THE STUDY OF IMPROVING A CITY'S COMMUNICATION BASED ON GEOGRAPHICAL NETWORK ANALYSES

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INTRODUCTION:

The paper attempts to present possible uses of GIS software for road network analyses. Tasks of this kind are realized with the help of specialist software for transport analyses. However, the main attempt of the author was to use for this purpose alternative and multipurpose software – the ArcInfo Package by ESRI.

- Looking for optimal information about pathways is a basic function of GIS software.

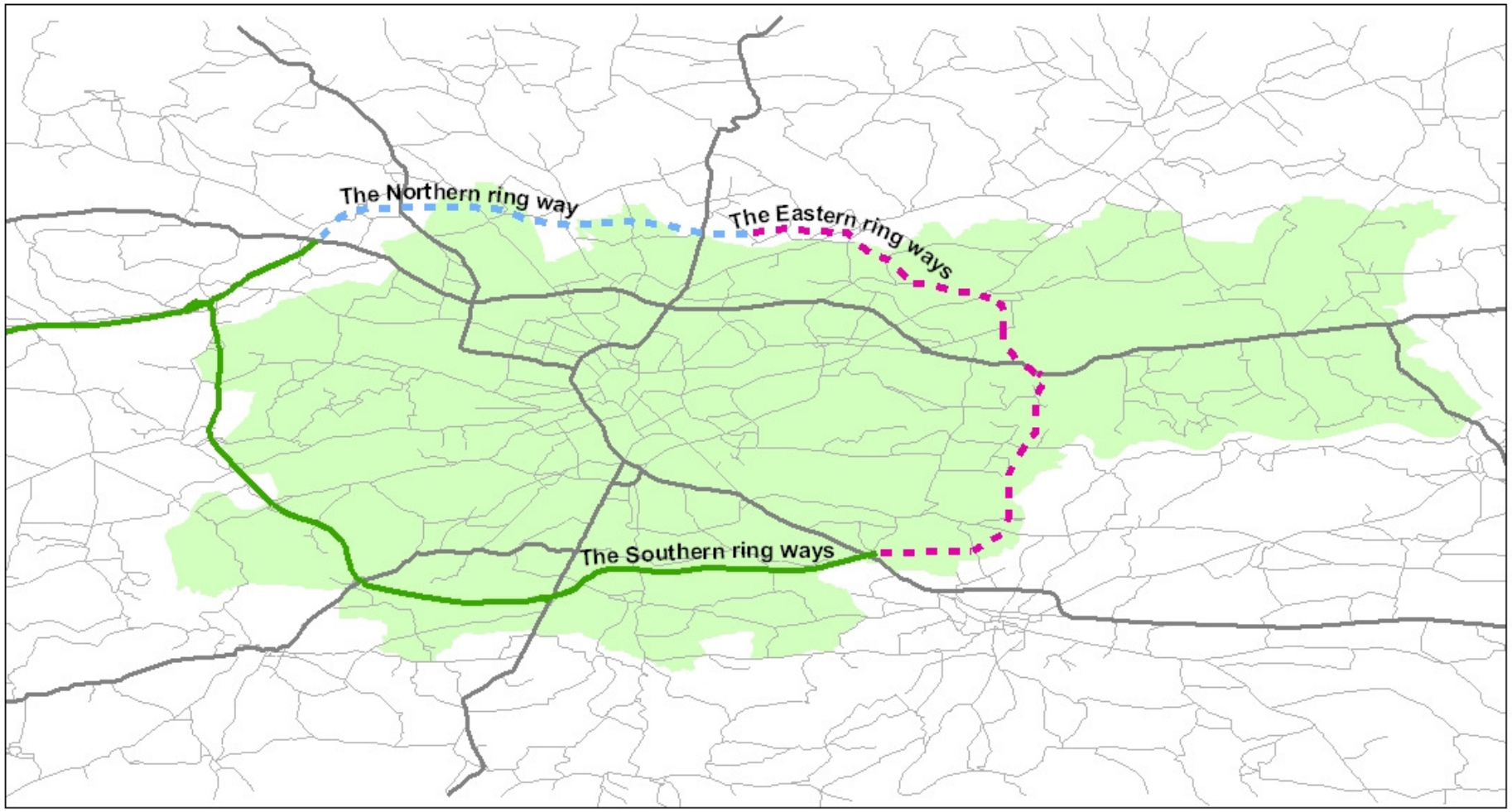
  All of us planning a journey want to get a goal using the fastest or the shortest way.

