



**CETRA**<sup>2014</sup>

3<sup>rd</sup> International Conference on Road and Rail Infrastructure  
28–30 April 2014, Split, Croatia

## Road and Rail Infrastructure III

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28–30 April 2014, Split, Croatia

TITLE

Road and Rail Infrastructure III, Proceedings of the Conference CETRA 2014

EDITED BY

Stjepan Lakušić

ISSN

1848-9850

PUBLISHED BY

Department of Transportation  
Faculty of Civil Engineering  
University of Zagreb  
Kačićeva 26, 10000 Zagreb, Croatia

DESIGN, LAYOUT & COVER PAGE

minimum d.o.o.

Marko Uremović · Matej Korlaet

PRINTED IN ZAGREB, CROATIA BY

“Tiskara Zelina”, April 2014

COPIES

400

Zagreb, April 2014.

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# IMPACTS OF THE CONSTRUCTION OF THE PLANNED RESIDENTIAL AND BUSINESS COMPLEX ON THE ROAD NETWORK OF THE CITY OF MOSTAR

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## Summary

Mostar municipality is an area of great significance for Bosnia and Herzegovina, both for the natural resources and cultural heritage as well as for the fact that it occupies the central part of the territory of Herzegovina and extends to the middle part of the Neretva River. Therefore, it has become an important traffic point over which cross the roads of European, national and regional importance. This paper presents the results of the research of traffic on the road network of the City of Mostar over the plan period. Within the framework of the research, the analyses were performed on the impact of the construction of planned roads in relation to the current traffic volume on the existing ones. Also, the impact of the construction of the planned residential and business area on the traffic volume was explored and estimated.

*Keywords: planning, traffic, road network, traffic volume*

## 1 Introduction

Mostar is situated on the Pan-European transport corridor in the north-south direction, known as the Corridor Vc. Favourable geotrafical position and traffic connection constitute factors that have significantly influenced the development of Mostar as municipal, regional and national centre. Figure 1 shows the location of Mostar in relation to the Pan-European transport corridors and transport infrastructure of Bosnia and Herzegovina. The City of Mostar is a traffic intersection of the railroad Sarajevo-Ploče, the main road M17 and future freeway Sarajevo-Ploče. Two development directions are highlighted within the Mostar municipality area: the north-south (the valley of the Neretva River) and the east-west.



Figure 1 Geotrafical position of Mostar



Through the mentioned settlement it is planned to construct a four-lane road which would be connected by a bridge over the Neretva River with west bank, i.e. Kralja Tomislava Street. On the east side, the complex is connected to Maršala Tita Street southern from the intersection “Mostar North”. Using the corrected O-D (original – destination) matrix, the traffic on the existing network and the network of planned roads was simulated. German software PTV Visum was used for simulation. The following scenarios were analyzed:

- Scenario “0” – analyses the case of the existing road network of the City of Mostar without construction of the planned residential and business complex “Sjeverni logor”, Figure 3.
- Scenario I – analyses the case of the construction of residential and business complex within the area “Sjeverni logor” including planned roads. The complex would be connected by a bridge to Kralja Tomislava Street running through the western part of the city, and on the east side connected to Maršala Tita Street southern of the intersection “Mostar North”, Figure 4.
- Scenario II – is the case of construction of additional four-lane road running along the right bank of the Neretva River, connected with an additional bridge to the northern part of the complex, and northern from the intersection “Mostar North” connects with main road M17, Figure 5.
- Scenario III – it is assumed that highway on the Corridor Vc and the South Bypass of the City would be constructed in addition to mentioned roads, Figure 6.

It should be noted that, within the Spatial Plan, it is planned to construct the Northern Bypass of the City of Mostar, which was not considered in this paper. Since mentioned complex is located nearby the intersection at the northern entrance to the city (Mostar North), it is obvious that the construction of the complex will have the greatest impact to this intersection particularly. Traffic volume within the urban zone was observed simultaneously (screen lines G1 and G2). Traffic analysis has been performed for the time sections 2015, 2020, 2025 and 2030 (years). This paper presents the results for the end of the planning period when it is realistic to expect to have all the planned roads constructed. Comparison of the results was presented on the screen lines G1 and G2 within the urban zone, and U3, U4 and U5 at the access roads to the intersection “Mostar North”. The results of these simulations are shown in the following figures.

