

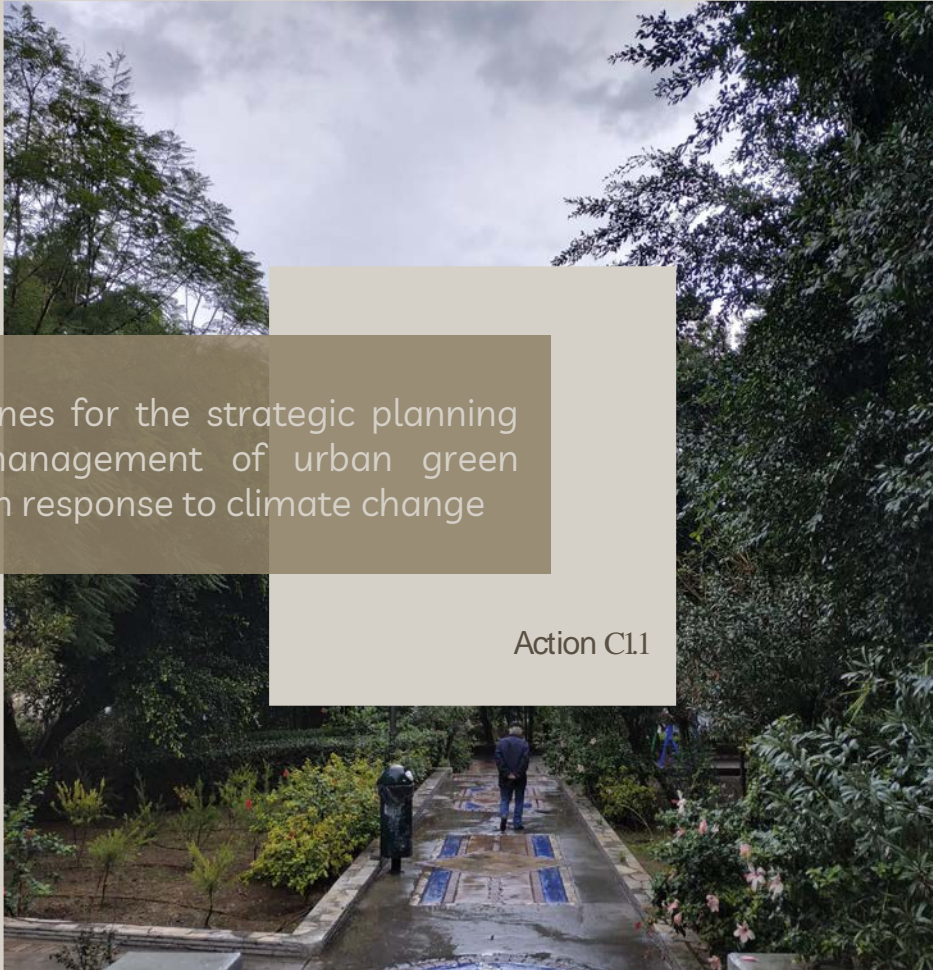
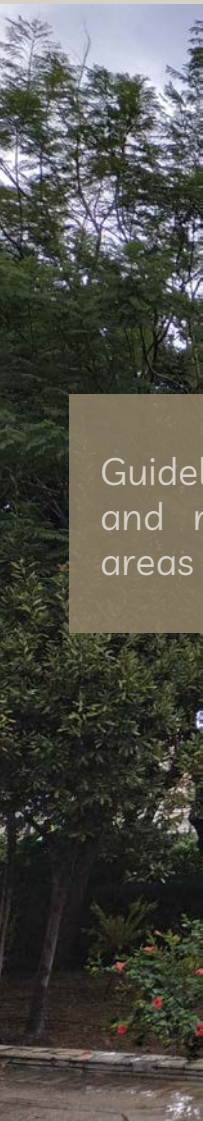


LIFE GrIn



Promoting urban integration of GReen INfrastructure to improve climate governance in cities

LIFE17GIC_GR_000029



Guidelines for the strategic planning and management of urban green areas in response to climate change

