



E (ye) scape

Designing with memory /+ fire, a Living Memorial

Ioanna Kokkona

Author: Ioanna Kokkona | 5100062

First Mentor: Saskia de Wit
Second Mentor: Aleksandar Staničić

Delft University of Technology
Faculty of Architecture and the Built Environment
Department of Urbanism

Chair of Landscape Architecture

Msc Graduation Thesis
Graduation Studio: Flowscapes

Urban Forest Places



Acknowledgements

From the bottom of my heart, I would like to thank all those who supported me in this journey.

To my first mentor, Saskia de Wit, who always encouraged me, guided, and accompanied me along this research journey, with patience and commitment, learning and acquiring new knowledge about the Greek landscape alongside me. Thank you for your help, support, and inspiration, not only for the past couple of months but from the first day of this master's program of Landscape Architecture at TU Delft.

To my second mentor, Aleksandar Staničić, who immediately believed in me, trusted me, and constantly inspired me, urging me to look further, to explore familiar but often forgotten or neglected aspects of architecture. Thank you.

To my parents, Maria and Alexis, without whose inexhaustible help and support I would not have been able to follow my dreams.

To Tasos, who patiently listened to all my thoughts, ideas and hesitations, rejoiced in my joys, but also was there for me in all the difficult moments, even from afar.

To Natassa and Georgia, resident of Mati and survivor of the fire, thank you for your immediate help, the narration of your experiences and everything you

went through, the useful information you gave me, but foremost the feelings you conveyed to me, something that gave me even more impetus and motivation.

To the experts Mr. Seklizioti and Mr. Kinthi, who were willing to discuss specific issues of the project with me, to explain ecological and technical aspects, and listen to my own ideas and intentions.

To the whole group of MSc Landscape Architecture 2019-2021, for their inspiring and pleasant companionship in these years, their contagious positive energy, and the incredible moments we went through, even in the difficult situation of this year.

And finally, to my Forest Family, those who were there, physically or digitally, encouraged me, made me laugh, listened to me, and went through the same things during this year. The best is yet to come.

Thank you!

Content

	READ	WRITE	
Introduction	Chapter 1: Fire	Chapter 1: Healing the Human Trauma	Reflection
Methodology / Reading Itinerary	Chapter 2: The Fire Narrative	Chapter 2: Healing the Landscape Trauma	Interviews
Glossary	Chapter 3: The Human Trauma	Chapter 3: The Vision-A Living Memorial	Bibliography
	Chapter 4: The Landscape Trauma	Chapter 4: The Principles	Appendix
	Chapter 5: The Region-Eastern Attica	Chapter 5: The Living Memorial	
	Chapter 6: The Area-Mati	Conclusions	
	Chapter 7: The Location-Pappa Stream		
	Conclusions		

Introduction

I have always been fascinated by fire. By no means does this mean that I am not afraid of it. As a child, growing up in the Athenian, suburban interface, but also in the Greek, Mediterranean, summery, rural landscape, fire was a familiar event to me. Even so, though, that doesn't make it something less shocking, scary, and unwanted. Every time, every summer, the fear of a fire in the forests, in the mountains, in the pastures, a fire that spreads uncontrollably, and that can destroy landscapes, properties, lives, is deeply rooted in the Greek souls.

However, it was, is, and will continue to be a natural part of the ecosystem (Papageorgiou, Karetsos, & Katsadorakis, 2012, p.110). Yet, it is the human actions that are responsible for the most destructive, unnatural, fires and wildfires, intentionally or not, directly or not, in the current times. And along with the global problem of climate change, the consequences on all aspects of nature and non-nature are devastating.¹

One of these most severe wildfires happened in Greece in 2018. The tragedy of Mati is recorded as the second-deadliest wildfire event of the 21st century, with 102 people confirmed dead. This event, was the second closer to me incident, as the location, Mati in the Eastern Attica, is an area close to my home, and an area, which was my summer, ephemeral, and almost daily destination for enjoying the sea, the greenery, and

the summer nostalgia.

And it was this tragic event that changed everything. People were killed, thousands of homes were destroyed, and tens of thousands of acres of forest were burned. Mati will not be the same again. And three years now, the memories are still there, painful memories that are engraved on people's souls, and recalled by the also battered landscape.

The causes of this fire, the factors that determined the devastating outcomes, and all the problems of the many direct, tangible consequences, I do recognize as very important problems, which I believe, landscape architecture and all fields of designing and engineering can and must solve.

However, in this thesis project, I focus on the two traumas that this fire caused, the Human Trauma, which refers to the general topic of the human wound, caused by the fire experiencing, the loss of people and property, and the identity of the once-familiar landscape, and includes the Individual trauma, as well as the Collective-Community trauma, and the disrupted, by the fear, relationship of people and nature, and the Landscape Trauma, the trauma of the landscape that includes the direct and indirect tangible consequences of the fire, such as the partial or total destruction of the vegetation, the later floods, soil erosion, and effects

on air quality, and the indirect tangible landscape degradation, when fires are repeated at relatively short intervals at the same place, as in this case, and delay its regeneration.

As an architect and landscape architect to be, I cannot stop myself thinking about the role of space and design in the healing processes of both traumas, about the opportunity that can be given in imprinting and expressing on-site the memories in a cathartic way, in a way that the design itself can contribute in the recovery of people and the landscape, and the restoration of their relationship, even in avoiding the same mistakes.

As a result, my design intention is to create a public locus, a didactic, non-static, Living Memorial that will express and imprint these memories, contribute to the tangible and intangible healing processes, integrating fire-resilient, landscape design tools, in order to achieve atonement and better relationship with nature and its phenomena, in order to show that fire is part of nature, destruction and loss is part of nature, we are part of nature, but the important is to bounce back every time, recover and heal, continue the cyclical journey of life, forgiving and learning from, but not forgetting, the past.

1. Papageorgiou, A., Karetsos, G., & Katsadorakis, G. (2012). Το δάσος: Μια ολοκληρωμένη προσέγγιση [The forest: An integrated approach]. Athens, Greece: WWF Hellas.

The title of my project is **E(ye)scape: Designing with memory /+ fire, a Living Memorial**. This title ‘*stuck*’ with me since the beginning of this 10-month research and design ride.

The word Eye was the first word I was hesitant to use during the first presentation of my project topic and location, since it is the translation of the name of the area, Mati, and I was not sure whether I could use it to better explain the history of this location, the history about the name derived from the imposing view of this area towards the sea and mountain. Moreover, it is interesting that in a later phase of the project, the circular shape of the eye literally emerged from the research process, and became a dominant form for the design Furthermore, soon, ‘*Eye-scape*’, so the landscape of the Mati area, but also the Sea-scape, and Mountain-scape, became one, so Eye-scape gained a double meaning, the area itself and the close relation to its views. Parallel, I wanted to emphasize the narrative of the fire. The sea was the only escape from the 2018 fire, it was the only way out of the flames and the suffocating smoke. The Eye-scape became also an ‘*Escape*’. However, it does not only refer to this negative notion of the escape from the fire but also the escape to nature, escape from the daily routine, escape to a different physical or mental place.

‘*Designing with memory*’ expresses my motivation

derived from the traumas, it expresses the intention of the design to imprint people’s stories and memories, their need for catharsis, and the memories of the landscape, the palimpsest, the natural and cultural history.

‘*Designing with fire*’ expresses all the phases I tried to, and I think did go through while engaging with the topic of fire, and that is the understanding of the fire and the system behind it, the what, how, and why, the acceptance phase of the fire, as part of nature and the ecosystem despite the human-factor, and the discovery of its beneficial use, ‘*control*’ or ‘*uncontrol*’ through the design.

Finally, ‘*a Living Memorial*’ literally explains in two words my design objective, my goal, my spatial answer to the problem statement, and context. The Living Memorial is the memorial that will ‘live on’ from the past and future memories, that will heal but will not let what happened to be forgotten, that will educate, that will change through time, and adapt, that will bring people closer to nature, to life, that will celebrate nature and life.

eye

/ μάτι / ‘ma.ti /

noun

- 1. each of a pair of globular organs of sight in the head of humans and vertebrate animals.
- 2. a thing resembling an eye in appearance, shape, or relative position.
- 3. location in Eastern Attica, Mati.

eye-scape

/ eye + scape / μάτι + τοπίο

noun

- 1. the landscape of the Mati area.
- 2. the landscape closely related to its views.

escape

/ έ’skāp / διαφυγή /

verb

- 1. break free from confinement or control.
- 2. elude or get free from something dangerous or unpleasant.
- 3. go to a better, more pleasant, physical or mental place.

E(ye)scape

Methodology / Reading Itinerary

The thesis project is based on the method of design by research and research by design, practices that are used to investigate the theoretical aspects that define the terms, frame the context and form the design principles of the research, and vice versa, enrich and strengthen the theoretical parts through design explorations.

The starting point of the work methodology was the motivation of the Mati fire. Firstly, background research about fires/wildfires, the situation in Greece, the ecological and fire history and ecosystem of this landscape, and general information about the fire management was done primarily through literature reading and research, as well as interviews/discussions with experts from the Forestry and Landscape Architecture field that know the area (Mr. Sekliziotis and Mr. Kinthis). Despite the personal connection and the knowledge about this tragedy, deeper research had to be done in order to create a complete narrative. Desktop research and ‘*investigation*’ based on the official reports, on scientific studies, on articles, and media sources (video/photographs/articles), were the first steps. Interviews with residents of Mati and survivors of the fire (Natassa and Georgia), were the second step, in order to better understand the facts, the background, the story of the fire, but also the history of the area, its perception before and after, and the problems and needs according to those who really know the area.

This research led to the identification of several problems, but also to the emphasis of the urgent challenges that emerged, challenges that then led to my **Research Questions**.

What is the Human Trauma and what the Landscape Trauma?

The theoretical research in order to define and understand the two challenges was based on literature that includes the research on the terms Psychological Trauma (according to Pedović & Hedrih, 2019), the Post Traumatic Stress Disorder (according to Taheri, Shabani & Sichani, 2019), the Collective Trauma (according to Kirmayer, 1995), and the tangible traumas of the landscape, the Direct and Indirect Consequences, and the Landscape Degradation (according to Vallejo, Arianoutsou & Moreira, 2012, and Stoof, 2011), as well as my conclusions from the interviews and testimonies of the residents and survivors, and my location visits that even three years later, helped me notice the traces, make the connections of the narrative, spatially, and identify the traumas on-site.

What was the landscape identity of Mati before and after the fire?

Parallel work was the landscape analysis on different scales about different layers. The scales, the large scale / Region (Eastern Attica), the medium-scale / Area (Mati), and the small scale / Design Location (Pappa stream), were necessary, not only in order to learn the long cultural history of the entire area and the reasons of its urban development, or to understand the system of the natural layer, its flows, and its components, just for the research phase but also in order to be able to create a broader plan, a strategy that can be applied on the wider region, consisting of the smaller concepts and design proposals. This part of the work methodology included methods and tools

such as Greek literature reading about the specific areas, the historic events, the Greek landscape in general, the vegetation, the ecology, the urban planning, and the fire history site-specifically, photographic archive analysis from the internet and survey sources. All these tools contributed to the creation of the ‘*before*’ and ‘*after*’ identity of the landscape, through the mapping, the on-site visits, and photography, and the interviews to understand the life before the fire, the experiences, the relationship, and attachment to the landscape.

What is the role of a Memorial Design and how it can contribute to the healing of Human Trauma?

Additional theoretical research had to be made for the part of the ‘*solution*’, the design idea of the Living Memorial as the carrier of this research and design project, for the two challenges. Here, the healing process of the human trauma is explored, through theories, so literature reading about the topics of the Mourning Process (according to Kübler-Ross’s model and Peter Homans theory, the Memorial (Landscape) Architecture (according to Tanović, 2019), and Healing (Landscape) Architecture (according to Stigsdotter & Grahn, 2002) together with case studies/precedent projects analysis (Flight 93 National Memorial, Pennsylvania, Heide’s healing garden, Melbourne), for the corresponding topics, something that not only inspired me, but also illustrated this translation from theory to design and clearly showed the methods and tools to do that, and thus contributed to the formation of the principles, by design experiments.

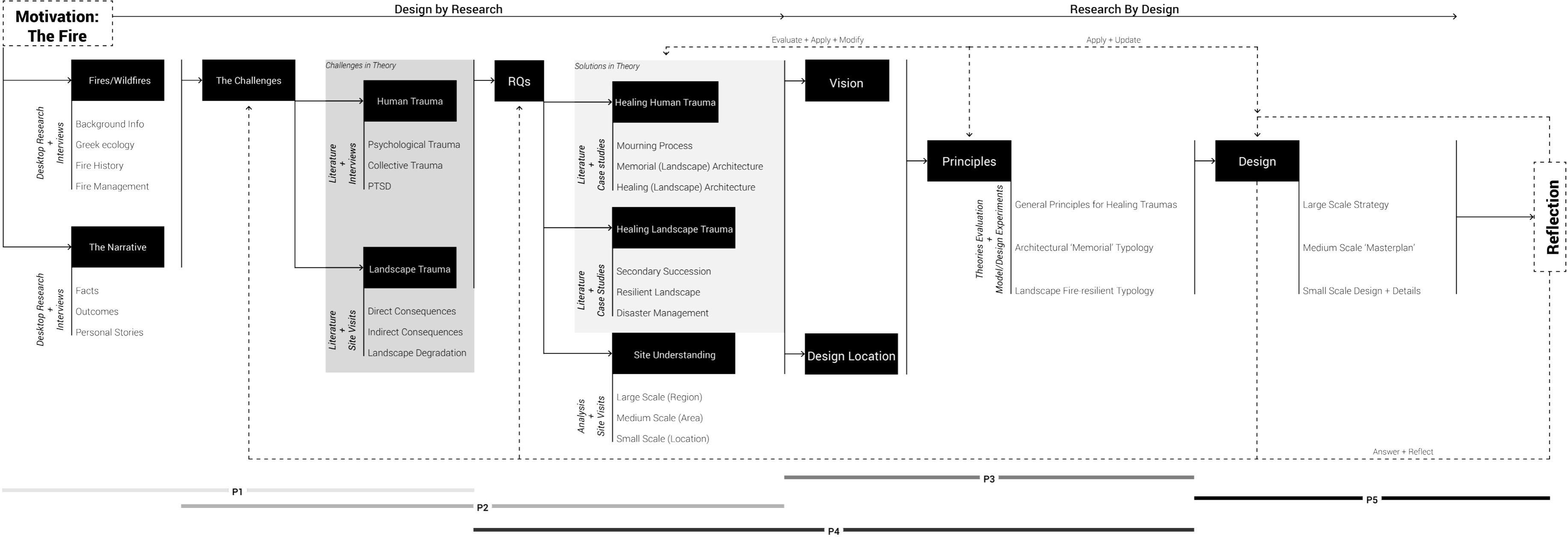
How can Forest Fires in the Wildland-Urban Interface areas be mitigated through (Fire)-Resilient Landscape Design

and how it can contribute to the healing of Landscape Trauma?

For the second topic, scientific literature about the secondary succession, resilient landscape, disaster management was studied, together again with case studies/precedent projects analysis (Wildfires-An Architectural Intervention of Resilience, Reconfiguring the Burnt Scar). This theoretical research and project cases led to conclusions that were then translated into principles, through design explorations, and which were later tested through model experiments.

In short, my motivation led me to the Fire Narrative that revealed to me the challenges and my research questions. By following methodologies and tools such as the literature reading, the desktop research, the site visit and analysis, the case studies, and the interviews conducting, the context and site became more clear and understandable, and principles and design directions emerged. A clear vision was formed, and a specific design location was chosen. The design was then the outcome that is able to reflect all previous stages and actions and answer the main question of:

How to heal Human and Landscape Traumas from the (Sub)-Urban Forest Fire of Mati, through designing a Living Memorial?



The report is mainly structured in two parts, having also two complementary, explanatory parts, one in the beginning that includes the Introduction, the Methodology and Reading Itinerary, and the Glossary, a lexicon of terms used in this report, defined through scientific knowledge or personal explanations, and one at the end that includes the detailed interview conversations, the reflection upon aspects such as the Socio-Ethical Issues and Relevance of the projects, the approach and work methodology, as well as the weaknesses and strengths, closing with the bibliography used during the entire research.

The part of *Reading* the landscape is about understanding the theoretical, and spatial framework of the project, about understanding the relevant topics, aspects, qualities, and problems, and is divided into seven chapters. Chapter 1: Fire refers to the introduction of the Fire, aims to make the reader more familiar with the element of fire, and fire Greece, and includes the conclusions related to the site-specificity and conditions. In Chapter 2: The Narrative, the condensed story of the facts, the factors, and the outcomes are presented through an objective but also personal perspective, by my own words, but also the words and narratives of the survivors. The short aftermath of 1 day, 1 year, and 3 years after, as well as the introduction of the traumas, are included. Chapter 3: The Human Trauma, and Chapter 4: The Landscape Trauma is dedicated to the theoretical and scientific explanations of these challenges, and their site-specific relation. Chapter 5: The Region-Eastern Attica, Chapter 6: The Area-Mati, and Chapter 7: The Location-Pappa Stream consists of the biggest part of the Analysis, on three different scales. In the

final Conclusion of this part, its purpose is clear, to understand the topic, to understand the challenges, to learn about the context, the location through a multiscale perspective, to actually *Read* the site.

The part of *Writing* the landscape refers directly to the design that in dialogue with Reading the landscape discusses the theoretical answers to the questions and problems, and their translation into a design proposal, and is divided into five chapters. Chapter 1: Healing the Human Trauma talks about the mourning, grieving, and so healing process of the trauma, about the Memorial Architecture and its contribution in the recovery process, the Healing Landscape Architecture, focused on Healing Gardens and Therapeutic designs, both indicating and analyzing some of the case study projects, and finally purposing the integration of these aspects as a solution that leads to specific principles. Similarly, Chapter 2: Healing the Landscape Trauma talks about the Secondary Succession (Ecological Cycle) as the natural recovery process of the landscape after the fire, and the positive, important role of fire in this cycle, the Resilient Landscape, as intervening actions in this cycle that can help the landscape bounce back and regenerate faster, and the Disaster Management Cycle, with a focus on the Prevention and Mitigation stages, as actions of primary importance that can result in a more balanced cycle, and through the case studies analysis explain the specific suggestions can work, also by giving technical solutions that *'feed'* the principles. Chapter 3: The Vision-A Living Memorial, is the introduction to my general idea/vision, and its contradiction with the current Mati Monument. Then, Chapter 4: The Principles incorporates the general principles for

both healings, as derived and created from the theory, research, and case studies, the Architectural Memorial Typology, the Landscape Typology of the vegetation zones, and water interventions, the Materiality inspiration, selection, and explanation, and finally the model test, and the observations of these explorations. Chapter 5: The Living Memorial consists of the architectural and landscape aspects of the memorial, with emphasis on the conceptual relation to the theory, the technical principles, the spatial, historical, and ecological relevance, and the multiscale significance of the design. The part ends up with the conclusions, and their purpose as the *Writing* of the project, the design interventions as the answers to the challenges and research questions, and as a reflection of the site *Reading*.

Glossary

In order to proceed in this thesis, I introduce a glossary that explains scientifically or personally defined the terms used.

Arcade (Screen)

An arcade is a succession of arches in a row, with each arch supported by a colonnade of columns, and while they go back to at least the Ancient Greek architecture of the Hellenistic period, they were much more used by the Romans. Exterior arcades are designed to provide a sheltered walkway for pedestrians, like a *stoa*.

However, and in this case, when the arcade consists of a single row of arches, such in the roman aqueducts, I use the term arcade screen.

Collective Memory

The term *‘collective memory’* was coined by the French sociologist Maurice Halbwachs, who emphasized that memory endures only through the frameworks and spaces provided by social groups: memory is a socially embedded construct, its development only possible within specific social arrangements. Today, the term is widely scrutinized by scholars and new terms appear such as *‘multidirectional memory’*, *‘memory of multitudes’* and *‘collective remembrance’*.¹

Commemorative Landscape

Commemorative landscapes express certain versions of history and become a symbolistic reflection, casting legitimacy upon them. However, they are not just a collection of historical events translated into space, *‘but a way of seeing the world, ordering reality, and projecting (rather than simply reflecting) values about the past’*². Commemorative landscapes have two aspects, the site (placement) and the situation (relative location) of

memorials and monuments. The two are related, but they differ in terms of scale and perspective. The site declares the specific, physical and symbolic position of a memorial, whereas the situation *‘is a memorial’s location relative to broader surroundings, patterns, and movements beyond its site’*³.

Ecological Resilience

The ability of a landscape to keep and support its ecological functions, enhance the native biodiversity, and the landscape processes over time, within a changing environment and altering conditions, and despite the potential stressing, disrupting factors and the uncertainties. In short it responds to a disturbance, resists the damage and recover quickly⁴.

Fire

Fire is a natural, and often uncontrolled, catastrophic phenomenon. It is a natural phenomenon due to combustion, a chemical reaction, usually an exothermic redox reaction, between one, at least, fuel and one, at least, oxidizing agent, usually oxygen, which is accompanied by the release of a significant amount of heat. However, in order for the ignition to start, the supply of heat from external sources is also required, something that often indicates the cause of the fire. Consequently, fuel, oxygen and heat form the *‘fire triangle’*.

Firescaping

To organize, arrange and design the features of an area in a way that prevents or suspends the spread of fire, using design principles, technical tools or policies.

Fire-adapted Communities

Defined by the United States Forest Service: it is *‘a knowledgeable and engaged community in which the awareness and actions of residents regarding infrastructure, buildings, landscaping, and the surrounding ecosystem lessens the need for extensive protection actions and enables the community to safely accept fire as a part of the surrounding landscape’*⁵.

Defined by The National Wildfire Coordinating Group definition, fire-adapted community is *‘a human community consisting of informed and prepared citizen’s collaboratively planning and taking action to safely co-exist with wildland fire’*⁶.

Fire Mitigation

Fire mitigation refers to a specific action, a series of steps taken in order to reduce the risk of a wildfire *hitting* an area, but more often an urban area, or specifically a property. It includes the risk assessment, the recognition of the dangers, and the creation of a defensible space. The primary types of mitigation actions to reduce long-term vulnerability include the local planning, land management, and regulations setting, structural and infrastructural interventions, such as floodwalls and retaining walls, restoration, preservation, and management actions that try to protect the natural systems, and finally actions that target the preparedness and the immediate, emergency response.

In this case, the term of mitigation is generalized as the goal to decrease the severity of human and non-human damages caused by the fire disasters, mainly by designing.

Fire Resilience

Within the general concept of resilient ecosystems and landscapes (ecological resilience), fire, in (urban)-forested landscapes in an era of extended droughts, climate change, and other stressing factors, becomes the main focus. The concept bridges the ecological and social resilience aspects, usually within the context of policy and forest planning.

Fire Prevention

Fire prevention is part of the functions of many fire departments that includes educational programs that intend to inform people and raise awareness around the topic of fire, fire protection and safety.

In this case, prevention mainly refers to the education of people in order to ensure that human actions or natural phenomena do not result in a fire disaster, but also to the active and mainly passive detection as most effective ways to help prevent fires.

Forest

A forest is an area of a dominated by trees land. Around the world, hundreds of definitions, more than 800, of forest are used that differ according to factors such as tree density, tree height, land use, legal standing and ecological function.

Forest Fire

A forest fire is an uncontrolled fire occurring in vegetation higher than 1.8 m and they are often related to major conflagrations. The start of forest fires vary, from natural causes of combustion and heat from the ground, surface or canopy, or man-made actions.

Greek Theatre

The ancient Greek theater was an institution of the ancient Greek city-state, teaching and performing theatrical performances, on the occasion of the celebrations of the god Dionysus. In ancient Greece, the theater was originally called the audience, but soon the name prevailed for the place of performances and its buildings.

The term has been identified with its amphitheater, circular, or semicircular form, its architectural design and its architectural elements.

Healing Gardens

Healing gardens concerns a general concept that usually refers to gardens that are purposely are designed to promote spiritual, emotional, psychological, and even physical recovery and healing. Healing gardens may also include memorial spaces or monuments of wars, diseases, or tragic events⁷.

Human Trauma

In this case, human trauma doesn't come from the trauma of social changes that refers to a dramatic loss of identity and social structure, but it refers and includes the individual, psychological trauma, and the collective-community-social trauma, both caused by, in this case, a natural disaster, the fire, and including its results, such the Post Traumatic Stress Disorder etc.

Landscape Trauma

In this case, landscape trauma is the ecological and spatial trauma of the landscape after the fire. It includes the direct and indirect tangible consequences of the fire, such the partial or total destruction of the

vegetation, the later floods, soil erosion, and effects on air quality, and the indirect tangible landscape degradation, when fires are repeated at relatively short intervals in the same place.

Memorial

A place that has a soothing nature, a commemoration space, a space of senses' stimulation, a space that is part of the healing process of the trauma, and a space that makes the visitor part of the experience, part of the landscape, so without letting him/her be just an observer. It is a place that pays tribute to the death and celebrating life at the same time.

Memoryscape

'*Memoryscape*' is a term which was first formed by the sociologist Tim Edensor, according to which is about categorizing sites '*which attempt to materialize memory by assembling iconographic forms...[around which] social remembering is organized*'⁸ (Edensor, 1997, p.178). '*Their deliberate orchestration belies their significance as active sites of struggle over the meanings of the past. These meanings may transcend their intended iconographies and instead derive from subsequent contexts, practices or perceptions. Urban spaces can serve to symbolize the aspirations and identity of inhabitants, yet these public meanings are both dynamic and malleable. More than this, they are memory devices for the transmission and preservation of cultural knowledge* (Stock, 1993, p.323). *The cultural geographer Laura Cameron suggests that tangible landscape features are 'durable visual loci' for the 'holding, reinforcing, and retaining of stories*'⁹ (Cameron, 1997,p.76,85-87).'

Natural Landscape

A natural landscape basically refers to a landscape that has its original state, a state that existed before any influence from human civilization, and so the natural landscape and the cultural landscape are different terms. In the 21st century, however, landscapes that are totally untouched by human activity basically no longer exist, and therefore referring to the natural landscape is more about referring to the degrees of *naturalness* within a landscape.

Pyrophobia

Pyrophobia is a fear of fire, which can be considered irrational if beyond what is considered normal. The most common cause of pyrophobia is that fire poses a potential threat to life safety, so a wildfire experiencing is one certain cause¹⁰.

Psychological Trauma

Psychological trauma is a response to an event that a person finds highly stressful, such as being in a war zone, experiencing a natural disaster, an accident, or any form of violence or abuse. Trauma is often the result of the overwhelming amount of stress that exceeds one's ability to cope or integrate the emotions involved with that experience. Trauma is the sum of the event, the experience, and the effect¹¹.

PTSD (Post Traumatic Stress Disorder)

It is a disorder that is more often associated with military veterans and domestic abuse victims, but nowadays it is happening more and more frequent to anyone who experiences an extreme amount of stress¹² (Taheri, Shabani & Sichani, 2019).

Restoration Ecology

Ecological restoration is the scientific study supporting the practice of renewing and restoring degraded, damaged, or destroyed ecosystems and habitats in the environment by active human intervention and action¹³.

Rural Area

A rural area is an area that is located outside cities and urban areas and is commonly defined as '*...all population, housing, and territory not included within an urban area. Whatever is not urban is considered rural*'¹⁴. So, rural areas characterized by a low population density and few settlements. It is also common to describe agricultural areas as rural. However, there are various definitions of what is rural depending on the country, where statistical and administrative purposes play an important role.

Rural–urban Fringe

The rural–urban fringe or just outskirts, can be described as the '*landscape interface between town and country*', or as the transition zone where urban and rural uses meet and even clash. However, it can be viewed as an individual landscape type, created and influenced by the interaction of the urban and rural land.

Stoa

In ancient Greek architecture, stoa is a covered walkway or portico, for public use. Stoas were open spaces, with columns on the one side , next to a building, creating a safe, enveloping, protective space, a transition between the inside and the outside. There are many types of stoa, designed with double rows of columns, both-sided rows of columns, or even two stories stoas.

Suburban Area

A suburban area is a mixed-use or residential area that is either part of a city or a separate residential community within a short distance from the city.

Urban Area

An urban area is where human settlements are located. It is characterized by the high population density and the infrastructure of the built environment. Urbanization leads to the creation of the urban areas that are categorized by their urban morphology as cities, towns, conurbations or suburbs. The term contrasts to rural areas, such as villages, and to natural environments.

Urban Forest

An urban forest is a forest, or a collection of trees, that grow within a city, town or a suburb. In general, the term can include any kind of woody plant vegetation growing in and around human settlements, and so it can be either privately or publicly owned. Apart from beautifying the urban environment, urban forests positively contribute to the ecology, climate and even economy of a place, while being a shelter to wildlife and a recreational area for the residents.

Urban Reforestation

According to Wikipedia, urban reforestation is the practice of planting trees, typically on a large scale, in urban environments¹⁵ (2021, March 28) . The term may also include practices like urban horticulture and urban farming. The reasons for practicing urban reforestation include the urban beautification, the increasing of shade, the improvement of the urban climate and air quality, and of course the restoration of urban forests after a natural disaster.

Wildland Fire and Wildfire

A wildfire or wildland fire is an unplanned, unwanted, uncontrolled fire in an area of combustible vegetation starting in rural and urban areas. There are several types of wildfires, classified based on the vegetation type present, such as forest fires, bushfires, desert fires, grass fires, hill fires, peat fires, etc. While the two terms seem similar, many people differentiate them, by referring to wildfire to an unplanned and unwanted fire, while to a wildland-fire as a prescribed fire.

Wildland (Sub) Urban Interface (WUI)

The Wildland (sub) urban interface is the zone of transition between wildland, the natural/rural area and the human/urban development. Areas within this zone are at high risk of catastrophic wildfires and natural disasters in general, and their presence often disrupts the ecology.

Καλντερίμι – Kalderimi

The Greek kalderimi is a cobblestone path that is an integral part of the natural landscape and the traditional Greek architecture in many places. It is a technique applied from local craftsmen that started to pave where the ground has steep slopes or stagnant water, and finally determined the rural and mountainous, Greek landscape, by creating large networks, many of which are architectural traces, which are maintained, as well as functional transportation networks.

Ξερολιθιά – Xerolithia

Xerolithia is a dry stone walling, stone walls without binder that are characteristic elements of the Greek landscape, on the hillsides of many places, around islands or inland, for the protection of crops in the

sloping soils and prevention of erosion. Apart from their practical function for the protection of the soils or the creation of arable land, they characterized the demarcation of the properties and are remarkable examples of the Greek Folk architecture.

University Press.
2. Alderman, D.H. & Dwyer, O.J. (2015). A Primer on the Geography of Memory: The Site and Situation of Commemorative Landscapes. 10.13140/RG.2.1.1419.6565
3. Alderman, D.H. & Dwyer, O.J. (2015). A Primer on the Geography of Memory: The Site and Situation of Commemorative Landscapes. 10.13140/RG.2.1.1419.6565
4. Beller, E.E., Robinson, A., Grossinger, R.M., Grenier, J.L., Davenport, A., & Spotswood, E. (2015). Operationalizing Landscape Resilience: Enhancing Biodiversity and Ecological Function at the Landscape Scale. https://www.sfei.org/sites/default/files/biblio_files/AGU_ResilienceFW.pdf
5. Forest Service U.S. Department of Agriculture. (2020). Fire Adapted Communities. <https://www.fs.usda.gov/managing-land/fire/fac>
6. Forest Service U.S. Department of Agriculture. (2020). Fire Adapted Communities. <https://www.fs.usda.gov/managing-land/fire/fac>
7. Faurest, K. Healing Landscapes: Gardens as places for spiritual, psychological and physical healing [PDF slides]. levego.hu. <https://www.levego.hu/sites/default/files/kapcsolodo/healinglandscape-en.pdf>
8. Gristwood, A. (2014). Memoryscapes: Heritage, the Cityscape and the Idea of Nation. Woven By Memory: The Idea of Nation in Education Abroad, pp.51-58.
9. Gristwood, A. (2014). Memoryscapes: Heritage, the Cityscape and the Idea of Nation. Woven By Memory: The Idea of Nation in Education Abroad, pp.51-58.
10. Pyrophobia. (2021, January 19). In Wikipedia. <https://en.wikipedia.org/wiki/Pyrophobia>
11. Robinson, L., Smith, M. & Segal, J. 2020. Emotional and Psychological Trauma. <https://www.helpguide.org/articles/ptsd-trauma/coping-with-emotional-and-psychological-trauma.htm>
12. Taheri, S., Shabani, A., & Sichani, M.G. (2019). The Role of Therapeutic Landscape in Improving Mental Health of People with PTSD. Psychological Trauma, Ana Starcevic. IntechOpen. 10.5772/intechopen.86543.
13. Restoration ecology. (2021, May 6). In Wikipedia. https://en.wikipedia.org/wiki/Restoration_ecology
14. Health Resources & Services Administration. (2021). Defining Rural Population. <https://www.hrsa.gov/rural-health/about-us/definition/index.html>
15. Urban reforestation. (2021, March 28). In Wikipedia. https://en.wikipedia.org/wiki/Urban_reforestation

1. Tanović, S. (2019). Designing Memory: The Architecture of Commemoration in Europe, 1914 to the Present. (1st ed.) Cambridge

READ: Fire

The conditions of human life changed when the fire was discovered. In the beginning, humans made hard efforts to maintain it, then to conquer it, and then use it for their needs. Greek mythology mentions fire, where according to tradition, Hephaestus created fire and Prometheus stole it to give it to people. However, the history of fire and forest fires specifically, begins long before the existence of human beings, who appeared only 2 million years ago¹.

Since the appearance of forest vegetation on Earth, that is, millions of years ago, there have been forest fires. The forest vegetation was initially burned by natural causes, by volcanoes, lightning, and self-ignition due to high temperatures. After the advent of humans, the forest vegetation began to be burned by them, in order to create agricultural land, to feed themselves, or to build houses (Eleftherakou, 2019). And historical evidence about the existence of fire can be found for all areas that the Mediterranean ecosystems are answered, where the rapidly changing atmospheric conditions that characterize the Mediterranean climate, and that is the high temperatures along with the extended periods of drought, causes the drying of the vegetation, making the vegetation particularly flammable, especially throughout the summer².

As a result, fire, as a natural phenomenon or a cultural tool used by people, is part of the Mediterranean ecosystem³ (Pausas & Vallejo, 1999), something that indicates that it is something that will keep happening as long as it can. It is important though to first better understand how it works and what is the general framework, as well as the situation in Greece, to understand the context of this thesis.



| Prehistoric Natural-Cultural Fire

According to Wikipedia (December, 2020), fire is a natural, ‘catastrophic’ phenomenon, a large-scale phenomenon that man is not yet able to control, and it is linked to the (un)-balance of environmental ecosystems. Uncontrolled fires develop on some kind of fuel and can have unwanted or even catastrophic consequences. It is a natural phenomenon due to combustion, a chemical reaction (usually an exothermic redox reaction) between one (at least) fuel and an (at least) oxidizing agent, usually oxygen, which is accompanied by the release of a significant amount of heat. However, in order for the ignition to take place (fire from combustion), the supply of heat from external sources is also required, which are identified with the causes of the fires. Consequently, fuel, oxygen, and heat are the famous ‘fire triangle’. In each forest area, the high concentration of organic fuel creates critical conditions, which when exceeded, ignition is created and the fire is started.⁴

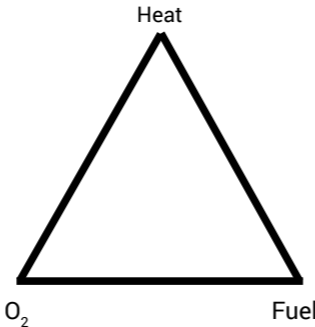
A rich terminology for categorizing and managing fires is available. Depending on whether or not it is in a man-made environment, there are the terms ‘fires’ and ‘wildland fires’, with the latter also including the term ‘forest fires’, which is addressed exclusively to forest areas and have more specific characteristics, they are particularly difficult to deal with and their effects are more severe.

The Mediterranean forests are particularly prone to fires and, especially Greece has the most devastating forest fires of all the countries of the European Union. **Man is primarily responsible for causing forest fires**, with a percentage of human responsibility exceeding 90% in the Mediterranean countries⁵. As for the factors that

favor the spread of a fire, there are many. Some include the meteorology, the topography, and the vegetation of the area. Of course the urban environment itself, next to or by force within the natural one, is another factor, since most of the materials used are a huge source of fuel.

The negative results of forest fires can be devastating, with serious consequences for health, the ecology, the economy, and society.

Fire Triangle



Categories



Causes

Natural Causes

Natural causes are usually lightning, volcanoes and natural succession.



Unknown Causes

There are some **fires** that can not be explained or proven, however this is not common.



Arson due to Negligence

Forest fires from negligence are a major cause. These include cigarettes, burning garbage and dry grass, electrical cables and and illegal camping **fires**.



Intentional Arson

The most destructive cause as it is premeditated to cause great destruction, with the aim of creating pastures and plots, revenge and damage.



human actions

More specifically, there are the direct consequences, those caused by the partial or total destruction of the green-tree structure and forest products. Lost human lives, flora, and fauna, as well as (material) property are direct consequences. Secondly, there are the indirect consequences that come after the event and include damages caused to the indirect benefits of/from the forest and the direct and indirect environment around, such the water, soil, and air, economy, ecology, and society.

And when a fire starts, there are many factors affecting the onset and the spread. These factors are mainly divided into the category of the Meteorological, Topographical, and Vegetation ones⁶.

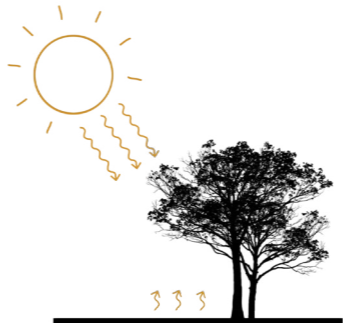
Moreover, there are four types of forest fires according to spatial expansion and spread⁷.

Consequences

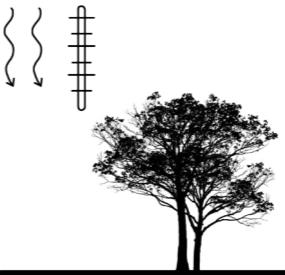


Factors affecting the onset + spread

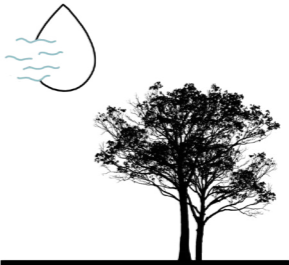
Meteorology



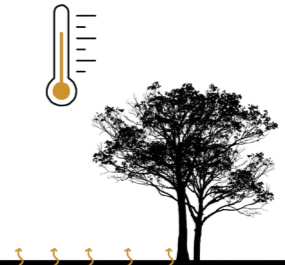
Solar radiation



Atmospheric pressure



Humidity



Air+Soil temperatures



Wind

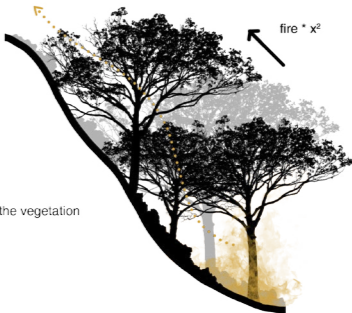
Topography



Altitude



Orientation



Relief / Terrain

| Types

Ground Fire	Surface Fire	Crown Fire	Mixed Fire
<p>Burn of organic matter under the leaf surface</p> <p>Slow burning</p> <p>Kills plants by destroying their root system</p> <p>Can irrupt into a surface/crown fire</p> <p>Rare in Greece</p>	<p>Burn of fuels between ground and tree crowns</p> <p>Can develop into crown fire</p> <p>High speed of spread</p> <p>Relatively small amount of smoke</p>	<p>Very high speed of spread</p> <p>Very destructive</p> <p>Depend on wind, tree's qualities</p>	<p>The mix of fire create several layers that can result in a Sweeping fire</p> <p>Very high-intensity fire</p> <p>Large flame height</p> <p>Inability to predict spread speed and behavior</p>
			

GREECE

In the last 100 years, the rate of forest cover has been reduced by less than half. However, the number of forest fires, while remaining almost constant until 1975 (with about 700 cases per year), increased over the next 20 years, reaching several thousand cases. In particular, after two decades of upward trend (1980-2000), during which hundreds of thousands of acres of forest and agroforestry disappeared, on average, the situation began to stabilize and improve⁸.

The disasters that occurred from the fires of 2007 onwards show a record of human casualties and extensive damage to the natural environment, structures, infrastructure, and civilian property, and so have placed the issue of forest fires at the top of the list of natural disasters in the country. The national, environmental, and economic damage caused by forest fires is incalculable and the need for a national strategy to protect against this danger is more urgent than ever⁹.

And that is only the start according to the scientists that expect a further increase due to climate change, something that we already see happening.¹⁰ The longer droughts and so the reduction in the humidity of the fuel, increase in the risk, the intensity, and the spread of fires. In the Mediterranean, areas with a historically low risk of fire are the most vulnerable to climate change and for every gradual rise in temperature, rainfall must increase more than 15% to prevent drying due to temperature and, consequently, the risk of fires.

As far for the Fire Management System in Greece the

Department of Forests that reports to the Ministry of Agriculture, Rural Development and Environment is responsible for the management system, organization, and general framework that guides all actions and measures required for the forest fires. The fire-fighting operational planning of the Department of Forests aims at reducing the number of fires and the area burned, the immediate detection of fires, and the rapid intervention and effective extinguishing and includes the following stages¹¹:

- 1.The prevention.
- 2.The detection and announcement of forest fires.
- 3.The pre-suppression.
- 4.The suppression of forest fires.

However, most of the attention, effort, and economic support lays in the suppression of the fires, and not the fire prevention or mitigation. That is definitely one of the biggest problems of the Greek fire-fighting system and management, a problem that costs a lot, economically, environmentally, and socially.

The lack of operational efficiency, readiness, and capacity of the fire brigade in dealing with catastrophic fires, the lack of preparation and energy of civil defense resources and means, the lack of planning and organization in the prevention, preparedness, response, and management of catastrophic fires, the lack of management of the forest and green tissues of the urban and non-urban landscapes, the lack of planning and uncontrolled expansion of urban areas, and several other reasons arising from Greece’s constantly latent political choices, lead every year to fatal mistakes and tragic events.¹²

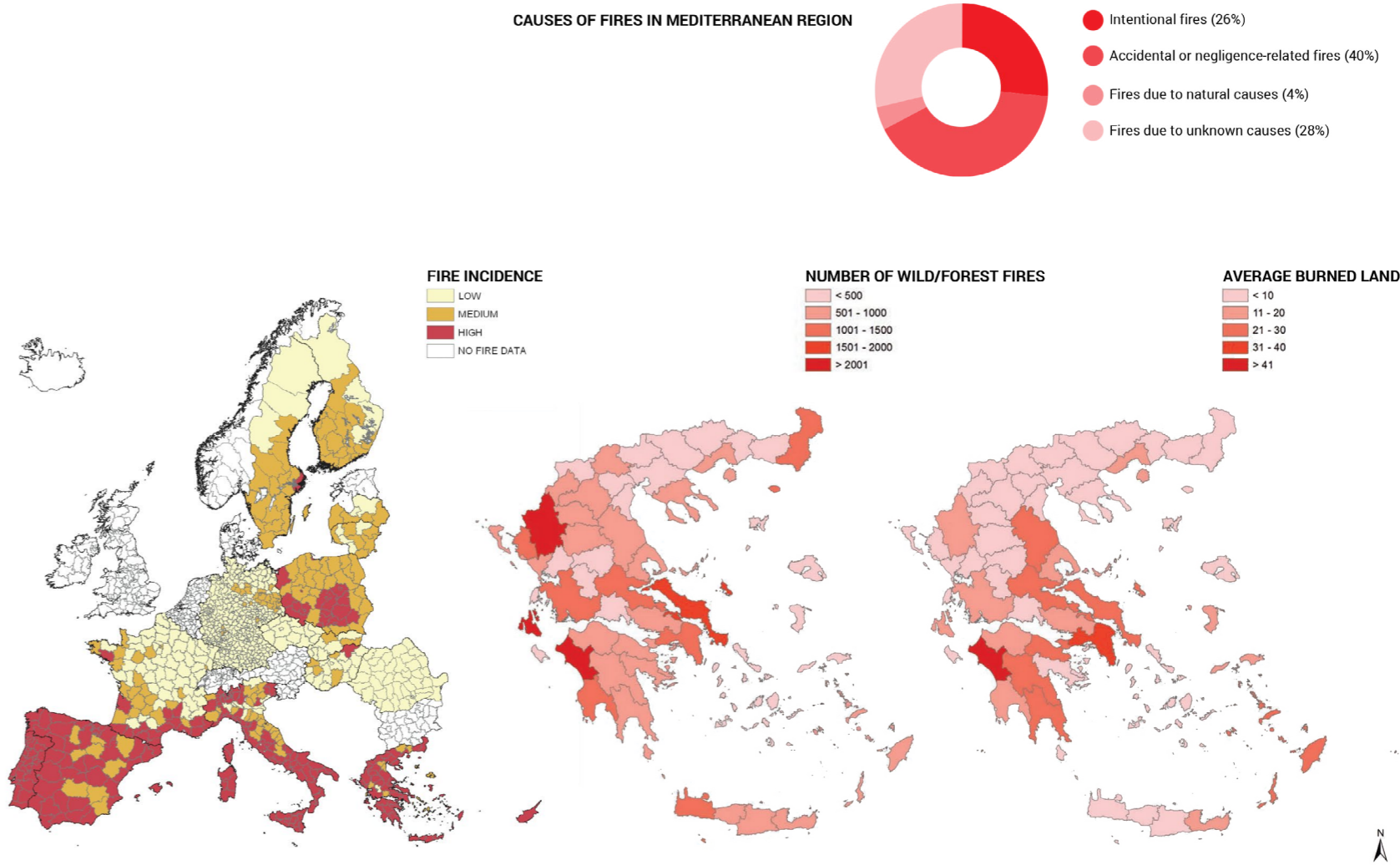


Figure 2. Fire in Europe, and Greece

One of these events was the national tragedy of the forest-urban fire of **Mati in 2018**, a catastrophic fire, one of many happening every year in Greece, although the first, and hopefully the last, with such devastating, deathly consequences, with 102 people confirmed dead, hundreds of acres of burned residential and forested areas, non-human losses, and many traumatic memories engraved.



Figure 3. Photo from Mati fire, Marathonos Avenue, July 23rd 2018

The background knowledge about the fires/wildfires, the definitions of the terms, the parameters of a fire event, the history, the causes, the consequences, as well as the general framework of the situation in Greece and the current Management plan and its weaknesses, were essential information in order to understand how fire operates, what is the context of the general thesis, and most importantly help in identifying the characteristics of the 2018 Mati fire, and defining some first conclusions, ideas, applicable to the design, and these are the following:

The conditions, factors affecting the onset and the spread of fire are very present in the selected region, area, location. Both the Mediterranean climate and the microclimates in the selected area, with the specific changes in the solar radiation, the humidity percentages, the temperatures, and wind speeds and directions along the year, the intense topography and the southeastern orientation, the differences in the stages of the vegetation due to previous fires, the ongoing urban sprawl, the lack of proper Fire Management and Policies, and the uncontrolled human intended or not actions, and wrong behaviors, all together create the *‘perfect’* framework for a fire on-set. Moreover, while ground fires don’t exist in Greece, surface and crown fires are the most frequent types. And when a surface fire becomes crown or the other way round, the mixed fire turns into the most destructive one. As a result, it is clear that when a fire starts, it is better for it to stay at the same stage, as one type, in order to be more easily controlled, and suppressed, and the first ideas about how to achieve that are by keeping clean and maintained the undergrowth, as well as the maintenance, and by using mixed vegetation species, species more fire-resistant,

in the reforestation plantings. In the case, however, of a fire becoming mixed, destructive, the urgency for control and mitigation is high. Restricting the zone, maintaining the surroundings, and managing the water and the humidity, are the following conclusions.

These thoughts are the first guidelines, applicable in the design in the corresponding part of the thesis.

1. Eleftherakou, M. 2019. Διαχείριση του τοπίου ως προς τις δασικές πυρκαγιές. Παραδείγματα από χώρες στη Νότια Ευρώπη [Landscape management in relation to forest fires. Examples from countries in Southern Europe]. [Master's Thesis, Aristotle University of Thessaloniki.
2. Papageorgiou, A., Karetzos, G., & Katsadorakis, G. (2012). Το δάσος: Μια ολοκληρωμένη προσέγγιση [The forest: An integrated approach]. Athens, Greece: WWF Hellas.
3. Pausas J.G., Vallejo V.R. (1999). The role of fire in European Mediterranean ecosystems. Chuvieco E. (eds) Remote Sensing of Large Wildfires. Springer, Berlin, Heidelberg. https://doi.org/10.1007/978-3-642-60164-4_2
4. Fire. (2020, December 18). In Wikipedia. <https://en.wikipedia.org/wiki/Fire>
5. Birot, Y. (2009). Η Ζωή Μας με τις Δασικές Πυρκαγιές: Η Άποψη της Επιστήμης Μία Συνεισφορά στο Διάλογο Επιστήμης-Πολιτικής [Our Life with Forest Fires: The View of Science A Contribution to the Science-Politics Dialogue]. EFI Discussion Paper 15. Finland.
6. Alcubierre, P.C., Castellnou, M., Ribau, de Egileor, A.L.O., Bover, M.M., & Kraus, P.D. (2011). Prevention of Large Wildfires using the Fire Types Concept. Unitat Tècnica del GRAF.
7. Pyne, S.J., Andrews, P.L., Laven, R.D. (1984). Introduction to Wildland Fire, Fire Management in the United States (2nd ed). New York: Wiley.
8. Tsagari, K., Karetzos, G., & Proutsos, N. (2011). Δασικές πυρκαγιές Ελλάδας, 1983-2008 [Forest fires in Greece, 1983-2008]. WWF Hellas and ETHIAGE-IMDO & TDP.
9. Birot, Y. (2009). Η Ζωή Μας με τις Δασικές Πυρκαγιές: Η Άποψη της Επιστήμης Μία Συνεισφορά στο Διάλογο Επιστήμης-Πολιτικής [Our Life with Forest Fires: The View of Science A Contribution to the Science-Politics Dialogue]. EFI Discussion Paper 15. Finland.
10. De Rigo, D., Liberta`, G., Durrant, T., Artes Vivancos, T. & San-Miguel-Ayanz, J. (2017). Forest fire danger extremes in Europe under climate change: variability and uncertainty (JRC108974). Publications Office of the European Union.
11. Department of Forests. (2014). Forest Fire Management. Retrieved December 12, 2020, from http://www.moa.gov.cy/moa/fd/fd.nsf/fd51_gr/fd51_gr?OpenDocument
12. Eleftherakou, M. 2019. Διαχείριση του τοπίου ως προς τις δασικές πυρκαγιές. Παραδείγματα από χώρες στη Νότια Ευρώπη [Landscape management in relation to forest fires. Examples from countries in Southern Europe]. [Master's Thesis, Aristotle University of Thessaloniki.

READ : The Fire Narrative

It's the 23rd of July 2018, in Mati, Greece, a settlement in the municipality of Nea Makri in Eastern Attica, with around 4000 permanent residents, 30 km from the center of Athens and neighboring the areas of Rafina, Neos Voutzas, Agios Andreas, Zouberi and Nea Makri.

At 16:35 a 65-year-old man sets fire to burning shrubs outside his house in Ntaou Penteli.

In the beginning, the fire was directed at a normal pace towards the areas of Kallitexnoupoli, burning low vegetation. The wind intensified sharply, reaching the speed of 95 km/h, changed direction to the east, the temperature was close to 40 °C and the humidity was negligible. As a result, the fire quickly got out of control. The topography, the microclimate, and the difference in the fuel, in vegetation species, and in development stages due to previous fires, created strong descending winds and multiple fronts. Fortunately, the children camping sites of Ag. Andreas and the Lyreio Children's Institution were evacuated quickly. At 17:50 the fire reaches Neos Voutzas. The abandoned, dense vegetation along the stream corridors and the plots, were open fuel-ways for the fire.

Meanwhile, the police decided to close Marathonos Avenue shortly before 18:00. With this act, they sent the cars from Marathonos to the smaller roads of Mati. The labyrinth of roads made people get lost and trapped in the narrow alleys.

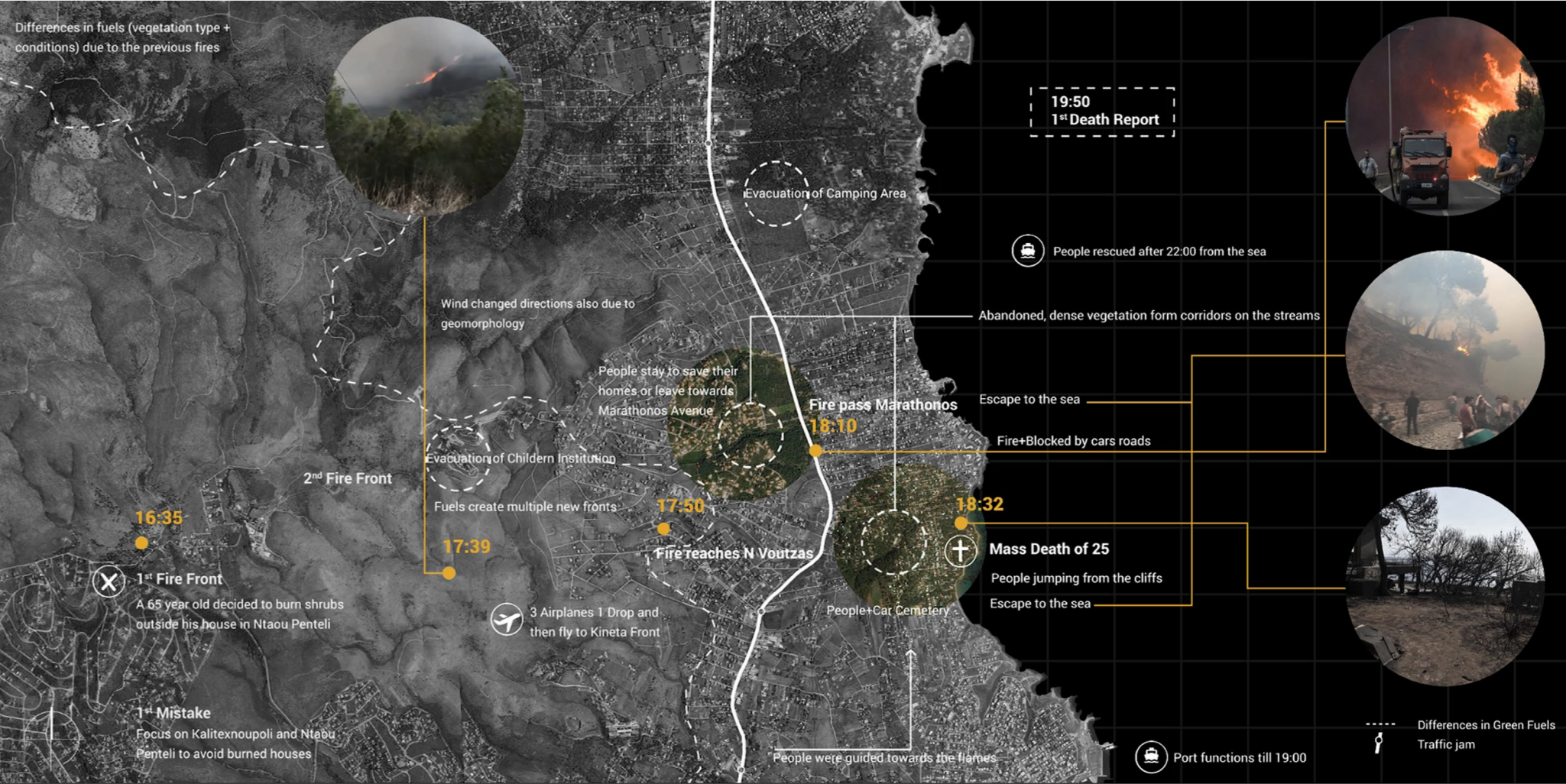
At 18:10 the fire passes the Avenue. It was supposed to work as a fire break. It didn't. The *Pinus Pineas* planted 15 years ago on the right and left of the boulevard had become large trees and in direct contact with the *Pinus*

halepensis. Two highly flammable tree species looking side by side and across the road.

The fire after passing the Avenue and finding so many fuels in the built environment was catastrophic. Due to the rapid spread, many residents and vacationers did not have time to react and either were trapped and burned in their homes or lost their lives trying to escape on foot or by cars. *'I cannot explain how many burned cars were there. It was impossible to reach the port of Mati'*, says Georgia, a resident of Mati. The sea was indeed the only escape. However, it wasn't easy to reach. Due to the lack of urban planning, the privatization of the coast, and the very few public, narrow paths towards the sea, made the coast difficult to reach or totally inaccessible. People were jumping from paddock to paddock, running between burning trees, cars, and houses, within a Hell, as Georgia says, to jump from the cliffs and escape the fire...

Some managed to survive, some not. A group of 25 people was found dead, on a plot by the sea. They could not find their way out, they were trapped there, they drowned in the smoke, and they burned a few meters from salvation...

The fire reached the coast and there was nothing else to be burned and so it went out. But this wasn't the end. The people that survived, along the creeks of Mati, sat inside the water for hours. *'We sat there for endless hours, the scenery was tragic'*, says Georgia. After many hours, small fish boats started to approach the creeks. Then rescuers came from the land. The rescuers were saying not to look down...



| Fire Narrative | Investigation Map

‘They were saying be careful you are not wearing shoes, and we hadn’t even noticed that. We were just in the corner of my neighborhood. Everything was black. I couldn’t recognize anything. It was a foreign, alienated landscape. It was like in movies, a war zone. I couldn’t believe it’, Georgia

One day later, *‘Mati looks like a ghost town, its people are ghosts too. They look around, and at each other, with glassy eyes. The glassy eyes of death. Even if they are alive. They will never be as alive as they were yesterday. Something inside them will be dead forever’*¹, writes Argyropoulos in his book Μάτι: Πυρ και Ύδωρ [Mati: Fire and Water], (2020), about the shocking narrative of July 23, 2018, his own experience, the next day, the return to the place of destruction, the relief for the salvation, but also the guilt of the survivor, the one that managed to escape.

One day later, the destroyed houses, the burned hanging trees, the ashes, the smell, and especially the silence, or rather the *penetrating* dead silence, are the witnesses of the destruction.

Ten days later, workers and crews try to clean the streets, pick up the burnt trees and debris, stack the melted cars, restore the electricity network, volunteers help the survivors by providing the first aid and the basic necessities, even the animals that managed to escape.

One month later, people do not seem to give up, they try to recover quickly, to repair what was destroyed, to go back to their lives. But that is partly because of the human survival instinct, the system of the body that still has the adrenaline from the experience of such a shocking event, which pushes people to act, to have hope, to recover. However, soon consciousness appears, and the realization of what has happened is even more devastating. The wounds have not healed and will take a long time to heal.

One year later, the area is trying to return to normalcy. Even if not much has been done in the reconstruction of the area, in the infrastructure, the darkness of the first months no longer exists. The burned trees have been cut, the burned melted cars have been removed, the debris is collected by the inhabitants, the yards are painted, and small interventions try to give hope to people. And even if nature makes its first steps to its recovery, the traces are still there, tangible left-over objects, or intangible images that resurrected and lead to the revival of the event, of the painful memories.

Three years later, the grief is still evident, the loss is not easily overcome. But along with the stages of mourning and grief, anger pervades. The anger for the unjust death of your own people, the destruction of your place, your life, your soul, which has been caused by mistakes, by mistakes of people, which could have been avoided. The shocking revelations about trying to cover up the crime further exacerbate the situation. Residents know how the disaster could have been avoided, in the beginning, or much earlier before it even starts.

The state apparatus tried to abdicate its innumerable responsibilities and to blame the citizens for alleged omissions and irregularities that the same state knew and tolerated for decades. Responsibilities must be taken by the fire department for the chaotic reaction, lack of coordination, and misjudgment of the danger of the situation from the beginning, by the police for the unpreparedness, and for the wrong, criminal judgment and decisions taken, by the Port Authority for the delayed action during the state of emergency, from the District and the Civil Protection Service, and the

mayors and deputy mayors of the areas, for the lack of readiness, information, and action, as well as the situation of the area in terms of urban non-planning, green management, protection of forest areas in cooperation with the Forest Service, and the legal framework governing construction. Currently, the case of the 2018 Mati fire tragedy is in the hands of Justice.

