„Intersecting Safety”
An International Student Competition
to improve the safety of vulnerable road users
at urban intersections

POLAND 2006

The conception of improvement of vulnerable road users safety at the section of Grochowska Street in Warsaw



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1. Introduction

The pedestrian crossing in Warsaw at Grochowska Street by the property no. 355 (fig.1 and 2), is very dangerous and onerous for traffic participants. Therefore, it was selected to the International Student Competition to improve the safety of vulnerable road users at urban intersections organised by the European Transport Safety Council in cooperation with the Motor Transport Institute in Warsaw.

The aim of the project is to present the conception of improving the safety of vulnerable road users in the area of analysed pedestrian crossing. Entering the competition we received the materials (situational plans, locations of accidents) from the analysed area.



Fig. 1. The location of analysed pedestrian crossing at Grochowska Street in Warsaw.

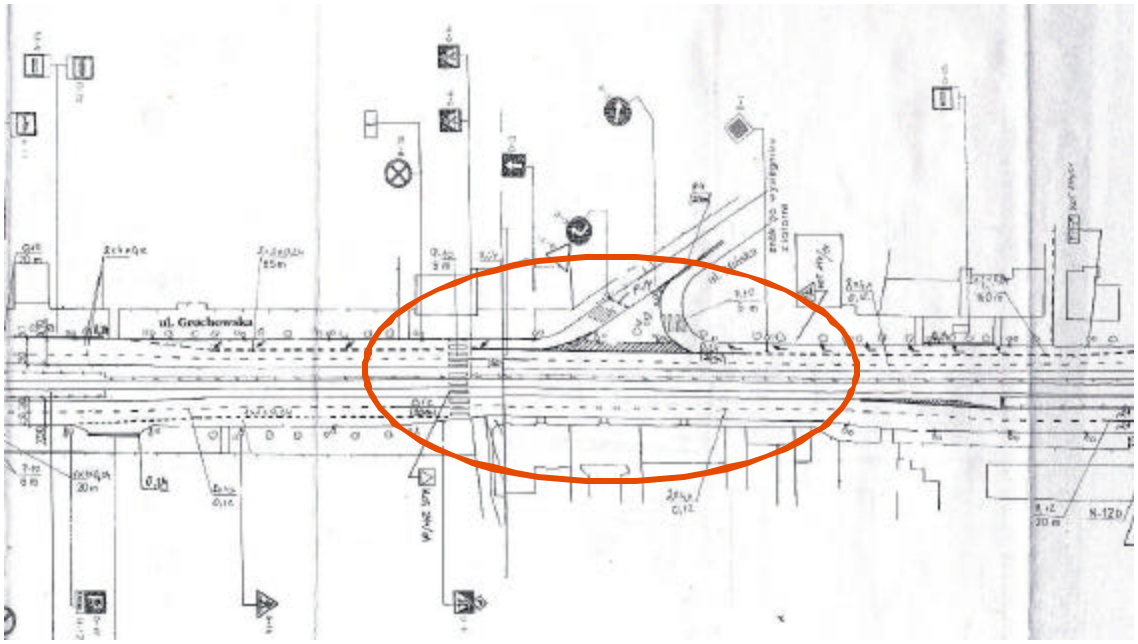


Fig. 2. The scheme of existing traffic organisation in the area of analysed pedestrian crossing at Grochowska Street in Warsaw.

2. Analysis and evaluation of present state

After studying the competition topic the local vision was performed and additional traffic and traffic participant's behaviour research and analyses were conducted in order to get detailed insight into the situation at the pedestrian crossing and in its proximity. The research on wheeled and pedestrian traffic volume, vehicle speed research and pedestrian surveys were conducted in coope ration with the other teams from Gdansk.

Multiple local visions in the analysed area allowed for performing the in-depth analysis of the present state and problems at the pedestrian crossing. Local vision combined with numerous researches and the analysis of gathered materials outlined the direction and the scope of works essential for the road safety improvement in the analysed area (fig.3).

On the basis of wheeled and pedestrian traffic measurements it was stated that there is high volume of motor vehicle (almost 4000 v/h in both directions in the area of pedestrian crossing) and tram traffic (38 trams per hour) at Grochowska Street and that the pedestrians have great difficulty getting through the pedestrian crossing safely (fig. 4). Speed measurements were conducted with radar speed indicators in proximity of analysed pedestrian crossing in both directions show (fig. 5), that more than 60 % of drivers in the direction of Wiatraczna Roundabout and 40 % of the drivers in the direction of Zieleniecka Street exceed speed limit (50 km/h).

