Planning for Environment and Resource eFficiency in European Cities and Towns

Bratislava study tour – learning report

Wednesday 22nd June to Thursday 23rd June 2022

From the 21st to the 23rd of June 2022, the PERFECT partners met in person to share experiences and visit green infrastructure sites. Bratislava Karlova Ves Municipality hosted the Town & Country Planning Association, Somogy County Government and Regional Development Agency of the Ljubljana Urban Region, Slovenia and their stakeholders. This report summarises the lessons learnt by the group at each site visited and how the experiences and knowledge gained will help improve green infrastructure policy and practice across the partner regions.

DAY 1 - Wednesday 22nd June 2022

On the first day of the study tour, the partners attended a presentation at Bratislava's Magistrate Office and visited sites managed by the City.

Presentation at Bratislava's Magistrate Office

"Their story is the proof of how local authorities manage to increase investments in green areas, parks and fountains across the city, thanks to a substantial increase of the municipal budget"

"This presentation helped inform my role in terms of understanding the process of implementing plans from a central government perspective. It highlighted that with some urban greening methods the environmental outcomes were not as successful in regard to climate change but did have an unexpectedly high positively impact on the mental health and enjoyment of the public."

Partners walked through Hlavne nam. and Hviezdoslavovo nam squares to the Bratislava Magistrate's Office where Zuzana gave a historical explanation of the area and some of the challenges protecting and reinstating trees in the Old Town. She also highlighted the importance of preserving ancient trees as large trees have a crucial role to protect from sun and rain, mew trees take too long time to grow to the same size as ancient trees.

Figure 1 Newly reinstated trees in Bratislava Main Square (Hlavne Namestie)

Figure 2 Importance of protecting older trees (right side), rather than planting new ones (left side)

The walking tour was followed by a visit to Bratislava's Magistrate Office where one of the officers gave a presentation on the work that is being pursued in the Department of Urban Greenery. Some of the projects that were mentioned were visited during the study tour.

The officer explained that the City had a project to revitalise urban green spaces at a large scale which is part of the vision of the Mayor, Matúš Vallo, to plant 10,000 trees by the end of his first electoral term.

The delivery of 10,000 trees was complex, and the officers recognised that it was not possible to plant 10,000 trees in an urban area as space is limited and there were infrastructure challenges. Whilst it was convenient that the trees were planted on municipal property, they needed consent from 30 utility representatives to decide their location and to minimise disruption to gas, water and sewage pipelines. The strategy shifted and by 2022 they successfully planted 3,420 trees, 17,488 shrubs and 20,600 seedlings. The City also recognised that there was a value to planting trees outside the urbanised area to enhance the local biodiversity next to the Biocentre Sprincľov majer and Bio corridor Račiansky potok where they planted 60 trees and 600 seedlings.

The City officer also outlined other interesting projects that were being delivered which included:

- Green railways in Bratislava: revitalised green spaces along the tram tracks where paved islands were changed into planting areas and flowering perennial beds were planted next to an open trackbed. The officer highlighted some of the problems around maintenance as weeds needed to be managed and protect the spaces from trampling
- Green facade in Janotova street and Ľ. Fullu street and in Karloveská street and Americké nám.: climbing vegetation was planted by concrete retaining walls. This was beneficial both by making the space more attractive and because it reduces the noise from the street. The main challenge that they face is that when gardeners mow the grass verge next to it, they accidentally cut the plants, overall it is a very cost effective measure

- Green road islands for better climate and a more beautiful city: perennial plants and stonecrops were planted on the road island, helping to make the city more beautiful. The main challenge around this project was that trees were planted close to the tram tracks but they were not in the initial plans so they had to be removed. The images showing the improvement can be accessed here.
- Butterfly or flower meadow: the project was created with to improve the quality of public space, increasing biodiversity and adapting to climate change. There will be limited mowing in the area and the seeds include a mix of flowering plant seeds to improve conditions for insect pollinators
- Climate resilience in practice: conservation, protection, restriction and cooperation in forests. This is a new approach on how to manage forests, plans to increase forests around the city but specially protecting existing trees as it is better for carbon sequestration than planting new trees. Some of the agreements include:
    - Cooperation on the declaration of the Vydrica nature reserve – 1.2.2022
    - Management limitation agreement with the Forests of the Slovak Republic - 5.6.2021
    - Closer to Nature Forest Management in Urban Forests: Restriction of logging, water retention measures, support of recreation

