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Greenway Planning in the 11th District of Budapest

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Abstract

District 11 is one of the most dynamically developing parts of Budapest, its population reached 150,000 people in 2018. The widest variety of land use is present in its 30 km² of area, including apartment buildings from the early 20th century on the banks of Danube, villas on the Gellért Hill, panel buildings in the outskirts, industrial areas, family houses, and semi-natural areas. In addition to the developments affecting residential areas (Kasza, 2007), numerous investments have been started in the last few years that will have an effect on the entire capital: the tallest building in the city is under construction at the Kopaszi-gát (Kopaszi-Dam) and a so-called 'super hospital' is planned in the district near Budaörs (www.ujbuda.hu).

The local government of the district has plans to create a greenway (Fabos, 2004), to satisfy the locals' need for recreation by joining the remaining semi-natural areas. Landscape architecture master's students from Szent István University are involved in the planning process. Our job was to select the route for it and to create development recommendations for hubs along the way. The planned greenway will be accessible to pedestrians as well as by bicycle (Bicycle roads, rules). It will lead from Kamaraerdő in the north (in the neighbouring District 12) to Normafa, two popular places on the Buda side of the capital for hiking and relaxation. Students completed the planning projects in groups.

The planning had to accommodate special requirements at each location:

1. Kamaraerdő: recreational developments, expanding existing elements
2. Bitterwater: recreational development while preserving the protection
3. Madárhegy (Birdhill): development of the green infrastructure network taking into account the new functions (parking, tree planting on the streets, potential future public transportation)
4. Rupp-hegy (Rupp Hill): recreational development while preserving the protection
5. Normafa: creating the link to the areas in District 11, expanding the green infrastructure network between it and the district's border

Two variants were created of the plans for both areas, which we presented to the local government and local population at a forum in May 2017. The local government of the district plans to use the materials created by the students as part of a tender for financing the greenway.

Introduction

District 11 is one of the most dynamically developing parts of Budapest, its population reached 150,000 people in 2018. The widest variety of land use is present in its 30 km² of area, including apartment buildings from the early 20th century on the banks of Danube, villas on the Gellért Hill, panel buildings in the outskirts, industrial areas, family houses, and semi-natural areas. In addition to the developments affecting residential areas (Kasza, 2007), numerous investments have been started in the last few years

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There is a close cooperation between the local government of the XI. district of Budapest (Újbuda) and the Faculty of Landscape Architecture of Szent István University: from time to time, our students complete surveying or planning projects for the local government with the assistance of the local government's experts. In the previous years, as part of this cooperation, we created the landscape value cadaster of the district, surveyed neglected areas, and the students presented concepts for the renovation of several parks. In the spring semester of the 2017-2018 academic year, students in the landscape architecture master's program received the task to select the path for a greenway from Kamaraerdő in the Southern part of the district to Normafa, past the northern border of the district, in the XII. district. As there were several areas of recreational importance along the planned path, we created concepts for their development. During their work, our students refined the provided map data with visits to the areas, then, through regular consultations, created the pathway and the development concepts.

The local government of the district has plans to create a greenway (Fabos, 2004), to satisfy the locals' need for recreation by joining the remaining semi-natural areas. Landscape architecture master's students from Szent István University were involved in the planning process. Our job was to select the route for it and to create development recommendations for hubs along the way. The planned greenway will be accessible to pedestrians as well as by bicycle (Bicycle roads, rules). It will lead from Kamaraerdő in the north (in the neighbouring District 12) to Normafa, two popular places on the Buda side of the capital for hiking and relaxation. Students completed the planning projects in groups. The plan connects the locations, which are prominent in recreational aspects, into the district's and the capital's green infrastructure network and were connected with a walking and cycling route.

