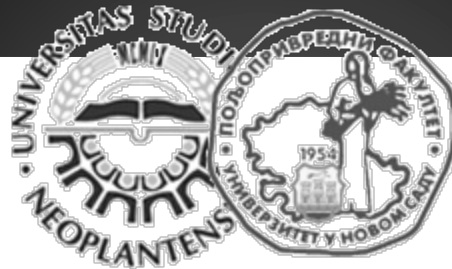


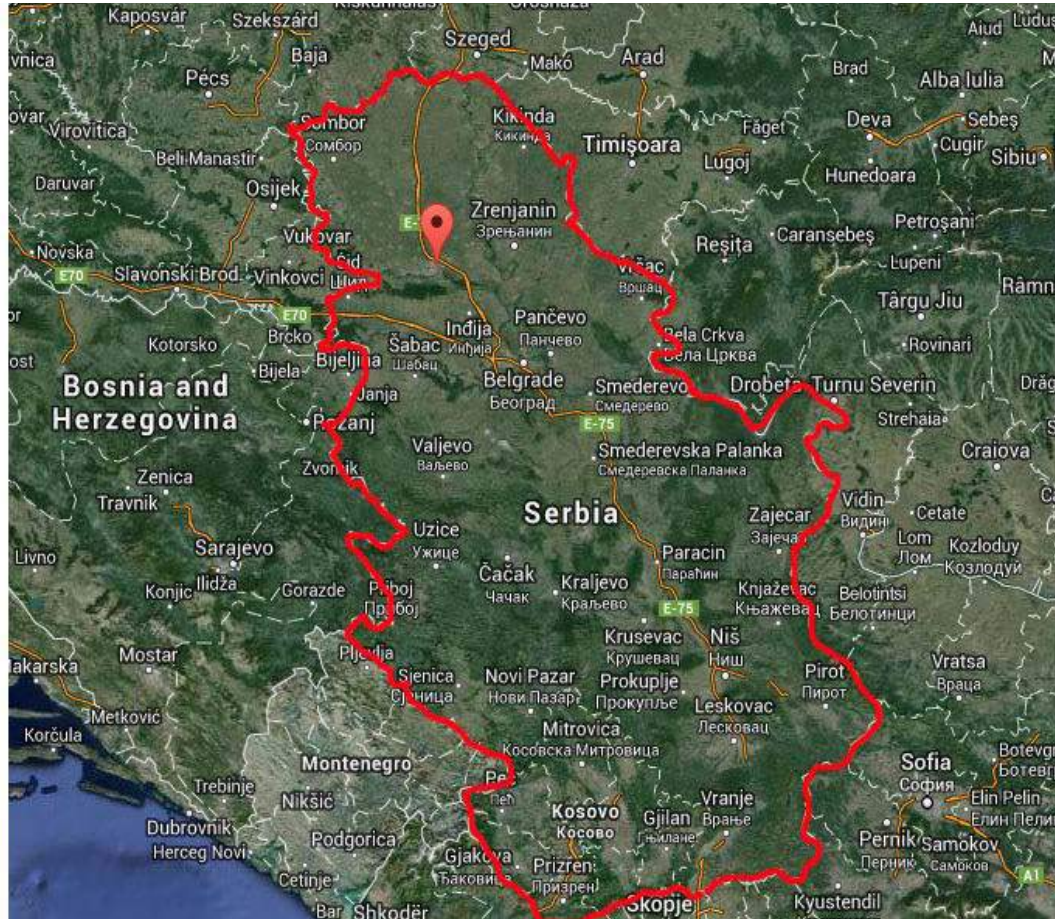
# DEFICIT OF GREEN SPACES AS AN ENVIRONMENTAL ISSUE IN URBAN AREAS



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Department for fruit science, viticulture, horticulture and landscape architecture

