WARSAW UNIVERSITY OF TECHNOLOGY
Faculty of Civil Engineering
Department of Transportation Engineering

Junction reconstruction design: Grochowska street / Minska street in Warsaw

Design team:
Michal Nurkiewicz
Tomasz Klab
Grzegorz Madrjas

1. PURPOSE OF THE PROJECT

The project describes a proposal of reconstruction of a junction of two streetrs in Warsaw: Grochowska and Minska. The aim of the design is to improve traffic safety, with a special consideration for the safety of the vulnerable road users (especially pedestrians).

The junction is located in the Praga Poludnie district of Warsaw.

2. DESIGN BASE

- ETSC VOICE campaign competition materials,
- design map scaled 1:500,
- national technical standards of the road design *"Rozporzadzenie Ministra Transportu i Gospodarki Morskiej z dnia 02 marca 1999 r. w sprawie warunków technicznych, jakim powinny odpowiadac drogi publiczne i ich usytuowanie."*
- national traffic lights and signs' design rules described in *"Rozporzadzenie Ministrów Infrastruktury oraz Spraw Wewnetrznych i Administra cji z dnia 31 lipca 2002 r. w sprawie znaków i sygnalów drogowych"*.
- traffic measurements dated 22th March 2006
- local investigation

3. DESCRIPTION OF THE CURRENT SITUATION

Grochowska street is a regional (voivodship) road no. 637 and is classed as a main (G class) street. The street has a dual asphalt carriageway, approximately 9.0 meter wide each. The central reservation is equipped with a double-track tramway route. The roadway surface is of good quality. Sidewalks are located on both sides on the street, directly next to carriageways and have a varying width of approximately 4.0 to 9.0 meters. In the central part of the junction however, due to close proximity of buildings, the southern sidewalk's width is reduced to 2.2 meters – and locally even to 1.2 meters. In addition the street is directly servicing housing and commercial establishments located these buildings. The southern sidewalk is of poor technical quality.

The Minska street is a single carriageway collecting (Z class) street with an asphalt pavement approximately 9.0 meters wide. The quality of the pavement is moderately good, with some cracks and foldings. Concrete sidewals are directly adjoing the roadway on both sides of the street. The northern sidewalk has a width of ca. 3.5 meters, while the southern sidwalk is approximately 5.0 meter wide.

The junction is a “T” type and the crossing angle is approximately 30°. The radius of the arches is approximately 12.0 meters. There are some shops and service establishments located in the area of the junction, as well as a secondary general and technical school cluster (*Zespól Szkól Licealnych i Technicznych nr 3*). A pedestrian crossing is located approximately 25 meters to the west from the junction. There were several incidents (pedestrian knockdowns) on the crossing. Direct observations prove that most drivers ignore some of the driving rules in this location. Speeding and driving over the ghost island is notorious. In addition, due to the limited width of Grochowska’s southern sidewalk, there are cases of pedestrians entering the roadway .

Bicycle traffic uses general traffic rules in the vincinity of the junction, i.e. uses the same carriageways as cars do, due to the lack of dedicated infrastructure.

4. PROPOSED CHANGES

The main mean aimed at the increase of pedestrian safety proposed is a traffic flow deviation on the northern road (with a 1:10 angle) and constriction of both carriageways to two 3.0 meter wide lanes each. The resulting island would be cultivated with low vegetation, blocking the line of sight and optically reducing the street’s width. This effect combined with the chicane would force the drivers to reduce driving speed. This solution requires a removal of a single dead tree.

The junction’s angle would be improved into 90°, and radii of the arches would be increased to 15.0 meters. The regained area of the junction would be excluded from traffic and turned to an island to optically and physically deviate the traffic flow, and would be cultivated with vegetation. An entrance to the school cluster would have to be removed, local inspection indicates however, that the schools have another entrance that could be used instead.

The southern roadway of the Grochowska Street would also be reduced to two three meter wide lanes. The regained area would be integrated into the sidewalk. Such a solution would allow both increasing the width of the pedestrian area by 0.5m and introducing chain barrier vastly improving pedestrian safety.

The existing pedestrian crossing would be relocated to a new location 10 meters to the east, so that the pedestrian flow is directed parallel to the western wall of the Grochowska 355 building. This solution would create a safe area for the pedestrians and the customers of a shop who currently directly enter the roadway. The aforementioned deviation of the northern

carriageway would allow constructing a pedestrian refuge allowing the pedestrians to cross the street in two stages.

A road entrance to a property on the southern side would also be modernised. An acquirement of approximately 19.5 sq. meters of a private, presently not built area would be required to meat technical parameters of the entrance.

