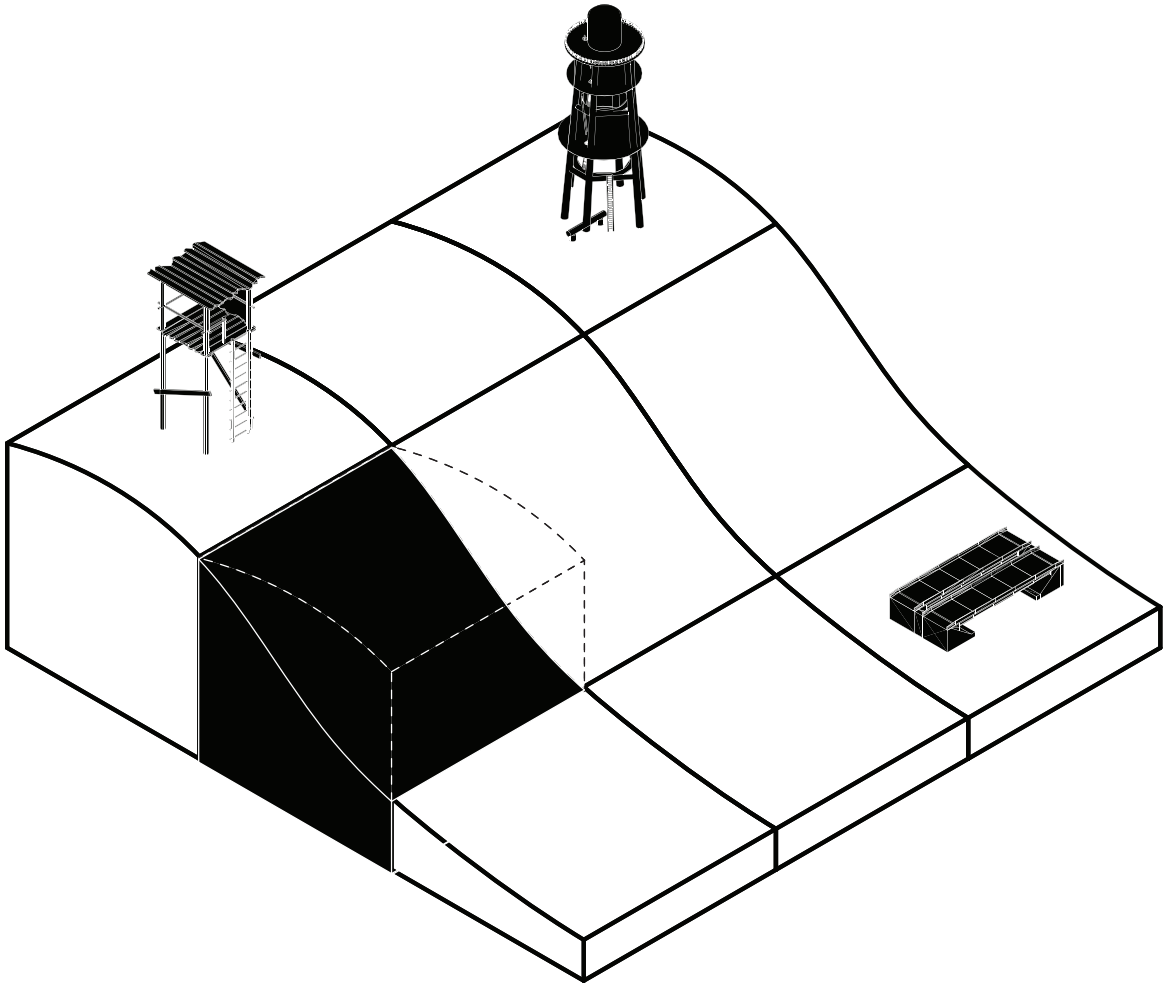


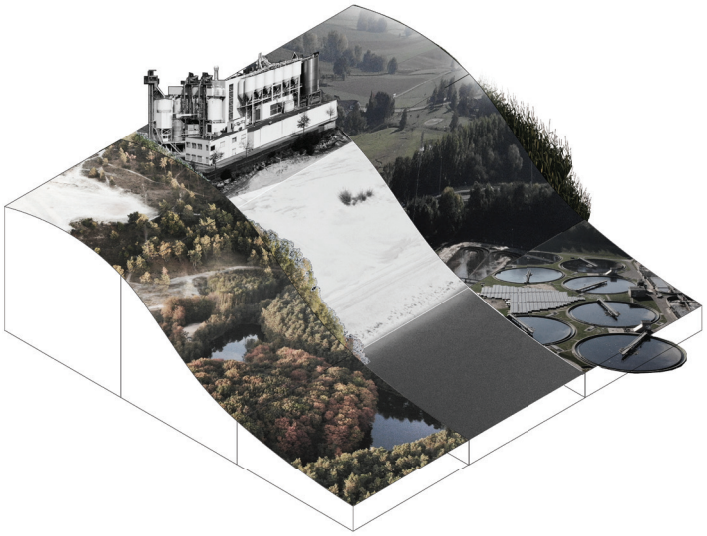
Harvest_BK
IBA Parkstad

An open-source guide for the activation of ecology in drosscape

Intecture
Tutor: Annebregje Snijders and Nico Tillie
Student: Maria Kaik
4737261

1

Introduction



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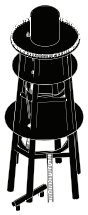
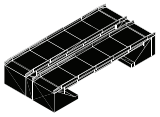
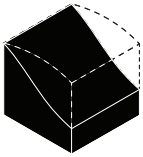






= Harvest

Conceptual Diagram (own image)

This paper is a summary of the research on instruments which stimulate the nature. Its goal is to provide an anthology of possible solutions for the reconstruction and enhancement of the habitat in the post-industrial conditions. [1]

Energy landscapes deform and break the ecological tunnels. Then, with the expiration of a certain industry, it is not only the buildings, infrastructure, and local settlements that lose its purpose. It is also, the profession of coal mining which becomes redundant from one day to another.

The exploitation of the resource or computational replacement will result in a significant increase in the amount of waste from the industries which became outdated. The afterlife of an energy landscape is often a wasteland - inhabited by nothing, but abandoned heavy infrastructure.[2]

However, this liminal landscape is just temporary. The nature and perpetual evolution of the ecosystems immediately adjust to such novel conditions. Microecologies develop on the borders created by the exploitive industry.[3]

The science of restoration ecology allows to speed up the transformations of the burren land exploited from resources into a novelty ecosystem.

Nonetheless, the extensive research and analysis often does not go beyond a piece of paper.[4] Difficulties arise when an attempt is made to implement the policy. Due to the gap between the science and practice, not only the process of restoration is being slowed down, but also the innovation within the disciplines is being limited.

Architectural profession can communicate and implement this knowledge.

In order to bridge the gap between the science of ecological restoration and its practical implementation, architectural operations which actively engage with the repair of places[5] will be investigated.

Small scale, low-tech, minimal intervention structures are analysed as devices for performative adaptation to a specific ecology. This type of functional architecture falls into the category of an agricultural device, animal shelter, visitor attraction or a folly. [6]

Illustrative communication of such solutions aims to make the engagement with the ecology accessible to an average user.

It searches the possibilities to reorder the existing element to activate the drosscape.[7] Because of this, it should be questioned whether the industrial infrastructure can become a part of performative ecosystems for endangered species.

The open-source guide for the activation of drosscapes takes from the four-part methodology of the continual process of evaluation and adaptation described in the “Border Ecologies”:[8]

1. Resourcing / Dynamics
2. Looping and Augmentation
3. Activation / Catalyzation
4. Adaptation / Succession.

This paper will focus on the role of the cohesive architectural devices that contribute to the Activation and Catalyzation process, which restart and trigger the ecological cycles. It strives for restoration, which accommodates for, serves and stitches the deindustrialised novelty landscapes.

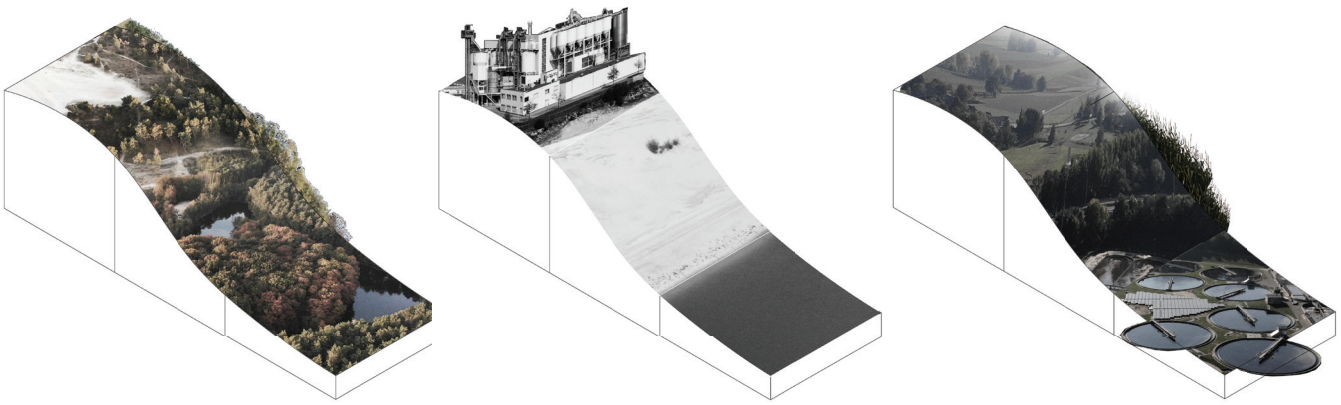
Methodology

A grid based on Klaas Jan Wardenaar's[9] visualisation method is used as a tool to monitor the speculative transformations triggered by the devices. His matrix of topographical conditions and maintenance levels represents the potential of the landscape in Zanderij Crailoo - a successful intervention in the area of the former sand mine.

Starting with the natural landscape, through drosscape, ending with an energy landscape - three different levels of treatment are being represented.[10] The medium case visualized by the Sibelco Sand Quarry which is facing the forecast of closure, represents a drosscape.
It represents a liminal state between the Brunssummerheide - grazed natural landscape and a water treatment plant - energy landscape.

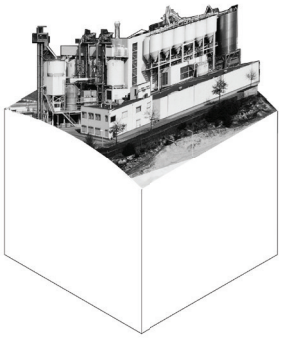
In fifteen years Sibelco Sand Quarry will become a brownfield. The land which is being exploited from the geological resource - Silica Sand- is currently attracting an abundance of birds. The water reservoir made by the mining excavation(3) created wet conditions and variations in the topography(2). From the industrial infrastructure a steep slope leads to a pit filled with groundwater.