## The city of Novi Sad (Serbia) - location





## Area of the city of Novi Sad (Serbia)

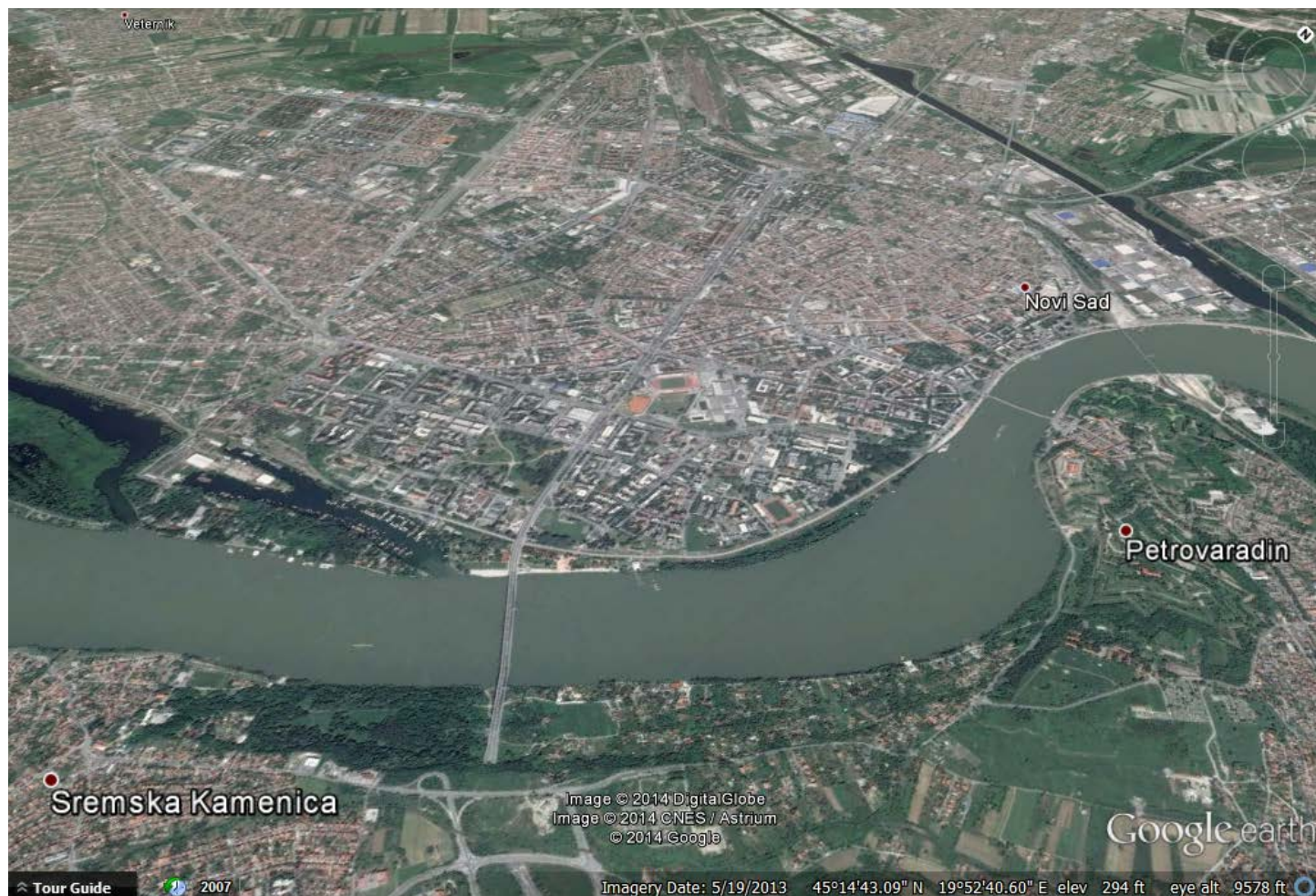


## Area of the city of Novi Sad (Serbia)



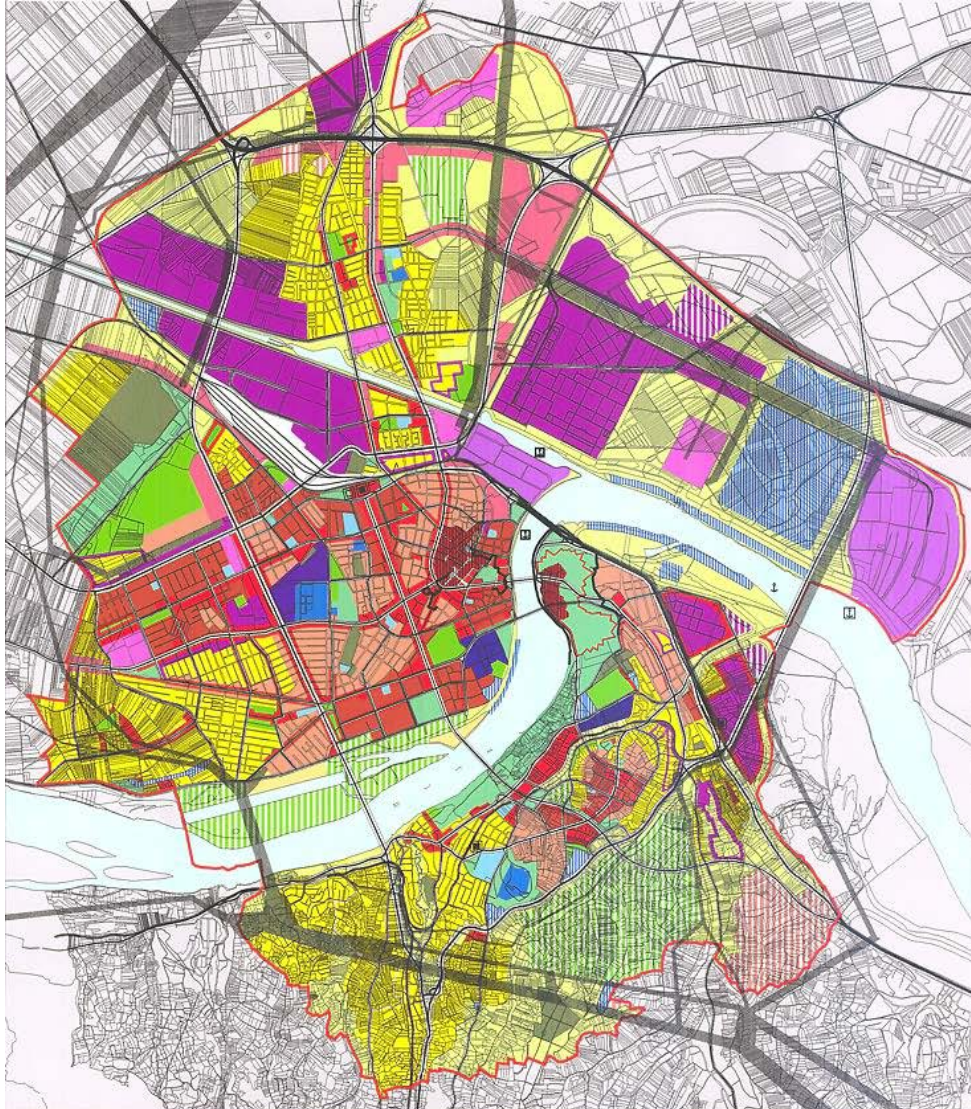
**Novi Sad = green city?**





➤ 430 ha of the city is under the greenery (13 m<sup>2</sup>/ citizen)  
*official data from the Public enterprise JKP "Zelenilo" - the greenery of Novi Sad*





### Green spaces:

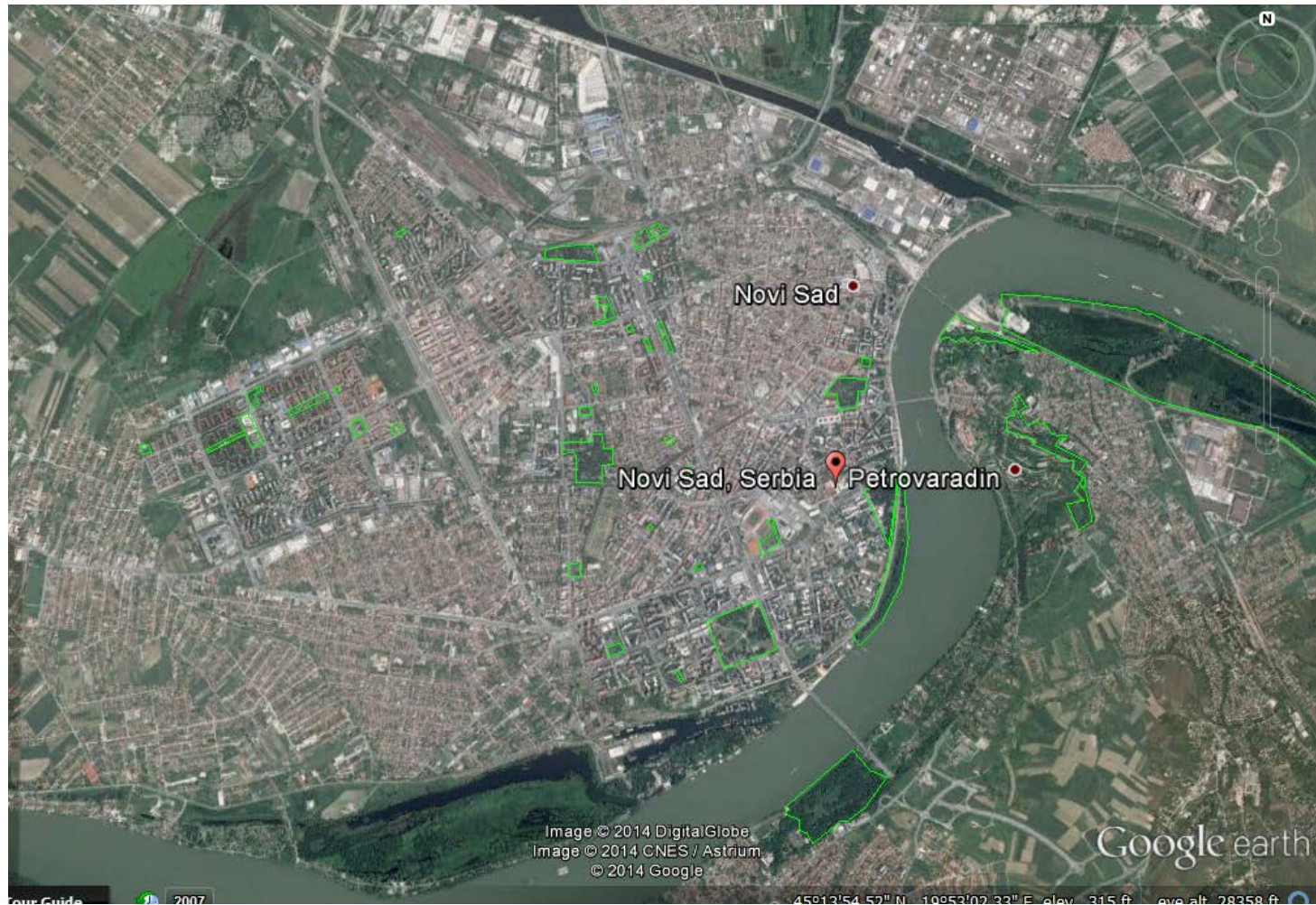
- Parks,
- Sport parks,
- Turistic sport and recreational areas,
- Sport centres,
- Sport,
- Graveyards.
- Linear greenery (tree-lines...),
- Forests,
- Squares?

### Others:

- residential areas,
- municipality areas,
- industry.