On the both sides of Grochowska Street, west of the junction, marked parking places separated with a curb would be introduced. A special 3.0 meter wide manoeuvre lane would be introduced to increased traffic safety and fluency.

Southern sidewalk would also be upgraded. Trees would be protected with special grids, increasing the useable area of the sidewalks. Minska Street would have its carriageway reduced to 7.0 meters so that only a single car would fit on each lane. As a result, the northern sidewalk of the Minska Street would be widened to 5.0 meters.

5. CONCLUSION

The aim of the geometric design is to force speed reduction and increase the drivers' attention. Pedestrian islands would increase pedestrian safety. Vegetation would improve the quality of the area. Traffic organisation would be altered be removing the separated right-turn lane on Grochowska. Analysis done in the VISSIM software indicates that the solution is acceptable in standard traffic conditions. There are some possible travel time increases and a short queue on the Minska's entrance to the junction in case of a significant pedestrian traffic increase, yet the effect is limited and can be even considered beneficial to traffic safety. Traffic calming will also increase the safety of bicycle users which use the main roadway by the general traffic rules. Further improvement of the safety of this group would require designing a continous, dedicated lane or bike road in the corridor of the Grochowska street with a total length of approximately 5.5 kms. Such a task vastly exceeds the scope of this project.

6. ATTACHMENT - DETAILS

Detail 1. Relocation of an entrance to the school.

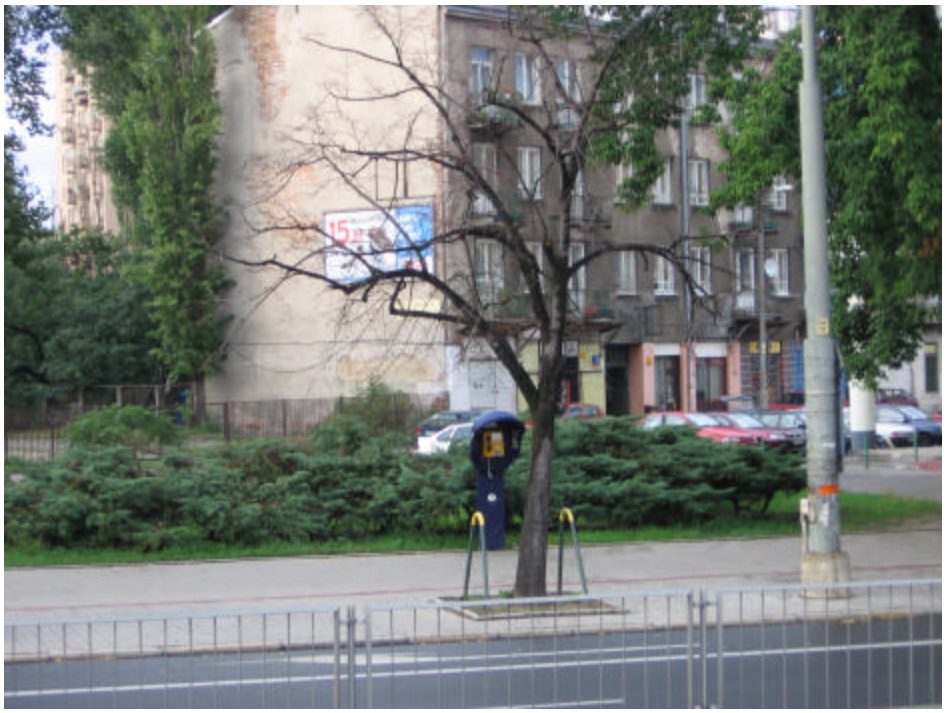


Existing entrance.



Alternative entrance presently unused. Viable, presently unused parking places visible in the background.

Detail 2. Dead tree to be removed.



Detail 3. Ghost island.



Existing ghost island fails to play its role. It is notoriously being driven over in the peak hour.

Detail 4. Entrance to a property by 355 Grochowska Street.



