



Golovec Urban Forest Operational Management Plan



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1. INTRODUCTION

1.1 The objective and purpose of the operational plan

- **Objective**
 - To ensure the multi-purpose and sustainable use of the Golovec urban forest;
 - To contribute to improvement in the management of the Golovec urban forest with regard to its great importance for a healthy living environment, recreation and leisure activities of residents of Ljubljana.

- **Purpose**
 - The Operational Plan (OP) serves as the basis for the more detailed and specific treatment of the Golovec urban forest, and it is intended for the Contracting Authority – the City Municipality of Ljubljana (CMOL), since it emphasises its interests, while representing an instrument for cooperation with the public interested in this area and the forest owners, and is a basis for participation in tenders for obtaining (international) projects and financial resources. At the same time, the OP is a tool facilitating cooperation with the public forestry department, as it can boost changes in forest management. In addition, it is an instrument facilitating cooperation with institutions in charge of spatial planning, as well as a tool for the promotion of the City Municipality of Ljubljana.
 - The OP is used as the basis for the preparation of the Plan for the arrangement and providing equipment for forests with a special purpose, which is set out in the Ordinance proclaiming forests with a special purpose;
 - the OP is also the basis for supplementing and changing the forest management planning system. In fact, the existing regulations do not allow for the preparation of a forest management plan that would be adapted to the specifics of the urban forest.

- **Relationship to the master plan**
 - The guidelines and measures set out in the OP for the Golovec urban forest are in line with the strategic guidelines set out in the Strategy for the Urban Forest Development of the City of Ljubljana (SP).

1.2 Design of an operational plan, commitments and validity

- **Bases**
 - 2015–2024 Forest Management Plan of the Ljubljana Forest Management Unit (FMP of the Ljubljana FMU, 2015)
 - 2011–2020 Forest Management Plan of the Ljubljana Forest Management Area (FMP of the Ljubljana FMA, 2011)
 - Municipal Spatial Plan of the Municipality of Ljubljana – strategic part (MSP MoL SP, 2010)
 - Municipal Spatial Plan of the Municipality of Ljubljana – operative part (MSP MoL OP, 2010)
 - Relationship to forest management and other planning bases
 - The FMP of the Ljubljana FMU (2015) is the underlying basis for forest management in the Golovec area. The OP is more detailed; it deals with content that is discussed in general in the FMP of the Ljubljana FMU. In cases when the OP determines content that is different to the contents defined in the FMP, they must be defined as a “proposal” presented by the City Municipality of Ljubljana (CMOL) when restoring the FMP of the Ljubljana FMU.
 - The OP can be the basis for proposals when drawing up spatial plans, since various professional institutions, forest owners and the public participated in its preparation.

- **Commitment**

- The OP is a compulsory basis for the City Municipality of Ljubljana, for planning the use of funds and obtaining international or national projects that are in line with the content of the OP.
- The OP is a tool used by the City Municipality of Ljubljana in the preparation of initiatives at the beginning of the restoration of the FMP of the Ljubljana FMU. In this way, the OP directly and indirectly influences the work of the Slovenian Forest Service (SFS), which is in accordance with the Act on Forests (ZG) responsible for forest planning, management and monitoring.
- The OP is an instrument facilitating communication with the owners regarding forest management and the basis for projects/agreements, subsidies that support the provision of public benefits in privately-owned forests. Some guidelines for the management of privately-owned forests of Golovec are derived from the emphasised social and ecological functions of the forest and/or from the legal regulations, as the City Municipality of Ljubljana proclaimed the wider urban forest area including Golovec as forests with a special purpose (FSP). The Ordinance on FSPs defined a framework “management regime”, which, however, is not sufficiently operational to implement the measures. The Ordinance mentions management plans that provide measures to promote forest functions. According to the Act on Forests (ZG), these include plans for the forest management area, the forest management unit and silvicultural plans. Part of the OP is also a drawn up plan for the arrangement and equipment of forests with a special purpose, which is otherwise defined by the Ordinance and adopted by the CMOL's City Council.

- **Drawing up the OP**

- SFS and CMOL are responsible for the preparation of the OP. The plan was developed in 2019 and 2020. Experts from research institutions, consulting companies, the public and forest owners were involved in the planning process through surveys, participatory workshops and individual focus group meetings organised within the framework of the URBforDAN project.

- **Period of validity**

- The period of validity of the OP is 5 years. This is the period that is most relevant from the point of view of assessing the necessity of works to be performed, subsidising, etc. After this period, it is assessed whether the plan needs to be supplemented (CMOL and SFS) and the revision of the plan is decided on. The City Municipality of Ljubljana in cooperation with the SFS is responsible for the plan revision.

- **Implementation and operational planning**

- The OP is the basis for carrying out the activities of the City Municipality of Ljubljana in the Golovec area. It includes guidelines, planned measures and tools. The OP does not cover all the implementation details; therefore, the activities defined in the OP can be specified through operational projects. This also applies to the period following the completion of the URBforDAN project.

- **The OP area**

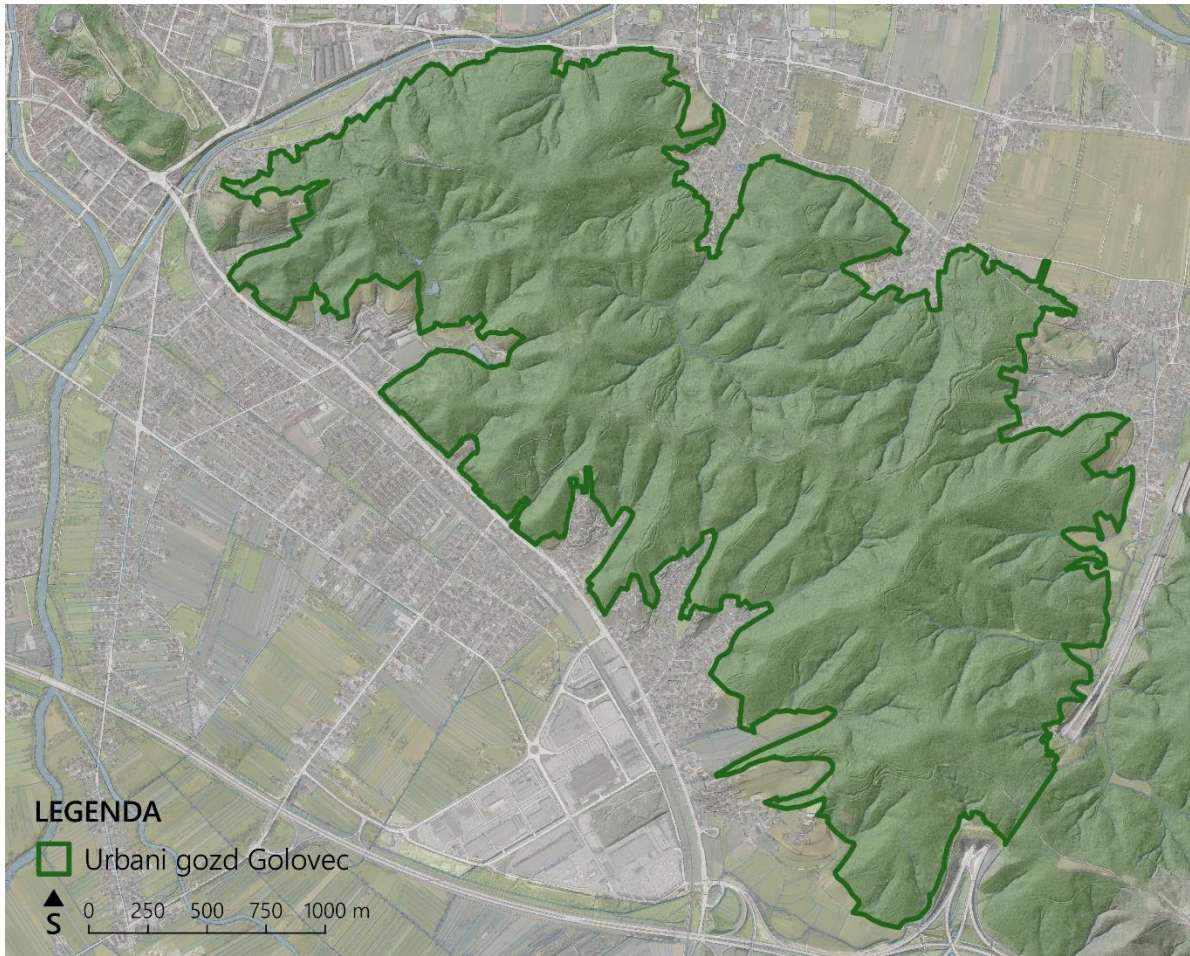


Figure 1: Golovec focus area, 636 ha

2 THE IMPORTANCE OF THE GOLOVEC URBAN FOREST

The Strategy for Urban Forest Development of the City of Ljubljana sets out the main objectives for its management. The entire area of the urban forests in Ljubljana measures 2,151 ha and includes several contiguous areas (Strategy, 2020), which differ somewhat in terms of natural circumstances, importance and management objectives.

2.1 The importance of the Golovec urban forest

- **The importance of forests**

Recreation and tourism

Due to its close proximity to Ljubljana and relatively large surface area, Golovec is extremely important for leisure activities and recreation. In Ljubljana, the number of tourist visits is increasing sharply; therefore, the forests on Golovec are very important for the promotion of sustainable tourism as well. Recreation is important throughout the entire area of the forests of Golovec, and its importance is relatively greater in the areas of the trails (walking and cycling trails), forest entry points and areas with special features such as remarkable trees, ridges, intersections of important trails, and recreational grounds. The eastern part of Golovec is visited less frequently, though it is especially appealing for mountain bikers and mountain runners.

Education

Golovec is important in terms of education, as it is regularly or occasionally visited by nearby schools, nursery schools, scouts and other organised groups that carry out educational activities in the forest. In addition, the Golovec urban forest is important for life-long learning because it is regularly visited by older generations and various activities for seniors are being conducted there.

Regulation of the local climate

The urban forests of Golovec have a significant impact on the quality of life in Ljubljana. They considerably reduce air pollution and are of great importance in the regulation of local climatic conditions. The forests on Golovec regulate the drainage of rainwater and contribute to the reduction of fine-particle air pollution, improve carbon sequestration and reduce the urban heat island effect. The forests on Golovec also protect against noise from motorways and main access roads.

Protective effects

Moreover, the forests on Golovec are important for protection against floods and the reduction of soil erosion hazards. Some parts of Golovec also have stormwater overflows that protect the populated low-lying areas from torrents and flood risks.

Nature conservation

On Golovec, some smaller areas have been declared as areas of natural value.

Cultural heritage

Cultural heritage is particularly important around the Trail of Remembrance and Comradeship (PST) that links Golovec to other urban forests of Ljubljana.

Timber production and non-wood forest products

The forests on Golovec are important in terms of timber production. The importance is greater in the eastern part, where private forest holdings are larger and forest management is more vibrant.

In addition, the forests on Golovec are important for the extraction of non-wood forest products, in particular for the collection of chestnuts, mushrooms and blueberries.

- **Target groups/users**

1. **residents of Ljubljana;** Golovec provides a healthy environment for all citizens and visitors and has a beneficial effect on the physical and mental health;
2. **forest owners;** a good 87% of Golovec forests are privately owned. Considerable differences in the interests and intensity of forest management are noticeable among the forest owners;
3. **user groups active in the field of leisure and recreation:** walkers, hikers, runners, cyclists, dog walkers, families, archers, equestrians, etc.
4. **educational institutions;** nursery schools, primary schools, scout associations, senior activity centres, etc.;
5. **tourists;** Golovec is situated in the vicinity of Ljubljana and offers opportunities for tourist visits.

3 THE CONDITION AND USE OF THE GOLOVEC URBAN FOREST

3.1 Forest condition and management

- **Forest surface area and ownership**

The Golovec urban forest belongs to the Ljubljana forest management area (FMA) and unit (FMU). In 2010, it was declared a forest with a special purpose including other important urban forests of Ljubljana in which measures are allowed to be undertaken by an ordinance of the City Municipality of Ljubljana (2015–2024 FMP of the Ljubljana FMU, SFS, 2014).

The surface area covered by forests on Golovec totals 636 ha, of which 551.17 ha (87%) are privately owned, 40.61 ha (6%) are state forests and 43.96 ha (7%) are forests of local communities. The average size of a forest plot totals 1.43 ha. The ownership structure is extremely fragmented (Figure 2) and most owners own plots of 1 to 5 ha (Figure 3).