The integrated urban development strategy for Újbuda for the period 2014-2020, in which the following objectives, relevant to the planning task, were developed in connection with the development of green infrastructure. (Budapest Főváros XI. Kerület Újbuda Integrált Településfejlesztési Koncepció, 2015):

<ul style="list-style-type: none"> • Strengthening transport links, reducing the negative effects of mobility • Development of external and internal community transport connections • Developing external and internal road network connections • Developing cycling infrastructure • Developing pedestrian traffic 	<ul style="list-style-type: none"> • Development of external and internal community transport connections • Developing external and internal road network connections • Developing cycling infrastructure • Developing pedestrian traffic
<ul style="list-style-type: none"> • Development of greenspace system 	<ul style="list-style-type: none"> • Quality and quantity development and maintenance of district public spaces and green spaces • Improving the urban green space system and protecting the green ring • Making green spaces suitable for community building

	<ul style="list-style-type: none"> • Protecting forest areas and new afforestation
<ul style="list-style-type: none"> • Preparing for climate change 	<ul style="list-style-type: none"> • Preparing to deal with extreme rainfall events caused by climate change • Preparing to deal with global warming
<ul style="list-style-type: none"> • Active society 	<ul style="list-style-type: none"> • Providing sports and recreation opportunities for all ages

The Budapest Green Infrastructure Plan, adopted in 2017, involved Kamaraerdő, situated in Újbuda, and the areas of the green spaces, which were not yet built on the western border of the district into protected areas. Among the developments in the plan, the green corridor connecting the Dobogó with the Danube is part of our planning area.

Background and Literature Review

Four of the areas, affected by the design, situated in the XI. district, and 1 to neighboring XII. district. Each area is historically different in terms of its features, so the emphasis of the design is different of each part.

These are the locations of the project in Újbuda (Figure 1.):

Kamaraerdő: The 11th district's contiguous forest area (180 ha), which has been inhabited since the Middle Ages. The place was donated to Germans not to leave the perished field waste by IV. Béla after the retreat of the Tatars. This settlement original name was Kána that existed until the 19th century. The name Kamaraerdő, used from 1847, comes from the German "Kammerwald". This is partly due to the distortion of the old German name (Kanaerwald) and the fact that for centuries the area was the property of the royal chamber (treasury) and the city of Buda. In 1847 the German mirror translation of the German Kammerwald became the name of the area. The area is very important for the recreation of local and not local residents. In the forest tourist routes were designated, in 2012 the municipality established a nature trail. A terület igen fontos a helyi és környékbeli lakosok rekreációja szempontjából. Az erdőben turista utakat jelöltek ki, illetve 2012-ben tanösvényt létesített az önkormányzat (Kasza, 2007).

Bitterwater (Keserűvíz-telep): The area is located between the M7 motorway and Egérút. It was named after the bitter water springs in the area, dating back to the 19th century, which were exploited for medical purposes. The 6 to 8 meter deep glaubers with mineral water is actually groundwater, in this case any surface contamination is at risk. The valuable meadow plant association typical of the meadow appeared as a result of minerals enriched in groundwater. The use of human landscapes also contributed to the survival of the meadow - long ago the area was grazed with cows and goats, or maintained by mowing, so the formation of shrub and tree groups`initiation could not start. The process has started for a short time, tree groups have emerged in some areas, and signs of spontaneous afforestation can be tracked. The meadow is losing the bitter taste water and dehydrating. As a result of the trench system collecting surface waters, the groundwater was deeper, thus reducing the concentration of surface salt. There are several types of recreational activities in the area: bob-trails, dog schools, parks and walking trails. The bitter water colonies are in the immediate vicinity of the newly planned South Buda Super Hospital (Kasza, 2007).

Birdhill (Madárhegy): One of the most rapidly transformed areas in the district, which was formerly called Starentanz (Seregélyes in Hungarian). The area was started to be built after 2006 with small and

medium sized apartment houses, it was almost uninhabited before. There is hardly anything left of natural plantation today (Kasza, 2007).

Rupp-hill (Rupp-hegy): The **Rupp-hegy** is the easternmost part of the Csíki Mountains in Budaörs, where both protected areas and fast-growing residential area can be found. 38 protected plant species are registered in the nature conservation area. The area of 7.7 hectares has been under protection in the capital since 1977 (Kasza, 2007).

