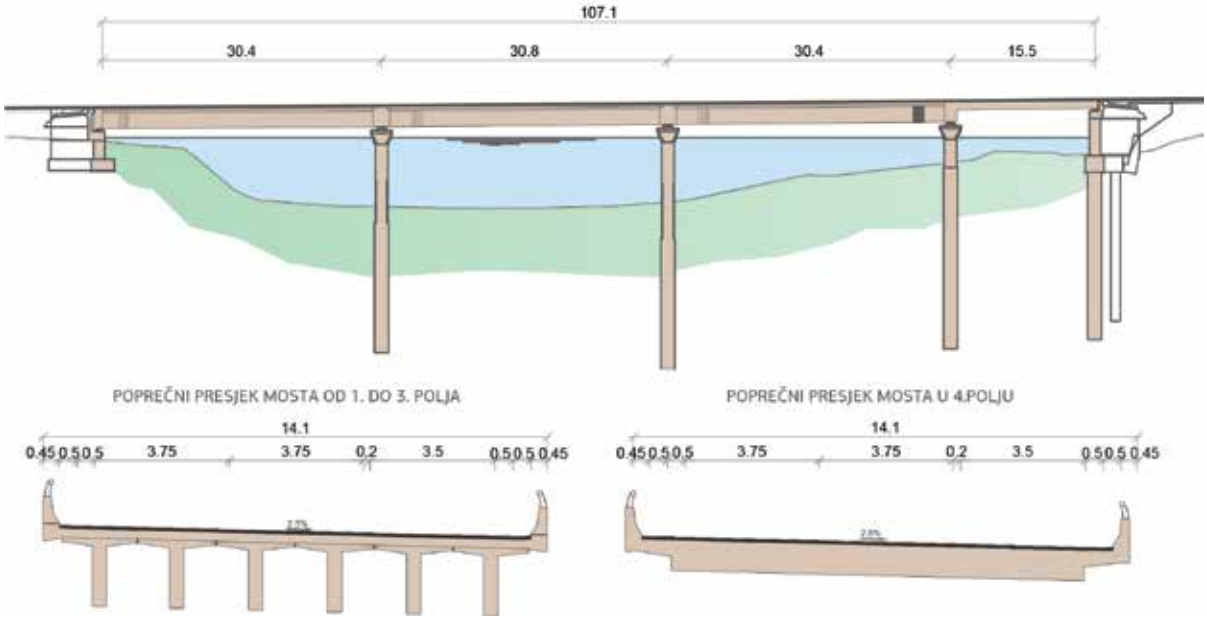
The M4 bridge is situated in Ljubnići and bridges the Bosna river. The left carriageway required construction of a new bridge with 3 spans and length of 90 m. The right carriageway is a reconstructed existing bridge with 4 spans, 105 m long.

The M5 bridge is situated in Podlugovi and bridges the Bosna river. The left carriageway required construction of a new bridge with 3 spans and length of 65 m. The right carriageway is a reconstructed existing bridge with 3 spans, 55 m long.

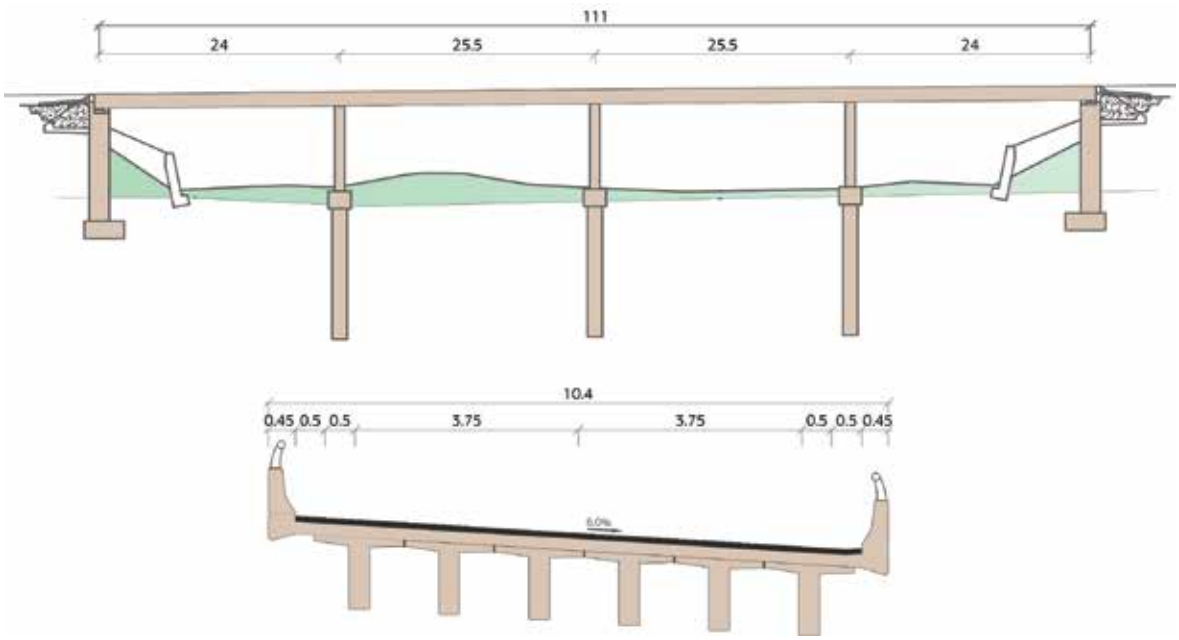
The Visoko interchange involved a reconstruction of the existing interchange, requiring an expansion of the ramps and construction of completely new carriageways.

The ramp toll plaza Visoko was constructed with four through lanes and one lane for large vehicles.

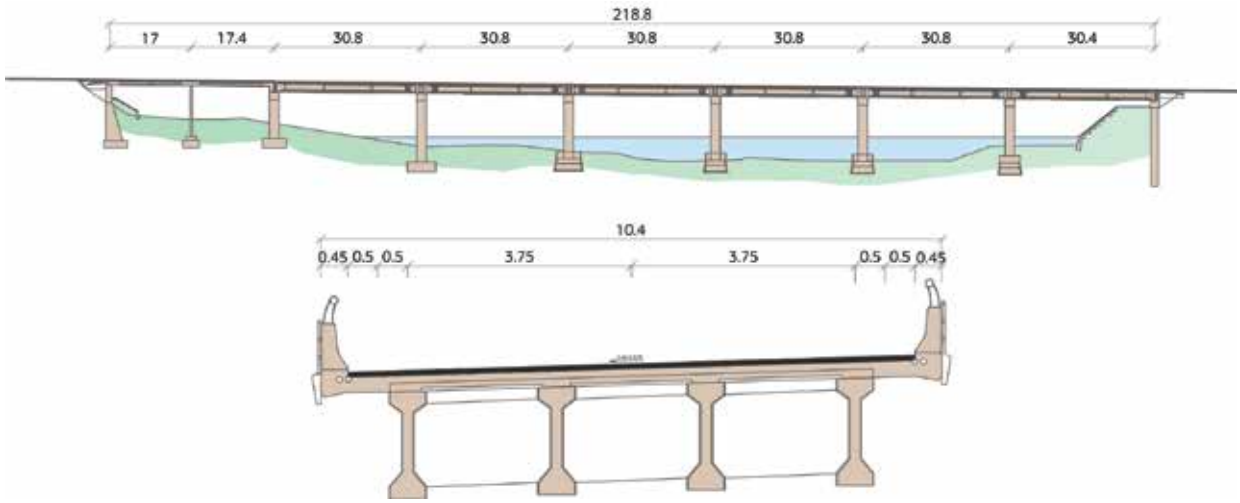
Smaller structures include: three bridges, two crossings for local roads and five crossings for agricultural machinery and pedestrians.



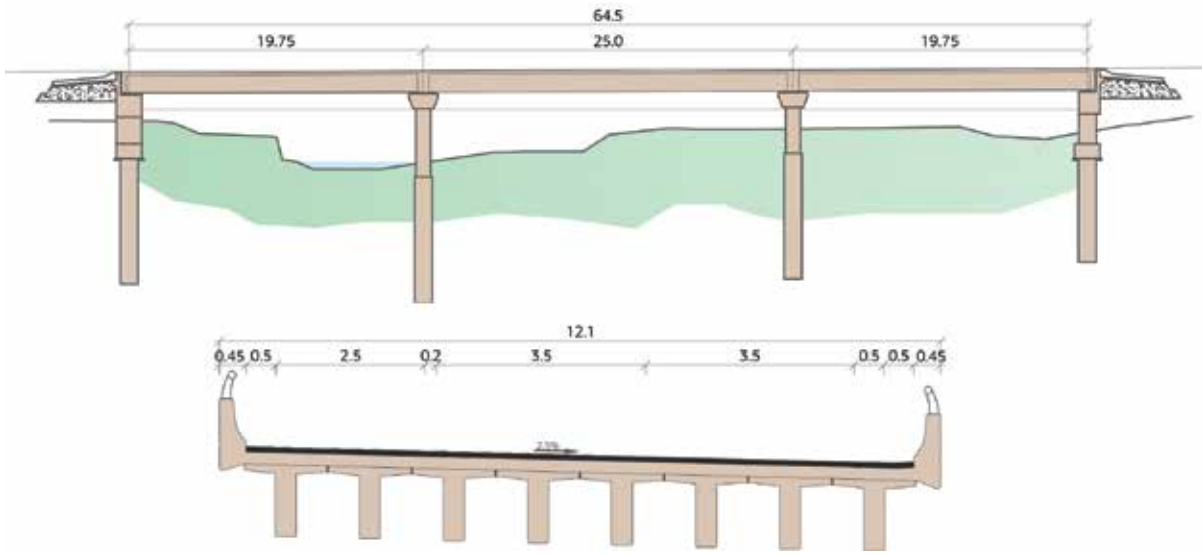
Most M1



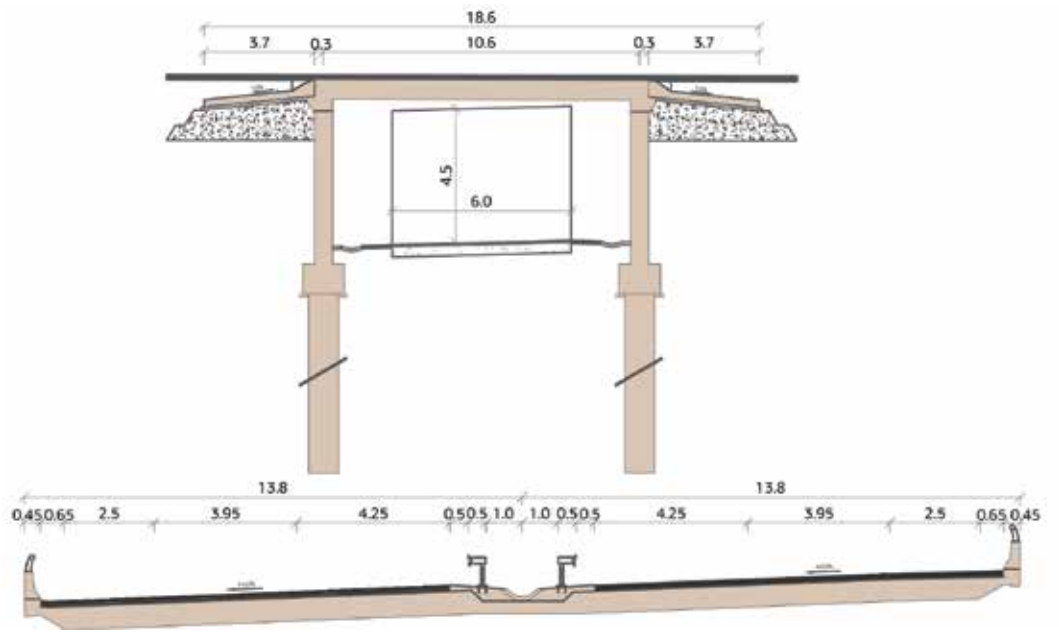
Most M2



Most M3



Most M5



Mali mostovi

Podionica Podlugovi – Sarajevo Sjever

Ovo je prva izgrađena poddionica autoceste na Koridoru Vc kroz BiH i duga je 11 km. Gradila se u periodu 2001-2002. godine. Najvećim dijelom trasa je smještena na ravnom terenu uz rijeku Bosnu, s nekoliko kratkih zadiranja u okolne padine. Karakteristika ove poddionice je čak osam prijelaza preko rijeke Bosne.

Trasa je projektovana za računsku brzinu 120 km/h s izuzetkom jedne lokacije gdje je, zbog nepovoljnog terena i manjeg radijusa horizontalne krivine, primijenjena računska brzina od 110 km/h.

Na poddionici Podlugovi – Sarajevo Sjever je izgrađeno osam velikih mostova preko rijeke Bosne, od čega je most M6 dug 600 m. Na ovoj poddionici su za jednu kolovoznu traku autoceste korišteni postojeći mostovi magistralne ceste M-17, pri čemu je urađena rekonstrukcija, dok su za drugu traku izgrađeni novi paralelni mostovi. Sistem rasponske konstrukcije kod svih ovih mostova je sličan; radi se o prednapregnutim nosačima T presjeka i armirano-betonskom pločom preko njih. Temeljenje mostova je vršeno na šipovima, bunarima ili direktno zavisno od geološke građe tla na kojeme se fundirani.

Sub-section Podlugovi – Sarajevo Sjever

This section is 11 km long and was the very first motorway section built on the Corridor Vc through BiH. It was built in the period 2001-2002. For the most part the alignment lies on flat terrain along the Bosna river, with only few cuts into the surrounding slopes. This section is characterised by eight crossings over the Bosna river.

The alignment was designed for a nominal speed of 120 km/h, with the exception of one location where unfavourable terrain and a smaller radius of the horizontal curve required a reduction of the nominal speed to 110 km/h.

A total of eight large bridges over river Bosna were constructed on the sub-section Podlugovi – Sarajevo Sjever, including the 600 m long M6 bridge. The existing bridges on the M-17 trunk road were reconstructed and used for one carriageway of the motorway and new, parallel bridges were constructed for the other carriageway. The superstructure system is similar in all these bridges, consisting of prestressed T-girders covered by a reinforced concrete slab. The footing was constructed using piles, wells or direct foundations, depending on the geological characteristics of the terrain.

Petlja Podlugovi

Natputnjak na petlji Podlugovi izvršena je rekonstrukcija postojećeg natputnjaka koji služi za prijelaz krakova petlje koji vode prema naplatnom mjestu Podlugovi. Rasponska konstrukcija natputnjaka je prednapregnuta ploča i sastoji se od četiri raspona, ukupne dužine 55 m.

Most M1 nalazi se u naselju Podlugovi i premoštava rijeku Bosnu. Na lijevoj kolovoznoj traci je izgrađen novi most, dok je na desnoj kolovoznoj traci izvršena rekonstrukcija postojećeg mosta. Oba mosta imaju 4 raspona, ukupne dužine 120 m.

Most M2 nalazi se u naselju Luke i premoštava rijeku Bosnu. Na lijevoj kolovoznoj traci je izgrađen novi most, dok je na desnoj kolovoznoj traci izvršena rekonstrukcija postojećeg mosta. Oba mosta imaju po 3 raspona, ukupne dužine 90 m.

Most M3 nalazi se u naselju Ribarići i premoštava rijeku Bosnu. Na lijevoj kolovoznoj traci je izgrađen novi most s 4 raspona, ukupne dužine rasponske konstrukcije 120 m. Na desnoj traci je urađena rekonstrukcija postojećeg mosta također s 4 raspona, ukupne dužine rasponske konstrukcije 120 m.

Most M4 nalazi se u naselju Donja Vogošća i premoštava rijeku Bosnu. Na lijevoj kolovoznoj traci je urađena rekonstrukcija postojećeg mosta sa 3 raspona, ukupne dužine rasponske konstrukcije 90 m, a na desnoj traci je izgrađen novi most sa 4 raspona. Ukupna dužina desnog objekta iznosi 120 m.

Most M5 nalazi se u naselju Donja Vogošća i premoštava rijeku Bosnu. Na lijevoj kolovoznoj traci je urađena rekonstrukcija postojećeg mosta, dok je na desnoj kolovoznoj traci izgrađen novi most. Obje mostovske konstrukcije imaju po 5 raspona, ukupne dužine rasponske konstrukcije 150 m.

The overpass on the Podlugovi interchange required a reconstruction of the existing overpass carrying the interchange ramps to the Podlugovi toll plaza over the motorway. The superstructure of this overpass is a prestressed reinforced concrete slab with four spans and total length of 55 m.

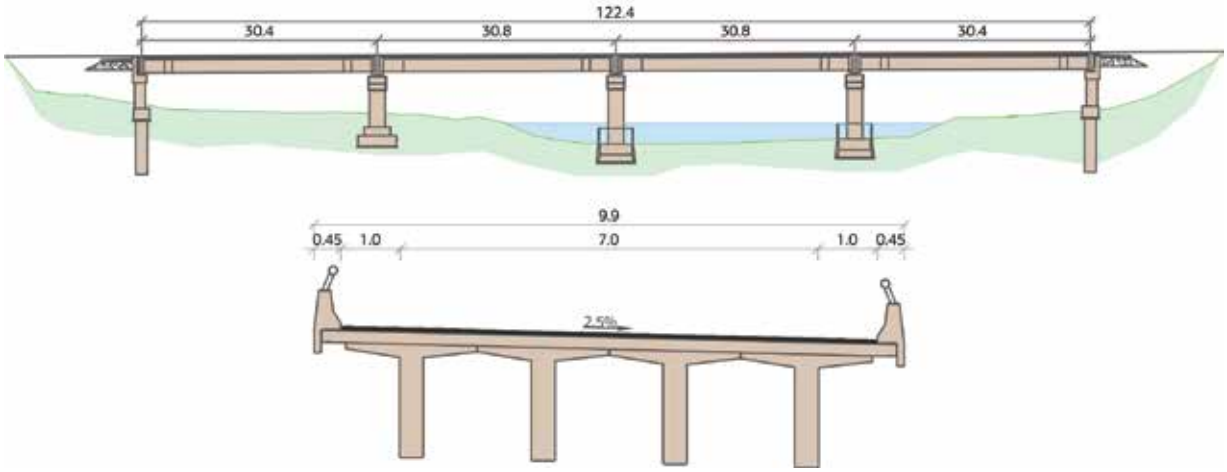
The M1 bridge is situated in the settlement of Podlugovi and bridges the Bosna river. The left carriageway required construction of a new bridge and the right carriageway uses the reconstructed existing bridge. Both bridges have 4 spans and a total length of 120 m.

The M2 bridge is situated in the village of Luke and bridges the Bosna river. The left carriageway required construction of a new bridge and the right carriageway uses the reconstructed existing bridge. Both bridges contain 3 spans, with a total length of 90 m.

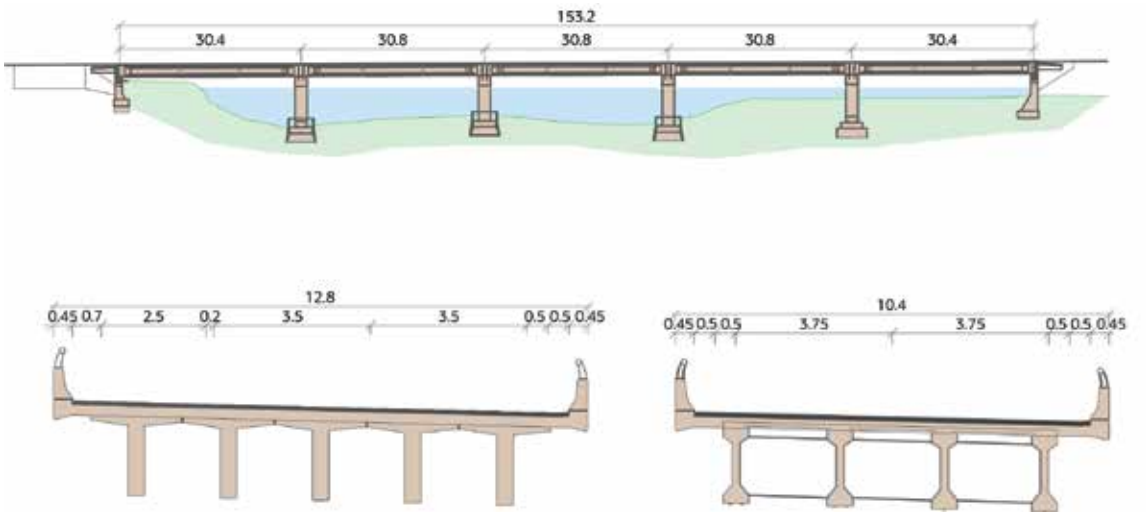
The M3 bridge is situated in the village of Ribarići and bridges the Bosna river. The left carriageway is a newly constructed bridge with 4 spans and superstructure length of 120 m. The right carriageway is a reconstruction of an existing bridge, also with 4 spans and superstructure length of 120 m.

The M4 bridge is situated in the village of Donja Vogošća and bridges the Bosna river. The left carriageway is a reconstructed existing bridge with 3 spans and total superstructure length of 90 m, and the right carriageway is a newly constructed bridge with 4 spans. The total length of the right structure is 120 m.

The M5 bridge is situated in the settlement of Donja Vogošća and bridges the Bosna river. The left carriageway uses the reconstructed existing bridge and a new bridge was constructed for the right carriageway. Both bridge structures have 5 spans, with a total superstructure length of 150 m.



Most M1



Most M5

Most M6 nalazi se u naselju Svrake i premoštava rijeku Bosnu. Na lijevoj kolovoznoj traci je urađena rekonstrukcija postojećeg mosta, a na desnoj je izgrađen novi most. Objekti su paralelni i imaju po 20 raspona, s ukupnim dužinama rasponskih konstrukcija po 600 m.

