Reviving the derelict

coexistence between man and the wilderness on a post-industrial site

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PART A

Research Studies

Dissemination

Reviving the derelict

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by

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Abstract

The aim of the research is to provide insight into the coexistence between wilderness and humans by viewing flora and fauna as primary *"clientele"* for architectural design. For this purpose, a roadstone quarry situated in Finglas, Co. Dublin is the chosen location to carry out research on these theoretical standpoints. The research focuses on the repurposing of this location back to its *"original"* state of a wild landscape utopia through the means of active rewilding techniques. A close selection of flora and fauna has been made, not only to aid nature's way back to recovery but also with the purpose of conserving endangered species introduced to the site. Furthermore, I have set out to recycle buildings, structures and materials available in the soon-to-be exhausted quarry with the purpose of providing areas for wildlife development & human recreation.

Declaration

I hereby certify that the material submitted in this dissertation toward the award of Masters in Architecture is entirely my own work and has not been submitted for assessment other than part-fulfilment of the award named above.

Signature of candidate: 

Date: 13/01/23

Acknowledgments

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Introduction

In this dissemination, I aim to explore the ideas of cohabitation and coexistence between human and natural realms. The idea behind the project is to prioritize the development of wilderness in a post-industrial zone while simultaneously providing areas for public engagement through recreation. The dissemination is thematically divided into three parts. The primary section on the topic of quarry revival will discuss the context of the research that commenced in semester two. The rewilding is examined through ecological regeneration techniques, research on vegetation and animal species that aid the biodiversity of derelict areas, as well as an understanding of native flora and fauna cycles. The rewilding techniques were applied to the post-industrial quarry site- Huntstown, situated in Finglas, Dublin. The following theoretical background examines the hypothesis behind cohabitation and the coexistence of human and animal species. The aim is to further explore the relationship between wilderness and cultivated zones and ways in which collaboration between the human and natural realm can be achieved in the scope of architectural design. The focus of the final theoretical background follows symbiosis between semi-domesticated honeybees and humans while exploring alternative beekeeping practices and beehive design. This hypothesis was crucial for the development of the architectural piece discussed in the final headings: *"research topic response*" and *"projected results"*. In the aforementioned final headings, I will discuss the process of harvesting material from the site with the aim of providing an architectural piece without the need for the importation of any additional material. Furthermore, the architectural piece is used by a beekeeper who observes honeybee populations and assembles beehives using material available on the site. The structure also provides areas for the habitation of animal and plant species. To conclude, this dissertation endeavours to highlight the significance of biodiversity, rewilding, and symbiosis thus creating awareness of the biological significance by discussing why the ecology must remain preserved.

The quarry rewilding

The term *"wilderness"* is described as *"a tract or region uncultivated and uninhabited by human beings"* (Webster, 2022) which implies a landscape in a pre-human state. On the contrary, Perino et al. (2019) consider *"wildness"* to be a result of the rewilding process managed by various ecological systems and influenced by anthropological activity.

As a starting point for the research of the site, I set out to explore the idea of bringing the landscape into a state of "wildness" through a set of rewilding techniques. The site on which these methods were applied is a 300-acre Huntstown quarry, which is situated in Finglas, Dublin. The process of stone extraction results in the alternation of ecology and wildlife of an area, demanding measures that can be implemented to repurpose the area into the "original" state of wildness (Noticenature, 2016).

In the process of rewilding, it is crucial to understand that the outcome can be achieved either through natural restoration or aided rewilding. The former *"passive rewilding"* implies minimal human intervention, resulting in ecosystems such as grasslands and scrublands which are crucial for birds and insects. Although natural regeneration might seem like an optimal choice, the technique not only risks the potential introduction of invasive non-native species and weeds, which subsequently restrict the expansion of biodiversity, but the process might also last several hundreds of years. Having explored the techniques of natural regeneration, I opted for an *"active rewilding"* approach which results in a more inclusive ecosystem, containing common animal classes such as insects, birds, amphibians, mammals, etc. (See *Figure I*), as well as native flora species that all form an important aspect of the wider biodiversity cycle (Prowse, 2004). Additionally, anthropological intervention is a crucial part of an *"active rewilding"* process as ecosystem restoration requires a detailed understanding of ecosystem deficiencies, measurement of impact, and development of recovery methods before rewilding commencement. The process also requires careful monitoring and frequent maintenance upon the restoration initiation (SER, 2017).

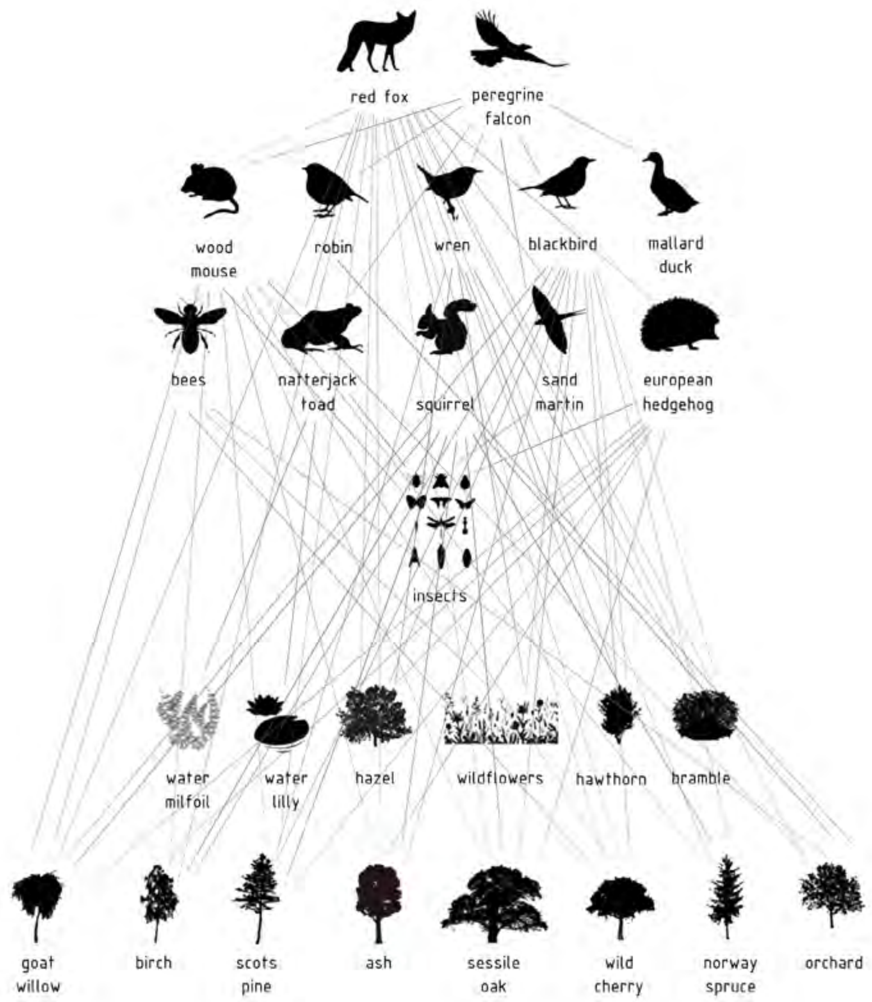

Figure I: Flora and fauna introduced to Huntstown quarry (author's own)

Furthermore, understanding that the process of ecological restoration influences wider biodiversity, it was crucial to establish the scope of wildlife that exists in the context of the Hunstown quarry site. *Figure II* illustrates the scope of flora and fauna that occurs in the surrounding context of Dublin, justifying the selection of wildlife introduced in *Figure I* as native species are fundamental in rewilding initiatives.

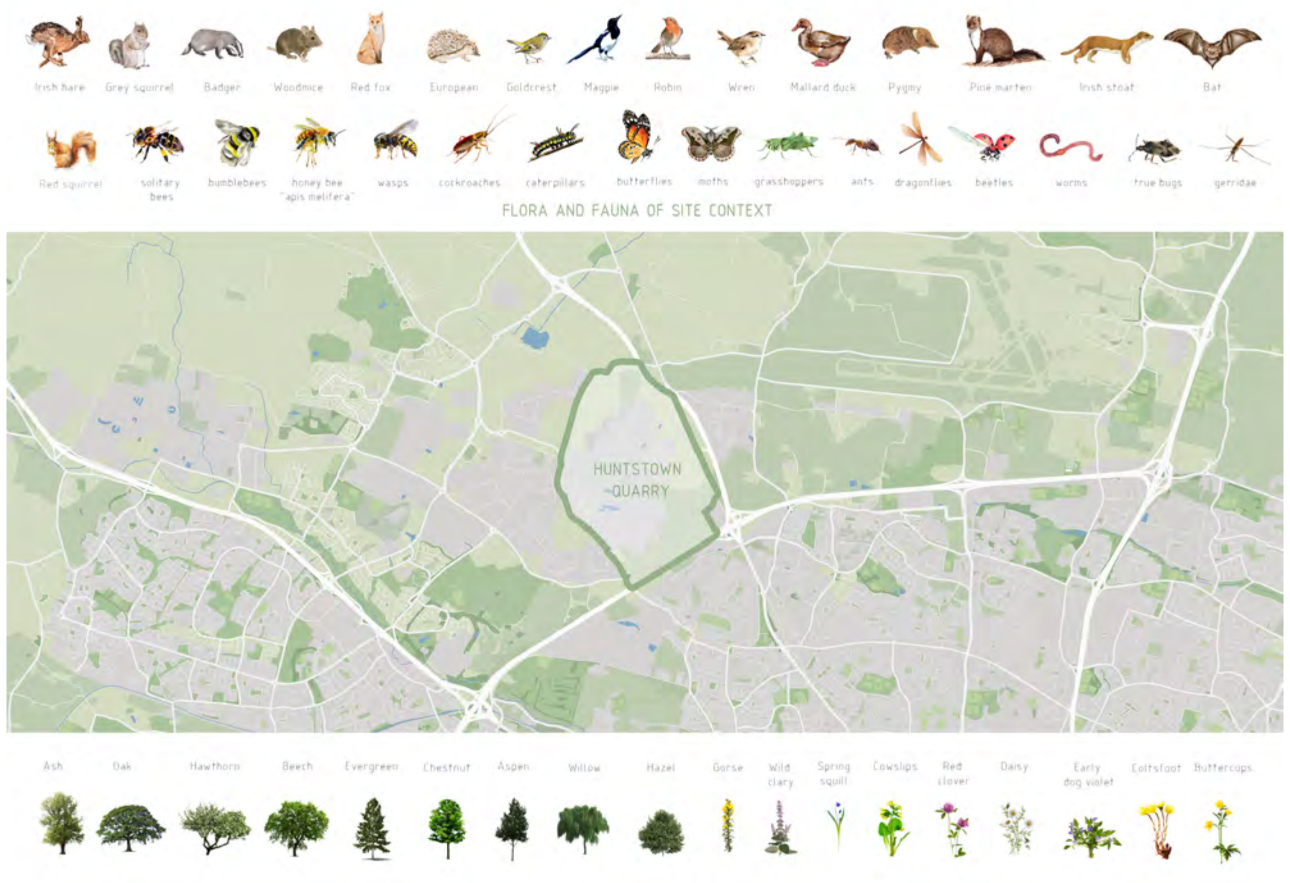

Figure II: Flora and fauna species native to the context of the Huntstown quarry (author's own)

The landscape of a former quarry establishes a crucial zone for declining species such as several hundreds of wild bee species, red squirrels, and sand martins, which due to lack of human interaction thrive in areas of former extraction sites. These animal species are crucial in the scope of rewilding as they aid the soil quality, planting distribution, and general biodiversity cycle (Noticenature, 2016).

However, restoring ecological habitats benefits both wildlife and society. It is crucial to recognize that ecosystems provide services that are categorized into four groups: provisioning services such as the production of goods, regulating services which include climate control, air quality & water regulation, supporting services such as soil formation, nutrient cycling, oxygen production, and finally cultural services such as recreational, religious and spiritual values (Daily and Matson, 2008).

When addressing benefits, it is worth including genetic reservoirs, which offer unique genetic patterns thus providing medicine, fiber and goods that humans currently consume. These essential goods are all under threat of disappearance due to the extinction of endangered species that are lacking ecological habitats. Furthermore, ecosystems offer zones of spiritual and social connections that support human wellness such as aiding with reduction of anxiety and depression (Apfelbaum and Chapman, 2014).

In order to create a successful and beneficial ecosystem, one must generate a broad knowledge of sowing techniques that aid soil regeneration. In accommodating the aforementioned flora and fauna species *(Figure I),* it is necessary to include three various vegetation conditions: wildflower meadows, scrublands, and woodlands (See *Figure III).* These conditions improve soil quality and create a diverse biological system. Additionally, it is required that 70% of all flora species are of native origin in order to provide a successful development of vegetation (Prowse, 2019).

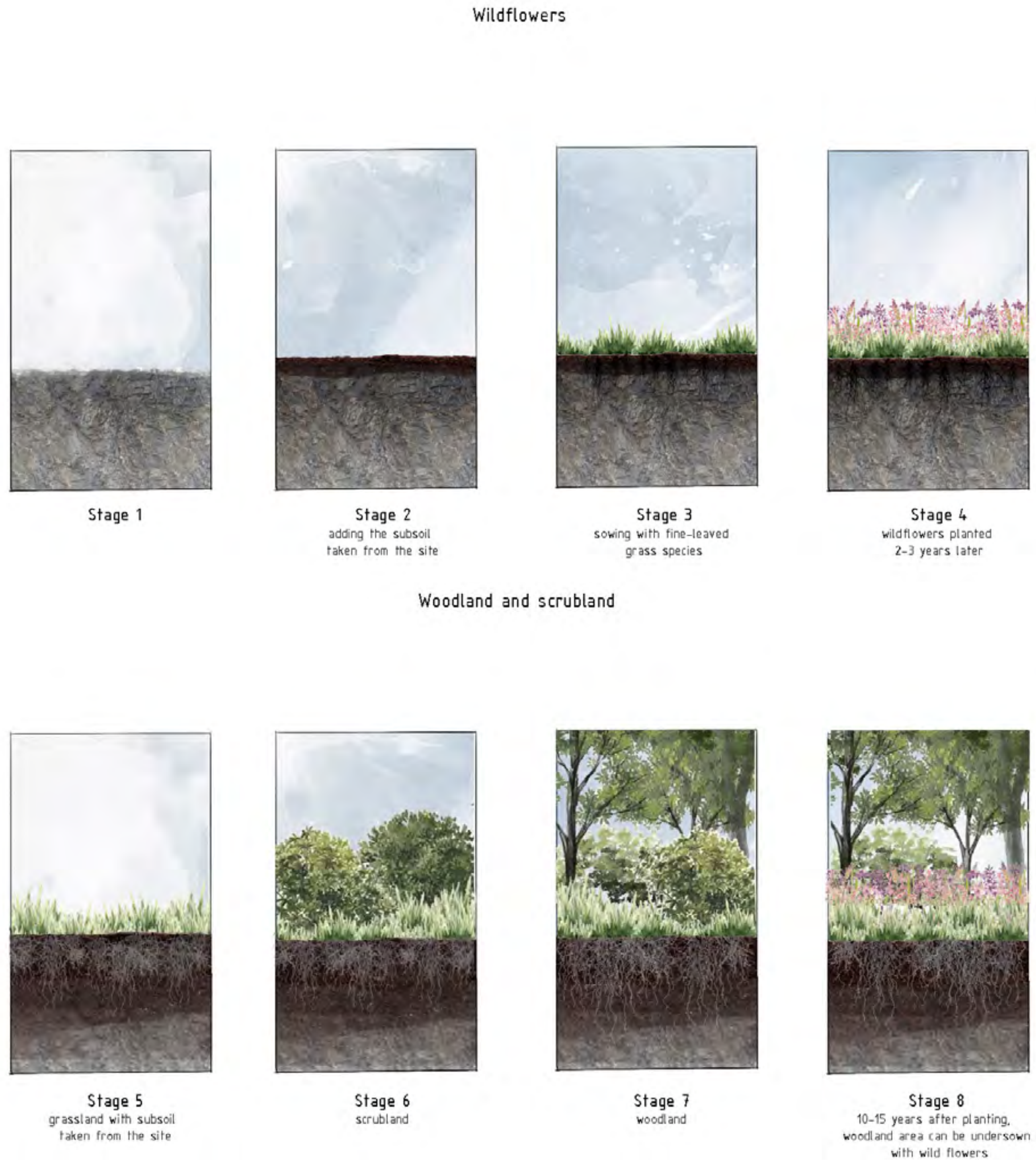

Figure III: Ground condition development for various vegetation types (author's own)

The observation of existing soil conditions and knowledge obtained on the topic of soil generation informed the zoning of vegetation as depicted on the Huntstown quarry site plan in *Figure IV*.

Figure IV: Present and future site plan including proposed flora (author's own)

Following the site plan, a comparative study of existing and future site conditions has emerged in *Figure V*.

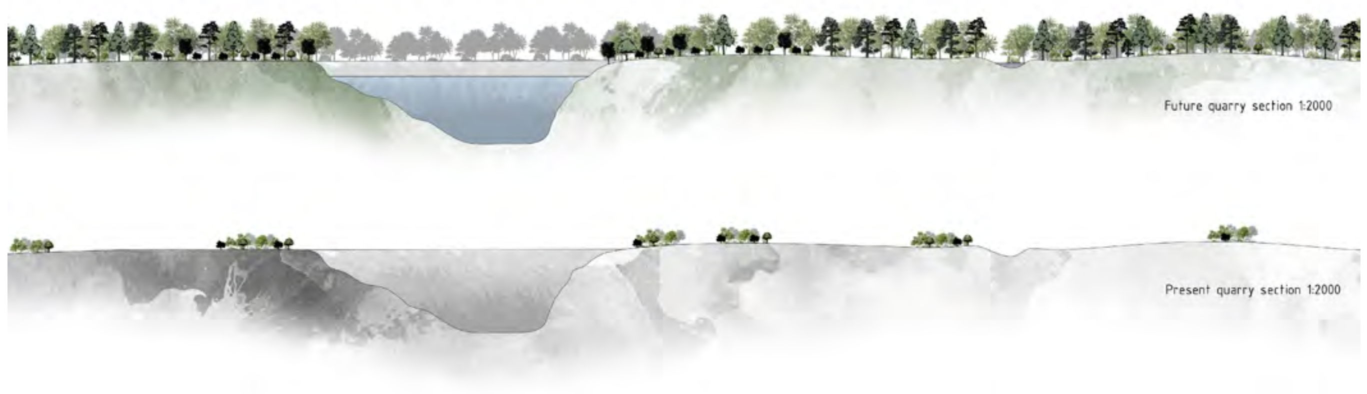

Figure V: Hunstown quarry section at present vs. the projected outcome 70 years into the future (presented as a result of the introduction of flora and fauna in *Figure I*) (author's own)

The literature that was critical at the commencement of research on the subject of rewilding techniques includes articles and books composed by restoration and wildlife organizations such as Heidelberg cement: *"Butterflies and other insects in quarries and gravel pits" (2016), "Biodiversity management in quarries and gravel pits" (2015)*, CIEEM: *"Using native flora for quarry restoration"* (2019), Notice nature: "*Wildlife, Habitats & the Extractive Industry*" (2016), and individual articles such as *"Conserving bees in destroyed landscapes: The potential of reclaimed sand and mines"* by Nicola Seitz (2019). These literary works held vital pieces of information on topics such as soil regeneration techniques and water management, ecological cycles, and biodiversity management. They broadened my knowledge about the types of flora and fauna that aid the restoration of derelict areas, thus standing as crucial pieces of literature in the early stages of design.

Having explored the scope of rewilding at the site level, I focused my attention on implementing humans into the scheme. The site is bounded by various levels of interaction, where the quarry will be dispersed into areas of *"wildness"* which implies minimal human interaction, public zones allowing for recreation and human immersion into nature, as well as private zones such as spaces dedicated to beekeeping which will be discussed in following sections. By creating zones, the site will have produced areas of various levels of interaction concerning both the needs of wildlife as well as humankind while both the wilderness and anthropological world benefit from mutual interaction.

Furthermore, ecologists such as Chris Thomas (2017) shared the position that human involvement with ecosystems has improved biodiversity through the past centuries, predicting a similar destiny: *"Come back in a million years and we might be looking at several million additional species whose existence can be attributed to the activities of humans"* (Thomas, 2017, p. 8).

In order to further develop the condition of the boundary between human and non-human it is crucial to delve into the theory of coexistence and cohabitation.

Cohabitation and coexistence

To reiterate, the term "wilderness" implies a habitat void of human contact, which draws a distinguished boundary between the human and animal realms. Although there is a distinction between anthropological and wilderness, it is evident that both benefit from mutual collaboration. As discussed earlier, humans benefit from numerous ecosystem services and wildlife benefits from human interaction such as wildlife monitoring, ecological restoration, preservation techniques, etc.

According to William Cronon (1995), romantics such as Immanuel Kant see the wilderness as a place in which one can be reminded of its mortality, contradicting the modern society's attraction towards primitivism where the remedy for an over-modernized world lies in returning to a more primitive way of life. Wilderness, which has presented uncertainty and unattractiveness in the past, is becoming an attractive bliss and an enticing alternative to the artificiality of modern civilization in which all species can collaborate and share an appreciation for the shared ecosystem.

There is a line of questions that emerges from observing the connections between human and non-human: Is there a point at which anthropological and wilderness overlap? Can animals and humans cohabitate? What is the threshold for successful cohabitation?

To answer the question of cohabitation, it is essential to understand the analogy between humans and animals. Many philosophers have been preoccupied with the idea of distinguishing anthropological from the wilderness with the aim of finding the origin of human superiority over other species. According to Agamben (2004), Aristotle depicts man as a *"living animal"*, a being with mastery of communication, social skills, and a capacity for political expression. Furthermore, he perceives a man as an overlap between human and non-human, making him a *"human animal"*. Furthermore, Alexandre Kojeve depicts human-animal as an anthropological creature, that through the act of mastery can destroy its own animality. There is an emerging link between the human and animal which classifies them into similar categories. Does that, in a broader sense, imply that design for human also entails design for non-human?

In *"Staying with the trouble"* (2016), Donna Haraway introduces the theory of *"string figures"* which is described as a mental frame that focuses on inter-species connections and relationships, thus emphasizing the theory of equal value. A connection can be drawn between human and non-human through the scope of architecture, whereas the latter provides a zone in which human and animal worlds overlap. Furthermore, architecture provides a space or merely a context for containing biological advancement, interspecies engagement, and social interactions, thus making architecture a secondary focus to the principal connection that happens between the two species (Ingram, 2006).

In this instance, architecture becomes a space that provides capacity for both. To be inside the enclosure, either a human house or a non-human nest is to be secure, enabling authority to either of the occupants. Can human and non-human inhabit an enclosure in which they share ownership?

Gunawan (2016) believes that human interaction with wildlife is tied to factors of control and perception, in which humans' perspective is influenced by the level of control they possess (See *Figure VI*). The domestic territory is seen as an emerging line of confrontation between the animal and human realm as adaptive animal species explore habitat opportunities. This is evident in the example of squirrels inhabitating the attics of domestic spaces in which the squirrels situate their nesting in a place that secures them from predators and provides insulating materials to keep their nestings warm (David, 2008). These conditions inadvertently invite wilderness into domestic spaces and to an extent, the two species already cohabitate in an adequate manner. Therefore, architecture is the key to proposing new ecological relationships between humans and the wilderness.

> *"We must consider the wall not only as a façade, but more significantly as potentially inhabitable membrane that can sponsor the propagation of living organisms." (Hwang, 2011).*

Figure VI: Level of control influences the perspective (Gunawan, 2016)

The literature that aided the knowledge of cohabitation and theories of equal value include: "*Staying with the trouble"* by Donna Haraway (2016), *"Inheritors Of The Earth: How Nature Is Thriving in an Age of Extinction"* by Chris Thomas (2017), and *"Feral"* by George Monbiot (2013). These literature pieces depict philosophical theories on the subject of ecology, cohabitation, and species cooperation. The authors voice their opinions on the importance of acting in the present rather than hoping for a utopian future.

> *"Staying with the trouble does not require such a relationship to the times called the future. In fact, staying with the trouble requires learning to be truly present, not as a vanishing pivot between awful or denic pasts and apocalyptic or salvific futures, but as moral critters entwined in myriad unfinished configurations of place, times, matters, and meanings."* (Haraway, 2016, p. 1).

Bees

Following the research on cohabitation, it is necessary to further delve into the ideology of coexistence. Similarly to cohabitation, coexistence is defined as a dynamic state in which human and non-human species can co-adapt to life in the wilderness governed by institutions that ensure steady population levels of wildlife, and tolerable levels of risk as well as social justice (Carter, 2016).

Haraway (2016) introduces the position towards shared lifestyle and species cooperation, through which she poses a theory that wilderness and anthropology are connected through the context of space: *"Nobody lives everywhere; everybody lives somewhere. Nothing is connected to everything; everything is connected to something"* (Haraway, 2016, p. 31).

Developing the idea of cohabitation/ coexistence implies research on human and non-human overlap in order to determine which species are suitable for the process of cohabitation (See *Figure VII*). In the comparative study, it was concluded that bees, birds, and squirrels are the most dependent on humans.

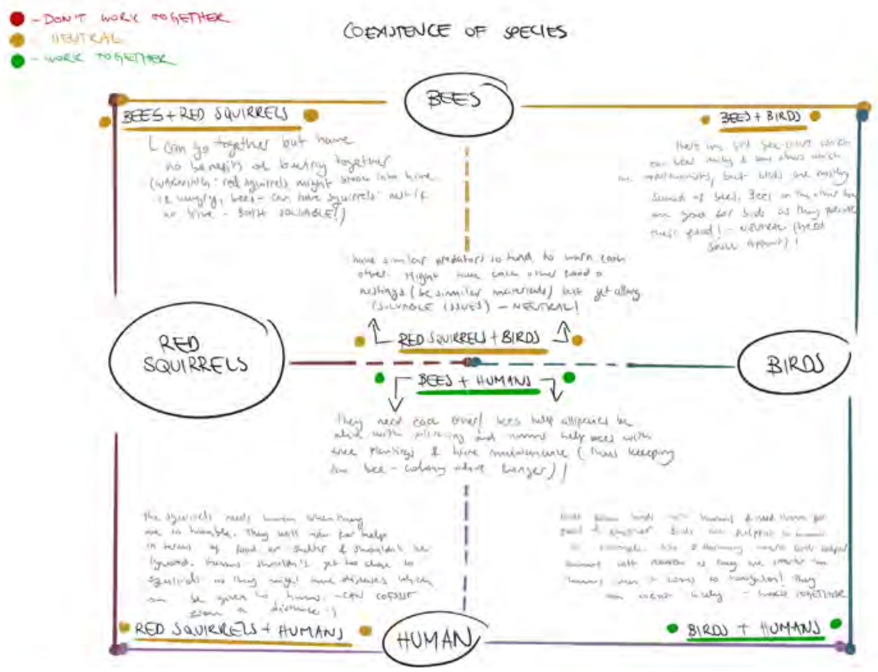

Figure VII: Comparative study of human and non-human in the context of cohabitation (author's own)

The species that were most interactive with humans were bees, more specifically the native Irish honeybee *"Apis mellifera"*.

