

Residential tree houses for a sustainable city expansion

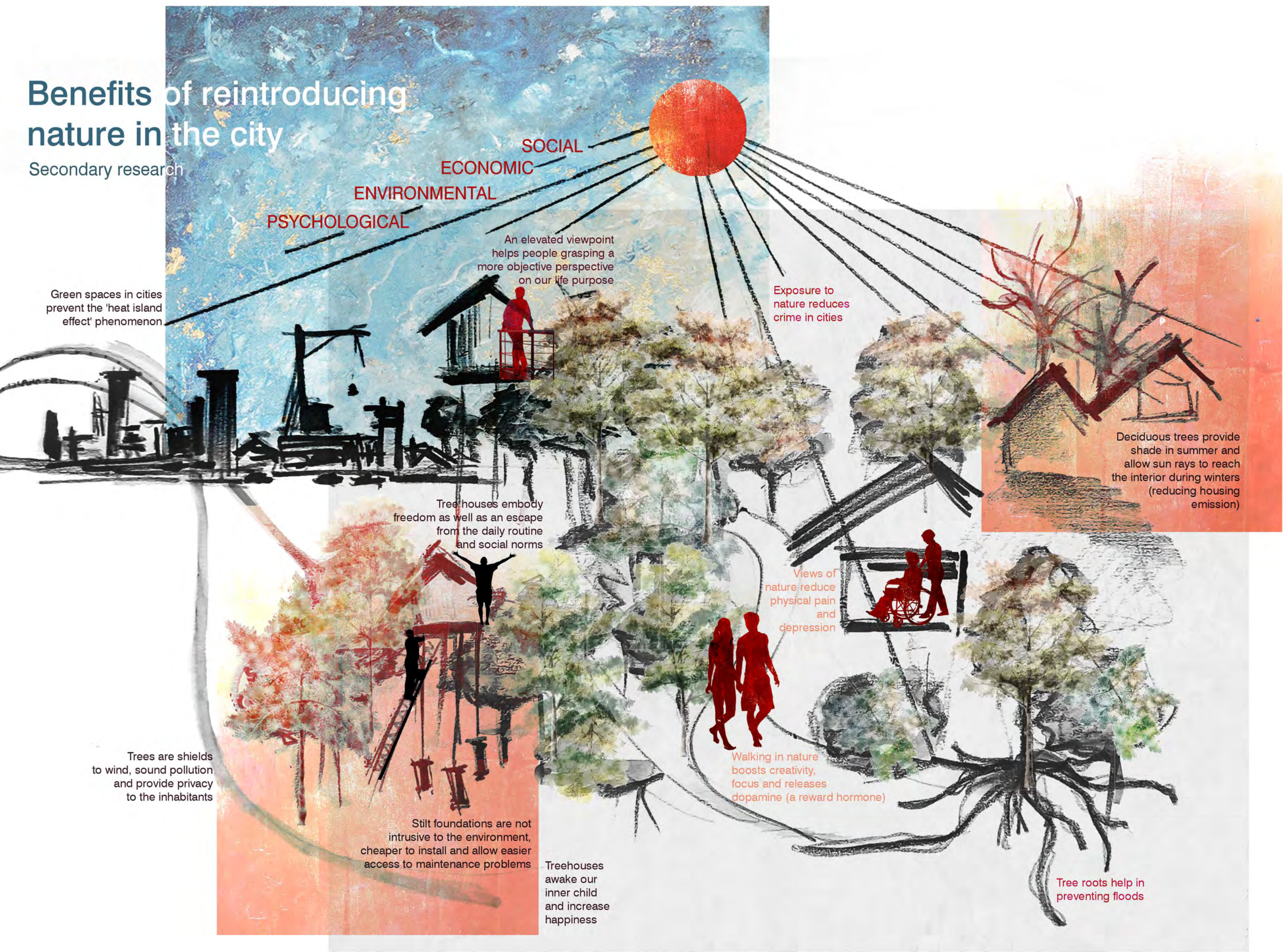
Habit-up concept is inspired by the behaviour of the mycelium and the symbiotic coexistence between plants. This project presents a green spatial unit comprising a cluster of seven tree house dwellings and two levels of elevated ramps to access them. This unit is based on a pentagonal shape which offers the possibility to easily expand residential areas by simply assembling together multiple units.