Most M7 nalazi se u naselju Svrake i premoštava rijeku Bosnu. Na lijevoj kolovoznoj traci je urađena rekonstrukcija postojećeg mosta sa 3 raspona, a na desnoj je izgrađen novi most. Objekti imaju po 3 raspona, ukupne dužine rasponske konstrukcije 95 m.

Most M8 nalazi se u naselju Semizovac i premoštava rijeku Bosnu. Na lijevoj kolovoznoj traci je izgrađen novi most sa 3 raspona ukupne dužine 90 m. Na desnoj traci je urađena rekonstrukcija postojećeg mosta također sa 3 raspona, ukupne dužine rasponske konstrukcije 90 m.

Petlja Sarajevo Sjever izvršena je rekonstrukcija postojeće petlje, što je podrazumijevalo proširenje krakova i izradu potpuno nove kolovozne konstrukcije.

Čeono naplatno mjesto Sarajevo Sjever izgrađeno je za potrebe naplate cestarine za vozila koja nastavljaju put autocestom na Sarajevskoj zaobilaznici ili se preko petlje Sarajevo Sjever uključuju/isključuju s autoceste. Ovo naplatno mjesto je izvedeno s osam saobraćajnih protočnih traka i dodatnom saobraćajnom trakom za vangabaritna vozila.

Manji objekti: pet prolaza za lokalne saobraćajnice i četiri prolaza za poljoprivredne mašine i pješake.

The M6 bridge is situated in the village of Svrake and bridges the Bosna river. The left carriageway uses the reconstructed existing bridge and a new bridge was constructed for the right carriageway. The structures are parallel with 20 spans each and superstructure lengths of 600 m.

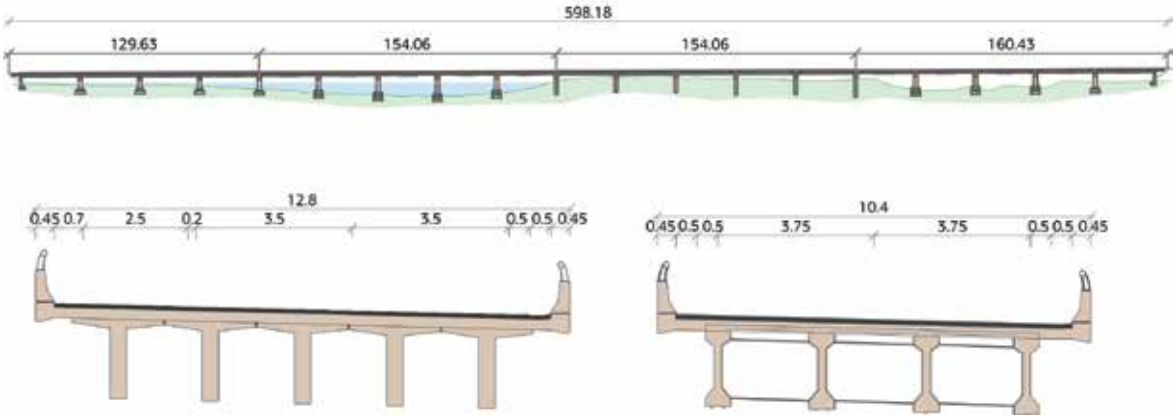
The M7 bridge is situated in the village of Svrake and bridges the Bosna river. The left carriageway uses the reconstructed existing bridge with 3 spans and a new bridge was constructed for the right carriageway. Both bridge structures have 3 spans, with a total superstructure length of 95 m.

The M8 bridge is situated in Semizovac and bridges the Bosna river. The left carriageway is a newly constructed bridge with 3 spans and superstructure length of 90 m. The right carriageway is a reconstruction of an existing bridge, also with 3 spans and superstructure length of 90 m.

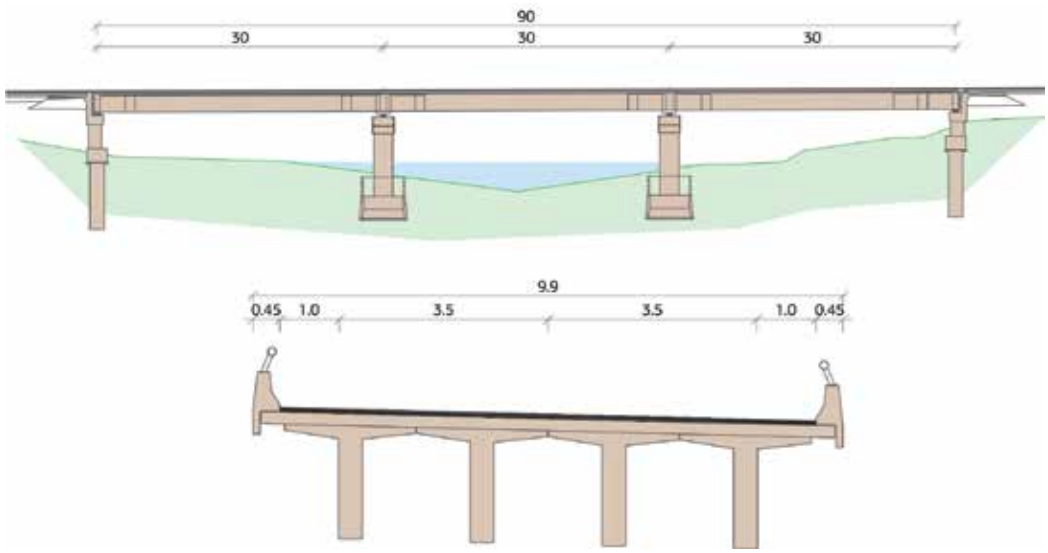
The Sarajevo Sjever interchange involved a reconstruction of the existing interchange, requiring an expansion of the ramps and construction of completely new carriageways.

The mainline toll plaza Sarajevo Sjever was constructed for toll collection for vehicles continuing on the motorway via the Sarajevo interchange or entering / exiting the motorway from the Sarajevo interchange. This toll plaza was constructed with eight through lanes and an additional lane for large vehicles.

Smaller structures: five crossings for local roads and four crossings for agricultural machinery and pedestrians.



Most M6



Most M8

Dionica Visoko - Sarajevo Sjever

SARAJEVO SJEVER → SARAJEVO ZAPAD

DIONICA SECTION

3.5

Dionica Sarajevo Sjever – Sarajevo Zapad

Dionica Sarajevo Sjever – Sarajevo Zapad predstavlja zaobilaznicu grada Sarajeva i duga je 9 km. Nalazi na sjeverozapadnom dijelu Sarajeva i proteže se dolinom rijeke Bosne na potezu između naselja Jošanica i Vlakovo.

Dionica je podijeljena na dvije poddionice:

- Sarajevo Sjever – Butila (LOT 1)
- Butila – Sarajevo Zapad (LOT 3a)

Veći dio trase autoceste prolazi kroz plavno područje, odnosno inundacioni pojas rijeke Bosne, što je uvjetovalo potrebu za ojačanjem određenih dijelova nasipa sa kamenitim drenažnim materijalima odgovarajuće granulacije i geotekstilom. Na taj način se ubrzalo vrijeme konsolidacije nasipa, izbjeglo efekt brane za slučaj pojave visokih voda, te spriječio prodor sitnih čestica u trup autoceste kako bi se osigurala stabilnost.

U nastavku je dat pregled najznačajnijih objekata po poddionicama.

Petlja Vlakovo

Sub-section Sarajevo Sjever – Sarajevo Zapad

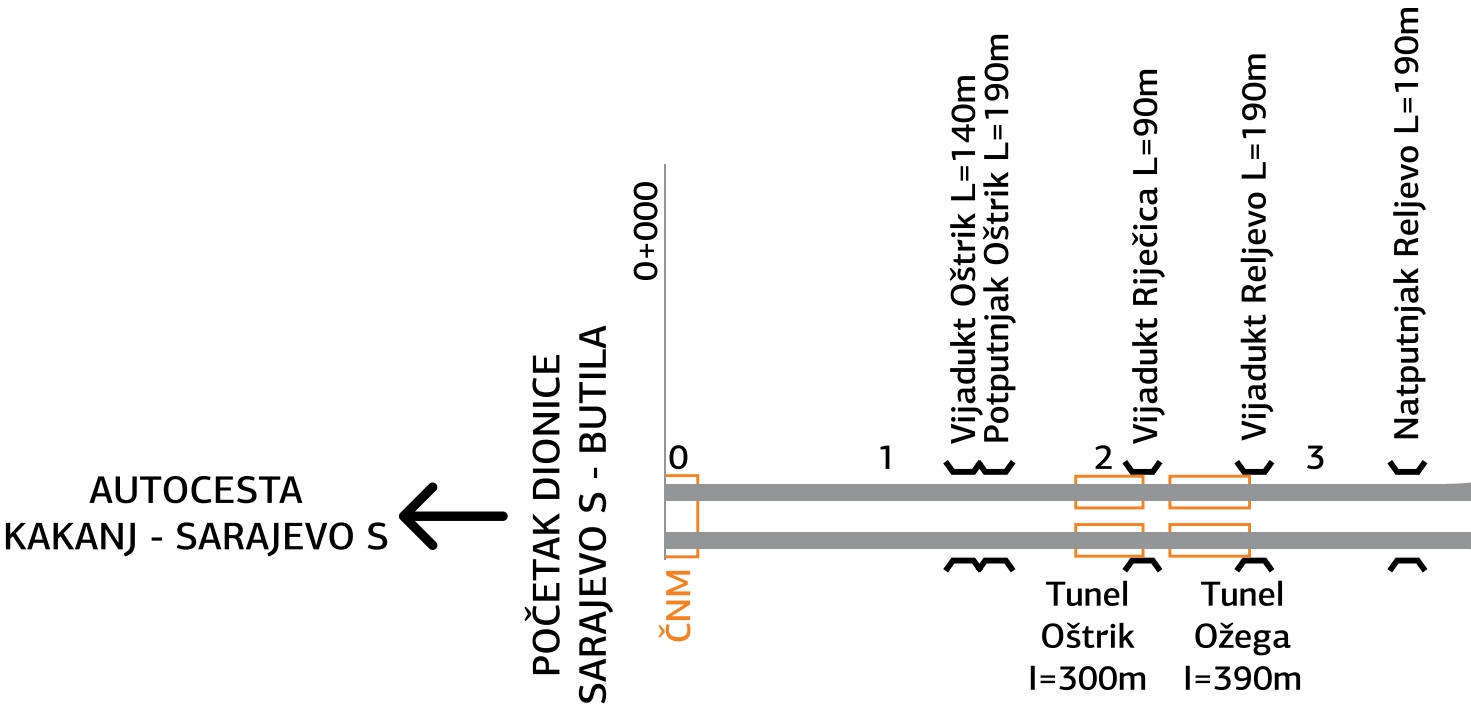
The sub-section Sarajevo Sjever – Sarajevo Zapad is a 9 km long bypass around the city of Sarajevo. It is located in the north-western part of Sarajevo and stretches along the river Bosna valley between Jošanica and Vlakovo.

This section consists of two sub-sections:

- Sarajevo Sjever – Butila (LOT 1)
- Butila – Sarajevo Zapad (LOT 3a)

The largest part of the motorway lies on the flood-plain / inundation zone of the Bosna river, resulting in the need to reinforce parts of the embankment with rock drainage materials of appropriate granulation and geotextiles. This expedited the consolidation of the embankment, averted the possibility that the embankment would act as a dam in case of elevated water levels, and prevented infiltration of small particles into the body of the motorway, thus ensuring its stability.

The following part provides an overview of the most significant structures in each sub-section.



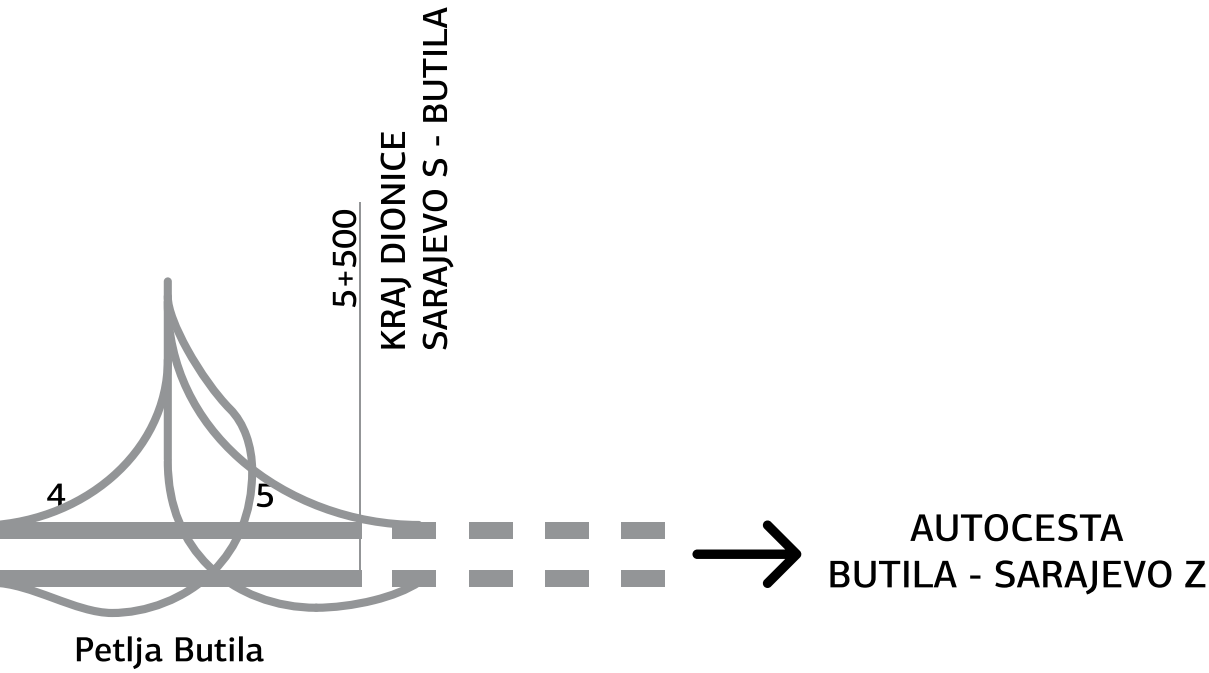
Podionica Sarajevo Sjever - Butila (LOT 1)

Poddionica Sarajevo Sjever – Butila se nadovezuje na trasu autoceste Zenica Jug – Sarajevo Sjever, neposredno iza petlje Sarajevo Sjever i pruža se prema zapadnoj strani Sarajeva sve do petlje Butila. Ukupna dužina ove dionice je 5,5 km.

Kružni tok Krivoglavci

Ovaj rondo prikuplja i distribuira saobraćajne tokove iz četiri pravca: magistralne ceste M-5 i M-18, lokalne ceste prema naselju krivoglavci i krak koji se veže sa autocestom u naselju Jošanica. Kružni tok je projektovan sa širinom od 10 m i poluprečnikom opisanog kruga 28 m.

Ulivni i izlivni tokovi u zoni raskrsnice su razdvojeni i omogućeno je regularno kretanje pješaka što je od velikog utjecaja na protočnost i sigurnost kružne raskrsnice. Nivelaciono rješenje kružne raskrsnice generisano je iz uvjeta efikasnog odvodnjavanja kolovoza i racionalnog prostornog uklapanja priključnih cesta.



Sub-section Sarajevo Sjever - Butila (LOT 1)

The sub-section Sarajevo Sjever – Butila connects to the Sarajevo Jug – Sarajevo Sjever alignment directly after the Sarajevo Sjever interchange and proceeds towards the western side of Sarajevo and the Butila interchange. The total length of this section is 5.5 km.

Krivoglavci Roundabout

This roundabout collects and distributes traffic flows from four directions: trunk roads M-5 and M-18, local road to the village of Krivoglavci and the ramp connecting to the motorway in the village of Jošanica. The roundabout was designed to be 10 m wide, with a radius of 28 m.

Entry and exit flows on the roundabout are separated and provisions are in place for regular movement of pedestrians, which significantly affects traffic capacity and safety of the roundabout. The grading of the roundabout was designed with a view of effective drainage of the carriageway and rational spatial integration of the connecting roads.

Vijadukt Oštrik

Vijadukt prelazi preko meandra rijeke Bosne. Rasponska konstrukcija objekta je prednapregnuta armirano-betonska ploča i sastoji se od šest polja, ukupne dužine 140 m. Zbog nepovoljnih geološko-geomehaničkih uvjeta obalni i srednji stubovi su fundirani na šipovima.

Potputnjak Oštrik

Izgradnjom potputnjaka omogućeno je ukrštanje s magistralnom cestom M-5 u dužini od 190 m. Projektovan je tako da u potpunosti zadovolji sigurnosni aspekt odvijanja saobraćaja na autocesti i u njenoj neposrednoj blizini. Konstrukcija objekta je izgrađena od armiranog betona sandučastog poprečnog presjeka, širine svijetlog otvora 8,6 x 5 m. Debljina konstrukcije iznosi 60 cm u svim presjecima. Na mjestu gdje je potputnjak izlazi izvan nasipa trupa autoceste (izlazni portal), umjesto monolitnih zidova, izgrađeni su stubovi kružnog poprečnog presjeka 46 cm. Ovakvo rješenje je znatno povoljnije, jer daje dnevno svijetlo u unutrašnjost objekta, omogućava bolju prirodnu ventilaciju i poboljšava vizuelni efekat objekta. Na desnoj strani, uz padinu, ulaznog i izlaznog portala objekta izgrađeni su potporni zidovi koji su monolitno povezani sa potputnjakom, a u funkciji su prihvatanja nasipa trupa autoceste.

Tunel Oštrik

Tunel prolazi kroz brdo Oštrik. Dužina lijeve tunelske cijevi uključujući portalnu građevinu iznosi 273 m, dok je desna tunelska cijev dužine 303 m. Tunel Oštrik je projektovan kao dvocijevni s po dvije saobraćajne trake u svakoj cijevi. Portali tunela nalaze se na nadmorskoj visini od 512 m, a visina nadsloja iznosi oko 50 m. Maksimalna dozvoljena brzina vožnje u tunelu je 100 km/h. Tehnologija izgradnje tunela je obuhvatila sanaciju postojeće desne tunelske cijevi uz dokopavanje na mjestima kako bi se postigla puna širina profila i kompletnu izvedbu lijeve tunelske cijevi. Kod izgradnje tunela korištena je NATM metoda (Nova austrijska tunelska metoda). Opremljen je najmodernijim sistemom za nadzor i upravljanje saobraćajem. Nadzor se obavlja svakodnevno puna 24 sata iz Centra za održavanje i kontrolu prometa (COKP) Drivuša.

Vijadukt Rječica

Vijaduk se nalazi na usjeku između tunela Oštrik i Ožeg i omogućava prelaz trase autoceste preko potoka Rječica i lokalne ceste. Rasponska konstrukcija je prednapregnuta armirano-betonska ploča s četiri po-

Oštrik Viaduct

This viaduct crosses a meander on the Bosna river. The superstructure consists of a prestressed reinforced concrete slab in six sequences, with a total length of 140 m. Due to unfavourable geological and geomechanical conditions, abutments and piers are footed on piles.

Oštrik Underpass

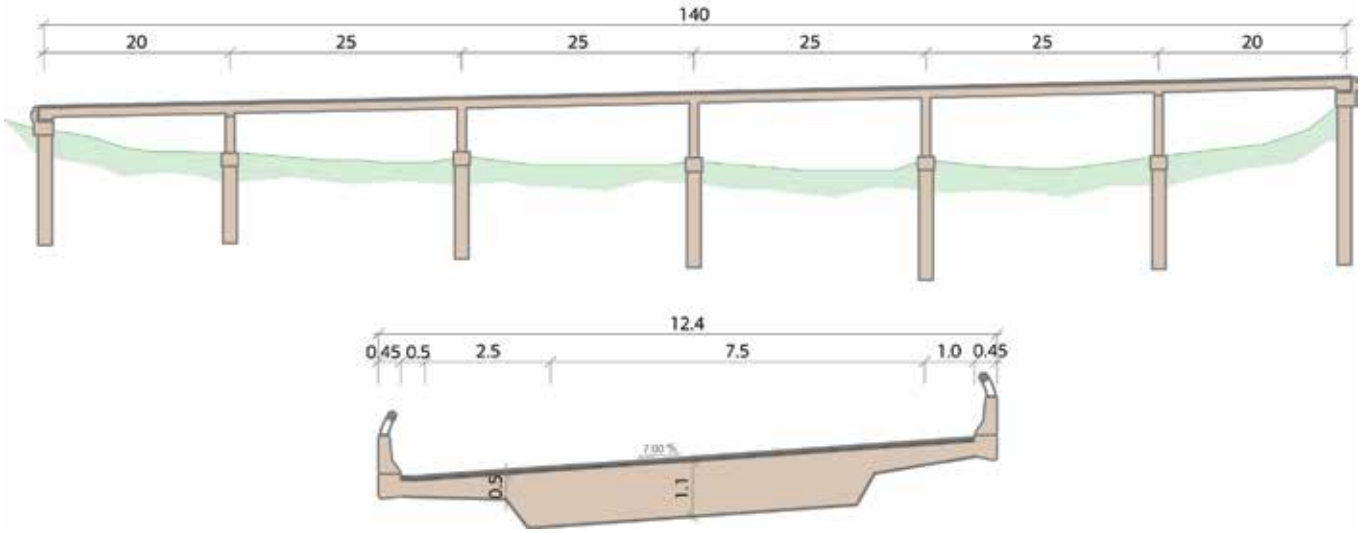
This 190 m long underpass serves to pass the M-5 trunk road under the motorway. It was designed to provide maximum safety for traffic on the motorway and in its vicinity. The superstructure was constructed from reinforced concrete box sections with an 8.6 x 5 m clear opening. The thickness of the structure is 60 cm in all cross sections. At the point where the underpass exits the motorway embankment (exit portal), columns with circular diameter 46 cm were used instead of monolithic walls. This solution is quite advantageous because it allows daylight to penetrate inside the structure, provides better natural ventilation and makes the structure more visually appealing. On the right side, retaining walls that were built to support the slope by the entry and exit portals are attached to the underpass, forming a monolithic structure which envelopes the body of the motorway.