- It is very important for such trade as transportation, ambulance service, fire service or police.

Source of data

- Vector data – streets network of Krakow - from Marshal's Office of the Malopolska Region (UMWM)
- Blueprint of planned ring ways – the Northern and the Eastern - from General Directorate for National Roads and Motorways (GDDKiA)

DATA FOR ANALYSES



The Southern ring ways
The Nortern ring ways
The Eastern ring ways
Street Network
National Roads
City's border

PURPOSE

- Database, containing the street network of the City Krakow and its adjacent areas including planned elements (the Eastern and Northern ring ways) was used to analyze the transit traffic and to propose diversions if some roads are closed.

- This has allowed to access the influence of future investments on traffic improvement and to validate their locations.

RESULTS OF ANALYSES

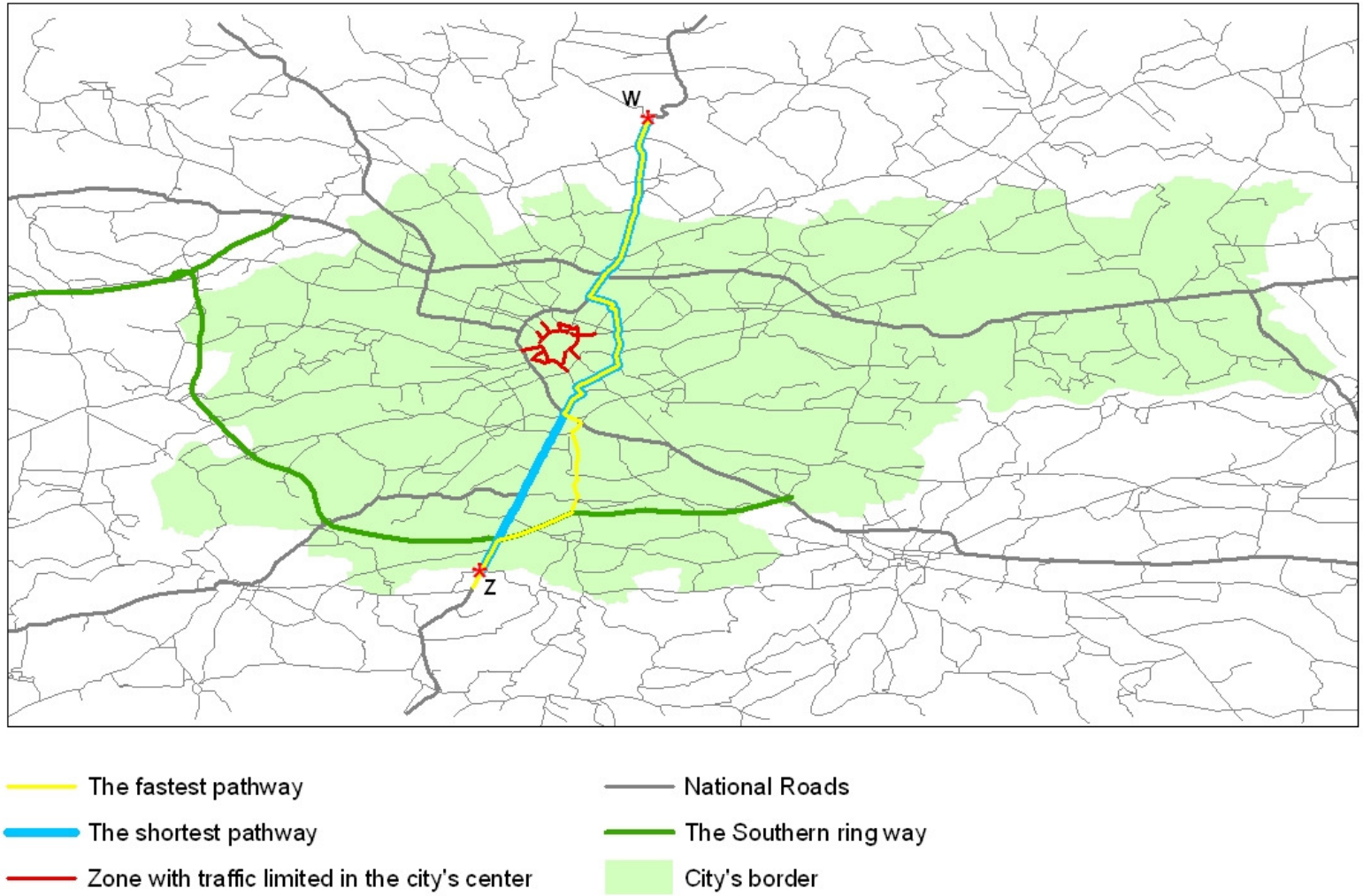


Figure 1. The shortest and the fastest pathways from point W to point Z, taking zone with limited traffic in the city's center under consideration.

