INTEGRATING WATER FEATURES INTO A RECREATIONAL SPACE

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Abstract
The paper focuses on the possibilities of applying water design elements in a recreational park space with an emphasis on capturing, retaining and reusing rainwater through blue-green infrastructure elements. The implementation of water elements in recreational spaces contributes not only to more effective rainwater management, but also to environmental education of the public and to promoting awareness of the importance of protecting water resources. The paper aims to highlight the potential of integrating blue-green infrastructure elements through landscape architectural solutions in a newly built recreational space, prepared as a design assignment for the Západoslovenská vodárenská spoločnosť. It also aims to emphasize their benefits for the public in terms of environmental sustainability, recreational quality and long-term stability of the urban environment.

Key words: recreation, landscape architecture, water design, environmental education

Introduction

Water features represent an important compositional and functional tool that allows connecting aesthetic, ecological and social aspects of public space. Elements such as rain gardens, retention ponds, infiltration strips or vegetation ditches are among the current measures for solving the water cycle in the landscape, fulfilling an important role of natural regulatory systems (Miklášová et al., 2024). Their appropriate placement and dimensioning requires an interdisciplinary approach (Čibik et al., 2022, Hus et al., 2021), which takes into account the hydrological, pedological and vegetational conditions of the area (Tóth, 2022, Rózová et al., 2023). Contemporary landscape architectural approaches emphasize the creation of adaptive and resilient public spaces that can respond to changing environmental conditions (Čibik et al., 2022). Water design and vegetation management thus become a means of not only a technical solution, but also a carrier of educational potential, allowing park visitors to directly perceive the water cycle in the landscape and understand its significance (Kuczman, 2025). In this context, a participatory approach to design also plays an important role (Kuczman et al., 2022, Bechera et al., 2022, Čibik 2024), which supports the public's relationship with the space and increases the acceptance of innovative solutions.

Materials and methods

The subject of the study is the unused area of the Západoslovenská vodárenská spoločnosť (ZVS) in Nitra with an area of approximately 19,200 m², situated in the peripheral part of the operating area in direct contact with the open landscape. The location is currently without active use, which creates the potential for its transformation into a functional and attractive public space. The area under study is located in the valley of the Nitra River, which played a significant role in the historical development and current functioning of the city of Nitra (Fig. 1 & Fig. 2). The location is located northeast of the city center, on the border of the built-up area and the open landscape, which gives it a specific transitional character and at the same time a significant landscape potential. The area is currently located on the edge of the urbanized structure, while showing significant links to the existing technical infrastructure and green areas. In terms of transport accessibility, it is a suitably connected area, especially in relation to the city districts of Zobor (with Zobor Hill - 587 m. above sea level) and Staré Mesto. An important element of the area is the existence of the Nitra - Drážovce cycle route, which directly passes through the planned area and ensures its safe and smooth connection with the surrounding localities for cyclists and pedestrians. This mobility line also represents significant potential for the integration of the area into the wider recreational and landscape-urban context of the city. The cadastral territory of the city of Nitra is mainly located in a warm climate area, specifically in the area of the Danube Plain and on the edge of the Tríbeč Mountains. The territory of the Nitra district belongs to the West Carpathian and Pannonian areas, where elements of the Pre-Carpathian and Eupannonian xerothermal flora meet. Significant vegetation units are Tribeč, Nitrianska pahorkatina and Žitavská niva, which affect the diversity of the flora in the region. A dendrological survey was carried out in the area in question, where 27 woody plants were identified, with a relatively high species diversity. Specifically, 8 taxa were identified (*Cerasus avium* (L.) Moench, *Rhamnus cathartica* L., *Robinia pseudoacacia* L., *Fraxinus excelsior* L., *Juglans regia* L. LC., *Populus alba* L., *Populus nigra* L., *Salix*

fragilis L.). The most abundant was the European Ash (*Fraxinus excelsior* L.) and the tree with the largest trunk circumference of 179 cm was the Crack Willow *Salix fragilis*. From a compositional point of view, the trees in the studied area occurred mainly as solitary trees or in smaller groups. Many individuals showed damage to the trunks and crowns, which occurred as a result of mechanical interventions related to land clearing.