However, *‘No, our wounds have not healed’*, says Loukas Dalaklis², no the landscape is not and maybe even not be the same again. And these are two challenges important to investigate further, to research and explore whether and how landscape architecture can contribute to finding solutions, in recovery.

For the above text, information has been used from the following online articles: iefimerida. (2019, July 22). Το Μάτι ένα χρόνο μετά: Το οικόπεδο της φρίκης, οι παραλίες, τα καμένα, όπως είναι σήμερα [εικόνες] [The Eye a year later: The plot of horror, the beaches, the burned, as it is today [images]. NEWSROOM IEFIMERIDA.GR. <https://www.iefimerida.gr/ellada/mati-enas-hronos-meta-eikones>. Moreover, testimonials from the interviews I took were used.

1. Argyropoulos, G. (2020). Μάτι: Πυρ και Ύδωρ [Mati: Fire and Water]. 1st ed. Marathia.
2. Raptis, C. (2020, July 23). Μάτι 2 χρόνια μετά: Συγκλονιστικό οδοιπορικό του in.gr – Τι λένε σήμερα οι κάτοικοι [Mati 2 years later: Shocking journey of in.gr - What the residents say today]. In.gr. <https://www.in.gr/2020/07/23/greece/mati-2-xronia-meta-syngklonistiko-odoiporiko-tou-gr-ti-lene-simera-oi-katoikoi/>



Figure 4. Photos from Mati, July 23rd 2018.

READ : The Human Trauma



| Experiencing the Fire

Psychological trauma is a response to an event that a person finds highly stressful, and is a term that before the 20th century was used within a medical and psychiatric context (Pedović & Hedrih, 2019). Examples of such events include being in a war zone, experiencing a natural disaster, an accident, or any form of violence or abuse. In general, trauma is often the result of an overwhelming amount of stress that exceeds one's ability to cope or integrate the emotions involved with that experience¹. Trauma is the sum of the event, the experience, and the effect, a physical or/and non-physical injury that has permanent consequences (Pedović & Hedrih, 2019).

In the case of Mati, the individual trauma is caused by the experience of the fire disaster, the loss and grief of family and friends, material property, and the distraction of the landscape identity, the familiar image of the place attached to people's lives. This unprecedented destruction has brought unprecedented trauma and for many of the survivors, recovering from it will require much more than replacing the physical items and it can take years to heal the mental trauma of surviving a fire like this², since psychologists indicate that trauma gets burned into the mind, like the imprint of a branding iron, it burns in the mind³.

Immediately after the fire, people felt fear, anxiety, they experienced sleeplessness and shallow breathing. All these symptoms are a natural response and are part of our body's survival mechanism, but the problem is when very often our brain keeps bringing to the surface these reactions, keep being in survival and mourn mode, leading to Post-traumatic Stress Disorders (PTSD), a disorder that is more often associated with military

veterans and domestic abuse victims, but nowadays it is happening more and more frequent to anyone who experiences an extreme amount of stress⁴ (Taheri, Shabani & Sichani, 2019). One example that illustrates the result that the trauma derives from, is the panic of a narrow space.

A recent study by Irva Hertz-Picciotto (2018), director of environmental health sciences at UC Davis, pointed out that about 60 percent of wildfire survivors experience increased anxiety and stress, the precursors to PTSD⁵.

Focusing on the event of a fire, wildfires, urban fires, forest fires, are particularly traumatic because of their unpredictability, according to the U.S. Department of Veterans Affairs. They spread quickly, they affect large areas, and they 'force' residents to make crucial yet snap decisions and to experience traumatic events.

According to Regardt Ferreiri, professor at the Tulane School of Social Work in New Orleans, recovering from the first symptoms could take six to 12 months, even with treatment, but if these symptoms are not treated immediately, the recovery time could take much longer. 'You might be going on autopilot for months or even years', explains Ferreiri, and then some trigger, a smell, a sound, a voice, an image brings back the traumatic memories, and the PTSD kicks in⁶ Moreover, this happens because often people still have adrenaline after the fire event and they believe they are ready to get through it, being very positive and energetic, but after the six or twelve-month anniversary they realize it takes more time to recover and rebuilt the tangible and intangible scars, and so stress heats back and PTSD symptoms appear.

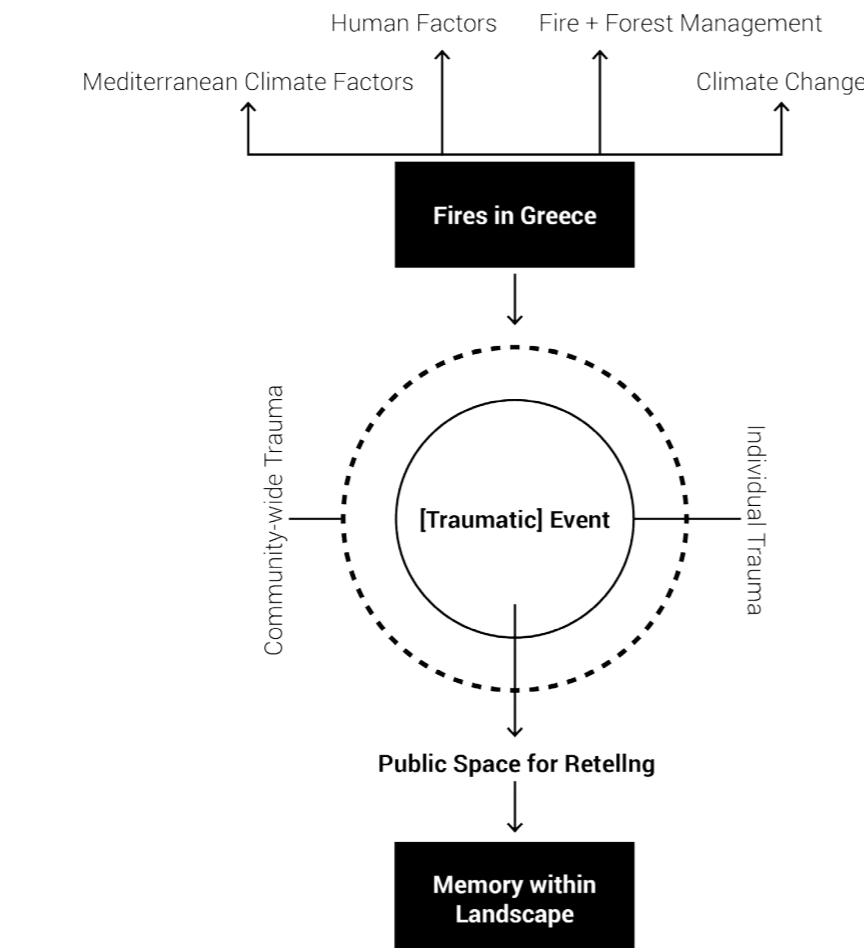
In Greece, where the forest fires is a yearly event as a result of a combination of the already existing Mediterranean climate, the increasingly dangerous climate change, and the human actions, it seems that it is something that will keep happening, leaving a common ‘signature’, the black ground and white ash, the jagged trees and the ruins every time.

And when an entire neighborhood, a town, a community, experience the event and so the effects at the same time, the results are what psychologists call ‘community-wide trauma’ and ‘collective mourning’, with the latter being no different in stages than any other form of mourning. And ‘trauma shared by a whole community creates a potential public space for retelling. If a community agrees traumatic events occurred and interweaves this fact into its identity, then collective memory survives and individual memory can find a place within that landscape’ (Kirmayer, L.J., 1995, p. 25), a place where both can be expressed and healed.

However, it is not only the close experience of the traumatic event from an entire community that creates the collective trauma and memory, but also the distanced, secondary witnessing, the selective presentation, and information that the media transfer nationally that retransmit the pain and loss, and emphasizes the need for support and compassion.

As a result and conclusion, in the case of Mati there is the challenge of a general human trauma that includes the individual, psychological trauma, and the collective-community-social trauma, both caused by, in this case, a natural disaster, the fire, and including its results, such the Post Traumatic Stress Disorder. This fire event was a national tragedy that has been engraved on Greek

history, not only because of the traumatic event itself, but mostly because of the memories of it, and only ‘when these memories return to their rightful places, in the collective consciousness’⁹ (Pedović & Hedrih, 2019, p.30), the trauma can be healed.



| Fire-Individuals-Community-Landscape Relation

After reading, re-watching, and conducting interviews after the catastrophic fire, one and two years later, all testimonies underline that nothing, but also everything turns people’s minds back. Is it the trauma, are they the memories, or are they the ruins that revive the event?

According to the residents, the tourists, in general, avoid the area, or others come out of curiosity.

‘I am tired of being pointed at, like a monument of horror ... I have chosen to be optimistic and to believe that at some point normality will return, all this will be somewhat forgotten. But, it needs patience, it takes time ...’ says Giannis (tavern owner in Asimenia Akti).

Marathonos Avenue has begun to reunite the area: houses and buildings have been painted and rebuilt, hotels and most shops have reopened. What has changed after two years?

‘Nothing. The only substantial change is that most of the trees were cut down and removed. Our municipality is, as always, non-existent: it does not clean the streets, it does not collect garbage. It can take up to a week to collect anything. If something will happen again, we will definitely be burned again’.

‘Politicians have been telling us for a long time that the Athenian Riviera will be built here ... And what happened? A tomb for everyone ... Only the locals go down to the sea. And those Athenians who pass by here take quick photos with their mobile phones and disappear. And they ask us: What happened here? Where were you that night? How many times to answer this question? I do not want to remember, I want to delete that night and all the nights

that followed’, says Petros, a permanent resident. And one word can exactly describe that, trauma.

The answer to the question of whether they recovered, 2 years later is: *‘No, our wounds have not healed. The hell we lived as a family, I will never forget. Five hours inside the house with wet towels for the smoke, anxious, lest the windows break and we find ourselves in what we saw outside, in the explosions, and in the fire’*, says Loukas Dalaklis. *‘What is certain is that Mati is nothing like the Mati we knew from our childhood. Dry, deforested, desolate, ugly. Our wounds are still bleeding’*, says local resident and writer Giorgos Spanos, *‘there is still a lot of pain, and a lot of anger, towards everyone’*. *‘All the residents are examples of resilience, because of what they went through, not only that day, but during the months after the tragedy’*, he added⁹.

Mr. John, another resident was staying with his family in the Air Force summer residences after the fire. *‘The hospitality is exemplary, but it remains hospitality. Our city must be rebuilt and we must return home. And for that to happen, you have to not forget us, you have to show the world what happened and what is happening’.*

And despite the fact that it is nature that makes wonders in Mati soon after the fire, with shrubs and flowers flourishing among the ruins, small freshly planted trees, trees that bud again, it is other crucial testimonies that explain a result of the traumatic event that shows a damaged relationship between people and elements of nature, so nature itself.

Many people, who regardless living the agony from afar and fortunately without the slightest loss, except material damages, are fighting the fires through descriptions of their own people that are enough to create a special relationship of terror and fear with the fire and nature for a long time, to create a phobia, pyrophobia, a fear of fire, which can be considered irrational if beyond what is considered normal¹⁰. And even if this phobia is partly one of the most common phobias, originating from ancient and primal human fears, so most of the time hidden deep in the subconscious, a traumatic experience with fire¹¹, such as having to escape a wildfire, can trigger pyrophobia in a person, bringing it back to the surface.

This fear is then linked to the phobia of nature. Fire is part of nature, and people after experiencing a seemingly natural disaster, even if it is not, distance themselves from it in order to protect themselves from another, possible, natural disaster. Fire is dangerous, fire happens in forests, forests are nature, so nature is dangerous. An *absurdity*, maybe, that is through reality

and is observed in this case.

Going back to the Mati fire, everyone agrees that as the days go by and the tragedy moves away from the limelight, the greater the need for all Greeks to remember what happened that afternoon and evening of July 23rd, 2018. Mati must not be forgotten and in fact, it must be a serious case study by the competent bodies so that in the future we do not mourn so many souls again.

| Child Intervention in Mati



1. Leonard, J. (2020, June 3). What is trauma? What to know. Medical News Today. <https://www.medicalnewstoday.com/articles/trauma>
2. Frontline Wildfire Defense System. (2020). Coping with Emotional Trauma after Fire, left Untreated, Trauma of Wildfire Can Lead to PTSD. <https://www.frontlinewildfire.com/surviving-the-trauma-wildfires-emotional-toll/>
3. Stern, J. (2020, July 20). A Mental-Health Crisis Is Burning Across the American West, each fire season can compound the trauma of the one before it. The Atlantic. <https://www.theatlantic.com/health/archive/2020/07/mental-health-aftermath-california-wildfires/608656/>
4. Taheri, S., Shabani, A., & Sichani, M.G. (2019). The Role of Therapeutic Landscape in Improving Mental Health of People with PTSD. Psychological Trauma, Ana Starcevic. IntechOpen. 10.5772/intechopen.86543.
5. Frontline Wildfire Defense System. (2020). Coping with Emotional Trauma after Fire, left Untreated, Trauma of Wildfire Can Lead to PTSD. <https://www.frontlinewildfire.com/surviving-the-trauma-wildfires-emotional-toll/>
6. Frontline Wildfire Defense System. (2020). Coping with Emotional Trauma after Fire, left Untreated, Trauma of Wildfire Can Lead to PTSD. <https://www.frontlinewildfire.com/surviving-the-trauma-wildfires-emotional-toll/>
7. Kirmayer, L. J. (1996). Landscapes of memory: Trauma, narrative and dissociation. P. Antze & M. Lambek (Eds.), Tense Past: Cultural Essays on Memory and Trauma (pp. 173-198). London: Routledge.
8. Pedović, I. & Hedrih, V. (2019). Social Trauma and Emotional Attachment. Philosophy, Sociology, Psychology and History, 18, 27 – 37. <https://doi.org/10.22190/FUPSPH1901027P>.
9. Doulgkeri, F. (2020, July 23). Greeks haunted by Mati fire tragedy, two years on. Euronews. <https://www.euronews.com/2020/07/23/greeks-haunted-by-mati-fire-tragedy-two-years-on>
10. Pyrophobia. (2021, January 19). In Wikipedia. <https://en.wikipedia.org/wiki/Pyrophobia>
11. Fritscher, L. (2020, January 30). Understanding Pyrophobia or the Fear of Fire. Verywellmind. <https://www.verywellmind.com/what-is-the-fear-of-fire-2671887>

READ : The Landscape Trauma



| Landscape Desertification

The Landscape Trauma is the ecological and spatial trauma of the landscape after the fire. It includes the direct and indirect tangible consequences of the fire, such as the partial or total destruction of the vegetation, the later floods, soil erosion, and effects on air quality, and the indirect tangible landscape degradation when fires are repeated at relatively short intervals in the same place.

In order, though, to best explain what landscape trauma is, and what factors can cause a landscape trauma, the term, and explanation of secondary succession needs to be mentioned first, as fire is often part of this cycle as the key disturbance factor.

Secondary succession is a type of ecological succession, in which flora and fauna recolonize a habitat after a major disturbance, such as the (wild)-fire, a disturbance that significantly alters an area but does not render it completely lifeless¹. Even if fire seems to only ruin the landscape, destruct everything alive on and in it, disturb the biological communities, and create a seemingly lifeless scape, the soil absorbs the nutrients produced by the decomposed living or non-living things, and the seeds that were buried for a short or long time can now sprout quickly, having also a greater success because of the reduced competition and shading. In this way, some species adapt in this frequent passage of disturbance, they gradually depend on fire, and become every time the dominant community, such in the case of Mati the *Pinus halepensis*. In short, fire plays an important role in the regeneration process and has another aspect that when is carefully, and appropriately ‘used’ it can lead to positive outcomes.

However, when the disturbance is massively catastrophic, then it effectively eliminates all the biological activity in the area². Losses in human lives but also in animals, homes, and facilities, losses of acres of agricultural and forest land, which in Greece correspond to 1.2 acres per inhabitant and to a 78,8% percentage of burned forest lands, something that makes the forest fire the first factor for the degradation of the natural wealth of the country, since the rates of recovery of natural ecosystems are at the same time relatively slow³.

As I mentioned above, the fire directly affects the vegetation, the soil, and the slowly moving fauna. When a fire occurs, the burned ecosystems do not have, in total or partially, vegetation for periods lasting from months to years. During this period, the bare soil is exposed to wind and rain erosion and degrades. At a larger scale, the vegetation cover changes resulting in the change of the rain retention from the canopy of the trees, a decrease in the infiltration of rainwater into the soil due to a lack of absorption by the root system, and a change in evaporation. Thus, the structure of the landscape becomes more homogeneous, the production of sediments, and the flow of nutrients changes with a frequent increase in the outflow of rainwater, in the redistribution of soil materials along the slope of the hill. So, as mentioned before, during the first or two years after the fire, the risk of flooding and sedimentation is very high. The risk of damage to infrastructure and the population from landslides and mudslides is also greatly increased.

Tangible Direct Consequences



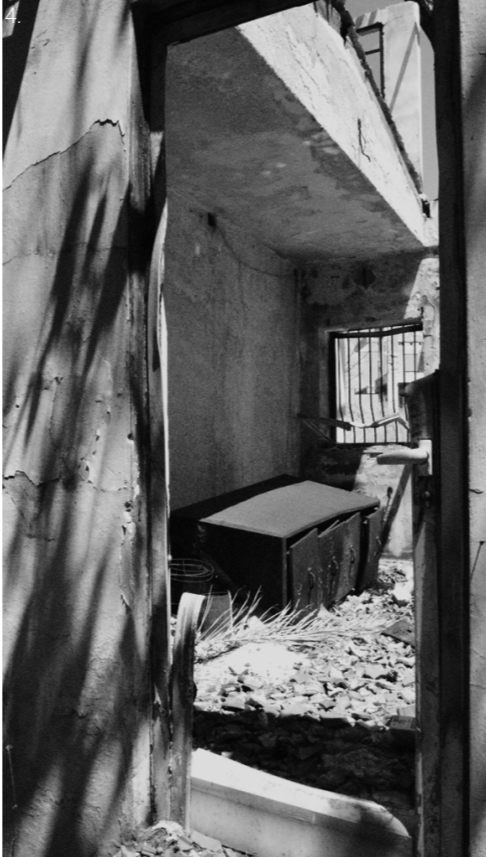
Loss of Human Lives



Loss of Fauna



Loss of Flora



Loss of Property

Tangible Indirect Consequences



Floods



Soil Erosion



Pollution

Figure 5. Photos from Mati, July 2018, January 2021

In short, the fire causes destruction of the above-ground biomass, drastic reduction of the organic matter in the soil surface, the disappearance of the beneficial effects of biodiversity, loss of animal life and destruction of the species' habitats, and degradation of the soil due to the loss of organic matter, nutrients, and nitrogen. As a consequence of all, there is more drought and more surface runoff and erosion⁴.

And the impact of the fire, its aftermath, and the severity of these consequences depend to a large extent on the size and recurrence of the fire.

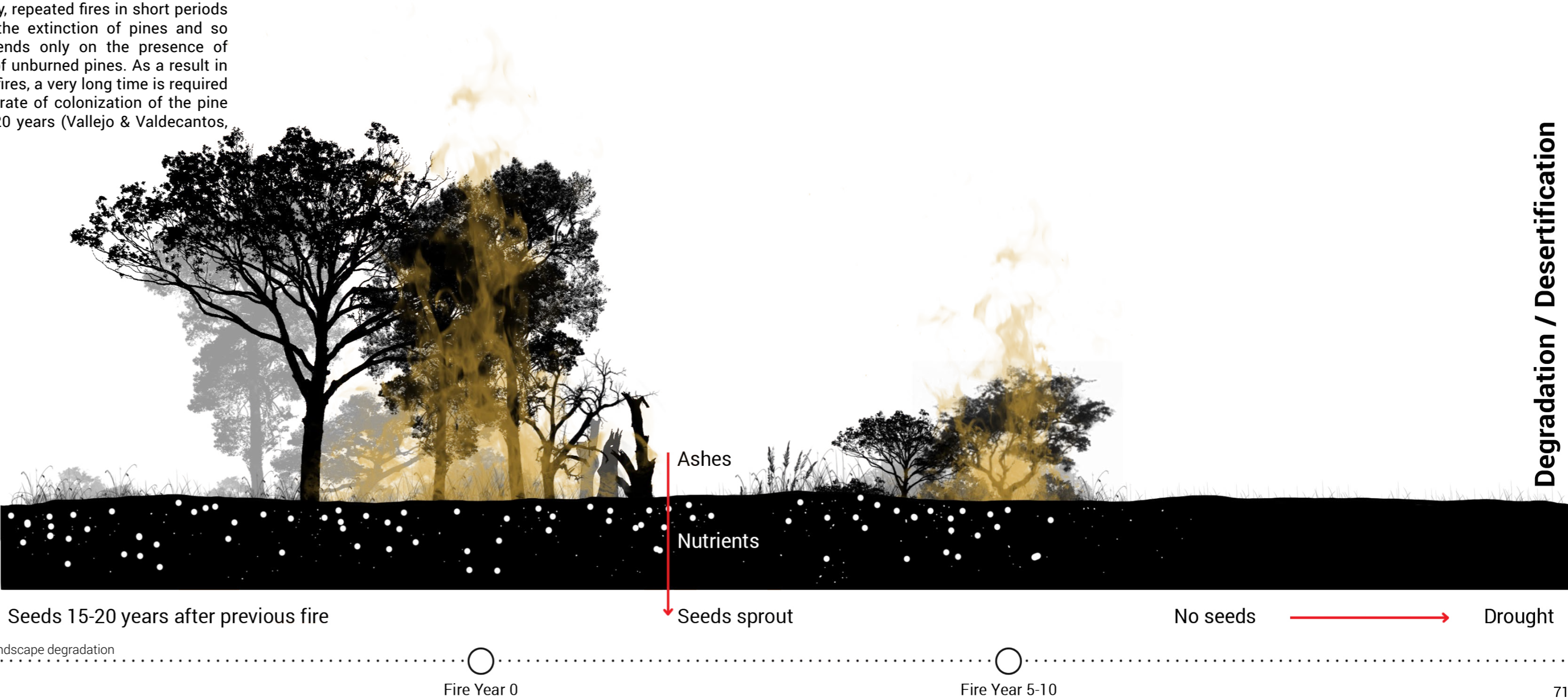
Large fires create high temperatures on the soil surface and lead, in contrast to the first state that fire is part of the process and creates positive effects on the landscape, to the loss of organic matter and nitrogen from the surface soil. Thus high-intensity fires can cause degradation of the entire soil structure⁵. The microflora and fauna of the soil are directly affected by the fire due to the effect of heat and the change of their natural environment. As a result, the composition, structure, and function of soil components lose their balance and are very different from the situation that existed before the fire.

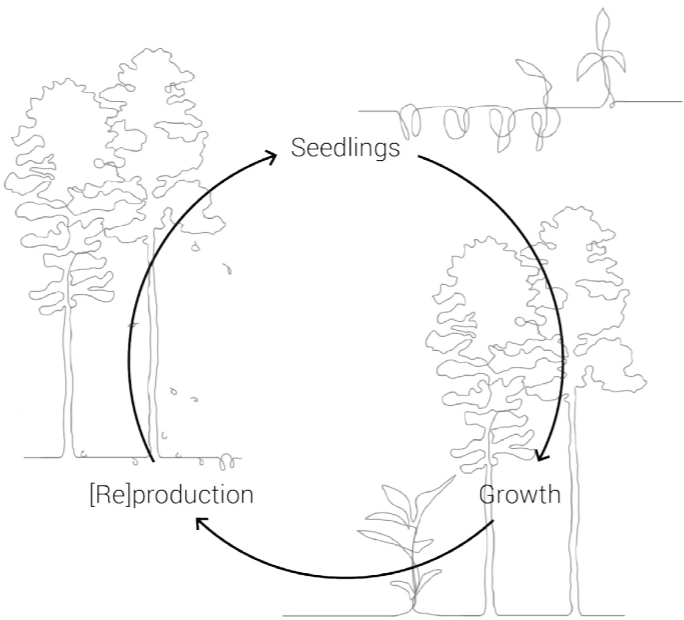
Recurrent fires increase nutrient losses that may not have been restored during the period between fires. The result of this imbalance is a reduction in soil fertility.

In the case of the Mediterranean pines, therefore in the case of the specific area of this project, the production of seeds from the regenerated plants is usually achieved 15 to 20 years after the fire ⁶ (Radoglou, 2001) . Therefore there are no seeds in the soil during

this period. In that way, repeated fires in short periods of time can lead to the extinction of pines and so their restoration depends only on the presence of neighboring clusters of unburned pines. As a result in the case of extensive fires, a very long time is required for recovery, with the rate of colonization of the pine around 25 meters in 20 years (Vallejo & Valdecantos, 2009).

| Indirect Consequences | Landscape degradation





In conclusion, in order to heal the landscape, a landscape that depends on fire, from its trauma, to help it recover, *‘there must be sufficient time between successive fires for the seedlings to mature and produce seeds and hence replenishing soil and canopy seed banks’*⁷ (Vallejo, Arianoutsou & Moreira, 2006), give landscape and nature time to heal, and make sure that no early, large, uncontrolled fires, caused by human actions, occur.

1. Secondary succession. (2019, August 2). In Britannica. <https://www.britannica.com/science/secondary-succession>
2. Secondary succession. (2019, August 2). In Britannica. <https://www.britannica.com/science/secondary-succession>
3. Tsagari, K., Karetos, G., & Proutsos, N. (2011). Δασικές πυρκαγιές Ελλάδας, 1983-2008 [Forest fires in Greece, 1983-2008]. WWF Hellas and ETHIAGE-IMDO & TDP.
4. Radoglou, K. (2001). Αποτελεσματικότητα της Φυσικής αναγέννησης στην αποκατάσταση Μεσογειακών πεύκων μετά από πυρκαγιά [Effectiveness of natural regeneration in the restoration of Mediterranean Pine ecosystems after fire]. Proceedings of a Scientific Two-Day Conference Restoration of burned areas. General Secretariat for Civil Protection Athens. <http://www.env.upatras.gr/files/announcements/a4.pdf>
5. Kapsoroulou, E.V. (2015). Μελέτη δυνατότητας φυσικής αναγέννησης και κινδύνου διάβρωσης μετά από δασικές πυρκαγιές. Περιοχή μελέτης Δήμος Πωγωνίου [Study of possibility of natural regeneration and risk of erosion after forest fires. Study area Municipality of Pogoni] [Master's thesis, National Technical University of Athens]. https://dspace.lib.ntua.gr/xmlui/bitstream/handle/123456789/40865/kapsoroulou_dasikes%20pyrkagies.pdf?sequence=1
6. Radoglou, K. (2001). Αποτελεσματικότητα της Φυσικής αναγέννησης στην αποκατάσταση Μεσογειακών πεύκων μετά από πυρκαγιά [Effectiveness of natural regeneration in the restoration of Mediterranean Pine ecosystems after fire]. Proceedings of a Scientific Two-Day Conference Restoration of burned areas. General Secretariat for Civil Protection Athens. <http://www.env.upatras.gr/files/announcements/a4.pdf>
7. Vallejo, R., Arianoutsou, M., & Moreira, F. (2006). Fire Ecology and Post-Fire Restoration Approaches in Southern European Forest Types. Restoration of burned areas in forest management plans, 5, 93-119. 10.1007/1-4020-3760-0_22

READ : The Region-Northeastern Attica

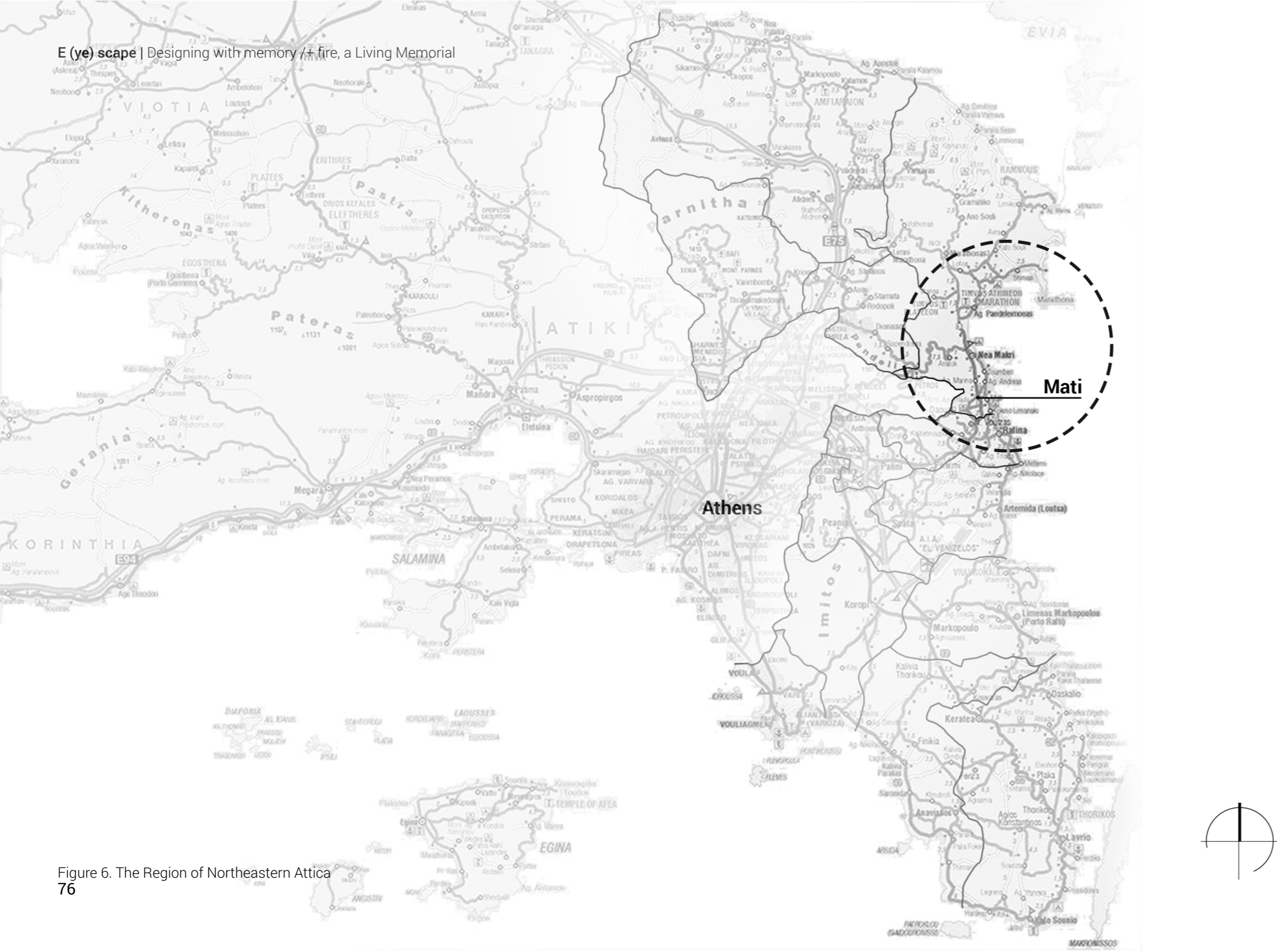


Figure 6. The Region of Northeastern Attica

The region of the eastern and northeastern Attica belongs to the Mediterranean, diverse natural landscape. It is a region that both man and natural factors have shaped.

The geological background of the wider study area consists of Indigenous Formations, such as Penteli Marbles, Alpine Background formations, and deposits from the Miocene and Pliocene. This composition has created an intense, complex terrain with the significant, dominant presence of mountain massifs, and more specifically the mountainous volume of Penteli.

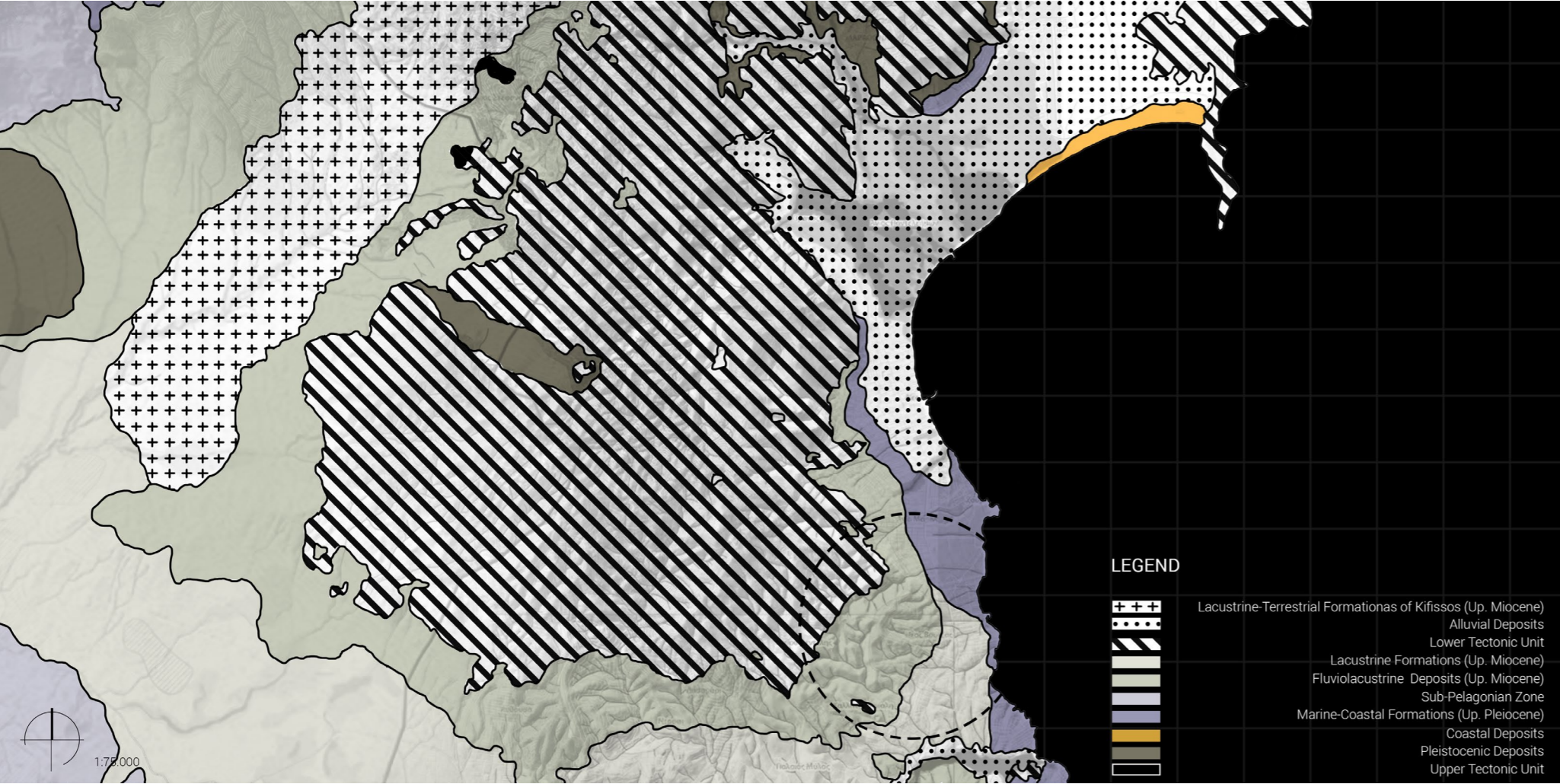
The combination of the soil materials and the morphology of the terrain, creates a dense complex of water structure, with springs and founts, streams, and rivers. And exactly around the altitudes of the sources for these water structures, most of the green volumes of forests are developing, with many parts being also wildlife shelters and protected areas by national or international laws. The Penteli Mountain is characterized as a Regional Park, to ensure the absolute protection of its natural ecosystems, which can be formed into a supra-local pole of recreation and culture, by highlighting the ancient quarries, the restoration and promotion of the landscape, and the protection of archeological sites. The Public Forest of Rapentosa has been designated as a wildlife shelter area, protecting bigger predators, while Schinias National Park is an area of great ecological value, which today is characterized as a national park and belongs to the Natura 2000 network, as there are formed swamps which are an important wetland, as well as one of the largest pine forests in Greece.

Smaller green patches can be identified within the urban environment, patches that are mainly left-over pine forests or neighborhood parks.

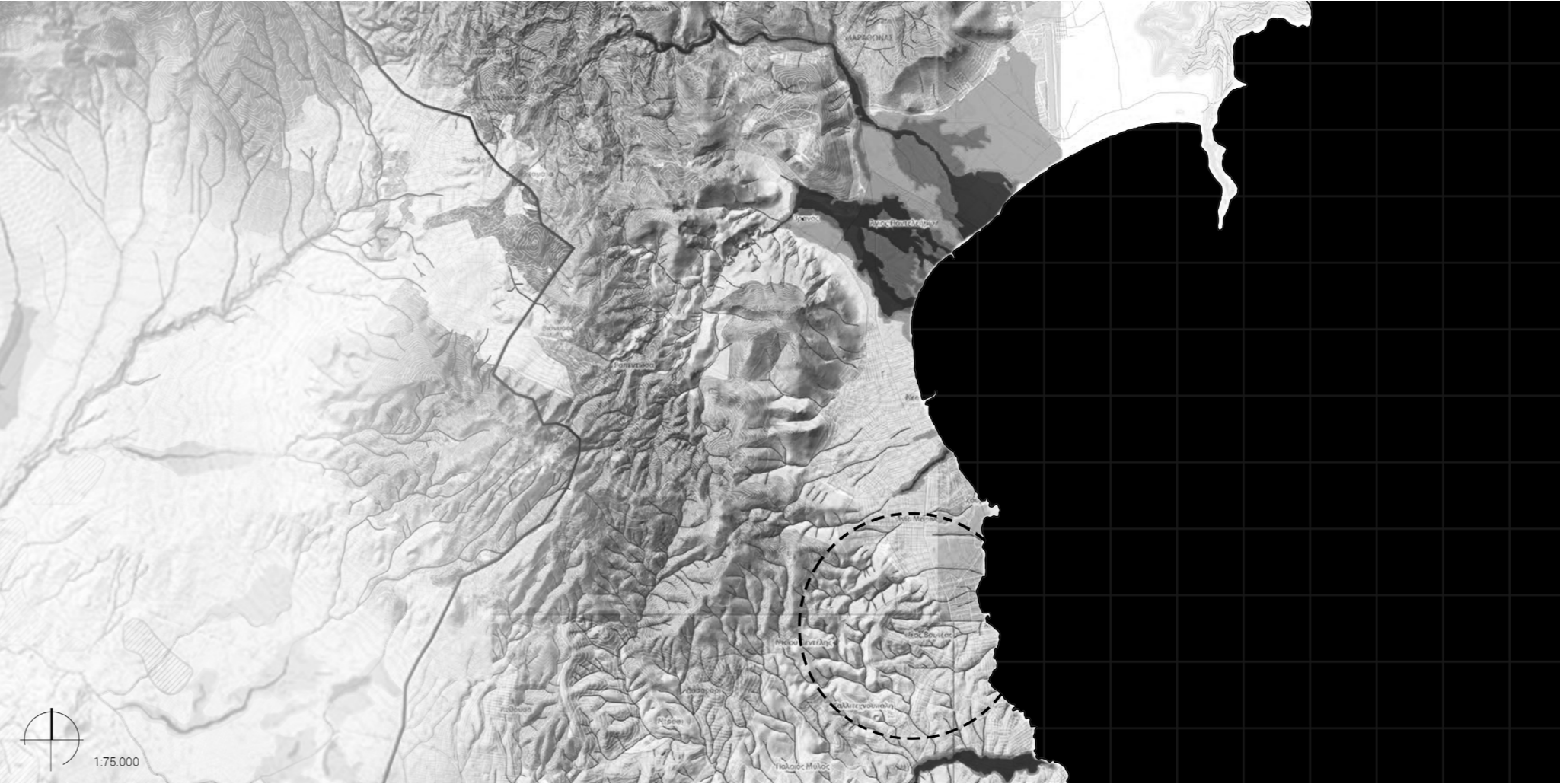
The climate in the area, as in general in the areas around the Mediterranean Basin, is warm to dry in summer, during the months from early May to mid-October, when the temperature value is higher than the rainfall value and cool to humid in winter. More specifically, based on the annual course of the average monthly number of storm days, the climate of the region is classified in the main transitional zone between continental Mediterranean and 'original' Mediterranean climates, with rain height between <400 mm and 400-600 mm on average, and warmer the month of August, with an average temperature of 28oC, while the colder month that of January, with an average temperature of 10oC. In addition, another important thing about the climate in the region is that during the hottest and coldest months the wind speeds are also the highest, making the dry season very dangerous for fire spreads.

There are though some variations on the microclimate of each area according to their terrain and the prevailing vegetation.

The coastal environment has also a significant morphological, biological and geographical diversity, but keeps declining due to urbanization and tourism throughout the years.



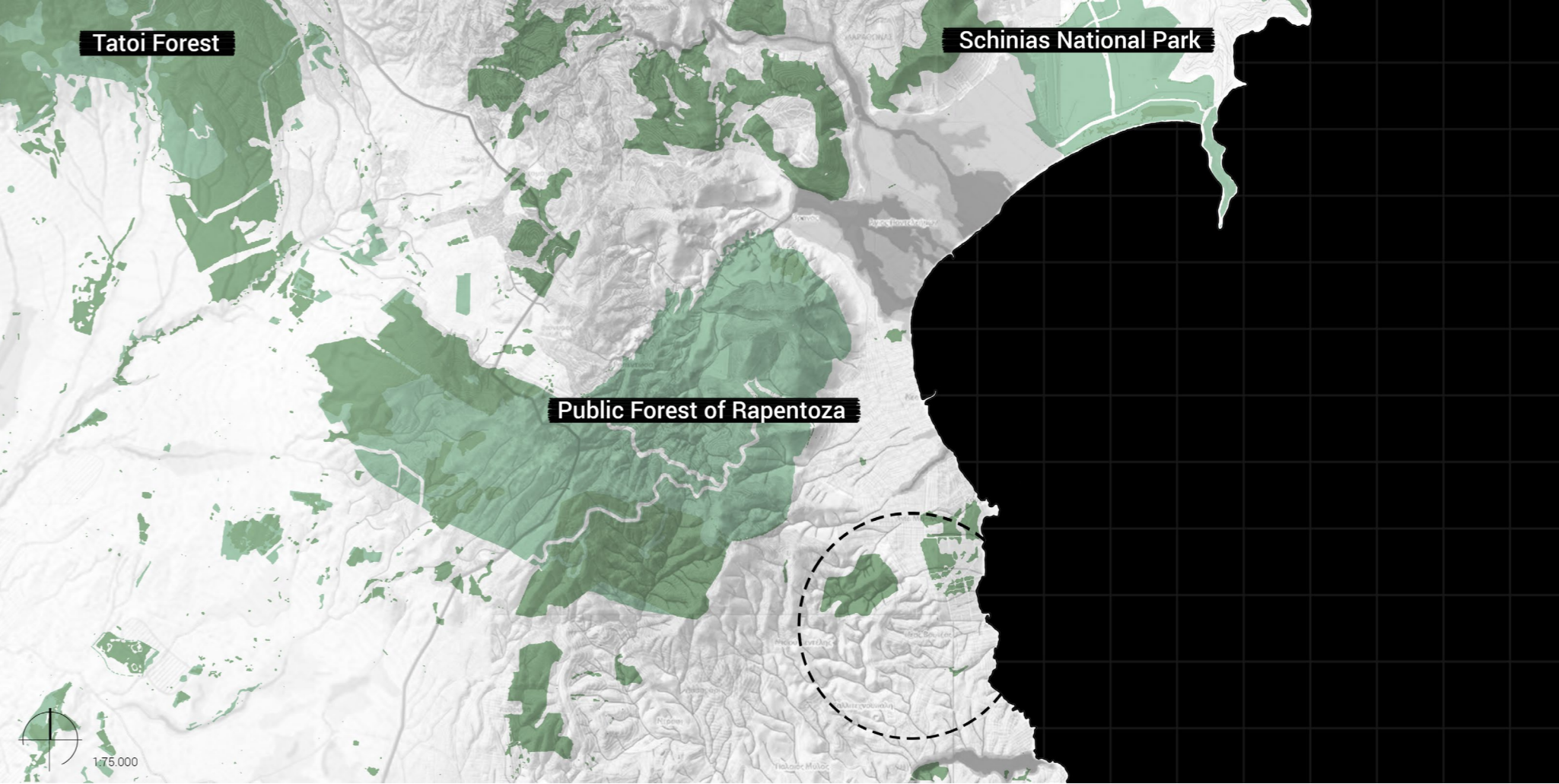
| Geological background



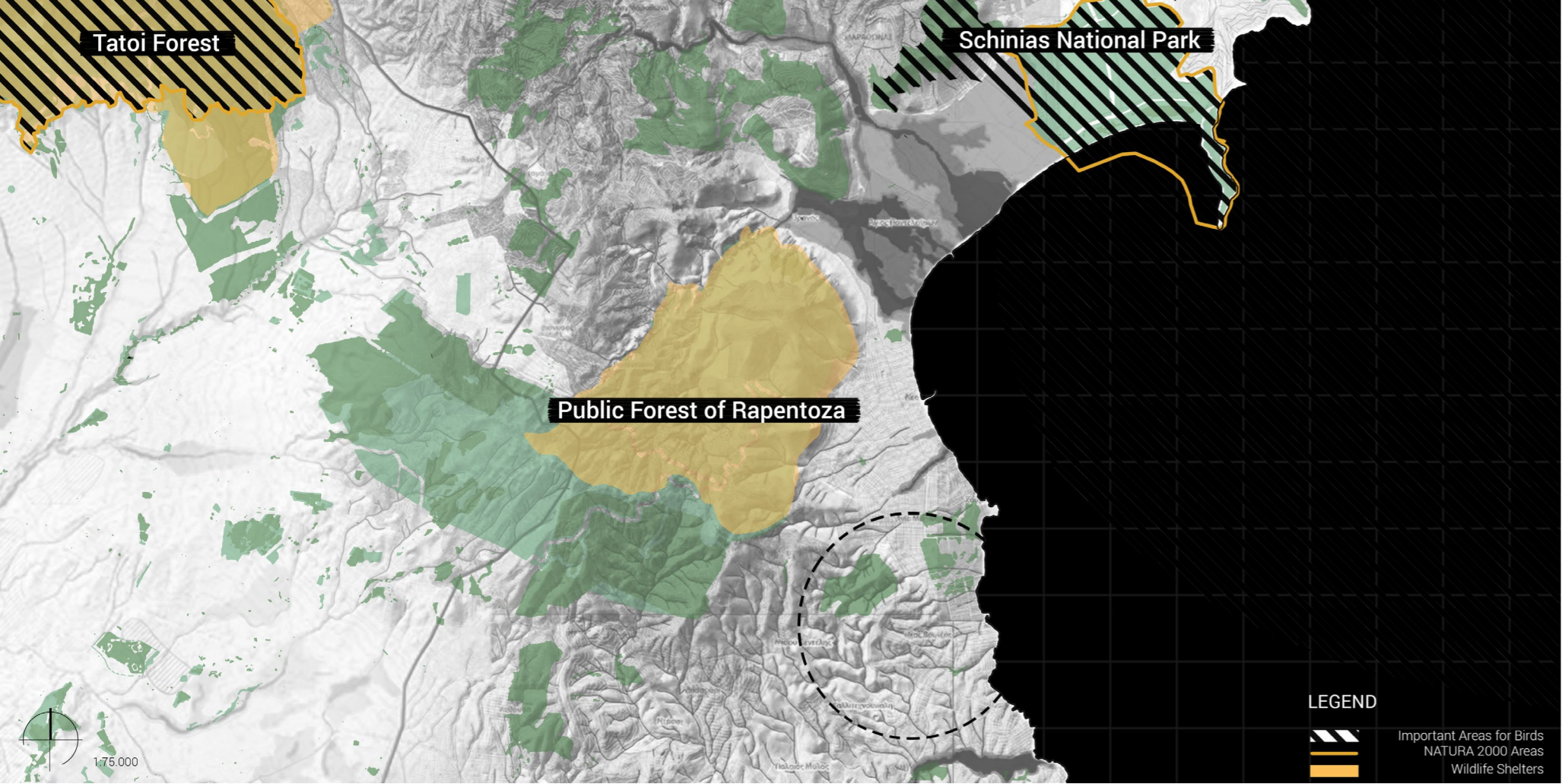
| Intense terrain



| Water structure



| Green volumes



I. Protected areas

The natural heritage of the region, however, cannot be understood separately from the cultural heritage. After 10,000 years or more of the coexistence of natural and man-made activities, most Mediterranean ecosystems, like this one, are inextricably linked to human intervention, leaving the future of biodiversity inextricable from that of human activities¹. This Mediterranean landscape is then a combination of nature and human, cultural action. In addition, as fire was and is part of the Mediterranean ecosystem and nature, it is definitely another part of this relation, nature-culture-fire. By looking back to the history of this triangle, many things, remarks can be made about the current situation.

5000-3000 BC

The ‘*Natural*’, primary state of the ecosystem of the region included two Mediterranean zones, the Quercetalia pubescentis, which includes the deciduous zone and small part of the evergreen zone, so the species there, were oak trees, quercus pubescens and quercus coccifera, at the higher grounds, and the Quercetalia ilicis along with the lower, coastal areas, which includes the evergreen zone, the macchia, and phrygana zone, and the olio ceratonion zone, so the species included cypress trees, pines, such as the *Pinus halepensis*, and the *Pinus pinea*, olive trees, Ceratonias, and many woody, short shrub species. In this period, the winters were cold, and rain and snow were happening at the higher altitudes, while the summers were warm and dry. The close-by mountain of Penteli and the wider region consisted of a geological stratification that kept the water on the surface. Slate and marble, materials that started to be excavated in the ancient quarries in order to be used for the construction of the Acropolis, hold the rainwater on the surface, along with the intense terrain, led to the formation of many springs and streams. In general, in this era, fire was only a natural disturbance, caused by lightning or natural resurgence in forests. Fire wasn’t used on large scale.

700-600 BC

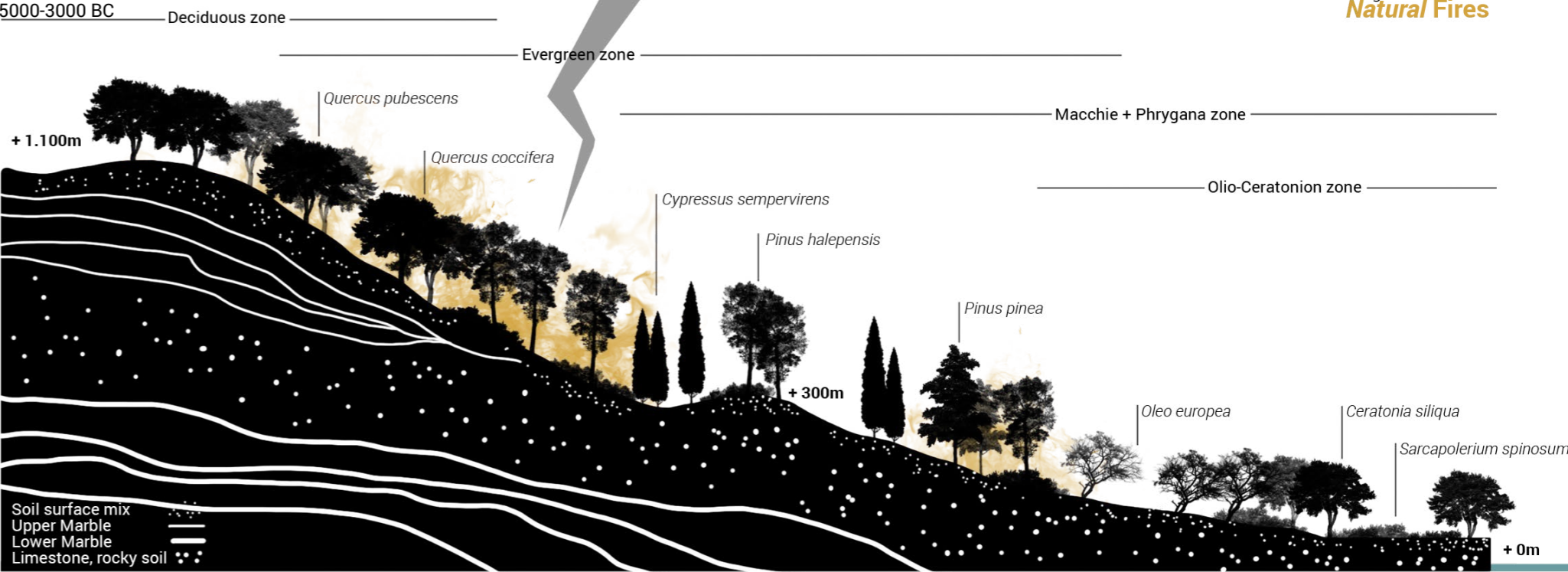
In this period, deforestation and mining were the prices for the survival and development of civilizations and culture. While the then religion referred to sacred, protected from gods, forests, there were also functional forests. The marble extraction led to bigger needs for wood, the wars led to more need for ships, wooden *trieren* (ships) that needed 100 acres of pine forests for one ship, and the rise of the population demanded wood that could be turned into coal as fuel material. However, rare was the use of fire as a deforestation tool. Instead fires kept being a result of natural events, and human mistakes. Moreover, grazing and agricultural practices kept the landscape maintained, but contributed to the slow landscape degradation. An important element on the landscape of the region then is the Marathonos route, the historical route of the Athenian soldier diary Pheidippides that after the battle of Marathon (490 BC).

600-0 AD

Plato wrote for the beauty of Attica: ‘...*only bones of a diseased body remained*’. This quote describes the state of the entire Attica region. After the long-lasting mining, extensive grazing, and deforestation during the wars, sedimentation was visible. The fires led to germination through the serotinous cones. Pines found the chance to spread in this ‘*bare*’ land, and the changing climate.

0-1000 AD

Fires kept occurring in this era, leading to an ecological adaptation. A big part of the vegetation was left to grow, having less grazing, but the same practices in agriculture and viticulture. Probably it is a period characterized by a change from exploitation to reconnection with nature.



1800-1930 AD

Coniferous forests are dominant in the region. These forests were used for hunting by the religious communities, monasteries that owned big parts of this landscape. Around the lower grounds, macchia and phrygana were the only habitats due to the grazing. However, sparse but dense coniferous forest patches could be found. Fires due to human mistakes, as well as activities, such as agriculture (burning the waste disposal, control diseases, and manage the land and crops), are happening in this period.

1930-1950 AD

In these difficult times, many changes took place. Migration led to the creation of large ephemeral settlements around the area. The land began to be distributed in plots, based on the previous agricultural pattern. The practice though didn't stop. Despite the large-scale changes in the landscape in specific areas, a landscape abandonment could be observed.

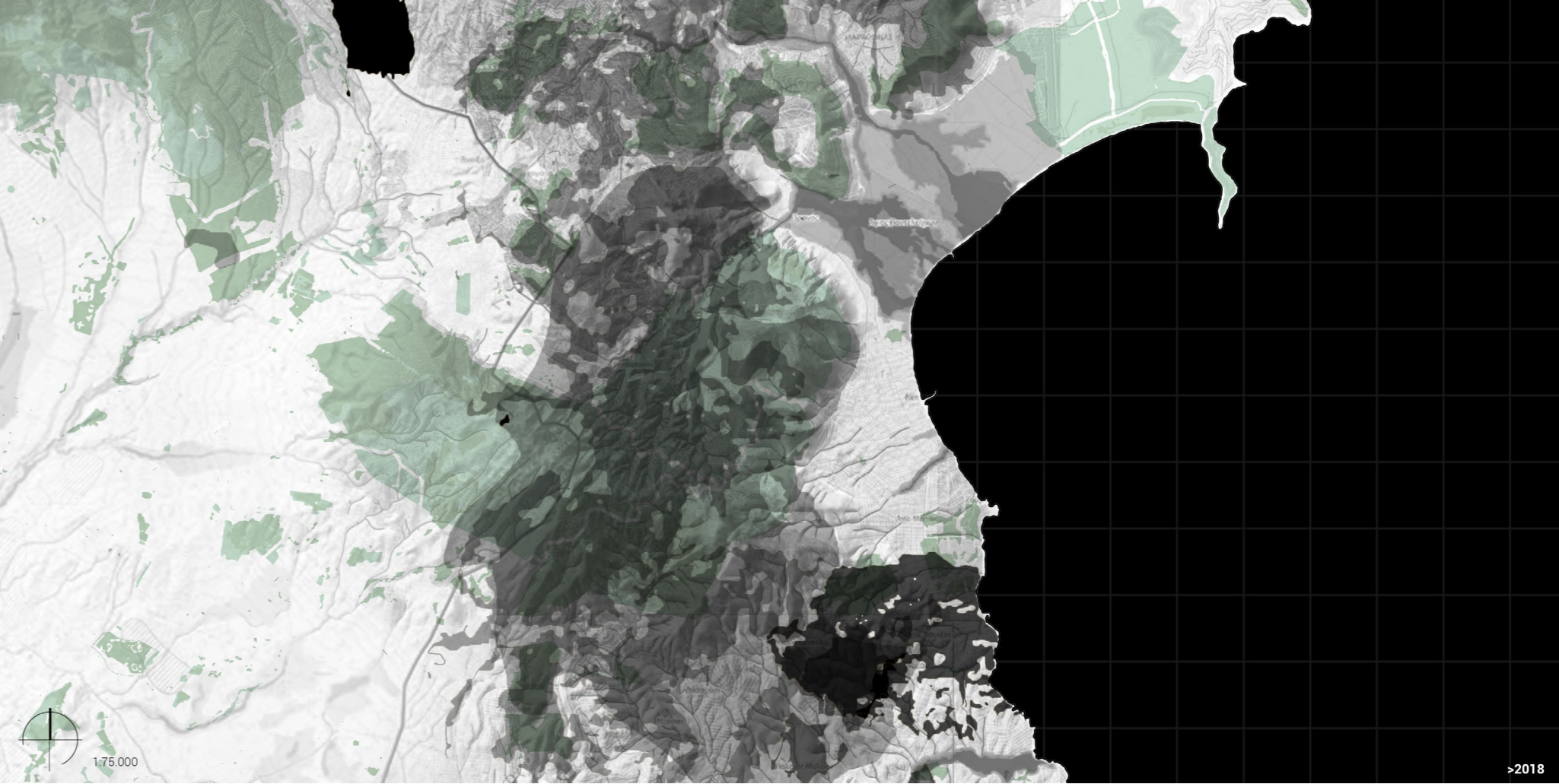
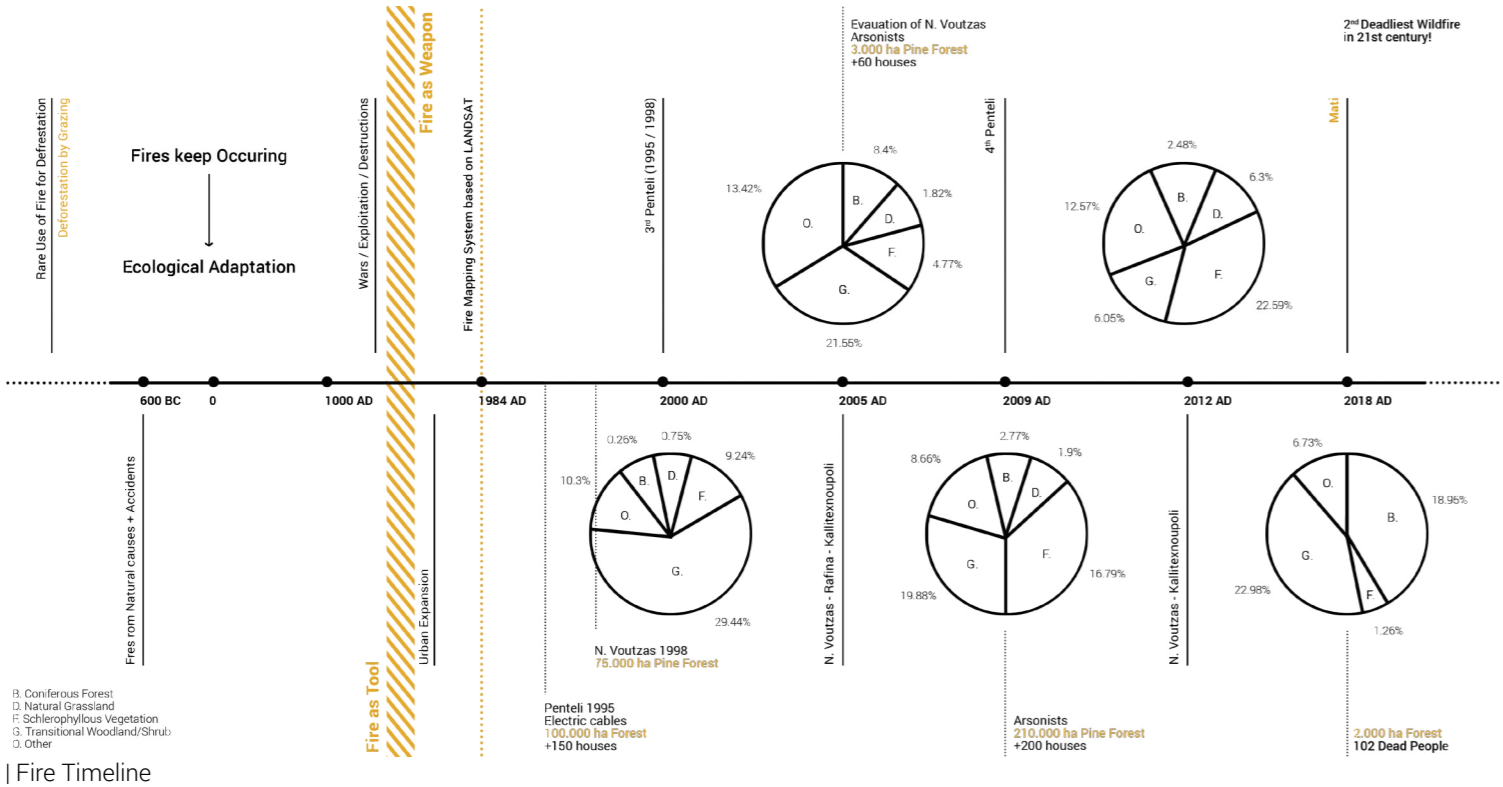
1950-1990 AD

The increase in population after the wars, the urban sprawl, and the trend for ephemeral, second homes in the suburban interface, was done in an *'arbitrary planning method'*. Holiday housings, touristic, coastal structures, and *'anarchic'* vegetation within the urbanized areas are visible. However, fires, especially in this period, have become a *'weapon'*, used in order to claim land, to create more space, taking through the space of forests, most of the time illegally. Due to the development of science, and the institutions of landscape management and protection, in this period there is a record of fires, which helps to identify things happening historically, fire regimes, patterns, etc.

