Assessment effectiveness of the functional zoning and calculation of the recreational load for the territory of Izmailovsky Park

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Abstract. The article reviews Izmailovsky park and it is not only one of the most environmentally friendly parks in Russia, but also in Europe, a monument to landscape art, as well as a specially Protected Natural Area. The park itself is located on the territory of the city's Izmailovo natural forest and covers an area of about 310 hectares. This paper will be analyzed the recreational load of the entire territory of the Izmailovsky Park, roads and trail network and assessment of the functional zoning of the Park by Analyze the current situation of the territory; calculate the pedestrian flows; Analyze pedestrian traffic; and Justify the urban planning decision. Recreational human loads in big cities such as Moscow and others depends on the relationship between areas of green territories on one hand and the increasing in population on the other hand, which significantly affects the natural framework for urban areas. This relation will be caused a lot of a deterioration in the natural environment and evaluation through structure planning for Urban Development, which determines the distribution of population density, and access to recreational facilities. To ensure the sustainable development of natural lands, the components of the natural environment must be balanced with human actions and activities during the study data allowed us to assess the real better view and decision for 4 entrances of the park. The main load falls on the northern entrance to the Park and analysis of the urban development situation of Izmailovsky Park was made, inconsistencies were identified in the current use of the Park's territories, and the number of potential visitors was calculated.

1. Introduction
Izmailovsky Park located in the territory of the natural Izmailovsky forest in the city of Moscow and covers an area of about 310 hectares. The main important advantages for this park a refreshing air, plants and birds, various toys with prices suitable for all ages [1].

Territory of the Park has all kinds of party themes, sports training (depending on the time of year) and there are holding for very young and adult visitors [2-3]. Near the big Ferris wheel on the square Nakoditsya circular pool, where there are areas for quiet recreation, boat rentals are available in summer and others. The Area of Izmailovsky park is 310 Ha [4], as shown in figure 1 and figure 2.
Izmailovsky Park has a rich history, in period of king Alexey Mikhailovich. In the XVII century, dense forests filled with an abundance of representatives of the animal world were noisy on the territory of Izmailovsky Park. In the XVII century, dense forests filled with a large of representatives of the animal world were noisy on the territory of Izmailovsky Park. Alexey Mikhailovich, being a great lover of hunting. The king, following the current European trend of Park art at that time, arranged "wonderful gardens" on the territory of his estate with a wide variety of species of wildlife and vegetation, which are the prototypes of the current Botanical gardens. The main decorations of the усадьбы were all kinds of fountains, pools, decorative towers, landscape patterns. Today, a circular pool has been existed, which is the central attraction in the Park, with a special man-made island in the center. The end of the XIX century, Lzmailovo was empty - the pool was covered with mud, the beautiful gardens has been gone and the animals became more numerous. All this was caused by the pre-revolutionary years, when workers found the territory of the Izmailovsky forest [1].

In the 1930s, during the great construction projects of the Soviet Union, it was planned to allocate a significant part of the forest area to create a large-scale and accessible recreation zones for residents. Thus, already in 1931, the Izmailovsky Park appeared, and it is also an important fact until 1961 it was named after I.V. Stalin. Famous landscape designers M.P. Korzhev and M.I. Prokhorova contributed to the creation of the basic appearance of the Park. At the end of the XIX century, in the 1930s, asphalt walking alleys and avenues were added to the longitudinal and transverse paths laid in the Park, decorated with such small architectural forms as statue, greenhouses, garden benches [5]. Over time, the Round pool remained the centre of the planning composition, along it there are walking areas in the form of two alleys-Large and Small circles. Over the years, the Park has truly become a real city-garden of entertainment, decorative shrubs and trees were planted, attractions were added, areas of quiet and sports recreation, restaurants and cafes, a boat station, hall and stages. According to the General plan of Moscow, the territory under consideration belongs to the functional zones of specially protected natural territories, natural and green areas. Also on the map of specially protected natural territories, natural and green areas, Izmailovsky Park are designated as protected areas formed within the existing boundaries, below Map-scheme of functional zoning of Izmailovsky park (figure 3).
2. Materials and methods
Materials that the regulatory framework used in this research: open data source such as Bing maps, Retro map, General plan of the Moscow city, historical and cultural reference plan of Izmailovsky Park and also, the following data were obtained according to the field survey, conducted on weekdays and weekends, in the morning and evening, the number of visitors to the park was calculated by the number of people who entered it per hour. Using method to calculate the number of potential visitors to the park using formulas (number of potential park visitors) depends on the area of territories in hectares and population density [6].

3. Results and discussion
Evaluating the effectiveness of the natural frame has been done by studying the following elements: access to transportation in the territory of study area, green areas, planning structure of the Park, Position of the Park in circumstance of urban development situation and Present functional zoning of the Park (table 1) shows Balance of the Park territory [7-8]. This study also shows the calculations part for estimating the number of visitors to the Park using the formula (1):

$$N = S \times P$$

where: \(N\) – number of estimated visitors to the Park (person); \(S\) – area of the territory within walking distance (ha); \(P\) – population density (person / ha). According to SP 42.13330.2016 “urban planning, planning and development of urban and rural settlements” the estimated number of one-time visitors to the territories of parks, forest parks, green areas, people/ha. For city parks-100; parks and recreation areas – 70; health parks – 50; Forest parks – grass parks, hydroparks – 10; Forests –1-3 [9-10].

In accordance with the field survey, which was carried out on weekdays and in the weekend morning and evening, the number of visitors to the Park was calculated by the number of people who entered it per hour, the result will be shown in (figures 4).

The data obtained during the study allowed us to assess the real significance of each Park entrance. Analysis of the data obtained showed that the main load falls, figure 4 part A,B,C, and D shows the
main load falls on the northern entrance to the park near the exits of the Partizanskaya metro station, and less on the entrance near the highway Entuziastov metro station. The Park is popular for recreation among both local residents and visitors from other parts of the city, especially during holidays and weekends.

Table 1. Balance of the Park territory.

| Name                                         | Area (ha) | Percent |
|----------------------------------------------|-----------|---------|
| Total area of the Park                       | 310       | 100     |
| Buffer zone                                  | 80.6      | 26      |
| Walking movement area                        | 49.6      | 16      |
| The area of movement of vehicles             | 27.9      | 9       |
| Zone with a special regime of use of the territory | 43.4    | 14      |
| Quiet recreation area                        | 108.5     | 35      |

Figure 4. The number of visitors to the Park (weekdays and weekends, morning and evening).

4. Conclusion
The research comes up with some conclusions:

- Data obtained during the studying allowed us to assess the real significance of each Park entrance;
- It is also worth noting that assessment by inquiry visitors and reviews from the Internet, the Park has a good reputation;
• Reviews also indicate to one of the significant advantages is the relatively high level of improvement and power systems within the boundaries of the park;
• An analysis of the urban development situation of Izmailovsky Park was made, inconsistencies were identified in the current use of the Park's territories, and the number of potential visitors was calculated.

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