

**CREATING WALKABLE STREETSAPES FOR ENCOURAGING WALKING  
AS A CLIMATE FRIENDLY TRANSPORTATION MODE  
CASE STUDY NEW BELGRADE**

**Prof. Dr Aleksandra Đukić**

**Dr Milena Vukmirović**

## Introduction

The attractiveness of open public spaces as well as the quality of pedestrian networks and shorter distance to attractive places and safety are important for intensity of users movements.

In Handy (2005) research it was found out that neighbourhood characteristics are the most important in exploring the changes in walking.

Qualities of open public spaces which ensure the presence of users are:

- attractiveness of walking tours,
- accessibility,
- aesthetic appeal of public spaces,
- safety,
- readability and
- activity (Ellaway, 2005; Gehl, 2006; Whyte, 1988; Jacobs 1995).

## Introduction

Greenhouse gas emissions are rising faster in transportation than in any other sector, worldwide. Rapid motorization, more cars and truck, is the principal cause. Urban traffic is responsible for 40% of CO2 emissions and 70% of emissions of other pollutants arising from road transport (European Commission, 2007). **Serbia and Belgrade are facing the same situation.**

Improvement of the qualities of the open public spaces could increase the number of users of climate friendly modes of transport, with a focus on walking and cycling. The most significant positions in **the green transport hierarchy go to pedestrian**, owing to low costs, spatial efficacy and non-existent negative effects on the environment (zero environmental impact).

## Methodology

The analysis of physical qualities of open spaces was enabled through a method of direct population survey. **200 inhabitants of New Belgrade responded to the survey.**

The socio-demographic structure of the group was similar to the structure of the inhabitants, both in the Municipality of New Belgrade and research polygon, while the survey covered **2% of residents of research polygon.**

The aim was to acquire the mobility characteristics in the Municipality of Novi Beograd, the needs and requirements of the citizens, the factors that affect the choice of walking for leisure, but also for targeted trips. The survey was organized in **three phases – three types of surveys.**

# First survey

The first survey was defined on the basis of professional tool for the evaluation of pedestrian movement and their environment.

Featured evaluative criteria include the following aspects:

- (1) design of the pedestrian environment
- (2) traffic rules and flows and
- (3) the aspect of traffic participants' behaviour (Gerlach 2010).

Bearing in mind the necessity of inclusion of direct space users in planning and designing process, mentioned evaluating apparatus was used as the basis for the creation of a questionnaire. In this way, citizens would be placed **in the position of "expert"** (Vukmirović and Milaković 2011).



## ANKETNI UPITNIK

### OPŠTI PODACI

Pol  Muški  Ženski

Starosna dob  0-14  15-19  20-29  30-39  40-55  56-64  preko 65

Profesija  Učenik  Student  Zaposlen  Zaposlen sa visokim obrazovanjem  Penzioner

Da li živite u Novom Beogradu?  Da  Ne

Na kojoj opštini živite:

Karakter učesnika u saobraćaju  
Da li imate privatni automobil?  Da  Ne

Koliko često koristite svoj privatni automobil?  Uvek  Kada idem na posao  Par puta nedeljno  Kada putujem van grada

Koje distance prelazite privatnim automobilom?  ne obraćam pažnju, uvek koristim automobil  preko 500m  preko 1000m

Koliko vremena potrosite u traganju za parking mestom?  Imam svoje  do 10min  10-20min  preko 20min

Da li bi mogli da se odreknete vožnje privatnim automobilom u korist pešačenja za prelaženje distanci manjih od 500m?  Ne  Zavisi od situacije. Navedite koje?  Da  Nisam razmišljao/la

Da li pešačite?  Da  Ponekad  Ne

Kojim povodom pešačite?  
1. Kada obavljam poslove u blizini mesta stanovanja  
2. Kada idem na posao koji mi je u blizini mesta stanovanja  
3. Kada vodim decu/unuke u školu  
4. Kada se rekreiram/idem u šetnju  
5. Kada idem u kupovinu

Da li pešačenje smatrate vidom transporta ili rekreacije?  Transport  Transport i rekreacija  Rekreacija

### Kvalitet neposrednog pešačkog okruženja u Novom Beogradu

#### 1. DIZAJN U ODNOSU NA FUNKCIJU SAOBRAĆAJNICE/ RANG

Da li ste zadovoljni veličinom trotoara/pešačkih staza na glavnim potezima u Novom Beogradu?  da  ne, navedite zbog čega