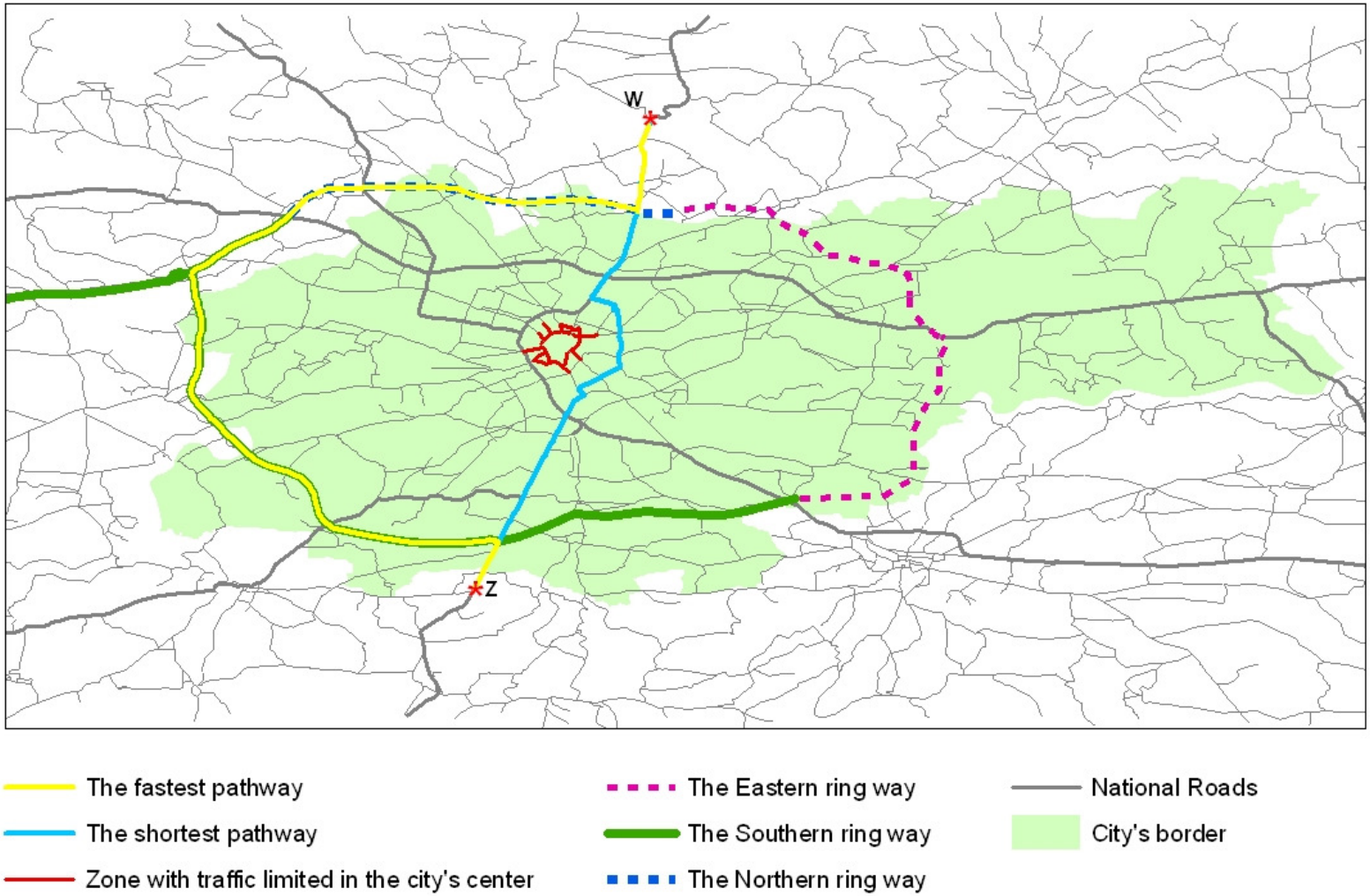


Figure 2. The shortest and the fastest pathways from point W to point Z, taking zone with limited traffic in the city's center and planned elements (the Eastern and Northern ring ways) under consideration.