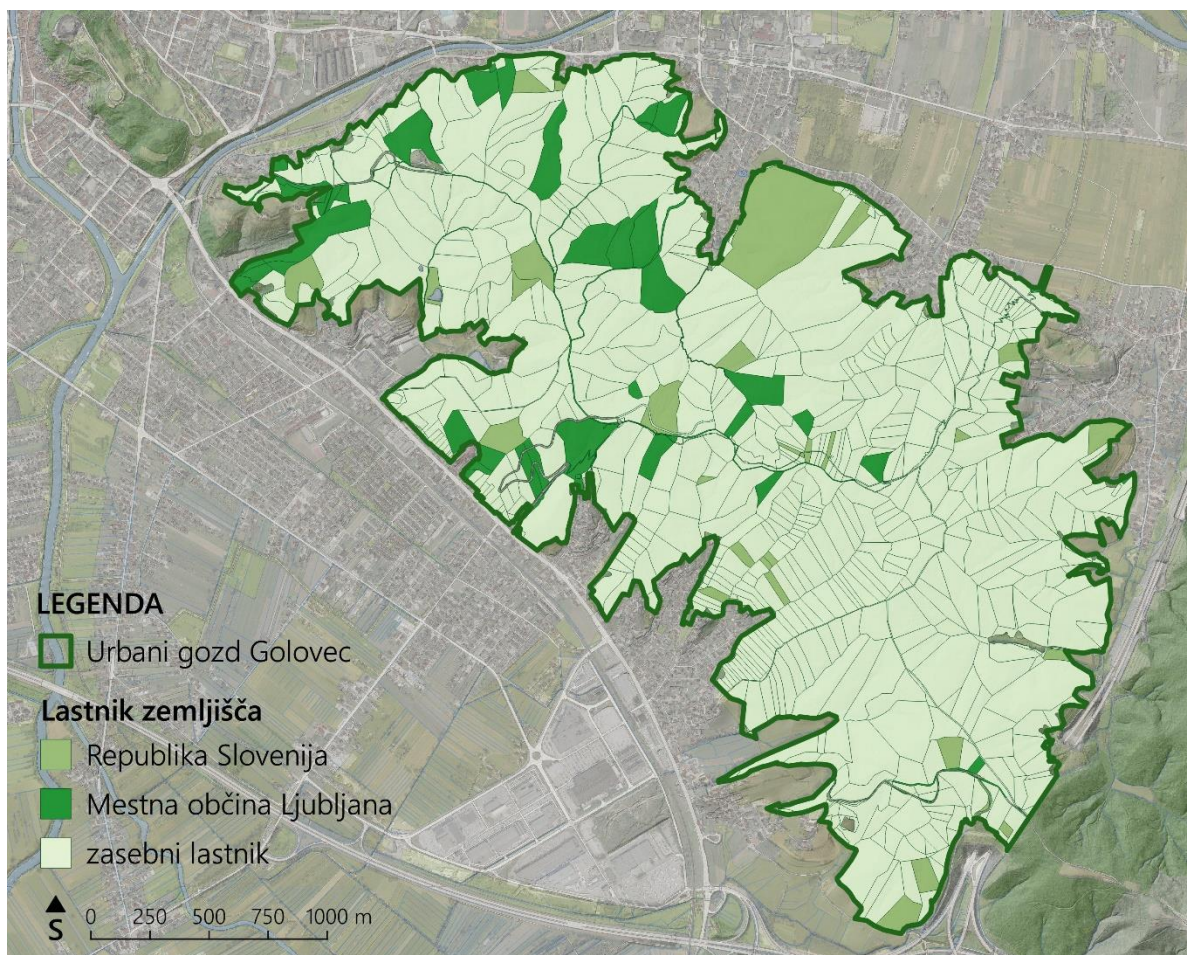


Figure 2: Ownership structure of Golovec forests

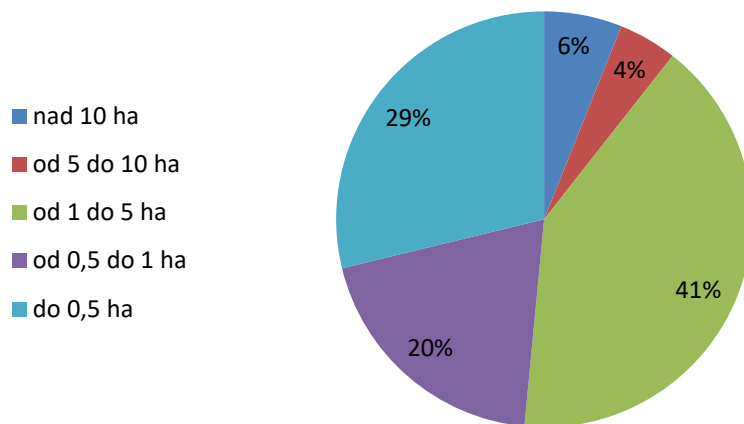


Figure 3: Forest holding structure

- **Site and stand characteristics**

The prevailing forest site types consist of acidophilous beech grove communities with deer fern (*Blechno-Fagetum*) (83%), followed by pre-Alpine oak-hornbeam groves (*Querco-Carpinetum var. Luzula*) (9%), acidophilous red pine groves (*Vaccinio myrtilli-Pinetum var.geogr. Castanea sativa*) (7%) and black alder groves (*Alnetum glutinosae*) (1%). Among the developmental stages of the forest stands, thick stage forest predominates, which covers 61.5% of the area, followed by pole stage forests that covers 30% of the area, stands for rehabilitation covering 8%, while young shoots cover only 0.5% of the area (Figure 4). The average growing stock totals 283 m³/ha, and the annual increment totals 8 m³/ha.

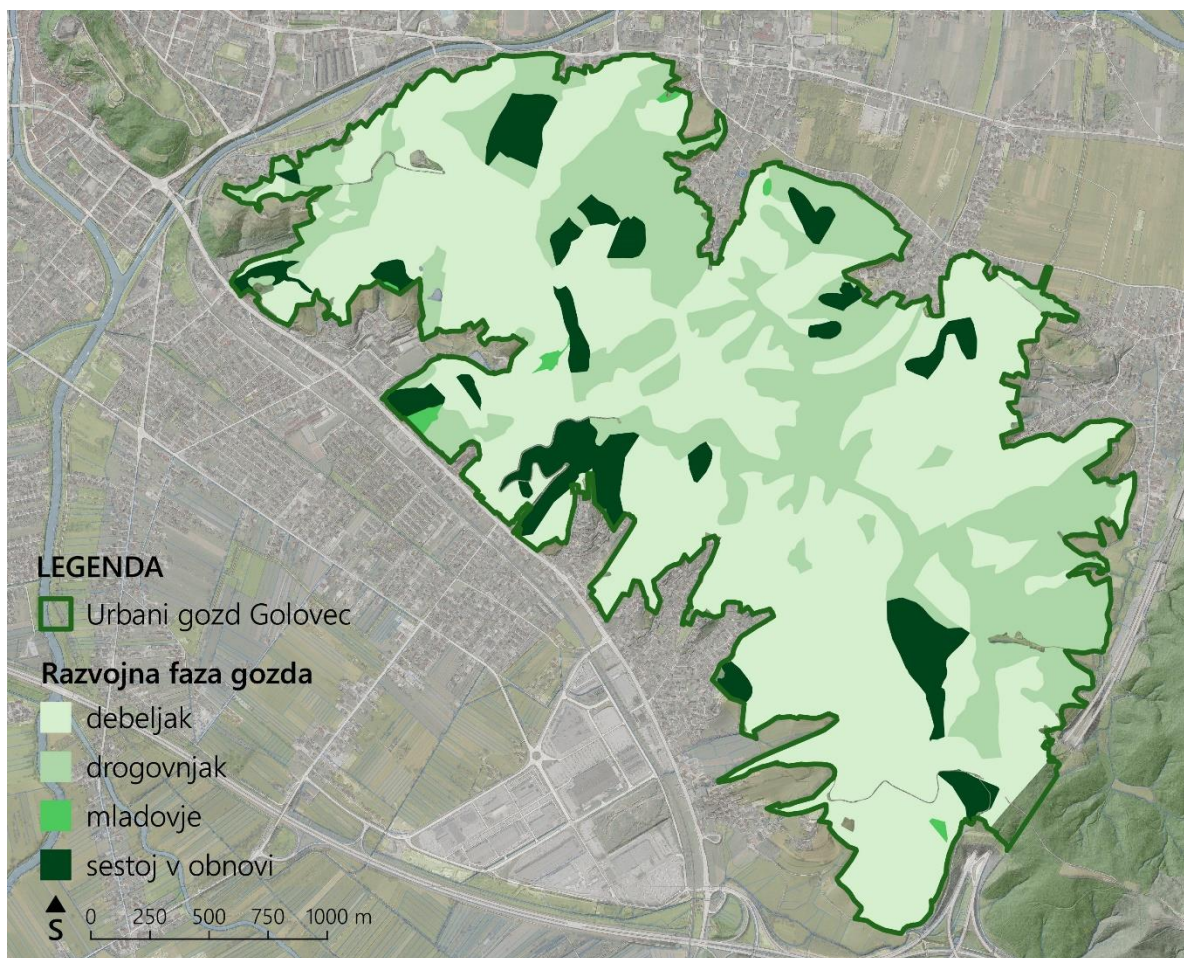


Figure 4: Developmental stages of Golovec forests

- **Forest management activities**

In the period from 2014 to 2018, the average annual harvest totalled as much as 19.6 m³/ha (Table 1). Thinning represents 5% of all felling, rejuvenating logging 3%, while the felling of decrepit trees and sanitary cutting 92% of all felling. Due to the ice-break in 2014, the highest possible volume of felling increased by 52% compared to the previous planning period, and in individual forest sites, it exceeds the ten-year increment (80 m³/ha). The felling volume is likely to be high in the coming years because of disturbances such as natural disasters and bark beetle build-up (FMP of the Ljubljana FMU, 2015).

Table 1: Logging during the 2014–2018 period

Year	Total logging volume (m ³)	m ³ /ha	Sanitary cut share (%)
2014	18323	28.81	85
2015	5286	8.31	91
2016	32159	50.56	94
2017	4497	7.07	50
2018	2114	3.32	76
Average	12477	20	79

- **Timber production**

Felling is carried out in a classic way with a chainsaw, and timber extraction is performed with the use of a tractor and a combination of manual work/tractor use in the entire area of Golovec. Wood

haulage on multi-purpose logging roads is prohibited (Ordinance..., 2010), therefore the transport of timber is carried out using tractor-trailers or trucks (FMP of the Ljubljana FMU, 2015).

- **Openness of the forest**

The openness of the forest for timber extraction is 76% (Figure 5). There are no forest roads; the most important ones for transporting timber by truck is the 4.7 km long public road (*Italijanka* road) that runs from Hrušica in the NE to the Dolenjska cesta Road (London) in the SW, almost in the middle of Golovec, and the 1.3 km long Cesta na Orle Road in the SE. On the hardened multi-purpose logging road that runs from the Golovec Astronomical and Geophysical Observatory in the W to the intersection with the *Italijanka* Road in the E with a length of 1.2 km, it is only permitted to transport timber using forestry tractor-trailers.

