Green Street Standards – A Breakthrough in Urban Green and Blue Infrastructure (Wrocław, Poland)

Planning and designing green and blue infrastructure (GBI) as an integral part of urban streets – as is widely recognised – requires support in terms of organisation, funding, legislation and social awareness. As demonstrated by the case of Wrocław – one of the fastest-growing cities in Poland – standards can serve as an effective tool for supporting the implementation of GBI. These standards include guidelines and model solutions that integrate spatial, technical, and environmental aspects.

Before establishing these standards, introducing green and blue infrastructure to Wrocław's streets – even in newly planned projects – posed significant challenges. The main obstacles included insufficient space, the location of underground utility networks in areas that could otherwise accommodate trees, and relatively low public awareness of the importance of creating proper conditions for vegetation, especially large street trees.

Additional legal barriers also existed. For example, regulations required that the trunks of newly planted trees to be placed at least 3 meters away from the edge of roads. In practice, this often made it impossible to plant tall greenery within standard street layouts.

Until 2017, Poland's Water Law classified stormwater as wastewater, which had to be discharged into a storm sewer or, in its absence, into a combined sewer system. These regulations effectively hindered the use of bioretention solutions in street design, such as rain gardens, infiltration swales, or retention basins.

The first standards for planning and designing green and blue infrastructure (GBI) in urban streets were developed in 2010 [**1**] and marked a breakthrough in terms of increasing the number of streets lined with trees. They included a catalog of model street layouts featuring tall greenery, underground utility networks (often hindering tree planting), and other street design elements. The catalog was officially adopted for use in Wrocław by Regulation No. 9448/10 of the Mayor of Wrocław, dated 20 May 2010 [**2**]. This document became a key tool in the city's planning process – used in the preparation of local spatial development plans, in the review and approval of street design projects, and as guidance for departments and sectors not directly involved in greenery planning.

The amendment of the Water Law in 2017 [**3**], aligning it with EU directives (the Water Framework Directive and the Floods Directive), enabled a new approach to stormwater management. As a result, the standards were updated and expanded to include the management of runoff from hardened street surfaces, such as roads and pavements [**4**]. The revised standards were formally adopted for use in Wrocław by Regulation No. 2785/20 of the Mayor of Wrocław, dated 20 March 2020 [**5**].

This regulation obliges all municipal units and entities affiliated with the city to apply the standards in various areas such as the preparation of public procurement documentation, the review and approval of design documentation, the development of pre-design guidelines, as well as in local spatial development plans and other strategic documents.

The development of the standards was accompanied by numerous consultations with utility managers, designers, planners, representatives of public administration, and local residents.

This stage was crucial for shaping specific solutions in a multidisciplinary setting, fostering an understanding of the need to formalise them through regulation, and raising awareness of the role of green and blue infrastructure among the local community.

One of the key principles of the standards is that bioretention systems – such as rain gardens, swales, and infiltration basins – might be located together with underground utility networks, including water supply, sanitation, and street lighting systems, within shared zones. This approach had previously not been widely accepted or clearly defined.
While developing the standards, the acceptable distances between trees and underground infrastructure were also defined, along with recommended widths of street zones accommodating tall greenery. These guidelines are particularly important in the context of climate change and the need to ensure sufficient space and appropriate conditions for tree growth and long-term health.
The use of model street cross-sections that illustrate the layout of greenery (including tall and low vegetation), bioretention features, roadways, pavements, and underground networks provides a comprehensive approach to the planning and design of street corridors.
Applying these standards speeds up the design and approval process for new street projects and, at the spatial planning stage, helps ensure that road corridors are wide enough to accommodate elements of green and blue infrastructure.

Since the introduction of the standards, there has been a significant increase in the number of street trees and streets equipped with bioretention systems. One notable example is the sequence of Asfaltowa and Lutosławskiego Streets in the southern part of the city, where rain gardens and infiltration basins were added, along with the planting of 202 trees and 13,400 shrubs, ornamental grasses, and perennials – some of which were placed within the rain gardens and swales (**Fig. 1, 2**). These streets were developed within one of the problematic catchments in southern Wrocław, where it was particularly important to relieve pressure on the receiving water body – the Brochówka River. In many new streets, rainwater runoff from roads and pavements is now managed through rain gardens, significantly reducing the load on the stormwater system and limiting the need to expand it further (**Fig. 3**).

