Starting point

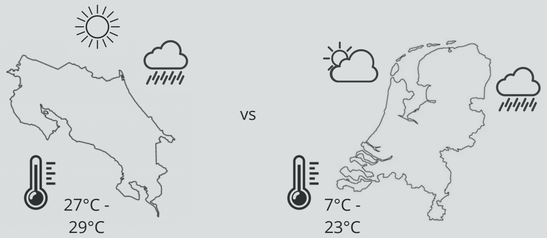
Reference

In parts of Vietnam, floating homes have been an integral part of everyday life for decades. Especially in the Mekong Delta, where flooding and fluctuating water levels are a constant reality, these floating structures offer a practical and resilient housing solution. Built on pontoons made of wood, barrels, or steel drums, the homes are simple, lightweight, and functional. They rise and fall with the water level, offering a flexible way of living that is well adapted to a changing climate.

This concept served as inspiration for our development of a floating housing model adapted to the Dutch context. The Netherlands faces similar challenges related to water management and spatial limitations. By analyzing the Vietnamese approach, we identified key values: adaptability, lightweight construction, self-sufficiency, and a strong sense of community.

Our interpretation resulted in a modular, floating housing unit designed for redevelopment areas such as old harbours. We use modern, sustainable materials and construct on standardized floating platforms. The design complies with Dutch regulations, comfort standards, and seasonal climate variations, while retaining the simplicity and flexibility that characterize the Vietnamese examples.

This creates a future-proof housing concept that not only makes space on the water but also brings new life to underused urban areas like former harbour zones.



- Tropical savanna climate (Köppen: Aw)
- Always warm: minimum of 27°C in January to a maximum of 29°C in April
- Rain throughout the year: 1795 mm of rainfall annually
- Nighttime: around 20°C
- Dry winter season

- Temperate oceanic climate (Cfb)
- Mild summers: minimum of 7°C in January to a maximum of 23°C from June to August
- Rainfall: 862 mm per year
- Chance of frost and snow
- Nighttime: down to 2°C in winter, around 14°C in summer

We also looked at the No Footprint Houses in Costa Rica. These homes are designed for the country's warm and humid climate and cannot simply be placed in the Netherlands. Due to the colder and wetter conditions here, several adaptations would be necessary such as proper insulation, heating systems, and moisture protection to make them suitable for the Dutch climate.

Ecological building is a sustainable and environmentally friendly way of constructing that contributes to a healthy indoor climate, lower energy costs, and a smaller ecological footprint. By using natural, renewable, and locally sourced materials such as wood, straw, clay, and recycled bricks, the environmental impact is significantly reduced. In addition, energy efficient technologies and smart design strategies help minimize resource use and increase self sufficiency. This makes ecological building a future-oriented choice that benefits both the environment and its users.

One of the best methods for environmentally conscious construction with a low footprint is building with wood. Wood naturally absorbs and stores CO_2, and its production and processing require far less energy compared to other building materials. Especially for construction on water, wood is ideal due to its light weight, flexibility, and buoyant properties. When combined with smart structural techniques, timber construction becomes not only a sustainable solution but also particularly well suited for innovative, water based housing concepts.

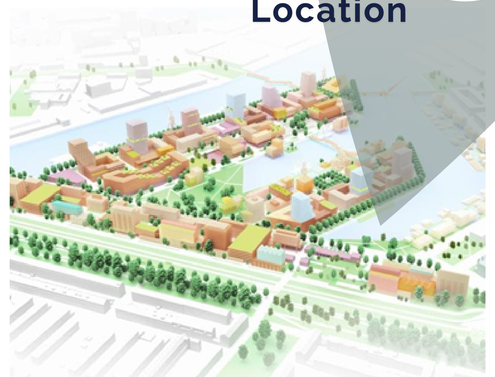
Location

The site is located in Rotterdam, in the Merwe-Vierhavens (M4H) area. The municipality aims to transform this former port district into a vibrant mixed-use neighborhood where living and working come together.

As part of this vision, the municipality has tasked us with designing a floating community in the area previously occupied by the Floating Farm. The location is easily accessible by public transport just a 5 minute walk away, you'll find tram line 1 heading toward De Esch and tram line 11 toward Woudhoek. Both lines connect you to the city center of Rotterdam in under 15 minutes. Additionally, the Marconiplein metro station is about a 20-minute walk from the site.

