

URBforDAN Operational Planning Guidelines

Joint methodology / approach for preparation of Operational parts of Integrated multi-use Management Plans – FINAL VERSION





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Timok Youth Center in the URBforDAN: Management and Utilization of Urban Forest as Natural Heritage in Danube cities" project, implemented through Interreg Danube Transnational Programme and co-financed by European Union funds (ERDF and IPA).

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1 INTRODUCTION	
1.1 The aim and purpose of OP	
The aim of OP	Management and Utilization of Urban Forests as Natural Heritage in Danube Cities (with acronym URBforDAN) is an EU co-financed project, which was designed to deliver a change in urban forest management and utilization of ecosystem services (ES). URBforDAN project is being implemented in 7 Danube Cities – Ljubljana (SLO), Vienna (AT), Budapest (HUN), Zagreb (CRO), Cluj-Napoca (ROM), Belgrade (SRB) and Ivano-Frankivsk (UA). Its' implementation is closely observed by 3 associated partner cities – Prague (CZE), Sarajevo (BIH) and Podgorica (MNE), as well as by Food and Agriculture Organization of the United Nations. All URBforDAN cities face similar challenges - they all manage significant NH areas (mainly UPF) within their city limits. Due to their characteristics, they attract many users (citizens, tourists), but they also have many stakeholders (managers, owners, interest groups) who try to manage these activities. Today, this is usually done without proper coordination of all the listed key actors. UPF also lacks the appropriate infrastructure and equipment to cope with the growing number of users. Therefore, UPFs are under increasing pressure from various activities, conflicts and unsustainable use of resources - all of which lead to the poor state of NH. UPF management in some cities is further challenged by extreme ownership fragmentation (which is mostly private).
The purpose of the plan	URBforDAN will mobilize key actors in the City of Belgrade and ensure their active participation in the integrated planning of the Avala area. The evaluation of ecosystem services will be combined through a participatory process to obtain integrated management plans for multiple use for UPF at the strategic and operational levels. The established UPF Danube Network enables the strengthening of cooperation between key actors, ensuring the timely exchange of knowledge / best practices, dissemination / transferability of project results and enabling further capitalization. UPF managers, owners and users will be equipped with management tools that support the multifunctional use of UPF and take advantage of new opportunities for sustainable development. Participatory planning and UPF management guidelines are developed based on lessons learned and best practices used.
 Link to the strategic part of integrated multi-use management plan 	The operational plan was made in accordance with the instructions of the Strategic Plan.

1.2 The design of the plan, obligations and validity of OP	
Basis for OP	 Plan for general regulation of green areas in Belgrade Afforestation strategy of the Belgrade area (Official Gazette of the City of Belgrade, No. 20/11) Special management basis for the Management Unit "Avala" period of validity 2018-2027 General Urban Plan of Belgrade ("Official Gazette of the City of Belgrade" No. 11/16). Plan of general regulation of the Ripanj settlement city municipality Voždovac (2016) Spatial plan of the special purpose area of the landscape of exceptional features Avala - Kosmaj, Off. Gaz. RS 146/14, reg.no. 5734 Study basis for declaring Avala a landscape of exceptional features (Institute for Environmental Protection of Serbia, 2004) Decision on placing the Avala natural resource under protection (2007) Plan (every 10 years) and protected area management program (every year) adopted by the City
Relation to forest management and other planning bases	Forest management plans must be harmonized with spatial plans as well as with "older" plans under the Law on Forests, as well as be harmonized with the Law on Nature Protection (comply with the conditions of nature protection provided by the Institute for Nature Protection). The conditions given by the Institute for Nature Protection are incorporated in the forest planning documents.
• Obligation	OP IMMP - For now, according to the valid laws, such a plan is not foreseen. For now, OP IMMP can be a mandatory basis for city administration, planning the use of funds, as well as for the procurement of international or national projects that are in line with the content of OP IMMP. OP IMMP is also the basis for the participation of the city administration in the preparation of forest management plans. OP IMMP directly and indirectly affects the work of the forestry sector. For all others (users of space and owners) there is an obligation for areas that are within the Protected Area - the obligation to implement the Plan and Program for the management of the protected area.
Preparation of the plan Time and liditure	The Secretariat for Environmental Protection of the City of Belgrade is responsible for drafting the Plan. The Operational Plan is bermanized with the Special
Time validity	The Operational Plan is harmonized with the Special Management Basis for the Avala Management Unit (10 years) and the Plan (10 years) and the Protected Area Management Program (1 year).

 Implementation and operational planning The operational plan is implemented in phases and represents the implementation of the strategic plan in phases.

Harmonized with the basis for forest management and further elaboration of the OP will be done on the basis of planning documents of the City.

The OP is harmonized with the dynamics of the implementation of the Operator Business Program and the Annual Programs of the Protected Area.

Upon completion of the project, the City may envisage the development of such a special plan, although a better solution is to fit into the Existing Forestry Plans and Protected Area Management Plans and Programs. Forest land is under the jurisdiction of the Republic, construction and agricultural land is under the jurisdiction of municipalities and cities. The city has competencies over the Protected Area, which it has declared and provides funding for the Protected Area Management Plan and Program.

KEY ACTION	RESPONSIBLE AUTHORITY	PARTICIPATING PARTIES	TIMEFRAME - Is it achievable within the framework of the URBforDANoject?
Definition of UPF on the territory of the city of Belgrade	City of Belgrade	PE Srbijašume	Yes
Removal of waste deposit area from forest ecosystem	City of Belgrade	Key stakeholders and local population	Partially
Reconstruction of the fountain	City of Belgrade	Ključne zanteresvane stane I lokalno stanovništvo	Partially
Formation of the Botanical Garden	City of Belgrade	Key stakeholders and local population	Partially
Reconstruction of a children's resort	City of Belgrade	Key stakeholders and local population	Partially
Establishment of research - development - educational center "Hollow Rock"	City of Belgrade	Key stakeholders and local population	Potentially
Establishing active communication through social media	City of Belgrade	Key stakeholders and local population	No
Installation of	City of	Key	Partially for the

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	urban equipment in UPF	Belgrade	stakeholders	area of protected natural asset Avala
	Setting up a visitor management system (including a mobile application)	City of Belgrade	UPF owners, selected key stakeholders	Partly - related to the URBforDAN Project budget
	Setting entry points and improving access	City of Belgrade	UPF owners, selected key stakeholders	Partly - related to the URBforDAN Project budget
	Future connection of UPF owners	City of Belgrade	UPF owners, selected key stakeholders	Yes

OP area

The total area of "Avala" is 943 ha. The total forest area is 91% of the area. Unforested land occupies 9% of the area, while unfertilized land (1.25 ha) consists of quarries that are not functioning as stone exploitation. Lands of other purposes include roads, trim tracks, transmission lines, the area around historical monuments, various buildings and meadows used for recreational and tourist purposes, which occupy 8% of the area. Forest land suitable for afforestation makes up only 1% of the area.

The research area is formed of overgrown and nonovergrown areas in state ownership, on the territory of the municipality of Voždovac. The total area of state land is 819.50 ha, where PE "Srbijašume" is the manager of the protected natural asset "Avala". Part of the area of the former parking lot was occupied on an area of 52 acres. With the construction of the facility along the very border of the forest in several places, the cases are in the process. According to the Law on Restitution, 15.54 ha of forests have been returned to private individuals. This area is formed of overgrown and non-overgrown areas in state ownership on the territory of the municipality of Voždovac. The area was obtained on the basis of cadastral parcels which by a special act, the Law on Forests, were allocated for management and use of FM "Belgrade", FM "Avala", as well as part of PE "Srbijašume".

The total area of the Landscape of outstanding features "Avala" is 489.13 ha, of which in the regime of the I degree of protection is an area of 8.06 ha, in the regime of the II degree of protection 121.78 ha, and in the III degree of protection 359,29 ha.

According to the ownership structure, of the total area of the protected asset, the area of 74.35 ha (15.2%) is in private ownership, and 414.78 ha (84.8%) in other forms of ownership.

According to the data from the cadastre, in the structure of the landscape of exceptional features, agricultural land

occupies an area of 97.21 ha, forests 368.65 ha and infertile land 4,0 ha. The share of agricultural land in the total area of PIO is 19,9%. In the total area of agricultural land (97.21 ha), fields cover 76.17 ha, ie 78.36%, orchards 2.86 ha (2.94%), vineyards 13.07 ha (13.44%) pastures 4, 48 ha (4.61%) and meadows 0,63 ha (0,65%).

2 THE IMPORTANCE OF URBAN FORESTS AND MAIN MANAGEMENT OBJECTIVES

2.1 Purpose of UPF

 Ecosystem services/ forest functions/ importance of UPF Three related concepts of ecosystem service delivery are in circulation: the ecosystem process, the ecosystem function, and the ecosystem service.

An ecosystem process is "any change or reaction that occurs within an ecosystem, physical, chemical or biological. Ecosystem processes include decomposition, production, nutrient cycling, and nutrient and energy flows. (MA 2005). The second concept is the ecosystem function which is "a

The second concept is the ecosystem function which is "a subset of interactions between biophysical structures, biodiversity and ecosystem processes that support the ability of ecosystems to provide ecosystem services (TEEB 2010).

Ecosystem services are "the benefits that people receive from ecosystems - the direct and indirect contribution of ecosystems to human well-being" (TEEB 2010). Ecosystem services represent the connection between social-economic systems and ecosystems (MAES 2013).

Anthropogenic impact on processes in ecosystems can be positive or negative.

People benefit from ecosystem services. They provide nutrition, access to clean air and water, health, safety and enjoyment, and increase well-being. This means that ecosystem services are measurable in money.

It is important to include other ecosystem values (health values, social values or conservation values).

Institutions, stakeholders and users of ecosystem services affect ecosystems directly or indirectly.

Area and proportion of mapped ES given ranks of their importance (for the strategic area)

Landscape of exceptional features					
Type of ES	%				
Timber production	2	122.28	31.29%		
Tilliber production	3	217.99	55.78%		
Non timber products	3	177.04	45.31%		
Non timber products					
Provision of drinking water	1	38.18	9.77%		
Local climate mitigation	3	340.27	87.08%		
Local climate initigation					
Local air quality	3	340.27	87.08%		
Local all quality					

	Protection against	2	148	37.87%	
	erosion	3	192.27	49.20%	
	Nature	3	340.27	87.08%	
	protection/habitats for species				
	Recreation and tourizm	2	95.66	24.48%	
	Recreation and tourizm	1*	0.02	0.01%	
	Scientific educational	1	24.82	6.35%	
		1	7.35	1.88%	
	Cultural heritage				
Target groups / users	Local administration (City of Belgrade, Municipa Voždovac)				
	2. State administration (Public company"Srbijašu		•	•	
	Army of Serbia, Protocol o			· · · · · · · · · · · · · · · · · · ·	
	3. Interested groups an			•	
	Bicycle association of Ser				
	carting association, AN			•	
	Educational centers and schools, Primary School in Beli potok, Kindergarten in Pinosava, Student rest area "Radojka				
	Lakić".	iosa\	ia, Stude	eni rest area Kadojka	
	4. Users (Bicycle riders, C		-	lents, Walkers, Hikers,	
	Drivers of quads, Scouts, T	ouris	sts.		
	5. Owners (TOTAL 108)				

3 STATE OF FORESTS AND FOREST USE	
3.1 State of forests and forest management	
Forest area	The total area of Avala is 819.50 hectares. Overgrown land occupies 9% of the area, while non-fertile land occupies 1.25 ha (a quarry that is not in the function of stone exploitation). Land for other purposes includes roads, trim tracks, power lines, the area around historical monuments, various buildings and meadows used for recreational - tourist purposes and which occupy 8% of the area. Forest land suitable for afforestation makes up only 1% of the area.
	All forests in the area are divided by global and basic purpose. By global purpose, the largest part of the forest of the management unit is protected as forests with a priority protection function (49%) (code 12), a smaller part, the area of exceptional features (46%) (code 20) and forests intended for recreation and general cultural and educational functions (5%). The forests of the area have six basic purposes: Seed sessile stand (in 17 - represented on 0.50 ha), Soil protection against
	erosion (in 26 - represented on 364.08 ha, with a volume of 65863.7 m3 and an increment of 1716.4 m3/ha), tourist center (at 73 - represented on 35.85 ha, with a volume of 7974m3 and an increment of 161.1m3 / ha), Protected area - I degree of protection (at 81 - represented on 8.06 ha), Protected area - II degree of protection (at 82 - represented on 101.59 ha), Protected area - III degree of protection (at 83 - represented on 232.69 ha).
Ownership of forests	The research area is formed of overgrown and non-overgrown areas in state ownership, on the territory of the municipality of Voždovac. The total area of state land is 819.50 ha. PE "Srbijasume" is the manager of the protected natural asset "Avala". Part of the 52-ha area of the former parking lot is occupied. According to the Law on Restitution, 15.54 ha under forest were returned to private individuals. In the area of Avala, 23.10 ha of private property and other users were registered: PE "Srbijavode", Ministry of Defense, TCE "Avala", City of Belgrade and city municipalities.