Fig. 1:, left: View of the cycle path leading along the developed area enclosed by blue fencing (Kuczman, G., 2025). Fig. 2, right: Visual connection of the planned area with the cultural and historical landmark - Nitra Castle (Kuczman, G., 2025).

The study applied the research by design method, which focuses on identifying and formulating key design principles, which are subsequently verified in a specific landscape-architectural solution. This approach allows theoretical starting points to be linked with practical design activities and at the same time reflects the specifics of the area being addressed. The solution process was divided into two main phases. The first, analytical phase, included a comprehensive processing of broader relations of the area, with emphasis on functional-spatial analysis, landscape analysis and dendrological survey. The initial stage also included identifying the needs and expectations of residents in relation to the proposed recreational space, which were supplemented by the requirements of the management of the ZVS in Nitra as the main client. The second, design phase, represents the landscape-architectural solution of the area itself. The study process involved second-year students in the Landscape Design Studio, Landscape Architecture Department, from the Institute of Landscape Architecture, SPU in Nitra, to develop design ideas within research-led teaching, using research through design. The studio created five design solutions with different implementations of water activities and elements.

Results

The design integrates water elements with recreational and social functions, which are based on the main requirements of the client ZVS in Nitra, with the intention of making the issue of water in the landscape and its importance in the urbanized environment more visible. At the same time, it reflects the principles of sustainable management of rainwater and supports their practical application within the landscape-architectural solution. Special emphasis is placed on ensuring the continuity of blue-green infrastructure within the city and on creating a high-quality public space that supports the environmental, aesthetic and social values of the area. The results of the creative process were integrated into a concept called: "KoloBeh vody", in which movement, play and water are naturally interconnected as basic thematic and spatial elements (Fig.3). The design concept works with multifunctional use of the area, while the entrance part of the area is designed as an intensive space intended for children's activities and interactive water games, the rear part of the area takes on a calmer, landscape character, where the space freely develops in the spirit of the river flow and serves for the movement of cyclists and visitors. Specific design solutions include the implementation of the polygon element, which is based on one of the basic requirements of the client, ZVS. This element is designed as a multifunctional area intended for social, educational and presentation activities, reflecting the professional focus and thematic orientation of the client. The polygon serves as a space for organizing events, workshops or interactive programs focused on the issue of water, its management and importance in the landscape. At the same time, it represents an important compositional node of the area, which connects the individual functional zones and supports the social interaction of visitors.