How can an architectural intervention shift the existing condition and maximise the ecological potential of the Sibelco Sand Quarry in the future? Does the construction transform the soon-to-be industrial leftovers into an energy landscape or rather a grazed natural park?



natural landscape drosscape energy landscape

Three examples of maintaining landscape (own image)



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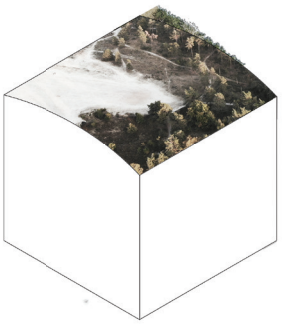

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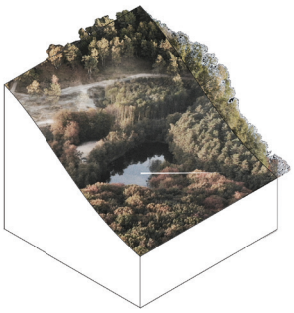

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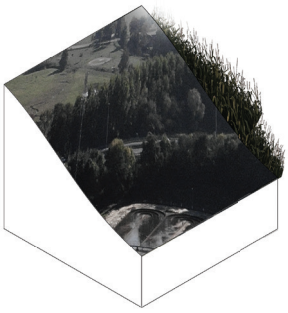

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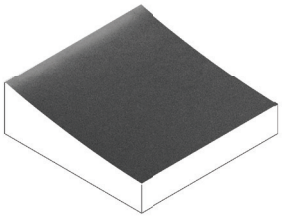

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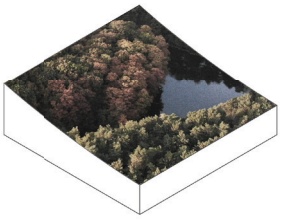

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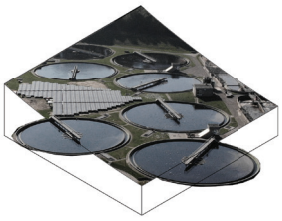

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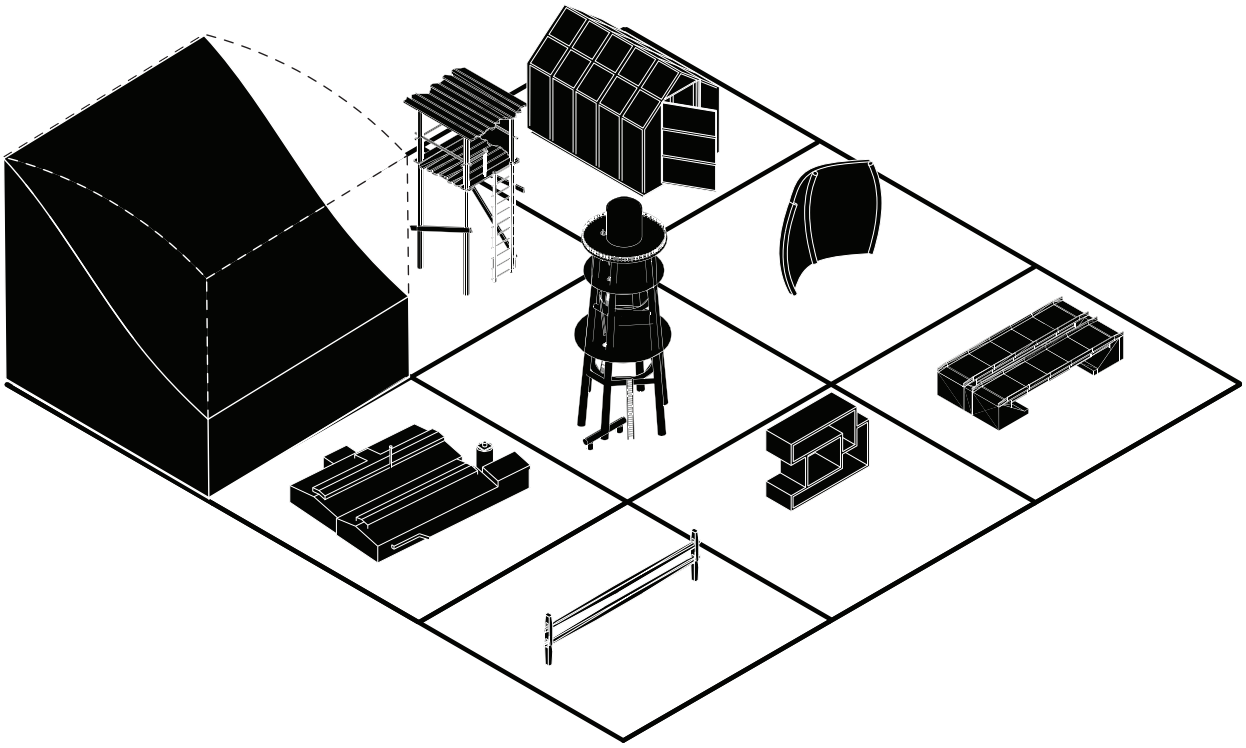
In the matrix, Schrieversheide in Brunssummerheide represents a grazed by sheep dry heather which varies in topography. The stream (6) - Roode Beek - cuts the hills creating a peaty and swampy slope to the valley (5). Reforested after a military activity in WWII nature reserve is now devoted to recreation (4). This heatherland represents the land threatened by exploitive industries such as sand mining. A brownfield left to spontaneous nature inhabitation could become a similar condition. Hence, which devices could speed up and support such process?

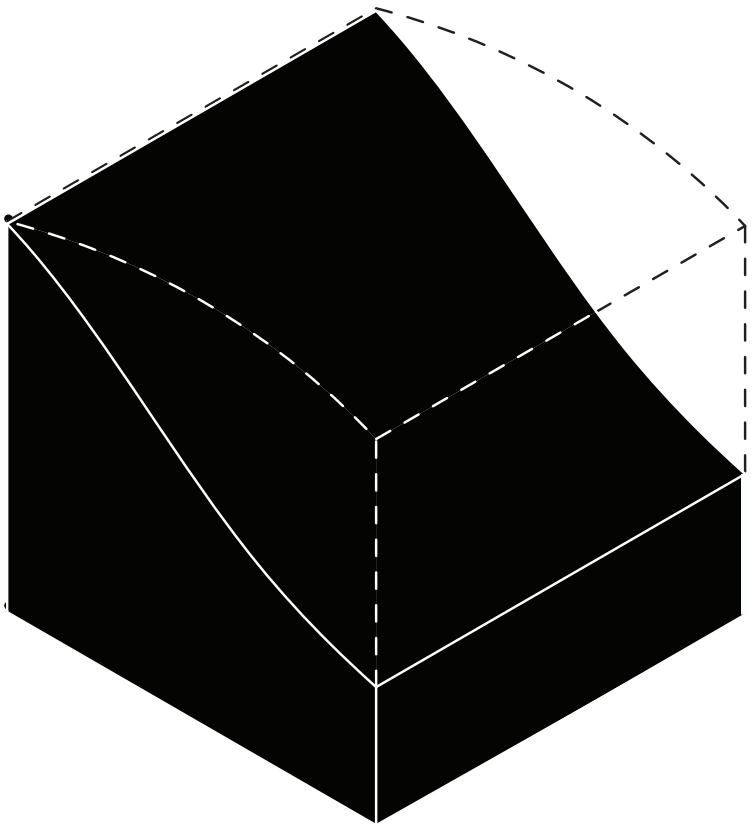
Another strategy to reinterpret the post-industrial landscape is to give it a purpose with a different industry. With the expiration of a contract for sand excavation, the land can still keep its productive character by producing sustainable energy or harvesting food. This solution is represented in the matrix as the Energy Landscape. The above mentioned devices can transform lush lake valleys, steep slopes and architecture into agricultural land.

II

Devices



Devices for the activation of Drosscape (own image)



Excavation - Fish Farm

La Tanzada Salt Fields, Spain ("La Tancada Salt Fields By EMF « Landscape Architecture Works | Landezine" 2018)[11]

Agricultural Device - Towards Energy Landscape

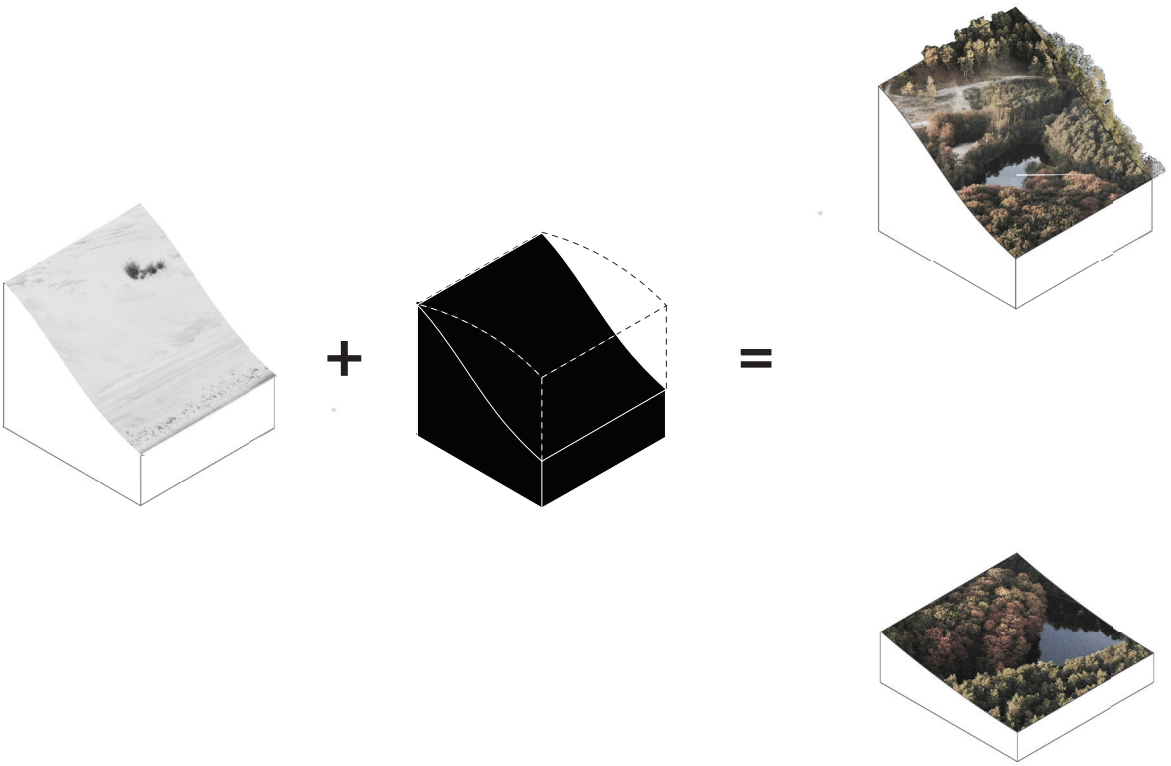
The change in topography created by excavation can result in reaching the ground water level. Provided there is no contamination, the appearance of water allows to introduce a reservoir which can be used as a fish farm. The already existing infrastructure is filled with juvenile fish and freshwater.

This synthetic cultivation requires regular input of fish food and water aeration, monitoring growth and water toxicity.[12]

A relatively low cost action of stocking the reservoir with juvenile fish can trigger and reinforce multiple growth cycles on the post-industrial land. This restoration is a hybrid of natural and constructed habitat. This agriculture is an active transformation into an energy landscape. A monoculture of fish species is attractive for other biodiversity which can inhabit the wetlands.

Fish agriculture attracts the migration of birds, which adjust their route in order to take advantage of the landscape filled with nutritions. This change of their trajectory causes a degrowth of their presence in the neighbourhood land. Birds such as ducks and geese fertilize with the nitro-rich manure algae growth[13]. This is just one of the constructed ecologies which represents a circular approach, where the waste from one species facilitates the growth of another.[14]

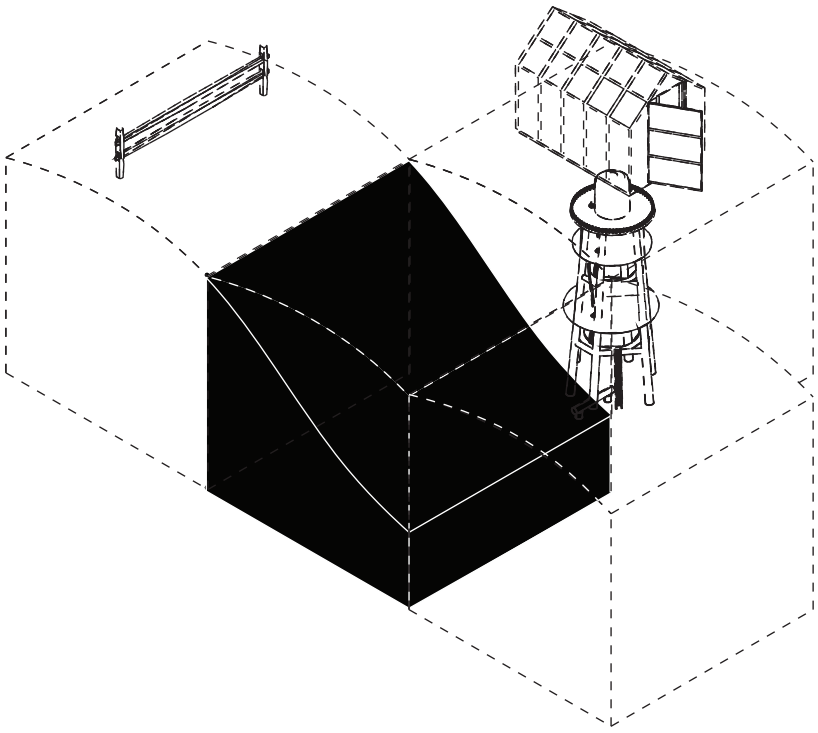
Such synthetic cultivation of land creates boundary conditions between the dry sandy land and water - an environmental protection for crustaceans, mangrove and reed. Fish farming creates a multi-layered transitional ecology, where the zones transform from open water, through mudflat settlements. This could become a new habitat for larvae and fish fry[15] as well as a breeding area for birds.