Notorious exceeding the speed limit influences the amount and type of accident in the area of analysed pedestrian crossing. The majority of accidents involving pedestrians takes place directly on the pedestrian crossing. The reasons may be various but the most important one is the location of pedestrian crossing.The recorded collisions involving pedestrians do not include accidents with fatalities, however, taking into account the recorded speed and large number of collisions the constant increase in the number and severity of accidents may be expected.

The pavement on the right side of roadway is also very dangerous. The pedestrians often use roadway to cross the road in this section. Whereas for people in wheelchairs and the blind this pavement constitutes the barrier impossible to break through because of numerous stairs, steps and the vicinity of vehicles passing fast. The accident analysis (fig. 6) shows that also collisions occur there. The pedestrian crossing at Minska Street, as well as the entry of this street, requires modernization. The entry location at an angle close to 30 degrees to Grochowska Street, together with acceleration lane, encourages drivers to fast driving and does not require increased attention. It was observed that cars speeding from Minska Street literally run into the pedestrian crossing without any possibility to check the situation there. The reason for that is the fact that visibility for entering cars is blocked by the vehicles parking on the pavement directly in front of the pedestrian crossing.

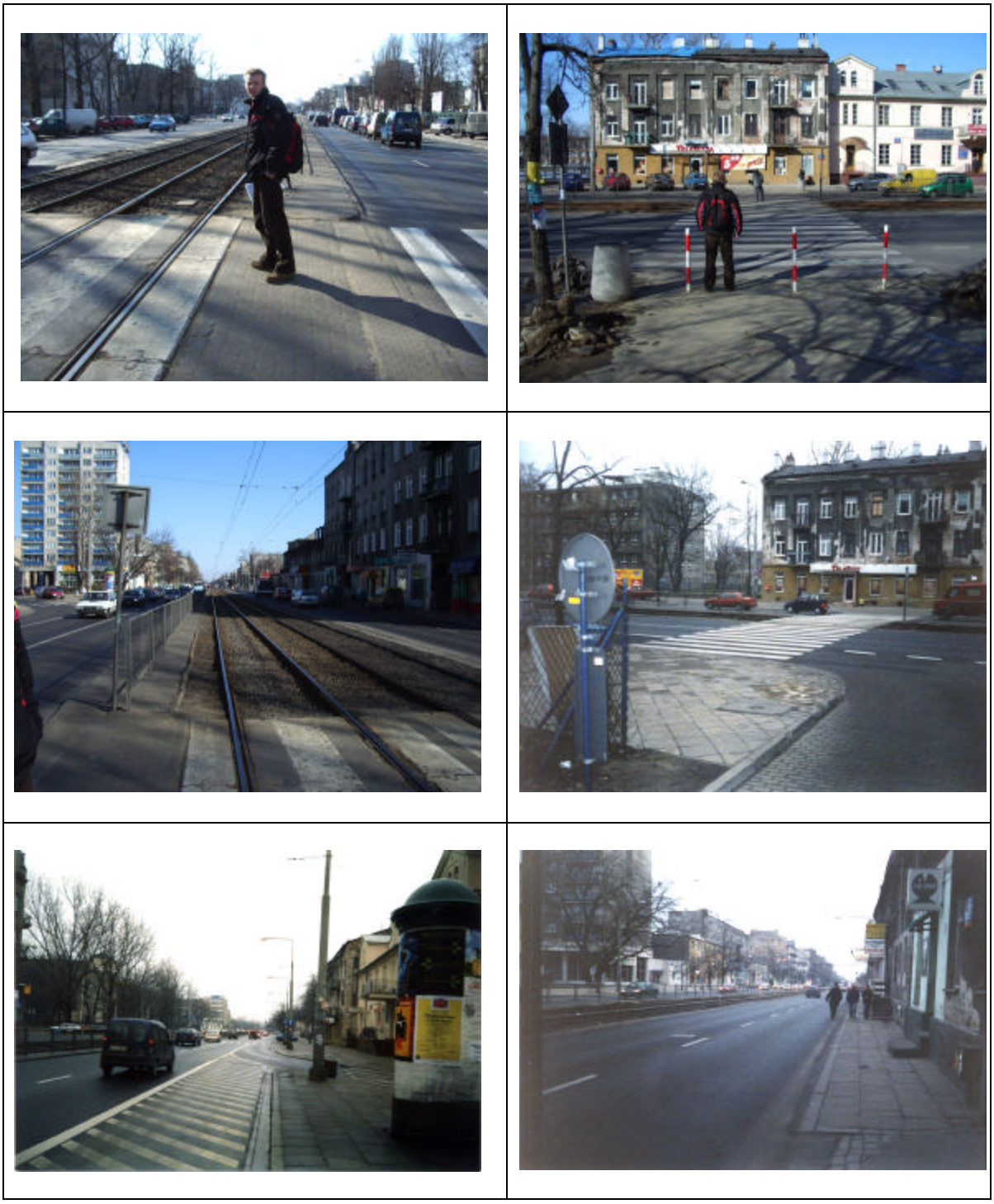
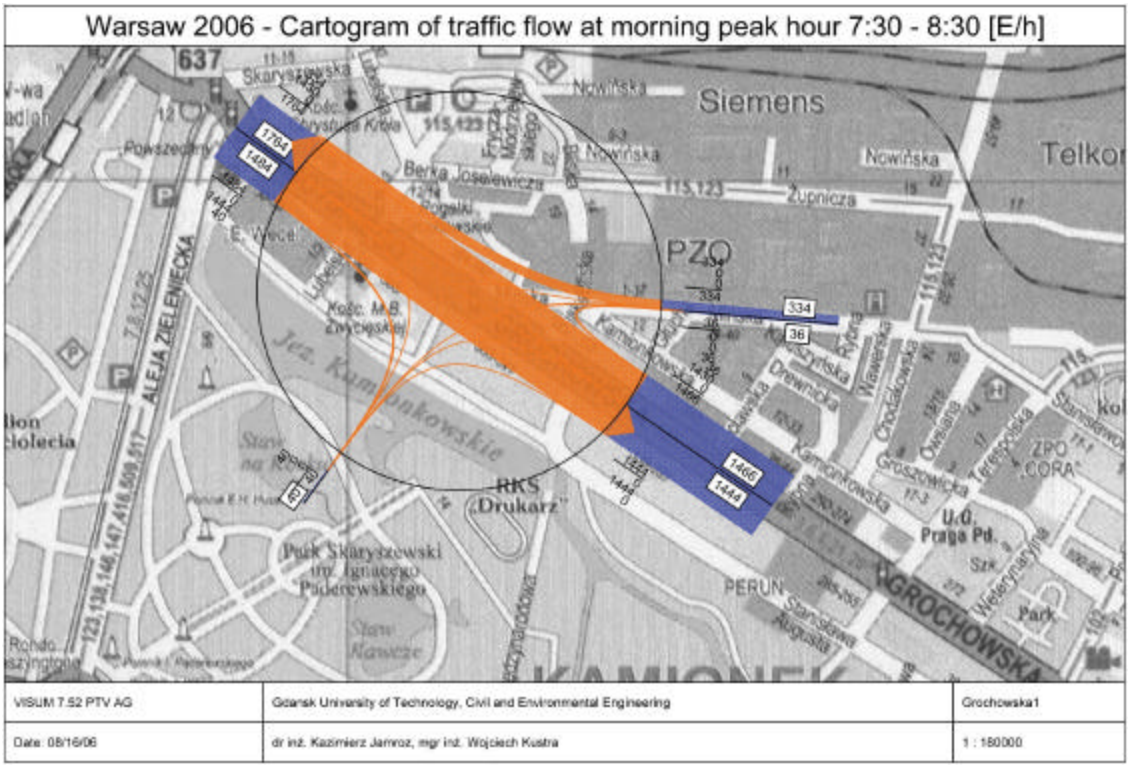