Oštrik Tunnel

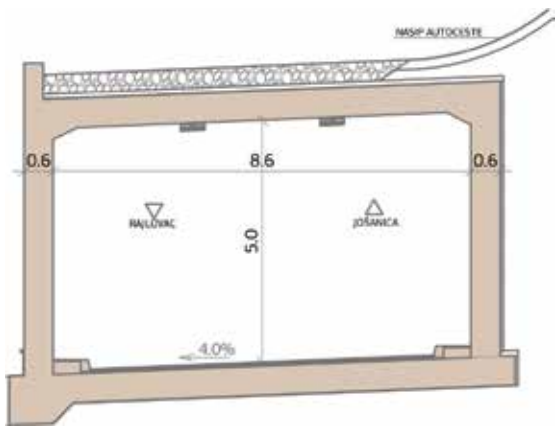
The tunnel passes under the hill of Oštrik. The length of the left tunnel tube, including the portal structure, is 273 m, while the right tunnel tube is 303 m long. Oštrik tunnel was designed as a twin tunnel with two traffic lanes in each tube. Tunnel portals are located at an altitude of 512 m and the overbearing is approximately 50 m. The maximum speed limit in the tunnel is 100 km/h. Tunnel construction involved a refurbishment of the existing right tunnel tube with additional drilling in places, as required to achieve the designed profile width, and construction of a new left tunnel tube. The tunnel was built using the New Austrian Tunnelling Method (NATM). It is equipped with the most modern traffic surveillance and management system. Traffic surveillance is operated 24/7 from the Maintenance and Traffic Control Centre (MTCC) Drivuša.

Rječica Viaduct

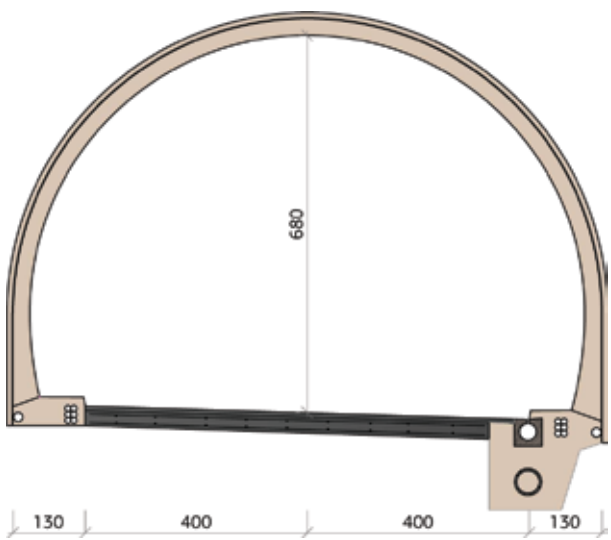
The viaduct is situated in the cut between Oštrik and Ožega tunnels and carries the motorway alignment over the Rječica stream and a local road. The superstructure consists of a prestressed reinforced con-



Vijadukt Oštrik



Potputnjak Oštrik



Tunel Oštrik

lja i ukupnom dužinom 90 m. Poprečni presjek rasponske konstrukcije je puna ploča s konzolnim prepustima na lijevoj i desnoj strani. Centralni dio ploče je debljine 110 cm. Ukupna širina vijadukta u poprečnom presjeku iznosi 12,4 m. Ovaj objekat karakterišu različiti tipovi temeljenja kao što su šipovi, kontragrede i temeljene stope s dubinom iskopa u nosivim slojevima od minimalno 50 cm, a što je uvjetovano različitim geološko-geomehaničkim svojstvima tla.

Tunel Ožega

Prolazak trase kroz brdo Ožega je ostvareno sa dvocijevnim tunelom, nakon kojeg se trasa postepeno spušta u dolinu Reljevskog polja. Dužina lijeve tunelske cijevi uključujući portalnu građevinu iznosi 393 m, dok je desna duga 382 m. Portal tunela Ožega se nalazi na nadmorskoj visini od 510 m, dok je maksimalna visina nadsloja iznad osovine tunela oko 50 m. Pri izgradnji tunela korištena je NATM metoda (Nova austrijska tunelska metoda). Opremljen je najmodernijim sistemom za nadzor i upravljanje saobraćajem. Nadzor se obavlja svakodnevno puna 24 sata iz Centra za održavanje i kontrolu prometa (COKP) Drivuša. Maksimalna dozvoljena brzina vožnje u tunelu je 100 km/h.

Vijadukt Reljevo

Za prelaz trase autoceste preko doline Reljevo, nakon tunela Ožega, izgrađen je vijadukt Reljevo. Rasponska konstrukcija vijadukta je prednapregnuta armiranobetonska ploča s 8 raspona, ukupne dužine 190 m. Poprečni presjek glavnog nosača je puna ploča s konzolnim prepustima na lijevoj i desnoj strani. Centralni dio ploče je debljine 110 cm. Ukupna širina vijadukta Reljevo u poprečnom presjeku iznosi 12,4 m. Vijadukt je plitko fundiran na temeljnim stopama samcima, visine 150 cm, a što je uvjetovano povoljnim geološko-geomehaničkim karakteristikama tla.

Natputnjak Reljevo

U cilju osiguranja veze između postojeće lokalne infrastrukture između naselja Reljevo i Rajlovac, projektiran je natputnjak Reljevo. Velika dužina ovog objekta je uvjetovana morfologijom terena, kao i potrebom za premoštenjem trase autoceste na Sarajevskoj zaobilaznici i korita rijeke Bosne. Rasponska konstrukcija je prednapregnuta armirano-betonska ploča s 9 raspona ukupne dužine 212 m. Poprečni presjek glavnog nosača je puna ploča s konzolnim prepustima na lijevoj i desnoj strani. Visina glavnog nosača-ploče je 110 cm, a širina poprečnog presjeka kolovozne površine iznosi 8,10 m. Način temeljenja

crete slab with four sequences and total length of 90 m. The cross section of the superstructure consists of a full slab with cantilever flanges on the left and right side. The central portion of the slab is 110 cm thick. The total width of the cross section is 12.4 m. This structure is characterised by different types of foundations, such as piles, strip foundations and block foundations embedded at least 50 cm deep into the bedrock, as conditioned by different geological and geotechnical soil characteristics.

Ožega Tunnel

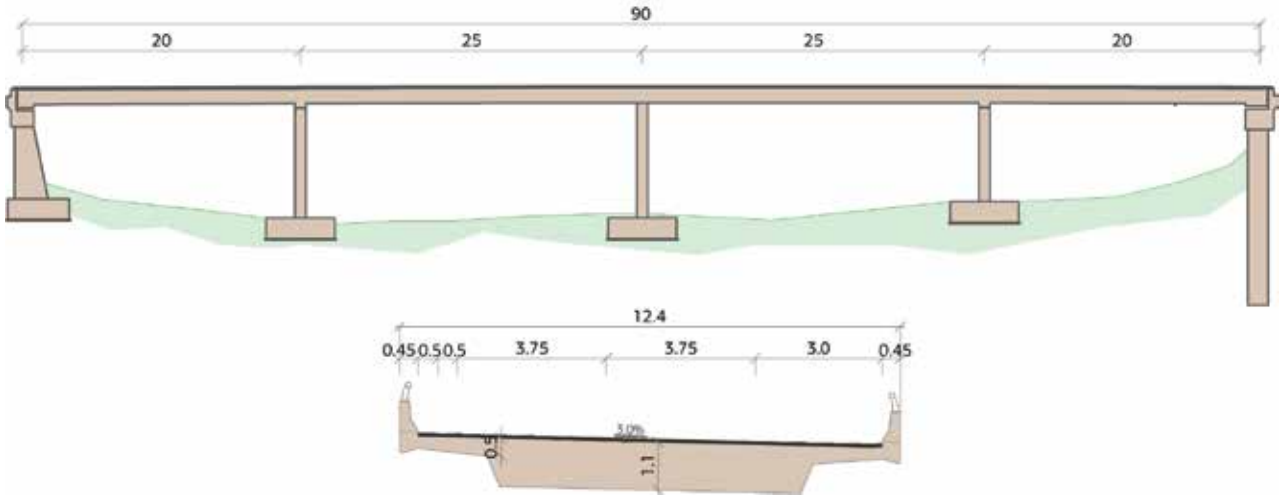
The alignment passes under the Ožega hill through this twin tunnel and then gradually flows down to the Reljevo Polje valley. The length of the left tunnel tube, including the portal structure, is 393 m, and the length of the right tunnel tube is 382 m. The portal of the Ožega tunnel is situated at an altitude of 510 m, and the maximum overbearing above the tunnel axis is approximately 50 m. The tunnel was built using the New Austrian Tunnelling Method (NATM). It is equipped with the most modern traffic surveillance and management system. Traffic surveillance is operated 24/7 from the Maintenance and Traffic Control Centre (MTCC) Drivuša. Maximum permitted speed in the tunnel is 100 km/h.

Reljevo Viaduct

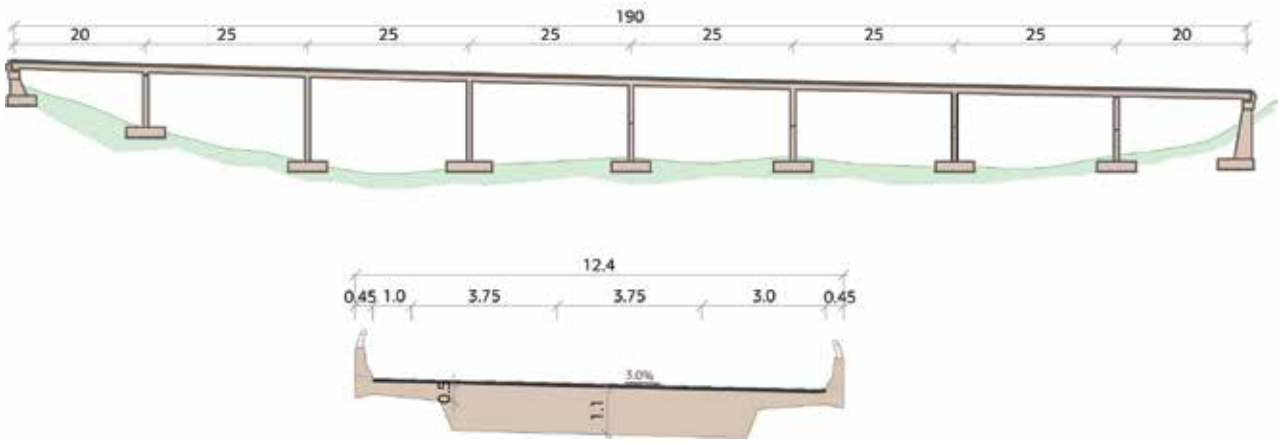
Reljevo viaduct was constructed directly after the Ožega tunnel, to carry the motorway alignment over the Reljevo valley. The superstructure of this overpass is a prestressed reinforced concrete slab with 8 spans and total length of 190 m. The cross section of the main girder is a full slab with cantilever flanges on the left and right side. The central portion of the slab is 110 cm thick. The total width of the Reljevo viaduct cross section is 12.4 m. Foundations were constructed as 150 cm high single block foundations due to favourable geological and geomechanical characteristics of the soil.

Reljevo Overpass

Reljevo overpass was designed in order to provide a link between the existing local infrastructure that connects Reljevo and Rajlovac. The very long length of this structure was necessary due to the morphology of the terrain and the need to cross the motorway alignment of the Sarajevo bypass and the Bosna river bed. The superstructure is a prestressed reinforced concrete slab with 9 spans and total length of 212 m. The cross section of the main girder is a full



Vijadukt Rječica



Vijadukt Reljevo

ovog natputnjaka je uvjetovan različitim karakteristikama tla i predstavlja kombinaciju plitkog i dubokog temeljenja.

slab with cantilever flanges on the left and right side. The height of the main girder/slab is 110 cm and the width of the cross section of the carriageway is 8.10 m. The choice of foundations for this overpass was conditioned by different soil characteristics and both shallow and deep foundations were used.

Potputnjak Oštrik

Tunel Oštrik

Tunel Oštrik

Petlja Butila

Petlja se nalazi na kraju poddionice Sarajevo Sjever – Butila. Izgrađena je u tri nivoa s površinom od preko 20.000 m^2. Ova petlja predstavlja ujedno i najveći objekat na Sarajevskoj zaobilaznici. Projektovana je i izvedena s četiri jednosmjerne rampe (dvije jednotračne i dvije dvotračne) koje omogućavaju odvijanje saobraćaja iz pravca Zenice i Mostara prema Sarajevu i obratno.

Ukupna dužina petlje sa pripadajućim rampama iznosi 2.482 m i to:

Rampa A (jednotračna) na dužini od 473,37 m (Sarajevo Zapad – Briješće),

Rampa B (dvotračna) na dužini od 778,17 m (Briješće – Sarajevo Zapad),

Rampa C (dvotračna) na dužini od 791,69 m (Sarajevo Sjever – Briješće),

Rampa D (jednotračna) na dužini 438,34 m (Briješće – Sarajevo Sjever).

Konstrukcija objekta na petlji je armirano-betonska prednapregnuta ploča s dvostranim konzolnim prepustima. Centralni dio nosača ima debljinu 125 cm. Ukupna maksimalna širina objekata rampe A i D u poprečnom presjeku iznosi 6,9 m, dok se za objekte rampe B i C ova vrijednost povećava na 9,9 m. Maksimalne vrijednosti uzdužnih nagiba je 5 % u usponu i 4,5 % na padu.

Butila Interchange

The interchange is located at the end of the sub-section Sarajevo Sjever – Butila. It was constructed in three levels and with a total surface area of more than 20,000 m^2. This interchange is also the largest structure on the Sarajevo bypass. The interchange was designed and constructed with four one-way ramps (two single-lane ramps and two two-lane ramps) for traffic from the direction of Zenica and Mostar towards Sarajevo and in the opposite direction.

The total length of the interchange together with the ramps is 2,482 m, as follows:

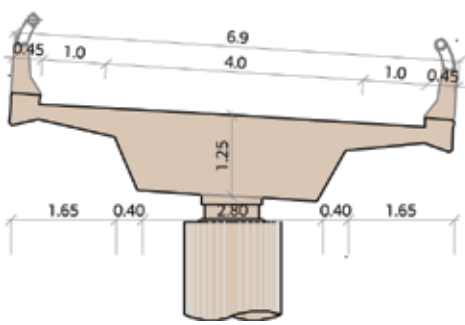
Ramp A (single lane) in the length of 473.37 m (Sarajevo Zapad – Briješće),

Ramp B (two lanes) in the length of 778.17 m (Briješće – Sarajevo Zapad),

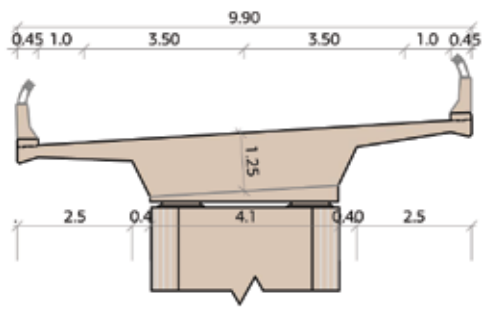
Ramp C (two lanes) in the length of 791.69 m (Sarajevo Sjever – Briješće),

Ramp D (single lane) in the length of 438.34 m (Briješće – Sarajevo Sjever).

The interchange structure is a reinforced concrete prestressed slab with two-sided cantilever flanges. The central portion of the slab is 125 cm thick. The total maximum cross section width for ramps A and D is 6.9 m, while for ramps B and C it is 9.9 m. The maximum linear inclination values are 5 % for upward and 4.5 % for downward slopes.



Rampa “A”



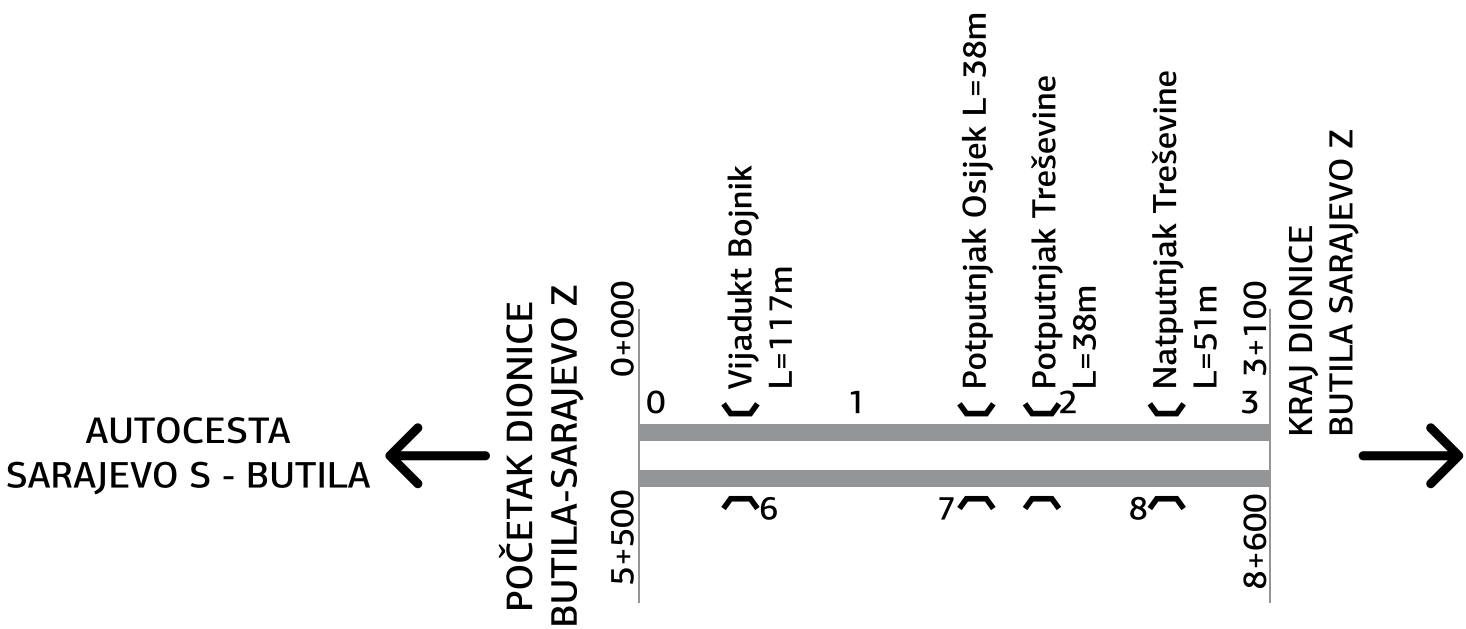
Rampa “B”

Rampe petlje Butila

Petlja Butila

Petlja Butila

LOT 3a BUTILA - SARAJEVO ZAPAD



AUTOCESTA
SARAJEVO Z - LEPENICA

Podionica Butila - Sarajevo Zapad (LOT 3a)

Ova poddionica se nadovezuje na trasu autoceste LOT-a 1, neposredno iza petlje Butila i pruža se prema zapadnoj strani Sarajeva sve do petlje Sarajevo Zapad. Računska brzina poddionice je 120 km/h.

Sub-section Butila - Sarajevo Zapad (LOT 3a)

This sub-section continues the LOT 1 motorway alignment directly after the Butila interchange and proceeds towards the western side of Sarajevo to the Sarajevo Zapad interchange. Nominal speed on this section is 120 km/h.

Petlja Butila

Vijadukt Bojnik

Glavna prometnica koja povezuje Stupsku petlju, naselja Bojnik i Dobroševići ostaje netaknuta zahvaljujući pogodnim nivelacionim rješenjem vijadukta Bojnik, kao dio trase autoceste na poddionici Butila – Sarajevo Zapad. Objekat je prednapregnuta armirano-betonska ploča debljine 110 cm. Vijadukt ima 5 raspona i dug je 115 m. Zbog nepovoljnih geološko-geomehaničkih karakteristika tla fundiranje objekta je vršeno na šipovima.

Potputnjak Osjek

Potputnjak se nalazi na križanju trase autoceste i lokalne ceste koja povezuje naselje Dobroševići s naseljem Osjek. Ukupna dužina podputnjaka iznosi 38 m. Na ulazu i izlazu objekta predviđeni su konzolni krilni zidovi. Debljina krilnih zidova iznosi 50 cm. Poprečni presjek potputnjaka je sandučasta konstrukcija svijetle širine 8,9 m i svijetle visine 5m. Debljina konstrukcije je 60 cm.

Potputnjak Treševine

Potputnjak se nalazi na mjestu ukrštanja trase autoceste i lokalne ceste, na lokalitetu Treševine, i dug je 37 m. Potputnjak Treševina je armirano-betonska konstrukcija promjenjivog raspona 7,6-10,3 m. Promjenjivi raspon javlja se kao posljedica usklađivanja širine potputnjaka sa poprečnim profilima lokalne ceste, s obzirom na to da se osovina lokalne ceste na izlazu iz potputnjaka nalazi u krivini.

Natputnjak Treševine

Natputnja je izgrađen na dijelu trase gdje autocesta prolazi kroz duboki usjek, čija se visina kreće od 10 do 24 m. Konstrukcija objekta je ramovska armirano-betonska prednapregnuta ploča s jednim rasponom ukupne dužine 51 m. Rasponsku konstrukciju čini pločasti, prednapregnuti nosač promjenjive visine od 1 m u polju do 2,2 m nad obalnim stubovima. Specifičnost ovog objekta predstavljaju konstruirani kosi stubovi pod uglom od 45° u odnosu na horizontalnu ravninu, a sve u cilju što boljeg uklapanja u okoliš. S obzirom na to da su obalni stubovi pod nagibom, u toku izvođenja, posebna pažnja je posvećena kontaktnom betoniranju kako bi se osiguralo potpuno uklještenje stubova.