The GBI standards implemented in Wrocław effectively support the concept, initiated in the second decade of the 21st century, of strengthening connectivity within the city's green infrastructure network through street greening [**6**]. Their universality and practical relevance are demonstrated by their adoption in other Polish cities, including Katowice.

Once a marginal aspect of urban street planning, GBI is now becoming a fully integrated and equal component of urban infrastructure. The successful integration of nature-based solutions with technical and transportation (road) infrastructure makes the Wrocław standards a significant point of reference for other municipalities – both in Poland and across Central Europe.

References

[1] Szopińska, E., Rubaszek, J., Skarżyński, D. (2010). Propozycje standardów w zakresie kształtowania zieleni wysokiej miejskich tras komunikacyjnych / Proposed standards for shaping high greenery on urban streets [In Polish]. Wroclaw: Zarząd Zieleni Miejskiej we Wrocławiu / Wrocław Municipal Greenery Board. Accessible at: https://zzm.wroc.pl/wp-content/uploads/2022/09/Propozycje-standardow-w-zakresie-ksztaltowania-zieleni-wysokiej-miejskich-tras-komunikacyjnych.pdf

[2] Order No. 9448/10 of the President of Wrocław from 20 May 2010 [In Polish]. Accessible at: https://baw.um.wroc.pl/UrzadMiastaWroclawia/document/5852/

[3] Act of 20 July 2017 - Water Law / Ustawa z dnia 20 lipca 2017 r. – Prawo wodne (Dz. U. 2017 poz. 1566) [In Polish]. Accessible at: https://isap.sejm.gov.pl/isap.nsf/DocDetails.xsp?id=WDU20170001566

[4] Szopińska, E., Rubaszek, J., Gizowska, A. (2020). Standardy planowania i projektowania ulic w zakresie zielono-niebieskiej infrastruktury / Street planning and design standards for green and blue infrastructure [In Polish]. Wrocław: Wydawnictwo Uniwersytetu Przyrodniczego we Wrocławiu. doi:10.30825/1.14.2020. Accessible at: https://dbc.wroc.pl/dlibra/publication/146692/edition/78639/content

[5] Order No. 2785/20 of the President of Wrocław from 20 March 2020 [In Polish]. Accessible at: https://baw.um.wroc.pl/UrzadMiastaWroclawia/document/41276/Zarzadzenie-2785_20.

[**6**] Rubaszek, J. (2016). The Green Arteries of Wrocław: the Example of Renovation of the Street Landscape. *Kwartalnik Architektura Krajobrazu/ Quarterly Landscape Architecture 4*, 53, 46–63. Accessible at: http://architekturakrajobrazu.up.wroc.pl/images/AK_4-2016_2.pdf

Fig. 1 Lutosławskiego Street in Wrocław (Poland) – the result of implementing green and blue infrastructure standards. A total of 220 trees and 13,400 shrubs, ornamental grasses, and perennials were planted along the street, some of them within rain gardens and infiltration swales (Photo: J. Rubaszek).