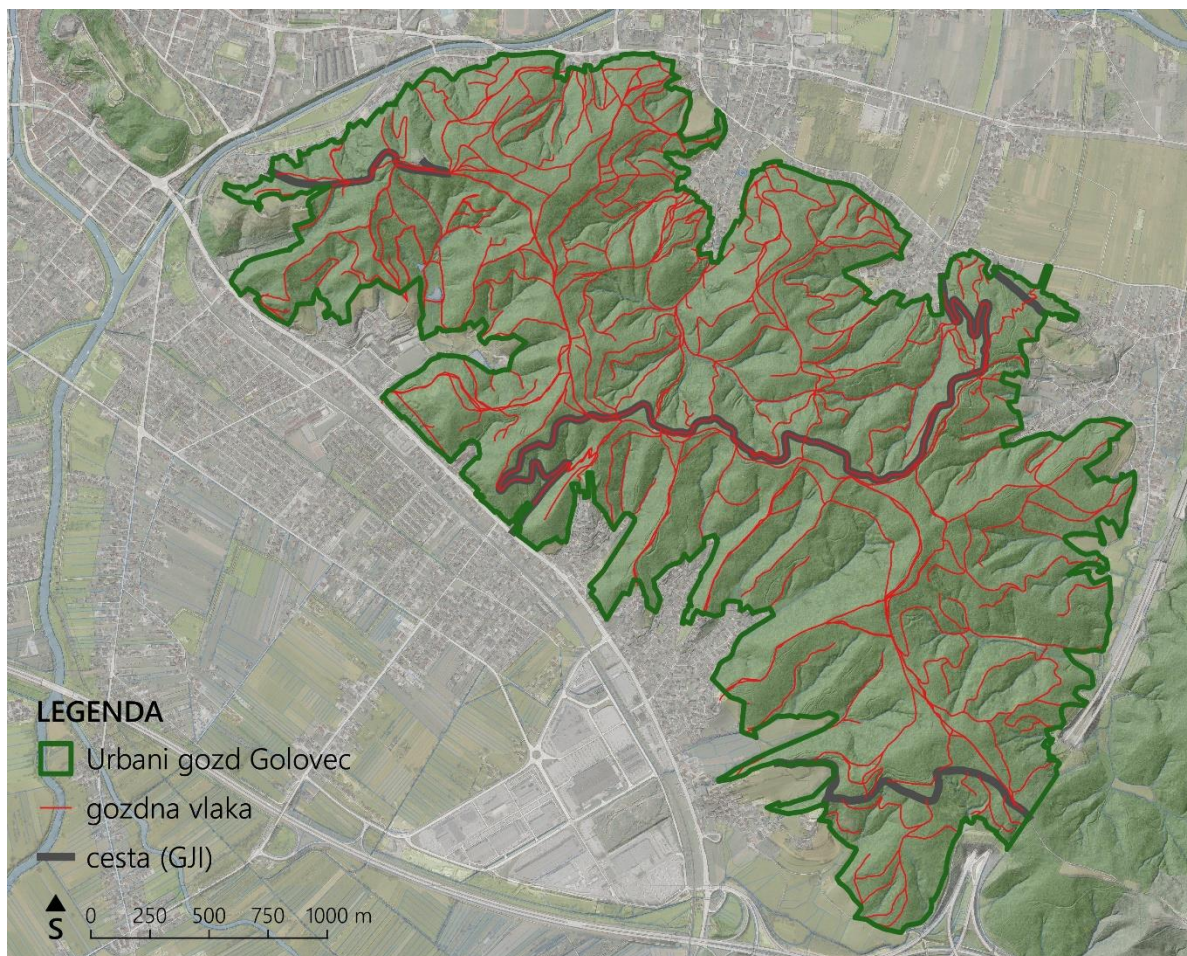


Figure 5: The openness of the Golovec forests

- **Effects and problems**

- Frequent natural disasters such as ice-break, windthrow, and snow-break;
- Bark beetle gradation;
- Browsing by game;
- Erosion due to unregulated footpaths and cycle trails.
- Access to the forest for forest production

- **Damage and threats**

- In 2014, the stands were severely damaged by sleet, affecting 26.2% of the trees. Relatively, the most damaged trees were pines, soft-leaved deciduous trees and beech. The data for the entire Ljubljana FMU indicates that the level of tree damage, excluding the sleet, is small, namely 7.4% of all trees (FMP of the Ljubljana FMU, 2015).
- The rate of saplings (>15 cm) that were browsed by game among the deciduous trees totals 22% and it causes concern for hardwood (white hornbeam, chestnut) and noble deciduous trees (maple, ash), as their stand ingrowth is prevented. The spruce has not been browsed by game, and beech only slightly (2015–2024 FMP of the Ljubljana FMU, SFS, 2014).

3.2 Recreational use of the Golovec Urban Forest

- **Visits to the forest**

Based on the monitoring of visits in Q1 of 2020 that we carried out as part of the URBforDAN project (the installation of meters on the busiest routes), the annual visit to Golovec is estimated at more than 500,000 visitors. The survey¹ (URBforDAN project, 2019) conducted at the end of 2018 shows that the most frequent visitors are men with 62%, the predominant age group is 31 to 45 years and represents 45% of all visitors (Table 1, 2; for details see Annex 1).

Table 1: Gender structure of visitors (the URBforDAN Project, 2019)

User group	Gender	
	Male (%)	Female (%)
Runners	60	40
Hikers	39	61
Cyclists	92	8
Mountain bikers	88	12
Dog walkers	35	65
Families	36	64
Total	62	38

Table 2: Age structure of visitors

User group	Age group				
	0–18 years (%)	19–30 years (%)	31–45 years (%)	46–60 years (%)	61+ years (%)
Runners	2	36	38	21	3
Hikers	1	24	33	28	15
Cyclists	2	23	52	18	5
Mountain bikers	10	34	45	9	2
Pet walkers	1	32	38	23	6
Families with children	2	12	66	16	4
Total	4	27	45	18	6

¹ (N = 877, online survey)

- **Disagreements on use**

The main disagreements were identified based on the conducted survey and workshops with the users and owners of the Golovec forests (URBforDAN project, 2019):

- Disagreements between the dominant groups of people seeking recreational activities and drivers of motor vehicles (e.g., cars, moto-cross, quadricycles);
- Disagreements between other users and cyclists/downhill mountain bikers; these disagreements are mostly related to safety issues due to speed, aggressive riding style, etc.;
- Disagreements between other users and dog walkers; these are mostly related to safety problems due to dogs walking freely (not kept on a leash), fear of dogs, etc.;
- Disagreements related to the inappropriate behaviour of individual users;
- Disagreements between other users and forest owners; these are mostly related to the inappropriate behaviour of individual users, the opening of new routes and the expansion of existing routes and consequent damage to the forest, non-compliance with safety instructions during the implementation of forestry works, etc.;
- Disagreements due to misunderstanding and poor understanding of the management regime; e.g. some users perceive works in the forest (logging, construction and maintenance of roads) as forest cover destruction;
- Disagreements due to unresolved ownership issues between public (state, municipality) and private owners;
- Disagreements between SFS, the City Municipality of Ljubljana and owners regarding the implementation of regulations governing forest management. Note: The SFS is not a manager; however, it guides the development of forests.

- **Infrastructure**

- Accessibility (roads, footpaths, logging roads):
 - a 4.7 km long public road (*Italijanka* Road) running from Hrušica in the NE to Dolenjska cesta Road (London) in the SW, almost in the middle of Golovec for pedestrians, cyclists and the use of motor vehicles;
 - the hardened multi-purpose logging road that runs from the Golovec Astronomical and Geophysical Observatory in the W to the intersection with *Italijanka* Road on the E in the length of 1.2 km for pedestrians and cyclists;
 - The Trail of Remembrance and Comradeship (PST) for cyclists and pedestrians is 2.7 km long;
 - There are also multi-purpose trails running on Golovec, owned by the City Municipality of Ljubljana and intended for pedestrians and cyclists, with a total length of 6.5 km;
 - In the SE part above Rudnik, a downhill mountain biking trail has been established under the management of the Golovec trails association.
- Urban equipment
 - Benches and tables are arranged along the PST (38 benches and 11 tables in total) and are maintained by the VO-KA Snaga public undertaking; some are also placed along the main path from the Centre entry point (EP) towards the Orle entry point (EP) (12 benches), though they are not maintained;
 - The plateau with exercise equipment is part of the PST and is located at the junction of the PST, the *Italijanka* Road and the multi-purpose logging road;
 - Springs/water; a drinking fountain was set up at the intersection by the Golovec Astronomical and Geophysical Observatory.

3.3 Important facilities in the Golovec urban forest

- **Nature conservation and protection**

Natural values/content (Environmental Atlas, 2020):

- Natural value: the beech tree by the road leading from the Golovec Astronomical and Geophysical Observatory in Ljubljana (ID 8792);
- Natural value: the pedunculate oak by the Hruševska cesta Road in Štepanja vas in Ljubljana (ID 8783);
- Natural value: Mokrotna dolina pod Golovcem Valley in Rakovnik in Ljubljana (ID 8707);
- Ecologically important area: Rakovnik pod Golovcem (ID 38400)

- **Cultural heritage**

- 2.75 km of the total 32.5 km of the PST runs along Golovec. It follows the route of the barbed wire that enclosed the city during the 2nd World War. The inauguration of the arranged sandy paths and tree-lined avenues took place on 9 May 1985. Two mass events, i.e. the Trojka Run and the March Along the Wire take place there.

- **Other facilities**

- Protection against flood risks – Rakovnik, Dolgi potok stormwater overflows and the Malenca stormwater overflow that is part of the motorway body and is managed by the DARS company.

4. OBJECTIVES AND GUIDELINES FOR GOLOVEC URBAN FOREST MANAGEMENT

Among the management objectives for all the urban forests of Ljubljana (Strategy, 2020), the following are particularly important for the Golovec area:

- **OBJECTIVE 1: ensuring a healthy living environment for city residents;**
- **OBJECTIVE 2: providing opportunities for sustainable recreation and leisure activities and promoting sustainable tourism;**
- **OBJECTIVE 3: providing opportunities for education and life-long learning;**
- **OBJECTIVE 4: nature and cultural heritage conservation;**
- **OBJECTIVE 5: creating a conducive environment for forest owners;**
- **OBJECTIVE 7: comprehensive management development.**

The following are important for achieving these objectives:

- guidelines of the Forest Management Plan of the Ljubljana Forest Management Unit (FMP of the Ljubljana FMU, 2015);
- guidelines of the Strategy for Urban Forest Development (Strategy, 2015) that also apply to the Golovec area;
- general guidelines of the operational plan (Chapter 4.2);
- project activities (Chapter 4.4).

Areas with pronounced forest features are important for the realisation of certain goals, as these areas show where individual management objectives are relatively more important (Chapter 4.3).

4.1 Above-standard guidelines

Forest Management Plan of the Ljubljana Forest Management Unit (SFS Ljubljana OU, 2015)

General guidelines that are important for the Golovec urban forest (shortened and adapted):

- **Guidelines for the provision of ecological objectives**
 - The preservation of the diverse structure of forest stands;
 - The preservation or establishment of natural forest ecosystems and time-defined peaceful areas for the development of wild animal species, especially for rare, endangered and vulnerable species;
 - Achieving a structure and abundance that will be in harmony with the environment through interventions in the populations of herbivorous game species.
- **Guidelines for the provision of social goals**
 - Strict observance of the detailed guidelines for the individual social functions of the forest during the performance of all works;
 - Cooperation with stakeholders including those who are not forest owners in management planning and implementing measures;
 - It is essential to keep the public constantly informed about forest management and the various aspects of forest use.
- **Guidelines for the provision of production targets**
 - Ensuring the optimal ratio of forest development stages;
 - Increase the scope of tending logging and cultivation-related work;
 - Encouraging the involvement of forest owners, informing them better and raising their awareness;

- The prioritisation of measures within silvicultural plans;
- Regeneration of the stands in a natural way by planting or seeding;
- In forest protection, the emphasis should be on prevention;
- Raising awareness and informing the users about public forest use and particularly collectors of non-wood forest goods about the legal regulations governing these areas;
- Where social functions are strongly emphasised, primarily arrange the existing forest logging roads and other hardened public paths in the forest and forest area to be useful for forest management and public use;
- Promoting the development of forest-timber chains and advise forest owners on the possibilities of local wood processing;

Ordinance on the municipal spatial plan of the Municipality of Ljubljana – strategic and operative part (Official Gazette of the Republic of Slovenia, No. 78/10)

General guidelines that are important for the Golovec urban forest (shortened and adapted):

The Golovec area belongs to the spatial planning units GO-232, GO-242, RN-336 and RN-345 with the designated intended use of a Forest Area. In the strategic part, they are defined as the category of green spaces, the category of urban forest and the category of forests with a special purpose. In the latter case, management measures are considered as adapted to the emphasised social functions. All actions that negatively affect the ecological stability and endanger the functions of forests are prohibited in these forests. Regarding the emphasised recreational role, the development of this activity should be directed so that it will not degenerate the quality of the forest. It is possible to build basic recreational infrastructure (for example, properly marked paths, rest areas and lookout points).

The operative part of MSP MOL defines:

- The forest areas as areas designated for forests and their management;
- Permissible encroachments in forest areas:
 - facilities and other works that increase the fire safety of forests,
 - forestry investment and maintenance work in accordance with the law;
- Urban zoning conditions: It is permissible to construct sports grounds (only adrenaline and climbing parks, ranges for paintball, archery, canopy walking, etc.). These arrangements must not interfere with the areas of footpaths and memorials. It is also permissible to arrange rest areas, learning and recreational trails, mountain biking trails, children's playgrounds, benches, tables and waste bins;
- Environmental conditions: The regulation of interventions listed in the urban zoning conditions is permissible in such a way as to preserve the condition of the habitat types that are important in terms of nature conservation. It is not permissible to construct sports grounds in wet areas and thermophilic forest of mixed deciduous trees and in the area of NV-8707. It is not permissible to illuminate the area.

4.2 General guidelines for Golovec urban forest management

- **Forest area**

According to the Ordinance on forests with a special purpose, the forest area must not be reduced.