1950-1990 AD



In more recent years, human activities, intentionally or unintentionally, continued to cause a huge part of this nature to be burned many times, with the most recent ones in 2000, 2005, 2009, 2012, and 2018.

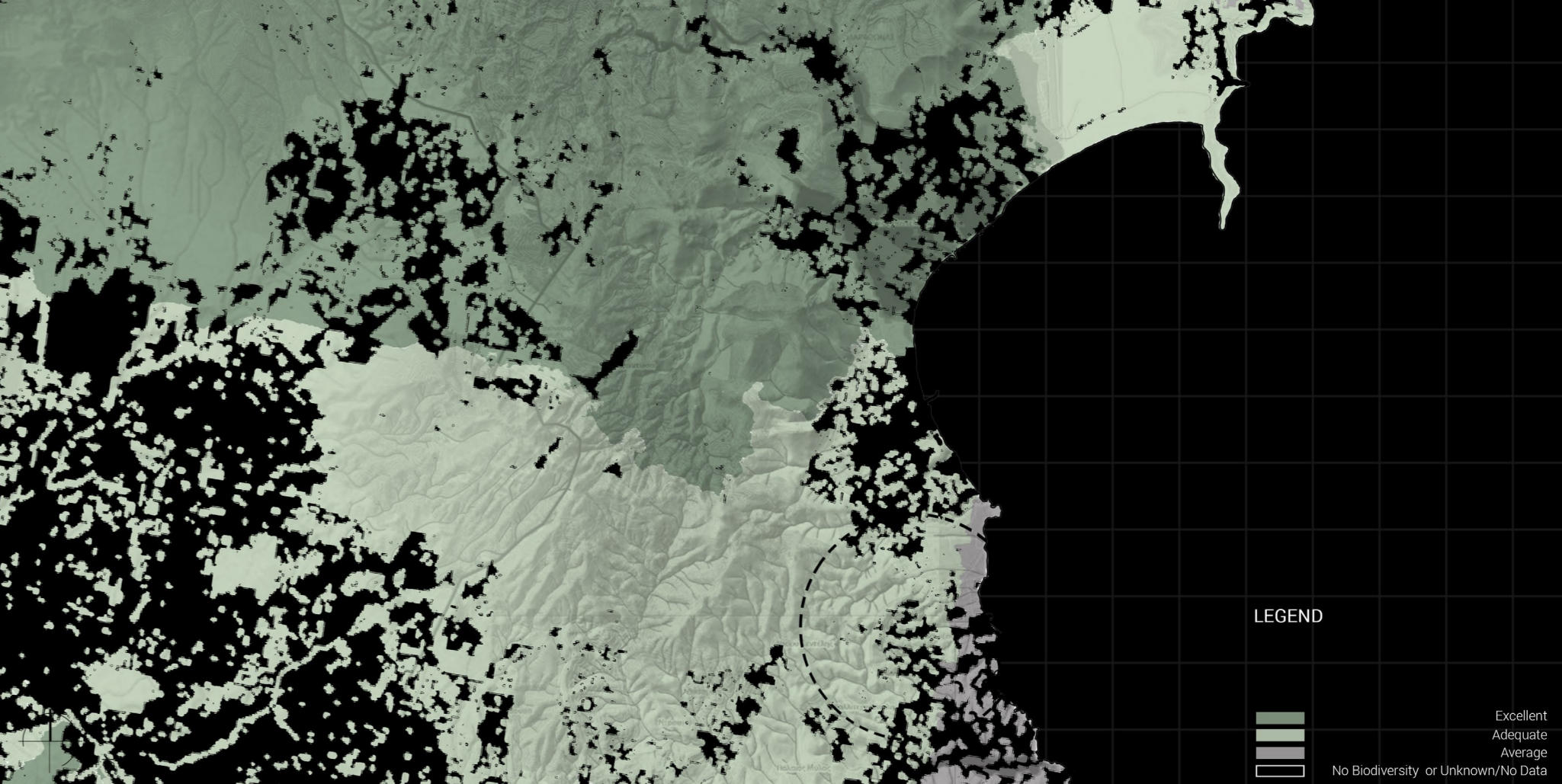


| Fire History of the Region | More recent fires of 2000, 2005, 2009, 2012, 2018

Without taking this, though, into account, someone can see that the biodiversity state in these places is at high levels, whereas within the urban area and rural-urban fringe is, in general, at an average state. At these exact locations, the potentials to serve ecosystem services, so the many and varied benefits to humans provided by these natural landscapes and healthy ecosystems, highlight exactly the importance of their protection.

In conclusion, having understood the history of the area through multiple layers, the relationship of fire, culture, human, and landscape, the framework and important elements of the region, and the fire history, a couple of things need to be highlighted. The landscape carries a huge, important history, with traces, visible or not, scattered around. Fire was and is part of this landscape, for reasons that differ from period to period. However, due to the large changes in land uses during these periods, the exploitation of the landscape through different ways, and most importantly the un-controlled urban spread, make a fragile boundary with the green, in many areas even protected areas. The unbalanced relation between the urban, coastal till hilly, zone, and the green, *‘natural’*, long-suffering zone, has destructive consequences for both. As a result, there is a need, and opportunity to protect both, for different reasons, maybe by the same strategy, using the same tools.

1. Catsadorakis. G. (2007). The Conservation of Natural and Cultural Heritage in Europe and the Mediterranean: A Gordian Knot?. International Journal of Heritage Studies, 13:4-5, 308-320. <https://doi.org/10.1080/13527250701350850>



| Biodiversity state

READ : The Area-Mati

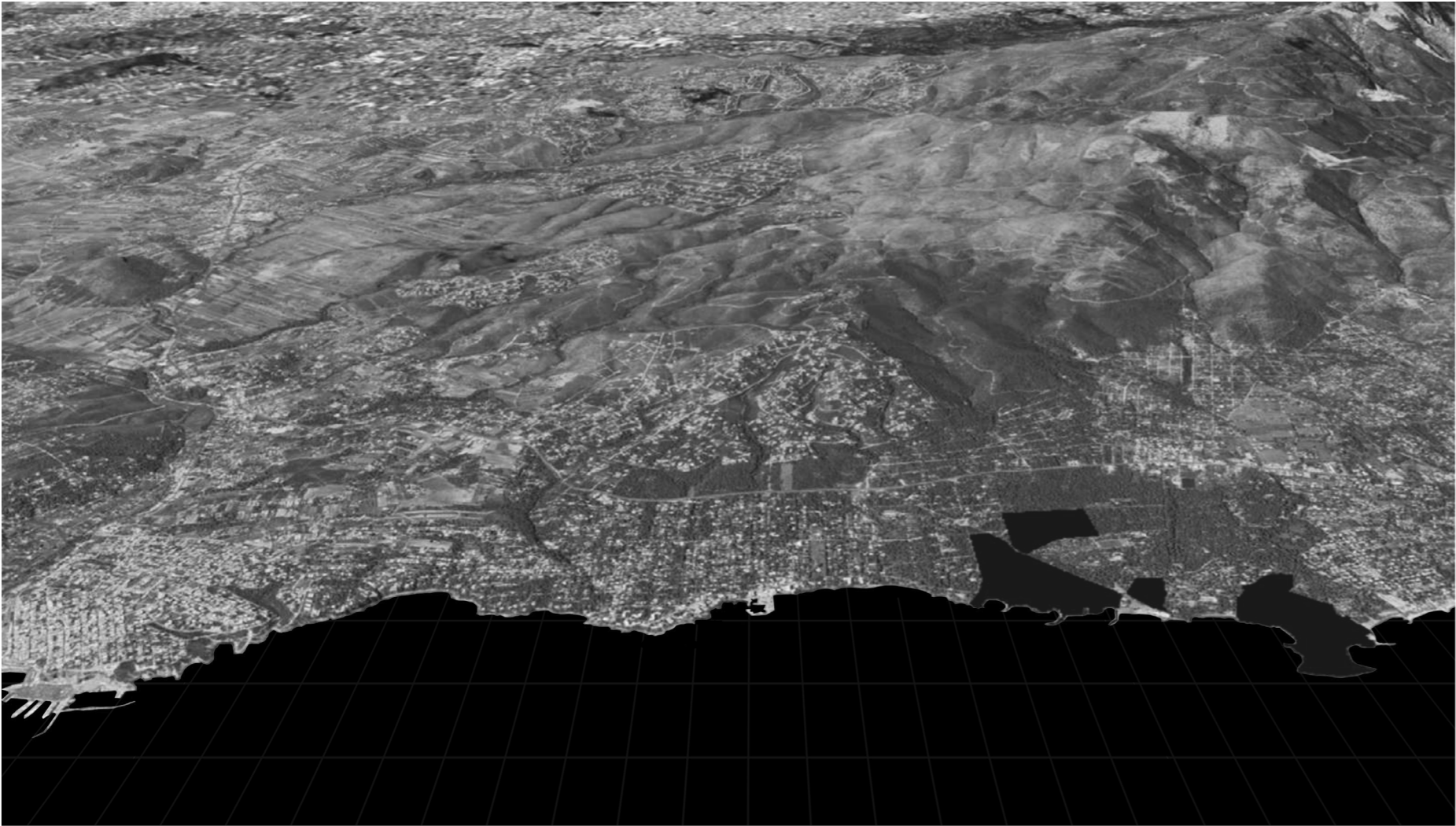


Figure 7. Bird-eye view of Mati

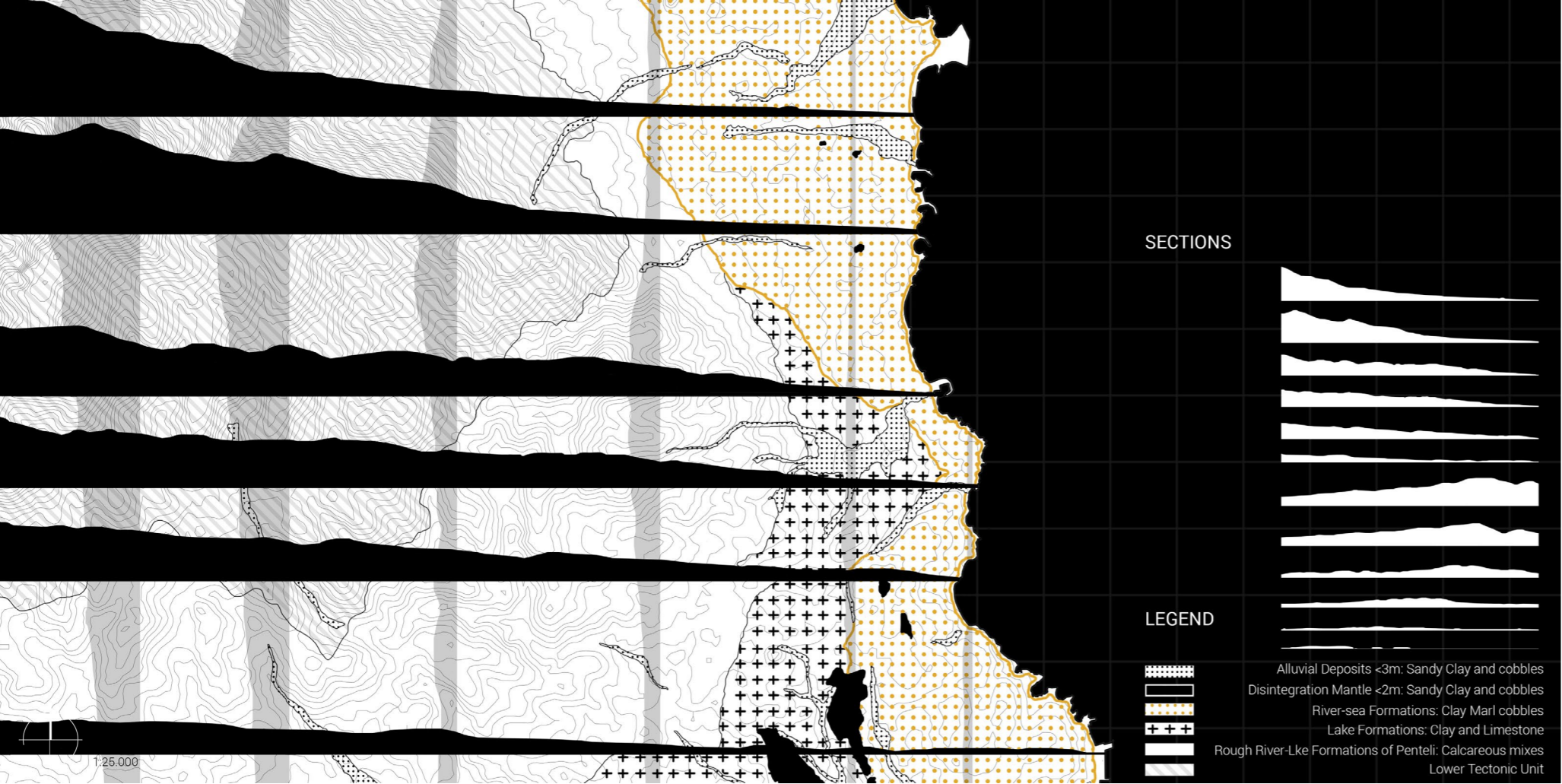
Mati is a holiday settlement in the municipality of Marathonos in Eastern Attica, at the administrative boundaries of the Municipal Unit of Nea Makri, at the southernmost point of the border with Rafina, and got its name, probably, because of the imposing sea view.

Geographically, it is located in the North-East of the Prefecture of Attica, at a distance of 32 km from the center of Athens, on the west coast of the southern Gulf of Evia. It borders north with Nea Makri, south with Rafina and west with the ends of Mount Pentelikos, and the sea at the east with an 8.5 km coastline. The extensive coasts, endings of the plain part, in combination with the mountain formations of Penteli are a unique geographical and aesthetic feature of the area, which geologically follows the general background of the wider region that consists of Indigenous Formations, such as Penteli Marbles and Alpine Background formations, and deposits from the Miocene and Pliocene. However, at a more shallow level, the soil includes mixes mostly shaped by the water routes and the deposits and erosions.

In general, it is clear that the area is characterized by a mild to relatively intense terrain. The plain part, the hilly zone, and the steep coastline can therefore be distinguished. The plain shows great residential development and consists of a large part of holiday homes. The hilly-semi-hilly includes the ends of the

northern foothills of Mount Pentelikos with altitudes from 100 to 300 meters.

In addition to these zones, there are also some characteristic types of the landscape. These are the type of anthropogenic elements of the landscape which include the continuous and organized urban landscape, the type of the suburban element, which is formed in the wider area as a result of anthropogenic elements but also activities, the type of rural landscape, crops and uncultivated fields, the type of natural elements of the landscape, such as the pine forests, the type of coastal landscape and finally the type of degraded landscape.



I. Geomorphology [Geological structure, and Terrain] of Mati

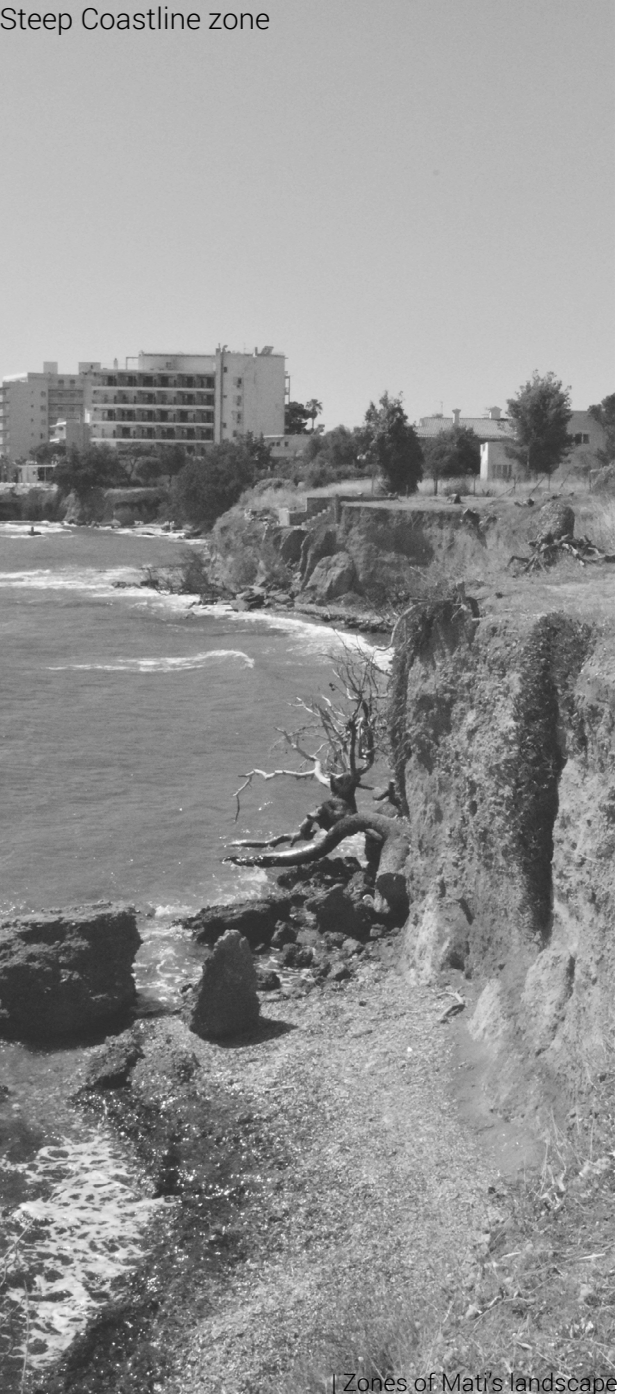
Hilly zone



Plain zone



Steep Coastline zone



At this point, the relevance to the Urban Forest topic will be explained.

Through desktop research, analysis, and on-site visits, a typology has been created, a typology that shows the different urban forest types of the Mati area. These types refer mainly to the previous state of the landscape, before the fire, however, some were still visible during the visits.

The most common type was the (Private) Forest Gardens, spread within the housing areas, and more specifically refers to the private maintained or abandoned gardens that include old trees, pines that remained from the natural succession and expansion. This type functioned as stepping stones for the fire spread.

The Road Plantations is a type that was mainly recognizable along the big roads, and avenues, such as Marathonos Avenue, and includes the plantations of the 2004 Olympics plan, in order to enhance the main axis of the Marathonos, especially during the Olympic Games. However, the choices made regarding the tree species were very unfortunate. The selected species played a destructive role during the fire, and totally eliminated the role of the Avenue as a fire break.

The type of the Stream Corridors includes all the abandoned, public, open streams, where the growing pines and the unmaintained undergrowth led to the streams becoming fire corridors during the event.

The Productive Remnants is a type recognizable till today and refers to the left-over agricultural fields,

fields of olive groves and vineyards, some of which remained intact, while others not, possibly because of their arrangement, species, or state of maintenance. The last type is the Woodlands, woody vegetation patches, created from reforestation actions after previous fires, or from natural, slow, secondary succession recovery. While this type seems to be a positive, functional, and ecologically interesting type, it also functioned destructively during the fire event, because it caused the transition of the fire from surface to crown, and the other way around, with the result of a mixed, destructive fire.

This Urban Forest Typology is not only useful for the Reading part of understanding and analyzing the landscape and the challenges, but also for the following *Writing* part of finding solutions and ideas, by altering, changing, improving these types, and applying to them a new layer/function, that refers to the fire-resistance-resilience.

	Description	Topography	Arrangement	Fire Spread	Situation
(Private) Forest Garden	Private maintained or abandoned gardens that include old trees, pines remained from the natural succession and expansion. This types functioned as stepping stones for the fire spread.				
Road Plantations	Type recognizable along the big roads, and avenues, such as Marathonos Avenue, and includes the plantations of the 2004 Olympics plan, during the Olympic Games. The choices made regarding the tree species were unfortunate, and totally eliminated the role of the Avenue as a fire break.				
Stream Corridors	Abandoned, public, open streams, where the growing pines, and the unmaintained undergrowth led to the streams becoming fire corridors during the event.				
Productive Remnants	Type recognizable till today, and refers to the left-over agricultural fields, fields of olive groves and vineyards, some of which remained intact, while other not, possibly because of their arrangement, species, or state of maintenance.				
Woodland	Woody vegetation patches, from reforestation actions after previous fires, or from naturally, slow, secondary succession recovery. It functioned destructively during the fire event, causing the transition of the fire from surface to crown, resulting to a mixed, destructive fire.				

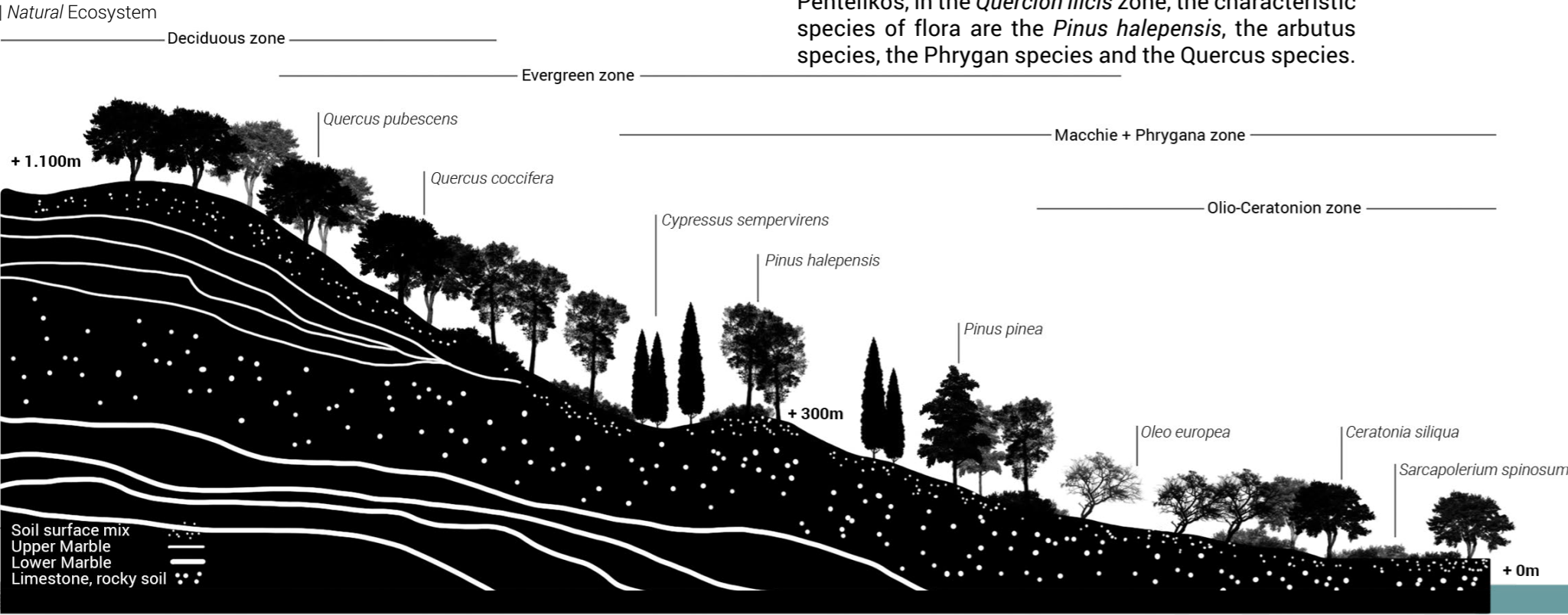
| Urban Forest Typology of Mati

Hydrographically, the area is characterized by streams of small catchments and torrents with direction from the west towards the ends of Pentelikos to the east, which during winter months flood and end in the sea while in summer months show zero flow. The ones that are characterized as streams are the following: Zoumperi, Ag. Andrea, Ampeloupoli, Mati, N. Voutzas, Pappa, Kalavriton and Pefkona. However, there are others that have not been demarcated and therefore are not reported, resulting in their poor protection. Those that have not been rubble, enter the residential fabric with an obvious alteration of their physical condition due to encroachments or reconstructions or their conversion into underground pipes.

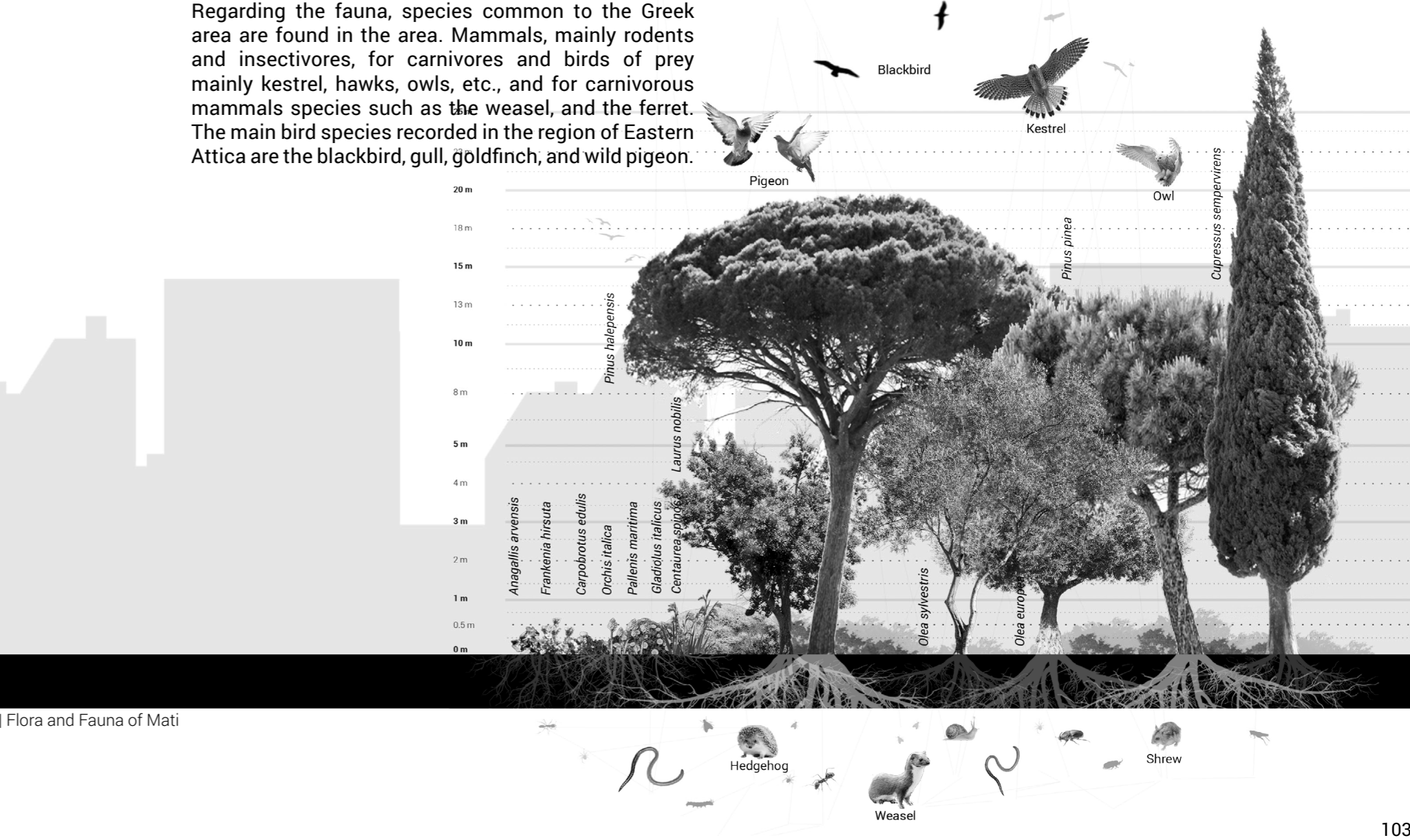


| Hydrology Map of Stream Network

As mentioned before, this region of Attica, like Attica itself, belongs to the Euro-Mediterranean vegetation zone, *Quercetalia ilicis*. This zone spreads to almost all the coasts of the country and especially in southern Greece extends to a considerable depth in the land areas, and specifically is divided into two sub-zones, with the lower towards the coast and the drier being called *Oleo-Ceratonion* and the upper being called *Quercion ilicis*. The area, specifically, belongs to the sub-zone *Oleo-Ceratonion* (sub-zone of olive and locust tree), characteristic species of which are the wild olive tree, *Olea oleaster*, *Pistacia lentiscus*, *Quercus coccifera*, *Pinus halepensis*, *Nerium oleander*, *Sarcopoterium spinosum*, *Cupressus sempervirens*, etc. while, higher on Mount Pentelikos, in the *Quercion ilicis* zone, the characteristic species of flora are the *Pinus halepensis*, the arbutus species, the Phrygan species and the Quercus species.



Regarding the fauna, species common to the Greek area are found in the area. Mammals, mainly rodents and insectivores, for carnivores and birds of prey mainly kestrel, hawks, owls, etc., and for carnivorous mammals species such as the weasel, and the ferret. The main bird species recorded in the region of Eastern Attica are the blackbird, gull, goldfinch, and wild pigeon.



Mati, together with the neighboring areas, has a relatively long history of changes in institutionalized land uses, with the first institutional urban planning regulation in the area recorded in 1935 and the second after twenty years in 1955. Regarding the existing land uses, and based on the spatial data of 2018 from the Corine database, the area is characterized for the most part by intermittent urban housing and is a predominant use, followed in presence and extent, the use of agricultural practices and the use of transitional wooded areas. A change from previous years concerns the absence of sparsely vegetated areas, which has been replaced by a coniferous forest area, and the new use of sports and green facilities, but in very small areas. On the other hand, compared to previous years, the initial area of coniferous forest in the area of Ag. Andrea and has been replaced by the new one use of military and camping facilities. The extent of urban construction has remained stable, however, the losses were covered by natural environment uses, as the total area (coniferous forest, and areas of sparse vegetation), which were half replaced by man-made uses. The institutionalized area on the coastal part of Kokkino Limanaki is important, as a public coastal zone. Unfortunately, this use has been trampled on, with coastal properties making access to the sea inaccessible, another fatal mistake of the catastrophic fire event.

The presence of Marathonos Avenue in the area is historically and culturally important. In addition, however, it is also the most important transportation artery, connecting Mati to the next areas, but also the center of Athens, while secondary arteries are Fleming Avenue that connects Mati with Rafina, and the roads

that lead to areas of higher altitudes but also the ones that cross the area relatively coastally, thus connecting the coast with the mountain.

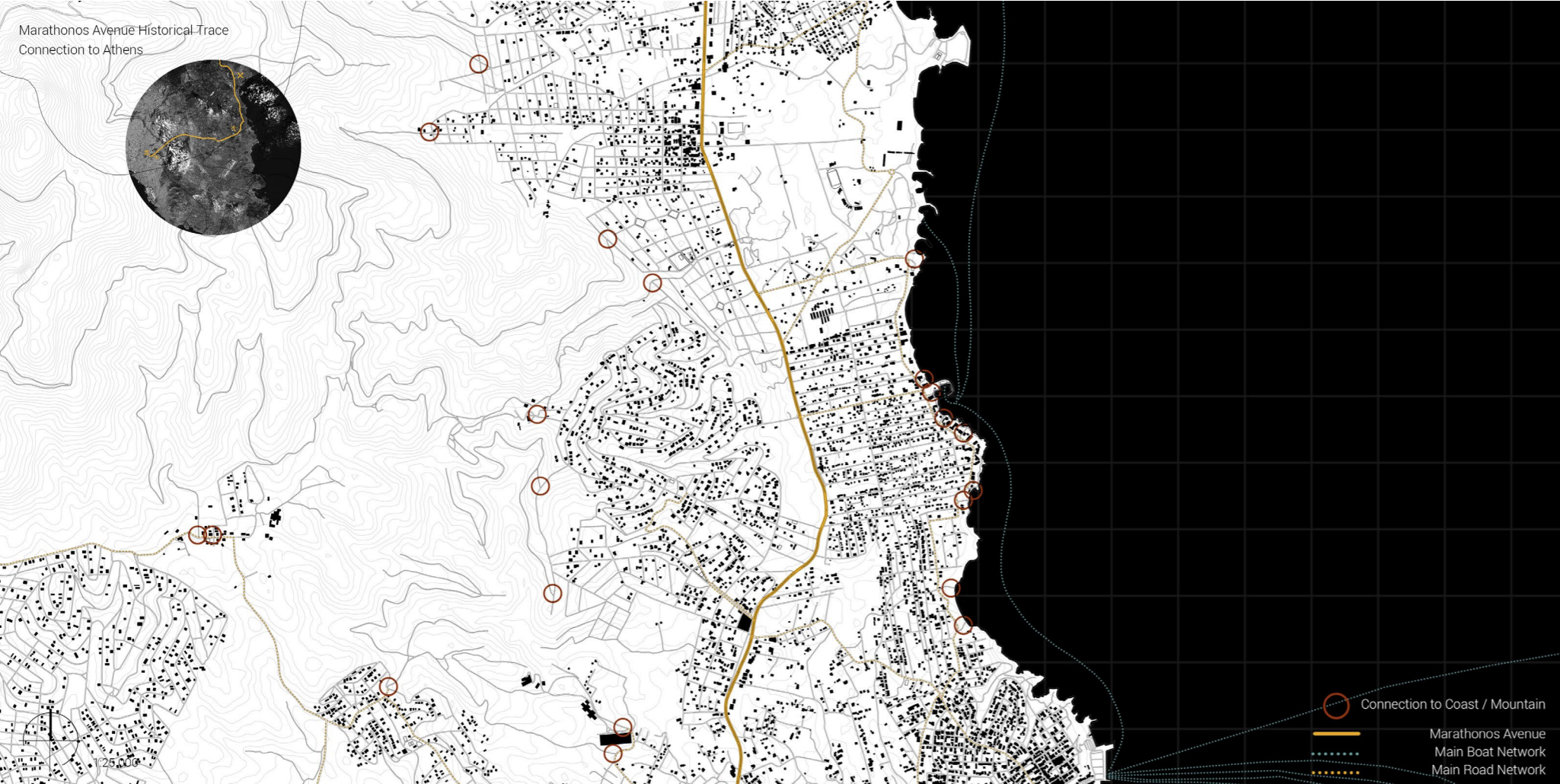
Apart from the road network, the area is served by a fairly big maritime transport network. The port of Rafina is located on the east coast of Attica, in the urban fabric of Rafina, and is the second most important passenger shipping port in the country, after the port of Piraeus, as it serves about 2 million passengers annually, and serves both passengers - tourist and freight traffic to the Cyclades islands and South Evia. Another port facility is located within the area, specifically in Mati. The vast majority of boats docked are private yachts and small recreational fishing vessels. Nevertheless, there is the connection of the port with that of Rafina, as well as with smaller northern fishing shelters and ports.

Moreover, from a more specific analysis of selected spots of the area, the urban and transportation structures reveal patterns that are based on previous landscape uses or characteristics in general, such as the topography itself. Some of these patterns also reveal the problems of this area and some of the causes of the catastrophic fire and its effects.

These patterns and networks are also closely linked to institutionalized land use, as they often determine their spatial form and division. These zones, show both the current legislation on specific uses, which are supposed to protect the landscape from exploitation and illegality, but also their changes, which are a large part of the causes of the catastrophic fire.



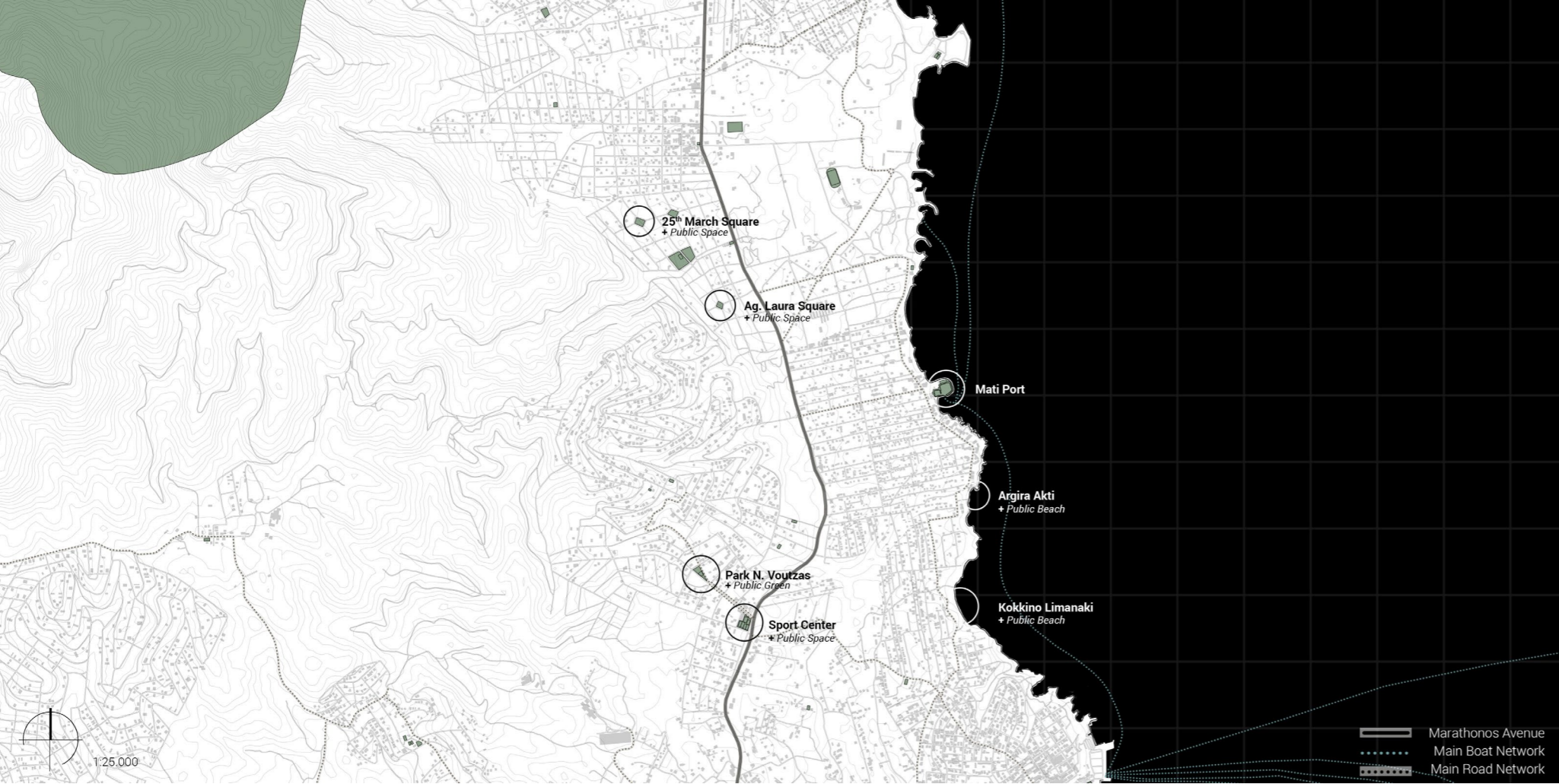
| Institutionalized Land Uses



| Transportation Network



| Urban Patterns



| Public, and Green spaces

The residential development and dynamics of the area, are visible through the age of the buildings, most of which were built between 1971 to 1980 and 1981 to 2005. During the first period the population explosion of permanent residents, and therefore houses, shows an increase of 107%, compared to the previous decade 1961 - 1971, which was a result of the creation of Attiki Odos in connection with Rafina, which significantly improved the accessibility of the area.

Until recently, the houses referred to houses for rent, due to the touristic, holiday character of the area, and then up to a degree to holiday or secondary residences, which gradually became permanent, first houses, due to the economic crisis of the last, several years.

Another important feature of the area is, as mentioned before, arbitrary planning, and construction. Especially after the fire of 2018, the problem, which was one of the causes of the catastrophic development of the fire, became even more visible.

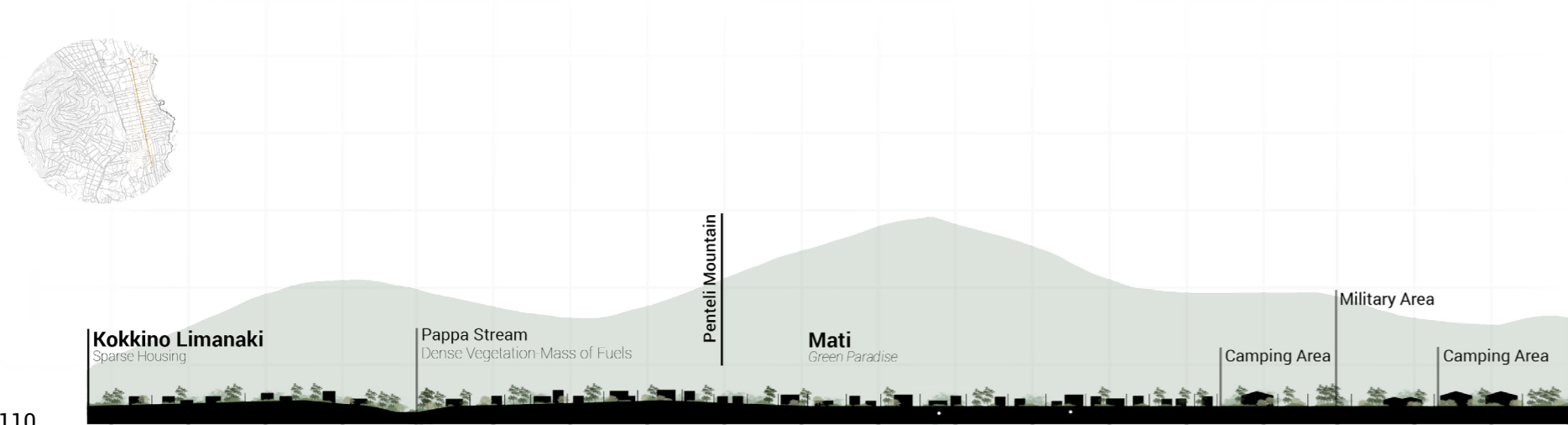
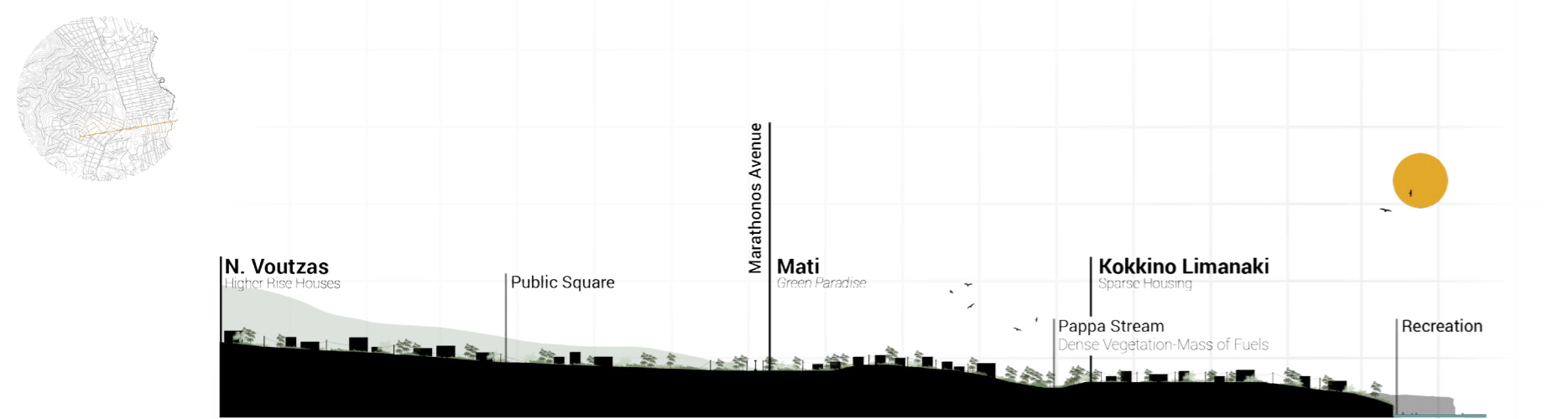
Within the area, the largest concentration of damaged, unsuitable, and now dangerous houses are recorded in the coastal part of Mati, and in Kokkino Limanaki, in the off-plan area.

Another crucial observation from the analysis of the area is the significant lack of public, green or not, spaces.

Few, very small patches of public spots exist, spread in the area, whose condition does not even manifest their use as places of gathering, social interaction, play, relaxation, and even places of emergency during an escape plan. Understandably, this was another problem and cause of the catastrophic fire.

Before the fire, the area was perceived by its green and blue views. Uses for recreation at the small port, the creeks, and the camping facilities are located along the coast. The identity of the place was totally different. From the interviews and my own experiences, I quote a few phrases that convey exactly the atmosphere.

The Identity Before



Tourist Stuctures



Local Recreation



Vast Forest / View



Built - Green Ratio



'The settlement had a very quiet, peaceful, summery atmosphere.'

'It was the Mati as we loved it, green, heavenly, like an island...', 'a heaven on earth'.

'Mati was a close summer, beautiful escape.'

'The landscape that I met was this green, vast, pine-forested, beautiful landscape...'

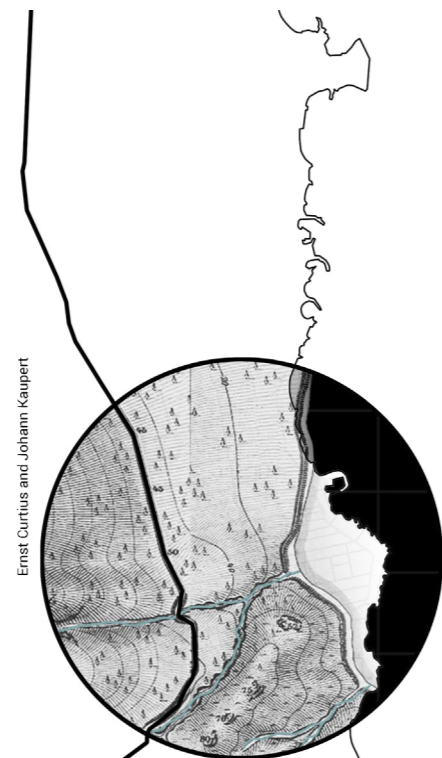
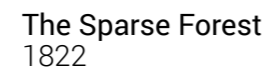
'...at some points you couldn't even see the sky from the dense high vegetation.'



Figure 8. Views of Mati before the 2018 fire

Going even more back in time, to understand the history, the processes, the events that shaped this landscape and created this identity (before the fire), the first date is 3.200 BC when the southern part of the area was first inhabited by an Early Helladic settlement. The Battle of Marathon took place north of the area in 490 BC., during the first Persian invasion, and the Marathon route was established, passing exactly next to Mati. Eastern Attica people have had a close relationship with their land (agriculture and livestock) since antiquity, while at the same time there was interdependence from Athens. After the Greek Revolution, Greece began to prosper again. The area is depicted by Curtius & Kaupert in 1882 as a forest area mainly of coniferous trees, while at the same time, there were some plots of land which were characterized as areas that serve viticulture. In 1930 the region was purchased by the Penteli Monastery and three years later the distribution of plots began. 16 men from Chalandri, an area of Athens, bought the area and used it as a hunting ground with ephemeral settlements. After 1940 the settlements became more concrete, and its free camping destination character transformed into more organized holiday settlements. During 1960 and 1990 there were many violations, exploitation of land, and the forest areas that kept growing inside or outside the property's boundaries. The urban explosion led to the area becoming a permanent settlement for many. However, the illegalities in building and urban planning, the lack of management of the green masses, and the general treatment of the landscape led to the disaster of 2018.

Historical Development



Ernst Curtius and Johann Kaupert

The Plot Distribution

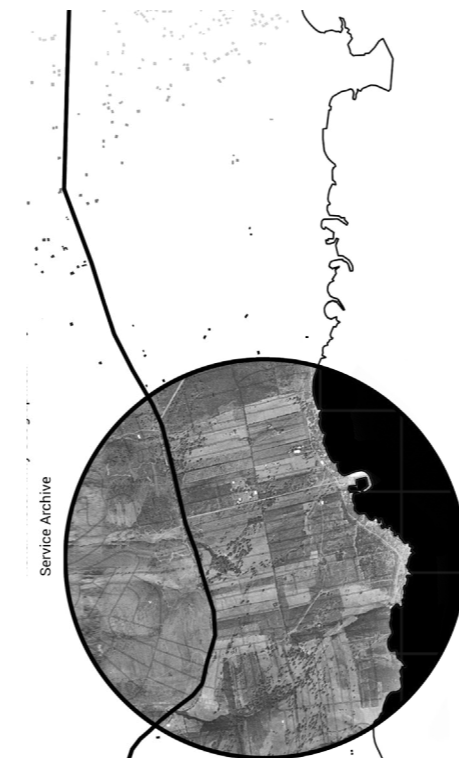


Municipality of Marathon



+ Nature

The Outdoor Camping 1945



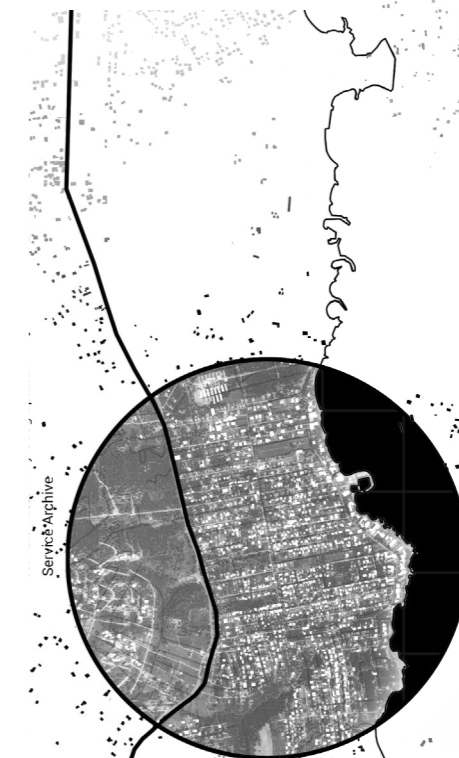
+ Agriculture

The Ephemeral Residences



+ Abandonment

The Permanent Residences 1987



+ Recreation

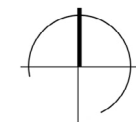
The Green Paradise
2015

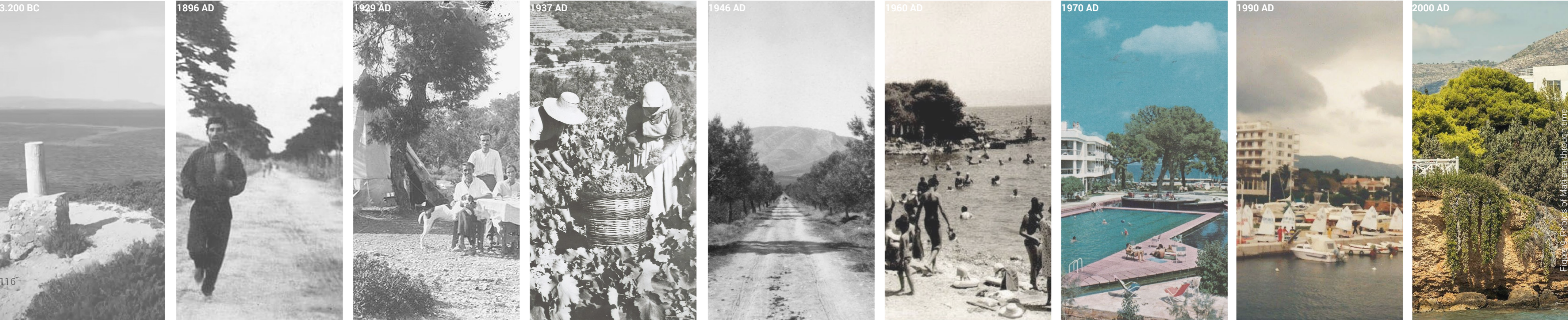


2

+ Urban Sprawl

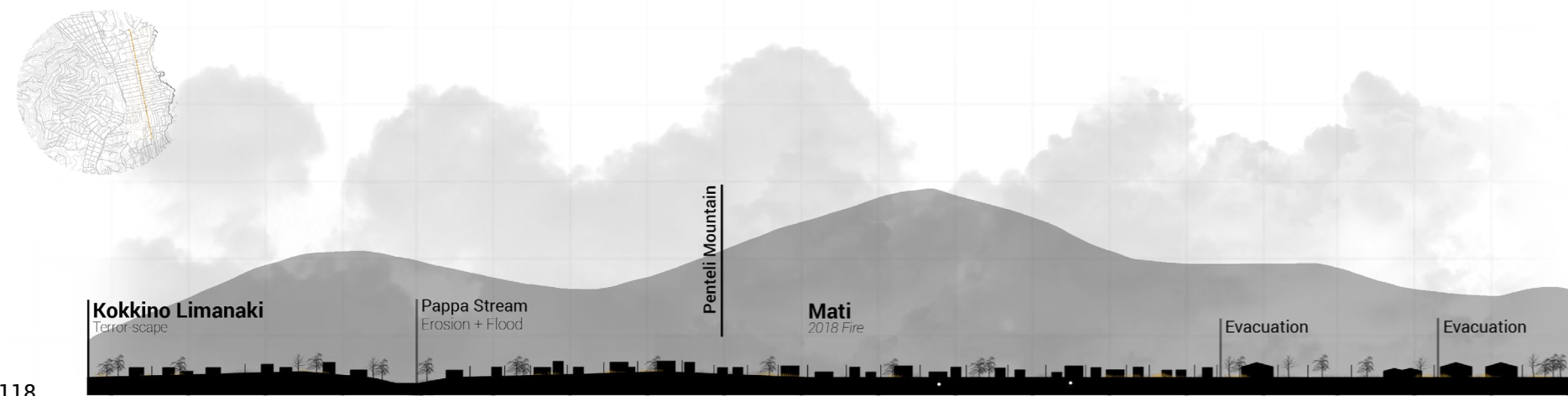
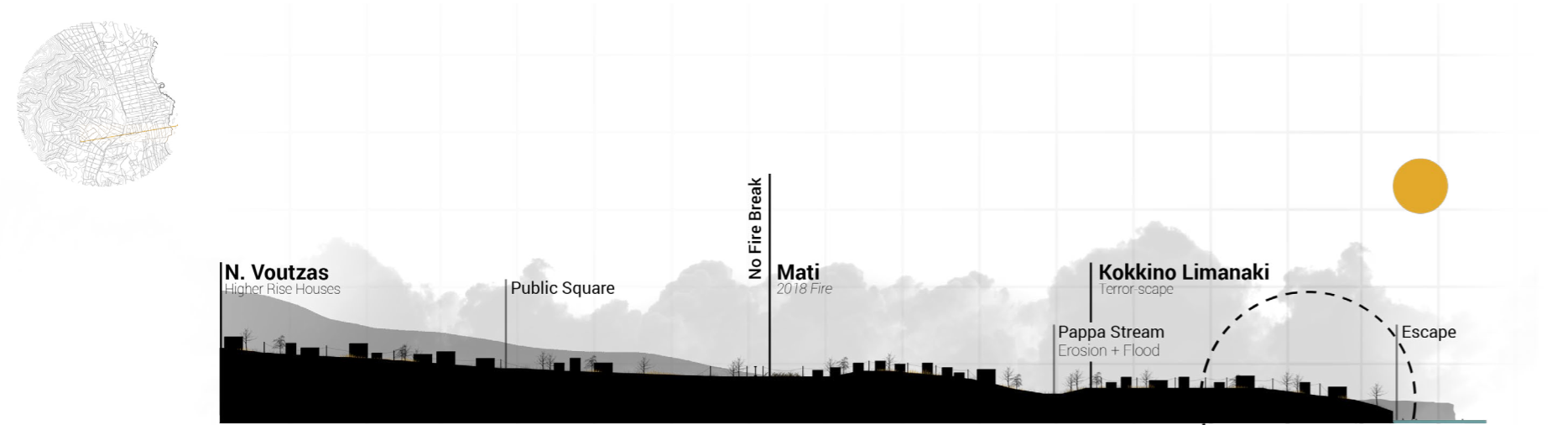
+ Destination





And the event changed the landscape drastically, its uses and character from recreation to escape places, from green to terror-scape.

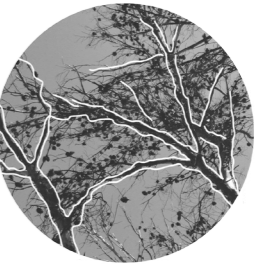
The Identity After



Place of Trauma



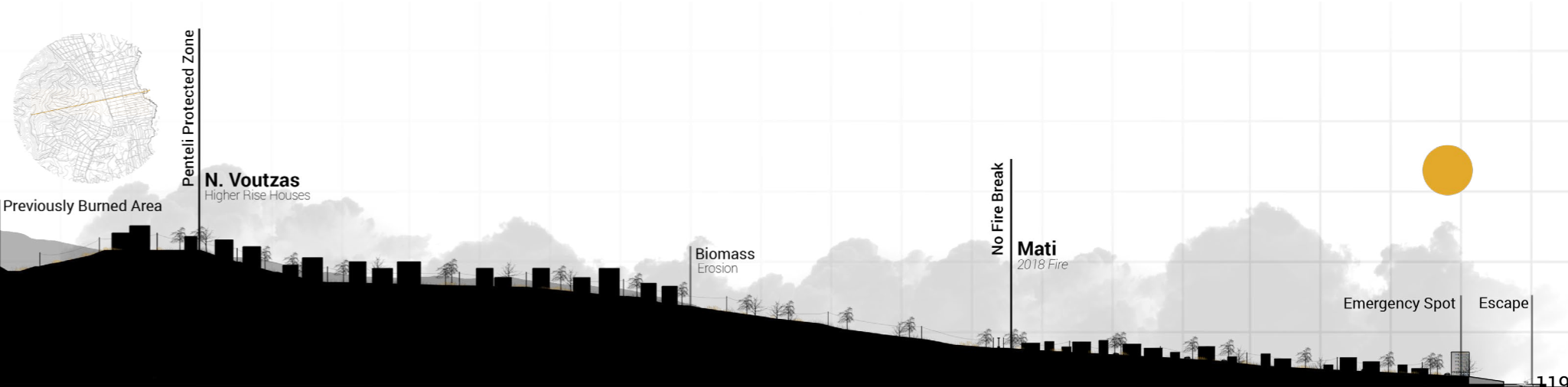
Monument of Horror



Burned / No Trees



No Built - No Green Ratio



'Within six minutes Mati burned. As soon as fire passed Marathonos Avenue in six minutes, Mati burned down.'

