

# GREEN INFRASTRUCTURE DEVELOPMENT OPPORTUNITIES IN RURAL SETTLEMENTS

## ZÖLDINFRASTRUKTÚRA FEJLESZTÉSI LEHETŐSÉGEK VIDÉKI TELEPÜLÉSEKEN

SZERZŐ/BY: VALÁNSZKI ISTVÁN, VIRÁG DEBÓRA,  
KISZTER ISTVÁN BALÁZS, BOROMISZA ZSOMBOR

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### ABSTRACT

The term of green infrastructure (GI) became widespread all over the world especially in relation to settlement planning. Because of the complexity and multifunctionality of the concept it can be applied in regional and rural development as well. The European Union intends to integrate the concept of green infrastructure into several policy fields, strategies. In Hungary during the last years, many important GI related strategies have been elaborated. However, the already existing complex projects and case studies mainly focusing on cities or bigger towns, settlements. In our study, we would like to give an example of a complex GI planning and development in a case of a smaller settlement on the Hungarian countryside. Following the local government's and stakeholders' needs our goal was to give a practice-oriented proposal for GI development for the settlement implementing many suggestions from the formerly mentioned research reports

and handbooks. We dealt with a typical rural settlement, called Kisszállás from the Great Hungarian Plain as case study. Our analyses focused on GI of the unbuilt and built-up areas of the settlement as well as the border zones between these two parts of the settlement. Our results showed many shortcomings related to the GI, however, we found also several untapped potentials. Based on these results, we developed the GI concept of Kisszállás. We targeted two main directions: 1, the professional maintenance, protection of existing GI system; 2, elaboration of conceptual development ideas focusing on two target areas. With these targets a significant improvement can be achieved in the green areas of the settlement. Our practice-oriented proposal-package represents an example how it is possible to implement the international and national policies, recommendations into local actions.

*Keywords: Green infrastructure; Rural development; Hungarian countryside*

### INTRODUCTION

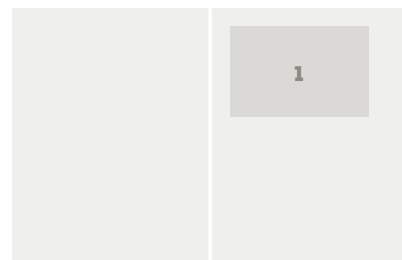
The term of green infrastructure (GI) became widespread all over the world especially in relation to settlement planning (e.g. initiative of green cities). Because of the complexity and multifunctionality of the concept it can be applied in regional and rural development as well [1]. Usually the traditional, grey infrastructure has one single function, however, the green infrastructure systems can meet many different needs [2]. Consequently, GI can serve objectives of nature protection, rural development as well as sustainable tourism development. Several terms and definitions exist for green infrastructure but usually the most widespread is the term elaborated by [3] in their book Green Infrastructure as "a strategically planned and managed network of wilderness, parks, greenways, conservation easements, and working lands with conservation value that supports native species, maintains natural ecological processes, sustains air and water resources, and contributes to the health and quality of life for America's communities and people". There are also many ways to group GI elements [4].

According to the original approach the main features of the GI are the followings: proactive; system-thinking; multifunctional; network-thinking; integrative. The term shows similarities with the green areas/surfaces among the Hungarian approaches. Despite of these, there are significant differences between the meanings of the terms. The GI is a much broader approach, not only means the vegetation coverage. The GI concept interrelated with the ecosystem services approach, it helps to connect the various ecosystems, protects them, and provides

the appropriate functions of ecosystem services. In this way, GI can: provide high-quality green network; multifunctional services; increase the identity; and mitigate the effects of climate change [5].

The main objectives of GI development are: development of the network, improving the carrying capacity of the landscape, elaboration of multifunctional zones. The spatial connections, networks can be improved by elaboration of hedges, preservation of natural field margins. The carrying capacity of the landscape can be strengthened by wildlife-friendly land uses and application of agri-environmental farming methods. Multifunctional zones support multiple land uses or activities such as agricultural production, forestry, recreation, nature protection. The detailed explanation of the concept was included in the 'Green Infrastructure – Enhancing Europe's Natural Capital (SWD (2013) 155 final) [6]. According to this definition, the GI only contains the natural and semi-natural areas. In 2011 the EEA published another document with the title of "Green infrastructure and territorial cohesion The concept of green infrastructure and its integration into policies using monitoring systems" [7]. This interpretation understands the GI much wider (including the natural, semi-natural, and man-made green elements), and this is the base of the new-approach of GI, which became common during the last years in Europe and also in Hungary.

Experts and researchers collected a wide range of the existing tourism products related to natural environment: green tourism, soft tourism, alternative tourism, responsible tourism [8]. In all these cases the responsible, sustainable use and preservation of natural assets



**Fig. 1:** Location of the study area and the National Ecological Network (OWN FIGURE)

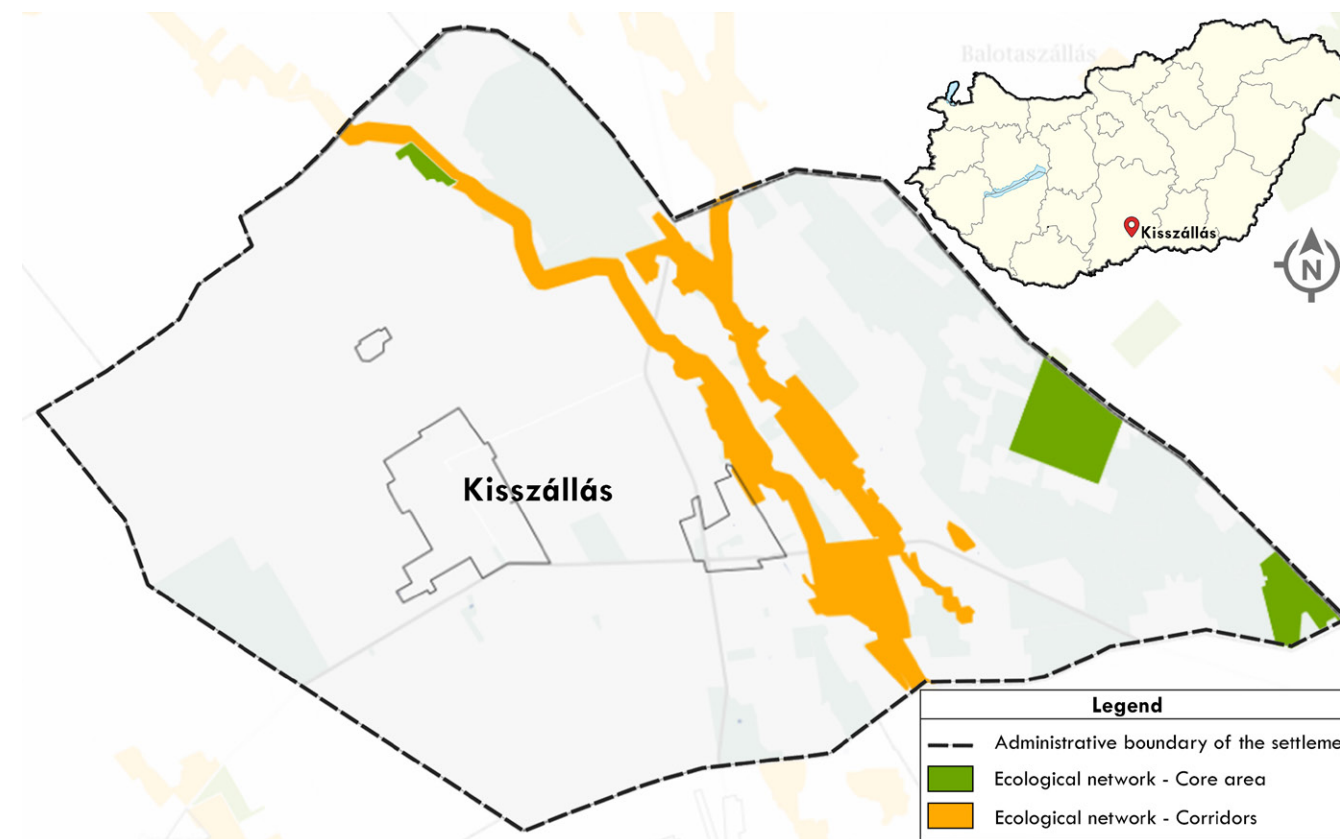
are highly important [9]. The recent concept of green infrastructure could serve this long-term sustainability via/ parallel with the development of these tourism products. It is especially relevant in rural regions, where complex green infrastructure and tourism development is possible [1]. One of the best examples for common management of tourism and green infrastructure is the greenway, which is a characteristic phenomenon of positive synergies of GI and tourism development [1]. Greenways are interpreted as linear open spaces offering non-motorised active recreational opportunities meanwhile protecting the environment even improving the ecologic value of the landscape [10; 11; 12]. Recognizing the benefits of greenways several researches, plans, projects focused on greenway development also in Hungary [10]. We also have to highlight, that there is a big difference between urban and rural GI development, since the objectives of them are usually not the same. It means, in the case of urban GI development the most important topics are: positive urban climate effect, places for recreations, aesthetic value. While in the case of rural GI development, one can consider mainly with nature protection, rural development as well as sustainable tourism development.