A possible transformation triggered by the device (own image)

Excavation - Fish Farm

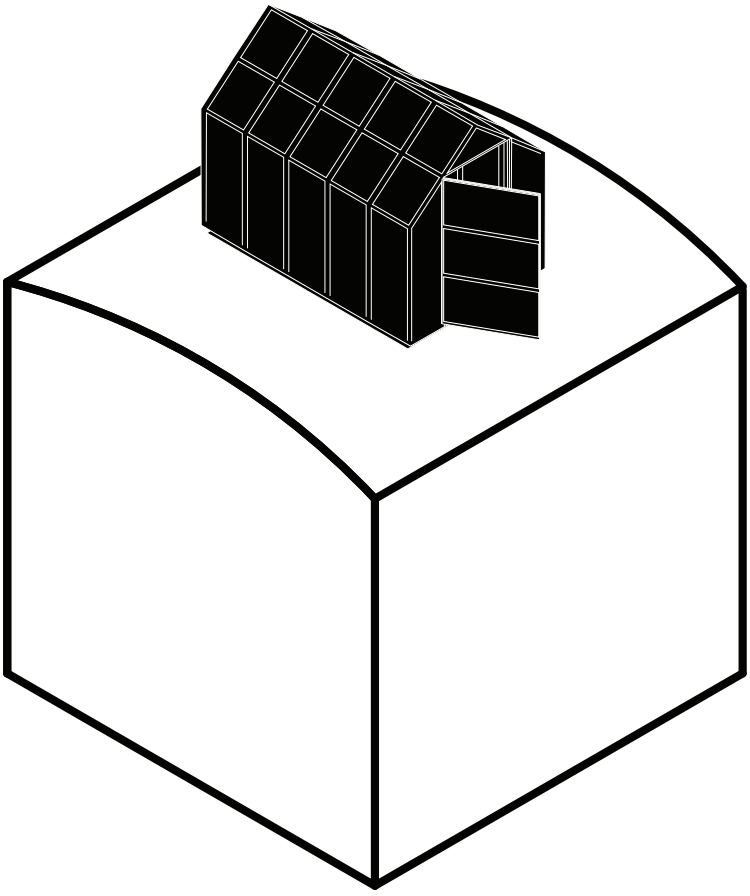
Potential



Opportunities for development (own image)

The fish farming ponds could be incorporated into a wider ecosystem, circulating the water through an irrigation system[16]. The fortified with nutrients[17] water could intensify the traditional farming techniques in fish farming. Such layering of ecology could become an agency for endangered species. In order to include the population from local villages, an economic incentive from fish farming, for instance a government subsidy could become an argument to maintain the fish ponds.

Water management needs 'macro-logics'[18] as its impact goes beyond monofunctional systems.



Greenhouse

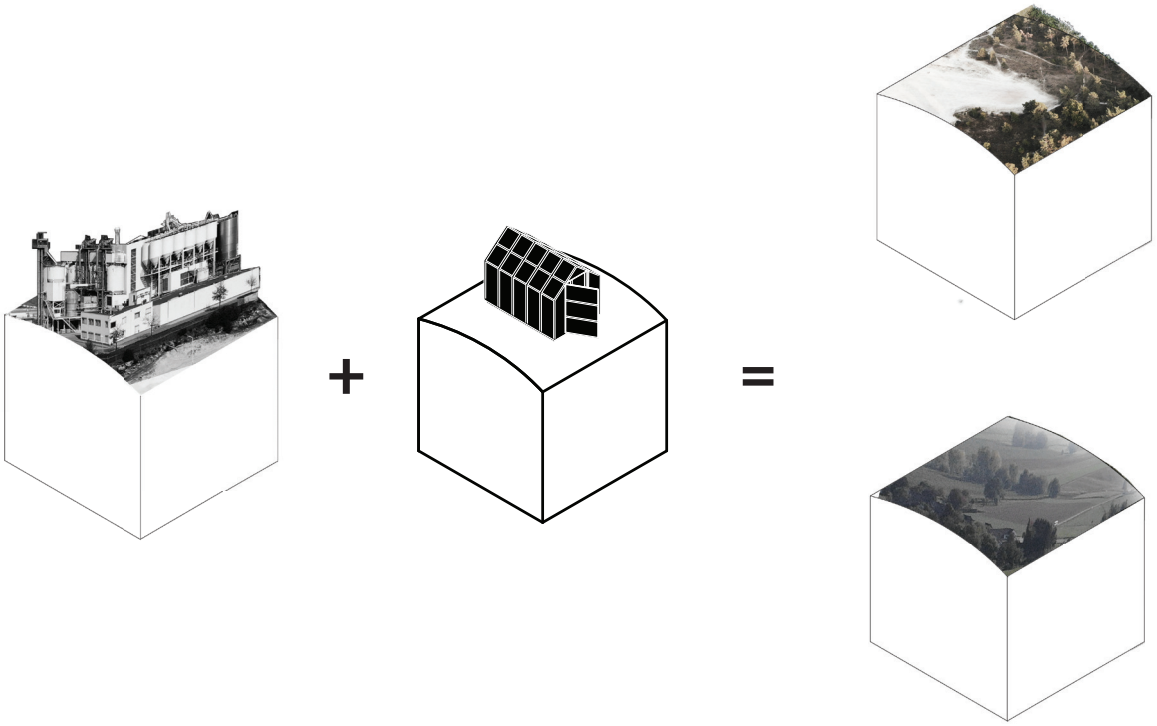
Les Fonderies, Nantes, France ("Les Fonderies" 2018)
Garden House by Baracco+Wright Architects Baracco, (Mauro. 2018)

Agricultural Device - Towards Energy and Natural Landscape

The chosen site is a transition between the filled with vegetation landscape and burren, grazed land. A built environment and architectural intervention serve as extension of the ecology.

The maintenance requires mowing and natural fertilisation of the non native, endangered plants.

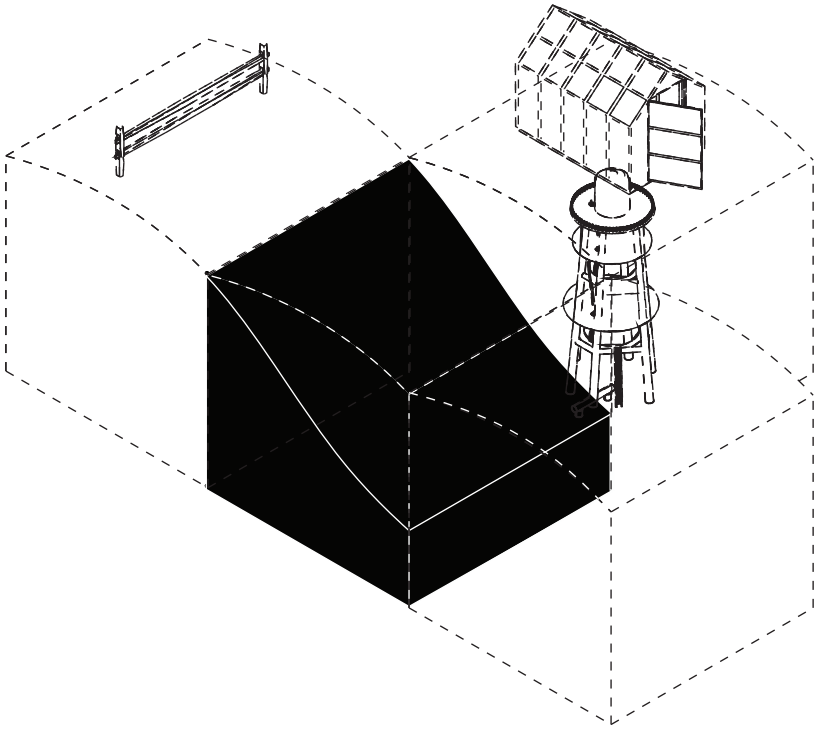
A set up of a greenhouse is an agricultural intervention which usually strives for food production. However, the Garden House by Baracco+Wright Architects, use the specific steady condition achieved via the glass structure in order to protect the endangered plants.[20] The presence of endemic terrestrial orchids proved that the solid has not been impacted by human activity.[21] This small scale architectural intervention is there to preserve the species in danger.



A possible transformation triggered by the device (own image)

Greenhouse

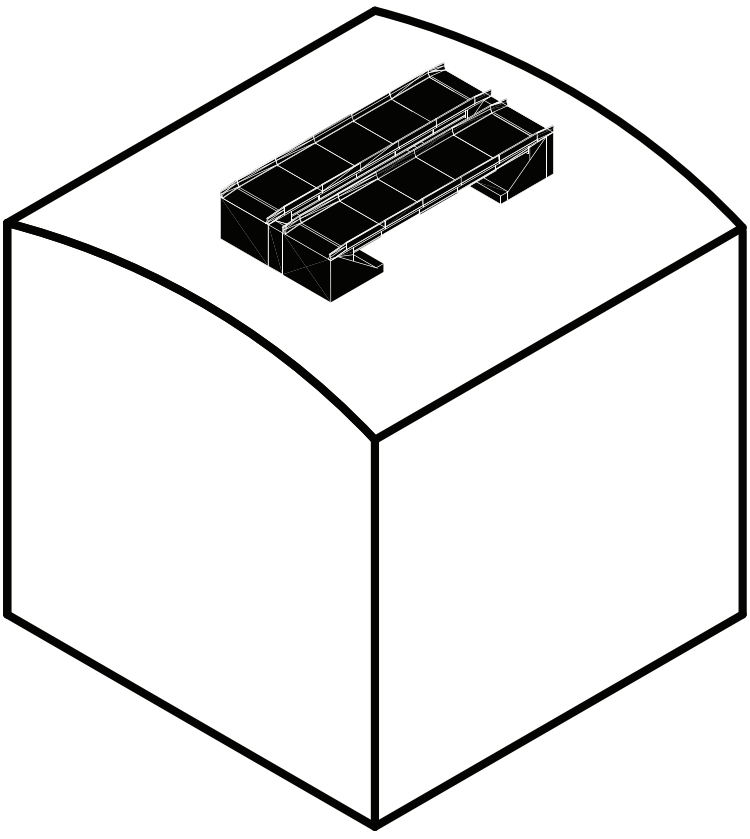
Potential



Opportunities for development (own image)

The steady controlled climate facilitates vulnerable biota. The endemic vegetation is under control, protected with regular weeding and preserved via seed collection. The seeds are distributed in the neighbourhood and dispersed locally. The greenhouse is a link connecting the biota between the tidal bay and temporary creek, where the condition oscillates between dry and flooded. The slightly elevated floor in the greenhouse allows to avoid the disturbance of the natural soil.[22] Terrestrial orchids and lilies extending from the outdoor environment inside the building. This oasis on the stable conditions is a corridor for trespassing animals. Even though the disturbance created by the construction was minimal, it was enough to introduce tea trees, which started to grow inside the greenhouse.

Although, the aim of the structure is protection of the natural conditions to some extent, it facilitates the dependance of nature on the human maintenance.[23] The protected species are preserved. However, over time due to the reliance on the human care, it will modify and change its survival characteristics.