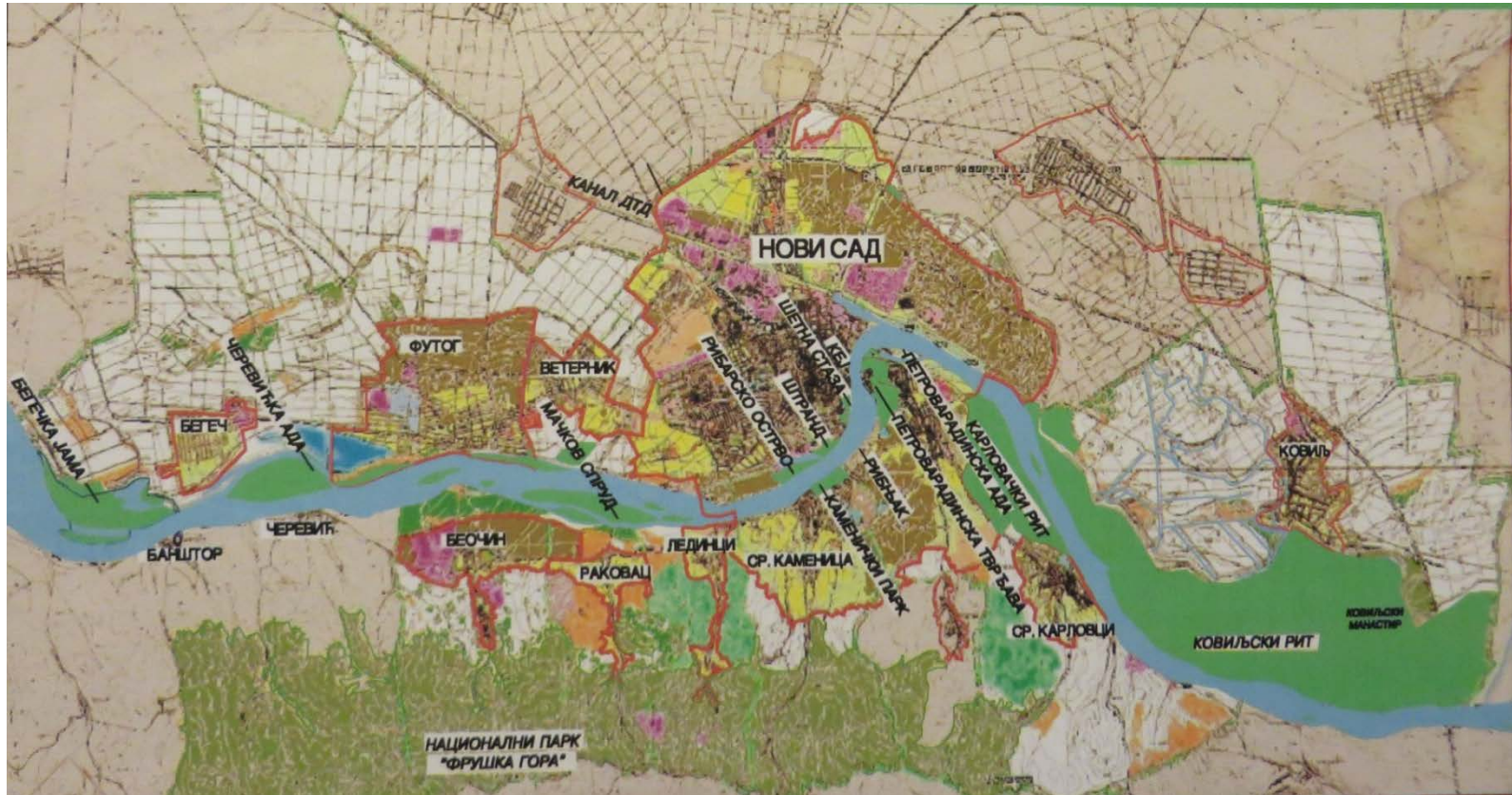


# Mapped green areas of the city of Novi Sad





# The greenery of the Danube Basin





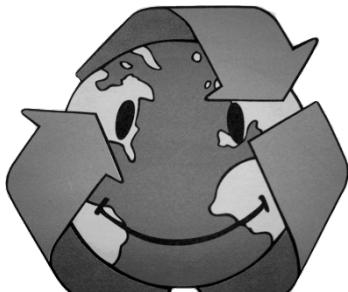
# THE AIM OF THE WORK

- The aim of this paper is to emphasize a need for determining the strategy for **system of greenery**, especially in the parts of the city where environmental parameters are **significantly poor** and life in that environment is **threatened** .



# METHODOLOGY

- The survey was conducted during **2013** year in the period from **April to July**.
- At nine different locations there were measured **noise levels** at various intervals during the day. Parallel to this process, it was analyzed an existing **greenery**.
- Some conclusions about the current environmental problems and possibilities of their transformation were set out.





# ENVIRONMENT

The environment is a complex **of various effects** (biotic and abiotic) **on the living organisms** in the area, where they are living.

Organisms are with the environment **unbreakably connected** throughout complex of relationships.

- ◎ Human influence on the changes in the environment is remarkable. During the development of human civilization, **man has contributed to significant changes** in the biosphere and transformation of natural ecosystems into the anthropogenic. Later, it came to the resource spending, changes in natural areas, pollution of the air, surface and ground water, soil degradation and changes in biodiversity.
- ◎ One of the biggest environmental problems in cities are **lack of green spaces and high level of noise.**





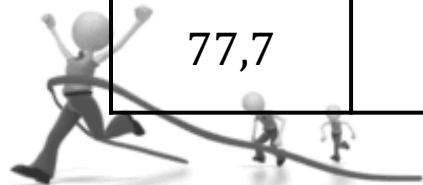
# NOISE

**“The noise is a sound which is out of place”**  
(Atkinson, 2007).

Any unpleasant sound, but strong enough to be singled out from the rest ones, is determined under term of noise. Noise is **a subjective feeling** and it isn't seen by all people in the same way.

- ◎ The effective protection of road noise can be achieved by means of **certain plant species**, where they have a substantial **width and density**.
- ◎ **The crowns** of deciduous trees absorb about **25%** of the sound energy, **75%** of it is dispersed and rejected.
- ◎ **Urban greenery**, especially trees, reduces the influence

SOUND VOLUME (dB)			WIDTH AND HIGH OF GREEN BELT, TYPE OF GREEN AREA AND SPECIES
before green belt	after green belt	difference	
76,7	69,0	7,7	Width of the belt 10, and high 5 m. Treeline and hedge, Tilia, Ligustrum
80,0	74,0	6,0	11 m, 8 m; one line of tree Tilia
83,0	75,6	7,4	10 m, 8 m; treeline Tilia with Ligustrum
77,7	66,1	11,6	36 m, 12 m; group of deciduous plants and shrubs





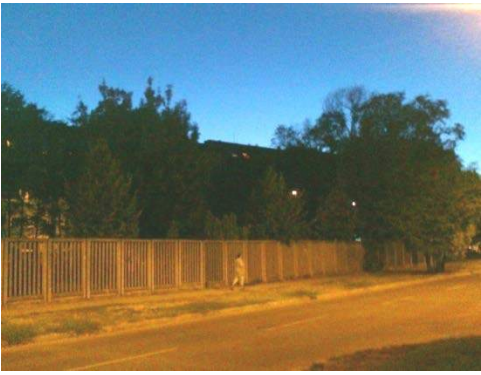


# The researched localities in the city of Novi Sad

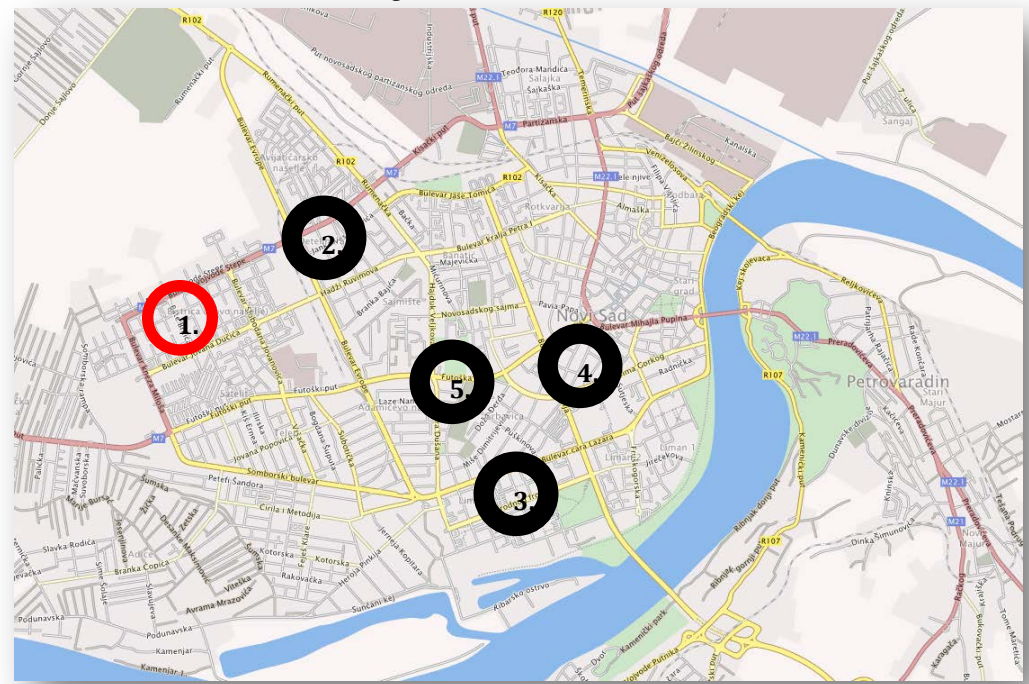
➤ Novo naselje



➤ Detelinara



➤ Liman 3



➤ "SPENS"