Action C1.1



The project "Promoting urban integration of GReen Infrastructure to improve climate governance in cities" (LIFE17GIC GR000029) is co-funded by the European Union in the context of Programme LIFE, with the contribution of the Green Fund

The project **LIFE GrIn: Promoting urban integration of Green Infrastructure to improve climate governance in cities** (LIFE17GIC/GR/000029) is included in the programme LIFE, the EU's funding instrument for the environment and climate action, and specifically in the category of Environmental Governance and Information actions. This category supports projects related to awareness raising, environmental training and capacity building, compliance and institutionalization of new legislative frameworks, knowledge development and citizen participation.

The main objective of the LIFE GrIn project is **to incorporate climate governance in the management of green infrastructure** at local level through the establishment of an integrated policy framework focusing on Urban Green Areas (UGAs).

The project promotes urban integration, which is translated into thinking of urban green spaces not as isolated units, but as vital elements of the urban landscape, with their own specific set of functions and contribution to climate change mitigation and adaptation. This approach capitalizes on UGAs as valuable resources for the adaptation of cities to climate change and the mitigation of its impacts through the principles of Urban Forestry. The more general view includes the adoption of the EU policies and tools, with the aim of improving the quality and connection of green spaces, with a view to creating more resilient cities to climate change.

Goals

1. Establish an integrated policy framework for the management, monitoring and evaluation of UGAs based on cooperative planning and best practices in urban forestry
2. Integrate and promote the EU policies in relation to climate change in local governance, as well as sustainable urban planning and design
3. Quantify and multiply the impact of UGAs on climate problems in cities
4. Promote the incorporation of sustainable urban forest management for climate change in the Covenant of Mayors
5. Improve citizens' quality of life through the mitigation of the effects of climate change and the multifunctional planning of UGAs
6. Raise awareness amongst decision-makers regarding the necessity and benefits of taking action on climate change adaptation/ mitigation at municipal level
7. Raise public awareness and promote active participation of stakeholders
8. Conserve nature and biodiversity and improve habitats for species in cities

Beneficiary Partners

Coordinating beneficiary is the Institute of Mediterranean Forest Ecosystems and Forest Products Technology (IMFE), one of the oldest research institutes in Greece that falls under the Hellenic Agricultural Organization "DEMETER". Associated beneficiaries are HOMEOTECH Co. a private company that elaborates environmental studies and projects, the Ministry of Environment and Energy, the Central Union of Municipalities of Greece and the Municipalities of Amara and Heraklion.

Budget

Total: 1,763,885 Euro
EU Contribution: 1,015,505 Euro (= 58.34%)

EU Policies



The European Commission adopted its **new EU strategy** on adaptation to climate change on February 24, 2021. The new strategy sets out how the European Union can adapt to the unavoidable impacts of climate change and become climate resilient by 2050.

The Strategy has four principal objectives: to make adaptation **smarter, swifter and more systemic**, and to step up **international action** on adaptation to climate change. Aiming to engage and support cities and towns to commit to reaching the EU climate mitigation and adaptation

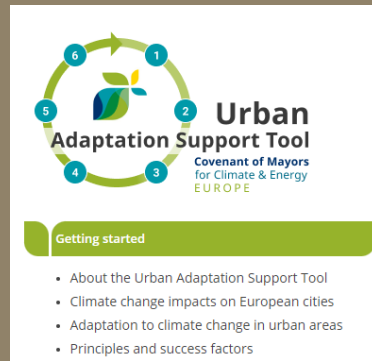


targets the European Commission set up **the Covenant of Mayors Initiative**, as one of the actions of the EU Adaptation Strategy.

The Covenant of Mayors was launched in 2008 in Europe with the ambition to gather local governments voluntarily committed to achieving and exceeding the EU climate and energy targets. In 2016, the Covenant of Mayors joined forces with the Compact of Mayors, resulting Global Covenant of Mayors for Climate and Energy, the world's largest movement for local climate and energy actions, which brings together more than 10,000 local and regional authorities in 57 countries. Signatory cities pledge action to support implementation of the EU **40% greenhouse gas-reduction target by 2030** and the adoption of a joint approach to tackling mitigation and adaptation to climate change.