Fig. 3. Photographic documentation



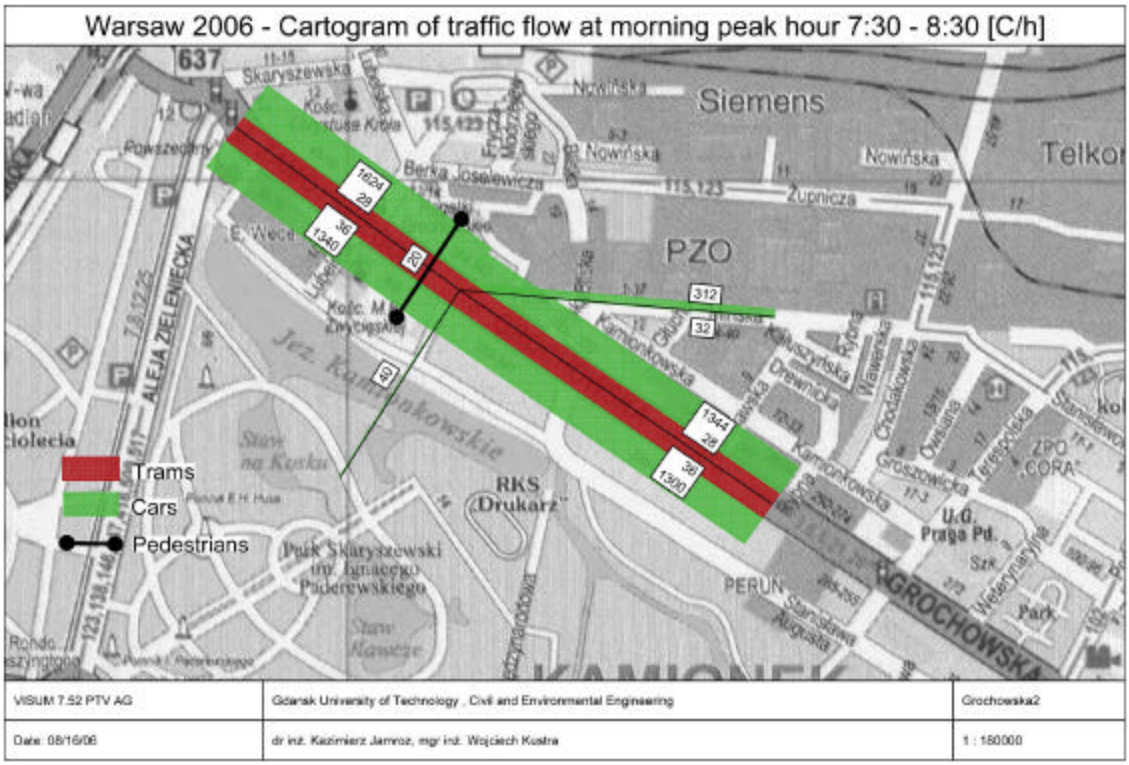


Fig. 4. Cartogram of traffic volume in the area of analysed pedestrian crossing at Grabowska Street (figure by Wojtek Kustra).