- **Structure and composition of the forest stands**

The key guidelines regarding timber production technology derive from the FMP of the Ljubljana FMU (2015) and the 2020–2030 Strategy for Urban Forest Development of the City of Ljubljana (URBforDAN project, 2019). The gradual group management of natural forest regeneration is recommended. It is important to balance the distribution of development stages, which, according to the production period, should (targets) be approximately 14% saplings, 38% pole stage forest, 28% thick stage forest and 20% stands for rehabilitation. The rehabilitation of stands takes place in areas that vary in size, usually ranging from a few acres to a hectare, exceptionally more. A mixed tree composition should be promoted using the technique of stand rehabilitation and tending them. In this way, we seek to achieve a more natural tree composition of the forests; the share of beech (now 24% of the growing stock) increases, mainly at the expense of red pine (23%), spruce (11%) and other hardwoods (17%), while the share of sessile oak (23%) is maintained. For the owners, the possibilities for increasing the value increment mainly lie in promoting sessile oak and spruce and in improving the quality of assortments. The promotion of spruce should be limited to individual trees or groups and nests (a maximum of 10% of growing stock). Continuous control of the state of health of trees and the timely removal of non-vital trees is essential. The vitality and stability of trees is an important criterion when choosing trees for felling. Along the paths, individual special trees (overgrowth, dimensions, monuments of previous forest use) should be preserved where possible.

- **Timber production technology**

The key guidelines regarding timber production technology derive from the FMP of the Ljubljana FMU (2015) and the 2020–2030 Strategy for Urban Forest Development of the City of Ljubljana (URBforDAN project, 2019):

- the predominant timber production technology is the so-called classic logging with chainsaw and tractor extraction. It is recommended to fell short timber or use the assortment method, but not the multiple method. Machine felling or cable extraction is only permissible in exceptional cases (deforestation, sanitary cuts) that require prompt action;
 - forest logging roads and other hardened public paths in the forest and forest area are, in addition to forest management, regulated for the purpose of public use, especially for various forms of recreation (walking, running, cycling, horseback riding, etc.), therefore instead of dragging along the ground, the extraction of forest timber assortments should mainly be carried out using tractor semi-trailers. On logging roads intended only for timber extraction, the use of tractor forest trailers is promoted (transporting timber out of the forest instead of dragging it along the ground);
 - felling, preparation and extraction are carried out in dry weather, preferably in the wintertime and on frozen ground;
 - during the execution of the works, it is necessary to mark the sites and install warning signs in order to ensure the safety of visitors;
 - the implementation of above-standard forest rules and the reduction of the amount of timber and slash, which would otherwise be left along the organised and marked paths after felling in the area of recreational infrastructure;
 - the quick and efficient rehabilitation of forests affected by natural disasters is necessary, as well as the regular implementation of necessary sanitary cuts and silvicultural works.
- **Nature conservation and protection**
 - Nature conservation is integrated into sustainable forest management. Special attention is devoted to natural heritage (see Chapter 4.3).

- **Areas with pronounced features**

- Management is focused on the simultaneous provision of ecological, social and production functions. The general guidelines for areas with pronounced features are defined in the FMP of the Ljubljana FMU (2015) and the Ordinance on forests with a special purpose (2005), and more detailed guidelines are provided in Chapters 4.3 and 4.4.

- **Forest use**
 - Forest use, as defined in the Act on forests (ZG), is carried out in accordance with the concept of multi-purpose and sustainable management. Due to the large number of forest visits and the considerable public importance, visitors must be directed to public multi-purpose paths to prevent spontaneous use. It is necessary to constantly inform and raise the awareness of visitors and to prevent possible disagreements between visitors and forest owners/contractors in the field of forestry and between different forest users. The orderliness and safety of public recreational trails must be ensured.
 - Access to urban forest areas must be safe. Access to the main forest entry points must be provided by public transport or bicycles.

- **Infrastructure in the forest area**
 - There are no forest roads on Golovec. The construction of new forest roads is not envisaged for the next decade. However, it is not prohibited. Driving trucks along the Pot na Golovec and Hrdeckega cesta Roads is prohibited, therefore the transport of timber by truck is not possible in the western part of Golovec to the *Italijanka* Road. Thus, the following two options have been proposed:
 - either elements are constructed on a hardened multi-purpose logging road that runs from the Golovec Astronomical and Geophysical Observatory in the W to the intersection with the *Italijanka* Road in the E in the length of 1.2 km, reclassify the road into a forest road and allow truck driving in order to transport timber under a strict regime (time of transport, scheduling of driving, etc.);
 - or to only allow the transport of timber with a tractor-trailer in this part of Golovec, whereby an estimate of compensation to forest owners for the increased costs of timber transport, if incurred, is prepared using a compensation model.
 - In the eastern part, transport is possible along the *Italijanka* Road, the road to Orle, the Poti na visoko Road, Periška cesta Road and the Poti v dolino Road.
 - The openness of Golovec for timber extraction is 76%. The maintenance of the existing network of logging roads has an advantage, while there is ongoing reconstruction and construction of logging roads, as these works are necessary for the realisation of allowable logging. According to the Ordinance on forests with a special purpose of the City Municipality of Ljubljana, haulage on multi-purpose logging roads is prohibited (ID 0458O02003; ID 0458O03016; ID 0458O03009; ID 0458O03001; ID 0458O02003; ID 0458L01010; ID 0458B10002; ID 0458SV2002; ID 0458SV3010; ID 0458SV3011; ID 0458RU5001; ID 0458RU5004).
 - Access to most logging roads is prevented due to property development on the edge of the forest. It is important to maintain and, when the opportunity arises, restore the existing access points to the forest logging roads. This relieves the burden on multi-purpose logging roads.
 - The arrangement of 8 entry points (EP), where information boards with a map of the area and other necessary information for visitors will be placed;
 - The installation of wooden orientation totems with signposts at all intersections of public paths and logging roads;
 - The marking and proper maintenance of paths connecting the entry points;
 - Indication of the regime of use on paths with exclusive use for individual user groups (pedestrians, cyclists, etc.).

- **Communication/informing the public**

The draft plan is expected to be presented to the public in the summer or autumn of 2020 via an online publication. Activities related to the Strategy for Urban Forest Development of the City of Ljubljana and the operational management plan for the Golovec urban forest will be presented:

- On the website of the City Municipality of Ljubljana and the URBforDAN project;
- In the Ljubljana municipal newspaper;
- In the online news of the City Municipality of Ljubljana;
- On the City Municipality of Ljubljana's social network platforms such as Facebook, Instagram and YouTube;
- During workshops with forest owners;
- With the construction of signage and the installation of urban equipment, when the inauguration event will be organised on Golovec, where further plans will be presented;
- Through articles in professional journals;
- During demonstration workshops where examples of good practice will be presented;
- Through presentations at international conferences.

- **Cooperation between stakeholders**

In preparing the plan, the SFS and the City Municipality of Ljubljana (CMOL) cooperated closely. Representatives of consulting companies (Zavita d.o.o.) and research institutions (Biotechnical Faculty – Department of Forestry, Forestry Institute of Slovenia) participated in the preparation and revision of the plan.

Users/visitors to Golovec and forest owners participated in the formation of objectives, an assessment of the situation, and the determination of priorities and measures, namely through the following activities (the material is available from the authors of the plan):

- The survey conducted among the owners of forests on Golovec;
- The survey conducted among visitors to Golovec;
- Three workshops for visitors to Golovec;
- Three workshops for owners of forests on Golovec;
- In-depth interviews conducted among focus groups (education, downhill mountain bikers, etc.).

4.3 Areas with pronounced features

These are areas that are particularly relevant to selected forest functions. They are determined according to the FMP of the Ljubljana FMU and the Strategy for Urban Forest Development of the City of Ljubljana (Figure 6). The determination is more detailed and adapted to the OP criterion and the results of the URBforDAN project.

Despite the spatial definition of individual functions, especially social ones, forest management in the entire area of Golovec is multi-purpose in nature. The forests on Golovec are also important because of their production function; most of these forests are privately owned and, therefore, it is necessary to recognise and understand the forest owners' interests and align them with the interests of other urban forest users.

At least one of the forest functions is highlighted in the entire area of Golovec. As a rule, areas with pronounced features overlap (recreational, hygiene and health, climatic and aesthetic function) (FMP of the Ljubljana FMU, 2015).

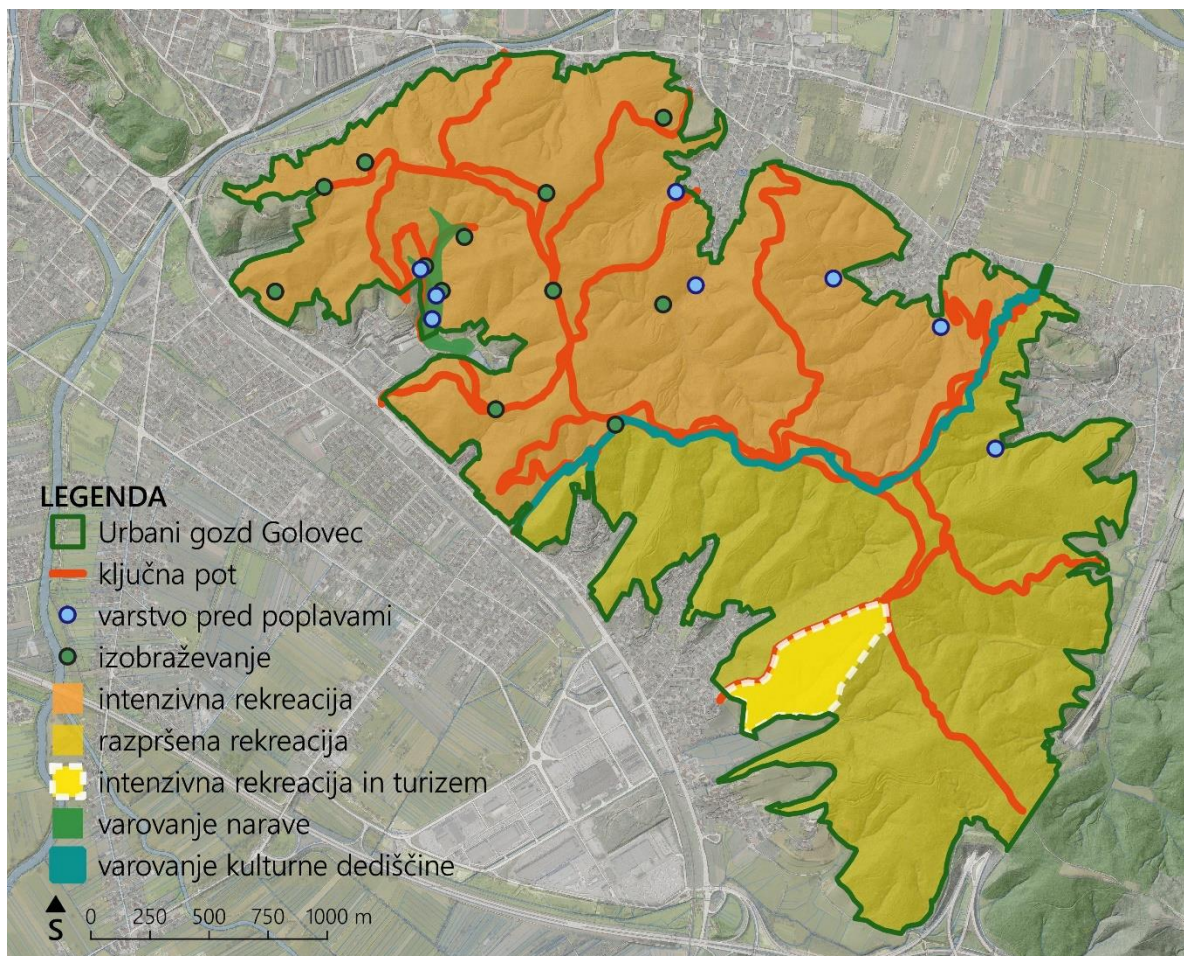


Figure 6: Areas relevant to selected forest functions

Areas important for recreation

Due to the differing numbers of people seeking recreational activities and forms of recreation, Golovec is divided into two areas, where different activities are planned (Chapter 4.5):

- The area of intensive recreation: the area from Hrdeckega cesta Road to the PST, in the direct vicinity of the city and thus more frequently visited on a daily basis, the target groups are mainly walkers, runners, cyclists and dog walkers;
- The area of dispersed recreation: this is further away from the city and less frequently visited; the target groups are mainly runners and mountain bikers who use single trails and downhill courses;
- **Detailed guidelines: 4.5.1, 4.5.2 and 4.5.3**

Areas important for intense recreation and tourism activities

This is an important downhill mountain biking course for sports tourism that also attracts visitors from other countries.

- **Detailed guidelines:**
 - The development of mountain biking tourism in the part of Golovec that is less visited;
 - Finding suitable areas for downhill courses in cooperation with the City Municipality of Ljubljana and the forest owners;
 - Reaching an agreement with the local association on arranging and designing downhill courses;
 - The proper marking of the area and ensuring the safety of all visitors.

Areas important for education

Areas of thematic trails, quiet zones, areas of attractive points and other accessible areas close to educational institutions.

- **Detailed guidelines: 4.5.4**

Areas that are important for protection against floods and torrents

The preservation of the areas of stormwater overflows in order to ensure the safety of the residents of Ljubljana from floods (guidelines in accordance with the regulation of these areas).