 Forests, site conditions, forest types, stand types Over 41 species of trees have been registered in the area, which indicates the floral diversity and attractiveness of the area. The most common species are Turkey oak (29%), sessile oak (12%), small-leaved linden (9%), malt (8%), black pine (7%), pedunculate oak and beech (6%). All other species make up 23% of the volume.

The most common are hardwoods (79%), followed by conifers (12%) and softwoods (9%), of which the most common is linden.

Future care and restoration measures should reduce the participation of linden and black ash, and increase the participation of other species. Force oaks, beech, white ash, maple, fruit trees and other indigenous species that correspond to habitat conditions. Of the conifers, the most common is black pine, which shows signs of weakening and dying out.

The presence of forest fruit trees is very important for flora and fauna and their participation should be increased by future measures.

In the intended unit 26 wood material is mostly thin. These are forests whose purpose is to protect the land from erosion, so the thickness of the trees is not the most important, but the overgrowth of stands and the type of trees that should protect the land from landslides. There is a large share of acacia stands whose trees rarely exceed 40 cm in diameter during a 30-year patrol. These are recreational-tourist forests, so the existence of thin to strong trees over 90 centimeters is desirable. Medium and strong trees make up 58%. Future care measures should pay attention to thicker trees and enable their further unhindered growth, in order to make the forest as attractive as possible.

In the first degree of protection, the condition of the thickness structure is good, the largest number of trees are medium and strong wood material.

According to the thickness structure in the second degree of protection, the condition is satisfactory. All thickness classes are present. Medium-strong material is the most common, which speaks of the potential of the habitat and the possibility of obtaining assortments of higher technical value during use.

In forests of the third degree of protection, the condition in terms of thickness structure is relatively favorable. Over half of the trees form a medium and strong material. Fifteen percent of the wood volume belongs to trees over 51 centimeters. Among the trees of medium and strong material are the trees of the future that will participate in the restoration of stands.

According to the thickness structure, the condition is satisfactory. Fifty-eight percent of the volume is made up of trees over 30 cm. Since these are forests that are close to urban areas, their attractiveness is significant. Individual trees over ninety centimeters are scattered throughout the entire management unit as historical monuments. When

implementing care measures, it is necessary to pay attention and enable their free growth. These trees indicate the appearance and composition of forests at the beginning of the last century.

In coniferous clean and mixed acacia forests there is an irregular distribution of age classes.

In stands whose age class is 10 years, the distribution of age classes is also incorrect. Large areas are in the eighth age class. Although the current condition of these stands is relatively good, as such they prevent soil erosion. It is possible that they will show certain weaknesses in the next managing period (excessive dilution, health condition, sensitivity to wind and humidity and other consequences).

In artificially raised pedunculate stands, whose width of the age class is 20 years, the distribution of age classes is extremely unfavorable. Almost all stands are in the 4th age class.

There is a certain irregularity of age classes, older stands predominate. For recreational and tourist purposes, the age of the stands is less important. The general appearance of the stands and their arrangement is much more important than the age of the forest.

Nature reserve first level of protection is in the eighth age class, at the end of the patrol. The stand is designed for monitoring natural processes, aging and renewal without human influence.

The forests of the Avala management unit are under a certain degree of protection, where other parameters of the condition of the stands are more important, and the age is only an approximate value. However, in the following development periods, the general condition of forests should be expected to worsen due to aging.

The condition of the stands by age in the management unit is bad. Over 50% of the stands are at the end of the patrol. The most common is the eighth age class, which accounts for 41% of stands. Improper age class distribution and old age indicate the need to enter the renewal process.

Forest crops participate in 2.56 ha in relation to the total overgrown area. These are young crops of maple, white ash, red oak and other deciduous trees raised in the previous development period. The state of the cultures is good. Cultures are properly and timely nurtured.

In the purposeful protection of land from erosion, the condition by origin is unsatisfactory, most of the stands are 74% of coppice origin. There are no high stands, and artificially raised stands participate with 26%.

In coppice stands, a large share is acacia, which we manage as coppice, so a large share of coppice stands is not a problem.

In terms of preservation, the condition is good, 81% of the stands have been preserved. The participation of the devastated ones is small and they will be reconstructed in this regulatory period. Forests of this purpose fully satisfy

their function, protection against erosion.

The high forest of beech, hornbeam and linden is in the first degree of protection, so any work is prohibited in it. It is a dilute stand.

Artificially raised stands for recreational and tourist purposes participate with 53% and coppice stands with 47%. We can consider the current situation to be satisfactory.

In terms of preservation, the situation in recreational and tourist purposes is good, 87% preserved and 13% rarified.

In the purposeful unit of the second degree of protection, the condition of the stands by origin and preservation is satisfactory. High and artificially raised stands participate with 49%. Preserved stands participate with 69%.

In the purpose-built unit of the third degree of protection, the condition of the stands by origin is satisfactory. The majority are high and artificially raised stands (56%). Most of the stands are preserved (53%). The condition of forests by origin in the management unit is bad, 60% of the stands are of coppice origin. There are 17% of high stands. Artificially raised stands participate with 23%.

The condition of the stands is good. Most of the stands, 70% are preserved. There are less than 1% of devastated stands. The devastated stands will be reconstructed in this management period.

For recreational and tourist purposes, 74% of the stands are mixed.

In order to protect against erosion, most stands are 77% mixed. Such a relationship is desirable.

In the first degree of protection, there is a mixed stand of beech, hornbeam and linden.

In the second degree of protection, almost all stands are mixed. Mixed stands are more resistant than pure ones and are richer in flora. In the forests that are recreationally and touristically visited, the floral diversity is also significant.

In the third level of protection, the largest number of stands is mixed (87%). Such a relationship is very favorable and speaks of the great plant diversity and richness of the protected natural asset.

The situation in the management unit is good. Most stands, 83% are mixed. Such mixing is very important for forests such as Avala. The large number of species and their mixture make the forests of Avala very attractive for its visitors.

The seed stand is an artificially raised stand of sessile oaks. It is a preserved stand, age 65, properly developed canopy and trunk, of good health.

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The condition of the stands is good. Most of the stands, 70% are preserved. There are less than 1% of devastated stands. The devastated stands will be reconstructed in this management period.

The forest management plans do not envisage an increase in the area under the forest, but the retention of the existing ones.

Forest operations

Until 1991, most of the works in the area of Avala were related to the arrangement of Avala as a recreational-tourist center. Only sanitary cuts were carried out.

In the period from 1987 to 1997, forest cultivation works intensified. Most of the works were related to sanitary and selective spacing.

Due to the intensified drying and wind break in 2016, with the consent of the inspector, sanitary cuts were carried out. Reforestation and cultivation works envisaged by the remediation plan are included in the cultivation plan based on forest management.

Forest protection works were carried out through sanitary felling of dry trees. In 2011 and 2012, the leper's litters were removed on an area of 450 hectares. In order to protect conifers, in 2015 and 2016, pheromone traps of the ecotrap type and pheromones sexowit and acuwit were installed for hunting bark beetles ips acuminatus and ips sexsdentatus. Five pheromone traps were set in 21b, d, 10e, and 13e. According to the data from the records from 2013 to 2016, control and hunting trees were set up (21d,c,).

Illegal cutting is largely prevented by organizing a guard service, the constant presence of foresters in the field. According to the data recorded in the forest administration in the period from 2011 to 2015, 7 reports of theft of 27.7 m3 were initiated. In order to protect the forests, a rehabilitation plan was made after the stormy wind in 2016 on an area of 200 hectares. Its realization is in progress.

Since 2008, a couple of stormy winds have been happening in the area of Avala, which have done great damage. With the repair of the windbreak, the planned state was transferred to 23%.

Execution of the forest use plan by area is 117%, and by volume with 123%.

Thee state was mostly achieved by sanitary felling. 7002m3 were cut down by sanitary thinning and repair of windbreaks. 2383m3 were cut down by felling of dry, semi-dry and broken trees after the windstorm in 2014 and 2016. At that time were totally destroyed 6 hectares, and in total it covered an area of 200 hectares, where it caused damage to a group or individual trees.

A rehabilitation plan was made after the wind break in 2016. From the works planned for the rehabilitation, the cutting and extraction of the cut wood volume was done, and the works on terrain preparation, afforestation, care and protection were transferred to the plans for the basis of forest management for the period from 2018 to 2027. Works on the management of protected natural assets are contained in a special program adopted by the city and are harmonized with the basis of forest management.

The proclamation of a protected natural asset defines the purpose of the areas of the largest part of the management unit.

In the previous development period, restitution, return of forests and land to other owners was carried out. The total area reduction is 15.54 ha. The returned area of forests and land to private persons was separated from the base. This was reflected in the obtained smaller volume than expected.

The planned cultivation works were realized in excess of the planned for 20%. Due to the need to repair windbreaks, sanitary rarification was performed on several occasions and on larger areas than planned.

The state of health is satisfactory, regardless of the windbreaks that occurred in 2014 and 2016 and the attacks of boars in 2011 and 2012.

Constant monitoring and felling of diseased, dry and broken trees prevented a greater presence of entomological and phytopathological diseases.

The use plan was exceeded by 23%. The reason is sanitary cutting and repair of windbreaks.

Wood production

The plan for the use of forests determined on the basis of forest management for the area of "Avala" is elaborated in detail in the contractor projects of forest management, harmonized by phases of works on cultivation and use of forests.

When felling, you should strictly pay attention to the direction of felling the trees, so as not to damage the

surrounding trees.

If the trees are damaged, they should be immediately marked and cut down.

The removal of the cut wood material should be done in such a way that the land and roads are damaged as little as possible. The cut wood material should be transported from the management unit as soon as possible.

When cutting near roads, the road should be visibly marked and secured. Mandatory presence of foresters, stopping traffic during felling and removing timber from the road as soon as possible.

Strictly follow the guidelines given in **Ordinance on forests** adopted on 31 May 2011, number 38/11.

It is important to designate, provide a place for cutting and extraction.

Prevent access to curious visitors.

Inform the public about the planned cutting.

Forest accessibility

For proper and timely forest management, a developed road network is necessary, which will enable the works on cultivation, use and protection of forests to be carried out at the right time with the shortest possible transport distance. Since Avala is a very important recreational and tourist area for Belgrade, external and internal openness is very important.

The management unit is in the immediate vicinity of the city, surrounded by streets that connect the Belgrade settlements the former villages of Pinosava, Beli potok, Zuce and Ripanj. All these settlements are connected by streets for the center of Belgrade and the highway and the Ibar main road for the whole of Serbia. The optimal openness of forests for the Posavina-Danube forest area is 15 m/ha. The actual openness of the management unit of 34.04 m/ha is far above optimal.

The total length of asphalt roads in the management unit is 8.8km.

The length of forest soft and hard roads is 19.08 km.

The total length of roads in the management unit is 27.88 km.