The European Union intends to integrate the concept of green infrastructure into several policy fields, strategies such as Biodiversity Strategy 2020 (COM (2011) 244 final) [13], Roadmap to a Resource Efficient Europe (COM (2011) 571) [14], Proposal on specific provisions concerning the European Regional Development Fund and the Investment for growth and jobs goal (COM (2011) 612 final/2) [15], the CAP towards 2020:

Meeting the food, natural resources and territorial challenges of the future (COM (2010) 672 final) [16], new Forest Strategy (COM (2013) 659 final) [17]. The Biodiversity Strategy sets the following targets among others by 2020: ecosystems and their services are maintained and enhanced by establishing green infrastructure and restoring at least 15% of degraded ecosystems, which was followed and strengthened by the EU Biodiversity Strategy for 2030 (COM (2020) 380 final) [18].

In Hungary during the last years, many important GI related strategies, documents have been made mainly under the framework of “Strategic Assessments supporting the long-term conservation of natural values of community interest as well as the national implementation of the EU Biodiversity Strategy to 2020” project led by the Ministry of Agriculture. From the four subprojects of this program one is the “Green Infrastructure - Networks of Nature”. Several researches have been carried out related to the subproject mainly focusing on country-level [19], but also on local (settlement) level [5]. These documents partly research reports, but also strategical documents and handbooks, which give suggestions and guidance for the local level GI identification, analysis and development.

However, the already existing complex projects and case studies mainly focusing on cities or bigger towns, settlements. There are only very few complex GI strategies, plans for smaller settlements, villages in practice. In our study, we would like to give an example of a complex GI planning and development in a case of a smaller settlement on the Hungarian countryside. Following



the local government's and stakeholders' needs our goal was to give a practice-oriented proposal for GI development for a small settlement implementing many suggestions from the formerly mentioned research reports and handbooks. Our proposal emphasizes the special role of GI in recreation and tourism [1], which are relevant in our case study area.

#### MATERIALS AND METHODS

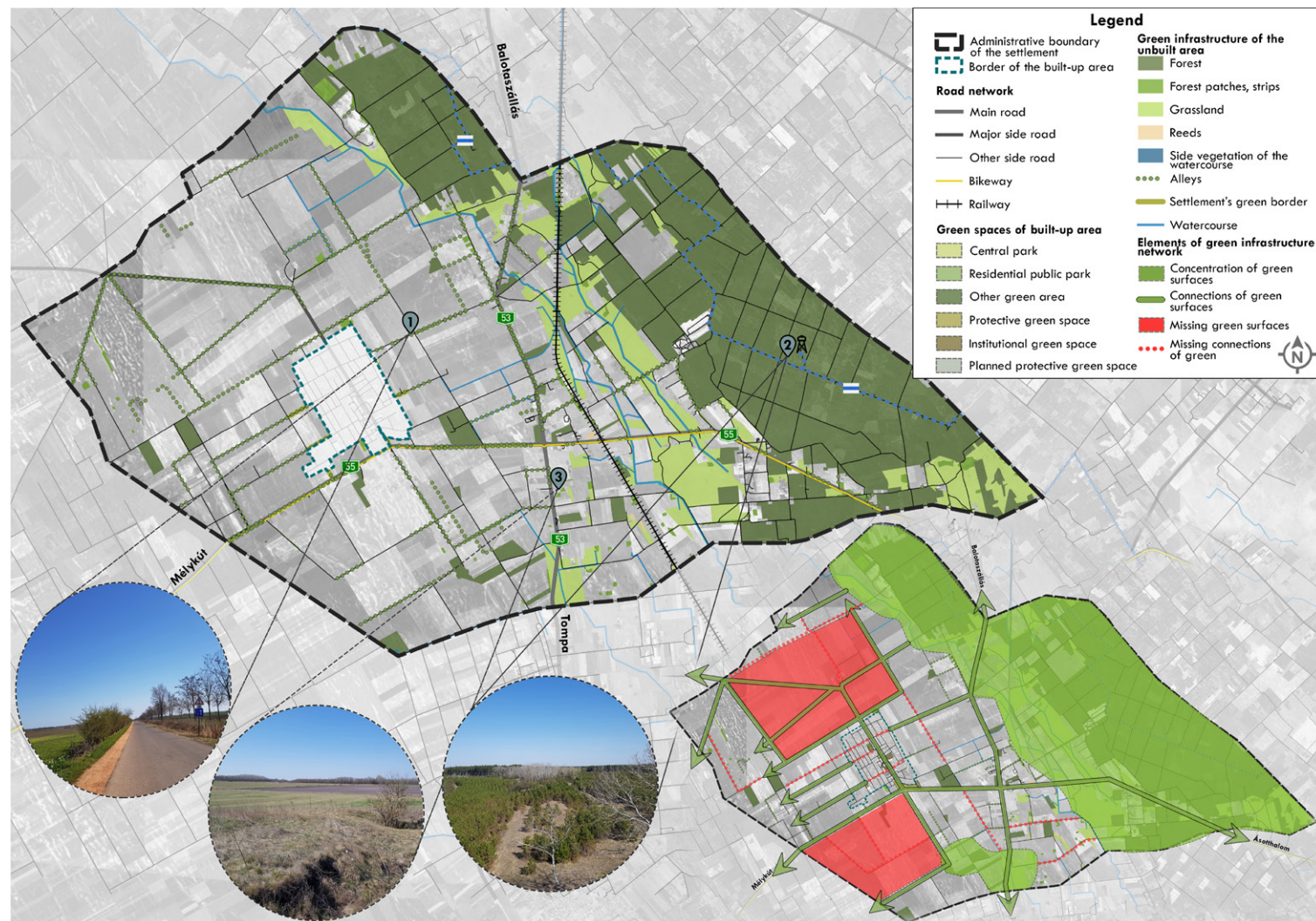
The study area of the research is Kisszállás, which is a village located in Bács-Kiskun county in the southern part of the Great Hungarian Plain. The size of the settlement is 92,05 km<sup>2</sup> with the population of 2372 (Figure 1). More than 10% of the inhabitants are still living in homesteads around the central built-up area of Kisszállás. The landscape features are diverse, the various parts of the settlement have significantly different vegetation, soil, and landscape character [20].