Bulevar Mihajla Pupina  da  ne, navedite zbog čega

Bulevar Zorana Đinđića  da  ne, navedite zbog čega

Bulevar Milutina Milankovića  da  ne, navedite zbog čega

Ulica Milentija Popovića  da  ne, navedite zbog čega

Ulica Antifašističke borbe  da  ne, navedite zbog čega

Ulica Spanskih boraca  da  ne, navedite zbog čega

Bulevar Umetnosti  da  ne, navedite zbog čega

Ulica Omladinskih brigada  da  ne, navedite zbog čega

Da li ste zadovoljni veličinom trotoara/pešačkih staza u sporednim ulicama (unutar bloka)?  da  ne, navedite zbog čega

Da li ste zadovoljni veličinom trotoara/pešačkih staza u ulici u kojoj živite?  da  ne, navedite zbog čega

[www.napravikorak.org](http://www.napravikorak.org)

## Second survey

The second questionnaire has been done in the central and one of the oldest parts of New Belgrade-Blocks 21 and 22.

The questionnaire was structured around five sections/thematic entities i.e. elements of mental maps defined by **Kevin Lynch (1960) – paths, edges, districts, nodes and landmarks.**

### Paths and edges

- Which street do you usually use for walking?
- Which is the most frequent street according your opinion?
- Which street has got the most frequent traffic according your opinion?
- In which street would you prefer to spend your free time?
- Which streets form the boundaries of the blocks 21 and 22?
- Which street presents the image of the blocks 21 and 22?

### Districts

- Which are the characteristics p[laces of the blocks 21 and 22?
- Where are your favourite place for spending free time during the day within the blocks 21 and 22?
- Which are your favourite place for spending free time during the night, within the blocks 21 and 22?

### Landmarks and nodes

- Where do you often go for everyday shopping?
- Select the three most important objects (buildings) on the location.
- Is it easy getting on the blocks 21 and 22?

## Third survey

The third questionnaire has also been done at the same polygon as the second one – blocks 21 and 22.

The aim was to find out the dominant qualities of open public spaces and their pedestrian surroundings.

According to this, the questionnaire has got 10 groups of questions, related to general and particular qualities of pedestrian space: (1) demographic and socioeconomic, (2) climatic comfort, (3) physical characteristics at the block level, (4) intensity of traffic, (5) safety, (6) comfort, (7) readability and accessibility, (8) advantages and disadvantages, (9) qualities of buildings and apartments and (10) suggestions.

The questions included in the first part of the questionnaire address the following topics:

- Transport mode(s) the respondents use in their daily trips;
- Frequency of the use of each transport mode;
- Indication of the three most important destinations:
  - The degree that a list of factors affect the choice of mode the respondents use for their daily trips;
  - The degree about factors which discourage the respondents from using public transport;
  - Level of effectiveness of several means of awareness in support of the respondents' mobility;
- Usefulness of a series of services of a mobility centre;
- Frequency in the potential use of a mobility centre.

## Research polygon

The conducted part of research was limited to a selected case study - Block 21 and 22, representing one of the oldest mega-blocks in the Municipality of New Belgrade, City of Belgrade. This research forms part of a broader research aimed at defining recommendations for the improvement the pedestrian and bicycle networks in an attempt to create a pedestrian friendly environment that would provide steady development of the city as a whole.

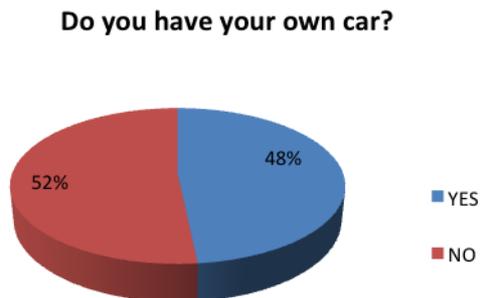
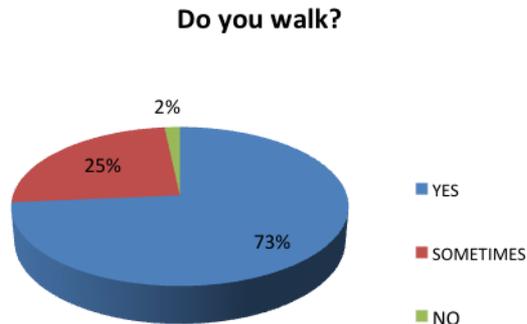


## Results

Results of the research follow the logic of the questionnaire. They are classified into three groups. The first set of results refers to the entire territory of the Municipality of Novi Beograd. Two other groups refer to the Blocks 21 and 22.