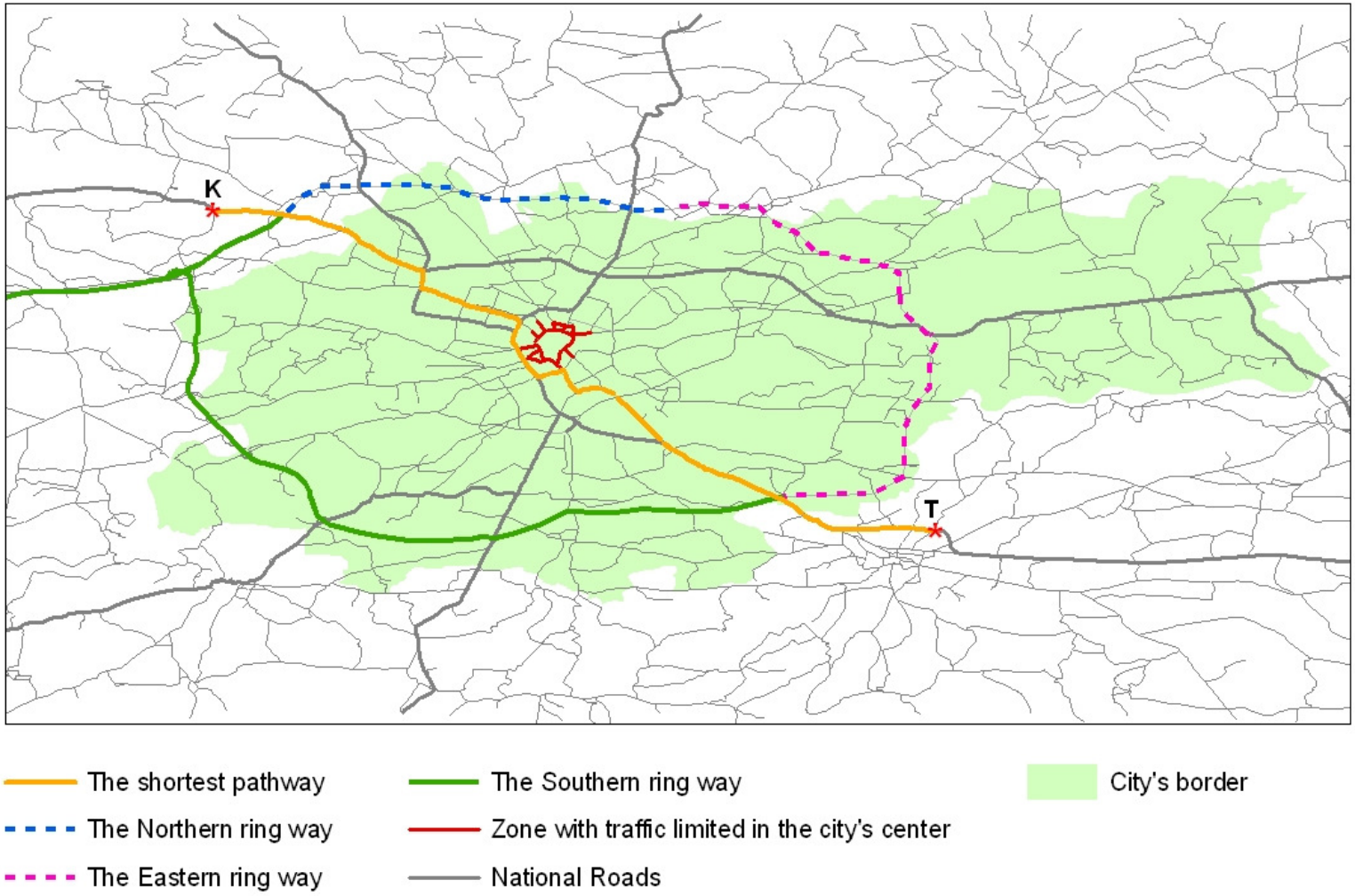


Figure 3. The shortest and also the fastest pathway from point K to point T, taking zone with limited traffic in the city's center under consideration.