Bojnik Viaduct

The main road connecting the Stup interchange and the villages of Bojnik and Dobroševići remains intact thanks to favourable grade levelling of the Bojnik viaduct on the sub-section of the alignment Butila - Sarajevo Zapad. The structure is a 110 cm thick prestressed reinforced concrete slab. The viaduct has 5 spans and total length of 115 m. Unfavourable geological and geomorphological characteristics of soil dictated the use of piles for foundations.

Osijek Underpass

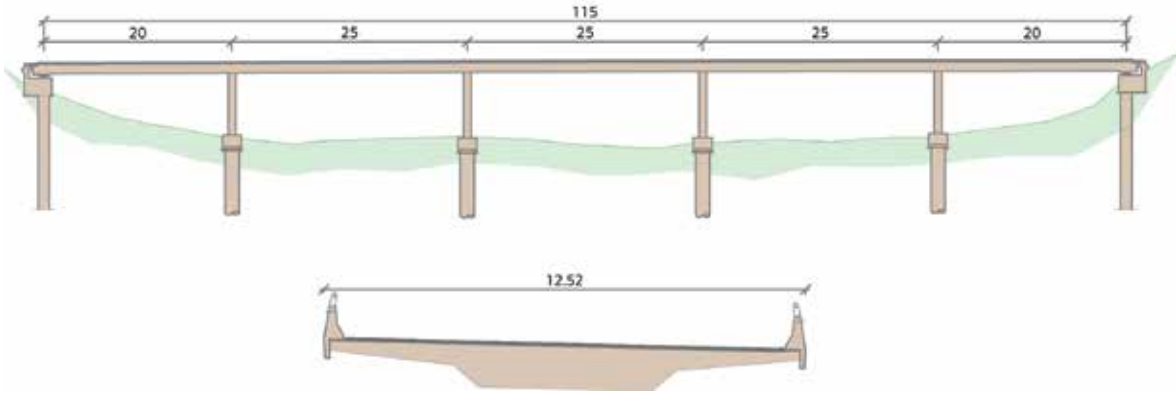
The underpass is located at the crossing of the motorway and the local road between the villages of Dobroševići and Osijek. The total length of the underpass is 38 m. Short abutment walls are designed on the entrance and exit of the structure. Thickness of these abutment walls is 50 cm. Cross section of the underpass is a box structure with a clear opening 8.9 m wide and 5 m high. The thickness of the structure is 60 cm.

Treševine Underpass

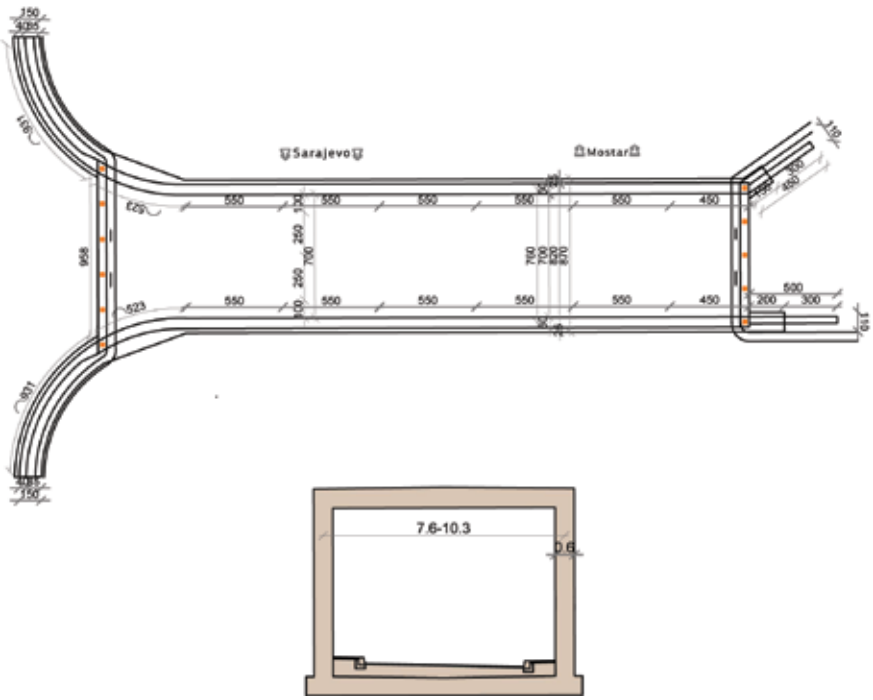
The underpass is 37 m long and it is located in Treševine, at the point where the motorway alignment meets a local road. Treševina underpass is a reinforced concrete structure with variable spans 7.6-10.3 m long. Variable spans were necessary in order to coordinate the width of the underpass with the profile of the local road, considering that the axis of the local road curves at the exit from the underpass.

Treševine Overpass

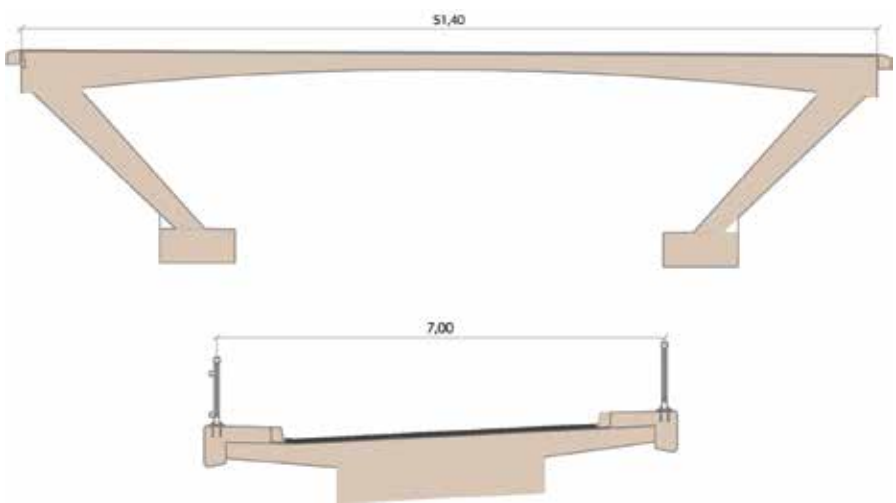
The overpass was constructed over the location where the motorway passes through a 10 to 24 m deep cut. The structure consists of a frame reinforced concrete prestressed slab with a single 51 m long span. The superstructure is a prestressed plate girder with variable height, from 1 m in the central segments to 2.2 m over the abutments. This structure is characterised by piers angled at 45° to the horizontal plane, for better integration into the surroundings. Considering that the abutments are constructed at an angle, special attention was paid to contact concreting in order to ensure that the piers are fully constrained.



Vijadukt Bojnik



Potputnjak Treševine



Natputnjak Treševine

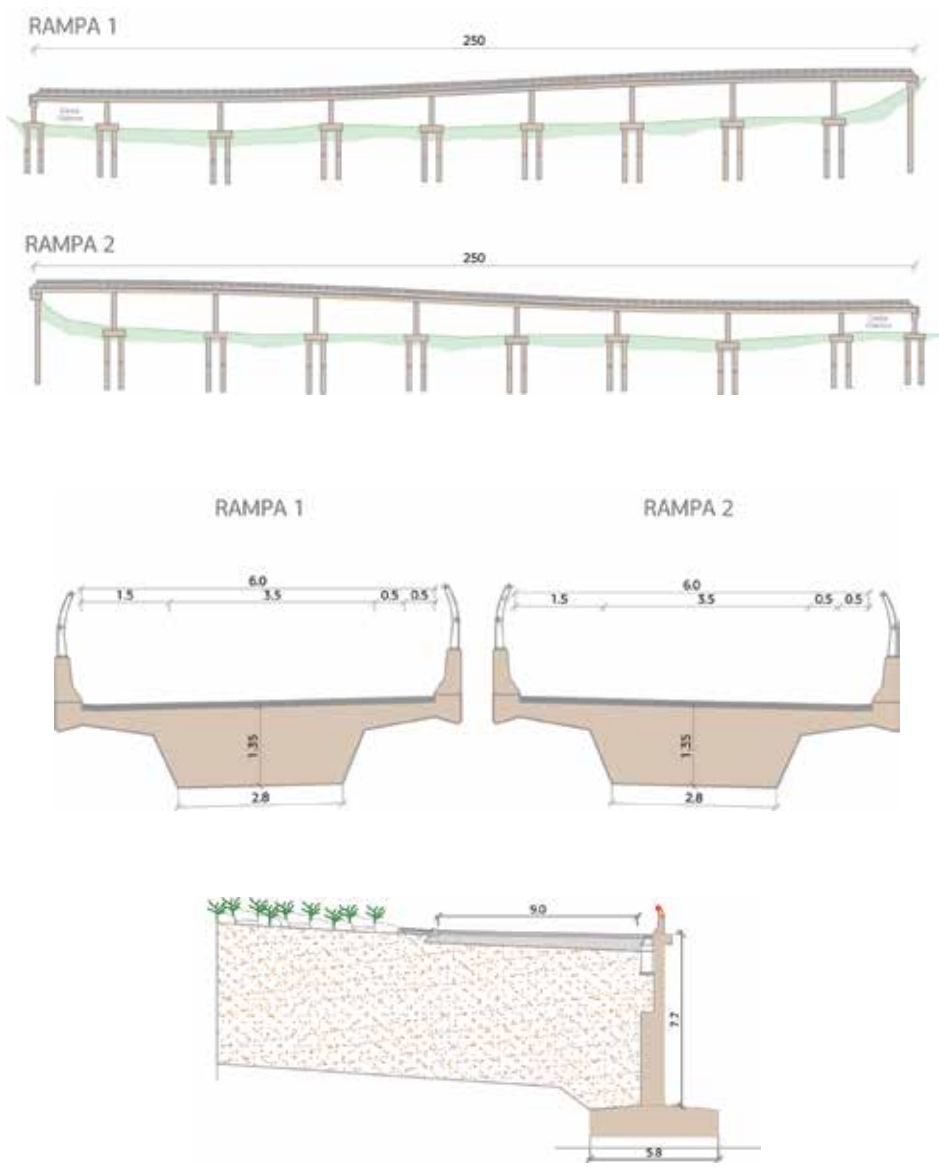
Butila - Sarajevo Zapad

Petlja Sarajevo Zapad

Trasa autoceste na Sarajevskoj zaobilaznici završava petljom koju karakterišu paralelne rampe i kružni tok. Rampe su jednotračne, širine 6 m, i na najvećem dijelu su izvedene na objektima u dužini od 250 m. Svojim manjim dijelom prelaze preko trupa lokalne ceste na dužini oko 60 m. U nivelacionom smislu rampe su projektovane s podužnim nagibima do maksimalne vrijednosti 5 %. Vanjski prečnik kružnog toka je 90 m, sa kolovozom širine 9 m. Specifičnost rješenja petlje Sarajevo Zapad je u tome da se kružni tok ne nalazi u nivou okolnog terena, već je izdignut i tako osigurava neometan promet lokalnom cestom Vlakovo – Mostarsko raskršće. U tu svrhu na spoju između kružnog toka i rampi izgrađena je potporna konstrukcija armiranobetonski zid fundiran na kontraforima.

Sarajevo Zapad Interchange

The Sarajevo bypass alignment ends with an interchange, characterised by parallel ramps and a roundabout. The ramps are single-lane, 6 m wide and mainly rest on 250 m long structures. Short segments pass over the body of the local road in the length of approximately 60 m. The grading is designed with linear inclination of maximum 5 %. External radius of the roundabout is 90 m and the carriageway is 9 m wide. Sarajevo Zapad interchange is specific in that the roundabout sits at a higher level than the surrounding area, providing for unobstructed traffic on the local road Vlakovo – Mostarska junction. For this purpose a retaining structure was constructed between the roundabout and the ramps, in the form of a reinforced concrete wall founded on strip foundations.



Rampe petlje Sarajevo Zapad

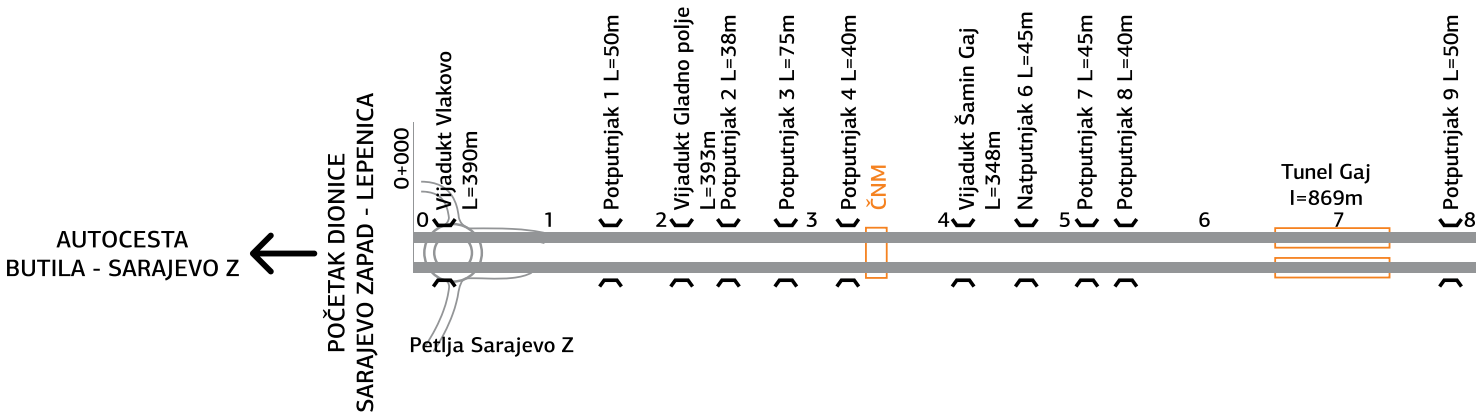
Vijadukt Vlakovo

3.6

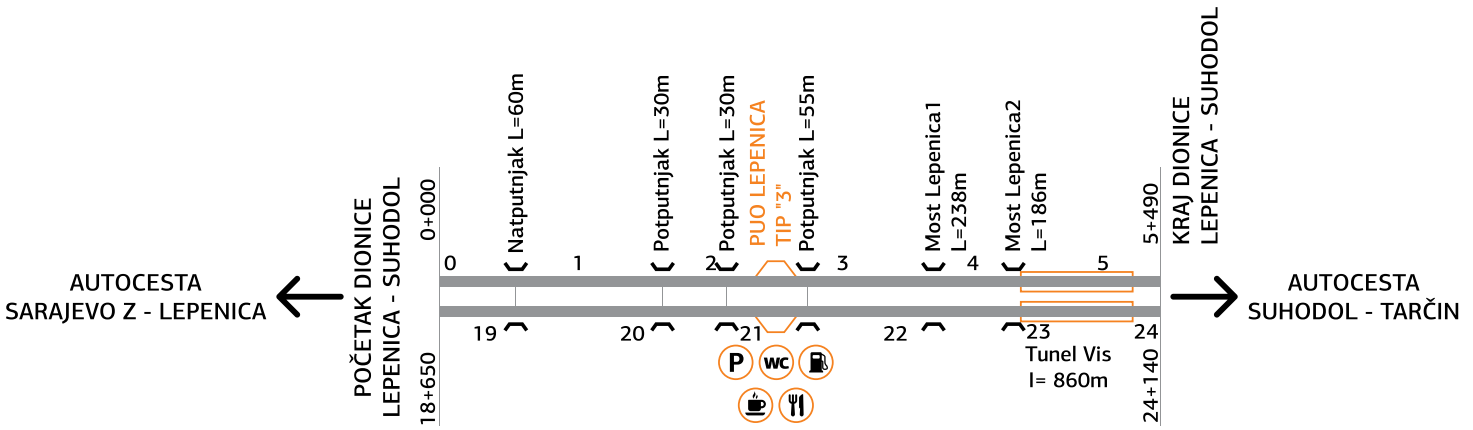
SARAJEVO ZAPAD

DIONICA SECTION → TARČIN

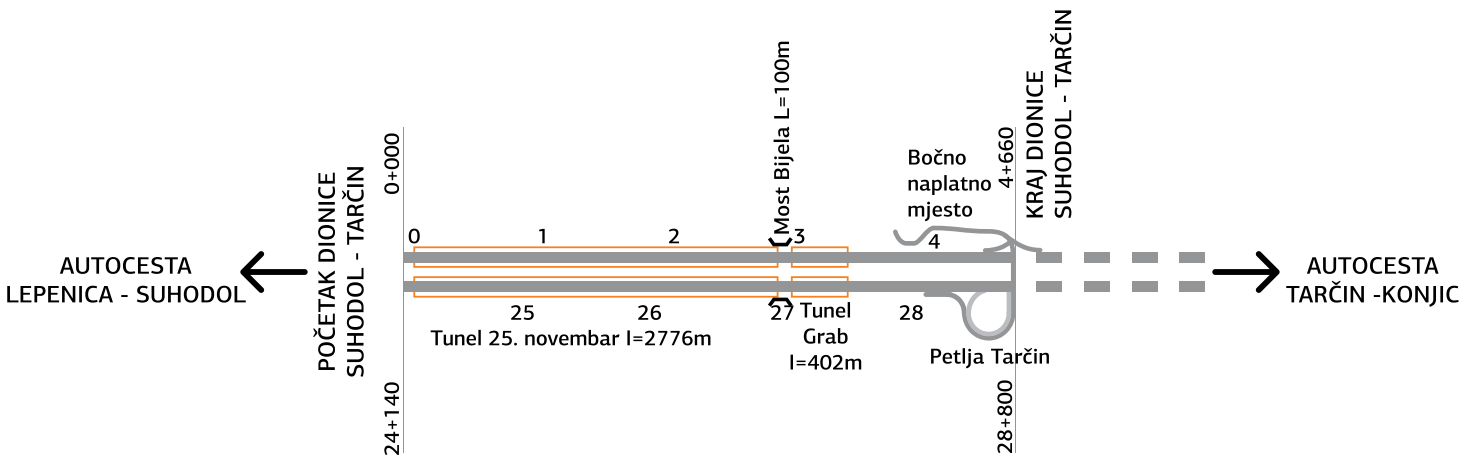
SARAJEVO ZAPAD - LEPENICA

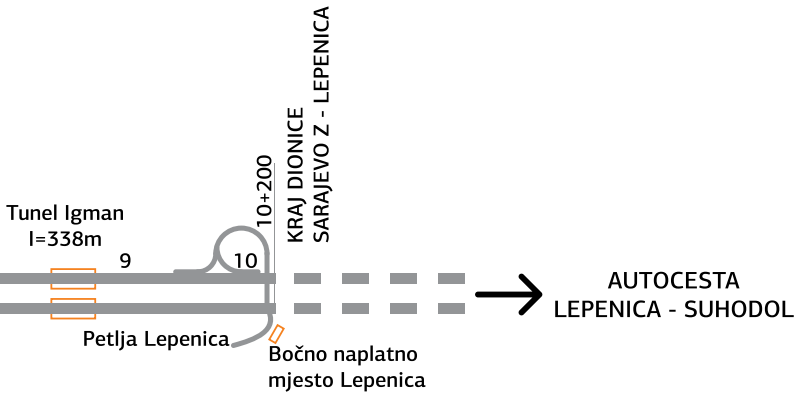


LEPENICA - SUHODOL



SUHODOL - TARČIN





Dionica Sarajevo Zapad - Tarčin

Radi se o, do sada, najvećem infrastrukturnom projektu u BiH, od rata do danas. Na 20 km ove dionice izgrađeno je 5,5 km tunela i 1,5 km mostova i vijadukta za dvije godine. Također je izgrađeno i 15 manjih objekata koji prolaze kroz trup autoceste, a čija je širine veća od 5 m. Najznačajniji objekat na trasi je tunel 25. novembar koji prolazi kroz brdo Suhodol, gdje trasa dostiže najvišu tačku od 665 m nadmorske visine.

Trasa autoceste na dionici Sarajevo Zapad - Tarčin se pruža brdovitim terenom, ali i kroz urbano područje, što je činilo vrlo zahtjevnom za izgradnju.

Section Sarajevo Zapad - Tarčin

This is the largest infrastructural project implemented in BiH from the end of the war to date. In the two years of construction, 5.5 km of tunnels and 1.5 km of bridges and viaducts were constructed on this 20 km long section. The section also includes 15 smaller structures wider than 5 m that pass through the body of the motorway. The most significant structure on the alignment is the 25. novembar tunnel passing through the Suhodol hill, where the alignment reaches its highest altitude of 665 m.
The alignment on the Sarajevo Zapad - Tarčin section flows through hilly terrain but also passes through urban areas, which made its construction very challenging.

Vanjska odvodnja obuhvata regulacije postojećih vodotokova Rakovički potok na Ilidži i Kalašnica na petlji Tarčin s tri pripadajuća hidrotehnička objekta. Na trasi je izgrađeno i nekoliko značajnih potpornih konstrukcija. Projektovana računska brzina je 130 km/h, osim u tunelima gdje je računska brzina 100 km/h.

Podijeljena je na tri poddionice:

- Sarajevo Zapad – Lepenica
- Lepenica – Suhodol
- Suhodol – Tarčin

U nastavku je dat pregled najznačajnijih objekata po poddionicama.

External drainage includes regulation of the existing water streams, Rakovički potok in Ilidža and Kalašnica on the Tarčin interchange, implemented with three water engineering structures. The alignment also involves several major retaining structures. The designed nominal speed is 130 km/h, except in tunnels where the nominal speed is set to 100 km/h.

This section is divided into three sub-sections:

- Sarajevo Zapad – Lepenica
- Lepenica – Suhodol
- Suhodol – Tarčin

The following part provides an overview of the most significant structures in each sub-section.