Location on the north side of the project area belonging to 12th district:

Normafa: Normafa is a popular destination for hiking and skiing in Budapest, in the eastern part of the Buda Hills, part of the Buda Landscape Protection Area, with a height of 477 m. The area is covered with forest. Normafa is one of the most popular hiking places in Budapest, where a ski resort were built, and it is a popular ski resort for the capital city.

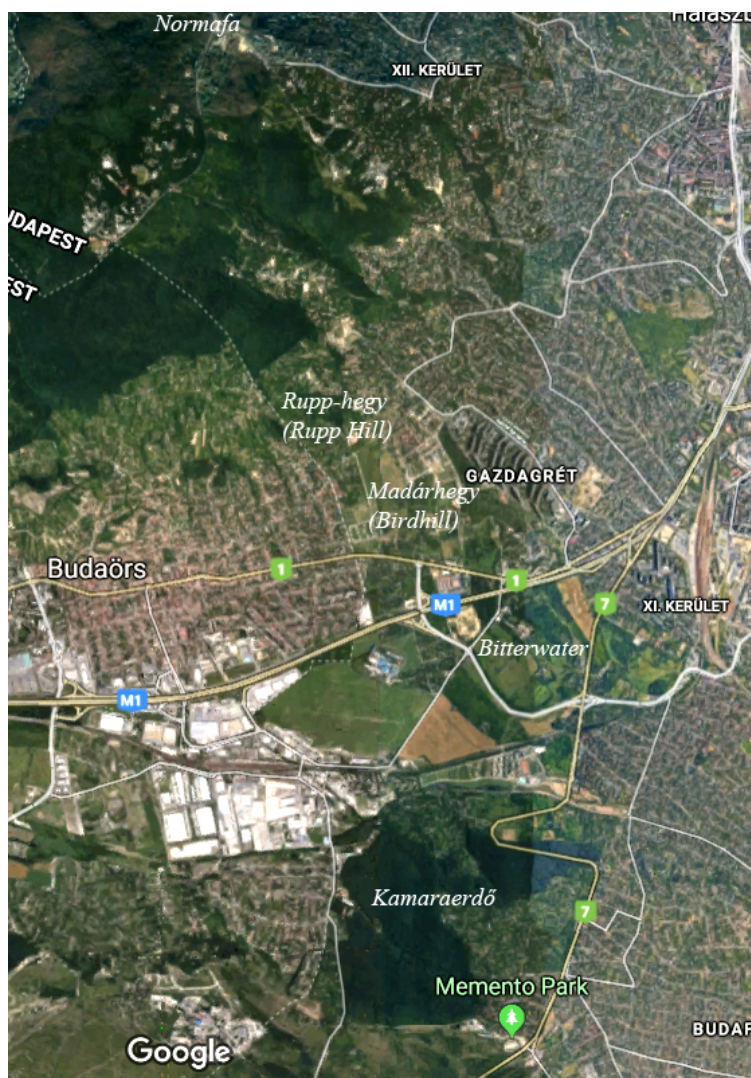


Figure 1.: Planning area

The design had to meet with 2 requirements: the plans had to be integrated into the green infrastructure network, and the sites, which had a prominent place for recreation, had to be connected with cycling and pedestrian paths for the highest possible use. The term green infrastructure design has gained more and more ground in the world including in Hungary in the last decade. The European Commission Communication on "Green Infrastructure - Enhancing Europe's Natural Capital" (...) defines green infrastructure as follows: "Green infrastructure: a strategically designed network of natural and semi-natural areas and other environmental features designed and managed to provide a broad ecosystem and be able to provide services." (2013, p.1) According to the definition it contains green areas (blue for aquatic ecosystems) and other physical properties in land (including coastal) and marine areas. On the mainland, green infrastructure is present in both rural and urban environments. The concept of green infrastructure is closely linked to the preservation of biodiversity in domestic and EU regulations, which plays an important role, but not exclusively, in uninhabited areas.