The openness of 34.04 m/ha is more than good, so there is no need to build new roads. Each department can be approached. Forest roads lead to asphalt or are connected to local roads. In addition to the above roads, there are also many forest shorter or cross roads. There are countless arranged and unarranged paths in the sections that are used for walking and active recreation. We can accept the existing openness as optimal, so there is no need for further construction of new ones. It is necessary to maintain the existing ones.

In addition to the ascending, descending road to the top of Avala, the road to Šuplja stena and part of the old road to Čarapića brest were also paved. The total length of asphalt roads is 8.8 kilometers.

The width of the planum of public roads is mostly 3 meters, except for asphalt roads 7 and 6 meters wide. The maximum

slope is up to 7%. Public roads are paved, with a drainage canal and culverts. The care of asphalt roads is under the jurisdiction of PU Belgrade.

The tractor tracks are 3 meters wide. The condition of roads and culverts is good and they are taken care of by the Belgrade forest management. The maximum slope is up to 7% so the roads are very accessible and easy to use and maintain. In addition to being used for forestry purposes, roads are abundantly used for recreation.

Impacts, problems

No greater presence of phytopathological and entomological diseases was observed. Individual physiological drying was observed.

In stands in which conifers were planted stably or in groups, drying caused by drought in 2012 and 2013 was noticeable. Drying is highly present in black pine. Of the entomological diseases, various bark beetles have been observed as secondary causes of the disease. This caused the physiological weakening of the plants and their death. There are some stands that are in poorer health, where the intensity of decay (drying) is stronger.

In 2016, the Avala top was hit by a stormy wind on an area of 200 ha, making timber and group fractures. The Belgrade Forest Management immediately started recording the damage and making a rehabilitation program. Rehabilitation works are still in progress. There is a real danger that in the coming period, the forests of Avala will show increased drying of trees, especially in shallower habitats.

In other parts of the management unit that were not affected by the storm, the health condition is satisfactory.

The expected increased drying is also affected by the age of the stands of the management unit. A large number of stands are at the end or near the end of the patrol.

The presence of moths and other defoliators was not noticed.

Forests and forest lands are divided into six categories, depending on the degree of fire risk:

I degree: stands and cultures of pine and larch (51.55 ha).

II degree: stands and crops of spruce, fir and other conifers (36.54ha)

III degree: mixed stands and cultures of deciduous and coniferous trees

IV degree: stands and cultures of oak and hornbeam – (422.51 ha)

V degree: stands of beech and other deciduous trees – (232.17ha).

VI degree: thickets, shrubs and other land – (76.74ha).

The greatest threat from fire is human negligence.

In the area of the management unit Avala, the hunting association Ripanj with its headquarters in Ripanj manages the hunting. The hunting ground covers the entire area of the municipality of Voždovac. The number of game is as follows:

deer 260, rabbit 2000, partridge 900 and pheasant 2500. No shots are done on the surface of the management unit "Avala" in the part of the Avala top. The main and basic reason is that the management unit is under the degree of protection and due to tourist attendance. In the rest of the hunting ground, the hunting association manages the hunting grounds according to the hunting basis and annual plans. 3.2 Visit to UPF and infrastructure Avala forests are located near the city of Belgrade. The area Visit to forest has an average of 50-100 visitors per day. Avala TV Tower and the Monument to the Unknown Hero attract the most tourists. Zones around access roads are mainly used by local people on their way to and from work. For proper and timely forest management, a developed road Already available infrastructure network is necessary, which will enable the works on cultivation, use and protection of forests to be carried out at the right time with the shortest possible transport distance. Since Avala is a very important recreational and tourist area for Belgrade, external and internal openness is very important. The space is in the immediate vicinity of the city, surrounded by streets that connect the Belgrade settlements the former villages of Pinosava, Beli potok, Zuce and Ripanj. All these settlements are connected by streets for the center of Belgrade and the highway and the Ibar main road for the whole of Serbia. The optimal openness of forests for the Posavina-Danube forest area is 15 m/ha. The actual openness of the management unit of 34.04 m/ha is far above optimal. State of traffic infrastructure: The total length of asphalt roads in the management unit is The length of forest soft and hard roads is 19.08 km. The total length of roads in the management unit is 27.88 The openness of 34.04 m/ha is more than good, so there is no need to build new roads. Each department can be approached. Forest roads lead to asphalt or are connected to local roads. In addition to the above roads, there are also many forest shorter or cross roads. There are countless arranged and unarranged paths in the sections that are used for walking and active recreation. We can accept the existing openness as optimal, so there is no need for further construction of new ones. It is necessary to maintain the existing ones. In addition to the ascending, descending road to the top of Avala, the road to Šuplja stena and part of the old road to Čarapića brest were also paved. The total length of asphalt roads is 8.8 kilometers. The width of the planum of public roads is mostly 3 meters,

except for asphalt roads 7 and 6 meters wide. The maximum slope is up to 7%. Public roads are paved, with a drainage canal and culverts. The care of asphalt roads is under the jurisdiction of PU Belgrade.

The tractor tracks are 3 meters wide. The condition of roads and culverts is good and they are taken care of by the Belgrade forest management. The maximum slope is up to 7% so the roads are very accessible and easy to use and maintain. In addition to being used for forestry purposes, roads are abundantly used for recreation.

Using the knowledge of the district engineer and forester of the Avala Forest Administration and the experience and advice of representatives of the Cycling Association of Serbia and the Avala Mountaineering Association, after reconnaissance of the terrain, the existing condition of hiking trails and forest roads on the southeast slope of Avala was determined in order to make a proposal for the route of the mountain biking trail on Avala.

3.3 Important objects in UPF

Nature conservation

By the Decision on the Proclamation of the Protected Area Landscape of Exceptional Features "Avala" (Official Gazette of the City of Belgrade, No. 501-678/07-C-December 24, 2007) by which the protected area "Avala" is classified in III, II and I protection category. The protected natural asset is located on the territory of the city of Belgrade, the city municipality of Voždovac. The total area protected is 489.13 ha. Most of the forests and land are state-owned, and the manager is PE "Srbijašume".

The forest management, as the manager of the protected area, implements all the conditions provided by the Decision on the proclamation.

In addition to general conservation activities, maintaining the cleanliness of the protected natural asset, the forest management, in cooperation with the City, adopts an annual management program that is harmonized with the Avala Base for Forest Management.

All forests of the management unit "Avala" belong to forests of high care value (HCV forests), seed stand, protected area of I, II and III degree of protection, protection of land from erosion and recreational-tourist forests.

Forests of Dedicated Unit 17 (HCV-1) belong to areas that contain important concentrations of biodiversity at the global, regional or national level.

Forests of dedicated units 81,82 and 83 (HCV-2), are large forest areas of landscape level significant at the global, regional and national level.

Forests of dedicated unit 26 (HCV-4), belong to areas that provide basic natural benefits in critical situations.

Forests of dedicated unit 73 (HCV-5), belong to the area

necessary to meet the basic needs of local communities.

Most of the forests of the management unit "Avala" belong to forests of high care value (HCV-4), an area that provides basic natural benefits in critical situations. 364,08 ha.

A small part of the forest of 0.50 ha was isolated as a seed stand of sessile oak of the highest value (HCV-1).

Copies of the decision on the conditions of nature protection and the proclamation of the seed facility are given in the attachment to the plan.

In the planning period, Avala and Kosmaj retain the status of protected areas, as landscapes of exceptional features.

The main goal of protection and sustainable use of natural heritage is: preservation and improvement of biological diversity, values of geoheritage and landscapes and development of public functions of protected areas, primarily in the field of scientific research and educational work, culture, sports and recreation; sustainable development of protected areas and realization of the well-being of local communities through planned, controlled and limited use of natural resources and space as construction categories, development of tourism and agriculture; connecting and harmonizing the national with the international system of nature protection.

The concept of protection, arrangement and use of natural heritage is based on increasing the total area under protection in the planning period (until 2020) to 12% of the territory of the Republic of Serbia, establishing a national ecological network and identifying areas for the European ecological network NATURA 2000 as well as developing management systems of the areas covered by the said networks. Planning, preservation, maintenance, arrangement and sustainable use of protected areas for which the status, spatial coverage and protection regimes will be defined, is carried out on the basis of spatial and urban plans, bases and programs of management and use of natural resources, in accordance with law, measures and nature protection conditions of the declared protected areas and on the basis of management plans.

In accordance with the Ordinance on the proclamation and protection of strictly protected and protected species of plants, insects, animals and fungi in the area of the management unit, the following species were found:

Strictly protected insect species: Acrda ungarica ungarica, Carabus ullrichi nastasi, Necrodes litoralis, Onthophagus furcatus, Cerambyx cerdo, Morimus asper funereus, Osmoderma eremita, Oryctes nasicomis, Lucanus cervus,

Protected insect species: Metrioptera domogledi, Cortodera flavimana, Paracorymbia pallens, Oberea pedemontana,

Birds: Accipter nisus sparrow-hawk, Accipter gentilis- tercel, Buteo buteo-buzzard, Columba oenas-pigeon, Coracias garrulus- European roller, Cuculus canorus-cuckoo, Dendrocopos major, medius, minor- large, medium, small colorful woodpecker, Dryocopus martius- black woodpecker,

Otus scops- Eurasian scops owl, Strix aluco- forest owl Mammals: Dryomus nitedula- forest dormouse, Scirus vulgaris-squirrel, Talpa europea- mole, Testuda hermanniforest turtle, Erinaceus concolor- hedgehog, Species that are on the red list with international endangered status: Insect species: Cerambyx cerdo VU(vulnerable), Morimus funereus VU, Osmaderma eremita VU, Mertrioptera domogledi VU, Anex imperatorLC(least endangered). Amphibian species: Triturus vulgarisLC, Salamandra salamandraLC, Bombina varegataLC, Bufo virdisLC, Bufo bufoLC, Rana dalmatinaLC. With the proclamation of Avala as a protected natural asset, the level of protection of rare, vulnerable and endangered species was raised to a higher level of protection. Monument to the Unknown Hero (World War I Memorial, Cultural heritage designed by Ivan Meštrović erected in 1938) and Monument to Soviet war veterans. (Plane crash in 1964. The delegation flew to Belgrade to attend the celebration of the 20th anniversary of the liberation of Belgrade) Monument to Vaso Čarapić The King's Fountain. Avala Tower (symbol of the city of Belgrade) was built in 1964, destroyed in the NATO bombing, and then rebuilt in 2010. The first mountain house was built on Avala in 1924 (Mitrovića house). Žrnov or Žrnovan is a medieval fortress located on the highest peak of Avala (Žrnovica) (511 m asl.). The oldest fortification on the site of the later town of Žrnovo was built by the Romans to control the approach to Singidunum, but also to protect their mines which they had on the slopes of Avala a hundred meters below the very top. There are no visible remains of Žrnovo today. After being blown up, the entire area of the former fortress was leveled and concreted, and today there is a monument to the Unknown Hero on it. Data on the appearance of the fortress are available today in the form of records of old chroniclers (Dj. Bošković), works of Aleksandar Derok and a few photos located in the National Museum in Belgrade. Other objects Agricultural land - Agricultural areas within the protected natural resource are represented in the northeastern, eastern and southeastern part and are located at lower elevations. According to the data from the cadastre, agricultural land occupies a total area of 97.21 ha. Of that, 70.75 ha (72.78%) is in private ownership, and 20.46 ha (27.22%) in other forms of ownership. In Avala and in the villages of Podavlje, cattle breeding, viticulture, fruit growing and vegetables were the traditional forms of agricultural land use. Today, however, many of these agricultural branches have almost died out (livestock, viticulture), so that

agricultural production has been reduced to a variety of

small-scale production of individual farms with holdings of up to 3 ha. All agricultural areas are subject to the Law on Agricultural Land ("Official Gazette of RS" No. 41/92) and accompanying regulations in this area.

Construction land - Under construction land we mean built-up areas, ie individual plots with facilities, roads, infrastructure and other facilities, infertile areas (according to the cadastre) and special purpose areas.