This project is designed to be easily transferable to any temperate region where trees are suitable for this purpose.

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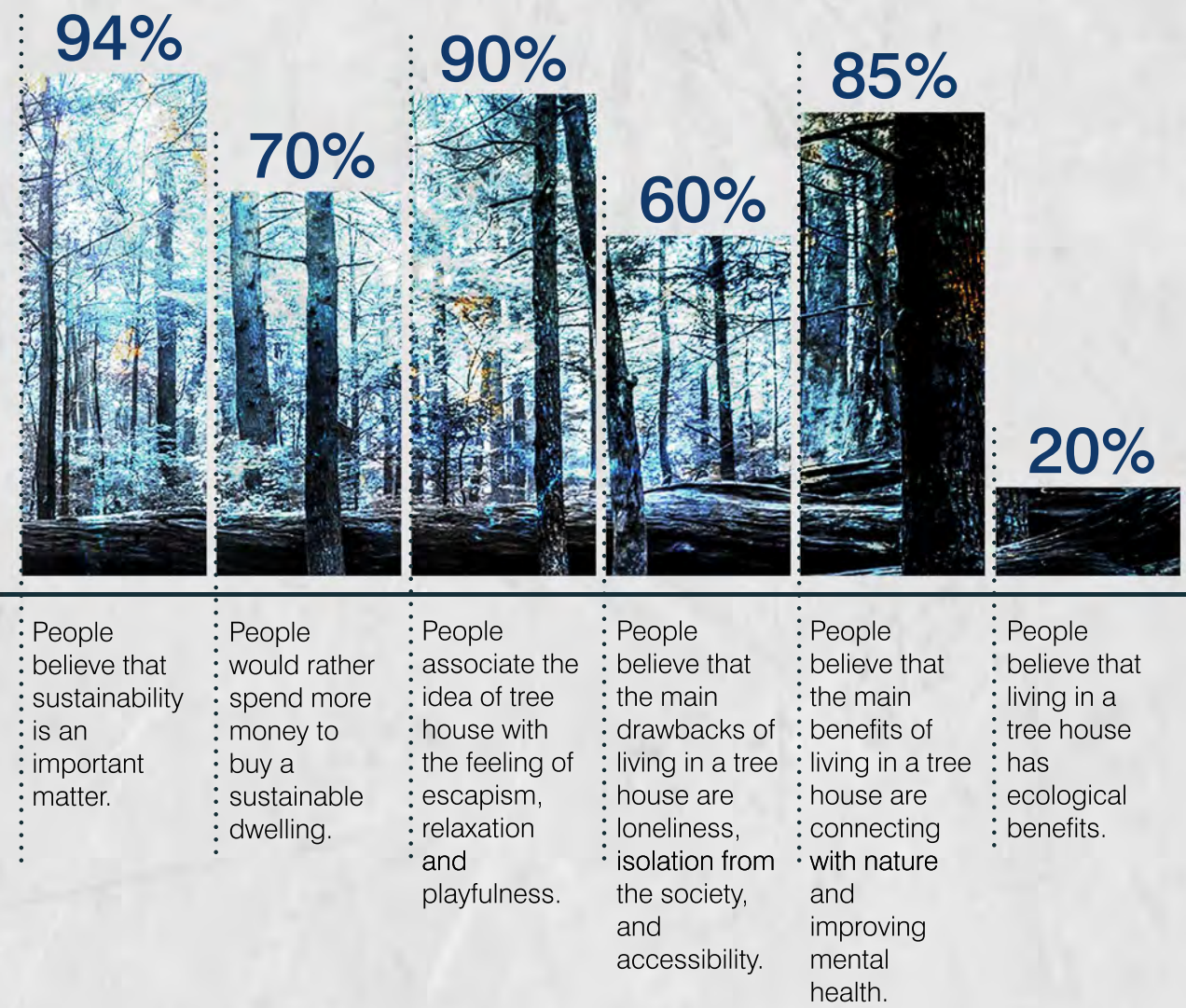
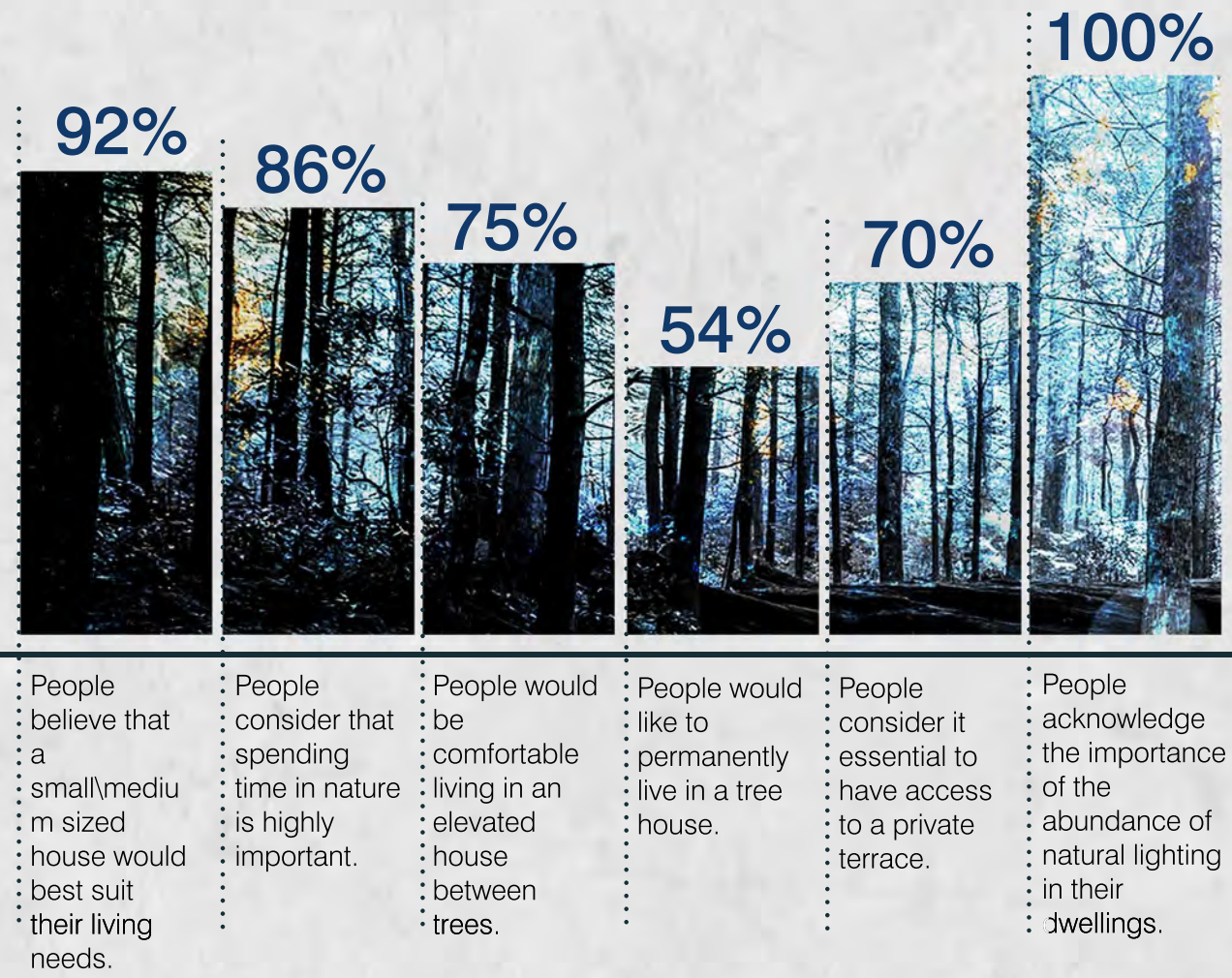
Benefits of reintroducing nature in the city