Areas important for nature and cultural heritage conservation

Guidelines in accordance with the FMP of the Ljubljana FMU (2015) and the Strategy (2020).

4.4 Planned activities

This chapter presents the planned activities that are important for achieving the management objectives (Figure 7):

Objective 1: this mainly depends on measures related to stands, which are conditioned by the active management and the interest of forest owners. Measures defined in the FMP of the Ljubljana FMU (2015) and activities that either increase the share of public forests (4.5.6) or encourage owners to more actively participate in management (4.4.8) are therefore important for this objective.

Objective 2 is a key objective for Golovec urban forest management. It is supported by activities 4.4.1, 4.4.2, 4.4.3 and 4.4.10.

Objective 3 is ensured by arranging forest play areas, forest learning trail points and thematic trails (4.5.4) and highlighted with content boards or other urban equipment (4.5.2). By establishing entry points, we enable conditions (4.5.1) so that even the youngest can use the forest area to the greatest possible extent.

Objective 4 is supported by activity 4.5.5. Ponds and artificial water bodies in Rakovnik make an important contribution to biodiversity and nature conservation.

Objective 5 is supported by a number of instruments: the purchase of forests from disinterested owners, to whom the forest mainly represents a burden (4.5.6), the integration of forest owners (4.5.8) and a system of compensation for management restrictions linked mainly to the Ordinance on forests with a special purpose (4.5.7).

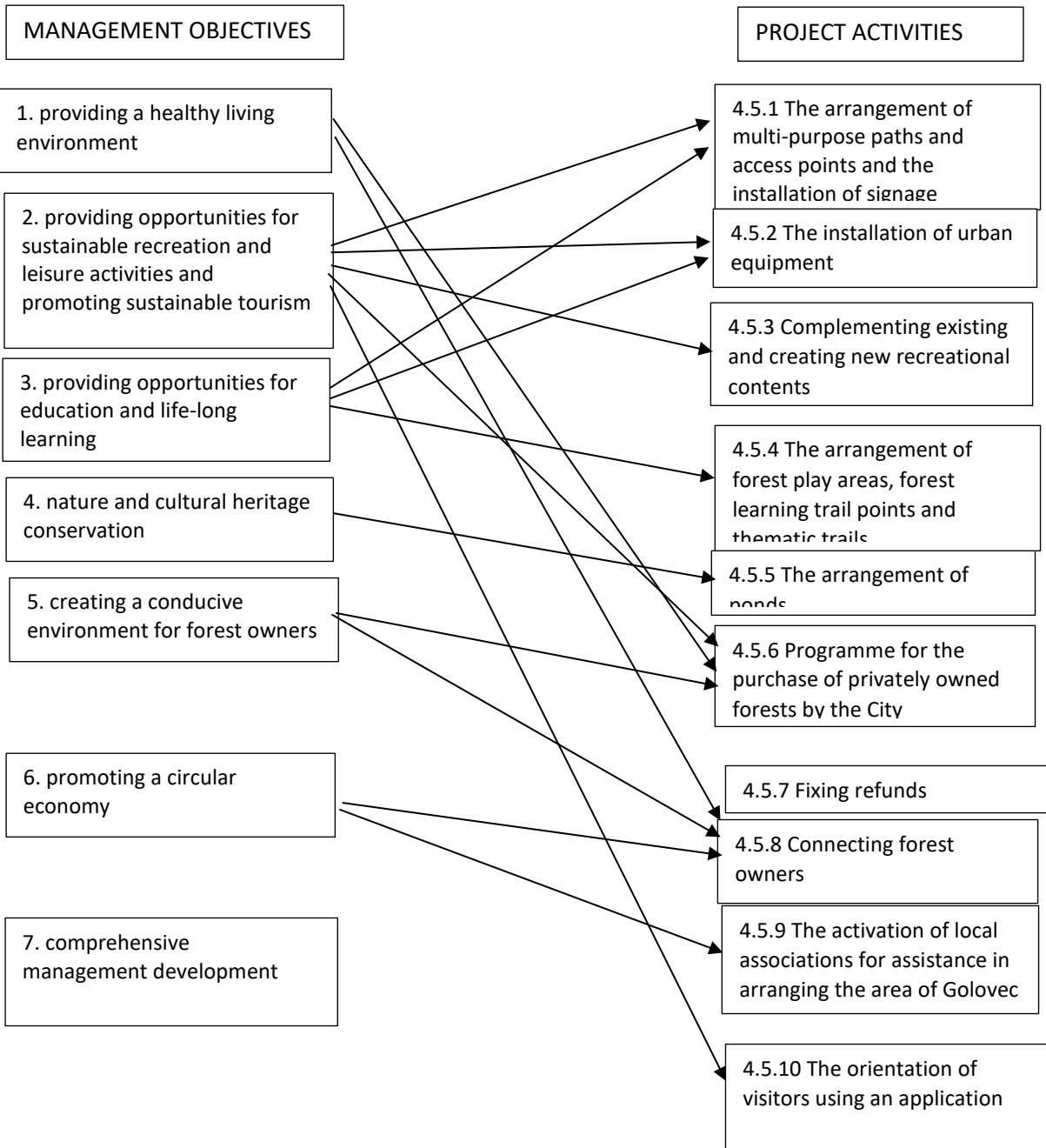


Figure 7: the connection between strategic goals for the urban forests of Ljubljana (Strategy, 2019) and project activities

4.4.1 The arrangement of multi-purpose paths and access points and the installation of signage

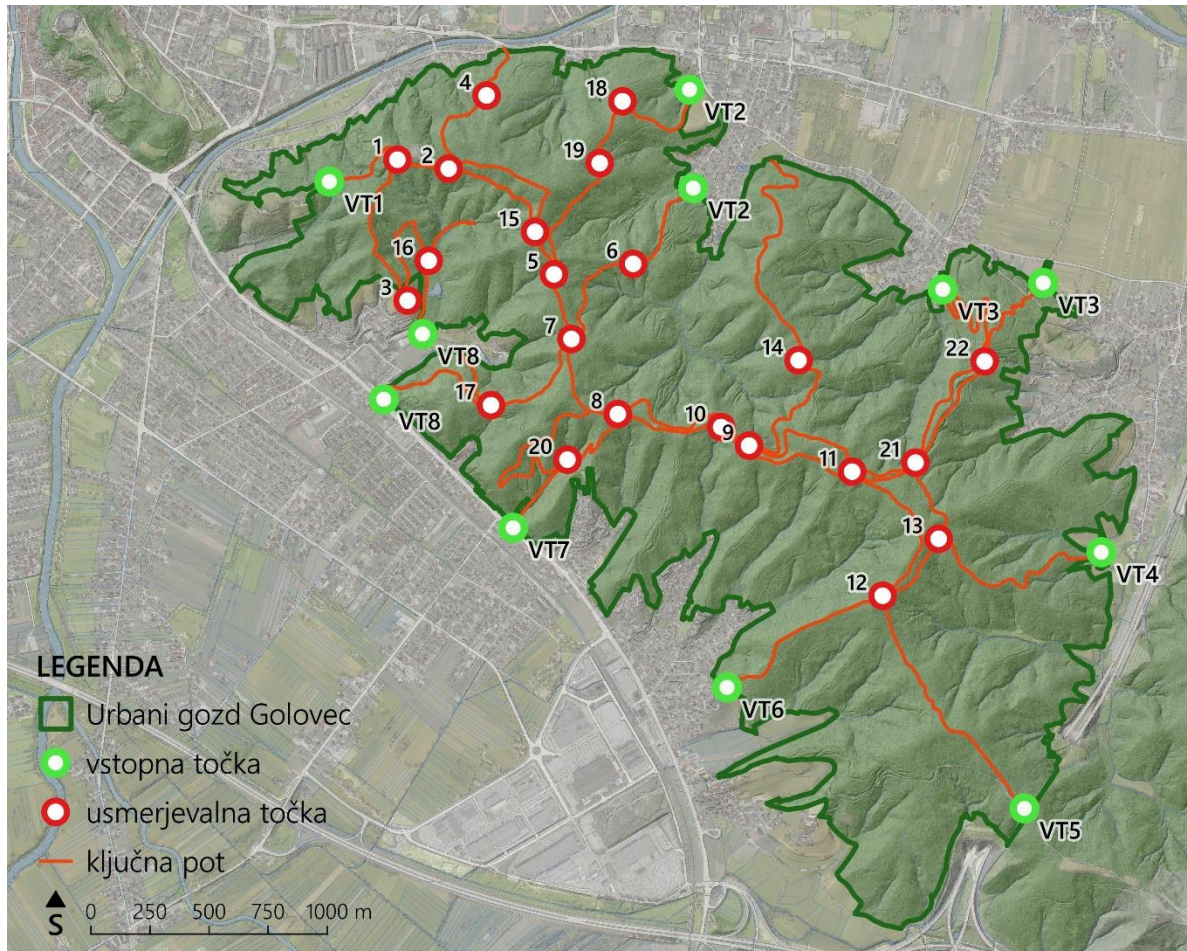


Figure 8: The arrangement of signage in the area of urban forests of Golovec

- **Condition/problems**
The whole of Golovec is interspersed with paths and forest logging roads. Due to the varied terrain and the large number of paths, many visitors have difficulty with orientation in the area and some even get lost. The existing thematic path markings are not uniform, they are drawn with templates on trees. The Slovenian Cycle-Touring Trail (STKP) and the Jakob Trail are marked along the entire Golovec ridge from EP5 Orle to EP1 Centre. They partially overlap or run along parallel paths. The Srčna pot trail is marked on EP2 with a hayrack and some wooden signposts. The equipment is deteriorating, there are too many markings and they mar the environment. Due to the lack of markings, visitors walk along a number of unregulated paths and trails.
- **Target condition**
 - Uniform markings are to be placed in key locations. 8 entry points have been arranged with information boards with a map of the area and other important information for visitors. Wooden orientation totems with signposts are placed at all intersections of public paths and logging roads, with the help of which visitors are directed in the desired directions.

- Marked and properly maintained paths that connect the entry points.
- Marked regime of use on paths with exclusive use – the PST is only for pedestrians and runners, the cycling path only for cyclists.
- Signposts supplemented by two clearly marked outline maps at intersections (the Observatory and the plateau with exercise equipment), which provide additional orientation.
- Themed wooden totems with markings for special features/points of interest (remarkable trees, quiet zone, etc.).

- **Purpose**

Ensuring regulated paths and basic safety on the paths.

- **Priorities**

The orientation of visitors, limiting spontaneous use, raising awareness of the importance of urban forests.

- **Most relevant functions**

Recreational, aesthetic

- **Possible activities**

- Multi-purpose forest management and recreation

- **Undesirable or prohibited activities**

- The use of motor vehicles
- The haulage of logs on well-maintained public paths
- Camping
- Burning
- Off-road terrain usage

- **Silvicultural measures**

- Along the paths, development is directed towards emphasising the aesthetic and educational functions. Old, thick trees, trees with an interesting habitus, are preserved. Along the multi-purpose paths, the diversity of autochthonous tree and shrub species is preserved as much as possible through cultivation measures.

- **Timber harvesting measures**

- The forest rule is arranged in a 5 m strip from the path and it is not allowed to haul wood assortments along multi-purpose paths.

- **Infrastructure measures**

- The arrangement of paths and signage, regulation of drainage.

- **Additional plan/sketch, if necessary**

- Project task for the signage contractor.