The area is easily accessible by road, although parking spaces near the waterfront are limited. From Merwe-Vierhavens, it takes about 15 minutes to reach the center of Rotterdam by car or around 20 minutes during heavier traffic.

If you want to visit the center of Schiedam, it's only a 5 minute drive away. For those who prefer cycling, there are dedicated bike paths available. It takes just 8 minutes by bike to reach Schiedam city center, and about 15 minutes to cycle to Rotterdam Central Station.

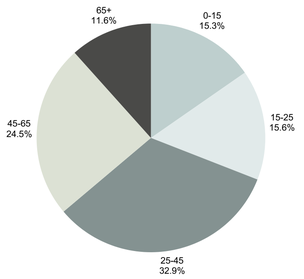


Target group

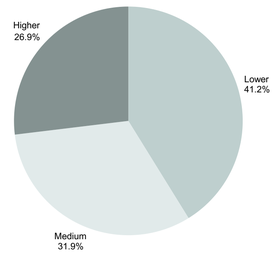
The Merwehaven project will introduce approximately 2,500 new homes, with 60% designated as affordable housing defined by purchase prices up to €390,000 and monthly rents up to €1,123 (based on 2024 figures). The development specifically caters to couples and small families, typically consisting of one to four persons. This aligns with demographic patterns observed in nearby neighborhoods such as Delfshaven and Bospolder-Tussendijken, where around 35% of residents are aged between 25 and 45 years, and more than half have a migration background. Rental housing dominates, accounting for roughly 70% of the supply.

These compact households are often seeking comfortable, modern living environments with strong community ties. The district's focus on sustainability, creativity, and inclusivity responds directly to these needs, offering green infrastructure, shared mobility, and social meeting spaces. Merwehaven aims to become a vibrant and future ready community for young urban residents eager to connect, grow, and thrive.

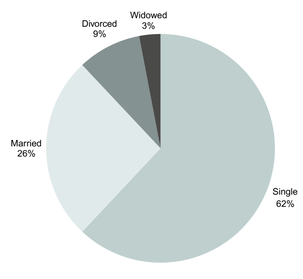
Age group



Education level



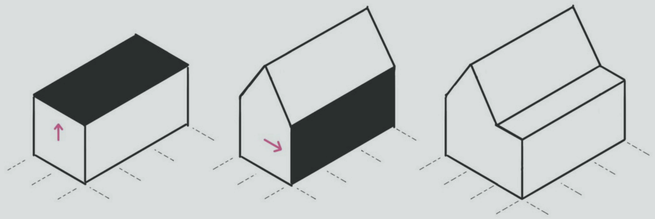
Marital status



Design concept

Our architectural concept revolves around the use of sustainable, biobased materials with a strong emphasis on natural aesthetics and climatic adaptability. The wooden slat façade not only provides a warm and tactile exterior but also contributes to passive shading, enhancing indoor comfort while reducing energy demands.
We employ a modular approach, using standardised units (2x3 and 3x3 meters) to create flexible living configurations. These modules can be combined and adapted based on site conditions, family sizes, or community needs.

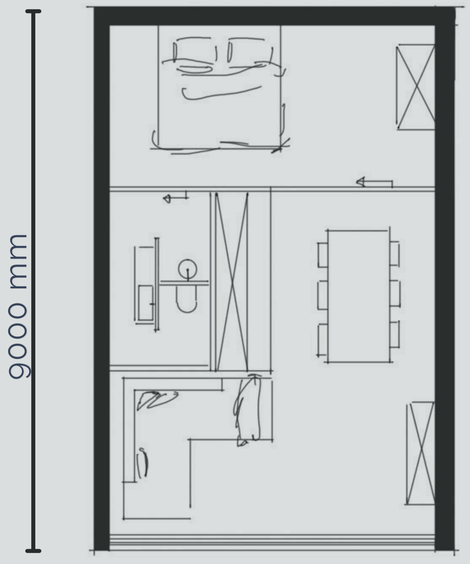
Each construction layer is carefully chosen for optimal thermal performance in colder, wetter climates like the Netherlands. The roof (Rc 6.6 m²K/W), façade (Rc 5.47 m²K/W), and floor (Rc 4.1 m²K/W) all include natural insulation materials such as cork and wood fiber, ensuring a healthy indoor climate and energy efficiency. A vapour barrier and EPDM membrane are integrated to protect the structure from moisture while maintaining breathability.
The overall layout and orientation are designed to enhance natural daylighting, views, and spatial flow within the site, while maintaining privacy and connection to nature.



