

**ERF 217, CAPE TOWN
WALLACE HONIBALL
MLA 2014**

ABSTRACT:

Laugier's *Primitive Hut* from 1755 depicts reason as a muse enthroned upon the ruins of the classical orders, pointing towards nature as a way forward. Similarly, in 1841 Joseph Paxton designed a glass conservatory at Chatsworth for the tropical *Victoria regia* water lily which literally referenced the lily pad veins as structural system. This preoccupation with nature as a design generator continues in the 20th century with digital tools that derive architectural form using biomimicry, in the work of R & Sie. All these projects are based on a dialectic relationship between architecture and nature, where the particular model of nature is translated into form.

This relationship in landscape architecture is discussed through the idea of the biomorphic. Applied as a guiding principle to investigate vegetation and plant form in the 17th Century *Company's Gardens* arguing that the generation of the biomorphic can be adjusted to serve as a mechanism to understand plant form in terms of effect.



Fig. 1: illustration of the Victoria regia lily pad.

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INTRODUCTION:

Stemming from the question of the role nature plays in the way we construct our environments this paper uses nature as a mechanism to explore the relationship between architectural and landscape form. This comparison raises the concerns that both disciplines exist as a dialectic, an aspect addressed in the paper as either a process of evolution or as a product of reproduction.

Three discussions are structured around plant form and biomimicry that facilitate discussions on;

- The biomorphic as other – a discussion on the biomorphic and *systemic mimesis*, an analogy that appropriates a different meaning for the term.
- The *Company's Garden* – as a study that investigates the historiography of the garden through form.
- Forming Nature – A discussion on plant form and the implication of working with vegetation as a potential building material.

The paper will conclude with a reflection on the potential inherent in vegetation as a system of cause and effect. Research and findings of this document were used as base data to inform a development proposal for the Company's Garden site under the notion of a *tree'd* site.

THE BIOMORPHIC AS OTHER:

“For those with no eye for geomorphology and those who view nature as chaos and disorder, the invention of this project is invisible”

– E. Meyer on the meaning of landscape (Meyer, 1994:26).

Derived from the Greek work βίος (bios), life, and μίμησις (mimesis) biomimicry was coined in the 1950's by Otto Schmitt and is used to describe the process of analogy between ideas in technology and biology in our current etymological vocabulary (Marshall & Lozeva 2009). The biomorphic as a variation of the term biomimicry from *mimesis* meaning to copy, has its paternal origins in philosophy and thinking (since the time of Plato and Aristotle) concerning imitation and representation of nature (Gebauer, 1995).

Similarly the discipline of architecture has been pre-occupied with the reproduction of nature. One of the earliest examples is found in Vitruvius' treatise *De Architectura* (Book II, chapter 1) where architecture's origin is offered to have derived from myth as illustrated in the 1753 etch *Essai Sur l'architecture* by Marc-Antoine Laugier (Forty, 2000). From the earliest ideas to our contemporary interpretation of this notion a relationship exists between the biomorphic and built form that has seen many variations in the way it has been translated. Sir Joseph Paxton's 1841 glass house at Chatsworth is a project that embodies a direct/literal relationship where plant form is used by Paxton to translate the *Victoria regia* lily pad leaf into a cast iron and glass conservatory (Chadwick, 1961). The work of François Roche in R&Sie

is a contemporary example that employs a less literal reference to the relationship, illustrated in Roche's 2008 project "*i'mlostinparis*" where the project's response is described under general responsiveness as using the architectural object as an adaptable structure that can respond, act and react to nature (Aaron & Leblanc, 2013).

In both the case of Paxton and Roche there is a dialectic that exists either as a process of evolution or as a product of reproduction. Either case determined through the way the mode of nature is brought about. Elisabeth Meyer addresses this dialectic in her analogy to the *Cyborg* in her discussion on Landscape architecture as modern other and postmodern ground (Meyer, 1994). In her discussion on the relationship between the man-made and natural, Meyer's view distorts the archaic notion that there should be a distinction between the living world of man and plants with a communal/shared outlook where both exist as equal. The example of Olmsted's Emerald Necklace is used as a project to explain this idea as where she explains the project as a 19th century land management system. The *Cyborg* analogy applied to the scheme translates as a dialogue between engineering and landscape conditions that coexisting as a dynamic between a machine and organism (Meyer, 1994).

In her approach Meyer's analysis of Olmsted's project is discussed as a system where the interests move beyond the representational qualities towards its processes. The propositional notion of this *systemic* analysis is used in combination with *mimesis* (concerned with representation of nature) as *systemic mimesis*.

THE COMPANY'S GARDEN:

Following from the discussion on the dialectic that investigated the work of Paxton and Roche and the biomorphic under the idea of *systemic mimesis*, the study will apply these findings to the case of the *Company's Garden*. The dilemma that befalls most archaeological studies occurs in proving its provenance, an idea linked to authentication. Field research was undertaken as a parallel exercise to the study (extracts of which appear as appendices) in an attempt to combat this. A timeline based discussion of the findings will investigate plant form based on quantitative and qualitative data.

Erf 217 is the site one of the South Africa's oldest gardens, with a history that dates back to more than 350 years, the *Company's Gardens* has undergone various transformations and ownerships over its lifespan. The data used in the analysis is taken from two primary sources and mapping exercises; an archival analysis that was completed by Gwen Fagan in 1989 for the City of Cape Town, doctoral research conducted by Ron Van Oers on colonial Dutch settlements in 2005 and several field research mappings (mapping of the historiography, existing tree canopy size, - tree form, - tree age, - oak species mapping, character mapping and type analysis of the trees).

The first four phases of the *Company's Garden* functioned as a productive/agriculture landscape that was designed in 1652 by Jan van Riebeeck and Hendrik Boom during the Dutch colonial expansion c. 1600-1800 at the Cape (Fagan, 1989). The garden forms part of the greater Dutch East India - (VOC) and Dutch West India Companies (WIC) where expansion occurred through the development and

annexation of new centres of commerce developed as trading posts for the Dutch empire. Table Bay was identified as a strategic trading post location and halfway sea link between Asia and the West for ships to stop and restock freshwater and food supplies (Oers, 2000).

Located alongside the first fortification, the *Fort de Goede Hoop* the garden location was positioned on *Roggebaai strand* (now known as Table Bay harbour) on grounds of proximity to a freshwater source (the *Versche River*) and for its position as secure military base. The embryonic garden introduced civil engineering and water management principles to drain waterlogged areas and to provide irrigation through the channelization of rivers. Form in the first and second mutations of the garden occurred during the time of the *Fort de Goede Hoop* (1652-1674), has been described by Gwen Fagan as a four square “garden of necessity” that was rapidly and continually improved upon in the first years of colonial occupation at the Cape (Fagan, 1989).

The third and fourth mutations of the garden occurred alongside the establishment of the *Kasteel de Goede Hoop* (1666 -1679) that replaced the temporary fort as military base. The garden form that experienced a rapid expansion gradually began to slow down as settlements started to become more permanent. This in combination with the emerging *freeburger* agricultural system significantly impacted on the production demand of the garden as the primary source of food supplies to ships passing through the harbour.

Remnants of the first four mutations during the VOC history still exist in garden, the most noticeable is a small 15m portion of the old water furrow in front of the *De Tuynhuys* (Garden House), the location (the City of Cape Town developed around the old garden) and the central avenue in the middle of the garden (Oers, 2000 and Fagan, 1989). Mapping indicated that individual specimens (a Saffraan Pear, *Pyrus communis* and a black mulberry tree, *Morus nigra*) survive in the garden during from the time of the VOC. Fagan’s analysis indicates that two planting strategies still survived as part of the garden, the first is the avenue planting where citrus/ productive trees were planted along main circulation routes and the second element being *Brabejum stellatifolium*, also known as van ‘Riebeeck’s hedge tree’ that made use of located vegetation that was planted as a hedgerow/barrier to keep people out of the garden.

The fifth mutation occurred during the time of Governor Van Der Stel(1679-1753) where the garden was transformed into a series of formal parterres and the adopted function of a botanical garden. Ordered around two main traversing axis’, from East to West in relation to *De Tuynhuys* and North to South that followed the water direction between the mountain and the ocean. The landscape functioned as a garden of curiosities for plants up until the end of the Dutch rule at the Cape when the British annexed the Cape on 11 June 1795.

Form and the layout made use of rectangular garden parterre that was ordered around tree lined pathways. Although most of the layout from the garden during the time of Van Der Stel’s has been lost, with the exception of a restoration project that was made in the 1990’s by Fagan Architects in front of *De Tuynhuys*, which re-introduced four parterres in front of the building. Two important aspects that still endure from this period of the garden’s history are the relationship between public and private.

Until this time access to the garden was reserved for the governor's private use and the newly introduced function of botany where plants were displayed as curiosities in the garden (Fagan, 1989).

The sixth mutation of the estate occurred under British rule that saw the major internal restructuring and the opening of the Government avenue axis as a public thoroughfare. The restructuring created two new areas in the garden, known as the 'paddocks' on the mountain side of the garden and the 'the public garden' towards the ocean facing portion of the estate. Changes made to the avenue allowed the people the ability to stroll and promenade in the garden as a public open space in the newly formed paddocks while the public garden introduced gardenesque elements of border style planting around winding/serpentine pathways (Fagan, 1989).

During the sixth mutation, the garden lost significant portions of its original size to buildings that began to encroach in the garden. Mostly, all of the trees planted in the garden that is visible today derive its position and placement from this time onwards. Field research confirms this idea as in the prominent oak lined Government Avenue that was planted by the English as shade trees and rare and exotic plant specimens. These still survive and were collected both locally and across the British Empire.

From the sixth mutation onwards, numerous small scale interventions followed that occurred and influenced the site structure. Of these interventions, two are significant to mention. The first change was made during the Delville Wood war memorial that was designed by Herbert Baker after South Africa became a Union on the 31 May 1910 and the second was the conservation management scheme that was completed by OVP in 1994 (Fagan, 1989).

The significance of the inquiry that followed out of the rigorous process of site mapping and historical cross referencing relates back to the question of plant form and the question of authentication or provenance. In using a model of cause and effect throughout the research the result is a dynamic model of thinking that ties back into the idea of *systemic mimesis*. Some of these aspects include but are not limited to:

- *Avenues in the garden that are marked with planting, a rhythm exists in the tree planting pattern either as either single alley, double alley or as ad-hock planting.*
- *The use of vegetation to mark boundaries in the gardens as edge.*
- *The garden as a laboratory or place where plants are grown for experimental purposes; a system that was initially used when plants were introduced as curiosities in the garden that continued as an idea in the time of the botanical garden.*
- *Access and the relationship between public and private defined as a system of boundaries (used in the garden as cast iron and low level brick walls). An idea that is extended to lawn and trees that were used as tools to make patterns that could accommodate promenading.*
- *Shadow and the effect of vegetation canopies it in the garden.*
- *Microclimate and the relationship between built form and plants a new dynamic that was introduced when buildings were allowed to encroach on the site.*

This model or algorithm assesses the current effect of plant form as overlapping patterns/systems that results out of the garden's history. The discernment that arises from the analysis does not address the model of representation with regards to nature (as expressed in the dialectic between Paxton and Roche). The last part of the discussion will address this aspect in relation to the analysis of plant form.

FORMING NATURE:

“Seeing a statue or building in a green landscape, we find it natural to speak of trees and plants as the setting for the artwork or the architecture. But a garden is not a landscape. In a garden, it is statues, gazebos, grottoes and temples that must serve as settings for the lives of the plants.”

– John Ferrari on *The Meaninglessness of Gardens* (Ferrari, 2010: 38).

To facilitate the discussion in defining nature as a dynamic system, forming nature investigates and references the work of Elisabeth Meyer’s, John Ferrari and Julian Raxworthy as theoretical support.

Plants and spatiality are used as the central theme in Elizabeth Meyer’s discussion on plant form in Dan Kiley’s Miller garden. This process assesses qualities and effects made by plants to illustrate that the project specifically sets out and makes use of nature as a dynamic system where plant form is used to make space. The detail of Kiley’s project is illustrated in his plant selection and placement pattern as a process of effects. Meyer’s analysis on vegetation reinforces the idea of a cause and effect model in working with plants as a design medium (Meyer, 2009). John Ferrari furthers this idea in his amorphous explanation of plants through the aspect of growth. In moving beyond nature as a dynamic system Ferrari argues that plants should become the informants of proposals that work with them as elements that the designer uses not only as living things but as alive and in a constant state of flux (Ferrari, 2010). Maintenance and horticulture aspects that are used to shape plants is a further support of this notion. Discussed by Julian Raxworthy under change, the case example of Sven-Ingvar Andersson’s Marnas garden is a garden produced through a process of ongoing maintenance and change where manipulation and agency of pruning harnesses the emergent qualities of vegetal growth to shape the form (Raxworthy, 2013).

CONCLUSION:

If one considers that the relationship between architecture and landscape architecture can be quantified to a question of man-made and natural, the analogy can be drawn to the theorem of *systemic mimesis*. A principle that is used as an experiment in the *Compay's Garden* to prove that the notion of systems and patterns (usually associated with the change) can be used to investigate the historiography of the site. This analysis also functions as a way to avoid the ingrained predicament, proving authenticity or provenance in considering form.

The question of the vegetation form on the site followed a rigorous process of analysis combined with historical cross referencing. This mode of thinking ties back to the idea of *systemic mimesis*, a dynamic model or algorithm that analysed plant form and historiography based on its significance as a system of effects. Some of the most significant aspects translated as a binary relationship of;

CAUSE : EFFECT

Land management systems : Geological and hydrological manipulation
Movement and order : Avenue hierarchies and rectilinear parterre gardens

Productive garden/halfway stop : Agricultural plants

Curiosities garden : Botanical plants

Marking of pathways : Avenue tree planting

Private garden : Hedgerow protective planting

Public garden : Open space and a decrease in biodiversity

Shade : Walkways to facilitate promenading

Internal restructuring : gardenesque walkways and border planting

Encroachment of buildings on the site : Variation in microclimate

Conservation management plan : Preservation anxiety of the existing

Preservation of old specimens in the botanical garden : Management of dying trees

Small and ad hoc site interventions : Increased confusion regarding provenance

These relationships relate back to the dialectic between Paxton and Roche that focused on plant form as an element subject to the process of change. The discernment that arises out of the analysis study on form is determined through the mode in which nature is represented.

In accepting that nature is dynamic and changing, the analogy can be translated to plants as building materials. The combinations of these ideas are explained under forming nature where a conclusion is drawn to plant growth and maintenance are the mechanisms through which dynamic system can be shaped as a system of cause and effect.

REFERENCE LIST:

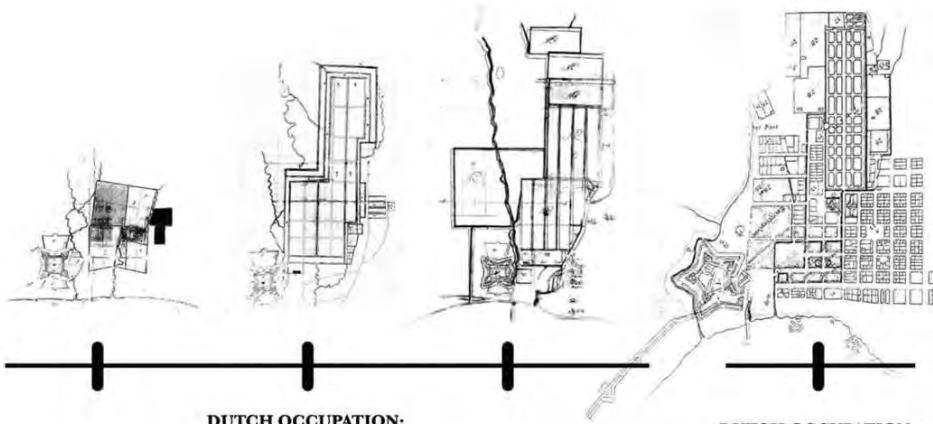
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LIST OF FIGURES:

Fig. 1: illustration of the Victoria regia lily pad.
Available at: <http://artsfuse.org/wp-content/uploads/2011/11/3-hooker-giant-waterlily-analyses.jpg>
[Accessed 03 August 2014]

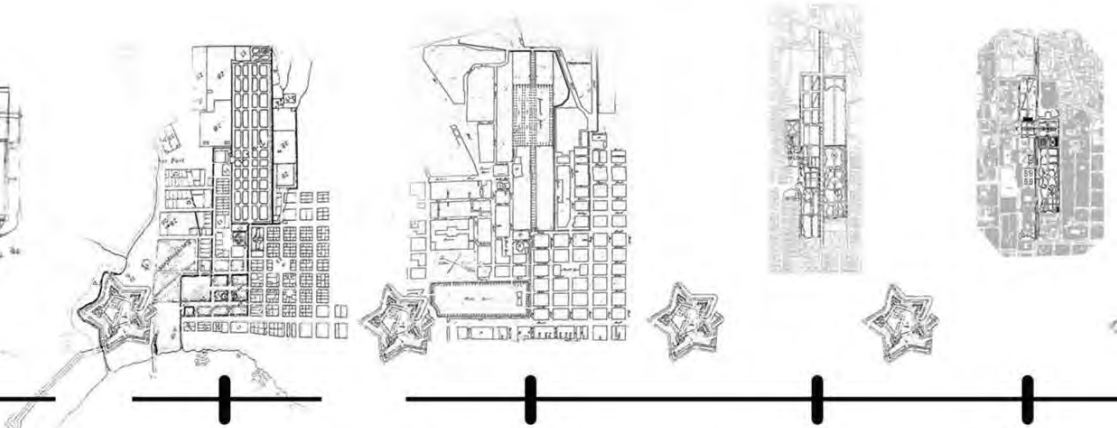
APPENDIX:

- *Timeline of the garden morphology illustrating the various types – pp. 9*
- *Map 1 – Site Plan, indicating aerial photo of the garden c. 2008 – pp. 10*
- *Map 2 – Tree canopy mapping 2014 – pp. 10*
- *Map 3 – Axonometric wedge map of the existing vegetation on site – pp. 11*
- *Map 4 – Axonometric wedge map of the vegetation types – pp.12*
- *Map 5 – Axonometric wedge map of the character type – pp. 13*
- *Map 6 – Tree map indicating age -. pp 14*
- *Map 7 – Tree map indicating the various species of oak – pp. 15*



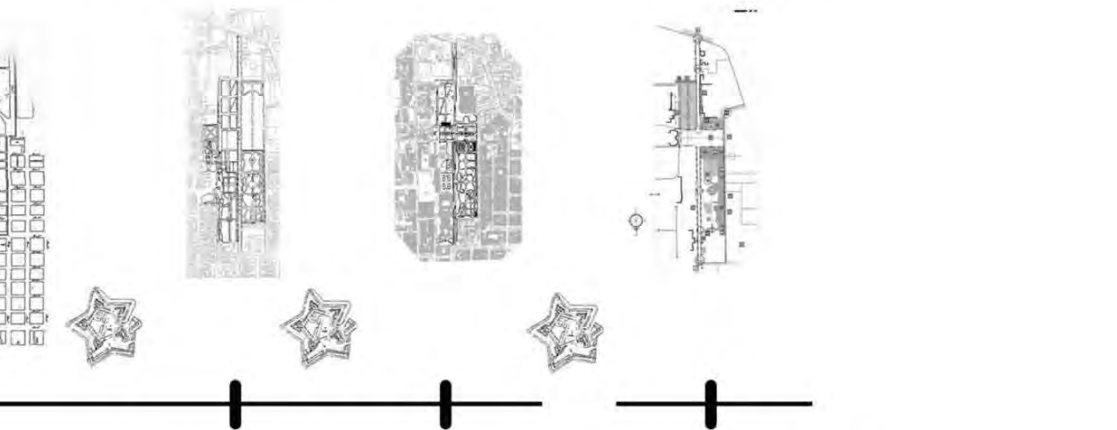
DUTCH OCCUPATION:
a) Fort de Goede Hoop) c.1652-1600

DUTCH OCCUPATION:
b) Kasteel de Goede Hoop c. 1600-17



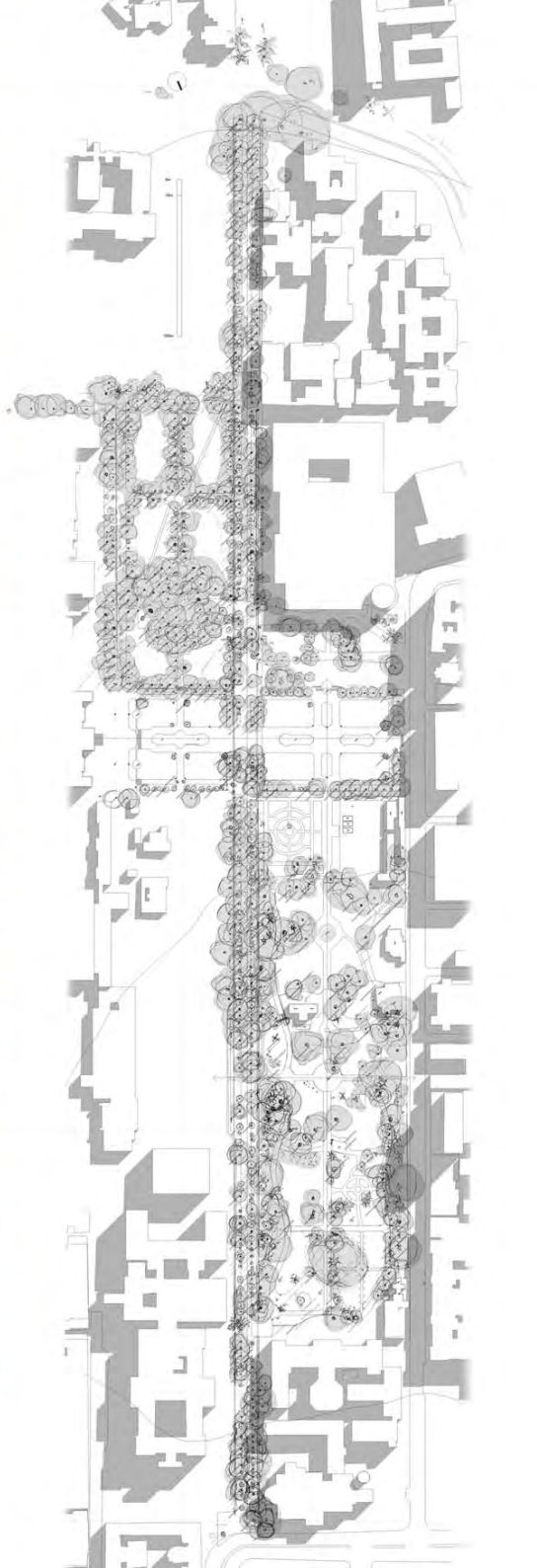
DUTCH OCCUPATION:
b) Kasteel de Goede Hoop c. 1600-1795