- **Costs**

- €70,000 of investments
- €5,000 annually for path and signage maintenance

- **Financing**

- CMOL budget, EU funds, SIDG

- **Co-ordinators**

- Department of Economic Activities and Transport (OGDP) and the URBforDAN Project Group

- **Stakeholders**

- SIDG, Salesians, owners of the paths

- **Timeframe**

- Investments made in the period from 2020 to 2023, followed by annual maintenance

4.4.2 Installation of urban equipment

- **Condition/problems**
 - The urban equipment on Golovec is deficient, not uniform, in relatively poor condition, and regular maintenance is not provided.
- **Target condition**
 - Providing appropriate equipment for Golovec with uniform urban equipment (uniform natural material, wood of local tree species – oak, chestnut) and a uniform shape:
 - Benches are placed along the main ridge path and at exposed points;
 - At individual exposed points (the top of Mazovnik, the top of the course, the Salesian meadow, etc.), tables will be added to the benches;
 - The existing benches and tables are being replaced, particularly along the PST;
 - Two wooden platforms for yoga/relaxation in silence/meditation in the area of the Mokrotna dolina Valley near Rakovnik and in the Dolgi potok Valley near Štepanjsko naselje;
 - At the entry points, the installation of bicycle stands that allow bicycle locking;
 - Gates for the prevention of unauthorised (prohibited) access for motor vehicles on critical forest roads (Rakovnik, the main road GC 041246 under Urh, etc.);
 - The stainless steel orientation board with marked cardinal points and main points (lookouts) at the lookout point (Salesian meadow);
- **Purpose**
 - Increase the attractiveness of the area for visitors
- **Priorities**
 - Install urban equipment and ensure its regular maintenance
- **Most relevant forest functions**
 - Recreational, aesthetic
- **Possible activities**
 - Socialising, walking, meditation
- **Undesirable or prohibited activities**
 - The destruction of equipment, littering, the unauthorised driving of motor vehicles on multi-purpose logging roads
- **Silvicultural measures**
 - Clearing cutting for the establishment and maintenance of lookout points
- **Infrastructure measures**
 - The installation of urban equipment
- **Additional plan/sketch, if necessary**
 - Drawing of urban equipment (benches, tables, stands, etc.) including dimensions. They enable a uniform equipment design throughout Golovec, even if contractors or operators change over time.
- **Costs**
 - Wooden bench (oak, chestnut) – €150/pc * 50 = €7,500
 - Wooden table (oak, chestnut) – €350/pc * 16 = €5,600
 - Wooden platform (oak, chestnut) – €100/pc * 16 = €6,000
 - Wooden/metal bicycle stands – €750/pc * 8 = €6,000
 - 1x gate = €8,000
 - A lookout point with a pedestal = €500
- **Financing**
 - UrbforDAN, MOL
- **Co-ordinators**
 - CMOL OGD P
- **Stakeholders**
 - SIDG, owners, recreationists, walkers, cyclists

- **Timeframe**
- Investments made in the 2020 period, followed by annual maintenance; in 2025 there is a planned preparation of urban equipment design supplementation

4.4.3 Complementing existing and creating new recreational content

- **Condition/problems**
 - The main recreational activities – hiking, running, cycling, cycling on trails, education in nature – are mostly not focused; in some places, there is a simultaneous implementation of different activities, which can lead to disagreements.
- **Target condition**
 - A wide range of recreational activities in the area has been identified, which will be mutually coordinated and properly managed.
- **Purpose**
 - The purpose of the activity is the appropriate organisation of existing recreational activities in the area and the establishment of conditions for planning the expansion of the offer.
- **Priorities**
 - Determining suitable recreational activities with locations and methods of implementation and providing conditions for the implementation of new recreational activities.
- **Most relevant functions**
 - Recreational, educational
- **Possible activities**
 - The identification of possible/new recreational content: quiet zones, forest playgrounds, trim trail, cycling courses, archery range and shooting range, canopy walking, adrenaline park, lookout points, orientation, treasure hunt for children, etc.)
 - Determining locations and rules for the implementation of these recreational contents
 - Agreement with the owners on the implementation of new recreational activities
 - The establishment of new recreational activities in the area
- **Undesirable or prohibited activities**
 - Motorised activities, shooting ranges
- **Silvicultural measures**
 - –
- **Timber harvesting measures**
 - –
- **Infrastructure measures**
 - According to the individual type of activity
- **Additional plan/sketch, if necessary**
 - The plan/project is prepared for each new activity separately
- **Costs**
 - Depending on the plan
- **Financing**
 - City Municipality of Ljubljana (CMOL) or investor
- **Co-ordinators**
 - OGD
- **Stakeholders**
 - Owners and target groups
- **Timeframe**
 - Preparation of the concept for new content in the period from 2024 to 2027, implementation by 2030

4.4.4 Arrangement of forest play areas, forest learning trail points and thematic trails

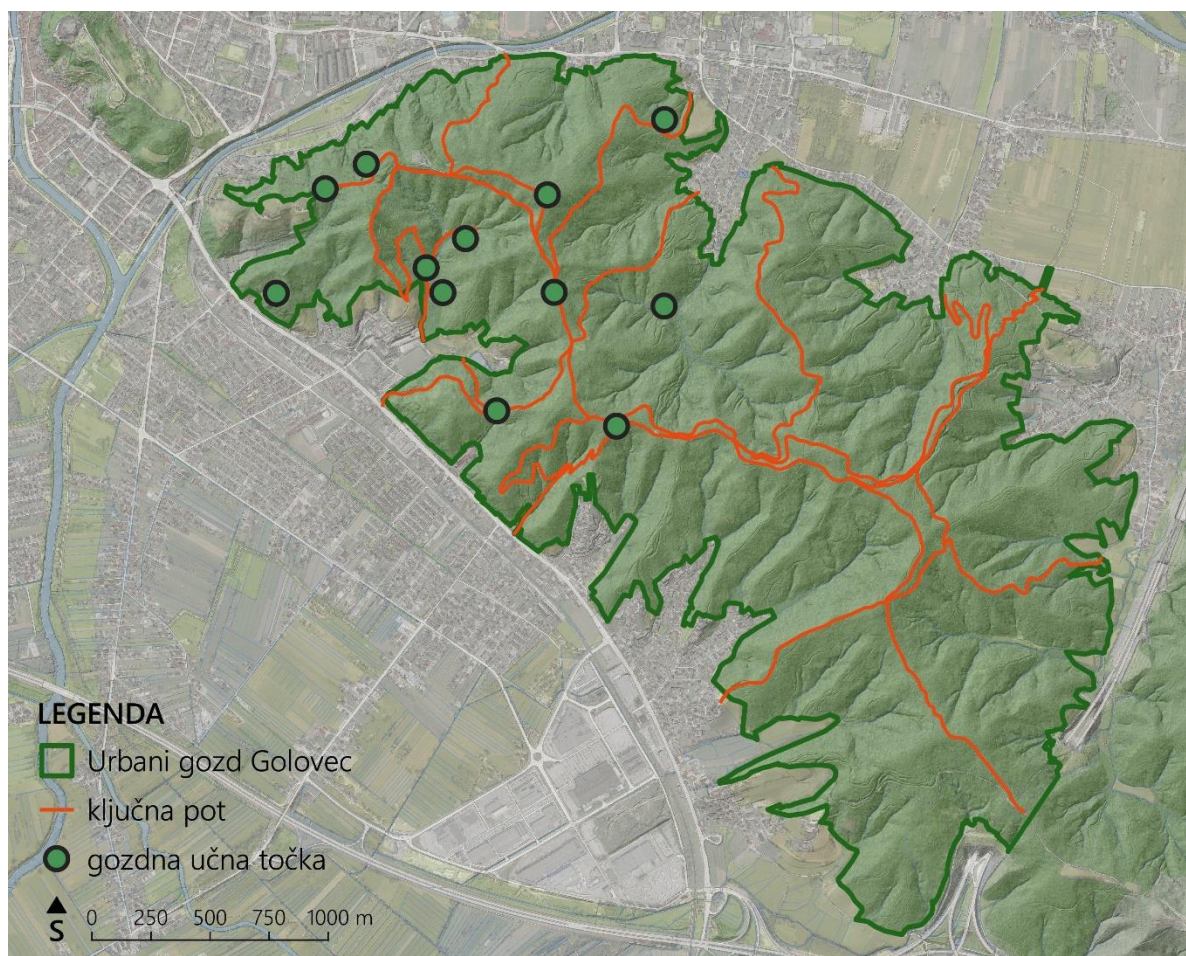


Figure 9: Forest learning trail points in the area of Golovec

- **Condition/problems**

The area of Golovec is regularly or occasionally visited by nearby schools, nursery schools, scouts and other organised groups that carry out various educational activities in the forest. Moreover, urban forests are equally important for life-long learning because they are regularly visited by older generations and various activities for seniors are being conducted there. When carrying out educational activities, the organisers (teachers, educators, guides, etc.) do not know where and under what conditions they can carry them out, as areas are not designated for these purposes and there are no didactic aids available. In addition, there is interest in arranging playgrounds and reconstructing themed learning trails in the urban forest. The forest learning trail has been damaged and the markings removed, and it is also necessary to restore the Srčna pot trail. Sometimes there are conflicts with forest contractors who carry out their activities in accordance with the law, while the educational institutions cannot check in advance when and where the work will take place in the forest. Access to the urban forest is not safe or suitable for all target groups (e.g. nursery schools and the elderly)

- **Target condition**

Located and arranged classrooms in the urban forest, arranged forest playgrounds, themed trails and forest learning trail points. A certain regime of use of the specified areas with regulated ownership (ownership of the City Municipality of Ljubljana or agreement with the owner) and the harmonisation and restriction of other uses (cycling, the use of motor vehicles, etc.).

- **Purpose**

Providing conditions for the safe and quality implementation of educational programmes in the urban forest.

- **Priorities**

- The arrangement of forest classrooms (setting up an itemised learning list on a tree trunk, where typical autochthonous tree species of Golovec are presented);
- The arrangement of forest playgrounds (installation of a plaything/climb-on trunk);
- The renovation of thematic trails or the arrangement of thematic points with didactic aids, which highlight the importance of urban forests for recreation, health, timber and other forest products, the conservation of biodiversity, the preservation of the quality and quantity of water resources, etc.;

- **Most relevant forest functions**

- Education

- **Activities**

- The designation of areas for forest classrooms, forest playgrounds and thematic trails;
- If necessary, the purchase of forest land or concluding a contract on use with the owners;
- The arrangement of areas for the safe implementation of educational activities;
- Determining a special regime of use and presentation to target groups: nursery schools, schools, scout associations, senior activity centres, etc.;
- Presentation of City Forest Etiquette, the poster “The City Forest Enriches Us” and other didactic materials prepared within the URBFoR DAN project;
- Continuous communication between educational institutions, owners and the City Municipality of Ljubljana and maintenance of infrastructure;

- **Undesirable or prohibited activities**

In accordance with the general (City Forest Etiquette, the Code of conduct when visiting nature) and special regimes of use;

- **Silvicultural measures**

Management adapted to instructive functions, the removal of dangerous trees and branches, maintenance of paths, city equipment and didactic aids

- **Additional plan/sketch, if necessary (AUTHORS OF IMAGES TO BE ADDED)**



Figure 11: Instructive and educational wooden trunk with a presentation of 10/11 tree species typical of the Golovec urban forest



Figure 12: Markings for remarkable trees on thematic trails or points with didactic aids (AUTHOR OF THE IMAGE)

- **Costs**
 - €100 per year for maintenance/individual forest play areas;
 - €15,000 for the arrangement of a forest playground/planetarium (presentation of the solar system within the radius of the sun);
 - €2,000 annually for the maintenance of urban equipment
 - €6,000 to set up two yoga/meditation platforms;
- **Financing**
 - CMOL budget;
- **Co-ordinators**
 - CMOL OGDP;
- **Stakeholders**
 - Educational institutions: nursery schools, schools, scout associations, senior activity centres, etc.;
- **Timeframe**
 - Investments made in the period from 2020 to 2023, followed by annual maintenance;