People have been living in the area of Kisszállás from long time ago, however, the name of the village was mentioned in 1561 for the first time. First historical maps about the settlement were made

at the end of the 18th century. From that time the settlement was part of a big manorial area, on which the most significant development was made during the 19th century. At that time, this was one of the biggest manorial areas of the country. During the 20. century we could witness a strong decline of the former era, mainly thanks to the WWII and the communist period. Nevertheless, this heritage is still visible in the structure, green network of the settlement, and also on the historical buildings [20].

According to the National Spatial Plan and the Spatial Plan of Bács-Kiskun county, there are three main land use categories in the area of Kisszállás: 1, Forest management area (eastern areas and southern and north edges of the settlement); 2, Agricultural area (central and western parts of Kisszállás, mainly in a large, contiguous blocks); 3, Built-up area (central built-up area and the surroundings of the railway station) [21]. Two of the National Ecological Network categories also located within the borders of the settlement. Smaller patches of ecological core areas are situated on the eastern and northern borders of the official borders of Kisszállás, while ecological corridors can be found along the smaller water





surfaces in north-south direction. These areas mainly overlap with the Natura 2000 areas of the settlement (Figure 1). We can identify 6 main settlement characters: settlement centre; built up area dominated with family houses; industrial character; natural character; forest character; homestead character.

During our research first, we have deeply analysed the related political and strategical documents, regulations on local (e.g. Settlement Visual Guide of Kisszállás, 2017; Local Building Regulation), county (e.g. Spatial Plan of Bács-Kiskun county, 2020), and also country level (e.g. National Spatial Plan, 2019) in order to have an overview of the existing frameworks. Our focus was on the GI-related regulations of these documents. In addition of this, our analyses followed these topics: the structure of landscape and settlement, the GI of the whole village, water surfaces and their relation with the GI, settlement edges and their GI system. In the second step, the evaluation

focused on the followings: structure, network, and accessibility of GI; main conflicts related to GI and its elements; current maintenance practices of GI.

Based on our analyses we gave a structured proposal for Kisszállás, which has two focus areas: 1, appropriate maintenance recommendation for existing GI elements; 2, possible GI developments. The first focus area contains possible protection and maintenance proposals for the preservation of the existing GI elements, with a high-quality maintenance goal (proposals, recommendations for each GI element). We also covered the proposal for the schedule of park maintenance works, tools to help with maintenance tasks, and a detailed presentation of the proposed machines/tools. In the case of the second focus area, we formulated conceptual-level ideas for the development of the GI network beyond the built-up areas. We made conceptual development proposals for two focus areas of the settlement, in two versions, which were



**Fig. 2:** GI system of Kisszállás (unbuilt areas) (OWN FIGURE)

completed with planting recommendations, suggested materials and functions. Similarly, we elaborated our development proposals for the streets along with a list of recommended species that can be used also by the locals.

## RESULTS

### Results of the survey of unbuilt areas of the settlement

The most significant GI elements of the unbuilt areas of the settlement are the extensive forests in the eastern part of the administrative area. More than a quarter of the entire settlement belongs to the forest management area. The planted forests, dominated by acacia and poplar, have a special economic purpose. The tourism and recreation functions of the settlement are also related to these GI elements. The National Blue Hiking Trail passes through the eastern forested parts, and lookout tower is located in this area as well. The role of grasslands in the GI of the unbuilt areas is also significant. The grasslands locate in mosaic-shape, typically around of surface watercourses and close to forest areas. These grasslands have special ecological significance. The internationally protected areas of the settlement overlap significantly with these parts of the GI. In the central and western parts of the settlement, between the intensive agricultural areas, there are smaller GI elements (groups of trees, lawns, shrubs), which mainly connect to the homesteads (or former homesteads). Other elements of the GI are the rows of trees and green strips along the roads, of which the visual and ecological significance is

outstanding. Typical species of rows of trees along the roads and patches of GI connected to homesteads: acacia, poplar, hawthorn. The significance of surface waters in Kisszállás is low. Smaller watercourses are located in the central part of the administrative boundary of the settlement and mostly cross the village in a north-south direction. These surface waters have a special ecological significance because the wildlife of the meadow-forest-arable mosaic landscape around them is rich (the majority of the area is protected by Natura 2000).

Regarding the entire administrative area of the settlement, the proportion of GI elements is quantitatively adequate, however, their location and distribution is not optimal. The contiguous forest areas are mainly concentrated in the eastern part of the settlement, and the grasslands are also located in the eastern part of the administrative area. Within the central and western parts of the settlement the intensive agricultural areas dominate, between which the smaller GI elements are located as islands, mainly connected to the surroundings of the homesteads. Between the eastern green surfaces and the former green spots, the rows of trees and green strips along the roads represent the connecting corridors. The landscape structure is still mosaic in the areas along the surface watercourses, however, with the exception of a few narrow roadside green corridors, there are no significant network-relevant GI elements north and west (partly south) of the inner area. Network problems and the lack of green infrastructure elements in central and western areas not only cause ecological and visual problems, but also make it difficult to





**Fig. 3:** GI system of Kiszállás (built-up areas)  
(OWN FIGURE)

access valuable green network elements. Network problems and the lack of GI elements in central and western areas not only cause ecological and visual problems, but also makes it difficult to access valuable green network elements. The GI elements with significant recreational potential are located very far from the built-up area, and there is no real green network connection with these parts. Because of these, the locals cannot use these areas for recreational purpose. This structure is also problematic from the point of view of tourism, as the National Blue Hiking Trail is very far from the built-up area, so it is difficult for tourists and hikers to access the services of Kiszállás (Figure 2).

In the system of GI, the border zone of built-up and unbuilt areas is very important, which also can be a source of many conflicts. Analyzing the border zone, we can distinguish two basic types of areas: 1, the area of settlement gates; 2, other settlement edges. The former group includes two focus areas: the junction of Fő Street and the road 55, and the north-eastern end of Kossuth Street. Representative elements are already appearing in the former area. In addition, there are several green space elements here, but a significant part of them has further development potential. On the other hand, in the area of the settlement gate on Kossuth Street there are no green surface elements. In the rest of the border zone, the GI elements appear only in the form of a few smaller forest patches as well as rows of trees along the farming roads. Apart from these, however, there is no transition between residential and agricultural areas. This causes a visual problem on one hand, as the buildings of

built-up area are less able to blend into the surrounding landscape, less integrated into the landscape, and on the other hand, it also causes functional deficiencies as the built-up areas are more exposed to dust pollution, finally it also results in ecological deficiencies due to the fragmentation of the GI network.