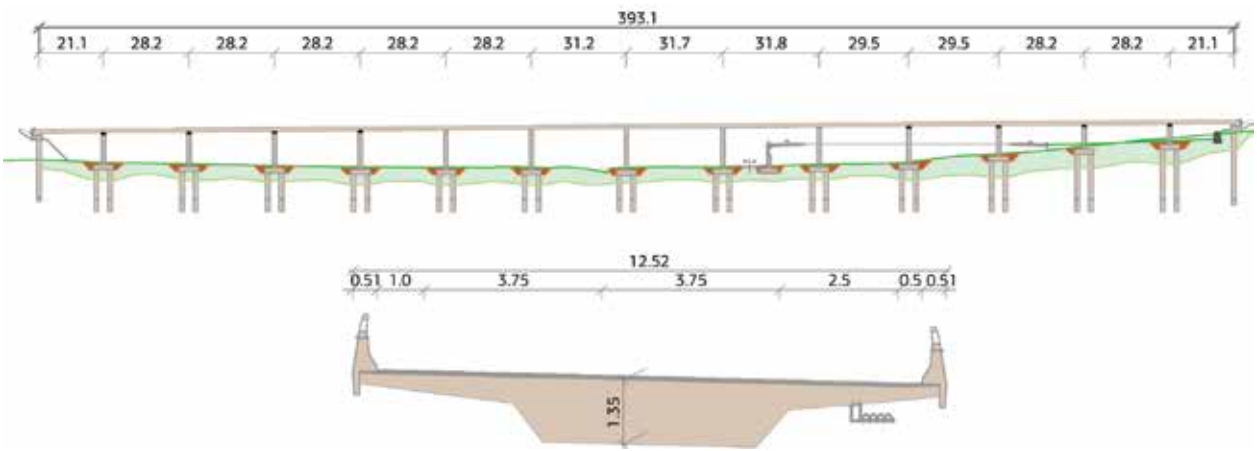
PODDIONICA
SARAJEVO ZAPAD → LEPENICA
SUB-SECTION

Vijadukt Vlakovo

Vijadukt je dug 390 m i nalazi se na petlji Sarajevo Zapad koja predstavlja ulaz u Sarajevo. Kružni tok i blagu dolinu premoštava s 14 raspona. Sastoji se iz dvije odvojene rasponske konstrukcije izvedene u krivini radijusa 1.200 m, s padom od 0.8 %. Rasponski sklop mosta je pločasta prednapregnuta konstrukcija debljine 135 cm. Tijela srednjih stubova su betonska, pravougaonog poprečnog presjeka sa zaobljenjima. Temeljenje je na šipovima.

Vlakovo Viaduct

This viaduct is 390 m long and located on the Sarajevo Zapad interchange at the southern entrance to Sarajevo. The roundabout and the low valley are bridged by 14 spans. It consists of two separate superstructures executed with a 1,200 m radius curve and decline of 0.8 %. The superstructure of the bridge is a 135 cm thick prestressed plate structure. Central pier bodies are made of concrete, with a rectangular cross section and rounded edges. Pier footing is on piles.



Vijadukt Vlakovo

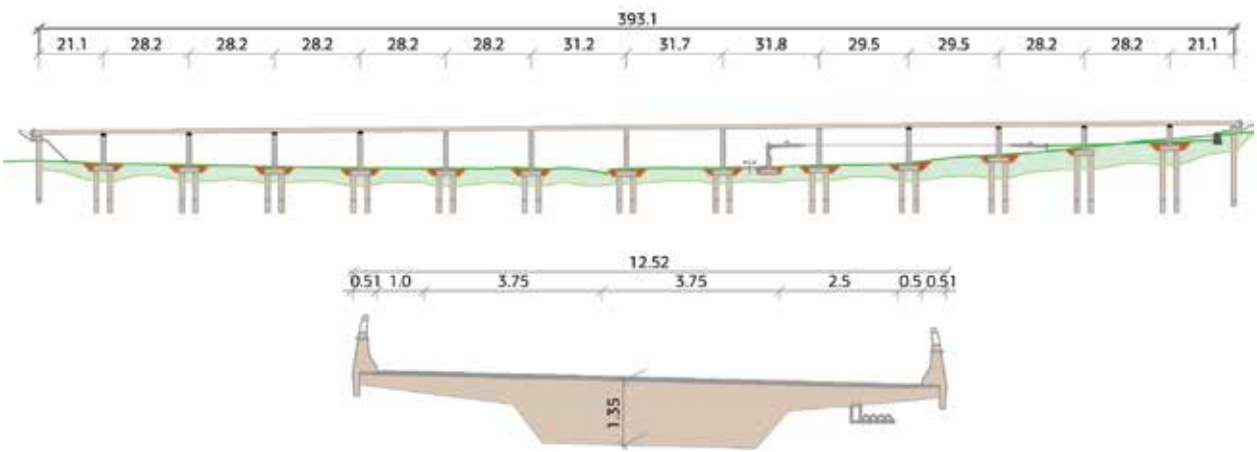
Vijadukt Gladno Polje

Vijadukt Gladno Polje

Vijadukt premoštava plitku dolinu sa 12 raspona, dužine od 24 do 30 m. Sastoji se iz dvije odvojene rasponske konstrukcije izvedene u nagibu 1,8 %. Kompleksnost ovog objekta se oslikava kroz činjenicu da osovina autoceste na mostu prelazi iz prelaznice u pravac, pa ponovo u prelaznicu. Rasponski sklop mosta je pločasta prednapregnuta konstrukcija debljine 135 cm. Tijela srednjih stubova su betonska pravougaonog poprečnog presjeka sa zaobljenjima. Temeljenje stubova je na šipovima.

Gladno Polje Viaduct

The viaduct crosses a shallow valley over 12 spans, 24 to 30 m long. It consists of two separate superstructures with a decline of 1.8 %. The complexity of this structure can be seen from the fact that the axis of the motorway shifts from the transition zone to a straight line, and then back to a transition zone. The superstructure of the bridge is a 135 cm thick prestressed plate structure. Central pier bodies are made of concrete, with a rectangular cross section and rounded edges. Pier footing is on piles.



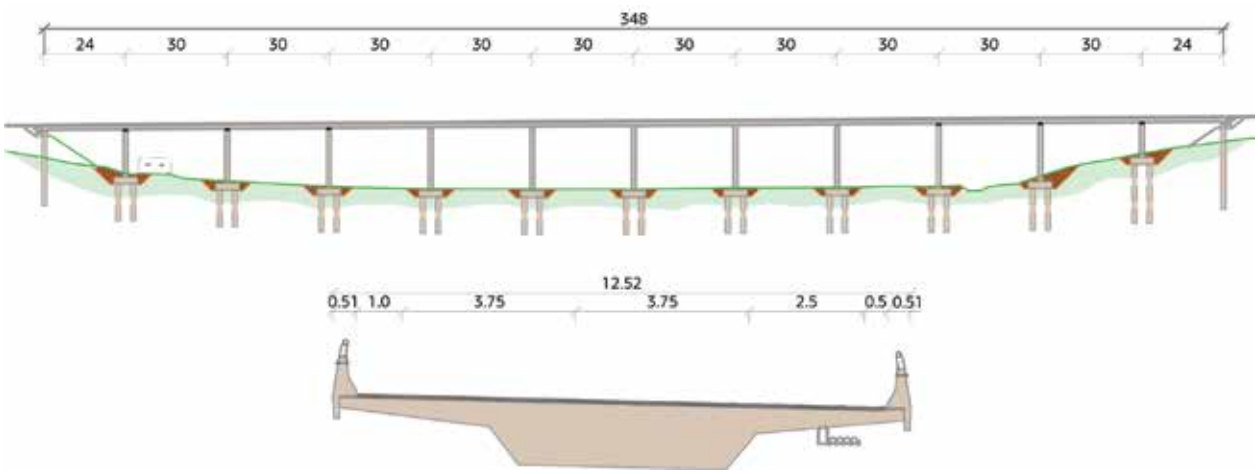
Vijadukt Šamin Gaj

Vijadukt Šamin Gaj

Vijadukt se sastoji iz dvije odvojene rasponske konstrukcije kojim premoštava plitku dolinu i rješava koliziju s magistralnom cestom M-5. Osovina ceste na vijaduktu je u pravcu, s podužnim nagibom 0,7 %. Rasponska konstrukcija je armirano-betonska prednapregnuta ploča debljine 135 cm, s 12 raspona dužine 24 i 30 m. Armirano-betonska tijela srednjih stubova su pravougaonog poprečnog presjeka sa zaobljenjima na krajevima. Temeljenje je izvršeno na šipovima.

Šamin Gaj Viaduct

The viaduct consists of two separate superstructures that bridge a shallow valley and it resolves the collision with the trunk road M-5. The axis of the alignment on the viaduct is straight, with a linear incline of 0.7 %. The superstructure consists of a 135 cm thick reinforced concrete prestressed plate with 12 spans, 24 and 30 m long. Central pier bodies are made of reinforced concrete, with a rectangular cross section and rounded edges. The piers rest on piles.



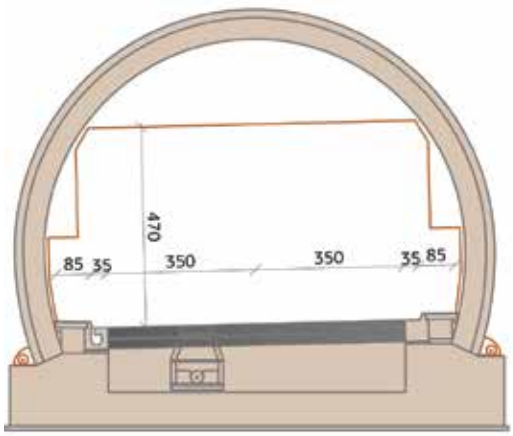
Tunel Gaj

Prolazak trase autoceste kroz brdo Gaj je ostvareno istoimenim dvocijevnim tunelom, dužine 855 m. Niveleta tunela se nalazi u konveksnoj vertikalnoj krivini s tim da najveći uzdužni nagib iznosi 2,5 %, a cijeli tunel se nalazi u pravcu. Maksimalni nadsloj iznad tunela je 50 m. Tunel Gaj je građen Novom austrijskom tunelskom metodom (NATM) u izuzetno teškim geološkim uvjetima, a konvergencije sekundarne obloge su se mjestimično razvile do 25 cm. Tunel sadrži dvije poprečne veze između lijeve i desne cijevi koje omogućavaju evakuaciju pješaka u slučaju požara. Posjeduje savremeni protivpožarni sistem s hidrantskim nišama, sistem ventilacije, telefonski pozivni sistem i sistem rasvjete. Također je opremljen najmodernijim sistemom za nadzor i upravljanje saobraćajem, koji se obavlja svakodnevno puna 24 sata iz Centra za održavanje i kontrolu prometa (COKP) Drivuša.

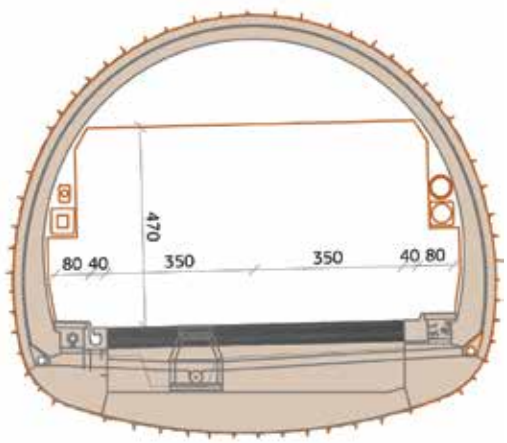
Gaj Tunnel

The motorway alignment passes through the Gaj hill through an 855 m long twin tunnel bearing the same name. The tunnel axis is straight and the grade level follows a convex vertical curve with a maximum linear inclination of 2.5 %. The maximum overburden above the tunnel is 50 m. This tunnel was built using the New Austrian Tunnelling Method (NATM) under extremely difficult geological conditions and convergences on the secondary lining reached 25 cm in several places. The tunnel contains two cross passages between the right and left tubes to allow for emergency evacuation of pedestrians in case of fire. It is equipped with a modern fire alarm system and hydrant niches, ventilation system, telephone call system and a lighting system. It also contains the most modern traffic surveillance and management system, operated 24/7 from the Maintenance and Traffic Control Centre (MTCC) Drivuša.

POPREČNI PRESJEK
PORTALNE KONSTRUKCIJE



KARAKTERISTIČNI POPREČNI PRESJEK
TUNELSKOG ISKOPA



Tunel Gaj

Tunel Igman

Tunel je izveden za puni profil autoceste, dakle s dvije tunelske cijevi na međusobnom razmaku osi cijevi od minimalno 25 m. Prosječna dužina tunelskih cijevi je 338 m, a usvojeni oblici i položaji portala su takvi da se uklapaju što je više moguće u prirodni teren. Ovakva rješenja najmanje remete prirodne uvjete što autocesti daje veći kvalitet. Tunel ima najveći nadsloj od 50 m. Građen je Novom austrijskom tunelskom metodom (NATM) u jako lošim geološkim uvjetima. Iznad tunela se nalazi selo, tako da je tokom građenja konstantno vršen geodetski nadzor nad pomjeranjima površine terena. Osiguranje ulaznog portala je jako složena geotehnička konstrukcija koja je zasnovana na dvostrukom nizu šipova sa naglavnom pločom. Niveleta tunela ima konstantan pad od 0,7 %, a osovina cijelog tunela se nalazi u pravcu. Tunel Igman posjeduje sistem rasvjete i ostalu potrebnu opremu s najmodernijim sistemom za nadzor i upravljanje saobraćajem, koji se obavlja svakodnevno puna 24 sata iz Centra za održavanje i kontrolu prometa (COKP) Drivuša.

Duboki usjek Ban Brdo

Duboki usjek je smješten na kraju poddionice Sarajevo Zapad – Lepenica. Dužine je 550 m, a dubina usjeka je na najvišem dijelu 27 m. Izveden je u sedam etaža čiji nagibi variraju od 1:1 do 1:2. Donja etaža je osigurana armirano–betonskom potpornom konstrukcijom, dok su gornje etaže obložene lomljenim kamenom i zatravnjene.

Igman Tunnel

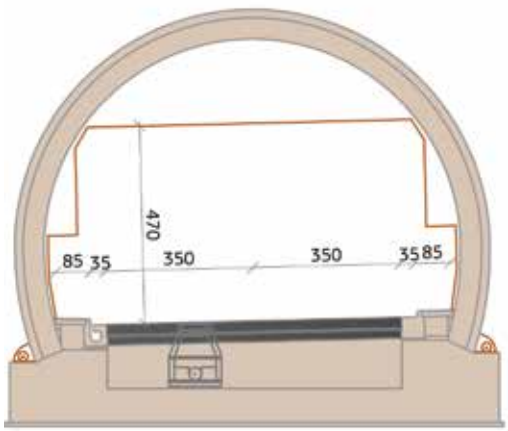
The tunnel was constructed to hold the full profile of the motorway, with the axes of the two tunnel tubes spaced 25 m apart. The average length of the tunnel tubes is 338 m and the shape and position of the portals were designed to blend into the natural surroundings as much as possible. This design solution minimises the disturbance of natural environment, thereby improving the quality of the motorway. Maximum overburden is 50 m. The tunnel was built using the New Austrian Tunnelling Method (NATM) under very poor geological conditions. Above the tunnel lies a village, and constant geological surveys and monitoring of surface movement were necessary throughout construction. The entry portal involves a highly complex geotechnical structure based on a double line of piles with a pile cap. The grade level has a constant decline of 0.7 % and the tunnel axis is straight. The tunnel is equipped with a lighting system and other necessary equipment, together with the latest surveillance and management system operated 24/7 from the Maintenance and Traffic Control Centre (MTCC) Drivuša.

Deep Cut Ban Brdo

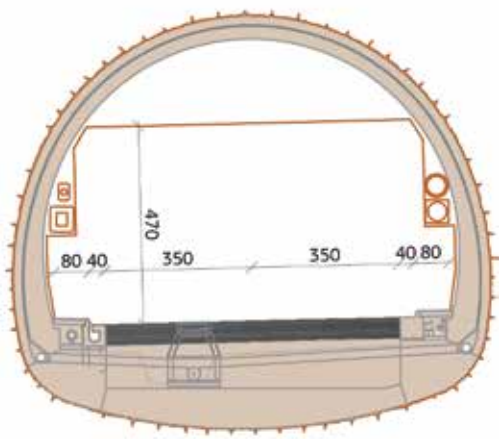
This deep cut is located at the end of the Sarajevo Zapad – Lepenica sub-section. It is 550 m long and the depth of the cut is 27 m at the deepest point. It was executed in seven steps with inclinations varying from 1:1 to 1:2. The bottom step is secured with a reinforced concrete retaining structure, while the upper steps are lined with crushed rock and grass.

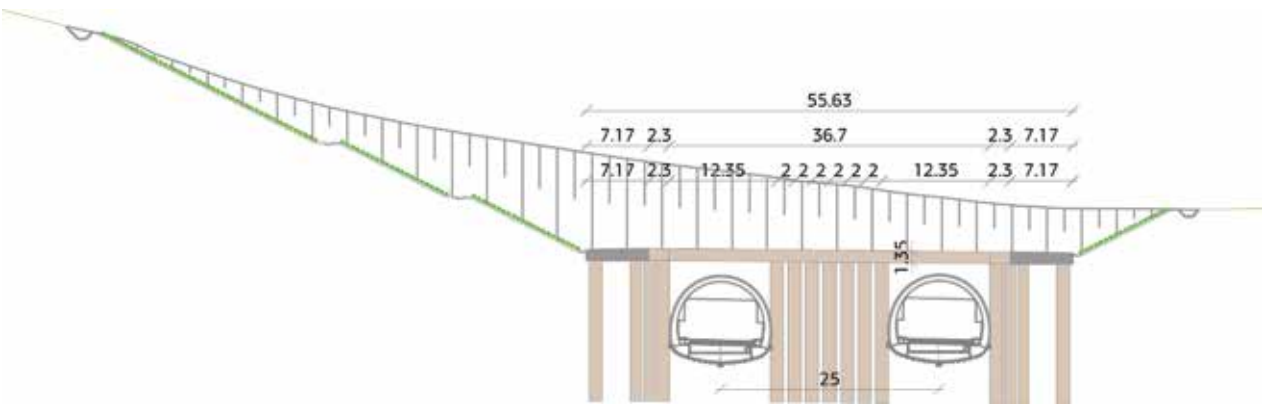
Tunel Igman

POPREČNI PRESJEK IZLAZNE PORTALNE KONSTRUKCIJE



KARAKTERISTIČNI POPREČNI PRESJEK TUNELSKOG ISKOPA





Duboki usjek Ban Brdo

PODDIONICA
LEPENICA → SUHODOL
SUB-SECTION

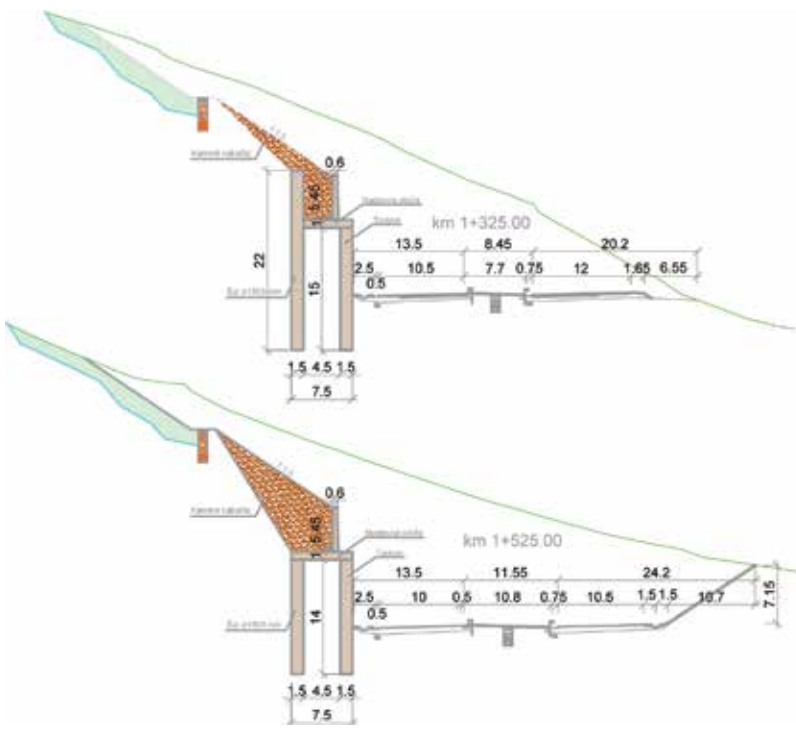
Duboki usjek Zakunjača

Duboki usjek Zakunjača

Duboki usjek predstavlja dio trase u dužini od 430 m. Lijeva strane autoceste je stabilizovana s potpornom konstrukcijom koju sačinjava dvostruki niz šipova s naglavnom pločom u koju je ukliješten zid visine 5,4 m.

Deep Cut Zakunjača

The part of the alignment going through this deep cut is 430 m long. The left side of the motorway was stabilised by a retaining structure constructed with a double line of piles with a pile cap that cradles the 5.4 m high wall.



Odmorište Lepenica

Odmorište Lepenica

Lokacija odmorišta je odabrana na osnovu raspoloživosti slobodnog prostora, kao i na osnovu reljefno-morfoloških karakteristika terena. S obzirom na to da je teren u manjem poprečnom nagibu, a građa takva da omogućava veće usijecanje, na platou je izvršeno denivelisanje u odnosu na autocestu. Na odmorištu Lepenica je, pored parking mjesta i sanitarnog čvora, predviđena i izgradnja pratećih i uslužnih objekata kao što su: benzinska stanica, prodavnica, bar i restoran.