Several definitions exist for 'greenway'. Most of the concepts are in English, but in the last few years several Hungarian definitions have been created. The first explanation accompaniment can be found in the Green Belt Pilot Project of South Buda, prepared by the Department of Landscape Planning and Regional Development of Szent István University. The current design area was affected by the pilot project from the West, as it was in the 11th district. The agglomeration settlements on the western border of the district were already part of this pilot project.

Greenway

We found two definitions for greenway, which have some overlaps but also notable differences. A greenway is a linear, multifunctional landscape architectural element whose most important role is to create a relationship between ecological and/or recreational open spaces (Fabos, 1995). A green road is a set of terrestrial green spaces created alongside a line-like natural formation (watercourse, natural corridor, ridge) or a human-made infrastructure facility (road, rail, canal) that connects parks, green spaces, nature conservation areas, and can also serve a recreational function (Csemez et al 2000). In the course of the design, we considered the first Fabos (1995) definition to be the guiding principle, supplemented by the definition used by the Greenway Hungary Methodological Association, according to which green roads are useful for nature conservation, cultural heritage protection and health preservation. They help the development of the local economy and the strengthening of local communities (www.zoldutak.hu).

Greenways for America, a book by Charles E. Little includes five definitions for greenways:

- **Urban riverside greenway** usually created as part of (or instead of) restoring a neglected urban riverside
- **Recreational greenway**, which is generally a long-distance road, based on natural boundary lines such as canals, abandoned railway tracks or other public roads
- **Ecologically significant greenways**, usually along rivers or streams or (rarely on mountain ridges) that promote animal migration, interrelationships, and knowledge of nature, as well as excursions
- **Paths along panoramic or historic roads**, usually roads or highways (rarely waterways) with roads designed to allow pedestrians to reach their main sights or provide a place to get out of the car
- **Comprehensive greenway** or network, usually based on natural landscape shapes such as valleys and mountain ranges, but sometimes just a network of green roads and diverse open spaces that create an alternative transport or regional green infrastructure (Little, 1995, 4-5)

Goals and Objectives

The planning had to accommodate special requirements at each location:

1. Kamaraerdő: recreational developments, expanding existing elements
2. Bitterwater: recreational development while preserving the protection
3. Madárhegy (Birdhill): development of the green infrastructure network taking into account the new functions (parking, tree planting on the streets, potential future public transportation)
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During the pre-design research, we focused on:

- natural and social conditions,
- territorial planning classifications,
- landscape and nature reserves,
- proposed sectioning of greenways (terrain, road surface, accompanying green areas, landmarks, nice lookouts),
- ecosystems, system components to be preserved,
- cultural heritage, unique landscape values,
- land use conflicts.

Our goals:

- resolving land use conflicts,
- greenway section development possibilities (road surface, landmarks),
- appointing rest areas, outline plans,
- suggestions for tree plantation (places, recommended tree species),
- corporate identity elements (road signs, information boards),
- road surface design options,
- green road junctions,
- planning of study trails.

Methods

To help with the planning process, the local government provided us with orthophotos of the district taken in 2017, which served as the primary source of data for the students. We used both GIS and CAD software (AutoCad) and graphical software (Photoshop). We used QGIS 2.10.1 (Pisa) software to process GIS data in the EOVS HD72 projection system. We used high-resolution Google Earth aerial imagery as well as vector layers with plot numbers, house numbers, and street names that contain land boundaries as the base layers that were used in 11th district municipality and provided for the project. The designs were documented on A / P posters. After presenting the results, we handed over the posters to the local government. According to the plans, they will be used in a joint green infrastructure development projects by the two local governments.

During the design process we have considered the criteria of **Central European Greenways (CEG)**: The urban greenway's main purpose is to learn about safe transport, relaxation and local values and heritage.