The City officer also talked about a project that explored the use of green infrastructure during the Covid-19 lockdowns. This project was informed by a survey on the participation of young residents in the Sad Janka Kráľa park. They monitored park attendance during the pandemic via Instagram and specific hashtags like #sadjanakrala. Using artificial intelligence tools, they were able to identify what each photo depicted, and the content of the comments and hashtags. They also used data from Google Maps and found that decreased by 22% in April 2021 activity compared to the period before the outbreak of the pandemic. At the same time, it increased in neighbouring areas, by up to 4% (Bratislava District II), 41% (Bratislava District III) and 20% (Bratislava District IV) 4. The analysis made by Urban Studies and Participation Section showed that Sad Janka Kráľa and Medická zahrada have the most posts, so they are visited by the most people using Instagram. So far, over 10,000 contributions have been published worldwide

Another project that emerged during the pandemic focussed on the revitalisation of public spaces with the addition of mature greenery. Several areas of public green space and parks have been revitalised and newly created as part of this initiative including: Križná-Karadžičova, Záhradnícka-Karadžičova, Husova, Kamenné nám., Trnavské mýto, Prugerwalner's garden, Crowne plaza and the park under the SNP Bridge. In Hodžovo Square they added new pots for trees and perennials although it was an expensive measure and it is unknown whether trees will survive being in pots. However, they are seeing a positive impact online.

Figure 3 - Green railways in Bratislava

Figure 4 Flowering meadows in green railways in Bratislava

JAMA Sports Park

"It would be useful to implement similar measures into UK parks as it manages rainfall and prevents the formation of puddles – a key issue in the UK. This highlighted the importance of surface water mitigation, as a way of keeping public spaces useable in all-weather and making use of rainwater."

"The way sports areas are integrated within the green landscaping and pathways, makes the park attractive and entertaining – particularly the cycle track covering the outskirts, the park is accessible and suitable for variety of different people and ages."

"We also consider important to combine natural elements with sports opportunities when renovating parts. One of the best ways to achieve mental health is outdoor sports. We would like to follow a similar approach when delivering future projects in our municipality"

After lunch, the partners visited the JAMA Sports Park (Športpark Jama) which is in the Bratislava - Nové Mesto city district. The park which was built on the grounds of a former cycling stadium was opened in 2017 and has an area of 17,000 sqm. It is used for leisure and exercise for all age groups.

The park is a unique ecological project in terms of rainwater management. Rainwater is collected from paved and green areas into artificial lakes which then become the water source for water irrigation. The water permeable concrete ensures that, when it rains, no puddles are formed in the park making it suitable for walking even in bad weather.

The two interconnected lakes are situated in the lower zone of the park. In addition to managing water for irrigation purposes, the water circulating in the lakes cools the surrounding area in the summer. There is also a lot of greenery (trees, lawns and areas planted with various flowers and plants), a natural amphitheatre, benches and two areas reserved for exercise, including exercise machines and a ping pong table. In the upper zone, there are lookout points, sports areas such as a multifunctional playground for mini-football and streetball, tennis courts, fitness machines, parkour sets, ping pong tables, a running track, a skating rink, and a cycling circuit.

Figure 5 JAMA Sports Park

Figure 6 Water retention lake in JAMA sports park

Iron Little Well (Železná studnička)

"It was useful to see the preservation of an existing natural site and transforming and regenerating it to have wider uses by the public. It was really great to see how, by creating attractions within a natural place, more people were drawn to visit it in order to use this infrastructure"

"A very special feature of Iron Little Well is the harmony of technical buildings (mills, ponds, forestry and fisheries facilities) with leisure-time buildings which are very popular among people. We could

also observe here what we have already experienced in Hungary, that the beautiful environment attracts people."

After JAMA Sports park, the visitors travelled to Iron Little Well (Železná studnička), part of the Bratislava Forest Park, which is one of the most famous and most popular recreational locations in Bratislava. It is located on the southern edge of the protected landscape area of the Little Carpathians and the Vydrica stream flows through it, which is historically known as an area of water mills, with mills dating back as early as 1455.

In 1846, millers solved the challenges of drought during the summer by building a system of four lakes, which served as a water reservoir for nine mills. The ninth mill is still preserved to this day - Suchý mlyn (Dry Mill). Klepáč, originally the eighth mill, is a pleasant place where people stop for a snack. The lakes are currently used by visitors for fishing and boating.

Železná studnička was named after a source of ferrous mineral water, which was discovered at the beginning of the 19th century by millers. In 1830, the guests of Ferdinand's Spa began to use the healing water. The springs of mineral water were lost over time, due to the construction of the lakes and the spa building fell into disrepair, until it was later demolished.

A particularly attractive area of Iron Little Well is Partizánska lúka (Partisan Meadow), which is in its immediate vicinity and is a popular excursion destination for Bratislava residents. In the 1960s and 1970s, the meadow began to open more to the public and add playground features. As a result, a small children's pool, a snack bar and a public toilet were added. In 2006, it was completely renovated. Today, Partizánska lúka has playgrounds, sports grounds, restaurants and attracts many visitors every year.