Lepenica Service Area

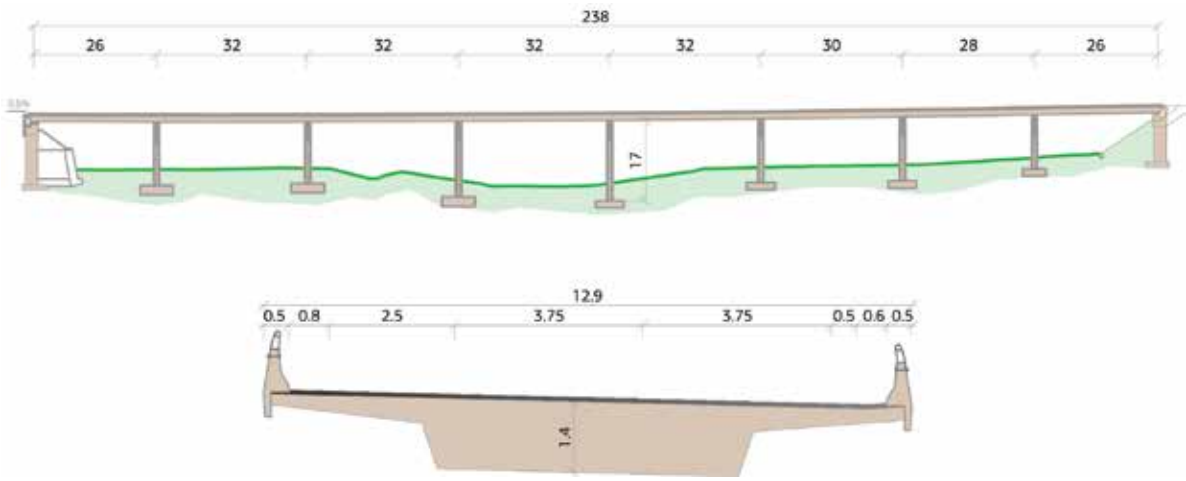
The location for this service area was selected based on availability of free space and the relief and morphological features of the terrain. Since the terrain has a gentle lateral slope and allows for deeper cuts, the plateau was grade separated in relation to the motorway. Lepenica service area, in addition to parking and toilets, is planned for construction of auxiliary and service buildings such as: petrol station, shop, bar and restaurant.

Most Lepenica 1

Most se sastoji iz dvije odvojene rasponske konstrukcije koja lokalnu cestu, rijeku Lepenicu i dolinu premoštava s 8 raspona dužina 26, 28, 30 i 32 m. Osovina ceste na mostu ima najmanji radijus krivine od 3.100 m. Niveleta ceste na mostu je u konkavnoj vertikalnoj krivini. Rasponski sklop mosta je pločasta prednapregnuta konstrukcija debljine 140 cm. Tijela srednjih stubova su betonska pravougaonog poprečnog presjeka sa zakošenim rubovima, a na visini od 4 m ispod rasponske konstrukcije se račvaju. Temeljenje je plitko na temeljnim stopama.

Lepenica 1 Bridge

The bridge consists of two separate superstructures crossing a local road and the Lepenica river and valley with 8 spans in lengths of 26, 28, 30 and 32 m. The motorway axis on the bridge follows the minimum radius curve of 3,100 m and the grade level lies on a concave vertical curve. The superstructure of the bridge is a 140 cm thick prestressed plate structure. Central pier bodies are made of concrete, with a rectangular cross section, oblique edges and branch at the level 4 m under the superstructure. The footings are shallow, on block foundations.



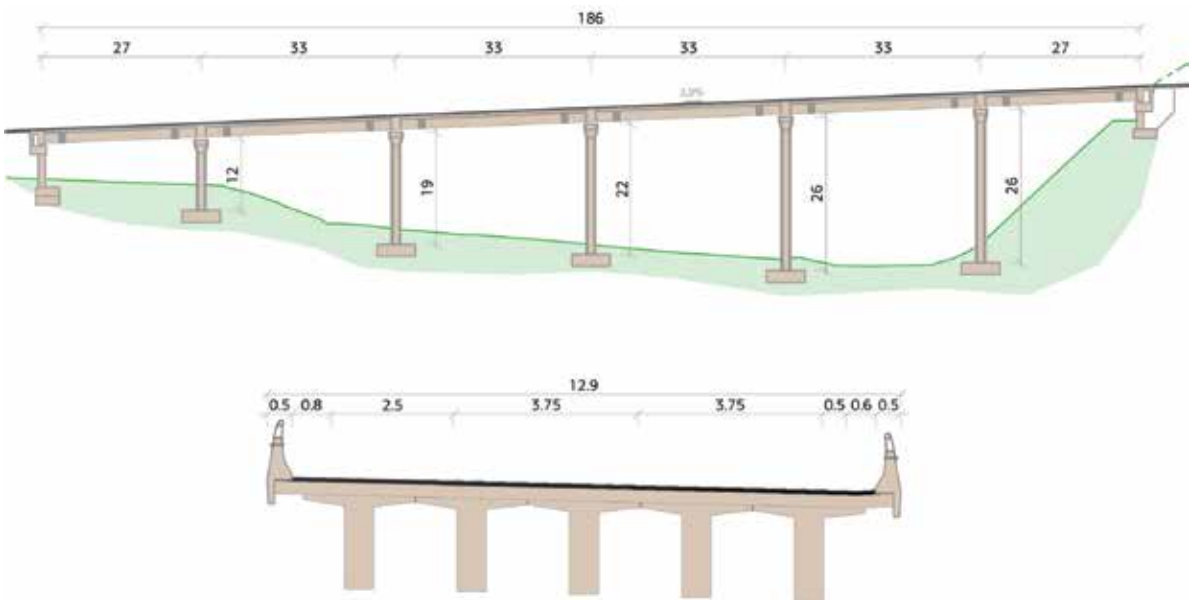
Most Lepenica 1

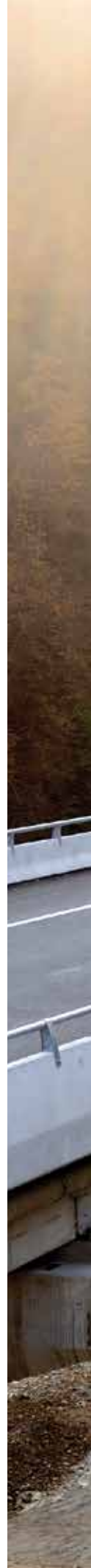
Most Lepenica 2

Most se sastoji iz dvije odvojene rasponske konstrukcije koje premoštavaju rijeku Lepenicu, lokalnu cestu i strmu dolinu. Rasponska konstrukcija desnog objekta ima 7 raspona dužine 27 i 33 m, dok konstrukcija lijevog objekta ima 6 raspona dužine 27 i 33 m. Osovine autoceste ceste na mostu je u krivini velikog radijusa od 3.100 m. Nivelete lijeve i desne kolovozne trake su u konstantnom nagibu od 3,6 i 3,9 %. Poprečni presjek mosta čini pet prednapregnutih betonskih nosača monolitiziranih betonskom kolovoznom pločom. Tijela srednjih stubova su betonska pravougaonog poprečnog presjeka sa zakošenim stranama i s ležišnom gredom na vrhu. Temeljenje je plitko na temeljnim stopama.

Lepenica 2 Bridge

The bridge consists of two separate superstructures which cross the Lepenica river, a local road and a steep valley. The superstructure of the right bridge consists of 7 spans in lengths of 27 and 33 m, while the left consists of 6 spans, also 27 and 33 m long. The motorway axis on the bridge follows a large curve with a radius of 3,100 m. The grade level on the left and right carriageways has a constant inclination of 3.6% and 3.9% respectively. The bridge profile consists of five prestressed concrete girders compounded with a monolithic concrete pavement slab. Central pier bodies are made of concrete, with a rectangular cross section, oblique sides and a bearing chair at the top. The footings are shallow, on block foundations.





Most Lepenica 2 i ulaz u tunel Vis

Tunel Vis

Ovo je treći po redu izgrađeni dvocijevni tunel na ovoj dionici, s prosječnom dužinom cijevi od 861 m. Najmanji nadsloj je na sredini i iznosi 15 m, a najveći 120 m. Osovina trase u tunelu je vođena u krivini s minimalnim radijusom od 1.400 m, dok je niveleta trase u tunelu sa konstantnim uzdužnim nagibom od 3,6 % u desnoj cijevi, odnosno 3,9 u lijevoj tunelskoj cijevi. Građen je Novom austrijskom tunelskom metodom (NATM). Ima tri poprečne veze između lijeve i desne cijevi koje omogućavaju evakuaciju pješaka u slučaju požara. U tunelu je ugrađen protivpožarni sistem s hidrantskim nišama, sistem prinudne ventilacije, telefonski pozivni sistem, sistem rasvjete i ostala potrebna oprema. Također je opremljen najmodernijim sistemom za nadzor i upravljanje saobraćajem, koji se obavlja svakodnevno puna 24 sata iz Centra za održavanje i kontrolu prometa (COKP) Drivuša.

Vis Tunnel

This is the third twin tunnel on this section, with an average tube length of 861 m. The minimum overburden is in the middle, 15 m, and the maximum is 120 m. The axis of the tunnel alignment follows a curve with a minimum radius of 1,400 m and the grade level of the alignment in the tunnel has a constant linear inclination of 3.6 % in the right tube and 3.9 % in the left tube. It was built using the New Austrian Tunnelling Method (NATM). It contains three cross passages between the right and left tubes to allow for emergency evacuation of pedestrians in case of fire. It is equipped with a modern fire alarm system and hydrant niches, emergency ventilation system, telephone call system, lighting system and other required equipment. It also contains the most modern traffic surveillance and management system, operated 24/7 from the Maintenance and Traffic Control Centre (MTCC) Drivuša.

PODDIONICA
SUHODOL → TARČIN
SUB-SECTION

Tunel 25. novembar

Tunel se nalazi na samom početku poddionice Suhodol – Tarčin i jedan je od najkompleksnijih objekata na čitavom Koridoru Vc. Izveden je za puni profil autoceste, s dvije tunelske cijevi na međusobnom razmaku osi od 25 m. Tunel ima najveći nadsloj od 200 m, a prosječna dužina tunelskih cijevi je 2.771 m. Niveleta je u konveksnoj vertikalnoj krivini s maksimalnim nagibom od 3,6 %. Osovina trase je u horizontalnoj krivini s radijusom 1360 m. Građen je NATM tunelskom metodom.

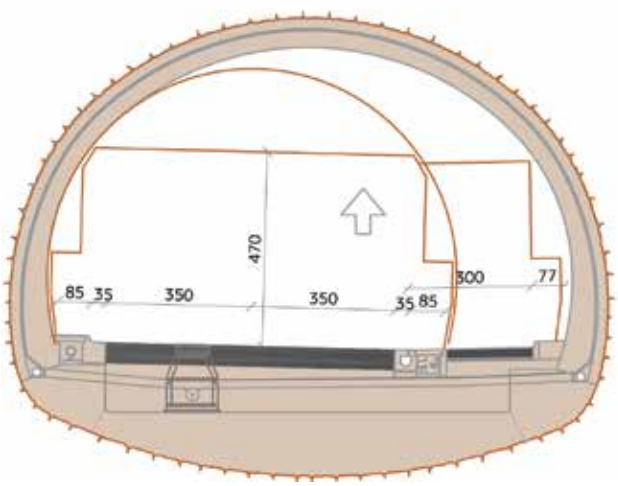
Tunel 25. novembar zbog svoje dužine, ima dvije parkirne niše i čak 11 poprečnih veza između tunelskih cijevi. Dvije poprečne veze omogućavaju kretanje vozila za pomoć i spašavanje u slučaju nezgode, dok su ostale veze za evakuaciju pješaka u slučaju požara. Kao i ostali tuneli i ovaj posjeduje protivpožarni sistem s hidrantskim nišama, telefonski pozivni sistem, sistem ventilacije, sistem rasvjete, te najmoderniji sistem za nadzor i upravljanje saobraćajem, koji se obavlja svakodnevno puna 24 sata iz Centra za održavanje i kontrolu prometa (COKP) Drivuša.

25. novembar Tunnel

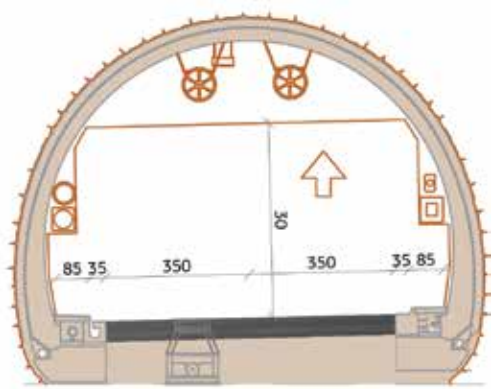
The tunnel is located at the very beginning of the subsection Suhodol – Tarčin and is one of the most complex structures on the entire Corridor Vc. The tunnel houses the full profile of the motorway, with the axes of the two tunnel tubes spaced 25 m apart. The maximum overbearing is 200 m and the average length of the tunnel tubes is 2,771 m. The grade level lies on a convex vertical curve with a maximum inclination of 3.6 %. The alignment axis follows a horizontal curve with a radius of 1,360 m. It was built using the NATM tunnelling method.

Due to its length, the 25. novembar tunnel contains two parking niches and as many as 11 cross passages between the tunnel tubes. Two cross passages allow vehicle access for emergency evacuation, while the other cross passages serve for emergency evacuation of pedestrians. Same as the other tunnels, this tunnel contains a fire alarm system with hydrant niches, telephone call system, ventilation system, lighting system and the most modern traffic surveillance and management system, operated 24/7 from the Maintenance and Traffic Control Centre (MTCC) Drivuša.

POPREČNI PRESJEK PARKIRNE NIŠE



KARAKTERISTIČNI POPREČNI PRESJEK



Tunel 25. novembar

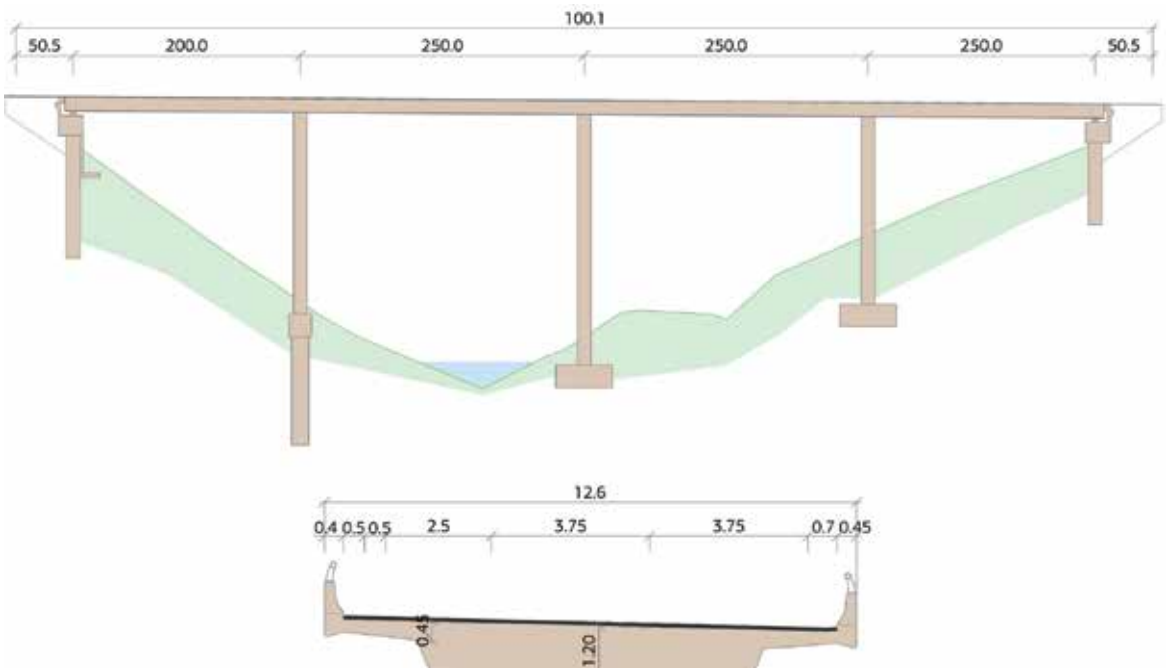
Most Bijela

Most se sastoji iz dvije odvojene rasponske konstrukcije s četiri polja kojim premoštava potok Bijelu i strmu dolinu. Osovine autoceste na mostu su u horizontalnim krivinama velikih radijusa 2.750 m i 2.675 m, dok je niveleta u uzdužnom padu od 0,7 %. U poprečnom presjeku konstrukcija mosta je prednapregnuta ploča debljine 120 cm. Tijela srednjih stubova su armirano-betonska, pravougaonog poprečnog presjeka. Temeljenje je plitko na betonskim stopama, a na mjestima sa slabijim geotehničkim karakteristikama izvedeno je na šipovima.

Bijela Bridge

The bridge consists of two separate superstructures with four sections and crosses the Bijela stream and a steep valley. The motorway axes on the bridge follow large radius curves (2,750 m and 2,675 m) and the grade level has a linear decline of 0.7 %. The cross section of the bridge superstructure is a 120 cm thick prestressed slab. Central pier bodies are made of concrete, with a rectangular cross section. The foundations are shallow, on concrete blocks, and piles were used in places with poor geotechnical characteristics.

Most Bijela


100.1
50.5
200.0
250.0
250.0
250.0
50.5
12.6
0.4 0.5 0.5
2.5
3.75
3.75
0.7 0.45
0.45
1.20

Tunel Grab

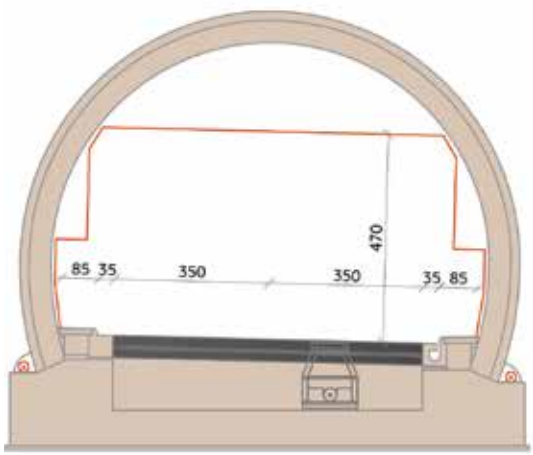
Tunel se nalazi na samom kraju poddionice Suhodol – Tarčin. Prosječna dužina tunelskih cijevi je 402 m, s konstantnim uzdužni padom od 0,7 % i minimalnim horizontalnim radijusom krivine od 2.675 m. Kao i ostali građen je Novom austrijskom tunelskom metodom (NATM). Tunel Grab ima maksimalni nadsloj od 100 m. Trasa autoceste se na ovom dijelu ukrštava s željezničkom prugom. Visinska razlika niveleta autoceste i pruge na ovom mjestu je svega 27 m što je dodatno usložilo izgradnju tunela. Tunel Grab izlazi iz brda gotovo paralelno s izohipsama, u jako teškim i promjenjivim geološkim uvjetima, pa je sjeverni portal bilo neophodno osigurati kompleksnom potpornom konstrukcijom visine 36 m. Tunel posjeduje protivpožarni sistem s hidrantskim nišama, telefonski pozivni sistem, sistem rasvjete i ostalu potrebnu opremu za nadzor i kontrolu prometa.

Grab Tunnel

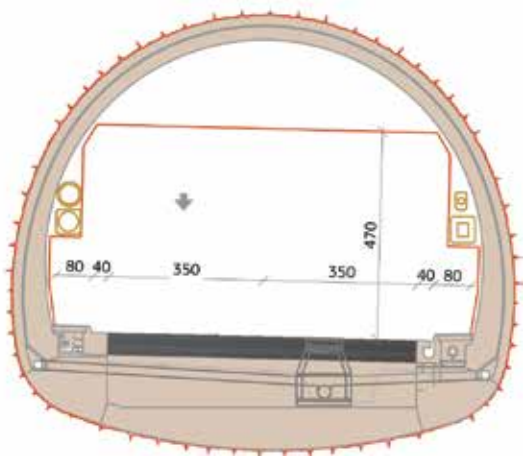
This tunnel is situated at the very end of the Suhodol – Tarčin sub-section. The average length of the tunnel tubes is 402 m, with a constant linear decline of 0.7 % and minimum horizontal curve radius of 2,675 m. Same as the other bridges, it was built using the New Austrian Tunnelling Method (NATM). The maximum overburden over the Grab tunnel is 100 m. The alignment here crosses paths with a railway track. The difference in altitude between the grade levels of the motorway and the railway at this point is only 27 m and this made construction of the tunnel even more challenging. The tunnel exits the hill almost parallel to contour lines and in very difficult and unstable geological conditions, and for this reason the northern portal needed to be secured with a complex, 36 m high retaining structure. The tunnel is equipped with a modern fire alarm system and hydrant niches, telephone call system, lighting system and other equipment required for traffic surveillance and control.

