

## **The site**

The rocky seashores and diverse forests of Merenkurkku, or Kvarken, are perpetually changing. Each year around one hundred hectares of pristine land emerges from the sea as a result of land uplift caused by the last Ice Age.

The project site is in Vaskiluoto, which is an island forming a part of the Merenkurkku archipelago nestled near the city centre of Vaasa on the Pohjanlahti mainland. The island is divided into thirds: one third is allocated for industrial and port activities, another for housing and accommodation functions while the remaining third is composed of forests and other natural areas.

Vaskiluoto bears the distinct characteristic of both human-induced and natural alterations to its surroundings. It transitioned from a leisure destination to an industrial and transit-focused area in the 19th century, and through the extension of power plants after World War II the island's landscape and function shifted towards its current state. The next big transition facing Vaskiluoto concerns an addition of 2200 new residents by 2040 to the 245 people inhabiting the island today. Simultaneously, Vaskiluoto faces an uncertain future as events related to climate change become more frequent.

## **Starting points**

Given the depletion of land, resources, water, and biodiversity, Vaskiluoto Refugium aims to have a net-positive impact on nature through a regenerative approach to urban development. Vaskiluoto Refugium aims to become a refugium against climate change and give wild species more time to adapt.

We aim at a deep understanding of the natural systems already present in the area facilitating the creation of environments where humans and other-than-humans can coexist harmoniously. The proposal is grounded in three approaches that support regenerative urban development: 1) the nature approach: regenerative landscaping and restoration of ecosystems 2) the social approach: community empowerment and nature stewardship, and 3) the architectural approach: nature-based solutions and biomimicry.

## **Basic principles**

Vaskiluoto Refugium is home for 800 new residents. The site is divided into three phasing zones. The first two are designated for mostly housing and the third for nature restoration. The proposal has four neighbourhood blocks, one of which sits by the water. Our aim is to form a neighbourhood block typology that has a strong identity, yet sits well in the natural landscape. The proposal aims to provide a framework for the creation of communities. These communities, and ultimately their identities, are created by the residents themselves. The aim is to follow up on the initial design with a participatory planning process that seeks to find more detailed solutions in each neighbourhood.

Art and learning assume an important role within the proposal. One key aspect is the allocation of 1% of the project's budget towards local artists. This funding aims to integrate landscape art into the design, providing a crucial avenue for learning from nature through artistic interpretation. As extensive research has demonstrated a causal link between empathy towards the natural world and pro-environmental behaviour in humans, our aim is to engender empathy via learning. This approach also aims to cultivate a sense of agency among the residents and foster an identity of nature stewardship.

## **Social approach: community empowerment and nature stewardship**

Vaskiluoto Refugium strives for spatial and civic equality. Residents are encouraged to be actively involved in the design, construction, and management processes. Knowledge-sharing among its residents is encouraged. These practices foster adaptability in the face of future challenges by sharing and acquiring skills for caring for the built environment. The proposal acknowledges the significance of neighbourhood-scale governance and control, emphasising the crucial role of environmentalism at this level.

#### *Common spaces*

The design provides varied and inviting communal spaces where residents can gather, discuss issues, and seek to better organise. Every building has a common space on the ground floor, the function of which can be decided by the residents themselves. The space is connected to a storage space for common goods: resources shared by the residents within each building. Additionally, the proposal has small garden houses of various uses in the courtyards. Finally, a bigger common space, a performance hall, is located in the harbour area. The common spaces comprise 2% of the total floor area of the proposal. The neighbourhood-scale is important as it functions as a foundation for sustainable practices such as water conservation, groundwater recharge, recycling, energy efficiency, and food production.

#### *Participatory planning process*

A participatory planning process follows the next stages in the design before the finalisation of the local detail plan. Community formation starts already at this stage as the potential residents can have their voices heard in the more detailed design of the neighbourhoods.

#### *Agents in energy transitions*

As localised energy production becomes more important in the future according to experts, residents are encouraged to form energy-citizenships. Solar and wind power communities allow for the residents to operate the energy production and sell any excess electricity back to the grid. Other solutions in the proposal are geothermal heating, natural ventilation, and a green facade system that prevents overheating during summertime.

#### **Landscape approach: learning from nature and ecosystem restoration**

Vaskiluoto's original name, *Vassglot*, is said to be derived from "gloe lakes", which are unique water bodies formed in environments experiencing land uplift. The Haukilampi lake near the project site stands as the last remaining water body of this kind on the island. It serves as an example of the existing conditions that Vaskiluoto Refugium aims to preserve and comprehend. New construction will be adapted to support these established natural systems.

#### *The Nature Trail*

The nature trail provides a green connection that caters to the recreational needs of both residents and visitors alike. It is an integral component of the approach of learning from nature, comprising a series of interventions designed to minimise any adverse impact on the surrounding environment such as a meditation spot nestled within the forest, designed to gradually meld into the environment as the timber naturally decomposes over time.

#### *Ecosystem restoration and animal routes*

Vaskiluoto Refugium seeks to maximise biodiversity through restorative practices. The northern tip of the island and the third phasing zone, is designated to be restored to its natural state and maximise biodiversity in the coming decades. This is in line with the EU's Nature Restoration Law. Currently the area is used as a camping site, set to relocate after a new location is found.