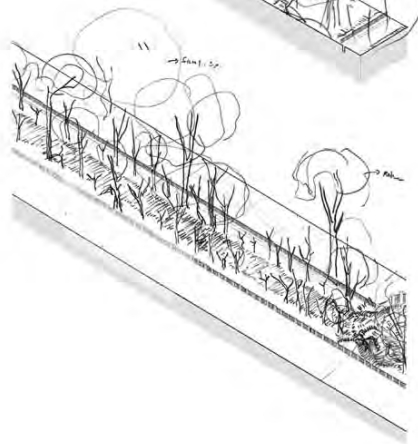
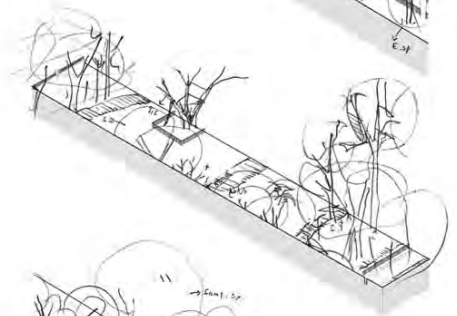
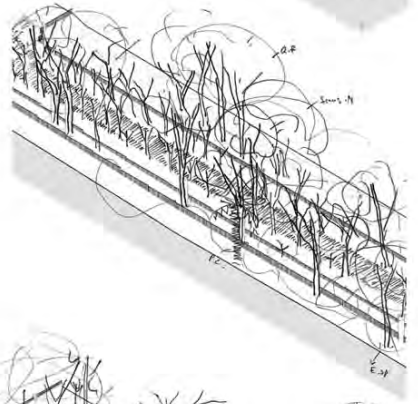
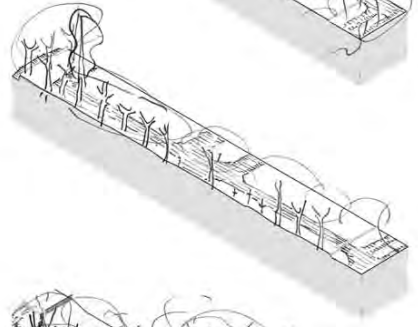
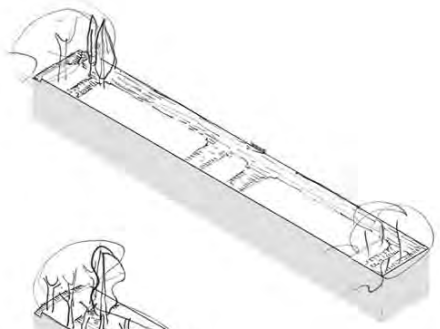
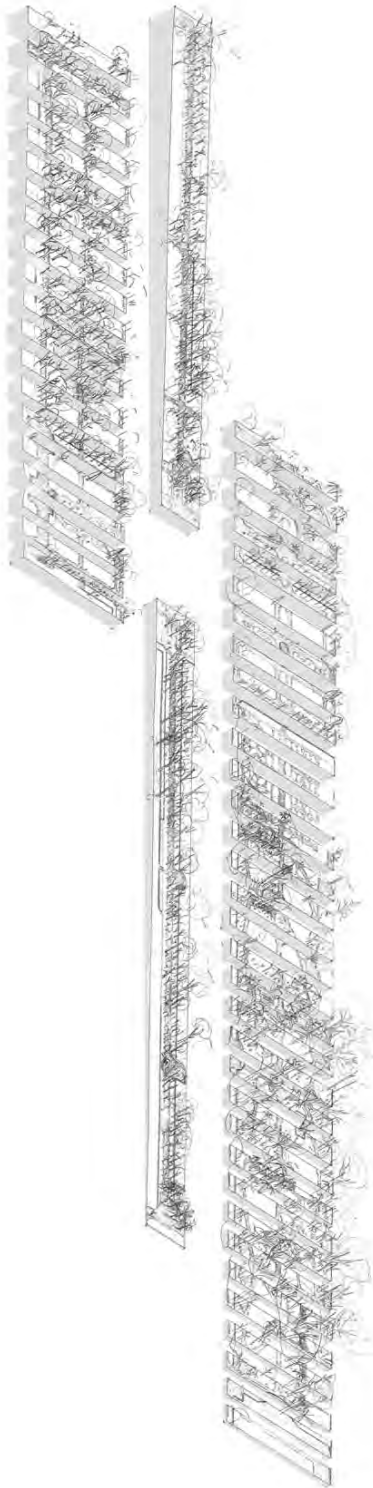
BRITISH OCCUPATION
C.1795-1909



BRITISH OCCUPATION
C.1795-1909

CONSERVATION MANAGEMENT
C.1994 –PRESENT





1

open

2

alley

3

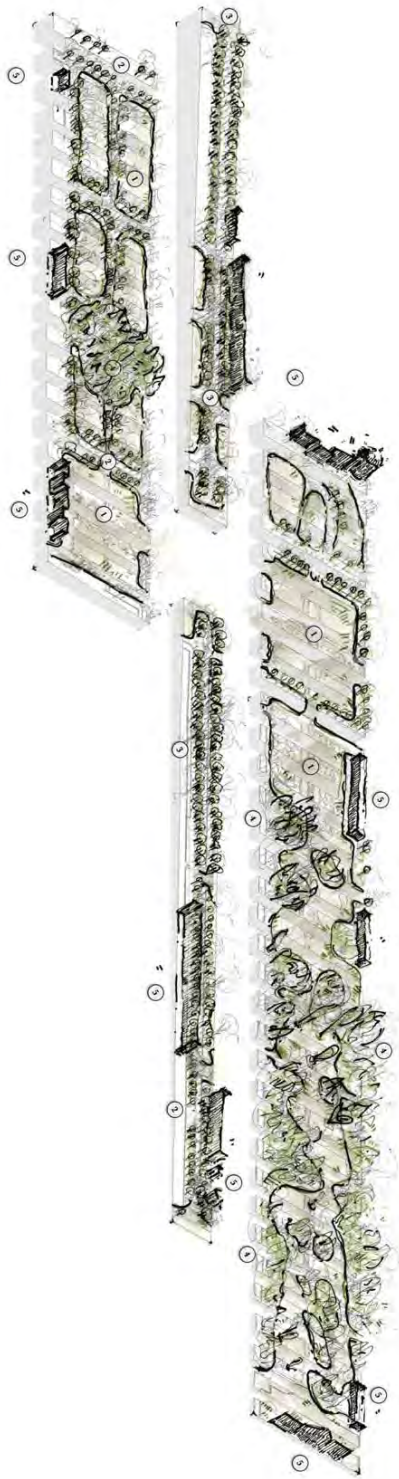
alley

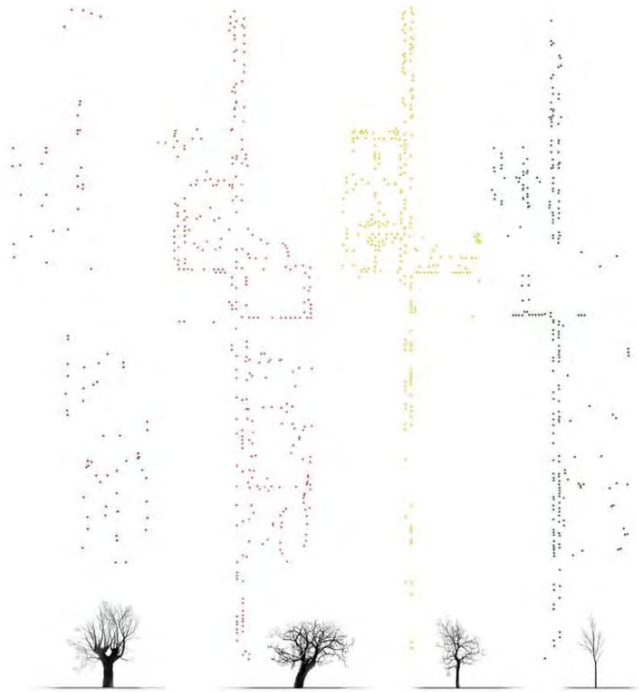
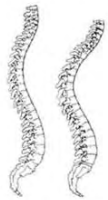
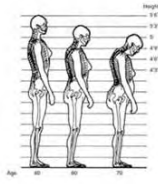
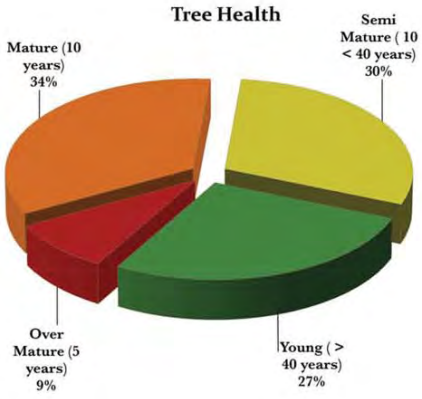
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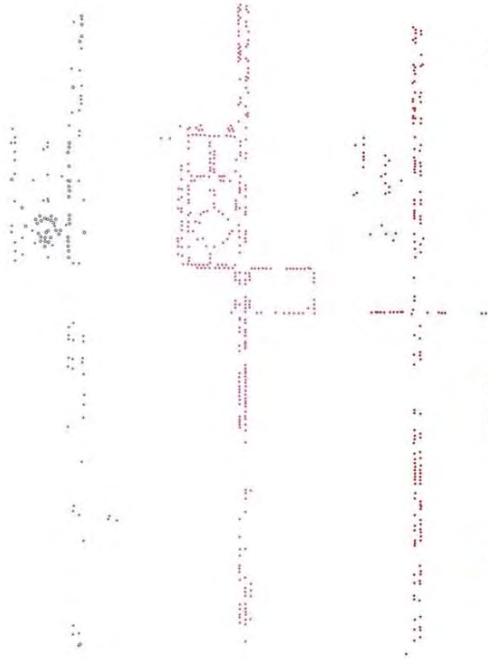
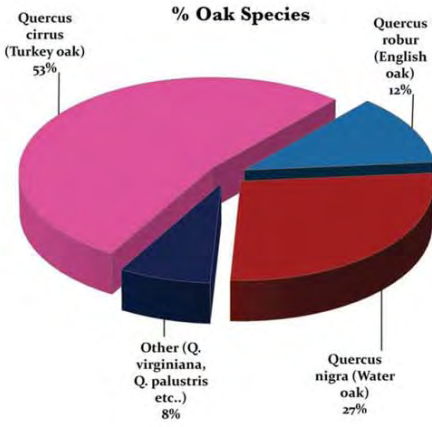
passage

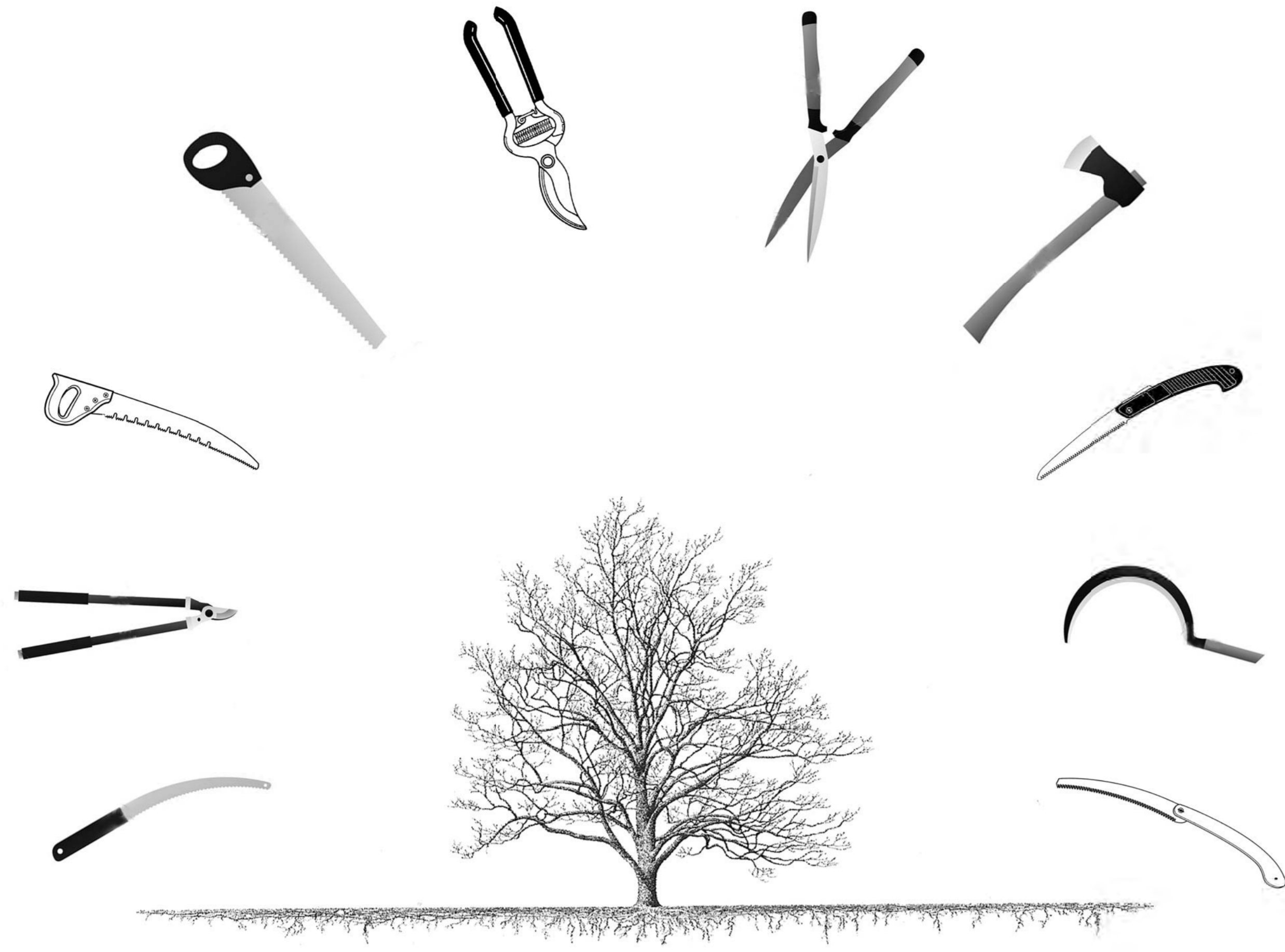
5

building









ERF 217: The Company's Garden

- TW Honiball -

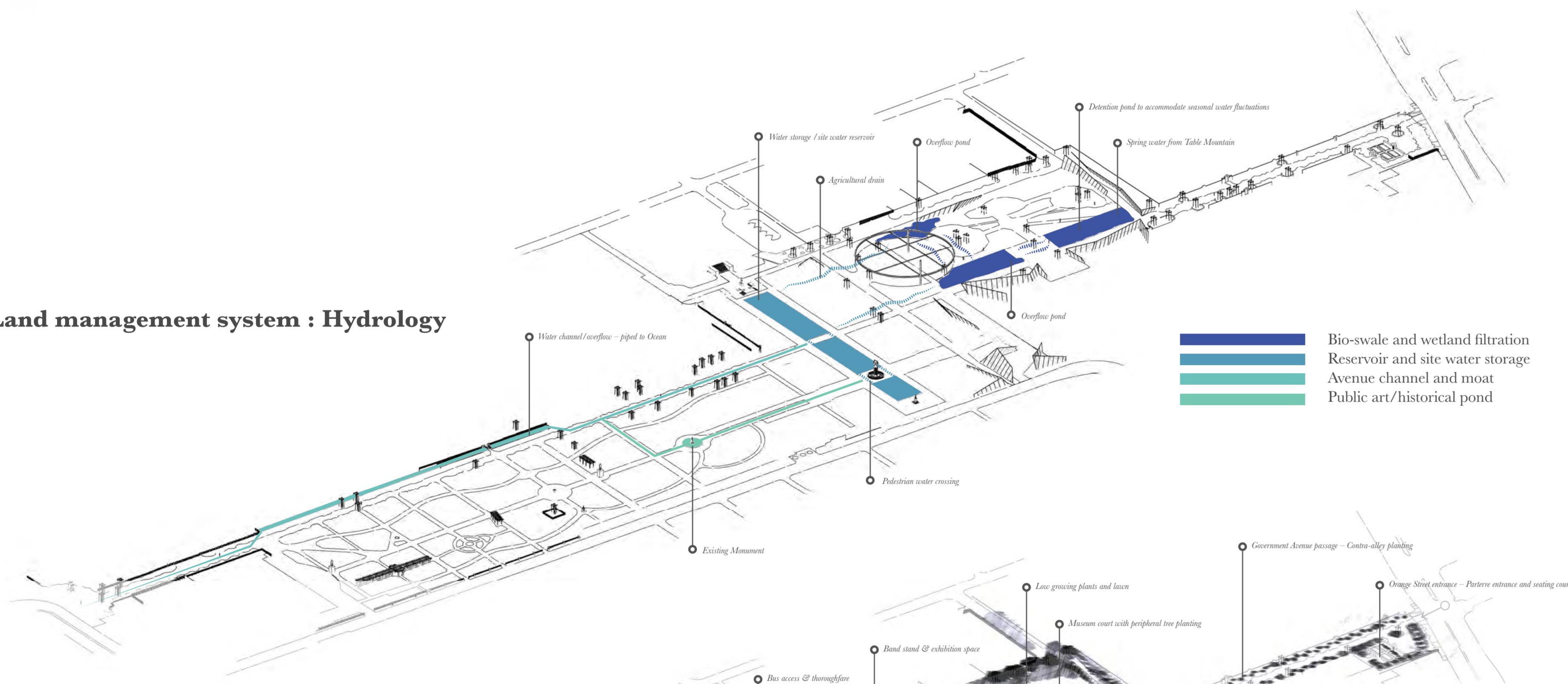
Erf 217 is the stand number for one of the South Africa's oldest gardens, with a history that dates back to more than 350 years it was chosen as a case study site to test the notion that space could be shaped architecturally by plants. The idea of shaping space with plants was explored by Elisabeth Meyer in her analysis of Landscape Modernism through the work of Dan Kiley. Extending this architectural model of tree use, this project rests on an analogy of the *tree's* site, where, like a building, the enclosure produces shadows (a principle that derives from thermodynamics referred to in thermodynamics as the concept of stand architecture).

Using shade, plant selection and maintenance techniques as tools, new proposition for the site was made on the aspect of functional re-organization (site programme) and the remediation. The predominant tree species on the site (more than 650 oak specimens) are infected with a deadly fungus that is selectively killing off trees on the site. Nicknamed "*Van Riebeeck's curse*" the pathogen has been identified by Professor Michael Wingfield (professor of forest pathology at Free State University) as *Armillaria mellea*.

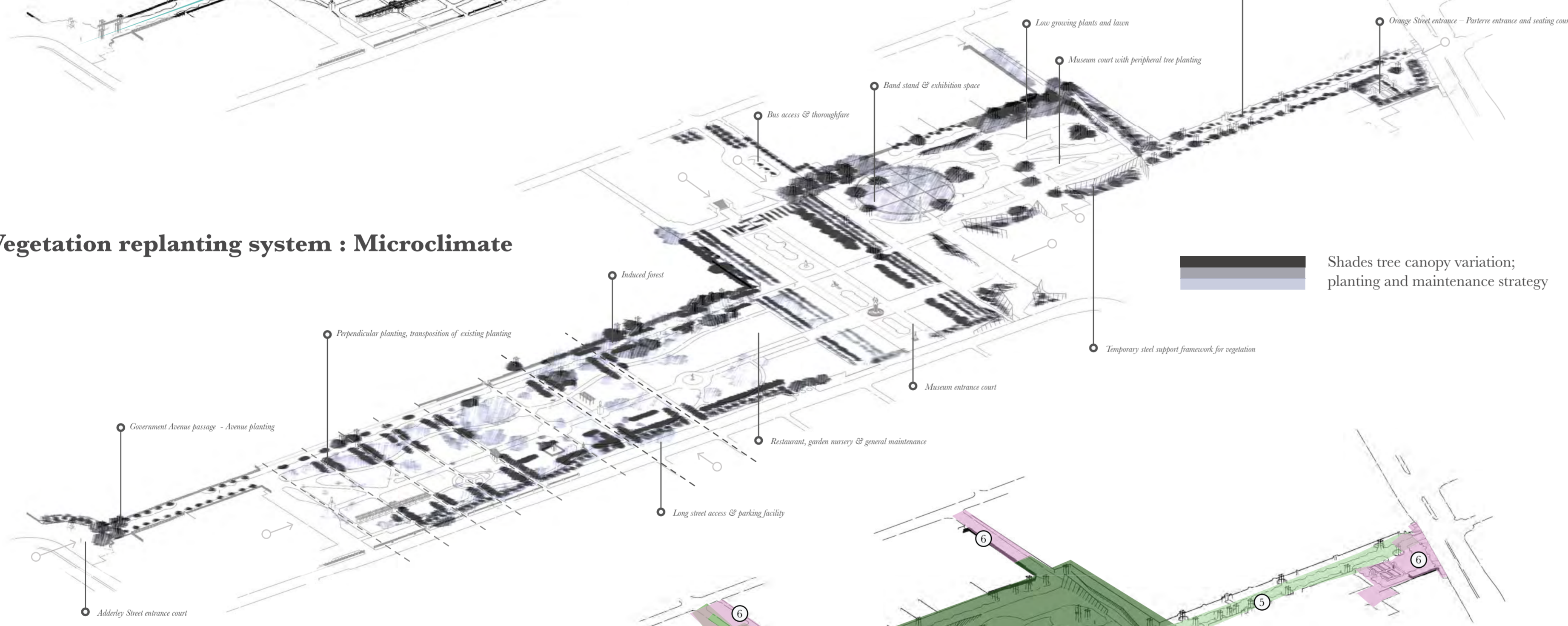
The projects approach to tree replacement and the question of *A. mellea* has been developed around two strategies that are staged on project phasing and implementation of a master plan designed around five habitat areas (biennial cleaning nature, decennial cape nature, decennial urban nature, semicentennial combination nature and semicentennial deciduous nature). The objective of the *tree's* site is aimed at using biodiversity to replace engineered structures with plants and vegetation. Implementation is facilitated through a cause and effect model that is staged to occur as a phased event.