'I will not forget that night. Now there are some who are not here...'

'We heard screams and explosions. Mati was like a cemetery...'

'This fire does not end today...'

'It was chaotic, a war scene, it was scary...', 'There was no one to help...'

'Every day we experience the fire in our house.'

But the hope is also there.

'Mati and its people will be able to overcome it, they are very strong.'

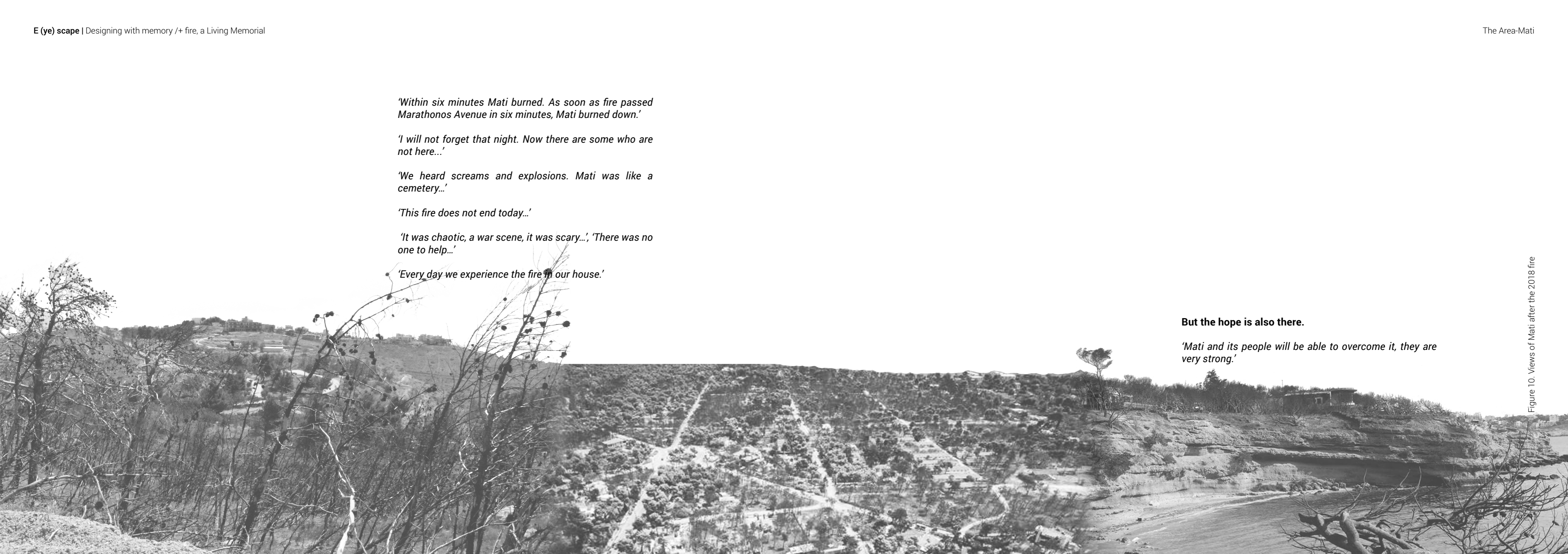


Figure 10. Views of Mati after the 2018 fire

1st Visit 2 years After

Two years later, someone can see many traces, traces of the causes, traces of the fire, and its direct and indirect consequences. Maybe though within this sad, and hopeless for many situations, someone can also see the potentials and chances to make things better, to heal, the hope that derives from Mati and its people themselves.

Two, and almost three years later, I visited the area twice. My first visit was in August 2020. I started by car from my home, following the *'path'*, and narrative of the fire. From Ntaou Penteli at higher altitudes, where the fire started, through the many times burned valleys, through Neos Voutzas, passing the Marathonos Avenue, and ending at the coast, I tried to compare the drastic changes that people and the landscape experienced. The first visit helped me in identifying some of the current qualities, the biggest problems that still remain, and most importantly see this once familiar place through a different perspective, that of the landscape architecture.



Trunk Grids



Burned Tree Remains



Burned House Remains



Different Vegetation Development Stages



Narrow Paths / Difficult Escape



Privatization / Erosion



Public Coastal Path



Spot of View



Bare N. Voutzas

2nd Visit 2,5 years After

The second visit was in January 2021. This visit was more targeted, with the goal of analyzing a specific location. Moreover, important was to see the landscape in different seasons, and that was achieved. During this rainy, winter day I was able to see many of the later consequences of the fire, such as the problem of flooding and erosion, because of the vegetation loss that used to hold the water and the soil. The atmosphere was heavier, darker. I went to specific places, places important in the narrative, such as the terror-scape, where 25 people died 10 meters away from the sea. The visit also helped me better understand the specific landscape, key spots, views, materials, species, and qualities, and identify fire traces that will support the design process in the following steps.



Access to the Beach



Terror-scape



No Access / Erosion



Burned Tree Remains



Access / Erosion



Flood



Stream / No Water Retention



Stream / Burned House Remains



Stream / Entry to Urban Tissue



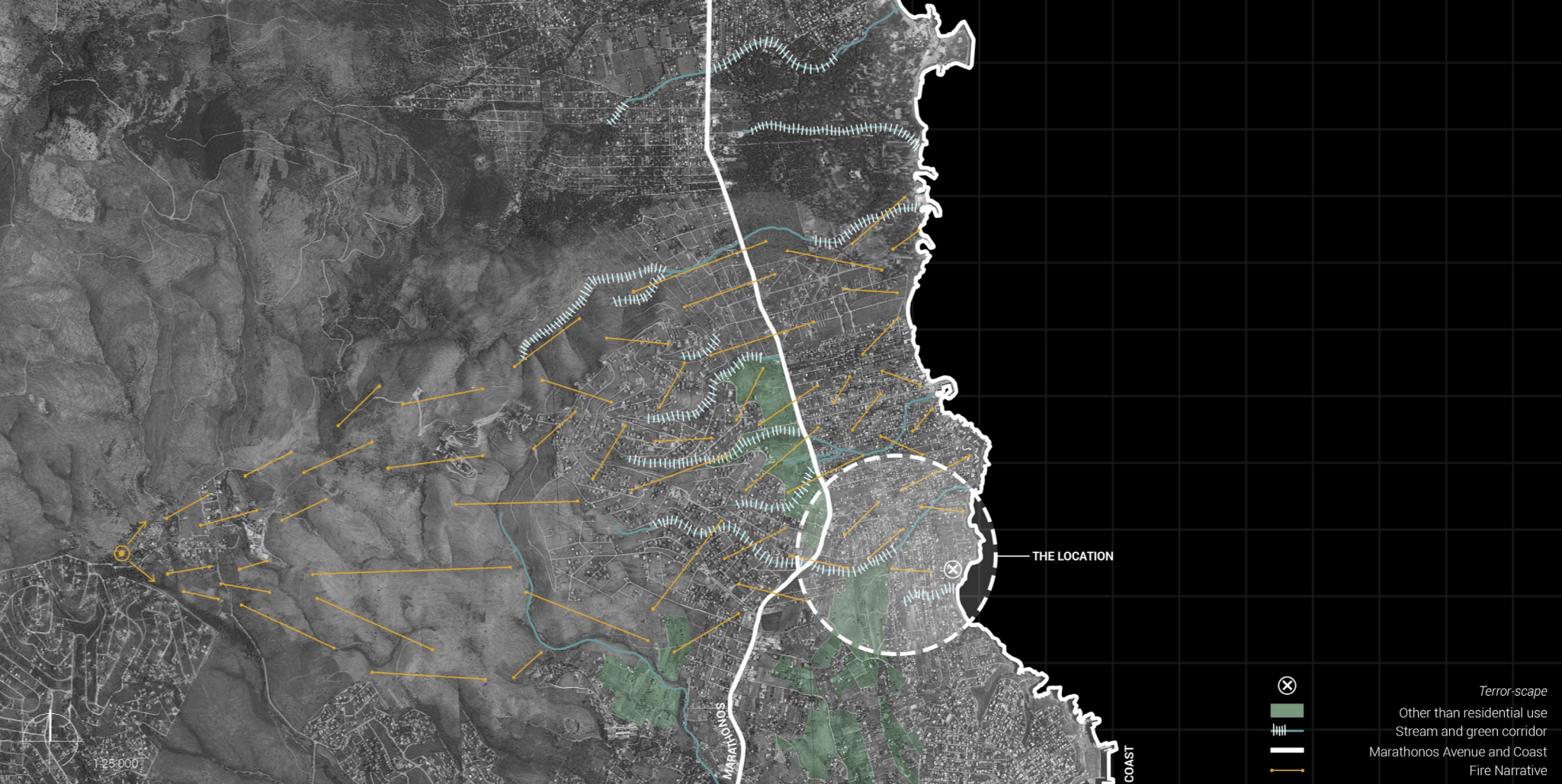
Privatization / Public Space

During these two visits, I also recognized some plant species that I also found through the landscape desktop research, the first vegetation after the fire. As previously mentioned, despite the fact that (forest) fires can appear devastating at first, nature has its systems for resilience. And depending on the scale and intensity of the fire, and what kind of plants were present, above and underground before, different kinds of vegetation will return. In this case, the species include *Arisarum vulgare*, *Asparagus acutifolius*, *Cyclamen graecum*, *Freesia leichtlinii*, *Muscari parviflorum*, *Taraxacum* sp., *Orchis italica*, *Tropaeolum majus*, *Centaurea spinose*, *Pallenis maritima*, and more, species that are mainly native perennials, but also annuals that sprout after the fire. Despite the fact that no major traces of the landscape recovery can be notices, these small pants are an indication that even if the healing is slow, the area will bounce back, if not disturbed again.

| Vegetation after the fire

At this point, I will explain the reasons for the selection of the design location, the location that I visited on my second on-site. Based on conclusions from the research and analysis of the region of Eastern Attica, and the area of Mati, as well as the fire investigation and narrative, a couple of important aspects, guided the choices. The fire direction and route, the connection to both Marathonos Avenue and the coast, the water streams and previously green corridors, the existence of different uses, and the specific places, places of martyrdom, led me to choose the location around the Pappa stream.

Sources for this part: Iefimerida. (2018). Εκατόμβη: Μαρτυρίες και ιστορίες που συγκλόνισαν από τη φονική πυρκαγιά στο Μάτι [Ekatombi: Testimonies and shocking stories by the deadly fire in Mati]. <https://www.iefimerida.gr/news/433036/ekatomvi-martyries-kai-istories-poy-sygklonisan-apo-ti-foniki-pyrkagia-sto-mati> Nikola, A. (2019). Testimonies from the fire in Mati: 'My wife suffered a heart attack, I hugged her at sea for 5.5 hours']. Newsbeast. <https://www.newsbeast.gr/greece/arthro/5185416/anatrichiastikes-martyries-apo-ti-fotia-sto-mati-i-gynaika-moy-epathe-emfragma-tin-eicha-agkalia-sti-thalassa-5-5-ores>



| Design Location selection

READ : The Location-Pappa Stream

The design location extends in the area of, and around the Pappa Stream that includes part of the Mati settlement, and the neighborhood, coastal area of Kokkino Limanaki, on the border with the municipality of Rafina. It includes the housing areas of Mati and Kokkino Limanaki on the north and east side, the hypothetical public, coastal zone, the agricultural fields on the south, and Marathonos Avenue on the west side as a strong boundary with the higher area of Neos Voutzas.

From some older aerial images, the vast green-scape is seen. All the previously mentioned urban forest types are also visible in these images. Many ‘good’ qualities, or maybe memories of the landscape are worth mentioning and even brought back. The small olive groves next to the avenue, a version of the previous state of the stream as a green corridor, but not as a distractive, non-maintained fire-bomb strip, and the very close relation of the green structure and the coastline, are some.



Figure 11. Location 2021



Figure 12. Location 2018



Figure 13. Location 2017

After the fire, the once fully green steam is now an empty landscape. The stream was susceptible to many changes itself and revealed some of the consequences of the event, the floods, the soil erosion, and the slow rate of landscape recovery. The Pappa stream is divided into sub-sections, according to its condition and from a technical aspect. Above Attalou Street, the stream has an adequate riverbed and zone for its development, but after the stream overflows in the north. Then it passes under Marathonos Avenue through a tubular pipe, which is not sufficient for the water supply, and then the stream crosses the area through a naturally formed bed, which presents local deficiencies. In the next part, the stream enters the built area on either side, where its riverbed is Psiloriti Street. In this part, the stream overflows towards the properties. Then the stream passes through properties where the riverbed has trampled and turned into a shallow ditch, which is interrupted for long periods. And finally, the stream is diverted, with an unformed riverbed, passing over the asphalt and flows into the sea, through a passage between buildings. Detailed sections along the stream show the topography and the elevations and inclinations, and therefore the most vulnerable areas for erosion that can guide also the plantations or other design solutions.

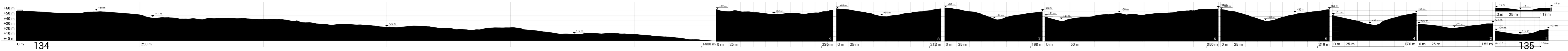
Important to mention is that the ground consists mainly of river-sea, and lake formations, so materials

of the surface are clay and marl, while underneath more solid, steady materials such as limestone and calcareous soils in general.

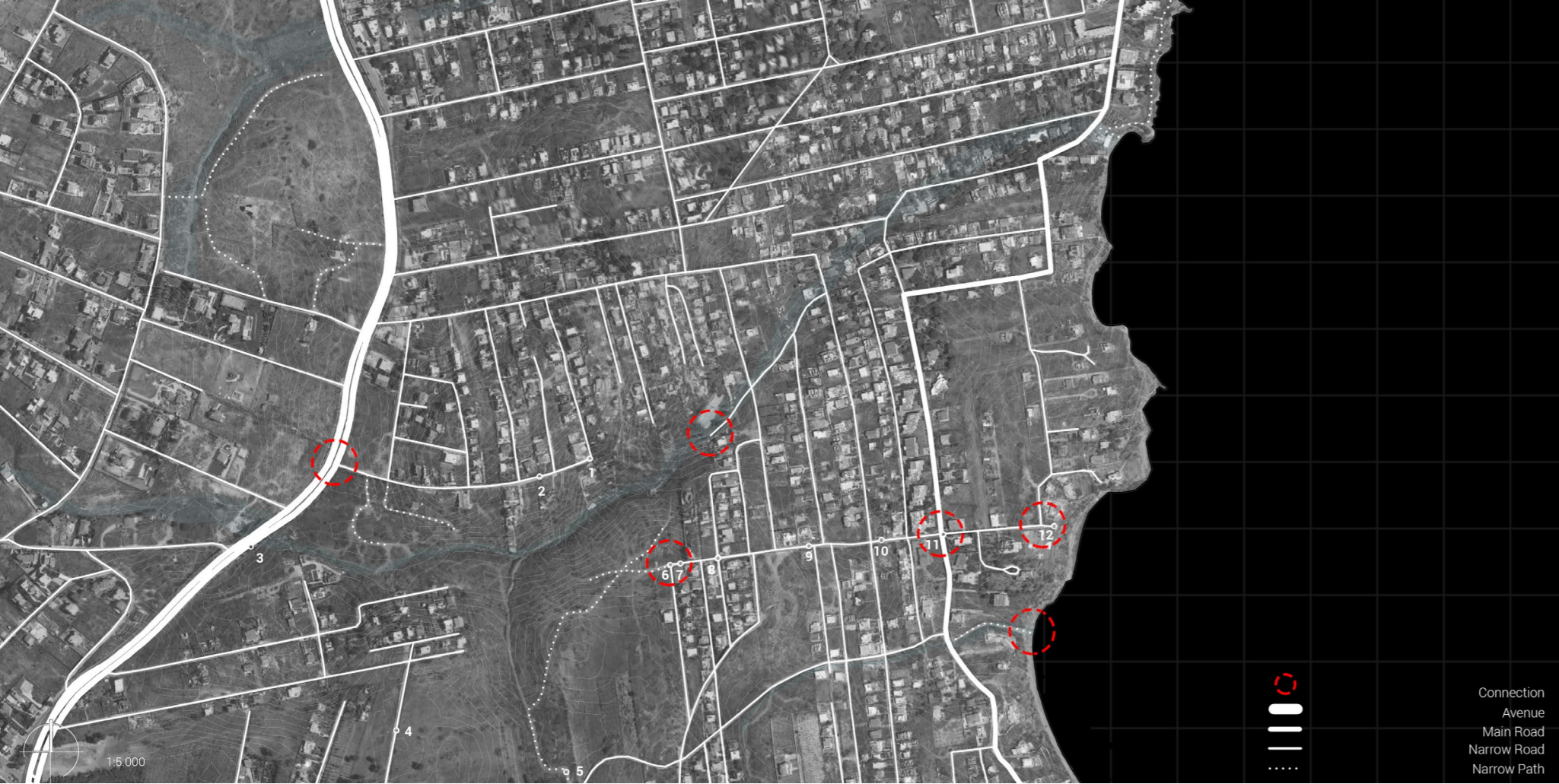
The most important connection of the location with the surrounding areas is through Marathonos Avenue. Another important axis of the area is Dimokratias Avenue, which is a two-way street, which runs parallel to the coastline and connects Rafina with Mati. The local road network of the area consists of parallel roads, at a short distance between them, in an arrangement parallel to the shoreline. The transverse paths are minimal, uncontrollably open, and discontinuous. As a result, access to the beach is difficult, which has been mentioned above as another reason for the tragic effects of the fire. Due to the intense relief observed in the area, the entire local road network also shows strong slopes, but also due to the dense distribution of plots, the widths of the streets range from 4.00 to 8.00 m. with non-existent or substandard sidewalks.



| Situation of Pappa stream and Elevations



Axis to the Sea



| Road Network and Connections

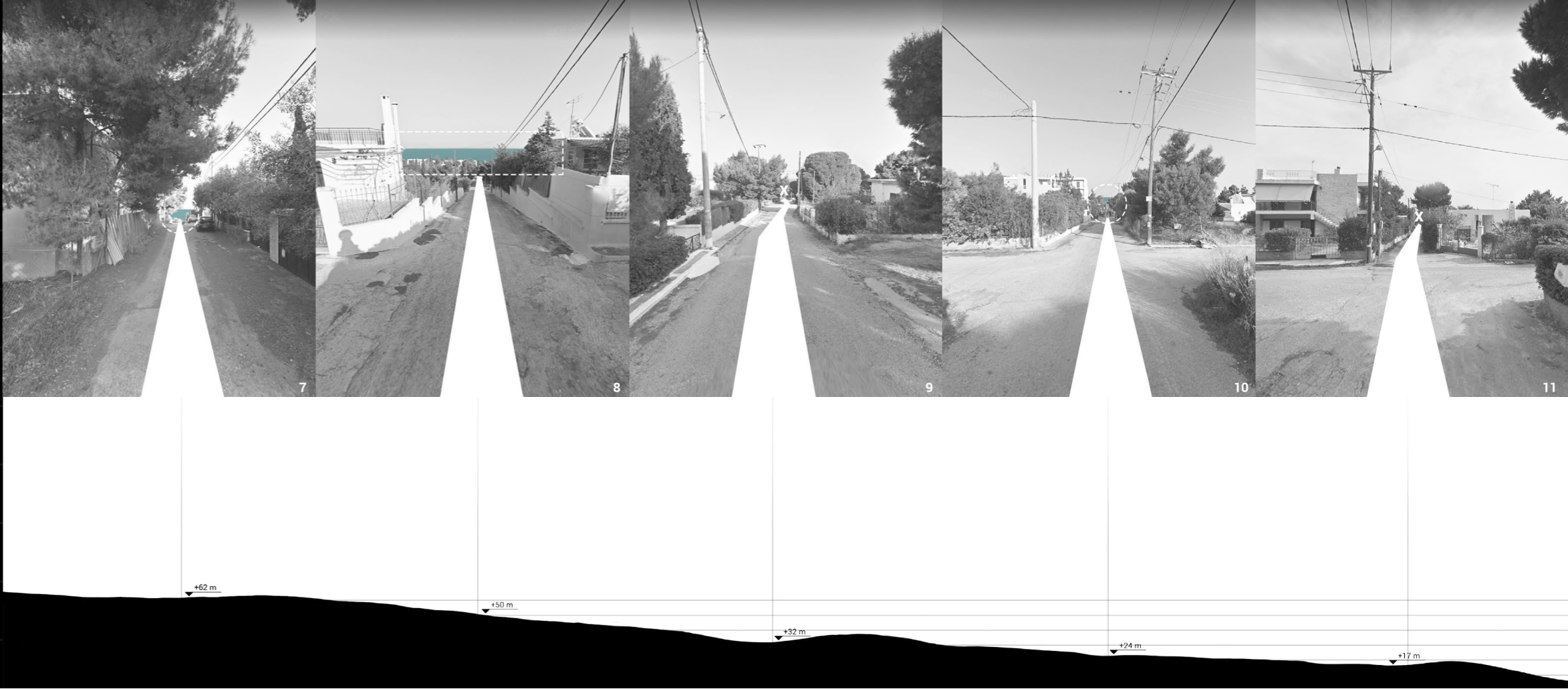


Figure14. Photos from Axis to the sea, Poseidon street



| End view to the sea

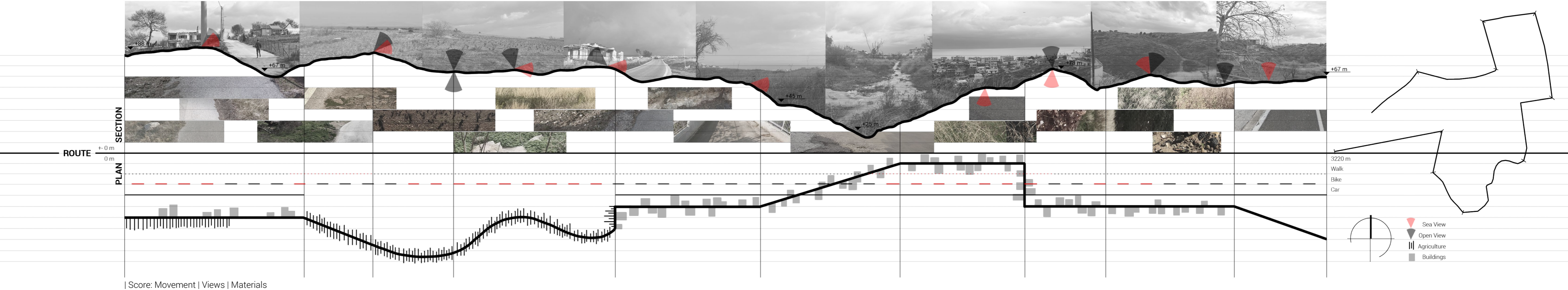
During the second visit on-site, and specifically to this location, things that had been observed during the desktop research and analysis were confirmed, and new observations were made. The eye-level perspective, the up-close experience, and concentration on the *'bodily feeling'*, and the details made clear beautiful qualities of the landscape, such as the axis of the sea-view that comes and goes based mainly on the landscape morphology, but leads to the tragic point where many people were trapped just 10 meters from the sea. The materials, the views, the uses, the different ways of transport, walking, biking, and their difficulties, were combined in order to create a complete profile, with technical, so objective, and experiential, so subjective, observations.

In the location, important places are the beach of Argira Akti, where a small local tavern restaurant, Argira Akti Taverna, was one of the few spots of first aid and hope during the fire, where most of the people found their escape, and salvation, and the beach of Kokkino Limanaki, the second place where people escaped to in the 2018 fire.

Moreover, from the analysis and the on-site visits, three spots stood out. The first next to the connection with Marathonos Avenue and Panos road, the second at the one end of the west-eastern axis of the Poseidon street, within the stream, as the highest point around

the nearby area, and the other end of this axis, next to the coast, as the exact location, where the plot of the 25 deaths is located. As a result, these three spots, are key for the design, as important spots of the landscape and the narrative.

Some conclusions for the location are the following: This area is a degraded landscape, not only as a consequence of the fire but also as it does not favor living conditions in general. The morphology of this area, which presents a strong relief with steep slopes, was developed residentially, ignoring these difficult morphological conditions, resulting in a subsection that does not create a feeling of comfort and safety in the area, while the road network was formed without a complete design, and that makes even more acute the problem of comfortable and safe traffic in the area. However, the landscape has also important qualities, characteristics of the landscape that is important to be highlighted over time, despite the disaster, and be taken into account in the design.



READ : Conclusions

In this part of the thesis, information about the fire, forest fires, fires and fire management in Greece were included so that an introduction and the first context of this project be made, while also understanding the *'nature'* of the 2018 Mati fire. The narrative of this fire was an integral part and starting point for the project, it is the core, the story of what happened, the driving force for the deeper investigation of the causes, the consequences, but also the needs and opportunities. Most importantly, however, this narrative unveiled to me the two important, hidden challenges that even three years later are there, and will be there if nothing changes, and these are the Human and the Landscape Trauma, notions that were explained, analyzed, and identified on the specific tangible and intangible scape, with the one being the trauma that is a combination of the individual, psychological trauma, and the collective-community-social trauma, both caused by this fire disaster, and includes its traumatic results caused by the fire experiencing, and the losses, such as the fear for fire and the damaged relationship with nature, and the other one being the trauma of the landscape that includes the direct and indirect tangible consequences of the fire, such the partial or total destruction of the vegetation, the later floods, soil erosion, and effects on air quality, and the indirect tangible landscape degradation, and inability to quickly recover.

Moreover, the multiscale analysis of the wider region

of Eastern Attica, the area of Mati, and the location of the Pappa stream provided significant information that not only makes more understandable the landscape, but also can and will be used in the design, and design process. In particular, the regional analysis revealed the natural and cultural layers of the wider landscape, how this landscape was created, and its important elements such as the large protected green, but some burned many times, masses, the history of the relationship of fire, culture, human, and landscape there, somethings that ties the element of fire with the project, and the unbalanced relationship between the urban, coastal till hilly, zone, and the green, *'natural'*, long-suffering zone. However, it also exposed the opportunity for a strategy that can protect both.

The next chapter that included the historical analysis of Mati, Mati's landscape layers, aspects, qualities, problems, from different perspectives, and phases in time, made clear many of the problems and causes of the fire tragedy. From the abandoned vegetation, the problematic urban forest types, the arbitrary planning, the inaccessible coast, the lack of public, open, spaces, the changes, illegally or not, of the land uses, the lack of policies, emergency management, fire and disaster services, the human, criminal actions years before, during, and after the event, and more, many issues that remain dangerous, they guarantee the same tragedy in another possible event like this. In addition, the

analysis of Mati unfolds the lost identity, a beautiful image of the place, its genius loci, which on the one hand after the fire has become a distant, nostalgic, desirable memory, but on the other a reminder of the causes that led to the catastrophic fire. This is why though, now there is the chance to combine things from the past with new goals, in order to make a new identity, to make new memories.

The last chapter of the location, selected through the previous analysis, apart from being important because it is a condition to acknowledge the landscape and the surroundings, the qualities, the flows, and the needs, it is the starting point of the design, by giving clues for the opportunities of the translation of the theory and analysis to the design, such as the opportunity for the protection and promotion of the Pappa stream as valuable and irreplaceable natural resources, and the opportunity for it to become the carrier of a design that will contribute in the healing process of the traumas.

In short, this Reading part indicates the importance of the understanding, the understanding of the fire as an element and phenomenon, the understanding of the natural and cultural history, the understanding the landscape, the understanding of the ecosystem, as healing process itself. Understanding the context and the problem indicates the conditions of the

healing processes of both traumas, the importance of education, and reconnection to a resilient landscape and community.

WRITE : Healing the Human Trauma

The Human trauma, as mentioned before, refers to and includes the individual, psychological trauma, and the collective-community-social trauma, both caused by, in this case, the fire disaster. And while people, in general, don't always permanently overcome a traumatic event, since it is clear that the trauma cannot be erased, they do get through it, following consciously or unconsciously some phases, stages that constitute the recovery process.

In professional therapy, experts follow a process in which the first step is to establish the feeling of safety, then introduce the phase of remembrance and mourning, when the victims are encouraged to release their feelings and emotions, and then begin the step towards the reconnection, a balanced, psychological statement. Nevertheless, most of the theories about the healing process follow a similar pattern that includes the stages of denial, anger, grief, bargaining, and acceptance, stages that form also the 'Kübler-Ross model' of the psychiatrist Elizabeth Kübler-Ross.

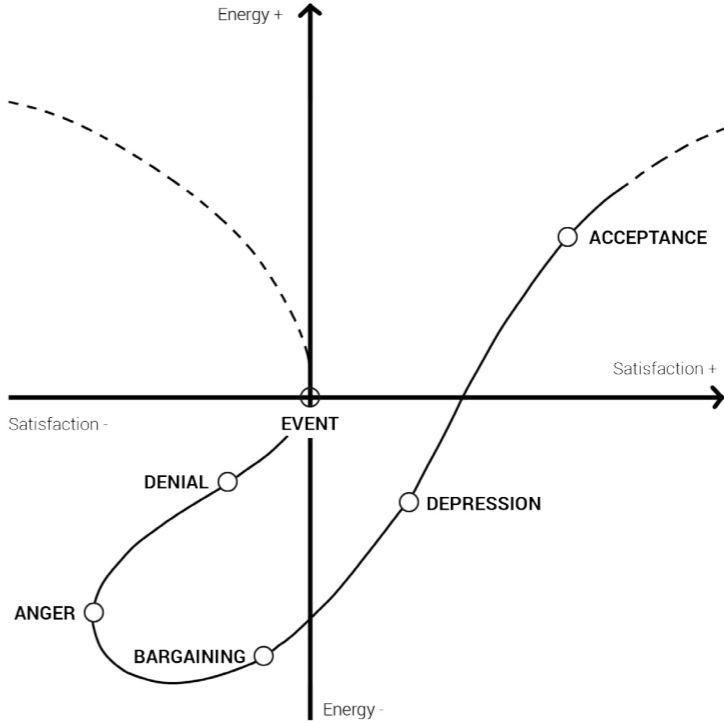
Peter Homans in 'Symbolic Loss: The Ambiguity of Mourning & Memory at Century's End', describes the process of mourning also in five stages: attachment, loss, grieving, mourning, and reattachment, emphasizing the period of mourning as a cure of human being. All approaches/theories do not work in linear ways. The stages may work in any order according to the individual, and they form an inner circle of the initial and natural response that can trap the person that may move around in this for any period of time and in any order. There is also though the outer circle that appears when he/she realizes that has a choice to move beyond the reactions described in the inner circle,

and move to the 'final' recovery phase that contains the stage of remembering since the paradox of the trauma is that in order for someone to 'forget' and heal, he/she needs to remember. In few words, by Herman (1992, p. 1): 'Remembering and telling the truth about terrible events are prerequisites both for the restoration of the social order and for the healing of individual victims'¹.

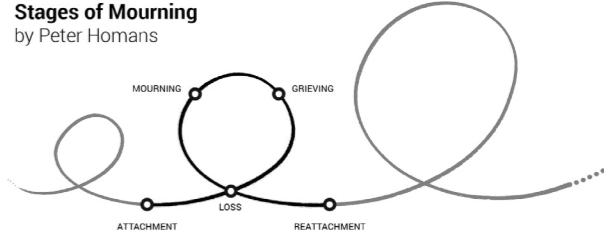
The goal for every trauma healing, as well as specifically for the healing of the human trauma from the Mati fire, 'is to acknowledge the experience and integrate it into a sort of personal or collective rebirth'² (Gutlove, P. & Gordon, T., 2004), something that can contribute to social reconstruction. It is argued though that the trauma will not go away unless it is actively confronted³. 'Psychological restoration and healing can only occur through providing the space for survivors to feel heard and for every detail of the traumatic event to be re-experienced in a safe environment'⁴ (Hamber, B., 1995).

And here is where physical space can be introduced. The question of how to use space to support the victims, to give them tangible and intangible space to express themselves, to be heard and supported by others, and to contribute to the recovery, immediately comes to my mind.

Phases of Grief Diagram
by Bertrand Grandin on Elisabeth Kübler-Ross' ideas



Stages of Mourning
by Peter Homans



Trauma Paradox
to FORGET → to REMEMBER

Based on Tanović (2019, p.1), memorial architecture, *‘is an act of representation, touches upon the essence of architectural creation and the question of how space mediates some of the most intricate social and cultural processes’*⁵, such as the mourning and the healing from traumatic events. Spatially this can be translated with contexts like monuments and memorials, through the expression of the painful memories, the materialization that is necessary in order to overcome the trauma and the recognition by the ‘others’ that according to some scholars, can cure the instability, characteristic of PTSD⁶ (Tanović, 2019, p.99).

Many times, the meaning, the role, or the actual goal-function of a memorial is not obvious. The point is not to represent, illustrate the event or person that is being commemorated but to create an atmosphere, a spatial framework for experiences, reactions, and stimuli. For that to happen, important is not only the architecture, the design elements themselves, but the landscape, the *‘real’* space, either because it is the suffered, the directly affected scape, or the *‘ideal’*, chosen space to carry the memorial design. And that is also the initial difference between the memorial and the monument, where a monument is perceived as something static, architectural, structural, or sculptural, and characterized by its visual recognition, whereas memorial as I mentioned, by its ability to let and guide the visitor to engage in an experience⁷ (Tanović, 2019,

p.9). In a few words, memorials, instead of displaying what is being commemorated, create spaces that reflect the narrative⁸ (Tanović, 2019, p.37).

This, in the design process, is done mainly by using symbolisms translated into objects, structures, spaces. According to Tanović (2019, p. 131), *‘the descent into the earth is commonly associated with the realm of the dead or unseen of Hades’*⁹, since it refers to the passage from one world (that of the living) to another (that of the dead), from one space to another. Other similar concepts are *‘the ‘space of fire’ and the ‘space of water’ seen by particular cultures as privileged spaces of crossing’*¹⁰ (Tanović, 2019, p.131), transition, and commemoration. In addition, the symbolism of the façade, the labyrinth, the staircase, the ladder, or other similar notions, are used in a real, tangible, spatial way in a memorial design. In general, however, the most distinctive spatial concept that also engages the landscape, the spatiality of a place, and the symbolism of transition, are the three notions of the Entrance, The Room, and the Path¹¹ (Tanović, 2019, p.139). And when these notions are translated into a design, so connected with each other, in (a) spatial sequence(s), then their experiential journey emphasizes the meaning, and symbolism of the space and design, which aims exactly to the enhancement of the emotions.

Figure 15. Passages, Homage to Walter Benjamin, 1990-1994, Portbou, Spain



'Flight 93 National Memorial', Paul Murdoch Architects



Figure 16. View of Flight 93 National Memorial

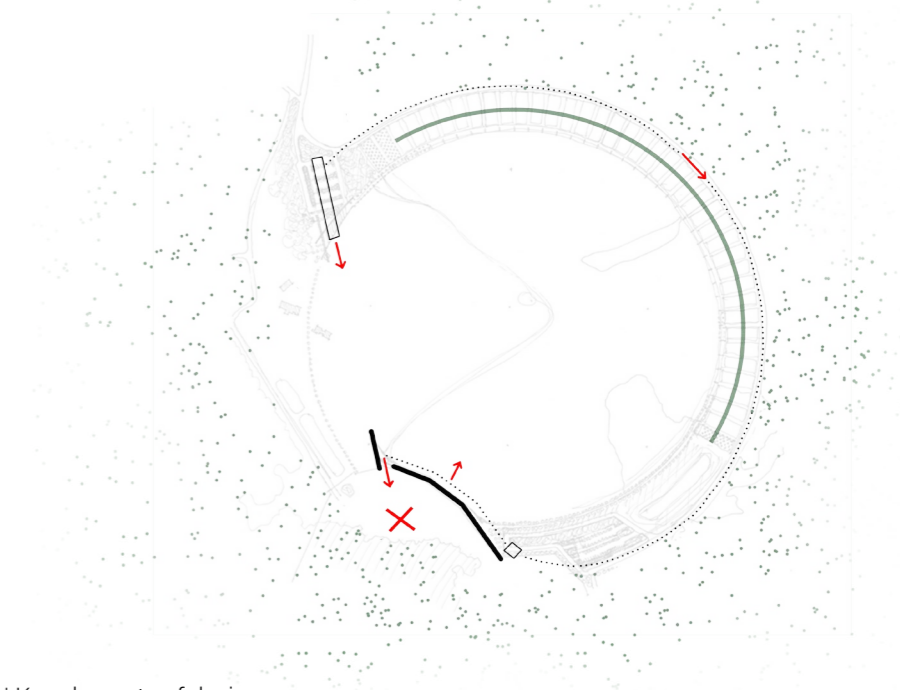
A project that explains and reflects the experiential approach of a memorial through the design, and that refers to the remembrance and the healing processes, and reflects them on the design, is the Flight 93 National Memorial in Pennsylvania, by Paul Murdoch Architects. The memorial is dedicated to the heroic actions of the 40 passengers and crew of the United Airlines Flight 93 who prevented a terrorist attack to Washington D.C. and fell on an open-pit coal mine.

The design of the memorial is based on and dedicated to the landscape itself. The team wanted to transform this site, a former reclaimed strip mine, into a place of memories, grieving, and environmental and symbolic healing. And the design does exactly that, guides, shapes, and experiences the place that narrates the tragedy, allowing the individuals to perceive it and mourn on their own terms.

That is achieved by the very well thought out elements that consist of the design that 'control' what someone sees and when. At the same time the open, vast, however also well thought out, the landscape itself creates a sense of freedom for feelings, for a physical encounter between the place, the visitors, and the national tragedy happened.

To conclude, in this project I recognize the approach of designing a memorial based on the landscape itself,

as well as guided by the narrative imprinted on the landscape, using designs symbolically for the healing, such as the path, emphasizing the experiential aspect of the place, narrating parallel the tragedy, which is mostly done by using design principles such as guiding views, enclosed and open spaces, materiality, and finally taking parallel into account the existing surrounding for the addition of new plantations.



| Key elements of design

Moreover, it can be mentioned that memorial architecture is not only about architecture, it is also about landscape architecture. Memorial landscape architecture has to make choices about the particular site, to find ways to address the palimpsest, its history, the event or what is being commemorated there, to make visible or enhance the disappearing by the natural processes physical traces of the place, and together with the architectural elements *‘guide’* the visitors.

And it is understood that since memorial spaces are means of expressing the memories, they are also the places where the past, the present, and the future meet, the past being the memories of the topic, the present the current moment, and the place dedicated to the topic, and the future the lessons learned that contribute to a better come.

Going back to the beginning, a very important goal of a memorial, if not the most important one parallel to the communication of what is being commemorated, is to be of service to the healing processes of the traumas created.

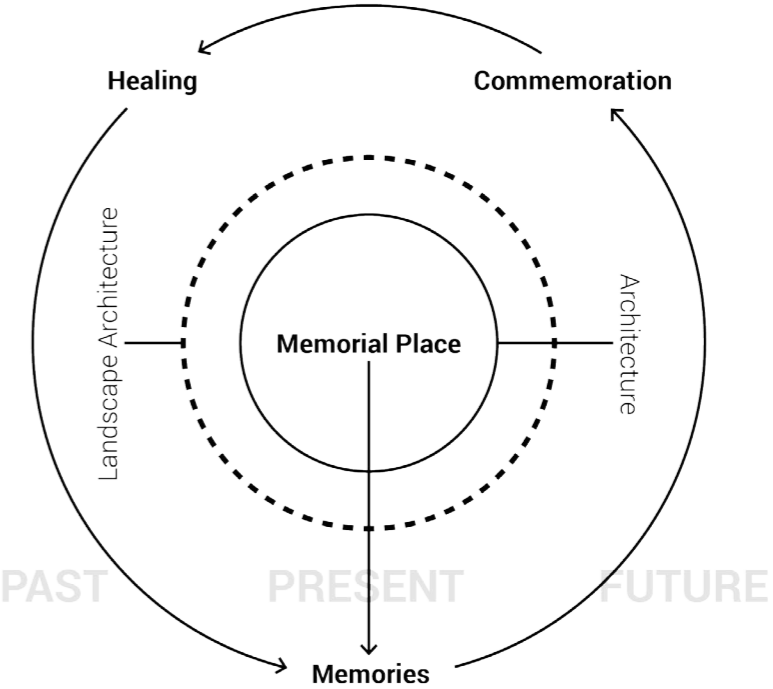
In the case of Mati today, two dimensions of trauma can be identified, two dimensions that are interconnected, the emotional individual pain, from the personal experience of the fire and the personal losses, and the general post-fire trauma of the community of Mati and the society as a whole, as a national tragedy.

This single dramatic event that catastrophically changed the physical image of the area, altering the basis on which processes, experiences, and perceptions are applied¹² (Butler, Sarlöv-Herlin, Knez, Ångman, Ode

Sang & Åkerskog, 2018), and had such devastating consequences, on the post-disaster landscape. It belongs to the Trauma-scapes, as defined by Tumarkin (2005), *‘a distinctive category of places transformed physically and psychically by suffering, part of a scar tissue that stretches across the world’*¹³. This gives the landscape a new, dark layer, a heavy atmosphere that will ‘lay’ and ‘wander’ there for a very long time. This layer will be crucial and determine the identity of the place, it will be the trauma that is engraved metaphorically and literally on the landscape.

Public space of trauma provides a consensual reality and collective memory through which the fragments of personal memory can be assembled, reconstructed, and displayed with a tacit assumption of validity¹⁴ (Kirmayer, 1996, p.25). This consensual reality and collective memory consist actually the intangible aspect of this post-traumatic landscape that wants to forgive but not to forget.

In that way, the memories of the living and non-living things must be imprinted. The landscape and the narrative must be experienced and oblivion must be confronted at the same time, because *‘we don’t always get over traumatic events, but we do get through them. This, too, is a form of resilience’*¹⁵ (Vale & Campanella, 2005, p.14).



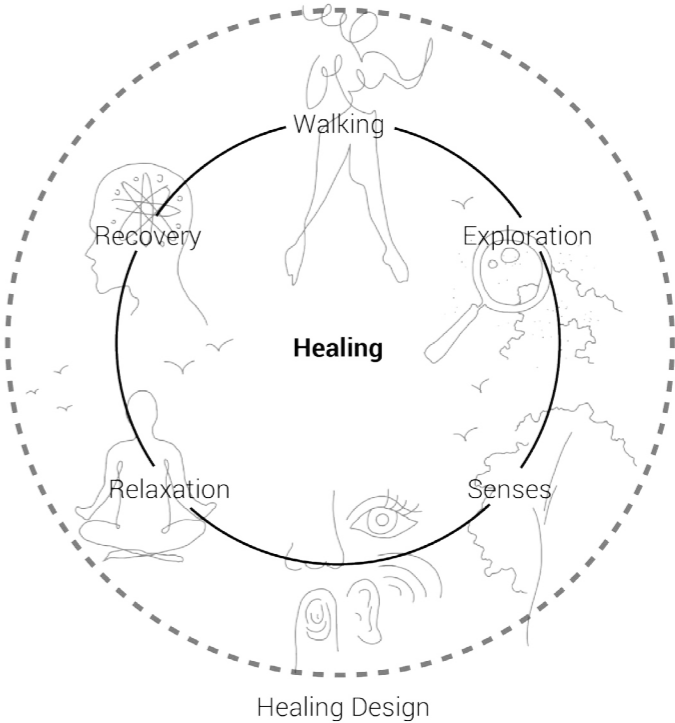
Nature and natural landscapes were and are the center of research interest since at least the 1970s in the western world. But even before that many cultures have addressed traditional views on nature as a *'healer'*, how natural sceneries and views can affect the mood and release stress and pressure. And as more systematic scientific research began to be conducted, many schools and theories were created, such as environmental and ecological psychology, medical geography, or the horticultural therapy¹⁶ (Jiang, S. 2013), referring to the *'natural'* landscapes as well as the designed *'natural'* landscapes. So, designing indoor and outdoor spaces to improve health processes received special attention.

In landscape architecture specifically, this expression was translated, for starts, through healing gardens, inspired by the healing temples such in ancient Greece, temples for the gods, located in pastoral settings with mineral springs, bathing pools, gymnasium, and healing gardens.

Healing gardens, like gardens, were, in the beginning, perceived as rooms, with clear boundaries, as a manifestation of life, using living materials, and as applied art, as experiential places¹⁷ (Stigsdotter, U.A. & Grahn, P., 2002), there are three schools of theories about the healing effects of gardens from different research areas, the Healing Garden School, which argues that the

design and the content of the garden as a room itself affect the visitor's health, the Horticultural Therapy School, which argues that the activities happening in the garden room are the ones that affect the health process, such as gardening, and the Cognitive School, which supports both arguments that the health benefits can come both from the design of the garden itself, as well as from the activities included, and add the aspect of the visitor's individual background and character that influence each perception and connection with the surroundings¹⁸. And my position on this, in general, and specifically regarding this project, is that indeed the last theory seems to be the most relevant, the most appropriate one, the one that I will try to pursue, regardless of the *'name'* of the designing outcome.

As a result, nature, man-made or not, designed or not, has a strong restorative effect on people¹⁹, according to R. Kaplan and S. Kaplan (2005). More specifically, nature places that are closely attached to people, for any reason, offer restorative, healing properties, through different activities, such as the walking that combines the exploration and the recovery²⁰ (Kaplan & Kaplan, 2005, p. 285). Frequent walking, experiencing, and connecting with nature will in time lead to recovery, to the healing of the Human Trauma.



‘Heide’s Healing Garden’, Openwork

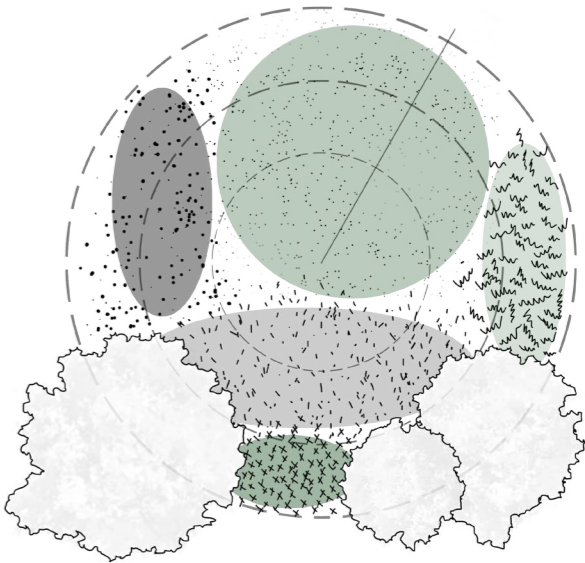


Figure 17. View of Heide’s Healing Garden--

In the case study of Heide’s healing garden, in Melbourne, the designers use the healing and curative properties of the plants and based on the concept of proxemics, that is the study of the personal space and how far apart people need to be from each other in different social circumstances, they create some planting zones that also express different sensorial activities, with the goal of them being spaces of pause.

The office sees the gardens not only as an aesthetically pleasing addition in a space, but more importantly as a powerful tool that can connect people and communities, offer life-affirming, positive experiences, and reduce at the end the social isolation, something that expresses also their goal of making a vital space for the broader community in the wake of COVID-19, nowadays.

Openwork Senior Landscape Architect Elizabeth Herbert says, *‘Using existing structures and plants the design looks to heighten the experience of nature and create a protective space within the wider Heide garden. In many ways, the Healing Garden sums up the broader Heide ethos and garden experience in one space. By creating small moments through different planting styles, strategic seating placement, and sensory activities, the garden’s design invites visitors to pause, occupy the space around them, and ultimately own their experience’*²¹.



| Design concept

The last part, result, of the Human Trauma, as mentioned before, is the pyrophobia, the fear for fire, and/or nature, something that creates a difficulty, or maybe a paradox in claiming that nature, designed or not gardens, that have therapeutic properties and effects, can heal this trauma, and so its parallel outcomes. However, regarding this phobia, one treatment option that scientists suggest is gradual exposure therapy. *'Exposure therapy aids people in confronting their fears. It uses gradual, repetitive exposure to the thing you fear to help you learn to manage your feelings, anxiety, or panic'*²², according to Seladi-Schulman (2019). More specifically, the progression of exposure therapy includes the following actions: thinking or talking about fire, viewing pictures or videos of fire, being around a fire at a distance, and getting closer to or standing next to a fire.

And because fire is part of nature, and specifically of this nature, the two ideas can be combined in the design, and the design process, aiming, both ways, to the gradual recovery, and healing of the Trauma.

All things considered, understanding the importance of the Mati fire, of its devastating consequences, the human and landscape traumas, the importance of commemorating this tragedy in order not to let it be forgotten, to remember in order to be healed, to learn from the mistakes, to remember to try for a better future,

and to create better relationships within nature by really embracing all of its elements and really understanding and connecting with it, I see the memorial as a form of a healing landscape /+ architecture, a chance, as the carrier of everything I want to address, solve, express, and enhance with my proposal in this thesis project.

1. Herman, J.L. (1992). Trauma and Recovery: The Aftermath of Violence - From Domestic Abuse to Political Power. BasicBooks.
2. Gutlove, P. & Gordon, T. (2004). Psychosocial Healing and Post-Conflict Social Reconstruction in the Former Yugoslavia. Medicine Conflict and Survival (20). 136-50. 10.1080/136236942000234726
3. Gutlove, P. & Gordon, T. (2004). Psychosocial Healing and Post-Conflict Social Reconstruction in the Former Yugoslavia. Medicine Conflict and Survival (20). 136-50. 10.1080/136236942000234726
4. Hamber, B. (1995). Do Sleeping Dogs Lie? The Psychological Implications of the Truth and Reconciliation Commission in South Africa. Seminar presented at the Centre for the Study of Violence and Reconciliation, Johannesburg.
5. Tanović, S. (2019). Designing Memory: The Architecture of Commemoration in Europe, 1914 to the Present. (1st ed.) Cambridge University Press. p.1
6. Tanović, S. (2019). Designing Memory: The Architecture of Commemoration in Europe, 1914 to the Present. (1st ed.) Cambridge University Press. p.99
7. Op. cit., p.9
8. Op. cit., p.37
9. Op. cit., p.131
10. Op. cit., p.131

11. Op. cit., p.139
12. Butler, A., Sarlöv-Herlin, I., Knez, I., Ångman, E., Ode Sang, Å. & Åkerskog, A. (2018). Landscape identity, before and after a forest fire. Landscape Research, 43:6, 878-889. <https://doi.org/10.1080/01426397.2017.1344205>
13. Tumarkin, M. (2005). Traumascape: The Power and Fate of Places Transformed by Tragedy. Victoria: Melbourne University Press.
14. Kirmayer, L. J. (1996). Landscapes of memory: Trauma, narrative and dissociation. P. Antze & M. Lambek (Eds.), Tense Past: Cultural Essays on Memory and Trauma. 173-198. London: Routledge.
15. Vale, L.J. & Campanella, T.J. (2005). How Modern Cities Recover from Disaster. Oxford University Press. <http://ebookcentral.proquest.com/lib/delft/detail.action?docID=273182>
16. Jiang, S. (2013). Therapeutic landscapes and healing gardens: A review of Chinese literature in relation to the studies in western countries. Frontiers of Architectural Research, 3:2, 141-153. <https://doi.org/10.1016/j.foar.2013.12.002>
17. Stigsdotter, U.A. & Grahm, P. (2002). What Makes a Garden a Healing Garden?. Journal of Therapeutic Horticulture, 13, 60-69.
18. Stigsdotter, U.A. & Grahm, P. (2002). What Makes a Garden a Healing Garden? Journal of Therapeutic Horticulture, 13, 60-69.
19. Kaplan R. & Kaplan S. (2005). Preference, Restoration, and Meaningful Action in the Context of Nearby Nature. Urban Place Reconnecting with the Natural World. USA: MIT Press.
20. Kaplan R. & Kaplan S. (2005). Preference, Restoration, and Meaningful Action in the Context of Nearby Nature. Urban Place Reconnecting with the Natural World. USA: MIT Press.
21. Green. (2020, May 6). Heide Museum of Modern Art reveals design details for new Healing Garden. <https://greenmagazine.com.au/heide-museum-of-modern-art-reveals-design-details-for-new-healing-garden/>
22. Seladi-Schulman, J. (2019, July 25). Pyrophobia: Understanding the Fear of Fire. Healthline. <https://www.healthline.com/health/anxiety/pyrophobia>

WRITE : Healing the Landscape Trauma

Secondary Succession

As mentioned in the 4th chapter of the *Reading* part, the Landscape Trauma is the ecological and spatial trauma of the landscape after the fire, including the direct and indirect tangible consequences of the fire, such as the partial or total destruction of the vegetation, the later floods, soil erosion, and effects on air quality, and the indirect tangible landscape degradation, when fires are repeated at relatively short intervals in the same place, as in this case.

As a disturbance factor that, at a first glance, changes dramatically a landscape, leaving it many times completely lifeless, it is part of the ecological cycle of the secondary succession, and so it is, at the same time, the beginning of life, and habitats, by letting all left-over, old, seeds to sprout and bloom with the help of the nutrients produced by the burned organisms, and giving them a new chance, with less competition, to grow and expand. And Greek, natural, Mediterranean ecosystems are adapted to deal with fire.

But fire is also a form of destruction, as it is shown. However, because under ‘*normal*’ conditions, a Mediterranean region can burn without long-term degradation, in terms of species diversity, community structure, and soil fertility, at intervals of about 40-70 years, the fire itself is not a catastrophe, but a circular disturbance¹, part of the secondary succession cycle, and local ecology. The most important, after a fire,

as scientific data suggest, is the tactic of letting the ecosystem activate its mechanisms to deal with this disturbance.

In that way, the natural ability of the landscape, and nature to heal itself is clear, and it is something that reveals the resiliency of the landscape.

| Secondary Succession Diagram



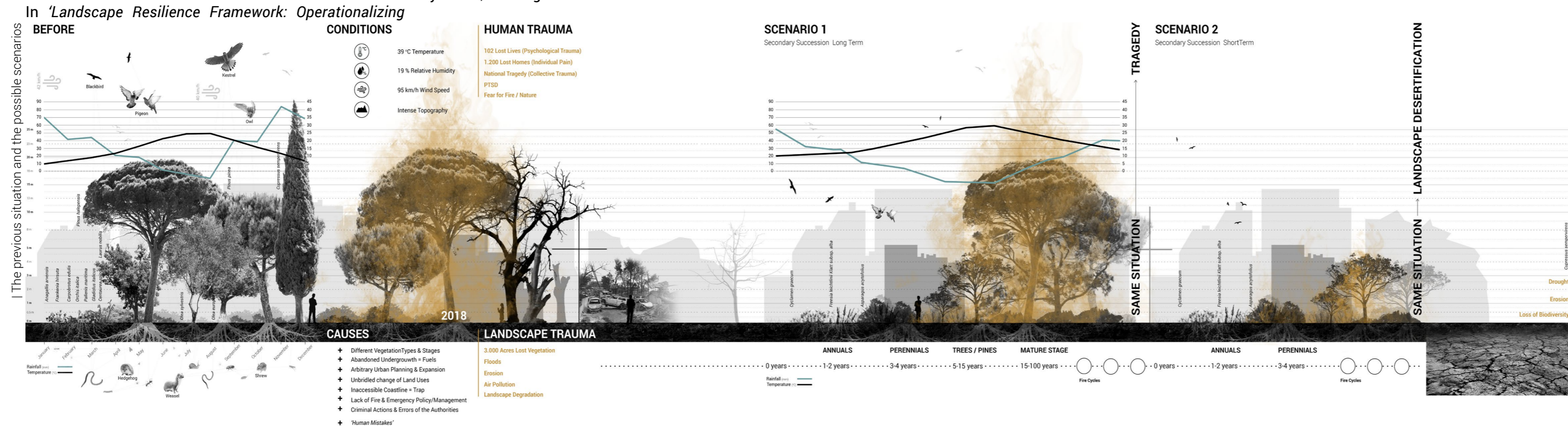
Resilience

According to Cambridge Dictionary (2021, April 22), *'resilience is the ability of a substance to return to its usual shape after being bent, stretched, or pressed; the quality of being able to return quickly to a previous good condition after problems; the ability to recover readily from illness, depression, adversity², etc.* In ecological terms, the definition of resilience shows many similarities. More specifically, according to the Canadian ecologist Crawford Holling, resilience is the ability of an ecological system to absorb and overcome disturbances, like in this case the disturbance of fire, being able to maintain and protect its original structure and functioning³ (Holling, 1973).

ecological resilience at the landscape scale' (Beller, Robinson & Grenier, 2015, p.12), the authors identify seven principles of landscape resilience, and these are the setting, the process, the connectivity, the diversity/complexity, the redundancy, the scale, and people⁴.

- **SETTING:** refers to the geophysical, biological, and cultural constraints and opportunities within a particular landscape.

- PROCESSES: refers to the processes of a landscape, such as the material movements, the climate changes or land-use changes, etc., that make the landscape a dynamic, heterogenic habitat.



- **CONNECTIVITY:** refers to the things that enable the movement of materials and organisms, and allow them to move in response to changing conditions.

- **DIVERSITY AND COMPLEXITY:** refer to the variety of landscape features provided, something that makes the landscape a network of complex interrelations.

- REDUNDANCY: refers to the number of elements on a landscape, the number of habitats, the number of species, and some things that provide insurance in case of a loss.

- SCALE: refers to the tangible view of space, and the intangible view of time-space, that determine whether there is sufficient space for the other principles to accommodate in the particular landscape, and how.

- PEOPLE: refers to the ability of people, as part of the ecosystem, to change and shape the landscape, in direct or indirect ways, creating new opportunities.

So, by *'testing'* these principles, as conditions, on Matí's landscape, in order to see whether it was, is, or will be a resilient landscape, based on the previous multiscale, multilayer, and multi-perspective analysis, my conclusion is that while Matí's landscape constituted a resilient landscape before this specific 2018 event, the fire disturbance shook significantly the form, qualities, and functions of the landscape. However, having said that, it seems even more important, urgent for the specific project design to bring back, support the resilience of this place, in order to be able to mitigate, tackle, and/or control future disturbances.

At this point, the Management of Forest Fires, in Greece, should be mentioned, according to the Greek Fire Brigade⁵.

The Management of Forest Fires is defined as any activity required to protect forests and other ecosystems from the risk of forest fires so that the objectives of managing these natural resources can be achieved. In Greece, as stated in a previous chapter, these activities that aim to reduce the number of fires, the burned areas, and all casualties, are divided into four stages, the phase of prevention, the detection and announcement of a fire, the phase of pre-suppression, and the suppression.

The Fire Prevention aims to prevent fires and includes various measures and actions, such as the implementation of the provisions of the Forest Legislation, which provides penalties for violators, either fines or imprisonment, and the education and public awareness campaign, with lectures in schools, camps and other organized groups and distribution of information material for public information.

As it is known, when a forest fire spreads it is difficult to deal with, when a fire is recognized in its early stages, extinguishing is easier, and the equipment needed is less. So, the Detections and Announcement of the fire is a very important stage of the Management and is achieved with a network of forest fire observatories, at strategic locations at high altitudes, to monitor and identify potential smoke, regular patrols in critical places, use of technology for surveillance of forest areas such as with drones, sensors, or video-thermal cameras, and with a forest fire hotline through which

the public can report smoke or fire at any time.

Precautionary measures, or in other words Mitigation include mainly infrastructure aimed at reducing the likelihood of any fire spreading and facilitating firefighting operations in firefighting operations, with the most important ones the fire lanes and breaks, forest roads, forestry management and maintenance, water supplies, and heliports.

And finally the Suppression of forest fires, a difficult and dangerous task, which aims to intervene as quickly as possible and suppress any fire in its early stages and reduce the damage caused. At this stage, the greatest emphasis is given in terms of staff, funding, and infrastructure, and includes measures such as the establishment of forest stations, the vigilance of forest officials, formation and training of forest fire brigades, possession of fire trucks and aircraft, as well as the creation of voluntary forest fire brigades.

However, most of the attention, effort, and economic support lays in the Suppression of the fires, and not the fire prevention or mitigation. That is definitely one of the biggest problems of the Greek fire-fighting system and management, a problem that costs a lot, economically, environmentally, and socially. Instead, the focus should be on the two first stages, Prevention, and Mitigation, in order to save lives, nature, material goods, and money.