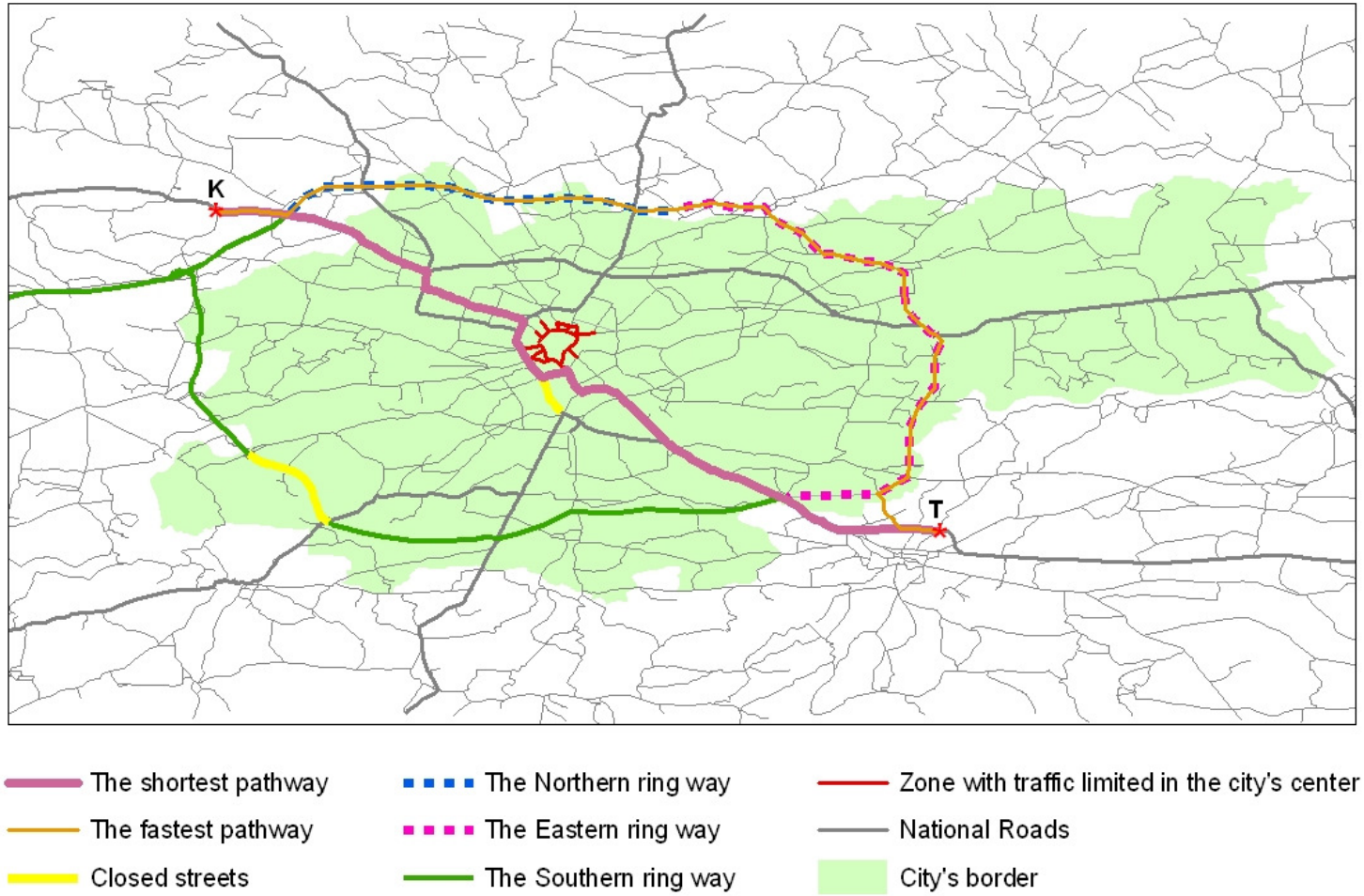
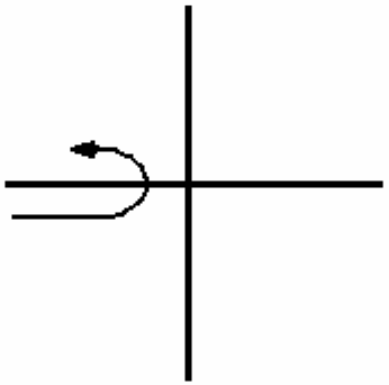
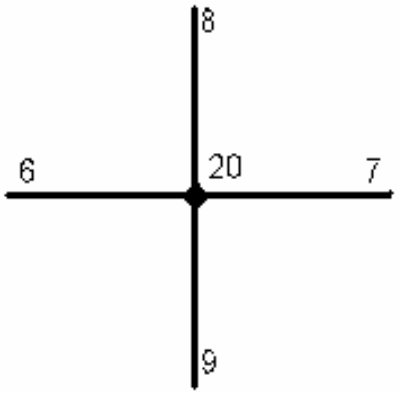
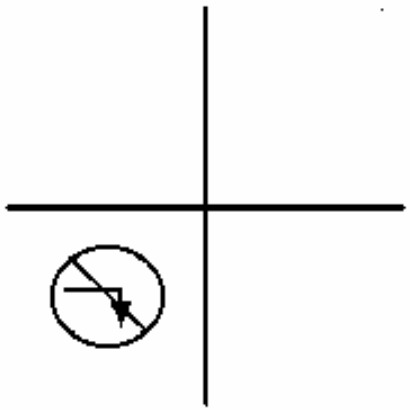
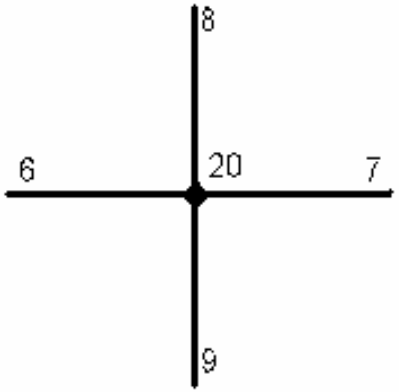