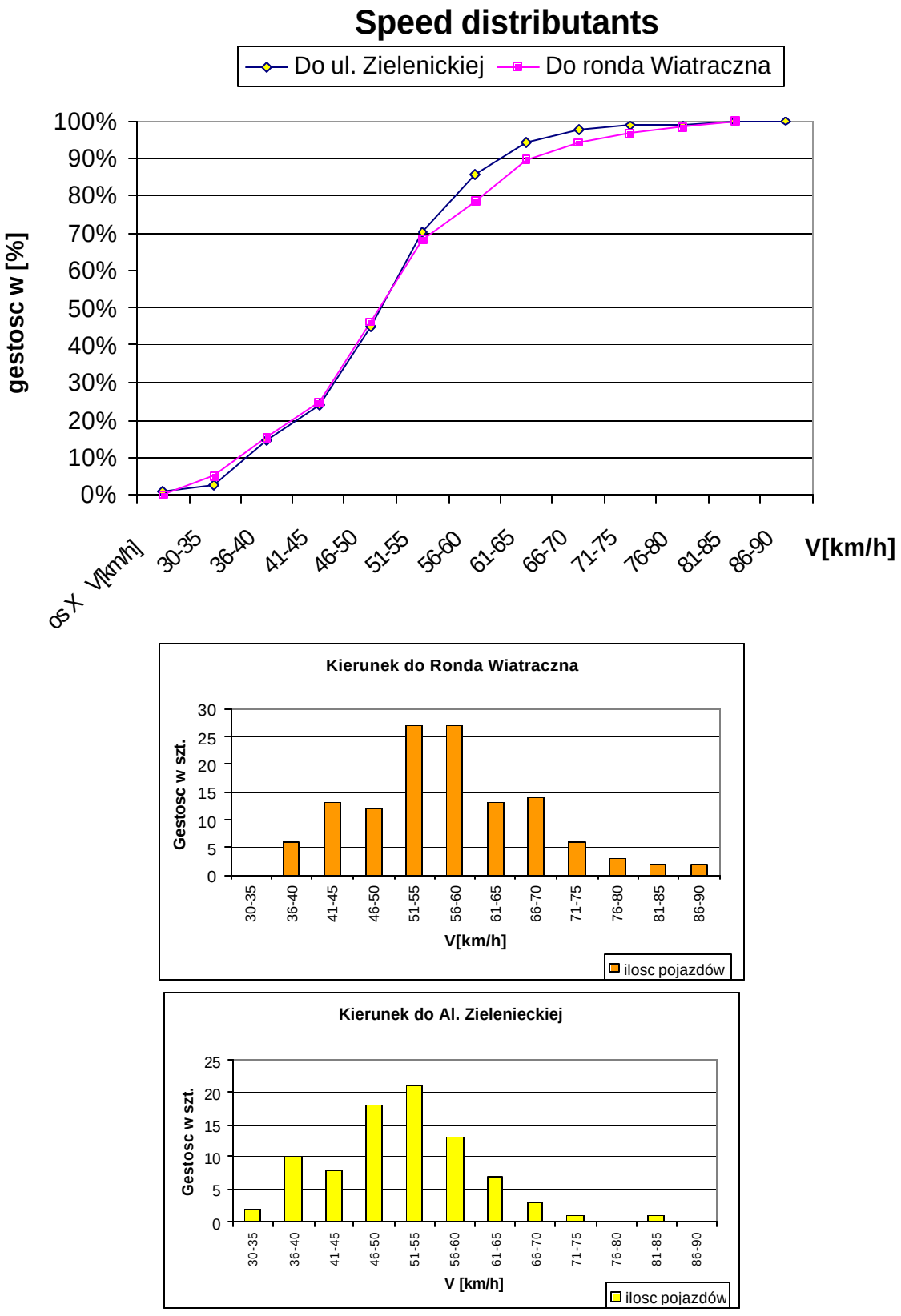


Fig. 5 The distribution and speed distributants at Grochowska Street in the proximity of