- Results of the first phase are systematized to show **general attitude to walking and general image** of New Belgrade as well as dominant characteristics of pedestrian paths.
- Results of the second phase are **related to the Blocks 21 and 22**, and they indicated the qualities of open public space and image of the polygon according Kevin Lynch theory, as well as the quality of pedestrian surroundings.

## Evaluation of the quality of pedestrian movement and direct pedestrian environment



- Only half of the respondents **own a private car** (48%). In 14% of cases, car is used for going to work, while 15% use it when travelling out of the city.
- The question about **intensity of private cars' usage** showed that 38% always use a car, while in the traditional center as much as 46% answered positively.
- Within walking distances, between 500 and 1000 meters, in New Belgrade only 9% residents use their car.
- New Belgrade inhabitants are willing to give up driving in favor of walking (73% answered positively).
- Most of them (88%) answered that they walk **while recreate, shop or do business** close to the place of living.
- Besides the **climate of walking** (pollution and noise), all other categories (character of traffic participants, design in relation to the function, sidewalks/walkways/paths, traffic flows) generally showed positive trends in New Belgrade, including safety and technical condition.
- Nevertheless, the small percentage of respondents find that **attractiveness** of pedestrian environment should be improved, i.e. sidewalks are too wide with conventional and monotonous appearance, missing rows of trees and shade in some streets, etc.

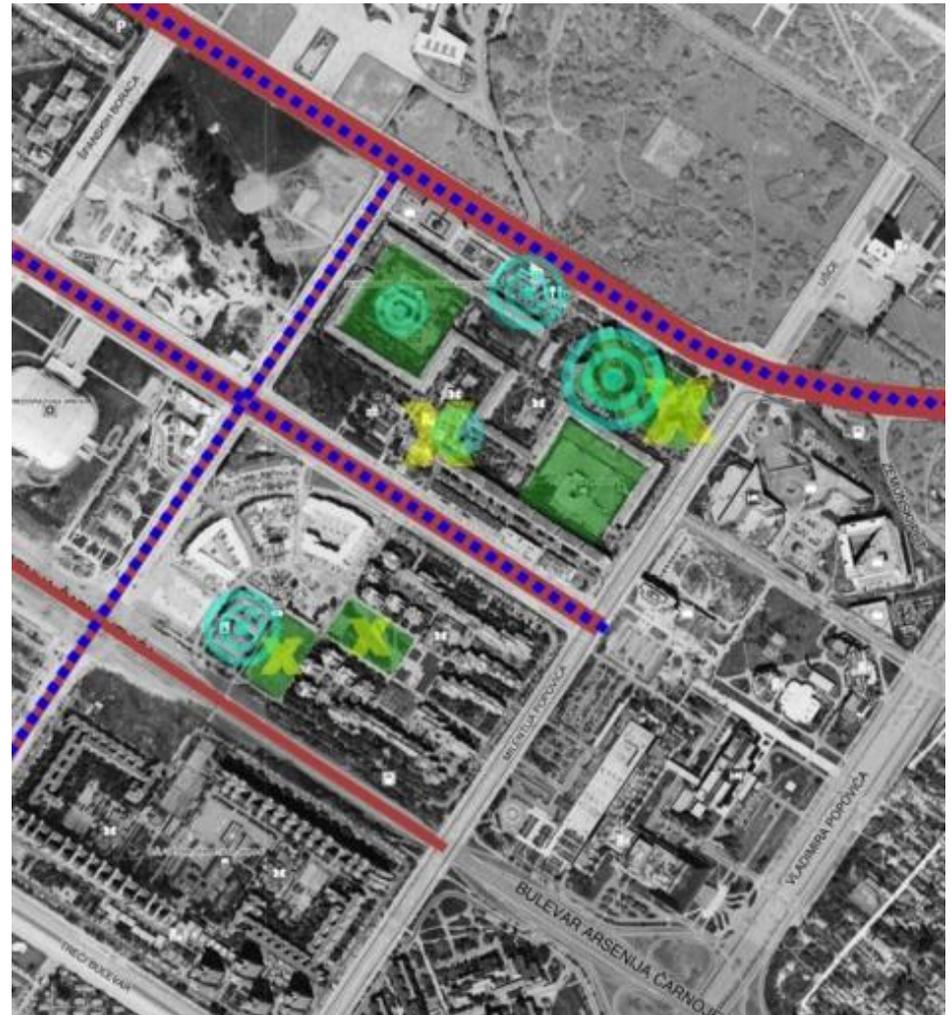
## Elements of the image of city Blocks 21 and 22