#### Results of the survey of built-up areas

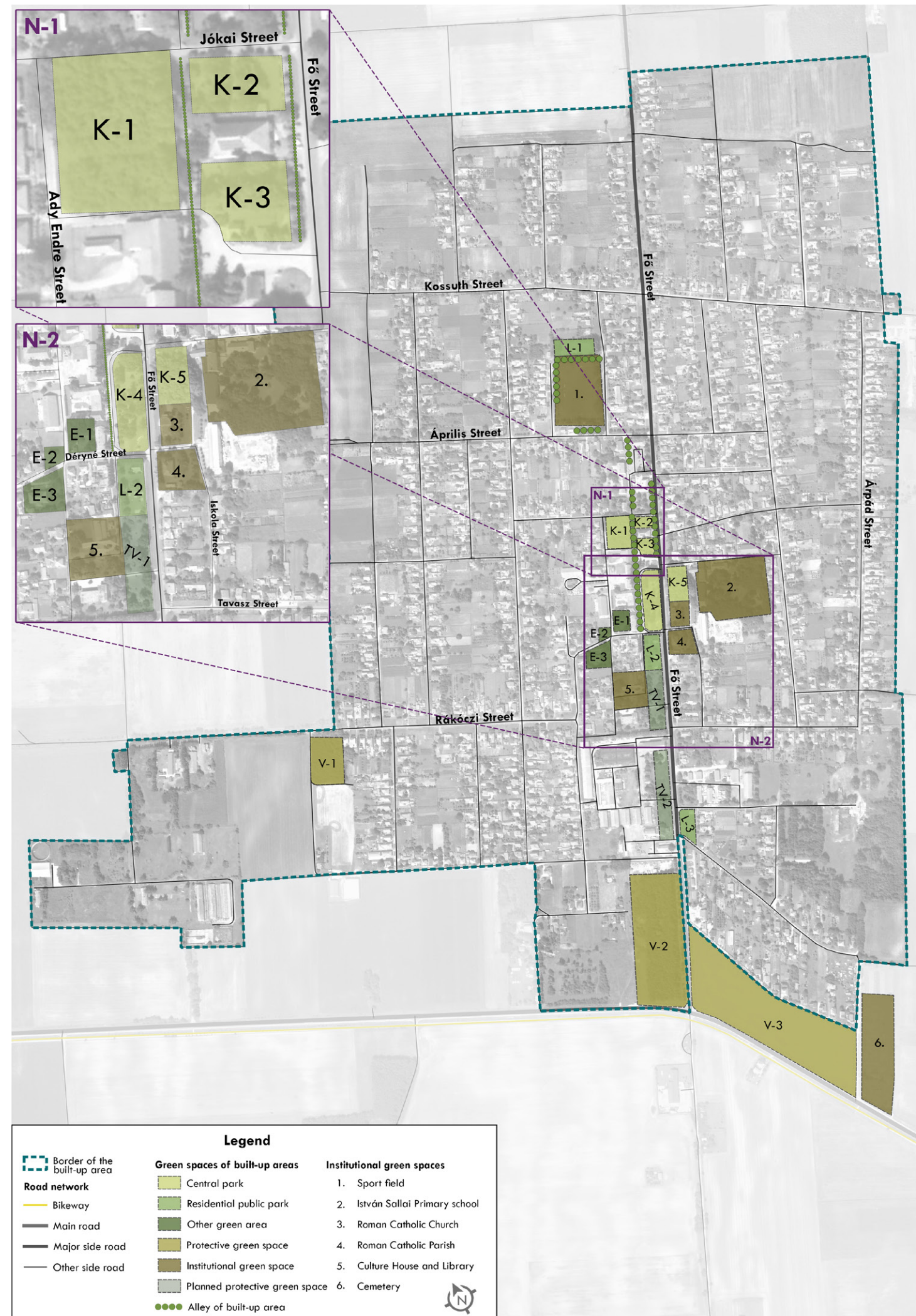
During the analysis of the green space system in built-up areas, the following types were distinguished: central park, residential public park, other green space, protective green space, planned protective green space. In each type, we delimited well-defined, separately interpretable green space units, which were evaluated in detail, as well as maintenance and development proposals were developed for them. The supply of green space in the built-up area of the settlement can be said to be good. The GI elements in the center of the village mostly form a connected network. However, from the point of view of network, these elements are too concentrated in the settlement center, smaller, island-like public green spaces are represented only by the sports field and its surroundings, and there are still such areas in the southern part of the built-up area (Figure 3). The streetscapes of Kiszállás shows a typical Great Plain rural image. The streets were divided into two major types based on their profile: narrow and wide. The wide types of streets are typically perpendicular to the Fő Street, providing the backbone of the built-up area of the settlement. The vast majority of the streets are not dense, with large front gardens in front of the houses,

most of which are well-kept, and are an important part of the GI network. At the same time, the unified image is reflected in the streetscape only in few places.

We identified the poor condition of the rows of trees and groups of trees as a problem, which can be seen in several parts of the settlement. The oldest and therefore most endangered trees are concentrated in the area of the historic core of Kiszállás. In many places of the settlement, the high proportion of adventive tree and shrub species results mainly visual-aesthetic conflict. These are mainly evergreens (pines, thujas), the character of which differs markedly from the typical image of local, traditional Great Plain and rural settlements, as well as from the landscape. In the cases of several public / green spaces, there is usually a significant untapped potential from this point of view. The bad condition of the street furniture can be identified in the cases of the central green areas. Another problem is that the new furniture is not uniform either, in the cases of individual (even adjacent) green surfaces elements with completely different styles were placed. The lack of rows of trees gives the feeling of empty space mainly in certain sections of the wide-type streets.