The built-up areas are located in the northwestern part (forest administration building, hotel "Belgrade"), on the ridge of Avala (hotel "Avala", monument to the Unknown Hero, monument to the perished Russian military delegation and TV tower) and in the north (restaurant "Mitrovića house"). The constructed facilities are registered in the cadastral section. As can be seen, the coefficient of construction is small, practically negligible. The built-up areas are spatially scattered, they have not been formed as settlements within the natural asset. The areas shown in the cadastral balance sheets represent the real situation on the ground, regardless of the inaccuracy of the cadastre and the manner of management. Conditions for construction and use of constructed and construction land are regulated by the Law on Planning and Construction ("Official Gazette of RS" no. 47/03).

Water areas - Avala is the "source" of numerous streams, which flow into the Sava along the Topčider River, and into the Danube along the Zavojnička River. Of the streams in this area there are: Smrdanski potok, Dragušnica, Prača, Beli Potok, Konopljište, Vranovac and Glođevac. Most watercourses are seasonal.

The environment is being arranged and the quality of drinking water sources in the area of "Avala" is constantly being controlled. Avala abounds in springs of clean water that locals have used since ancient times. The most famous in this area are:

Sakinac - the spring from which the water is used in George Weifert's brewery. The spring was named after *sakas* - water barrels placed on a base with two wheels that were delivered by horse-drawn carriages to the settlement.

Ledinac - popularly called Ladne vode, it is located in the valley of Vranovački potok.

Kamenac – It is named after the water that flows out of the stone. located at 275 meters above sea level.

Vranovac - Vranovac spring is located on the road to the village of Zuce from Beli Potok

Kraljeva Česma - It was built in 1930 by the then owner of the Lovački sastanak tavern.

Special purpose areas - Special purpose areas are not shown separately in the area balance. They imply a special purpose and in this case they are found, built plots/facilities, existing

	traffic and communal infrastructure, abandoned superior and
	traffic and communal infrastructure, abandoned quarries and
	other mining works.
3.4 Assessment of use,	
changes and influencing	
factors	
Damages, risks	Potential risk of damage to forests is mainly caused by climate change, harmful insects and plant diseases, protection from visitors and local people, protection of forests from fire, negative consequences of snow and ice and damage from stormy winds.
Issues of forest use	Within the management unit, 23.10 hectares of private property were registered, as well as other users such as PWE "Srbijavode", the Ministry of Defense, TCE "Avala", the City of Belgrade and the city municipality. Areas under ordinal numbers 70-71 are common property due to the apartment in the building, at the foot of Avala. Areas under ordinal numbers 62 to 69 are joint property with the municipality of Voždovac, whose share is on an area of 50 ares and 27 m2. The area under ordinal number 75 is divided in the field. Part of the area under the forest has entered the base, and in the part outside the base there is a Živanović building. The cadastral parcel under serial number 178 is an old village road that has not been used for a long time. That surface (8/3) entered the surface of the plan. Plots 172 to 177 and 179 to 183 were wrongly registered in the municipality of Voždovac. Forest management "Belgrade" filed a complaint. Cadastral parcels 1415/1 to 5 are co-owned with a legal entity and cp no. 1415/2, in terms of area and location, corresponds to the co-ownership part, which is basically under ordinal number 56, someone else's land (table 3.). The number of departments and sections is an approximate orientation of the cadastral parcel. The size of the section and the cadastral parcel do not match. The basic map can accurately identify the position of individual plots in relation to a section or department. During the development period, the forest unit "Belgrade" will resolve the property and legal status of the disputed plots.
	All cadastral parcels whose user or owner is another person is a clearing part set aside as a separate unit.

4. GUIDELINES FOR FOREST MANAGEMENT	
4.1 Subordinated guidelines	
Forest management plans	 The management plan contains the following data segments the maximum area from which the forest product can be extracted or the maximum amount of forest product that can be harvested or both in a given period of time, conducting forest protection operations, conducting forest development operations, including forestry, other issues that are necessary or appropriate for the effective implementation of management objectives. This may include forest inventory, mapping, technical and social research, and public consultation. A management plan applicable to public or private forest land should be approved by the ministry responsible for forestry or other specific authorizations.
	Management level
	1. Strategic issues 1.1 National (time frame> 10 years) Key element of forest management - Conservation within the Forestry Development Strategy 1.2 Subnational (time frame> 10 years) Key element of forest management - Forestry sector development plan
	2. Operational issues 2.1 Forest management (time frame 10 years) Management function - Planning (Forest inventory, environmental impact assessment, zoning of forest functions, forest protection, property rights, yield regulation) Management (annually) - Management function - implementation (management of forest resources with low impact, distribution of yields by age classes) - Management function - control (periodic revision of management plans, management of the degree of use)
Spatial plansStrategic plan for UPF	Spatial planning operates within the public sector. The goal is to create conditions for optimal use of land that is in line with the need to protect the environment and create social and economic goals. The green cities of the future will be the result of the activities undertaken today. These activities take place within a framework that includes

the planning, design and management process. In their interaction and feedback, decisions and actions taken are optimized. The boundaries between UPF planning, design and management are often blurred. Cities are adaptive systems that change over time, as are urban forests. For this reason, planning is linked to design and management to maintain the adaptability of the city system. Urban forests should be a priority in municipal planning strategies, with the aim of maximizing the benefits provided by trees and green infrastructure. Urban forest plans should provide a framework for action, both active (i.e. what can be done) and passive (i.e. what is not allowed), and norms that regulate them. A comprehensive urban plan should reflect local policies and provide a framework for the implementation of land use regulations (eg zoning and functions), and should specifically address all aspects of green infrastructure. Decision makers and planners should ensure that green spaces in the urban planning process receive equal attention as elements of the built environment and are seen as key infrastructure components, providing the city with ecosystem services as well as (in many cases) direct and indirect socioeconomic benefits. Master plans of cities should set aside areas for green areas, determine the functions of such green areas and provide funds for their development, maintenance and preservation. Consideration should be given to using, whenever possible, green infrastructure, rather than gray infrastructure, using nature-based approaches to wastewater treatment, sewage treatment, energy saving and improving human health. 4.2 Fundamental/basic concepts Forest land, forest area The forests of the area have six main purposes: Sessile oak seed stand (at 17 - represented on 0.50 hectares), Soil protection against erosion (at 26 - represented on 364.08 hectares, with a volume of 65863.7 m3 and an incremet of 1716.4 m3/ha), Recreational-tourist center (at 73 represented on 35.85 hectares, with a volume of 7974m3 and an increment of 161.1m3 / ha), Protected area - I degree of protection (at 81 - represented on 8.06 hectares), Protected area - II degree of protection (at 82 - represented on 101.59 hectares), Protected area - III degree of protection (at 83 - represented on 232.69 hectares). All forests in the area are divided by global and basic Structure and forest composition purpose. By global purpose, the largest part of the forest of the management unit is protected as forests with a priority protection function (49%) (at 12), a smaller part, the area of exceptional features (46%) (at 20) and forests intended for recreation and general cultural and educational functions. (5%).

Technology of wood production

GUIDELINES FOR THE USE OF FORESTS

PRODUCTION PREPARATION

Preparation of production in the use of forests includes:

- design and construction of a secondary network of forest communications,
- defining gravitational and working fields and transport boundaries
- selection of technological and transport scheme, etc..

The final planning document, which defines the preparation of production, is the construction plan. This plan has the character of a project on the basis of which the implementation of management measures determined on the basis of forest management is implemented. The construction plan determines the cut, wood volume and its structure, norms for all phases of work, transport distances, the amount of financial resources to be invested in infrastructure facilities and other.

The basis for the selection of cutting technology, production and attraction of wood assortments is the remittance of trees for felling. Based on the remittance data, the amount of wood volume, its structure, basic elements for the norms of cutting and production, as well as other important data that were collected during the remittance, and are in the function of planning, are determined.

The main goal to be achieved, which serves as a guide in the selection or design of technological methods of use and selection of work techniques for performing cultivation or protective measures by felling, is the minimum damage to the remaining trees in the stand, soil, etc.

Methods of cutting in stands

A high level of protection of the remaining trees in the stand during felling and the first phase of transport is necessary, as well as the need to protect the young and the soil. Two cutting methods are used: the trunk part method and the classical assortment method. The application of the mentioned methods in the area of Avala Park would have the most favorable effects.

Trunk part method - The application of the trunk part method is recommended due to the reduction of unit production costs to a minimum. This is achieved by the maximum realization of costs in the first phase of transport. By transporting parts of the trunk from the forest to the temporary warehouse, the first phase of transport is unified. The same means of transport attracts all categories of wood,

except wood from branches (about 10%), which will be made in the classic way.

Assortment method - This technological method should be applied in stand situations where there is a need for an increased degree of protection on any basis. First of all, it refers to the so-called completed felling during restoration felling. When applying this method, directed cutting must also be performed completely. All assortments from the category of technical wood paneling must be trimmed on the side for which they will be hung in the first phase of transport. Their foreheads must also be separated, for easier passing during pull-out. During the execution of both technological methods of cutting and manufacturing, it is necessary to take all measures to avoid the occurrence of damages that fall into the category of avoidable. This will be possible only if all technological interventions are consistently performed, with full application of technological and work discipline.

Considering that the works on the use of forests will be performed by third parties, as services, it is necessary to provide the necessary protection of the remaining trees, saplings and land through constant and complete control, during the execution of works.

Nature conservation

By the Decision on the Proclamation of the Protected Area Landscape of Exceptional Features "Avala" (Official Gazette of the City of Belgrade, No. 501-678/07-C-December 24, 2007) by which the protected area "Avala" is classified in III, II and I protection category. The protected natural asset is located on the territory of the city of Belgrade, the city municipality of Voždovac. The total area protected is 489.13 hectares. Most of the forests and land are state-owned, and the manager is PE "Srbijasume".

Areas with emphasized ES (or forest functions) in the UPF area

Three protection regimes have been established in the protected natural asset.

The protection regime of the first degree was established on an area of 8.06 hectares. It is a high forest of beech, hornbeam and linden in a place called "Ladne vode" in the 26th section, section b. The total volume of the section is 2,374 m3, ie 294 m3/ha and with an increment of 5.1 m3/ha. The most common type is beech with 1471m3. Its health is good. The diameter of the trees ranges from 11 to 90 centimeters. It is a rarified stand of good appearance and quality, 99 years old. In the first instance, it is forbidden to perform any work, except for scientific purposes.

The protection regime of the II degree was established on an area of 101.59 hectares. It is characterized by a wealth of species (22) that build about twenty farm classes. The most common are coppice mixed Turkey oak forests (25%) and high Sessile oak forests (20%). High forests participate with 48%, coppice with 51% and artificially raised with 1%. The total volume is 24,352 m3, ie 240 m3/ha and with an increment of 5.0 m3/ha. The most common type is sessile oak with 81,514m3. Preserved stands cover 87% and rarified

23% of the area. The age of the stands ranges from 24 to 91 years. These are the best stands of the farm unit. The diameter of the trees ranges from 5 to 90 centimeters. The health condition is satisfactory, with individual drying of the trees.

The protection regime of the III degree covers an area of 232.69 hectares. It is characterized by a wealth of species (30) that build thirty-three master classes. The most common is the coppice mixed forest of sessile oak (11%). High forests participate with 29%, coppice with 44% and artificially raised with 27%. The total volume is 46,569 m3, ie 200 m3/ha and an increment of 4.4 m3/ha. The most common type is sessile oak with 9,030m3. Preserved stands cover 53% and diluted 47% of the area. Mixed stands participate with 87%. The age of the stands ranges from 11 to 115 years. The diameter of the trees ranges from 5 to 90 centimeters. The health condition is satisfactory, with individual drying of the trees, except in the part affected by the stormy wind. The rehabilitation of the burned part is in progress, as well as the cutting of individual broken and fallen trees.