Figure 7 Canal in Iron Little Well forest

DAY 2 – Thursday 23rd June

The second day of the study tour focussed on the projects being delivered in the municipality of Bratislava Karlova Ves.

Waterworks Garden (Vodárenská záhrada)

"This site demonstrates how a privately owned and managed park is being used freely by the public. The paddling pools worked well providing a clean and safe place for children to cool down, the volleyball and table-tennis area also encouraged physical activity, which again was a reminder that if you provide the infrastructure people will use it, but also that the infrastructure complimented the climate of Bratislava"

"The waterworks complex's main feature is the union of technology and nature. We could visit not only the Waterworks Museum but the Waterworks Garden and the Community Garden as well. We got to know a comprehensive overview of the production and distribution of drinking water and drainage and treatment of wastewater."

"The Community Garden provides opportunities for citizens to grow vegetables, fruits and herbs using local resources. It responds to the lack of greenery in cities, the loss of public space at the expense of private spaces, the transformation of abandoned space, the creation of a more pleasant natural environment or the connection of the local community with urban agriculture."

On the second day, the partners travelled by bike along the river to the Waterworks Garden, a well-known and attractive garden in Bratislava. The park is part of the Waterworks Museum and opened to the public in 2012. It is in the Bratislava-Karlova Ves city district, near the Karloveské Rameno arm of the river Danube, in the vicinity of which the original floodplain forests with rare species of plants and animals have been preserved. The partners received a tour of the park, the museum and the allotment by a tour guide.

The dominant feature of the garden is the cascade fountain called Drop of Water and a water reservoir with a view. It has its a leisure and an active zone and includes the outdoor display of the Waterworks Museum.

The leisure area is situated around an English lawn and a historic fountain called Little Boy with Egret. There is also an indoor design gazebo nearby. The sports part of the garden can be used to play volleyball, football and ping pong. Bicycle stands are available for visitors. There are drinking fountains throughout the garden. There is also a community garden in the 3-hectare area of the Water Museum.

Figure 8 Waterworks Garden

Figure 9 Wildflower meadow by allotment in Waterworks Garden

New Karlova Ves Shipyard (Nová Karloveská lodenica)

After the visit of the Waterworks Garden, the partners stopped for refreshments at the New Karlova Ves Shipyard (Nová Karloveská lodenica). This building was built by the Bratislava-Karlova Ves municipality in 2019 and it is located by the Karlova Ves arm of the Danube River.

Its architecture draws from the tradition of water sports and classic wooden shipyard buildings in Karlova Ves, with a strong focus on natural materials. The lower part, which is partially underground, serves as a hangar for kayaks and other boats and is made of reinforced concrete as a preventative measure in case of potential flooding; the 2-storey upper part is made of untreated wood and steel, with walls lined with vertical wooden boards both in the exterior and interior.

At the shipyard, the partners were given a presentation by Daniel Slontay, one of the band members of Longital, a Slovak music group. The presentation was about 'Longital – Soundwalk', a unique music soundtrack available as a mobile app which was composed by the band for their favourite hour-long walk along the Danube - from the residential area Dlhe Diely to the SNP Bridge (Most SNP). Alongside the soundtrack there are also narrations from the artists about the space.

The app contains 10 songs, with a total length of 60 minutes. Each track defines one section of the route along the Danube between Dlhe Diely and the centre of Bratislava. At the same time, it provides

insights and stories of the band to each place of the walk. The app also includes a map outlining the route. The soundwalk starts on Jamnickeho Street in Dlhe Diely in Bratislava and leads down Matejkova Street to the arm of the Danube, continues downstream through Waterworks Garden, Karloveska Bay and along the waterfront will take you to the SNP Bridge to the city centre.

New multifunctional park in Karlova Ves

After the shipyard visit, the partners visited a new multifunctional sports park in Karlova Ves that was opened at the beginning of May 2022. This park was mentioned during the presentation at Bratislava's Magistrate Office. It was built on an empty site which had no use in the past. During the Covid-19 pandemic, it became clear that Karlova Ves lacked in public green spaces, especially for young people, so the municipality invested in this new multifunctional park.

The biggest attraction of the park is the sports zone with a skate park and a playground. In the children's zone, there is a slide, a game tunnel, mini-football and seat rollers. The third multifunctional zone consists of a running track, fitness climbing and ping pong. The individual zones in the park are separated by greenery with benches, which helps to create a pleasant place for all generations. There is also a drinking fountain in the park and a grandstand to observe what is happening in the park. One of the benefits highlighted by the municipality is the new lighting and camera system, which increase the security of the whole area.