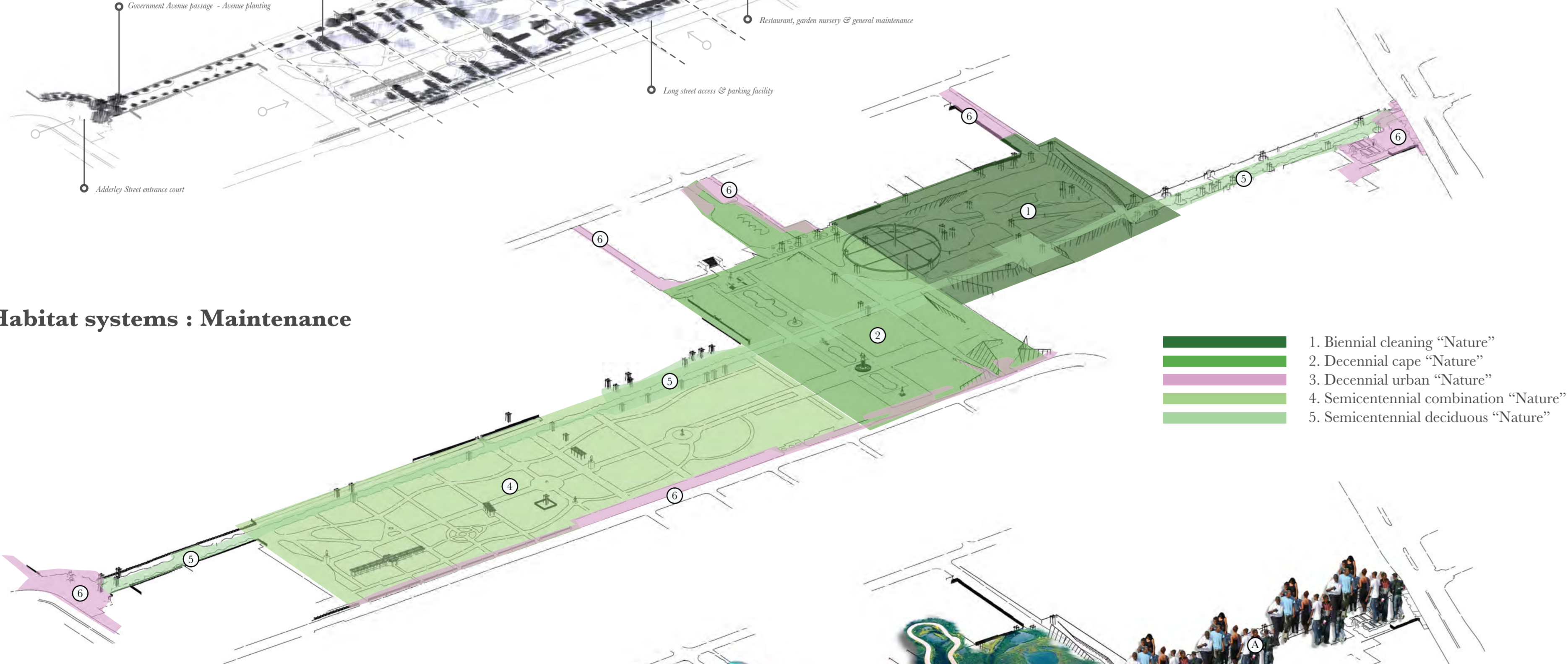
Land management system : Hydrology



Vegetation replanting system : Microclimate



Habitat systems : Maintenance



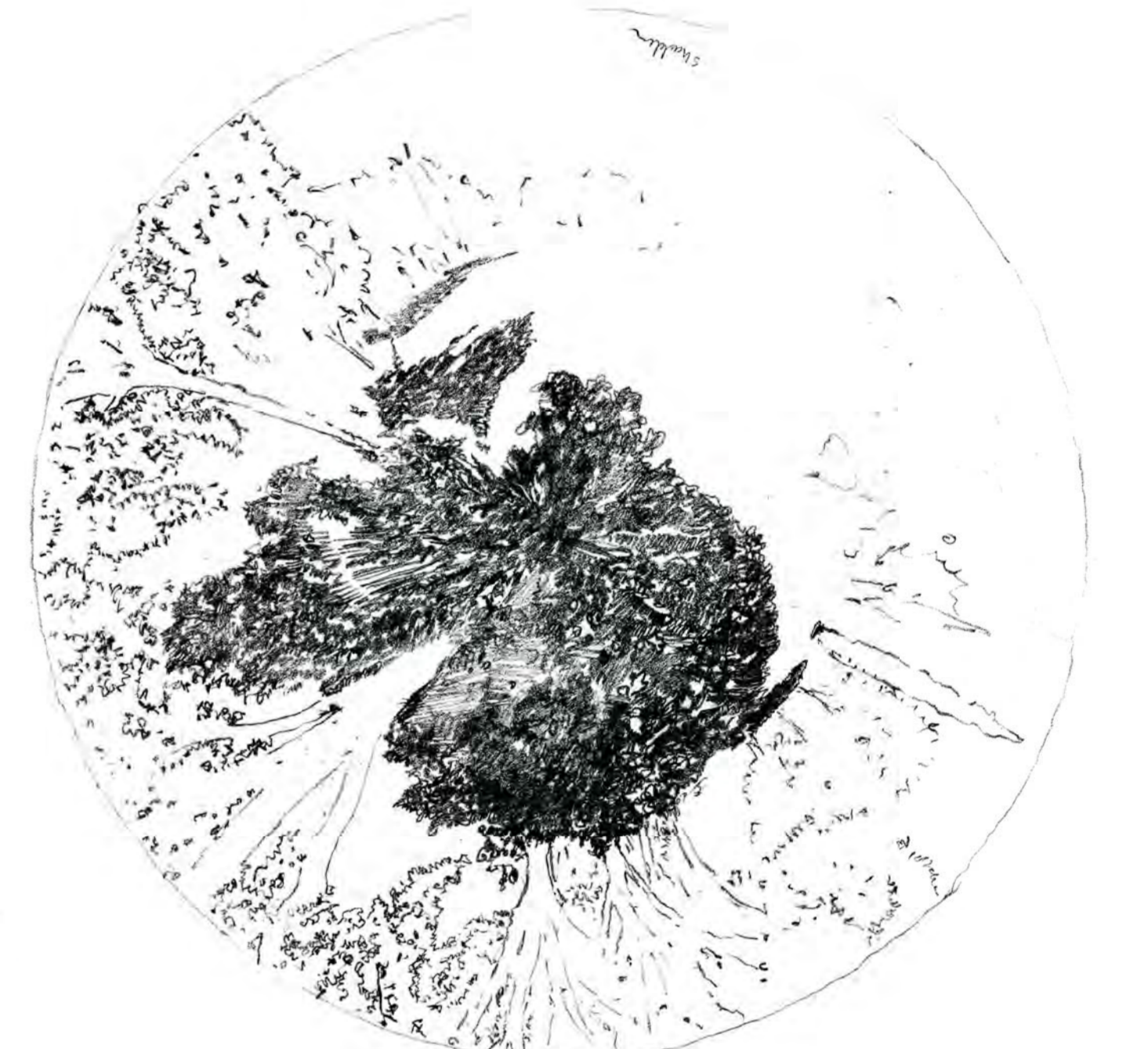
Movement systems : Order



Shadow mapping process - polar coordinate



Shadow mapping process - Outline of negative



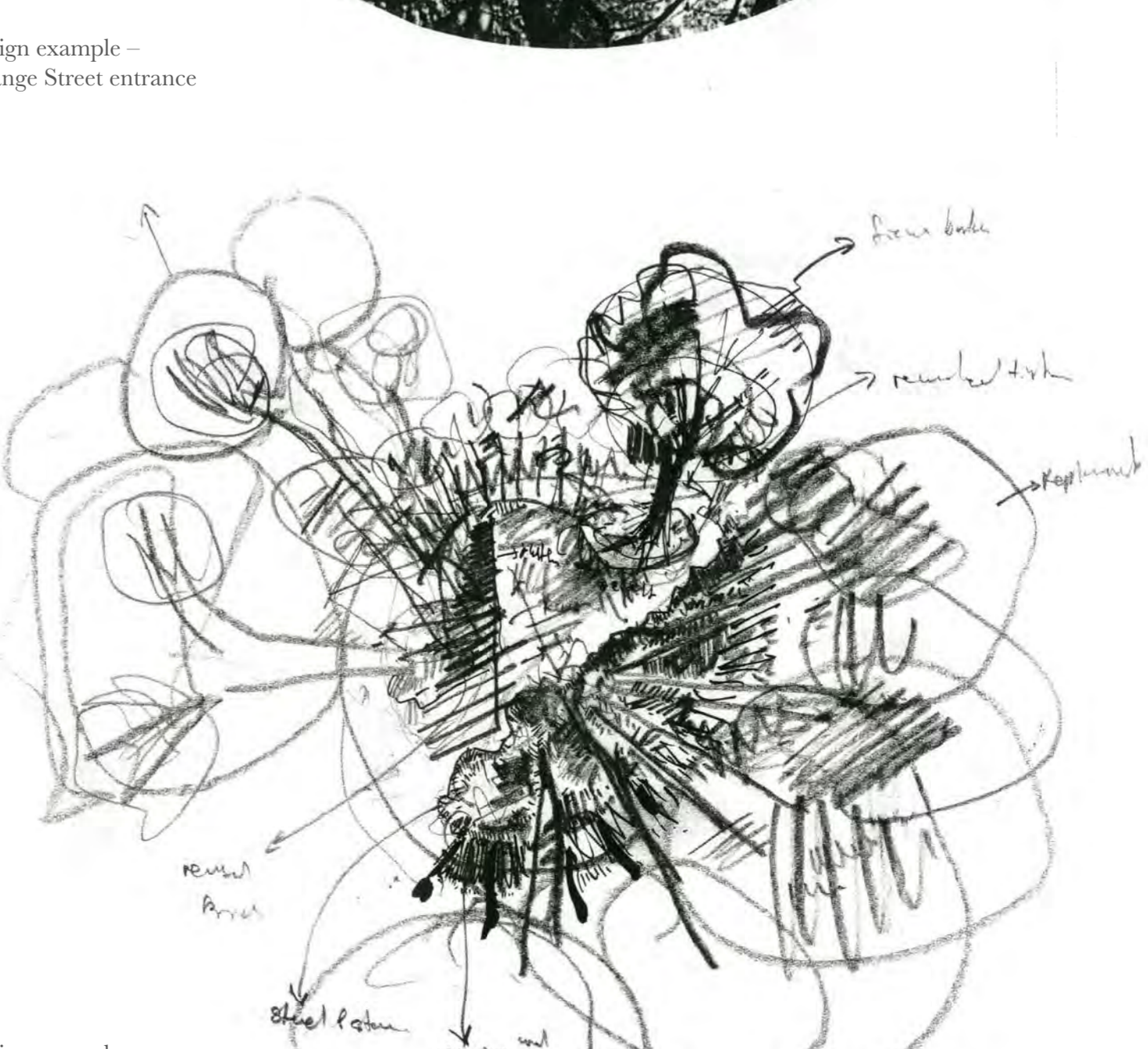
Shadow mapping process - Intensity of shade



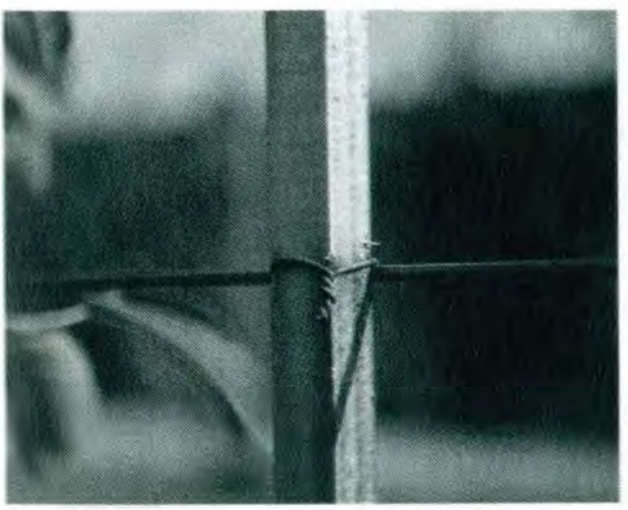
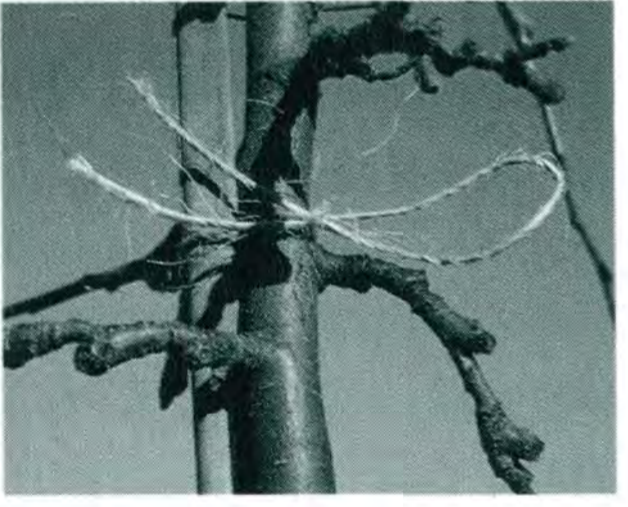
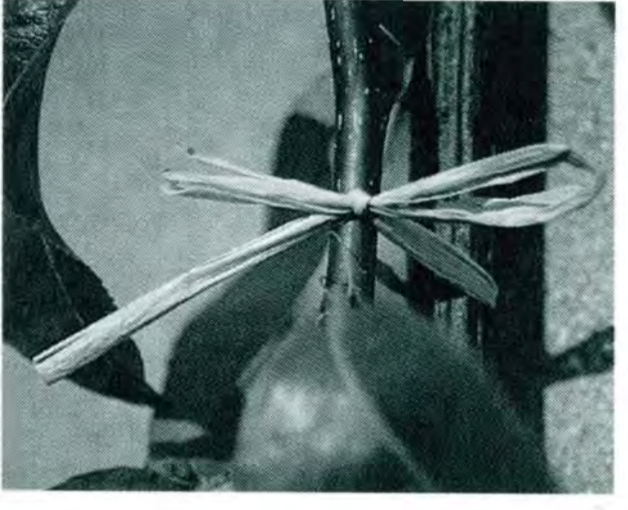
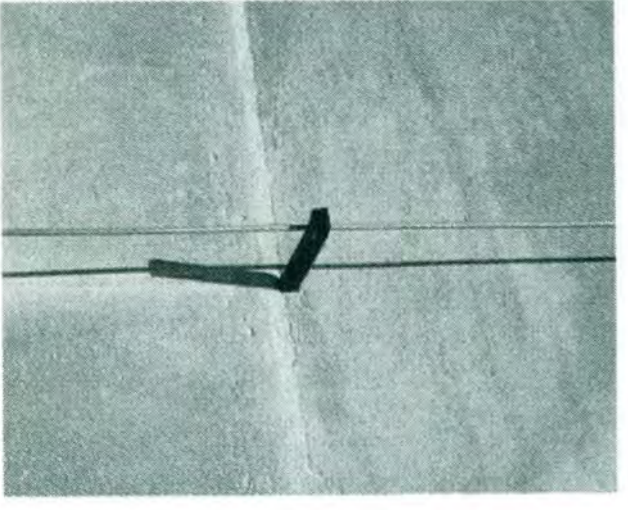
Shadow mapping process - Source of shade