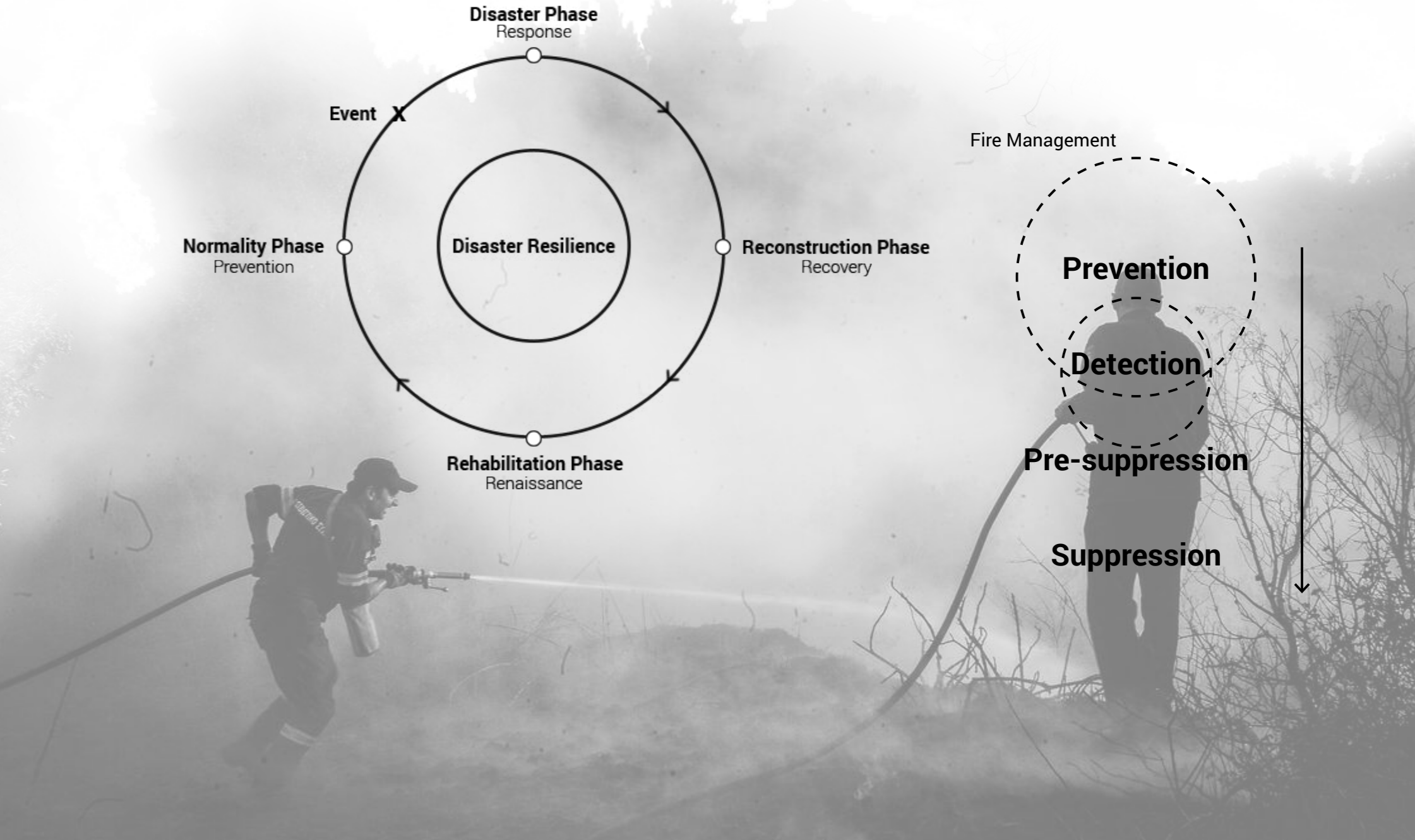


Figure 18. Fire fighters-Fire suppression

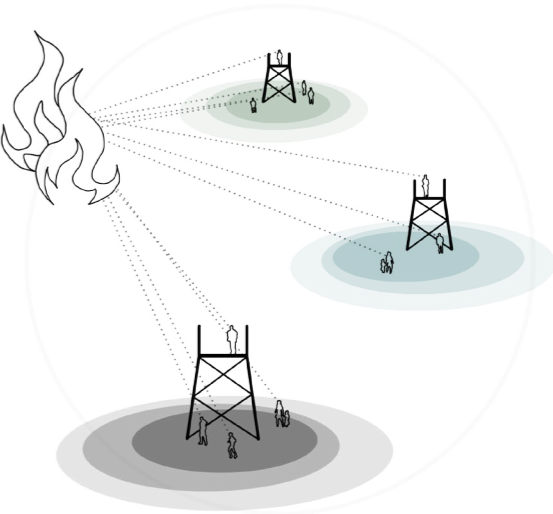
‘Wildfires – An Architectural Intervention of Resilience’, Alexandre Sequeira, José Gonçalves



Figure 19. View of the Programmed-Infrastructure Network of Watchtowers

One project that represents the importance of fire prevention as one necessary step towards a resilient landscape is the architectural proposal ‘Wildfires – An Architectural Intervention of Resilience’ by Alexandre Sequeira and Jose Goncalves, a project made for a design competition organized by Building 4humanity, under the supervision of Professor Hugo Farias, Lisbon School of Architecture. The location is Bragança municipality, in Portugal, where wildfires is a dangerous and recurring problem, and it explains its focus on fire prevention, having architecture as a strong catalyzer to create a strong surveillance system, where the passive way of detecting wildfires was and is the most effective one. The team creates a programmed network of infrastructure that activates the passive detection through different activities, focused on factors of wildfire prevention such as information, education, and water shortage, and make them also recreational spots. Wooden watchtowers undertake functions such as a museum tower, a bathing tower, or a scout tower, and creatively transform the functional purposes of fire prevention into fun activities of passive detection.

It is an architectural proposal that depicts exactly the importance of the prevention phase, the different fields that can contribute to landscape resiliency, and the opportunity to combine program and function through architecture, and so why not also through landscape architecture.



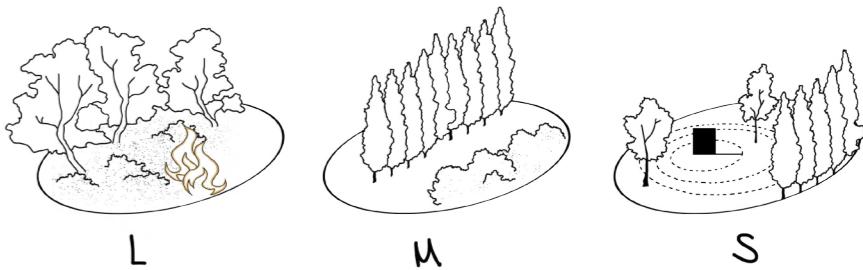
| Design concept

‘Reconfiguring the Burnt Scar’, Louise Kathleen Brukman



Figure 20. View of reconfigured plantations

Another project that represents the importance of fire mitigation as the second necessary step towards a resilient landscape is the project *‘Reconfiguring the Burnt Scar: A Landscape Architectural Response to the Knysna Fires of June 2017’*, in which the designer, Lousie Kathleen referred to Knysna fires in South Africa, and through the implementation of immediate solutions and long term planning, she tries to reconfigure the scars of the 2017 fires. From this project, I recognize the focus on the multiscale fire-planning and designing solutions, such as the erosion management system, the fire monitoring, and the controlled burns on the large scale, the scenic plantations of fire-resistant trees that create fire-breaks between the districts in the medium scale, and the suggestion of a fire-resistant species palette for domestic use and protection in the small scale.



| Design strategy

In conclusion, although every year, fires destroy important ecosystems in the Mediterranean basin, in Greece, and the specified area of eastern and northeastern Attica, the role of fire is not only a factor of landscape degradation but also a factor of renewal that is part of the natural, ecological cycle. It is important for people to understand that fire is and will be part of a landscape that was, is, and will be a result of the coexistence of natural and human actions, since it also played a decisive role in the evolution of plant species, as they have developed special adaptations to deal with its action, ensuring their presence in space and time. In short, fires are part of the forest life cycle and can be considered beneficial to Mediterranean ecosystems like this one. Therefore, they can play an important role in their functioning and evolution and need to be treated accordingly, not eliminated.

And while gradual exposure to fire can be used as a treatment for the fear created by the Human Trauma, it is clear to me that fire is part of this project, of the design itself. However, this can be done only with the condition of emphasizing the Prevention and Mitigation, as two primer actions to restore the landscape, and find a balance that will benefit all *‘stakeholders’* of this landscape, and as actions that can help to guarantee, on the one hand, the *‘normal’*, natural interval of the disturbance, and on the other the prevention of premature, undesirable, dangerous for people and the

landscape, future fire incidents.

1. Papageorgiou, A.Ch., Karetzos, G., Katsadorakis, G. (2012). Το Δάσος: Μια Ολοκληρωμένη Προσέγγιση [The Forest: An Integrated Approach]. WWF Greece
2. Resilience. 2021, April 22). In Cambridge Dictionary. <https://dictionary.cambridge.org/dictionary/english/resilience>
3. Holling, C. S. (1973). Resilience and Stability of Ecological Systems. Annual Review of Ecology and Systematics, 4, 1–23.
4. Beller, E., Robinson, A., & Grenier, L. (2015). Landscape Resilience Framework: Operationalizing ecological resilience at the landscape scale (Report SFEI-ASC's Resilient Landscapes Program No 752). San Francisco Estuary Institute.
5. Πυροσβεστικό Σώμα Ελλάδας [Greek Fire Brigade]. (2021, April 22). <https://tulib.tudelft.nl/apa/>
6. Kathleen, L. (2017). Reconfiguring the Burnt Scar: A Landscape Architectural Response to the Knysna Fires of June 2017 [Master's thesis, University of Cape Town]. <https://core.ac.uk/download/pdf/185410049.pdf>



Figure 21.

WRITE : The Vision-A Living Memorial



| Vision collage

Combining the information gathered, the theories and challenges analyzed, the conclusions, and my own ideas and thoughts, I from my (design) vision of this project.

The vision is to **create a public locus, a didactic, non-static, Living Memorial that will express and imprint the memories, contribute to the tangible and intangible healing processes of the Human and Landscape Traumas, integrating fire-resilient design tools, in order to achieve atonement and better relationship with nature and its phenomena.**

More specifically, the memorial will derive from the theory of architecture memorial design and the use of symbolisms, and the landscape architecture therapeutic design and the *use* of nature as a healer. Tools for Prevention and Mitigation as technical or landscape elements and designs will not only be utilitarian for the case of the expected on-time fire, and the possible, unexpected fire, but also will make visible the possibilities of a fire-resistant/resilient design that can prevent, and/or mitigate/control a fire disturbance, making people more aware, and comfortable around and in nature, achieving both ecological/landscape resilience, and social resilience, an important component under which individuals and social groups adapt an environmental change.

Figure 22. Current monument of Mati, 23rd of July 2020

At this point I would like to refer to the monument of Mati, presented on 23rd of July 2020. It is a sculptural monument dedicated to the 102 victims of the deadly fire in Mati, which literally depicts the disaster, the tragedy. And I would like to express my opinion, with as much objectivity as I can though. I believe that the calamity is not represented in similar places of martyrdom, it is symbolized. I find it an inappropriate realism without any obvious, positive purpose. Any monument, and memorial, is not meant to remind you of the pain, because memory, wherever you touch it, it hurts, is not meant to point with the finger the mistakes, and to terrorize you. And these are exactly what this monument does. It promotes the pain, it takes over the role of a *teaching* omniscient, and it perpetuates a latent image of a phenomenon that is part of nature, destroying any hope of a better relationship with it. And exactly the opposites are what I want to achieve with the vision of my project.

WRITE : The Principles

At this point, before introducing the specific principles for/of the design (for all-scales), I would like to dedicate this part to explain the definitions of restoration, resilience, and resistance, three actions or/and goals of this project that will help in understanding later the design.

Natural restoration was the way in which most of the forests (pine forest) survived in the Mediterranean region over the years, and it is a way that was followed also many times in Greece, after a fire, and it has many advantages. First of all, it is the cheaper way, from a technical perspective, and the most beneficial for the individual landscapes, as it usually regenerates the same biological characteristics of these landscapes. A disadvantage is that it may, never, follow a stable process, as it is affected by various external, environmental factors. However, there was, and still is a *‘strong political pressure for reforestation or afforestation burned areas in the Mediterranean region, quickly after a wildfire, as a common practice since, and particularly in conifer forests’* (Vallejo, Arianoutsou & Moreira, 2006, p.106).

Thus, an eternal question is whether natural regeneration (indirect restoration) is (always) the best choice to follow after a (fire) disturbance, or active restoration (reforestation, planting, seeding) can beneficially contribute to the process.

Under normal conditions, three to four years after a fire there is partial landscape recovery, and in ten years it has fully recovered. However, it is now clear that this depends on many factors, such as the fire intensity, the scale, and the recurrence period, factors that can

lead to landscape degradation. If during the first years, the succession seems to be very slow and insufficient, something that is noticeable in this region, after a long period of recurrent fires within the rural and urban settlement, then the non-natural reinforcement with gentle interventions, such as plantings and sowings with native species, is necessary. In addition, in this way, a more heterogeneous landscape can be slowly created, within its natural ecosystem. In this situation, *‘changing burned pine forest patches into hardwood forest would in many cases re-naturalize the area, increase (bio)-diversity and fire resilience, and reduce pest outbreaks’*² (Vallejo, Arianoutsou & Moreira, 2006, p.106), leading to the reduction of fire propagation risk.

Following these strategies, I suggest that natural regeneration will be followed regarding the pine forest patches, remnants of the fire, while **active restoration** will be followed regarding the areas where no natural (pine) tree regeneration is expected, and where the introduction of other species (later explained landscape pattern/typology), in order to create heterogeneous patches, should be made. As a result, the landscape will better reveal and enhance its hereditary trait, the resilience.

In a previous chapter (Healing the Landscape Trauma), the landscape resilience, and some principles that interpret it, were briefly explained, in order to define the situation of the Mati landscape. However, at this point, I would like to be more explicit about resilience in general, the difference between **resistance**, and **resilience** as a goal that can also explain the design itself.

Firstly, I would like to mention three aspects of resilience, aspects that at the end I try to combine as a coherent goal of the project, as one of the answers to the two traumas.

Social resilience, according to Adger (2000, p.347), is the ability of the individuals, and social groups (communities) to adapt to environmental changes and cope with external stresses, and disturbances³. In short, it can be argued that it is the ability and its speed of recovery from the (human) trauma caused.

Urban resilience follows the same notion of the ability to bounce back, and recover quickly, but is a more specific definition, a framework created by local or national leaders, and applied and accepted by citizens, a strategy followed after a disaster⁴ (Vale & Campanella, 2005, p.353).

Between many definitions, and as previously mentioned, **ecological resilience** is the ability of a system to absorb and overcome disturbances, like in this case the disturbance of fire, being able to maintain and protect its original structure and functioning⁵ (Holling, 1973). In addition, it is the key to biodiversity conservation, as it preserves the stability and function of the ecosystem.

Something, though, that is part of all these *‘different’* aspects of resilience, is that it is the speed of recovery from the disturbance, event, trauma that enhances the essence of resilience in general, and it is something that shows its difference with the term resistance, since on contrary it is *‘the extent to which the disturbance is actually translated into impact’*⁶ (Adger, 2000, p.349),

the level of *‘refusal’* of a situation to alter, to succumb to the disturbance and its consequences.

Taking everything into account, and having in mind the project vision, the goal-related is to achieve social resilience that with having no casualties, having a balanced relationship with nature and fire, and having a community ready to recover, to support the landscape restoration (by natural or non-natural restoration ways), to protect the natural processes, achieving natural fire regimes, thus enhancing the ecological, landscape resilience, while also following the framework of urban resilience (government, agency strategies), it is very much possible to achieve a holistic (community) resilience, different, greater than before, since the speed of the recovery will be even faster.

General Principles

Both analysis and research regarding the two main topics of the project led to the formulation of a set of design principles, principles that not only refer to the landscape fire-resistant and resilient aspects, and the memorial, site-specific design, and relation to the Greek history, but also to the materialization of the narrative, the theory, and the concept into the design.

Based on Patrick Daigle and his paper about Fire-Resilient Landscapes (2010)⁷, the objectives, or basic principles for achieving a fire resilient landscape that deals with the land, fuel, and fire management, can be divided into three categories, the Ecological, the Social and the Fire Management ones. I quote below some of these basic principles and management concerns, as mentioned in his discussion paper:

Ecological Principles:

- Fire is an important ecological process, so the natural disturbance regimes must be sustained, restored, and maintained.

- The whole landscape must be considered.

- Aim for heterogeneous landscapes, composed of a mosaic of patch sizes, species composition, seral stage composition, and structure.

- Reduce the threat of unnatural crown fire.

- Consider climate change, and how it will affect the landscape conditions.

Socio-economic Principles:

- Engage the public and enhance peoples' understanding

and support for reintroducing fire.

- Integrate fire management with social and economic well-being to help maintain viable urban and rural communities.

Fire-management Principles:

- Initiate, develop, and maintain interagency cooperation and collaboration with other agencies, levels of government, and private landowners.

- Use the best available science, concepts, and tools: biological, physical, social, economic, and management.

- Consider the full range of wildland fire analysis, planning, and management, including fuel management techniques, fire use, as well as fire suppression.

- Consider the principles of fire-tolerant or 'fire-safe' forests, such as reducing surface fuels, increasing height to live crown, decreasing crown density, and retaining large-diameter trees of fire-resistant species.

- Repeat fuel treatments over time.

- Learn over time.

In addition, according to the 'Proposed methodology for reducing the risk of forest fires' of the Greek North Aegean Region that emphasized the problem of Greece about dealing with forest fires based on the philosophy mainly of strengthening the forces and means of repression, suggested some specific actions about the phase of Fire Prevention and Mitigation. These include:

- Informing citizens not to cause fires by negligence.

- Having a system for early detection of fire.

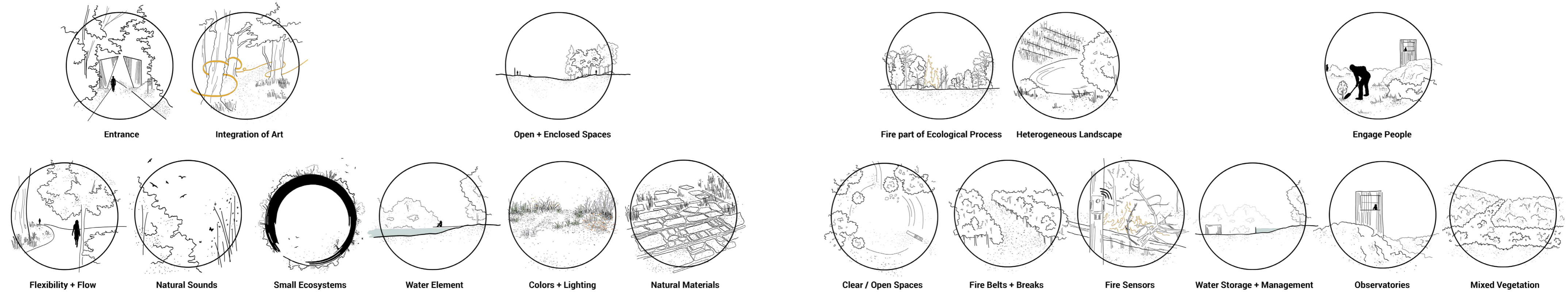
- Creating fire obstacles that aim the fire prevention and mitigation, such as fire zones, fire shelters, fire-breaks, water storages, and safe, fire-resistant design of houses-settlements.

- Vegetation management, such as undergrowth clearance.

According to these, I create a condensed group of principles, like a toolbox, regarding general actions that must be applied in all scales of the landscape and project, of the design.

The general principles, guided me then to define specific characteristics, specific elements, and typologies, derived from technical research and the previous analysis. Two main topics then appeared, two topics that have to be included, the topic of the plantations, and the topic of the water.

1. Vallejo, R., Arianoutsou, M., & Moreira, F. (2006). Fire Ecology and Post-Fire Restoration, 106
2. Op. cit., p. 106
3. Adger, W.N. (2000). Social and ecological resilience: are they related? Progress in Human Geography (24:3), 347–364.
4. Vallejo, R., Arianoutsou, M., & Moreira, F. (2006). Fire Ecology and Post-Fire Restoration, 353
5. Holling, C. S. (1973). Resilience and Stability of Ecological Systems. Annual Review of Ecology and Systematics, 4, 1–23.
6. Adger, W.N. (2000). Social and ecological resilience: are they related? Progress in Human Geography (24:3), 347–364.
7. Daigle, P. (2010). Fire-Resilient Landscapes (Wildfire Management Branch). Ministry of Forests and Range. https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/land-based-investment/forests-for-tomorrow/fire-resilient_landscapes_discussion_paper_dec_23_2010_draft_p_daigle.pdf

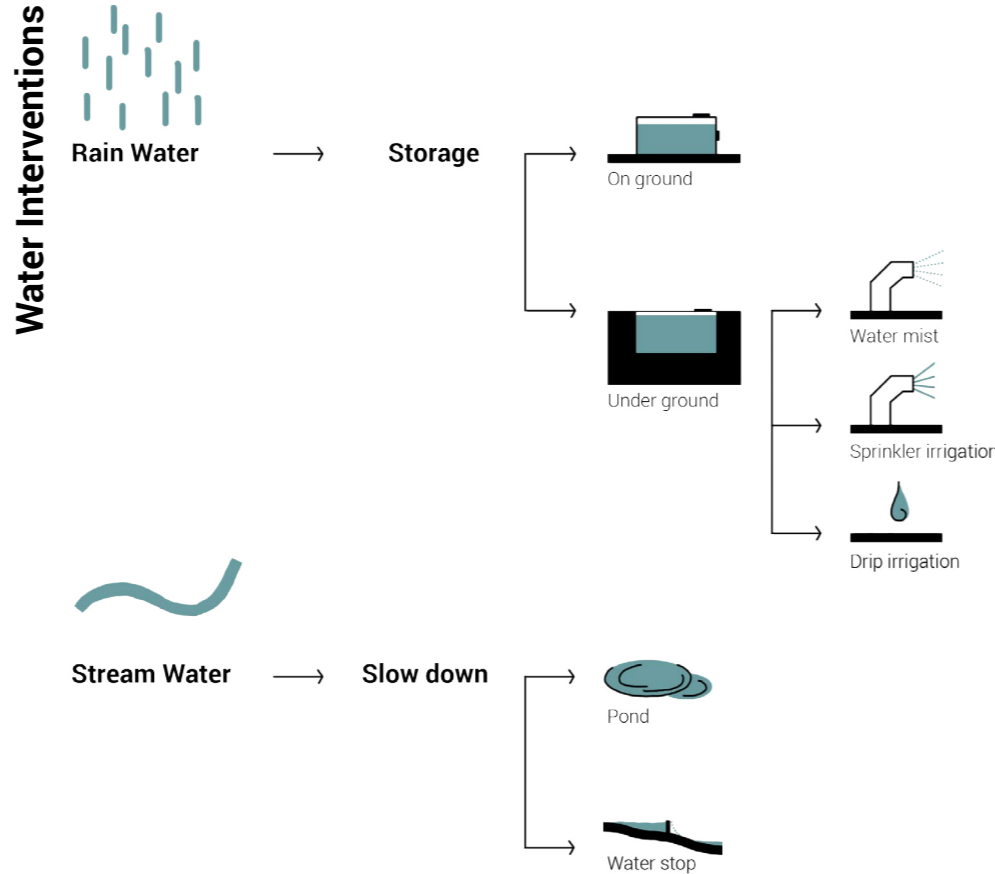


Landscape Typology

Thus, the first typology refers to the development of the urban forest types that have to alter and function as mitigation types, as fire-resistant types, and parallel as interesting experiential sequences on the landscape, resulting in a **Landscape Vegetation Zone Typology**. This is done by changing their composition, their arrangement, their maintenance levels, and the use of fire-resistant species. In addition, these types also refer to the **Plantation (Unbuilt) components** gathered from the study, and research of the Burial/Memorial Greek Architecture, and the ancient healing places Asclepieia, elements that were important symbolisms in Ancient Greece, such as the Cypress tree (line), as an ancient symbol of death and mourning but also of duration through time, a predominantly funerary plant, planted in temples and sacred groves, considered a sacred tree of the god of medicine Asclepius, the Aromatic gardens, as the religious and therapeutic gardens in Ancient Greece, with plants such as fennel, cumin, celery, cardamom, coriander, mint, iris, and others, plants that have healing properties, the Sacred Grove, which was a kind of temple, delimited and dedicated to the gods, and the Olive tree, the most important symbol of Greece, and Attica region, in particular, a sacred tree and a symbol of victory, peace, mercy, and especially of hope and eternity through rebirth.

The second typology refers to the water management system, based on the **Water Intervention Typology** of

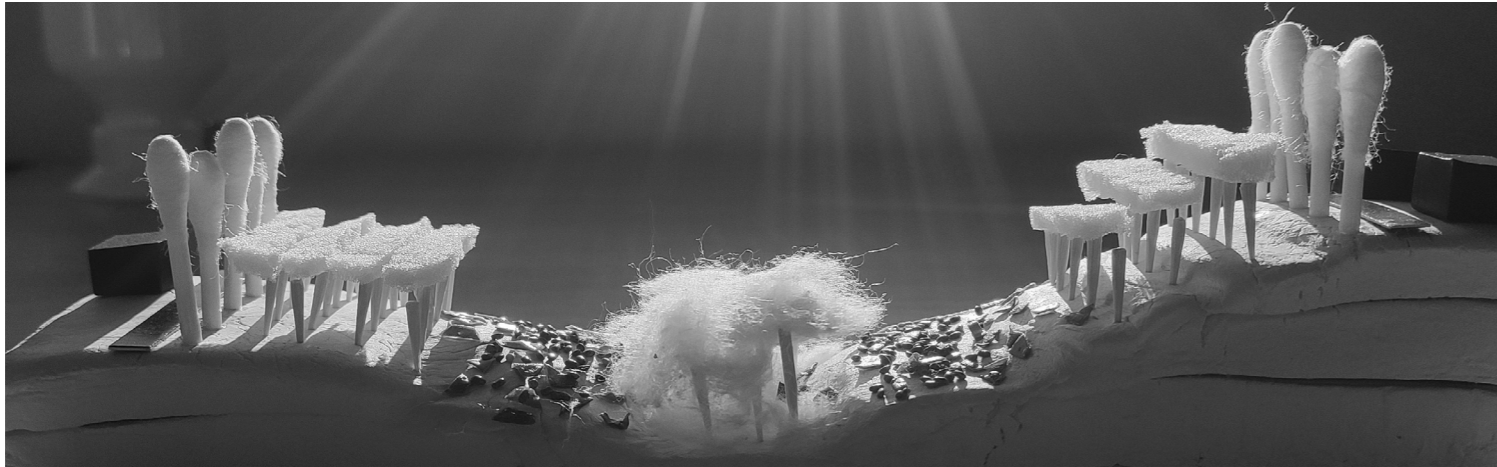
storing rainwater, and slowing down stream water, which aims to function as an irrigation system for watering the plantations (vegetation zones), as hydration and increase of humidity in dry seasons for the prevention of an early fire, and as an emergency reserve for the suppression of the fire on time.



Vegetation Zones					
	Protected Zone	Shield	Productive Zone	Open Zone	Fire Zone
Topography					
Arrangement					
Species					
Maintenance					
	Fruit Trees	Cypresses	Olive Trees	Flowering Plants + Succulents	Pines
	Constant	No	1/y	1/y	No

Test Model

In order to test some of these principles, regarding the landscape vegetation zones typology, a model test was done, in order to experiment with the different types, their effectiveness, and reaction to fire. Materials were picked according to their flammability, in order to resemble specific, fire-resistant species. Moreover, multiples try-outs resembled the maintenance levels, and so different scenarios, as well as different weather conditions (more or less wind). The outcomes were very encouraging, showing that a mixed planting patchwork can function as mitigation zone within an urban settlement.



| Test Model Section



| Test Model Fire

Greek Principles

Moreover, based on Kristin Faurest, director of Education at the Corvinus University of Budapest, and her lecture on *‘Healing landscapes’*, I create the second condensed group of principles, regarding general actions, elements, and designs that must be applied in the project, as principles for this healing, memorial space.

Furthermore, continuing the study of the Burial/Memorial Greek Architecture, such as the Agora and the Acropolis, the Ancient Theater and the entire archeological site of Delphi, cemeteries, the tombs, and burial monuments, the ancient healing places Asclepieia, as the healing places in nature, and

surrounded by nature, and the existing post-fire traces, an architectural memorial typology that includes the built, architectural components was created, a typology that seems to be a toolbox of specific elements for use, however, it is a very important group of elements, of archetype forms that will be part of the design and used symbolically and practically, according to the previously analyzed memorial theories and categories, that of the entrance, the path, and the room. Thus, the Amphitheatre, the Stairs, the Arcade Screen, and the Stoa, are the main forms, guiding the design, and used symbolically, and practically.

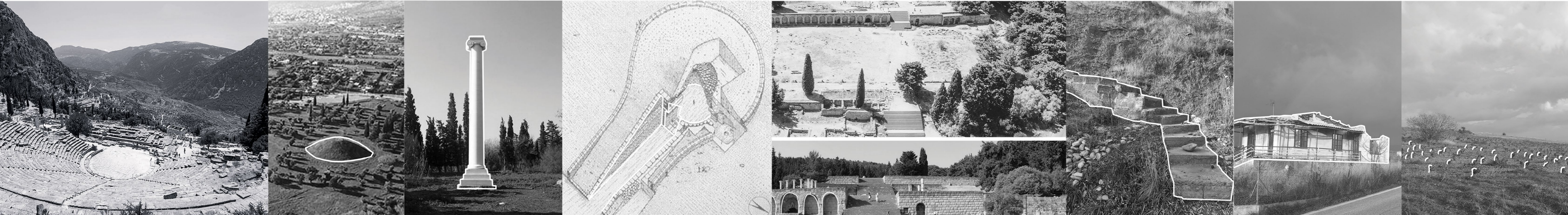
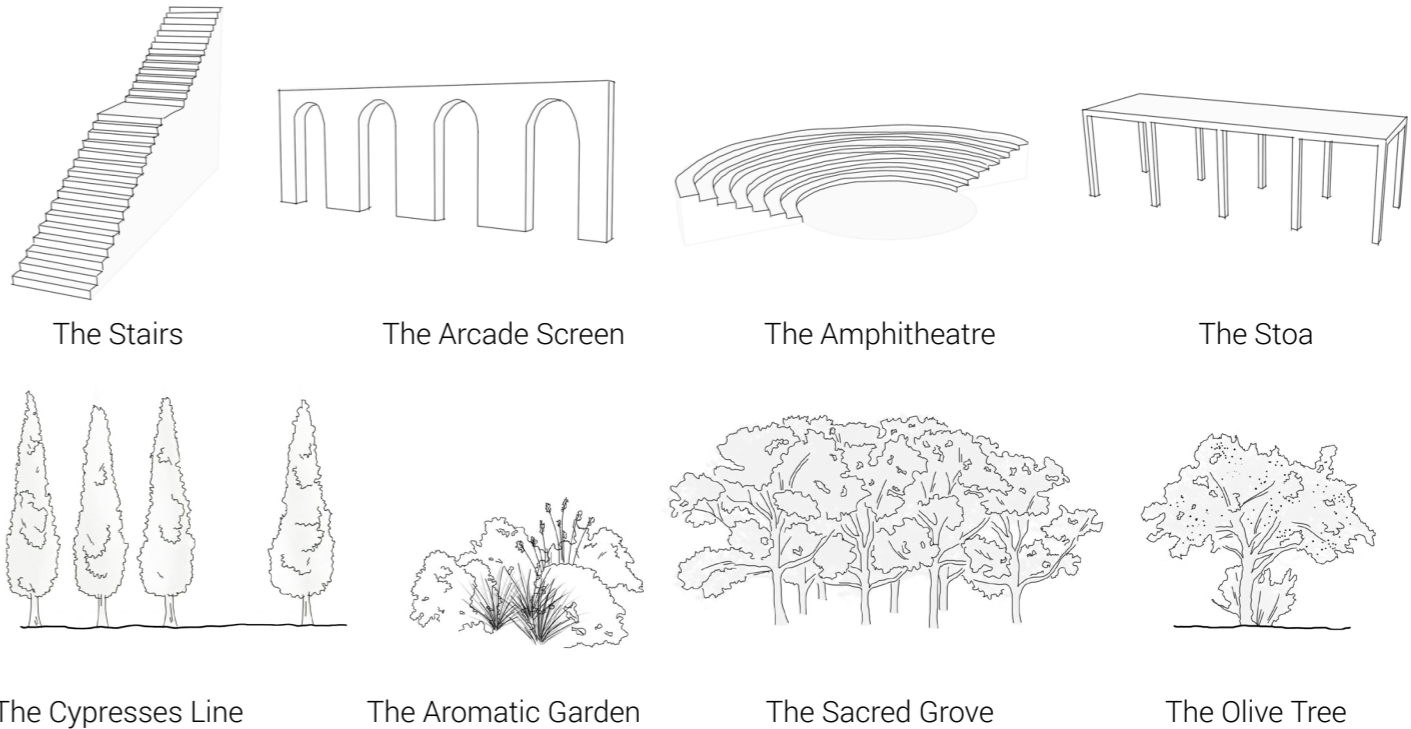


Figure 23. Ancient Theater of Delphi
194

Figure 24. Tomb of Marathon

Figure 25. Pillar of Marathon

Figure 26. Ancient vaulted tomb

Figure 27. Asclepion of Kos

| Traces of Mati fire, January 2021

195

Materiality

Materiality plays another important role in the design. Four main materials were chosen, both because of their symbolism and meaning, and their technical qualities.

The first material is stone. Inspired firstly by the Greek *‘καλντερίμια’*, cobblestone paths that are an integral part of the natural landscape and the traditional Greek architecture in many places and that is a technique from local craftsmen that started to pave where the ground has steep slopes or stagnant water, and secondly by the dry stone walling, *‘Ξερολιθιές’*, stone walls without binder that are characteristic elements of the landscape, on the hillsides, for the protection of crops in these sloping soils and prevent erosion, stone (local limestone types) is a material that expresses the cultural, and natural connection to the landscape and its people, as a remarkable example of the Greek Folk architecture.

The second material is debris. Using the remnants of the already destroyed by the fire buildings around the area, and the future demolition of the arbitrary houses around the design location that will be marked with a settled outline frame, and inspired from projects, where tons of busted chunks of salvaged material become primary ingredients for paving to form a porous surface and so saving trips to the landfill, debris is the materialization of the human, and the landscape trauma, the illustration of the memories, the cathartic

depiction of the event, a material that through its reuse cannot only express the cyclical, sustainable *‘life’* of materials but also the natural healing through its slow conquest by natural growth.

Another material is wood. Wood is a material that can really create a connection with this landscape, give a sense of continuity, of warmth, a familiar feeling, but it is also considered as the most dangerous one, as the most flammable, something that is not necessarily true, and so material like the exposed mass timber, the CLT, reduces carbon dioxide and it is proven to be more fire-resistant because of the slow rate at which the fire can burn through CLT’s many layers, and so can withstand flames and remain structurally intact for much longer.

Finally the well-known concrete. Concrete is a material that is widely used. However, the reason for choosing this material is not only because of its aesthetic outcome, and its almost unlimited abilities and structural qualities, but also because it can on the one hand create a contrast with the rest materials, and at the same time connect really well, as it is a material that it’s not clear is it’s natural or unnatural kind of.



Figure 28. The Wood: Exposed mass Timber (CLT)



Figure 29. The Stone: *Καλντερίμι* < Cobblestone path + *Ξερολιθιά* < Dry stone walling



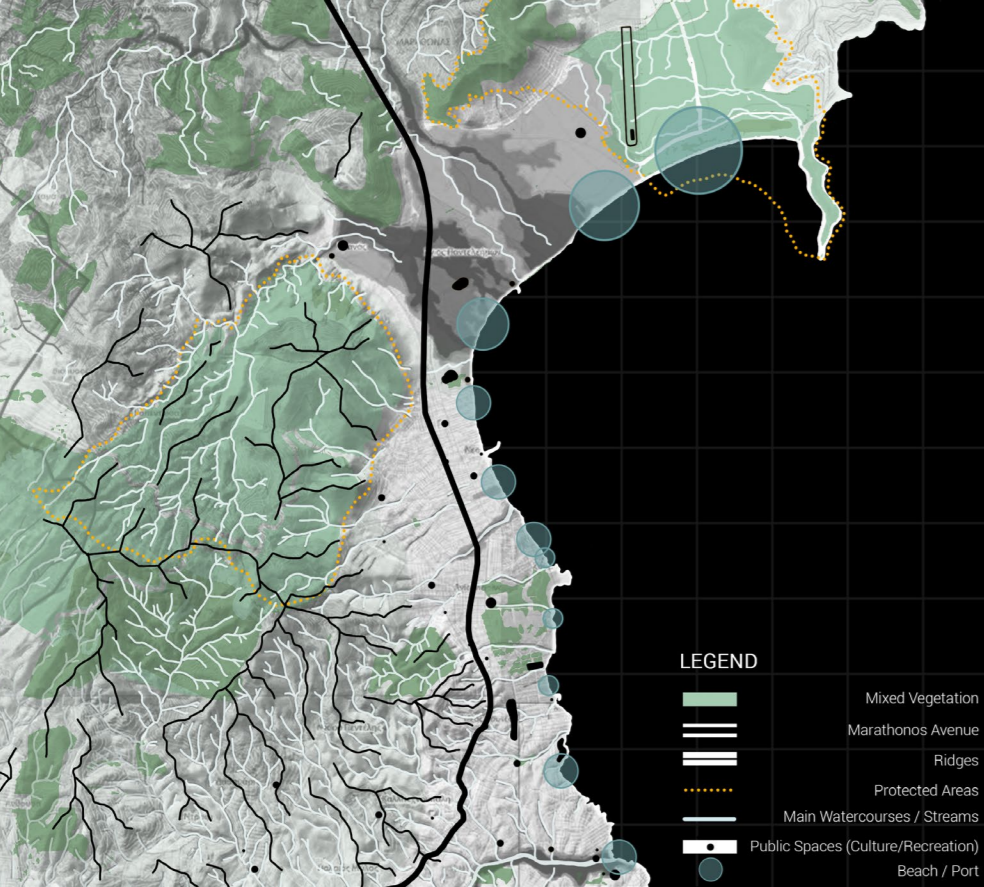
| The Debris: Debris and Demolitions



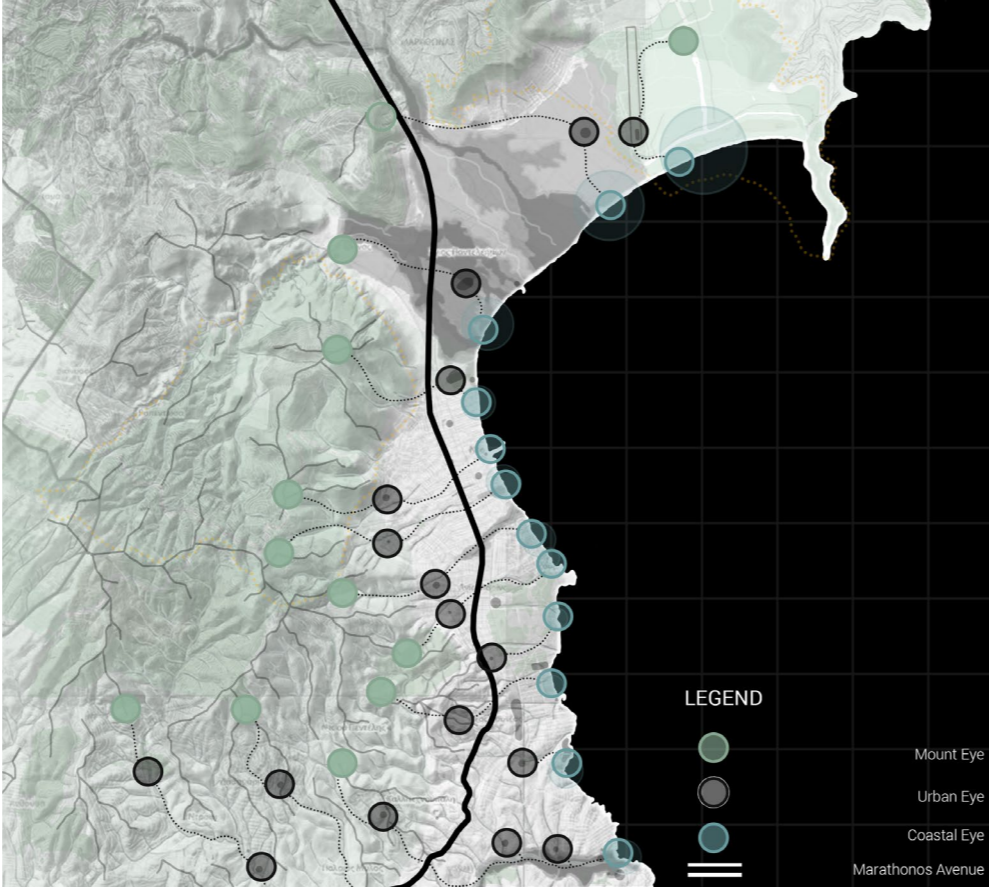
Figure 30. The Concrete: Natural-Unnatural

WRITE : The Living Memorial

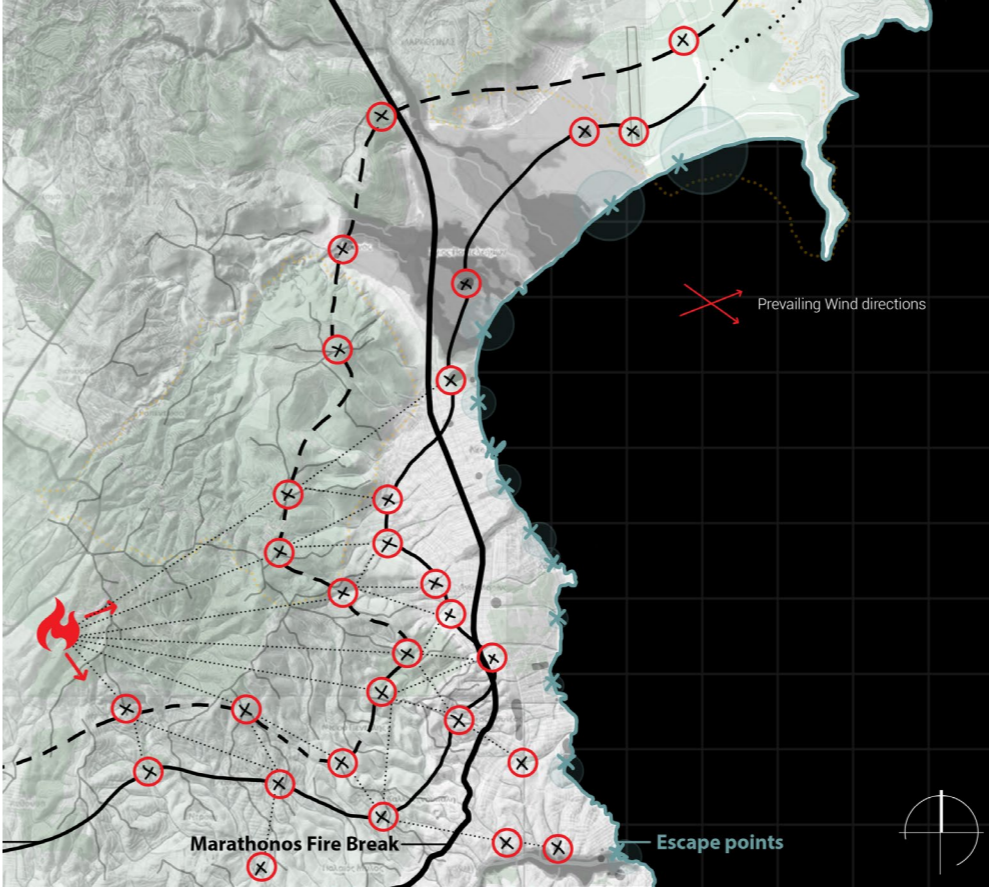
| Ingredients for Large scale concept



| Strategy

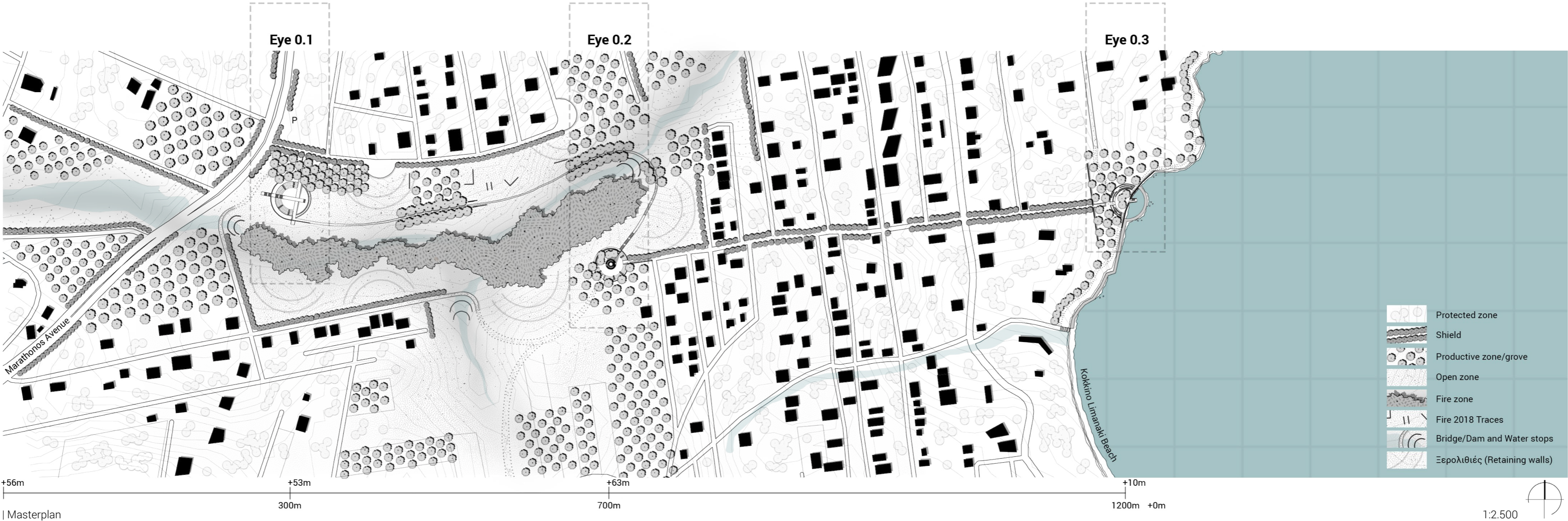


| Function



Starting with the large-scale concept of the Living Memorial strategy, it is an idea for improving the relationship of the urban and the long-suffering nature zone, and as a continuation of the vision. Based on the regional analysis important ingredients are gathered, such as the water structure, the protected and green areas, the public available spaces, and the ridges of the terrain, and three zones of memorials, called Eyes are created, the coastal eyes along the coast, the urban eyes inside the urban fabric, and the mount eyes within the nature zone. These eyes are connected through the stream corridors and are used as contemplation and fire education spaces, as reconnections to nature, as passive and active fire detection spots, as fire mitigation areas, and safe, open, gathering spots. In case of fire, the first detection barrier of the mount eyes will spot the fire and proceed to the fire announcement, while mitigating it because of their function as fire obstacles due to their design, following the previously mentioned principles. If the fire passes the first barrier, then the second barrier of detection and mitigation is in use, along with the large Marathonos avenue fire break. If that fails to work, the coastal eyes are then the only escape option, as they function as safe open gathering places, and accesses to the sea.

E(eye)scape



The design is based firstly on the concept of memory, derived from the theories, having three steps for the healing, and these are learning about the fire, confronting, and accepting the pain, gaining the catharsis, thus forgiving but not forgetting. An important role plays the strategic locations of the three spots/ steps, which are selected because of their landscape characteristics, the altitudes, the Mountain View, and the axis and escape to the sea. More specifically, the first location is the place for learning about the 2018 fire but also learning about fire as part of Greece. This location should, and is directly connected to the main transportation lane of Marathonos Avenue, making it accessible to local and non-local visitors. Moreover, it is the closest point to the higher grounds of the area, having a direct view towards the mountain of Penteli, something very important in order for this node to function as a detection spot as part of the large-scale Living Memorial strategy. In addition, the specific qualities of this spot will play an important role in the design, qualities like the almost flat land, the close connection to the Pappa stream, and the existence of post-fire, and palimpsest traces, such as the olive grove. The second spot, the spot about confrontation (of fire? Of pain?), is located at the highest point of the nearby area. It has a view towards the valley of the Pappa stream and is very close to the area where agricultural fields, fields of olive productions, and vineyards, still exist. But more importantly, it is the spot of an amazing view to the sea, the spot at the one end of an axis that was the only escape from the deadly event. This axis leads to the third spot. The third spot is located at the place of martyrdom of 25 people, who followed the axis to escape the fire, but found their trap, the non-reachable sea...So close, but so far away.

However, this spot, exactly at the steep coastline, with this breathtaking view, can become the point of acceptance, the point of catharsis, and salvation.

Secondly, the design is based on the concept of the fire, which in order to be part of the design, some zones should be identified, such as the protected zone, so the residential built areas that must be protected, the buffer zone that must work as fire mitigation zone, and the fire zone where part of the pine planted green corridor will be brought back to make visible the natural cycle of the pine ecosystem. In these zones, the landscape typologies will be applied in such a way that creates an interesting, and site-suitable sequence of patterns.

The location analysis of the existing road network, revealed problematic points of the area, such as the inaccessibility of the coast, but also the lack of accessibilities to the Pappa stream, something that makes its maintenance, and protection, with or without the design, difficult, and something that denies access for the purpose of recreation in a public, green space, a space that itself has interesting qualities, regarding the landscape materials, the views, and experiential, spatial qualities, despite its post-fire, traumatic state. However, at the same time, many opportunities for the design can be noticed.

| Concept_Memory



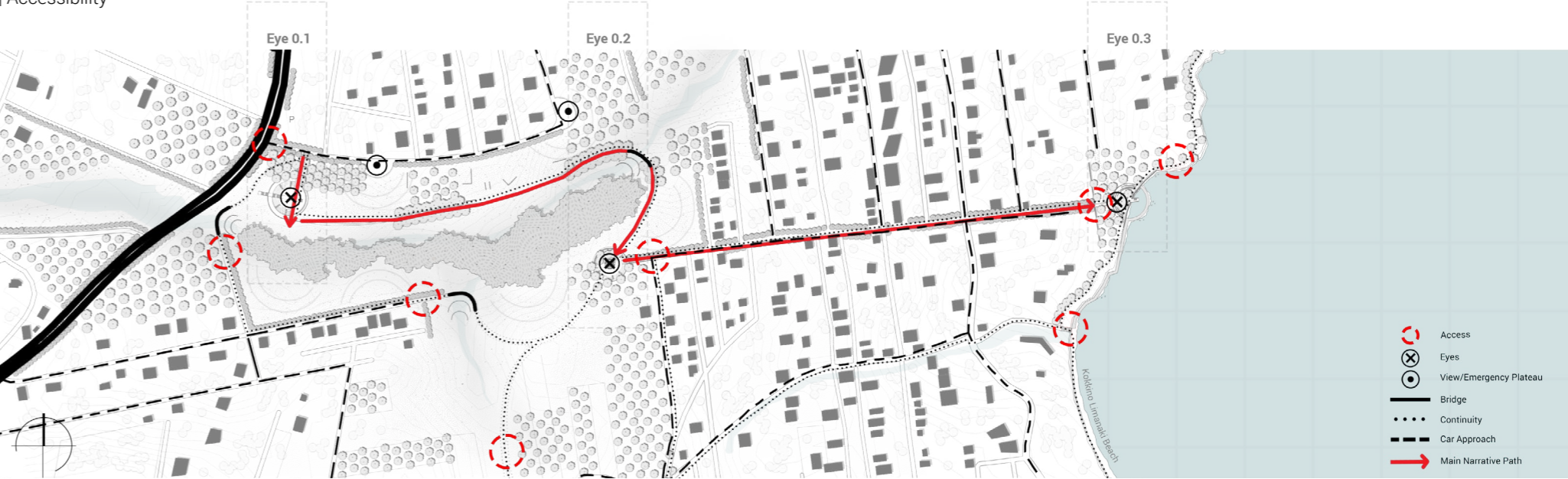
| Concept_Fire

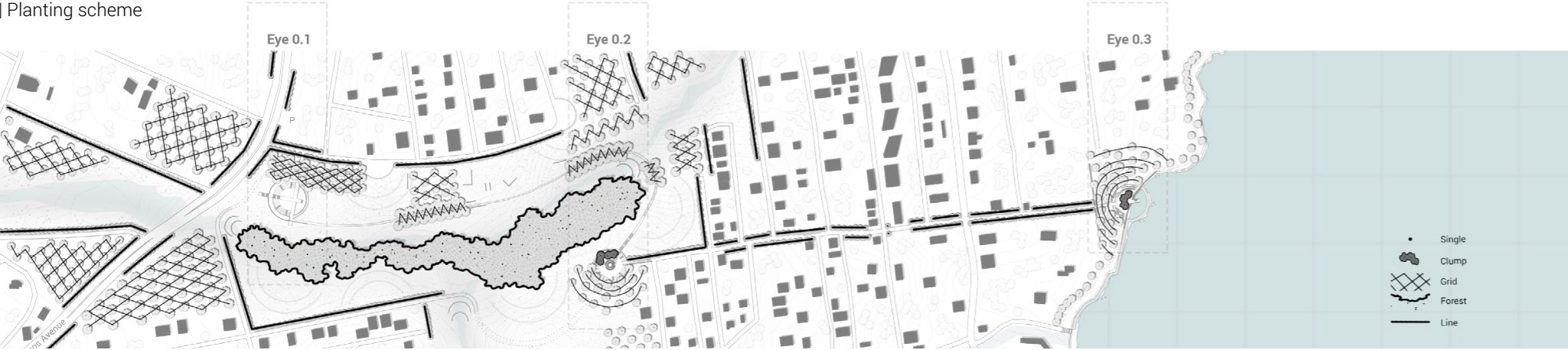


In this way, through thinking of different users, and emergency cases, the spots become accessible, viewing plateaus are made, continuity, and focus on the Narrative Path, the path that connects the three eyes, and makes the experiential journey that combines different elements of the landscape, with the fire narrative, and the understanding of a fire-resistant and resilient landscape design, is of crucial elements of the proposal.

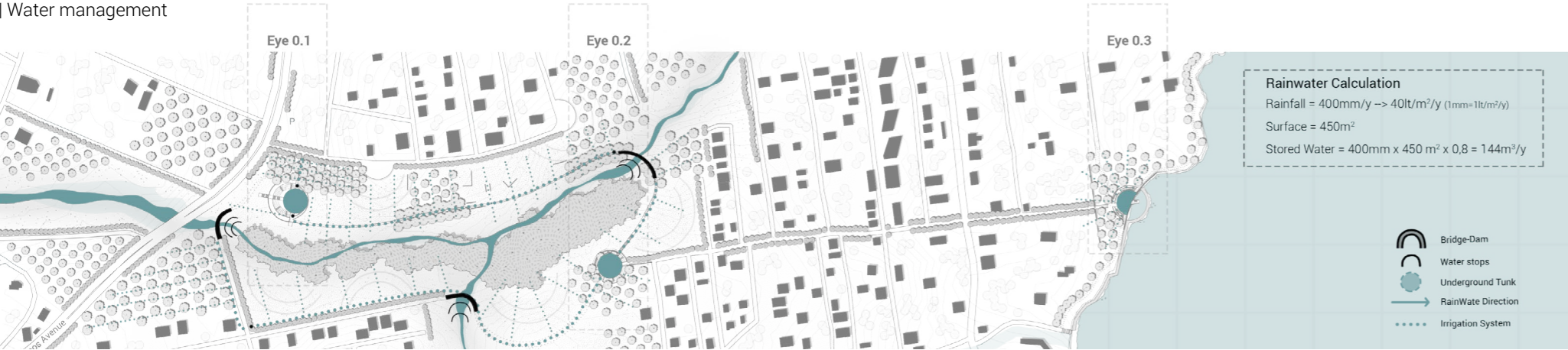
The previously analyzed principles, typologies, and/or toolboxes, are also applied in the design. The planting pattern of the landscape typology, based on the urban forest types that will work as mitigation zones, when the fire will happen, and as interesting experiential sequences along the Narrative path, including native species such as the *Pinus halepensis*, the cypress tree, the olive tree, the carob, fig-trees, and aromatic shrubs like the lavender, and the rosemary, and the water management system, based on the water intervention principles of storing rainwater, and slowing down stream water that aims to function as an irrigation system for watering, as hydration and increase of humidity in dry seasons for the prevention of an early fire, and as an emergency reserve for the suppression of the fire on time, are carefully located.

| Accessibility

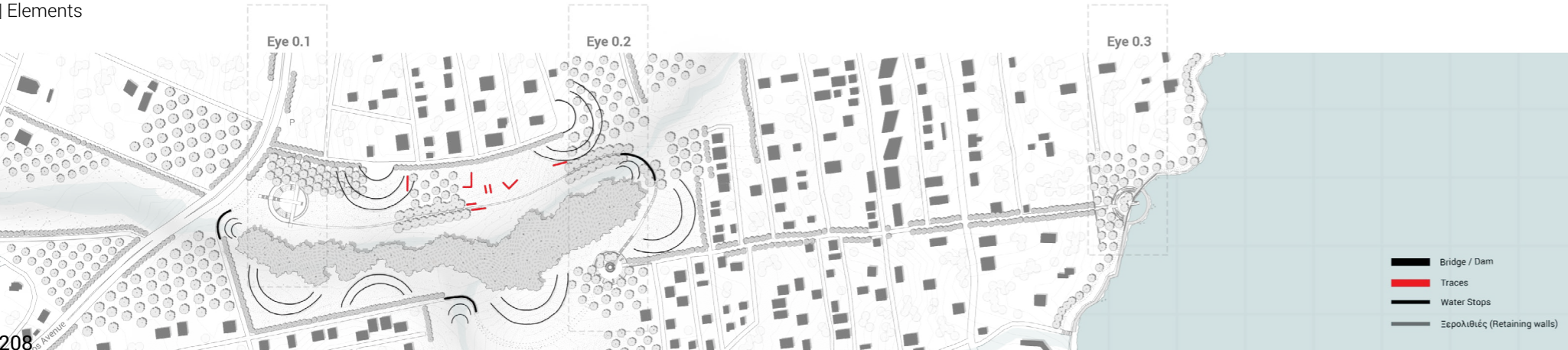




| Water management



| Elements



Moreover, specific elements (built and planting) in order to enhance the goals of this design are added. The Bridge/Dams and the watering stops are located in the three key spots around the fire/pine zone, the traces of the burned housing as part of the fire narrative and path landscape experience are located around their previous spot, and the 'Ξερολιθιές', the dry stone retaining walls, characteristic elements of the Greek landscape, at the spots where the open, maintained zone is located, with the function of fire mitigation and a soil retention zone, spots that also show the largest slopes, so greater chances of landslide and erosion.