➤ Boulevard cara Dušana



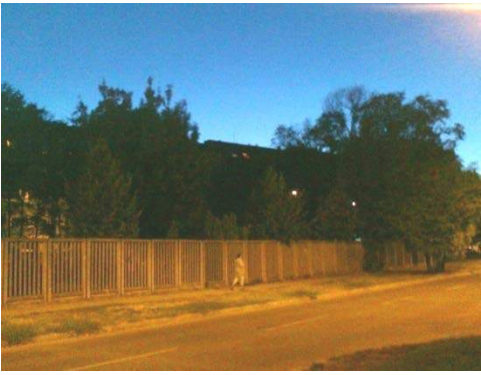


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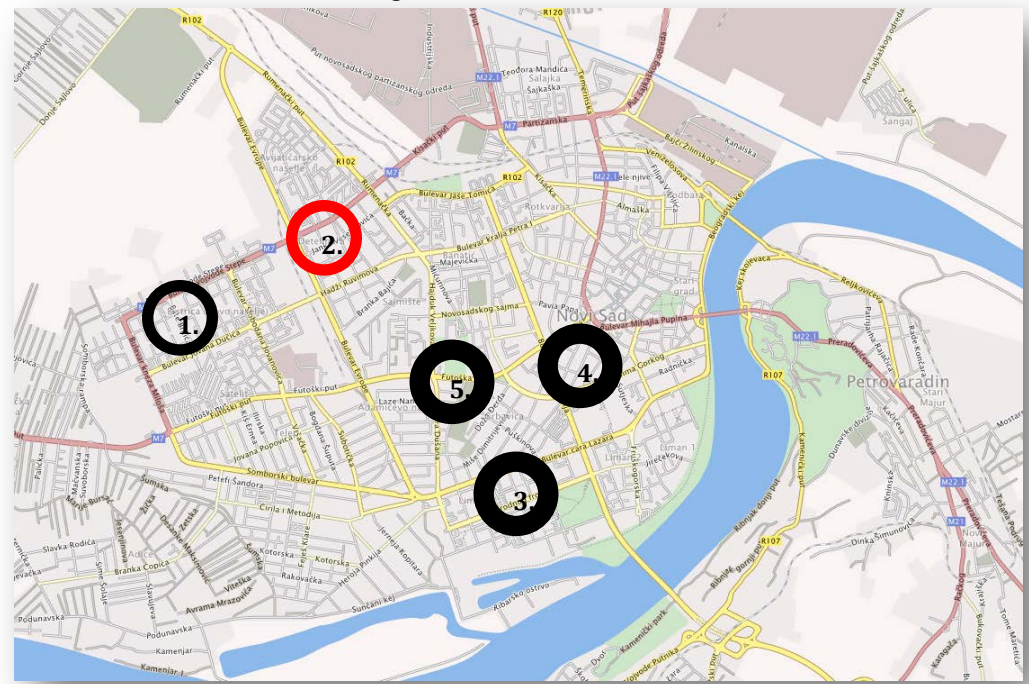
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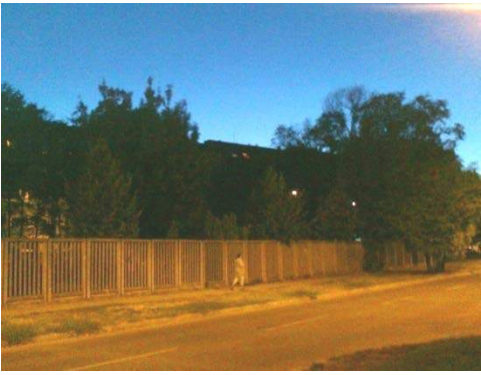


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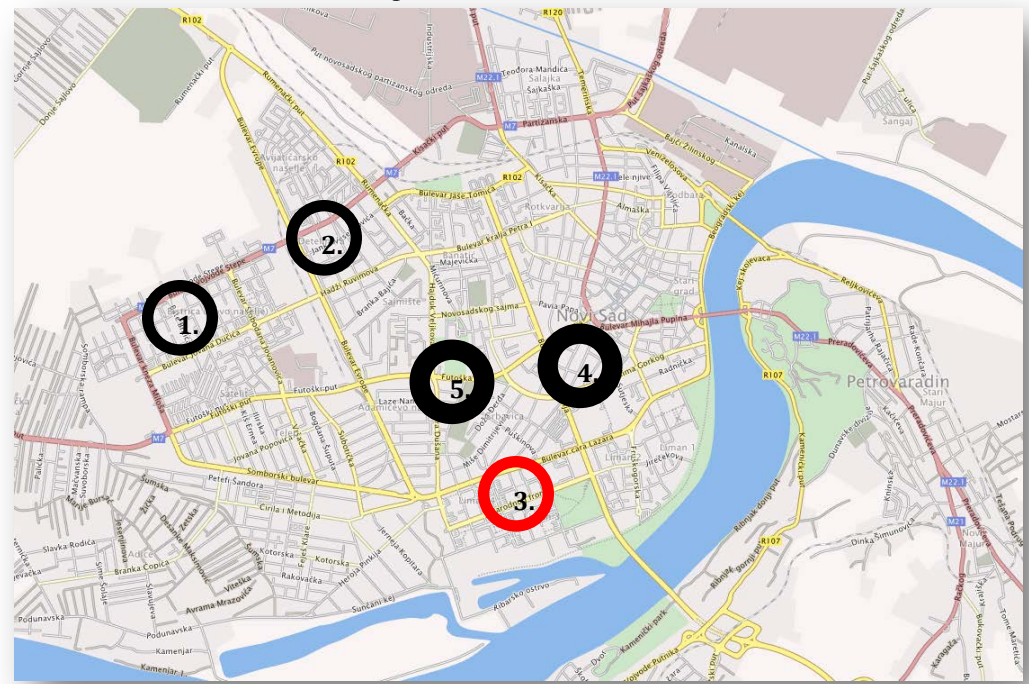
➤ Novo naselje



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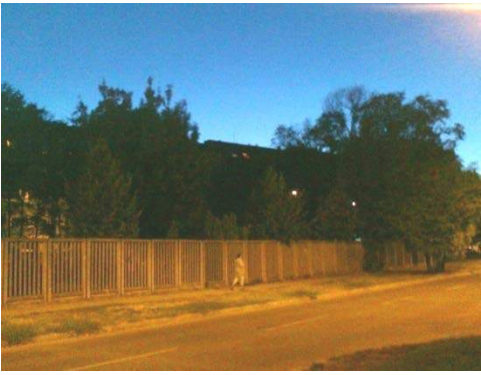