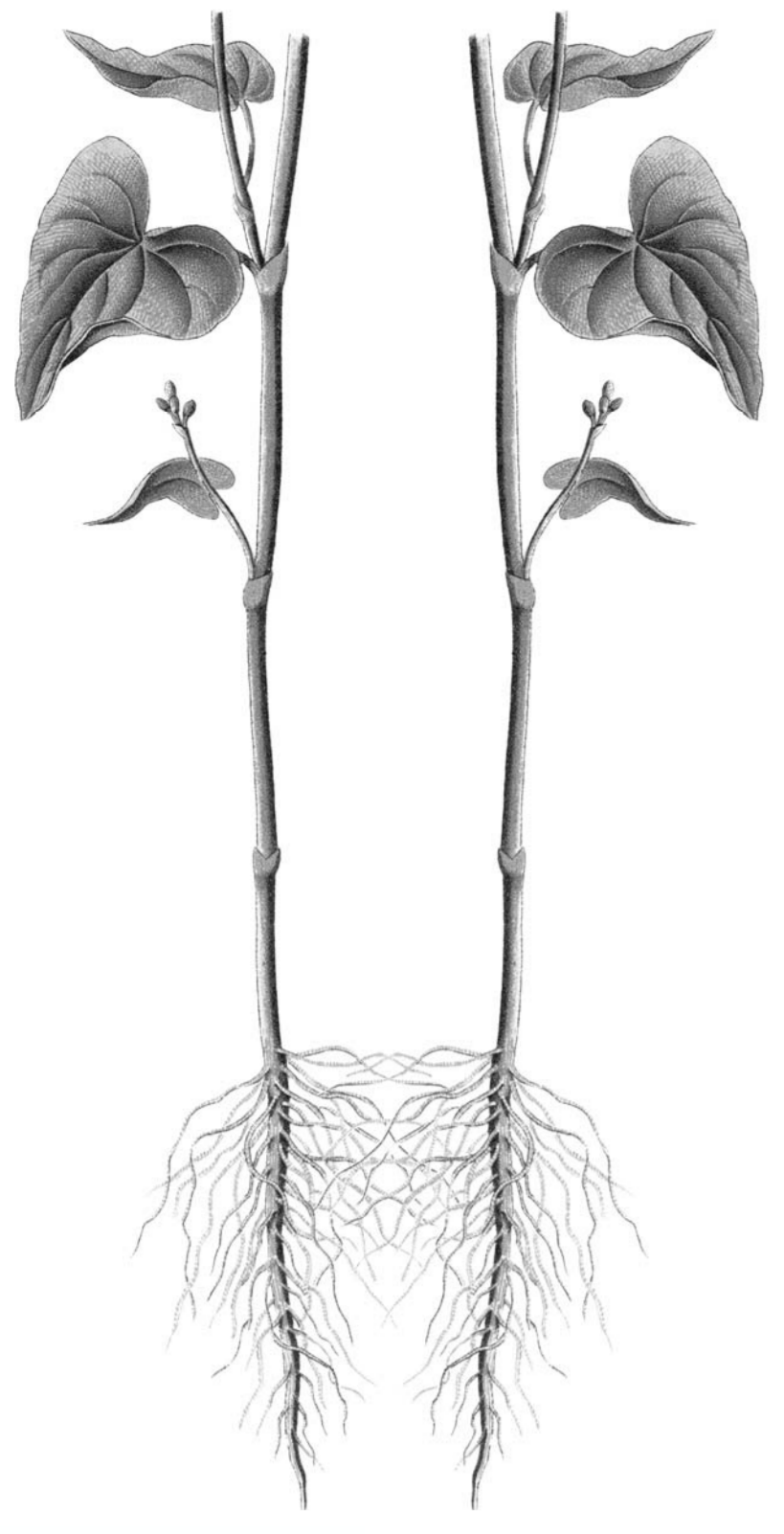


Design example - Orange Street entrance

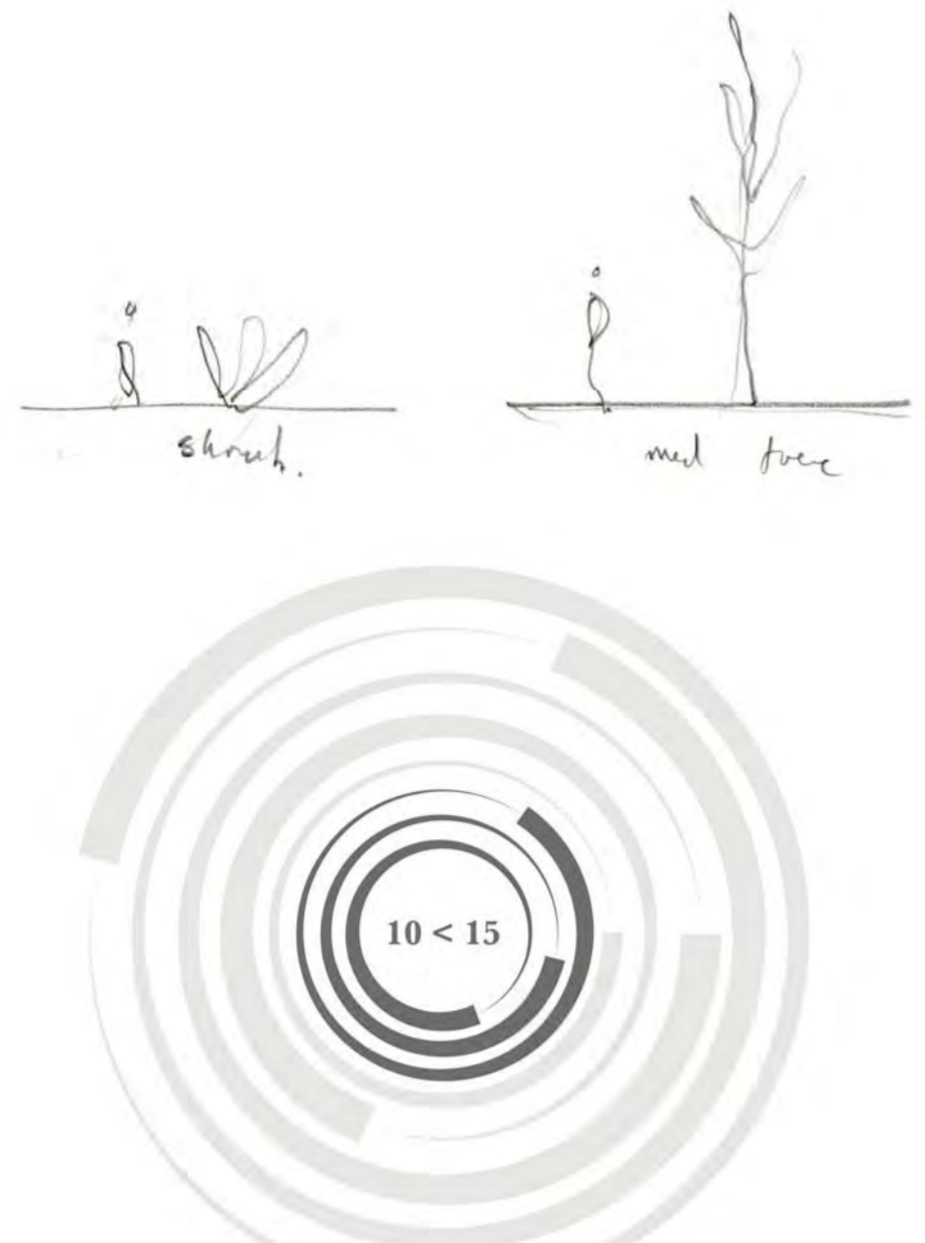
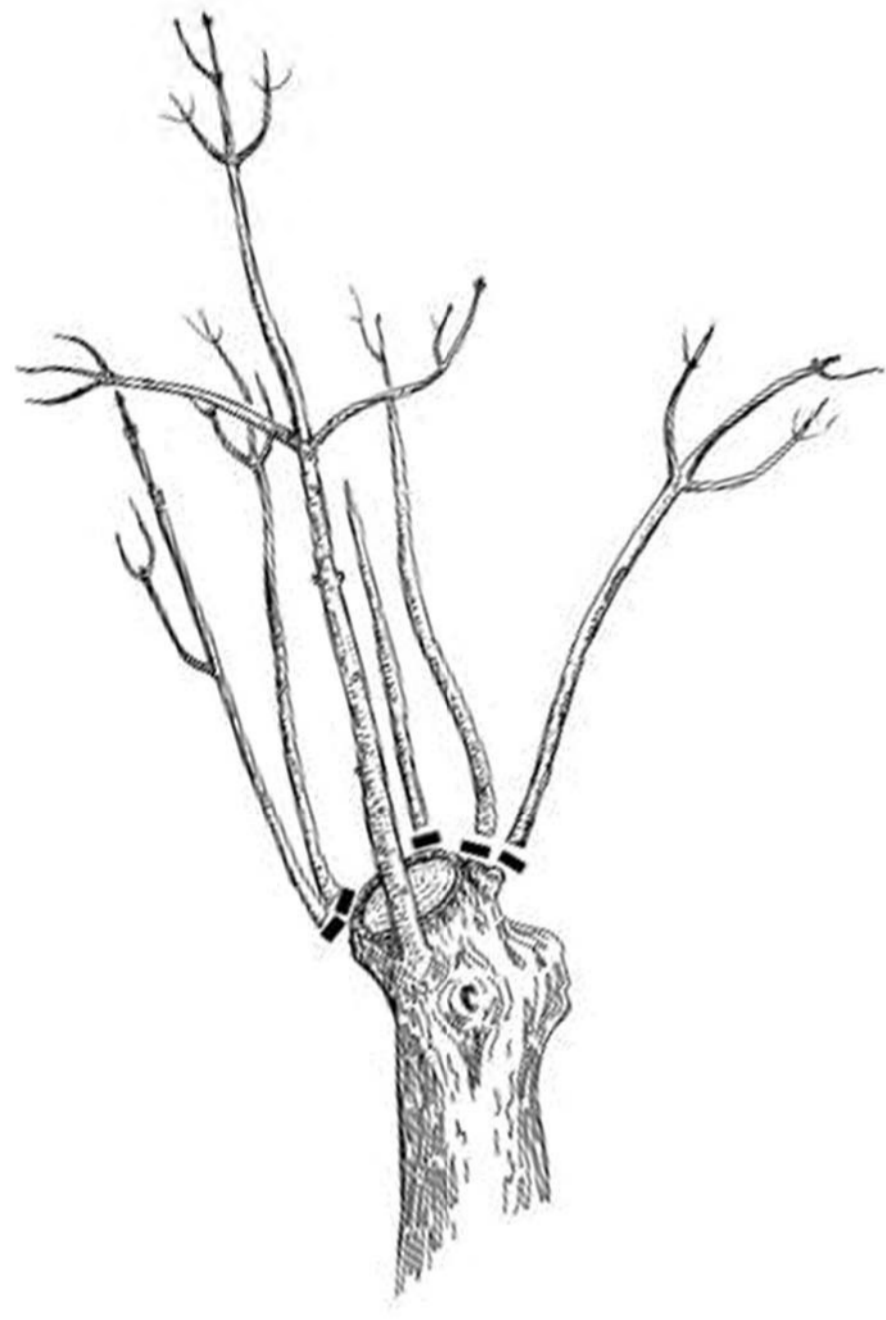
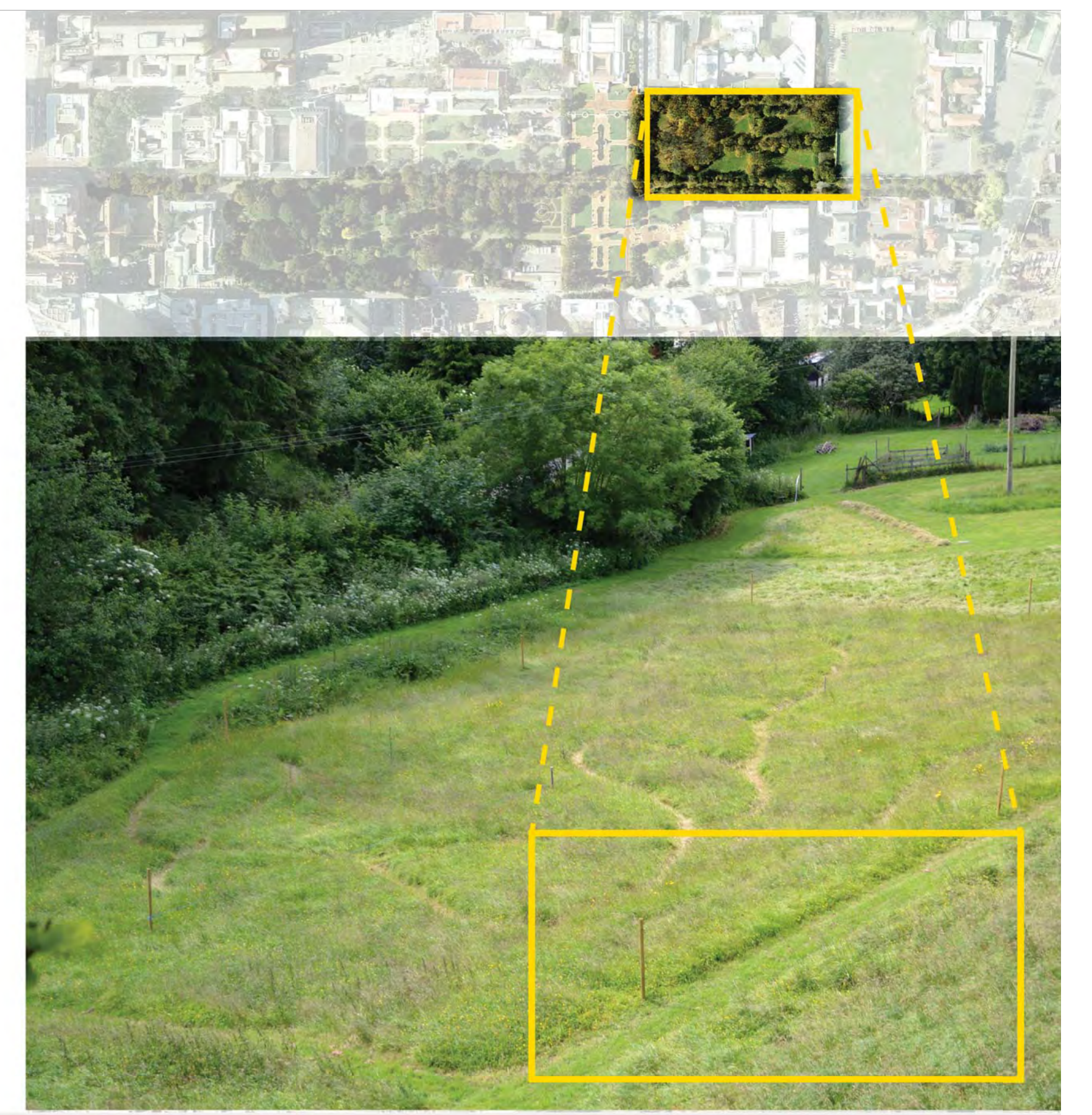
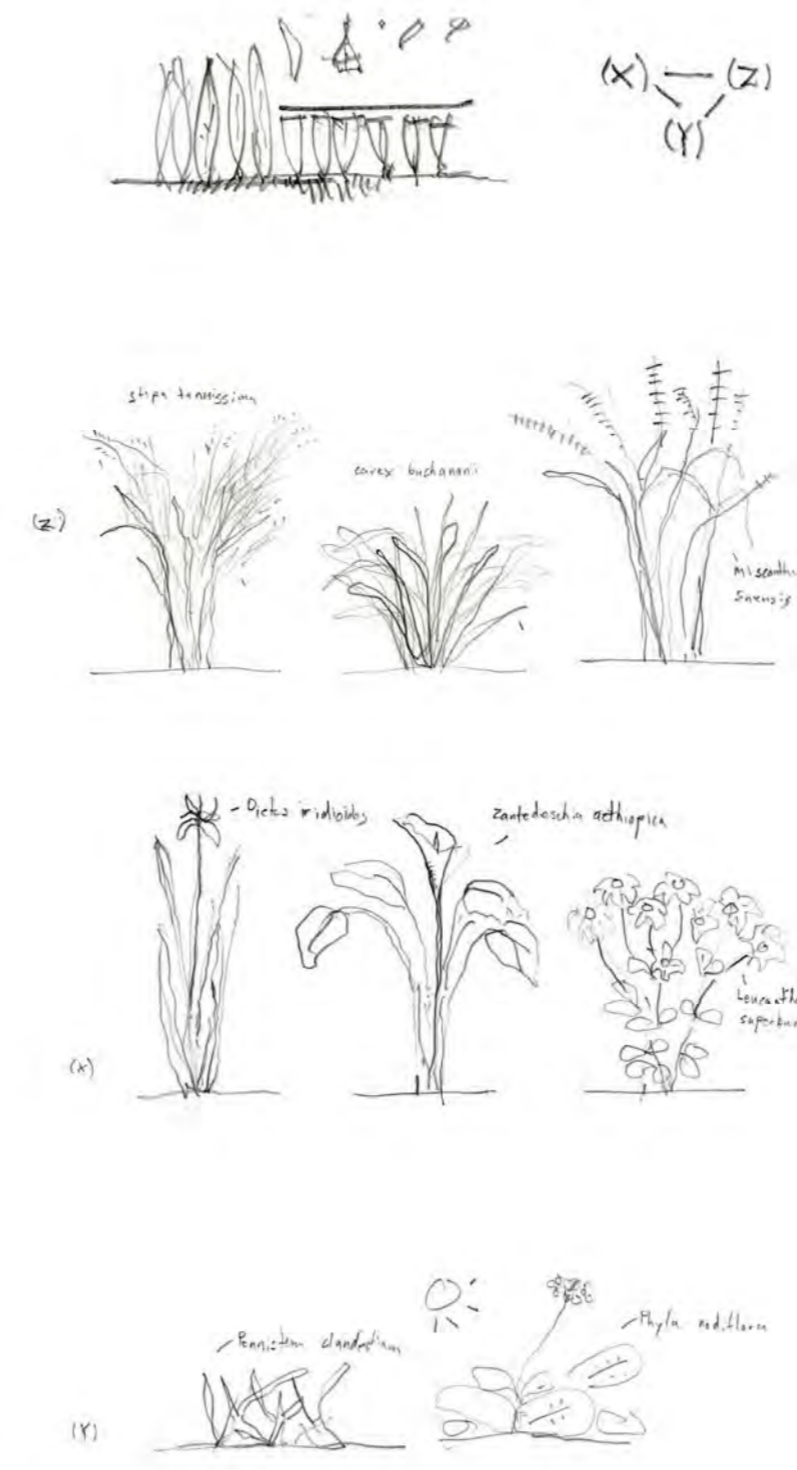
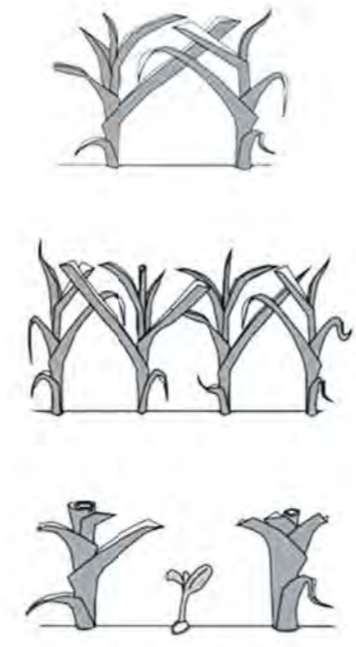