Concept diagram

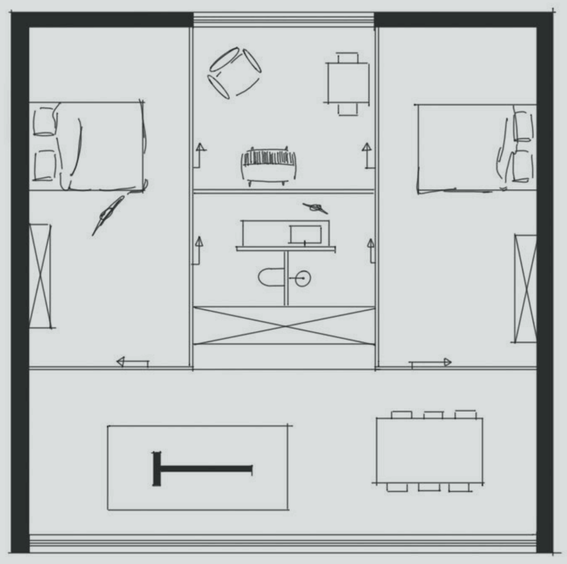
6000mm

9000 mm



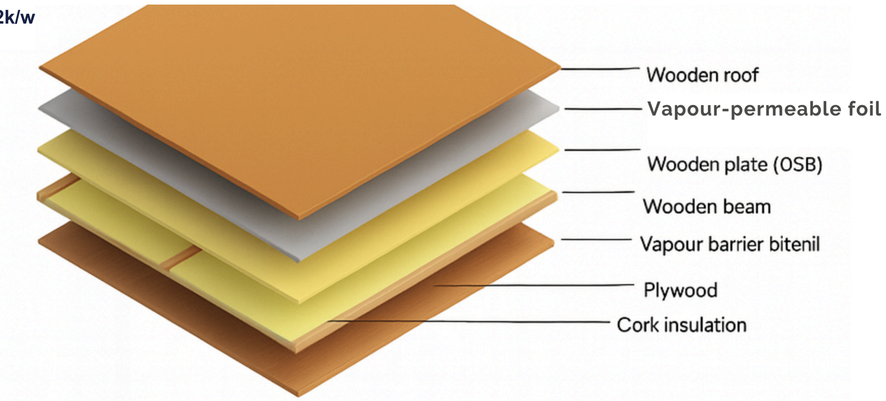
9000 mm

2x3

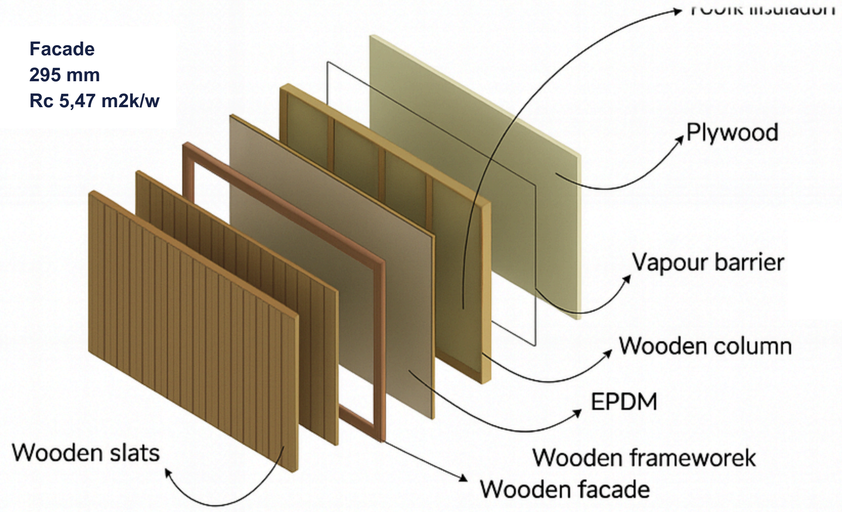


3x3

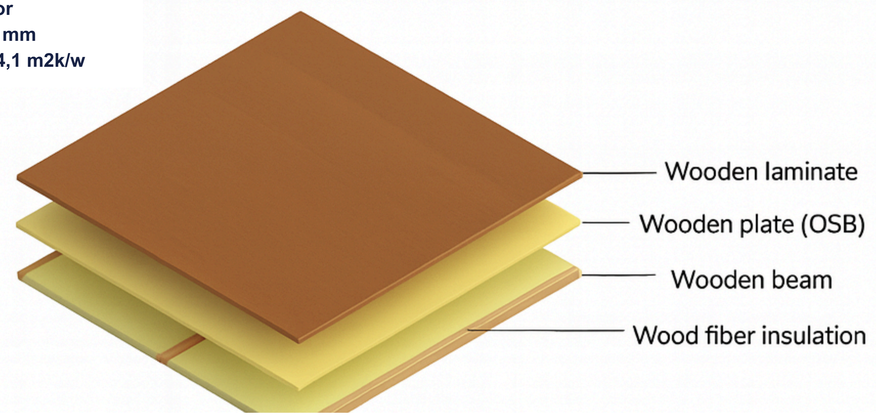
Roof
292 mm
Rc 6,6 m2k/w

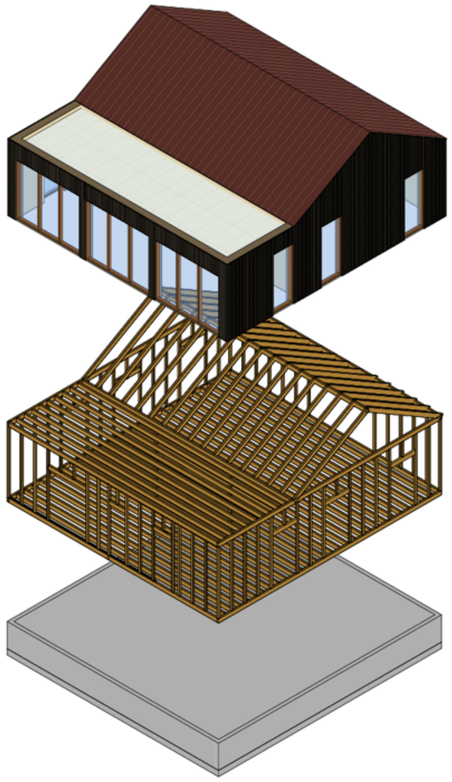


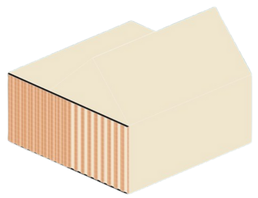
Facade
295 mm
Rc 5,47 m2k/w

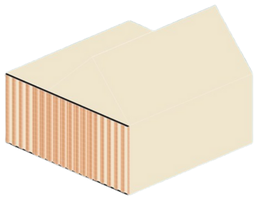


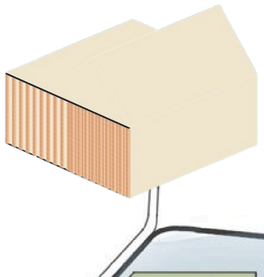
Floor
200 mm
Rc 4,1 m2k/w









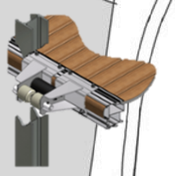


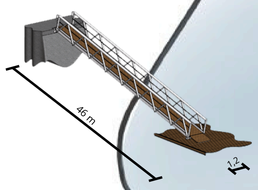
Stability
The wooden interior and exterior cladding attached to the timber frame (HSB) walls together form a rigid unit. This causes the walls to act as a diaphragm that can resist forces such as wind loads, thereby providing stability. The wooden cladding on the roof also contributes to the overall strength, as it functions as a horizontal diaphragm that connects the walls and keeps the entire structure stable.