#### DISCUSSION AND PROPOSALS

Based on our research results, the GI and green space development concept of Kiszállás was developed. It defines two main directions: 1, the professional maintenance, protection and gradual renewal of existing GI elements; 2, elaboration of conceptual development ideas focusing on different target areas,





Maintenance and development interventions in each GI elements of the built-up area																							
Areas	Maintenance										Development												
	Mowing	Shrubs maintenance	Tree care	Pest-control	Foliage collecting	Playground maintenance	Planting and maintenance flowers	Weed control	Clearing	Irrigation	Irrigation system maintenance	Planting tree	Planting bulbous	Planting perennials	Planting shrubs	Planting grass	Sowing wild flowers	Design borders	Branch shredding	Installation of street furniture	Sidewalk construction	Installation of irrigation system	
Central park (K-1)	x	x	x	x	x			x	x	x				x			x	x	x				
Central park (K-2)	x	x	x	x	x			x	x		x			x		x			x				x
Central park (K-3)	x	x	x	x	x					x		x			x					x			
Central park (K-4)	x	x	x	x	x			x	x	x	x	x	x	x	x			x	x	x	x		
Central park (K-5)	x	x	x	x	x			x	x	x		x		x	x			x	x				x
Sport field (1.)	x		x	x	x																		
Primary school inner garden (2.)	x	x	x	x	x	x	x	x	x	x	x			x	x	x	x		x	x	x		
Church (3.)	x	x	x	x	x			x		x		x		x	x								
Parish (4.)	x		x	x				x			x												
Culture House and Library (5.)	x	x	x	x	x			x	x	x	x		x	x	x	x		x	x	x	x		x
Cemetery (6.)	x	x	x	x	x			x			x			x									
Residential public park (L-1)	x		x	x	x					x													
Residential public park (L-2)	x	x	x	x	x	x	x	x	x		x		x	x	x	x		x	x	x	x		x
Residential public park (L-3)	x		x	x						x		x											
Protective green space (V-1)	x		x	x							x												
Protective green space (V-2)	x	x	x							x				x	x						x		
Protective green space (V-3)			x	x						x		x											
Planned protective green space (TV-1)	x	x	x	x	x			x		x		x	x	x	x			x	x	x	x		x
Planned protective green space (TV-2)	x		x	x	x			x	x		x					x							
Other green area (E-1)	x		x	x	x																		
Other green area (E-2)	x		x	x	x					x		x											
Other green area (E-3)	x	x	x	x	x			x	x				x	x				x	x	x			

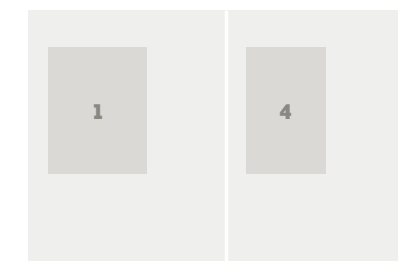
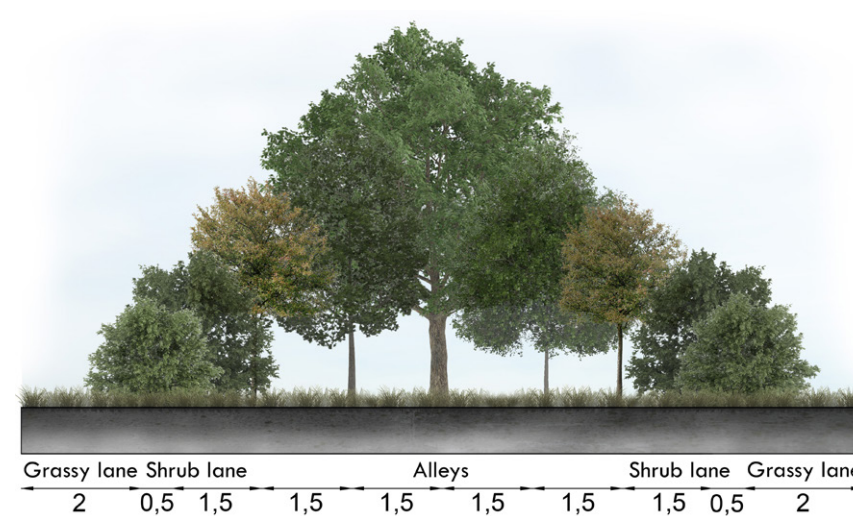
with which a substantial improvement in quality and quantity can be achieved in the green areas of the settlement.

#### Maintenance and protection of existing GI elements

Our goal was to develop a relatively lower cost maintenance proposal package. The maintenance recommendations were prepared for each green space elements, which were also summarized at the settlement level (Table 1). The recommendation for the schedule of various maintenance works was also part of our concept, which was supplemented with a tool and machine recommendation necessary for the maintenance works. A detailed species list has also been compiled for development and maintenance proposals.

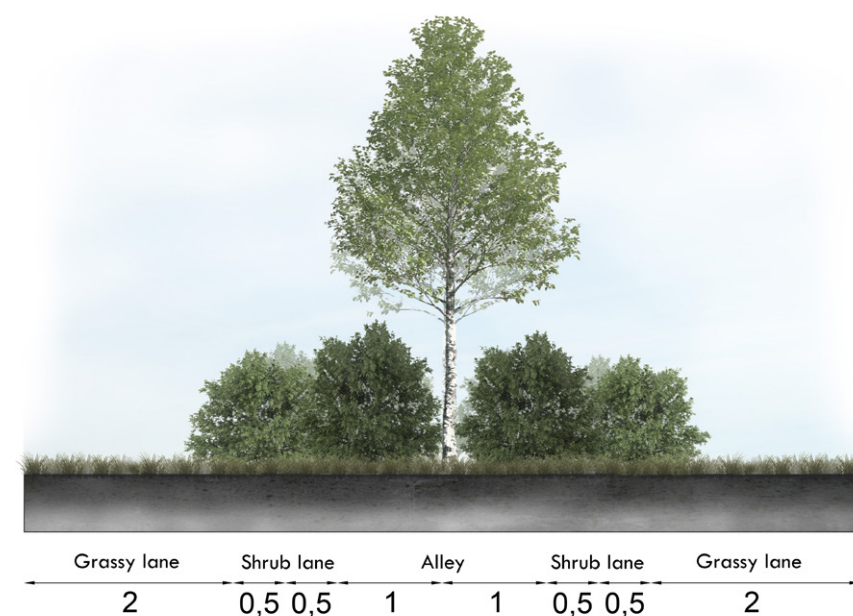
In the case of trees, the aspect of the selection was to fit into the local, rural landscape and settlement characters, climate, as well as other environmental conditions (e.g. *Acer campestre*, *Fraxinus angustifolia* subs. *pannonica*; *Ulmus laevis*). In the case of shrubs, the most important aspect was the adaptation to environmental conditions (e.g. *Berberis vulgaris*; *Cornus alba*; *Cotoneaster horizontalis*; *Ligustrum vulgare*), while the selection of perennials was influenced by the increasingly popular ecological park / green area maintenance (e.g. *Bergenia* sp.; *Dryopteris* sp.; *Eryngium* sp. *Hosta* sp.).

The most important shortcoming of the GI system of the unbuilt areas was the unbalanced territorial location and, in this context, the lack of green



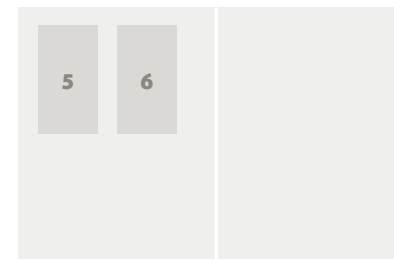
**Table 1:** Summary of maintenance and development proposal types (OWN TABLE)

**Fig. 4:** Proposed structures of GI elements in Kisszállás (OWN FIGURE)



corridors in intensive agricultural areas. In relation with these, we have made two conceptual, system-wide proposals. Partly, there is a need to encourage farmers to create green corridors on their agricultural land. National and EU funds, grants and compensations are available for such activities (mostly in connection with the EU “greening” initiative). We propose the use of three types of GI elements in the agricultural areas of Kisszállás (field protection forest strip, tree alley, hedgerow). Proper application of these has not only ecological (habitat, hiding, feeding, breeding ground for wildlife) and visual (diverse landscape) beneficial effects, but also economic significance (favorable ability to produce yields by improving microclimate) (Figure 4). A greenway would

best serve the connection of the eastern forest areas and the built-up area for recreational purposes, which is also our other proposal. Several Hungarian experts have already emphasized that greenways are an integral part of GI as linear green elements. The design of greenways can very often be linked to abandoned railway lines, which is also relevant in the case of Kisszállás (old small railway). Taking into account all these principles, after the availability of financial resources, the development of a greenway in the settlement is recommended, primarily in order to connect the built-up area and the eastern, forested parts (and the National Blue Hiking Trail). This would not only expand the GI network of the settlement, but also create a



**Fig. 5:** Conceptual plan of central park, type 'A' (OWN FIGURE)

**Fig. 6:** Conceptual plan of central park, type 'B' (OWN FIGURE)

new recreational opportunity for the locals that can be used in everyday life. The greenway (especially after further development, expansion of it towards the surrounding settlements) also has a significance for tourism.