Ecoduct

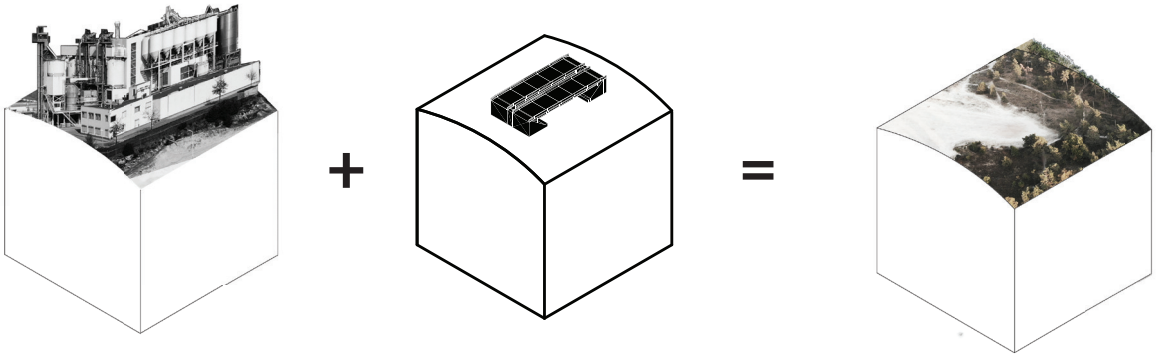
Left: Natuurbrug Zanderij Crailoo, Netherlands (“Animal Highway: Natuurbrug Zanderij Crailoo” 2018)

Infrustructure for animals - Towards Natural Landscape

Zanderij Crailo is the longest ecoduct in the world, merging the habitat of Hilversum and Bussum.[24] It bridges the ecosystems separated by the 8-11 meter excavation, which is a result of the area being a former sand mine. [25]

The bridge has been absorbed into ecosystem.[26] It is a platform to monitor the influence of the man made infrastructure into bridging the ecological corridors. The only regular intervention is monitoring the frequency of the trespassing animals, which provides reliable scientific data.[27]

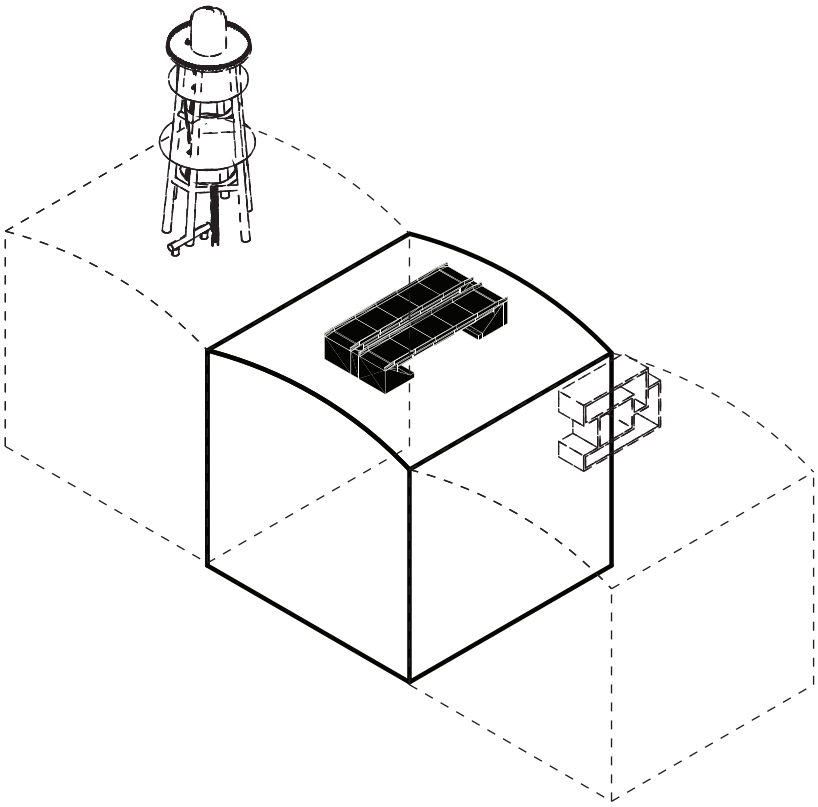
Zanderij Crailo is an example which demonstrates that a matrix of carefully designed ecological conditions can support and expand the habitat for particular species.



A possible transformation triggered by the device (own image)

Ecoduct

Potential

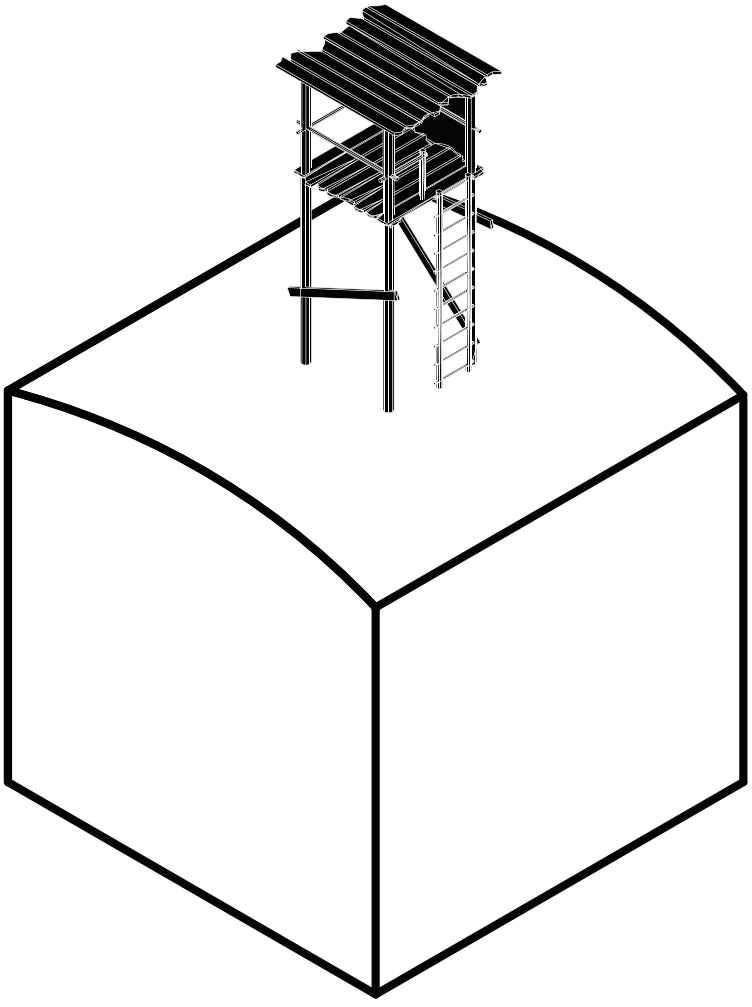


Opportunities for development (own image)

The bridge is a tread which became a starting axis for the restoration of the drosscape. The fertilisation of sandy substrate resulted in an agricultural and natural overtake. It allowed species such as deer, fox, rabbit etc. to move freely without any risk between Hilversum and Bussum.[28] Ecoducts are also a mean of protecting the biota from human interference and collisions with vehicles.

Zanderij Crailo demonstrates different balance of human cohabitation with animals. The habitats vary from those absolutely left to nature, through grazed agricultural zones, to the touristic bike paths. The level of impact of human habitation onto the hostility of the environment is constantly monitored.

The matrix of maintenance, humidity and fertility levels resulted in a gradient of vegetation and fauna ecotopes.[29]



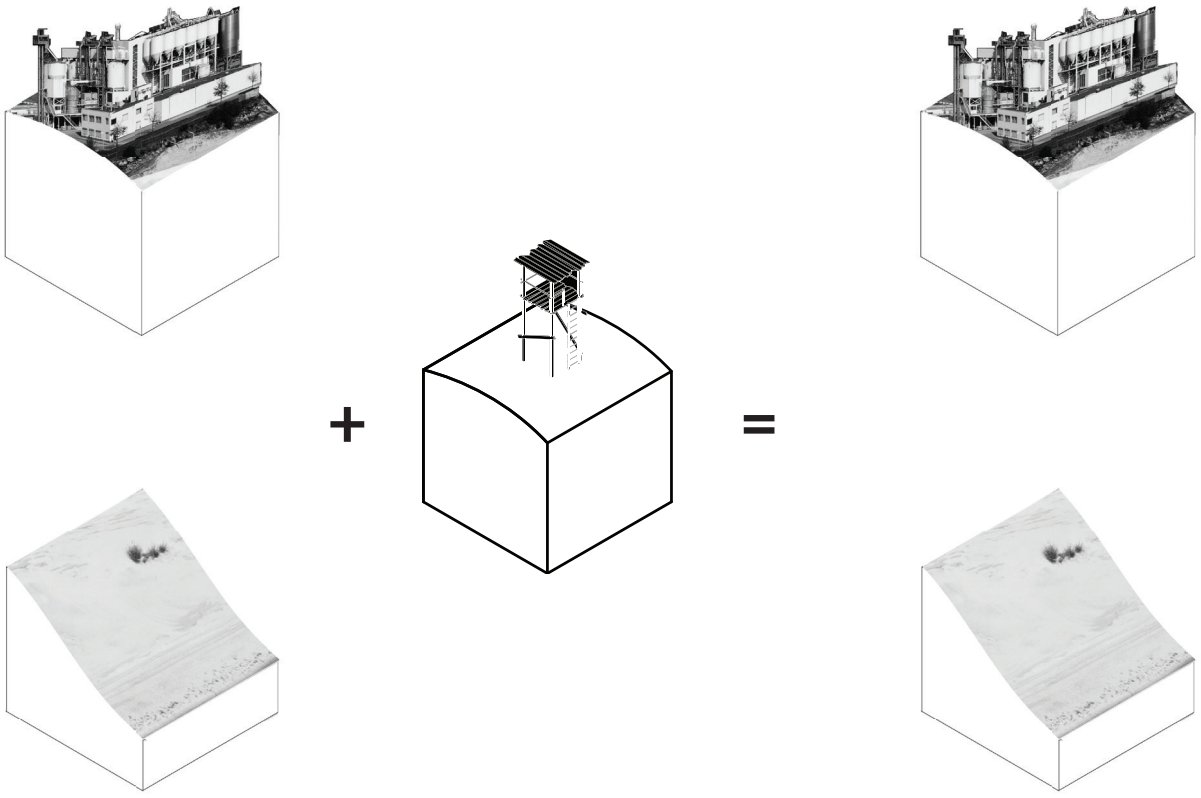
Watchtower

Johansen Skovsted Arkitekter, Tipperne Bird Sanctuary, Tipperne, Ringkøbing Fjord, Denmark (Johansen Skovsted Architekter 2017)

Infrastructure for people - Towards Energy and Natural Landscape

Tipperne Bird Sanctuary by Johansen Skovsted Arkitekter is set up on the migratory route.

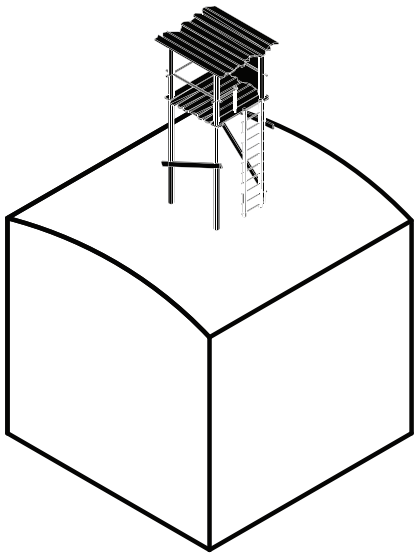
The steel structure built by the local factory specialising in the production of masts in



A possible transformation triggered by the device (own image)

Watchtower

Potential

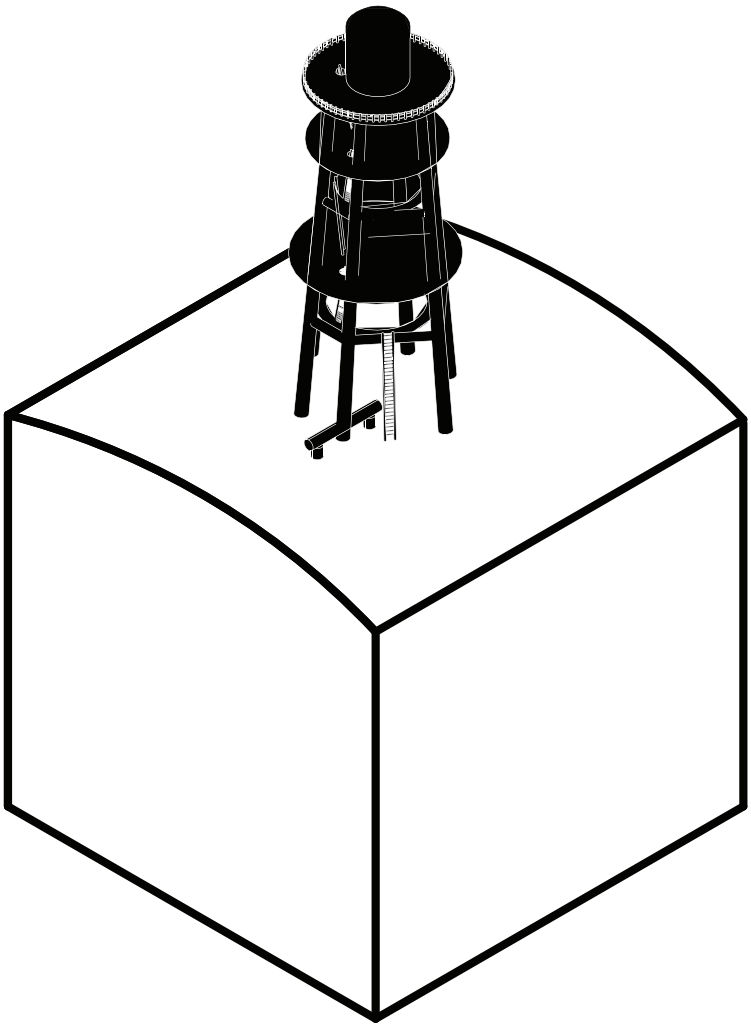


Opportunities for development (own image)

solid cylindrical iron bars[30] is an example of sustainable material sourcing.