The honeybees *"Apis mellifera"* are the only semi-domesticated bee species, implying that honeybees require human assistance to survive. Humans aid the bees via observation of beehives against pests such as Varroa mites and by ensuring the survival of the colony in the wintertime (Seeley, 2019). On the contrary, bees aid humans through means of honey production and pollination. Bees are the most effective pollinators and one-third of all bee species are currently threatened with extinction due to habitat loss that occurred as a result of food crops and nesting sites' absence. Furthermore, in order to be fertilized, 80% of vegetation is dependent on the process of pollination, and 33% of global food production is dependent on pollinators. The absence of bees would have catastrophic consequences for all living organisms on Earth, thus making it crucial to include bees in the planning processes (Hassett, 2018).

Seitz, et al. (2019) undertook a comparative study of bee populations. The study compared the number of bee populations in a roadside meadow and the former quarry site and the result demonstrated that more bee species were found on post-industrial sites as these habitats offered bare ground patches (habitat), food crops (planting), and minimal human intervention.

Following the research, a section of the Huntstown quarry site was dedicated to preserving declining honeybee populations (See *Figure VIII)*. The section was chosen for its soil quality thus forming a foundation for wildflower & seasonal shrub growth which enables honeybee populations to increase.

Figure VIII: Section of Hunstown quarry site plan dedicated to bees, the beekeeper, and for recreational purposes (author's own)

Additionally, a beekeeper space is introduced in the area dedicated to bees with the aim of beehive preservation through beehive maintenance, assembly, and monitoring of the declining bee population. To comprehend the depth of interaction between a beekeeper and a semi-domesticated honeybee, it was beneficial to research the beekeeper's activity throughout the year. Additionally, the research informed the scope of seasonal vegetation essential for enabling food sources for bees throughout the year (see *Figure IX*).

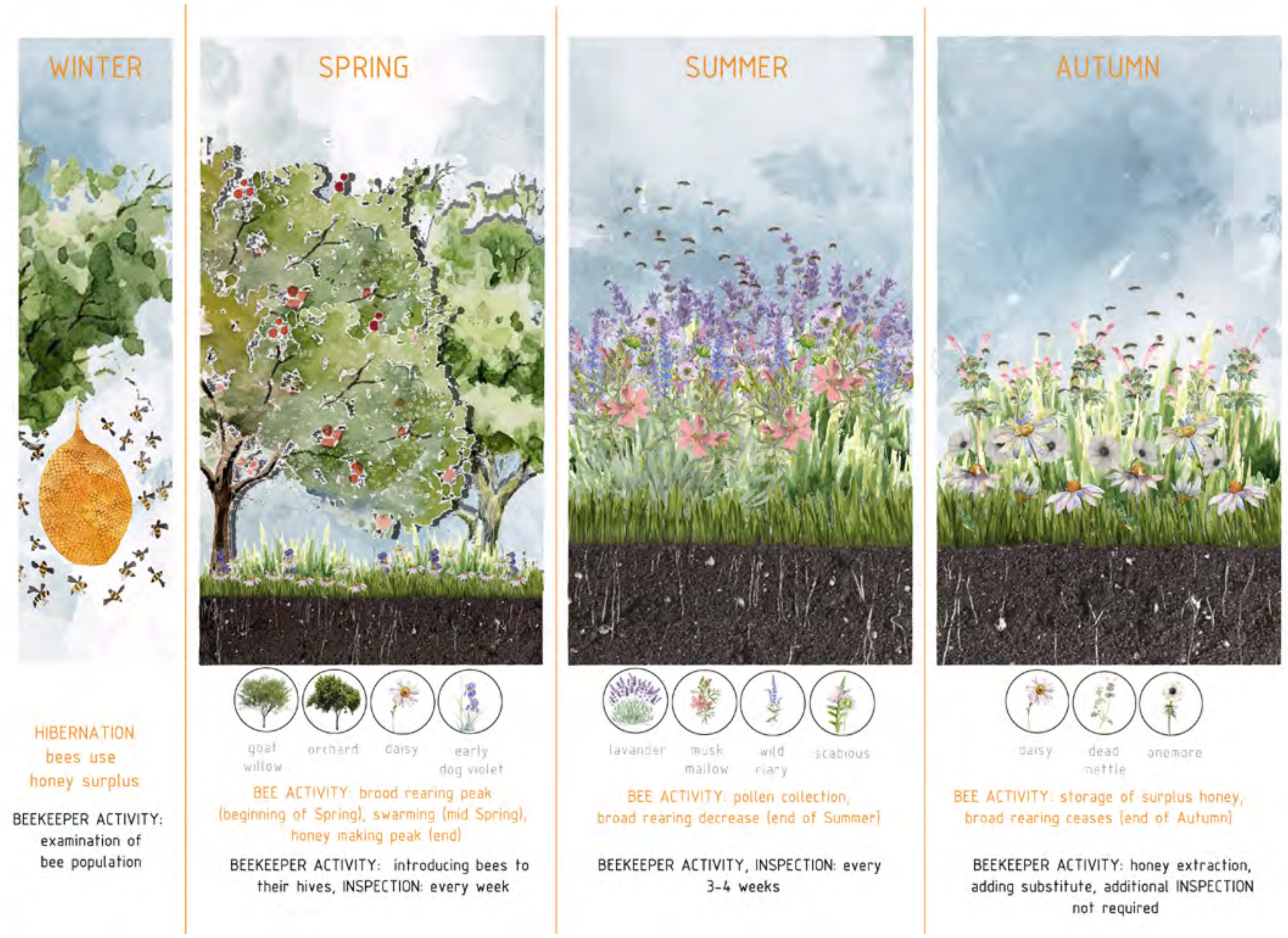

Figure IX: Bee's seasonal food source introduced to the site and beekeeper's activity (author's own)

One of the beekeeper's roles on the site includes beehive assembly. Upon the research of beehives and bee activity, it was concluded that the typical Langstroth beehive has various drawbacks such as disabling natural comb production due to its rectangular shape, short material life span, and overproduction of honey resulting in exploitation of bees (Fikadu, 2018). Considering the aforementioned disadvantages, Mancke (2005) has proposed an alternative beehive *"the sun hive" (See Figure X).* The idea behind the sun hive is that it prioritizes colony health rather than honey production and it follows an organic beehive form allowing for natural comb development. Additionally, the hive doesn't include the queen excluder thus enabling unrestricted colony movement. Mancke's beehive was introduced to the site not only for its aforementioned advantages but also because the hive enables assembly in Huntstown quarry as materials required are available on the site.

The hive is constructed from rye straw, mud, recycled timber posts, and drystone wall (see *Figure X*) which are selected for their availability on the site.

Figure X: The sun hives introduced to the site (author's own)

Assembly of *"the sun hive"* requires a number of tools demonstrated in *Figure XI*. The tools are required for the construction of the beehive skep, honeycomb arches, hive structure, and fastenings, as well as harvesting materials and sculpting. Additionally, the diagram illustrates the equipment necessary for monitoring and maintenance of beehives following the assembly.

Figure XI: Beekeeper's tools (author's own)

In terms of literature that aided the knowledge of bee species and lifecycles, literary pieces such as "*The Lives of Bees: The Untold Story of the Honey Bee in the Wild*" (Seeley, 2019), *"The Sun Hive"* (Mancke, 2005) online articles such as *"Why bees are essential to people and planet"* (Bartlett, 2022) and beekeeping forums were effective as they offered a personal experience into the world of beekeeping which informed the decisions of beehive selection, location and introducing a beekeeper to the site.

Concluding theoretical backgrounds of rewilding, cohabitation, and beekeeping, the following section contains implementations of the aforementioned theories into an architectural piece.

Research topic response

Knowles (2006) states that the building systems isolated the human population from the wilderness, however, he aims to depict how the architect can reconnect humans to the landscape through structures that enable creativity and ecological balance. Through a detailed investigation of *"moments"* of building systems, Knowles states that one's surroundings (both architectural and ecological) depict the intuitive rituals one might gain. The rituals are obtained through individual responses to the ecological rhythm. Additionally, he believes that by introducing nature into architectural design one can create sustainable shelters, resulting in unique pieces of architecture. In order to reach fulfillment one must immerse oneself in wildness and nature.

As mentioned before, following the ideologies of ecological preservation aiding the establishment of zones in which flora and fauna become the primary focus of the design process. As research has led me to the preservation of honeybee species, I set out to repurpose an old canteen and storage building into a beekeeper's workshop (See *Figure XII*). The aim of the intervention was to create an area that provides research spaces, workshop zones, storage rooms, and cohabitation zones for birds, mammals, insects, and vegetation. The building was selected for its unique spacial arrangement which consists of thermally insulated space on the southwest formerly used as a canteen and the southeastern uninsulated space which was used for storage. Additionally, the shape of the building allows for a courtyard space in the northeast. The nature of form and spacial organization allowed for beekeeper's rituals. The courtyard affords an important aspect of beekeeping as it provides shelter for newly caught swarms in the spring, a period in which the courtyard area becomes a temporary habitat for bees before introducing them to permanent beehive habitats. The main threat to swarms is wind as it creates an imbalance in the swarm temperature (Seeley, 2019), and the nature of L shaped structure creates a boundary between swarms and prevailing southwestern winds (MET, 2021). The swarms are kept in bee catchers in the courtyard for up to a week after being captured (Mancke, 2005). Additionally, the courtyard space is used as a gathering space for materials and the main workshop area. The southeastern interior area is used to provide storage areas for beekeeper's equipment such as skeps, catchers, beekeeper's suits, etc.

The insulated room on the southwest provides a temporary rest area and an enclosed workshop space, which are both provided as alternatives to an external courtyard area. Additionally, all furnishings are reused from the surrounding post-industrial buildings.

Literature such as Kiel Moe's *"Unless"* (2021) depicted the immense impact that design process has on the ecology, society, and economy, emphasizing the incredible amount of energy, materials, and labour involved in the process of building a singular piece of structure. This ideology has inspired the standpoint of repurposing post-industrial buildings available on the site. In the reusing of the canteen building, a couple of interventions have been made: an additional opening connecting interior and exterior workshops, a dry stone wall outlining the private beekeeper zone, and an additional elevated roof. *Figure XIII* illustrates the source of materials that are used for the repurposing and techniques for their assembly.

Figure XII: Canteen building repurposed into beekeeper's workshop space (author's own)

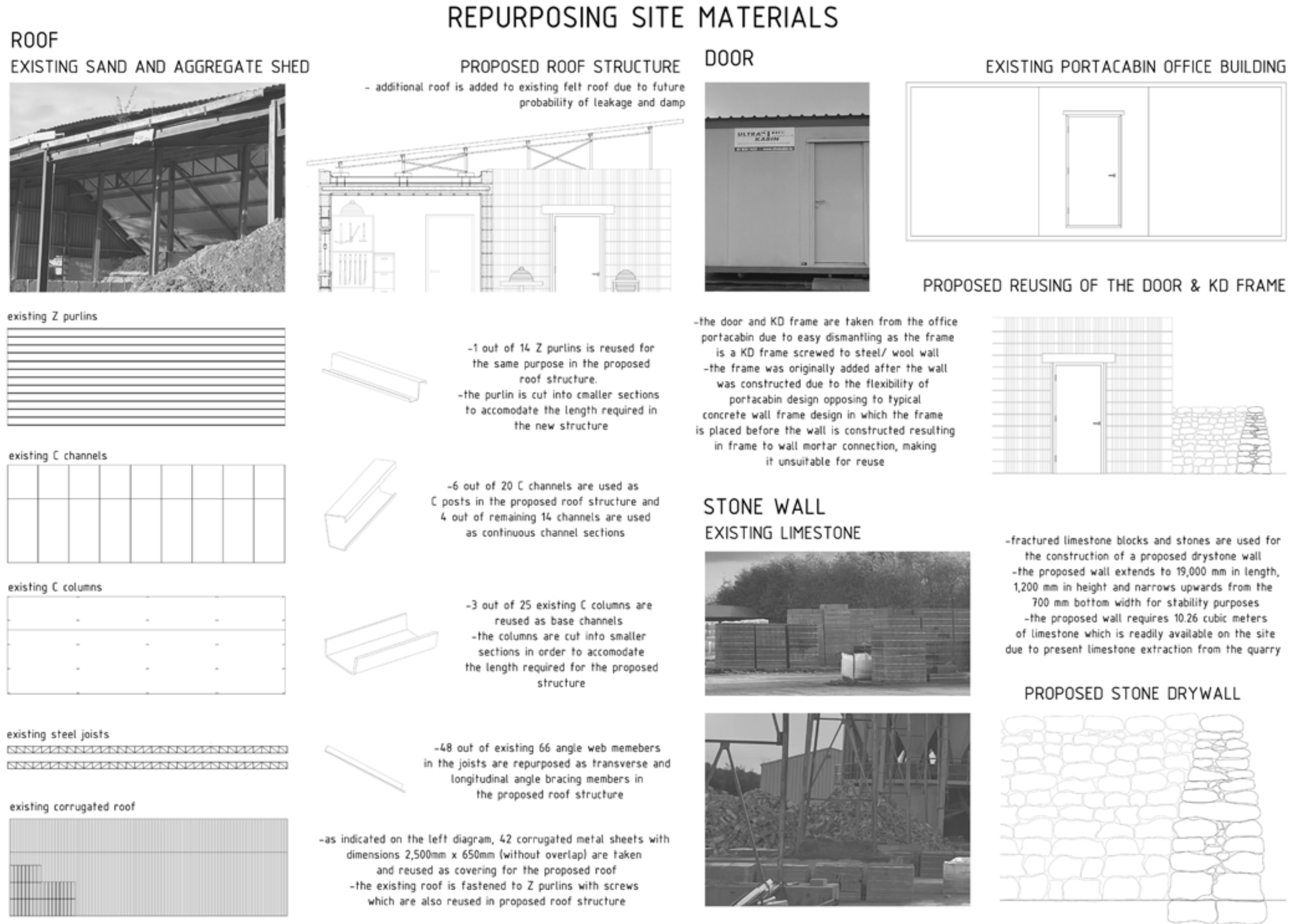

Figure XIII: A variety of repurposed material used in the proposed beekeeper's workshop (author's own)

When considering additional roofing, it is beneficial to include that the existing flat roof consists of felt roofing material which has a 20-year lifespan (Mccabe, 2016). The industrial buildings on the site have been constructed in 2004, implying that by 2024 the existing roof will have warped due to weathering causing dampness and leakage (EPA, 2011). By reusing materials from sand and aggregate shed, an additional roofing layer has been placed on top of the existing flat roof. Materials that have been repurposed include corrugated metal panelling, purlins, joists, bracing elements, columns, and fasteners (See *Figure XIV*). The elevated roofing also allows for various bird nesting habitats and shelters (See *Figure XV*).

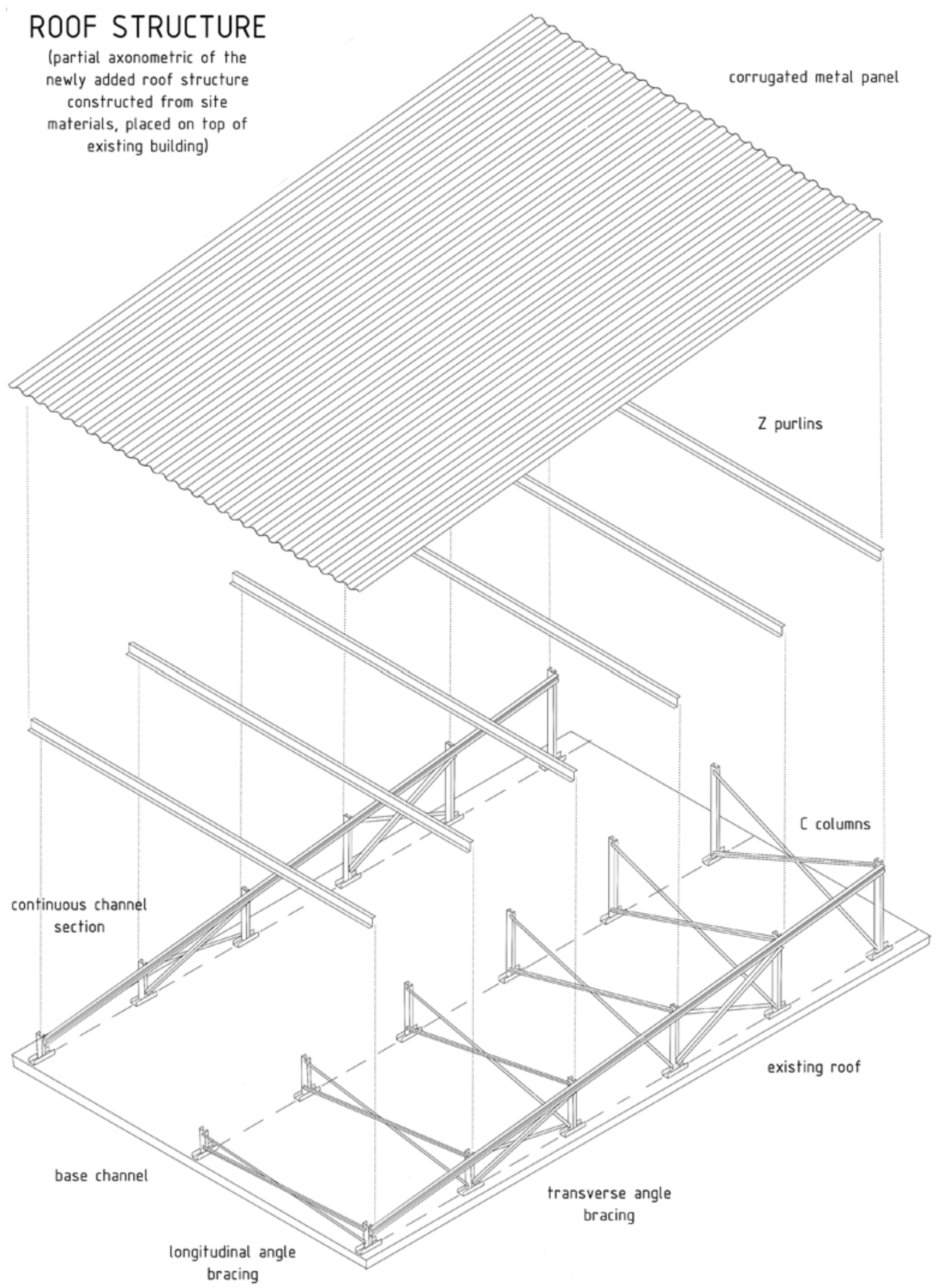

Figure XIV: Additional roof structure (author's own)

Figure XV: Bird habitats sheltered with the proposed roof (author's own)

Furthermore, an opening was created in the existing beekeeper's workshop connecting the internal workshop and external courtyard providing access between two zones. It was essential to establish the connection between the two workshops while they both provided areas for beehive assembly and material gathering. The door and the door frame were taken from an existing portacabin which allows for effortless dismantling, while the door frame is a knock-down frame joined to walls by fasteners only.

Additionally, the proposed drystone wall creates a boundary between public areas for recreation and private areas dedicated to beekeeping. The dry stone wall is assembled from limestone blocks and stones which are excavated from the south quarry. An introduction of dry stone walls or *"linear nature reserves"* enables habitat for various flora and fauna species. The narrow cracks between stones allow habitation for insects such as solitary bees, ants, spiders, caterpillars, woodlice, and spacious cavities provide nesting spaces for species such as wrens, mice, shrews, and lizards (See *Figure XVI*). Damp and shaded areas of the walls form a foundation for moss and liverworts, while plant species such as lichens adopt surfaces exposed to the sun (DSWA, 2007).

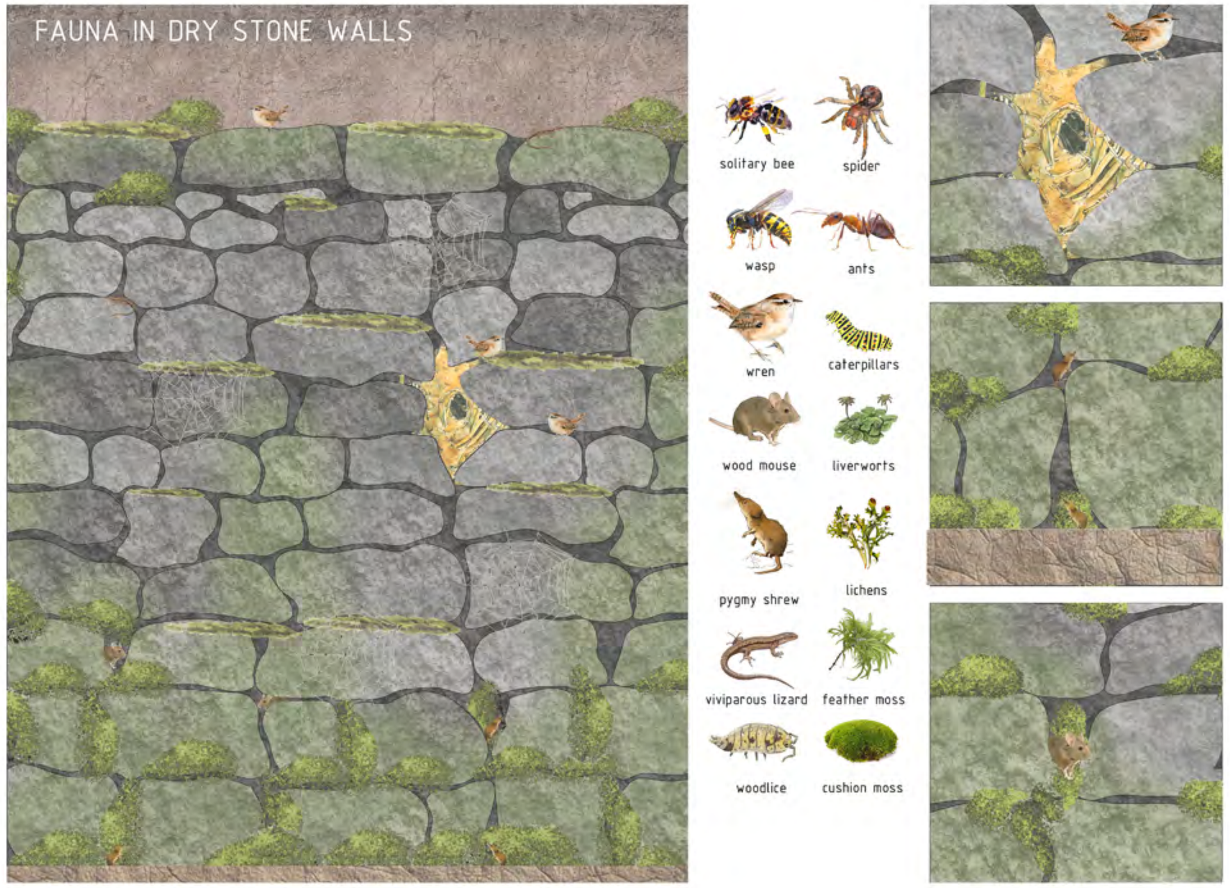

Figure XVI: Biodiversity in the dry stone walls of Huntstown quarry (author's own)

It is evident that the response to the research topic is achieved through drawing methods depicting various scales such as regional, site, building, and detail. The difference in scaling aided design choices as it inspired consideration of architectural intervention on the ecology, wider biodiversity impacts, flora and fauna species as well as humans. It is evident that architectural design impacts biodiveristy, and it is crucial that one considers wildlife as an immensely valuable *"client"* which is greatly affected by the consequences of human intervention.

> *"The wildlife and its habitat cannot speak, so we must and we will."* (Theodore Roosevelt)

Projected results

> *"The historical link between animals and architecture is as long and as old as society. From its early beginnings, evolving out of the agrarian huts of early human societies, architecture has been silently devoted to managing human and animal life"* (Dodington, 2014).

The research aims to rethink the idea of common human-dominating architecture. It is crucial that one familiarises oneself with the benefits of human-wildlife collaboration and recognizes that cohabitation between the two is presently existent, and not a theory for a distant future. Furthermore, understanding the scope of influence that the animal realm holds, not only on ecological cycles but also on human wellness, will aid in raising awareness of human-animal interconnectivity. Additionally, it is important to consider literature such as the aforementioned *"Unless"* (Moe, 2021) so that architects can familiarise themselves with the immense ecological consequences that the design process imposes.

The result of this project and dissemination is to inspire the non-architectural and architectural reader into rethinking the idea of dwelling as a design solely for humans, raise awareness of the declining species and inspire the reader to consider the scope of biodiversity that surrounds urban and sub-urban areas. Furthermore, the dissemination aims to inspire the reader into repurposing rather than disposing and also making alterations to their domestic space that might inhibit various wild species, which is a step towards achieving a sustainable environment.

Finally, I envisage that my research would incite architects to reconsider the scope of the impact architectural design imposes on biodiversity. Furthermore, ecologists will find the dissemination resourceful as the research is based on habitat restoration and wildlife preservation in the scope of architecture. Finally, I believe that the dissertation would provide food for thought for any reader in shifting perspective from human-dominated to considering wildlife inclusion on a global and domestic scale.

In summary, *"Rewilding is not about abandoning civilization but about enhancing it. It is to 'love not man the less, but Nature more"* (Monbiot, 2013).