Secondary research



Primary research

Survey conducted over 50 people to understand their consideration about tree houses



Case studies



Bert Tree House
Conceptual project, designed by Architecture Studio Precht

This tiny house can expand its volumetry vertically by adding modular units. The quirky look is inspired by the main character of the animated movie 'The Minions'.



Street Tree Pods
Conceptual project designed by Matthew Chamberlain

This tree house aims to alleviate London's housing crisis as well as cleaning the polluted air of the city centre thanks to trees. The structure occupies the same amount of space as a parking lot, it is sustainable and self-sufficient.

Interview to explore sustainable practices

Urbanist Husam Al Waer
Replacing parts of the asphalt with green spaces is a sustainable solution for remodelling cities. An example of this would be to create some 'green urban corridors' that cut through the city.



Design concept

Fungi live in symbiosis with plants. Mycelium is essential to the survival of other plants. It provides nutrients and makes them communicate with one another.

People are nutrients

"Mycelium is Earth's natural internet. [...] It's a van guard species that opens the door for other biological communities."
- Paul Stamets -

FUNGI AND MYCELIUM

The city is the forest soil

This project design takes inspiration from the fungi kingdom and more specifically, the mycelium behaviour and patterns. This project development started with the analogy of citizens being plants' nutrients and the city being the forest bed permeated with mycelium. The tree house area in the city will therefore act as the corridor that re-establishes the symbiotic coexistence between nature and society.

Sketch models and hand sketches that helped exploring shapes and forms inspired by the mushroom concept.

Paper sketch model

Sketch models inspired by mushroom gill arrays.

Exploration of negative spaces created by the intersection of simplified mushroom-cup shapes.

Tree house structures inspired by mushroom gills.

A sustainable structure



Sustainable elements:

Materiality. The main materials used for the construction of the structure are highly sustainable. These are timber for the houses, steel for the structural frame and hempcrete for the ramps and support columns. These materials are also easily recyclable after demolition.

Small structure. The interior spaces are compact and have low ceilings. This helps retain the heat during cold months and requires fewer building materials for the construction.

Off-site construction. The modular shape allows the structure to be fabricated off-site and assembled on site. This process is a quick and low carbon emission building method and facilitates a serial production of the houses.

Thick insulation. The thermal insulation used for the house walls helps prevent heat loss and therefore optimises energy consumption in the house.

Natural lighting. The structure is designed around the idea of allowing an abundance of natural lighting in the interior throughout the whole day. This helps in minimizing electricity use for artificial lighting and in keeping an indoor moderate temperate during sunny winter days.

Benefits from being surrounded by trees. The presence of trees around the house brings many sustainable advantages such as:

- deciduous trees provide shade during warmer months and let the sun through during colder months;
- the presence of green areas in cities helps to reduce the 'heat island effect'; a high increase of temperature occurring in urban areas during summer;
- Tree roots prevent floods efficiently making Habit-up an ideal solution to turn any unused flood risk fields into residential areas.

Welcomes biodiversity. Allowing nature back in our cities greatly improves the local biodiversity and the integrity of the soil.

Stilts foundation. The structure is elevated on stilts. This construction method requires fewer building materials than conventional in-ground foundations and is less intrusive to the natural environment. It also facilitates the natural ventilation of the house and isolates the structure from the humidity coming from the ground.

Renewable energy. The structure can also be supplied with renewable energy technologies such as solar panels placed on the top access ramps or a rainwater harvesting system. Habit-up would also be suitable to be transformed into a smart-community and supplied with a centralized renewable energy implants.