This architectural intervention can be considered as a display device which attracts visitors rather than nature. Situated in a wetland territory surrounded by grasslands, it allows birdwatchers to have a vast overview onto the surrounding nature without any obstructions. It is one of the nodes in the Ringkobing Fjord along with a bird hide, workshop and the Tipper House research center. It became a reference point in the bird sanctuary, which responds to the specific landscape situation.

A watchtower should be always accompanied by another device or incorporate an additional agricultural function in order to attract nature and contribute to the ecological restoration.



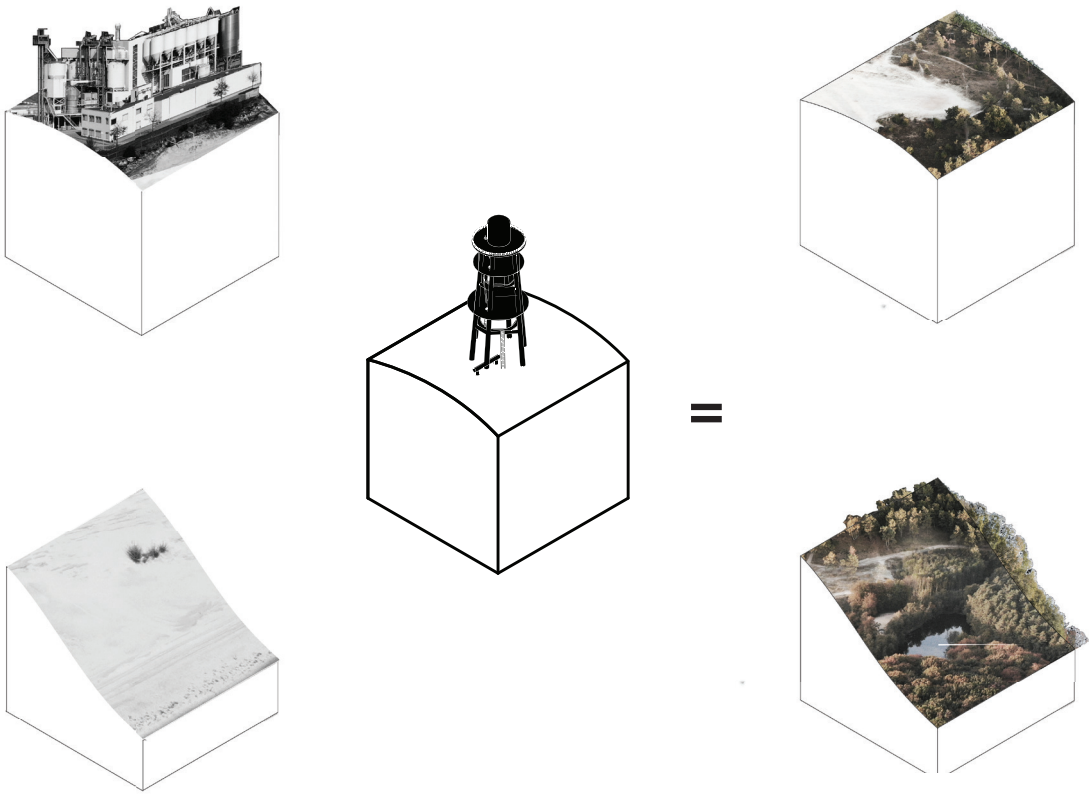
Bat/Bird tower

Bat Tower, Sugarloaf, USA (Geoff Manaugh 2018)

Infrastructure for animals /Agricultural Device

Animal hideaways are a tool to protect and strengthen the presence of endangered species. Firstly, structures such as bat towers should be based in the natural habitat of animals. The endangered species, which feed of mosquitos can be observed in abundance in the wet areas, populated by insects.[31]

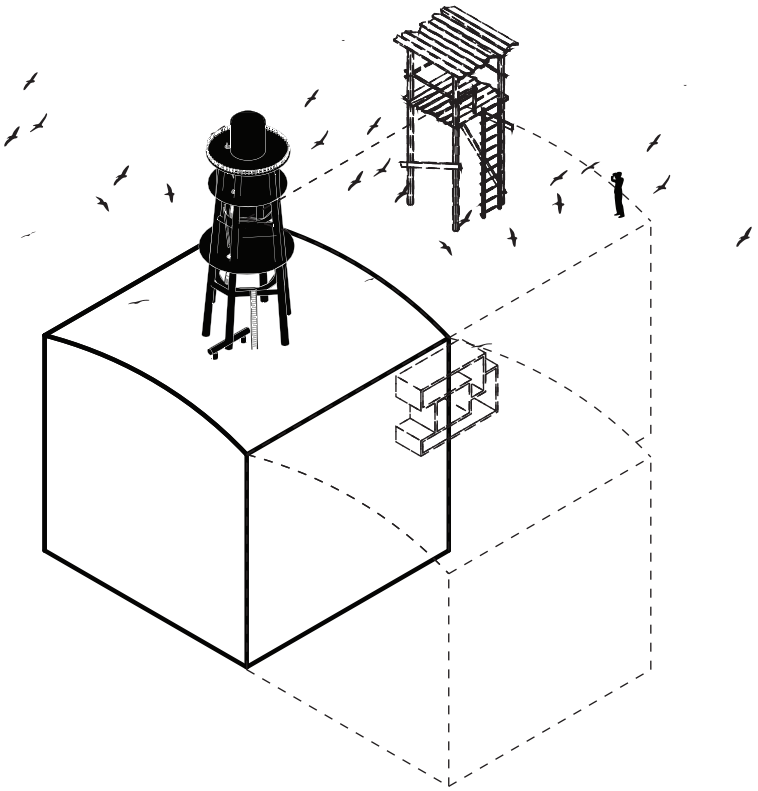
Secondly, the structure should adapt biomimicry-like geometry, mocking the habitats which are familiar to the targeted species. Contoured construction provides “landing pads” for bats, the ergonomically situated grooves and a combination of vertical and horizontal planes make the climb easier. In addition, the dark colour absorbs the



A possible transformation triggered by the device (own image)

Bat/Bird tower

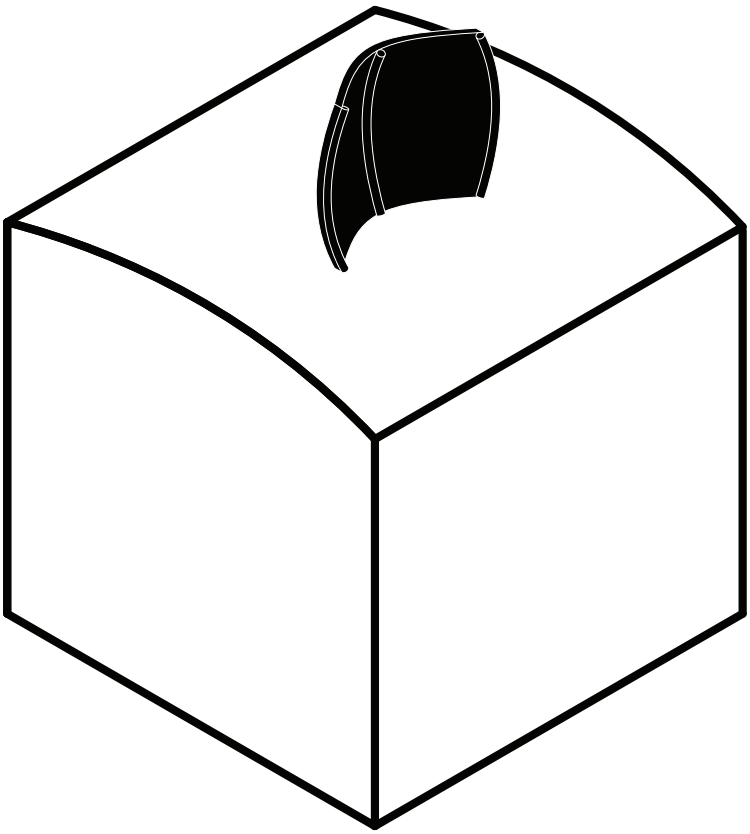
Potential



Opportunities for development (own image)

sunlight in order to provide warm hiding place for bats.[32] Bird towers often accommodate small, tunnel-like perforation which imitate hollows. Bird towers on a similar basis, provide a hideaway and breeding environment for birds. At the same time the geometry of the structure collects guano, which is used as an agricultural fertilizer.[33]

Animal shelters are an example of symbiosis, more precisely mutualism. Such hideaways are an example of an animal infrastructure as well as agricultural device. The Sugarloaf Key Bat Tower was built with an intention of tackling the mosquito problem, therefore prevent the spread of malaria[34]. At the same time, surrounded by herbs such as chives and oregano it served the bat population as a hiding and feeding place. On the other hand bird towers are an instrument to harvest fertilizer. This quiet architectural structure is a low-tech instrument to stimulate the growth of agriculture and animal population.



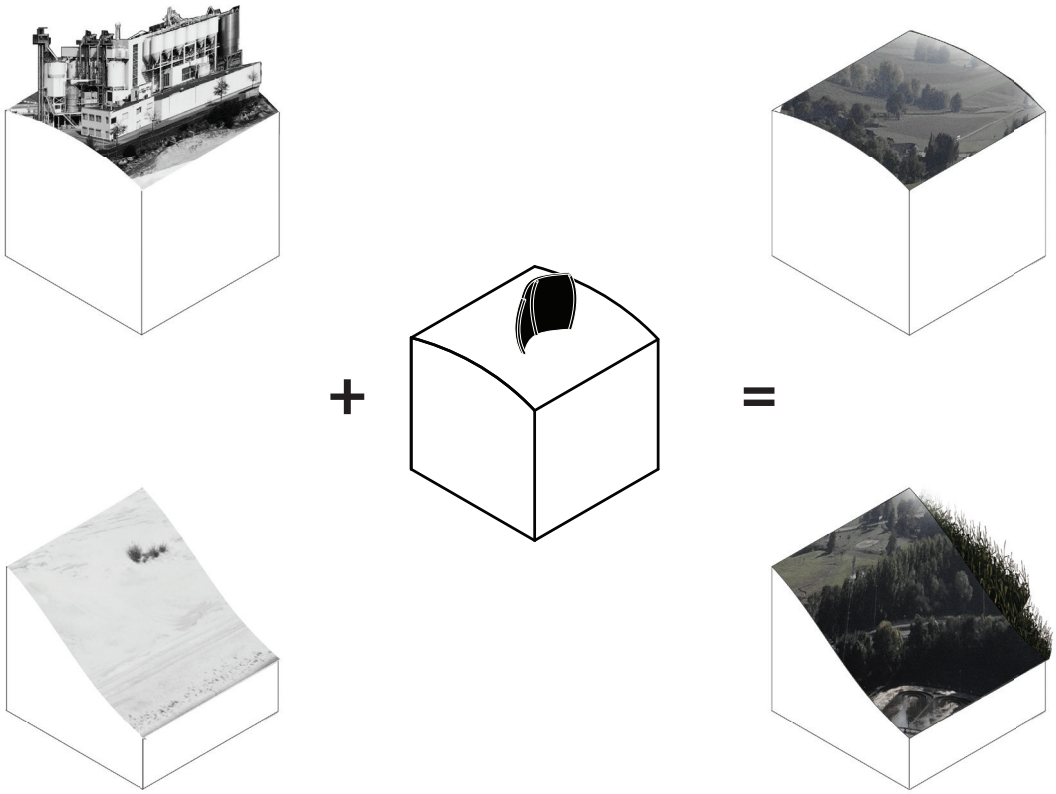
Windbreak

Windbreak, location unknown, ("Windbreak | Sensitive Wall - Design Master Studio - Summer 2011" 2018)

Agricultural device

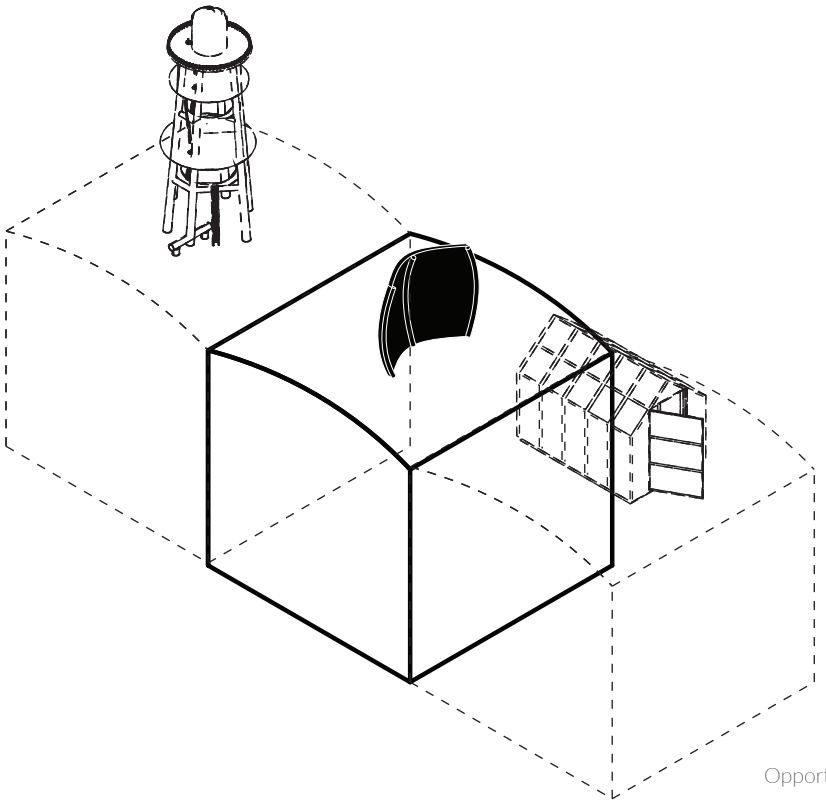
A windbreak can either be a built structure or planted trees. Depending on the height, density, orientation it can create a microclimate by breaking the force of a wind. Windbreaks are necessary in the open fields, industrial stockpiles and dusty industrial operations.[35]

Windbreaks provide shelter from the wind and therefore protect the soil from erosion.[36] They can reduce the wind speed by half, decrease the erosion by 80% and the cost of heating and cooling in domestic architecture.[37] The microclimate created by windbreaks can be beneficial for crops, due to the less drying and chilling at night.