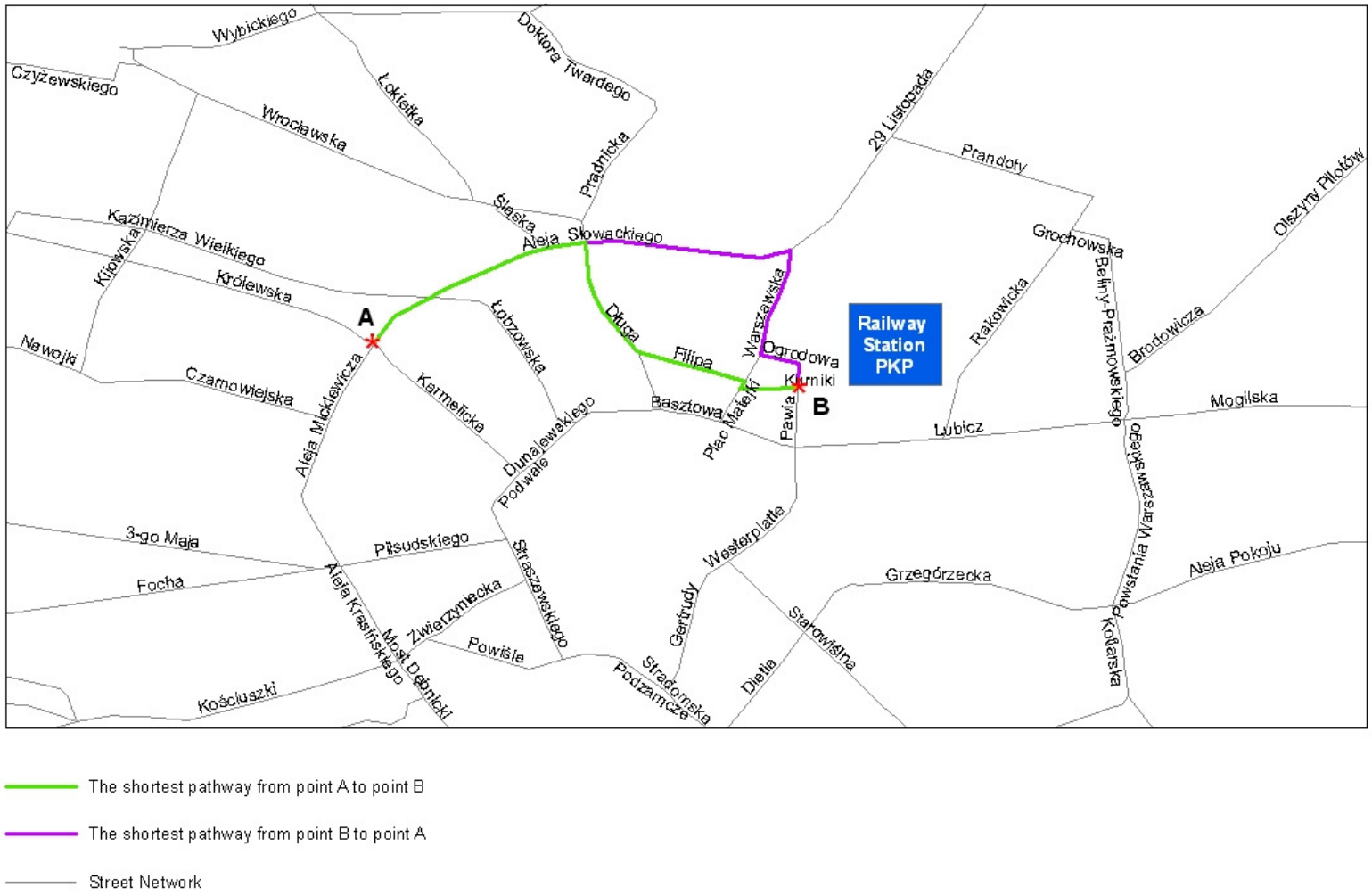
Figure 4. The shortest and the fastest pathways from point K to point T,with closed streets, taking zone with traffic limited in the city's center and planned elements (the Eastern and Northern ring ways) under consideration.

Situation	Presentation in AAT	Presentation in TRN
		NODE# 20 ARC1# 6 ARC2# 6 AZIMUTH 90 ANGLE 180 TURN IMPEDENCE 0
		NODE# 20 20 20 ARC1# 6 6 6 ARC2# 9 7 8 AZIMUTH 90 90 90 ANGLE -90 0 90 TURN IMPEDENCE -1 0 0

AAT – Arc Attribute Table

TRN – Turn Table

Figure 5. The Figure shows a few examples of situations on crossroads and their presentation in TURN TABLE. A value '-1' in TURN IMPENDANCE column means no entrance, a value '0' means you can drive.



The shortest pathway from point A to point B

The shortest pathway from point B to point A

Street Network

Figure 6. The shortest pathway from point A to point B and shortest return pathway from point B to point A ,with taking TURN TABLE under consideration.