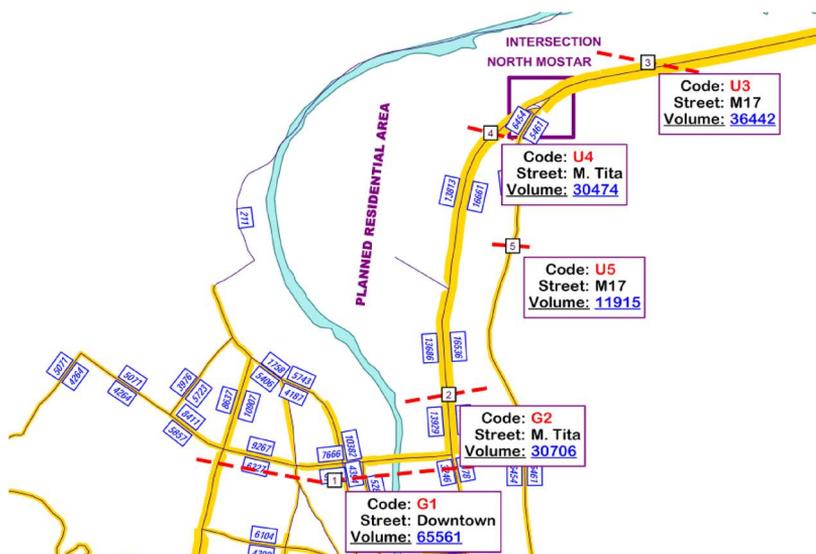


Figure 3 Traffic volume Scenario “o” – without planned residential area

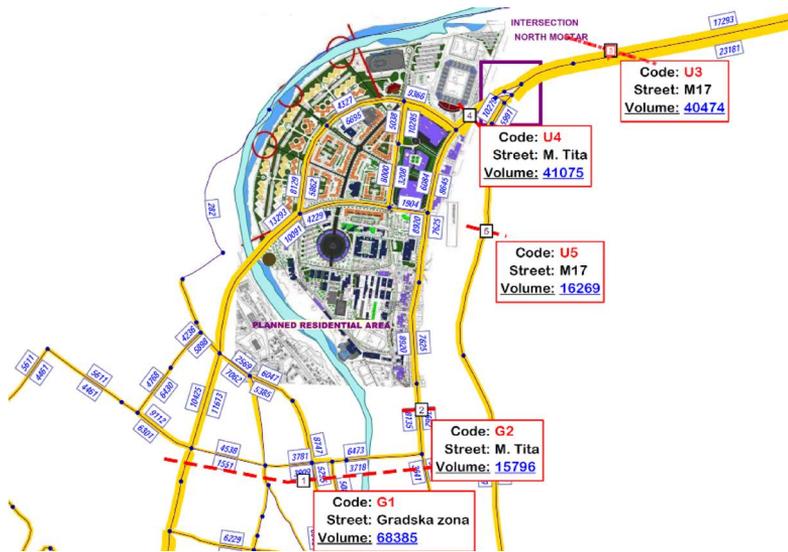


Figure 4 Traffic volume Scenario I – with planned residential area and roads

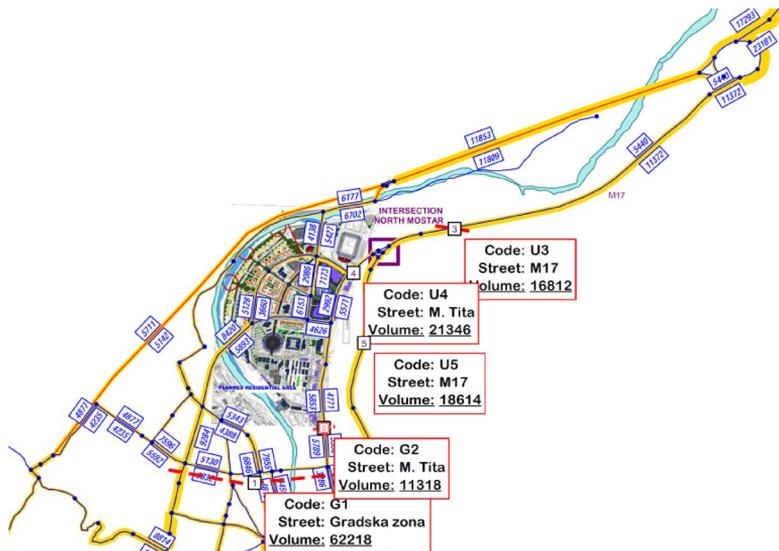


Figure 5 Traffic volume Scenario II – with new road on the right side of the river