Figure XVII: Rewilded Huntstown quarry (author's own)

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PART B

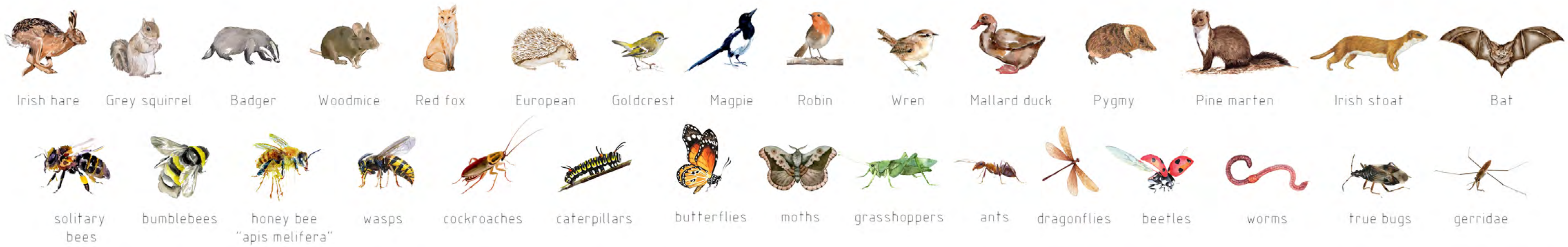
Architectural Research Design Studio

ADRS Project

Site research

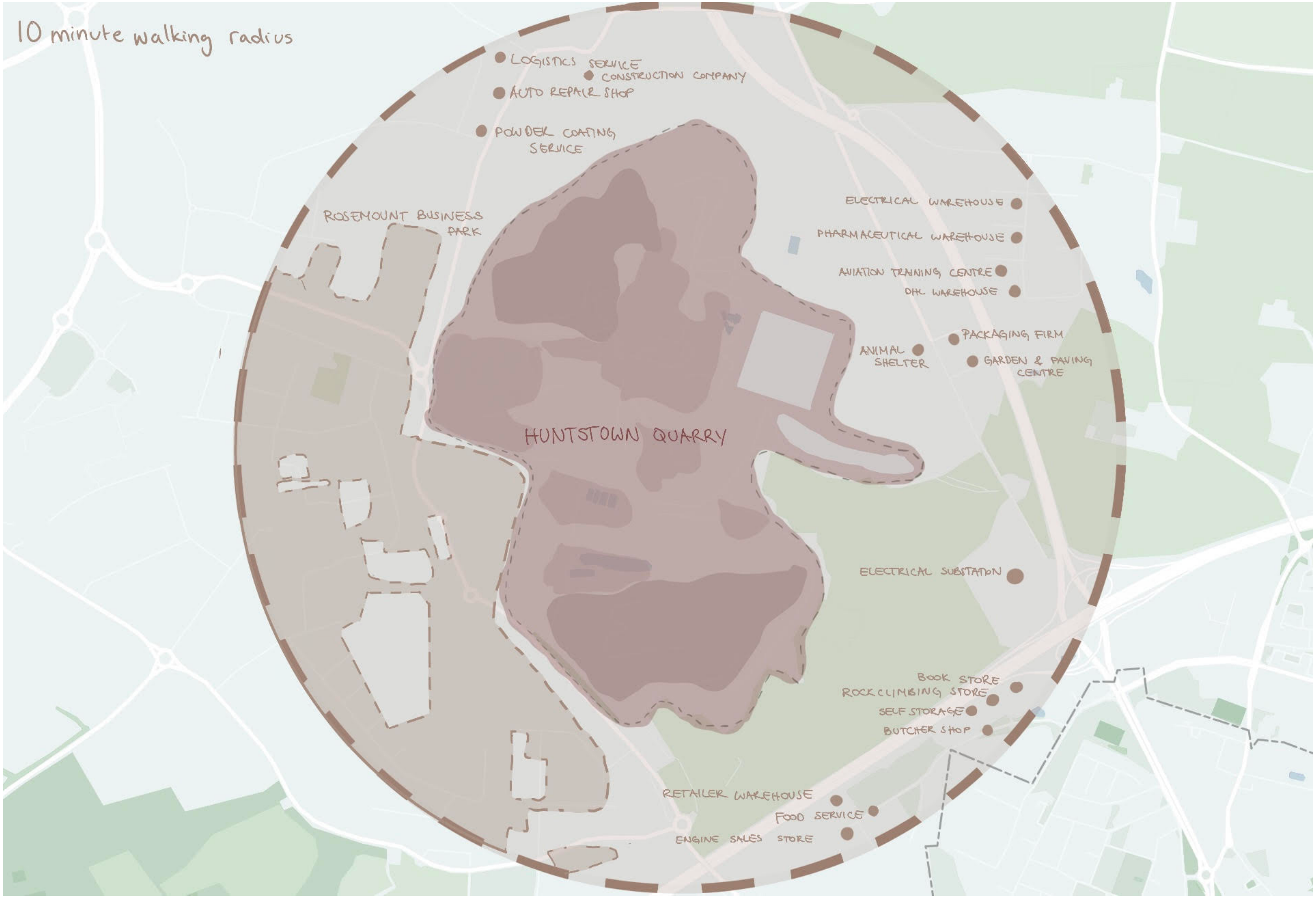
Context of the Huntstown quarry, site analysis

Semester 2 & 3

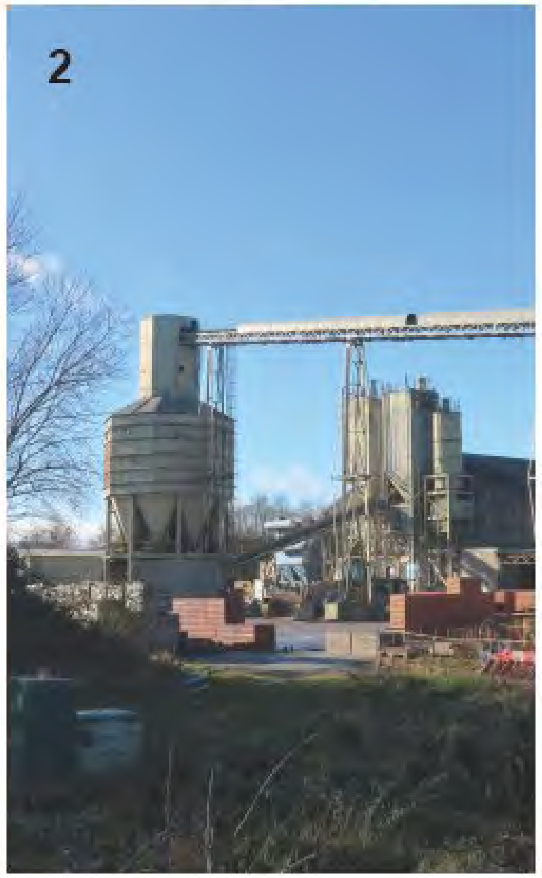


FLORA AND FAUNA OF SITE CONTEXT

RESEARCH
(STUDY OF THE SITE CONTEXT)

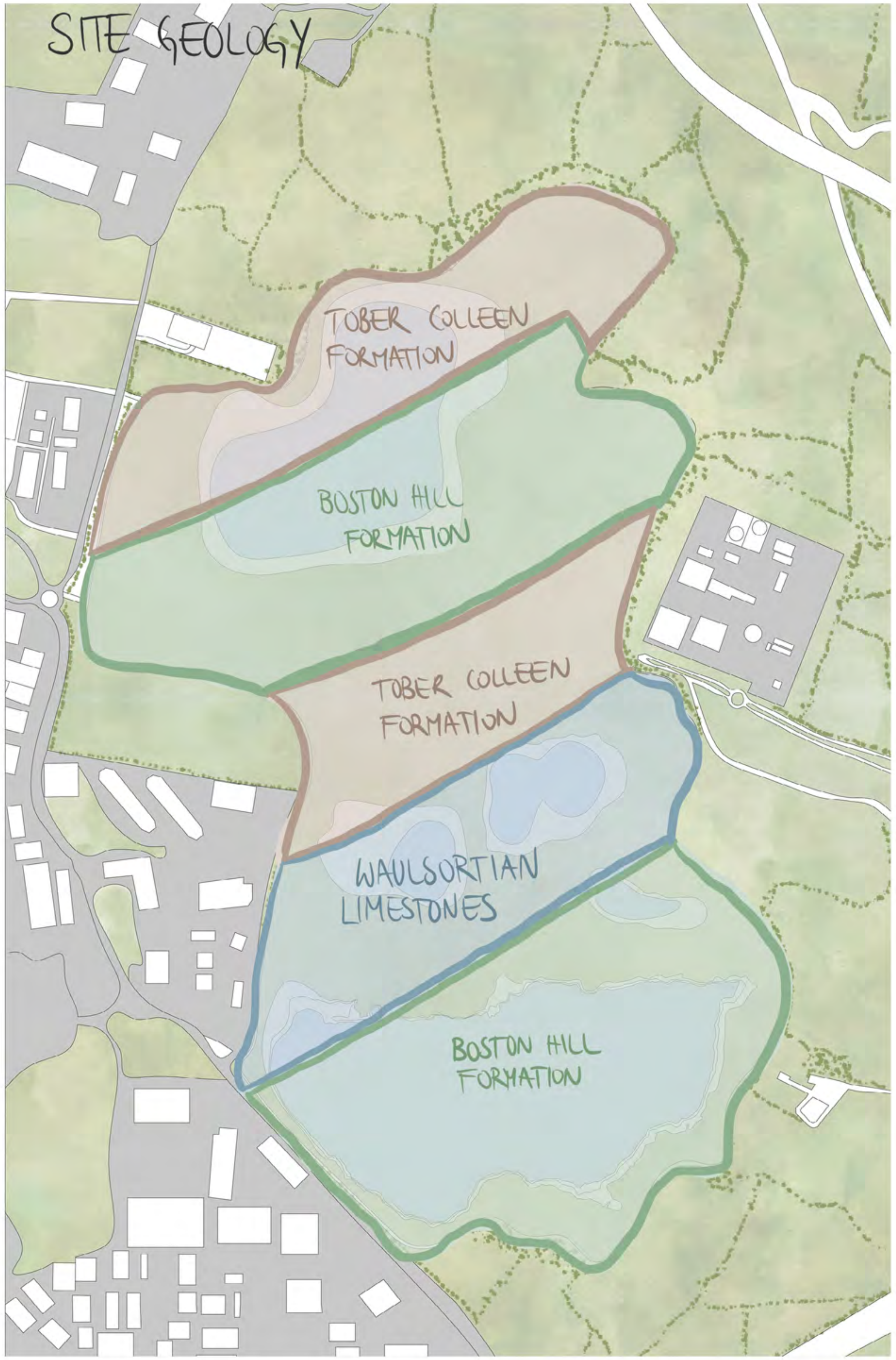


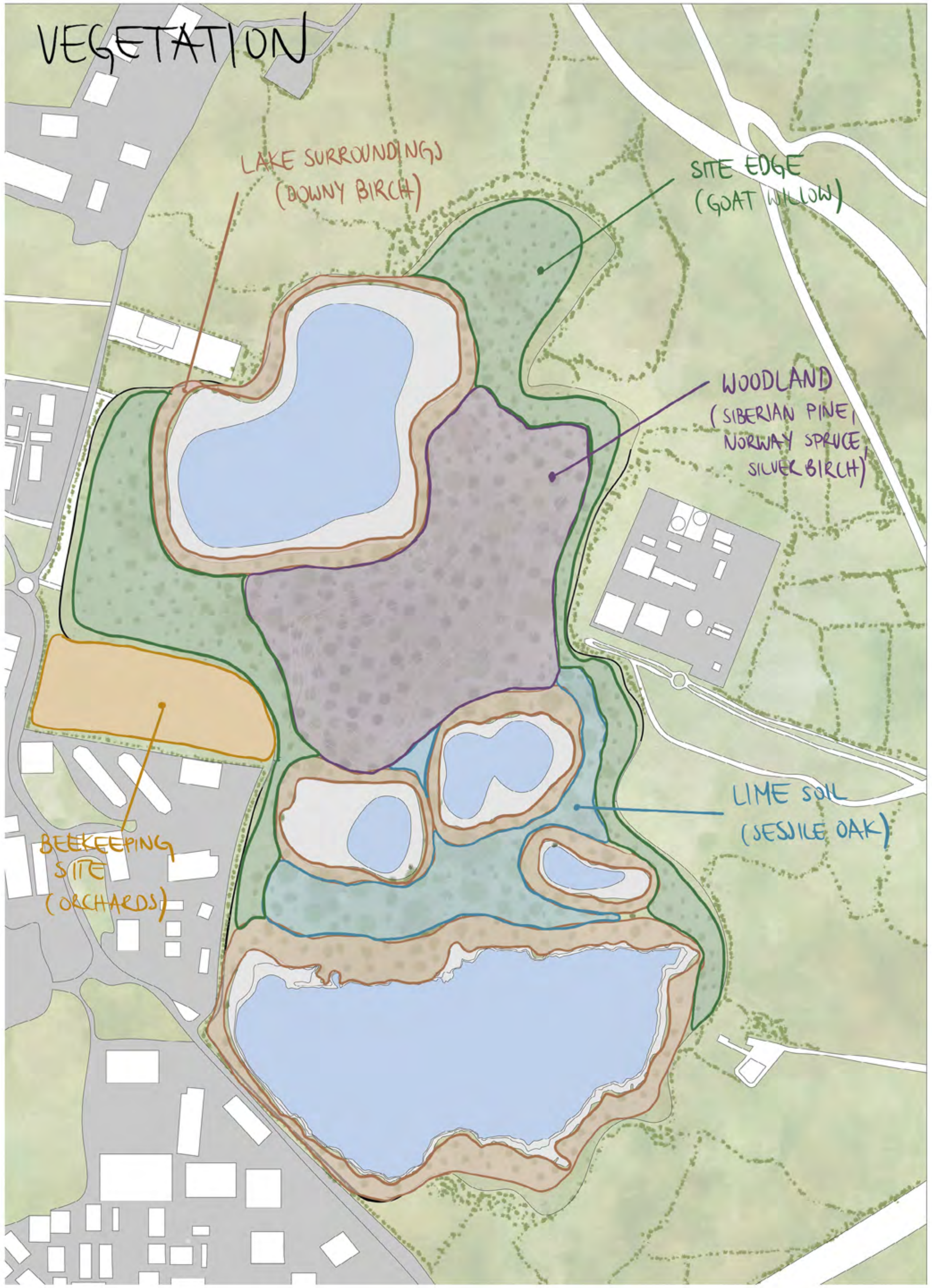
SITE PHOTOS



RESEARCH

(ANALYSIS OF THE SITE GEOLOGY AND ROUGH SITE PLAN)



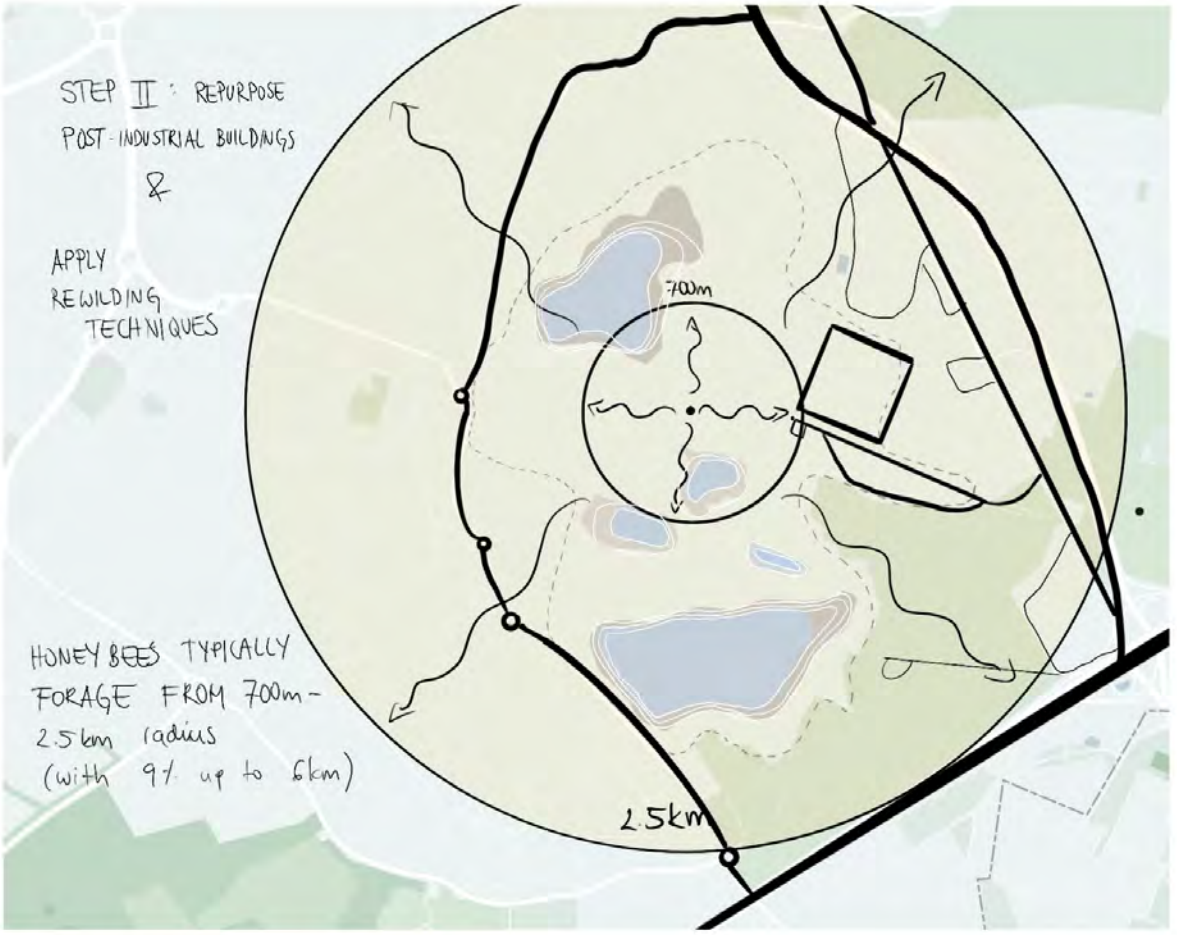


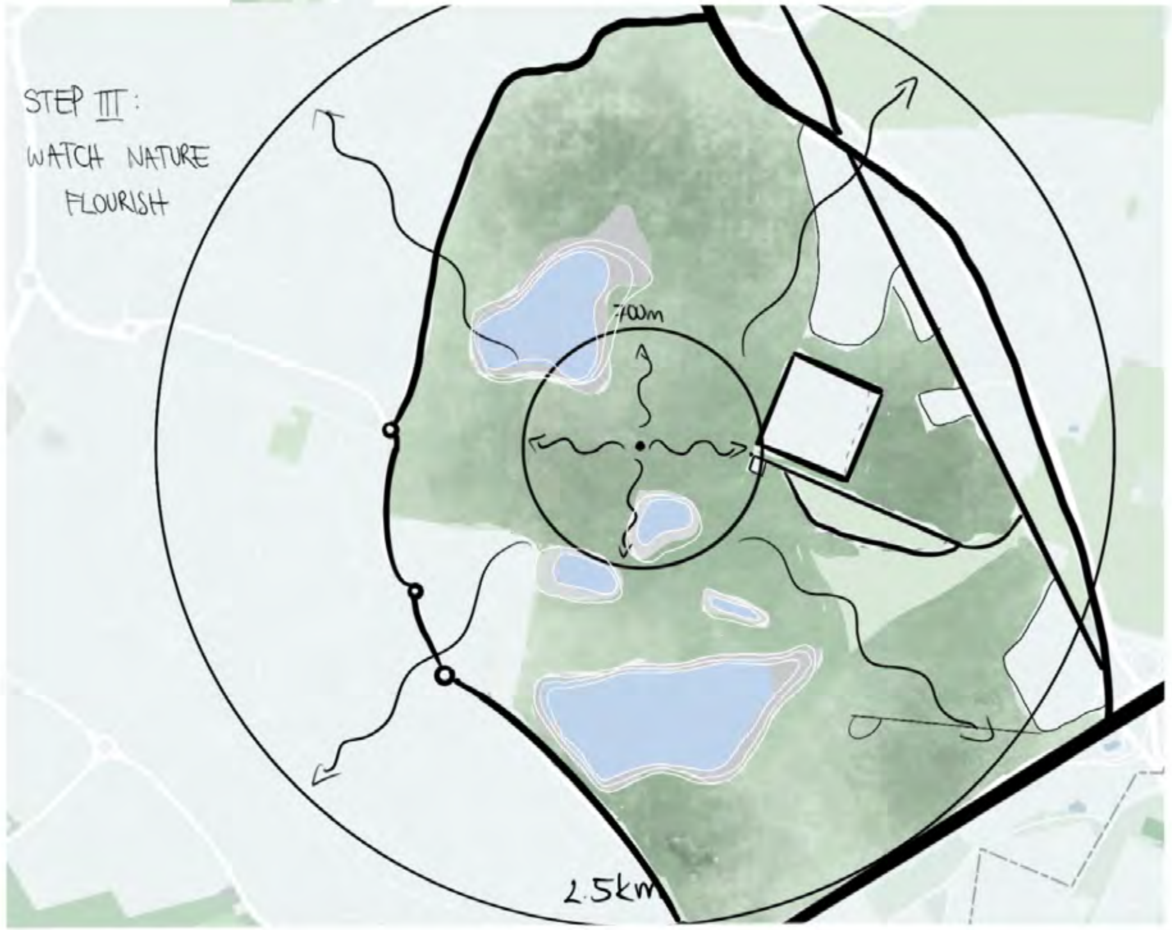
Rewilding

Flora and fauna research, rewilding techniques and a site plan

Semester 2 & 3

REWILDING PLAN
(RESEARCH STAGE OF THE DESIGN)





SITE PLANS

(CURRENT SITE PLAN VS THE REWILDED HUNTSTOWN QUARRY)

Post review work (new drawings)

SOIL REGENERATION TECHNIQUES

Wildflowers

Stage 1

Stage 2
adding the subsoil
taken from the site

Stage 3
sowing with fine-leaved
grass species

Stage 4
wildflowers planted
2-3 years later

Woodland and scrubland

Stage 5
grassland with subsoil
taken from the site

Stage 6
scrubland

Stage 7
woodland

Stage 8
10-15 years after planting,
woodland area can be undersown
with wild flowers

SITE SECTION
(FLORA ZONING INTRODUCED TO THE HUNTSTOWN QUARRY)