A possible transformation triggered by the device (own image)

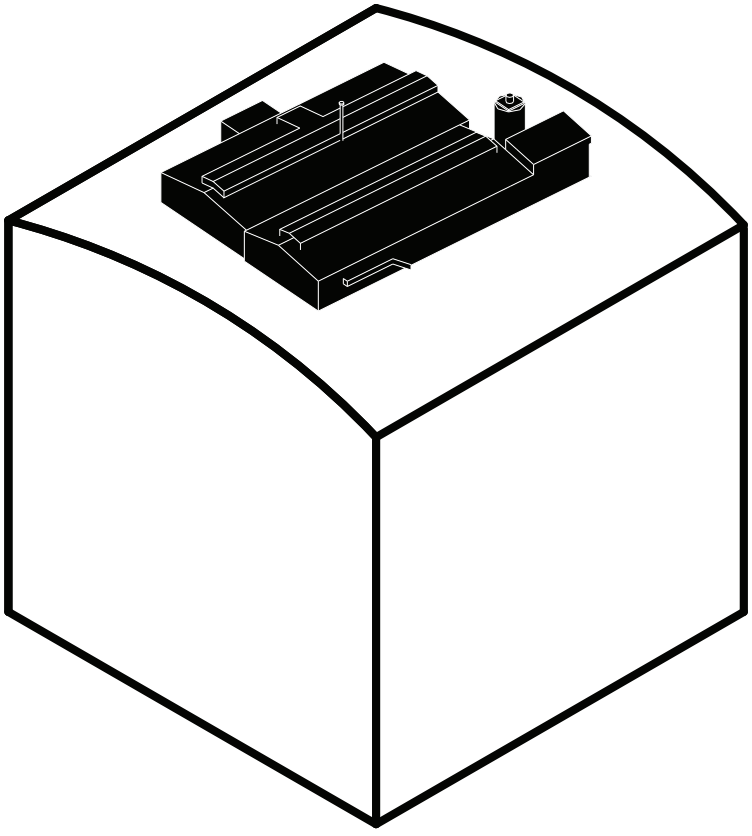
Depending on the natural or architectural properties of the structure, windbreaks can facilitate a habitat for wildlife. Concrete structures could provide shelter, while the waste from natural windbreaks such as trees allow intercropping and food production.



Opportunities for development (own image)

Windbreak

Potential



Thermal mass

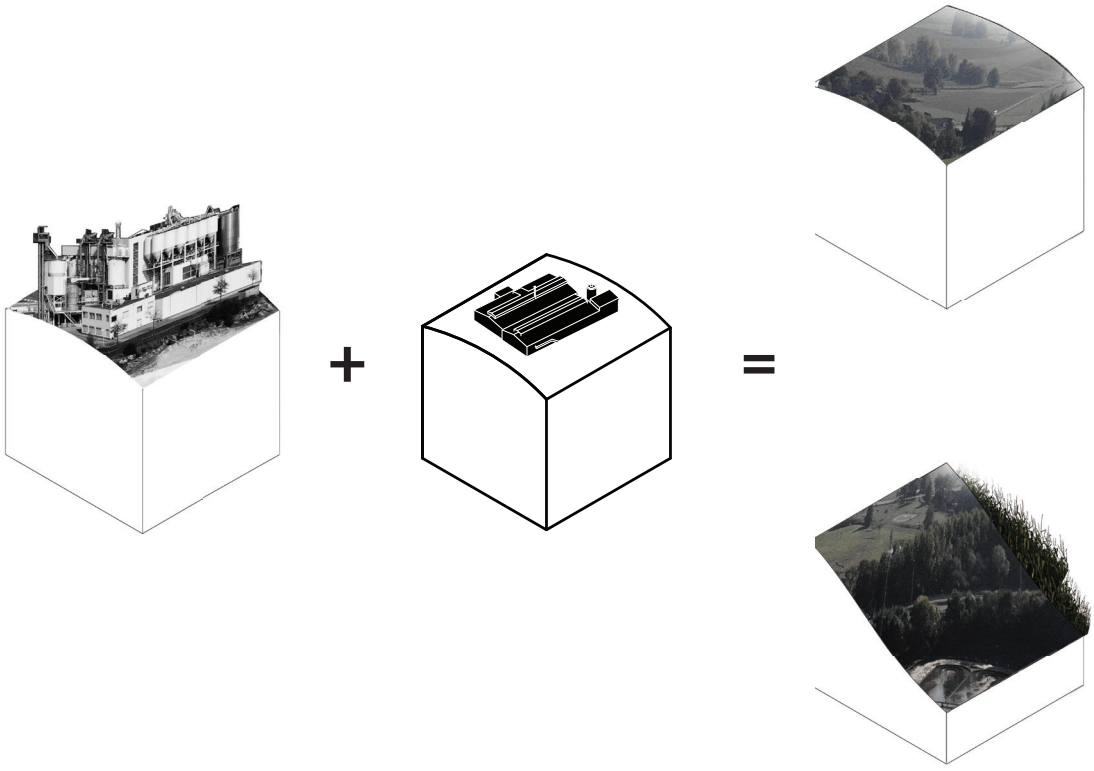
Walworth Garden, London (Runoff 2018)

Towards energy landscape

Thermal mass, such as south-facing brick or concrete infrastructural remainings can stimulate the growth of new species, by manipulating the microclimate. This change of use can allow to reuse the infrastructure, which is already present on site.

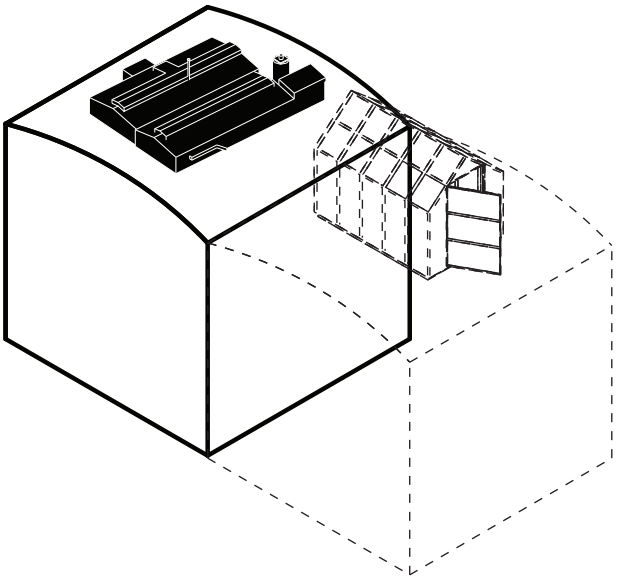
Re-radiation of the sun energy accumulated during the the day can provide frost-free fields around the buildings, allowing longer growing seasons.[38] The seemingly small increase in the temperature next to south facing walls allows to introduce foreign species into the ecosystem, embracing biodiversity.

Walworth Garden is an example of the influence of the thermal mass accumulated in the brick walls of a housing estate in London. The heat released from the walls allows to grow palm trees in England.



A possible transformation triggered by the device (own image)

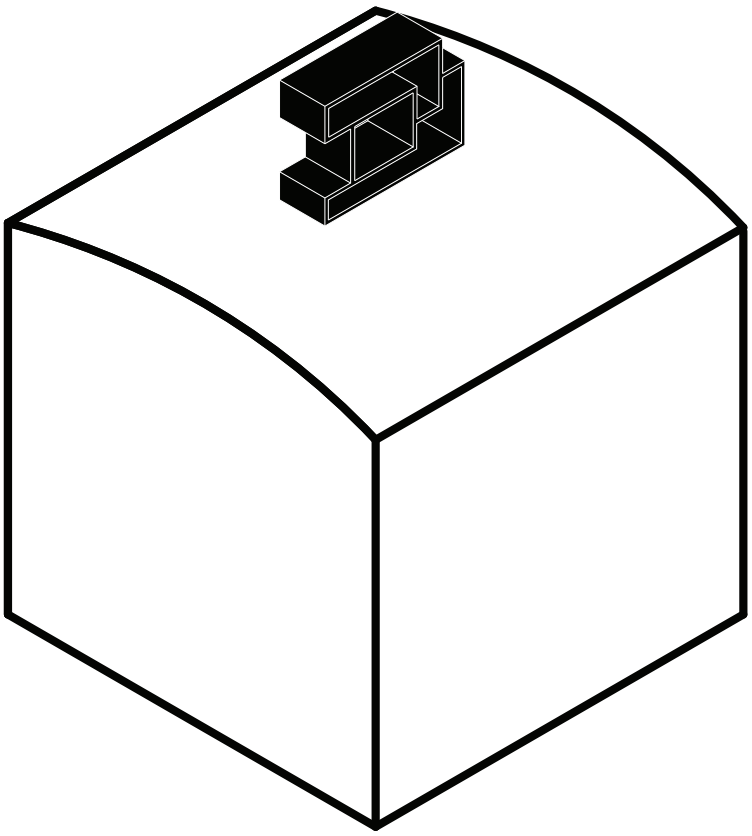
This intervention could comodify the energy accumulated in the abundant structures within agriculture. Strategic spatial planning could stimulate farming and extent the crop season.



Opportunities for development (own image)

Thermal mass

Potential

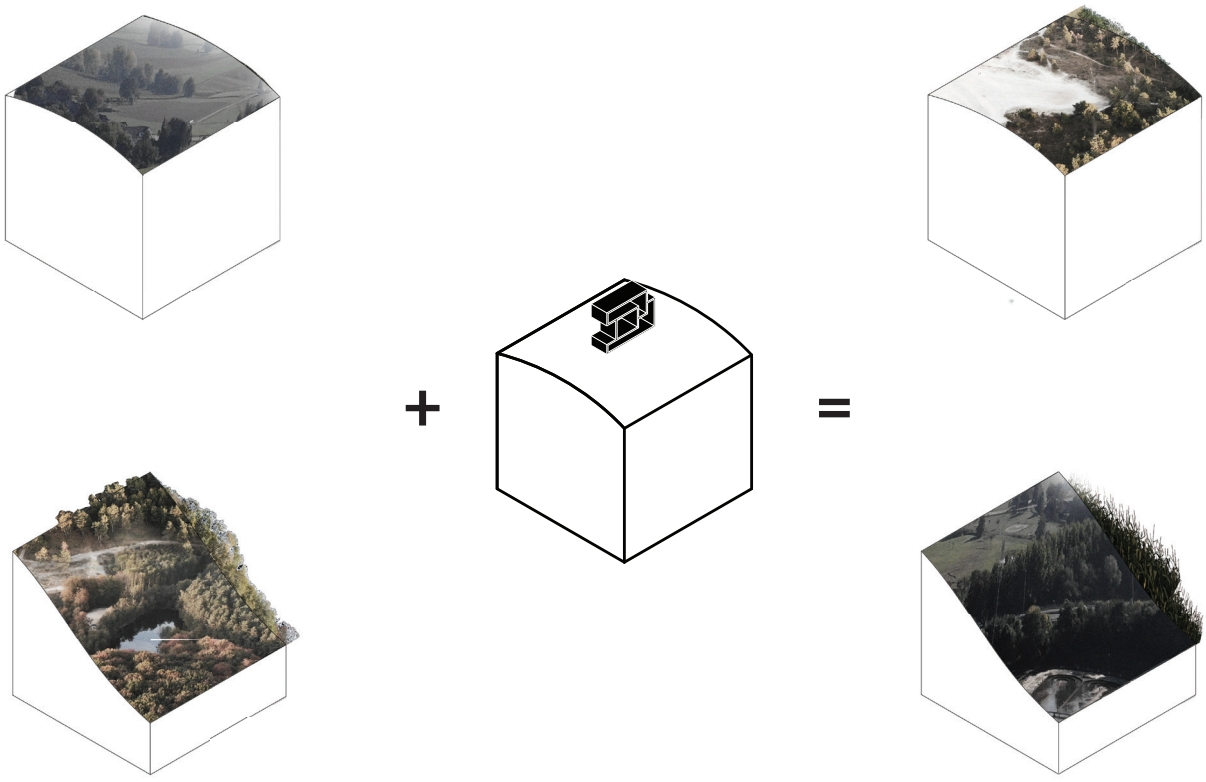


Stile

Stile, Location Unknown, Uk (Company 2018)

Stile is a type of gate which allows to control animal farming. This geometrical jigsaw - often a combination of steps or levers, allows the humans to trespass the fields, at the same time making it impossible for the animals to cross the boundary.