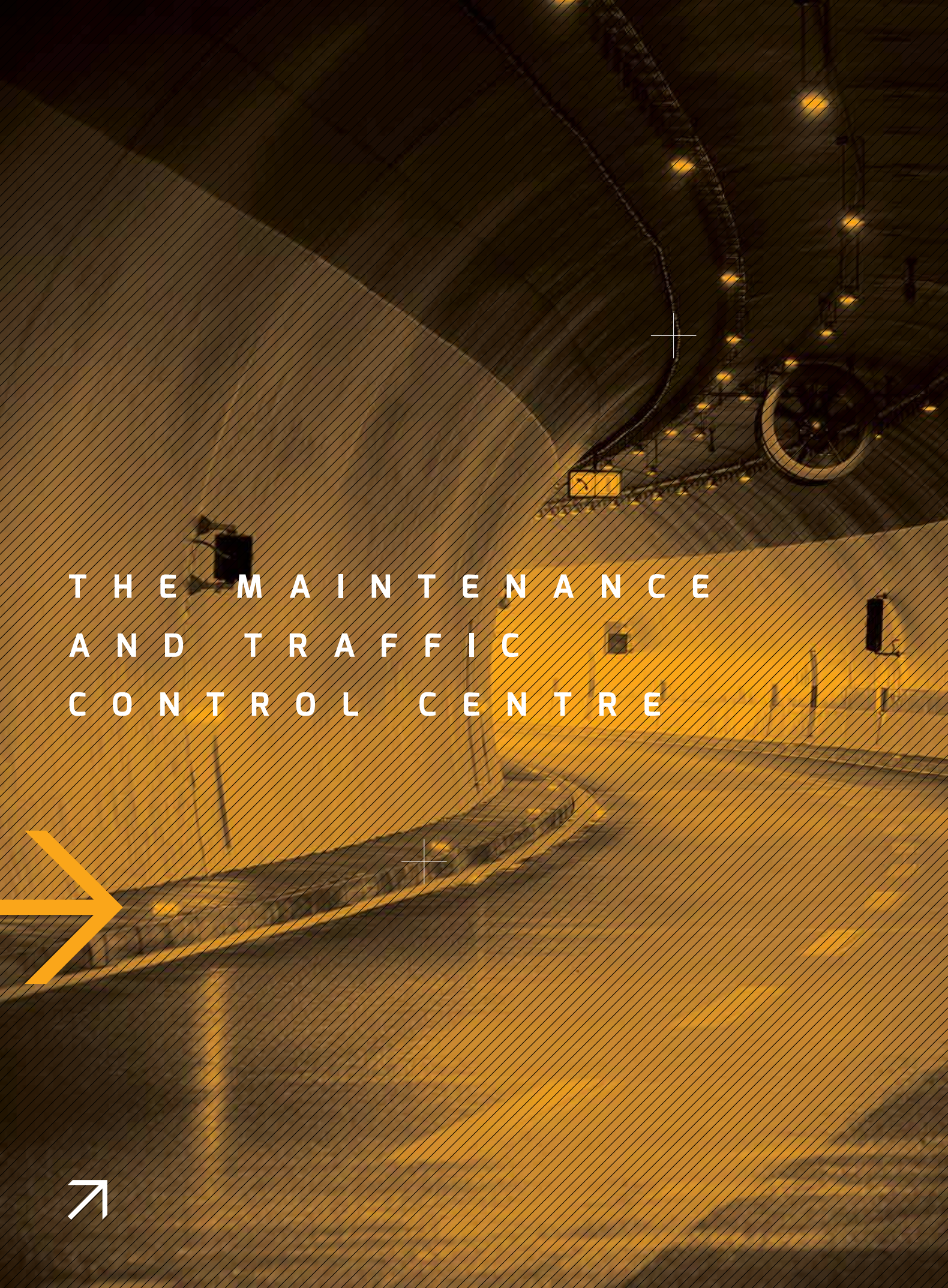
Tunel Grab

POPREČNI PRESJEK
PORTALNE KONSTRUKCIJE



KARAKTERISTIČNI POPREČNI PRESJEK





THE MAINTENANCE AND TRAFFIC CONTROL CENTRE

KONTROLA I UPRAVLJANJE PROMETOM 4.0

Centar za održavanje i kontrolu prometa predstavlja jedan potpuno novi koncept objekta na našim cestama. Centar je u potpunosti u funkciji autoceste. S aspekta održavanja predstavlja bazu za smještaj sve potrebne mehanizacije i ostalih sadržaja poput garaža za vozila, solane za posipni materijal, praonice, benzinske pumpe.

U sklopu Centra za održavanje i kontrolu prometa nalazi se i kontrolni centar – prvi centar ovakvog tipa u Bosni i Hercegovini. Kontrolni centar je svojevrsna fuzija najboljih iskustava i savremenih tehnologija, tekovina više naučnih disciplina: informacionih tehnologija, saobraćaja i komunikacija, građevine i ostalo. Zadatak Centra je da upravlja svim sistemima na autocesti i tunelima (svjetlosna promjenjiva signalizacija, sistem za automatsku detekciju incidenata, sistem vatrodojave u tunelima, sistem radio difuzije, sistem radio-govornih veza, sistem za prognozu vremenskih uvjeta na autocesti i sl.). Koristeći najbolje svjetske prakse iz oblasti upravljanja saobraćajnim resursima, svi sistemi su precizno sihnronizovani, uz trajni nadzor domaćih stručnjaka, a sve u cilju sigurnog prometa na autocesti A1.

Vrlo važan segment rada Centra jeste integracija svih hitnih službi u upravljanju sigurnošću saobraćaja. Simulacije udesa i provođenje zajedničkih vježbi policije, vatrogasnih jedinica, hitne pomoći i ophodnje autocesta doprinijelo je tome da se na najefikasniji način odgovori u slučaju incidenta na autocesti.

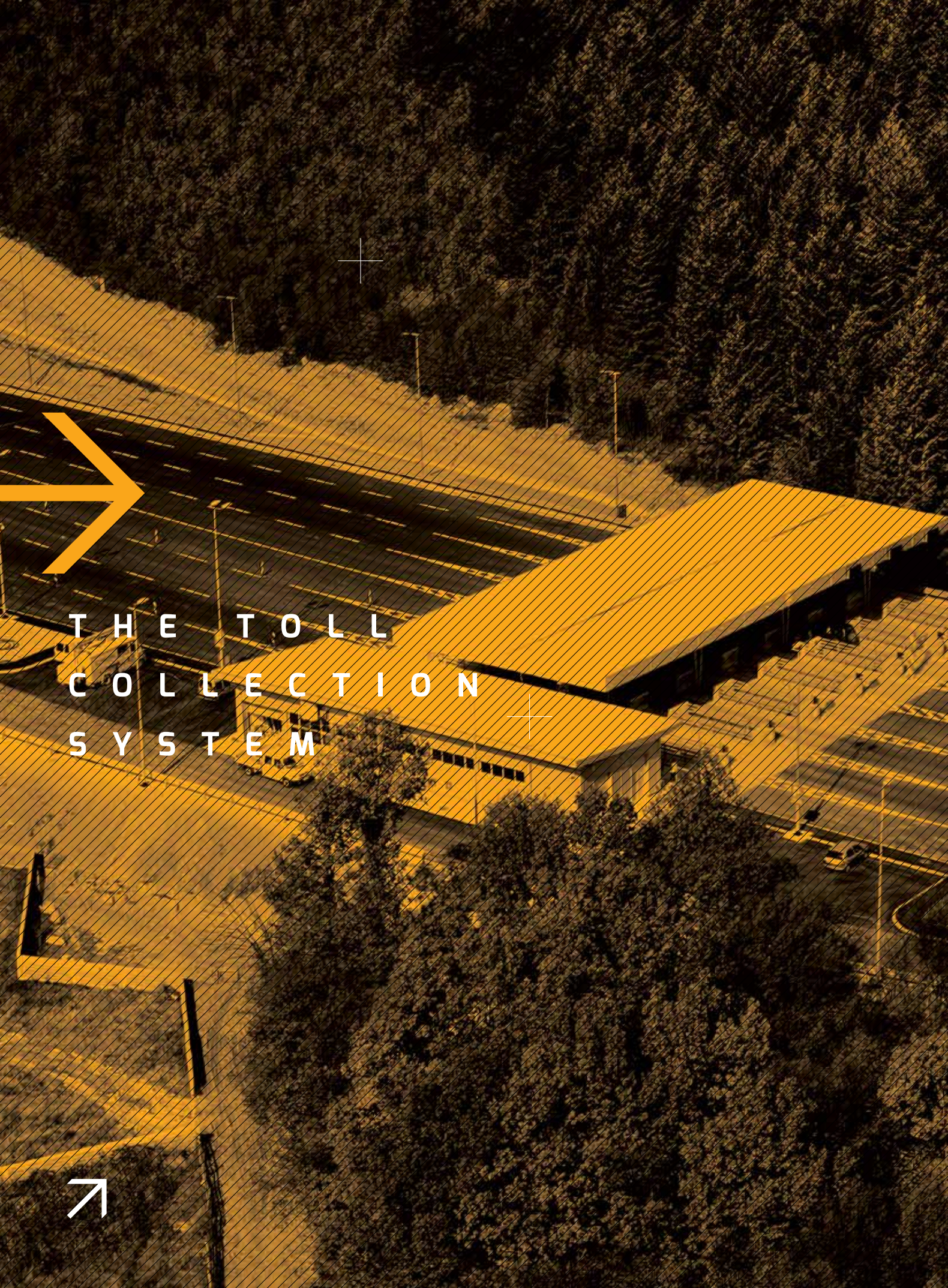
Kuriozitet je da je ovo prvi centar ovakve prirode u širem regionu, koji je u tehnički gledano, arhitekturalno najsavremeniji centar i u potpunosti se oslanja na IP tehnologije. Centar se može dograđivati u skladu s potrebama, dugoročno štiteći investiciju. Implementacija Centra rezultat je dugogodišnje akvizicije svjetskih znanja od strane domaćih stručnjaka iz raznih struka. Uz kontinuiranu obuku domaćeg osoblja u inostranstvu, Bosna i Hercegovina je prvi put dobila kritičnu masu kvalifikovanog kadra i kompleksnog znanja iz oblasti upravljanja, razvoja i održavanja ovakvih sistema. Ovo osoblje osigurava da se najsavremeniji standardi iz oblasti upravljanja autocesta primjenjuju i kod nas, te prenose na nove uposlenike, razvijaju i konkurentno pariraju zemljama liderima u ovoj oblasti.

The Maintenance and Traffic Control Centre is an entirely new concept on our roads. The Centre is fully dedicated to the operation and servicing of the motorway. With regard to maintenance, the Centre is a base that houses all mechanisation and other facilities such as the vehicle garage, storage for road salt, vehicle wash and petrol pumping station.

The Maintenance and Traffic Control Centre also houses the control centre - the first of its kind in Bosnia and Herzegovina. The control centre is a fusion of sorts of the best practices and modern technologies stemming from multiple scientific disciplines: information technology, traffic and communications, construction, etc. The mission of the control centre is to manage all systems on the motorway and in the tunnels (dynamic motorway signalisation, automated incident detection systems, fire alarm systems in tunnels, radio diffusion systems, voice/radio communication systems, motorway weather forecasting systems, etc.). Using the globally accepted best practices in management of traffic resources, all systems are precisely synchronised under constant supervision of local experts in order to ensure the safety of traffic on the A1 motorway.

An important segment of the Centre's operations is the integration of all emergency services in managing traffic safety. Accident simulations and joint exercises by the police, fire brigade, ambulance service and motorway patrol have contributed to the ability to provide the most efficient response to any incident on the motorway.

The exceptional fact is that this is the first Centre of its kind in the wider region, being the most technically and architecturally advanced centre that is fully reliant on IP technologies. The Centre was designed to accommodate expansions that may be needed in the future, thereby protecting the long-term viability of the investment. The Centre is a result of many years of acquisition of global knowledge by domestic experts of different profiles. With continued training of domestic personnel abroad, Bosnia and Herzegovina has finally reached critical mass in terms of personnel and complex know-how in management, development and maintenance of such systems. This personnel ensures that the latest standards in motorway management are applied in-country and that this knowledge is transferred to new employees, continuously developed and competitively matched to the leading countries in this field.


THE TOLL
COLLECTION
SYSTEM


CESTARINA
6.0

Sistem naplate cestarine na autocesti A1 u Federaciji BiH je organizovan kao zatvoreni ili otvoreni sistem, zavisno o dijelu autoceste. U zatvorenom sistemu se naplaćuje na osnovu razdaljine između dvije naplatne stanice i na osnovu pripadajuće klase vozila, dok u otvorenom sistemu naplate iznos cestarine zavisi o dužini korištene dionice i pripadajuće klase vozila. Klasifikacija vozila je izvršena na osnovu Pravilnika o sistemu naplate cestarine na autocestama, brzim cestama i objektima s naplatom u FBiH i to na I, II, III i IV klasu vozila, dok je ukupna visina naknade za korištenje cestarine definisana Uredbom o naplati za korištenje autoceste A1 koju donosi Vlada FBiH.

Cestarina se može platiti gotovinom, u nacionalnoj i stranoj valuti euro, karticama i sredstvima pretplate (smart kartica ili elektronska naplata cestarine ACC - Autoceste Card).

Autoceste Card (ACC) je elektronska naplata cestarine koja korisniku autoceste omogućava brzu i efikasnu naplatu cestarine bez posredovanja blagajnika i zaustavljanja na naplatnim mjestima. Elektronska naplata cestarine koncipirana je na modelu prepaid plaćanja. Korisnik ACC usluge uplaćuje ACC kredit - gotovinski, bankovnom karticom ili virmanski, a uplaćeni novčani iznos se pohranjuje na ACC TAG uređaj i tako ostvaruje mogućnost plaćanja usluge korištenja autocesta i brzih cesta u Federaciji BiH prema važećem cjenovniku. ACC TAG uređaj može ko-

The toll collection system on the A1 motorway in the Federation BiH is organised as an either closed or open system on different parts of the motorway. Within the closed system the toll is determined on the grounds of distance between two toll plazas and according to the vehicle class, while in the open system the toll depends on the length of the section travelled and the corresponding vehicle class. Vehicle classification is based on the Regulation on Toll Collection Systems for Motorways, Expressways and Structures in FBiH for Vehicle Classes I, II, III and IV, while the toll price is stipulated in the Regulation on Toll Collection on the A1 Motorway adopted by the FBiH Government.
The toll is collected in cash, in domestic and euro foreign currency, bank cards and prepaid cards (smart card, i.e. electronic toll collection ACC - Autoceste Card).

The Autoceste Card (ACC) is an electronic method of toll collection offering its users fast and efficient payment of toll without the need to interact with the cashier or stop at the toll station. Electronic toll collection concept is based on a prepaid model. The ACC user pays for ACC credit - in cash or by bank card or wire transfer, and the deposited amount is credited to the user on the ACC TAG device, thereby allowing the user to pay for motorway and expressway services in the Federation BiH according to the current price list. The ACC TAG device can be used only by users that

ristiti samo ugovoreni korisnik, i to za vozilo za koje je namijenjen. Transakcija između ACC TAG uređaja i sistema za naplatu cestarine je automatska – odvija se pomoću ACC TAG-a smještenog s unutarnje strane prednjeg vjetrobranskog stakla u vozilu i antene na nadstrešnici iznad ulazne/izlazne naplatne staze.

Na naplatnim mjestima postoji najmanje jedan izdvojeni naplatni prolaz koji služi za elektronsku naplatu cestarine. ACC TAG uređaj mogu koristiti korisnici svih klasa vozila (I, II, III i IV).

Cjelokupni sistem naplate cestarine (otvoreni ili zatvoreni) je integrisan i omogućava nadzor funkcionisanja kompletnog sistema naplate (finansije, brojanje prometa, videonadzor) s bilo kojeg naplatnog mjesta ili udaljene lokacije u pravom vremenu.

JP Autoceste FBiH d.o.o. Mostar kontinuirano radi na unapređivanju sistema naplate cestarine. Za sada su fokusirana na korištenje elektronske naplate cestarine, a sve s ciljem da se korisnicima pruži što kvalitetnija usluga, brži i sigurniji prolaz, prolazak bez zaustavljanja, smanjenje gužve na naplatnim mjestima, ali i cjenovne pogodnosti. Konačni cilj je integracija i uspostavljane interoperabilnog sistema elektronske naplate sa sistemima naplate cestarine susjednih država, pa i šire.

signed the contract and only for the vehicle specified in the contract. The transaction between the device and the toll collection system is automatic - it takes place between the ACC TAG device placed inside the windscreen of the vehicle and the antenna on the canopy above the entry/exit toll lane.

Every toll plaza contains at least one lane dedicated exclusively to electronic toll collection. The ACC TAG device can be used for all vehicle classes (I, II, III and IV).

The overall toll collection system is integrated and allows for real-time supervision of the entire system (financial, traffic counts, video surveillance) from any toll plaza or remotely.

JP Autoceste FBiH d.o.o. Mostar continually works on improving the toll collection system. So far these efforts are focused on utilisation of electronic toll collection in order to provide its users with maximum service quality, faster and safer passage without stopping, reduction of queues on the toll plazas, as well as price benefits. The end goal is to integrate and establish an interoperational electronic toll collection system compatible with the toll systems used in the neighbouring countries and further abroad.

ENVIRONMENTAL PROTECTION

6.0

ZAŠTITA OKOLIŠA

Zaštita okoliša

Autocesta kao veliki linijski objekat prolazi kroz naseljena, poljoprivredna i šumska područja gdje se pored ljudskih zahvataju i mnoga staništa flore i faune, što nameće potrebu za provođenjem mjera zaštite okoliša, kako u toku projektovanja i gradnje, tako i u toku eksploatacije.
Kod cestovne infrastrukture, pored iznalaženja tehnički prihvatljivih ekonomičnih konstruktivnih rješenja izgradnje, postavlja se obaveza racionalnog korištenja i zaštite postojećih potencijala. Već u fazi planiranja i izrade glavnih projekata mjere zaštite okoliša su sastavni dio tih projekata i bitno, odnosno u nekim slučajevima eliminatorno utječu na izbor trase autoceste kroz neko zaštićeno područje.
Obaveza, ali i jasna opredijeljenost JP Autocesta FBiH kao društveno-odgovornog preduzeća, da ulaže u oblast zaštite okoliša verifikovana je kroz uvođenje standarda ISO 14 001.
JP Autoceste FBiH ima okolišne dozvole za sve dionice koje se grade ili su izgrađene. U okolišnim dozvolama koje izdaje Federalno ministarstvo okoliša i turizma, na osnovu svih pribavljenih saglasnosti i izrađene Studije utjecaja na okoliš, navodi se da je autocesta A1 okolišno prihvatljiv projekat. Da bi se okolišna dozvola obnovila potrebno je zadovoljiti uvjete iste, odnosno provoditi redovan okolišni monitoring i o tome redovno izvještavati inspekciju i ministarstvo. Briga o okolišu nije samo obaveza po domaćoj zakonskoj regulativi, ista je i uvjet međunarodnih finansijskih institucija.

Utjecaj cestovne infrastrukture na
okoliš manifestuju se kroz:

- buku,
- vibracije,
- korištenje zemljišta,
- vizuelnu degradaciju prostora,
- zagađenost zemljišta, zraka i vode.

Mjere zaštite okoliša kao što su inteligentni sistemi upravljanja i održavanja ceste, zatvoreni sistem odvodnje, zvučne barijere, hortikulturno uređenje su vrlo skupe i svojstvene su savremenim cestama, odnosno cestama s naplatom cestarine.

Environmental Protection

A motorway is a large linear structure passing through inhabited, agricultural and forested areas, affecting human settlements and habitats for flora and fauna and therefore implying a need for implementation of environmental protection measures in the course of design, construction and exploitation of the motorway.
With road infrastructure, in addition to determination of technically acceptable and cost-effective construction solutions, there is a requirement to ensure rational use and protection of the existing potentials. Environmental protection measures are a component part of these designs and are an important, and in some cases even a deciding factor in choosing the alignment of the motorway through a protected area.
The dedication and strong commitment of JP Autoceste FBiH, as a socially responsible company, to investing in protection of the environment was further substantiated with the introduction of the ISO 14 001 standard.
JP Autoceste FBiH has acquired environmental permits for all sections that have been constructed or are currently under construction. The environmental permits issued by the Federal Ministry of Environment and Tourism, pursuant to all acquired approvals and the Environmental Impact Study, declare motorway A1 to be an environmentally acceptable project. Renewal of an environmental permit requires compliance with its requirements, which includes regular environmental monitoring and reporting to the inspectorate and the ministry. Environmental management is more than just a requirement of the local legislation, it is also a requirement imposed by international financial institutions.

Environmental impact of road infrastructure
is manifested through:

- noise,
- vibration,
- land use,
- visual degradation of the space,
- land, air and water pollution.

Environmental protection measures, such as intelligent road management and maintenance, closed drainage systems, sound barriers and landscaping, are very expensive elements that are characteristic of modern roads and toll roads.

Sistem odvodnje

Odvodnja autoceste ostvaruje se sistemom vanjske odvodnje, pomoću propusta i jaraka van trupa autoceste i zatvorenim sistemom unutrašnje odvodnje koji se sastoji od glavnog i sekundarnih kolektora, revizionih okana, slivnika, rigola, raznih vrsta jaraka i prečistača. Autocesta kao linijska građevina i fizička prepreka u prostoru prouzrokuje određene promjene vodnog režima. Saobraćaj zagađuje vodonosna područja na dva načina i to kontinuirano i u akcidentnim situacijama. Kontinuirano zagađenje od saobraćaja potiče od emisije izduvnih gasova, dijelova guma i kočnica, te od određenih postupaka održavanja puteva. Na površini saobraćajnice, u kišnom razdoblju prikupljaju se znatne količine oborinskih voda koje ispiru površinu saobraćajnice, te otapaju i mobilizuju spomenute zagađujuće supstancije. Obim zagađenja zavisi od gustine saobraćaja i karakteristika kolovoza. Zagađenje u akcidentnim situacijama nastaje kao rezultat vanrednog događaja, a može imati značajne posljedice na vodne resurse.

Unutarnje vode s autoceste treba smatrati onečišćenim fluidom, kojeg je prije puštanja u okoliš potrebno u hipsometrijski najnižim tačkama uzdužnog profila saobraćajnice prikupiti u separatore ulja.

Na autocesti A1 u prosjeku na svakih 300-400 metara je ugrađen separator lakih tečnosti, kroz koji prolazi sva voda iz unutarnjeg sistema odvodnje. Ugrađeni separatori su gravitacijski, te pročišćavaju vodu tako da se lake tečnosti izdvoje na površinu komore separatora, a pročišćena voda ističe dalje do krajnjeg recipijenta. Navedeni prečistači zadovoljavaju BAS EN 858 1 i BAS EN 858 2.

Najčešća je izvedba separatora s bypass-om, dok se u vodozaštitnim zonama koriste separatori bez bypass-a. Također, na mjestima pogodnim za to, oborinske vode se prečišćavaju sistemom laguna.