SITE EDGE/
BEE ZONE

wildflowers

orchards

goat
willow

LIME SOIL

sessile
oak

WOODLAND

siberian
pine

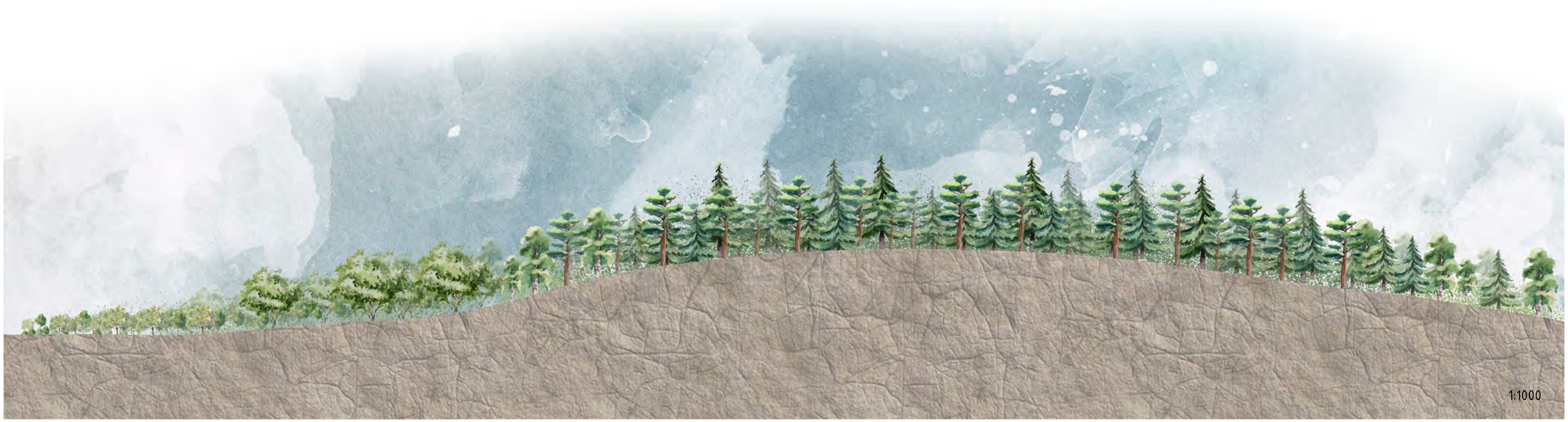
norway
spruce

silver
birch

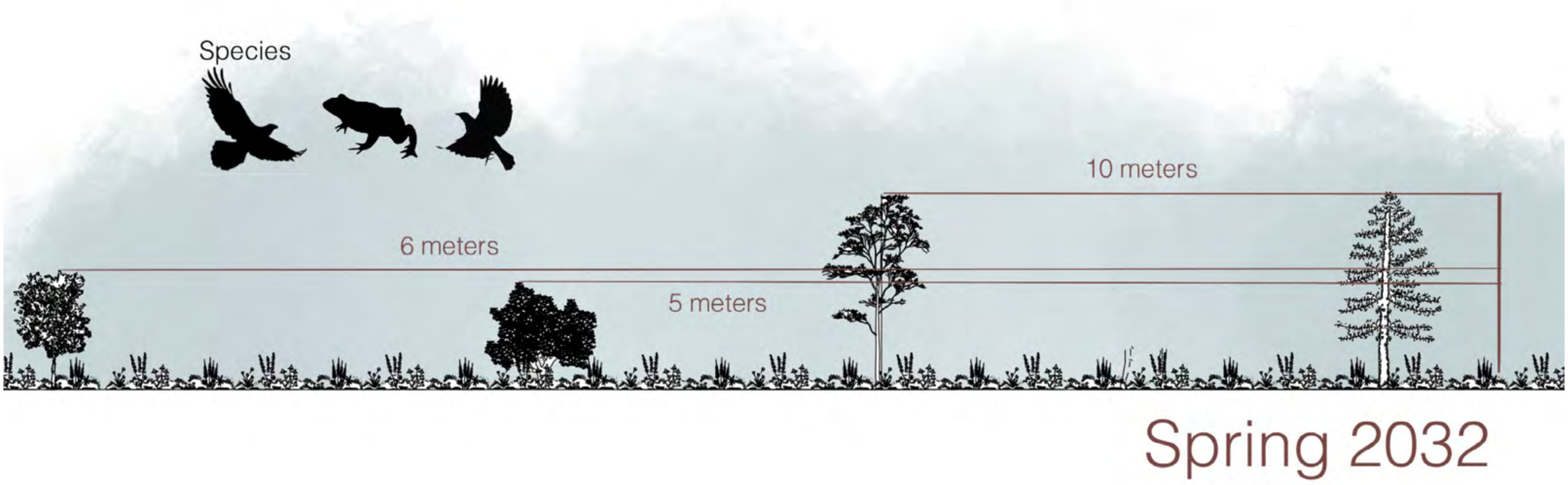
LAKE ZONES

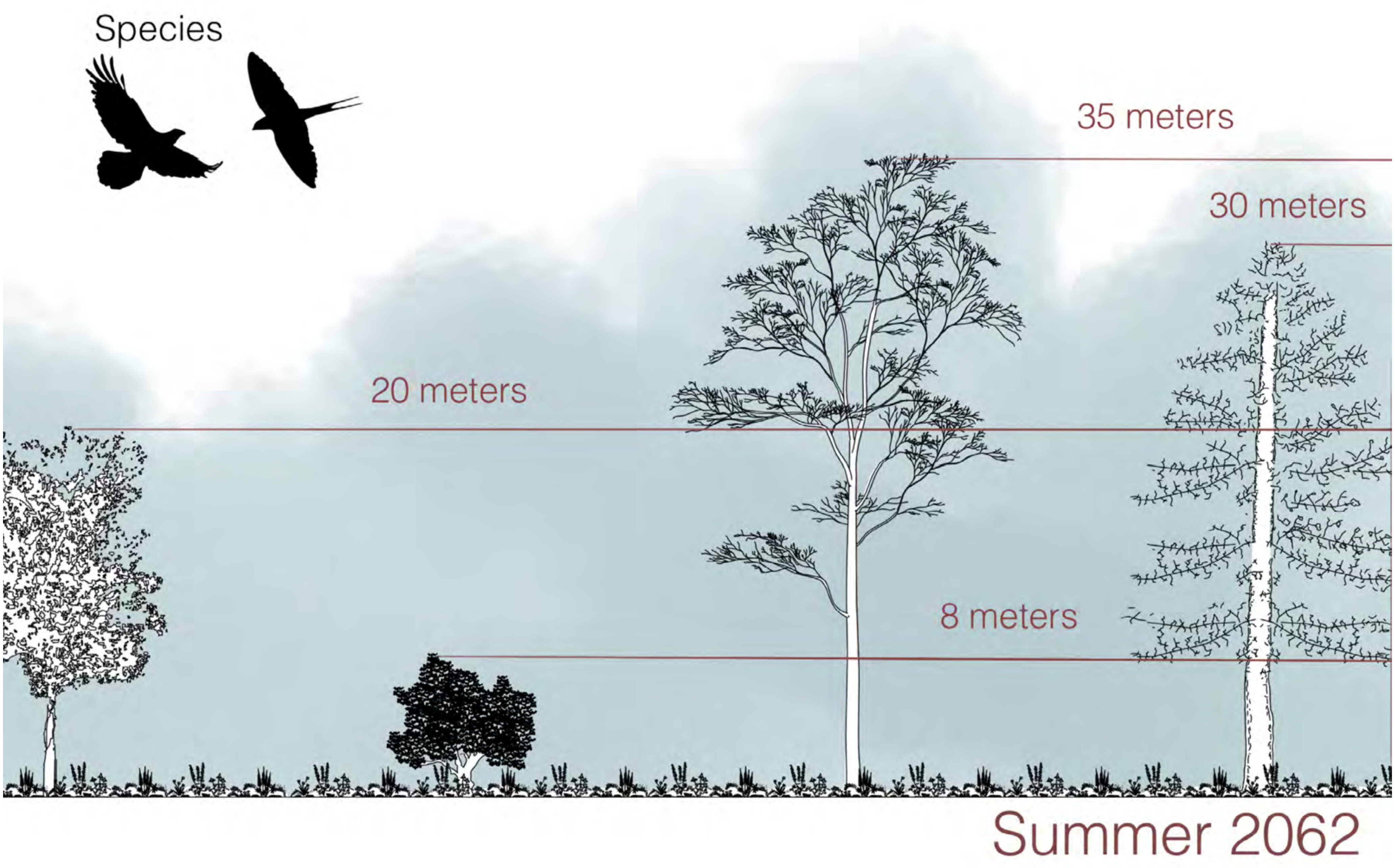
downy
birch

common
reed

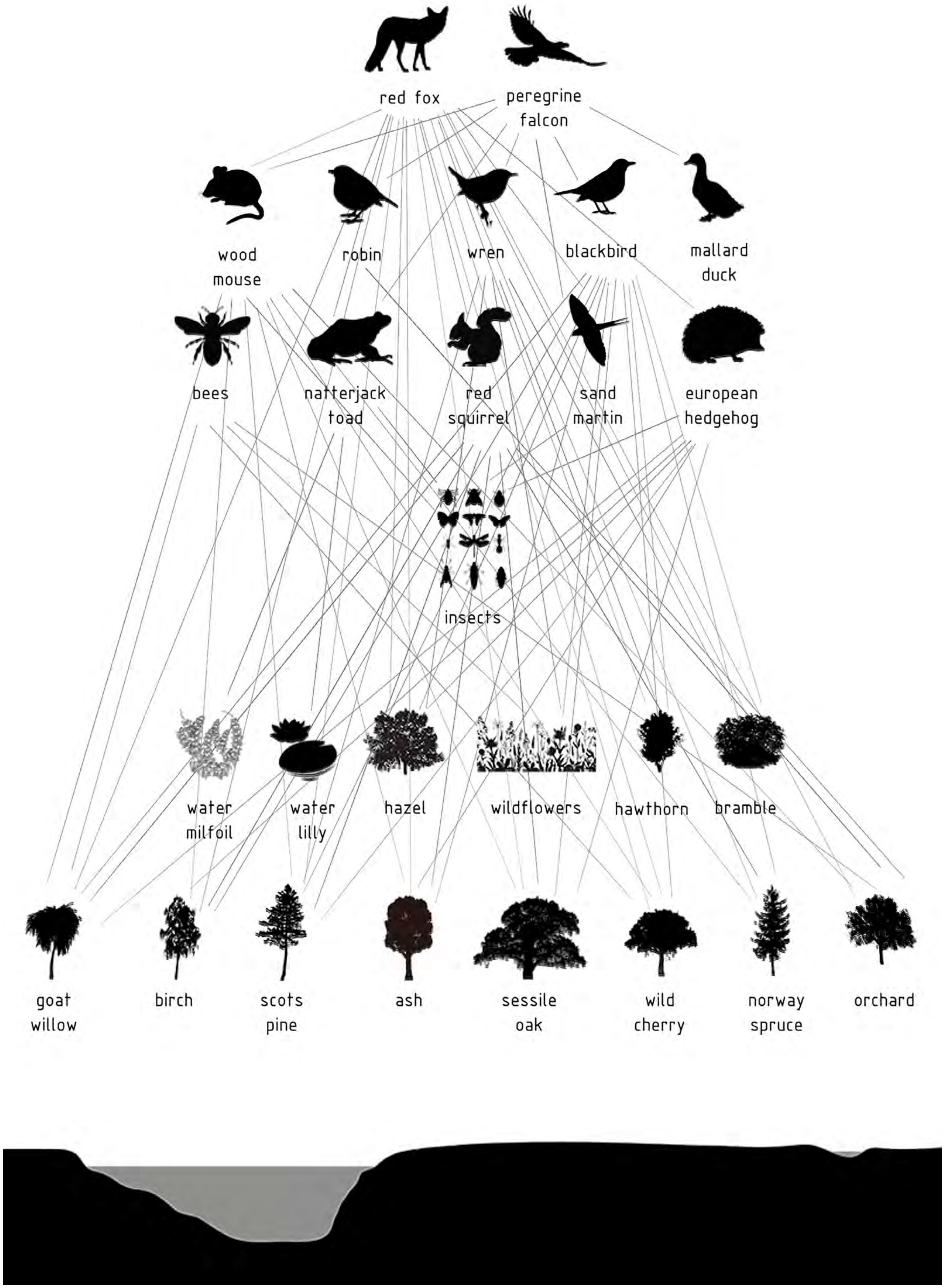


TIMELINE OF VEGETATION GROWTH

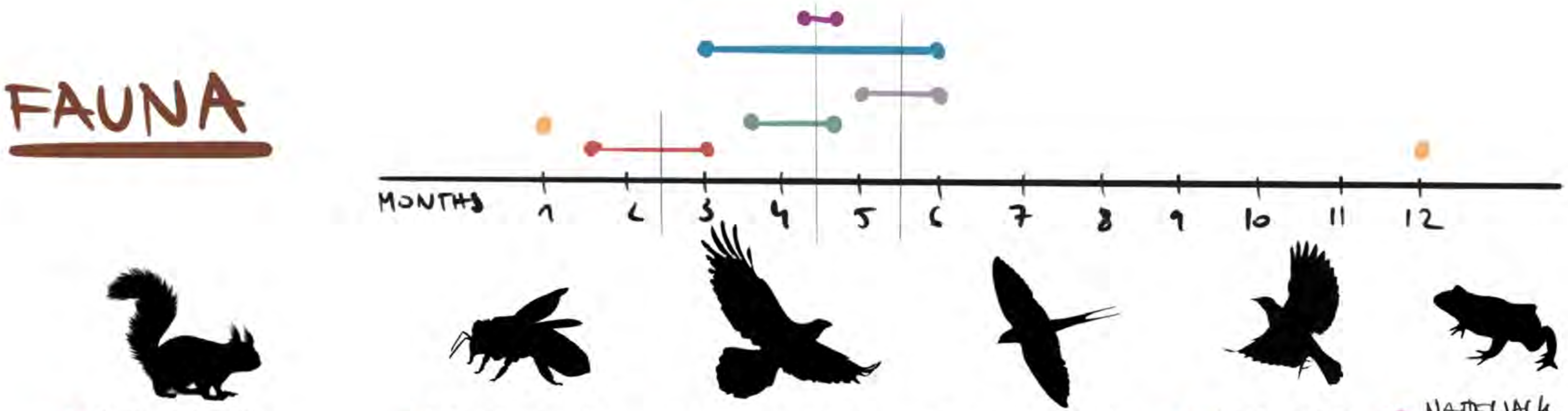




FLORA AND FAUNA
(INTRODUCED TO THE HUNTSTOWN QUARRY)

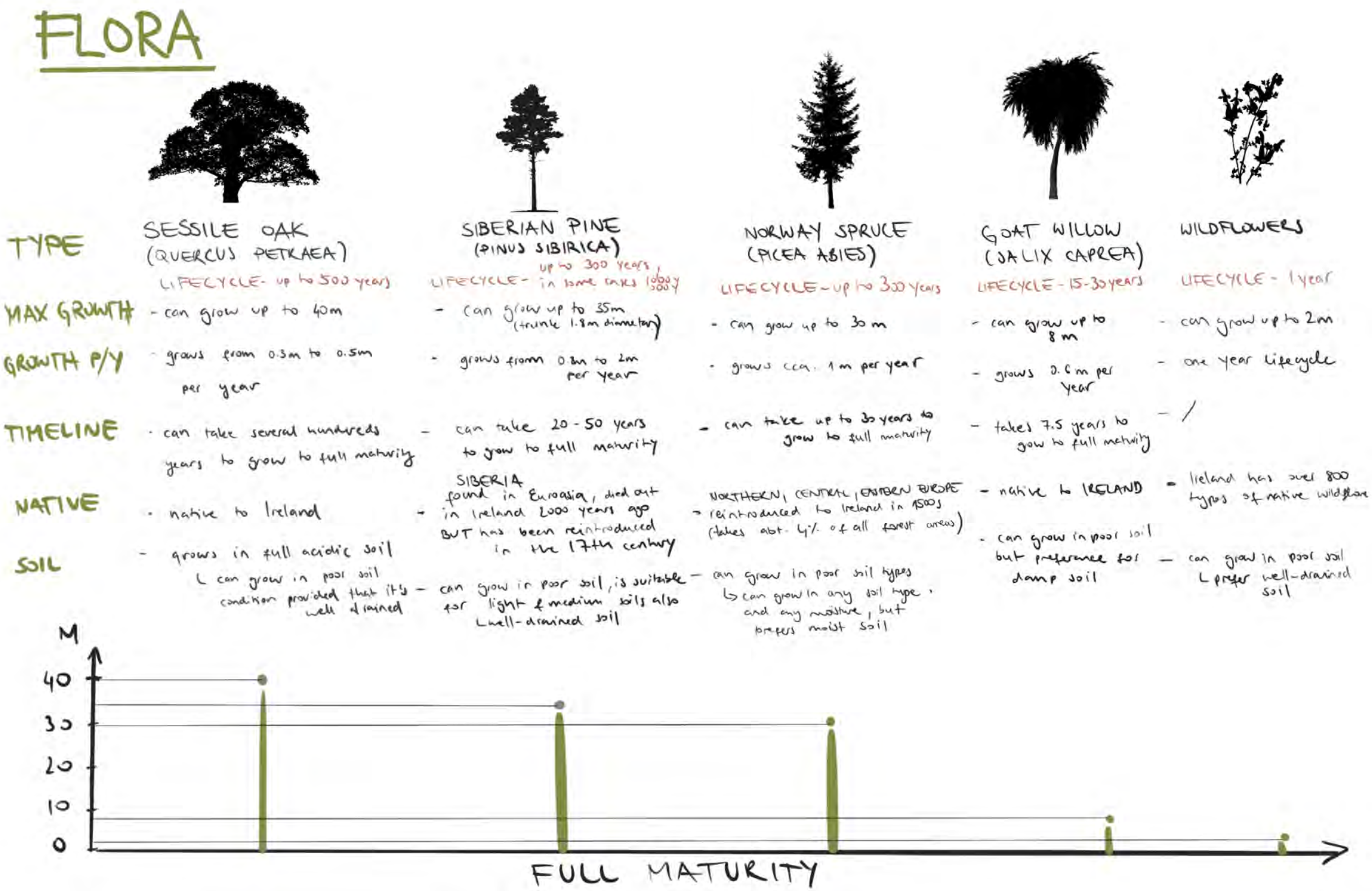


FAUNA RESEARCH
(CRUCIAL ENDANGERED SPECIES)



	• RED SQUIRREL (SCIURUS VULGARIS	• BEES (SOLITARY + HONEY)	• PEREGRINE FALCON (FALCO PEREGRINUS)	• SAND MARTIN (RIPARIA RIPARIA)	• BLACK BIRD	• NATTERJACK TOAD (EPIDALEA CALAMITA)
LIFESPAN	- 3-5 years	20-60 days	- up to 15 years	- 2 years	- 10-15 years	- 6-7 years
NESTING TIME	- Jan/Feb (dur: 6 weeks)	- Dec/January (replacing the bees that died during winter)	- March/April (30 days per eggs)	- May (3 weeks)	- March-June	- April (12 days)
NESTING MATERIAL	- leaves, straw, hay TOWARDS SUNLIGHT/ AWAY FROM PERCIPITATION	- SOLITARY - clay, sand, soil, brick, wood	- gravel/other loose material └ nest in cliffs	- sand/fine gravel (cliffs)	- twigs, leaves, grass, mud, moss	- in the pond
BROOD	- 1-6 kittens	- 40,000 (twice a year)	- 3-4	- 1-2	- 2-3	- 7,500 eggs
NATIVE	- native to Ireland	- APIS MELLIFERA - NATIVE - 81 solitary bee types	- only 265 pairs in Ireland atm	- found in Ireland from March to Sept	- widespread & common	- NATIVE TO IRELAND
PLANTING	- PINE & SPRUCE TREES	- SESSILE OAK, WILDFLOWERS, WILLOW, MAPLE...	- /	- /	- ANY TREES/ HEDGES	- /
FOOD	- tree seeds	- nectar	- BIRDS (pigeons, thrushes, waders, wild fowl, gulls, seabirds)	- insects	- insects, snails, fruit, seeds	- invertebrates

FLORA RESEARCH
(CRUCIAL SPECIES)



SITE SECTIONS
(CURRENT SITE CONDITION VS THE REWILDED QUARRY)

FLORA AND FAUNA OF THE REWILDED QUARRY

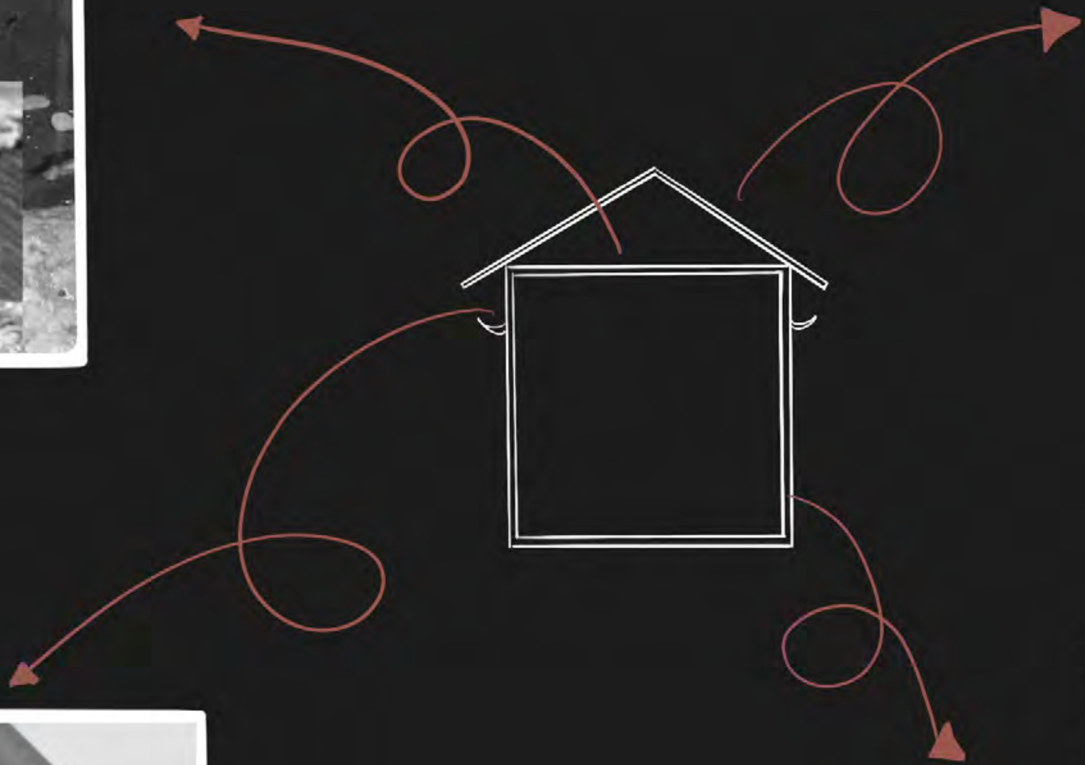
Coexistence & bees

Cohabitation and coexistence research, bees, beehive analysis, applied research

Semester 3

COHABITATION ALREADY EXISTS

SQUIRRELS IN ATTICS



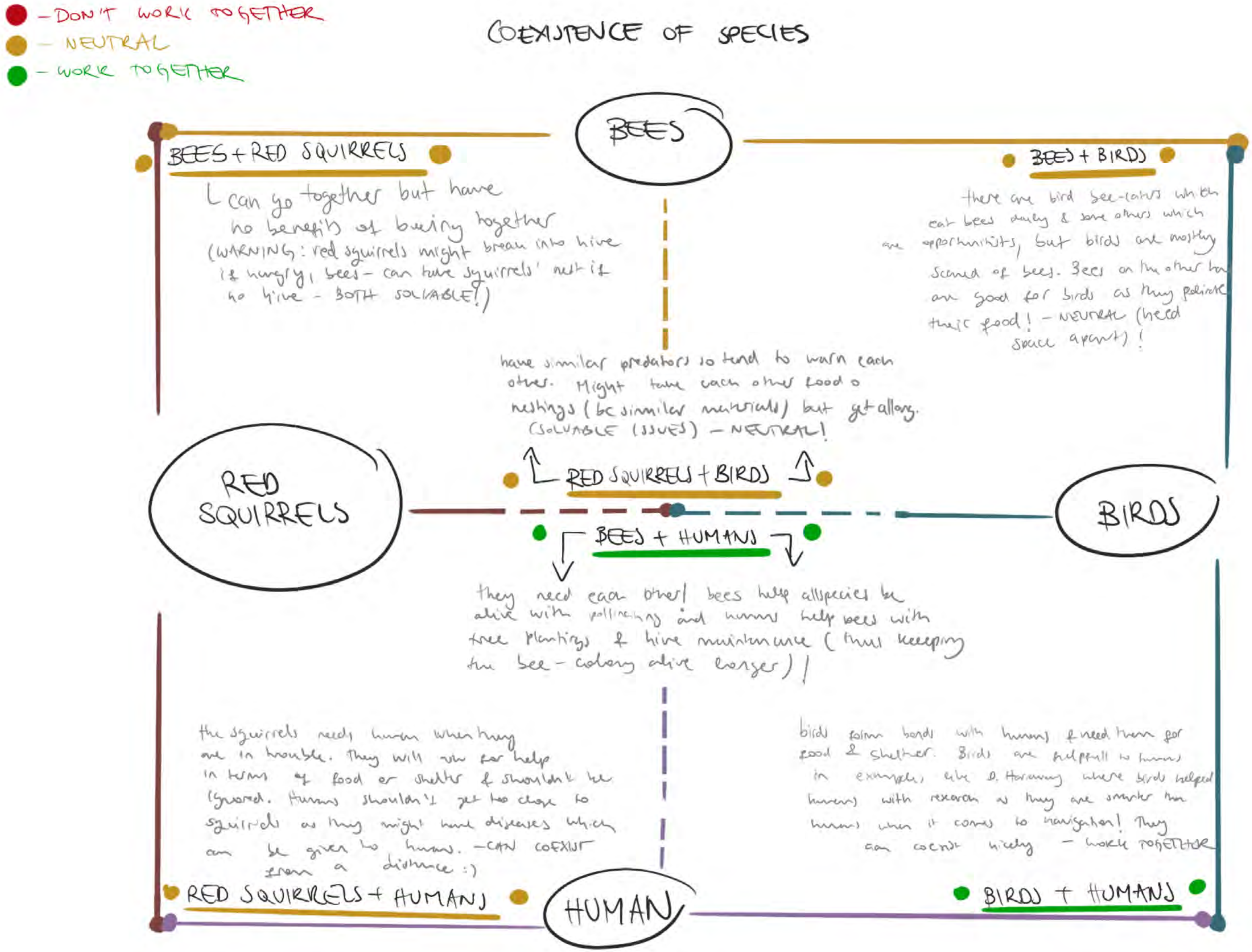
BIRD NESTINGS ON THE ROOF

BIRDS BELOW ROOF EAVES

MICE IN WALL STRUCTURE

SPECIES COEXISTENCE

(STUDY COMMENCED WITH THE AIM OF CONCLUDING WHICH SPECIES BENEFIT FROM HUMAN INTERACTION)



BEES

80 % of flowering plants depend on pollination

in order to be fertilized, and

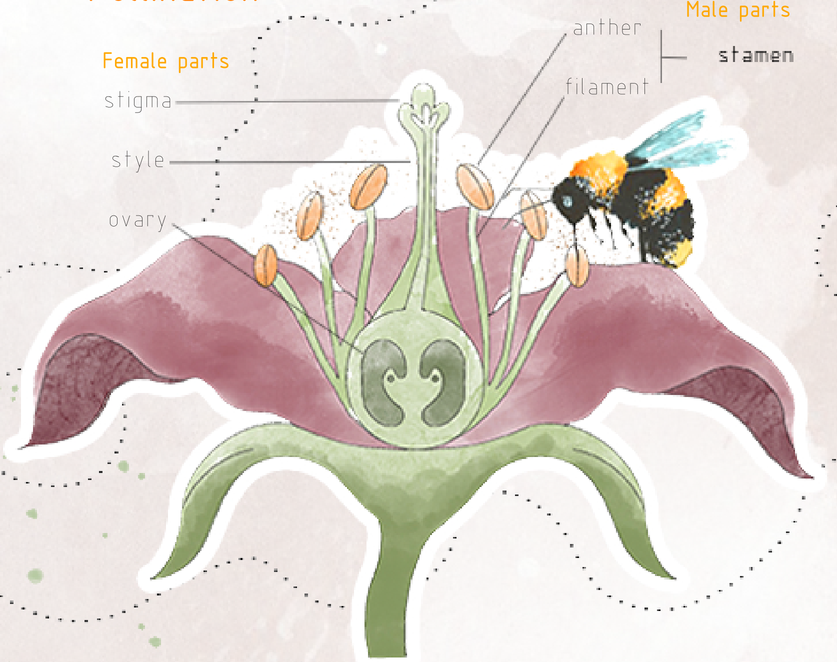
one third of global food production depends on pollinators

One third of our bee species is threatened with extinction from Ireland

This is because we have drastically reduced the amount of food (flowers) and safe nesting sites in our landscapes

Bees thrive in areas filled with vegetation, but their favourites are **wildflowers**, **orchards** and **goat willows**

Pollination



When a bee collects nectar and pollen from the flower of a plant, some pollen from the stamens, the male reproductive organ of the flower, sticks to the hairs of bee's body. When she visits the next flower, some of this pollen is rubbed off onto the stigma, or tip of the pistil the female reproductive organ of the flower.

MAN AND THE BEE

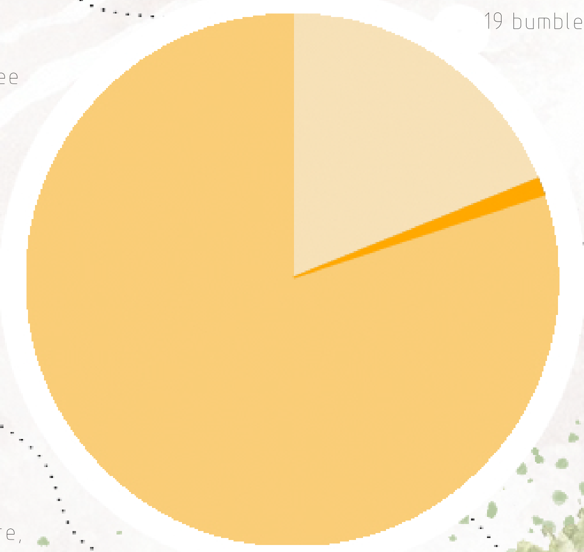
Honey bee is semi-domesticated

The genetics of honeybees have been affected by man for thousands of years through beekeeping

The human aids bees via observation of beehives against pests such as Varroa mites and ensuring the survival of the colony in the wintertime

Bees are responsible for pollination, ensuring the survival of many species (including humans) as well as the production of honey

Bee species in Ireland

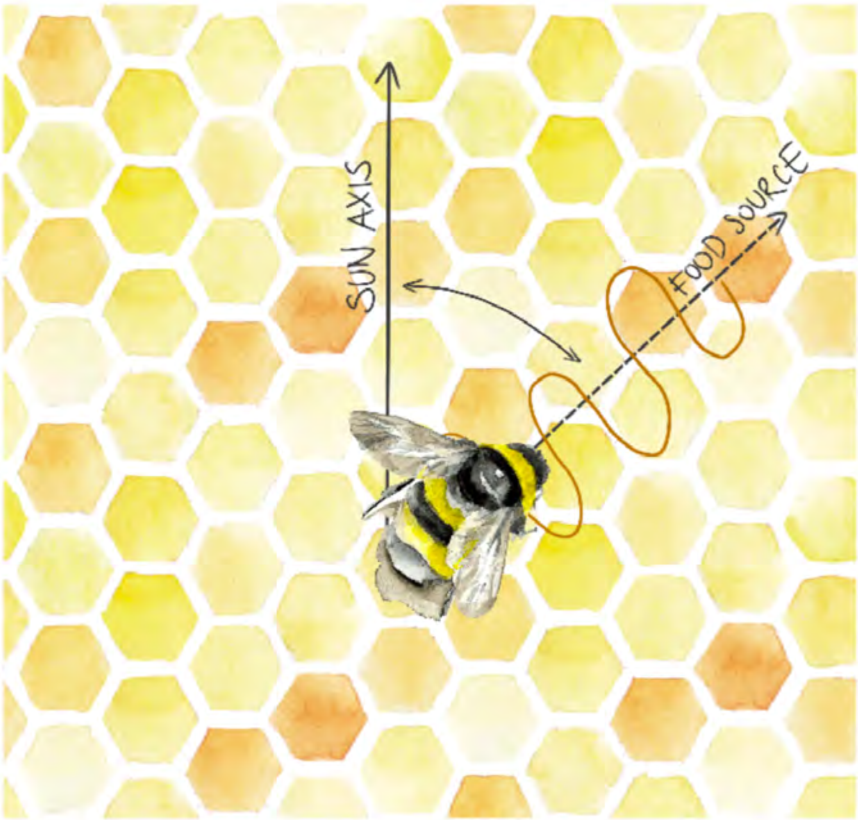


Bees are not the only pollinators.
Flies, wasps, moths, beetles and even some birds, bats and lizards all pollinate, however these species land on flowering plants for brief amounts of time required for their own feeding purposes. Because they gather pollen to stock their nests

bees are generally the most effective pollinators

since they visit many more flowers and carry more pollen between them.