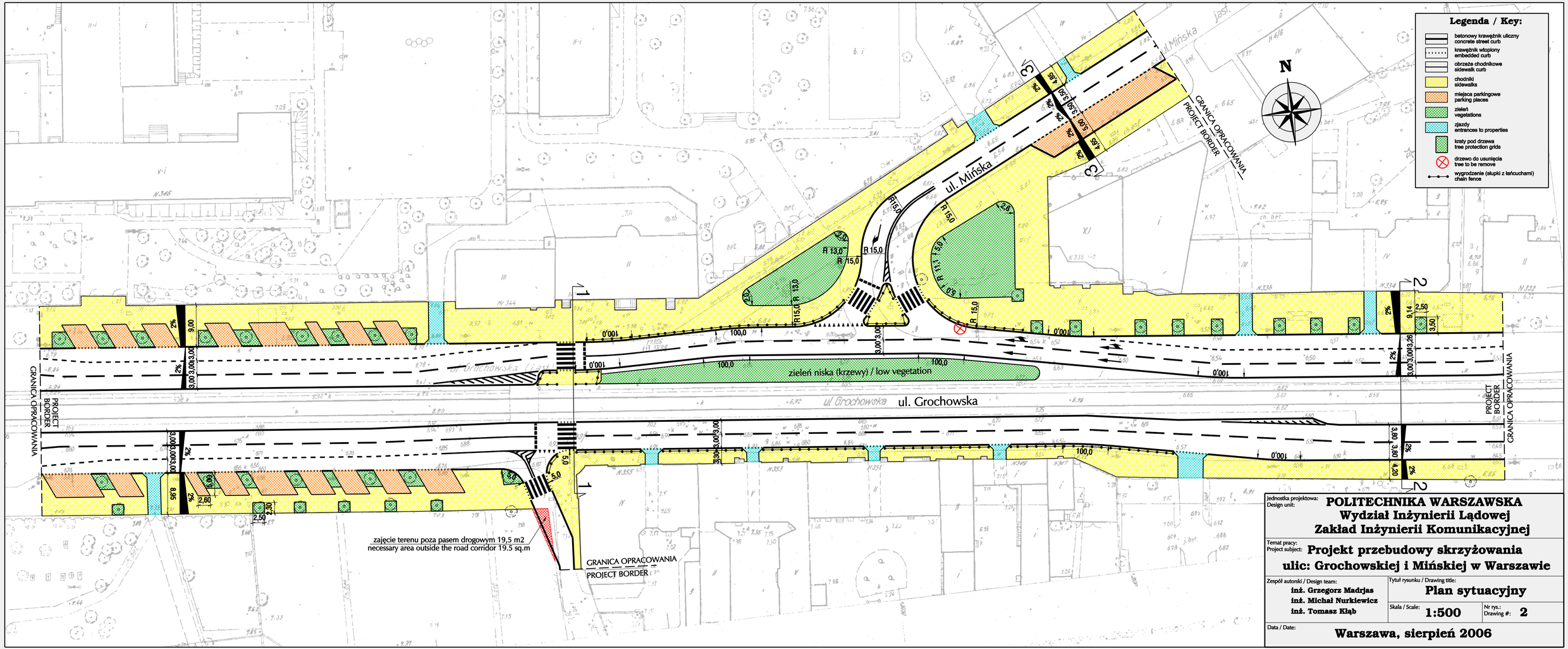
Entry road has reduced pedestrian area and fails to comply to the technical requirements.

Detail 5. Obstructions in the pedestrian traffic.



Multiple backyard entrances and stairs leading to service establishments result in a sidewalk width reduction and worsen traffic safety.


ul. Mińska
ul. Grochowska
Kamionek
Szmulki
Saska Kępa
Park Skaryszewski
im. Ignacego Paderewskiego
ZAMOJSKIEGO
TARGOWA
AL.KS.PONIATOWSKIEGO
WAŁ MIEDZESZYŃSKI
SOLEC
CZERNIAKOWSKA
AL.ZIELENIECKA
WASZYNGTONA
Stadion Dziesięciolecia
W-wa Stadion
Warszawa Wschodnia
MOST PONIATOWSKIEGO
Płyta Desantu
Torwar
CWKS „Legia"
Trasa AL. STA
Jednostka projektowa:
Design unit:
POLITECHNIKA WARSZAWSKA
Wydział Inżynierii Lądowej
Zakład Inżynierii Komunikacyjnej
Temat pracy:
Project subject:
Projekt przebudowy skrzyżowania ulic: Grochowskiej i Mińskiej w Warszawie
Zespół autorski / Design team:
inż. Grzegorz Madrjas
inż. Michał Nurkiewicz
inż. Tomasz Kłąb
Tytuł rysunku / Drawing title:
Orientacja
Skala / Scale:
1:12 500
Nr rys.:
Drawing #:
1
Data / Date:
Warszawa, sierpień 2006



Jednostka projektowa: Design unit:

POLITECHNIKA WARSZAWSKA
Wydział Inżynierii Lądowej
Zakład Inżynierii Komunikacyjnej

Temat pracy: Project subject:

Projekt przebudowy skrzyżowania ulic: Grochowskiej i Mińskiej w Warszawie

Zespół autorski / Design team:

inż. Grzegorz Madrjas
inż. Michał Nurkiewicz
inż. Tomasz Kłąb

Tytuł rysunku / Drawing title:

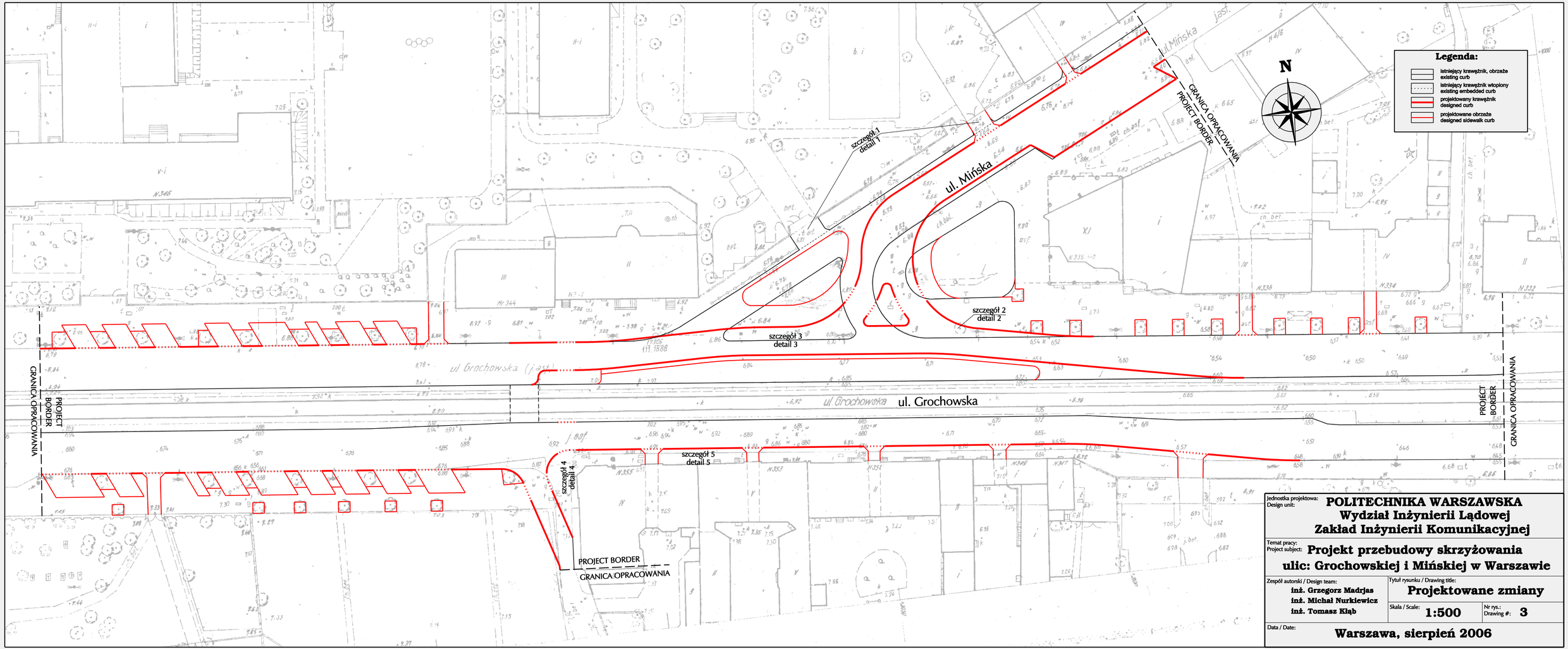
Plan sytuacyjny

Skala / Scale: **1:500**

Nr rys.: Drawing #: **2**

Data / Date:

Warszawa, sierpień 2006



Jednostka projektowa:
Design unit:

POLITECHNIKA WARSZAWSKA
Wydział Inżynierii Lądowej
Zakład Inżynierii Komunikacyjnej

Temat pracy:
Project subject:

Projekt przebudowy skrzyżowania ulic: Grochowskiej i Mińskiej w Warszawie

Zespół autorski / Design team:

inż. Grzegorz Madrjas
inż. Michał Nurkiewicz
inż. Tomasz Kłąb

Tytuł rysunku / Drawing title:

Projektowane zmiany

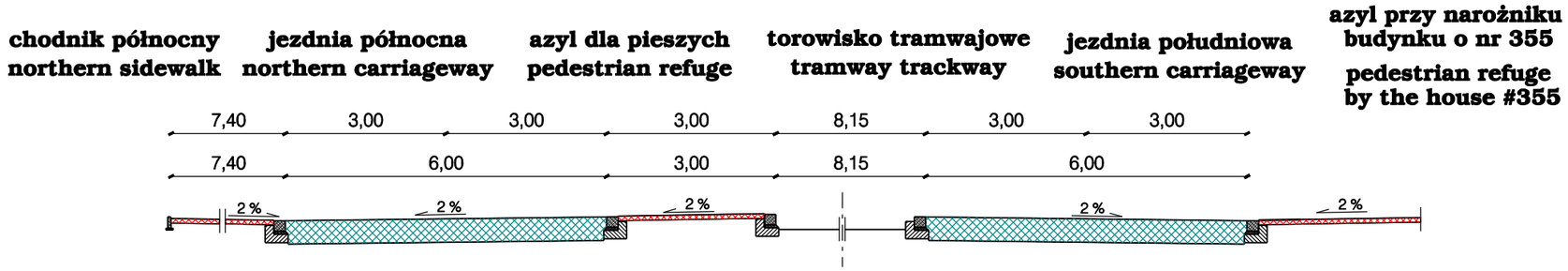
Skala / Scale: **1:500**

Nr rys.: Drawing #: **3**

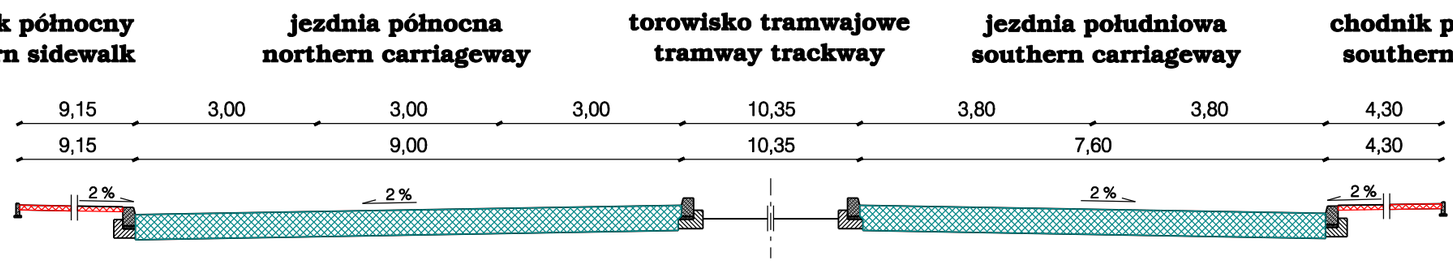
Data / Date:

Warszawa, sierpień 2006

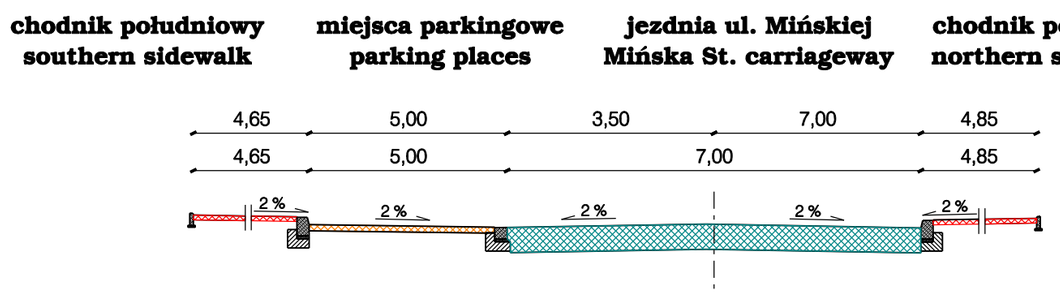
przekrój poprzeczny nr 1 / cross section # 1
ulica Grochowska / Grochowska Street
w miejscu przejścia dla pieszych / location: pedestrian crossing



przekrój poprzeczny nr 2 / cross section # 2
ulica Grochowska / Grochowska street



przekrój poprzeczny nr 3 / cross section # 3
ulica Mińska / Mińska Street



Jednostka projektowa: Design unit:
POLITECHNIKA WARSZAWSKA
Wydział Inżynierii Lądowej
Zakład Inżynierii Komunikacyjnej

Temat pracy: Project subject:
Projekt przebudowy skrzyżowania ulic: Grochowskiej i Mińskiej w Warszawie

Zespół autorski / Design team:
inż. Grzegorz Madrjas
inż. Michał Nurkiewicz
inż. Tomasz Kłąb

Tytuł rysunku / Drawing title:
Przekroje poprzeczne

Skala / Scale: **1:100**

Nr rys.: Drawing #: **4**

Data / Date:
Warszawa, sierpień 2006