4.4.5 Arrangement of ponds

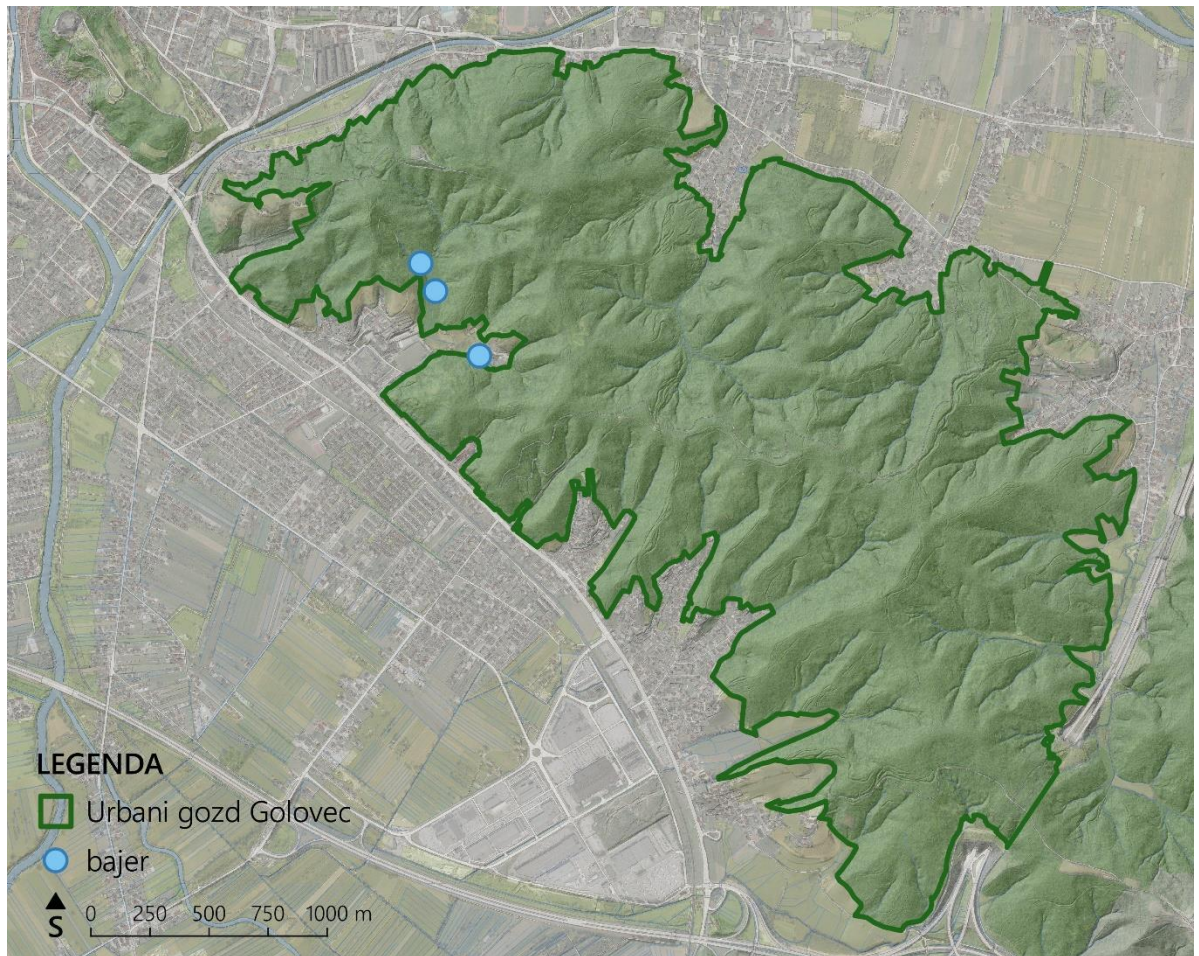


Figure 12: Arrangement of ponds

- **Condition/problems**
 - In the area of Rakovnik, there are three ponds, which are artificially created and were created as a protection measure against flood risks. The ponds are currently quite abandoned and silted up. They represent the only water surface in the Golovec area. Due to the disorder, they are currently a gathering place for various groups that organise picnics and social gatherings, littering the place.
- **Target condition**
 - An arranged area where a lot of content will be concentrated, from sports and recreation to education that will be appealing to various target groups of visitors. The area is regulated in such a way that at least part of the area will be accessible to vulnerable groups (the elderly, the disabled, the blind, etc.), as well as nursery schools and schools.
 - Reconstructed dam of the small pond
- **Purpose**
 - Activate the area for wider visiting;
- **Priorities**
 - Pond cleaning (sludge removal), condition remediation, rehabilitation of paths and logging roads;
- **Most relevant forest functions**
 - Recreation, education;
- **Activities**

- Preparation and coordination of the project for arrangement;
- Sludge removal;
- Arranging ponds and the surroundings;
- The installation of urban equipment;
- **Undesirable or prohibited activities**
- In accordance with the general regime of use;
- **Infrastructure measures**
- The arrangement of ponds, the connection of paths and logging roads
- **Costs**
- Preparation of the arrangement project totals €20,000, the rest in accordance with the project;
- **Financing**
- CMOL budget
- **Co-ordinators**
- CMOL OGD
- **Stakeholders**
- CMOL OVO, Institute of the Republic of Slovenia for Nature Conservation (ZRSVN), Slovenian Water Agency (DRSV)
- **Timeframe**
- Preparation of the concept of the arrangement of ponds in the period from 2024 to 2027, implementation by 2030;

4.4.6 Programme for the purchase of forests

- **Condition/problems**

Most of the forests (551 ha) on Golovec are privately owned. The network of roads, paths and logging roads in the area is highly diversified. Some of these roads and logging roads are in the public domain, while many of the paths and logging roads run across private land. There are many recreationists in the area on a daily basis in all seasons. In accordance with the Ordinance proclaiming forests with a special purpose, forest owners must remove slash from multi-purpose paths, and it is also not permitted to haul forest wood assortments along multi-purpose paths. The daily presence of visitors makes it difficult to carry out work in the forests, as they often do not comply with the restrictions and markings of worksites and thus increase the risk of accidents. In addition, recreationists use other paths and logging roads, not just those that are publicly owned. This is provided in accordance with the law, but in cases of highly intensive use, restricts normal forest management. In addition to the paths, the forest is also used as a forest classroom. The locations of the forest classrooms are already used in their existing/natural form, but due to the potential for additional landscaping and more intensive visits, it makes sense that they are in the public domain. In the long run, it should be ensured that more intensive forms of recreation take place on public land.

- **Target condition**

Forest plots that are important for promoting social functions (e.g. recreation, education) become public property. In two locations, there will also be quiet zones for attuning to the forest, where there will be conditions for focusing on forest sounds, yoga and meditation.

- **Purpose**

Reducing disagreements resulting from the use of private forests and directing visitors to publicly owned infrastructure, introducing new content that it only makes sense to implement in public spaces.

- **Priorities**

First, the purchase of land plots along paths and at the locations of other recreational areas (forest classrooms, lookouts, quiet zones, etc.), on the forest edge and in areas where the existing land of the City Municipality of Ljubljana is rounded off;

- **Most relevant forest functions**

Recreation, education

- **Activities**

- The preparation of a priority list of plots for purchase;
- A call for the purchase of plots;
- Purchasing plots from owners who are willing to sell them;
- The inclusion of plots in the property plan of the City Municipality of Ljubljana;
- Additional plan/sketch, if necessary;

- **Costs**

€100,000 per year. The indicative purchase price is €1/m²;

- **Financing**

- CMOL budget

- **Co-ordinators**

- CMOL OGD, CMOL ORN

- **Stakeholders**

- Owners in areas where the purchase of forests is planned and are included on the priority list for the purchase of land plots;

- **Timeframe**

- Preparation of a priority purchase plan until 2022, annual purchases in accordance with budgetary capacities

- **Notes**

- The City Municipality of Ljubljana will prepare an ownership plan for its forests, which will define the management of forests owned by the City Municipality of Ljubljana. Each year, the plots that will come into CMOL's ownership will be included in the ownership plan.

4.4.7 Fixing refunds

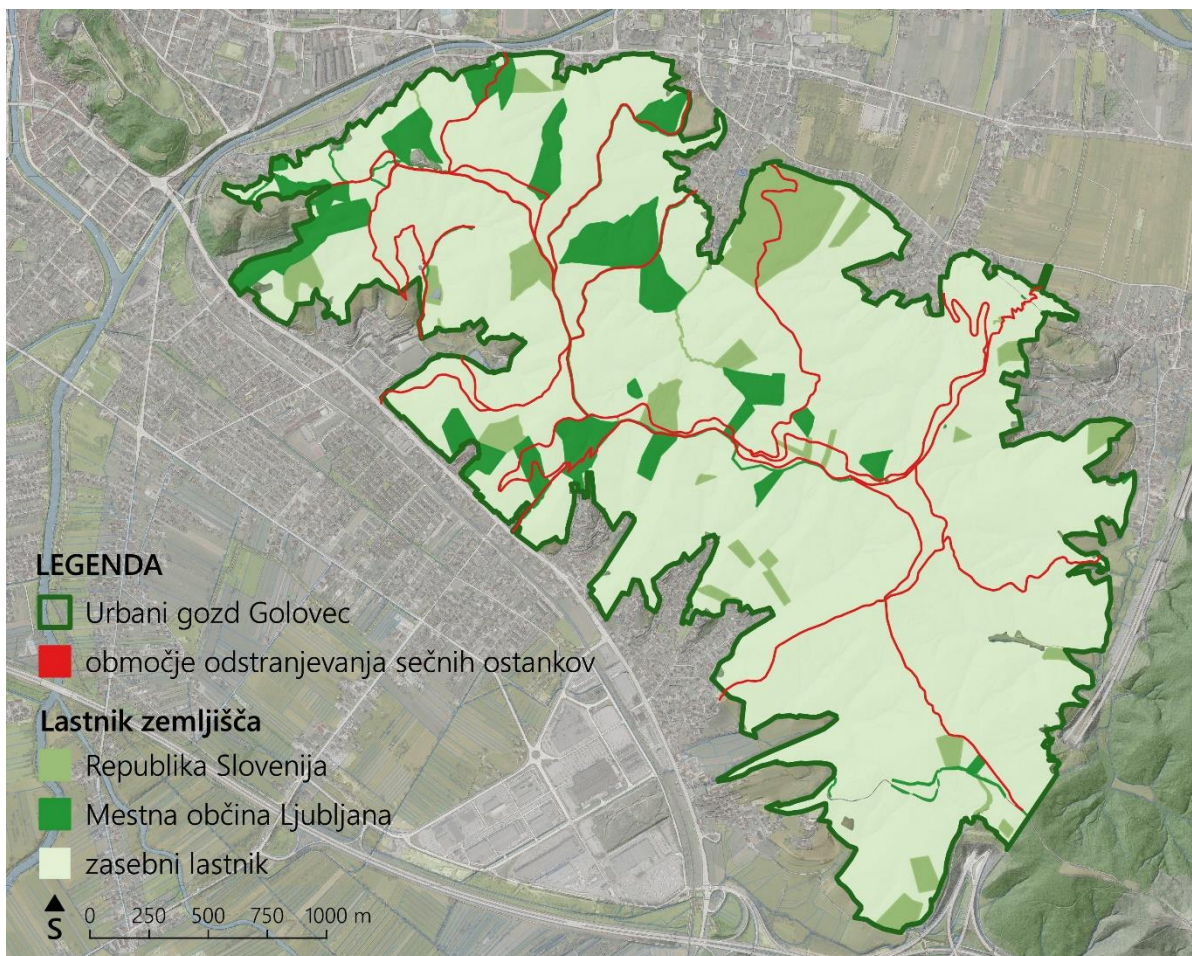


Figure 13: slash removal area along multi-purpose paths

- **Condition/problems**

Some forest owners may incur additional forest management costs as a result of carrying out works in forests as provided for in the Ordinance on forests with a special purpose. The ordinance stipulates that they are therefore entitled to compensation or tax exemptions. These have not been determined so far, causing dissatisfaction among the owners. The Ordinance on forests with a special purpose sets out superior standards in the implementation of the forest rule along paths. Restricting the hauling of wood assortments along trails is a matter of the appropriate regime on multi-purpose forest logging roads. In addition, by constructing a roundabout on Hrdeckega cesta Road, the City Municipality of Ljubljana almost made it impossible to transport forest assortments from the western part of Golovec to Dolenjska cesta Road. This has increased the cost of transporting logs to end-users. It is necessary to regulate the system according to which owners who have increased costs of forest management due to the proclamation of forests with a special purpose will receive appropriate compensation or the Republic of Slovenia will exempt them from paying taxes.

- **Target condition**

A regulated area in accordance with the provisions of the Ordinance on forests with a special purpose and satisfied owners who receive compensation due to the increased costs of work in forests.

- **Purpose**

Resolving disagreements between forest owners and the City Municipality of Ljubljana, which are the result of the non-implementation of the Ordinance on forests with a special purpose in the area of compensation to owners due to the higher costs of works or the restriction of property

rights and thus improved cooperation between landowners and the City Municipality of Ljubljana.

- **Priorities**
 - The establishment and implementation of a compensation system;
- **Most relevant functions**
 - Production and social;
- **Activities**
 - The preparation of an expert basis for determining compensation and the formation of a compensation system;
 - System testing and streamlining;
 - Putting the system into practice;
 - Communication with the owners;
- **Undesirable activities**
 -
- **Silvicultural measures**
 - The continuation of sustainable forest management;
- **Timber harvesting measures**
 - In accordance with the FMP of the Ljubljana FMU (2015);
- **Infrastructure measures**
 - Not required;
- **Costs**
 - up to €10,000 per year;
- **Financing**
 - CMOL budget;
- **Co-ordinators**
 - CMOL OGDP;
- **Stakeholders**
 - Forest owners;
- **Timeframe**
 - Preparation of the compensation scheme in the period from 2020 to 2023, implementation of the compensation system following the approval of the scheme;

4.4.8 Connecting forest owners

- **Condition/problems**

According to the survey conducted among the owners of the forests on Golovec (results are available from the authors of the plan), forest owners can be divided into the following two groups:

- Active owners – those who manage their forests, whether due to income from forests or as a hobby, a sense of responsibility or tradition. These forest owners either carry out the work in the forests themselves or have concluded arrangements with contractors.
- Passive owners – those owners who have usually inherited the forests and do not manage them, usually only carrying out sanitary cutting, which is prescribed by the SFS. These owners do not carry out work in the forests themselves and they usually do not have permanent contractors; it could be said that their ownership is more of a burden than a benefit, but they are not willing to sell it for various reasons. These owners are also the target of dishonest forest contractors, who often dupe them when carrying out work in their forests and owners usually do not even notice because they do not understand the situation.