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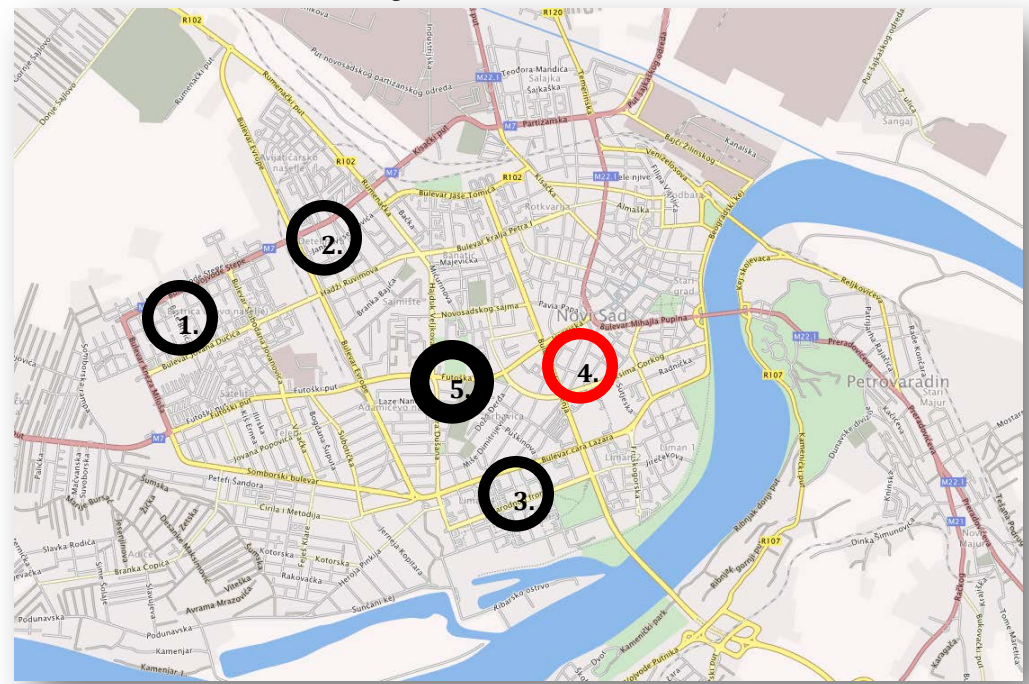
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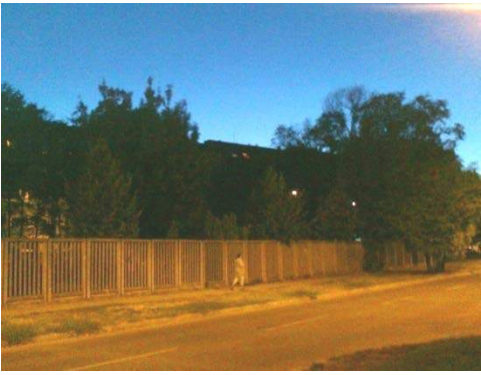


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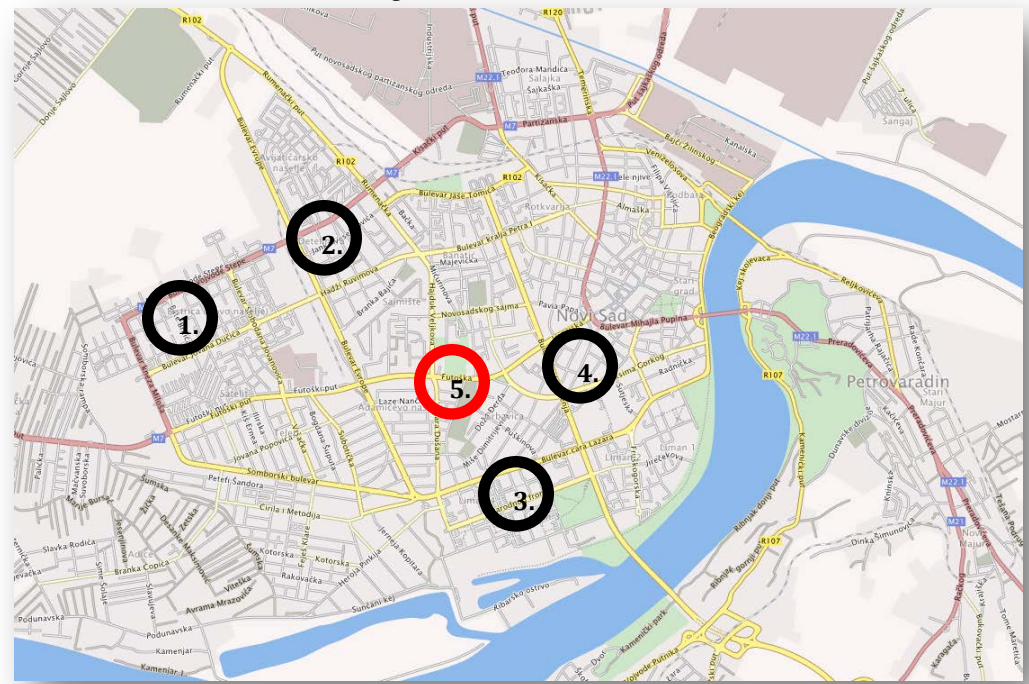
➤ Novo naselje



➤ Detelinara



➤ Liman 3



➤ "SPENS"

➤ Boulevard cara Dušana



<b>N<sup>o</sup></b>	<b>Measured locality in the city of Novi Sad</b>	<b>ID br. measurement</b>	<b>Date of measurement</b>	<b>L<sub>day</sub><sup>*</sup> dB (A)</b>	<b>L<sub>evening</sub><sup>*</sup> dB (A)</b>	<b>L<sub>night</sub><sup>*</sup> dB (A)</b>	<b>L<sub>den</sub> dB (A)</b>
1.	Novo Naselje	861	10.04.2013.	57,9	55,9	50,0	59,3
2.	Nova Detelinara	865	18.04.2013.	58,7	56,4	50,3	59,8
3.	Liman 3	863	12.04.2013.	66,7	65,9	59,9	68,8
4.	"SPENS"	869	24.04.2013.	69,4	69,9	63,8	72,4
5.	Ulica cara Dušana	873	28.04.2013.	65,6	64,9	61,8	69,3
<p>*reference interval for the day is from 6:00 to 18:00 p.m., for the evening is from 18:00 p.m. to 22:00, and for the night is from 22:00-06:00, in terms of national norms, Sl.glasnik 75/2010</p>							

No	Measured locality in the city of Novi Sad	ID br. measurement	Date of measurement	L <sub>day</sub> <sup>*</sup> dB (A)	L <sub>evening</sub> <sup>*</sup> dB (A)	L <sub>night</sub> <sup>*</sup> dB (A)	L <sub>den</sub> dB (A)
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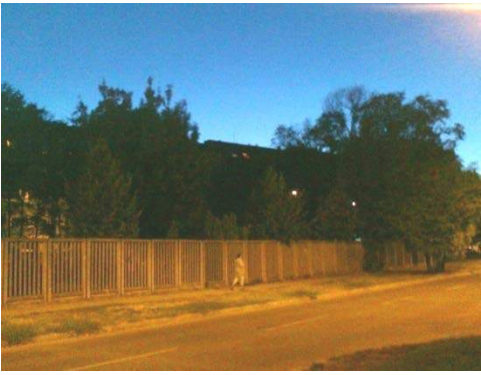


# The researched localities in the city of Novi Sad

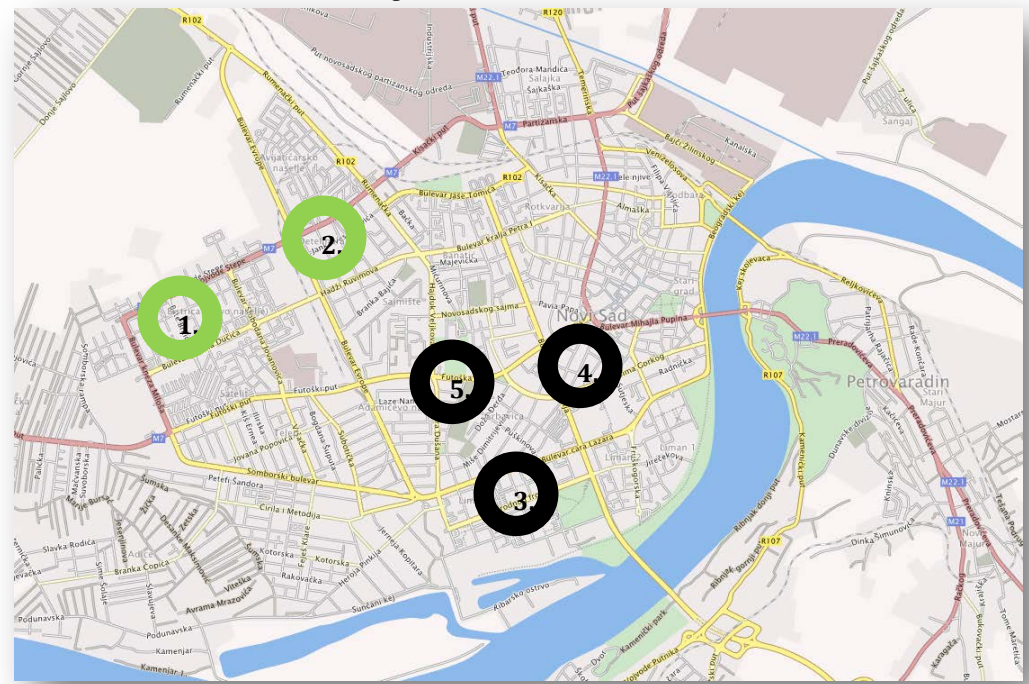
➤ Novo naselje



➤ Detelinara



➤ Liman 3



➤ "SPENS"