Features:

- a) At least 90% of urban green roads are covered with solid surfaces.
- b) Greenway traffic corridors for non-motorized vehicles; are built along separate routes, follow available, old or unused traffic roads.
- c) The rise of greenways is low or zero, so it can be used by all users, including people with disabilities.
- d) There is at least one (if the greenway is returning to themselves) or two (if the Greenway is non-returning) information table.
- e) There are at least one "point" of rest and / or leisure on greenway. "<http://zoldutak.hu/dokumentRAs/>)

Following the guidelines for planning, we chose roads with solid paving suited for bicycle traffic for the greenway, ideally ones that avoid high-traffic roads and junctions. Our biggest difficulty was crossing the M7 motorway, which resulted in us having to incorporate a small bypass in order to be able to use an existing road. At each station of the greenway, there are boards and, where possible, nature trails to aid navigation. We also created resting places with bicycle storages next to recreational junctions.

Results

As a result of the design work, we have made suggestions for the greenway connecting the 11th and 12th districts of Budapest, not only for the development of the route, but also for the development of the significant green spaces associated with it. Presenting the plans, we head north from the Kamaraerdő in Újbuda, towards Normafa.

Kamaraerdő: design area in the 11th District includes Kamaraerdő in the southern, south-western part of the district, which is connected to Keserűvíz-telep in the north. When creating the green corridor, the aim was to create an enjoyable and interesting hiking route through Kamaraerdő. Functions along the route can be enjoyed by all ages. The trail of the green corridor is branched, offering more traffic. Thus, Kamaraerdő does not only provide recreation opportunities for the people living in the area but can also be a popular place for excursions at weekends. There are several new features in the area: Bicycle Rest, Birdwatch, Shroudline, Forest Children's Center, Active Elderly Park, Sunbathing, Street Workout Park, Forest Runway. (Figure 2.).