To support adaptation action in European cities the European Commission launched the **Urban Adaptation Support Tool**. It provides practical guidance and knowledge to signatories as well as to any other interested stakeholders in Europe and beyond and supports urban adaptation with a quick-start step-by-step guidance through the adaptation planning and implementation cycles. It also facilitates easy access to in-depth, expert information and data by providing a comprehensive up-to-date database of literature and information sources for each step of the urban adaptation cycle.



- 1 Preparing the ground for adaptation
- 2 Assessing climate change risks and vulnerabilities
- 3 Identifying adaptation options
- 4 Assessing and selecting adaptation options
- 5 Implementing adaptation
- 6 Monitoring and evaluating adaptation

The Urban Adaptation Support Tool guides decision-makers and practitioners through the main steps of the adaptation process. The tool is based on the **adaptation policy cycle**, which highlights that climate change adaptation is an iterative process. The UAST is divided into six steps, is regularly updated and for each step provides links to carefully selected resources. To incorporate Strategic Management Plans for UGAs in the adaptation planning, **LIFE GrIn propose** to follow the steps that are suggested by the UAST:

01 Preparing the Plan

02 Assessing climate change risks and vulnerabilities

03 Identification and selection of means and measures

04 Assessing the selected means and measures

05 Implementation of the proposed Strategy

06 Monitoring and Evaluation of the management



In 2016, the Greek National Strategy for Adaptation to Climate Change was prepared by the Directorate of Climate Change and Atmospheric Quality of the General Directorate of Environmental Policy of the Ministry of Environment and Energy. It states that:



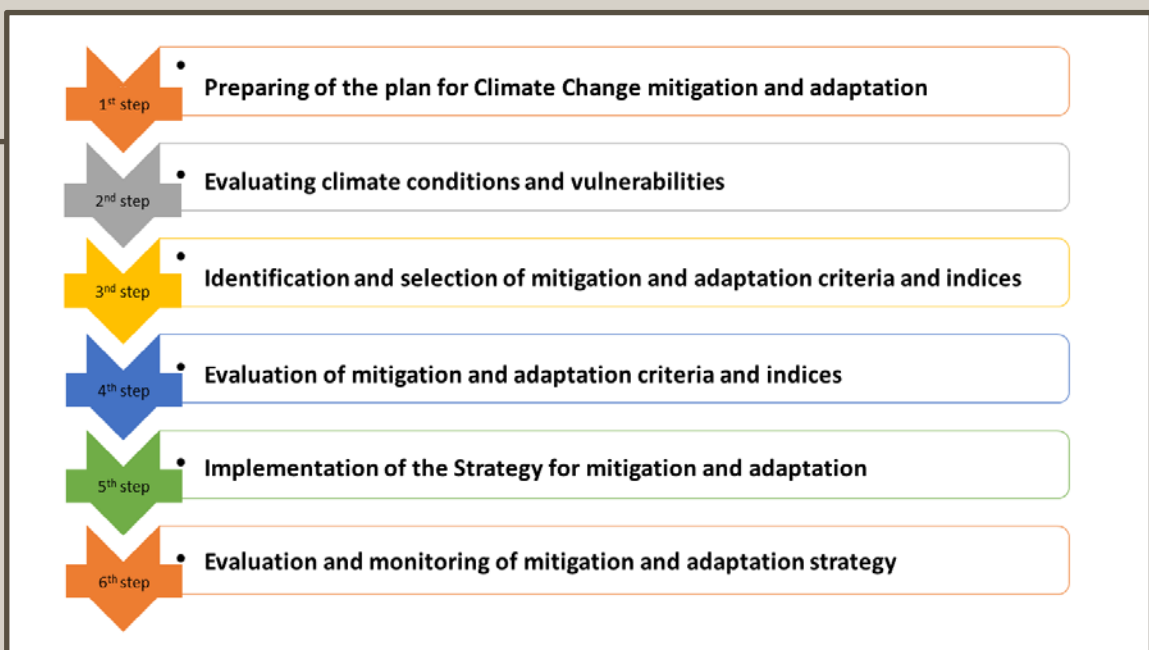
«One of the biggest problems facing modern cities is the lack of urban green areas. The occupation of urban space by cement has significant energy and environmental effects, since buildings are responsible, to a large extent, for energy consumption, but also for the emission of pollutants and gases. In Greece, buildings are responsible for **40% of total energy consumption and 45% of carbon dioxide (CO₂) emissions** into the atmosphere.