#### Development ideas focusing on target areas

Collecting and arranging development ideas in the built-up area of Kisszállás was the other main pillar of our concept. We have developed more conceptual proposals for two main green space elements, which could broaden the recreation-green space palette of the settlement, diversifying the range of leisure opportunities available in Kisszállás, and increasing the representation potential of the village.

For the most significant, busiest public park (indicated with "K-4" in Figure 3) in the center of the settlement ideas in many versions were elaborated, while for the currently unused protective green space (indicated with "V-2" in

Figure 3) at the southern gate of the built-up area concepts primarily for recreational purposes were developed.

We basically developed two main concepts for the regulation and development of the central park (K-4). The first case is the idea that requires little financial, human, time investment, which can already result in a quality improvement in the center of Kisszállás. The second version shows an ideal development idea that would involve significant transformation and investment. To substantiate the concepts, we also performed more detailed analyzes of the current situation. Currently, there are four points to enter the park (on all four sides of the green space element). The entry points are connected by a straight sidewalk (east-west direction) and a path (north-south direction), which intersect approximately in the middle of the park. There is also a monument in this part. The area is dominated by evergreen species, with some deciduous individuals close to the northern boundary

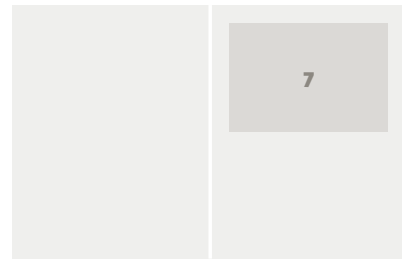
line. The trees are older individuals, the shrub level is completely absent from the area. Some minor patches of perennials and annuals are located along the inner axis of the park. The street furniture (benches and trash bins) is located along the north-south unpaved path, their condition is extremely deteriorating. The tall evergreen trees are densely located in the area, making the park extremely shady at all times of the year, and the grassland vegetation is also in poor condition.

In the first version of the concept, we did not propose any significant structural changes, but rather formulated minor regulatory and maintenance recommendations. In this case, the woody plant stock is preserved in its original quantity and arrangement, however, the sick individuals must be cut and possibly replaced with native tree species (e.g. *Fraxinus excelsior* 'Globosa'; *Betula pendula*). The location of the monument has also been left unchanged, but the path (north-south) will be paved. The replacement and renovation of street furniture (benches, trash bins) is also urgent. Perennial beds will remain in place for current plantings. We recommend shade-tolerant species for these places (e.g. *Anemone* sp.; *Eupatorium maculatum*). As a further development (in the following phases), we recommend the enrichment of the shrub level with shrubs planted as solitaire (e.g. *Cornus sanguinea*; *Cotinus coggygria* 'Royal purple') (Figure 5). According to the second concept version, the route network of the park will be significantly transformed into curved lines, with the creation of additional entry points, mainly on the north and south sides. The entire road network will

be paved. The street furniture (benches, trash bins) will also be completely replaced and the central monument will be relocated. A representative annual planting was planned around the monument, while a perennial planting was proposed in the background (e.g. *Hosta* sp.; *Brunnera* 'Silver Heart'). Additional annual and perennial plantings are recommended in the vicinity of entry points and junctions. As a new function, we have designed a playground for the southwest of the park, which needs to be fitted with a shock-absorbing rubber cover. Beyond all these, a significant change is the gradual replacement of evergreen vegetation while retaining a few individuals. We recommend the planting of new deciduous trees and shrubs (e.g. *Buddleia davidii* 'Nanho Purple'; *Cotoneaster multiflorus*), mainly from native species (Figure 6).

The protective green space (V-2) at the southern (main) entrance of the built-up area is currently underused, dense mixed - pedunculate oak forest. Based on our development concept, we give the area a recreational function, with extensive maintenance and preservation of the forest character. Based on our suggestions, a forest gymnasium will be created with 10 stations, on which boards show the exercises to be performed, and at these stations we have designed simple wooden tools, which are necessary for performing the gymnastic exercises. The station points are connected by an oval-shaped path that runs around the entire forest patch. We recommend creating the route with mulch and wood chips in order to preserve the character. The connection of the trail with the existing entry points (east and west side) was planned. It is recommended to place an





**Fig. 7:** Current and proposed cross-sectional design of Kisszállás street types (OWN FIGURE)

information board and map at the entry points, and it is proposed to plant semi-extensive shrub patches for representation purposes. In the central part of the new recreational forest, we recommend the creation of a smaller glade, where, in addition to the placement of street furniture (benches, trash bins, table), there would also be a smaller forest playground. Preservation of the original vegetation is recommended throughout the area except for the central glade and gymnastics stations.

As revealed during the analysis, the streetscapes in the settlement are not uniform, in many cases the potentials of wide streets are untapped. Unification is a big challenge because many areas are no longer owned and maintained by the municipality. However, we have formulated principles and recommendations for the local government, which should be communicated to the local citizens. The promotion of these principles is possible through various local campaigns and actions. In the case of narrow types of streets, the structural design of the green strips is mostly adequate, in most of these places there is no more enough space for further plantings. Due to all these, it is necessary to strive for unification and quality renewal in the case of narrow streets. In the case of wide streets, we have identified untapped potential in several places, therefore we recommend the plantation of additional (woody) plants in these areas. In addition, we plan to gradually replace the evergreens (thujas, pines) as well as to enrich the shrub level. A significant part of Fő street is municipally maintained (or connected to municipally maintained areas). In this case,