Figure 2. Development Concept of Kamaraerdő

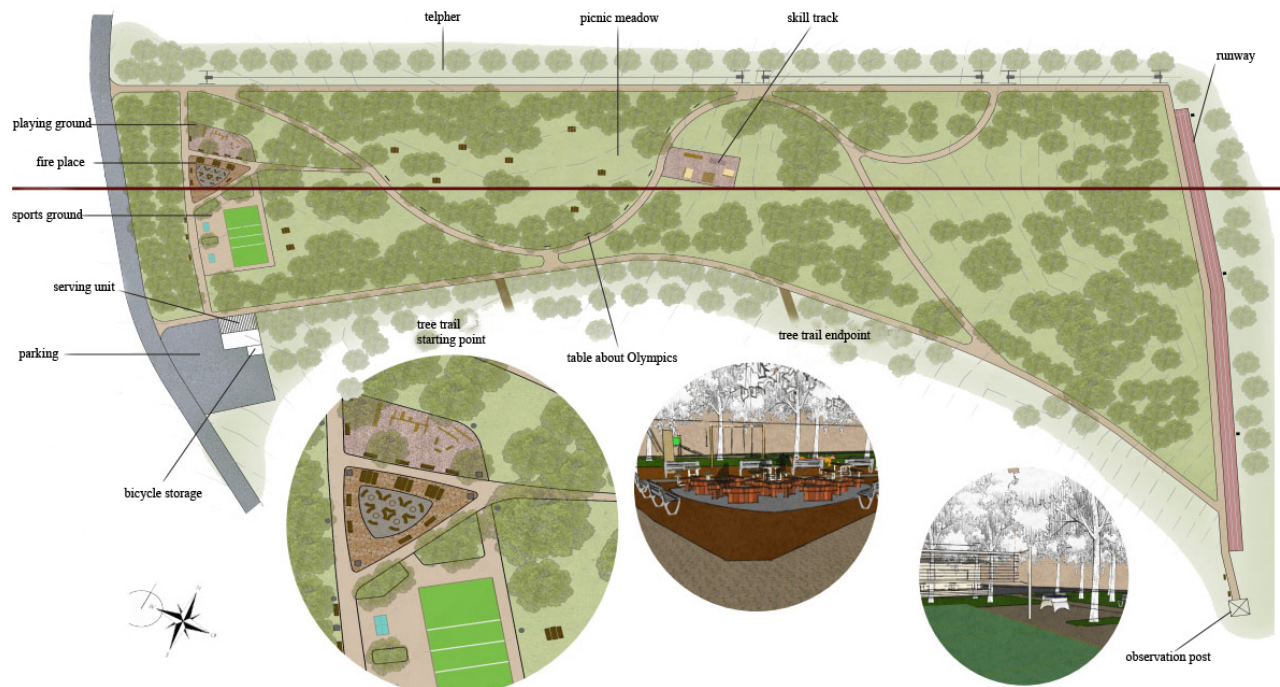


Figure 3. Design of the Olimpycs Park

Keserűvíz-telep: Beyond the protected areas, the Bitter Water Settlements area contains the Olympic Park, which was established in the 1980s, and was one of the emphasized locations. In the park beside the valuable tree stock we found rather degraded conditions, therefore the development was primary. In addition to the green passage, we proposed a canopy promenade in the area of the Olympic Park, the placement of sports equipment, a picnic meadow and the construction of a telpher. (Figure 3.).

Also, in this location there is an unused area surrounded by high-traffic roads, where building regulations made it possible to design a motocross track suitable for the area's qualities (good road accessibility, traffic noise), for which there is a large residential demand. (Figure 4.).

