FAKULTA STAVEBNÍ
ústav architektury

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| Project Topic: | Tiny house |
| Academic Year/Semester/Year: | 1st / Summer / 2025–2026 |
| Thesis Supervisor: | Ing. arch. Bohumila Hybská |
| Author: | Ester Pavloušková |

## BRIEF

Design of a tiny house as a fully functional dwelling with a very small floor area (maximum 40 m²), conceived with an emphasis on maximum spatial efficiency, functional minimalism, and reduced material and energy demands. The project is not merely a downsized family house, but a comprehensive housing concept based on the reduction of needs, thoughtful spatial organization, multifunctional use of elements, and often principles of sustainability and mobility. The tiny house may be either permanent or mobile and is typically intended for two occupants. The proposal includes a comprehensive design of the building, including the interior, built-in furniture, and detailed resolution of functional and spatial relationships.

## GENERAL INFORMATION

Project Name: Tiny House
Location: Brno – Štýřice
District: Brno-City
Region: South Moravian Region
Plot No.: 143/1

Site Area: 37,000 m² (18,000 + 19,000)
Built-up Area (including terrace): 68.92 m²
Gross Floor Area: 50.33 m²
Net Usable Floor Area: 41.17 m²

## URBAN DESIGN

The proposal is based on the unique location within the future floodplain park of the Svratka River, an area that represents a key recreational node of the Brno waterfront. It is a dynamic, nature-oriented site that combines flood protection functions with contemporary urban space. The surroundings are primarily defined by riparian vegetation, a revitalized riverbed, and cycling paths, establishing the area as suitable for environmentally sensitive and lightweight architectural interventions. The site is visually characterized by panoramic views of the city, dominated by the Cathedral of St. Peter and Paul. While the surrounding urban fabric is characterized by a permanent, structured form, this project adopts a principle of mobility and temporariness, in direct response to the floodplain conditions. This approach allows the building to exist in close proximity to the river without causing permanent impact on the landscape. The design places the tiny house in непосредственной proximity to an existing access road, enabling convenient arrival and parking on a newly designed gravel surface. This solution was selected for its permeability and its visual integration with the park environment, avoiding the need for invasive paved surfaces. A key compositional element is the orientation of the building, with generous glazing directed towards the dominant landmark of Petrov, creating a strong visual axis between the interior and the historic center of Brno. At the same time, this placement concentrates operational activity at the edge of the site, preserving the natural biotope from unnecessary disturbance.

## ARCHITECTURAL DESIGN

The proposal responds to the unique context of the future floodplain park in Brno. The compact, stepped volume with a grey-brown slatted façade is designed to naturally blend into the revitalized riverside landscape. The main concept is maximum openness. Through generous glazing and an adjoining wooden terrace, the interior extends directly into the surrounding greenery, while external blinds allow for sensitive control of privacy and daylight. The absence of internal load-bearing walls enhances the sense of lightness and spatial openness. Within a floor area of 40 m², a high standard of living is achieved through thoughtfully designed built-in furniture. Integrated storage, seating elements, and a pull-out table form a cohesive functional system that efficiently utilizes space while maintaining spatial clarity. The project thus defines a sustainable way of living in close contact with nature in the heart of the Brno metropolitan area.

## SPATIAL LAYOUT

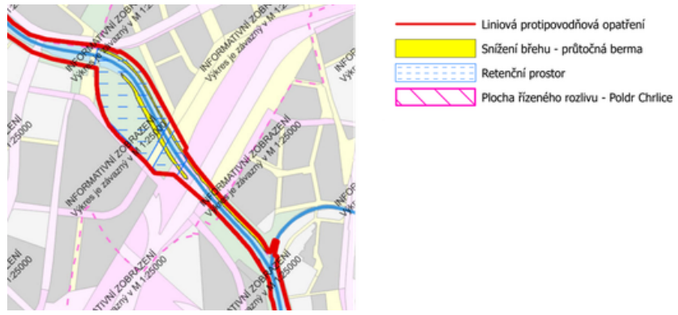
The layout efficiently utilizes the 40 m² floor area through vertical organization. The main entrance on the south side leads through a wind lobby into an entry space, followed by a bathroom with WC. The bathroom is equipped with dual-position doors, allowing flexible separation of functions for simultaneous use by two occupants. The core of the house is the living area with a kitchen, accessible via sliding doors. The space is designed with an emphasis on views: side glazing opens towards the terrace and floodplain park, while a frontal panoramic window frames the dominant landmark of Petrov. The upper level contains the private zone with a bedroom and an adjoining gallery. This space serves as a reading nook and, through its visual connection to the ground floor, enhances the perception of openness within the interior. The layout clearly organizes the house into living, sanitary, and private zones, with a strong emphasis on visual connection to the Brno waterfront.