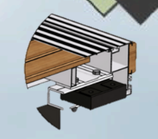
All homes are equipped with solar panels and a hybrid air-to-air heat pump. These systems provide heating and hot tap water. Additionally, the homes are connected to district heating, which supplies supplementary heat during peak hours and cold winter months when the heat pump is less efficient.
Furthermore, each home uses a smart grid. This allows the energy generated by the solar panels and heat pump to be optimally utilized, and the heat from the district heating to be deployed efficiently.

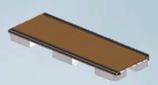
Instalations

Pier









Footbridge

The water level at this location ranges from a minimum of -0.6 meters NAP to a maximum of +1.0 meters NAP (Rijkswaterstaat Waterinfo, n.d.). The footbridge, which is 26.7 meters long, 1.2 meters wide, and has a slope angle of approximately 4.8 degrees, is designed to move with these water level changes. It is attached on the quay side with stainless steel hinges and rests on neoprene rollers on the pier side to allow smooth movement as the water level rises and falls.

Pier

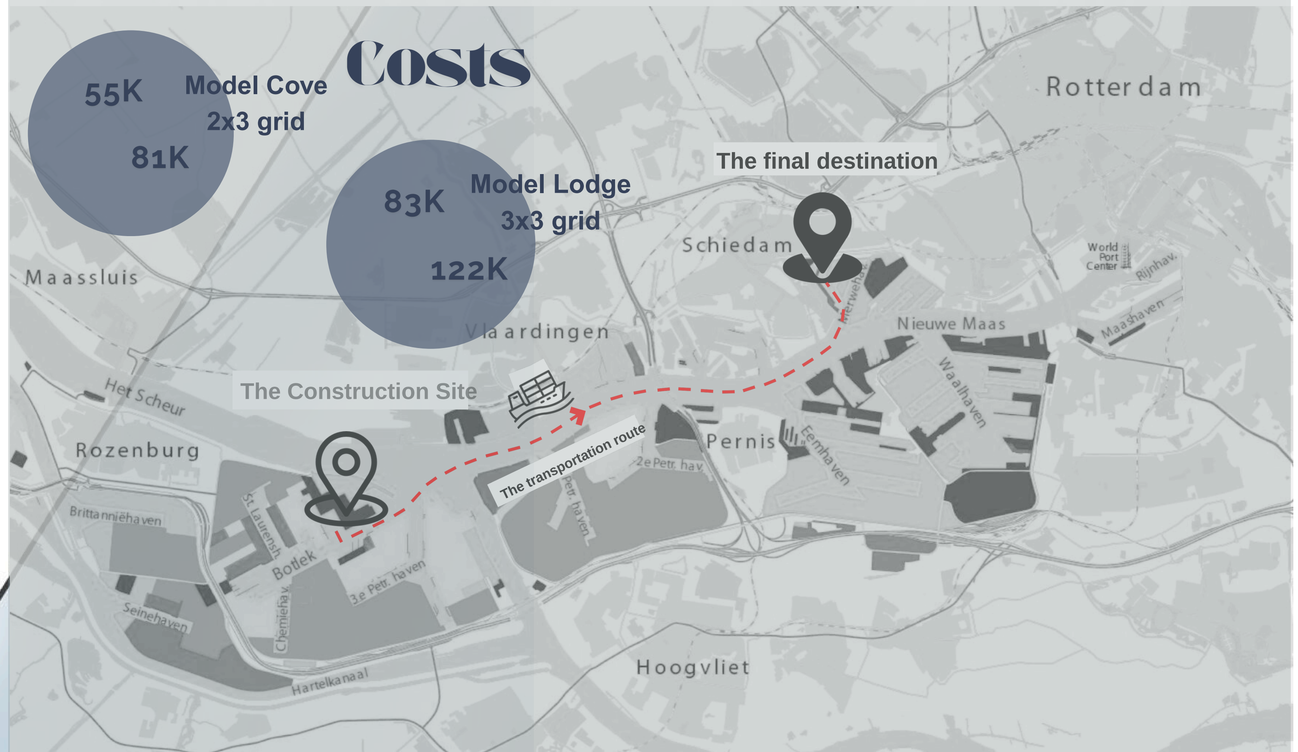
- The pier is stable thanks to the placement of floats made of strong, seawater-resistant aluminium. These floats are fully foamed, making them unsinkable.
- The piers have wooden fender strips.
- All pipes for water, electricity, TV, telephone, and computer are concealed in built-in cable ducts along the sides of the piers.
- The pier is held in place by steel piles. Pile guides with neoprene rollers ensure the pier can move smoothly along the piles. The pile guides are placed on the outside of the pier to optimize the usable space on the pier.