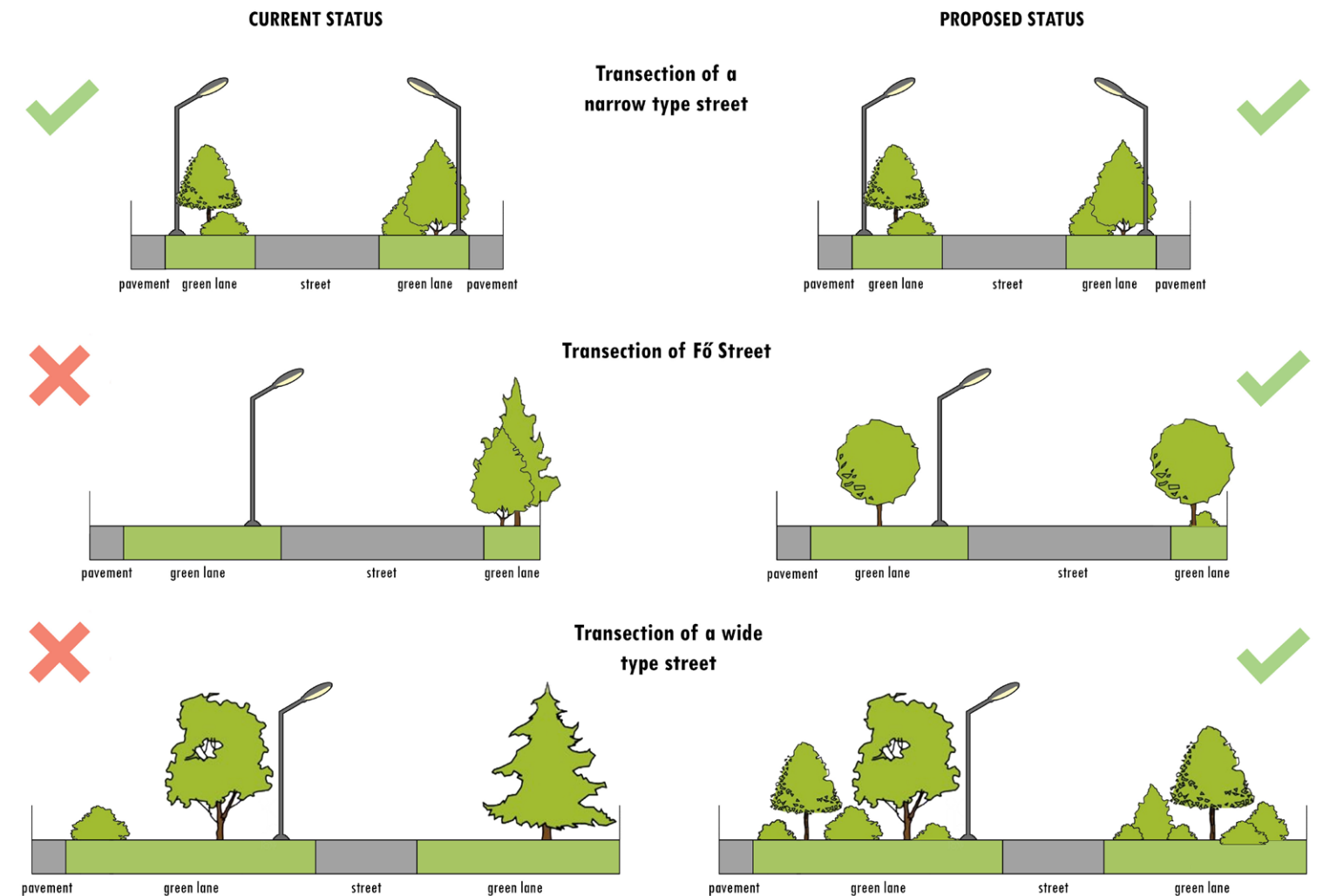
the uniform streetscape is especially important, one of the best tools of which is the creation of uniform rows of trees and green strips along the entire length of the settlement. Also here, the afforestation is recommended on both sides, and, as before, evergreens are avoided and gradually replaced (Figure 7).

When planning settlement (urban) green spaces, we strive to create a unified plant system, creating close-to-nature associations. Therefore, it is important that the flora of the public areas created and maintained by the locals should be in line with the areas maintained by the local government. In the case of tree plantings, it is not enough to follow a specific guideline, in all cases it is necessary to consult the municipality in advance in order to determine the exact location of the tree. For other plantings (shrubs, perennials, annual flowers), it is important for property owners to consider long-term maintenance tasks, their labor requirements, and the availability of their capacity to do so. The distribution of the amount of plants is either even or increasing towards the building is aesthetic, and it is recommended to create the edges running parallel to the streets or irregularly but firmly separated (bed edge or lawn edge cut).

#### CONCLUSIONS

Based on the recommendations and guidance of international and national research results, strategies, documents, in our work, we presented an example of applied GI development plan for a smaller settlement. We dealt with a typical rural settlement, called Kisszállás

#### TRANSECTIONS OF STREET TYPES



from the Great Hungarian Plain as case study. During our work, several discussions took place in order to get familiar with the locals' expectations. These requirements were synthesized with the principles and recommendations of the Hungarian and international GI related documents, policies. Our detailed analyses focused on GI of the unbuilt and built-up areas of the settlement as well as the border zones between these two parts of Kisszállás. Our results showed many shortcomings related to the GI, however, we found also several untapped potentials. Based on these results, we developed the GI concept of Kisszállás. We targeted two main directions: 1, the professional maintenance, protection of existing GI system; 2, elaboration of conceptual development ideas focusing on two target areas, with the help of which a significant improvement can be achieved in the green areas of the settlement. We have developed more concepts for these two main GI elements, which could broaden the recreation-green

space palette of the settlement, and increasing the representation potential of the village. We can conclude, that in these kinds of rural areas the complex agricultural- and recreation-oriented GI development is very important on the un-built areas. While in the cases of the built-up areas the maintenance and the development should be done parallel. With the appropriate design, plant-selection and human-scale comprehensive developments the well-being of the locals in these types of villages can be increased significantly from the relatively small amount of financial investment. Our practice-oriented proposal-package represents an example how it is possible to implement the international and national policies, recommendations into local actions. ©