The lack of green infrastructure **affects public health** and burdens the **psychology** of city inhabitants by creating and intensifying a feeling of discomfort.

On the other hand, it is found that **urban green areas improve the microclimate** of the cities, reduce particulate matter and air pollution, strengthen and protect the insulation of the buildings and **increase their energy efficiency**, while creating a more favorable natural environment - habitat for flora and fauna species.

- Redesign of land use planning at Municipal level, in order to scale up urban green infrastructure, connect urban green areas and making it more integrated and effective
- Establishment of new Urban Green Areas in strategic city spots
- Limitation of the intensity of the competition, between constructions and vegetation (grey and green infrastructure)
- Municipalities' UGAs strategic management cannot be spatially separated at regional or national level
- Identification and tackling the adverse effects of climate change, using urban green as a tool to mitigate them and adapt cities to the new conditions
- Promotion and facilitation of communication and coordination among Departments of the Municipality, Municipality and citizens, utilities and stakeholders with environmental organizations that operate on climate change issues
- Citizens' awareness raising regarding urban green issues and the benefits derived from it. Motivating citizens' participation in the processes of the protection, management and monitoring of urban green areas

In order to draw up the strategic planning of the UGAs, it is necessary to follow the following stages, as presented in the Figure below:



The field of application is open-space areas reserved for parks and other *green spaces*, including characteristic presence of vegetation, regardless of size scale. Most urban open spaces are green spaces, but occasionally include other kinds of open areas. The landscape of urban open spaces can range from playing fields to highly maintained environments to relatively natural landscapes.

The **Ministerial Decision 10788/2004**, introduces the concept of urban green areas and specific quantitative parameters, as a minimum (**standards**) as follows

Standards of open spaces in Greek cities				
	m ² /citizen		Range of reference (m)	Size (m ²)
	Planning unit	City		
Road islands	0,25		800	100-1.000
Squares	0,50		800	1.000-5.000
Playgrounds	0,25			100-1.000
Parks		1,5	1.500	5.000-15.000
City Parks		5,5	City	>15.000
Total	8,0			

The **Ministerial Decision 133384/6587/10-12-2015** (ΦΕΚ Β 2828), defines as follow:

Park	They are public spaces within city residential areas that are characterized as Parks in the urban planning, or they have established vegetation or are about to be planted and that have undergone or will undergo horticultural treatments.
Groves (Woods)	They are public spaces within city residential areas that are characterized as Groves (Woods) in the urban planning, or they have established vegetation or are about to be planted and that and have never been handled in any way.
Parks or Groves (Woods)	They are public spaces within city residential areas that are characterized as Public spaces in the urban planning and they have established vegetation or are about to be planted and that are de facto defined as Parks or Groves (Woods).
Parks or Groves (Woods)	They are public spaces within the urban area that are not included in the urban planning, they have established vegetation and they are de facto used as Parks or Groves (Woods).