➤ Boulevard cara Dušana



- ◎ Selection of the **plant species** in the study area is mainly **focused** on highlighting their **aesthetic values**, while the **functional values are ignored.**
- ◎ The most common plant species that occur on the research area are **poplar**, acacia, cypress, **birch**, cherry laurel, cherry plum, berberis and the most common form **ligustrum hedges.**









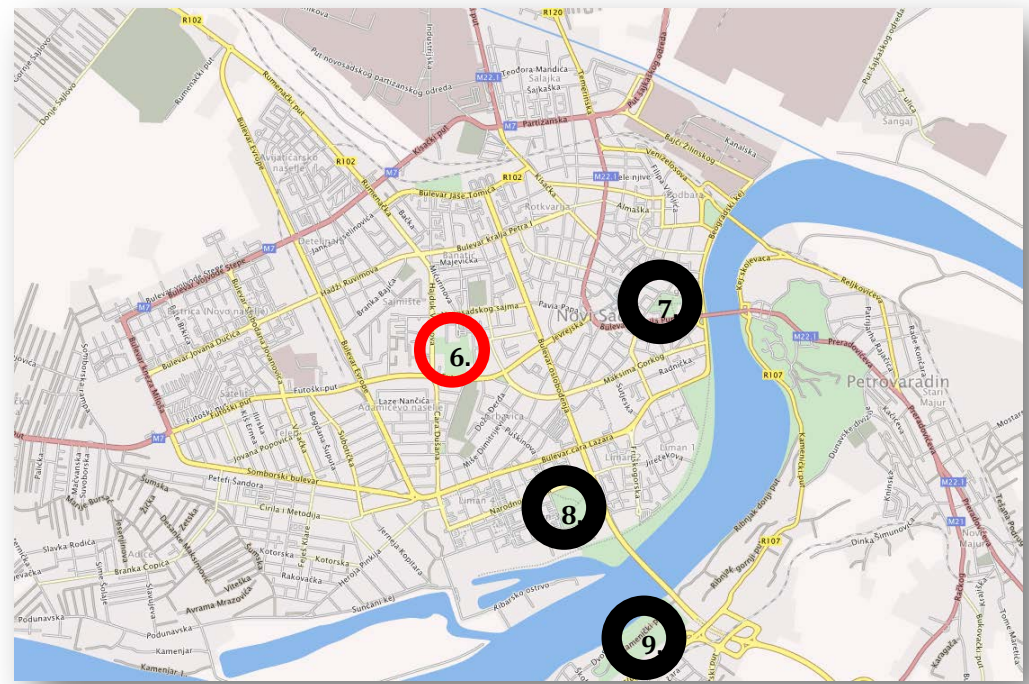
➤ Futoški park



➤ Dunavski park



➤ Limanski park



➤ Kamenički park





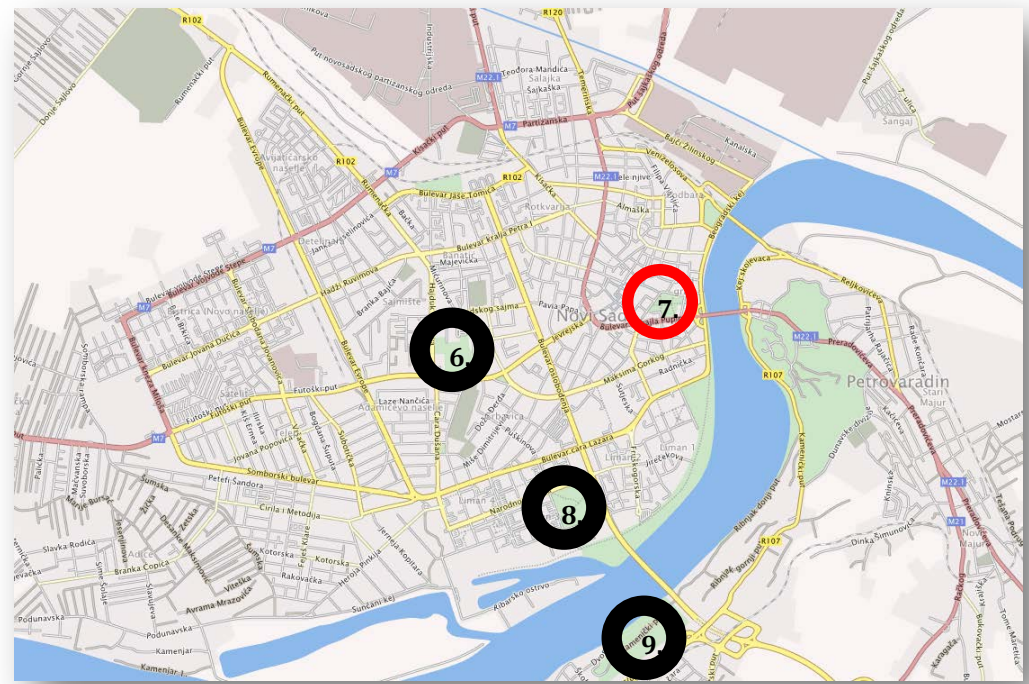
➤ Futoški park



➤ Dunavski park



➤ Limanski park



➤ Kamenički park





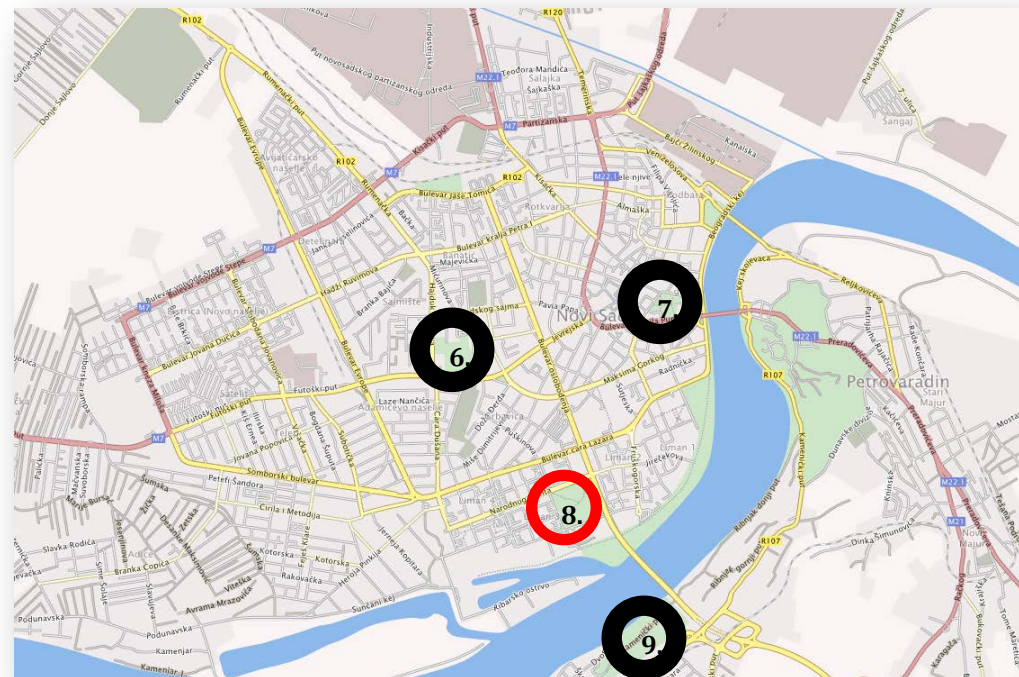
➤ Futoški park



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➤ Limanski park