The following is forbidden in the second and third degree:

- 1. change of purpose of the area;
- construction of industrial, infrastructural, economic, hydrotechnical and other facilities that may cause unfavorable changes in the quality of land, water, air, wildlife, character and beauty of the landscape and its surroundings;
- performance of works which may disturb and worsen the characteristics of biological, geological and landscape diversity of the protected area;
- works that disturb the morphological and hydrological characteristics of the terrain, except for the purpose of improving the hydrological and ecological conditions of the habitat;
- 5. damage and endangerment of cultural heritage faaacilities;
- carrying out interventions on buildings that represent cultural and historical heritage without the conditions of the competent protection services;
- 7. hindering of valuable, ie significant views;
- 8. formation of landfills, disposal or temporary storage of municipal, industrial and other types of waste:
- dumping waste outside the places marked for that purpose;
- 10. destruction of flora and fauna
- 11. hunting

as well as many other activities given in the decision on the proclamation of the Landscape of Outstanding Features

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The forest management, as the manager of the protected area, implements all the conditions provided by the Decision on the proclamation.

In addition to general conservation activities, maintaining the cleanliness of the protected natural asset, the forest management, in cooperation with the City, adopts an annual management program that is harmonized with the Avala Management.

• The use of forests

Opinion of key stakeholders present at the workshop held on June 14, 2019

Work group 1. Defining the problem

Work group 1 has defined 6 groups of problems

- Problem of competencies networking of competencies of different institutions, maintenance of existing infrastructure;
- 2. The problem of education not the education of citizens;
- 3. Ignorance of the process it is necessary to strengthen the local community rural development
- 4. Policy illegal construction, expansion of existing illegal buildings;
- 5. Poor communication between managers and users of the area
- 6. Financing

Work group 2. Recommendations (potentials, needs and desires)

Work group 2 has defined potentials, needs and desires in the following 6 categories:

- 1. Infrastructure informing about the rich history of Avala through info boards, tourist and info centers, construction of a winter indoor classroom, planning a parking space outside the protected area and encouraging citizens not to use motor vehicles in the protected area, provide maps of areas for users, installation of additional furniture, installation information boards with guidelines on behavior in the protected area, set up an idea to make people want to come to Avala again, construction of an access path for cyclists to the very top of Avala, expansion of the upper parking lot, installation of info facilities that work non stop, regular municipal transport, tourist trails for walking, sports and recreation.
- 2. Culture dedicate a part of the forest to some part of history, construction of the ethno house Avala, construction of a museum, construction of an exhibition space.
- 3. Safety involvement of institutions in the problems of vandalism, theft, stray dogs, surveillance, expulsion of driving tubs
- 4. Biodiversity planned activities must be harmonized

- with the main goal of nature protection, ie conservation of biodiversity in a way and to the extent that they do not disturb natural values, increase the protected area
- 5. Forest protection forest durability, increase of the area under protection, development of the Avala Landscape Plan with detailed elaboration, consideration of the regional context of Avala, limited access to vehicles, protection of the forest from felling and destruction
- 6. Education bring closer information about Avala, model of the town of Žrnov, development based on the rich history of Avala.

At the end of the workshop, it was concluded that care should be taken to avoid conflicts between different ecosystem services, to ensure that the forest capacity is not endangered due to the planned increase in the number of tourists, to improve cultural and historical heritage (despot Stefan Lazarevic Church museum, model of the town of Žrnov) and on that to base the content for attracting tourists as well as educating the population.

All activities must be harmonized with forest protection and nature and biodiversity conservation.

Future activities include the preparation of the operational part of the plan, the production of a film about this area, separate workshops with the institutions of the city of Belgrade, educational institutions, scientific institutions and the NGO sector.

Infrastructure in the forest area

The goal of the exploitation is to take all the timber from the forest from the stump to the temporary warehouse. The timber is hauled to a temporary warehouse from where it is transported by truck further out of the forest towards larger and busier roads, until the exit is reached on a public highway, waterway or railway.

In the area of Avala, the total length of asphalt roads in the management unit is 8.8 km, the length of forest soft and hard roads is 19.08 km, the total length of roads in the management unit is 27.88 km.

Openness of 34.04 m/ha is more than good, so there is no need to build new roads. Each department can be approached. Forest roads lead to asphalt or are connected to local roads. In addition to the above roads, there are also many forest shorter or transverse roads. There are countless arranged and unarranged paths in the sectors that are used for walking and active recreation. We can accept the existing openness as optimal, so there is no need for further construction of new ones.

Sewerage network - All constructed facilities within the protected natural resource are not connected to the city sewerage network, but wastewater is collected in septic tanks.

The surrounding settlements are also not completely connected to the city sewerage network. Most facilities only have permeable septic tanks and sewage pits without any purification.

Electricity supply - A network of electrical installations has been developed in the area of natural asset. The existing network and capacities cover all locations and facilities on the protected natural asset (underground lines).

A network of power lines (combined overhead and underground) has been developed in Podavlje settlement, and all facilities are adequately supplied with electricity.

Other communal equipment - In the protected area within the constructed facilities, waste materials are collected at special locations (eg hotel "Avala" and partly in containers and taken from there to the city landfill).

Waste materials in the settlements are partly collected in containers and taken away, and part of the population disposes of them within their plots. Unfortunately, unscrupulous citizens from the surrounding settlements scatter waste material along the roads and along the edge of the forest.

Communication / Informing the public

- Website development
- Connecting with primary and secondary schools
- Active assistance to students who prepare seminars, theses and master's theses,
- Active participation in conferences, seminars, round tables,
- Web presentations,
- Through the media,
- Other publications (annual report, special reports, occasional publications ...),
- Information material (brochures, bookmarks, posters, promotional videos ...),
- Projects and various events.

Responsible: City of Belgrade – Secretariat for Environmental Protection, Municipality of Voždovac, PE Srbijašume and private forest owners in the area.

 Cooperation between stakeholders The operational plan should solve environmental problems that prevent the concept of sustainable development. Suburban forests have a positive impact on living conditions around cities and thus represent a great potential for sustainable development that is underused. Stakeholders are of particular importance in this approach.

Stakeholders should define an integrated forest management system in urban and suburban areas and the goal of contributing to the sociological, health and economic well-being of urban populations. This should enable forestry to be fully integrated into urban planning.

Despite the different interests of individual stakeholders in urban areas, a level should be reached where everyone will accept the significant material benefits they have and which includes firewood, food, medicine and other non-wood

	products. Stakeholders will cooperate in: improving the appearance of the landscape, recreation, education and the common good; wildlife habitat; climate modification; control of air and noise pollution; erosion control; protection of catchment areas for urban water supply; But the basic condition for stakeholders to be able to cooperate with each other is the availability of information of public importance.
4.3 Guidelines for allocations with priority ES	
Other multifunctional forests	Creating and managing forests that need to fulfill multiple functions is more difficult and complex in multifunctional mixed forests than in pure forest plantations. Mixed forests, however, offer more benefits in the long run. Their greater diversity ensures better stability for uncertain conditions of the future environment and distant future markets.
Overlapping of allocations	Botanical Garden, Arboretum of Forest Tree Species and Nursery garden represent a whole within the Educationally Diverse Educational Center " Šuplja stena"
4.3.1 Allocations for priority ES	Teaching location - Faculty of Mining and Geology Water tank Walkways Educational-developmental center "Šuplja stena" Waiting point on the Šuplja stena Gazebo Botanical Garden Nursery garden (within the Botanical Garden) Arboretum of forest tree species Canopies Road signs Seating sets Information desk Suva česma Fountain at the entrance to Avala Wood Model of Žrnovo Fountain on Čarapića brest
4.4 Detailed forest zoning	
Zoning regarding the forest land use	Expansion of the protected area 2 Green walkways 3 D model of Žrnovo Ecological vehicle 1st route Avala, 2nd route Expansion lot Cars - parking

Deck chairs + meditation place + lookouts

Parking multiple levels smaller area

Cycling - from existing roads 2. Mountain biking draw a route on the existing road.

Trolley stations (signs, marks and bicycle rental on Avala).

Info desk container - electronic board

Data Initial state

What can I see

How to get to that place

How many km or minutes

Information about the place we visit.

The first step is that part of the landscape must be set aside as reserves for the conservation of biological diversity.

The second step is to assess the potential of the unreserved landscape for WOOD production. In conditions where the demand for wood is small, practice extensive (ecological forestry). In conditions where the demand for wood is high, intensive forest cultivation should be applied in order to compensate for the loss obtained by the area under extensive production. With this concept, we do not disturb the appearance of the landscape.

Ecological zone - large parts of the forest should be separated in order to protect the values related to ecosystem services. Reserve habitats are essential elements in any management system and have a role to play in conserving biodiversity in the future. All ecosystems occurring in the area should be included in the protection zone.

Production zone - the volume of production in these areas should be increased through a moderate increase in management intensity (establishment of intensive plantations).

The choice of areas for intensive production can represent a possible conflict if it is not done in the form of ecological processes in the landscape. The most productive locations for intensive management are also areas with a high level of biodiversity. For this reason, we have not monopolized production on site. It is necessary to form corridors for the movement of wild animals, to leave sufficiently wide vegetation belts around streams and rivers in order to preserve biodiversity.

Reusable zone - The remaining forest area includes a zone of wide use. This zone includes natural regeneration, forestry and its use in order to improve productivity and biodiversity.

The management practice of these zones consists of 7 protection factors and 4 management factors.

Protection factors are:

- (1) aquatic ecosystems and coastal buffers;
- (2) wildlife corridors;
- (3) special habitats (cliffs, meadows, landslides, caves, and thermal characteristics);
- (4) remains of relict forests in succession processes;
- (5) biologically important areas (populations of rare species);

(6) culturally sensitive areas and
(7) ecosystem disturbances (fire, wind and other
disturbances).
The four management factors are:
(1) the road network should be minimized;
(2) landscape-level objectives should be set for specific
structural characteristics or vegetative conditions
(3) patterns of spatial and temporal use (size of unit of
production, length of rotation) and
(4) restoration and recreation of forests of late successive
stands or habitats.
Zone development requires measurable results through the
key components of an efficient adaptive management system
and must be achieved through monitoring.

	Teaching location - Faculty of Mining and Geology
4.5 Activities	Walkways
	Educational-developmental center "Šuplja stena"
	Waiting point on the Šuplja stena
	Gazebo
	Botanical Garden
	Nursery garden (within the Botanical Garden)
	Arboretum of forest tree species
	Canopies
	Road signs
	Seating sets
	Information desk
	Suva česma
	Fountain at the entrance to Avala
	Wood Model of Žrnovo
	Fountain on Čarapića brest

4.5.1 A detailed plan for each of activities listed above

Area and map	Teaching location - Faculty of Mining and Geology
 Condition / problems 	School mine at the foot of Avala "Crveni breg" Lead, zinc
	and silver used to be mined here. There is still ore, but
	exploitation would be very expensive. That is why it has
	been in the hands of the Faculty of Mining and Geology in

		Belgrade
 Target 	state	Due to its rich history, a modest mining and geological museum was opened next to mine. Students and keepers of this mine plan to modernize the museum over time and make it a tourist attraction along with a tour of the mine. In fact, it is an idea to popularize the mine
• Purpo	se	Now the mine has served students for internships. Becouse of exhibits that were once used in the mine, elementary mining tools used in the exploitation of mineral raw materials it can be interesting for tourists who come to Avala for the sake of general knowledge.
 Priorit 	У	Medium priority, . must do it in the next 4 years
Most i	mportant ES	Education, research, recreation and tourism
• Possib	le activities	Support services that enable other services to function, such as soil formation, nutrient movement, and primary production
• Unwai	nted or prohibited activities	Construction of buildings
 Silvicu 	lture measures	Sanitary felling on and around access paths and roads.
 Measu 	res for wood production	
Infrast	cructure measures	Removal of tailings from the mine at the entrance to the facility
 Addition 	onal plan/sketch, if needed	Number on the map - 1
Costs		50.000 €
• Financ	ciers	Budget of the City of Belgrade Budget of the Municipality of Voždovac
• Coord	inators	Secretariat for Environmental Protection of the City of Belgrade
• Stakeh	nolders	Public company "Srbijašume", Mountaineering Society, Bicycle association of Serbia, Hotel "Avala", Serbian car and carting association, Educational centers and schools, Primary School in Beli potok, Student rest area "Radojka Lakić". Bicycle riders, Children, Students, Walkers, Hikers, Drivers of quads, Scouts, Tourists.
Legal INotes	oasis	Decision of the City Administration on the expansion of the protected natural asset that would include the area of the mine "Crveni breg". Necessary removal of illegally erected buildings at the entrance to the mine