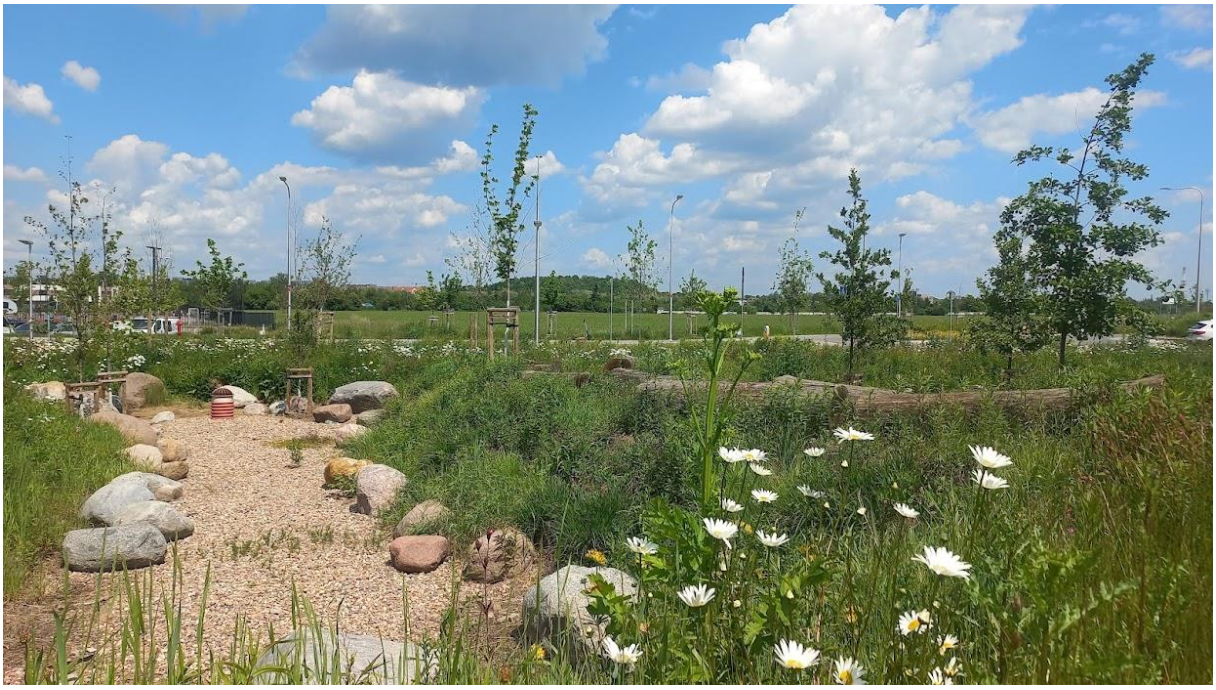

Fig. 2 Infiltration swale on Asfaltowa Street in Wrocław (Poland), designed to collect excess water during heavy rainfall (Photo: J. Rubaszek).

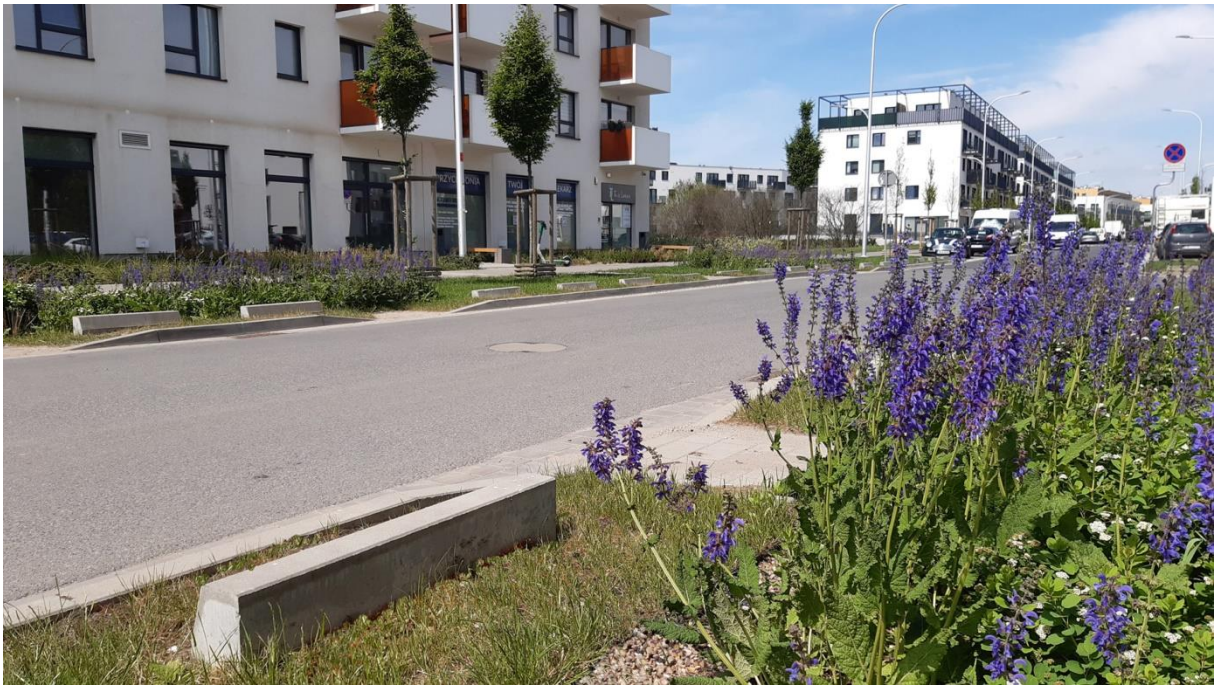

Fig. 3 Local stormwater management in a rain garden collecting runoff from S. Drabika Street, Wrocław (Poland). (Photo: J. Rubaszek).