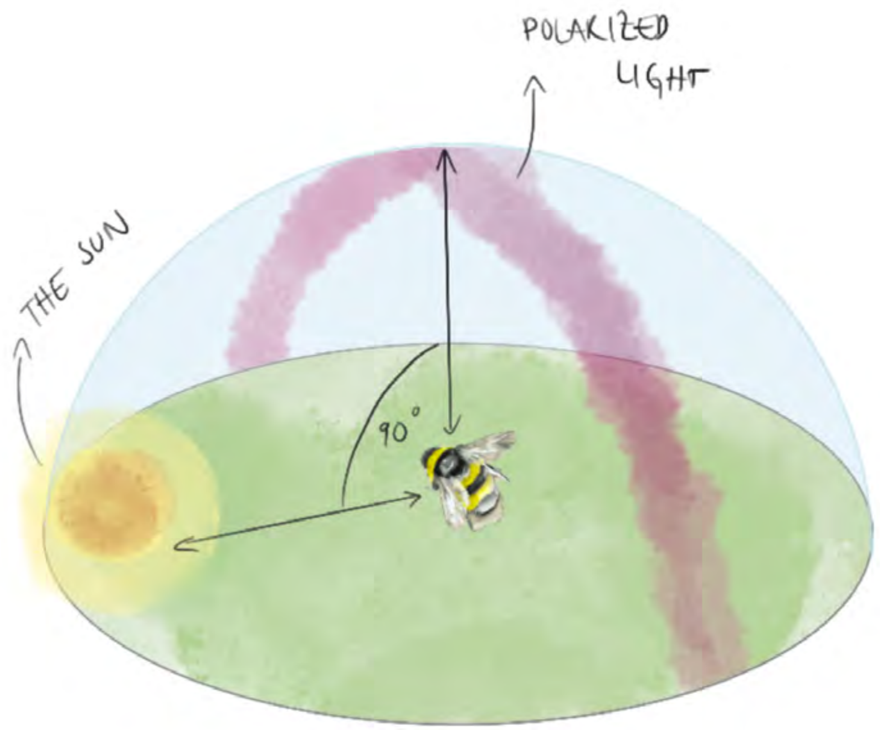
ORIENTATION OF BEES



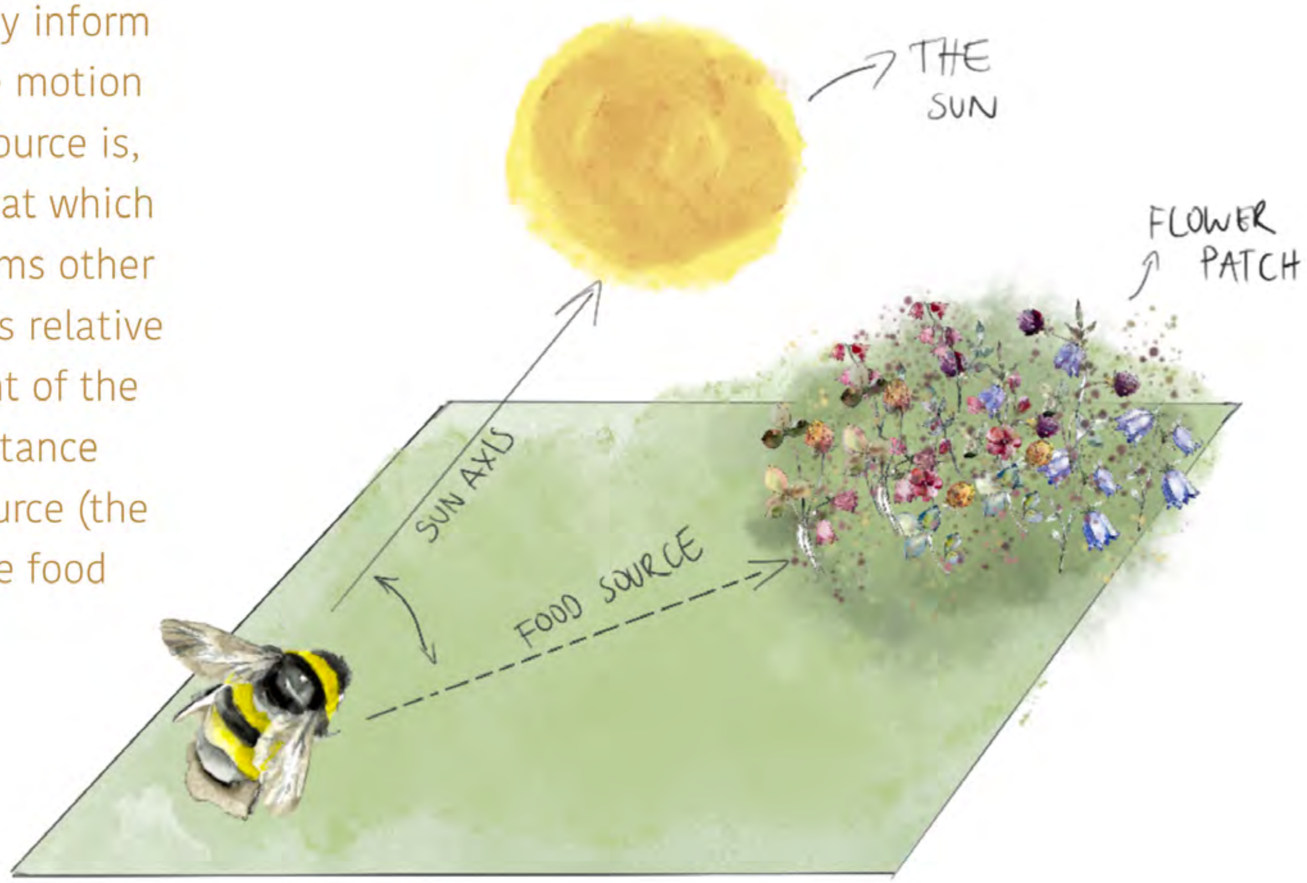
The “waggle dance”

In a vertical honeycomb bees perform the “waggle dance” through which they inform other bees of the food source. The motion informs the bees where th food source is, relative to the Sun axis. The angle at which the bee performs the motion informs other bees of the angle the food source is relative to the Sun. Additionally, the lenght of the “dance” informs bees of the distance between the hive and the food source (the longer the dance, the farther the food source and vice versa).

When it’s cloudy and the visibility of the Sun is not optimal, bees use their ability to perceive polarized light in order to communicate food sources to other bees. The polarized light is located 90 degrees from the position of the Sun. The bees then proceed to the left or the right of it, which means they can go any direction possible in order to forage. On the contrary, on a sunny day, bees will typically move to a maximum od 90 degrees left or right from the axis of the Sun,



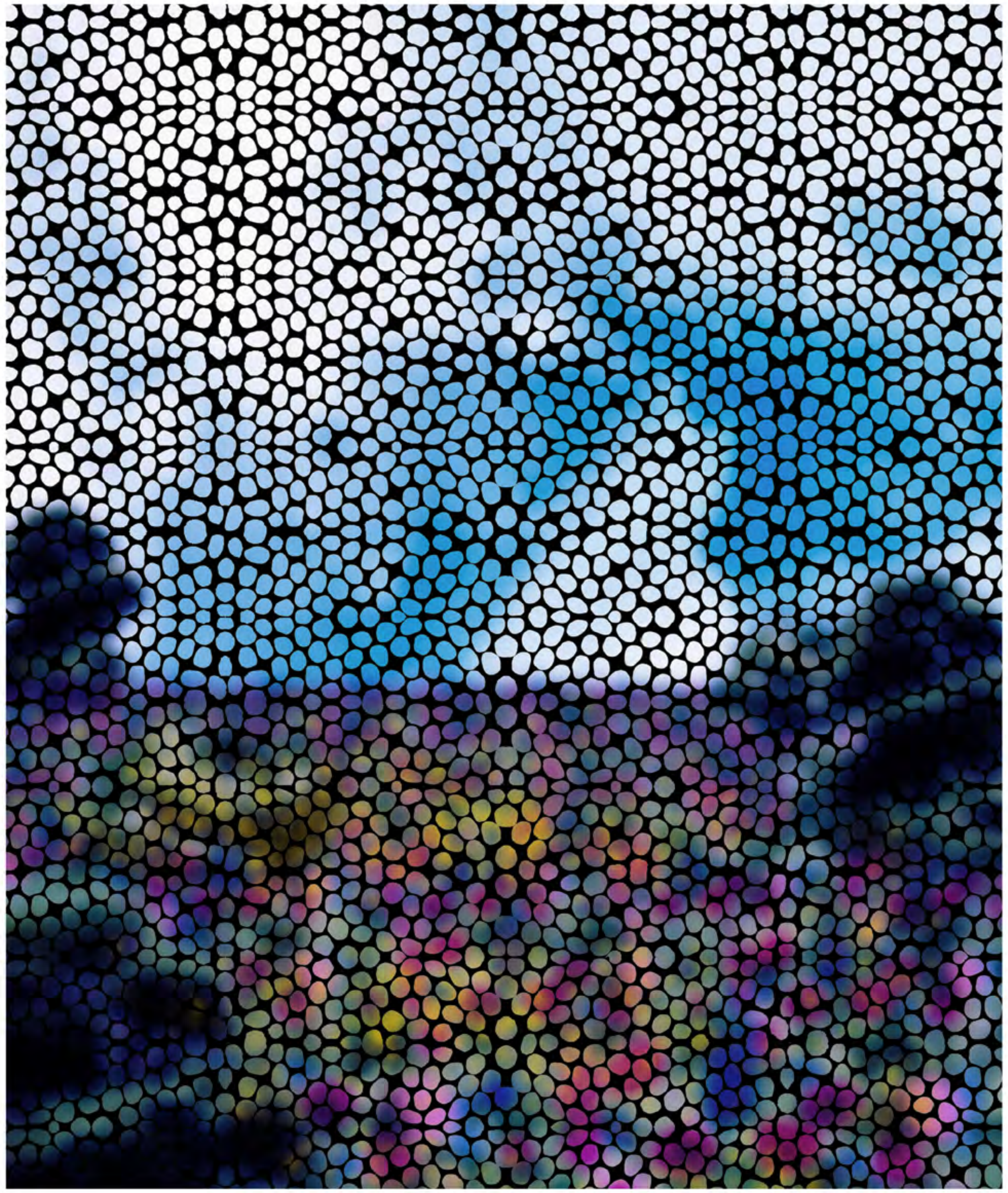
Locating the food source



Bees have sense of gravitation, and their hives work on the basis of gravity.
An interesting fact: bees can’t see colour red and they are very drawn to yellow and blue!

HUMAN AND BEE PERSPECTIVE

Human perspective

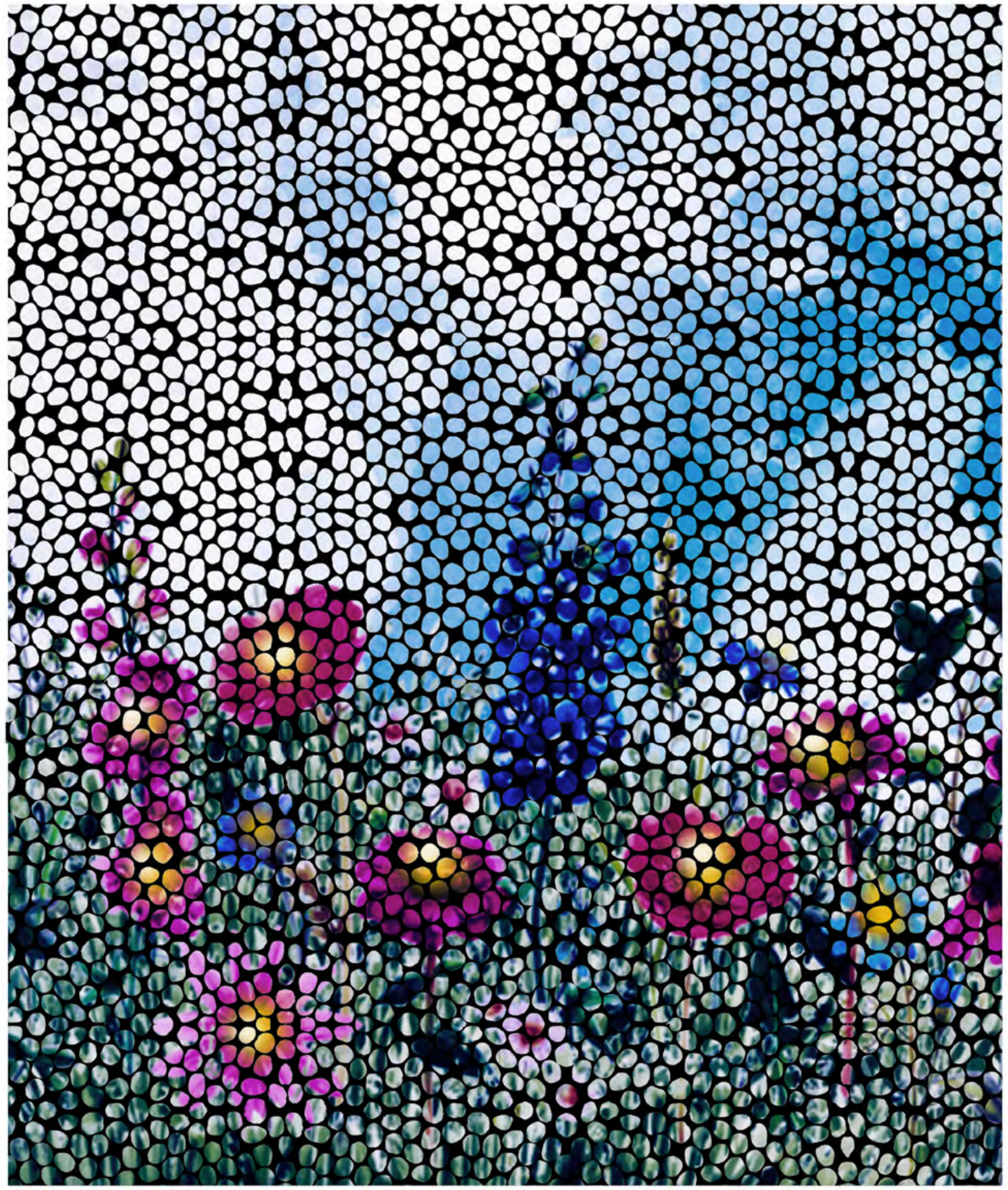


Bee perspective

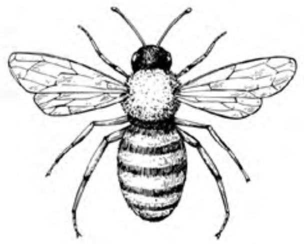
Post review work (new drawings)

HUMAN AND BEE PERSPECTIVE

Human perspective

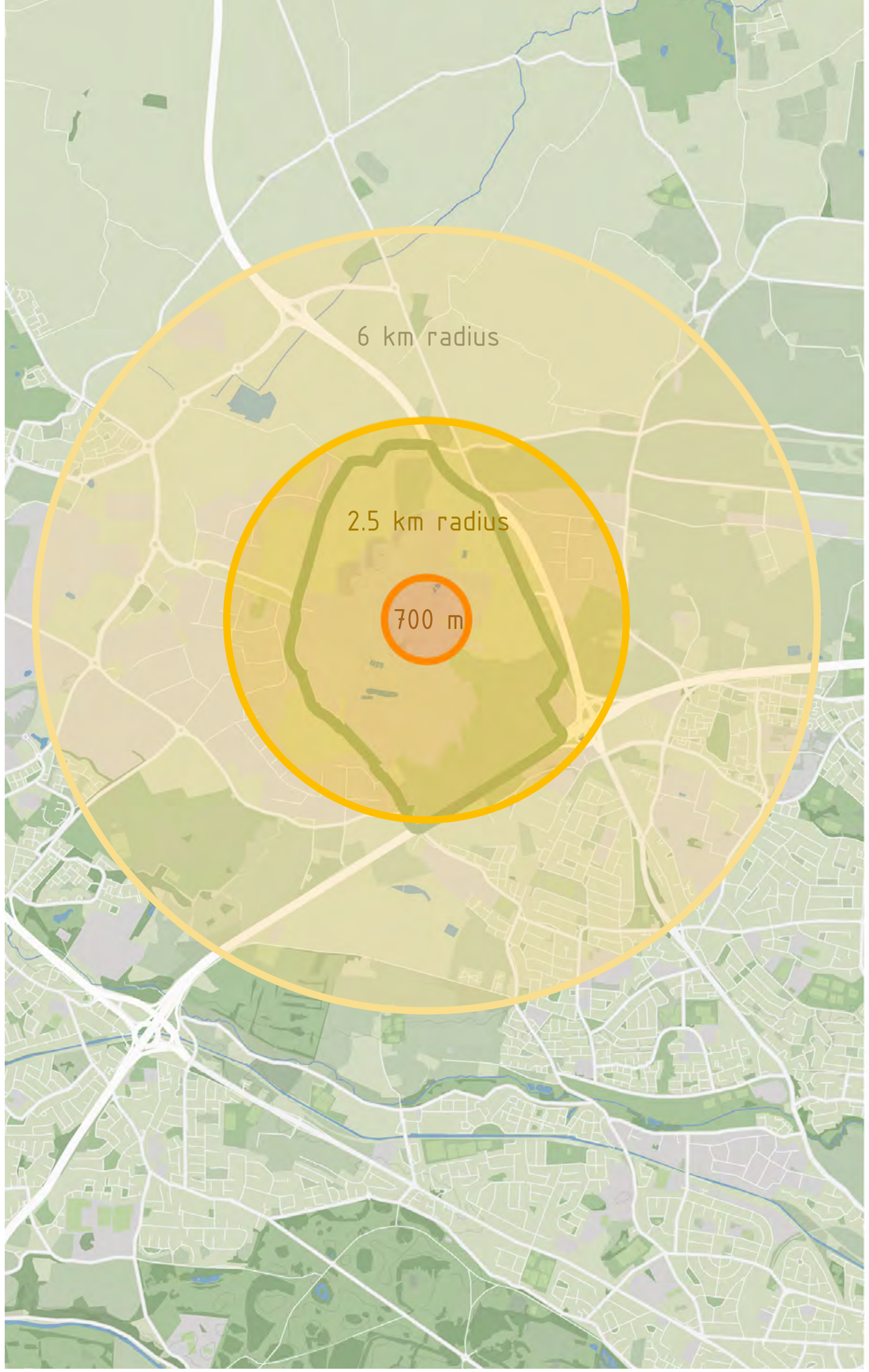


Bee perspective



Post review work (new drawings)

BEE MOVEMENT
(IN THE SITE CONTEXT)



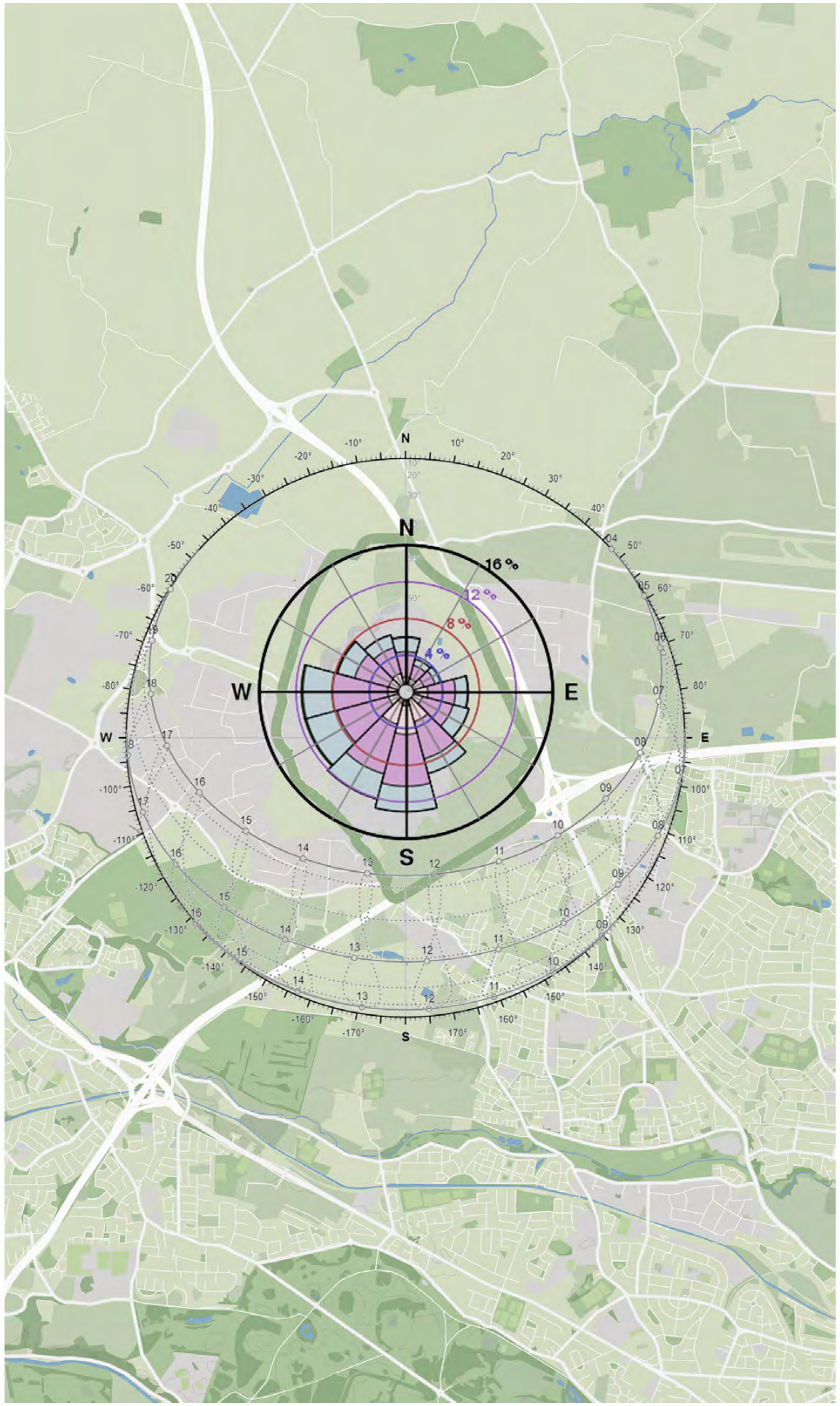
Bees generally forage
in a radius of 700m to 2.5 km,
while 9% forage up to
6 km from the hive

Through “waggle dance”,
bees communicate the direction
of the food source
to other bees in the comb
based on the axis of the Sun.

On a sunny day
bees they use the axis
of the Sun to communicate
where the nectar is located.

On a cloudy day,
when the Sun is not visible,
bees use their ability
to perceive polarized light
in order to communicate
the food source.
In this instance,
they use the polarized light axis,
which is positioned
at 90 degrees
from the Sun, in which case
they fly in any direction
to find a food source.

Additionally, bees have a higher
foraging rate in the
afternoon (12pm- 6pm).