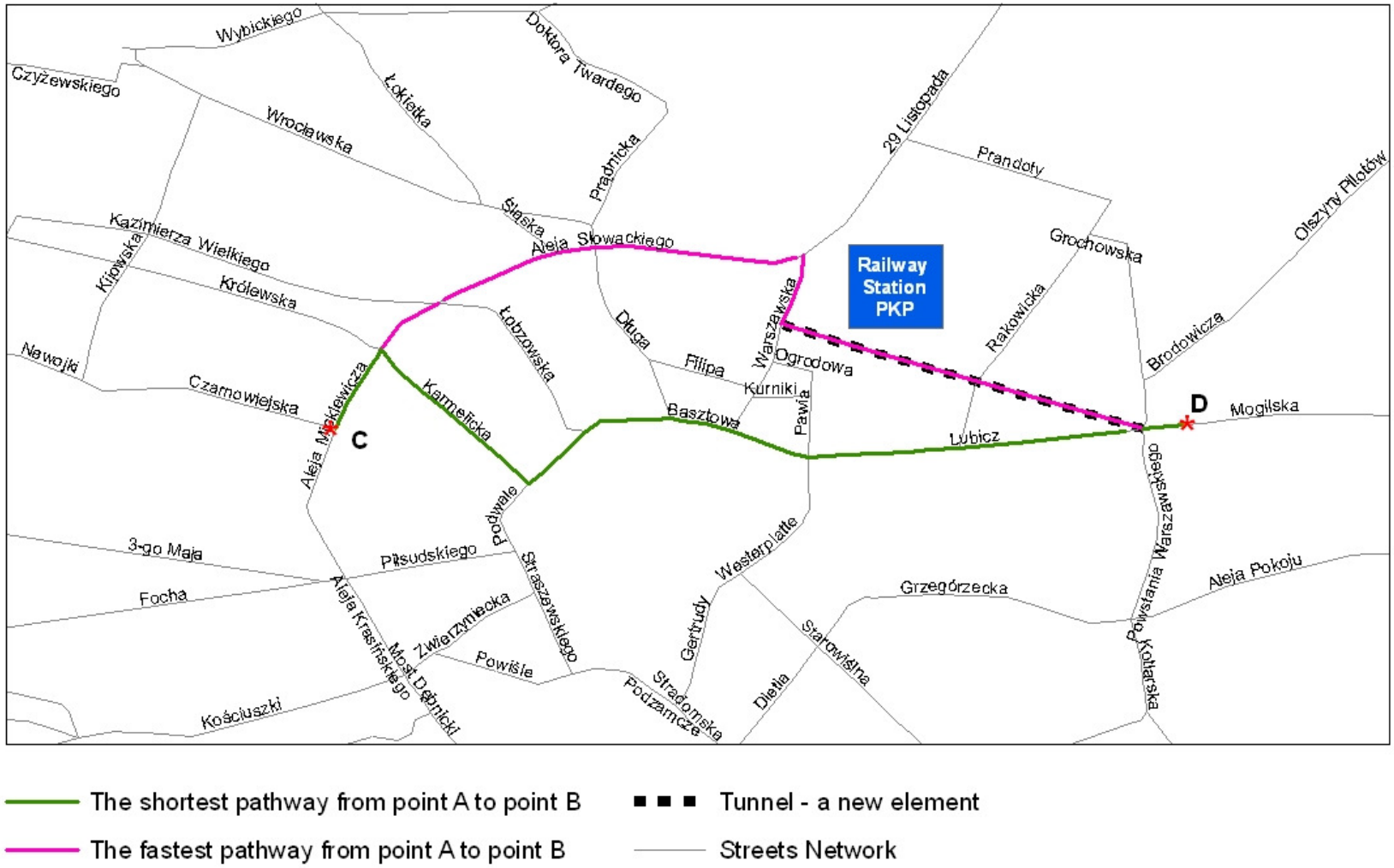


Figure 7. The shortest and the fastest pathways from point C to point D containing a new element – planned tunnel.

QUESTIONS?

In paper, written by author, there is more information about preparing data for analyses, how works a TURN TABLE, conclusions after analyses and more.