In the frame of LIFE GrIn project a more detailed concept of urban green areas is suggested, given that some important areas are not included in the prime scope. The proposal is presented in the Table below:

	Classification according to the way of use	Classification according to land use	
Green spaces designed and intended for recreation are included. They refer to private and public areas which have more than one land use	Recreational Green	Open green areas of neighborhoods	Parks
			Play grounds
			Private green (Yards, towns)
			Green road islands
		Central City Functions	Squares
Green spaces that their main land use is practical connected with basic urban functions, such as social, economical, spiritual etc). They refer to private and public areas with open or limited entrance (schools, public buildings etc)	Functional Green	Sports Facilities	Stadiums, golf courts
		Tourist Facilities	Hotels, Ports
		Religion Facilities	Churches, Cemeteries
		Institutions	Educational Institutes (Schools, Universities etc)
			Elderly house, orphanages Hospitals, Clinics
Public Buildings	Public Services: Malls Offices		
Urban spaces that are on purpose unexploited and unstructured as natural sites or they are abandoned. They refer to private or public areas with open or limited entrance.	Natural Semi-natural ecosystems	Agricultural lands	Agricultural land, groves, experimental sites
		Forests	Forests
		Water - Wetlands	Lakes Rivers
		Disturbed Ground (with previous different land use)	Industrial buildings Quarries
Other	Open spaces, with Flora and Fauna		
Urban spaces that are parallels with transportation networks. Green corridors, or spaces where is planned to establish vegetation	Networks	Roads and Transportation (Cars, trains etc)	Sidewalks
			Road Islands Street trees Slopes Open spaces corridors
		Energy	Open spaces corridors
Canals	Shores - Slopes		

Lionatou (2008)

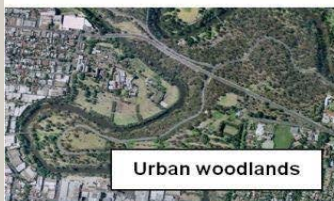


Urban agriculture



Green walls

Urban green infrastructure



Urban woodlands



Suburban street trees



City street trees



Green roofs

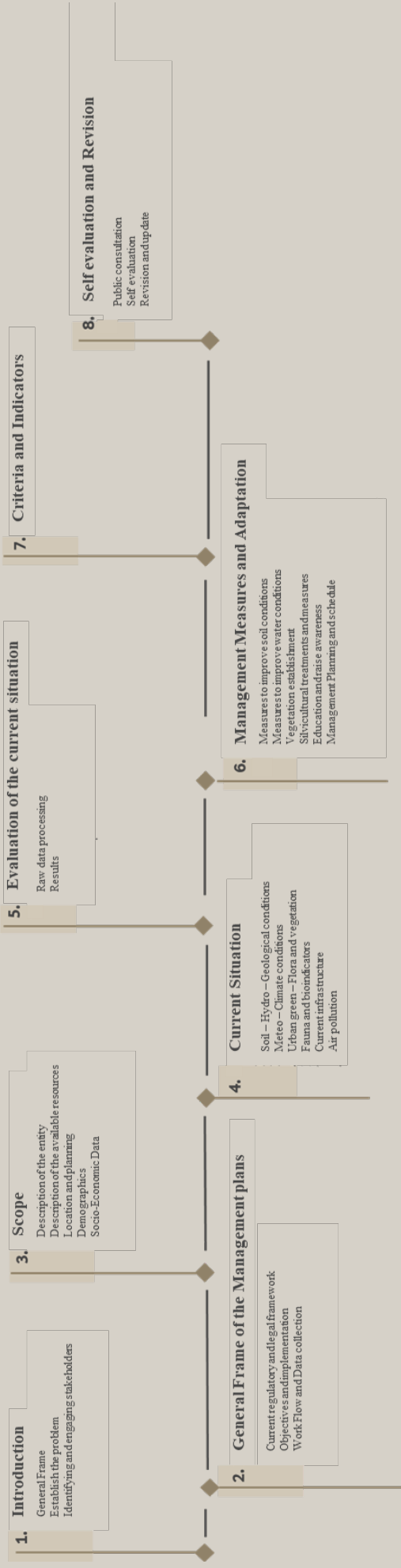


Sensitive urban design



Parks, gardens & golf courses

Content of Strategic Management Plan



Flow Chart

1. Introduction

Describes those involved in the planning and management of the Urban Green Areas, entities and stakeholders, including the degree and type of their involvement.