As the area of forests owned by individual owners is small, and as most owners are no longer qualified to work in the forest, it would make sense to connect and organise them for more efficient forest management. A survey conducted in 2018 found that 40% of owners do not know the boundaries of their holdings, 60% are employed, 35% are retired, and less than 5% are farmers. 33%

of owners have not carried out logging in the last 10 years, 60% do not own the equipment required for work in the forest and, of the remaining, 40% only own a chainsaw. About 50% of owners stated that they would put the forests under management.

- **Target condition**
 - Actively and sustainably managed forests on Golovec.
- **Purpose**
 - Connecting forest owners into a joint initiative that will encourage more active forest management.
- **Priorities**
 - Connecting forest owners
- **Most relevant functions**
 - Production
- **Activities**
 - Agreement on the establishment of the initiative and its legal form (association, cooperative, etc.);
 - Preparation of constituent documents;
 - Establishment of the initiative;
 - Work programme preparation;
 - Communication with owners, stakeholders, CMOL and SFS;
- **Timber harvesting measures**
 - Organising work in forests, more information on forest contractors, greater supervision over the work of contractors;
- **Costs**
 - €1,500 to set up the initiative
 - €1,000 per year for operating costs
- **Financing**
 - Projects/owners/CMOL
- **Co-ordinators**
 - Initiative
- **Stakeholders**
 - CMOL OGD, SFS
- **Notes**
 - City Municipality of Ljubljana offers administrative support for the initiative

4.4.9 Activation of local associations for assistance in arranging the area of Golovec

- **Situation/challenges**

Many local associations and other entities are connected to the area of Golovec (sports associations, cycling associations, scout associations, neighbourhood communities, etc.). They carry out their activities in the area and are also interested in keeping the area as tidy as possible and adapted to their needs. For this, they are also willing to contribute to the landscaping of the area through their voluntary work. The key challenge is how to organise and coordinate the performance of the works;
- **Target condition**
 - Local entities are actively involved in the implementation of voluntary landscaping work in the Golovec area. The CMOL OGDG coordinates the implementation of activities;
- **Purpose**
 - Utilising the potential of voluntary organisations, learning, gaining the experience of young people in arranging recreational areas and intergenerational cooperation, and increasing affiliation to the area;
- **Priorities**
 - Determining the type of works that could be carried out by volunteers;
- **Most relevant functions**
 - Recreation, education
- **Possible activities**
 - Work programme preparation;
 - Negotiating with local entities if they are interested in carrying out the works;
 - Performance of works;
- **Costs**
 - €3,000 per year for meals allowances and small inventory
- **Financing**
 - CMOL, SIDG, sponsors
- **Co-ordinators**
 - CMOL OGDG
- **Stakeholders**
 - Local associations and other entities

4.4.10 The orientation of visitors using an application

- **Condition/problems**

The whole of Golovec is interspersed with paths and forest logging roads. Due to the varied terrain and the large number of paths, many visitors have difficulty with orientation in the area and it is not uncommon for some to get lost. New technologies make orientation for visitors easy;
- **Target condition**
 - A developed mobile application, with the help of which it will be possible to provide easy orientation on Golovec and direct visitors;
- **Purpose**
 - Greater satisfaction and safety of visitors and forest owners due to directed movement along the paths
- **Most relevant functions**
 - Recreation, education
- **Possible activities**
 - Application development

- Application promotion
- Application maintenance
- **Costs**
- €4,500 Application development within the URBforDAN project, promotion and maintenance
- **Financing**
- CMOL OGDG
- **Co-ordinators**
- CMOL OGDG
- **Stakeholders**
- Visitors

5. IMPLEMENTATION and MANAGEMENT

5.1 Implementation

The implementation of activities is based on the cooperation of two institutions: i.e. the SFS and the City Municipality of Ljubljana. The competencies of the former are defined in the Act on forests (ZG) and the City Municipality of Ljubljana, OGDG Department is responsible for directing activities related to the social functions of forests, particularly recreational and educational functions.

- A list of the main managers/coordinators of activities and their responsibilities
- The Slovenian Forest Service – preparation of forest management and silvicultural plans, the selection of trees for felling, determination of cultivation and protection measures, planning the construction and maintenance of forest infrastructure, supervision of works, cooperation with forest owners and initiative and the City Municipality of Ljubljana;
- The City Municipality of Ljubljana – cooperation with forest owners, the initiative and the SFS, the maintenance of forest and recreational infrastructure, the provision of utility services, planning, coordination and implementation of new infrastructure, the purchase of forests, the payment of compensation for restrictions on works, assistance to owners in connecting and carrying out works in forests;
- Forest owners – on their own and associated with the initiative – carrying out works in forests, taking care of forest stability, sustainable forest management;

- Subsidy system

The CMOL will support forest owners through:

- Initiative support;
- Payment of compensation to affected owners due to increased labour costs;
- Enabling the involvement of owners or the initiative in the implementation of works on Golovec, which are financed from the budget of the City Municipality of Ljubljana (felling, cutting branches, additional forest rule, arranging and maintaining infrastructure (benches, paths, etc.), implementation of silvicultural works, etc.);
- Tighter supervision over external contractors carrying out work in forests;
- Above-standard maintenance of forest infrastructure;
- Assistance in the form of raising the awareness of visitors, informing them about the progress of forestry work, arranging closures of access to work sites during felling and extraction;
- Informing owners and initiatives about possible financial resources;

5.2 Association of forest owners

The associated forest owners will be able to manage their forests more efficiently. The URBforDAN project motivates forest owners to associate in the form of an initiative, association or any other form of association. The support also includes professional, substantive and administrative support in the preparation of all necessary activities and documentation for the establishment and operation of the initiative during the project. Objectives of the initiative:

- Better communication with the City Municipality of Ljubljana in the implementation of the Ordinance on forests with a special purpose;
- Better communication with the SFS and better supervision over the performed works (e.g.: if the owners in one department connect when performing felling, and choose the same contractor, the work is done more efficiently, it is cheaper, the felling site is easier to secure during felling, the works are taken over and the quality of the performed works is inspected

more efficiently, unrecorded felling is reduced, forest roads are rehabilitated together after felling and extraction, etc.);

- The more efficient organisation of work in forests – by managing the work in such a way that the work is carried out in larger contiguous areas, the costs of felling and extraction can be significantly reduced;
- The implementation of cultivation works – the implementation of cultivation works in the early period of forest development significantly improves the quality of assortments and thus also affects the price of timber on the market. In recent decades, cultivation work has been carried out on a much smaller scale than until 1993, when cultivation work in privately owned forests was mostly carried out by the Ljubljana Forest Management. In the future, this will reflect in the stability of the stands and their quality. The initiative could encourage forest owners to carry out cultivation and protection works more actively, while these works would also be subsidised;
- The recruitment of quality contractors – with the help of the SFS, GIS and CMOL, the initiative can influence the selection of the best contractors for their forests and start by keeping a list of contractors who perform quality and fair work, while the above institutions provide expert assistance;
- Better negotiating positions for contractors and with timber sales – similar to the performance of works, this is also the case with the sale of timber – larger quantities of wood sell better, wood can be better cut and thus achieve higher prices;
- Facilitated implementation of neighbourhood assistance and the performance of work in forests with local contractors – the initiative can also intervene in neighbourhood assistance and advise on the selection of quality and local contractors, for which this can be an important source of additional income;
- The group representation of interests for the easier meeting of requirements and achieving of goals – associated owners can assert their interests more strongly, be it with contractors, wood buyers, the SFS or CMOL;
- Better control over the work carried out – the initiative can organise additional inspections of felling sites and forest roads;
- The easier planning, construction and maintenance of forest infrastructure – through the initiative, it is easier to plan, coordinate the course of new forest roads and prepare documentation for their construction, which means cheaper construction and maintenance, better control, more efficient negotiation with CMOL on the above-standard maintenance of forest infrastructure that is also used by people seeking recreational activities, etc.;
- Energy utilisation of slash and thus higher revenues – currently the slash are in most cases not utilised. In the case of larger felling sites, this pays off and owners can generate more revenue from forests;
- The efficient flow of information – currently the forest owners are poorly informed. The initiative can make a significant contribution to better-informing owners about important issues for forest management and about the possibility of obtaining incentives from various sources;
- The transfer of good practices – the initiative can connect with other similar associations of forest owners at home or abroad and exchange experiences in forest management with them.

6. MONITORING

6.1 Monitoring and supervision indicators

- The effectiveness of the implemented activities and measures for forest management is checked through individual planned activities (Chapter 4.5), in which the concrete measures and the target condition are specified. 1) the implementation of measures and 2) the achievement of the target condition are checked.
- The effectiveness of the implemented measures is checked every 5 years.
- Periodically conducting a survey with a standard questionnaire among visitors, which will also show users how successful the implementation of the plan is.

Monitoring and supervision indicators

Activity	Measure	Value	Timeframe
4.5.1 Arrangement of multi-purpose paths and access points and the installation of signage	8 entry points have been arranged, where information boards with a map of the area and other important information for visitors are placed.	8 information boards 8 forest etiquette boards	investments made in the period from 2020 to 2023, followed by annual maintenance
	Uniform markings to be placed in key places	120 orientation and thematic totems 2 information boards within the Golovec area	investments made in the period from 2020 to 2023, followed by annual maintenance
4.5.2 Installation of urban equipment	Installation of benches and tables	50 benches 16 tables	investments made in the period 2020, followed by annual maintenance; in 2025 there is a planned preparation of urban equipment design supplementation
	Installation of equipment for other leisure activities	Two wooden platforms for yoga/relaxation	investments made in the period 2020, followed by annual maintenance; in 2025, there is a planned preparation of urban equipment design supplementation
	Installation of bicycle stands	8 bicycle stands	investments made in the period 2020, followed by annual maintenance; in 2025 there is a planned preparation of urban equipment design supplementation
	Installation of other urban equipment	1 traffic gate 1 lookout point	investments made in the period 2020, followed by annual maintenance; in 2025 there is a planned

			preparation of urban equipment design supplementation
4.5.3 Complementing existing and creating new recreational content	Identification of possible/new recreational content	According to requirements and capabilities	Preparation of the concept for new content in the period from 2024 to 2027, implementation by 2030
4.5.4 Arrangement of forest play areas, forest learning trail points and thematic trails	Arrangement of forest classrooms, forest playgrounds and the reconstruction of thematic trails or arrangement of thematic points	1 climb-on tree 1 tree species identification trunk 1 forest planetarium Number of nursery schools and schools that visit Golovec The number of days of visit	Investments made in the period from 2020 to 2023, followed by annual maintenance
4.5.5 Arrangement of ponds	Pond cleaning (sludge removal), condition remediation, rehabilitation of paths and logging roads	Arranged area (MATJAŽ) Reconstructed dam of the small pond	Preparation of the concept for the arrangement of the ponds in the period from 2024 to 2027, implementation by 2030;
4.5.6 Programme for the purchase of privately owned forests by the City Municipality of Ljubljana	The purchase of land plots along paths and at the locations of other recreational areas, on the forest edge and in areas where the existing land of the City Municipality of Ljubljana is rounded off;	Annually purchase €100,000 worth of forests (ha). The indicative purchase price is €1/m ²	Preparation of a priority purchase plan until 2022, annual purchases in accordance with budgetary capacities
4.5.7 Fixing refunds	Establishment and implementation of a compensation system	Total amount of compensation (€10,000 per year)	Preparation of the compensation scheme in the period from 2020 to 2023, implementation of the compensation system following the approval of the scheme;
4.5.8 Connecting forest owners	Establishment of the initiative	?	?
4.5.9 Activation of local associations for assistance in arranging the area of Golovec	Involve local associations and other entities in the landscaping of Golovec	The number of associations involved in the landscaping of Golovec	?
4.5.10 The orientation of visitors using the application	Application development, promotion and	?	?

	maintenance		
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6.2 Revision of the plan

After a period of five years, it will be assessed whether a revision of the plan is required. This is necessary if major natural disasters occur in the intermediate period, if new interests in forests arise that significantly change their importance, or if there are other reasons why the success of the activities carried out cannot be guaranteed. The City Municipality of Ljubljana and the SFS are responsible for the revision.

7. COSTS AND FINANCING

A list of urban equipment with indicative prices (source of funding: URBforDAN project)

TYPE OF EQUIPMENT	QUANTITY	PRICE/UNIT	TOTAL €
Bench (pcs)	50	€150	€7,500
Table (pcs)	16	€350	€5,600
Orientation signs (pcs)	120	€10	€1,200
Lookout (pcs)	1	€500	€500
Gate (pcs)	1	€800	€800
Bicycle stand (pcs)	8	€750	€6,000
Wooden platform (m ²)	60	€100	€6,000
Wooden pillar with a spacer and buried concrete foundation (pcs)	70	€250	€17,500
Info board (pcs)	10	€1,000	€10,000
Climb-on tree plaything	1		€0
“Tree species identification” trunk (pcs)	1	€10,000	€10,000
“Forest Planetarium” playground (set)	1	€15,000	€15,000
Grand total			€80,100