•	Area and map	Walkways
•	Condition / problems	Currently, due to the absence of green footbridges, game crosses the road from one part of the forest to another. Such a situation is equally dangerous for the driver and the game.
•	Target state	We want to preserve game as well as drivers.
•	Purpose	Establishment of a unique whole of forest ecosystems without habitat fragmentation between the complex of Avala and Šuplja stena conditioned by the regional road
•	Priority	Very , must do it in next 2 years.
•	Most important ES	Protection against natural hazards and extreme events
•	Possible activities	Arrangement of access parts around the walkway Recreation and tourism
•	Unwanted or prohibited activities	List the activities that are not allowed or are restricted
•	Silviculture measures	Sanitary cutting
•	Measures for wood production	
•	Infrastructure measures	
•	Additional plan/sketch, if needed	Mark on the map - 3 / i and 3/1
•	Costs	The construction of two footbridges is planned. The unit price of the footbridge is 70,000 Euros, so the total price is 140,000 Euros.
•	Financiers	Budget of the City of Belgrade Budget of the Municipality of Voždovac
•	Coordinators	Secretariat for Environmental Protection of the City of Belgrade
•	Stakeholders	Public company "Srbijašume", Mountaineering Society, Bicycle association of Serbia, Hotel "Avala", Serbian car and carting association, Educational centers and schools, Primary School in Beli potok, Student rest area "Radojka Lakić". Bicycle riders, Children, Students, Walkers, Hikers, Drivers of quads, Scouts, Tourists.
•	Legal basis Notes	Decision of the City Administration Walkways could also be used to move visitors from one location to another (via the main road)
		It is necessary to remove the shelter for strey dogs at the location of the walkway 1

Area and map	Waiting point on the Šuplja stena
Condition / problems	There is currently one wooden checkpoint for wildlife watching.
Target state	The existing checkpoint would be reconstructed, as well as a part of the forest in its vicinity so that it can be used as a lookout, for observing wildlife and birds.
• Purpose	Reconstruction of the checkpoint and its expanded use will enable tourists to experience nature in all its beauty.
Priority	Very , must do it in next 2 years.
Most important ES	Recreation and tourism
Possible activities	
Unwanted or prohibited activities	Hunting
Silviculture measures	
Measures for wood production	
Infrastructure measures	Arrangement of the access road
Additional plan/sketch, if needed	Number on the map - 5
• Costs	5000 Euros
 Financiers 	Budget of the City of Belgrade
	Budget of the Municipality of Voždovac
Coordinators	Secretariat for Environmental Protection of the City of Belgrade
• Stakeholders	Research institution Public company "Srbijašume", Mountaineering Society, Bicycle association of Serbia, Hotel "Avala", Serbian car and carting association, Educational centers and schools, Primary School in Beli potok, Student rest area "Radojka Lakić". Bicycle riders, Children, Students, Walkers, Hikers, Drivers of quads, Scouts, Tourists.
Legal basis	Decision of the City Administration on the expansion of the protected natural asset.
• Notes	If possible, limit hunting activities in the hunting ground that covers this part of the area

Area and map	Gazebo
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 Condition / problems 	Currently, there is no arranged place for sitting and resting in attractive areas in the forest.
Target state	Improving living conditions in the forest.
• Purpose	By setting up a facility for a peaceful vacation in interesting places in the forest, it will enable people to react to stressful everyday life.
• Priority	Less, must do it in the next 5 years
Most important ES	Recreation and tourism
Possible activities	Landscaping around the Gazebo
Unwanted or prohibited activities	Waste disposal
Silviculture measures	Sanitary felling
Measures for wood production	
Infrastructure measures	Arrangement of the access path
Additional plan/sketch, if needed	Number on the map - 6
• Costs	It is planned to raise 3 pieces of gazebos. The unit price is
	1800 Euros, so the total installation price is 5400 Euros.
 Financiers 	Budget of the City of Belgrade
	Budget of the Municipality of Voždovac
 Coordinators 	Secretariat for Environmental Protection of the City of
	Belgrade
 Stakeholders 	Research institution
	Public company "Srbijašume",
	Mountaineering Society, Bicycle association of Serbia,
	Hotel "Avala",
	Serbian car and carting association,
	Educational centers and schools,
	Primary School in Beli potok,
	Student rest area "Radojka Lakić".
	Bicycle riders,
	Children,
	Students,
	Walkers,
	Hikers,
	Drivers of quads,
	Scouts,
. Landbasia	Tourists.
Legal basis	Decision of the City Administration
• Notes	It is necessary to organize adequate (periodic) cleaning of the space from waste

Area and map	Canopies
Condition / problems	The current number of existing canopies will not be able to satisfy the increased number of visitors it is aiming for.
Target state	Increasing the number of canopies will be in line with the expected increase in users.
• Purpose	Increasing the capacity for a quiet holiday will allow you to spend a comfortable time in the forest.
• Priority	Very.
Most important ES	Recreation and tourism
Possible activities	
Unwanted or prohibited activities	
Silviculture measures	Sanitary cutting
Measures for wood production	
Infrastructure measures	Arrangement of access paths
Additional plan/sketch, if needed	Marking s on the map – D1, D2, D3, D4, D5, D6, D7, D8, D9, D10
• Costs	It is planned to install 10 canopies. The unit price is 1500 Euros, and the total price is 15000 Euros.
• Financiers	Project URBforDAN funds: Management and Utilization of Urban Forest as Natural Heritage in Danube cities
• Coordinators	Secretariat for Environmental Protection of the City of Belgrade
• Stakeholders	Research institution Public company "Srbijašume", Mountaineering Society, Bicycle association of Serbia, Hotel "Avala", Serbian car and carting association, Educational center and schools, Primary School in Beli potok, Student rest area "Radojka Lakić". Bicycle riders, Children, Students, Walkers, Hikers, Drivers of quads, Scouts, Tourists.
Legal basis	Decision of the City Administration

• Notes	
 Notes 	

•	Area and map	Road signs
	Condition / problems	There are numerous signposts on Avala that show the
	Condition / problems	direction of movement to interesting parts of the forest,
		but it is necessary to replace some of them due to
		dilapidation, as well as add new ones that direct visitors
		to new contents.
	Target state	Setting up new signposts will allow users to learn new
	Target state	information about newly selected habitats and facilities.
	Durnaca	New signposts enable better information of users as well
	Purpose	as the shortest way to new contents.
•	Priority	Very.
•	Most important ES	Recreation and tourism
•	Possible activities	Landscaping around signposts and the purpose of their
		visibility
•	Unwanted or prohibited activities	
•	Silviculture measures	Sanitary cutting
•	Measures for wood production	
•	Infrastructure measures	
•	Additional plan/sketch, if needed	Markings on the map – from G1 to G30
•	Costs	It is planned to install 30 signs. The unit price is 350 Euros,
		and the total is 10500 Euros.
•	Financiers	Project URBforDAN funds: Management and Utilization of
		Urban Forest as Natural Heritage in Danube cities
•	Coordinators	Secretariat for Environmental Protection of the City of
		Belgrade
•	Stakeholders	Research institution
		Public company "Srbijašume",
		Mountaineering Society,
		Bicycle association of Serbia,
		Hotel "Avala",
		Serbian car and carting association, Educational centers
		and schools,
		Primary School in Beli potok,
		Student rest area "Radojka Lakić".
		Bicycle riders,
		Children,
		Students,
		Walkers,
		Hikers,
		Drivers of quads,
		Scouts, Tourists.
_	Logal basis	
•	Legal basis	Decision of the City Administration
•	Notes	

Area and map	Seating sets
Condition / problems	The current number of existing table with two benches will not be able to satisfy the increased number of visitors it is aiming for.
Target state	Increasing the number of canopies will be in line with the expected increase in users.
• Purpose	Increasing the capacity for a quiet holiday will allow you to spend a comfortable time in the forest.
 Priority 	Very.
Most important ES	Recreation and tourism
Possible activities	Arranging the space around the set
Unwanted or prohibited activities	
Silviculture measures	Sanitary cutting
Measures for wood production	
Infrastructure measures	
Additional plan/sketch, if needed	Markings on the map - from E1 to E30
• Costs	It is planned to install 30 seating sets. The unit price is 280 Euros, and the total is 8400 Euros.
Financiers	Project URBforDAN funds: Management and Utilization of Urban Forest as Natural Heritage in Danube cities
Coordinators	Secretariat for Environmental Protection of the City of Belgrade
• Stakeholders	Research institution Public company "Srbijašume", Mountaineering Society, Bicycle association of Serbia, Hotel "Avala", Serbian car and carting association, Educational centers and schools, Primary School in Beli potok, Student rest area "Radojka Lakić". Bicycle riders, Children, Students, Walkers, Hikers, Drivers of quads, Scouts, Tourists.
Legal basis	Decision of the City Administration
• Notes	It is necessary to organize adequate (periodic) cleaning of the space from waste

Area and map	Info desk
 Condition / problems 	Currently, the only information on Avala about where the
	interesting contents are, the visitor received on the basis

	of information boards and signposts. In essence, it is a
	modest source of information.
Target state	To provide visitors with a modern way of informing and to
	promote Avala on the Internet.
Purpose	In this way, it will be possible for visitors to follow the
·	events on Avala as well as to give their suggestions,
	critiques.
 Priority 	Very.
Most important ES	Recreation and tourism
Possible activities	
Unwanted or prohibited activities	
Silviculture measures	
Measures for wood production	
Infrastructure measures	
Additional plan/sketch, if needed	Markings on the map C1, C2
• Costs	It is planned to set up 2 info desks. The unit price is 9600
	Euros and the total price is 19200 Euros.
 Financiers 	Project URBforDAN funds: Management and Utilization of
	Urban Forest as Natural Heritage in Danube cities
 Coordinators 	Secretariat for Environmental Protection of the City of
	Belgrade
 Stakeholders 	Research institution
	Public company "Srbijašume",
	Mountaineering Society,
	Bicycle association of Serbia,
	Hotel "Avala",
	Serbian car and carting association, Educational centers
	and schools, Primary School in Beli potok,
	Student rest area "Radojka Lakić".
	Bicycle riders,
	Children,
	Students,
	Walkers,
	Hikers,
	Drivers of quads,
	Scouts,
	Tourists.
Legal basis	Decision of the City Administration
• Notes	

Area and map	Suva česma
Condition / problems	The existing fountain has great potential in terms of improving the offer for a peaceful holiday for users who visit Avala.
Target state	Allow users to have drinking water after a walk through the woods as an opportunity to take a break.
• Purpose	Allow users to have drinking water after a walk through the woods as an opportunity to take a break.

• Priority	Very.
 Most important ES 	Water regulation and water purification
 Possible activities 	Preservation of forests in the basin of the stream that
	provides water at the fountain
 Unwanted or prohibited activities 	Prohibition of all activities in the basin that may cause
	water pollution (form a spring protection zone)
 Silviculture measures 	Sanitary cutting
 Measures for wood production 	
 Infrastructure measures 	
 Additional plan/sketch, if needed 	Marking on the map - J
 Costs 	Arrangement of Suva česma amounts to 11000 Euros.
 Financiers 	Budget of the City of Belgrade
	Budget of the Municipality of Voždovac
 Coordinators 	Secretariat for Environmental Protection of the City of
	Belgrade
 Stakeholders 	Research institution
	Public company "Srbijašume",
	Mountaineering Society,
	Bicycle association of Serbia,
	Hotel "Avala",
	Serbian car and carting association, Educational centers
	and schools,
	Primary School in Beli potok,
	Student rest area "Radojka Lakić".
	Bicycle riders,
	Children,
	Students,
	Walkers,
	Hikers,
	Drivers of quads,
	Scouts,
	Tourists.
Legal basis	Decision of the City Administration
 Notes 	It is necessary to ensure a constant flow of water at the
	tap

 Area and map 	Fountain at the entrance to Avala
Condition / problems	A historical monument erected in memory of the victims who gave their lives in the fight against fascism. Their names are listed on the fountain and they all lived in the villages around Avala. The current situation is that the fountain has no water and that it is not clearly marked what it represents.
Target state	Marking the significance of the memorial fountain, as well as putting the fountain into function, would additionally revive the place at the entrance to Avala, which has already been organized as a place for peaceful rest.
• Purpose	In this way, the tourist offer would increase and the existing capacity for a peaceful vacation would be activated.