Design example - Shade proposal

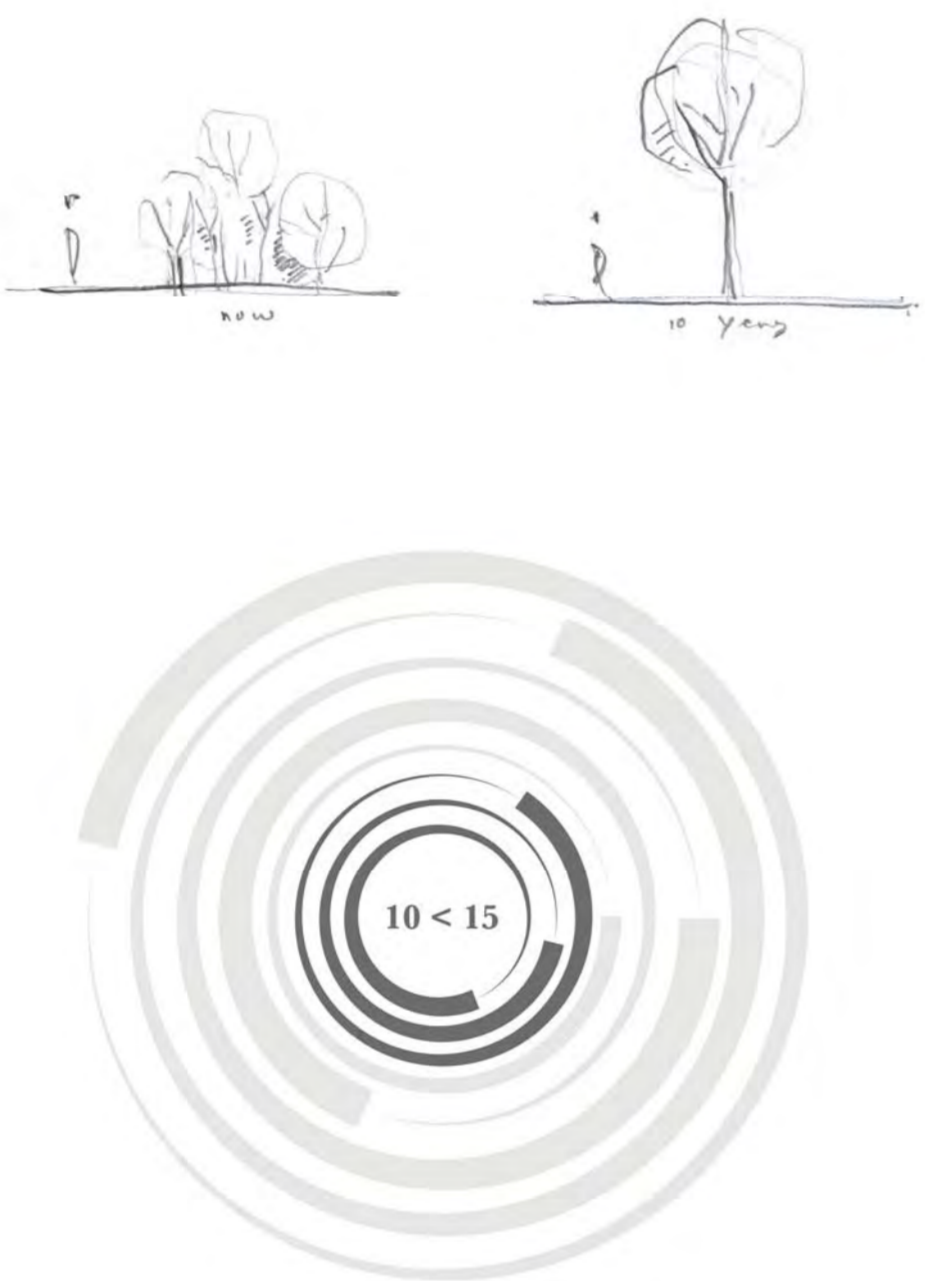
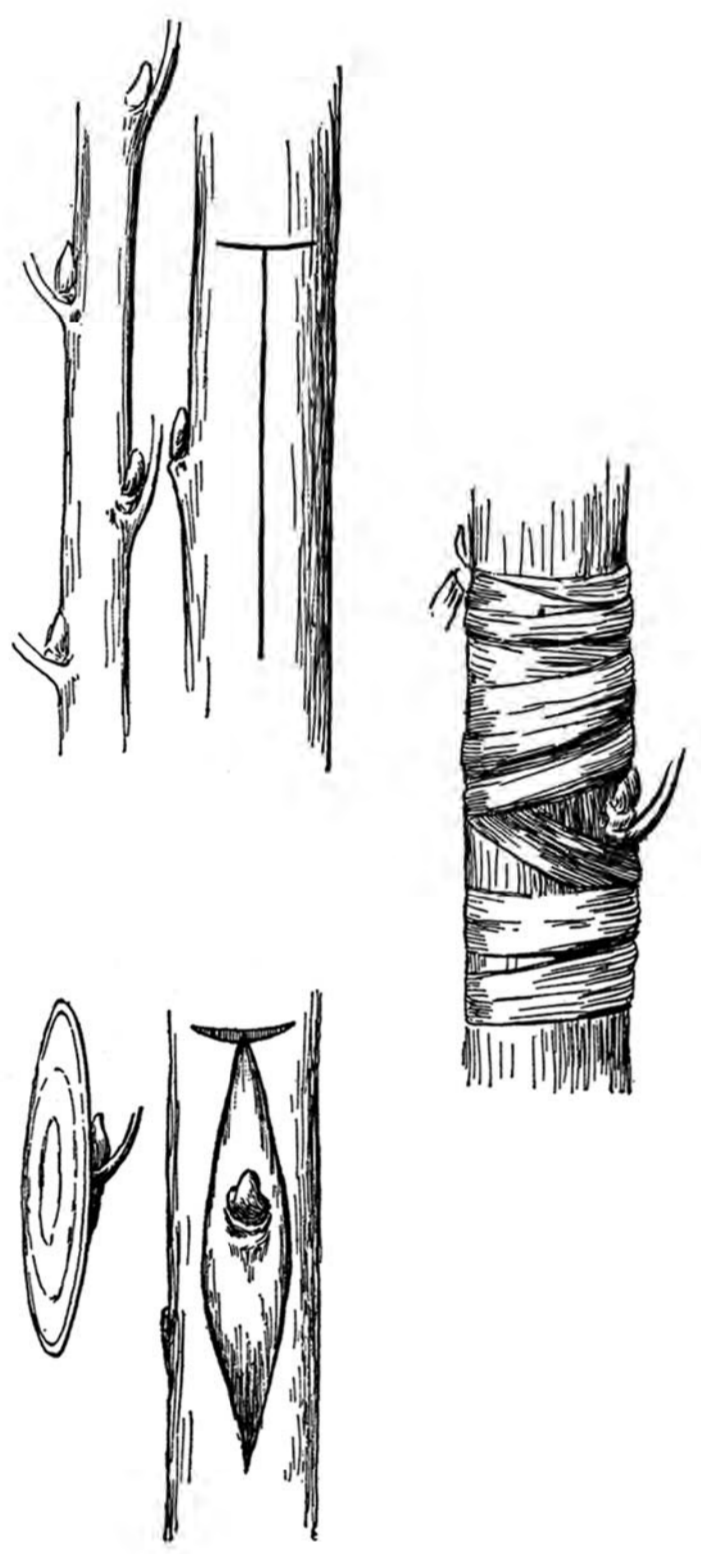
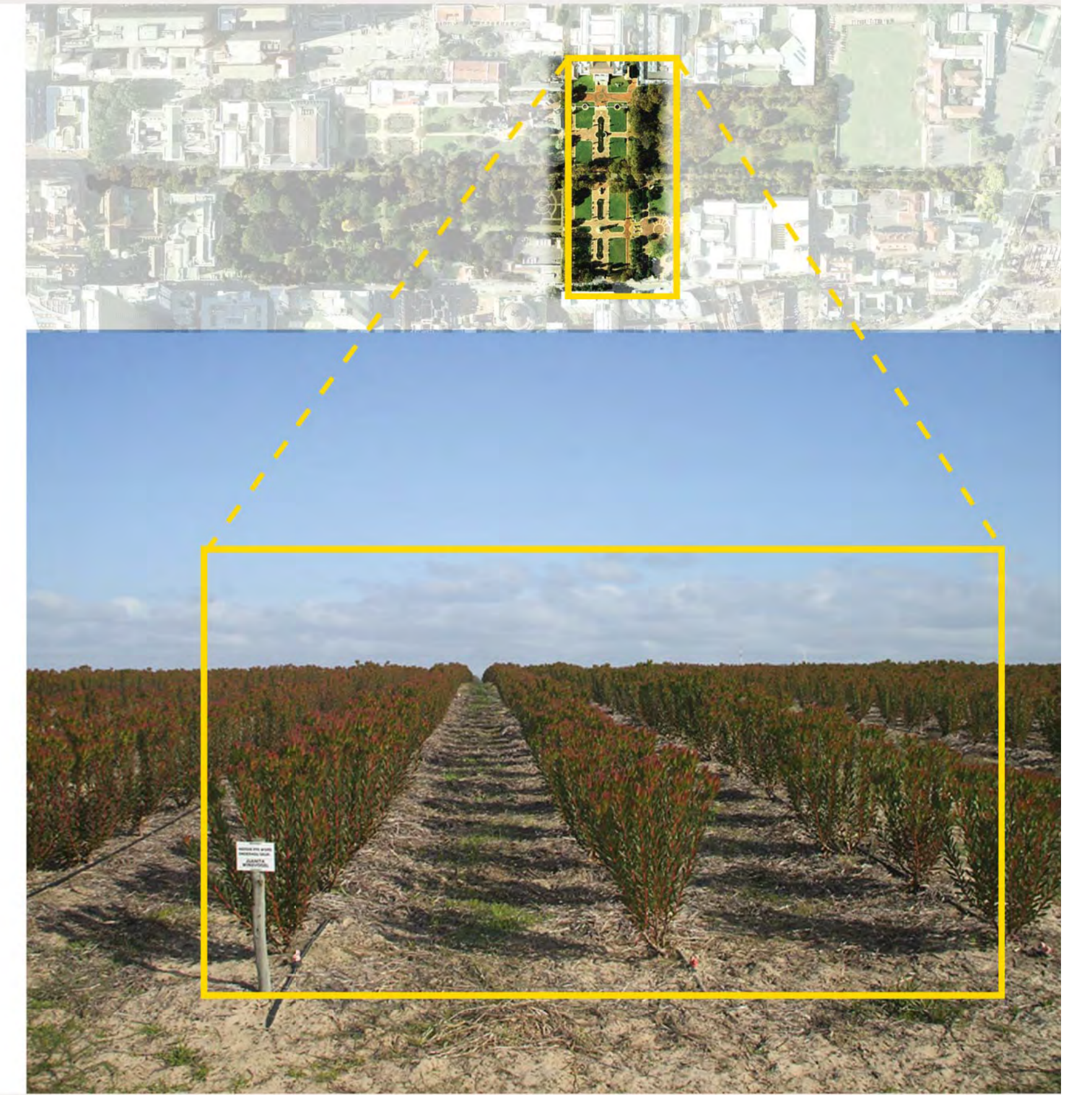
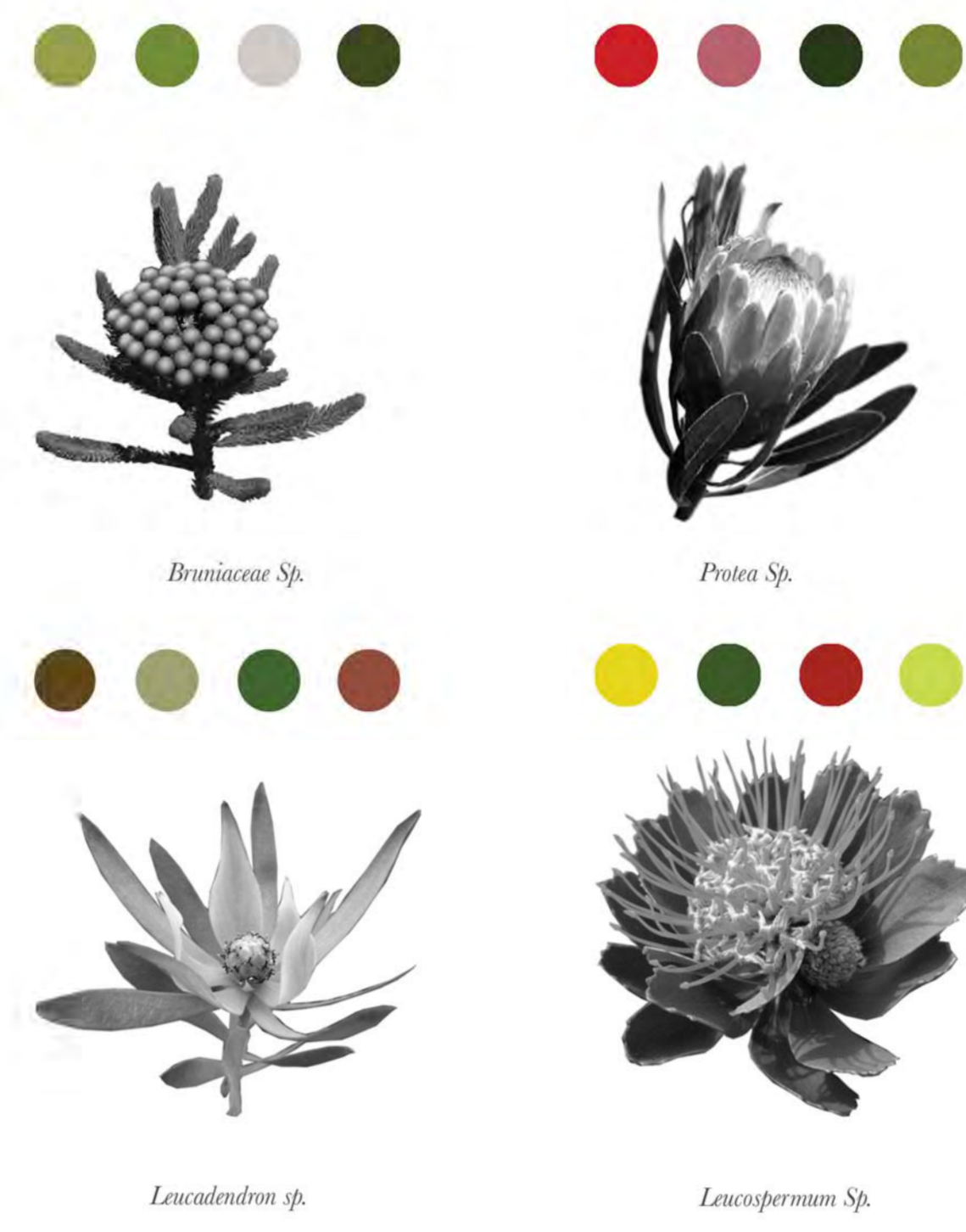
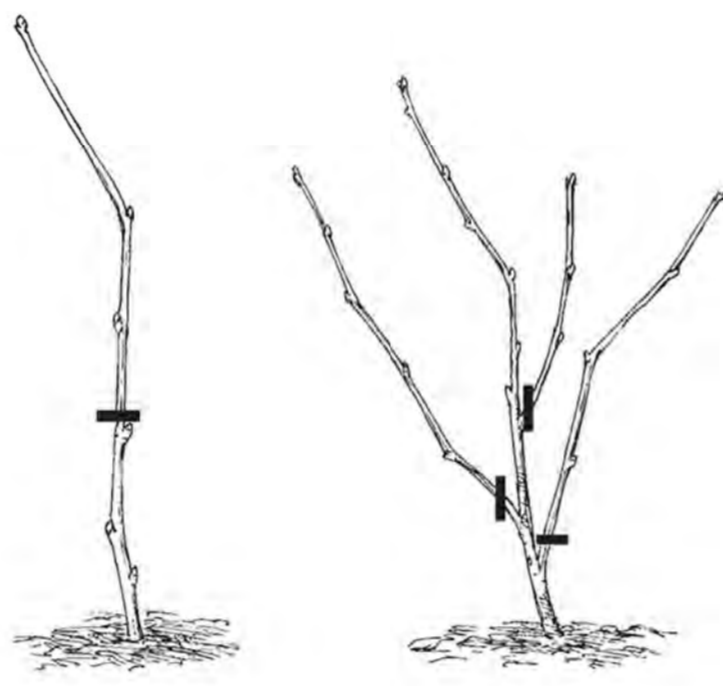
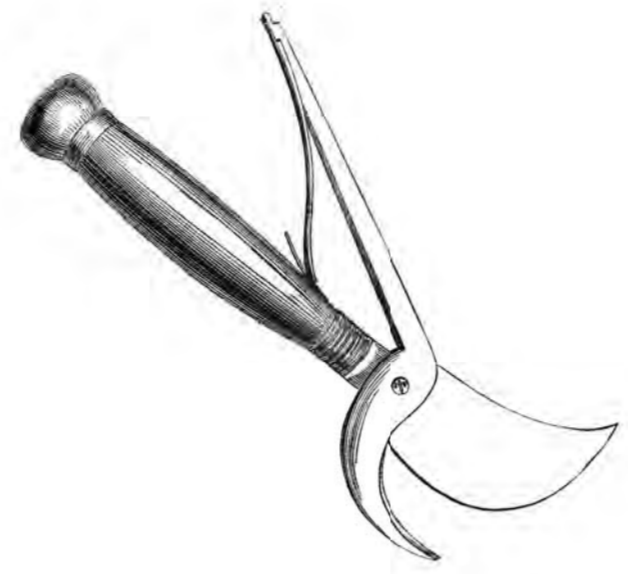




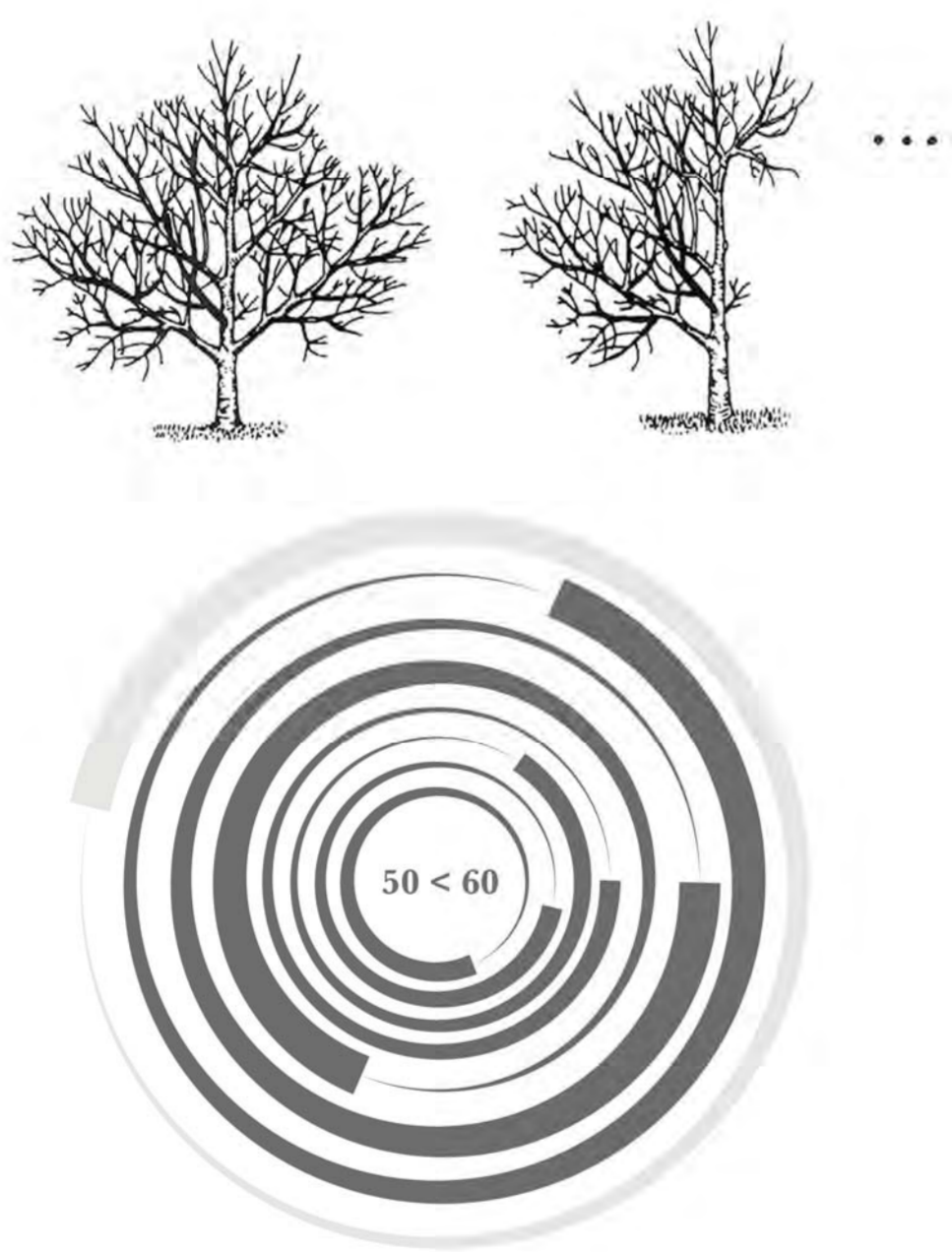
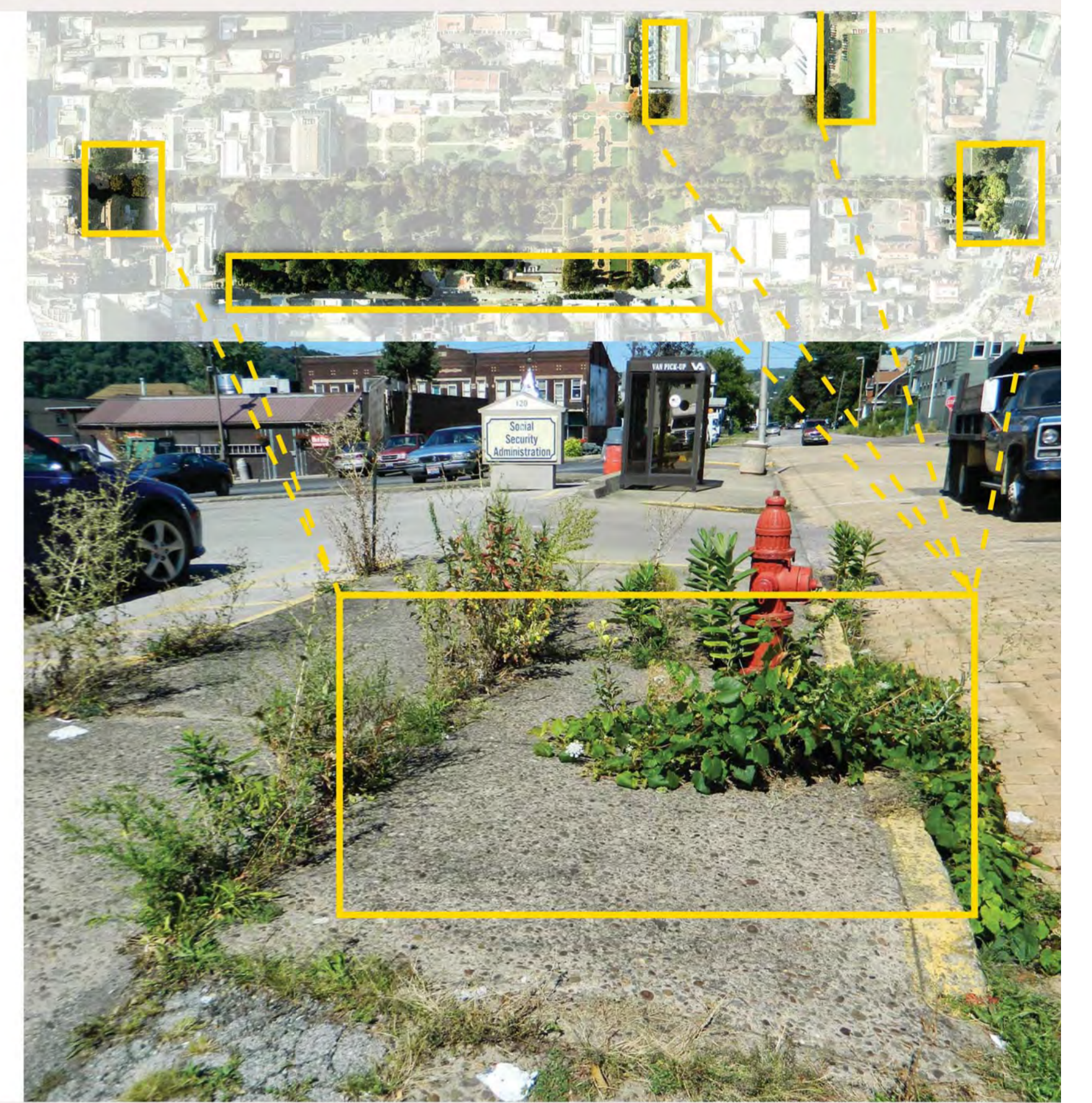
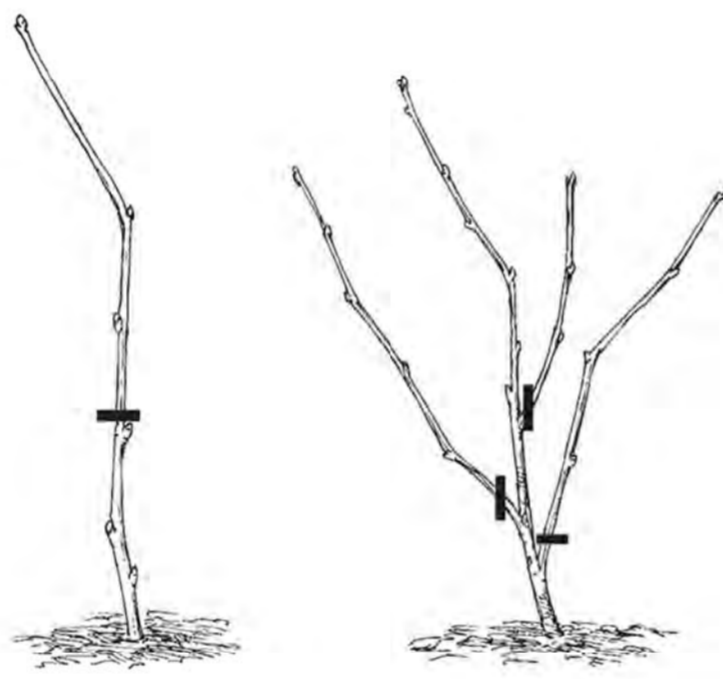
① Biennial Cleaning "Nature"