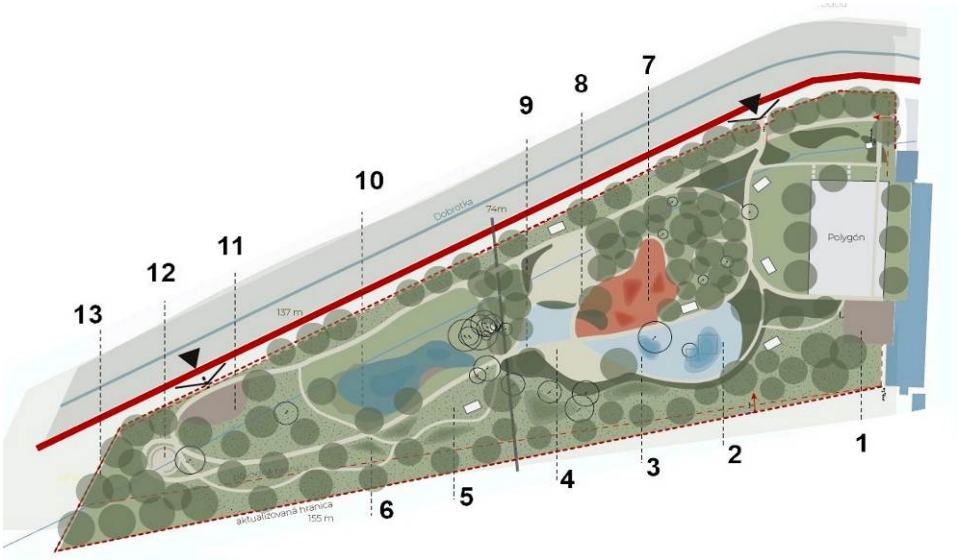

Fig. 3: Design solution for the ZVS complex with the main design philosophy of the Cycle of Water with the implementation of water elements. Overview of proposed elements and activities: 1) zone for social events, 2) well, 3) water playground, 4) relaxation zone, 5) terrain modeling, 6) fruit trees, 7) dry playground, 8) relaxation zone, 9) water playground, 10) wetland with a pond, 11) cycling hub, 12) viewpoint, 13) natural habitat (authors: T. Havrila, T. Ravasová, F. Tkáč, L. Vavrová, supervisor: G. Kuczman & V. Paganová, 2024-2025).

Access to the area is provided by footpaths and a cycle path. The extensive part is open to the public continuously, while the intensive part has a modified operating regime to protect the proposed technical water features. The extensive part of the area represents an open space based on natural elements and with low maintenance requirements. The dominant feature of this part is the cyclohub, the main base of cycling routes in Nitra, which provides a place to stop, rest, safely store bicycles and transition to the pedestrian zone. The area is complemented by a bicycle shelter, a gazebo, a fireplace, a yoga zone, a lookout and a pier by the lake. Natural meadow vegetation, terrain modeling and a biotope create an environment for relaxation, walks and ecological observation. Architectural interventions respect the natural character of the area and work with natural materials without the need for intensive maintenance. The design of the vegetation structure includes four thematic groups of trees: insulating, fruit, solitary and multi-stem trees. Insulating trees ensure the separation of noisy spaces, fruit trees support biodiversity and provide benefits, while solitary and multi-stem trees complete the aesthetic and spatial character of the landscape space. The main skeleton of the proposed trees consists of the following species: *Carpinus betulus, Quercus robur, Ulmus minor, Fraxinus angustifolia, Acer campestre, Salix, Prunus avium, Pyrus communis, Betula utilis* 'Jacquemontii', *Sorbus aria* 'Lutescens' and fruit trees: *Prunus avium, Pyrus communis, Prunus domestica, Prunus armeniaca, Cerasus avium, Castanea sativa, Amelanchier lamarckii.* The intensive part of the area is supplemented with perennial-grass plantings to ensure year-round visual attractiveness and its use. A significant habitat in the area is the wetland by the lake, which thematically completes the space and fulfills an important ecological function by retaining water and improving the microclimate in the area(Fig. 4, 5).

Fig. 4, 5: Visualization of part of the proposed recreational area (authors: T. Havrila, T. Ravasová, F. Tkáč, L. Vavrová, supervisor: G. Kuczman & V. Paganová, 2024-2025).

The result of the design process is a newly built recreational space, where water acts as a supporting compositional element that connects individual functional zones, but also fulfills an educational and symbolic role. It becomes not only a source of inspiration, but also a means of conveying knowledge about natural processes in the landscape.

Discussion

In the context of increasing manifestations of climate change, such as extreme precipitation, droughts, and increasing temperatures in urban environments, integrated water management is becoming increasingly important (Vinczeová et al., 2025). The discussion is therefore increasingly focused on the role of water features in recreational and public spaces, which can represent an effective tool for adapting to these changes (Bihuňová, et al., 2017, Bellérová & Hus, 2025). Their implementation contributes not only to more effective management of rainwater, for example by retaining it and gradually infiltrating it, but also to improving microclimatic conditions in the area. At the same time, it supports increased biodiversity and strengthens the overall ecological stability of the environment. Despite these benefits, it is also necessary to take into account the limits and challenges associated with their design, implementation, and maintenance, which opens up space for further research and the search for optimal solutions in specific local conditions.

Conclusion

The solutions created within the studio work represent a set of analyses and proposals aimed at making the issue of water in the landscape and its importance in the urbanized environment of the city of Nitra visible. The studio outputs reflect the principles of sustainable management of rainwater and point to their potential for practical application in landscape and architectural solutions. The proposed approaches connect technical and ecological aspects with artistic representation, through integrated artistic elements emphasizing the theme of water, as well as vegetation solutions close to nature.

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Souhrn
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