## STRUCTURAL DESIGN

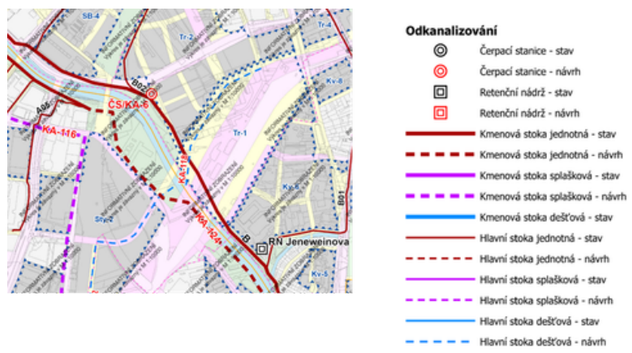
The building is designed as a lightweight timber structure using a system of prefabricated wooden posts and beams. This structural system ensures high stability and stiffness while maintaining a low overall weight. The use of prefabricated elements enables rapid on-site assembly with minimal impact on the ecosystem of the future park. Due to its location within the Svratka floodplain, the building is carefully anchored using steel ground screws evenly distributed beneath the floor structure. This solution eliminates the need for concrete foundations, ensures stability in soft soil conditions, and allows for full reversibility of the structure. High thermal performance and year-round habitability are ensured by an insulated building envelope. The design emphasizes sustainability and a low carbon footprint, with natural timber as the primary material for both the structural system and the façade.

## TECHNICAL INFRASTRUCTURE

The plot is located on the right bank of the Svratka River within the area of the future flood-protection park, the completion of which is scheduled for 2028. The locality will be fully connected to modernized infrastructure: water mains are routed along the right bank, while sewer and gas mains will be newly constructed as part of the park's implementation and connected to the existing network on the left bank. The connection to the electrical grid will utilize a utility corridor towards the new main railway station, ensuring a stable energy supply even in this newly emerging recreational area.








## ZONING PLAN

The Zoning Plan is a binding spatial planning documentation and consists of a graphic and a textual section. Both sections contain a binding part, i.e., the regulatory statement, and a non-binding part, the so-called justification, which comments on the prescribed binding regulations, etc.
Blue and blue-green hatching: Water Bodies and Infrastructure (W) – including the actual riverbeds of the Svitava and Svratka rivers and new water management elements. The creation of a lateral meandering channel and various pools (ponds) is proposed.
Green hatching: Urban and Landscape Greenery Areas (Z / ZP) – a new extensive "Flood Park", which includes green embankments, flood meadows, cycling and pedestrian paths, wooden piers, and a natural amphitheater.
Red, brown, and orange hatching: Mixed-Use and Residential Areas (S / B) – polyfunctional development of the "New Trnitá District". Within these blocks, housing for approximately 10 to 15 thousand residents will be built, closely integrated with administrative spaces, shops, and services.
Grey and white lines/hatching: Transport Infrastructure (D) – a new central boulevard, pedestrian footbridges, and cycle routes connecting both riverbanks. Safe underpasses are proposed at the edge of the park (for example, under the Komárov Bridge) to allow cyclists and pedestrians to avoid conflicts with vehicular traffic.


## GREENERY AND VEGETATION IN BRNO

The study area can be characterized as a site with brownfield elements – the territory contains minimal planned greenery, which is the result of long-term industrial and transport utilization. In the near future, its transformation into a flood-protection park along the Svratka River is planned.
According to the Zoning Plan of the City of Brno (ÚPMB), the study area falls into the category of "general greenery" (ZU). This type of greenery includes areas without significant barriers – parks, orchards, meadows, linear greenery, and public spaces. Shrub and tree stands predominate in the surroundings, with the largest area classified as meadow grassland.
A fundamental transformation of the area is linked to the planned revitalization of the Svratka River embankment and the creation of the flood-protection park. The newly proposed meandering channels will slow down water runoff and enable natural retention in the landscape.
Focus will also be placed on new lawns and green roofs. The proposal includes creating a link between the new main railway station and the historical center. An important element of the new district will be avenues of trees, which will simultaneously serve as a component of blue-green infrastructure.