Post review work (drawing alterations)

FLORA AND BEEKEEPING BY SEASONS

HIBERNATION
bees use
honey surplus

BEEKEEPER ACTIVITY:
examination of
bee population

goat willow | orchard | daisy | early dog violet

BEE ACTIVITY: brood rearing peak (beginning of Spring), swarming (mid Spring), honey making peak (end)

BEEKEEPER ACTIVITY: introducing bees to their hives, INSPECTION: every week

lavander | musk mallow | wild clary | scabious

BEE ACTIVITY: pollen collection, broad rearing decrease (end of Summer)

BEEKEEPER ACTIVITY, INSPECTION: every 3-4 weeks

daisy | dead nettle | anemore

BEE ACTIVITY: storage of surplus honey, broad rearing ceases (end of Autumn)

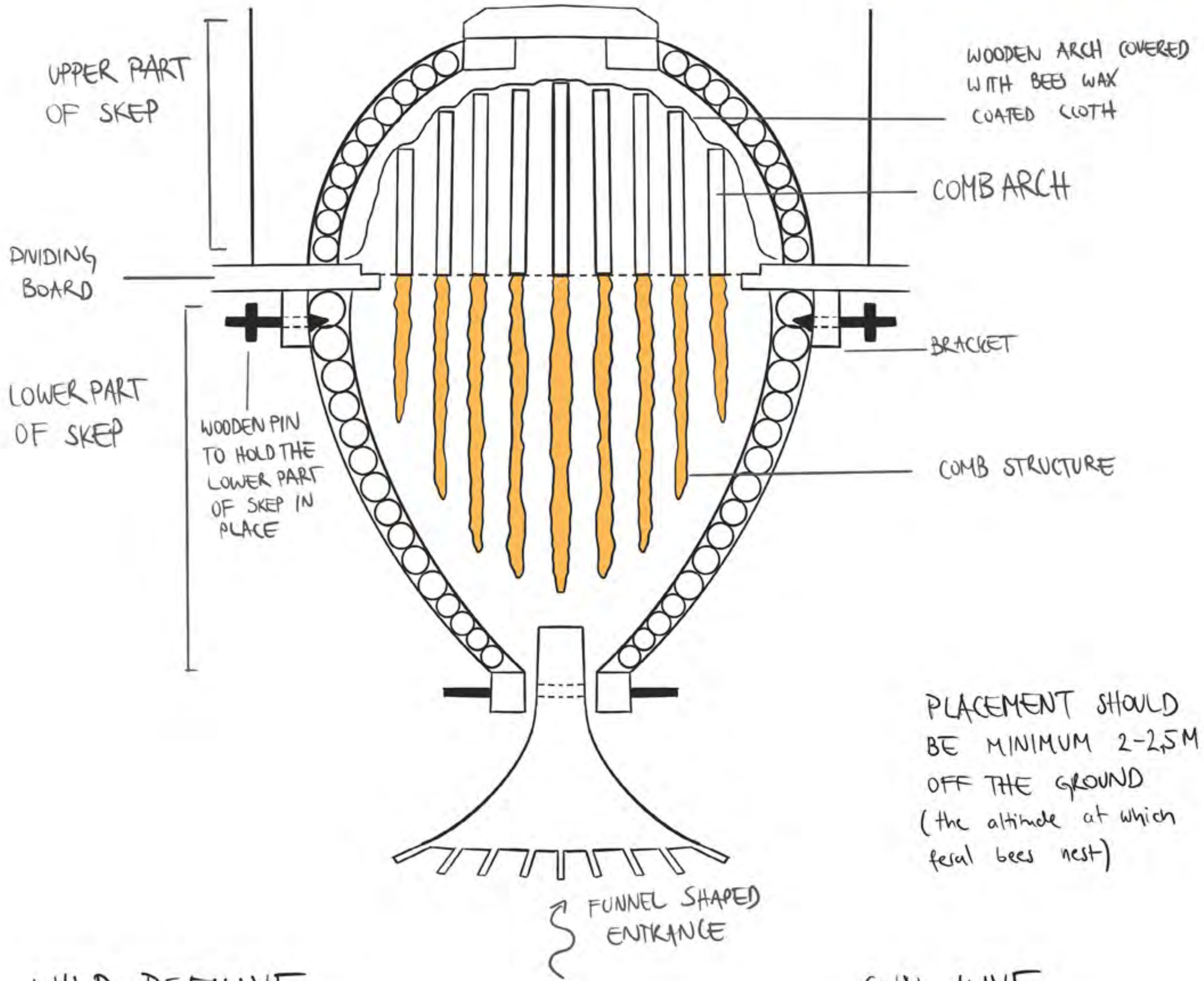
BEEKEEPER ACTIVITY: honey extraction, adding substitute, additional INSPECTION not required

BEEHIVE

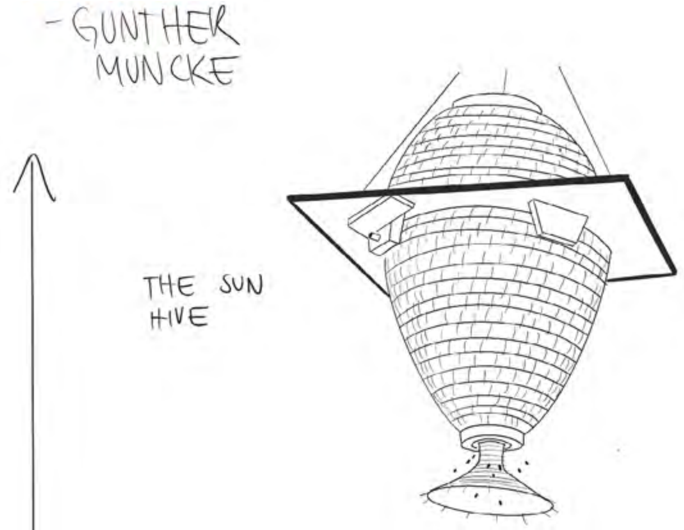
(THE SUN HIVES INTRODUCED TO THE SITE)

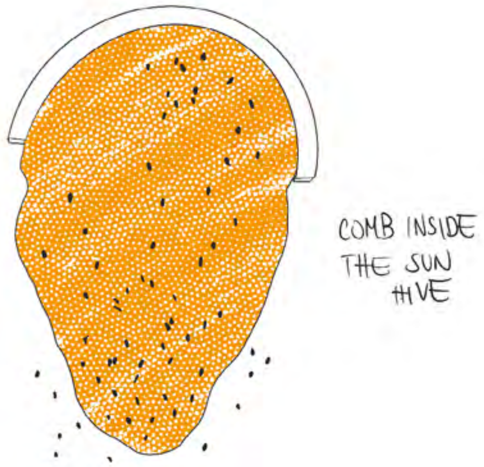
THE SUN HIVE 1:50

THE SUN HIVE



PLACEMENT SHOULD BE MINIMUM 2-2,5M OFF THE GROUND (the altitude at which feral bees nest)

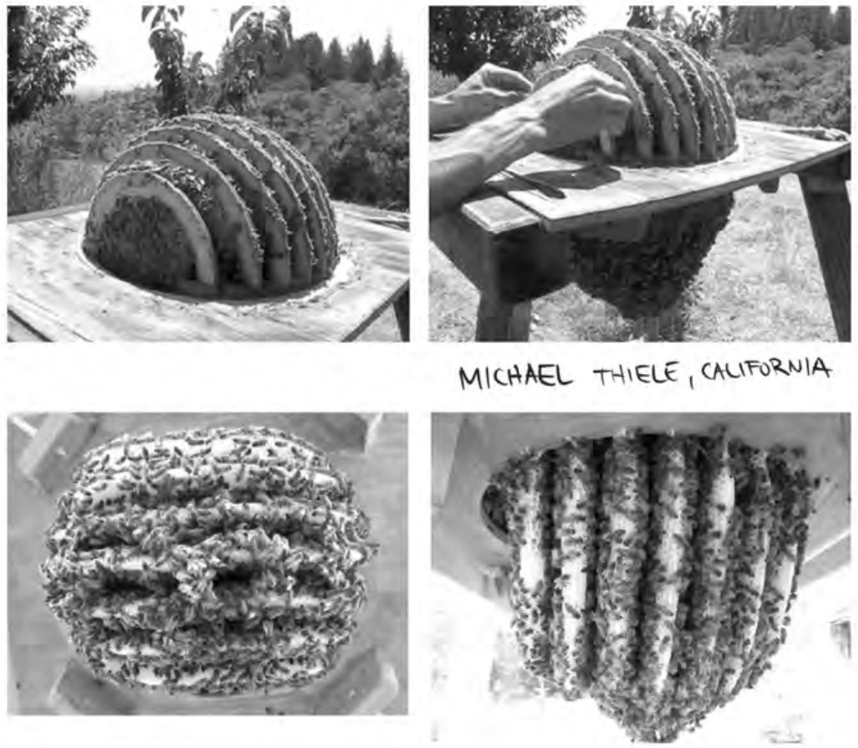




- mimicks the natural environment for bees & allows natural/ feral honeycomb shape
- a BEEHIVE which prioritizes bee health over honey production
- offers thermal insulation with RYE STRAW & MUD coating
- based on traditional skep development

WILD BEEHIVE

SUN HIVE

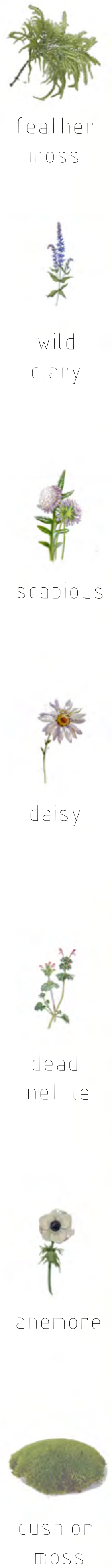


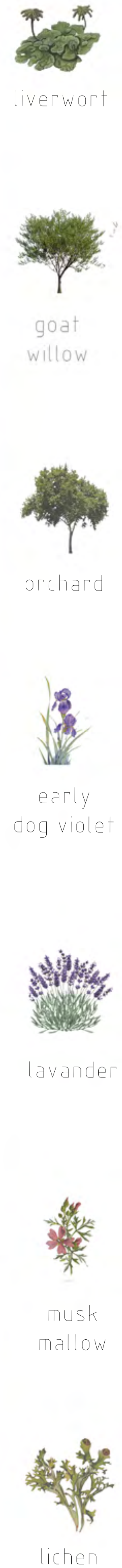
MICHAEL THIELE, CALIFORNIA

Repurposing a post-industrial building

Planning (beekeeper's workshop), material repurposing, cohabitation within the building scope and coexistence within the site

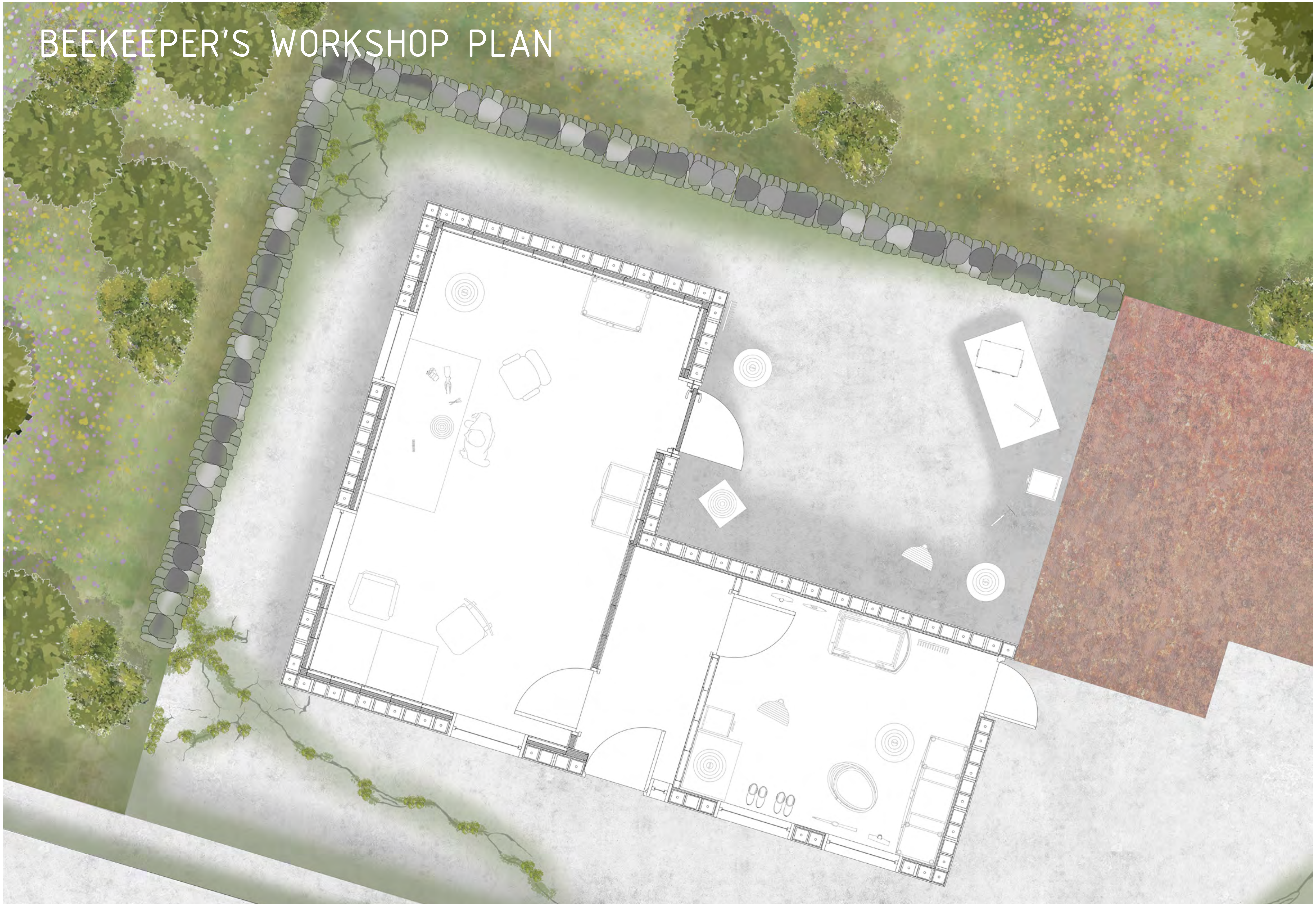
Semester 3





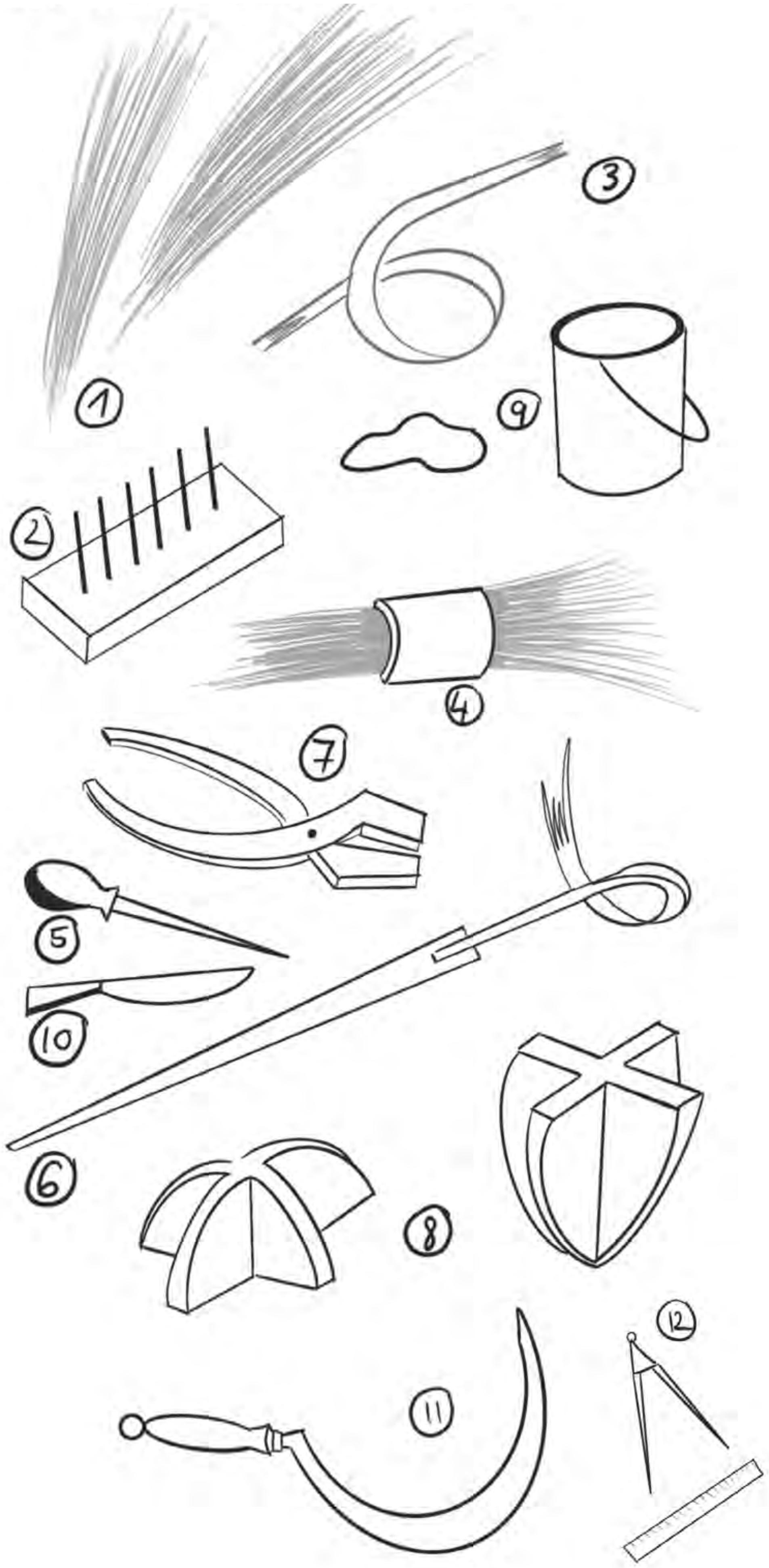
Post review work (drawing alterations)

BEEKEEPER'S WORKSHOP PLAN

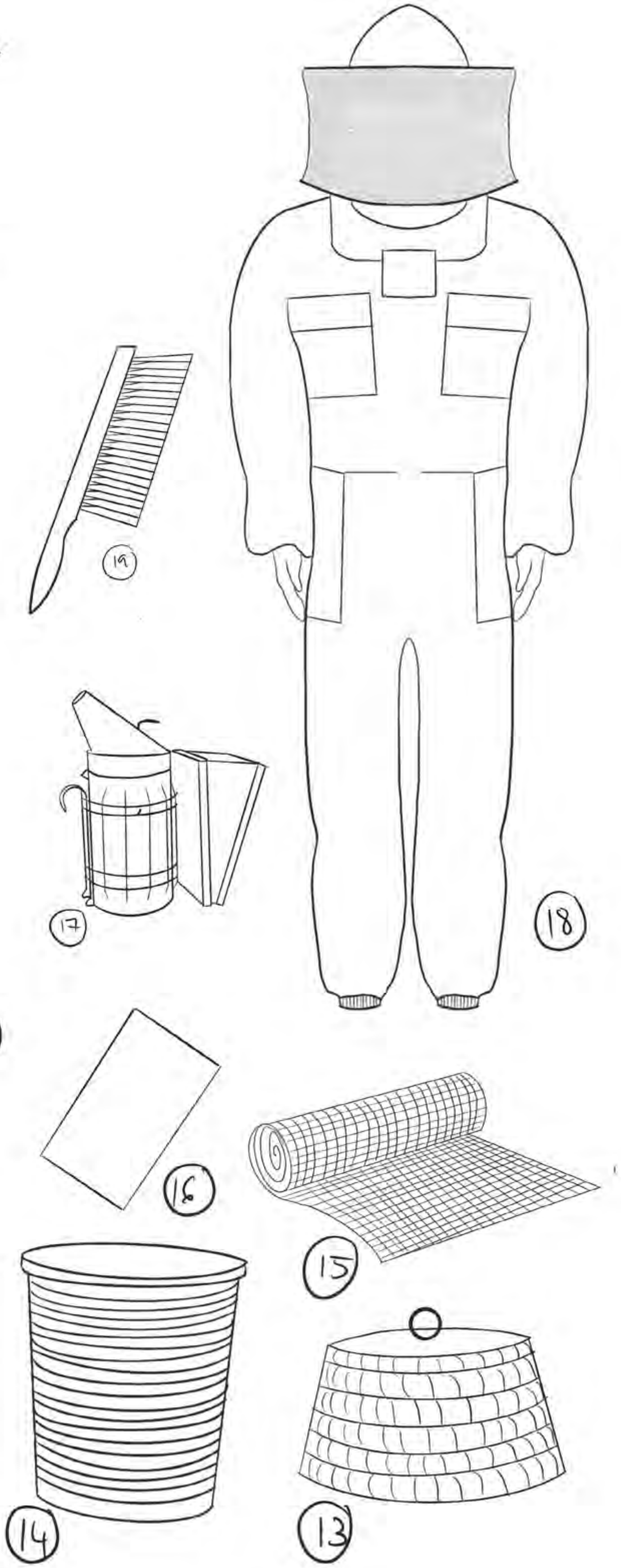


Post review work (drawing alterations)

BEEKEEPER'S TOOLS



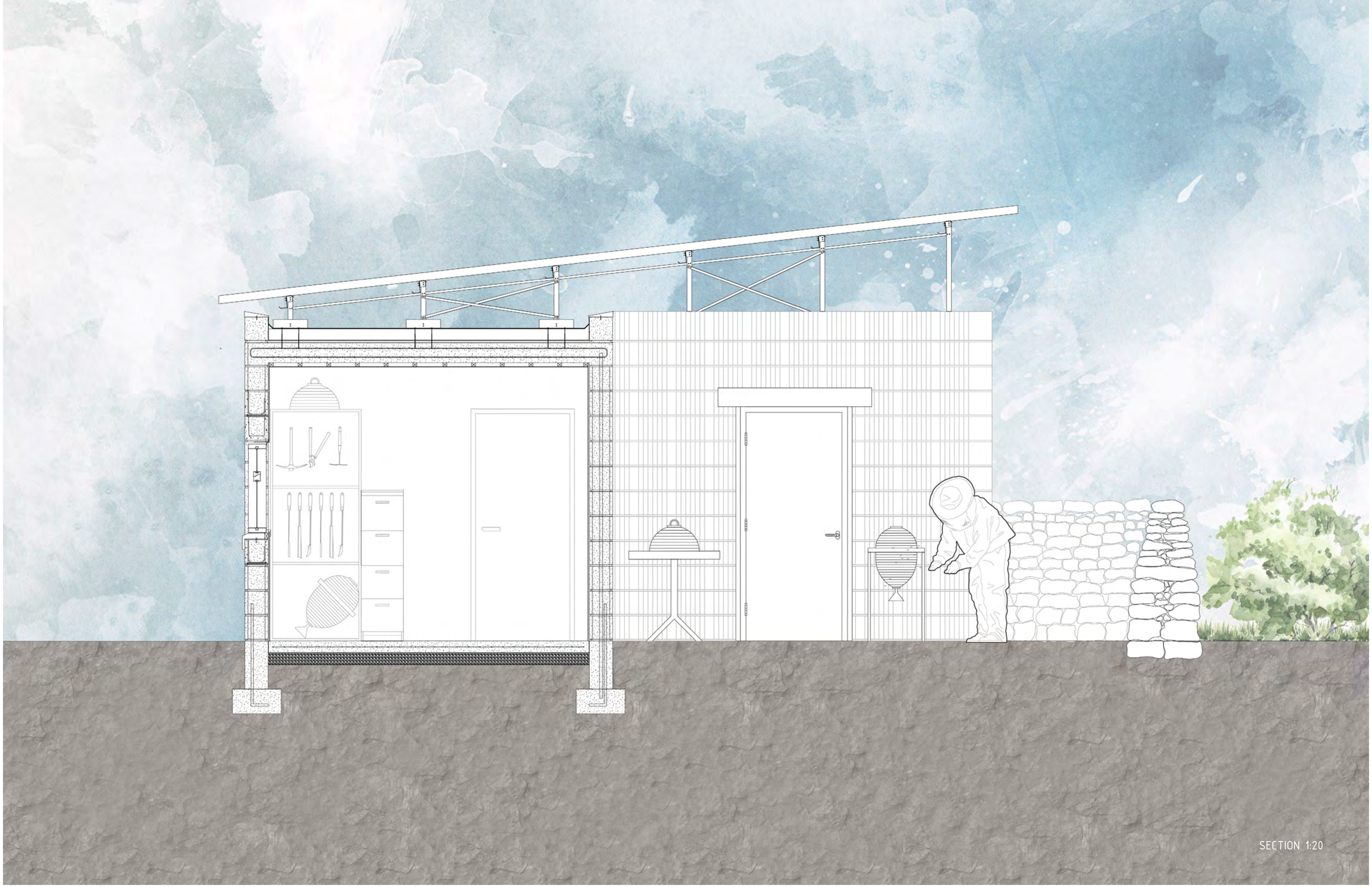
1. RYE STRAW (must be in long stalks) → need to be cut with a sickle
2. a COMB for removing leaves & tyding the stalks
3. WILLOW SPLINT (abt 8mm wide for sewing) ↳ around 150 m needed for 1 skep
4. a RING/TUBE to ensure all ropes of straw are the same thickness
5. a SCREWDRIWER to make holes for splint/needle
6. a WOODEN/METAL needle with an eye through which the binding (splint) is threaded
7. COMBINATION PLIERS to pull the splint tight
8. TEMPLATE to ensure skips are accurately formed
9. COWDUNG + MUD from organic farms to coat the skep
10. a KNIFE to cut straw & splint
11. SICKLE for cutting the straw
12. COMPASS & a RULLER for drawing the template (8)
13. BASKETWORK SWARM CATCHER
14. WASTEPAPER BASKET (for placing the lower part of the skip)
15. WIRE NETTING (to cover the swarm catcher in transfer)
16. piece of PAPER (to cover the entry of the bottom skip when transfering bees)
17. a BEE smoker – used to calm bees upon hive inspection (isn't harmful to bees)
18. BEE SUIT + GLOVES
19. THE BEE BRUSH (used to move bees into the swarming basket)



SOUTH ELEVATIONS
(CURRENT BUILDING CONDITION AND PROPOSED INTERVENTION SET IN THE FUTURE)

Post review work (drawing alterations)

SECTION THROUGH THE BEEKEEKEEPER'S WORKSHOP



Post review work (drawing alterations)

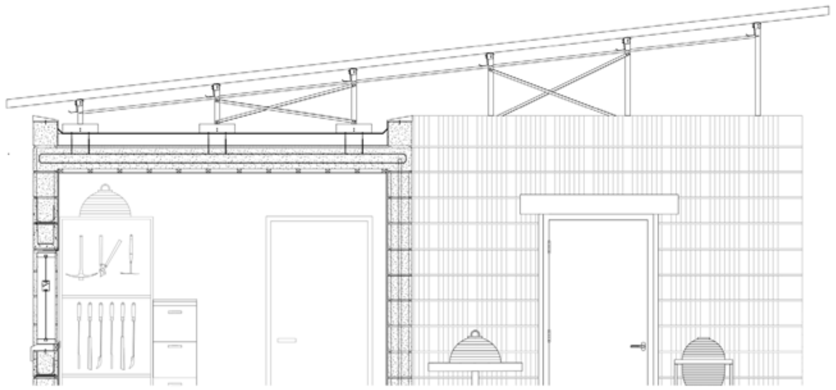
REPURPOSING THE SITE MATERIALS

ROOF

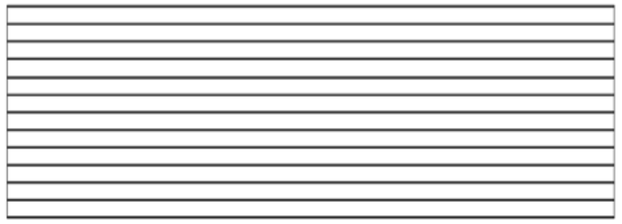
EXISTING SAND AND AGGREGATE SHED

PROPOSED ROOF STRUCTURE

- additional roof is added to existing felt roof due to future probability of leakage and damp

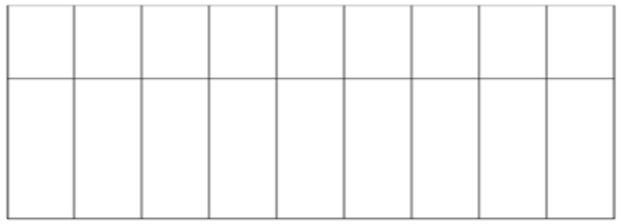


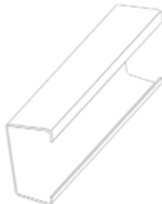
existing Z purlins



-1 out of 14 Z purlins is reused for the same purpose in the proposed roof structure.
-the purlin is cut into cmaller sections to accomodate the length required in the new structure