analysed pedestrian crossing

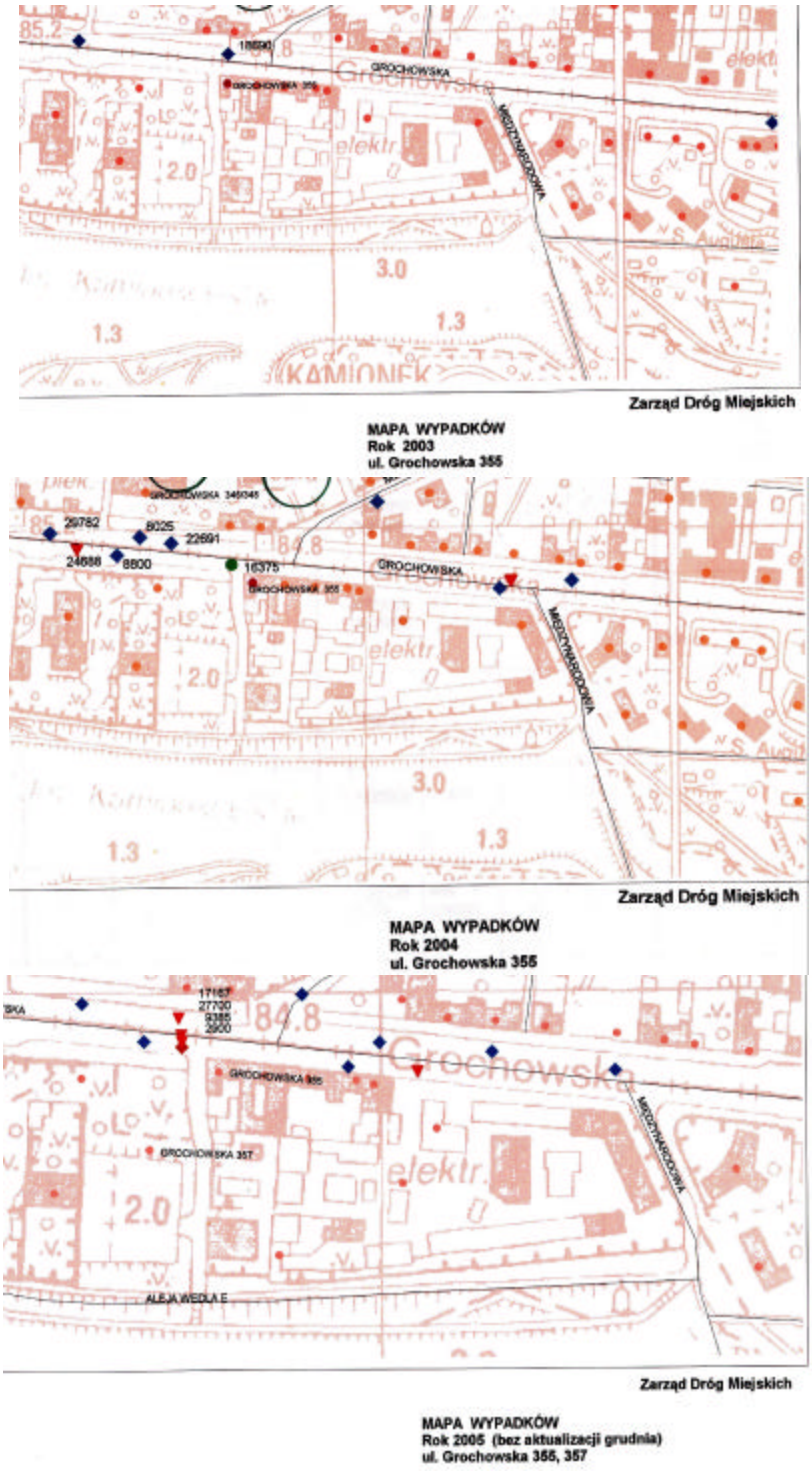


Fig. 6 Accidents location (according to data from MZD in Warsaw)