Drainage System

The drainage on the motorway comprises an external drainage system with culverts and gutters situated outside the body of the motorway and a closed internal drainage system consisting of a main and secondary collectors, inspection shafts, inlets, gutters, and different types of ditches and separators. The motorway, being a linear structure and a physical spatial barrier, causes certain changes in the water regime. Traffic pollutes the aquifer in two ways: through continuous pollution and in emergency situations. Continuous traffic pollution is caused by exhaust fumes, parts of tyres and brakes and certain motorway maintenance procedures. During the rainy periods, substantial amounts of rain water run-off wash across the surface of the motorway and leach and mobilise these pollutants. The extent of this pollution depends on traffic density and characteristics of the pavement. Pollution from emergency events results from accidents and may have a major impact on water resources.

Motorway run-off should be treated as a polluted fluid that needs to be collected in oil separators located at the lowest hypsometric point of the longitudinal road profile prior to discharge into the environment.

On the A1 motorway, light fluids separators are installed 300-400 m apart and receive all water from the internal drainage system. The installed separators are gravitational and filter the water by separating lighter fluids at the surface and allowing purified water to pass to the end recipient. These separators are in compliance with BAS EN 858 1 and BAS EN 858 2.

The most common method of installation is using a bypass, while in water protection zones separators without a bypass are used. Also, in appropriate locations, atmospheric water is purified using stabilisation ponds.

Zaštita od buke

Sastavni dio projektne dokumentacije autoceste jesu i projekti zaštite od buke. Osnovni ulazni podaci za modeliranje karti buke su topologija terena kojim autocesta prolazi te prognozirani obim saobraćaja na toj dionici. Pored uvjeta koje daje projektant, postoji obaveza redovne provjere usklađenosti dozvoljenih nivoa buke sa zakonskim propisima. Zaštitni zidovi od buke pored osnovne funkcije smanjenja utjecaja buke u skladu sa zakonskim propisima, trebaju se vizuelno što bolje uklopiti u okoliš. Razni su materijali od kojih se izrađuju paneli za zaštitu od buke poput drveta, aluminija, betona, transparentnih materijala i slično.

Noise Protection

Noise protection design is a component of the design documentation. Essential input data for noise maps is the topology of the terrain and the planned traffic density on the given section. In addition to the inputs provided by the designers, noise levels have to be checked for compliance with the relevant regulations. Noise barriers should, in addition to their basic purpose of reducing the impact of noise in accordance with the regulations, visually conform to the surroundings. Noise barrier panels are made from different materials, such as wood, aluminium, concrete, transparent materials, etc.

Pejzaž, arheologija i kultura

Svakim zahvatom na određenom području, bilo da je običan ili estetski izuzetno atraktivan, unose se određene promjene i mijenja se prvobitni vizuelni identitet. Kako ni izgradnja cestovne infrastrukture nije izuzete od tog pravila, već u ranijim stadijima projektovanja provodi se trodimenzionalno modeliranje trase da bi u konačnici vizuelni rezultati bili što prihvatljiviji, odnosno da bi se trasa nove ceste što bolje vizuelno uklopila u područje kojim prolazi.

Društvo JP Autoceste FBiH, uz podršku organa državne uprave, u svim segmentima svoje djelatnosti veliku pažnju pridaje zaštiti okoliša uopće, provodeći različite vrste zaštite, uvažavajući posebne potrebe lokalnih zajednica.

Bosna i Hercegovina baštini bogato kulturno-historijsko naslijeđe, obiluje arheološkim nalazištima koja svjedoče o čovjekovoj prisutnosti u prostoru i vremenu, a imaju umjetničku, historijsku i antropološku vrijednost. Cilj sistemskih terenskih pregleda trase buduće autoceste je pravovremeno detektirati, kartirati i zaštiti arheološke nalaze i nalazišta prije nego dođe do njihovog uništenja prilikom zemljanih radova i bespovratnog nestanka podataka i artefakata vrijednih za baštinu koja može sezati od lokalnog do svjetskog značaja.

Druga, ne manje važna stavka je potreba da se ovakvim pristupom pravovremeno obave arheološki istražni radovi i time omogući nesmetan nastavak građevinskih radova koji također (naročito u ovom

Landscape, Archaeology and Culture

Any intervention on a given area, whether functional or aesthetically appealing, introduces certain changes and alters the initial visual identity of the area. Road construction is no exception to this rule and the alignment was modelled in 3D from the early stages of design in order to ensure that the final visual impact would be as agreeable as possible, i.e. to ensure that the alignment of the new motorway visually conforms to the area through which it passes.

JP Autoceste FBiH, with support from the government authorities, pays great attention to overall protection of the environment and strives to implement various forms of environmental protection and to accommodate the individual needs of the local communities.

Bosnia and Herzegovina has a wealth of cultural and historical heritage, with numerous archaeological sites of major artistic, historical and anthropological value that bear witness to human presence throughout space and time. The objective of systematic surveys of the future motorway alignment was to detect, map and protect such archaeological sites and findings before they could potentially be exposed to damages during the execution of earthworks, and to prevent destruction and loss of information and artefacts that may be of local or even global significance.

The second, but not less important, aspect was the need to carry out archaeological survey works ahead

kontekstu – autocesta) imaju neprocjenjiv značaj za cjelokupnu zajednicu.
Hortikulturno uređenje integrisano je u svaku fazu planiranja autoceste. Ono nije zasebna ili dodatna aktivnost, već je važan element pri projektovanju i građenju svake savremene saobraćajnice, što upravo u najvećoj mjeri doprinosi vizuelnom uklapanju trase u okoliš.
Kod projektovanja i izbora trase nove ceste često se nastoji omogućiti lakši pristup i otkrivanje posebnih znamenitosti ili specifičnih lokaliteta od izuzetnog kulturnog značaja kroz koje cesta prolazi. Još prije gradnje ceste potrebno je dobiti saglasnost nadležne institucije za zaštitu arheoloških nalazišta.

Monitoring

S obzirom da se ugradnjom svih elemenata koji će doprinjeti zaštiti okoliša ne rješavaju svi problemi u ovoj oblasti, potrebno je provoditi redovni monitoring kako bi se uvijek bilo svjesno stanja okoliša, odnosno uticaja autoceste na okoliš.
Proračuni i procjene uticaja na okolinu na bazi kojih su tražena projektna rješenja mogu biti nedovoljno pouzdani. Isto tako, u toku vremena se mijenjaju i uslovi okruženja, te sami i okolinski propisi. Stoga je zadatak nadležnih organizacija uspostava okolinskog monitoringa. Zadatak monitoringa jeste praćenje emisija štetnih materija (u zrak i vodu), te promjene parametara okoline (kvalitet zraka, nivo buke, kvalitet vode u rijekama, promjene kvaliteta tla).
Sistem monitoringa ima za cilj i provjeru svih sistema od kojih zavisi kvalitet okoline, te se na bazi rezulatata monitoringa poduzimaju dodatne organizacione ili investicione mjere.

Zakonska regulativa i jasna opredjeljenost JP Autocesta FBiH u oblasti zaštite okoliša na najbolji način minimiziraju i preveniraju sve negativne utjecaje na okoliš koje sa sobom nosi ovako jedan veliki projekat. Redovnim monitoringom na autocesti A1 provjerava se stanje kvaliteta vode, zraka, tla i buke.

of time and thereby ensure unhindered progression of construction works, which are also (especially in the context of a motorway) of major importance to the community as a whole.
Landscaping formed an integral part of all stages of planning for the motorway. This is not a separate or additional activity but rather an important element in the design and construction of any modern road, again contributing to the visual integration of the alignment with the environment.
One of the considerations in designing and selecting the alignment for a new motorway is to facilitate access and discovery of particular landmarks or heritage sites situated along the motorway. The institution competent for protection of archaeological sites provided its approval before the actual start of construction of the motorway.

Monitoring

Considering that installation of these environmental protection elements does not resolve all potential environmental problems, regular monitoring is required to ensure continuous supervision of the environment and the impacts of the motorway on the environment.
Environmental impact calculations and estimates which form the basis for the design may prove to be inadequate. Furthermore, circumstances in the environment tend to change over time, as does environmental legislation. Therefore the competent institutions need to organise and establish environmental monitoring. The role of monitoring is to track emissions of pollutants (to air and water) and changes in environmental parameters (air quality, noise levels, water quality in rivers, changes in soil quality).
The monitoring system is also responsible for controlling all systems that affect the quality of the environment and for initiating additional organisational measures and investments based on the results.
Legal requirements, together with a clear commitment of JP Autoceste FBiH to protecting the environment, provide the best method of mitigation and prevention of any negative impacts on the environment inherent in a major project of this kind.
Regular monitoring on the A1 motorway includes monitoring of land, air and soil quality and noise levels.

FUTURE PROJECTS

BUDUĆI PROJEKTI

7.0

Projekti u toku izgradnje
Projects Currently Under Construction

Svilaj – Odžak

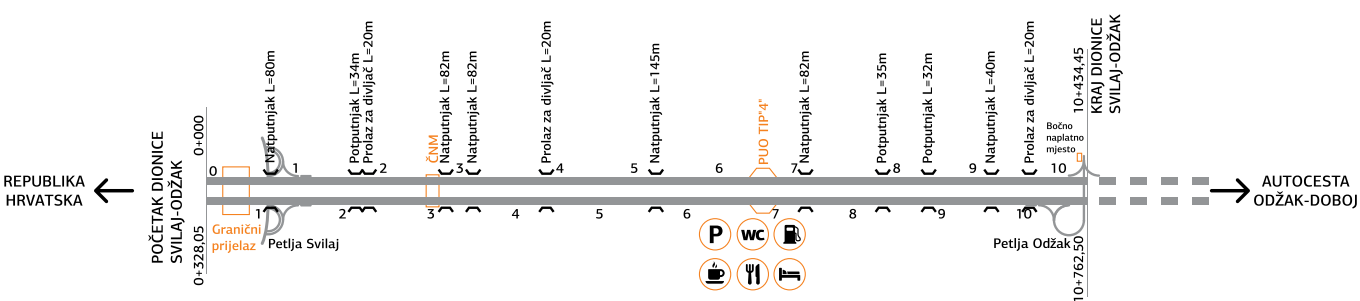
Dužina:	11 km	**Length:**	11 km
Izvor finansiranja:	Kredit EIB (Evropska investiciona banka)	**Source of financing:**	EIB (European Investment Bank) loan
Procjena troškova:	83,8 mil. €	**Cost estimate:**	83,8 m EUR
Dionica uključuje još dvije stavke:	- Petlja Odžak (5 mil. eura) - Granični prijelaz (5 mil. eura)	**This section includes two additional items:**	- Odžak interchange (5 m EUR) - Border crossing (5 m EUR)
Dostupna dokumentacija:	- Glavni projekat - Građevniska dozvola	**Available documentation:**	- Main design - Building permit

Dionica autoceste Svilaj - Odžak, dužine 11 km, čini najsjeverniji dio Koridora Vc u Bosni i Hercegovini. Početak dionice se nalazi odmah iza budućeg međudržavnog mosta Svilaj kojim se premoštava rijeka Sava, a završava se na petlji Odžak koja se nalazi sjeverno od grada Odžaka. Most preko rijeke Save ujedno je i spojno mjesto između autoceste koja prolazi kroz Bosnu i Hercegovinu i Hrvatsku.

Na dionici se od značajnijih objekata nalaze granični prijelaz, dvije petlje, odmorište, čeono naplatno mjesto, dva mosta, tri prolaza za divljač, četiri natputnjaka, tri potputnjaka i dva propusta za kanale za navodnjavanje.

The Svilaj - Odžak section of the motorway is over 10 km long and represents the northernmost part of the Corridor Vc in Bosnia and Herzegovina. The section starts directly after the future inter-state bridge Svilaj over the Sava river and ends at the Odžak interchange, located north of the town of Odžak. The bridge over the Sava connects between the motorways in Bosnia and Herzegovina and Croatia.

Important structures on this section include a border crossing, two interchanges, service area, mainline toll plaza, two bridges, two wildlife corridors, four overpasses, three underpasses and two culverts for irrigation canals.



Dionica Svilaj - Odžak

Klopče - Drivuša

Dužina:	2,32 km	**Length:**	2,32 km
Izvor finansiranja:	Kredit KFAED (Kuvajtski fond za arapski ekonomski razvoj)	**Source of financing:**	KFAED (Kuwait Fund for Arab Economic Development) loan
Procjena troškova:	33,527 mil. €	**Cost estimate:**	33,527 m EUR
Dostupna dokumentacija:	- Glavni projekat - Građevniska dozvola	**Available documentation:**	- Main design - Building permit

Projekti za izgradnju
Projects Awaiting Construction

Donja Gračanica - Klopče

Dužina:	6,5 km	**Length:**	6,5 km
Izvor finansiranja:	Kredit KFAED i OPEC	**Source of financing:**	KFAED and OPEC loans
Procjena troškova:	110 mil. €	**Cost estimate:**	110 m EUR
Dostupna dokumentacija:	- Glavni projekat - Građevniska dozvola	**Available documentation:**	- Main design - Building permit

Počitelj - Međugorje

Dužina:	11 km	**Length:**	11 km
Izvor finansiranja:	Kredit EIB (Evropska investiciona banka)	**Source of financing:**	EIB (European Investment Bank) loan
Procjena troškova:	100 mil. €	**Cost estimate:**	100 m EUR
Dostupna dokumentacija:	- Glavni projekat - Građevniska dozvola - Urbanistička dozvola - Studija izvodljivosti	**Available documentation:**	- Main design - Environmental permit - Urban planning permit - Feasibility study

Doboj - Žepče

Dužina:	38,6 km	**Length:**	38,6 km
Izvor finansiranja:	Koncesija po principu *Dizajniraj-Finansiraj-Izgradi-Upravljaj i Održavaj*	**Source of financing:**	Concession under *Design-Build-Construct-Manage & Maintain* principle
Procjena troškova:	380 mil. €	**Cost estimate:**	380 m EUR
Dostupna dokumentacija:	- Idejni projekat - Okolišna dozvola - Studija izvodljivosti	**Available documentation:**	- Conceptual design - Environmental permit - Feasibility study

Žepče - Zenica

Dužina:	20 km	**Length:**	20 km
Izvor finansiranja:	Kredit	**Source of financing:**	Loan
Procjena troškova:	330 mil. €	**Cost estimate:**	330 m EUR
Dostupna dokumentacija:	- Idejni projekat - Okolišna dozvola - Studija izvodljivosti	**Available documentation:**	- Conceptual design - Environmental permit - Feasibility study

Tarčin - Konjic

Dužina:	21 km	**Length:**	21 km
Izvor finansiranja:	Kredit	**Source of financing:**	Loan
Procjena troškova:	430 mil. €	**Cost estimate:**	430 m EUR
Dostupna dokumentacija:	- Glavni projekat - Okolišna dozvola - Studija izvodljivosti	**Available documentation:**	- Main design - Environmental permit - Feasibility study
Eksproprijacija:	u toku	**Expropriation:**	in progress

Počitelj - Buna

Dužina:	9 km	**Length:**	9 km
Izvor finansiranja:	Kredit	**Source of financing:**	Loan
Procjena troškova:	50 mil. €	**Cost estimate:**	50 m EUR
Dostupna dokumentacija:	- Glavni projekat - Studija utjecaja na okoliš - Studija izvodljivosti	**Available documentation:**	- Main design - Environmental impact study - Feasibility study

Brza cesta Lašva - Travnik Expressway

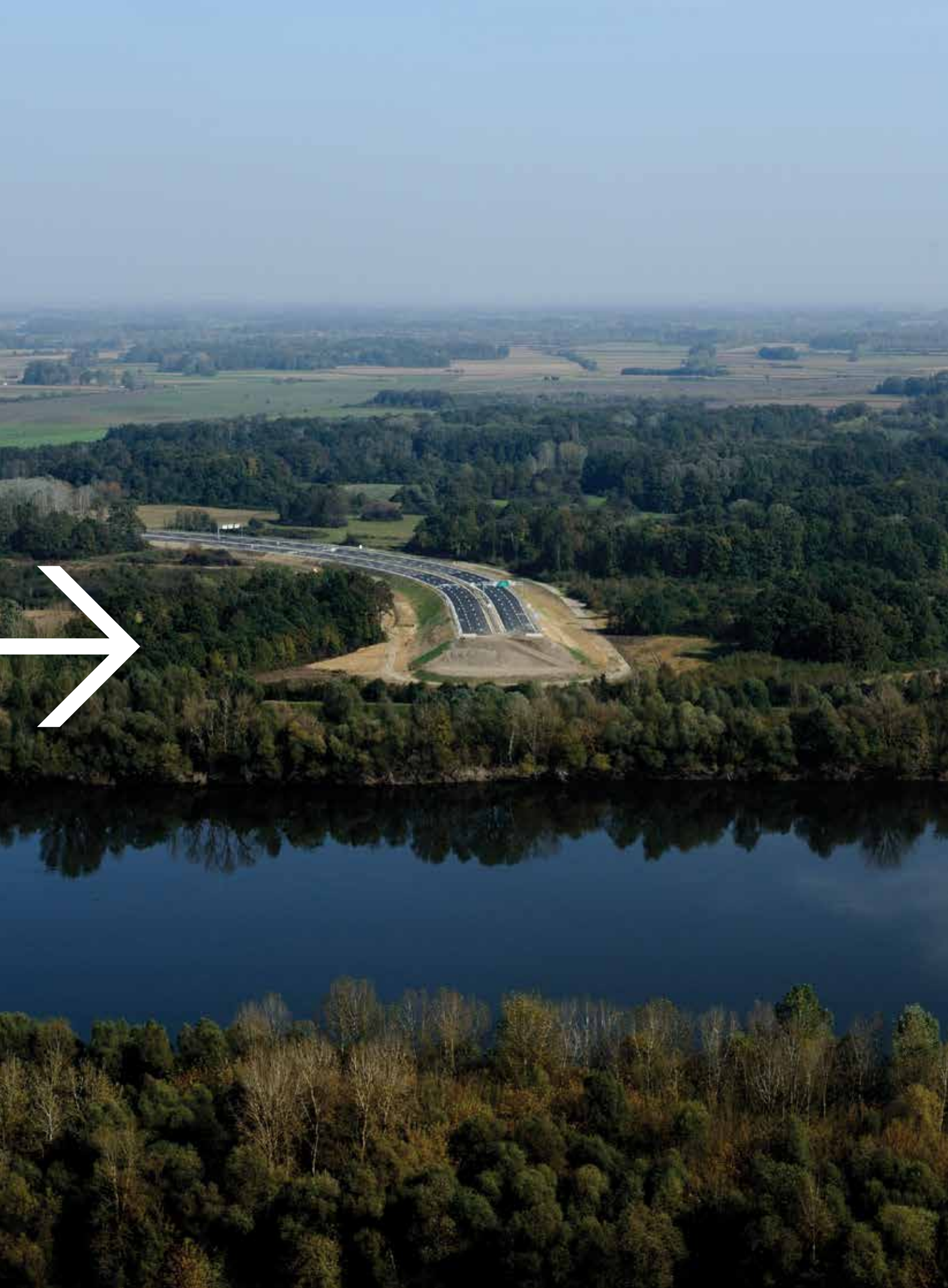
Dužina:	24 km	**Length:**	24 km
Izvor finansiranja:	Koncesija	**Source of financing:**	Concession
Procjena troškova:	205 mil. €	**Cost estimate:**	205 m EUR
Dostupna dokumentacija:	- Glavni projekat - Okolišna dozvola - Studija izvodljivosti	**Available documentation:**	- Main design - Environmental permit - Feasibility study

Autocesta Tuzla - Žepče Motorway

Dužina:	52 km	**Length:**	52 km
Izvor finansiranja:	Koncesija po principu *Dizajniraj-Finansiraj-Izgradi-Upravljaj i Održavaj*	**Source of financing:**	Concession under *Design-Build-Construct-Manage & Maintain* principle
Procjena troškova:	-	**Cost estimate:**	-
Dostupna dokumentacija:	- Idejni projekat - Studija utjecaja na okoliš - Studija izvodljivosti	**Available documentation:**	- Conceptual design - Environmental impact study - Feasibility study

*sve cijene su bez PDV-a

*all prices are exclusive of VAT



IZDAVAČ PUBLISHER	JP Autoceste FBiH d.o.o. Mostar
ZA IZDAVAČA FOR THE PUBLISHER	Ensad Karić
UREDNICI EDITORS	Ensad Karić, Ešref Gačanin, Ermin Hadžimehmedagić
RECENZENTI REVIEWERS	Ivan Lovrić, Fatima Terzić
AUTORI AUTHORS	Ensad Karić, Jasmin Bučo, Ermin Hadžimehmedagić
SARADNICI COLLABORATORS	Amir Šikalo, Antonio Križanac, Bože Talić, Marijana Prkačin, Taner Šan, Tarik Pihura, Danijel Ivanković
KOORDINATORI COORDINATORS	Ena Duran, Narcisa Livnjak-Borić
FOTOGRAFIJE PHOTOGRAPHY	Almin Zrno
GRAFIČKI DIZAJN GRAPHIC DESIGN	Amer Mržljak
PRIJEVOD TRANSLATION	Tihana Puzić
ŠTAMPA PRINTING	Logotip, Široki Brijeg
TIRAŽ NUMBER OF PRINTED COPIES	1.000

CIP - Katalogizacija u publikaciji
Nacionalna i univerzitetska biblioteka
Bosne i Hercegovine, Sarajevo

625.7/.8(497.6)(084)

KARIĆ, Ensad
Prvih 100 kilometara = The first 100 kilometres / Ensad Karić, Jasmin Bučo, Ermin Hadžimehmedagić ; [fotografije, photography Almin Zrno ; prijevod, translation Tihana Puzić]. - Mostar : Autoceste, 2015. - 208 str. : ilustr. ; 24 cm

Tekst na bos. i engl. jeziku.

ISBN 978-9926-8007-0-3
1. Bučo, Jasmin 2. Hadžimehmedagić, Ermin
COBISS.BH-ID 21999878