Figure 32. Elements



Bridge / Dam



Ξερολιθιές [Retaining Walls]



Traces



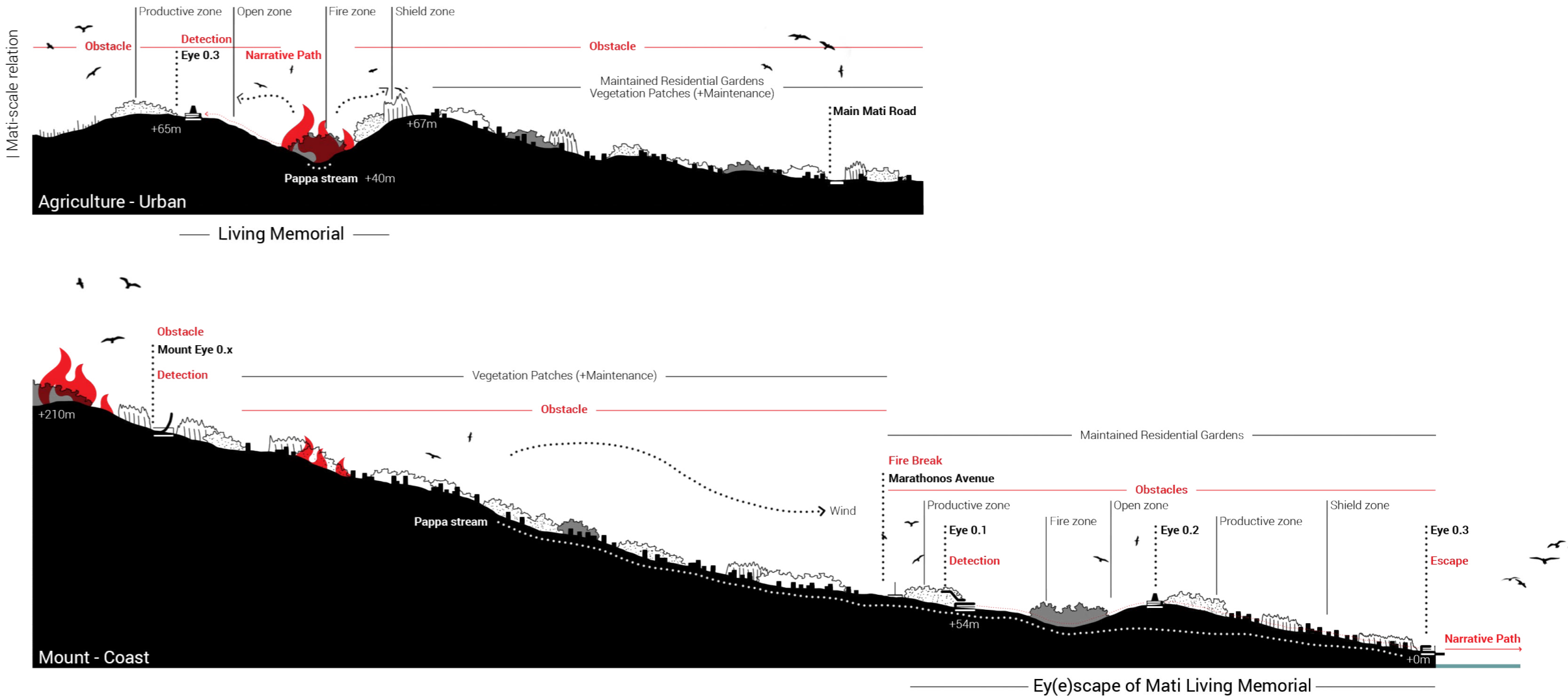
Water Stops

As part of the large-scale strategy of the Living Memorial network, the specific Ey(e)scape Living Memorial of Mati exists within an urban context and is part of a, now, defined landscape. Two specific relations have, thus, to be explained, the relation of Urban-Agriculture, so the north-south axis of the urban-scale relation, and the relation of Mount-Coast, so the east-west axis. In both connections, the fire event, expected or unexpected, and its effect are explored.

The Mount-Coast relation shows at first, Pappa stream as a potential corridor, connecting the Ey(e)scape of Mati with the Mount Eye at the higher grounds. Besides the individual relations to the built environment, the specific characteristics (such as Marathonos fire break Avenue, etc.), the viewing connections, and the vegetation patchwork strategy, the ecological aspect of the proposal can be seen, creating stepping stones, and links between the ‘*natural*’ and urban parts of this landscape. In case of a fire on the higher grounds, coming towards the coast once again, the detection and prevention function of the large-scale Living Memorial network can be seen, announcing the fire, and creating obstacles along the fire path.

The Urban-Agriculture relation shows the design within the urban-scale framework. As an important public, green ‘*lung*’, it is both an epicenter of social and ecological gathering, since from the analysis of the

area of Mati, and the fire investigation, major problem was the lack of public spaces, and especially after the event, definitely the lack of green spaces to support the existing, surrounding network of flora and fauna of the wider Eastern Attica region. More specifically, the configuration of common, public areas to ensure maximum environmental and aesthetic quality for the citizens and visitors of Mati, by creating, completing, configuring and improving networks of public spaces and green, safe, accessible from everyone networks of pedestrian routes and open spaces, is of high importance. Thus, the specific design will become an important addition in this network, an important connecting link for both directions. And when the subscribed, or an unexpected, but natural, fire begins in the pine zone, an action/event that has almost a ritual, exemplary character that depicts the nature of fire, and the healing and protective goal and function of the design, then with safe management, safe distances, and immediate actions of course, the built, residential environment, as well as the already highly maintained, protected agricultural fields will not be affected.



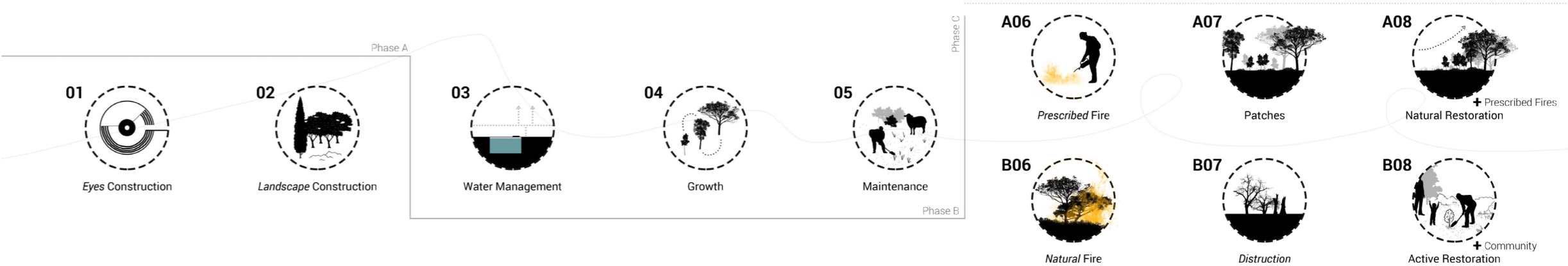
Time_Fire

To be more specific, and better explain, step by step, the chosen actions for the project, but also the future expected or unexpected incidents, I hereby include a Design/Time/Fire and Actions diagram. Starting with the memorial construction, building the pieces of the design, the Eyes, the landscape plantations, and the connecting elements, seeing the stream water slow down because of the gradual growth of the vegetation on the higher grounds, and the interventions on-site that create drier and wetter conditions, with the goal of preventing early fires, by increasing humidity, and seeing the rainwater be collected and used for the same purpose and practically, for watering, the next phase is definitely seeing the growth of the plantations and the natural succession and growth of the pine, exemplary forest from the leftover and deposited seeds. During this time, maintenance or non-maintenance, according to the landscape types, is done. There are then two scenarios for the future. The first ones says that prescribed fire, will be practiced to the pine/fire zone, in order to clear the undergrowth and the older pines, and make room for new growth. The result will be a pine grove of young and older trees, creating different spatial forms/patterns that will follow the sequence of the Path, and its next phase is keeping the natural restoration/succession, while practicing fire prescription. The second option is having an on-time, but unexpected, natural fire ignition. In this situation, immediate announcement and action is necessary for

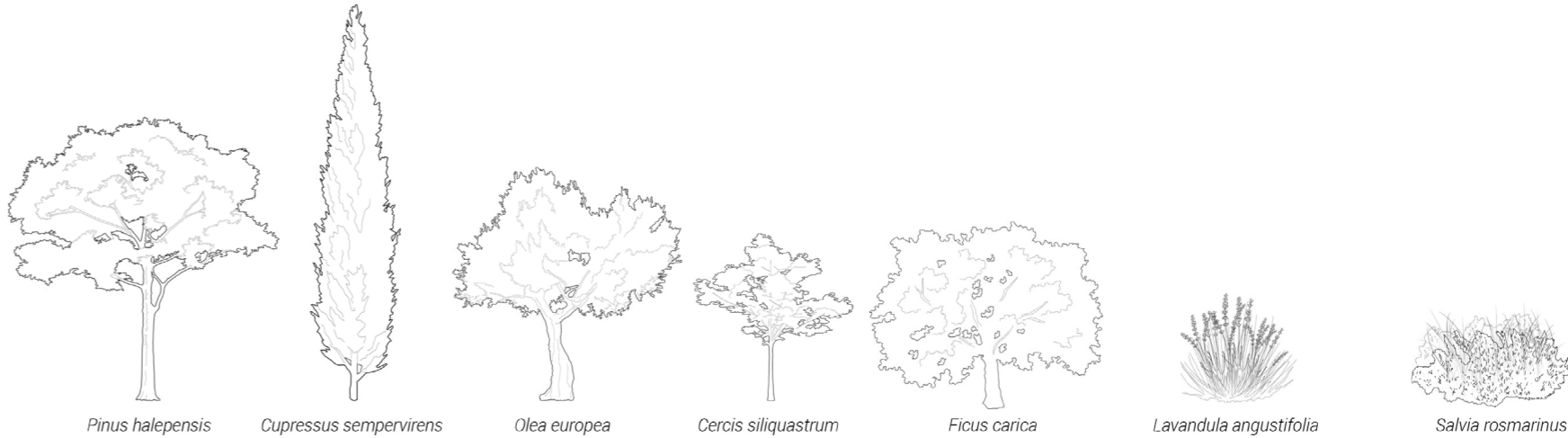
the protection of the surrounding area, and immediate use of the on-site interventions (such as the water system). The result will be either a total burn or a partial destruction of the case piece. The next step in this case will be the active restoration by the engagement of the community. Either way, the goal of the design will be achieved. The purpose of seeing, understanding, and experiencing nature and its phenomena, healing slowly both human and landscape trauma, and the purpose of the design to work as fire-resistant and resilient, through the plantations (of olive, locust, judas tree, etc.) that not only prevent the fire spread, mitigate it, and create a buffer-shield around to protect the residential zone, but also after the fire reveal their ability to recover, to sprout again, to hold and protect the soil from erosion with their rich, undestroyed root system¹, can be achieved.

1. The native tree species chosen, all demonstrate their ability to return to their previous state before the fire, especially when the appropriate human actions are performed, which include pruning, replacement or repair of the irrigation system, nutrition management and necessarily patience on the part of the forester. However, it must be mentioned that this ability depends on the intensity of the fire, the size-age of the tree, the intensity of water stress before and after the fire, and the number of branches that appear intact.

| Design_Time_Fire_Actions



| Species



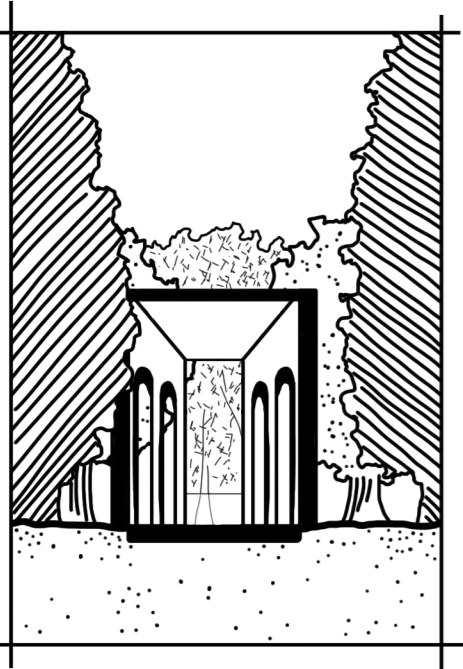


1. Find Natural and Man-made Fire break
2. Decide fire ignition spots according to wind direction, terrain, and chosen flora areas for burning
3. Surround the area(s) with crew members for safety
4. Start spot-headfires

| Time Section

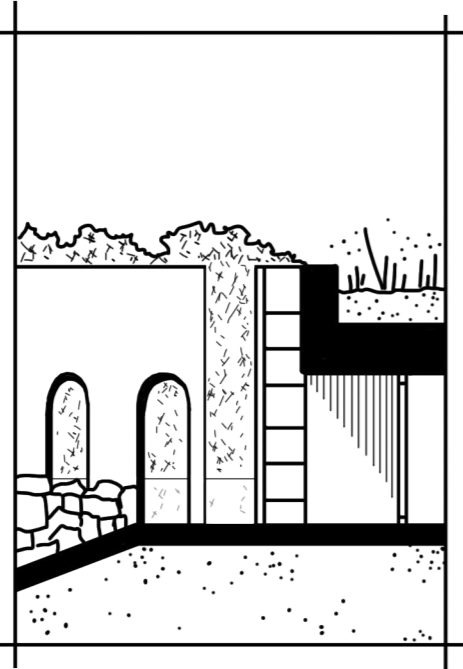


1. Entrance



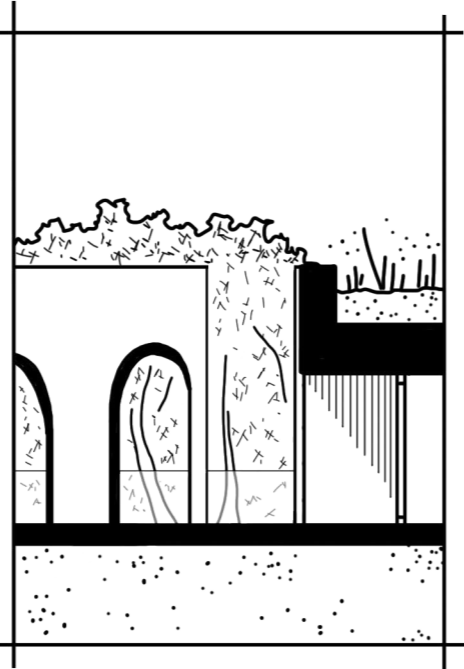
You pass through the cypresses gate. You enter the arcaded stoa that frames the olive fields that surround you. The light patterns, the atmosphere, and the forms emphasize the framed vocal point, the fire balcony.

2.Eye 0.1



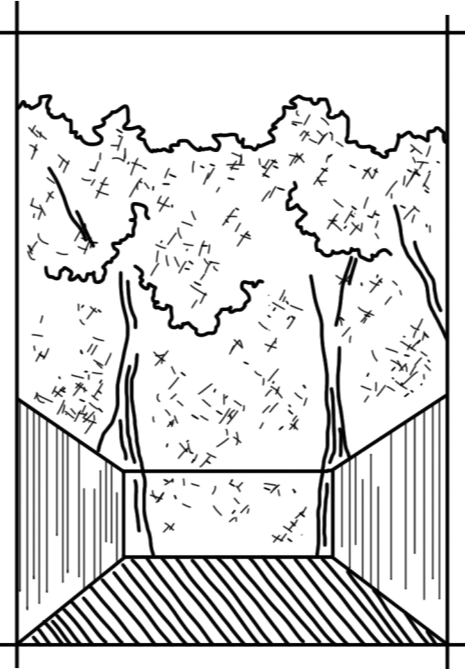
At the end of the stoa more reveals are happening. The entrance of the museum on your right, the underground Narrative path of the debris wall on your left, the openness of the amphitheater plaza straight ahead. What will you do?

3.Eye 0.1



Reaching the balcony, either way, the changing landscape, the growing trees, and the fire rituals, hidden and enhanced at the same time by an arcade shield, attract attention.

4.Eye 0.1



Fire balcony/axis.

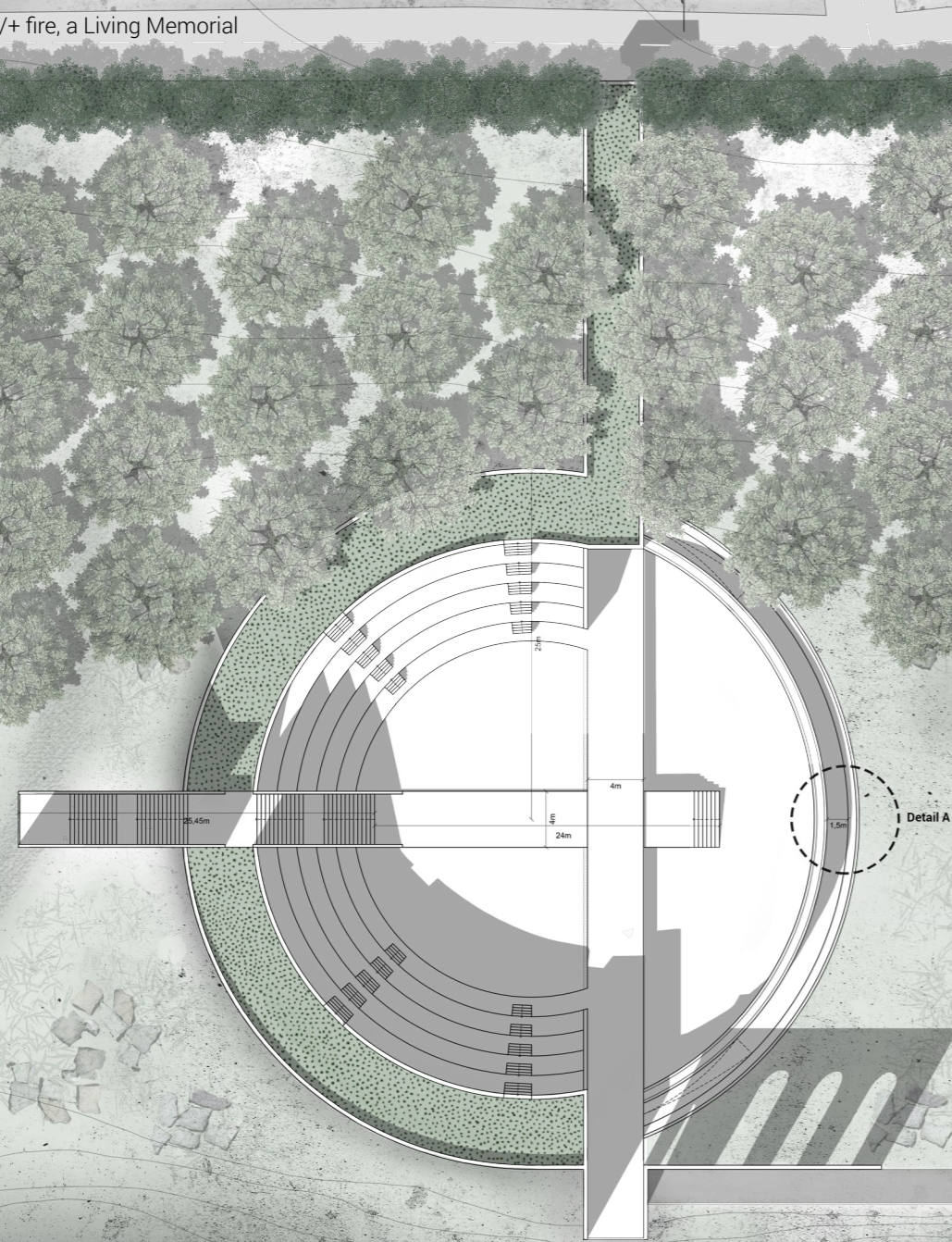
At the first Eye, and passing through the Cypresses gate shield line, the green-roofed stoa enhances the axis and frames the fire balcony, where people will be able to see the growth of the pines, and the fire disturbance as part of the cycle. It also creates a connecting boundary between the olive groves, and an atmosphere, of light, and shade, the light breeze passing through the trees, the sounds of the leaves, and the birds, that prepare the visitor emotionally.

Reaching the end of the stoa, the entrance of the Museum is located at the right. It is an information spot, and exhibition center, a museum about what happened in 2018, but also about the positive aspects of fire. The visitor goes down the first transition towards the info desk, passing by the arcade screens that frame the grove, and lets the natural sun fill the space, raising feelings of emotional connections, and eagerness. And the exhibition starts with the part of **The Facts** of the 2018 event, reports, documents, graphs, show objectively the narrative. After another decent transition, a narrow, enclosed, dark hallway leads to the maze of **The Stories** part, where the personal testimonies displayed on the high walls tell the narrative from another perspective.

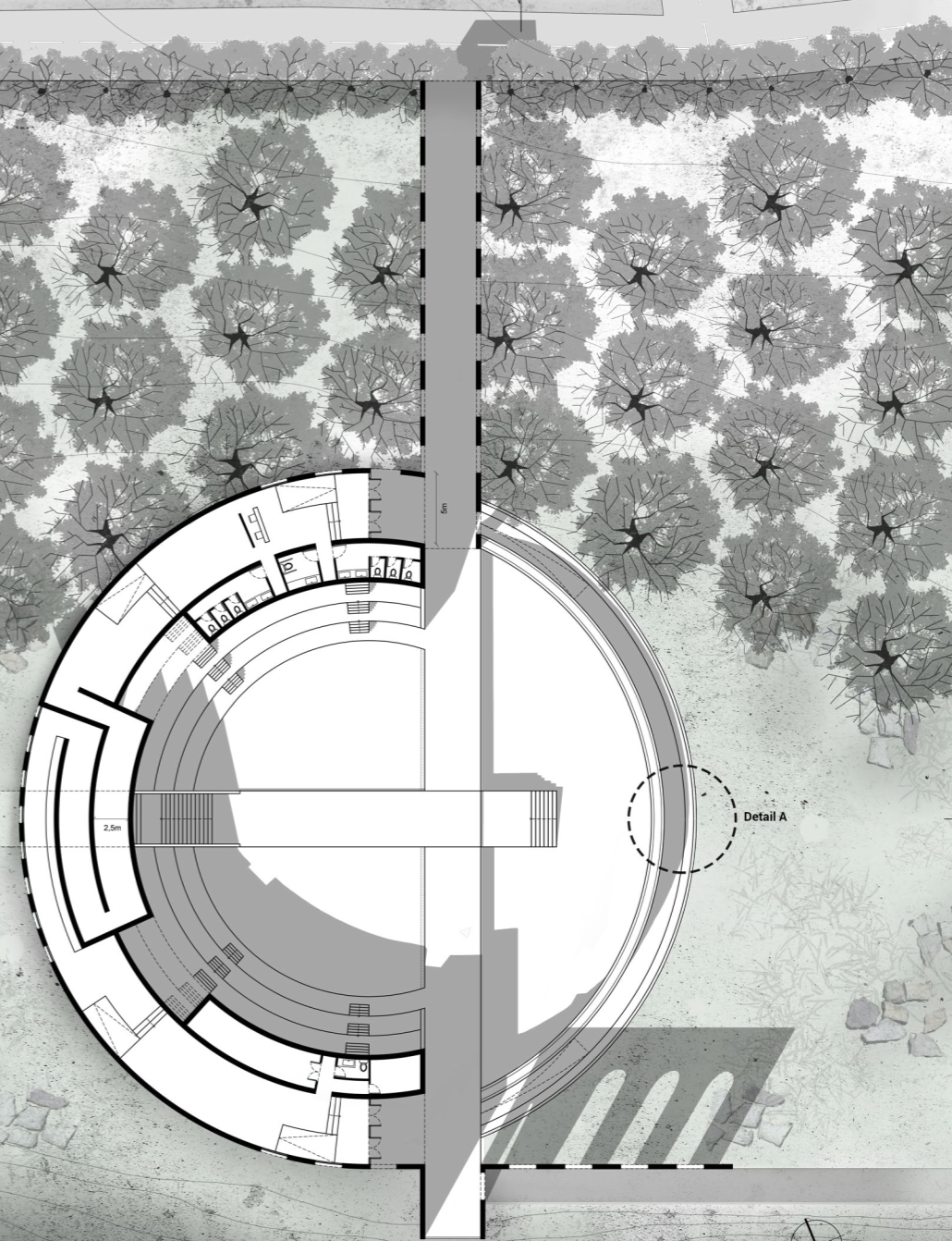
With intense, *'charged'* emotions, the arched room with its bright openness offers the space for an emotional break, a relief, and a connection with the plain, open

zone, and the sky-tall cypress trees. The visitor then starts to ascent, following the part of the **Nature**, which explains the fire as part of the Greek nature and culture, and finally exiting the space passing by another arcade screen that gradually shows the landscape, and leads to the fire balcony axis. The second though important axis is that of the wooden observatory staircase, which is oriented towards the Penteli mountain, as part of the passive and active fire detection strategy, and connected to the green, accessible roof of the museum. The main, central space of the Eye, the amphitheater plaza has the purpose of a public, open, gathering, sitting space.

This central *'stage'* though also collects the rainwater, guiding it under the main axis, falling from small notches as rainfalls towards the first, outer, underground part of the Narrative path, a narrow path with a debris wall that shows one of the consequences of the fire on the one side and a concrete retaining wall with the victims' names on the other, is *'growing'* through time showing the processes and the small scale but equally important aspects of the ecosystem, and can be characterized as the focal point of the amphitheater, as the monument in the memorial that expresses the memories and receives the commemoration. The materiality, the enclosure, the inclinations that guide the water to the underground storage tank, and so the water sounds, enhance the memorial experience.

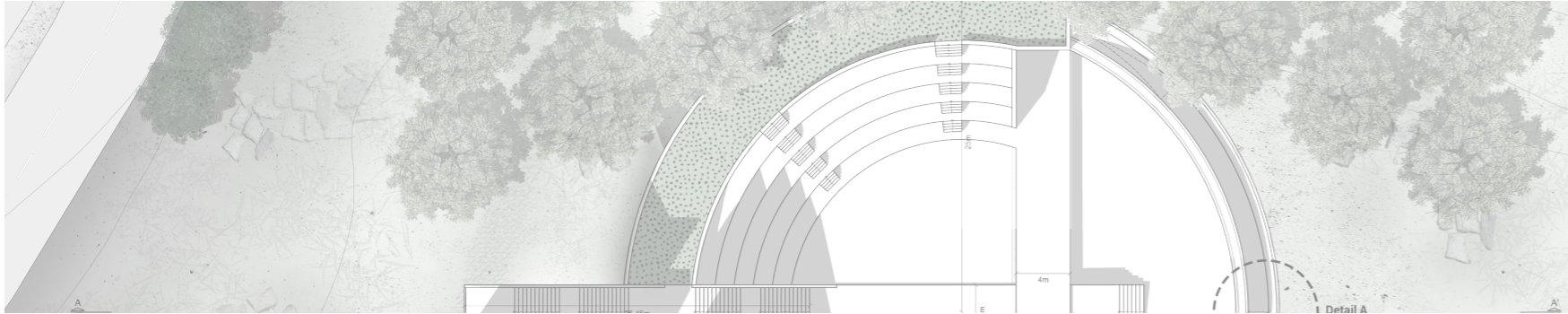


| Plan A 1:250

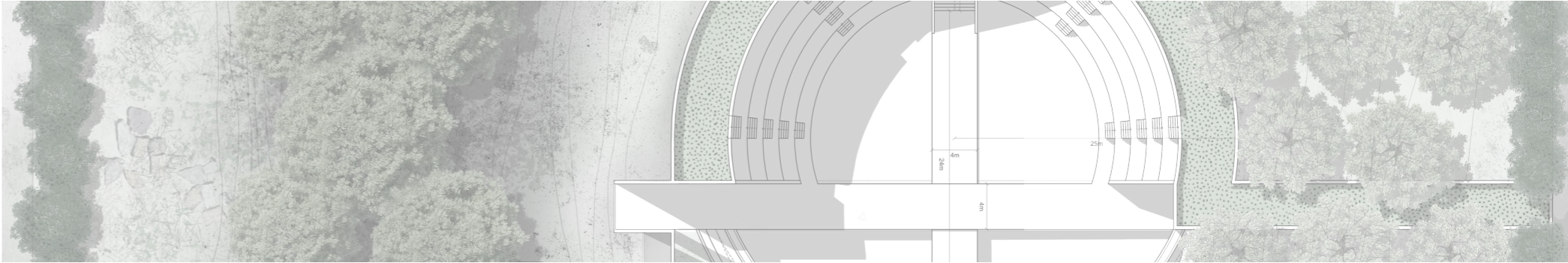


| Plan B 1:250

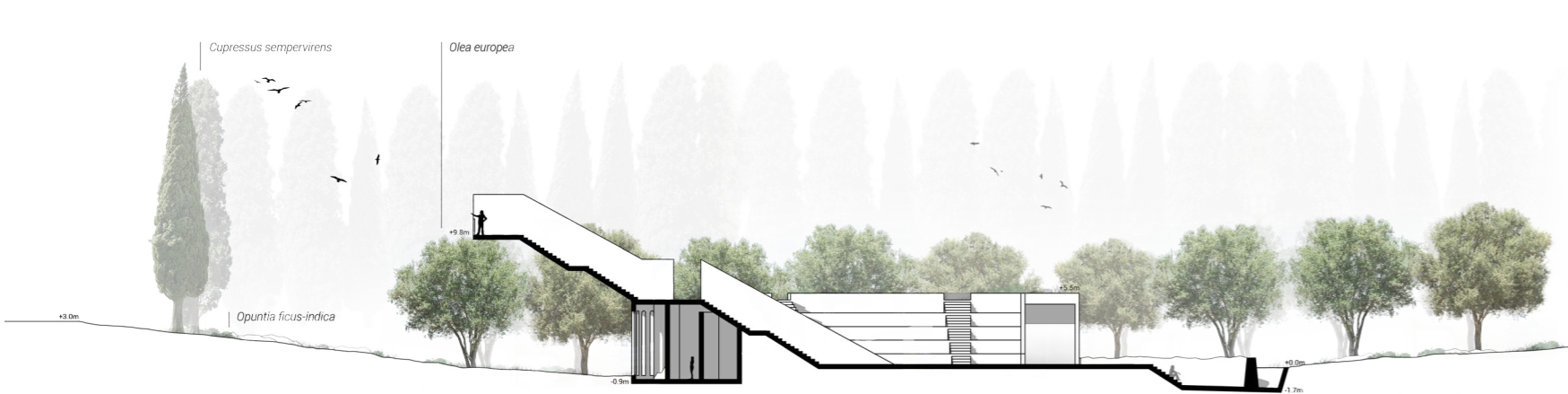
| Plan Section A_1:250



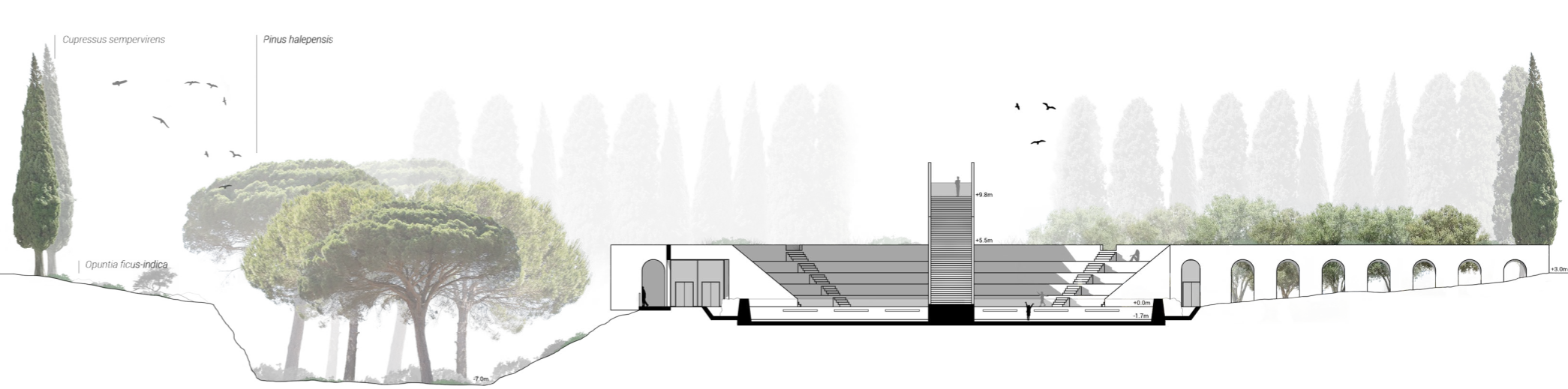
| Plan Section B_1:250



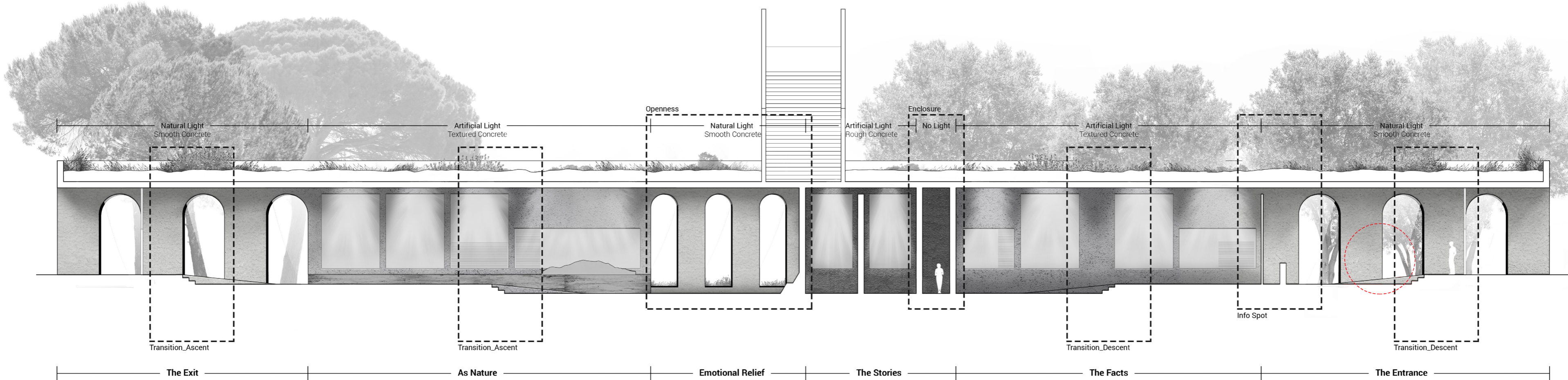
| Section A_1:250



| Section B_1:250

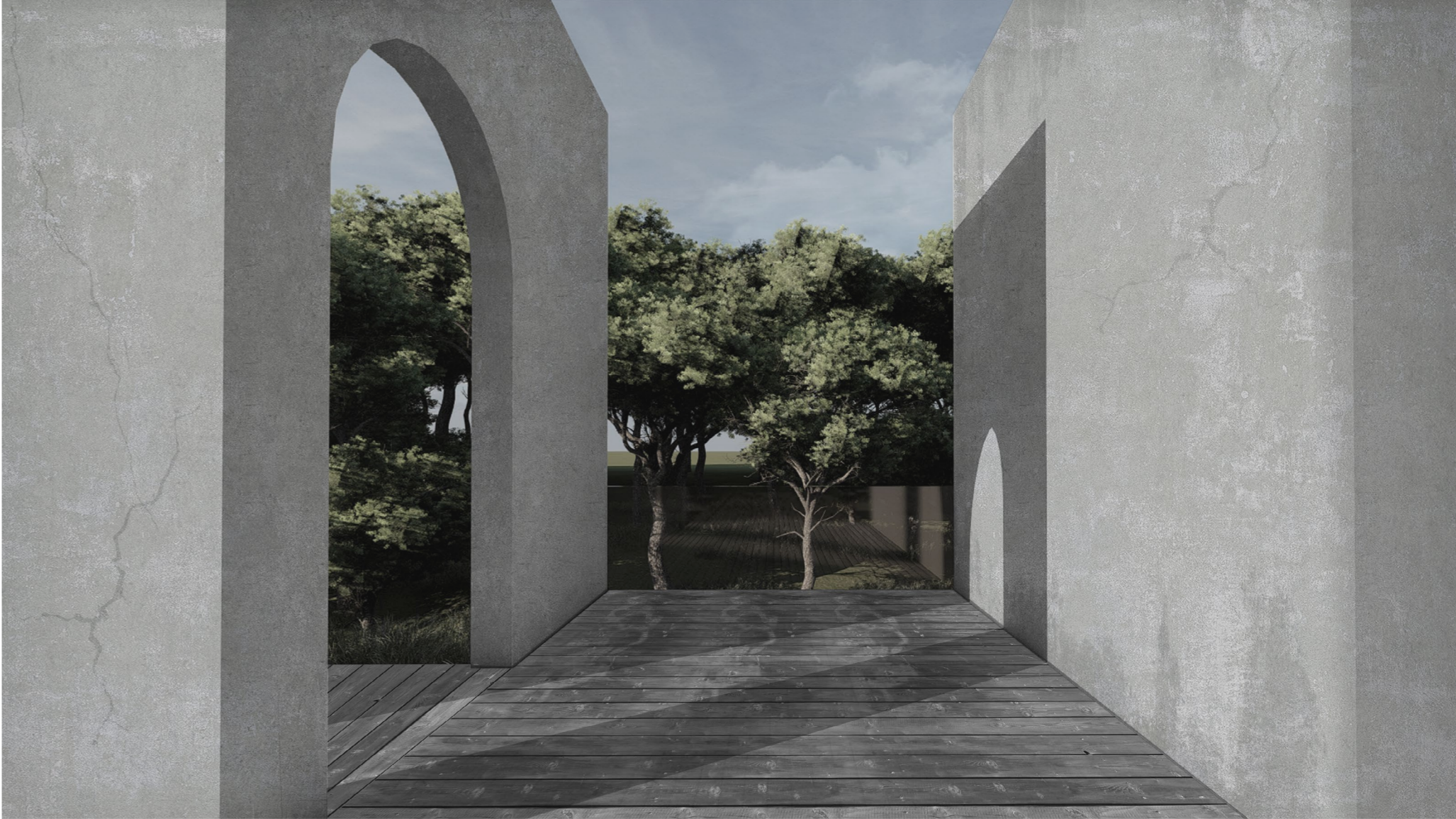


| Materiality | Light | Emotions_Museum 1:100





| Entrance_Olive Grove



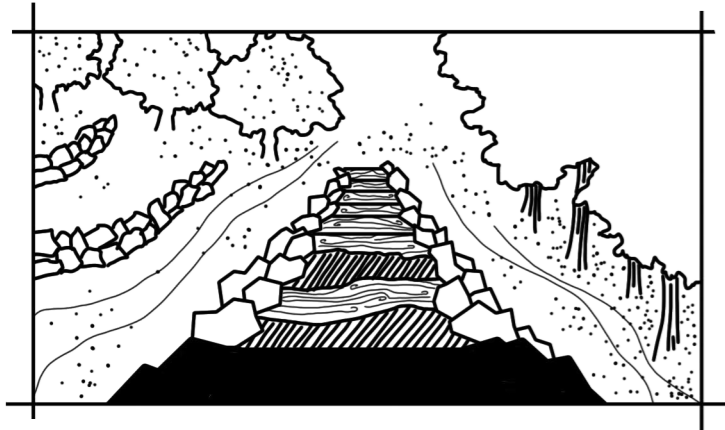
| Fire Balcony



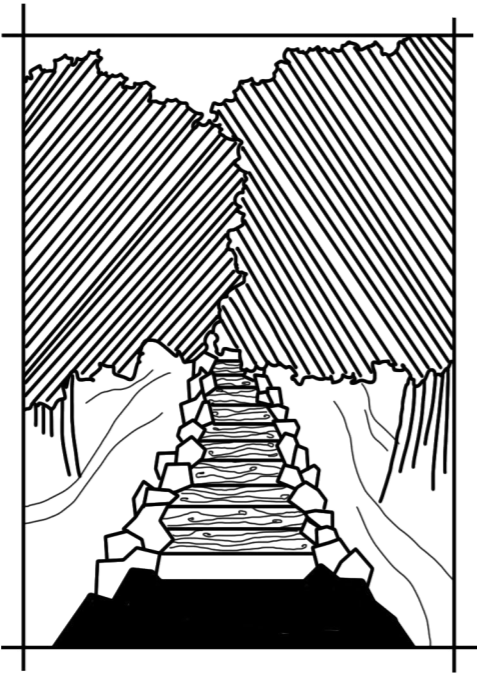
| Detail A_1:20

5.Narrative Path A

You follow the path, the Narrative path. You are standing on an elevated wooden structure, framed by scattered rocks. The enclosed, by the pine trees, right side guides your gaze to the left side. The openness of this zone, the ξερολιθιές, the fire-resistant species, such as the Opuntia ficus-indica that thrives in the Greek landscape, gently shows the abilities of nature, the opportunities that were already there, and the capabilities of the design.



6.Narrative Path B



Continuing on, other scenes are created. Different views, atmospheres, qualities, create different experiences. The enclosure of the sheltered, by the part of the grove, is an entrance that prepares for the next part of the path.

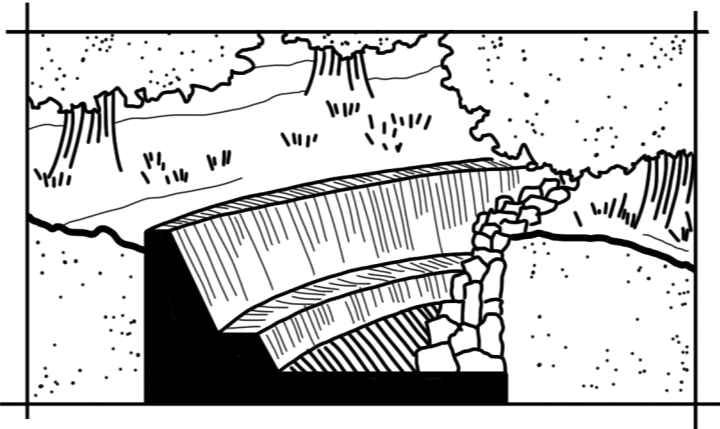
7.Narrative Path C



An open zone is revealed. The only elements are the traces of the 2018 fire, remnants, ruins of houses. The wooden path lays directly on the ground.

8.Narrative Path D

A transitional descent to the underground gives another perspective of the place. Surrounded by the concrete and stonewalling, and sheltered by the tree canopies, the mixed feelings, emotions resemble the narrative of the event.



9.Narrative Path E

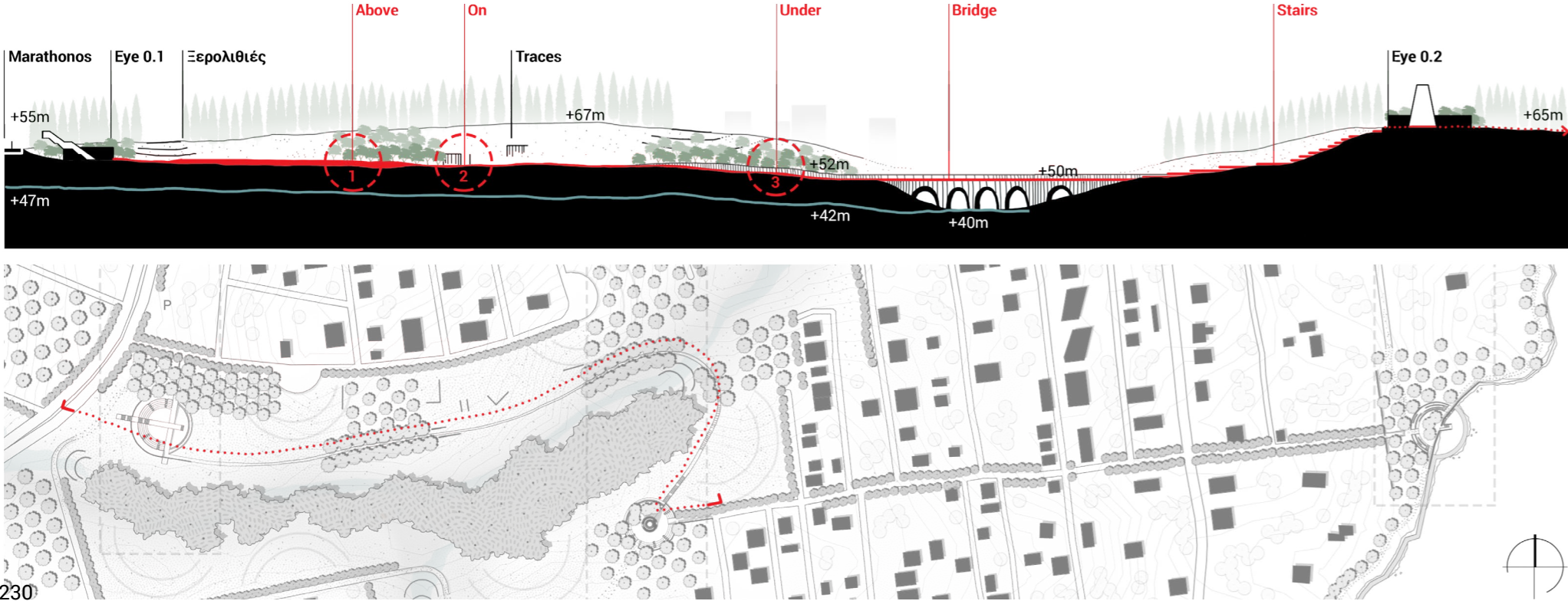


At the openness of the bridge/dam you have an overview of the area. You see the pine part, you see the water, you see the different vegetation patterns.

Leaving from the fire balcony, the visitor follows the Scenographic-inspired Narrative Path. While for the most part extends at the same height difference from the Pappa streambed, the path has three relations to the ground, above, on, and underground, so different perspectives that create a sequence of distinct viewing frames, three relations to the body posture of standing, lying, and sitting, as ways and spots of pause, and different widths that along with the different surroundings create levels of enclosure and openness that lead to different feelings and experiences. The most important spots are where transitions are happening, and where visitors can identify the meanings of this design, such as while passing between the open and fire zone, seeing the ‘ξερολιθιές’, further passing between and under the productive fire-resilient groves, then the open field of the remnants of the burned houses, the underground stone-walled part, and the bridge/dam that reveals most of the different surrounding plantation patches, and its water slow-down function.

The bridge-dam that crosses the stream, leads to a high staircase. While climbing these stairs, the slow pace, because of their steepness, and the exhaustion from the activity make visitors more aware of their movement, but more focused on it. Reaching the end of this staircase, the reward is fulfilling. The curved wooden path, next to a stone-wall ‘ξερολιθιά’, and while being shaded from a big tree canopy that seems to come directly from the sky, the look goes down the stream valley and the growing pine forest.

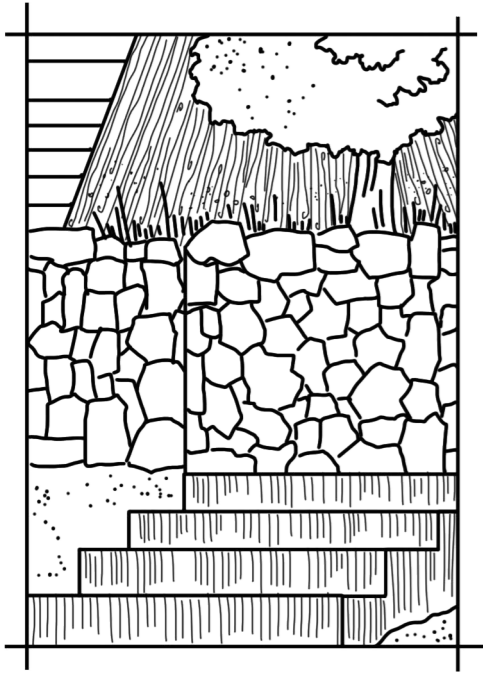
| Narrative Path sequence



| Relation to the ground-body_Perspectives_Proportions_Enclosure



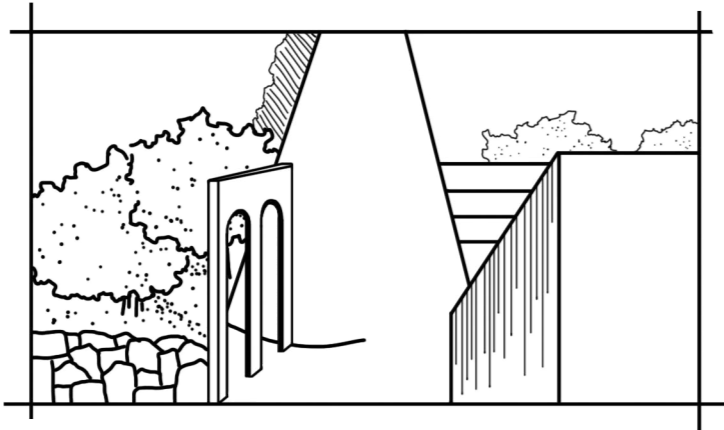
10.Eye 0.2



And you have to climb the stairs. This long, tiring part of the path makes you more aware of your movement. It also escalates your anticipation of reaching the top.

11.Eye 0.2

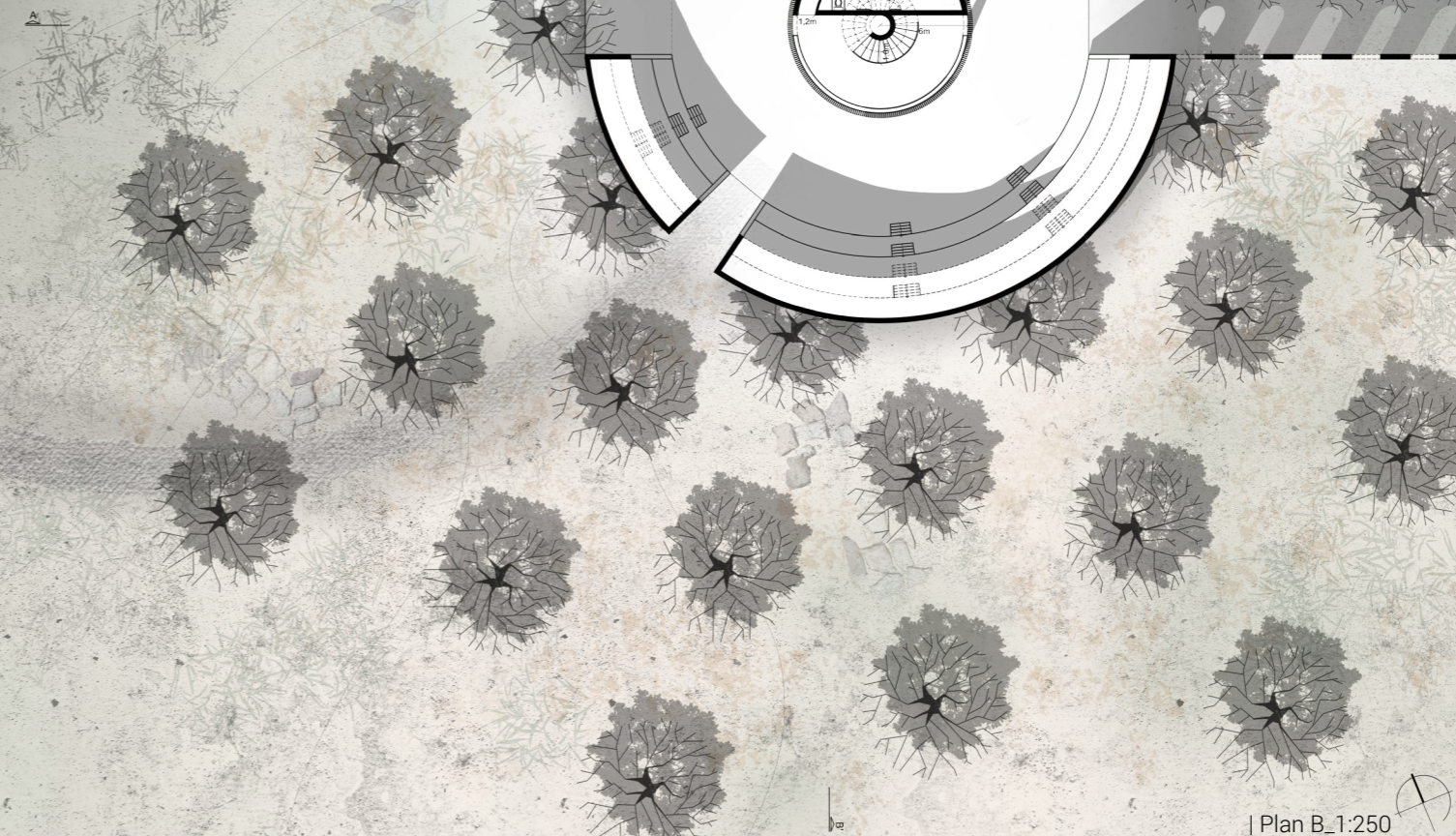
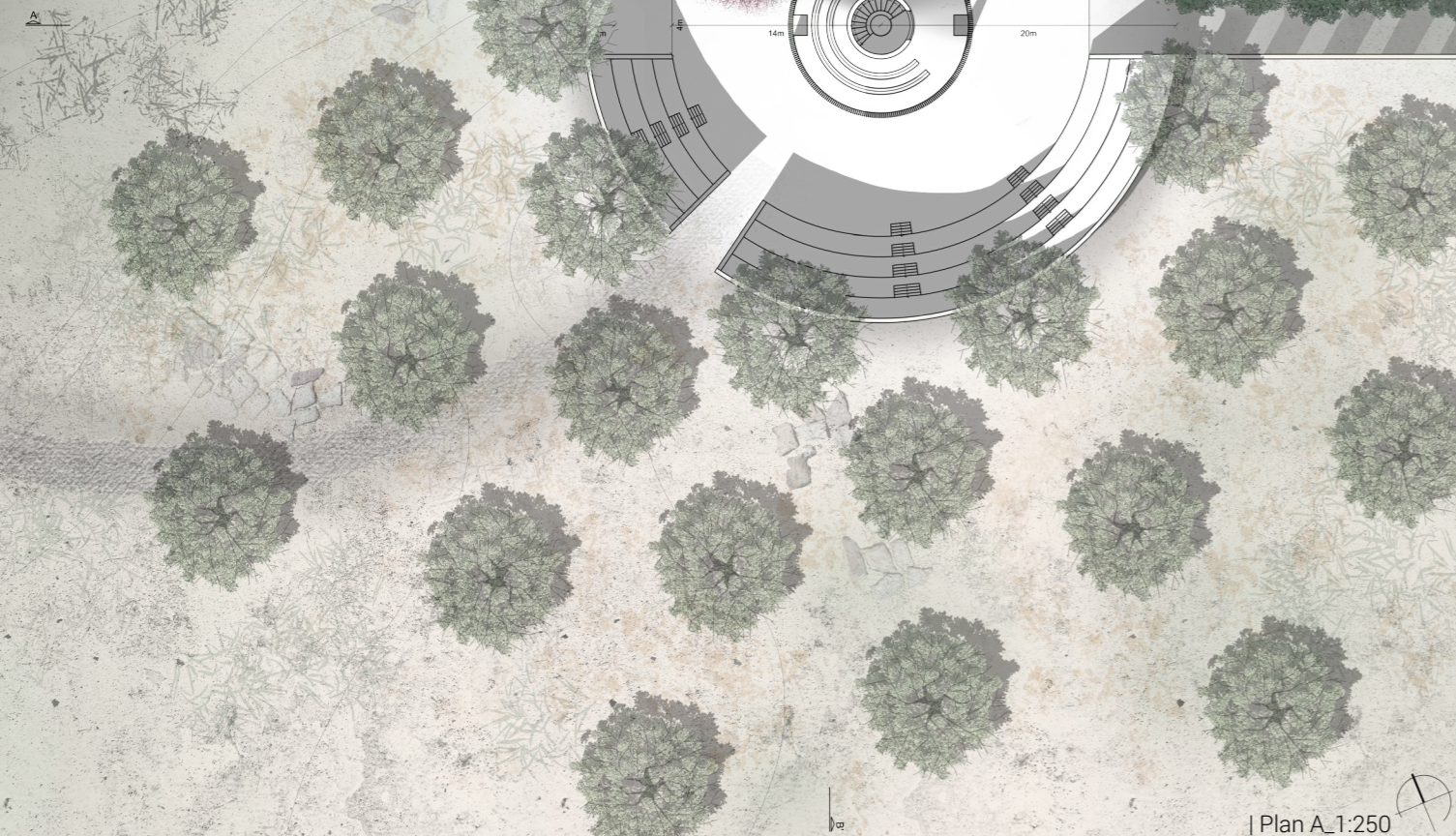
And the top is rewarding. The curved, stonewalling guides you gaze towards the stream valley. And the landmark of the Eye 0.2 is revealed. The shaded garden, the arcaded shield, the observatory, and the amphitheater, are clear elements, and sections of the design. You can see the purpose, the idea, behind it.



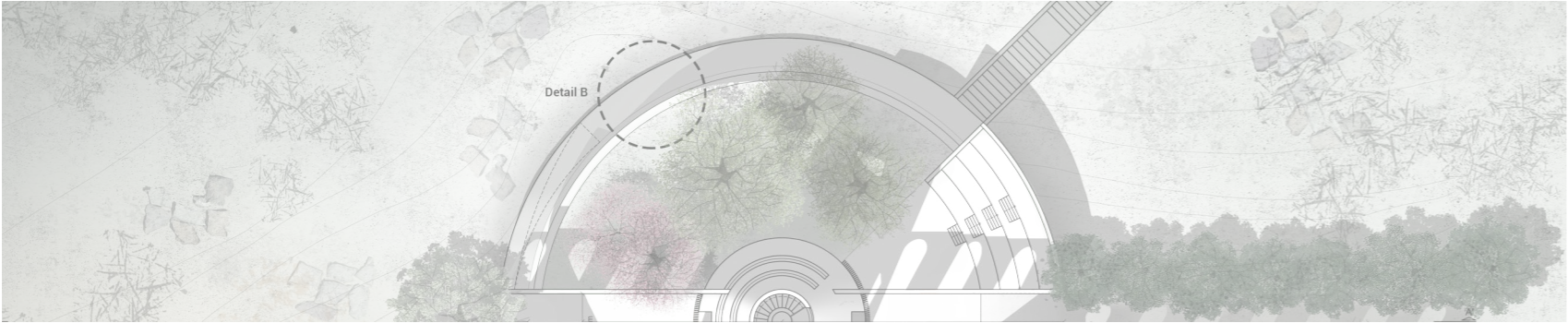
Continuing on, the visitor is in front of the monumental landmark of the wooden, Eye 0.2 observatory, at the highest point of the location. The arcade screen at the left creates the connecting boundary, as mentioned before, hiding and revealing the garden behind, a shaded, resting place for the visitors, and background of the Observatory tower, planted with judas trees, colorful but also fire-resistant species, common in the Greek landscape.

Going inside the tower, the spiral staircase seems sky-ending. A first level is connected to the first opening that creates a relationship with the tree canopies and the amphitheater, so giving the sense of see/not see, and seen/unseen, and a second level to the second opening that ‘sees’ everything from above. In between enclosed, darker phases intensify the anticipation, and the cyclical movement within the ‘burned’ wooden structure conveys the imitation of disorientation that people experienced during the fire event within the urban trap. Reaching finally the top though, the only opening towards the sea indicates the purpose of this axis as the escape. The arcade screen, along with the cypress line enhances, even more, the axis, and leads the way to the 3rd coastal Eye. The sitting area of the amphitheater that is oriented towards the tower makes it the focal point of the design, a monument that through its materialization, form, and scale leaves no room, but to be noticed, to be observed, and derive

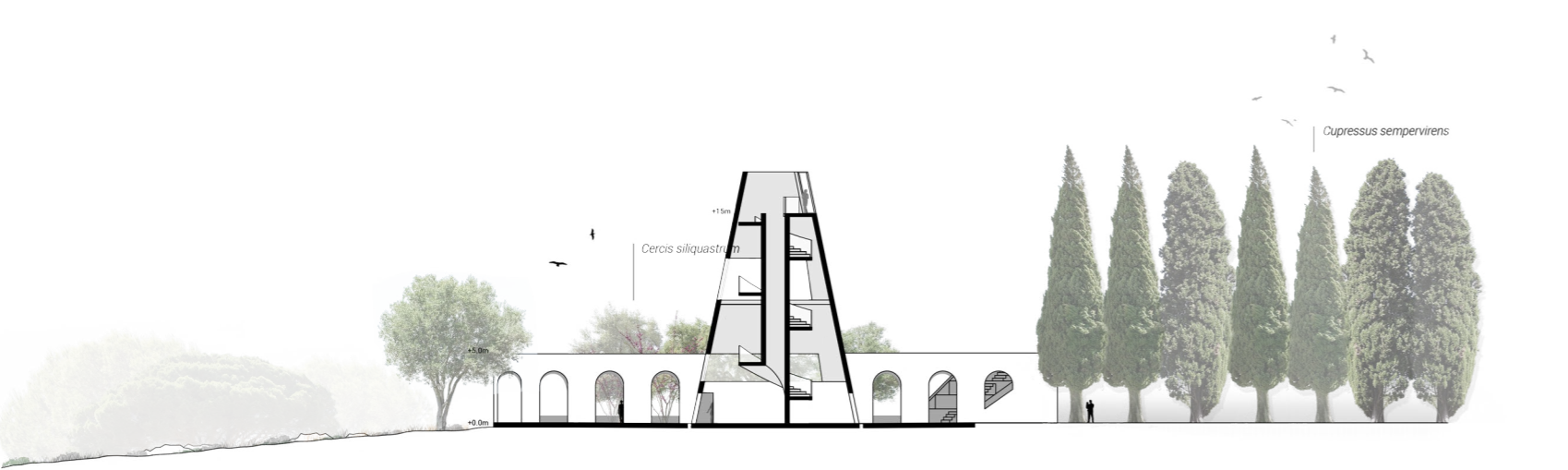
memories, and emotions. The olive grove that encircles the structure creates shaded places, light patterns, and sounds. The concrete structure has also an outer layer of stones, a ‘virtual ξερολιθιά’ that can attract and host small creatures, something that makes the structure in-tune with the landscape, blend in not only virtually but also systematically.