The surveys conducted among pedestrians were related to defining their needs and behaviour in the analysed area. Up to 95 % of surveyed pedestrians indicated the necessity of reconstruction of pedestrian crossing and installation of traffic lights, and almost half of them agreed on the change of location of the discussed pedestrian crossing (fig. 7).

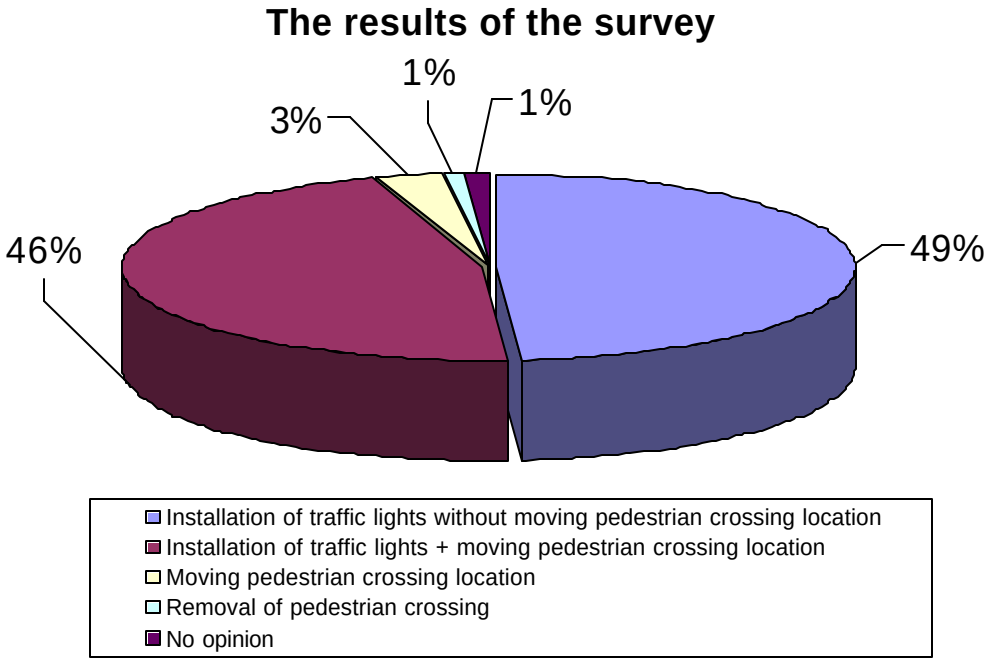


Fig. 7 The results of surveys conducted among pedestrians related to the type of suggested improvements at the analysed pedestrian crossing.

The most dangerous elements of the pedestrian crossing were defined on the basis of the gathered information:

- The necessity to pass the roadway and tramway without possibility to stop in the middle,
- Lack of pedestrian protection devices
- Lack of facilities for the disables, people with prams and cyclists
- Very narrow pavement by the right roadway
- Acute angle of entry of Minska Street encouraging drivers to run fast into pedestrian crossing
- Vehicle parking on the pavements and in proximity of pedestrian crossing.

The above confirms the necessity of application of road facilities improving the safety of traffic participants in the area of analysed pedestrian crossing.

3. The conception of road safety improvement

The conception of improvement of pedestrian, cyclist and motor traffic safety in the analysed area was presented in figure 8 and 9. The several basic measures were accepted to achieve that aim.

Change in Grochowska Street axis in the direction of Minska Street. The change will allow for formation of pedestrian refuge island (of minimal width of 3 metres), where pedestrians, cyclists and people in the wheelchairs will be able to wait safely to pass the next stage of the crossing.

Moving the pedestrian crossing behind the entry of Minska Street. It will allow for decreasing the width of roadway necessary to pass at one go, it will enable better

communication between two sides of Grochowska Street and moves the pedestrian crossing out of acceleration and deceleration lanes.

Change of Minska Street entry construction into perpendicular passage to Grochowska Street, which will force drivers to increase their caution, will decrease speed and significantly improve visibility

Installation of traffic lights at the pedestrian crossing (synchronised with the intersections in the area), which will make it safe and comfortable especially for the youth attending the nearby school.