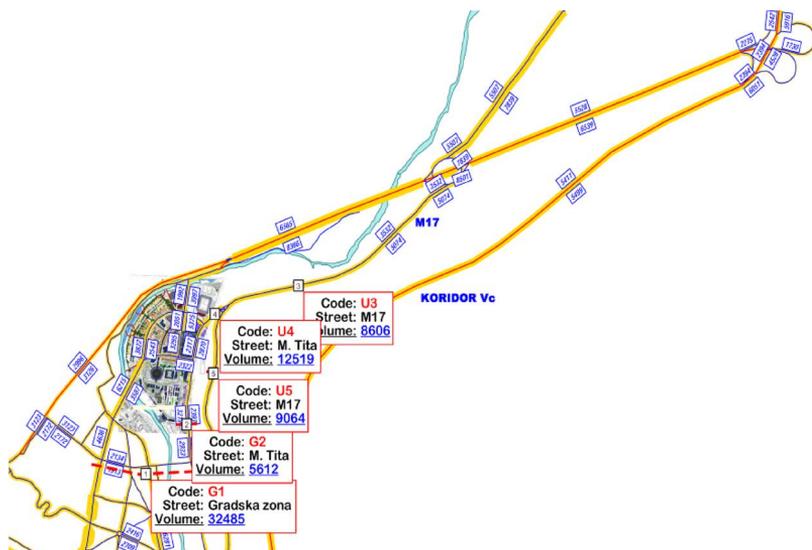


Figure 6 Traffic volume Scenario III – with the Corridor Vc and the South Bypass

### 3 Results of the research

The results of the research are presented in Table 1. They refer to the last year of the planning period (2030), per previously described scenarios and per examined screen lines on the road network of the City of Mostar.

Table 1 Traffic volume in 2030 on screen lines

Code	Traffic volume in 2030 [veh/day]				
	City		Intersection "Mostar North"		
	G1	G2	U3	U4	U5
Scenario "0"	65.561	30.706	36.442	30.474	11.915
Scenario I	68.385	15.796	40.474	41.075	16.269
Scenario II	62.218	11.318	16.812	21.346	18.614
Scenario III	55.231	9.328	14.640	22.522	15.266

Figure 7 presents a graph with percentage of increase or decrease of the traffic volume on the observed screen lines. On the screen line which goes through the centre of the city G1 it can be seen that in the case of Scenario I the traffic volume increases by 4.3%. In cases of Scenario II and Scenario III the traffic volume is reduced by 15.8% compared to the initial Scenario "0", Figure 7. At the G2 screen line the traffic volume is reduced in all three scenarios and even up to 69.6% in Scenario III. Regarding the screen line U3, the traffic volume in the case of Scenario I increases by 11.1%, while in Scenario II and Scenario III it decreases to 59.8%. The screen line U4, in the case of Scenario I, has increase of the traffic volume by significant 34.8%, while in two other scenarios occurs traffic relieve. The greatest traffic relieve occurs in case of Scenario II (by 30.0% compared to the initial scenario). Finally, on the screen line U5 in all three scenarios the increase of traffic volume occurs and in that case the least favourable is Scenario II. From the results presented in Table 1, it can be concluded that the intersection "Mostar North" will be overloaded following the construction of the planned complex. The

reconstruction of this intersection into multilevel intersection would resolve traffic congestion at the intersection itself. However, without construction of the additional roads, the traffic volume on the access roads increases – Scenario I (Figure 7.). In the case of Scenario II, traffic volume relieve occurs on all screen lines observed except on the screen line U3. However, it can be stated that the congestion problem at the intersection of the “Mostar North” only moves to newly projected intersection located on the main road M17.

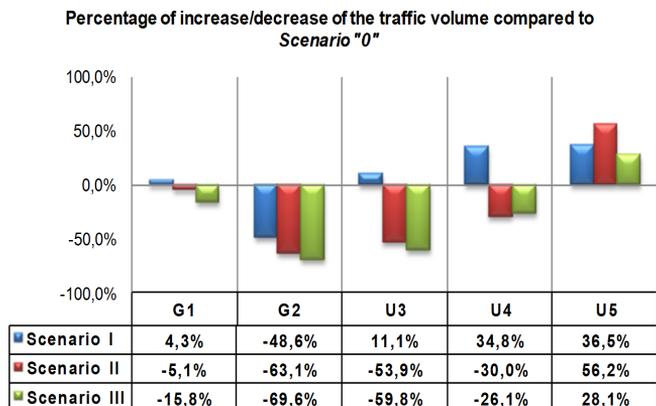


Figure 7 Percentage of increase/decrease of the traffic volume compared to Scenario “o”

Finally, the Scenario III offers traffic volume relieve on the main road M17 and its intersections, because by the construction of the Corridor Vc and the South Bypass the “road ring” around the City of Mostar would be closed while the transit traffic and the part of the original-destination traffic would be moved to these roads.

## 4 Conclusion

Based on the presented results of the research, it can be concluded that the planned construction of the residential and business complex impacts the traffic volume which should not be ignored. This impact reflects mostly at the intersection “Mostar North”. The roads that are planned as part of the residential and business complex affect the redistribution of traffic at the northern entrance to the city. It can also be concluded that traffic congestion can be resolved with:

- 1 The construction of bridges connecting the planned residential settlement with the right bank of the Neretva River;
- 2 The construction of the road on the right bank of the Neretva River connecting urban zone with the northern part of the city;
- 3 The construction of the Corridor Vc and the South Bypass of the city.

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