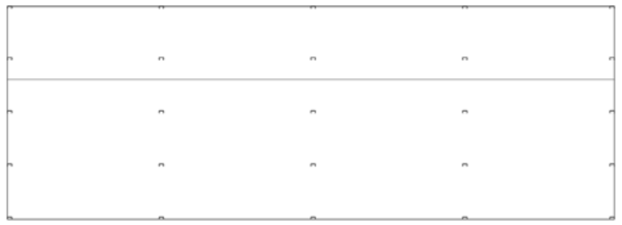
existing C channels

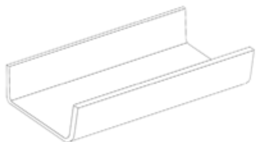




-6 out of 20 C channels are used as C posts in the proposed roof structure and 4 out of remaining 14 channels are used as continuous channel sections

existing C columns





-3 out of 25 existing C columns are reused as base channels
-the columns are cut into smaller sections in order to accomodate the length required for the proposed structure

existing steel joists

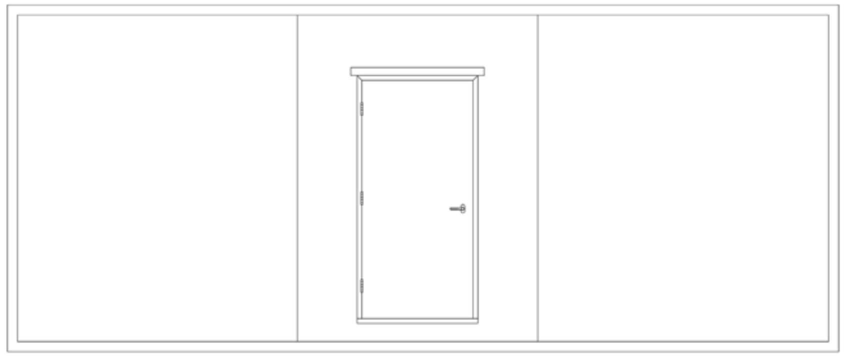
-48 out of existing 66 angle web memebers in the joists are repurposed as transverse and longitudinal angle bracing members in the proposed roof structure

existing corrugated roof

-as indicated on the left diagram, 42 corrugated metal sheets with dimensions 2,500mm x 650mm (without overlap) are taken and reused as covering for the proposed roof
-the existing roof is fastened to Z purlins with screws which are also reused in proposed roof structure

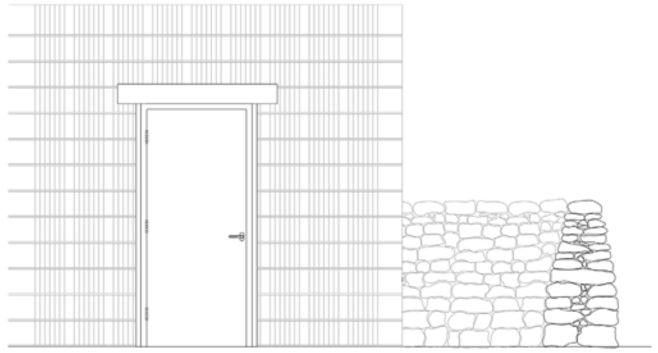
DOOR

EXISTING PORTACABIN OFFICE BUILDING



PROPOSED REUSING OF THE DOOR & KD FRAME

-the door and KD frame are taken from the office portacabin due to easy dismantling as the frame is a KD frame screwed to steel/ wool wall
-the frame was originally added after the wall was constructed due to the flexibility of portacabin design opposing to typical concrete wall frame design in which the frame is placed before the wall is constructed resulting in frame to wall mortar connection, making it unsuitable for reuse

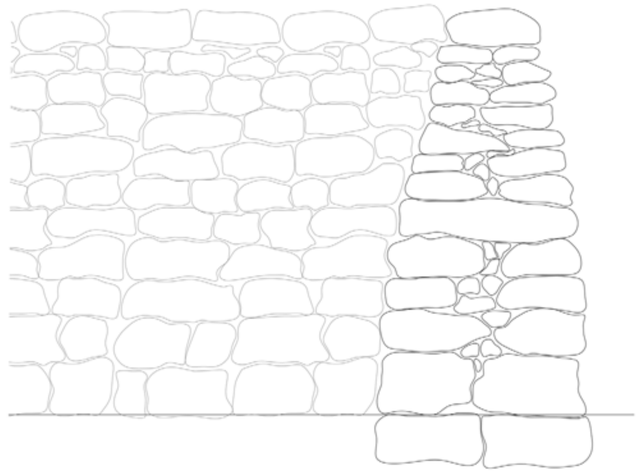


STONE WALL

EXISTING LIMESTONE

-fractured limestone blocks and stones are used for the construction of a proposed drystone wall
-the proposed wall extends to 19,000 mm in length, 1,200 mm in height and narrows upwards from the 700 mm bottom width for stability purposes
-the proposed wall requires 10.26 cubic meters of limestone which is readily available on the site due to present limestone extraction from the quarry

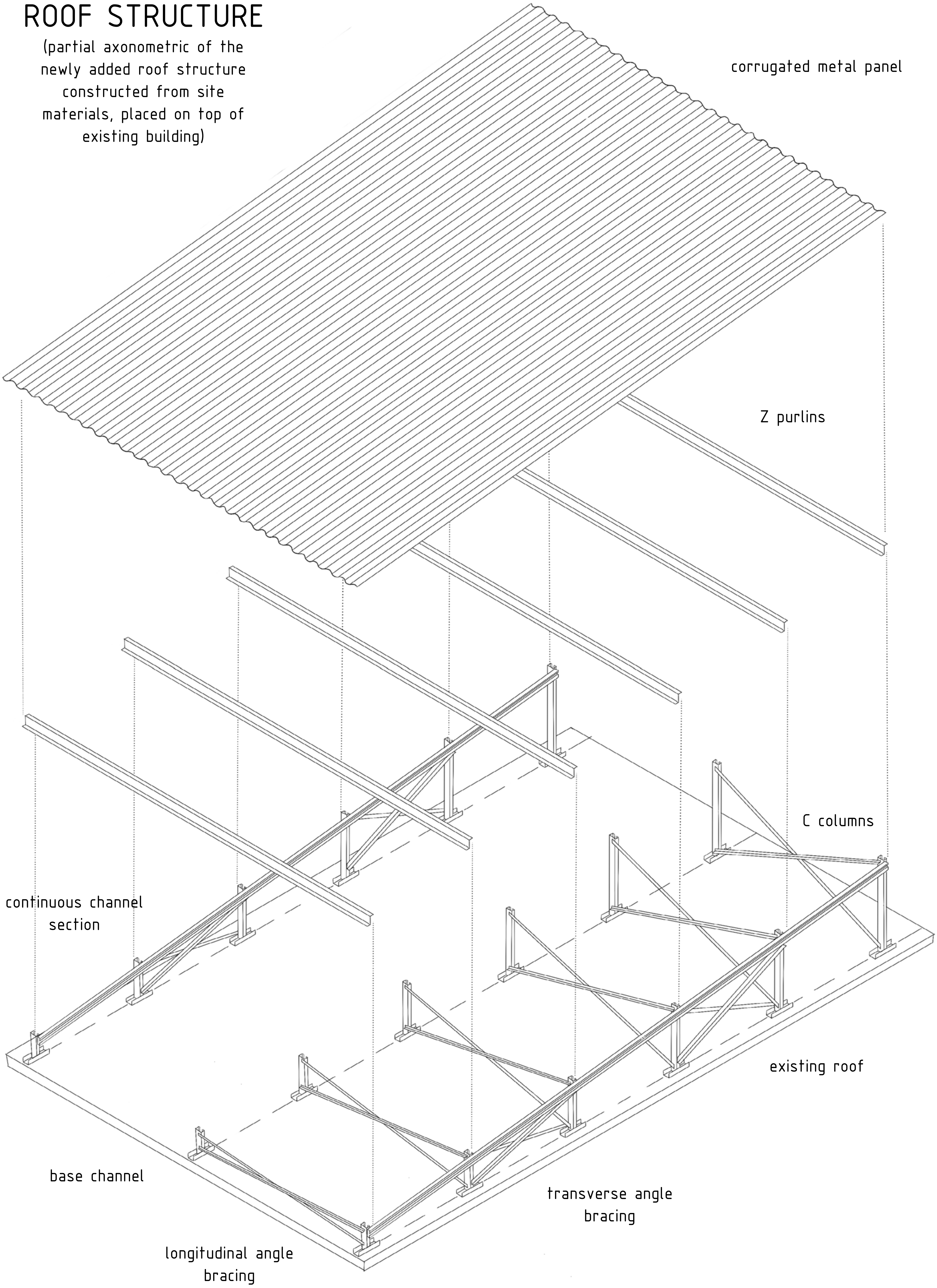
PROPOSED STONE DRYWALL



Post review work (new drawings)

ROOF STRUCTURE

(partial axonometric of the newly added roof structure constructed from site materials, placed on top of existing building)

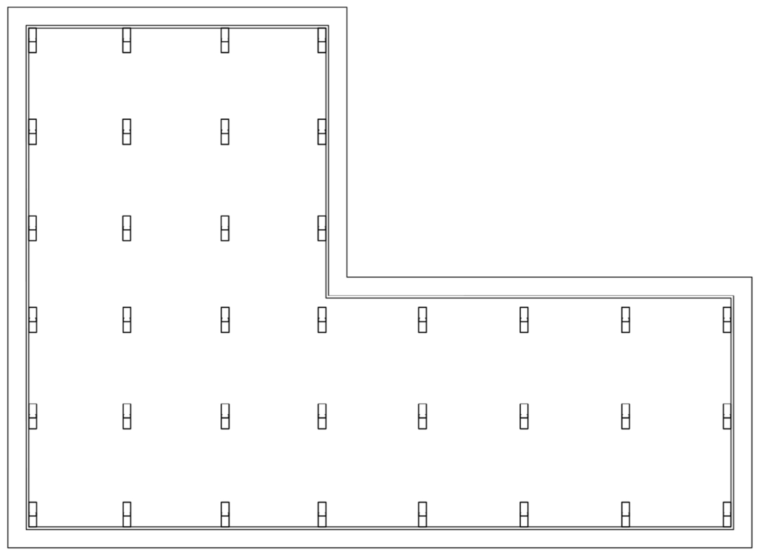


Post review work (new drawings)

ROOF STRUCTURE PLAN

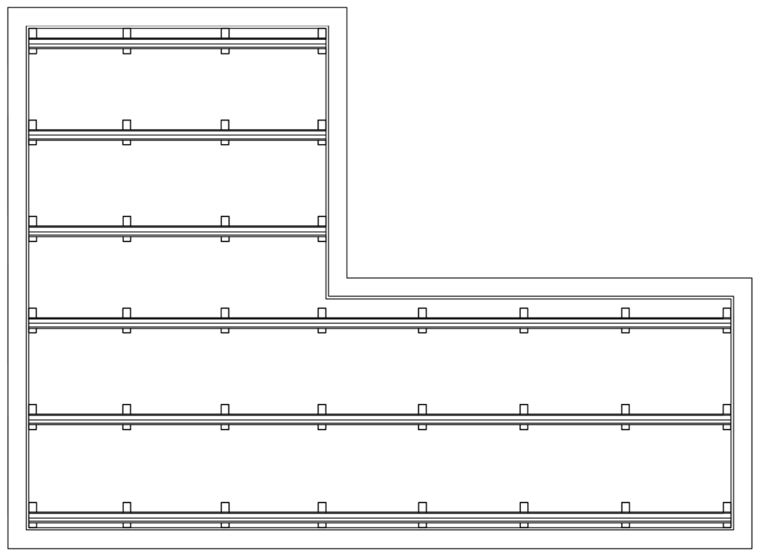
layers of proposed roof structure

LAYER 1



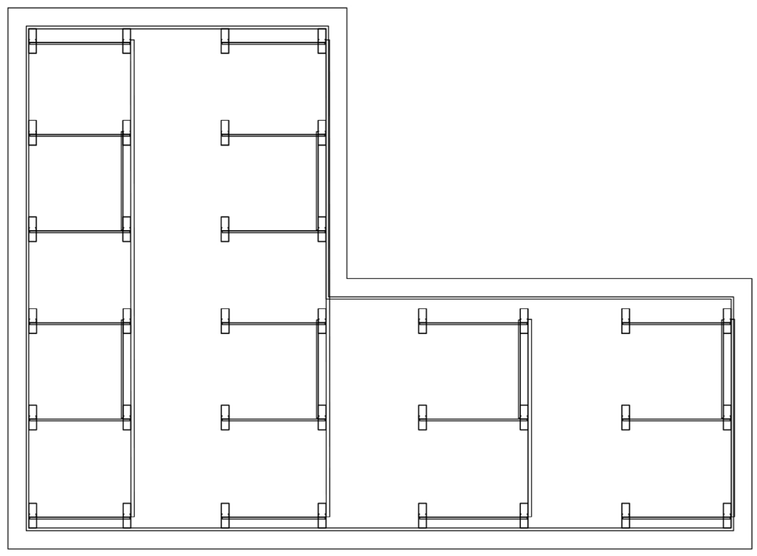
base channels and C columns

LAYER 2



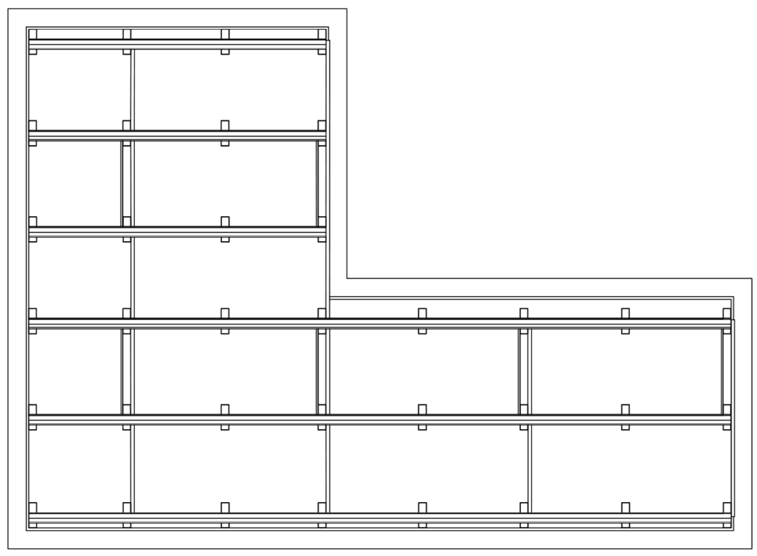
Z purlins placed on top of columns

LAYER 3



longitudinal and transverse bracing, continous channel sections connecting the purlins

LAYER 4

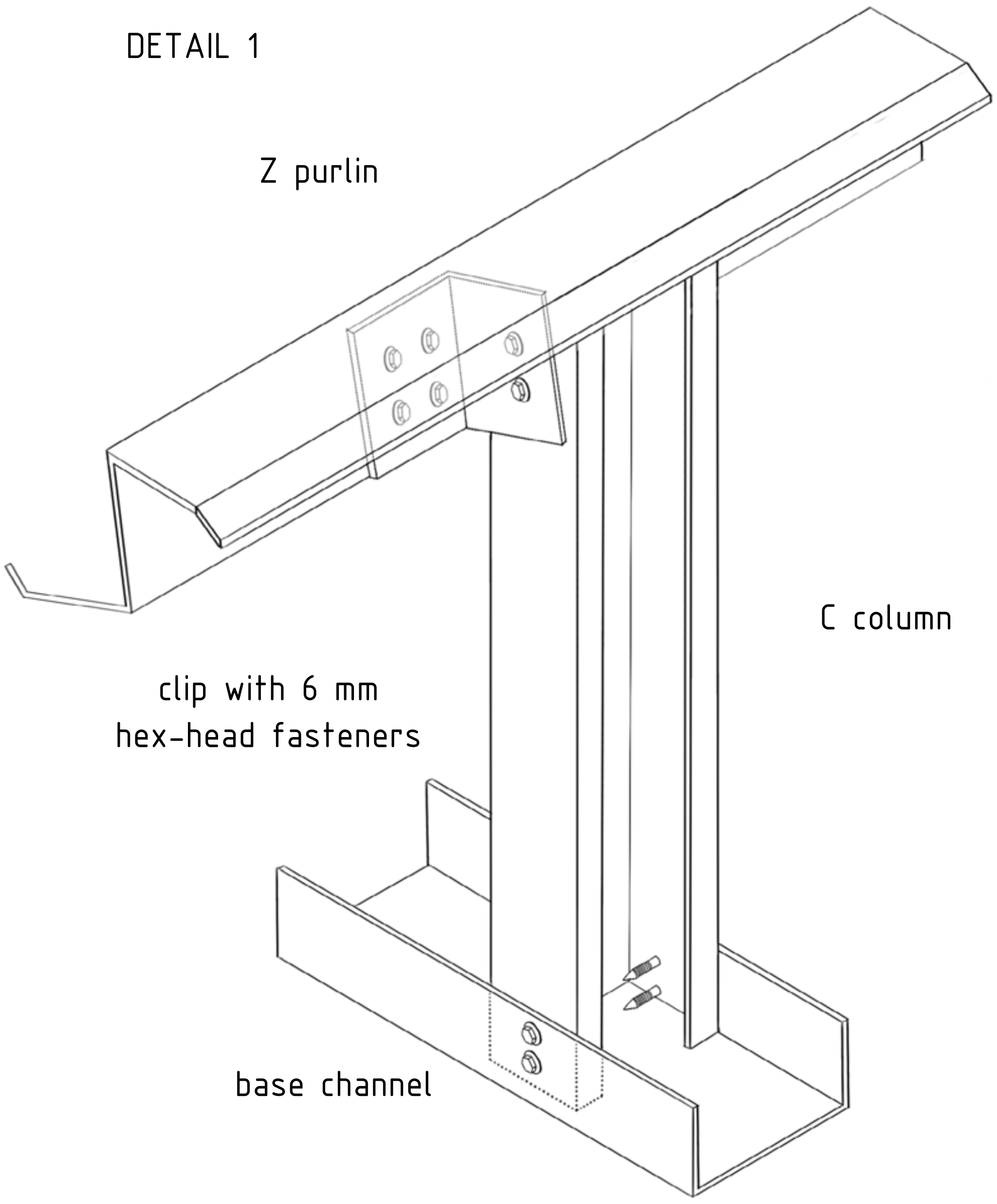


complete assembly onto which corrugated metal panels are placed

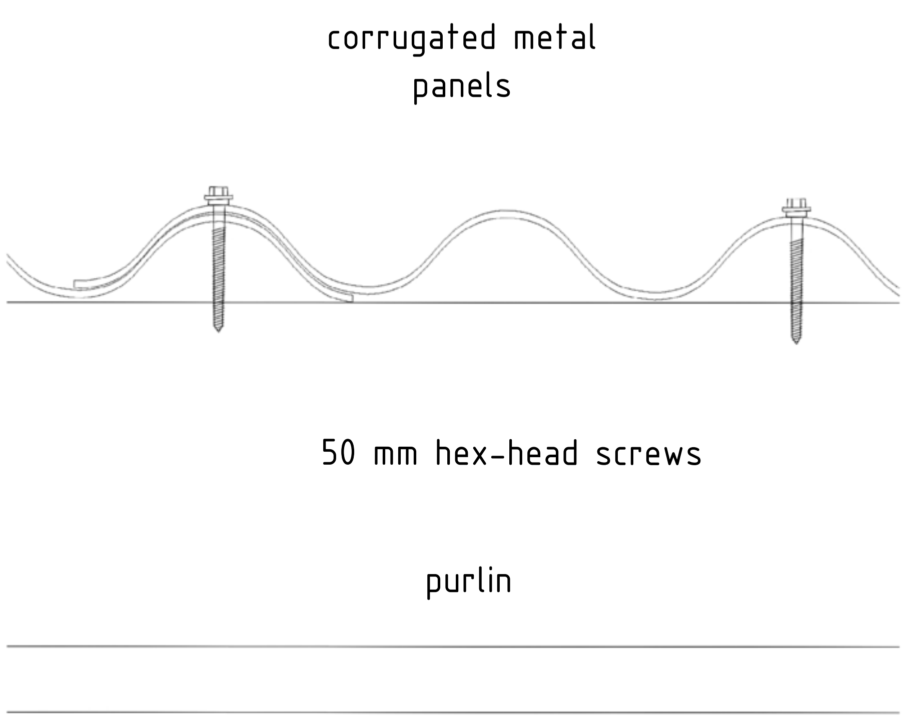
Post review work (new drawings)

ROOF DETAILS

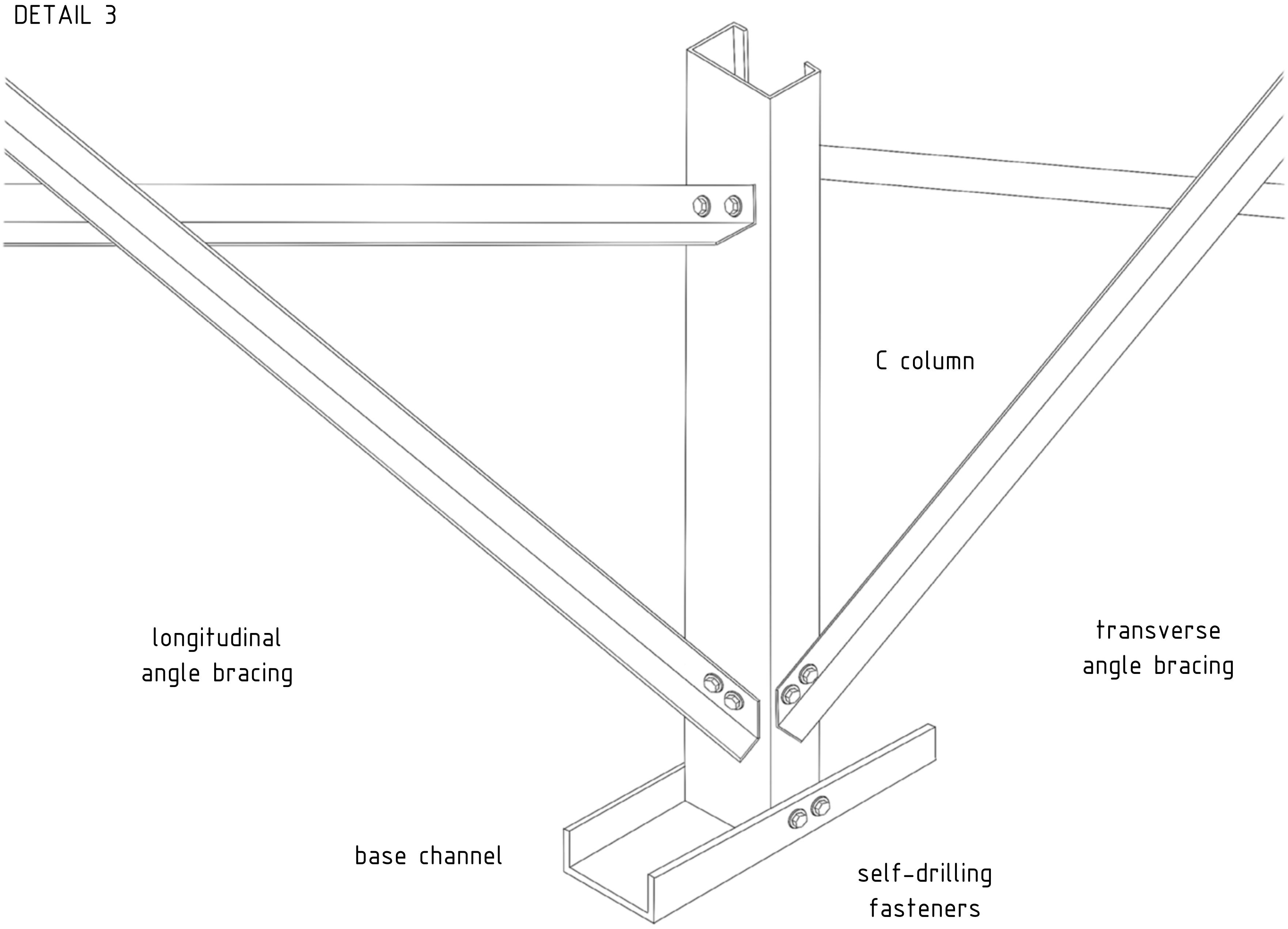
DETAIL 1



DETAIL 2



DETAIL 3



Post review work (new drawings)

FAUNA IN THE ROOF SPACE

house sparrow

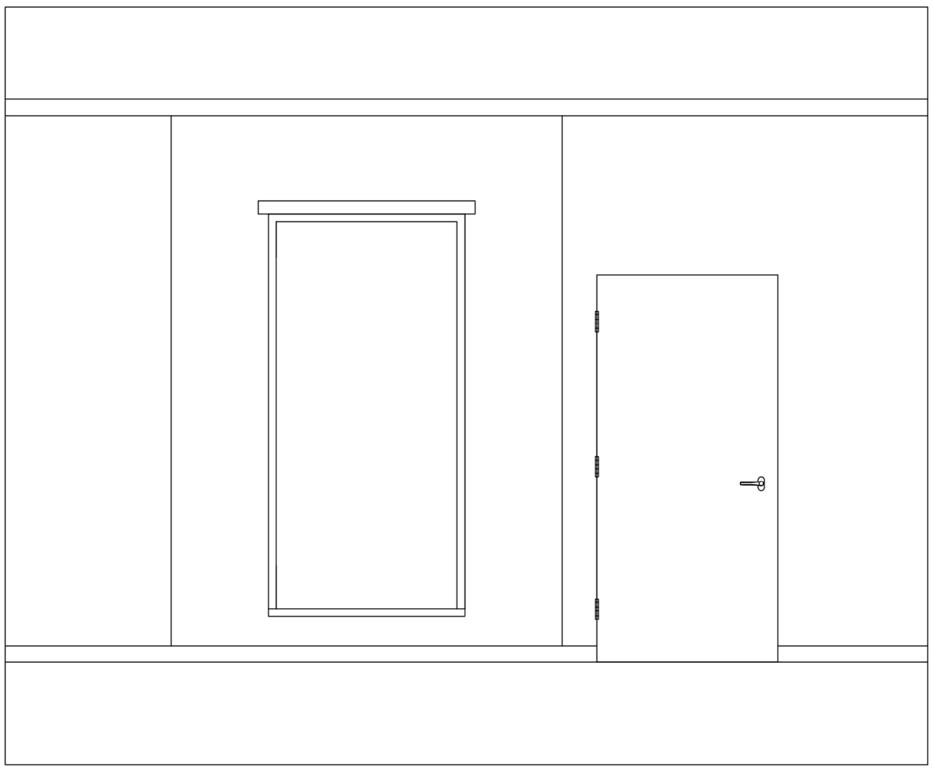
common starling

feral pigeon

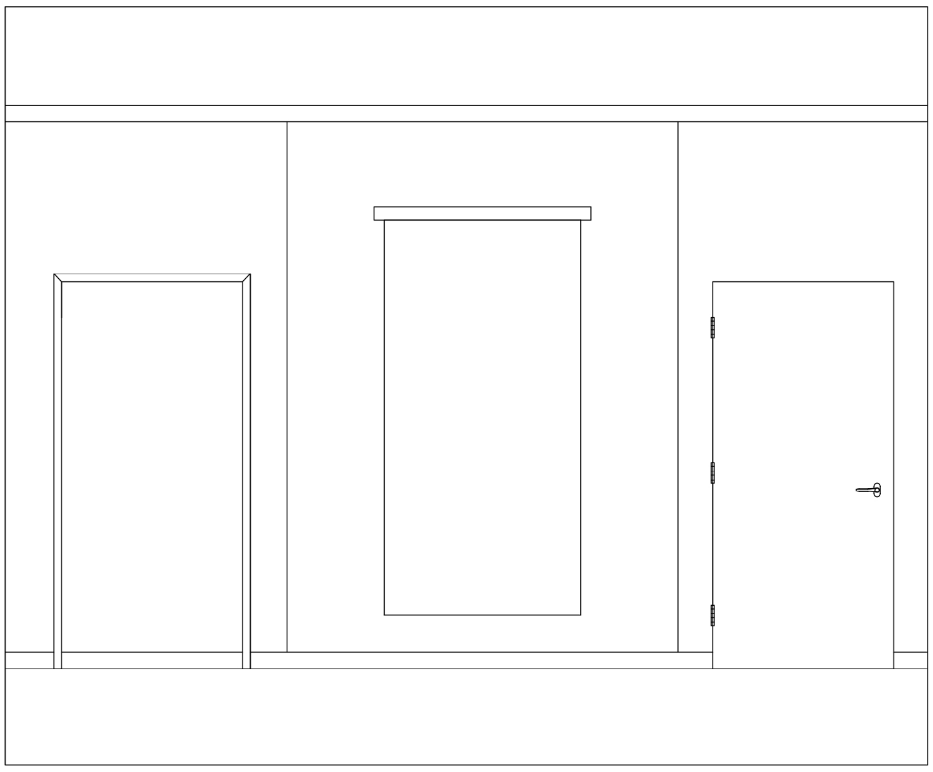
common swift

Post review work (drawing alterations)