As main **paths** the inhabitants have outlined the Mihajlo Pupin Boulevard, Dr Zoran Djindjic Boulevard, Arsenije Carnojevic Boulevard and Antifasistickih Brigada Street.

Dr Zoran Djindjic Boulevard, Mihajlo Pupin Boulevard and Atifasistickih Brigada Street are recognized by inhabitants as **edges**.

Four **districts** are identified on the research polygons. Those are green surfaces – spaces within the blocks, two spaces in Block 21 and two spaces in Block 22.

The inhabitants have marked four **nodes**. The petrol station, children playground, the business premises within the block and meeting points in open space in front of Šest kaplara. The inhabitants marked **5 landmarks**. As the most important landmark, which surpasses the local surrounding, the inhabitants have marked six skyscrapers known as Šest kaplara



## **Quality of open public and communal spaces and existing pedestrian and bicycling networks**

- The results of the survey indicated that one of the main problems is subjective feeling of insecurity (mostly during the night), which is caused by insufficient public lighting and over-scaled public space as well as lack of inclusive design of communal open spaces. More than 24% of respondents feel unsafe in poorly illuminated open public spaces.
- The respondents criticized some elements of the environmental comfort (lack of trees and shades), especially during the summer (67%).
- The lack of proper access to the pedestrian paths is considered as the main problem for walking through the block (24%), as well as the insufficient capacity of the place for leaving the bicycle (62%) and increase of cars inside the block (38%).
- The maintenance of green public spaces was perceived ambiguously because 98% of respondents have a positive opinion about its general quality, but 30% of inhabitants think that it is not well maintained.
- It is also interesting to underline some other needs – for ex. to separate facilities by different groups of users (58%) or to increase the attractiveness of open public spaces (53%) and urban furniture (37%).

## Quality of open public and communal spaces and existing pedestrian and bicycling networks

According to the presented results the general opinion of inhabitants is **not so positive**.

The majority of them think that the open public spaces of the blocks 21 and 22 do not fulfil some of the selected criteria –

- **safety** (more than 49%),
- **equipment and general quality of pavement and facilities** (37-50%),
- **accessibility** (24%),
- **comfort** (37%) and
- **liveability** (i.e. capacity and diverse of activities) - 19%.

These identified problems **should be used as initial points** for further improvement of open spaces and according to them a list of priorities related to revitalization and redesign should be created.

## Discussion

In order to improve this situation and to motivate more people to walk and use bicycle, following types of interventions are suggested:

- Redesigning the pedestrian and bicycle paths into safe and accessible ways of transport;
- Establishment of continuity of sidewalks and paths with the focus of improvement the connection between the blocks and riverbanks;
- Anticipation of measures for stimulation of attractive activities and their even distribution along the paths, which would allow for proportional use of space during all periods of the day;
- Enlargement of shop window surfaces in order to achieve greater contact between activities in buildings and open public spaces, and
- Providing of new and more transparent types of protective curtains to stimulate pedestrian movement during evening hours;
- Providing better pedestrian facilities.

## Discussion

The above measures and recommendations would result in:

- Increasing the intensity of pedestrian movement as a way of transport;
- Increasing the intensity of pedestrian and bicycle movements which connect the current blocks with the riverbanks;
- Creating high - walkable neighbourhoods;
- Raising awareness about the need to use environmentally and climate friendly modes of transport, especially for short distances (this can decrease the level of CO2 emission);
- Improvement of the quality of life in New Belgrade

To achieve the above mentioned improvements it is necessary to integrate them into the types of interventions and guidelines into the urban plans and projects, to provide public participation and education of citizens, local authorities and experts in the field of urban planning, design and transportation.