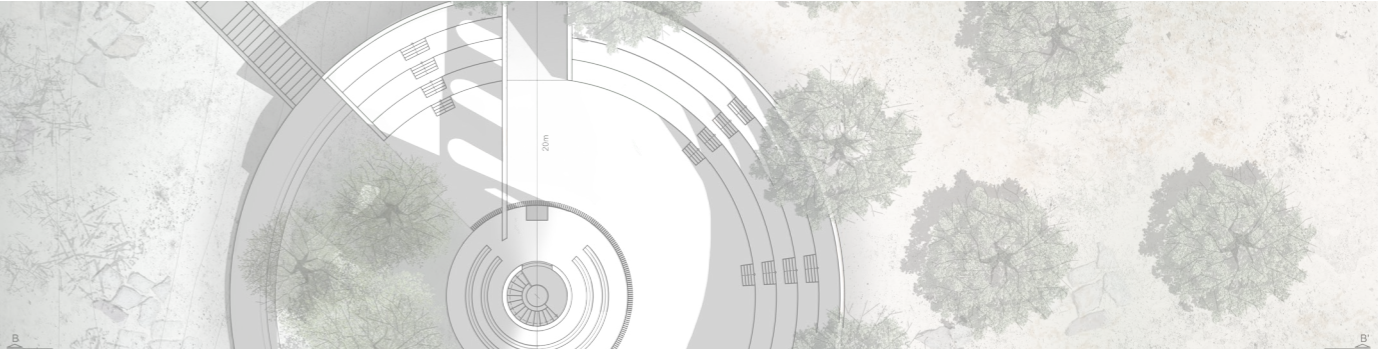
| Plan Section A_1:250



| Section A_1:250



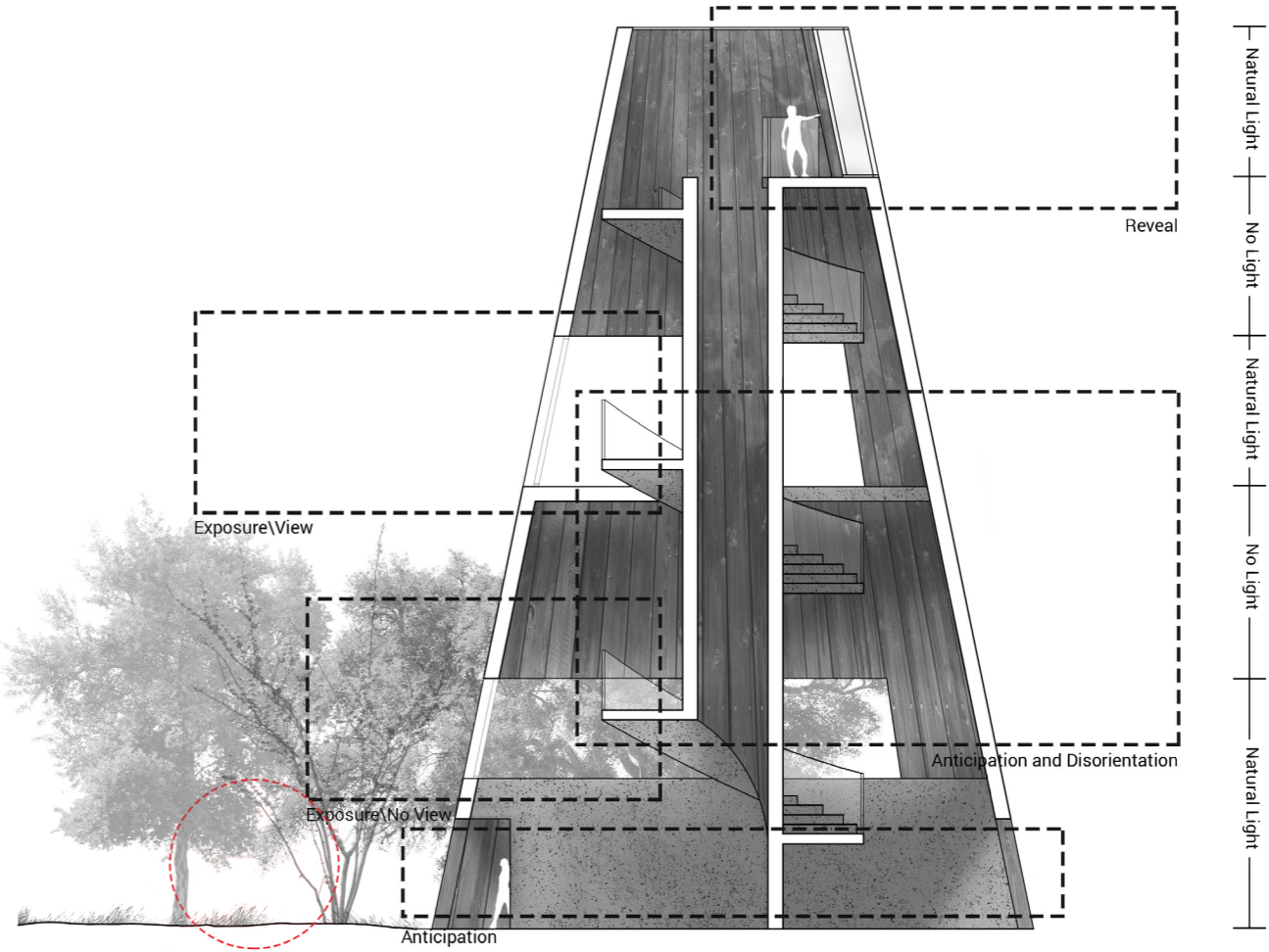
| Plan Section B_1:250

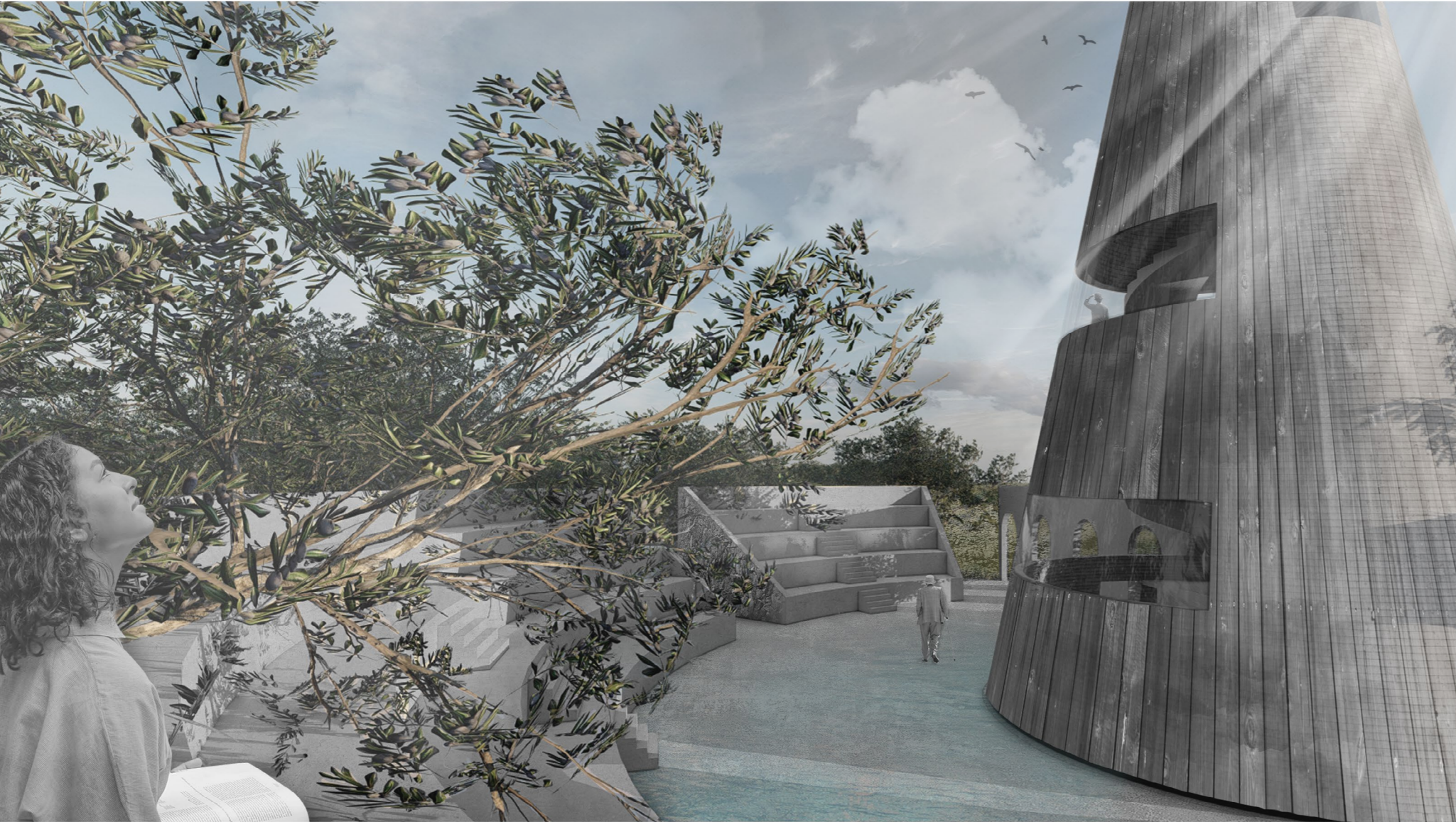


| Section B_1:250



| Materiality | Light | Emotions_Obsrvatory 1:100

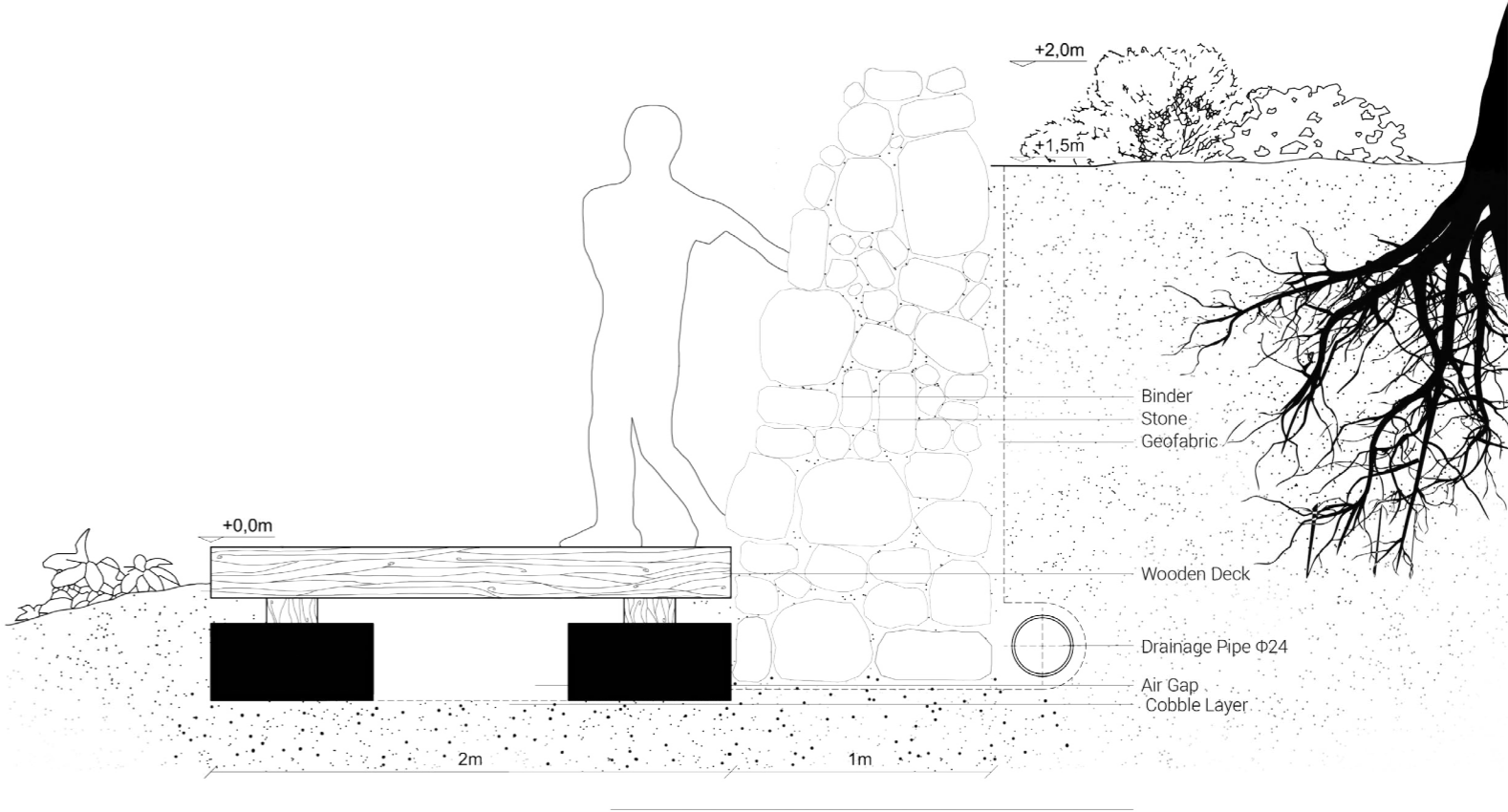




| Monumental Observatory

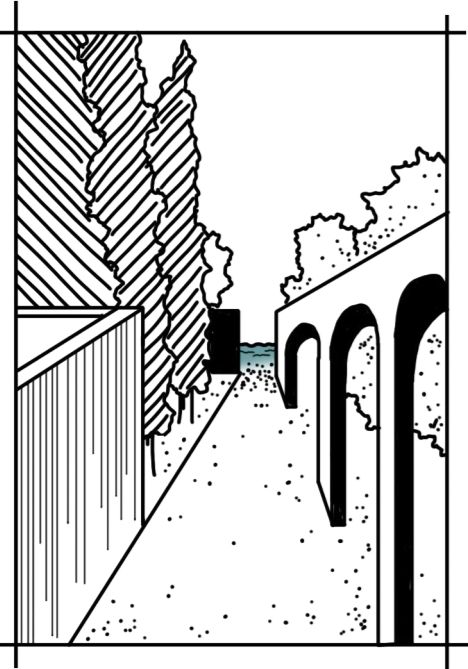


| Secret Garden



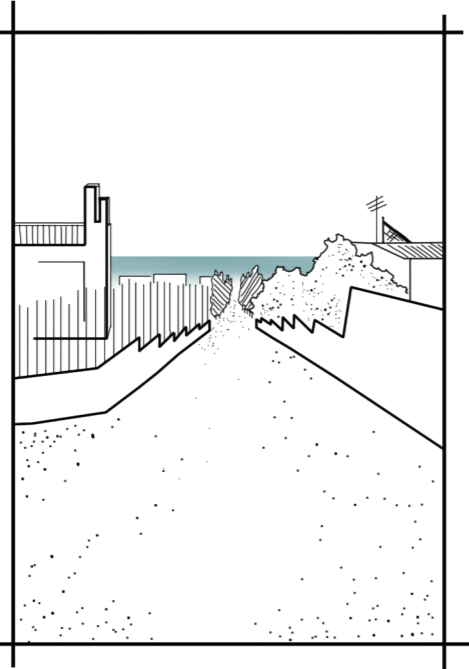
| Detail B_1:20

12.Eye 0.2



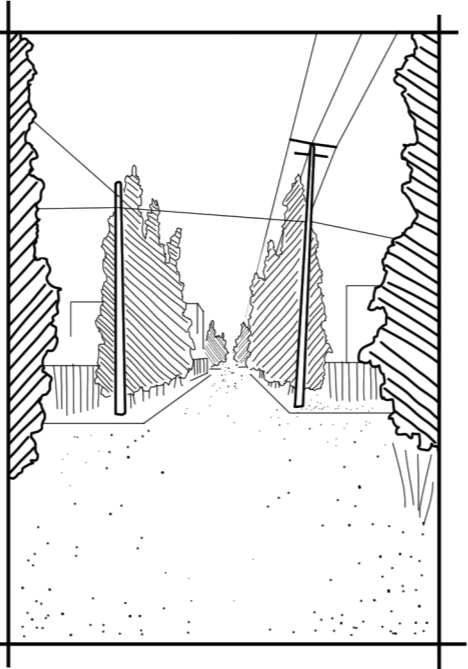
Either from the top of the tower or the ground level, the axis towards the sea, emphasized by the built and non-built structures, shows you the way.

13.Narrative Path F



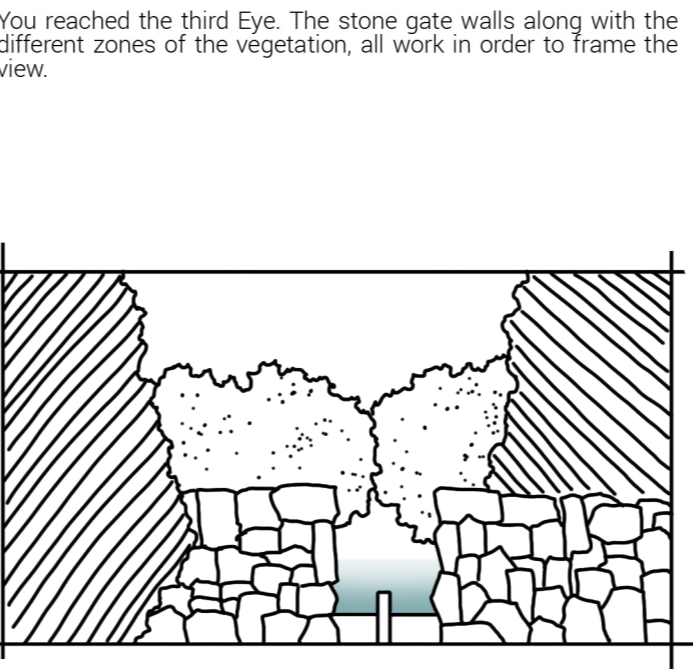
Walking along the neighborhood road no distinct intervention is to be seen. There is no need. The topography itself reveals its qualities, the beautiful sea, the destroyed and the under-construction houses, the narrowness of the urban structure, and more.

14.Narrative Path G



But when the environment, despite the urban lines, makes it hard to understand where to go, cypresses lines strengthen the axis.

15.Eye 0.3

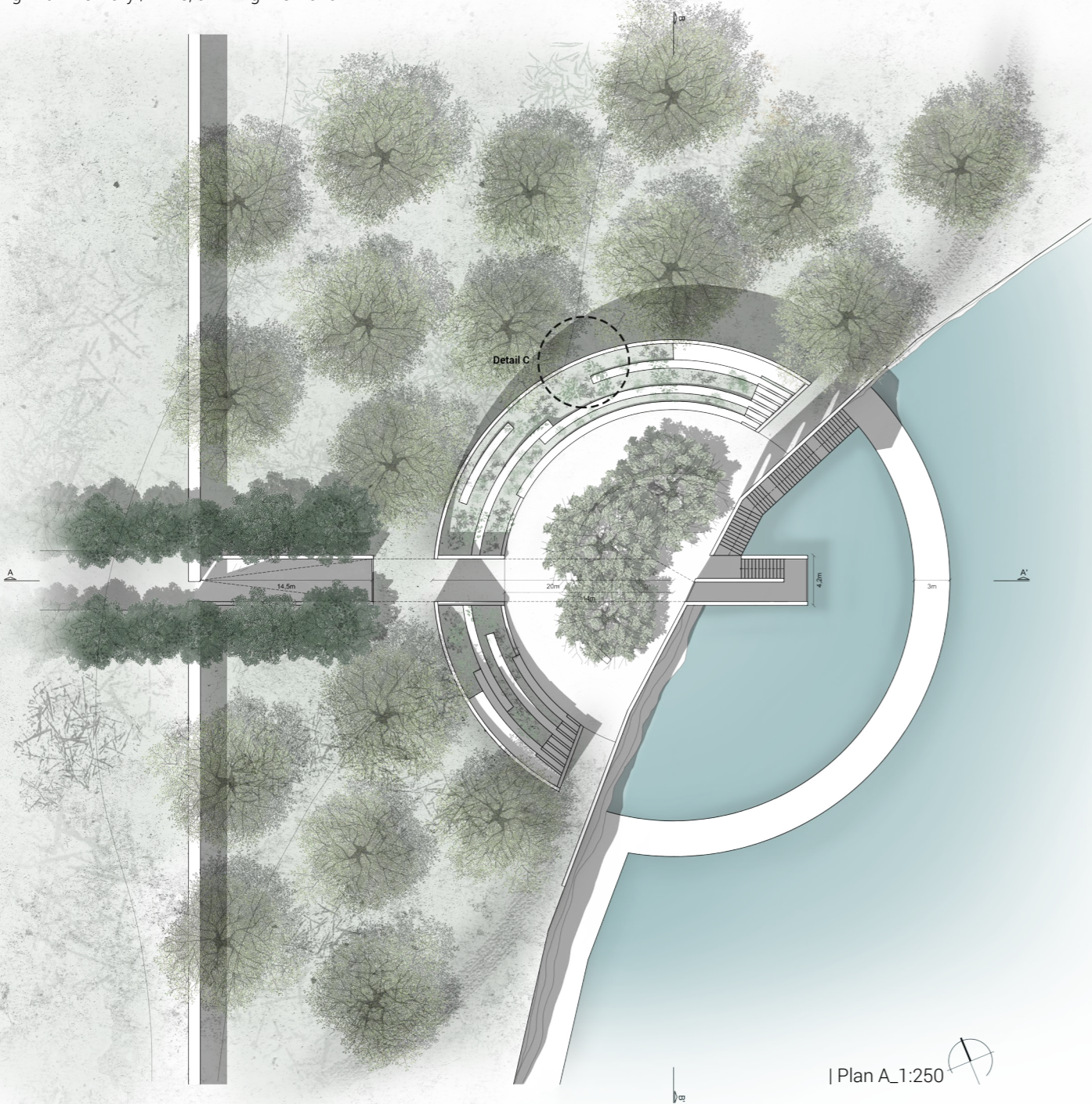


You reached the third Eye. The stone gate walls along with the different zones of the vegetation, all work in order to frame the view.

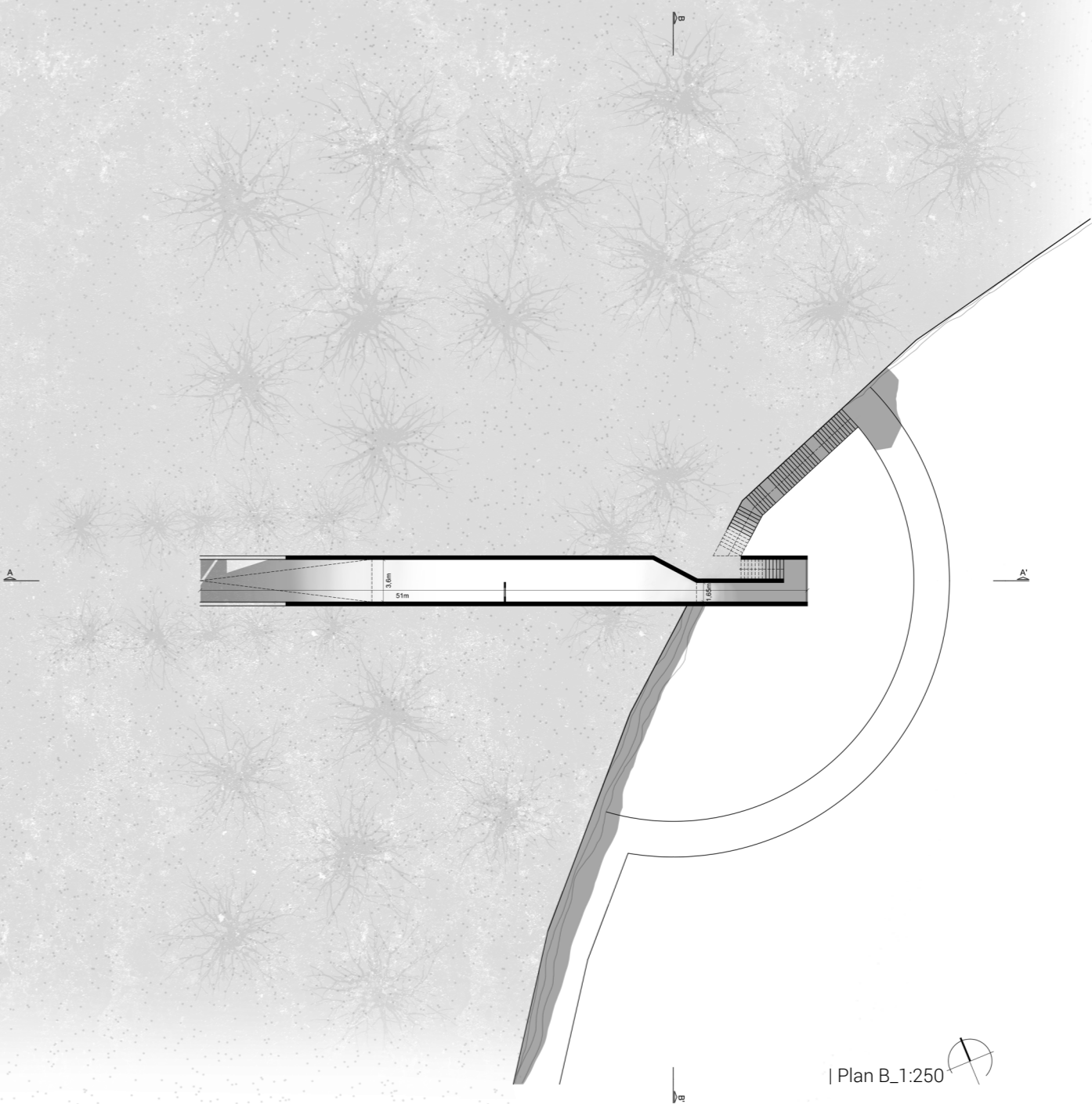
Following then, the escape axis, the direction that people tried to follow to save their lives, walking on the narrow neighborhood Poseidon and Irini streets, guided by the distinct plantations of the cypresses, and while to the topography and the local existing, and gradually changing after the fire surroundings that allows or prohibits the sea view, the end of the Narrative Path stops in front of a high debris wall that leaves only one opening notch. Moving further though, the ground *'sinks'*, leading the visitor to the underground tunnel. The rough rocky walls slowly transition to rough concrete, parallel with the transition from the light to the dark. This darkness of the underground structure increases the brightness of the ending sea view. An upside-down arcade in the middle of the route, instead of working as an inviting doorway to pass, makes the visitor stop, observe, and admire the sea framing. And going on, transitioning back from the darkness to the light, the revealing is even more rewarding, cathartic.

At this coastal balcony, one thing is important, the endless horizon. The sea meets the sky. After enjoying this moment, the visitor can go down the steep coast and walk on the wooden, on-sea path towards the public beach of Kokkino Limanaki, where hundreds of people from Mati found their salvation. Having a different perspective, a closer connection with the sea from the one hand derives memories of the event, of the long hours in the sea, of waiting to be saved, but on

the other to focus on the moment and feel the gratitude for [our] nature. The other option is to go upstairs to the sitting spot, a shaded by a central clump of carob trees bench is oriented towards the amphitheater. The amphitheater is a garden, an aromatic garden planted and maintained by the Mati residents, by the survivors, the family, and friends of the people lost. Sitting at the center of the Eye, having the view of the memorial garden, and the fig tree grove that encircles the structure, hearing the sounds of the birds, the sound of the sea, euphoria is the world that maybe can describe the feelings. The arcade screen along the coastline has the same quality as in the previous Eyes, hiding and framing the sea at the same time, but also marking the existence of the Eye, being a linking element with the coastal public path towards Mati port or Rafina, a future design that the 2020 Urban planning report for the area mentions.

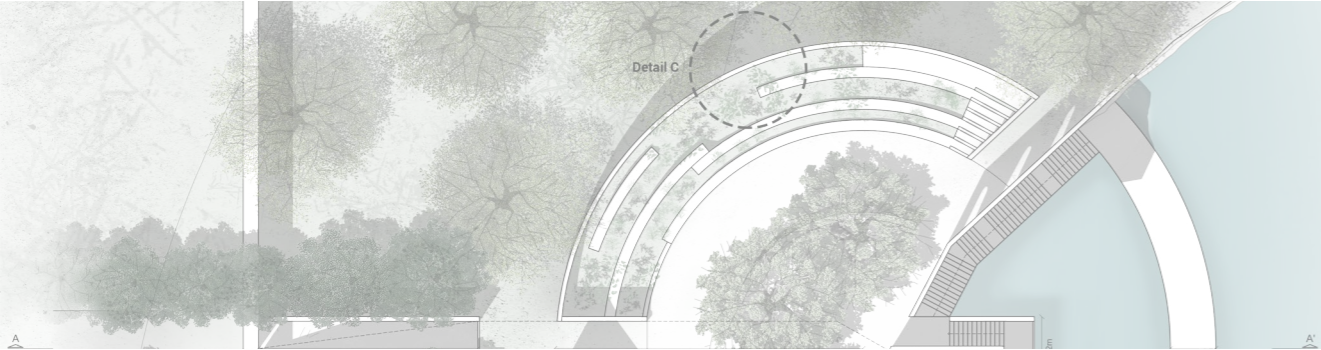


| Plan A_1:250

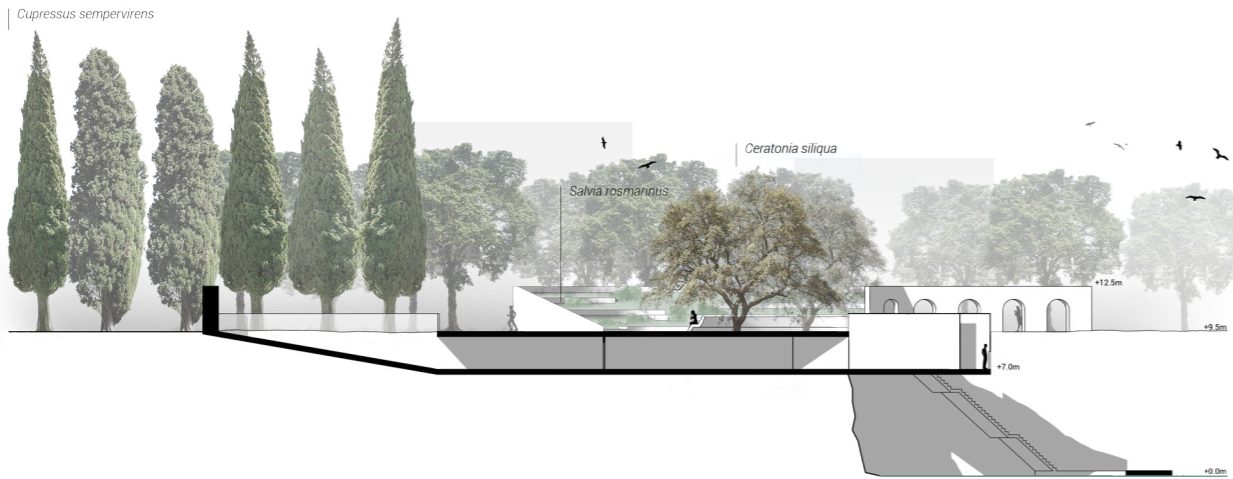


| Plan B_1:250

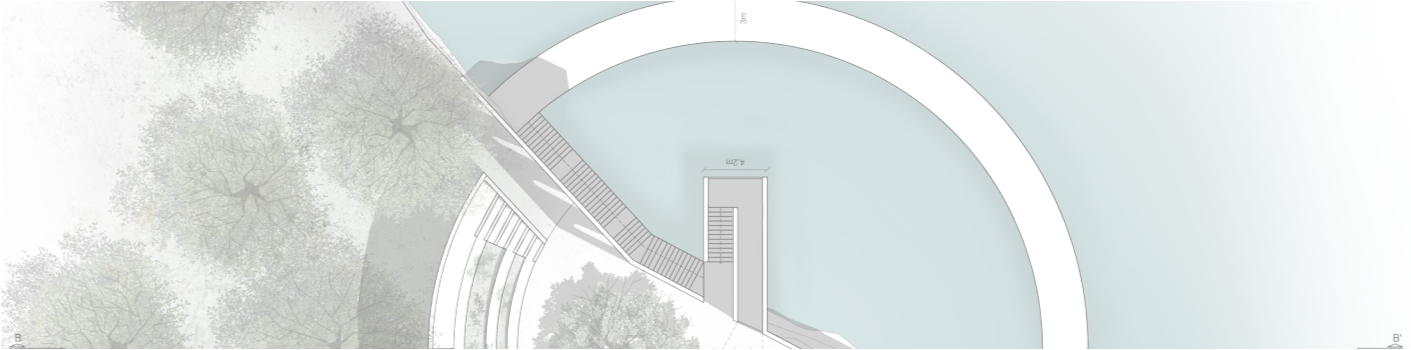
| Plan Section A_1:250



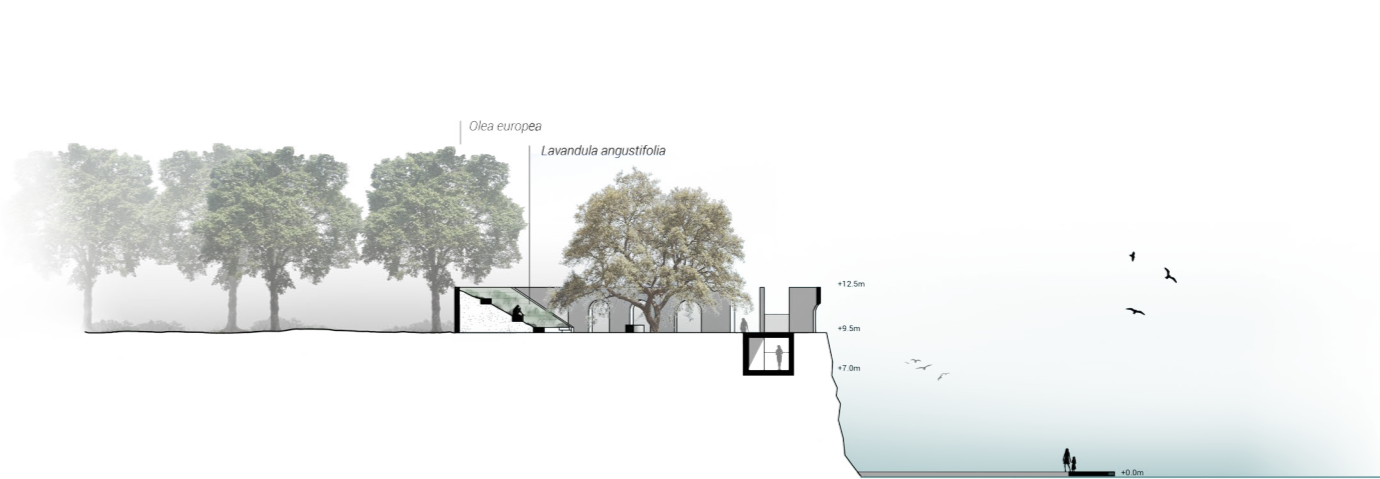
| Section A_1:250



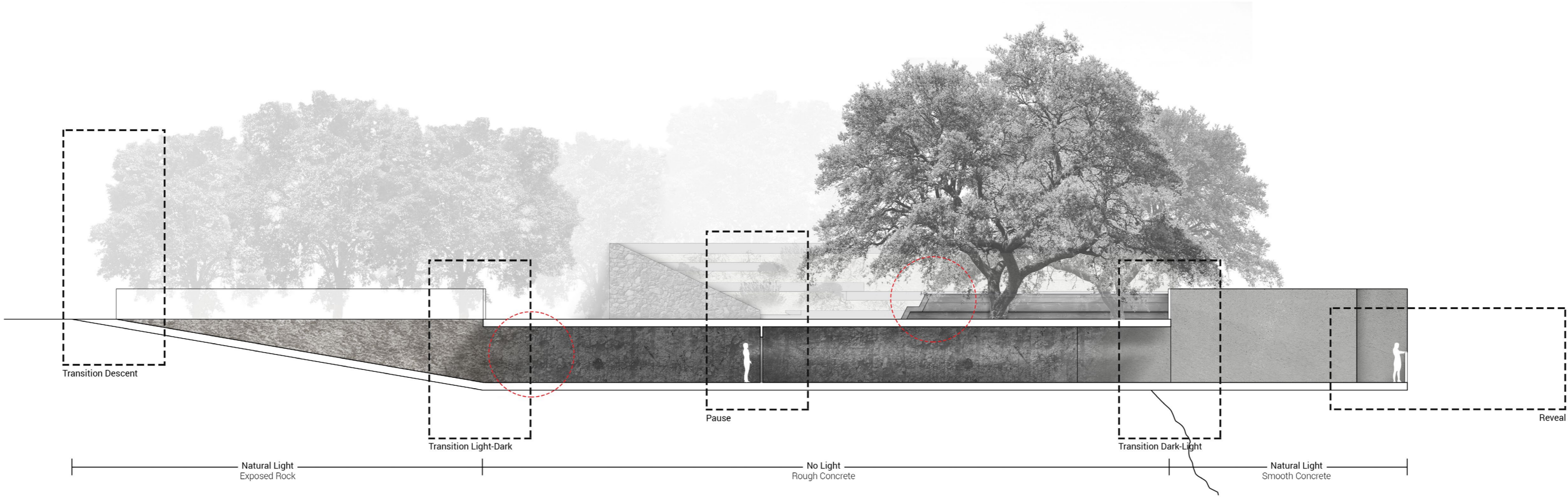
| Plan Section B_1:250



| Section B_1:250



| Matriality | Light | Emotions_Underground tunnel 1:100

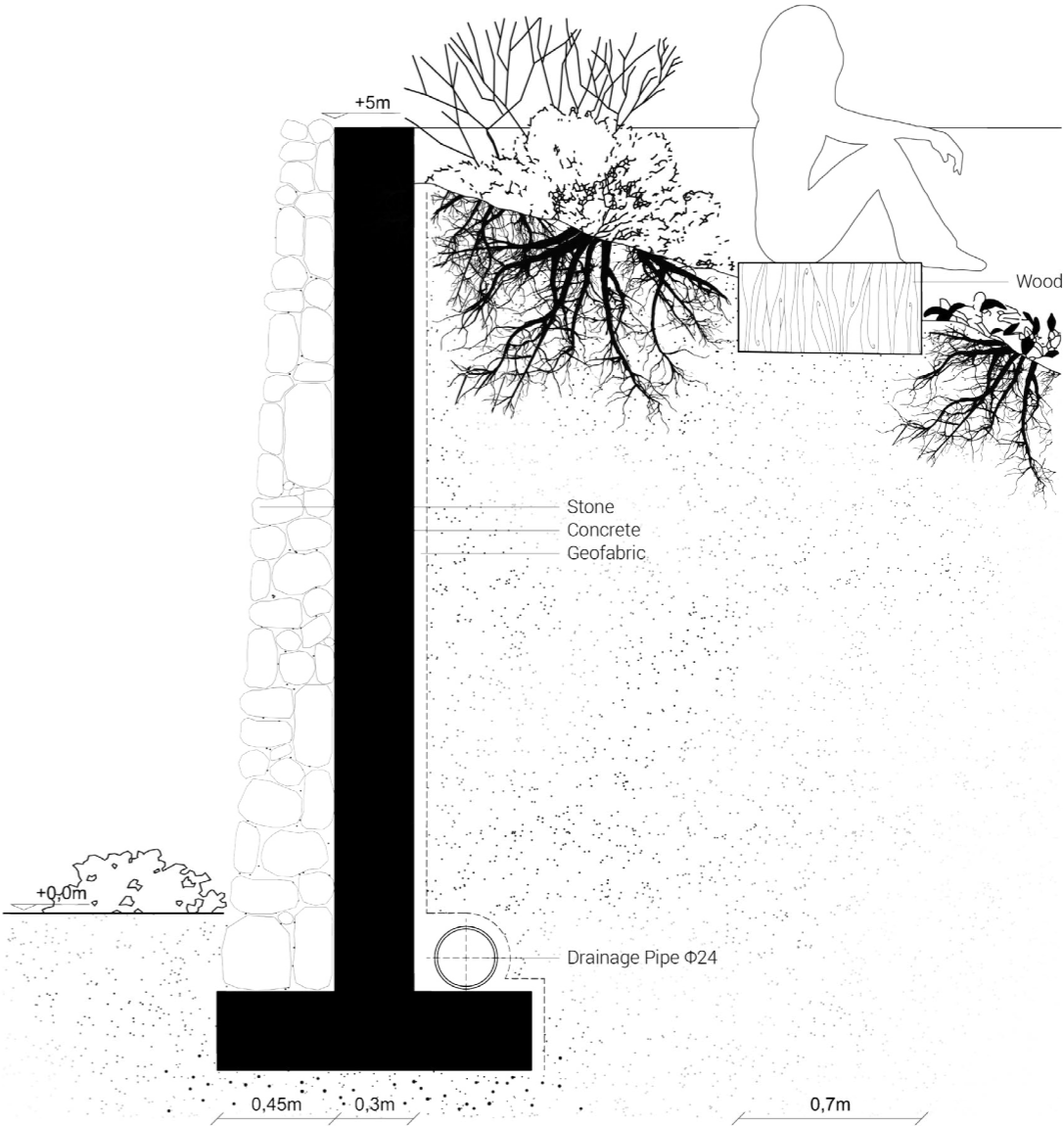




| Memorial_Healing Garden



| Tunnel_Axis to the Sea



| Detail C_1:20

16.Eye 0.3

And following the underground tunnel, you see it. The horizon. A slight line that distinguishes the sea and the sky, the salvation and the catharsis.



WRITE : Conclusions

Moreover, the inversion of the once dangerous, abandoned, and introvert in character stream corridors into an active place of improved conditions, along with the active participation of the communities, '*fights*' the landscape, urban, or social degradation of the area(s), and '*tights up*' the contiguity of the existing, and future ecological and societal aspects between the area(s) and the project.

Reflection

‘Eye-scape: Designing with memory /+ fire’ is a project conducted according to the Master of Architecture, Urbanism, and Building Sciences program at TU Delft (MSc), under the Landscape Architecture track, and will include, sum, and develop further all the knowledge absorbed during the two-year program, resulting in a Landscape Architecture thesis.

Socio-ethical Issues and Scientific Relevance

The topic chosen was first a very personal choice, located in my home country, Greece, about a very familiar, even daily, during summer, event, the fire, and a very interesting, and many times controversial theme, the memories and trauma. The project is related to my graduation lab Urban Forestry, because it concerns, first of all, an area where the Urban Forest meets parts of Natural Forest of the mountain, once unburned, in an area that belongs to the Wildland (Sub)-Urban Interface, and where the phenomenon of the fire, caused either from natural or like in this case, man-made actions, is very closely related to the trees, as one of the disturbances playing a determining factor in the ecological, secondary succession cycle, so the ever-changing process of the landscape. Moreover, since the topic of the Graduation Studio is the Flowscales, the project deals with various relevant approaches such as the landscape as infrastructure, the landscape resilience, and building-with-nature, approaches that some less, some more have been taken into account and integrated within the present research-for and by-design graduation thesis.

This thesis tries to contribute to the vast social, professional, and scientific field, and the field of

landscape architecture specifically, by combining different research topics and design languages, to form a coherent idea, that of a Living Memorial, designed based on resilient and healing, for people and the landscape, approaches. It includes theories, such as the Post-disaster psychological trauma, and the post-fire, immediate trauma of the landscape or the long-term struggle of the degraded, by the recurrent fires, landscape, composing the theoretical framework, and design methods that include the selected topics that contribute to the designing solution, such as the Memorial Landscape /+ Architecture Design and Healing Landscape /+ Architecture Design, and their interrelation, the (Fire)-Resilient Landscape Design, and (Fire) Disaster Management, both translated and imprinted on the final project. It can be a useful addition in the field, because of its combination of topics and knowledge included, creating a new basis for coping with post-disaster traumas and forest-fires, with the ultimate goal the reattachment with the past and nature, by having a direct confrontation with qualities that the landscape used to have, and new ones that will be used as linking *‘words’*, as symbolisms that will function as unifying elements.

However, the struggles, the ethical, and moral dilemmas were not absent from the process.

First of all, working with the different theories and aspects is very hard to do, since they should, and can, be unified. Secondly, choosing this still fragile topic, something that happened two and a half/three years ago that is still an open wound for many, is itself a dilemma. However, the theory and the interviews gave me the answer that this event is something that

needs to be addressed, to be confronted, not to be forgotten, to be an example, in order to provide catharsis, relief, and unity.

On the other hand, my constant concern was and still is the generalization of all of what the survivors experienced. All have unique stories that ideally should have been addressed, they deserve it. Of course, that is not possible, at least at this scale of this individual work, and so this thesis is based on the collection of information from external sources and personal interviews, to form some conclusions, and their incorporation into the theoretical and designing process and narrative.

Moreover, this thesis is not conducted in order to bring justice, to find the very reasons that the fire had such devastating results since big part refers to political actions and choices. So, this project isn’t politically based, but supports, however, the position, stating that it is of high importance to bring justice to those who suffered and still suffering in order to help in the healing process and to make drastic changes in many fields related to the causes, such the urban planning and illegal housing, the forest and fire management, and more.

As an architect and a landscape architect to be, I strongly believe that by creating open public spaces in the area, green spaces that will promote the reconnection to nature, the oblivion as the chance to heal from the trauma, to forgive, and not to forget, spaces that serve the (fire)-resiliency of the landscape, spaces that belong to the Living Memorial, many of the issues can be tackled. It should be clear that the proposal is not intended to function as a totalitarian, social curator, but as it is, a proposal that can add

something to the general, relevant research field.

Research and Design

The approach I followed, in general, was firstly the division of the work and topics in sectors, according to their theme. Despite the fact that along the way, many things changed a little, some others were rearranged several times, and others were rejected, the basic elements were always there, following both research for and by design practices.

Firstly, research needed to be done about Forest Fires and the Wildland (Sub)-Urban Interface, based on literature and scientific articles, in order to understand the basic framework, as well as about site-specific knowledge on the Greek forest and fire management, and the general situation in this Mediterranean climate zone. Secondly, the narrative of the Mati Fire of 2018, as a fire *‘investigation’*, based on the official reports, on scientific studies, on articles and media sources (video/photography/articles), and interviews with residents and survivors, was the starting point of and for many things, of understanding what happened, identify the problem and challenges, show the aftermath of such a disaster, and many more.

The third part of the work was the theoretical research of the issues recognized, the problems that formed the theoretical framework. Literature about the post-traumatic stress, the psychological traumas of the survivors, the physical short and long-term traumas of the landscape, with additions from testimonials from the interviews, explain the meanings of the terms, help in understanding and making connections between them,

and of course, enhance the initial purpose of the project's idea.

Parallel to this, the historical research of the landscape's layers, the development of the area, with methods consisting of literature about Greece, the Greek culture, the Greek landscape, vegetation, and ecology etc., research papers about the location, which also include the urban planning, vegetation, and ecological history, photographic archive analysis from internet and survey sources that help create a 'before' identity of the landscape, mapping, on-site visits/photography, and interviews with residents of the location, about the life before the fire, the experiences, the relationship and attachment to the landscape, interviews with experts from the Forestry field that know the area are conducted in order to personally understand the specific ecological cycle and opportunities of the area, along with the basic analysis on three different scales, that of the region (big scale), the area (medium scale), and the location (small scale), based on internet and survey sources, on-site visits, and mapping, were also all work done based on the research for design practice, and tools to use for the next research by design part. Basically, this first part constitutes the *Reading* of the project and the landscape, so the understanding, something that is noticeable also from the report's structure.

The following part of the work that constitutes the *Writing* of the project and the landscape, so the designing intervention on the landscape as a solution of the presented challenges, and follows the research by design practice, includes the Healing of the Human Trauma, for which I continued with literature research and case studies analysis about Memorial (Landscape)

Architecture and Healing (Landscape) Architecture, to identify specific design theories and solutions, the Healing of the Landscape Trauma, for which I also research the topics of (fire)-resiliency, ecological cycles, and dealing and treating post-disaster landscapes based on literature and case studies, to help me in the translation of the problem and the theory to a design solution, the Principles derived from both previous parts and followed a method of clarification, combination and exclusion, and basically is the first illustration of the relation between research and design, and finally the Design idea, the materialization of the vision, which is primarily a designing method.

Four Lenses

Perception

As the term of perception indicates, is the organization, identification, and interpretation of sensory information in order to represent and understand the presented information, or the environment. In landscape architecture, the perspective of perception is exactly that, how a person moves into a space and how experiences it. So it is all about the movement in space and the elements that contribute to the whole experience. Perception was from the beginning one of the most important aspects of the design. The spaces, created by combining architectural and landscape elements, and following an intangible narrative as guideline, form a memorial ensemble that becomes a landmark, making the landscape distinguishable and memorable itself. At the same time, being in tune with the environment, the design does not pop-up as something alienated. The movement and experience within the Eyes or from one to another, offers the opportunity to perceive the landscape from different perspectives, to understand the design from its perceptions through the materiality, the textures, the smells, the atmospheres, the spatiality, etc.

Palimpsests

Palimpsests played also an important role from the starting point of the project, as primarily a method of landscape analysis, and then a design approach. Searching about the history, on cultural and natural level, on different scales, analyzing past events, and the traces left, and bringing back some of these tangible and intangible signs, makes the layers of history recognizable. Findings from

this lens helped me in all steps of the project.

Process

According the perspective of process the design deals with the ecological process. Fire as part of this landscape and this ecological cycle, is itself an integral process of the project. The idea and design are based on this, enhance it, and create new conditions that keeps it as part of the natural, and non-natural processes. Moreover, process plays an important role in the intangible part of the memories, as the project deals also with the healing of the human trauma. It accepts this cycle and contribute to its continuation, healing, and recover.

Scale

Regarding the perspective of scale, the project deals with various ideas, strategies, or design that will have impacts from the wider region to the neighborhood scale. Economic, social, and ecological impacts all link to the design. Public spaces of learning, mourning, but also relaxing, and socializing, totally relate to the economic and social strengthening of Mati. Being a green, ecological source helps also being part of the greater green, ecological structure, within and without the urban environment, becoming a stepping stone. And continuing the design strategy, these will not only stay at the scale of the neighborhood, or the area, but will expand to the entire region.

Approach, Feedback, Work, and Learning

Despite the fact that the process was sometimes disturbed by the difficulties of the situation, for example, difficulties in finding information and data about the site, the history, or relevant topics, especially with regards to the physical, technical and social aspects, I relied on my own relationship with the event, the area, and general knowledge, and along with the desktop research and analysis, on-site visits, discussion with survivors, experts, and colleagues, I believe the work and approach were strengthened significantly.

The research around all the different topics, not only was something to be done in order to proceed with the project, but it was something that literally gave input and guided the idea for the design itself. For example, identifying one of the challenges of this project, the psychological trauma, led to the research of what the cause is and how it works, something that led to the research of how to heal it that led to a spatial ‘*answer*’ that led to designing research and tryouts. In short, the methodological approach and structure that I followed, somehow created a chain of actions, leading to the final design. However, that being said, going back and forth between research, analysis, and designing was and is, part of the working process, in order for one to ‘*feed*’ the work for the other. Moreover, the study of site-specific elements like the presence of water, temperature, soils, views, the stream and landscape situation, etc. challenge the way of designing, since my purpose in this project is to create a variety of conditions in the area of my design proposal.

During all tutoring sessions, the feedback from both

mentors was always a fruitful source of thought. The suggestions given by the mentors either about the research and analysis stages, so more about the structure, the methodology, the importance, and the specific literature, or the designing stage, so more about specific decisions, references, and inspirational propositions, were all incentives to proceed to the next phase, to look to another direction, or to broaden the knowledge for something specific. Until now, I try to be confident and always support and ‘*defend*’ my ideas and purposes, but trying to translate the feedback given appears to be a much more productive process, something that opens up my way of thinking. One recent example is a specific question of Saskia de Wit and Aleksandar Staničić, about which is my architectural and landscape architectural language. This question really made me stop for a bit and really think about what am I doing, what my goal is, how do I really imagine the architectural and landscape design, and what the ‘*linking word*’ is, the one that will ‘*tie*’ everything together. This question was basically the push, the start of the actual designing ideas.

Since the beginning of this journey, the main accomplishment I have achieved is learning about and understanding things that I considered as given, such as the familiar at first Greek landscape, from the perspective of a landscape architect now. Learning about the flows, the processes, the system, the analytical and design methods and tools, the four lenses of landscape perspectives, and many other things during the first year of the Master’s track, were a knowledge that I not only put into practice one more time, but I apply on a very different landscape, so applying and testing parallel the methods.

Moreover, ‘*diving into*’ new theories and topics, topics that I knew I liked before, topics that are broad and maybe, abstract, but never had the chance to deal with, not even during my architectural studies, such as the memorial (landscape) architecture, the fire-resilience, management, and designing, or the more scientific topics of trauma and recovery, was something that excited me and kept me interested, many times, in what I am doing. I learned how not to be afraid to mix the practices, not to just work in a linear way, because that is never possible.

I learned how I can mix different aspects, various disciplines, having the same purpose, and also achieve a certain aesthetic result. I believe I learned, but also still learning, to think in four dimensions, through space and time, and actually make them one in the design proposal, but I also learned that nothing starts and ends, things ‘*flow*’, and I can just decide where and when I intervene to give another direction to an ever-ending path.

And what I think is clearer to me, after these two-year studies, and after this thesis project, is that I want to continue this path of learning, and design, by combining intangible theories, and tangible practices, in order to create experiential spaces. This is what, for me, is the key in the relationship between landscape and architecture, two notions that I want to bring closer, to make the one compliment the other, to really merge. But maybe, they aren’t different from the beginning. Landscape design, and architectural design, are both based on qualities that a memorial design ‘*should*’ have. The expression of the cultural and natural history, the importance of the processes, the scale relations, the spatial sequences, and forms, the philosophical, introspective, and sensual levels of perception and

human/non-human interrelations, the materiality, and finally the same initial intension of not only fixing a problem, but creating new bonds, new terms, new experiences, new narratives, and rituals, with a design that concerns about the very broad, wide-angle, to the very small, specific detail.

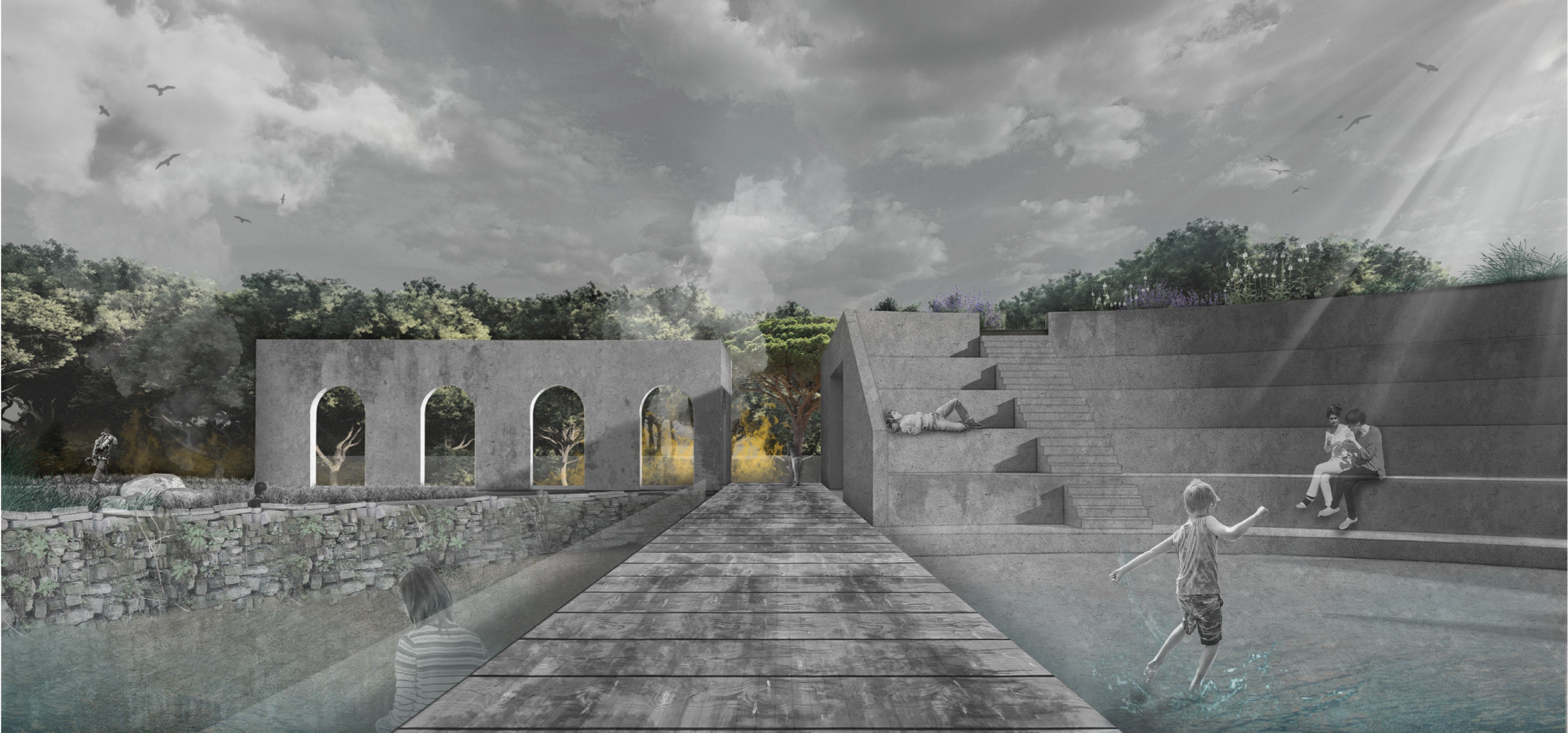
In conclusion, I would like to end with a one-word reflection. The word that I think describes this project, wraps-up this two-year journey, and describes me, at least until now, is **syn[thesis]**.

synthesis

/ σύνθεσις / ‘sin(t)-thə-səs /

noun

1. the compositions of parts or elements so as to form a whole
2. the combining of often diverse conceptions into a coherent whole
3. deductive reasoning
4. the dialectic combination of thesis and antithesis into a higher stage if truth
5. a mode in the design thinking that makes sense of the data collected, gives the ability to make informed decisions, and the information and inspiration to translate them into spatial structures/designs.



| Eye 0.1_Memorial_Prescribed Fire Ritual_Public space_Water management

Interviews

One of the main cores of the thesis is about the trauma, the expression and healing of an incident that affected both people and the landscape. And it is impossible to deal, design, talk, about/with the one without doing the same about/with the other. Interviews with people that experienced the incident, that live with the aftermaths until today, that know the landscape, and with people that are more experts on the practical, technical parts included, will play important roles as a research methods and tools for the thesis.

Although it won't be a participatory method for the design, these interviews will be structured and incorporated in the thesis according to the narrative. The interviews with the specialists will be included in the parts about the particular background knowledge about specific topics, for example the fire history, the specific ecology, the local fire management, etc. Parts or knowledge from the interviews will be incorporated in many parts of the report. All interviews follow a form of structured conversations.

A rough structure of the conversations with the non-specialists is the following:

- The first part will be about the life before the fire, the experiences, the relationship and attachment to the landscape, description-sketching of garden/planted public-private space, etc.
- The second part has to do more about the fire, the incident, and the trauma that followed. A brief description of the personal experience, action, moves, but with as little emotional pressure as possible, and what came after (negative and positive remarks).
- The third part will refer to the design and

opinions about the memorial landscape, to their illustration of the future and suggestions. As for the conversations with the specialists, the interviews are structured more based on the specific ground of knowledge, before the meetings.