➤ Kamenički park





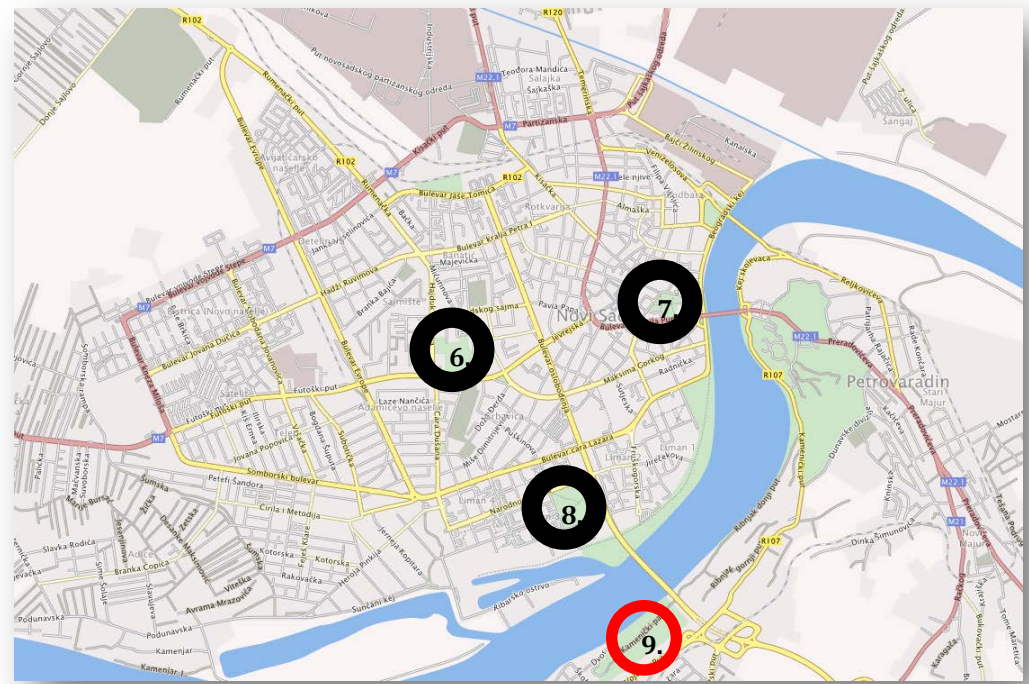
➤ Futoški park



➤ Dunavski park



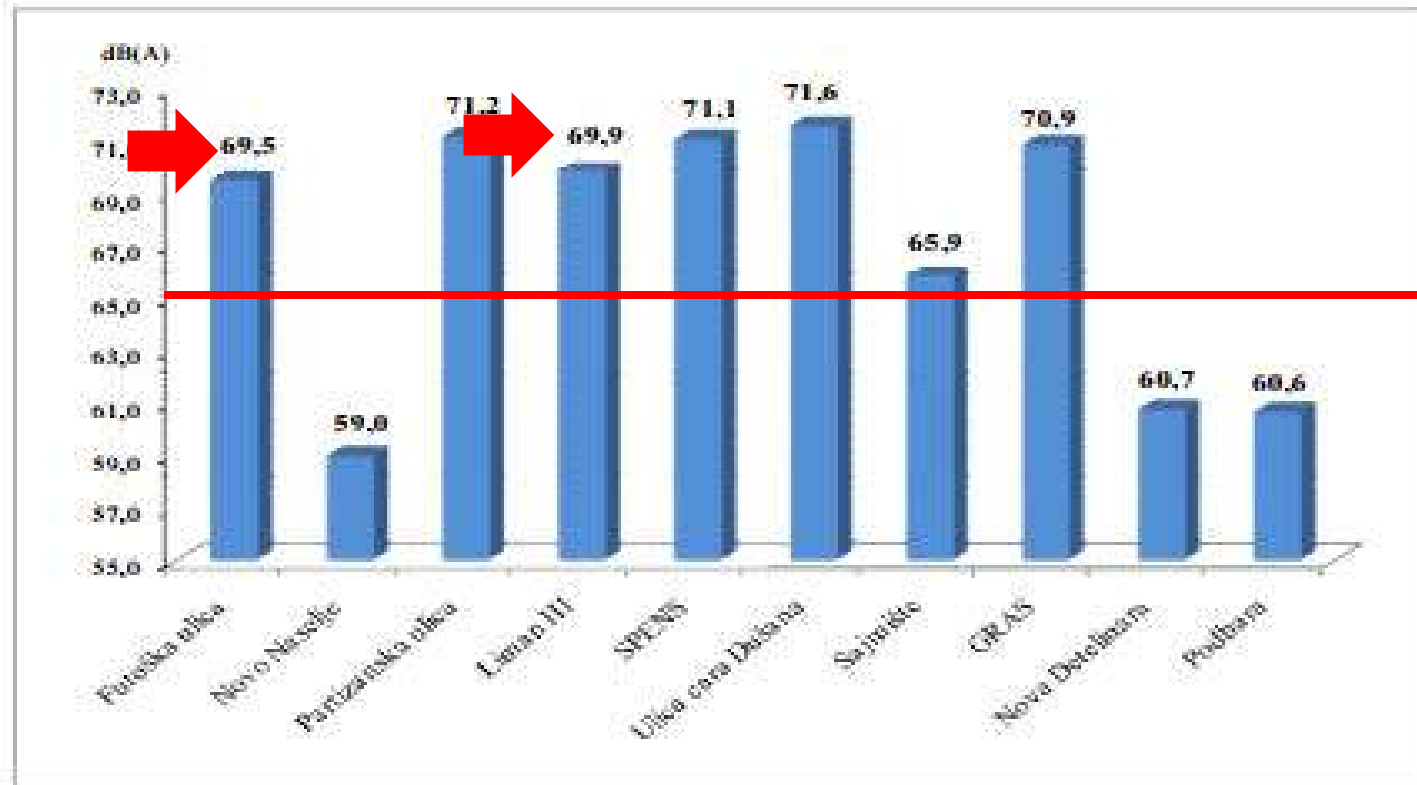
➤ Limanski park



➤ Kamenički park



## Level of noise in diferent parts of the city





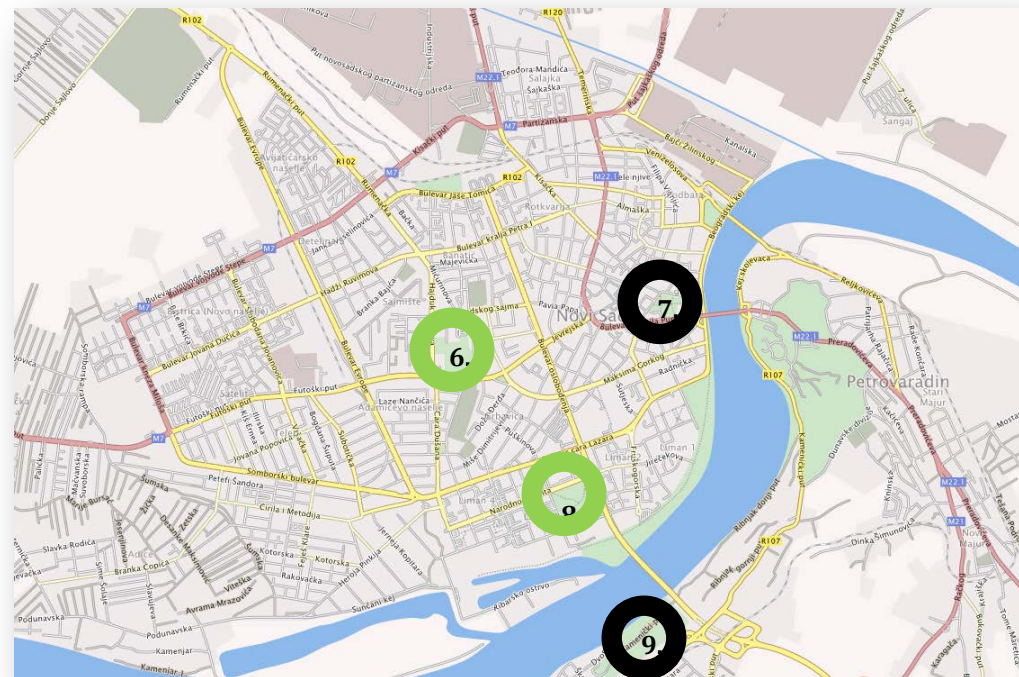
➤ Futoški park



➤ Dunavski park



➤ Limanski park



➤ Kamenički park





№	Measured locality in the city of Novi Sad	Date of measurement	L <sub>day</sub> <sup>*</sup> dB (A)	%A	%NA
1.	Zone of city center and traffics corridors	10.04.2013.	70,4	48	26
2.	Sport and recreational areas	18.04.2013.	65,9	37	18
<p>*mean monthly values - %A: percentage of people threaten by noise, %A - percentage of people threaten by noise on high level</p>					