Moreover, the numerous detailed measures improving road safety and the comfort of the pedestrian crossing were proposed:

- Widening the pavement on the right side of the roadway to 3 metres will allow for free passing
- Installation of protecting barriers for pedestrians,
- The bus stop was moved behind the pedestrian crossing according to guidelines,
- Gaining space for the roadside vegetation square in front of the school - which will create a natural acoustic barrier,
- Lowering the kerbs at the crossings for pedestrians and cyclists

The cyclists will be definitely pleased with:

- Designing one and two-directional cycle paths in the whole area of modernisation
- Establishing pedestrian – cyclist track on the pavement on the right roadway allows for effective development of space
- Designing refuge islands on the entry to Minska Street provides a safe place to wait for free way
- Cycle paths made of coloured asphalt of chameleon type divide clearly cycling zone.

The important users of pedestrian crossing are the disabled – thinking of them the following detailed solutions were applied:

- The use of warning flagstones for the disabled pedestrians on the pavements before the pedestrian crossings and across the pavements according to the guidelines
- Filling tramways with rubber plates on the rails' level facilitates passing and decreases the risk of wedging
- The use of audible traffic signal to facilitate the blind pedestrians crossing the street.

The correct design of new pedestrian crossing was quite difficult taking into account the space which was available in the old arrangement of tramways and roadways. Therefore, the advanced modernisation was decided upon, not limited to the pedestrian crossing, but covering the nearby streets (Minska Street and the access road to dwellings on the right side of roadway).

4. Conclusion

Apparently the scope of works to implement proposed conception is very wide, but only such a comprehensive solution will ensure reaching „Vision Zero", which is elimination of running into pedestrians collisions and significant decrease in the number of accidents related to other participants of road traffic. The introduction of the above measures will make the pedestrian crossing more friendly and comfortable for vulnerable road users.

Fig. 8. The conception of traffic improvement on the analysed section of Grochowska Street in Warsaw – situational plan

Fig. 9. The conception of traffic improvement on the analysed section of Grochowska Street in Warsaw – cross-section.

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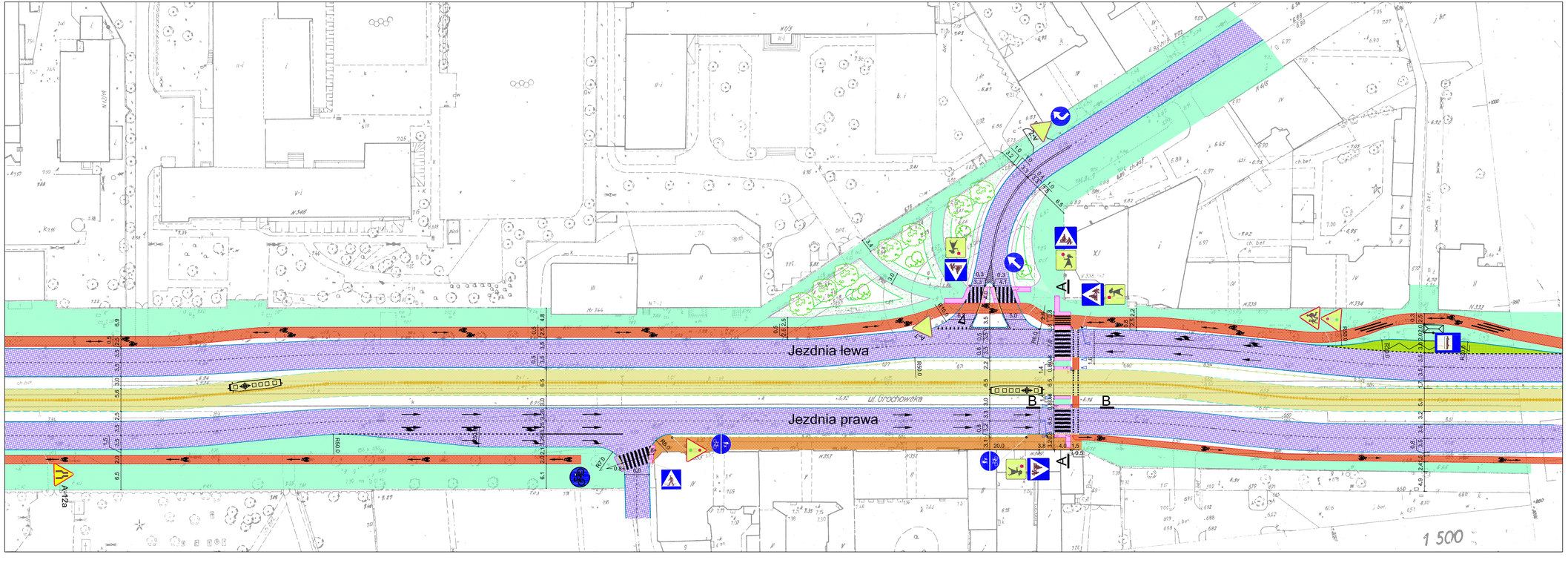
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LEGENDA