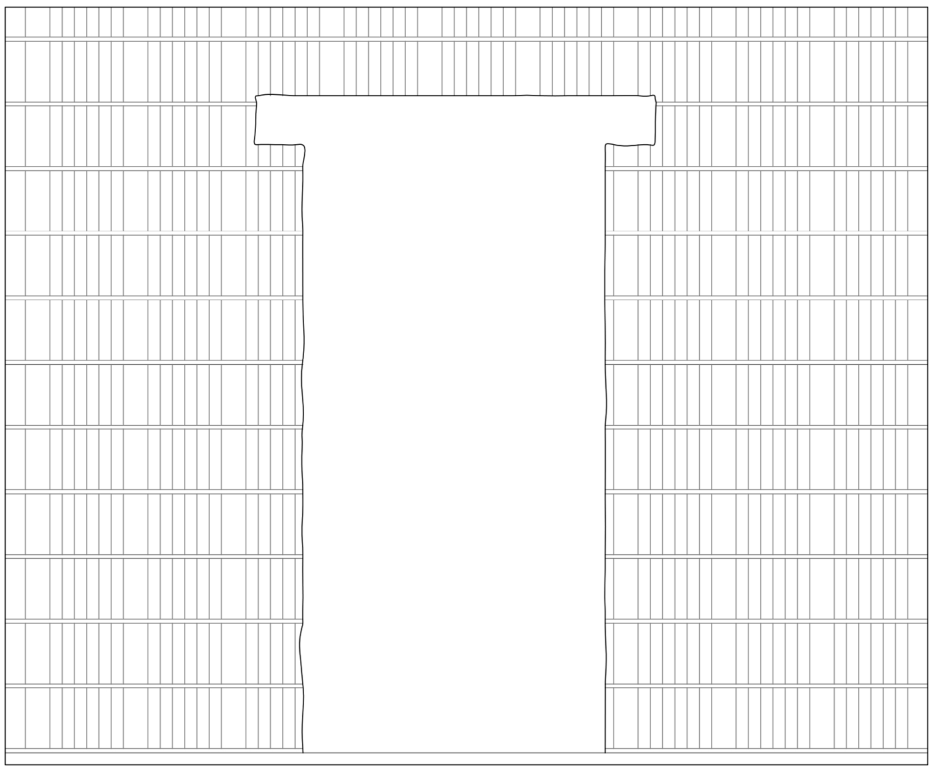
REPURPOSING THE DOOR KD door frame and doors taken from portacabin



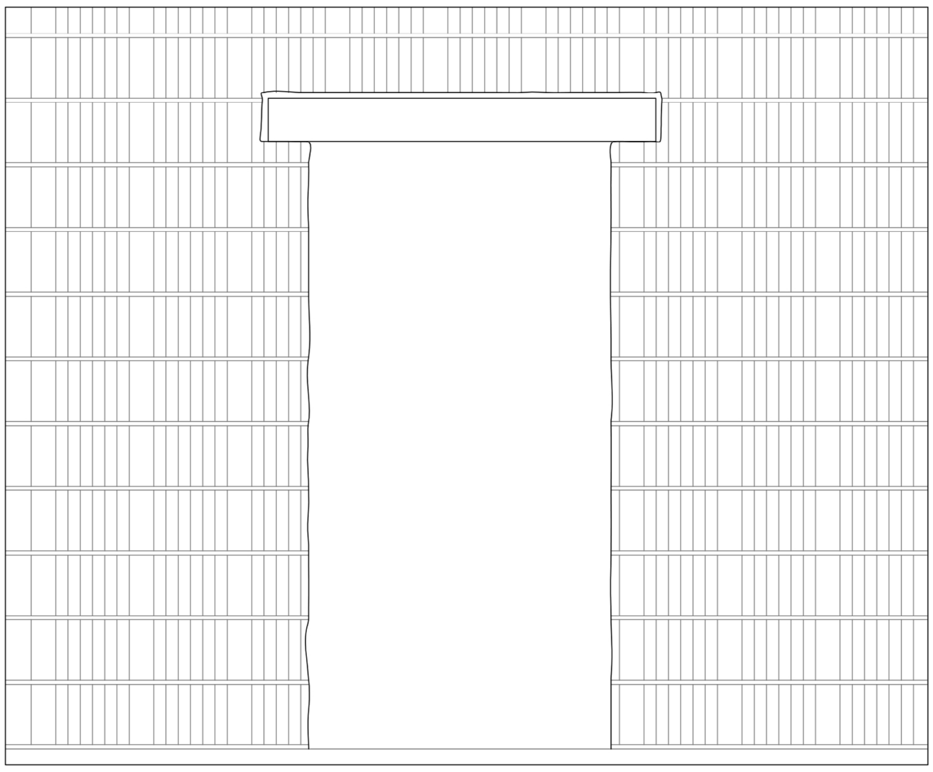
1: unscrewing the existing hinges to take off the door



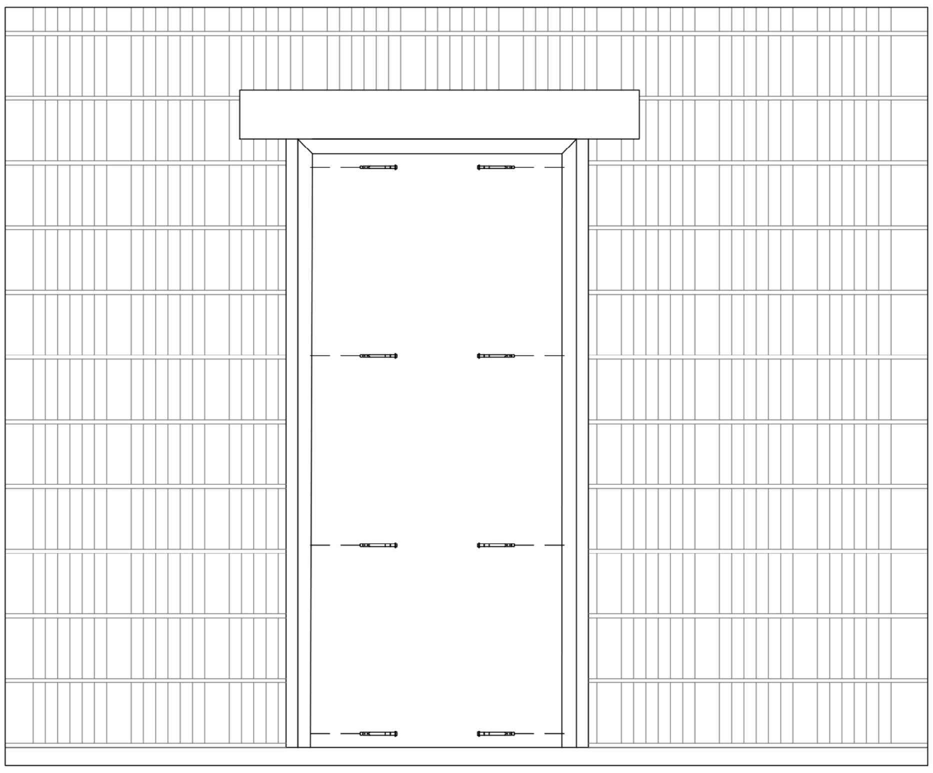
2: KD door frame taken out by cutting the screws (with reciprocating saw) between the door frame and the wall



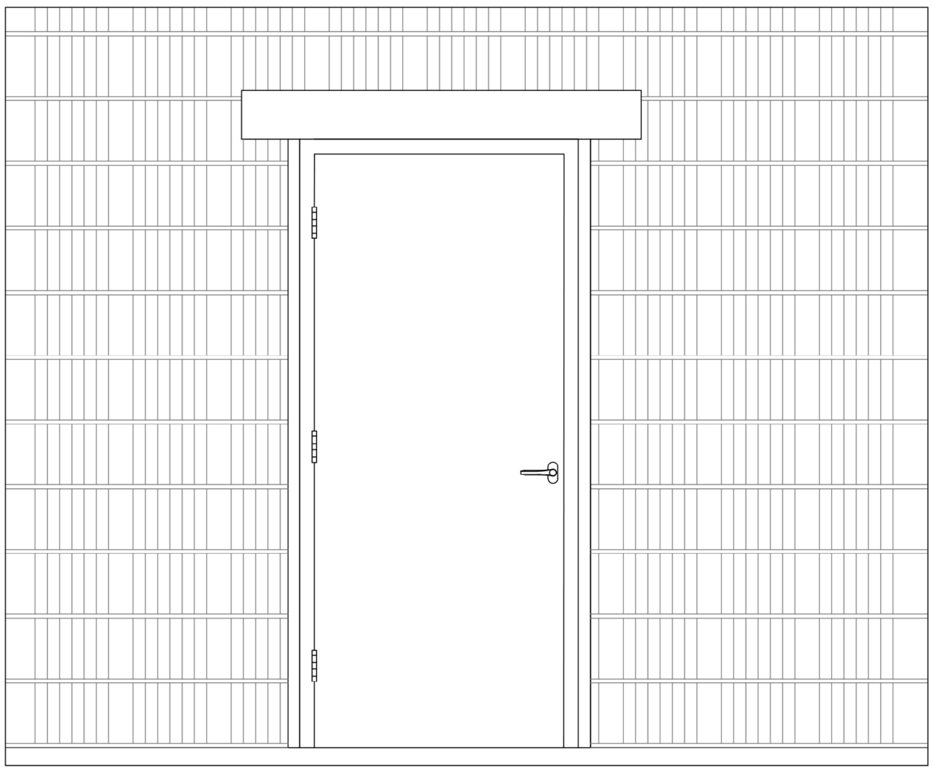
3: cutting out & breaking a door and lintel opening in the proposed building



4: adding a limestone lintel



5: lining the opening with sand aggregates, cement and water mixture (taken from the site), placing the door frame and securing it with ancors



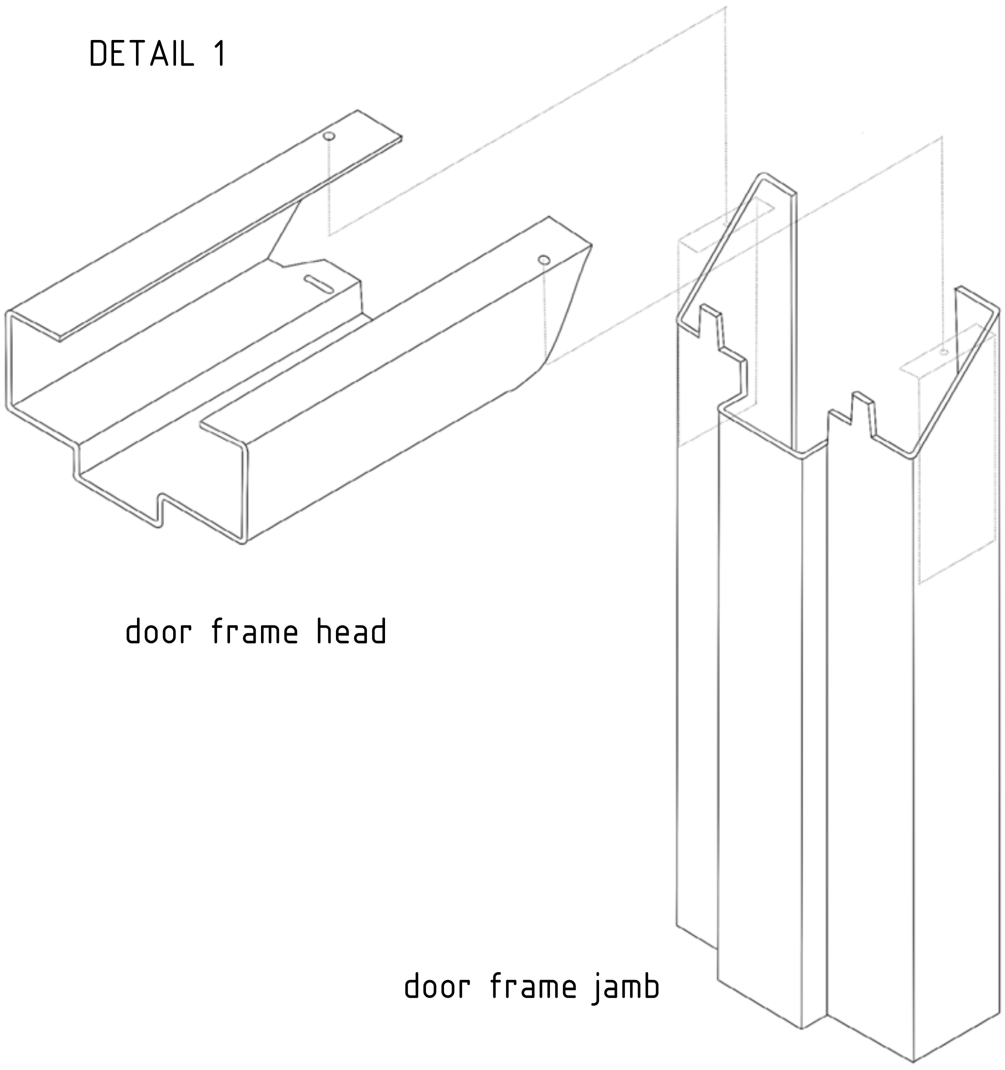
6: screwing the hinges and door back to the frame

Post review work (new drawings)

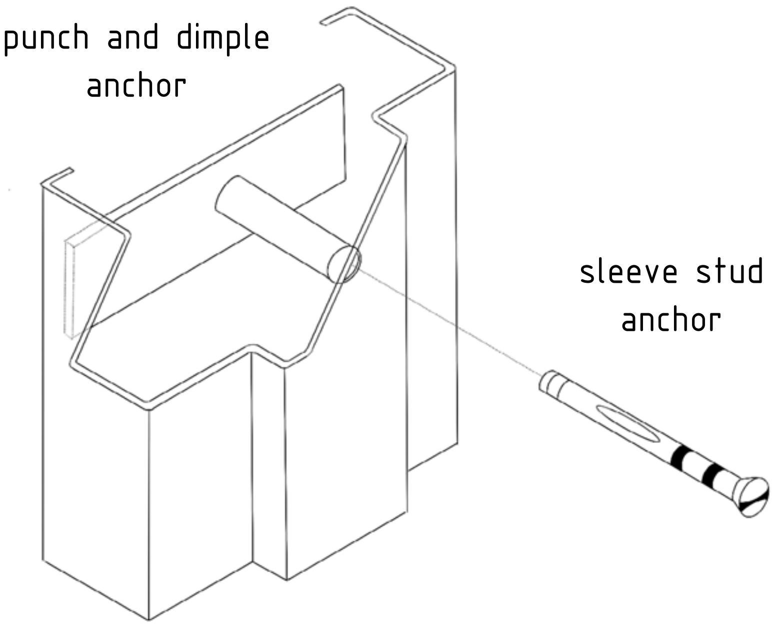
DOOR FRAME DETAILS

KD door frame

DETAIL 1

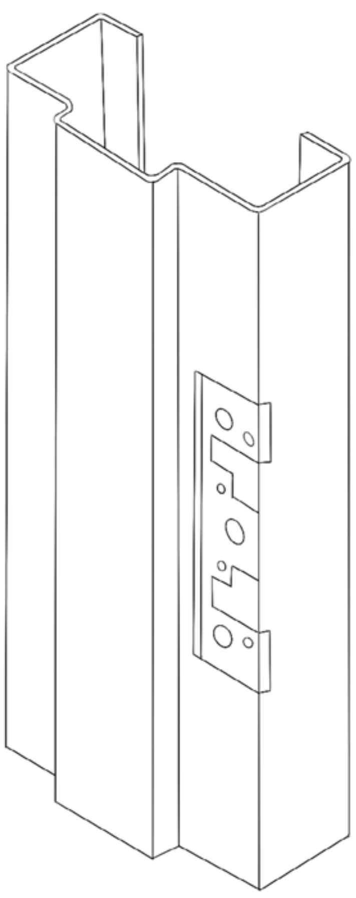


DETAIL 2 frame to CMU wall connection



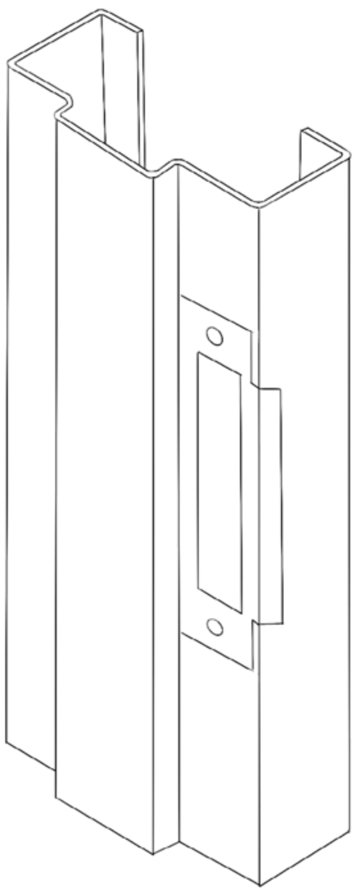
KD door frame

DETAIL 3



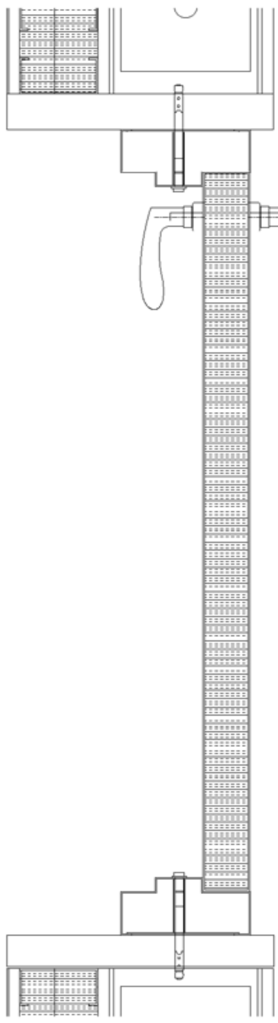
hinge reinforcement

DETAIL 4



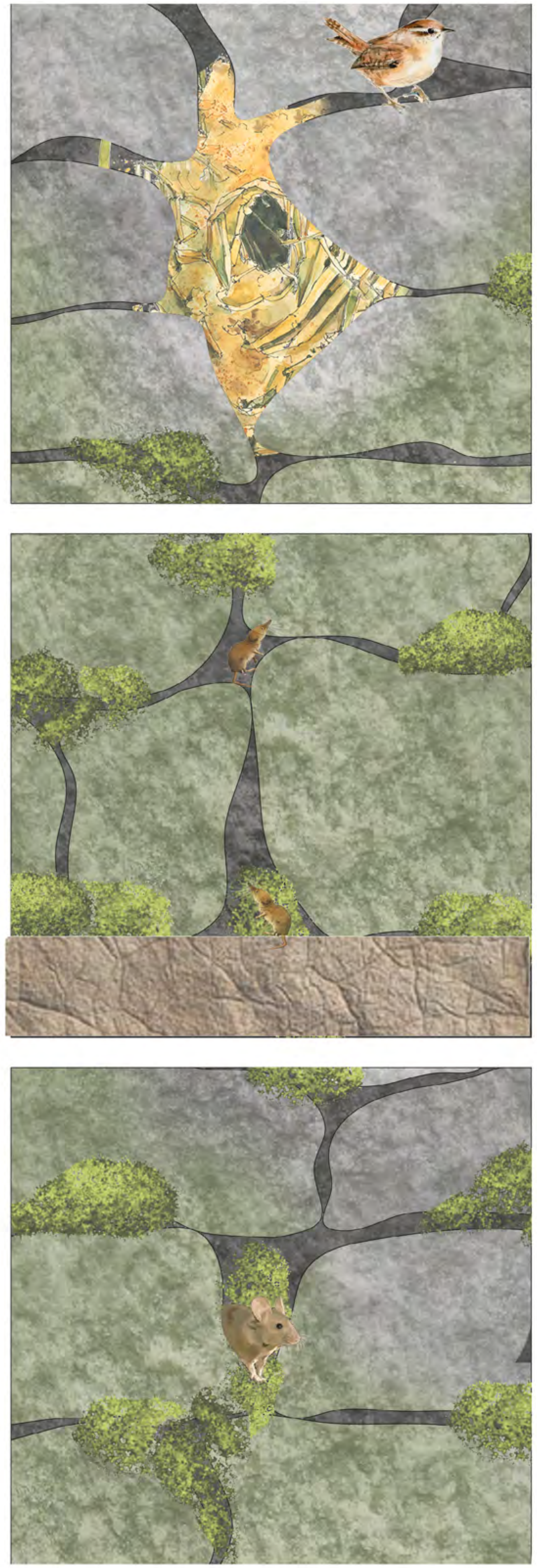
strike reinforcement

DETAIL 5



KD door frame and doors placed in the proposed building

Post review work (new drawings)



Post review work (drawing alterations)

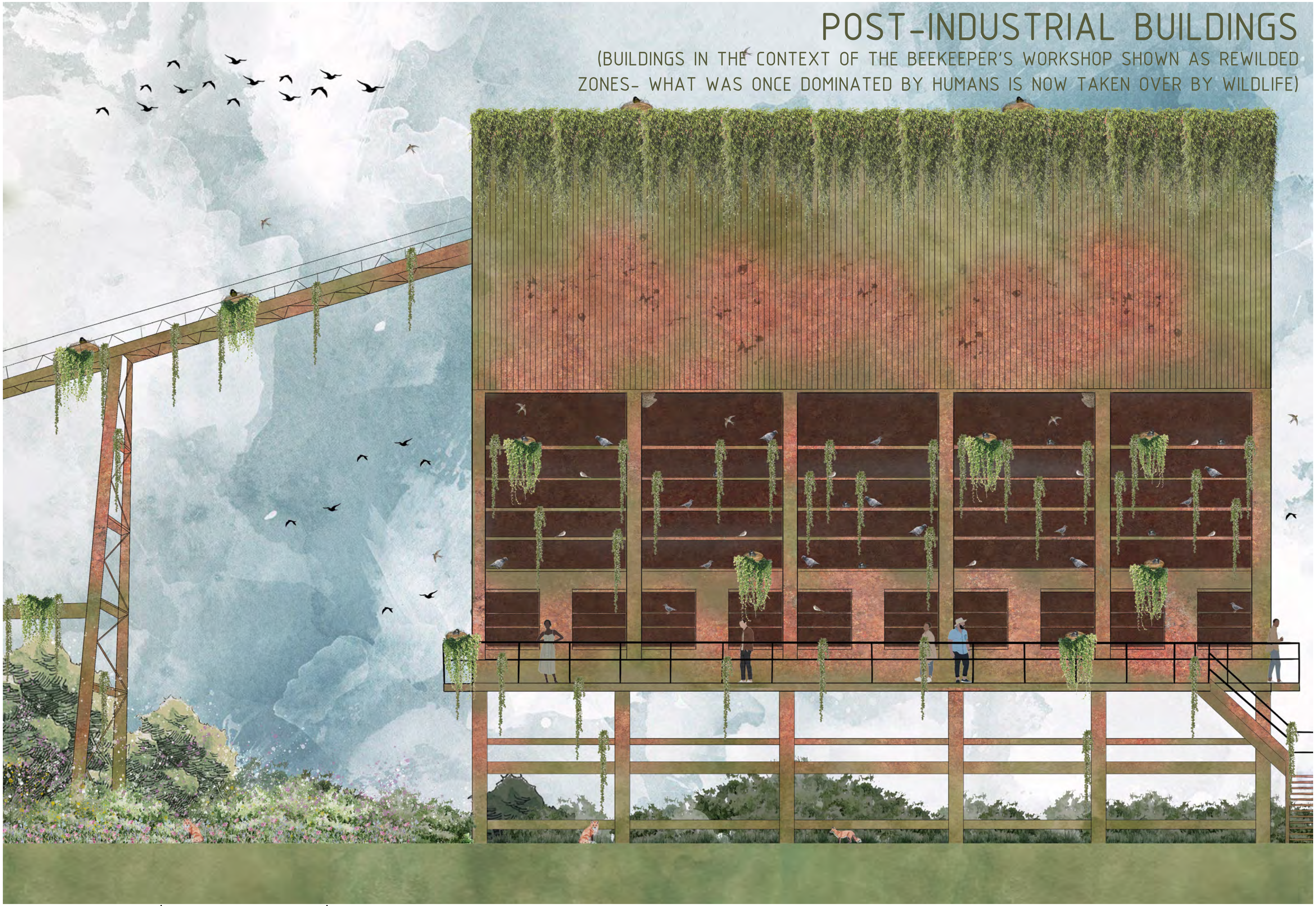
Post review work (drawing alterations)

WEST ELEVATION

Post review work (drawing alterations)

CONTEXT OF THE BEEKEEPER'S WORKSHOP

Post review work (drawing alterations)



Post review work (drawing alterations)

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