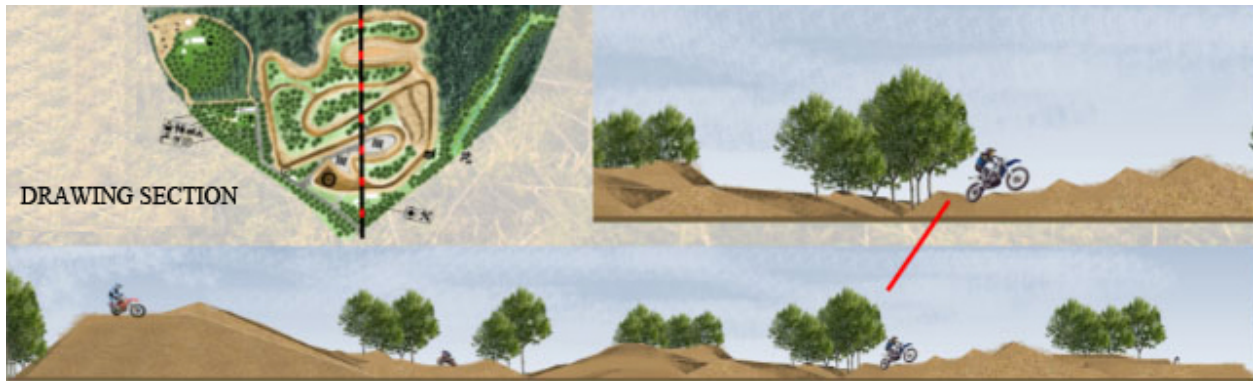


Figure 4.: Motocross Track

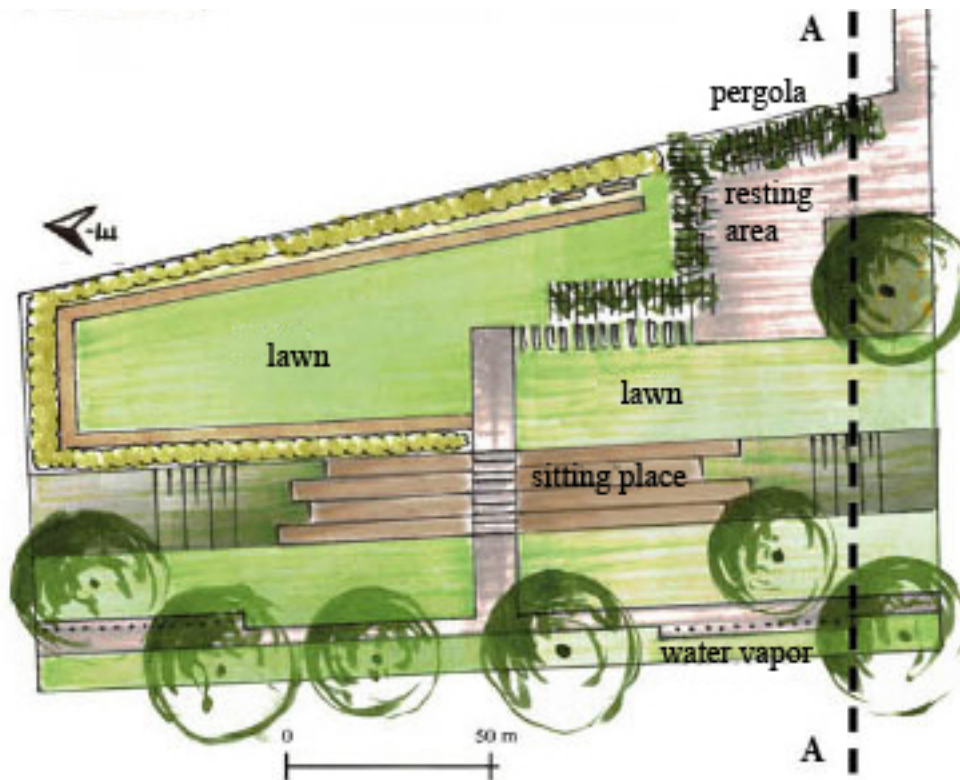


Figure 5.: Resting place of Madárhegy

Madárhegy (Birdhill): In the past decade, there have been very significant residential developments at this location, therefore the main focus of the planning process was to integrate the uninhabited municipal areas into a green road. In addition to creating a bicycle-friendly green road, we have developed a concept for a small recreational park that can also serve as a place for cyclists to rest. (Figure 5.).

Rupp-hegy (Rupp Hill): In the case of the Rupp Hill, due to the intensively built-up area, we tried primarily to ensure the passage: we marked a bicycle path, as well as resting places where the residents and the users of the road can relax. In the resting areas, we have designed drinking fountains outside the benches and bike supports, as well as a few playground elements at the places where we found sufficient amount of space. The material usage in the planned spaces is primarily characterized by the proximity of nature. (Figure 6.).



Figure 6.: Greenway of Rupphegy



Figure

7. First site of the nature trail

Normafa: The last stop of greenway is at Normafa, where it crosses the boundary between the two districts. The main issues with the site were the level differences and the lively car traffic. Regrettably, due to the large proportion of privately owned areas, it was not possible to create a riad independent of the existing road network. After long discussions with the local governments, we managed to find the most suitable

route for the greenway, which is a road with a relatively lower elevation and traffic. Connected to the greenway, we proposed a study trail showing the wildlife of the Buda Hills and Normafa. (Figure 7.).

Discussion and Conclusion

During the planning process, our students performed a very interesting and contemporary task, as in Budapest like all major cities, the aim is to increase the area covered by vegetation to mitigate the heat island effect. The task was particularly difficult, as they had to discover the options for establishing a greenway in a very rapidly developing part of the city, which was affected by significant residential and other investments and therefore with more dense construction. In the case of stretched greenway sections we had to face very different conditions and expectations: in the case of Kamaraerdő, Keserűvíz-telep and Rupphegy, we had to create development proposals focused on the nature conservation aspects, while in the rapidly developing areas (Madárhegy), we faced the problem that green surfaces are rapidly decreasing.

In the planning process, students had the opportunity to gain experience in the importance of coordinating with both the client (the local government) and the locals, utilizing the planning theory they had learned during their studies, and helping outsiders accept the plans. The planning process lasted roughly two and a half months, which included numerous visits to the field, as well as consultations and presentations. The project proved to be a learning experience for both the students and the local government, as the students got to take part in a 'live' project, while the local government got to see ideas that had only existed on a conceptual level realized in the form of plans. Optimally, these plans could serve as the basis for future tender entries (?) with smaller additions. The planned greenway in the finalized concepts could be considered a linking element (?), with the areas connected to it allowing the students to realize their individual concepts.

Overall, it was very instructive for the students to think about how to reconcile the expectations of different interest groups in a plan which was prepared for a long-term development project for local governments. The process of planning was assisted by continuous consultation with the staff of the Environmental Protection Department of Újbuda Local Government. The completed plans were commented on by the Department of Urban Construction at a local forum, providing important feedback for future planners.

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