## Literatures

1. VALÁNSZKI I., DANCSÓKNÉ FÓRIS E., FILEPNÉ KOVÁCS, K. 2018. Parallel Development of Green Infrastructure and Sustainable Tourism – Case Studies from Hungary. Polish Journal of Natural Sciences. Volume 33, Issue 4, pp. 625-647.
2. ELY M., PITMAN S. 2014. Green infrastructure; Life support for human habitats. A review of research and literature Prepared for the Green Infrastructure Project Botanic Gardens of South Australia, Department of Environment, Water and Natural Resources.
3. BENEDICT M.A., MCMAHON E.T. 2001. Green infrastructure: smart conservation for the 21st century. Sprawl Watch Clearinghouse, Monograph Series, Washington D.C.
4. CIVIC K., SIUTA M. 2014. Green infrastructure. Training manual for trainers. ECNC, Tilburg, the Netherlands and CEEweb for Biodiversity, Budapest, Hungary. Copyright © 2014 ECNC and CEEweb, [http://www.ecnc.org/uploads/2015/10/GI\\_Training\\_Manual\\_Final.pdf](http://www.ecnc.org/uploads/2015/10/GI_Training_Manual_Final.pdf), access: 02.09.2018
5. BÁTHORYNÉ NAGY I. R., DANCSÓKNÉ FÓRIS E., JOMBACH S., SALLAY Á., SZILVÁCSKU ZS., KESZTHELYI Á., KOTSIS I., SZCZUKA L., TAKÁCSNÉ ZAJACZ V., VALÁNSZKI I. 2020. Zöldinfrastruktúra-hálózat fejlesztése – A hazai zöldinfrastruktúra megőrzését és fejlesztését megalapozó stratégiai keretek meghatározása: Módszertani javaslat a zöldinfrastruktúra belterületi elemeinek azonosítására, állapotértékelésére és annak mintaterületi alkalmazására. Ormos Imre Alapítvány, Megbízó: Agrárminisztérium
6. European Commission 2013. „Green Infrastructure (GI) — Enhancing Europe’s Natural Capital” (2013), [http://eurlex.europa.eu/resource.html?uri=cellar:d41348f2-01d5-4abe-b817-4c73e6f1b2df.0014.03/DOC\\_1&format=PDF](http://eurlex.europa.eu/resource.html?uri=cellar:d41348f2-01d5-4abe-b817-4c73e6f1b2df.0014.03/DOC_1&format=PDF).
7. EEA 2011. Green infrastructure and territorial cohesion. The concept of green infrastructure and its integration into policies using monitoring systems. Copenhagen, 2011
8. VARGÁNÉ CSOBÁN K. 2010. A fenntartható turizmus vidékfejlesztési összefüggései az Észak-Alföldi régió példáján. Doktori (PhD) értekezés. Debrecen, Debreceni Egyetem, Agrár- és Gazdálkodástudományok Centruma, Gazdaságelméleti Intézet Ihrig Károly Gazdálkodás – és Szerveztudományok Doktori Iskola.
9. VASVARI M., BODA J., DÁVID L., BUJDOSÓ Z. 2015. Water-based tourism as reflected in visitors to Hungary’s Lakes. Geojournal of Tourism and Geosites, 15(1): 91–103.
10. FILEPNÉ KOVÁCS K., EGYED A. 2011. Az élőhelyek rehabilitációja és a zöldtervezés kapcsolata a Hanságban. Tájékológiai Lapok. 9. pp. 73–85.
11. FLINK, A. C., SEARNS, M. R. 1993. Greenways, a Guide to planning, design and development, The Conservation Fund. Island Press, Washington D. C..
12. East Coast Greenway Alliance (2019): Greenway Criteria and Design Guide. East Coast Greenway Alliance, Durham.

13. COM (2011) 244 final. Our life insurance, our natural capital: an EU biodiversity strategy to 2020; Communication from the Commission to the European Parliament, the Council, the Economic and Social Committee and the Committee of the Regions; Brussels, 3.5.2011 <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52011DCo244&from=EN>. access: 28.08.2018.
14. COM (2011) 571 final. Roadmap to a resource efficient Europe; Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52011DCo571&from=EN> access: 20.09.2018.
15. COM (2011) 612 final/2. Proposal on specific provisions concerning the European Regional Development Fund and the Investment for growth and jobs goal; Proposal for a Regulation of the European Parliament and of the Council on the Cohesion Fund and repealing Council Regulation (EC) No 1084/2006 <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2011:0612:FIN:EN:PDF> access: 25.08.2018.
16. COM (2010) 672 final. The CAP towards 2020. Meeting the food, natural resources and territorial challenges of the future; Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:0672:FIN:en:PDF> access: 28.08.2018.
17. COM (2013) 659 final. A new EU Forest Strategy: for forests and the forest-based sector Brussels, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions 20.9.2013 [https://ec.europa.eu/agriculture/forest/strategy/communication\\_en.pdf](https://ec.europa.eu/agriculture/forest/strategy/communication_en.pdf) access: 28.08.2018.
18. COM (2020) 380 final. Bringing nature back into our lives. EU Biodiversity Strategy for 2030. EC
19. KOLLÁNYI L., BÁTHORYNÉ NAGY I. R., DANCSÓKNÉ FÓRIS E., JOMBACH S., KESZTHELYI Á., KOTSIS I., SALLAY Á., SZCZUKA L., SZILVÁCSKU ZS., FÜLÖP GY., FILEPNÉ KOVÁCS K., DANI R. 2020. Zöldinfrastruktúra-hálózat fejlesztése – A hazai zöldinfrastruktúra megőrzését és fejlesztését megalapozó stratégiai keretek meghatározása: Módszertani javaslat a zöldinfrastruktúra belterületi elemeinek azonosítására, állapotértékelésére és annak mintaterületi alkalmazására. Ormos Imre Alapítvány, Megbízó: Agrárminisztérium
20. SZILBERHORN E. (ed) 2017. Kiszállás Településképi Arculati Kézikönyve. Kiszállás Község Önkormányzata
21. Országos Területrendezési Terv 2019. 2018. évi CXXXIX. törvény Magyarország és egyes kiemelt térségeinek területrendezési tervéről

## ZÖLDINFRASTRUKTÚRA FEJLESZTÉSI LEHETŐSÉGEK VIDÉKI TELEPÜLÉSEKEN

A zöldinfrastruktúra (ZI) kifejezés széles körben elterjedt, elsősorban a település- és a területi tervezés terén. A koncepció összetettsége és multifunkcionalitása miatt a terület- és vidékfejlesztésben is alkalmazható. Az Európai Unió több szakpolitikába, stratégia-ába kívánja integrálni a zöldinfrastuktúra fogalmát. Magyarországon az elmúlt években számos fontos ZI-val kapcsolatos stratégia készült. A már létező komplex projektek, esettanulmányok azonban főként nagyobb városokra, településekre fókuszálnak. Tanulmányunkban egy komplex ZI tervezésre és fejlesztésre mutatunk példát egy kisebb vidéki település esetében. Célunk az volt, hogy az önkormányzat és az érintettek igényeit követve gyakorlatorientált javaslatot adjunk a település zöldinfrastruktúrájának fejlesztésére, az előzőekben említett kutatási jelentések és kézikönyvek javaslatait adaptálva, megvalósítva. Esettanulmányként egy tipikus alföldi vidéki településsel, Kiszállással foglalkoztunk. Elemzéseink a település belterületének és külterületeinek zöldinfrastruktúrájára, valamint a kül- és belterület közötti határzónákra irányultak. Eredményeink számos hiányosságra mutattak rá a ZI-val

kapcsolatban, ugyanakkor számos kihasználatlan potenciált is találtunk. Ezen eredmények alapján dolgoztuk ki Kiszállás zöldinfrastruktúra koncepcióját. Két fő irányt céloztunk meg: 1. a meglévő zöldinfrastruktúra szakszerű fenntartását, védelmét; 2. koncepcionális fejlesztési ötletek kidolgozását két célterületre fókuszálva. Erre a két fő ZI-elemre több olyan javaslatot dolgoztunk ki, amelyek szélesíthetik a település rekreációs-zöldfelületi palettáját, és növelhetik a község reprezentációs potenciálját. Megállapíthatjuk, hogy az ilyen jellegű vidéki települések külterületein nagyon fontos a komplex mezőgazdasági és rekreációs célú ZI-fejlesztés. A belterületek esetében pedig a fenntartás és a fejlesztés párhuzamosan kell, hogy történjen. Megfelelő tervezéssel, növényalkalmazással és emberi léptékű fejlesztésekkel az ilyen típusú falvakban a helyiek jó közérzete viszonylag alacsony anyagi ráfordítással is jelentősen növelhető. Javaslati csomagunk példát ad arra, hogyan lehet a nemzetközi és nemzeti politikákat, ajánlásokat helyi szinten átültetni a gyakorlatba. ©