## TRANSPORTATION

The transport infrastructure in the vicinity of the construction site is highly accessible by public transport, thanks to a large number of tram and bus stops, such as Opuštěná, Křídlovická, or ÚAN Zvonařka, which ensure high-quality connectivity to the city center, the main railway station, and the wider area of Brno. However, the locality is also significantly affected by intensive vehicular and rail traffic, which burdens and partially fragments the space. Class I road I/42, routed through Opuštěná Street, acts as a primary transit axis between the center and the southern parts of the city, especially towards Vídeňská and Bohunice, which negatively impacts pedestrian permeability and the connectivity of surrounding neighborhoods. Another barrier is formed by the Svratka River combined with traffic corridors and a limited number of bridges, which reduce the overall accessibility of the area. Transport servicing of the railway facilities is primarily concentrated into Opuštěná and Plotní streets, leading to their increased traffic load. Following the implementation of the new part of Brno, the situation is expected to improve with the creation of the new Zanádražní Street connected to the Large City Ring Road, while the extended Uhelná Street will serve as a temporary solution until the extension of Vodařská and Bidláky streets. In the long term, the relocation of the Large City Ring Road into the corridor of the existing railway line towards Chrlice is anticipated, thereby diverting transit traffic away from the study area. The creation of an urban boulevard oriented not only toward transportation but also toward everyday city life, together with its integration into the flood park, should contribute to the transformation of the area into a high-quality urban district with improved permeability, a more pleasant environment, and a stronger connection to the river.


LEGEND

1. New Zanádražní Street
2. At-grade solution on Opuštěná Street
3. Restricted parking on the boulevard
4. Extended Uhelná Street
5. New Large Urban Ring Road

Map of planned transport infrastructure changes

## HISTORY

The territory of today's Southern District of Brno has been settled since early periods due to its location near the Svratka and Svitava rivers. In the Middle Ages, development occurred primarily around the fortified city, while the area south of the walls remained predominantly agricultural due to frequent flooding. A major turning point came in the 19th century following the demolition of the city walls, when the suburbs were annexed to Brno and the territory transformed into a prominent industrial center, driven particularly by textile manufacturing and the development of railway transport from 1839 onwards.

In the 20th century, the development of the area was chiefly influenced by railway infrastructure and repeated considerations regarding the relocation of the main railway station. Intensive industrial production long hindered urban development here, and its subsequent decline resulted in extensive brownfield sites. At the turn of the 21st century, a gradual transformation of the territory began, associated with the demolition of substandard structures and the construction of new infrastructure, such as the Zvonařka bus station, the Vaňkovka shopping center, and the city ring road.

Today's territory of Trnitá, extending between the Lower Station (Dolní nádraží) and the planned new transport hub, represents an area at the interface of an industrial past and future development. A key role is played here by the Lower Station, established in 1856, which long served primarily freight traffic and co-shaped the enclosed character of the territory. At the same time, it formed a barrier between the city and the Svratka River. Today, this area is transforming from a brownfield into the new center of Brno, with the primary catalyst for this transformation being the planned relocation of the main railway station directly into this territory.

# REGULATORY FRAMEWORK

## SITE PLACEMENT

The distance from a facade with habitable room windows to a road must be at least 3 m. If a sidewalk runs nearby, the windowsill must be positioned at least 1.8 m above ground level. The minimum clearance between detached family houses must be 7 m, or 4 m if there are no habitable room windows in the facing walls. The setback from the property boundary must not be less than 2 m.

## DAYLIGHTING

The sum of the floor areas of sunlit habitable rooms must constitute at least half of the total floor area of all habitable rooms. Direct sunlight must enter the interior through a transparent material without color distortion.

## FUNCTIONAL AND TECHNICAL REQUIREMENTS AND APARTMENT SPACES

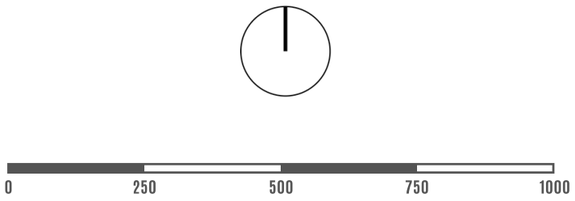
Habitable rooms must have a clear height of at least 2,500 mm (2,300 mm in attics) and a minimum floor area of 16 m² for single-room apartments. Staircases must have a minimum width of 900 mm, a slope of up to 35° (max. 41°), and handrails between 900–1,000 mm. The layout must allow for the handling of objects measuring 1,800 × 600 × 1,800 mm, with minimum room widths of 3,300 mm for the living room and 2,400 mm for the bedroom. Corridors must be at least 1,100 mm wide. With a clear height of 2,300 mm, sanitary facilities must provide the necessary clearances (500 mm in front of the toilet, 650 mm for the bathtub or washbasin). Entrance must be designed via an entrance vestibule, and bathroom doors must be at least 700 mm wide.