2. General Frame of the Management plans

The current legal and regulatory framework for urban greening is presented.

The objectives and goals, of the Management Plan are thoroughly developed.

The ultimate goals are the rational management of the Urban Green Areas, aiming to sustainability and improvement of the citizens' quality of life and the countering of the adverse effects of climate change.

The method of financing the design and implementation of the Plan is being developed.

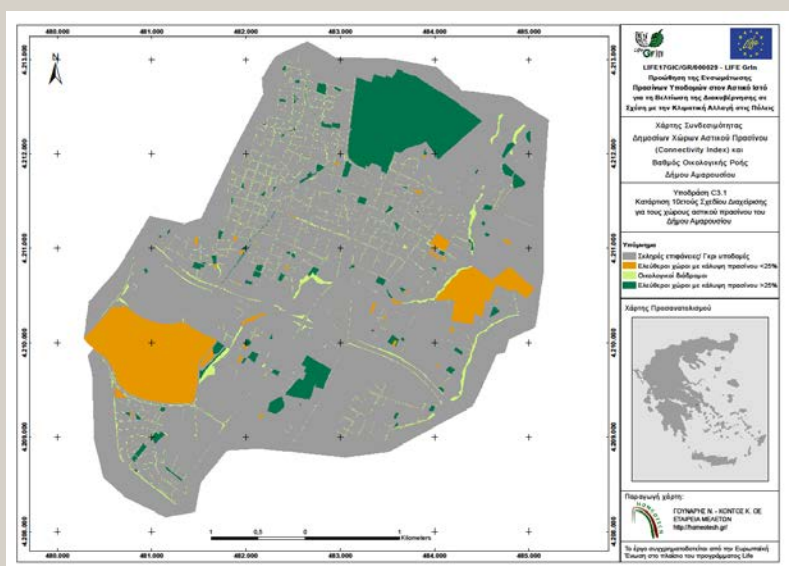
3. Scope

An approximate description of the area of the Municipality, emphasizing the Urban Ecosystem.

It contains the presentation of the human resources and the technical infrastructure of the Municipality, associating them with climate, urban green and environment issues, in order to create the ratios, which demonstrate their adequacy or not.

There is reference to the spatial urban planning status of the areas that are going to be the subjects of the management plan as well as their entire surrounding urban areas.

Special reference is given to classification and description of the urban Green Areas, according to the proposed classifications the areas of interest are mapped.



For better understanding of the correlation between the population and the existing urban green areas, there is a presentation of at least three census periods. In addition socio-economic data are collected.

4. Current Situation

Soil – Hydro – Geological conditions



O'Flaherty, R., Davies, J., Stevens, C., and Denton, J. N. – The effects of sealing on urban soil carbon and nutrients, SOIL, 7, 661–675

The physical, chemical and biological soil properties of the area are described.

During the study it needs to be taken into account that urban soils are interrupted by the structural elements of the urban environment, and their development is affected by human activities. Thus, it is difficult to study them as single or continuous systems.

In the same chapter, information is provided about the entire hydrographic network, the water table and water quality.

Meteo – Climate conditions



Meteorological data come from nearest meteorological stations.

Furthermore, data about extreme weather events are collected.

It also contains information and climate models and scenarios, that simulate the future state of the area.

Urban green – Flora and vegetation data collection

Urban vegetation, within the limits of the areas of interest, and in the surrounding area as well – especially if it shows an ecological connection, is described.

Emphasis is given in woody vegetation. Collected biometrical and silvicultural data create an urban tree inventory. In that way, structure, composition and quality of urban green is easier to be assess.

Vegetation data is used to assess biodiversity, species suitability for urban use, tree health and stability and the carbon storage estimation.



Fauna data collection

The natural presence (permanent or seasonal) of mammals, birds, amphibians, reptiles, fish and other animals that appear in the urban ecosystem of the areas of interest.

In addition, spots of presence, breeding or nesting are referred and mapped.