Greenery plays an important role in the whole park, which will have a positive effect on the local microclimate, especially during the summer months. In addition to the Sakura Alley, with cherry trees donated by the Japanese Embassy, there is also a rain garden in the park, which can absorb large amounts of rainwater. While the water flowed directly into the sewers in the past, the rain garden will help capture the water in the area so that it gradually evaporates into the air. As a result, the air will improve, as well as the conditions for the growth of greenery or the life of avian insects. There are also water-permeable surfaces throughout the park.

Figure 10 New multifunctional park in Karlova Ves

Kaskady Park

"Kaskady Park has the model value and could serve as example how to deal with separated green infrastructure elements in more integrated way taking into the consideration different aspects of the green infrastructure and the functions in the field of the adaptation and mitigation to the negative impact of climate change. We can adopt these experiences when planning our liveable settlement projects in order to mitigate the negative climate change impacts."

"This visit was especially useful for my role because it was a both a public and residential space – it was a direct solution to tackling rainwater drainage in a residential area, whilst also providing green space for the residents and locals to enjoy."

Following the visit of the multifunctional park, the partners visited the Kaskady Park, one of PERFECT's pilot projects. The revitalisation of Kaskady Park was carried out in accordance with the Climate Action Plan, which the Municipality Bratislava-Karlova Ves adopted to mitigate the negative climate change impacts. The project is in a green area in a residential estate that was revitalised in 2021 to capture, slow down run off and use rainwater effectively. This was used to end up in a unified sewerage system mixed with wastewater but is now used as an irrigation system.

Water from the roofs and terraces of the upper residential complex is drained into two underground reservoirs and is used for drip irrigation of trees, bushes and planted plants. There are also two wetland beds, which collect the rainwater from the sidewalks and the surrounding slope laws, and seven grassy retention areas which have been planted with flowering meadows. 21 trees were planted and are protected by 84 prickly bushes because tree trunks are often damaged by the mowing mechanisms and pets. The water that evaporates from the wetland beds and the retention areas humidify the air to create a cooler microclimate during hot days.

Figure 12 Water retention feature in Kaskady Park

Figure 11 Roofs in Kaskady Park

Majernikova Sports and Recreational Area

After lunch, the partners visited the Majernikova Sports and Recreational Area (Športovo-rekreačný areál Majerníkova) which is in the residential area Dlhé diely. This is a sports park with football, basketball, volleyball and running facilities which are lit by solar lamps. It is used by residents and the pupils from the adjacent school, Alexander Dubcek Elementary School. New plants, trees, shrubs, shelters for reptiles and hedgehogs and birdhouses have been included in the recreational area. Information boards explain the value of these 'insect hotels', the role of green infrastructure to cool down the park and its relationship with climate change.

Alexander Dubcek Primary School

"Seeing that all the lamps were solar supplied, and the swimming pool would be heated by these was encouraging. It led us to think about how UK schools could use their buildings/roofs for solar energy. The construction of the outdoor learning areas, such as a gazebo and information boards on ecology, was a very inspiring and it was clear that education of the importance of preserving the natural environment was a prominent feature of the redevelopment of the school"

"We have seen some really good ideas that can be implemented on a really small budget. All of this is created in the immediate vicinity of a school, which has an educational role in addition to protecting the environment"

The last site that the partners visited was Alexander Dubcek Primary School (Základná škola Alexandra Dubčeka) which is adjacent to Majernikova Sports and Recreational Area and is the largest primary school in the Bratislava-Karlova Ves municipality. The school is currently being renovated and aims to implement measures to adapt to the changing climate, mitigate climate change and promote biodiversity.

The renovation will go beyond the existing requirements for temperature management for public buildings, having high energy performance and reducing its carbon footprint. The building will improve the indoor temperature, the outdoor microclimate, use rainwater and increase plant and insect diversity. The school will use solar energy through the photovoltaic facility as a small source of electricity in the school. This will reduce energy consumption for water heating including in the swimming pool. In addition to thermal insulation, the building will also be prevented from overheating through adjustable blinds and creeper plants on the facade.

Local biodiversity will be supported by nest boxes for dark earthworms, bats and white worms. Climbing greenery will also be located in the inner atriums, from where cleaner and cooler air will be sucked into classrooms, offices, classrooms and the gym. Ventilation systems will prevent the penetration of dust and pollen, reducing the risks of mould. To educate children about climate change, 2D and 3D interactive models will be placed in the atrium. They will be part of the newly created Community Climate and Biodiversity Educational Centre which provides the school's environmental education.

Figure 143 Green roof at Alexander Dubcek Primary School

Figure 134 Green infrastructure at Alexander Dubcek Primary School