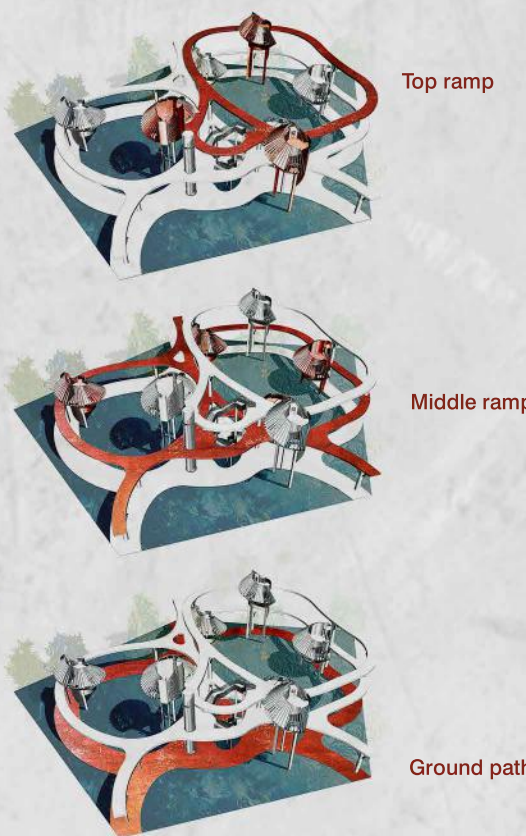
Habit-up cluster



A tree houses cluster module as a sustainable solution to the city expansion

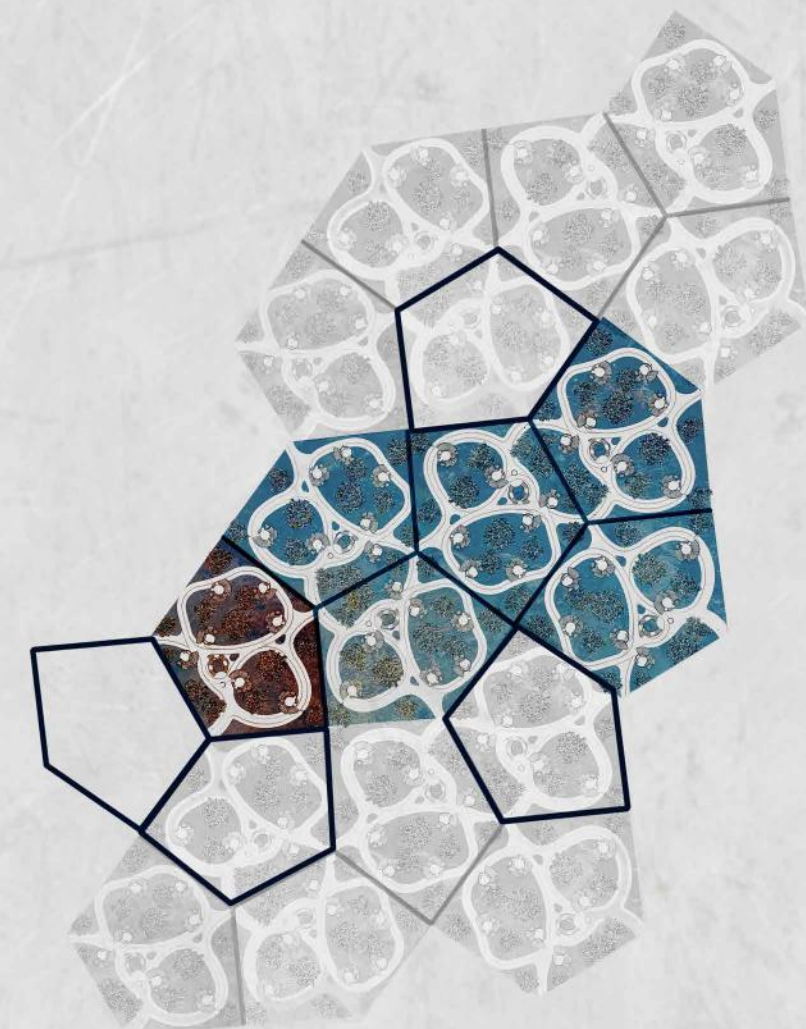
The Habit-up cluster includes six tree house dwellings of different capacity and a set of ramps to access them. Habit-up cluster could be a sound solution for increasing residential areas without eradicating the natural setting and biodiversity. Moreover, thanks to their elevation on stilts, these clusters could be very well inserted in unused parts of an urban area like brownfields, flood risk areas etc. and revitalise them as well as restore the local biodiversity.

Mycelium inspired walking ramps



Habit-up tessellates to expand the city sustainably

The Habit-up module sits on a pentagonal base that can be tessellated and expanded over the city ground. This system results being sustainable by facilitating a modular and rapid expansion and by using the off-site construction method.



View of the Habit-up cluster

Habit-up design aims at dissolving the threshold between interior and exterior. This city intervention leads to improve users' lifestyle by drawing their focus towards the exterior views and leading them to live in a daily state of mindfulness.

Video of a walk through a Habit-up cluster and the interior of a Cocoon tree house :



Interior views



Recessed seating area



Attic bedroom

Interior zoning

The Habit-up tree houses are elevated on stilts and their structure is formed by a central cylindrical core surrounded by structural ribs that swirl upwards.