Priority	Medium. Must do it in the next 4 years
Most important ES	Water regulation and water purification
	Recreation and tourism
 Possible activities 	Preservation of forests in the basin of the stream that provides
	water at the fountain
 Unwanted or prohibited activities 	Prohibition of all activities in the basin that may cause water
	pollution (form a spring protection zone)
 Silviculture measures 	Sanitary cutting
 Measures for wood production 	
Infrastructure measures	
Additional plan/sketch, if needed	Marking on the map – A
• Costs	The estimated cost of putting into operation the Fountain at
	the entrance to Avala is 9000 Euros.
Financiers	Budget of the City of Belgrade
	Budget of the Municipality of Voždovac
Coordinators	Secretariat for Environmental Protection of the City of
	Belgrade
Stakeholders	Public company "Srbijašume",
	Mountaineering Society,
	Bicycle association of Serbia,
	Serbian car and carting association,
	Educational centers and schools,
	Primary School in Beli potok,
	Student rest area "Radojka Lakić".
	Bicycle riders,
	Children,
	Students,
	Walkers,
	Hikers,
	Drivers of quads,
	Scouts,
	Tourists.
Legal basis	Decision of the City Administration
• Notes	Ensure water stability at the tap

Area and map	Model of Žrnovo
Condition / problems	No trace of a medieval Turkish fortress.
Target state	To present to the public that part of the history of Avala.
• Purpose	By placing a wooden model of a medieval fortress, the tourist offer will increase and attract a larger number of visitors.
• Priority	Medium. Must do it in the next 4 years
Most important ES	Inspirational values, education, cultural heritage, tourism
 Possible activities 	
 Unwanted or prohibited activities 	
Silviculture measures	
 Measures for wood production 	
 Infrastructure measures 	

Additional plan/sketch, if needed	Marking on the map - F
• Costs	The cost of making the model is 5000 Euros.
Financiers	Budget of the City of Belgrade
	Budget of the Municipality of Voždovac
 Coordinators 	Secretariat for Environmental Protection of the City of
	Belgrade
 Stakeholders 	Research institution
	Public company "Srbijašume",
	Mountaineering Society,
	Bicycle association of Serbia,
	Hotel "Avala",
	Serbian car and carting association,
	Educational centers and schools,
	Primary School in Beli potok,
	Student rest area "Radojka Lakić".
	Bicycle riders,
	Children,
	Students,
	Walkers,
	Hikers,
	Drivers of quads,
	Scouts,
	Tourists.
Legal basis	Decision of the City Administration
 Notes 	Make the model on the basis of archival material preserved in
	the Archives of the City of Belgrade.

Area and map	Fountain on the Čarapića brest
Condition / problems	The existing fountain on Čarapićev brest is located near
	sports fields and areas for peaceful rest, but it is not in
	function.
 Target state 	Due to the large number of visitors to this part of Avala, it
	is necessary to reconstruct the existing fountain because
	it benefits all visitors to Čarapićev brest.
 Purpose 	The availability of a public fountain with drinking water is
	of great importance for a comfortable stay in nature
	because you are not forced to use the restaurant services
	or to carry water on a trip.
 Priority 	Very, must do it in the next 2 years
Most important ES	Water regulation and water purification
	Recreation and tourism
Possible activities	Preservation of forests in the basin of the stream that
	provides water at the fountain
 Unwanted or prohibited activities 	Prohibition of all activities in the basin that may cause
	water pollution (form a spring protection zone)

 Silviculture measures 	Sanitary cutting
 Measures for wood production 	
 Infrastructure measures 	
 Additional plan/sketch, if needed 	Marking on the map - B
• Costs	The arrangement of the fountain on Čarapića brest costs 9000 Euros.
Financiers	Budget of the City of Belgrade
	Budget of the Municipality of Voždovac
 Coordinators 	Secretariat for Environmental Protection of the City of Belgrade
 Stakeholders 	Public company "Srbijašume",
	Mountaineering Society,
	Bicycle association of Serbia,
	Serbian car and carting association,
	Bicycle riders,
	Children,
	Students,
	Walkers,
	Hikers,
	Drivers of quads,
	Scouts,
	Tourists.
 Legal basis 	Decision of the City Administration
 Notes 	Ensure water stability at the tap

Area and map	The botanical garden
Condition / problems	The botanical garden will have an educational and research scientific character and will be formed on the criteria and principles of a multifunctional creation.
Target state	In the preserved fragments of vegetation, it is planned to fill with the corresponding autochthonous deciduous trees or conifers in the places where sanitary felling or removal of undesirable species will be performed. When performing the procedure, the aesthetic-spatial component will be taken into account.
• Purpose	The purpose of the Botanical Garden is to exhibit species of trees, shrubs and ground flora from the area, which will serve pupils, students, mountaineers, tourists and other visitors, to get acquainted with the flora, as well as to study the biological and phenological characteristics of individual species, collection, distribution and exchange of seeds and other plant material.
• Priority	Very, must do it in the next 2 years
Most important ES	Conservation of genetic resources, recreation and tourism, research, education,
 Possible activities 	
 Unwanted or prohibited activities 	Prohibition of all activities defined by law in protected

	natural assets
 Silviculture measures 	Sanitary cutting
Measures for wood production	
Infrastructure measures	Surface fencing, construction of paths, facilities for the
	needs of the functioning of the Botanical Garden
 Additional plan/sketch, if needed 	Number on the map - 8
• Costs	100000 Euros
Financiers	Budget of the Republic of Serbia
	Budget of the City of Belgrade
	Budget of the Municipality of Voždovac
Coordinators	Secretariat for Environmental Protection of the City of
	Belgrade
 Stakeholders 	Research institution
	Public company "Srbijašume",
	Mountaineering Society,
	Bicycle association of Serbia,
	Educational centers and schools,
	Primary School in Beli potok,
	Bicycle riders,
	Children,
	Students,
	Walkers,
	Hikers,
	Drivers of quads,
	Scouts,
	Tourists.
 Legal basis 	Decision of the City Administration
 Notes 	

Area and map	Nursery garden (within the Botanical Garden)
Condition / problems	Part of the existing nursery garden needs to be converted into a nursery garden whose dominant role will be to meet the needs of afforestation and replenishment of species in the Avala Area
Target state	It is necessary to start with the purposeful production of seedlings of known provenance for a known habitat.
• Purpose	Production of seedlings for the needs of raising the Botanical Garden, as well as filling with species in the Arboretum of forest species
Priority	Very, must do it in the next 2 years
Most important ES	Genetic resources, primary production
Possible activities	
Unwanted or prohibited activities	Prohibition of the use of dangerous preparations in the protection of seedlings
Silviculture measures	
Measures for wood production	
Infrastructure measures	
 Additional plan/sketch, if needed 	Number on the map – 8a
• Costs	20000 Euros
 Financiers 	Budget of the Republic of Serbia

	Budget of the City of Belgrade
	Budget of the Municipality of Voždovac
 Coordinators 	Secretariat for Environmental Protection of the City of
	Belgrade
 Stakeholders 	Research institution
	Public company "Srbijašume",
Legal basis	Decision of the City Administration
• Notes	It is necessary to ensure the production of appropriate species for the needs of raising the Botanical Garden of known provenance, which will aim to monitor the adaptive capabilities of the species to climate change

Area and map	Arboretum of forest tree species
Condition / problems	Due to the cessation of funding in 1967, the Central Arboretum of the Forestry Institute "Šuplja stena" fell into oblivion. These areas continued to be managed as with other artificially raised stands, not realizing the invaluable importance it has for science and profession, because it is the only facility of this kind and this area in the Balkans.
Target state	The importance of the Arboretum is multiplied by climate change because it provides important information about the adaptability of a large number of indigenous and non-indigenous species to new conditions.
• Purpose	In many countries Arboretums have been raised to the level of a national treasure. Potential opportunities provided by the reconstruction of the Central Arboretum, not only in the application of adaptive measures of forest ecosystems but also in the development of the tourist potential of Belgrade.
Priority	Very, must do it in the next 2 years
Most important ES	Genetic resources, recreation and tourism, education, research
Possible activities	Filling with species on empty plots
Unwanted or prohibited activities	Prohibition of all activities defined by law in protected natural assets
Silviculture measures	Sanitary cutting
Measures for wood production	
Infrastructure measures	Surface fencing, construction of paths, setting up information boards on species
 Additional plan/sketch, if needed 	Number on the map - 9
• Costs	30000 Euros
• Financiers	Budget of the Republic of Serbia Budget of the City of Belgrade Budget of the Municipality of Voždovac
Coordinators	Secretariat for Environmental Protection of the City of Belgrade

Stakeholders	Research institution
	Public company "Srbijašume",
	Mountaineering Society,
	Bicycle association of Serbia,
	Hotel "Avala",
	Serbian car and carting association,
	Educational centers and schools,
	Primary School in Beli potok,
	Bicycle riders,
	Children,
	Students,
	Walkers,
	Hikers,
	Drivers of quads,
	Scouts,
	Tourists.
Legal basis	Decision of the City Administration
• Notes	

Area and map	The educational-development center "Šuplja stena"				
Condition / problems	Currently, there is an accommodation facility on Šuplja				
	stena that is used for rest and recreation of students who				
	attend primary school				
 Target state 	Expanding the existing mixing capacities and the number of				
	classrooms would enable the stay of students of forestry,				
	landscape architecture, biology who are committed to				
	environmental protection and environmental awareness				
	raising				
 Purpose 	The planned activities would enable the idea of sustainable				
	development and protection of the environment to be				
	implemented by well-educated experts				
Priority	Medium, must do it in the next 4 years.				
Most important ES	Education, research, recreation and tourism				
 Possible activities 					
 Unwanted or prohibited activities 	Prohibition of all activities defined by law in protected				
	natural assets				
 Silviculture measures 					
 Measures for wood production 					
 Infrastructure measures 					
Additional plan/sketch, if needed	Number on the map – 4i and 4a				
Costs	50000 Euros				
Financiers	Budget of the City of Belgrade				
	Budget of the Municipality of Voždovac				

 Coordinators 	Secretariat for Environmental Protection of the City of
	Belgrade
 Stakeholders 	Research institution
	Public company "Srbijašume",
	Mountaineering Society,
	Bicycle association of Serbia,
	Hotel "Avala",
	Serbian car and carting association,
	Educational centers and schools,
	Primary School in Beli potok,
	Student rest area "Radojka Lakić".
	Bicycle riders,
	Children,
	Students,
	Walkers,
	Hikers,
	Drivers of quads,
	Scouts,
	Tourists.
Legal basis	Decision of the City Administration
Notes	The educational-development center "Šuplja stena" covers
	the surface of the Arboretum of forest tree species, the
	Botanical Garden, the Nursery garden and the Children's
	Resort "Šuplja stena". In this way it forms a functional whole.