- Krawężnik / Kerb
- Krawężnik ścieżki rowerowej / Kerb of bicycle path
- Obrzeże / Border
- Obniżony krawężnik / Kerb lowered
- Skrajna torowiska / Tram
- Bariera ochronna / Security bar
- Oznakowanie poziome / Horizontal signs
- Sygnalizacja świetlna / Traffic lights
- Jezdnia / Street
- Ścieżkia rowerowa / Bicycle path
- Chodnik / Pavement
- Torowisko / Tram
- Płyty typu ostrzegawczego dla niewidomych / Security warning type touch surface
- Trakt pieszo jezdny / Pedastrians and bicycle way
- Trawnik / Grass
- Zatoka autobusowa / Bus stop

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Conception of rebuilding Grochowska street in Warsow in the area no 355, aspect of safety traffic

Lipiec 2006

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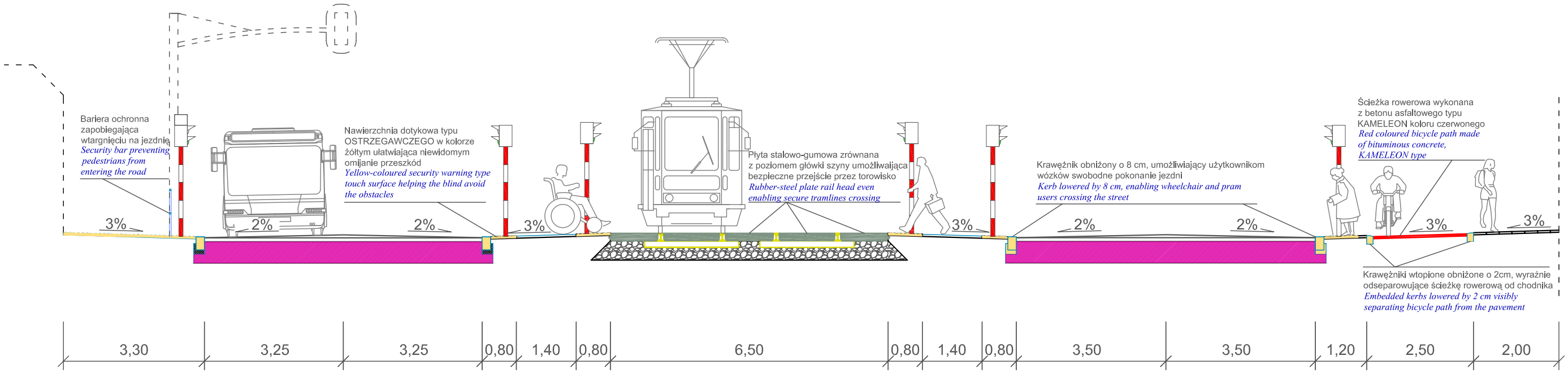
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Situation

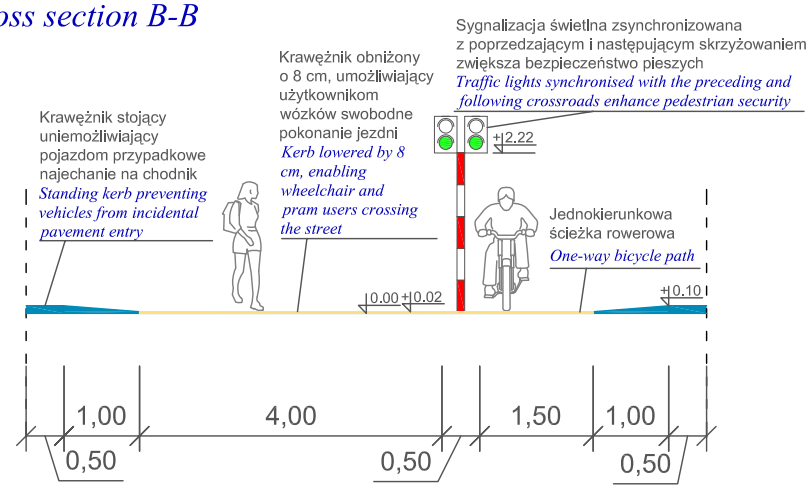
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PRZEKROJE NORMALNE
Skala 1:100

Przekrój A-A
Cross section A-A



Przekrój B-B
Cross section B-B



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