Draft Residents Interviews:

-General Info (Name, Age, Occupation)

-Conversation/Questions:

1. Where do you live? How many years have you been living there? How was the daily life there (habits, experiences, stories etc.)? What do you think about the landscape / what was your relationship with the landscape/trees / do you have photos etc.? What were the bigger problematic elements of the area? How is your garden designed / what species / what is the management schedule? Can you make a quick sketch?
2. Can you describe the day of the fire / your actions/moves? What were people's actions? Can you think specific landscape characteristics (vegetation/infrastructure/uses etc.) that affected positively and negatively the fire spread/progress?
3. How do you feel 2 years later? What changed? How do you experience the landscape now? How do you relate to nature elements? What do you think about the area being forested again?
4. What is your opinion about the current memorial statue? What is your opinion about a fire-resilient memorial landscape with didactic role? How do you imagine this area look like in the future? What do you think it will be the next step / a new design addition?

Natassa, 25 years old, Architect

Where do you live? How many years have you been living there?

Since 2008 I live in N. Voutzas, but even before that, every summer I was going to my grandmother in Mati, where she had one of the first summer, ephemeral houses that became permanent residence. So I grew up basically in both Mati and N. Voutzas.

Can you describe the life in the area before the fire? The landscape and relation to the landscape?

The landscape that I met was this green, vast, pine-forested, beautiful landscape, which at some points you couldn't even see the sky from the dense high vegetation. Each resident always took care of the trees and the vegetation, within the plot. Think, my grandmother owned a plot of 300m2 in which there were 5 big pine trees. In general, there wasn't any problem regarding the vegetation, only their big roots that sometimes destroyed the roads etc. The biggest problem of the area was and still is the lack of public space! Because, even if the character of the area was this holiday-second-housing settlement, there were never public spaces that could serve people's activities. The only space maybe was the small port of Mati, where the hotels and the cafes can function as gathering places, and some of the camping areas that were basically privately owned, but for many kids were the only open areas they could play. The vegetation of Mati was basically private, but the feeling it got was that it was public. The identity/character of Mati was that of a holiday settlement, but most of the people live permanently now. The boundaries of the private and public, which refers to the roads, is that narrow and strict because the plots were

divided as agricultural plots.

How is your garden designed / what species / what is the management schedule?

*Our garden wasn't actually a garden, it is sloping due to the relief landscape, and because as most of the housing, civil engineers designed and built the homes and the outdoor spaces, and so most of the surface was covered with concrete and there are some flower beds. Specifically, we had planted roses, locust trees (*Ceratonia siliqua*), one cypress (*Cupressus sempervirens*), laurels (*laurus nobilis*), jasmines (*Jasminum fruticans*), and Bougainvilleas.*

What was the last things you remember 1 day before the fire?

One day before the fire, I remember characteristically walking around the entire Mati in the afternoon, and I had a déjà vu from my childhood, seeing kids playing around on the streets, at the beach, many people enjoying, feeling the celebration of the summer, the typical, familiar nostalgia of the Greek summers.

Can you (briefly) describe the day of the fire / your actions/moves? What were people's actions?

The fire started at Kallitexnoupoli. I wasn't at home, not even at the area that day. I left that morning and went with my best friend to Voula to a hospital to see my grandfather, and at some point during the day we noticed ashes, which were coming from Keratea. I was going back to my grandmother that lived in Dafni, and while eating we saw 'Fire in Kallitexnoupoli' in the news.

We said: ok, classic summer, every year the same things, at least 2-3 times. But 5 minutes later, the fire was already at the Lyric Foundation, which was an alert for me, while the distance from there to my house is around 800m. Phone calls started immediately, from friends and family from Mati, telling where are you, leave immediately! But I took the car in order to go take my dog that was inside the house. I had 20 missed calls already within a time-frame of 15 minutes. The plan was taking my dog from N. Voutzas and go to my cousin in Mati to stay there and be safe. Nobody knew that the fire was coming down towards there. Only when my friend called me and said the fire is at Marathonos Avenue towards Mati, then I knew that the plan was already doomed. At this point I lost all contact with everyone from there. Thankfully my ex-boyfriend that lived next to house went there and saved my dog and I was stopped by the police, by chance, at Marathonos, and turned back, otherwise I would have been another one that went towards the beach, trapped there.

Where were your family?

No one was at home, my parents were at Folegandros for work and my grandmother was at Lamprini, in Athens, because now only my cousin was living in her house in Mati, where he wasn't also that day. The alarm though of the housing was ringing very loudly, and they were calling him from the security company, telling him that it's from the fire. Most of the neighbors were managed to survive. My friend's story was however tragic. Her mother, cousin, dog and she were managed to leave by car but at some point the dog jumped and so they went outside to look for him and they lost each other. Her mother managed to find her way out with the dog and sat inside the sea for hours, and her cousin was with a group of people, jumping from

paddock to paddock in order to escape towards the sea, but she was the last jumping and saw the rest of the group being burned from the fire, they could not be saved. She has not yet recovered from it. I went there the next day and realized that they had broken into my house.

Georgia, 25 years old, Architect

Where do you live? Is this your summer or permanent house? How many years have you been living there?

We have our summer-house in Mati, around 300-400m from the coast. However, every summer, since 1995, we basically move in and stay for the entire summer, almost 3 months.

How was the daily life there (habits, experiences, stories etc.)?

Because in the area there are some large hotel units, during summer Mati is filled with tourists, and we still say that it was lucky that the fire happened Monday, cause if it was weekend, the casualties would be fivefold. Everyday life was very casual, we were going for a swim on foot because the sea is very close. About the accessibility, there are paths and stairs that lead to the coast, but indeed these are very narrow and only if you know the area they are easy to locate. The largest beaches of the area are right and left of the port, and then along the settlement's coast there is a very narrow, earthen path with some stairs to go down the small creeks, but these are at several meters distance each. The settlement in general had a very quiet atmosphere, except from the central road that leads to the port, Kyanis Aktis, and is busier because of the buses and cars that go to the hotels, bars, restaurants and beaches. There is general the center of Mati, because there is also a market and these amenities and going there was part of the daily life.

How is your garden designed / what species / what is the management schedule? What is the relationship between private and public vegetation?

Regarding our garden, of course we take care of it, for example we have 3 high pine trees at the corner of the plot, but we cut it very often in order for the canopy to be only at the top. Around the house there is only grass and laurels (laurus nobilis) in perimeter as a fence, which surprisingly did not burn, but turned orange from the temperature but slowly we saved them. Moreover, that day of the fire we had predicted that something can happen because of the wind, and here education plays important role, because I would like everyone to be more aware and know the basics of fire prevention and control and everyone should take care of their garden, that day we saw the wind, we smelled the ash and so we watered all the plants, the outdoor area and the exterior of the house, we cleaned the surfaces from the pine needles and dry fallen leaves, and so it wasn't easy to catch fire. However, for example right across our house there is an abandoned, destroyed house that became a forest and the fuels are everywhere, overgrown vegetation, rubbish and rubble that immediately could and did set on fire. People need to be more aware, need to be educated. On the other hand, at this size of disaster there is a need of a bigger strategic plan and management, but individual actions contribute a lot. In general though, in Mati there is no public vegetation, and so public management.

And what do you think about the public space, better say the lack of public space?

Yes there is no public space. Maybe only the port can be characterized as public space, but again it only consists of private amenities, bars, cafes etc.

Can you (briefly) describe the day of the fire / your actions / moves?

Yes, I remember everything. To begin with, I was in the house with my mum, my sister, and our dog. It was noon, we were eating, and we were impressed by the wind, the force of the wind, like a hurricane. Then we smelled something burned. We went outside to look but there is no visibility, the trees hide the view towards the west, and so we had no idea of where was the smell coming from. We opened the TV and watched the news, saying that the fire was high at N. Voutzas. So because we have experienced similar days again and N. Voutzas is quite close, we were suspicious and our first moves were the ones I mentioned before, we picked up the dry, fallen leaves and threw water everywhere, but these actions were just in case of emergency, cause the reporters were saying that the direction of the fire was towards the exact opposite. After that the electricity was cut off. Thankfully, because of that we decided it was a good idea to already open the garage door manually and parked our two cars outside. Then the water supply was cut off. Three helicopters, the only ones during the entire event, flew right above our house and so we knew that the fire was close by now. I went up to the attic and opened to see from the skylight. I was seeing smoke. We were in panic. I went up once again and I suddenly saw flames in the house in front and I screamed! I screamed fire to alert everyone, my family and neighbors, cause no one had any clue, no one notified us, we had no idea what was going on. We closed all windows and while this took 3 minutes, the fire was already outside the house, in 20m further one of our trees, 30m high in flames. I screamed last time at my neighbors to run, unfortunately they were burned and died by the flames.

We went inside the car, with doors still open. I was driving

with my dog on my legs. I pressed the accelerator and we reached the parallel to the coast, main road. At this time, from the car you could see everything catching fire from a tornado of sparks! I crashed many times but I did not care about that at that moment. I was trying to go to the port, because we have a boat so that we can escape there. But I couldn't. The traffic was terrible. We didn't know that they were sending the cars from Marathonos Avenue to the smaller roads of Mati towards the sea. That action was criminal, sending the traffic jam to an already dense system that blocked any trace of accessibility, so escape. I cannot explain how many burned cars where there. So it was impossible to reach the port, everyone was going towards the opposite direction. So, I turned the car and tried to follow the traffic's direction. After a couple of minutes we saw and heard a friend telling us to just leave the car and run to the sea. And so we just took the water bottles and masks that my mum had already packed, thankfully, because they saved us and as many people as we could help! And we run between burning trees, cars, and houses. It was a Hell! We reached the small path parallel to the coast and the stairs that we found and went down to a creek, already filled by people, as in all creeks that don't really have space, land, and so everyone was inside the water. We stayed there I don't know for how many hours...They say that 17:40 they were doing consultation, 17:40 we were already at sea, the settlement was already on fire. We were rescued around 23:00! All this time we stayed inside water but close to the land, in the shallows, but many people were swept away by the flow that had a very rare direction to the west, towards deep in the sea, and drowned. We sat there for endless hours, the scenery was tragic. Burned, naked people, lost people and children, animals burned.

All this time we had no contact with my father. One woman gave me her cell-phone and managed to call him and tell him that at least we were alive and he told me that they were stopped by the police in Marathonos. People that weren't there and were just watching the news they couldn't realize the size of the disaster. We knew that many people had already died, that we will die...from the fire, from the smoke, from drowning... We were crying and started saying goodbye. After experiencing this, it is as if I died and lived again.

We were waiting minute by minute for the fire to end. The fire reached the coast and there was nothing else to be burned and so it went out. My dog was shaking, we were shaking in the water, and the night has come. We went outside near the rocks because the fire was somewhat extinguished, from the trees and vegetation, it was limited, only the buildings were still on fire. From then on, another tragedy started.

All this time of course, people were trying to pass from the rocks from creek to creek, screaming names, names of their family members, of their kids, parents, family, and friends. Small fish boats, fishermen that started to approach the creeks, saving few people each time. Then a group of rescuers came from the land, from the path we followed during the fire escape, and with the rest of the people we followed them. On the way back, the rescuers were saying not to look down. I looked. Burned dead people. We went over.

They were saying be careful you are not wearing shoes, and we hadn't even noticed that. We were just in the corner of my neighborhood. Everything was black. I couldn't recognize anything. It was a foreign, alienated landscape. It was like on movies, a war zone. I couldn't believe it.

They gathered us all to a hotel that had been turned into a rescue center. There was panic, all of us black from the

smoke, barefoot, burned. The time was 23:30. We were trying to communicate with my father. He told us that someone passed outside our house and saw that it wasn't burned from what he could see. Also the other car that we left outside, apart from some plastic part that melted from the heat, it was ok. At some point we managed to leave and go to our permanent house. We were lucky that we had one.

Only with the first morning news that showed scenes of the size of the disaster, only then those who did not experience the fire understood the situation.

The dead are certainly many more than those that have been announced to date, more than 102. We have friends living on the islands across, and they were saying that bodies were washed away by the sea, to the shores.

I had, as all, he feeling that nobody was helping us. We were alone. After the wars, nothing like this had never happened before. To date, no one has been punished, no one in charge has resigned.

How do you feel 2 years later? What changed? How do you experience the landscape now?

Last year we didn't even go there. We couldn't. Even if our house was a lucky one, we couldn't go. 2 years later, you still face the burned, destroyed houses. You still come face to face with the same scenery. You experience the event again and again. The terror has been imprinted on the landscape. Almost nothing has changed. Only actions of the people, volunteers, helped right after and still continue to help regularly, with reforestation actions, meals, and collection of products for families.

This year I went and saw that the settlement is trying to recover. But the hotels do not work. There are not tourists. Not many people. People are still living in ephemeral places, like the camping areas. There is a stigma. It is a terrscape. It is a monument of terror, and you experience and perceive it as one. The landscape that was once the reason why people was coming, its beauty, its atmosphere, and its identity, has become the reason that people do not come anymore. There are no animals, you cannot hear the birds, the dogs, the cats, nothing.

How do you relate to nature elements?

The biggest issue for me is still the fire. Last summer, so 2 years after the fire, I visited an island, and 2 fires started. I couldn't sleep. The hotel I stayed was within a forest and I couldn't sleep. I wanted to go sleep next to the sea. The same happened and still happens to my sister. We have terrible anxiety about fire. What do you think about the area being forested again? Yes it will at some point be green again, I think. The point is not to let parallel to the anarchic construction, the anarchic vegetation to take over. If the area will be reforested again, it should be done using also other species. People must also be educated!

What is your opinion about the current memorial statue?

There are some small monuments referring to the human lives lost, initiatives of the inhabitants, spontaneous actions that try not to forget what happened. I agree that it should not be a monument though like the official one that kind of enhance the terror, the fear for the fire itself, something that makes the trauma worse.

Regarding the spot of the plot where 26 people died, yes it is devastating. But many people were saved too by the owner that opened the door to the coast and tried to save the people. The spot has a double meaning.

How do you imagine this area look like in the future?

After experiencing the fire, seeing this vegetation being burned but also causing fire, I definitely imagine the area with other kinds of vegetation, still green but different. I imagine the identity of the area being a neighborhood and a touristic, summer attraction, coming back. I imagine more public, open spaces, because there is none.

What do you think it will be the next step / a new design addition?

There are so many things that should be done! Starting from the general urban planning till smaller interventions regarding the access to the coast, from theoretical, institutional frameworks and laws till static, construction and design issues. Public spaces and utilization of streams can also be a start.

Stamatis Sekliziotis, Agr. Specialist and Landscape Architect (Ph.D, Birm UK)

In our Mediterranean ecosystems, forest fires have been, are and will be a very common phenomenon. They are part of their life cycle and regeneration mechanism, and so the species of the Mediterranean zone have developed mechanisms of recovery after fires. Therefore, if nothing is done about planting only in the Eye area, another cycle will be repeated, another fire will be repeated. What are some of the steps you can take to begin the process of preparation for mediation, and if it is at all possible?

Definitely Landscape Master Plans in many parts of the Attica Region with the introduction of new firefighting plant species.

What is your opinion about the production of forest areas and the exploitation of timber in Greece? Is it possible? Can it also serve as a monitoring, prevention of forest fires?

Pine is only for firewood and less for industrial use. It should be slowly replaced in Attica with other species, where possible and especially away from settlements. You will need a Landscape Master Plan for each area (Municipality / Community) separately...

Water management is also a very important part / tool, both for suppressing and preventing fires. Do you see any opportunities in the region of Eastern Attica?

Rain water harvesting systems, reservoirs, small dams, water tanks in certain locations well scattered are some of the opportunities and tools I see.

Do you have in mind some native species that can be

used in both reforestation plans and prevention plans? Yes, definitely oaks, eucalyptus, cypress, hornbeam, mulberry, all deciduous.

Do you know more about the historical evolution of the ecosystem and its uses and changes in the region of Eastern Attica?

The pine was not dominant since ancient times. The oak was dominant in Attica, with few conifers, with more cypresses, plane trees in wetter soils (ravines and plains), mulberries, etc.

Can architectural landscape design help mitigate urban-forest fires in Greece, or do greater changes in forest recording/monitoring and management be needed?

Landscape Architecture is the answer in collaboration with Foresters for the most appropriate distribution of green (firefighting) and in zoning. It is necessary to perfect the forest maps and to have final urban plans for the areas where there will be Landscape Master Plans, which can impose changes to reduce for example the vegetation of the pine and replace it with fire-fighting species.

Must and can we learn to live with fires, as in the Netherlands they have learned to live with water and the chances of flooding;

Yes, but more limited and away from residential areas. We need a better response mechanism, equipment & training of services, new aircraft, etc. And to return the responsibility to the Forest Service and not only to the Fire Department.

How do you imagine the future of this suburban area?

Free of pine, with many openings (plains) with meadows and visibility, mild and active leisure activities, edible landscaping, water reservoirs...

What is the relationship of Greeks with nature today?

It is definitely not like in the Netherlands... It is less friendly, although it is slowly changing for the better. It is a matter of education!

How can we strengthen this relationship?

With education at a very young age, participation in reforestation projects, conservation planning, exhibitions, workshops, and more environmental education from the media (mainly state media).

By achieving this, do you think the situation can be improved?

Maybe under conditions we have already described, but it takes a lot of effort and time...

Bibliography

- Adger, W.N. (2000). Social and ecological resilience: are they related? *Progress in Human Geogra-phy* (24:3), 347–364.

- Alcubierre, P.C., Castellnou, M., Ribau, de Egileor, A.L.O., Bover, M.M., & Kraus, P.D. (2011). Pre-vention of Large Wildfires using the Fire Types Concept. *Unitat Tècnica del GRAF*.

- Alderman, D.H. & Dwyer, O.J. (2015). A Primer on the Geography of Memory: The Site and Situa-tion of Commemorative Landscapes. 10.13140/RG.2.1.1419.6565

- Approaches in Southern European Forest Types. *Restoration of burned areas in forest manage-ment plans*, 5, 93-119. 10.1007/1-4020-3760-0_22

- Argyropoulos, G. (2020). Μάτι: Πυρ και Ύδωρ [Mati: Fire and Water]. 1st ed. Marathia.

- Beller, E.E., Robinson, A., Grossinger, R.M., Grenier, J.L., Davenport, A., & Spotswood, E. (2015). Operationalizing Landscape Resilience: Enhancing Biodiversity and Ecological Function at the Landscape Scale. https://www.sfei.org/sites/default/files/biblio_files/AGU_ResilienceFW.pdf

- Birot, Y. (2009). Η Ζωή Μας με τις Δασικές Πυρκαγιές: Η Άποψη της Επιστήμης Μία Συνεισφορά στο Διάλογο Επιστήμης-Πολιτικής [Our Life with Forest Fires: The View of Science A Contribution to the Science-Politics Dialogue]. *EFI Discussion Paper* 15. Finland.

- Butler, A., Sarlöv-Herlin, I., Knez, I., Ångman, E., Ode Sang, Å. & Åkerskog, A. (2018).

Landscape identity, before and after a forest fire. *Landscape Research*, 43:6, 878-889. <https://doi.org/10.1080/01426397.2017.1344205>

- Catsadorakis. G. (2007). The Conservation of Natural and Cultural Heritage in Europe and the Med-iterranean: A Gordian Knot?. *International Journal of Heritage Studies*, 13:4-5, 308-320. <https://doi.org/10.1080/13527250701350850>

- De Rigo, D., Liberta`, G., Durrant, T., Artes Vivancos, T. & San-Miguel-Ayanz, J. (2017). Forest fire danger extremes in Europe under climate change: variability and uncertainty (JRC108974). *Publica-tions Office of the European Union*.

- Eleftherakou, M. 2019. Διαχείριση του τοπίου ως προς τις δασικές πυρκαγιές. Παραδείγματα από χώρες στη Νότια Ευρώπη [Landscape management in relation to forest fires. Examples from countries in Southern Europe]. [Master’s Thesis, Aristotle University of Thessaloniki.

- Faurest, K. *Healing Landscapes: Gardens as places for spiritual, psychological and physical healing* [PDF slides]. [levego.hu. https://www.levego.hu/sites/default/files/kapcsolodo/healinglandscape-en.pdf](https://www.levego.hu/sites/default/files/kapcsolodo/healinglandscape-en.pdf)

- Gristwood, A. (2014). *Memoryscapes: Heritage, the Cityscape and the Idea of Nation*. *Woven By Memory: The Idea of Nation in Education Abroad*, pp.51-58.

- Gutlove, P. & Gordon, T. (2004). *Psychosocial Healing and Post-Conflict Social Reconstruction in the Former Yugoslavia*.

Medicine Conflict and Survival (20). 136-50. 10.1080/136236942000234726

- Hamber, B. (1995). Do Sleeping Dogs Lie? The Psychological Implications of the Truth and Recon-ciliation Commission in South Africa. Seminar presented at the Centre for the Study of Violence and Reconciliation, Johannesburg.

- Herman, J.L. (1992). *Trauma and Recovery: The Aftermath of Violence - From Domestic Abuse to Political Power*. BasicBooks.

- Holling, C. S. (1973). Resilience and Stability of Ecological Systems. *Annual Review of Ecology and Systematics*, 4, 1–23.

- Jiang, S. (2013). Therapeutic landscapes and healing gardens: A review of Chinese literature in rela-tion to the studies in western countries. *Frontiers of Architectural Research*, 3:2, 141-153. <https://doi.org/10.1016/j.foar.2013.12.002>

- Kaplan R. & Kaplan S. (2005). Preference, Restoration, and Meaningful Action in the Context of Nearby Nature. *Urban Place Reconnecting with the Natural World*. USA: MIT Press.

- Kapsopoulou, E.V. (2015). Μελέτη δυνατότητας φυσικής αναγέννησης και κινδύνου διάβρωσης μετά από δασικές πυρκαγιές. Περιοχή μελέτης Δήμος Πωγωνίου [Study of possibility of natural regeneration and risk of erosion after forest fires. Study area Municipality of Pogoni] [Master’s thesis, National Technical University of Athens]. https://dspace.lib.ntua.gr/xmlui/bitstream/handle/123456789/40865/kapsopoulou_dasikes%20pyrkagies.pdf?sequence=1

- Kirmayer, L. J. (1996). Landscapes of memory: Trauma, narrative and dissociation. P. Antze & M. Lambek (Eds.), *Tense Past: Cultural Essays on Memory and Trauma* (pp. 173-198). London: Routledge.

- Kathleen, L. (2017). Reconfiguring the Burnt Scar: A Landscape Architectural Response to the Knysna Fires of June 2017 [Master’s thesis, University of Cape Town]. <https://core.ac.uk/download/pdf/185410049.pdf>

- Papageorgiou, A., Karetsos, G., & Katsadorakis, G. (2012). Το δάσος: Μια ολοκληρωμένη προσέγγιση [The forest: An integrated approach]. Athens, Greece: WWF Hellas.

- Pausas J.G., Vallejo V.R. (1999). The role of fire in European Mediterranean ecosystems. Chuvieco E. (eds) *Remote Sensing of Large Wildfires*. Springer, Berlin, Heidelberg. https://doi.org/10.1007/978-3-642-60164-4_2

- Pedović, I. & Hedrih, V. (2019). Social Trauma and Emotional Attachment. *Philosophy, Sociology, Psychology and History*, 18, 27 – 37. <https://doi.org/10.22190/FUPSPH1901027P>.

- Pyne, S.J., Andrews, P.L., Laven, R.D. (1984). *Introduction to Wildland Fire, Fire Management in the United States* (2nd ed). New York: Wiley.

- Radoglou, K. (2001). Αποτελεσματικότητα της Φυσικής αναγέννησης στην αποκατάσταση Μεσογειακών πεύκων

μετά από πυρκαγιά [Effectiveness of natural regeneration in the restora-tion of Mediterranean Pine ecosystems after fire]. *Proceedings of a Scientific Two-Day Confer-ence Restoration of burned areas*. General Secretariat for Civil Protection Athens. <http://www.env.upatras.gr/files/announcements/a4.pdf>

- Robinson, L., Smith, M. & Segal, J. 2020. Emotional and Psychological Trauma. <https://www.helpguide.org/articles/ptsd-trauma/coping-with-emotional-and-psychological-trauma.htm>

- Stigsdotter, U.A. & Grahn, P. (2002). What Makes a Garden a Healing Garden?. *Journal of Thera-peutic Horticulture*, 13, 60-69.

- Tanović, S. (2019). *Designing Memory: The Architecture of Commemoration in Europe, 1914 to the Present*. (1st ed.) Cambridge University Press.

- Taheri, S., Shabani, A., & Sichani, M.G. (2019). The Role of Therapeutic Landscape in Improving Mental Health of People with PTSD. *Psychological Trauma, Ana Starcevic*. IntechOpen. 10.5772/intechopen.86543.

- Tsagari, K., Karetsos, G., & Proutsos, N. (2011). Δασικές πυρκαγιές Ελλάδας, 1983-2008 [Forest fires in Greece, 1983-2008]. WWF Hellas and ETHIAGE-IMDO & TDP.

- Tumarkin, M. (2005). *Traumascapes: The Power and Fate of Places Transformed by Tragedy*. Victo-ria: Melbourne University Press.

- Vallejo, R., Arianoutsou, M., & Moreira, F. (2006). *Fire Ecology and Post-Fire*

Restoration

- Vale, L.J. & Campanella, T.J. (2005). *How Modern Cities Recover from Disaster*. Oxford University Press. <http://ebookcentral.proquest.com/lib/delft/detail.action?docID=273182>

Internet Sources

- Urban reforestation. (2021, March 28). In Wikipedia. https://en.wikipedia.org/wiki/Urban_reforestation

- Forest Service U.S. Department of Agriculture. (2020). Fire Adapted Communities. <https://www.fs.usda.gov/managing-land/fire/fac>

- Pyrophobia. (2021, January 19). In Wikipedia. <https://en.wikipedia.org/wiki/Pyrophobia>

- Restoration ecology. (2021, May 6). In Wikipedia. https://en.wikipedia.org/wiki/Restoration_ecology

- Health Resources & Services Administration. (2021). Defining Rural Population. <https://www.hrsa.gov/rural-health/about-us/definition/index.html>

- Fire. (2020, December 18). In Wikipedia. <https://en.wikipedia.org/wiki/Fire>

- Department of Forests. (2014). Forest Fire Management. Retrieved December 12, 2020, from http://www.moa.gov.cy/moa/fd/fd.nsf/fd51_gr/fd51_gr?OpenDocument

- iefimerida. (2019, July 22). Το Μάτι ένα χρόνο μετά: Το οικόπεδο της φρίκης, οι παραλίες, τα καμένα, όπως είναι σήμερα [εικόνες] [The Eye a year later: The plot of horror, the beaches, the burned, as it is today [images]. NEWSROOM IEFIMERIDA. GR. <https://www.iefimerida.gr/ellada/mati-enas-hronos-meta-eikones>. Moreover, testimonials from the interviews I took were used.

- Raptis, C. (2020, July 23). Μάτι 2 χρόνια μετά: Συγκλονιστικό οδοιπορικό του in.gr – Τι λένε σήμερα οι κάτοικοι [Mati 2 years later: Shocking journey of in.gr - What the residents say today]. In.gr. <https://www.in.gr/2020/07/23/greece/mati-2-xronia-meta-sygklonistiko-odoiporiko-tou-gr-ti-lene-simera-oi-katoikoi/>

- Leonard, J. (2020, June 3). What is trauma? What to know. Medical News Today. <https://www.medicalnewstoday.com/articles/trauma>

- Frontline Wildfire Defense System. (2020). Coping with Emotional Trauma after Fire, left Untreated, Trauma of Wildfire Can Lead to PTSD. <https://www.frontlinewildfire.com/surviving-the-trauma-wildfires-emotional-toll/>

- Stern, J. (2020, July 20). A Mental-Health Crisis Is Burning Across the American West, each fire sea-season can compound the trauma of the one before it. The Atlantic. <https://www.theatlantic.com/health/archive/2020/07/mental-health-aftermath-california-wildfires/608656/>

- Doulgkeri, F. (2020, July 23). Greeks haunted by Mati fire tragedy, two years on. Euronews. <https://www.euronews.com/2020/07/23/greeks-haunted-by-mati-fire-tragedy-two-years-on>

- Fritscher, L. (2020, January 30). Understanding Pyrophobia or the Fear of Fire. Verywellmind. <https://www.verywellmind.com/what-is-the-fear-of-fire-2671887>

- Secondary succession. (2019, August 2). In Britannica. <https://www.britannica.com/science/secondary-succession>

- Iefimerida. (2018). Εκατόμβη: Μαρτυρίες και ιστορίες που συγκλόνισαν από τη φονική πυρκαγιά στο Μάτι [Ekatombi: Testimonies and shocking stories by the deadly fire in Mati]. <https://www.iefimerida.gr/news/433036/ekatomvi-martyries-kai-istories-poy-sygklonisan-apo-ti-foniki-pyrkagia-sto-mati>

- Nikola, A. (2019). Testimonies from the fire in Mati: ‘My wife suffered a heart attack, I hugged her at sea for 5.5 hours’. Newsbeast. <https://www.newsbeast.gr/greece/arthro/5185416/anatrichiastikes-martyries-apo-ti-fotia-sto-mati-i-gynaika-moy-epathe-emfragma-tin-eicha-agkalia-sti-thalassa-5-5-ores>

- Green. (2020, May 6). Heide Museum of Modern Art reveals design details for new Healing Garden. <https://greenmagazine.com.au/heide-museum-of-modern-art-reveals-design-details-for-new-healing-garden/>

- Seladi-Schulman, J. (2019, July 25). Pyrophobia: Understanding the Fear of Fire. Healthline. <https://www.healthline.com/health/anxiety/pyrophobia>

- Resilience. 2021, April 22). In Cambridge Dictionary. <https://dictionary.cambridge.org/dictionary/english/resilience>

- Πυροσβεστικό Σώμα Ελλάδας [Greek Fire Brigade]. (2021, April 22). <https://tulib.tudelft.nl/apa/>

Figure Sources

All figures, photos, diagrams, drawings, schemes, etc. with the remark | in front of the title/explanation are by the author.

1. Agriniotimes. (2018). <http://www.agriniotimes.gr/fotia-mati-ixeran-nekrous-2133-vinteo-ntokoumento/> and Agriniopress. (2018). <https://www.agriniopress.gr/soroi-paidika-pantoflakia-paichnidia-kai-apoka-dia-sokaristikes-eikones-kai-martyries-sti-rafina/>

2. Tsagari, K., Karetso, G., & Proutsos, N. (2011). Δασικές πυρκαγιές Ελλάδας, 1983-2008 [Forest fires in Greece, 1983-2008]. WWF Hellas and ETHIAGE-IMDO & TDP. p. 35, 40

3. In.gr. (2019). <https://www.in.gr/2019/03/06/greece/mati-idou-pos-gkremistikan-ta-fake-news-tis-kyvernisis-gia-tin-tragodia/>

4. Various internet sources from online articles and google images. <https://www.protothema.gr/greece/article/1034425/vlepame-ton-kapno-sto-daou-otan-piname-kafe-me-ton-dioikiti/>. <https://www.protothema.gr/greece/article/1029184/mati-to-gramma-enos-12hronou-paidiou-pou-kolubouse-gia-shedon-5-ores-parea-me-ton-thanato/>. <https://www.protothema.gr/greece/article/1028153/mati-proedros-axkon-purosvestikis-eimai-exorgismenos-den-boro-na-dianoitho-auton-ton-dialogo/>. <https://www.lifo.gr/now/greece/apokalypseis-gia-ti-fotia-sto-mati-haos-kai-syghysi-sta-prota-lepta-tis-pyrkagias>

5. Figures 1-4: Agriniotimes. (2018). <http://www.agriniotimes.gr/fotia-mati-ixeran-nekrous-2133-vinteo-ntokoumento/> and Agriniopress. (2018). <https://www.agriniopress.gr/soroi-paidika-pantoflakia-paichnidia-kai-apoka-dia-sokaristikes-eikones-kai-martyries-sti-rafina/>. Figures 5-6: Author. Figure 7: Medium.com. (2017). <https://medium.com/planet-os/analyzing-the-air-pollution-spike-caused-by-the-thomas-fire-3830a1aa60df>

6. Google maps (street view). Mati area

7. Google Earth. 30.05.2019

8. Lizardou. A. (2019). Rural_rurban_urban | The urbanization of the countryside [Master’s thesis, University of Crete, Department of Architecture Engineering]. Google maps. https://www.google.com/maps?q=%CE%B1%CF%84%CE%B9&rlz=1C1CHBD_enNL862NL862&um=1&ie=UTF-8&sa=X&ved=2ahUKEwipNLfzKvxAhUQcBQKHfuRA_0Q_AUoAnoECAEQBA. <https://www.patrasevents.gr/article/360177-to-mati-attikis-prin-kaei-olosxeros-mia-kataprasini-perioxi-pou-den-iparxei-pia-video>

9. Various sources including: Burton Holmes, published 1901, book title The Burton Holmes Lectures (Volume 3): With Illustrations from Photographs by the Author, page 69, Lizardou. A. (2019). Rural_rurban_urban | The urbanization of the countryside [Master’s thesis, University of Crete, Department of Architecture Engineering], personal archive of Lizardou Anastasia, Facebook page ‘MATI ΦΩΤΟΓΡΑΦΙΕΣ-Mati Photos’.

10. Various sources including: Photo by Author, <http://www.agriniotimes.gr/fotia-mati-ixeran-nekrous-2133-vinteo-ntokoumento/>, <https://www.in.gr/2020/07/23/greece/mati-syzygos-tou-dimarxou-rafinas-perigrafei-tis-dramatikes-stigmes-pou-ezise-sti-fotia/>

11-12-13. Google Earth. 2021, 2018, 2017

14. Google maps (street view). Mati area

15. Blassi. J. (1994). Passages, Homage to Walter Benjamin [Photograph]. <https://jeannebucherjaeger.com/20th-anniversary-of-the-passages-memorial-to-walter-benjamin-by-dani-karavan/>

16. bioLINIA and Paul Murdoch Architects. (2001). Flight 93 National Memorial. <https://www.britannica.com/place/Flight-93-National-Memorial>

17. ArchitectureAU Editorial. (2020). Healing Garden at Heide Museum of Modern Art. <https://landscapeaustralia.com/articles/heide-garden-1/>

18. Google images

19. Sequeira. A & Gonçalves. J. (2019). Wildfires – An Architectural Intervention of Resilience. <https://tristotrojka.org/wildfires-an-architectural-intervention-of-resilience/>

20. Kathleen. L. (2018). Reconfiguring the burnt scar: a landscape architectural response to the Knysna fires of June 2017. <https://open.uct.ac.za/handle/11427/27985>

21. Stoof. C. (2011). Fire effects on soil and hydrology [Master’s thesis, Wageningen University]. p.6

22. Protothema. (2020). <https://www.protothema.gr/greece/article/1029342/dakrua-gia-to-mati-mnimeio-gia-ta-102-thumata-tis-fonikis-purkagias-epimnimosuni-dei-si-sto-limanaki/>

23. Ancient Theater of Delphi, Delphi, Greece. <https://onparnassos.gr/el/places/arxaio-theatro-delfon>

24-25. Tomb of Marathon, Marathon, Greece. <https://www.welovemarathon.gr/post/tumvos-tou-marathona>

26. Ancient vaulted tomb, Messinia, Greece. <https://translate.google.com/?sl=el&tl=en&text=%CE%9C%CE%B5%CF%83%CF%83%CE%B7%CE%BD%CE%AF%CE%B1&op=translate>

27. Asclepion of Kos, Kos, Greece. <https://www.discovergreece.com/el/experiences/feel-healing-energy-asclepion-kos>

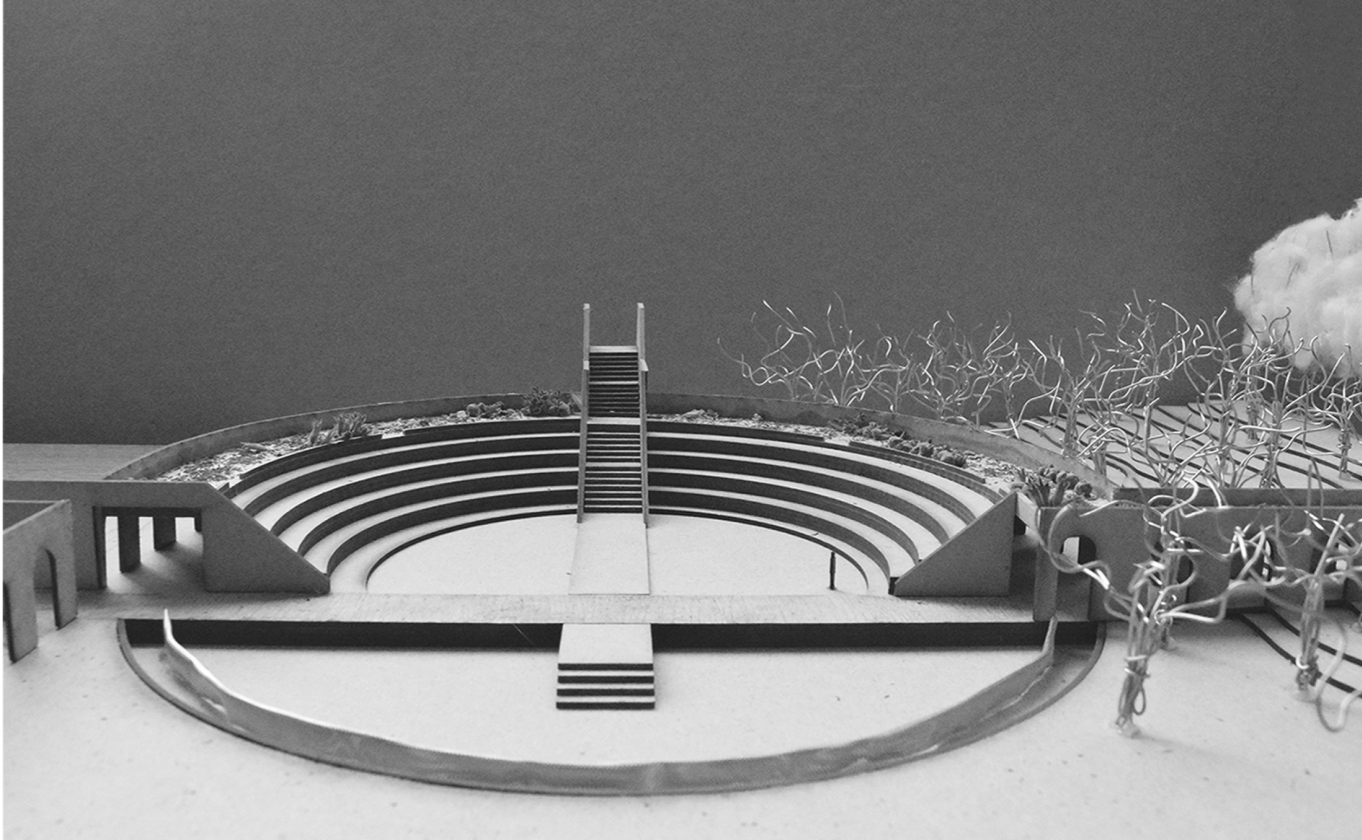
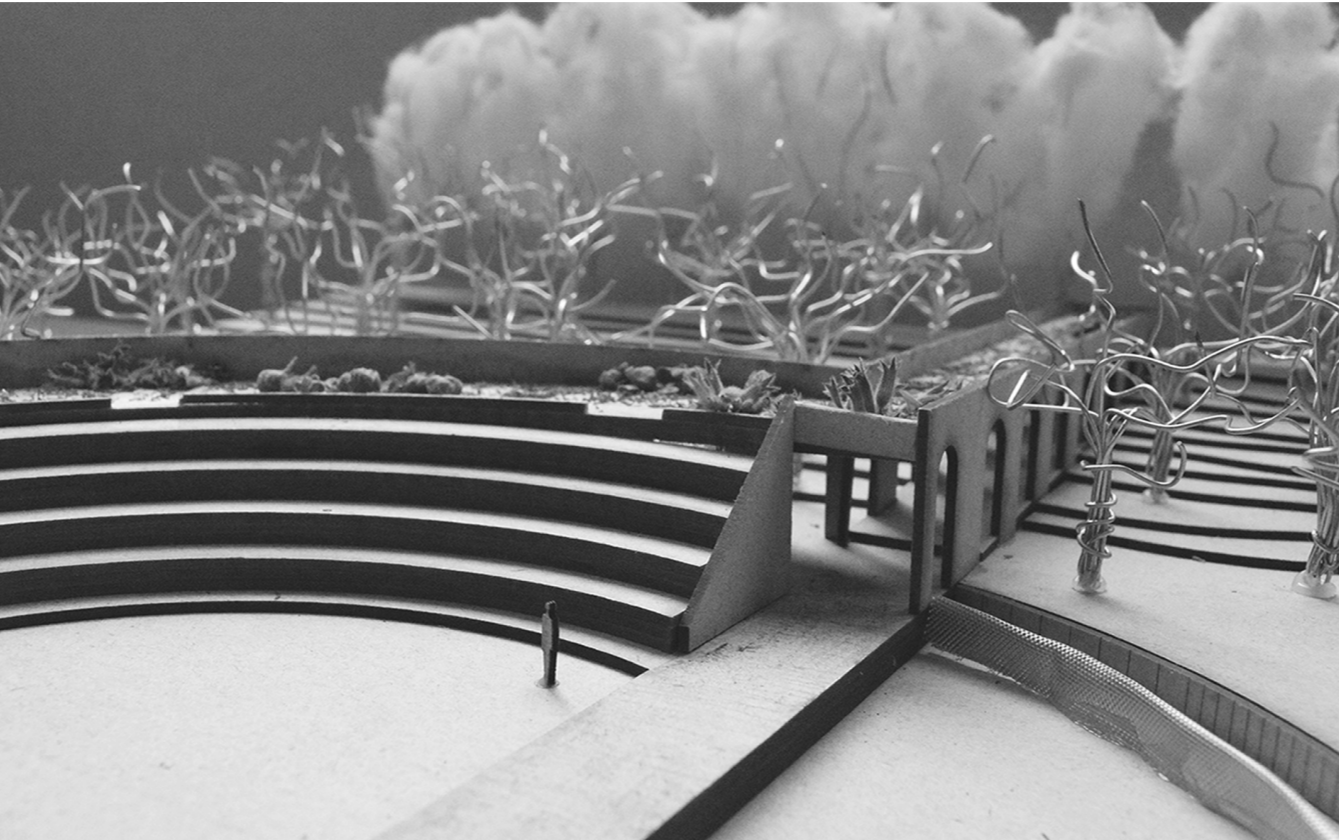
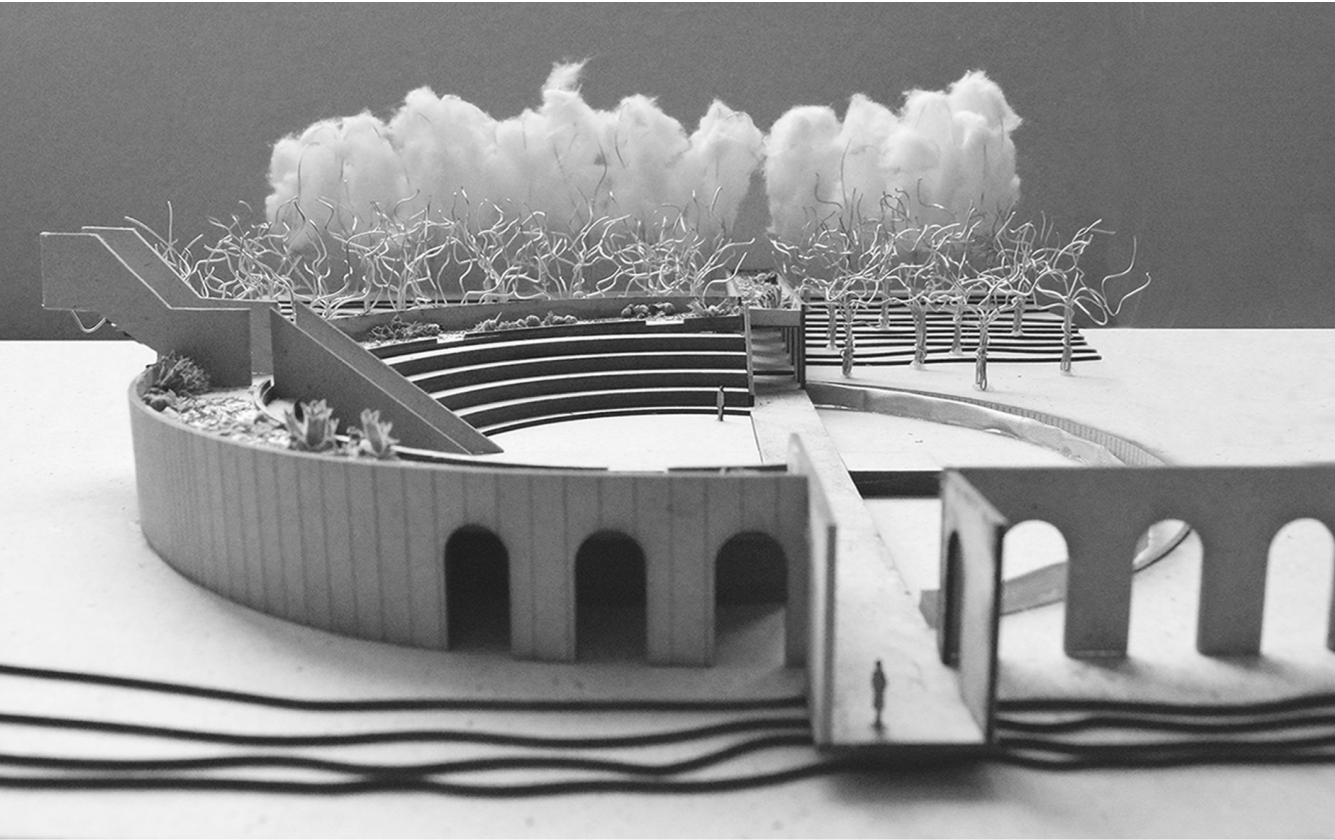
28. Exposed mass timber fire test. https://twitter.com/eth_timber/status/927993889180540929

29. Kasos hiking trail. (2020). <https://www.pathsofgreece.gr/en/odoiporiko-stin-kaso/>

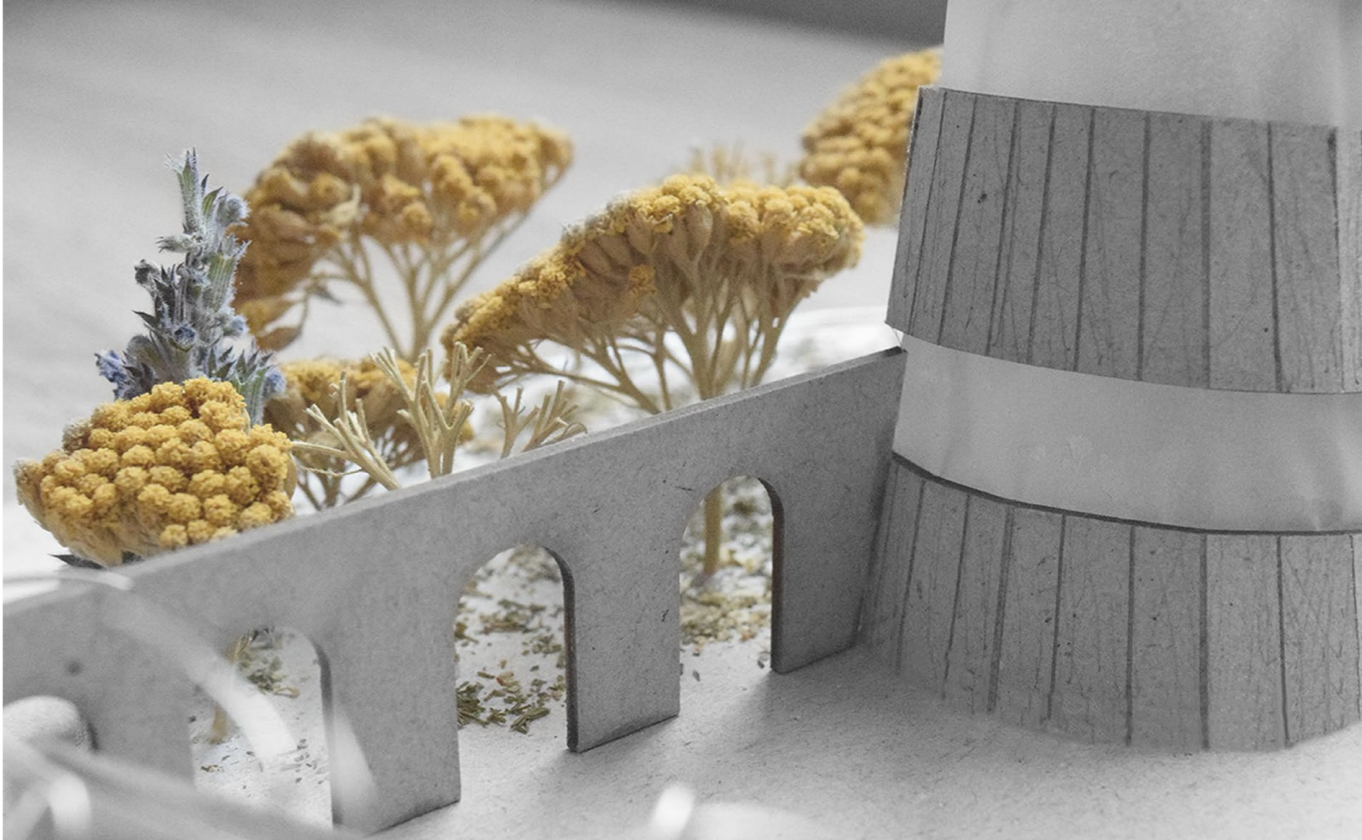
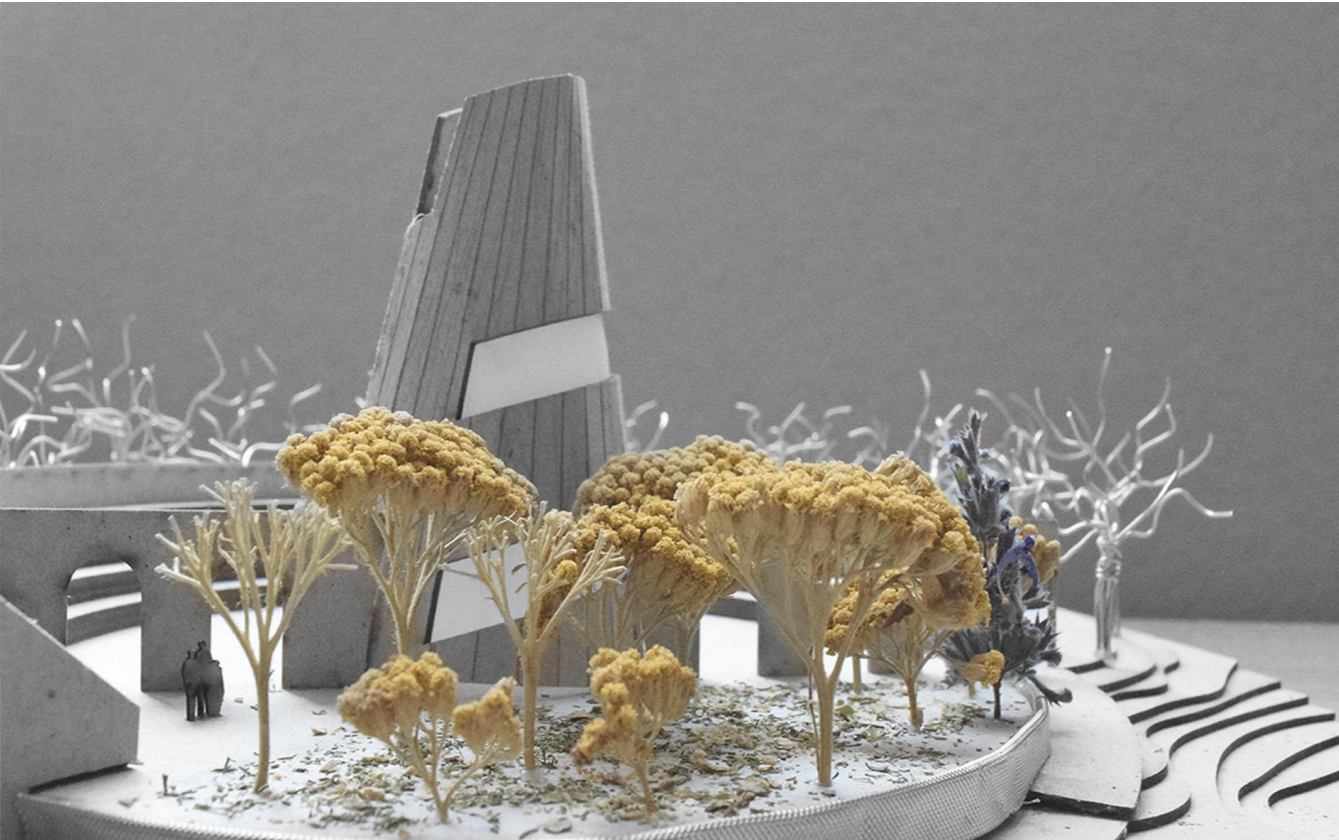
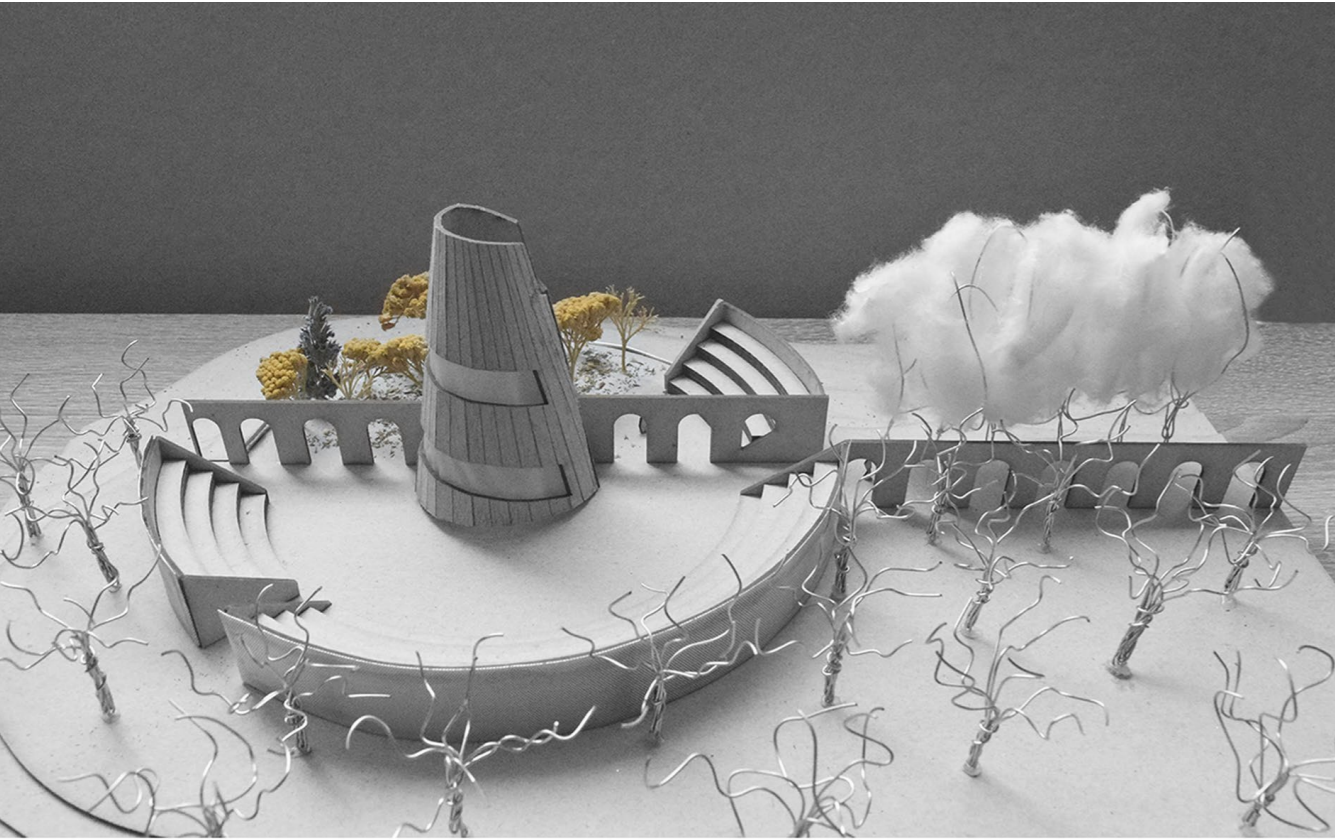
30. Sohlbergplassen Viewpoint, by Carl-Viggo Holmebakk. (2013). <https://www.shft.com/reading/sohlbergplassen-viewpoint-by-carl-viggo-holmebakk>

Appendix

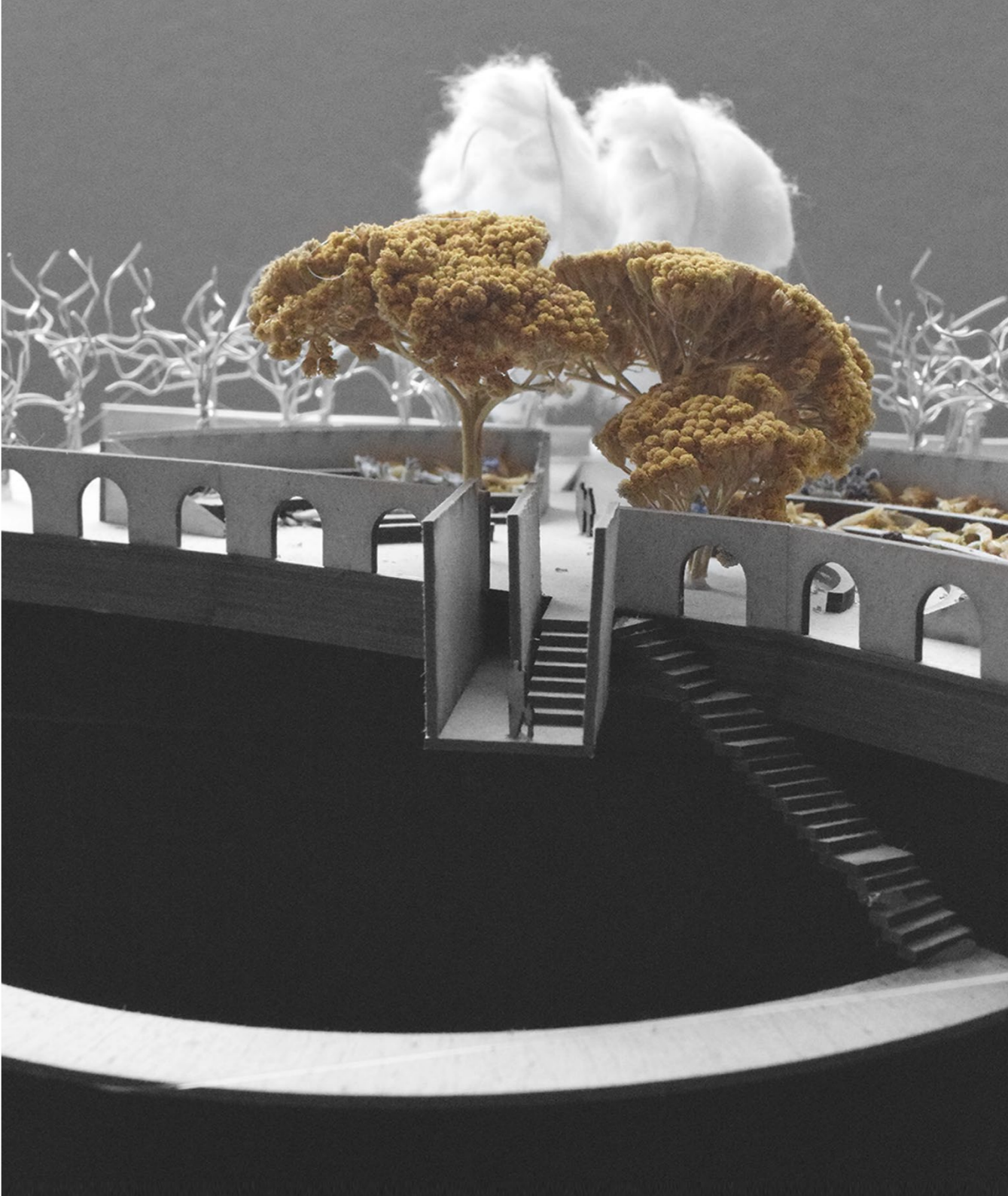
| Eye 0.1_Model 1:200



| Eye 0.2_Model 1:200



| Eye 0.3_Model 1:200





Graduation Thesis Report

June 2021