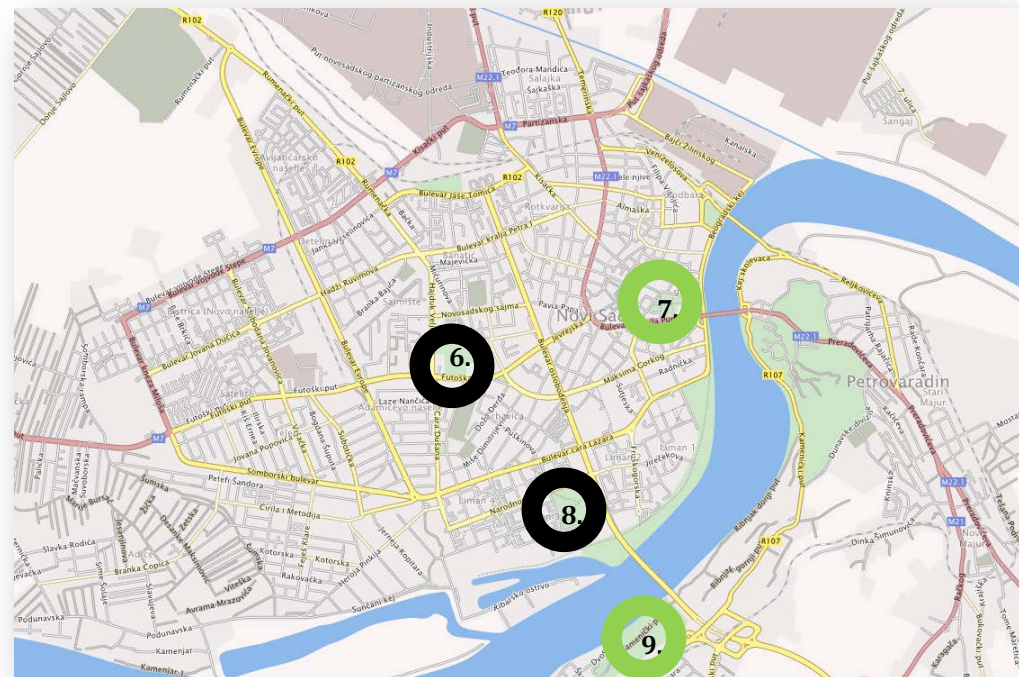
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➤ Dunavski park



➤ Limanski park



➤ Kamenički park

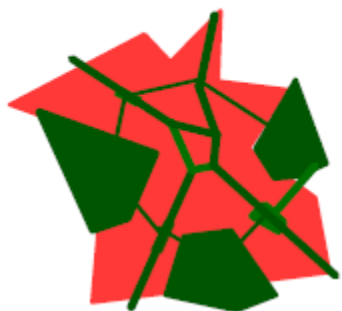


# CONCLUSIONS

- ⊙ The research has shown that **measured levels of noise** close to or in surroundings of **green areas**, such as parks, are **lower** than the value of same in the **other areas**.
- ⊙ **The vegetation** is the greatest assistant in the fight against environmental problems. What is not courages, the noise level was **above the limited** (65dB).
- ⊙ Deficit of green areas proved to be an environmental issue in urban areas and that has to be changed in recent future.



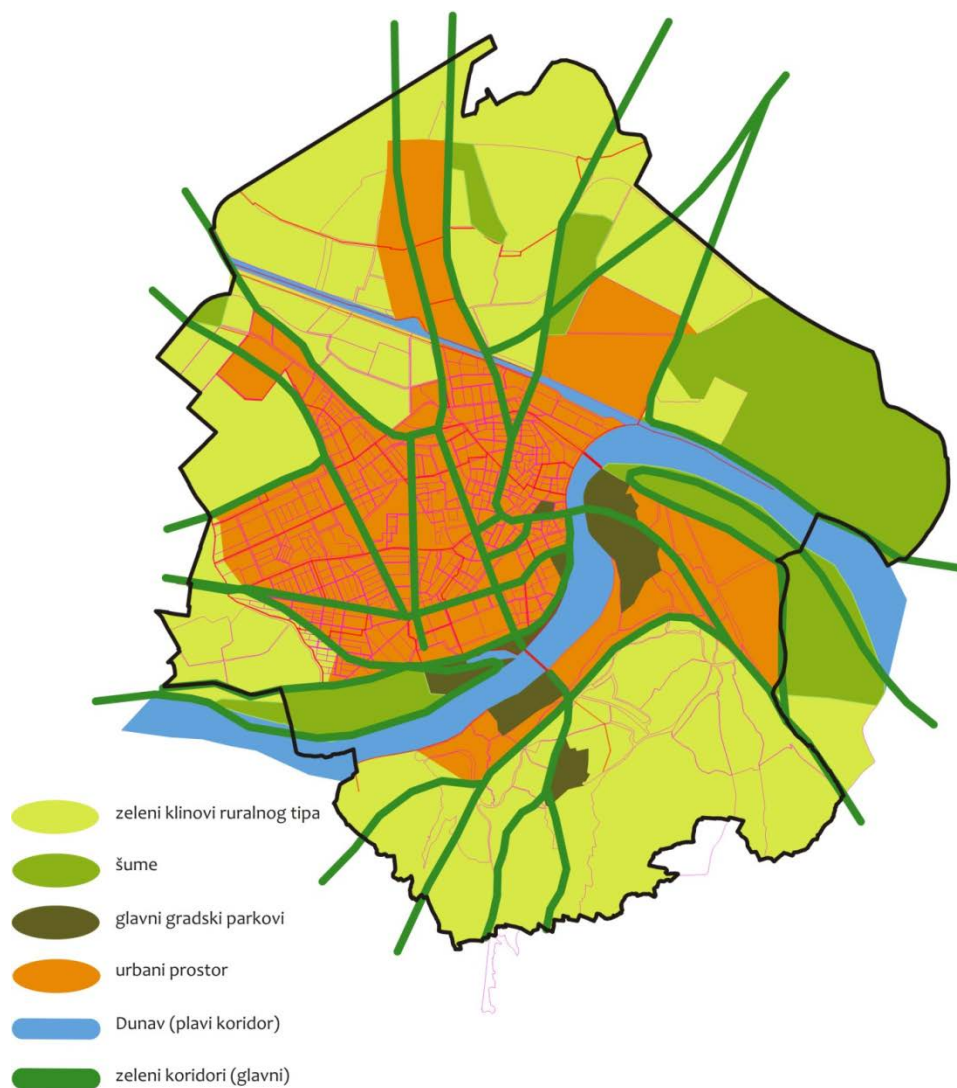
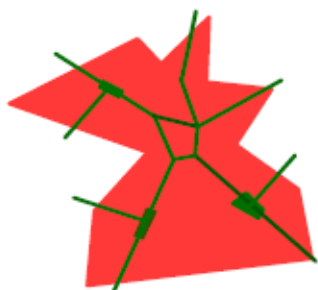
hollistic



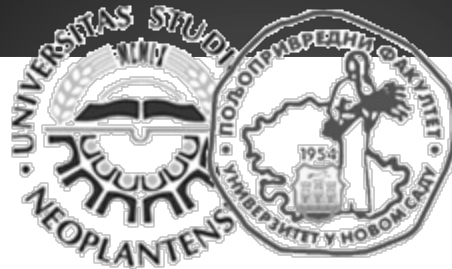
network



route



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## THANK YOU FOR THE ATTENTION!

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