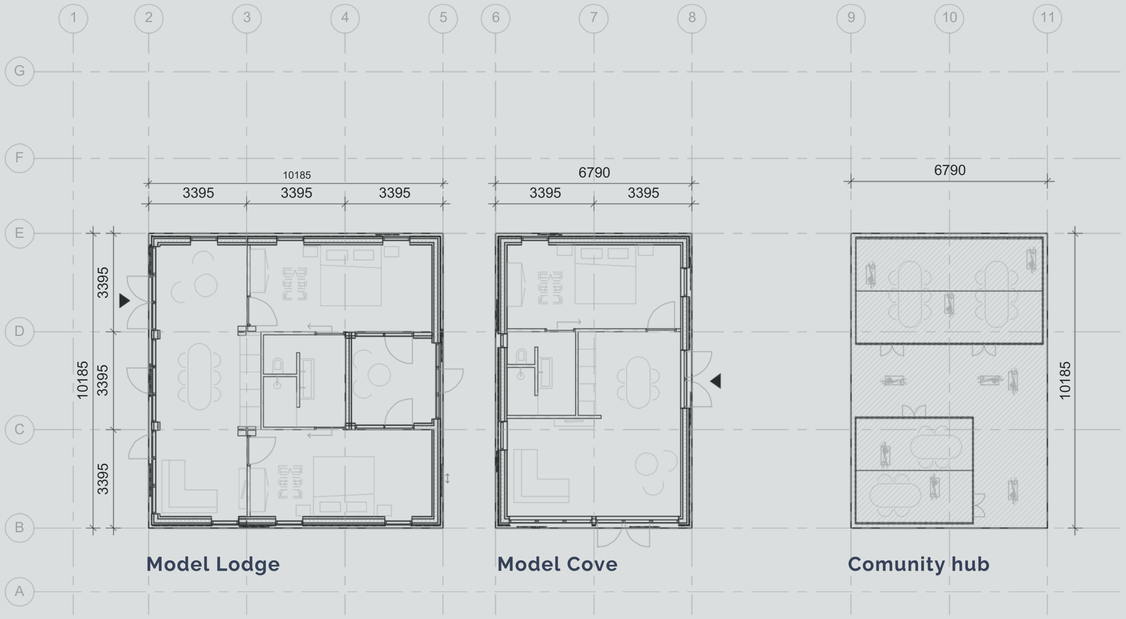
execution

Sustainable Construction at the Prins Willem-Alexander Dock
For this project, the construction site was deliberately located at the Prins Willem-Alexander Dock rather than in the densely built-up M4H area. This location offers significant spatial and logistical advantages: wide supply routes, no conflicts with urban traffic, and ample space for storage and on-site assembly. In contrast to M4H where limited space, heavy city traffic, and noise restrictions can delay construction the dock enables clean, quiet, and efficient operations.

Smart Logistics: Construction Site as Distribution Hub
The construction site functions as a distribution and assembly hub. The entire construction process takes place here from pontoon foundation to weather-tight structural shell (wind and watertight). With a just-in-time delivery system, materials arrive only when needed, minimizing on-site storage and reducing the risk of errors or material damage. Deliveries are made via waterways or by electric vehicles, significantly lowering CO_2 emissions. This method aligns perfectly with our commitment to circular, low-emission, and sustainable construction.

Waterborne Transport to M4H
After completion, the floating unit is launched and transported by ship to its final location in M4H. This waterborne transport avoids additional urban traffic congestion, reduces emissions, and saves time. On-site work is limited to final utility connections and anchoring. This streamlined approach drastically shortens installation time and minimizes environmental impact on the surrounding area. and aligns perfectly with the City of Rotterdam's goals to promote sustainable, innovative, and future-ready housing.





Link naar de film:
https://youtu.be/mn6E5Uv4ce0

Design