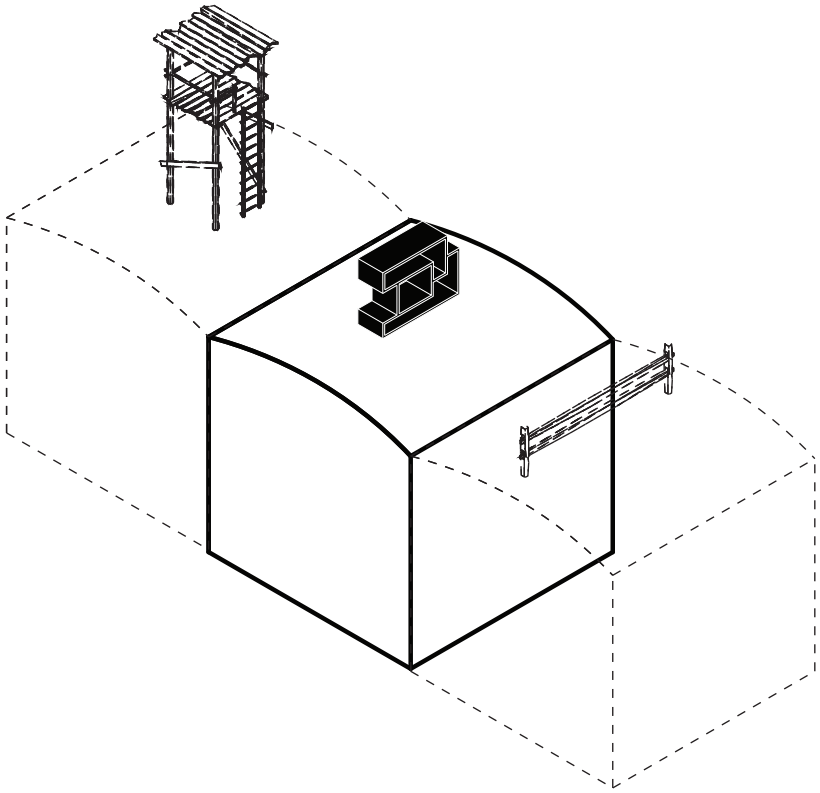
Stiles enable the casual trespassers to respectively cross the private fields without distribution to the farming fields. This measure unlocks the private land and makes it accessible to visitors. The culture of country hiking is possible for example in the UK, where under "The Right to Roam" the walkers are allowed to cross the private land for leisure or exercise. This specific arrangement of the geometry acts as a filter, which allows the framer to keep the ownership of the flock, without shutting off his



A possible transformation triggered by the device (own image)

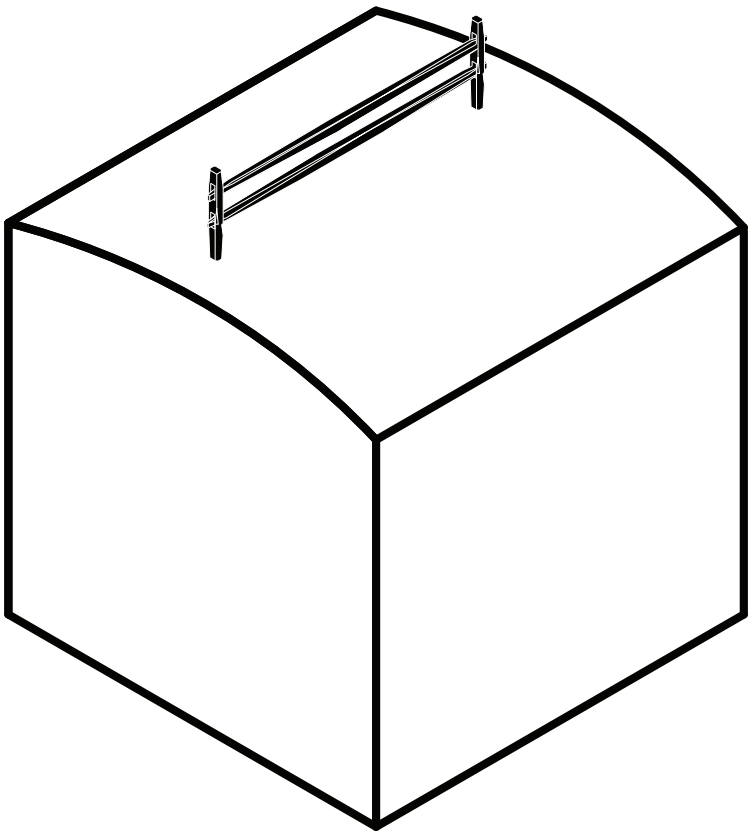
Stile

Potential



Opportunities for development (own image)

This typology of a gate is an instrument which could accompany certain legislation. It is a moderate measure of controlling ownership, therefore a possibility to rethink the use and accessibility of the industrial and post industrial land. Stile is an instrument, which could stimulate tourism and therefore encourage to built visitor structures, such as for example a watchtower.

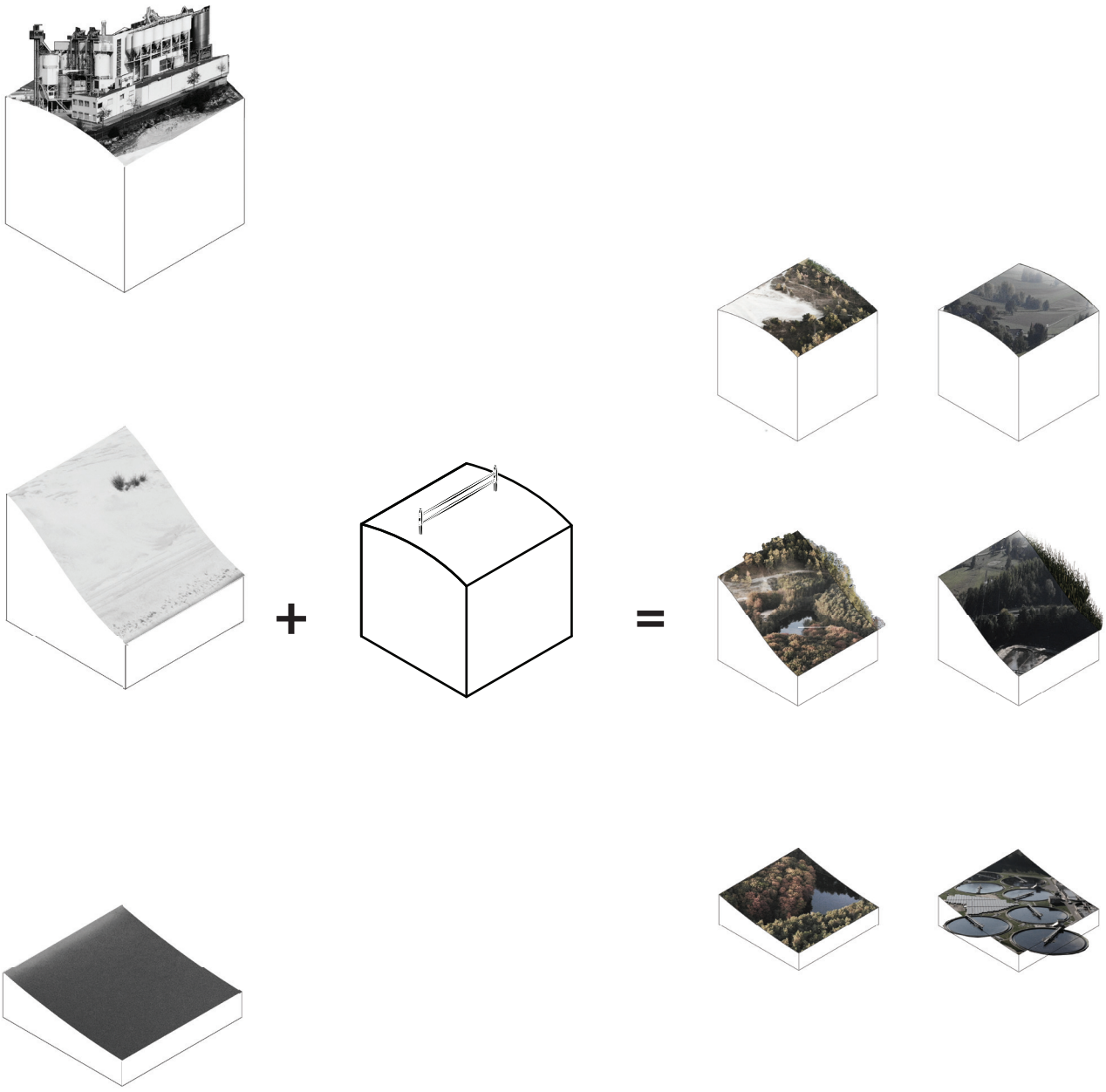


Legislation

Stile, Location Unknown, Uk (Company 2018)

Towards inclusive landscape

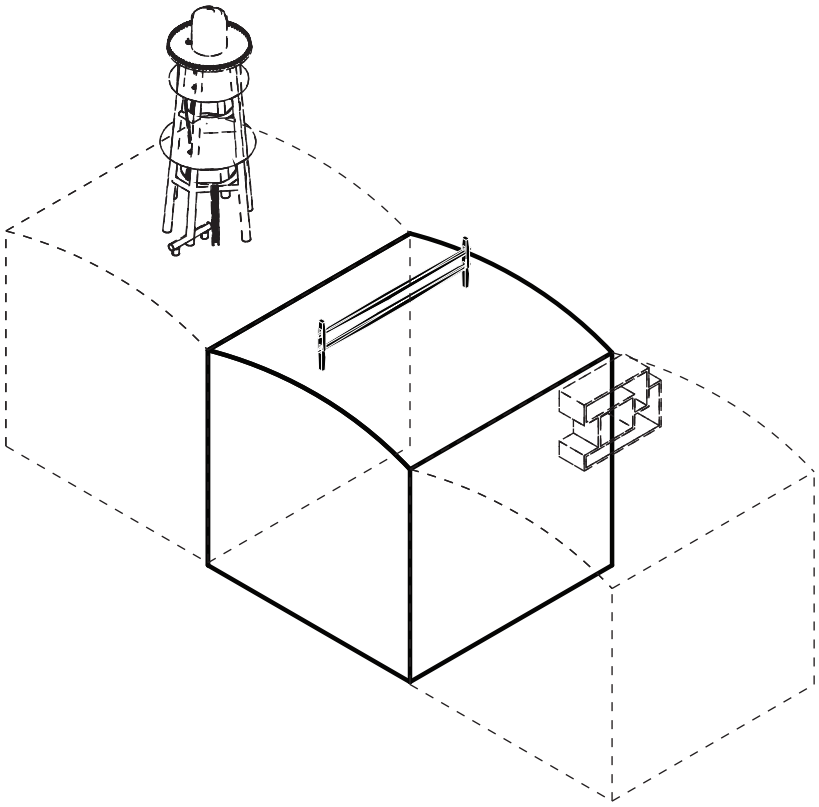
Legislative changes often require no infrastructure. However, the government initiatives can stimulate the ecology on a bigger scale than built interventions. By giving community new rights, and what follows - obligations, citizens have a bigger impact on the nature.[39] An example of the laws, which could revive the ecology on the post-industrial sites are : Temporary Nature law, The Right to Roam or the housing replacement policy in Limburg (new construction equals demolition of the abandoned structures).