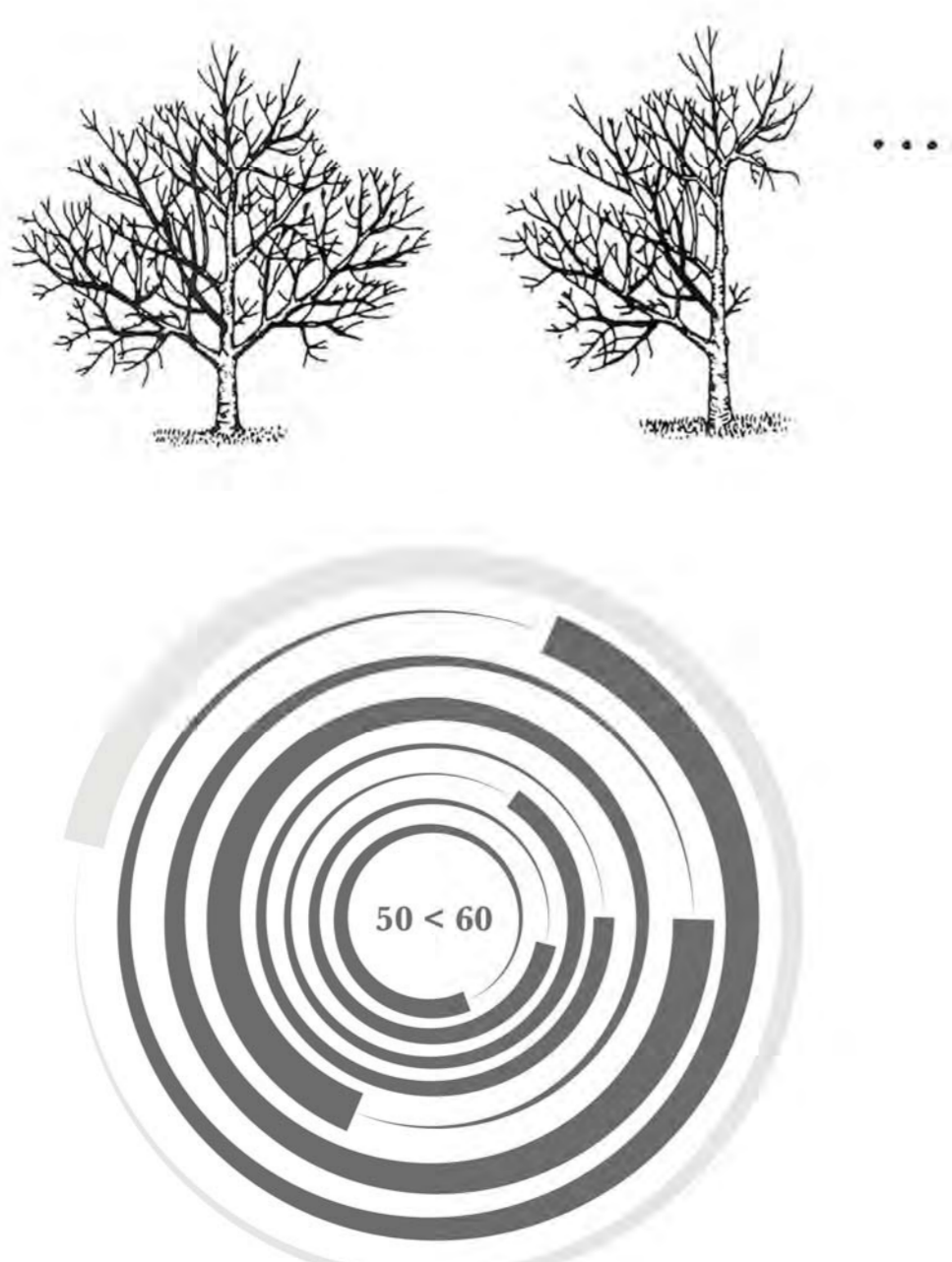
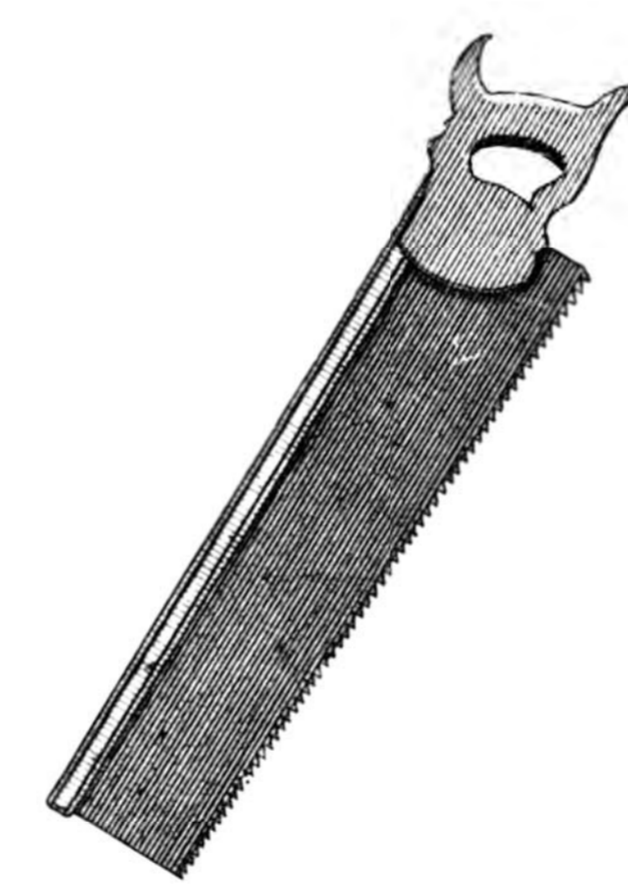
② Decennial Cape "Nature"



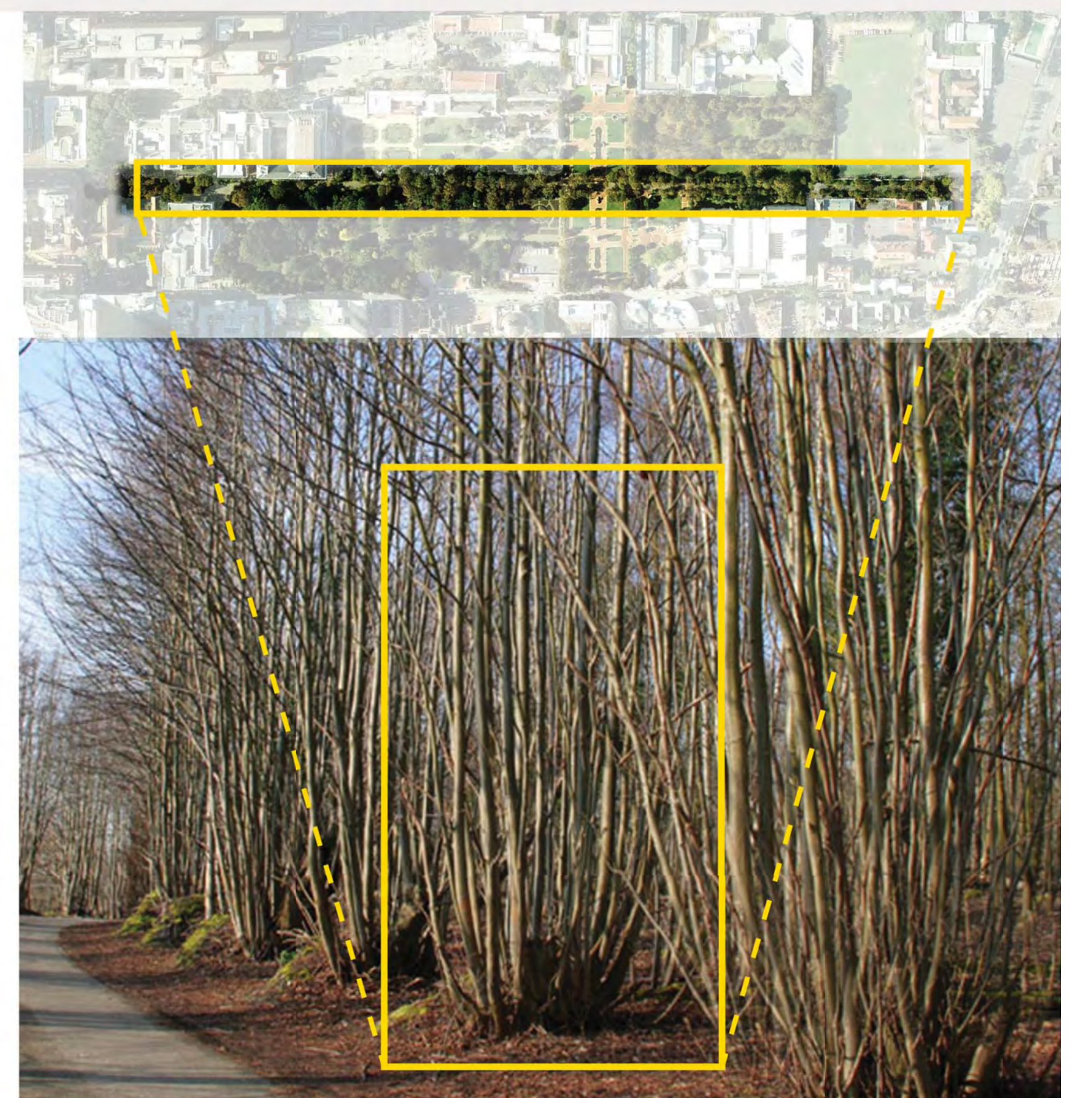
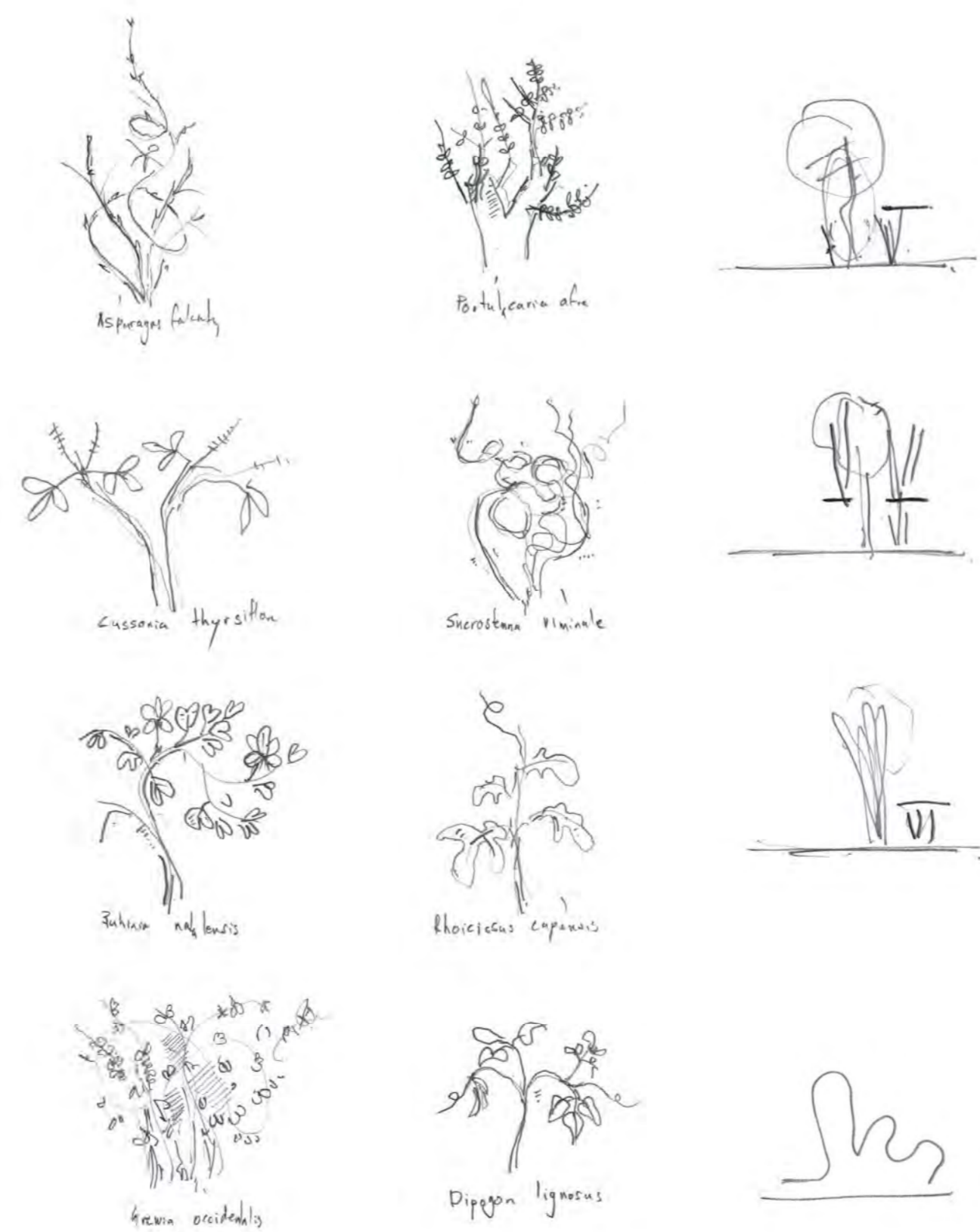
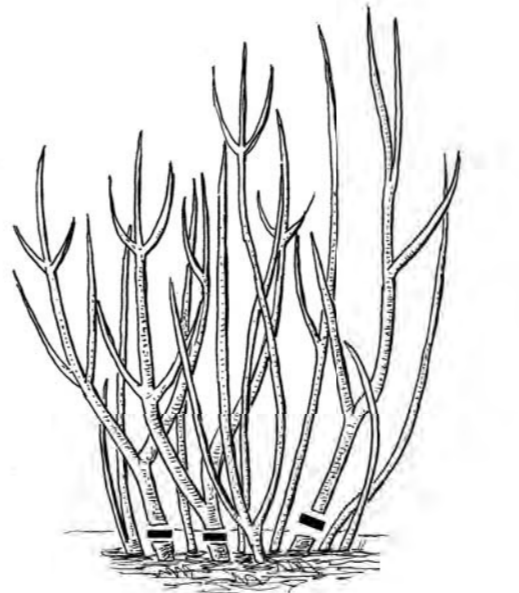
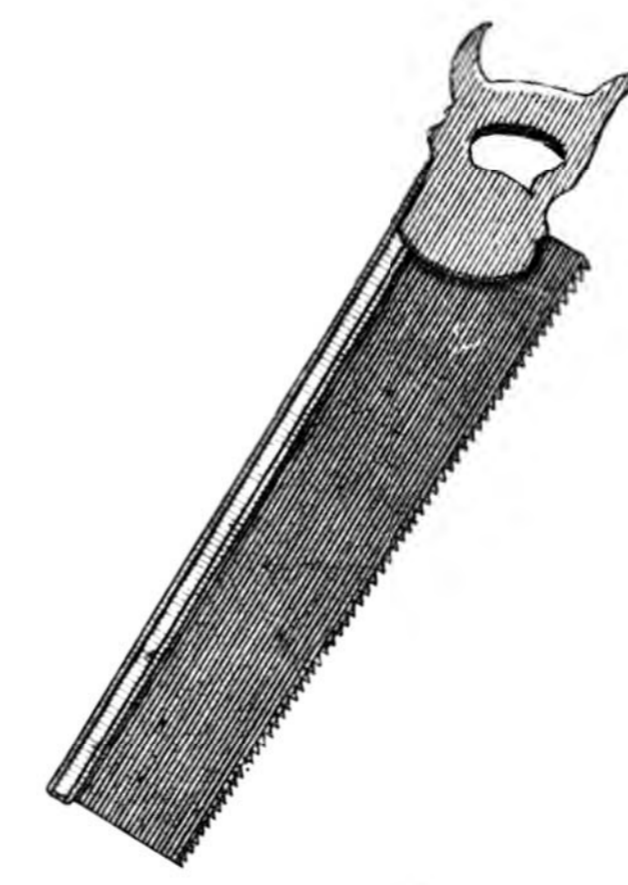
③ Decennial Urban "Nature"

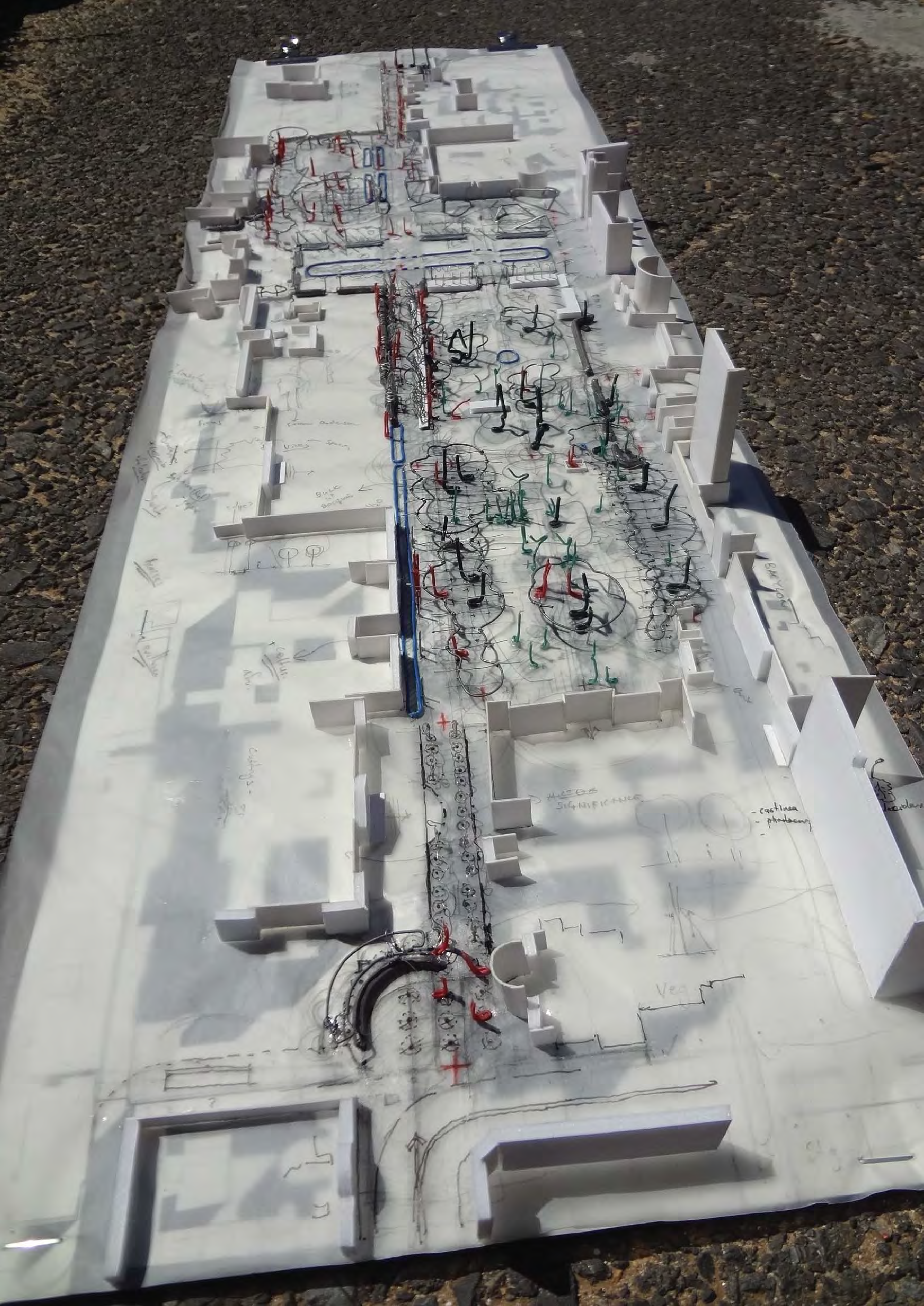


④ Semicentennial Combination "Nature"



⑤ Semmicentennial Disciduous "Nature"





coltura
AEE 25
cubigli - 2

AEE 25
S4MPTIC 1100

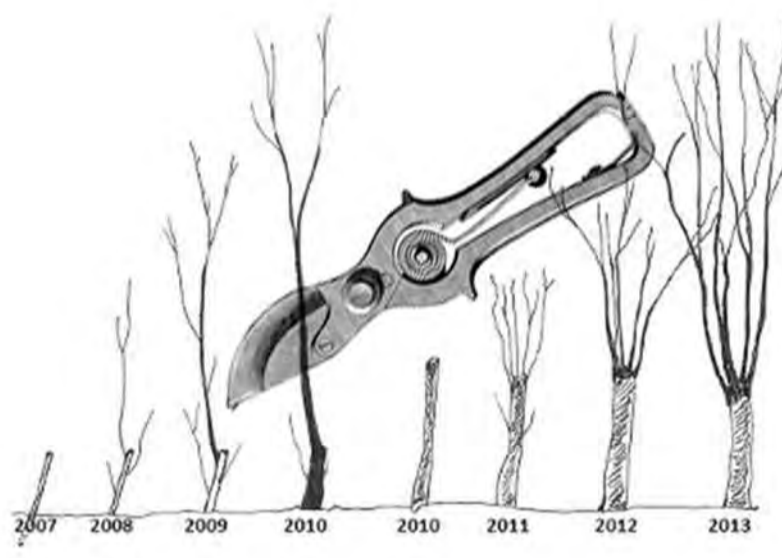
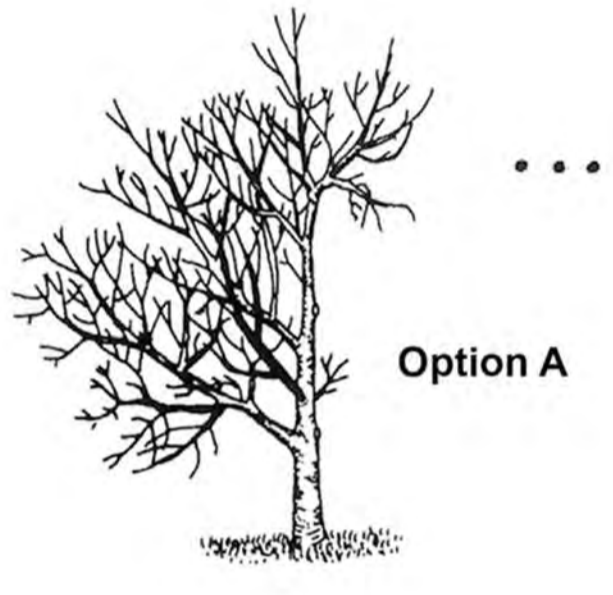
castinea
ptolacum