The island serves as a vital landing ground for hundreds of thousands of migrating birds, adding to its ecological significance. This is why a preserved area for bird habitat lies by the water, in the northern part of the project site. Moreover, the proposal's tunnels below roads and spots for nest making support the existence of many animal species found in Vaskiluoto. A birdwatching tower aims at expanding the idea of learning from nature as well as offering the birds a place for nest making.

### *Courtyards*

The first phasing zone consists of two neighbourhoods with distinct identities: the Pioneers and the Foresters, and the second of the Islanders and the Mariners. The landscaping in each neighbourhood adapts to Vaskiluoto's natural conditions with their own theme. The primary landscaping in the Pioneers neighbourhood consists of groundcover and non-cultivated meadow. Preserved forest floor vegetation is the main vegetation type in the Foresters neighbourhood and diverse and blossoming rocky garden form the landscape in the Islanders courtyard. The Mariners adapt to the conditions near the shore with a coastal vegetation theme adapted to land uplift environments.

### *Stormwater management*

The stormwater management in Vaskiluoto Refugium aims at benefiting from existing conditions and utilising natural solutions such as open conduits/streams, soaking, and lagging. Each neighbourhood block implements its own local stormwater collection system. Any surplus stormwater runoff is directed through small streams towards a designated point on the western side, eventually finding its way to the sea. All roads within the boundaries of the courtyards are gravel roads, aimed at creating porous surfaces for more effective stormwater management and healthier natural environments.

### **Architectural approach: modern villas, microclimates and nature-based solutions**

Vaskiluoto, together with the wider Vaasa region, has a rich history of craftsmanship and timber construction. Numerous skilled builders have left their mark through the wooden villas that still stand today. Vaskiluoto Refugium proposes a building typology inspired by the island's history. The principles of biomimicry and nature-based solutions are used to address the challenges of the 21st century.

### *Modern Villas*

The neighbourhood blocks feature a combination of lamellas, point houses, and townhouses. The Pioneers, the Foresters and the Islanders bear similarities to one another in their composition. Slight differences in the choice of colours and facade elements form a distinct identity to each neighbourhood block. In designing the apartments, the proposal takes into consideration the diverse needs of different individuals, with a focus on flexibility and multifunctionality. The floor plan for the apartment buildings are based on a modular grid that allows for the creation of a variety of apartments, and their modification in the future.

The facade concept of the buildings revolves around the notion of a green pergola. Vines are deliberately allowed to flourish and grow upon the wooden structure of the

pergola, contributing to the creation of a microclimate throughout the summer and autumn seasons, avoiding overheating during hot summer months. In addition, wind turbines to produce energy locally and/or bird nests are integrated into the pergola.

To align with Finland's net-zero targets for carbon dioxide emissions by 2035, the buildings are constructed primarily using timber and adhere to nature-based principles in any other material use. The goal is to create houses that, even after their service life, enable recycling or natural decomposition when no longer needed.

### *Storage*

Residents' storage space is situated on the top floor, utilising the attic space within the buildings. This approach maximises the available area on the ground floor, allowing for more apartments to be accommodated.

## **Infrastructure**

### *Connections*

A ferry runs between Vaskiluoto and Palosaari connecting the island to the Vaasa city centre. A new bus connection that runs through the northern tip of the island, together with a wide network of cycling roads connect the new neighbourhood effectively to the surrounding areas. As humans cohabit the area together with diverse species, the site takes into account paths for humans and other-than-humans. This is implemented by providing tunnels underneath roads, enabling a safer crossing for other-than-humans.

In the landscaping, an emphasis on accessibility by way of using ramps and gently sloping surfaces is placed to ensure that the courtyards and green areas are fully inclusive and accessible. Additionally, the needs of those with visual impairments are taken into consideration by implementing guiding elements, such as specialised lighting solutions along specific routes in the courtyards and on the main green route.

### *Parking*

We propose the implementation of robotic parking buildings on the site. Each neighbourhood will have its own dedicated parking building, accommodating approximately 180 car parking units. This prevents the construction of an extensive deck structure for parking, ultimately allowing for a thriving soil and natural vegetation in the courtyards. In case the robotic parking building is not feasible, there is an option to convert the structure into a conventional parking building. Additional car parking units are located in the courtyards next to the entrances to the buildings to ensure accessibility.

The architectural design of the parking buildings adheres to the same principles as the other buildings in the area, complementing the green pergola concept. Additionally, the rooftops of these parking buildings will be designed for recreational use. Bicycle parking will be featured in the courtyard, next to the building entrances, as well as inside with warm bicycle storage space to ensure bicycle storage.

## **Scale-linking strategy**

A strategy for linking scales is crucial for a regenerative plan. Vaskiluoto Refugium aims to plant more trees than what is used for the new construction. All new construction should follow Finland's carbon-neutral targets by 2035. The sea and the woodlands have long given a livelihood and an identity for the inhabitants of the Merenkurkku region. The new phase in Vaskiluoto's future is to bring this symbiosis into a more lasting one. The more we learn from nature, the more we realise our dependency on it.