Bioindicators data collection



Insects are important **bioindicators** due to their sensitivity to even the mildest environmental changes.

Thus, it is proposed to investigate the insect fauna, with an emphasis on **lepidoptera**.

In addition, data about the insect fauna can provide significant information about entomological problems and **infestations**, and **invasive species**.

Current infrastructure

The chapter contains the mapping of the **restrictions** that urban vegetation faces, and it is accompanied by a description of every object, infrastructure, construction or facility that disturb the unhindered growth of urban trees

Fences	Soil protection and rainwater drainage infrastructure
Buildings and other artificial facilities	Irrigation, water supply and firefighting system
Network of roads, sidewalks and paths	Lighting

Air pollution

There is a presentation of the percentages of air pollutants and the days of their maximum values.

Emphasis is given on **greenhouse gas (GHG) emissions**.

5. Evaluation of the current situation

Processing of the raw (primary) data and the presentation of the **Results** are carried out

6. Measures of Management and Adaptation

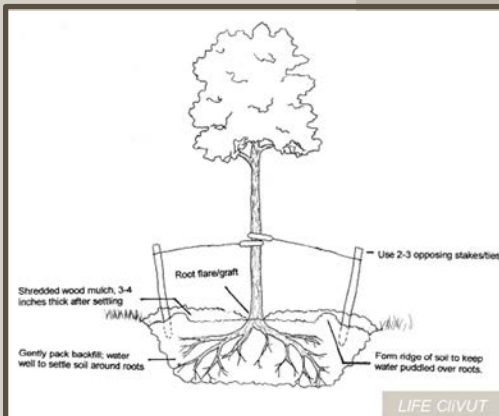
As urban green areas are an ideal natural solution, the whole method can be based on good practices for their management aiming to adapt to climate change. Such practices are available on the **CLIMATE-ADAPT** platform. The utilization of these good practices presupposes their evaluation, as each area has its unique particularities.

Measures to improve soil conditions

The areas where intervention is needed are identified, given particular attention to **soil compaction problems**. The suggested management measures and their implementation are fully described as well.

Measures to improve water conditions

The areas where intervention is needed, in order to improve the water conditions are identified. The suggested management measures and their implementation are fully described as well. Where necessary, the **establishment of an irrigation system** is planned.



Vegetation establishment

This chapter describes the vegetation establishment. Taking into account the **growth space, ecological and functionality criteria** the plants that are going to be used for the vegetation establishment are selected and proposed. Additionally, plantings are planned, setting spatial and temporal priorities.

Silvicultural treatments and measures

The suggested silvicultural treatments and maintenance works, with their implementation are fully described.

Education and awareness raising

This chapter deals with the environmental education and awareness raising activities. Thus, appropriate resources, advice and educational material are given, while actions to encourage citizens' participation, possible collaborations with educational institutions and citizen movements are planned.

Management Planning and Schedule

The validity of the Strategic Management Plan is 10 years.



7. Criteria and Indicators for Monitoring and Evaluation

In order to observe the degree of implementation of the objectives set in the plan, specific criteria and indicators are monitored at regular intervals.

Taking into account the Indicators established by the European Environment Agency, in the Strategic Management Plan, the following must be monitored as a minimum:

Urban Green Typology Indicators	Biodiversity and Alien species occurrence Indicators
Urban green Composition and Structure indicators	Landscape Analysis Indicators
Urban green Phenology Indicators	Carbon sequestration (carbon storage) Indicators
Bioclimatic Indicators - biometeorological assessment of citizens' discomfort.	Socio – Economic Indicators

8. Self-evaluation - Revisions

Consultation and results processing

The strategic Urban Green management plan should be presented to every interested part, stakeholders and involved entities, as well to the general public in order to gather and process different opinions and conceptions to update and improve it.

Self evaluation

It takes place at regular intervals, usually every 5 or 10 years, with the main one being in 10 years.

Revision and update

Revisions and updates are carried out at regular intervals but also in case of an emergency.

The need to implement regular revisions is assessed by the Municipality's technical services.

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