vea

coltura



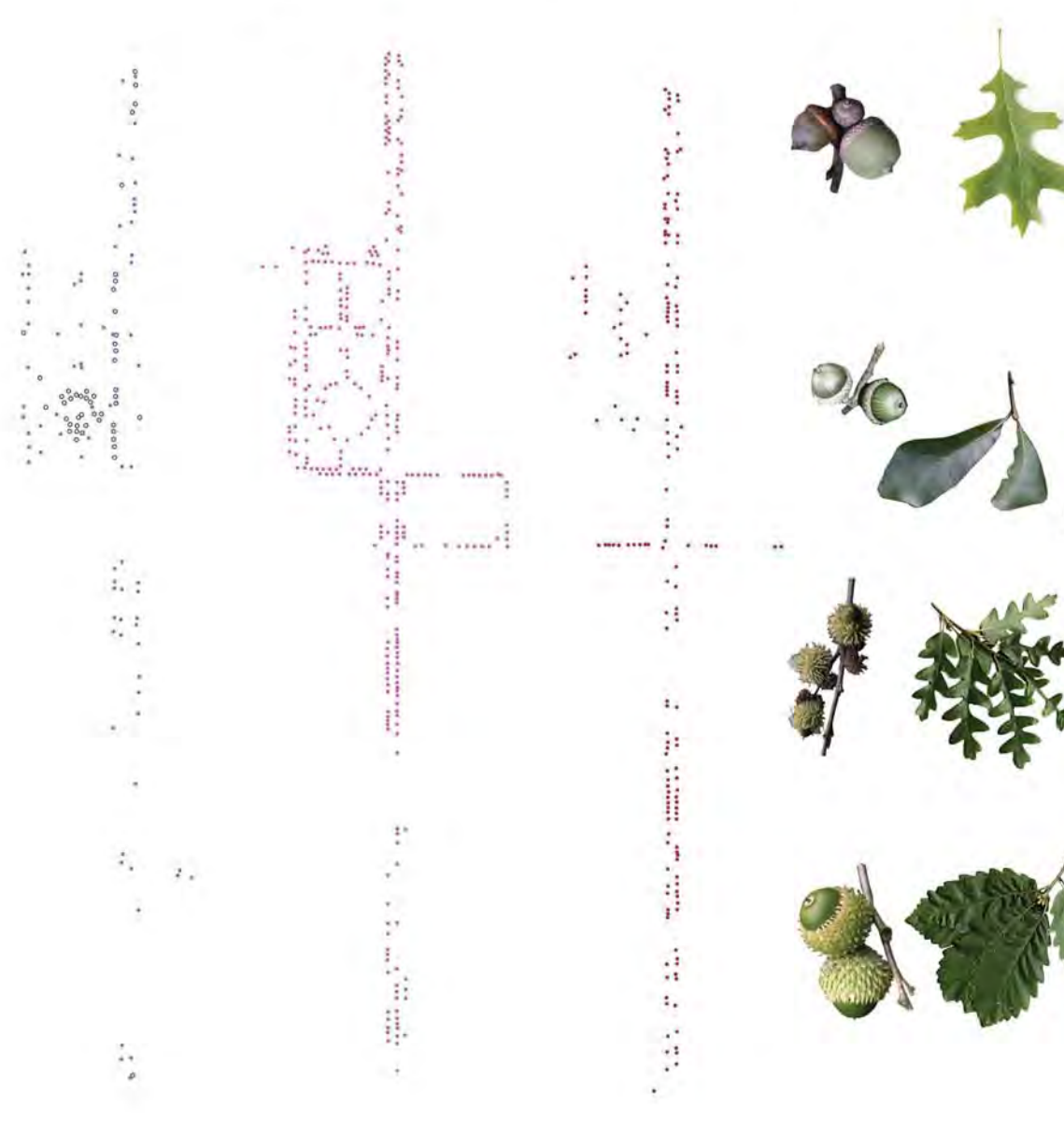
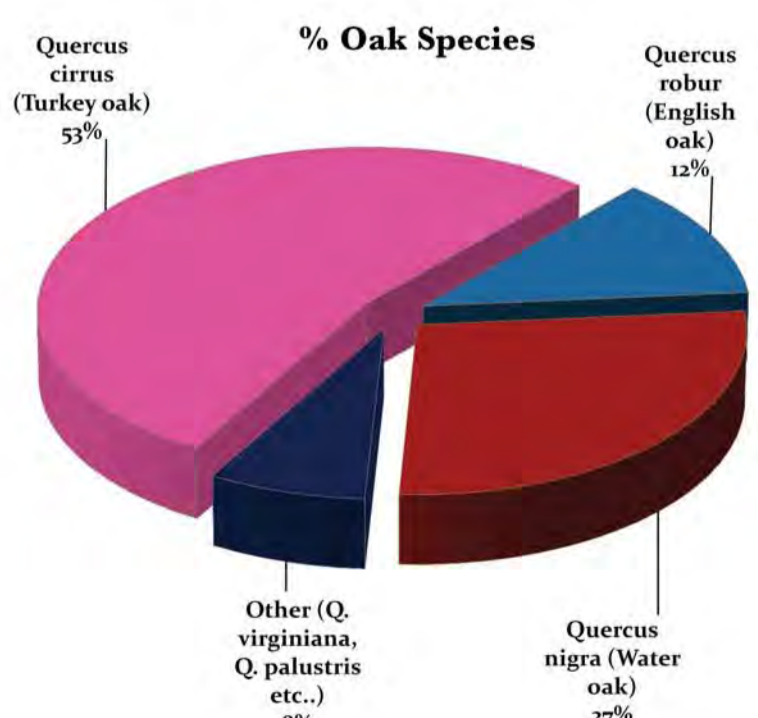
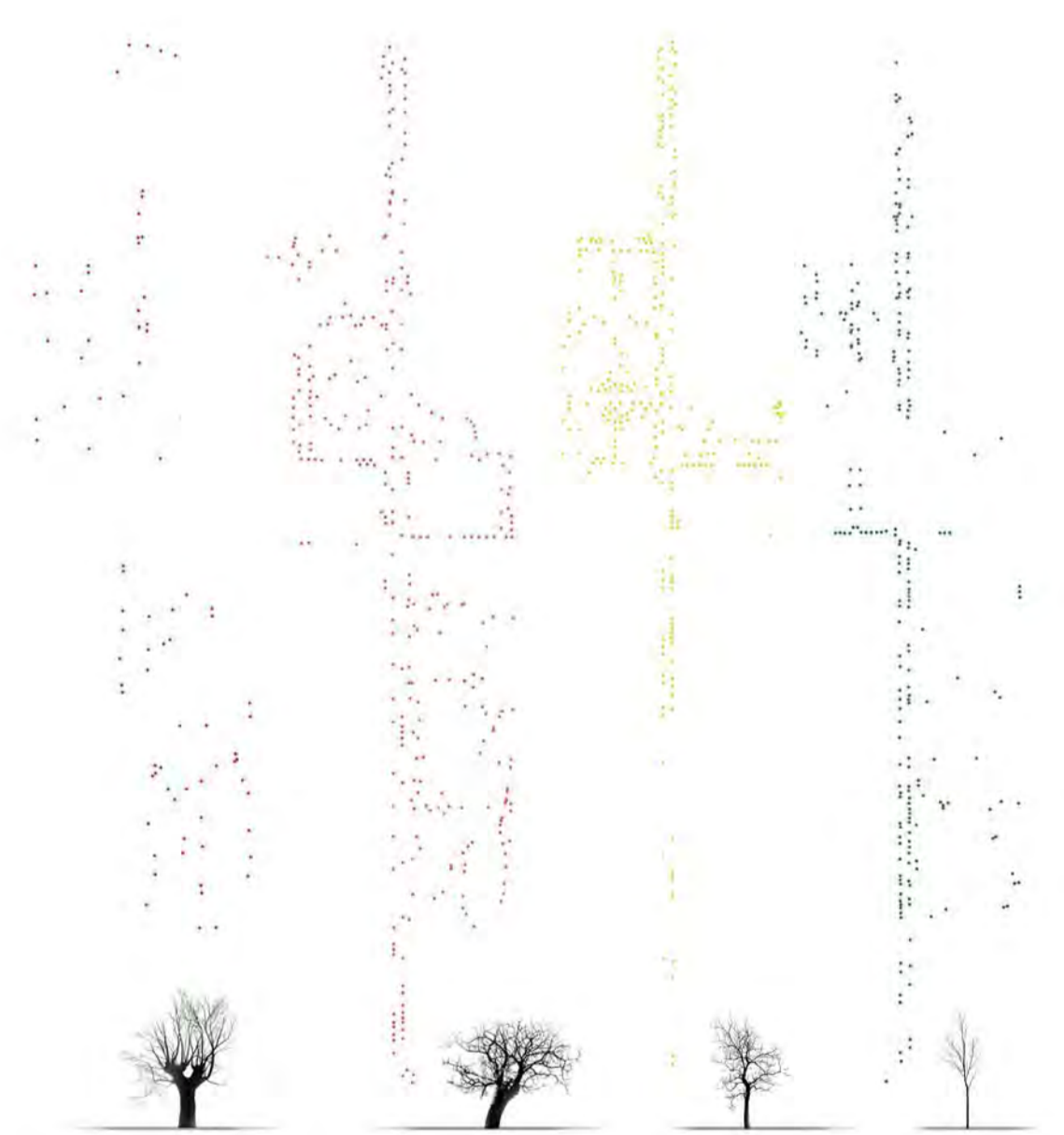
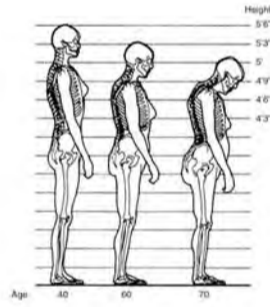
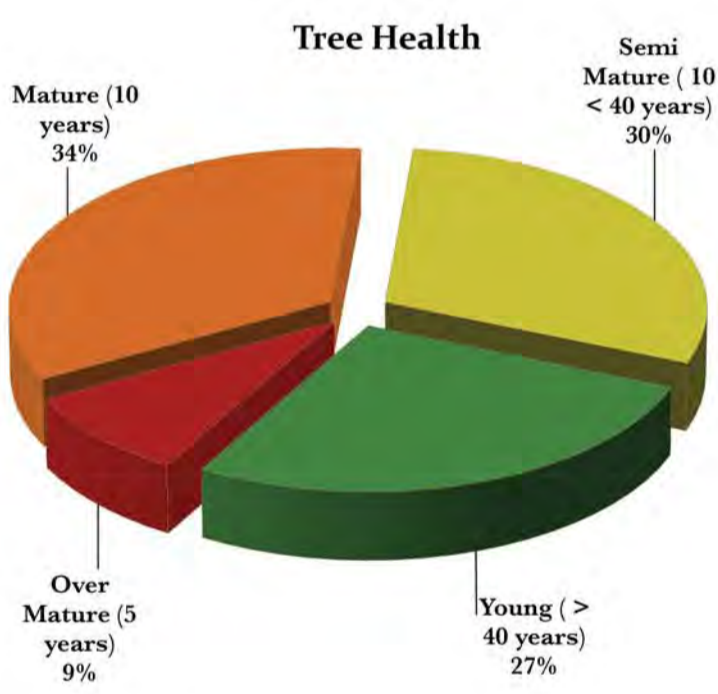
Before pruning