A possible transformation triggered by the device (own image)

Legislation

Potential



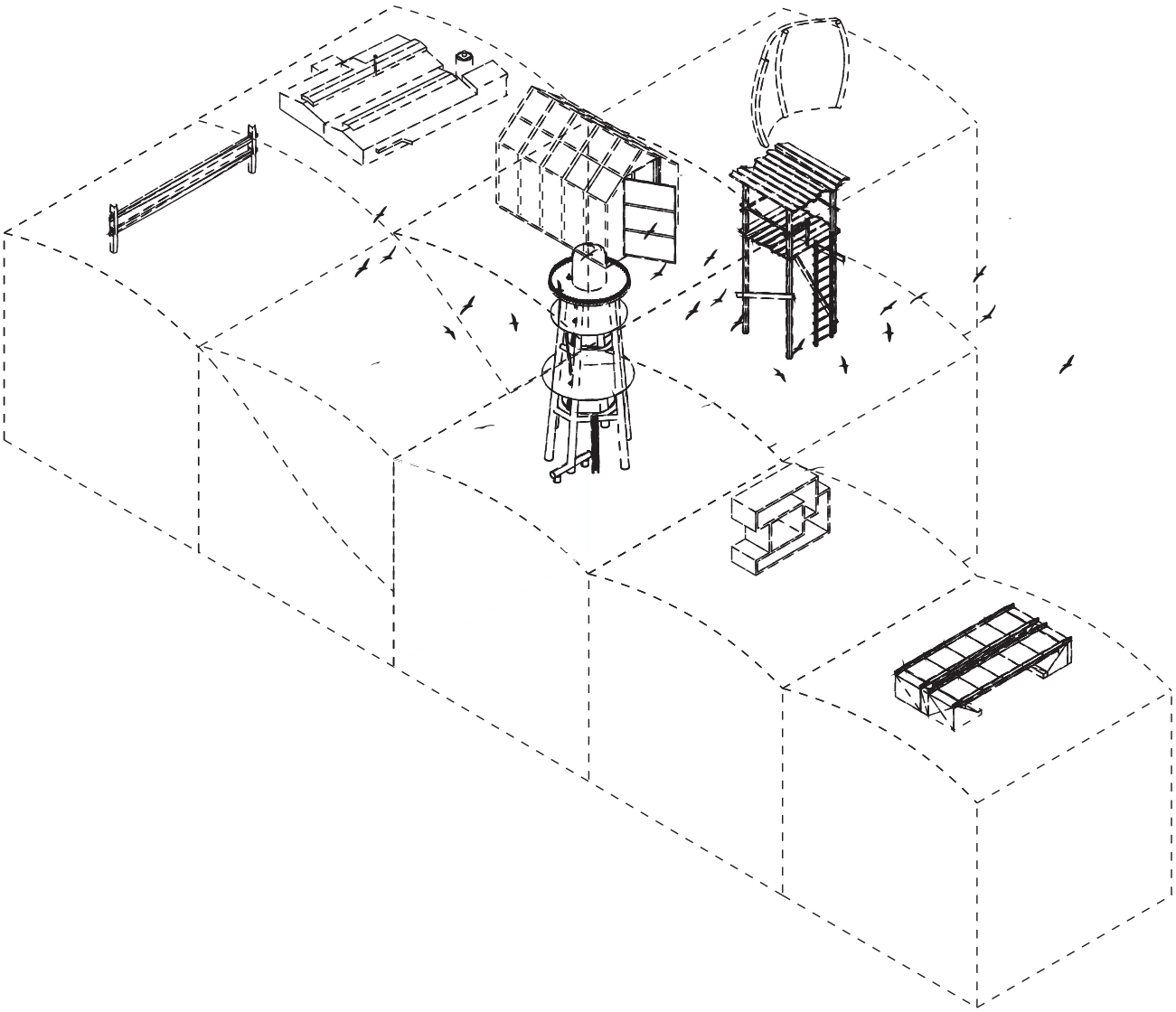
Opportunities for development (own image)

Temporary Nature bridges the ecological objectives with the economic ones. Before the policy appeared, it was more profitable for landowners to graze the area, to prevent the appearance of endangered species - which otherwise at the same time would make the land immediately protected. With the Temporary Nature Law, settlement of the protected species does not prevent the landowner to carry out a development. [40]

A law introduced in Limburg accommodates for the post-industrial remainings and the demand for high-quality housing, while the population in the area is shrinking. It obliges developers to demolish the same amount of housing units as construct.[41]

On the other hand, the Right to Roam is a policy which has been introduced in multiple north European countries, however not yet in the Netherlands. It allows the public to access private cultivating agriculture land for leisure and exercise.[42]

Legislation can be a tool to share the ownership of the other eight devices described in this document. It can shape and stimulate the community's enthusiasm to get involved into the ecological restoration.[43] By providing a common incentive, such as attractive accessible land, it can speed up the repatriation of the landscape.



Collage of interdependant devices, combined in an arrangement of symbiosis (own image)

Conclusion

The discussed instruments demonstrate a significant impact on the ecological conditions of drosscape. When designing for resilient, inclusive and safe sustainability,[44] it is necessary to look at the ecology in terms of time. Therefore, it is important to account for the ecological consequences of an architectural intervention.

The analysis of the devices which trigger changes in the ecology of the post-industrial site suggests that like in a chain reaction - one instrument can stimulate ecology and create conditions for consecutive infrastructure. For example, a fish farm, with time would attract birds, therefore a bird tower could be installed nearby. Subsequently, it would become a place to harvest natural fertilizer from bird waste and facilitate the local farms.

These architectural elements can be used to trigger as well as to patch the flows in nature and industry.

On the other hand, this human impact diverts the current natural corridors. Such changes can be seen as a distribution to the novelty landscape, which became the norm when the industry was in operation. Industrial buildings and infrastructure made an irreversible changes to which the ecosystem has adjusted and the nature has been displaced. [45]

To judge the balance between the harmful and beneficial impact of the construction on the post-industrial sites, one has to monitor it and use indicators.

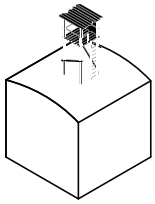
The flows present in nature are always disturbed, broken or diverted. Almost every intervention triggers a chain reaction - it triggers layered processes. Rather than via a singular element, restoration should happen via a collage of instruments, which work in a timed synchrony.

Due to the ever-changing landscape, which bears traces of human modifications, it is necessary to accept the temporalities of ecology. This paper demonstrated that one way of creating architecture which is an extension of the environment is to consider it as a device operated by natural forces.

Appendix

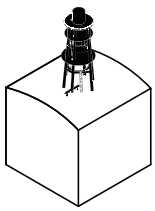
"For most restoration projects it is generally recommend to source material from local populations, to increase chance of restoration success and minimize the effects of maladaptation." [46]

A preliminary inventory of the potentials in Sibelco sand mine is paired with the instruments indicated based on th visual, topographical similarity and functional associations.



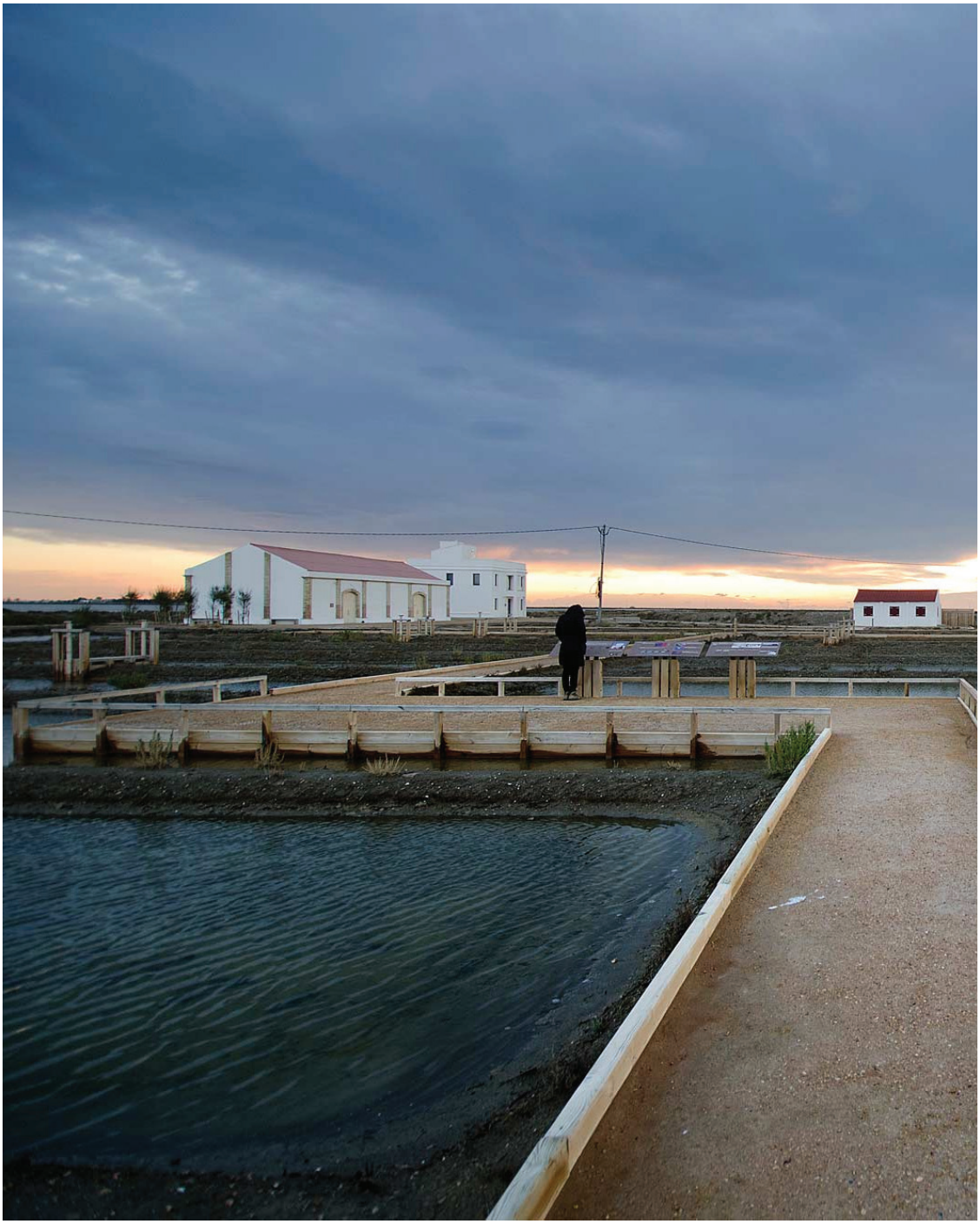
Watchtower

Left: Johansen Skovsted Arkitekter, Tipperne Bird Sanctuary, Tipperne, Ringkøbing Fjord, Denmark (Johansen Skovsted Architekter 2017)
Right: Schutterspark, Limburg, Netherlands , 2018,



Bat/Bird tower

Left: Bat Tower, Sugarloaf, USA (Geoff Manaugh 2018)
Right: Sibelco Sand Mine Silo, Limburg, Netherlands , 2018, own image



Fish Farm

Left: La Tanzada Salt Fields, Spain (“La Tancada Salt Fields By EMF « Landscape Architecture Works | Landezine” 2018)
Right: Sibelco Sand Mine Excavation Pond, Limburg, Netherlands , 2018, own image

Legislation

Left: Stile, Location Unknown, Uk (Company 2018)
Right: Sibelco Sand Mine Fencing, Limburg, Netherlands , 2018, own image

Stiles

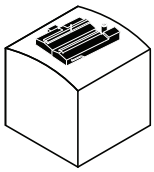
Left: Stile, Location Unknown, Uk (Company 2018)
Right: Sibelco Sand Mine Fencing, Limburg, Netherlands , 2018, own image

Greenhouse

Left: Les Fonderies, Nantes, France (“Les Fonderies” 2018)
Right: Sibelco Sand Mine, Limburg, Netherlands , 2018, own image

Ecoduct

Left: Natuurbrug Zanderij Crailoo, Netherlands (“Animal Highway: Natuurbrug Zanderij Crailoo” 2018)
Right: Sibelco Sand Mine, Limburg, Netherlands , 2018, own image



Thermal Mass

Sibelco Sand Quarry (fot. Kooymans, Hugo, 2017)

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