Area and map	Kraljeva česma (The King's Fountain)
 Condition / problems 	The existing fountain has great potential in terms of
	improving the offer for a peaceful vacation for users who
	visit Avala (Šuplju stenu).
 Target state 	Allow users to have drinking water after a walk through
	the woods as an opportunity to take a break.
 Purpose 	Allow users to have drinking water after a walk through
	the woods as an opportunity to take a break.
 Priority 	Very.
 Most important ES 	Water regulation and water purification
Possible activities	Preservation of forests in the basin of the stream that
	provides water at the fountain
 Unwanted or prohibited activities 	Prohibition of all activities in the basin that may cause
	water pollution (form a source protection zone)
 Silviculture measures 	Sanitary cutting
 Measures for wood production 	
Infrastructure measures	
Additional plan/sketch, if needed	Mark on the map - O
• Costs	The decoration of the King's Fountain costs 11,000 Euros.
Financiers	Budget of the City of Belgrade
	Budget of the Municipality of Voždovac
Coordinators	Secretariat for Environmental Protection of the City of
	Belgrade

Stakeholders	Public company "Srbijašume",				
	Mountaineering Society,				
	Bicycle association of Serbia,				
	Educational centers and schools,				
	Primary School in Beli potok,				
	Student rest area "Radojka Lakić".				
	Bicycle riders,				
	Children,				
	Students,				
	Walkers,				
	Hikers,				
	Scouts,				
	Tourists.				
Legal basis	Decision of the City Administration				
 Notes 	Ensure water stability at the tap				

5. GOVERNANCE	
5.1 Implementa tion/ responsibility	
A list of main managers/coordinat ors of activities and their responsibilities	 City of Belgrade - Secretariat for Environmental Protection of the City of Belgrade Municipality of Voždovac PE Srbijašume Private owners Hunting associations Water management organization Ministry of Defense
Subsidy system	 Financial compensation Public investments into forest infrastructure Higher standards of maintaining forest infrastructure Organization and implementation of silviculture and protection works Facilitating the implementation of works in all forests by forest owners who express their interest

5.2 Forest owner association

The current lack of available capacity is a consequence of the lack of regular planning for private forest management, limited understanding of private forest owners regarding the opportunities offered by sustainable forest resource management, insufficient organization into associations intended for stronger representation of their interests towards third parties. In addition, the formal organization of forest owners would take into account highly developed and efficient forest management, which in turn would generate higher revenues, improve access to international financing and improve environmental protection in specific municipalities. Economic efficiency is of particular importance in rural areas where agriculture, due to unfavorable natural conditions, generates limited income.

The aim is to facilitate the development of private sector capacity for sustainable forest management in the Djerdap National Park, through the transfer of specific expertise related to forest planning, as well as through the development of simple and economical planning procedures, which encourage sustainable management of privately owned forest resources, which contributes to improving the development of rural areas, the forestry sector, environmental protection and the national economy.

The following needs to be done:

- Assist during the process of establishing an association of private forest owners
- Assist in the development of an accessible methodology for the planning of sustainable forest management of owners, through training, technical (professional) assistance and the development of a pilot plan for the management of privately owned forests
- Assist in the establishment of the Office for advising private forest owners, within the Forestry Institute in Belgrade.

The aim is to encourage the formation of associations of private forest owners in order to improve the supervision of private forests, as well as to better define the legitimate rights of forest owners. In addition, associations could assist owners in a range of complex and often interrelated challenges and tasks, such as: poor forest resources, timber theft, poaching (illegal hunting on other people's land), high costs of forest management and small-scale planning, the emergence of insects and diseases, fast-changing timber markets, applying for forest management initiatives, etc. Improved forest management usually results in a significant improvement of life in local communities (increased income from forestry, greater diversity of forest products from forests that are managed in a sustainable way, job creation, tourism, etc.). In the long run, the results can contribute to more efficiently addressing a number of serious and environmental and social challenges: afforestation of extreme locations, prevention of soil erosion, improvement of areas under degraded forests, as well as the employment of people at risk of transition.

Development of a methodology for sustainable planning related to owner forests

The methodology was developed in consultation with interested private forest owners in other areas, but their application can provide support

and engagement during the implementation of the plan. The end users are:

- Forest owners
- Municipality of Voždovac that will benefit from improved standards for forest management, as well as from increased revenues from forestry.
- Indirectly, all private forest owners in Serbia will benefit from the transfer of know-how (scientific and technical knowledge) related to planning, as well as the procedure for establishing an association of private forest owners.
- Population of Serbia, in general, through improved forest condition (timber / other forest products with higher added value), as well as environmental conditions (an improved standard of forest management, which ensures the sustainable development of forest resources, is the best precondition for the creation of balanced forest ecosystems, which are able to fulfill numerous functions, including water conservation, soil erosion control as well as biodiversity conservation).

Establish a center for sustainable development

The Center for Sustainable Development in its activities should have the following priorities: ecology, tourism, educational and cultural activities.

Activities in the field of ecology include protection and preservation of biodiversity of forests and forest ecosystems, with sustainable use of natural resources of the area.

The field of tourism is focused on the development of rural and mountaineering tourism.

In the field of education, they are aimed at the rural population through the organization of forums, seminars and lectures on sustainable use of resources.

6. MONITORING A. Establishment of monitoring of changes in forests and forest 6.1 Indicators of ecosystems: monitoring and 1. Measurement of microclimatic characteristics in the forest ecosystem control via a moving meteorological station (establishment period 2019) (recording period of 30 minutes) 2. Measurement of adaptive abilities of forest tree species via dendrometers in order to establish the dependence of thickness increment with microclimatic characteristics (establishment period 2020) (recording period of 30 minutes) 3. Establishment of monitoring of arthropod diversity in different ecological units in the canopy zone, on the surface and at different soil depths. (establishment period 2020) (trap collection period 7 days) 4. Establishment of bark beetle monitoring (establishment period 2020) (trap collection period 7 days) 5. Monitoring the monitoring of the dynamics of the spread of invasive tree species on clearings (clearings) and in forest ecosystems (establishment period 2019) (drone shooting period at the beginning of the vegetation period, and every 30 days). 6. Monitoring of soil moisture in the area of Avala and Šuplja stena (establishment period 2019) (recording period every 30 days). Monitoring the implementation of the Operational Plan B. Improving forest production potential Area of forests in which thinnings have been carried out, as forest care measures, Area of restored forests with accompanying care measures, Area of raised new forests, Area of performed measures of care of newly erected forest plantations (culture),

Area of implemented care measures in high even-aged forests, Area of implemented restoration measures in even-aged forests,

Area of implemented measures of thinning of coppice forests in

Area of reconstructions of devastated high forests,

the function of indirect conversion into high forests,

- conversion,
- Area of devastated coppice forests in which direct conversion into forests of higher cultivation form was performed,
- C. Use of wood volume yield
 - Achieved annual quantitative level of use of planned wood volume.
 - Achieved qualitative structure of used wood volume.
- D. Gene pool and production of forest seeds and planting material7
 - Area of registered seed stands,
 - Plantation area for the production of selected forest seeds,
 - Quantity of collected and processed forest seeds,
 - Quantity of forest seedlings produced,
 - Quantity of realized forest seedlings.
- E. Maintenance of forest roads and trails
 - Length of forest roads with performed works on regular maintenance,
- F. Conservation of biodiversity of forest ecosystems and its monitoring
 - Development and implementation of a project to establish Natura 2000 and EMERALD networks,
 - Monitoring of biodiversity in forest ecosystems.
- G. Protection and sustainable management of protected natural resources
 - Development and implementation of the ADL protection and improvement program,
- H. Research and education in forestry
 - Number of adopted and accepted proposals for scientific research programs and projects (fundamental research),
 - Number of completed scientific research programs and projects (fundamental research),
 - Number of adopted and accepted development programs and projects,
 - Number of completed development programs and projects,
 - Number of implemented development programs and projects,
 - Number of seminars held.

6.2 Revision of the plan

The plan is to be revised every 10 years.

7. COSTS AND FINANCING

STRATEGIC AREA ŠUPLJA STENA	Number on map	Pieces	Unit price	Total price	Implementation period
Teaching	1				
location -					
Faculty of		1	50000	50000	2020-2022
Mining and					
Geology					
Water tank	2	1	-	-	-
Walkways	3 i 3/1	2	70000	140000	2020-2030
Educational-	4 i 4a				
development					
center		1	50000	50000	2020-2030
"Šuplja					
stena"					
Waiting	5				
point in		1	5000	5000	2020.
Šuplja stena					
Gazebo	6	3	1800	5400	2020.
Botanical	8	1	100000	100000	2020-2030
Garden					
Nursery	8a				
garden					
(within the		1	20000	20000	2020-2030
Botanical					
Garden)					
Arboretum	9				
of forest tree		1	30000	30000	2020-2025
species					

STRATEGIC	Number	Pieces	Unit	Total	Implementation
AREA AVALA	on map		price	price	period
Canopies	D1-D10	10	1500	15000	2020.
Signboards	G1-G30	30	350	10500	2020.
Seating sets	E1-E30	30	280	8400	2020.
Info desk	C1, C2	2	9600	19200	2020.
Suva česma	J	1	11000	11000	2020.
Fountain at	Α				
the entrance		1	9000	9000	-
to Avala					
Wood model	F	1	5000	5000	2021.
of Žrnovo		_	3000	3000	2021.
Fountain at	В				
the Čarapića		1	9000	9000	2021.
brest					
Kraljevska	0	1	11000	11000	2020

česma (The					
King's					
Fountain)					
Tower of	- 1				
Avala		-	-	_	-
Church	Н	-	-	-	-

During the development of operational plans (Basis of forest management and Owners' Forest Management Program), revenues and expenditures and provision of missing funds for the execution of planned activities are explained in detail.

The Law on Forests, in Article 4, defines that the general interest includes activities of preservation, protection and improvement of forests, use of all potentials of forests and their functions, as well as through the construction of new forests in order to achieve optimal forest cover, spatial distribution and structure of the forest fund in the Republic of Serbia.

These activities of general interest in forests are financed from:

- 1) funds for forest regeneration-reproduction;
- 2) budget of the Republic of Serbia, ie the autonomous province; Funds for restoration reproduction of forests are allocated by the user, ie the forest owner who manages the forests in accordance with the basis and can be used as a priority for forest maintenance and development of forest management plans, and unspent funds in the current year must be used as participation in the financing of measures determined by the development programs from Article 19 of the Law on Forests, ie the annual program of use of funds in the following year.

In the budget of the Republic of Serbia, funds are provided for the implementation of priority measures from the development program from Article 19 of the Law on Forests, for:

- 1) raising the degree of forest thickness by afforestation;
- 2) improving the condition of coniferous forest plantations;
- 3) conversion of coppice forests into a higher cultivation form;
- 4) production of forest reproductive material.

These funds are used in accordance with the medium-term and annual program adopted by the Government:

In order to achieve the general interest and long-term goals based on the principles of sustainable forest management determined by the Development Program and owner's forest management plans, a Budget Fund is established. The funds of the Budget Fund are provided from:

- 1) acts of compensation for the use of forests and forest land;
- 2) fees for protection, use and improvement of public forest functions;
 - 3) budget of the Republic of Serbia;
- 4) funds intended for rural development, environmental protection, water protection, regional development and other funds;
 - 5) other sources in accordance with the law.

Sources of financing of the Budget Fund are other revenues, such as:

- 1) monetary penalties;
- 2) confiscated property gain;

- 3) funds generated by changing the purpose of the forest;
- 4) funds generated by the alienation of forests and state-owned forest land:
 - 5) funds received from the donation.

Funds generated from the fee for the use of forests and forest land in the amount of 70% are the revenue of the budget of the Republic of Serbia, and in the amount of 30% are the revenue of the budget of the local self-government unit.

The Law on Forests stipulates that the funds from the budget funds be used for the implementation of measures determined by the development programs (above all, the Development Program, and then the plans for the development of forest areas), as well as the annual program for the use of funds. Out of the total realized funds of budget funds, funds are reserved as a priority for the development of development plans and programs, as well as for the financing of forest protection measures from causing consequences of wider dimensions (from fires, insect overgrowth and the like), envisaged by the mediumterm plan for fire protection, ie the medium-term plan for the protection of forests from plant diseases and pests. Funds from the budget of the local self-government unit (part of the funds obtained from the fee for the use of forests and forest land in the amount of 30%) are used for the establishment of new forests. Of course, unspent funds from budget funds during the current year are transferred for the same purposes in the following year.

Budget funds for nature and environmental protection, rural development, research projects, etc. will be used to finance the activities envisaged by this plan.