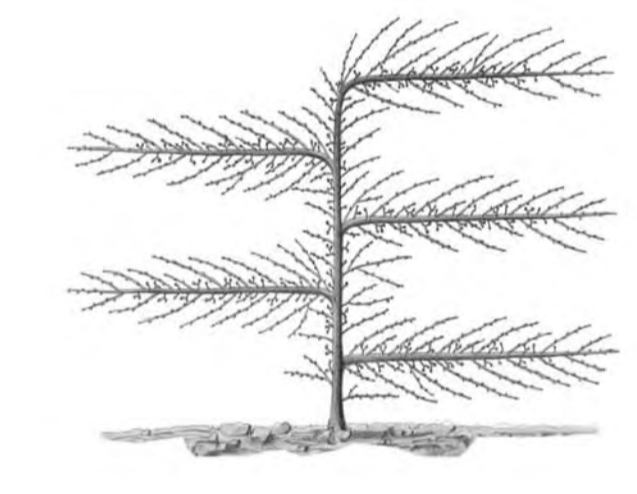
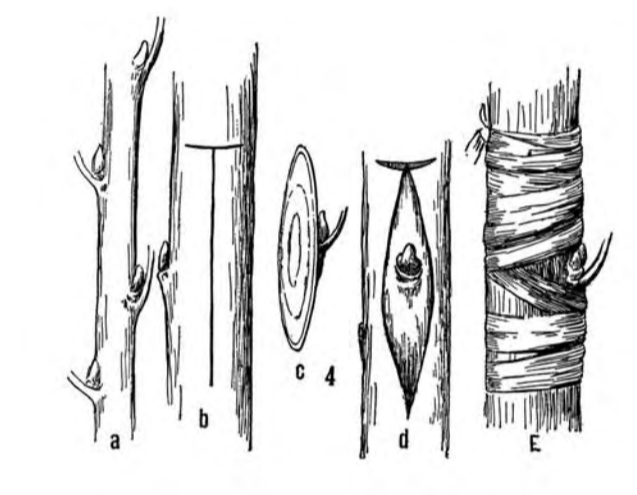
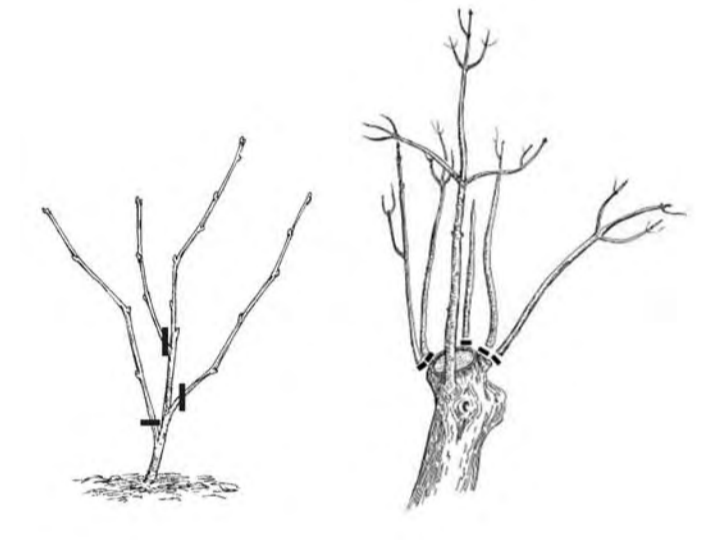
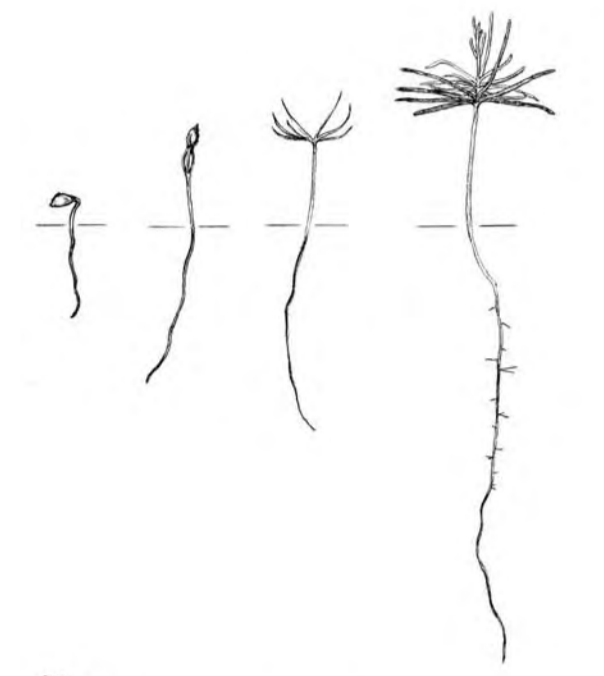
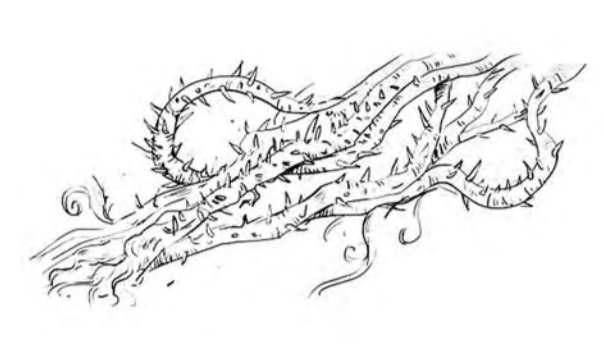
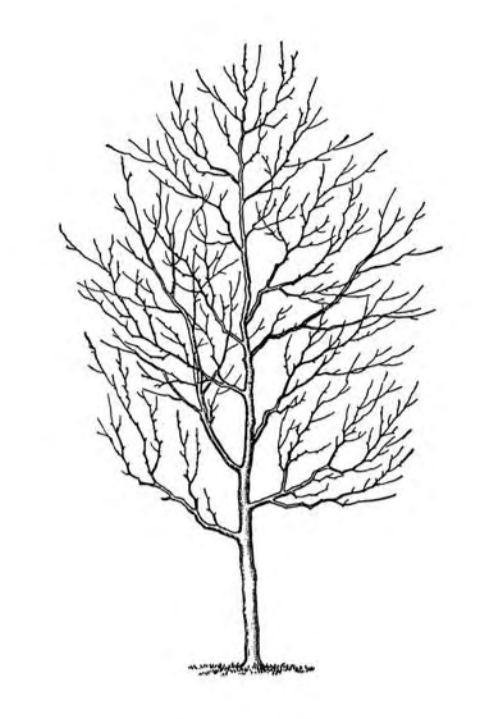
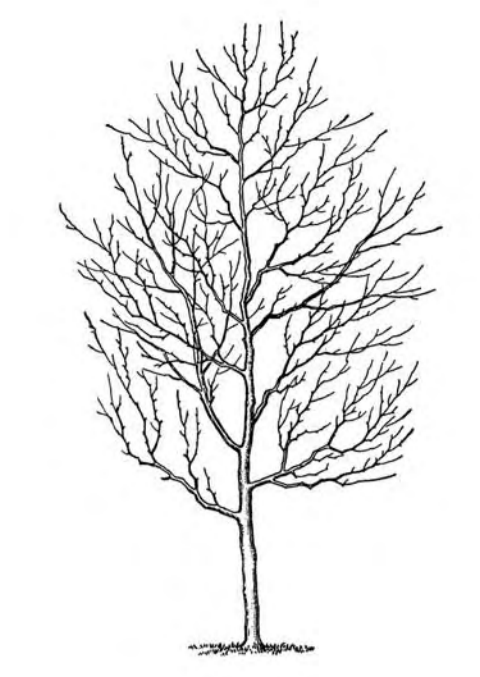
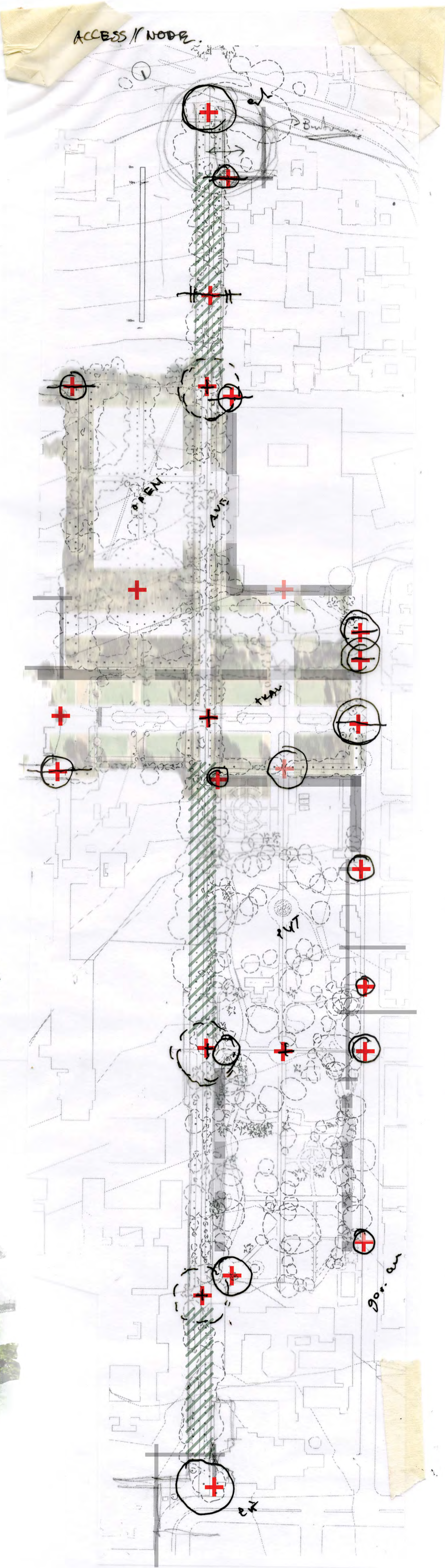
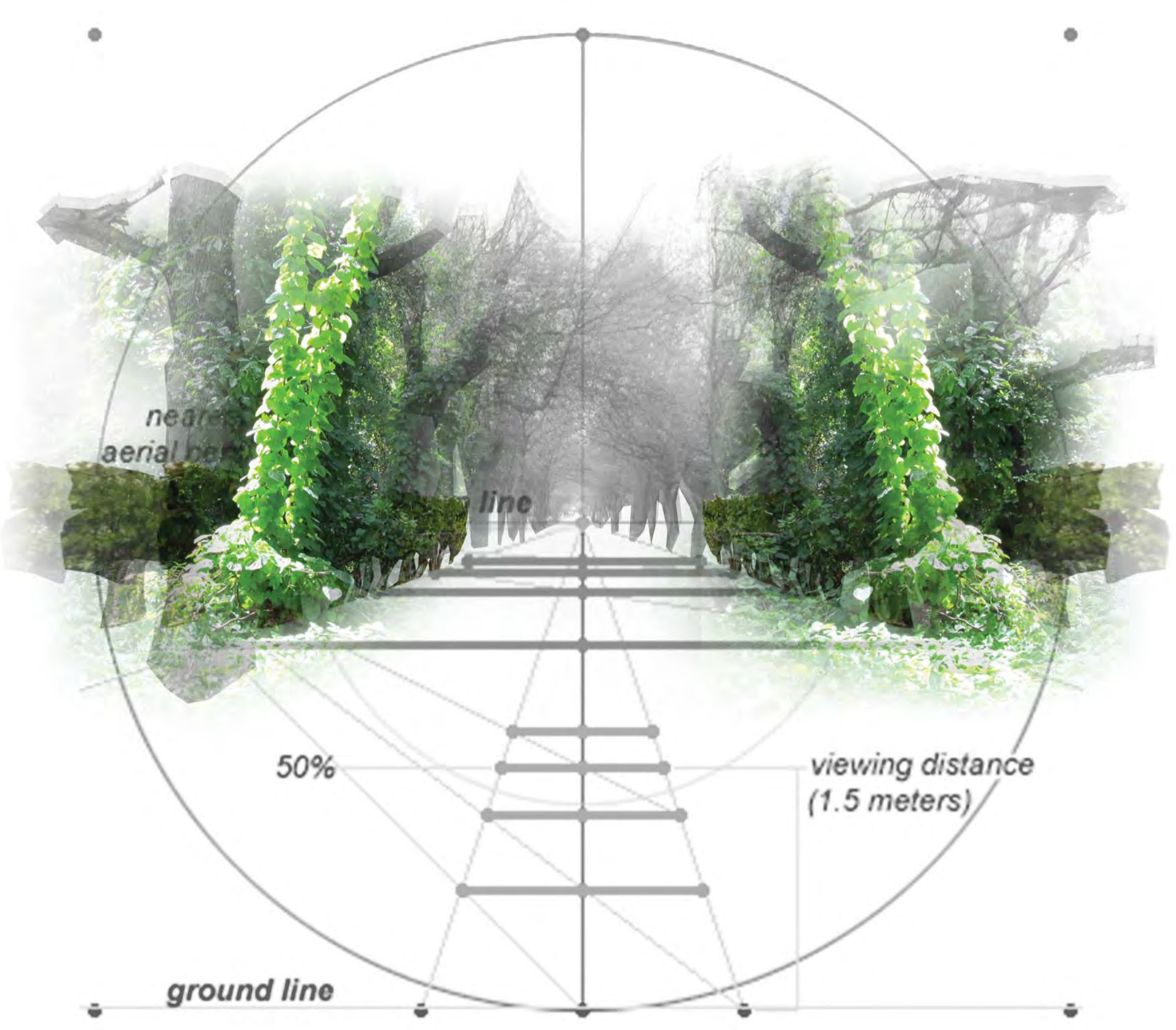
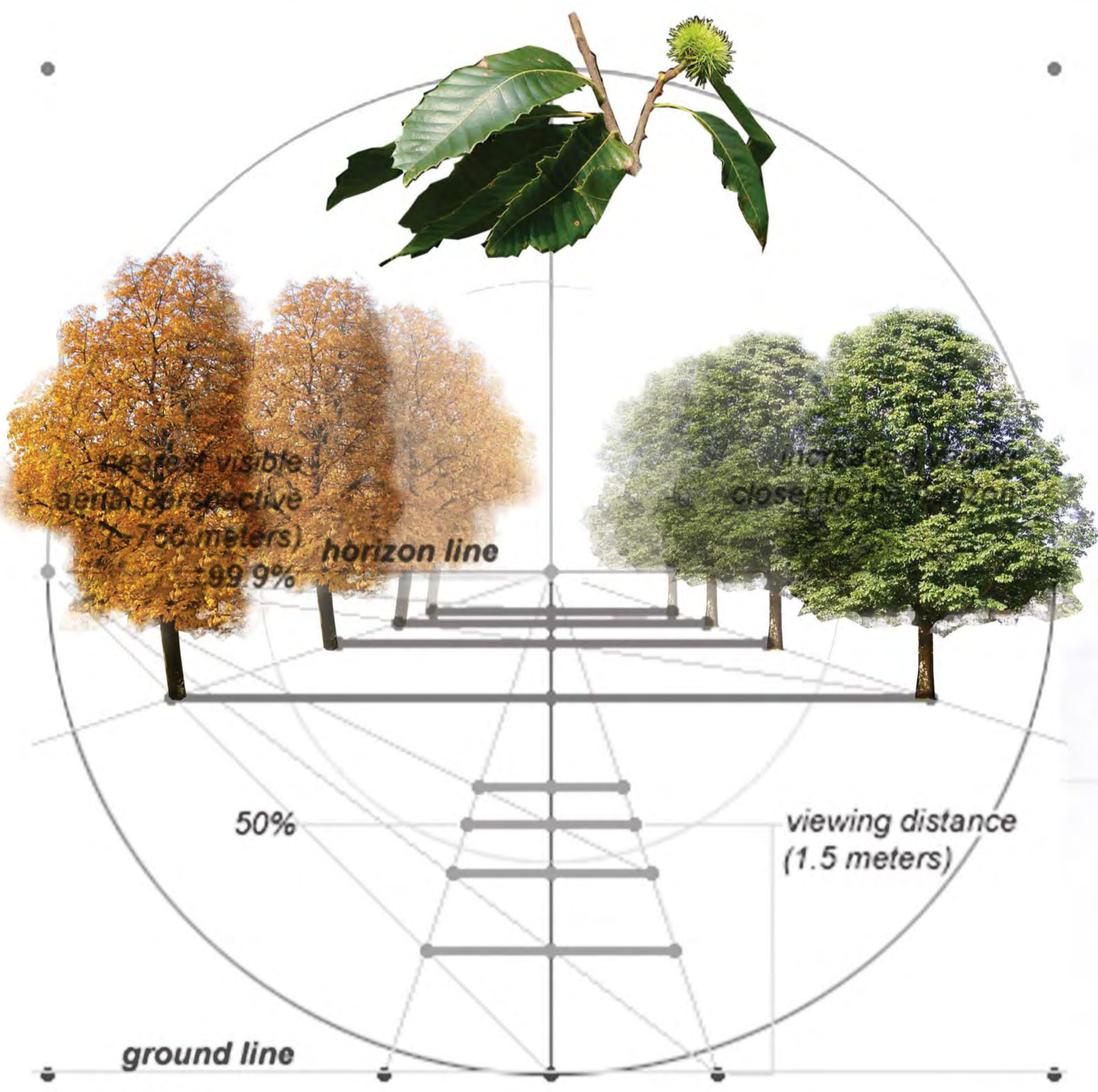
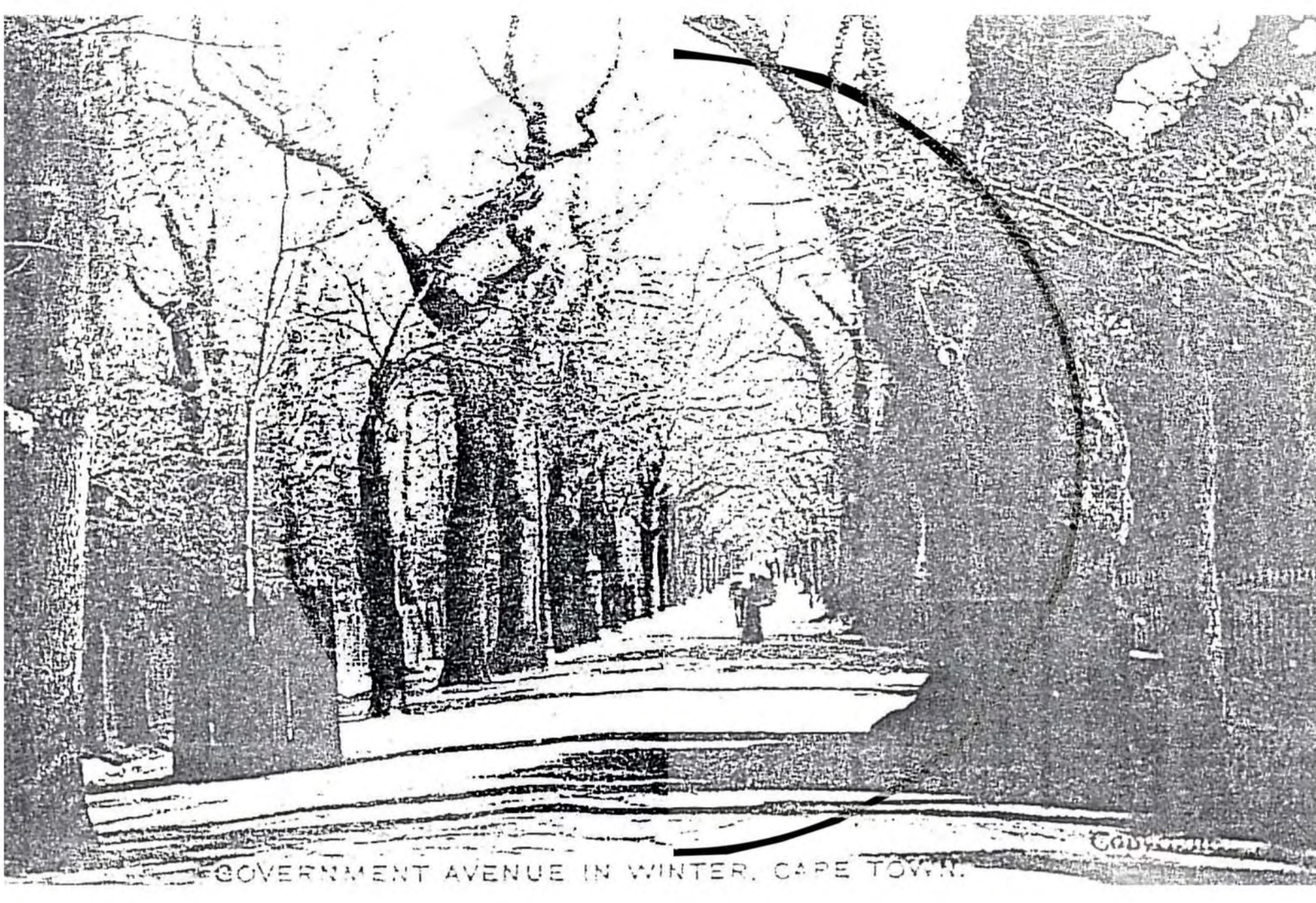
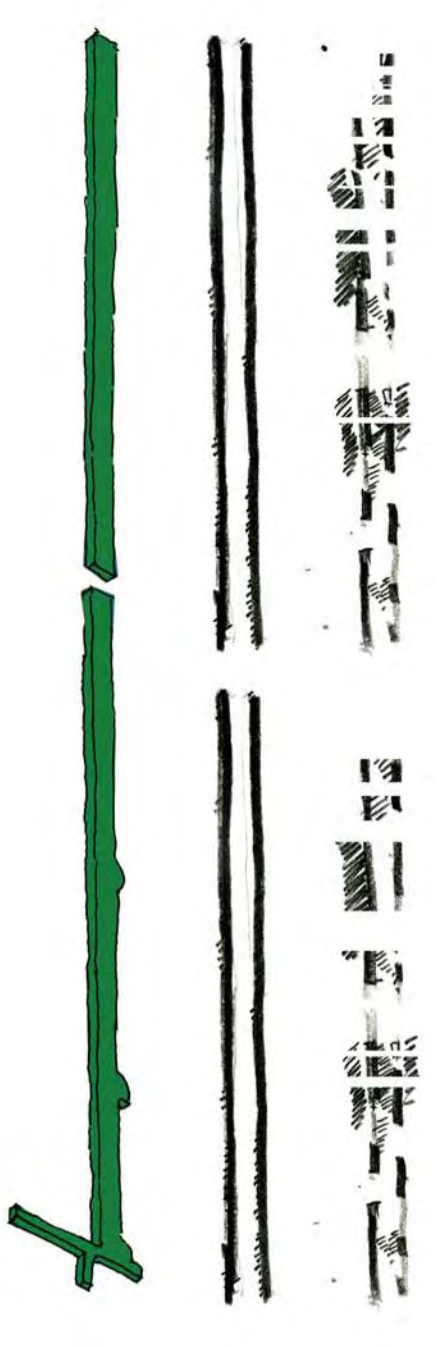


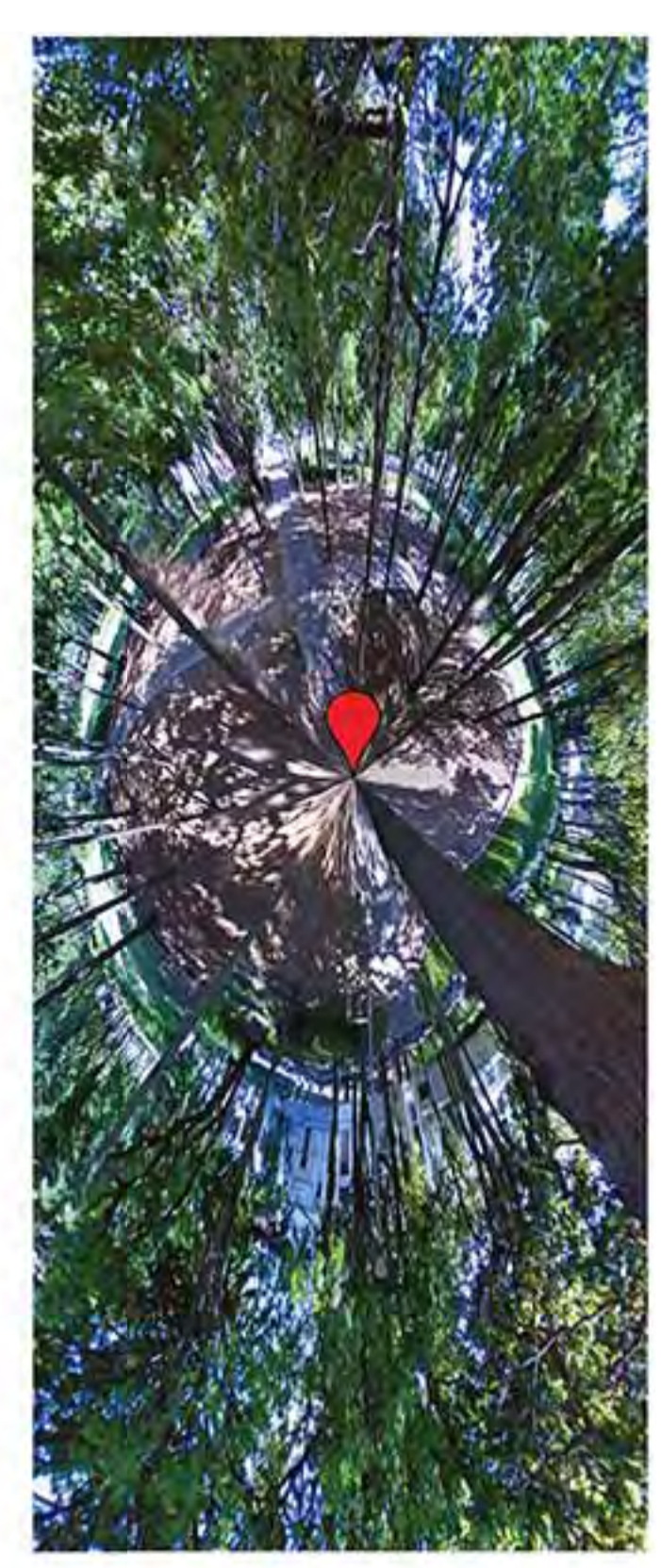
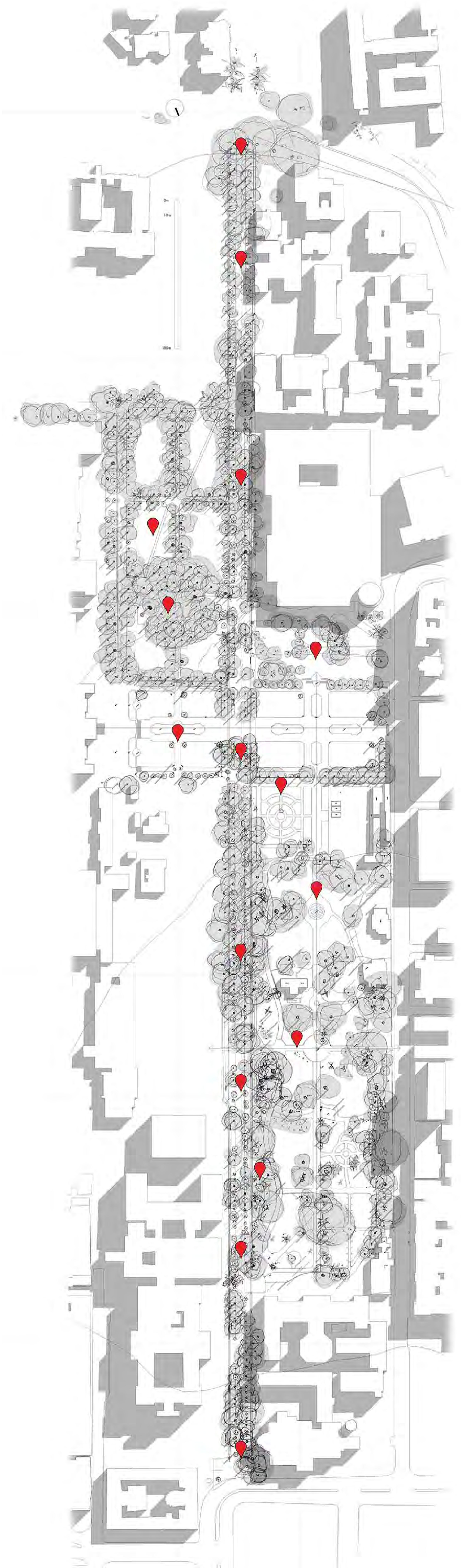
'Van Riebeeck's curse' killing off historic oaks in Gardens

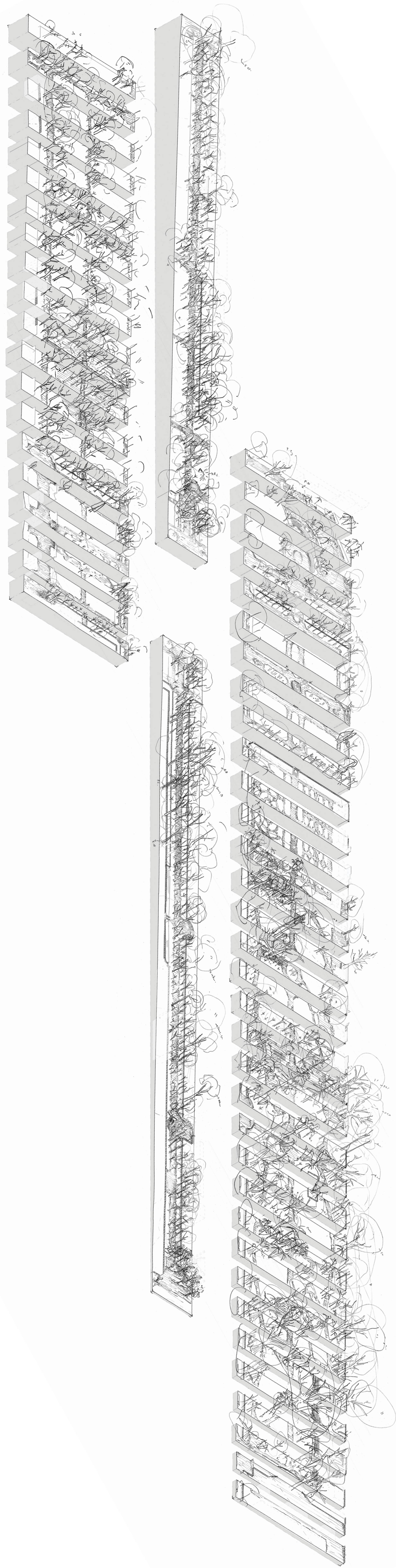


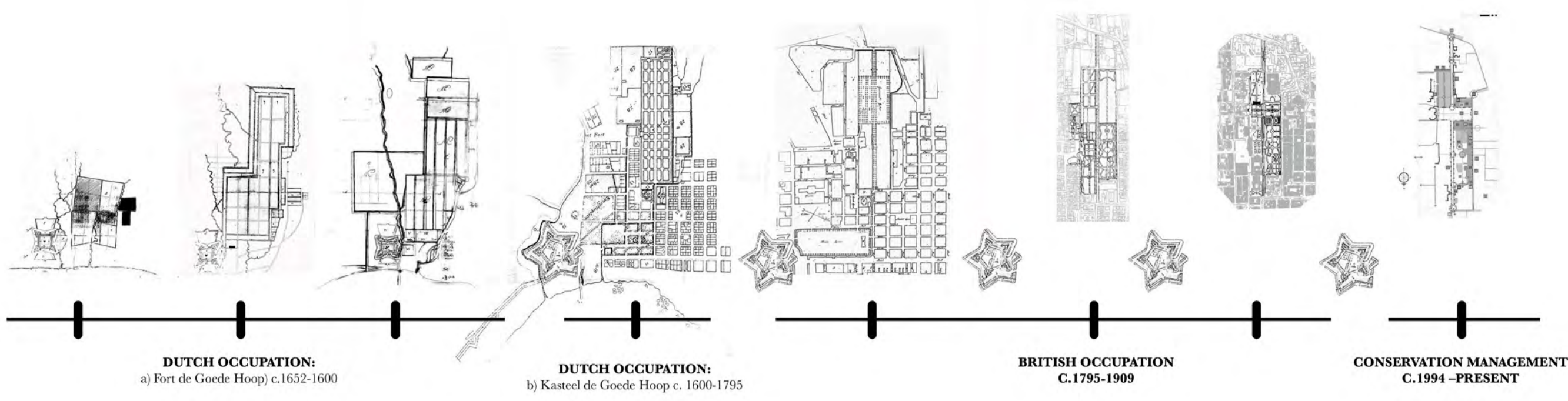
Can a pile of 300-year-old fungus be called a national monument,











'Van Riebeeck's curse' killing off historic oaks in Gardens

Can a pile of 300-year-old fungus be called a national monument,



Showaway: the mushroom-like fruit of the killer fungus