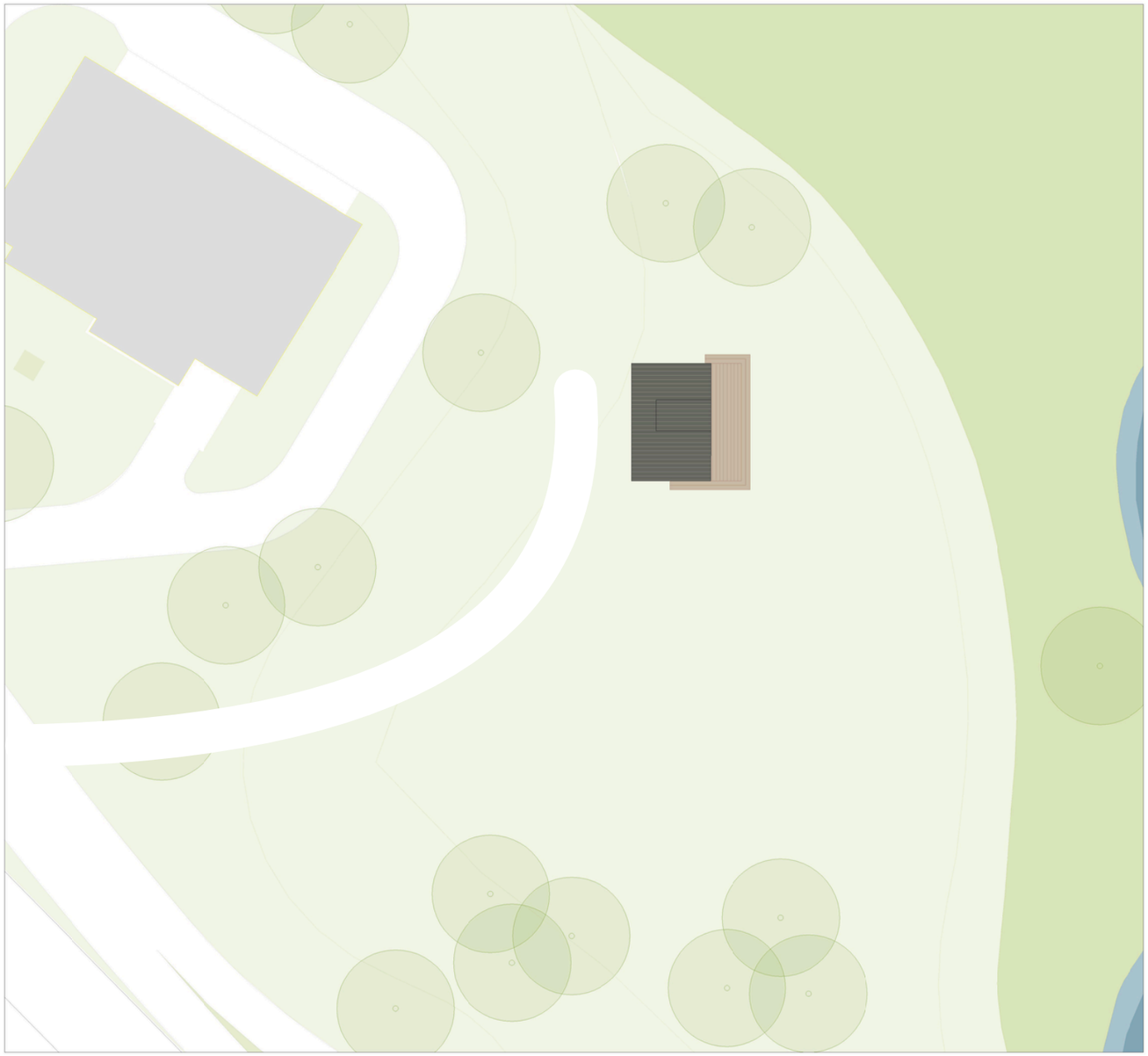
## ECOLOGICAL DESIGN PRINCIPLES

The design aims to reduce the annual heating energy demand below 50 kWh/m². The building envelope must be compact, well-insulated, and airtight. Glazing should ideally face south to utilize passive solar gains. The design must include mechanical ventilation with heat recovery, rainwater management, and the use of renewable energy sources (e.g., solar panels) to minimize environmental impact.

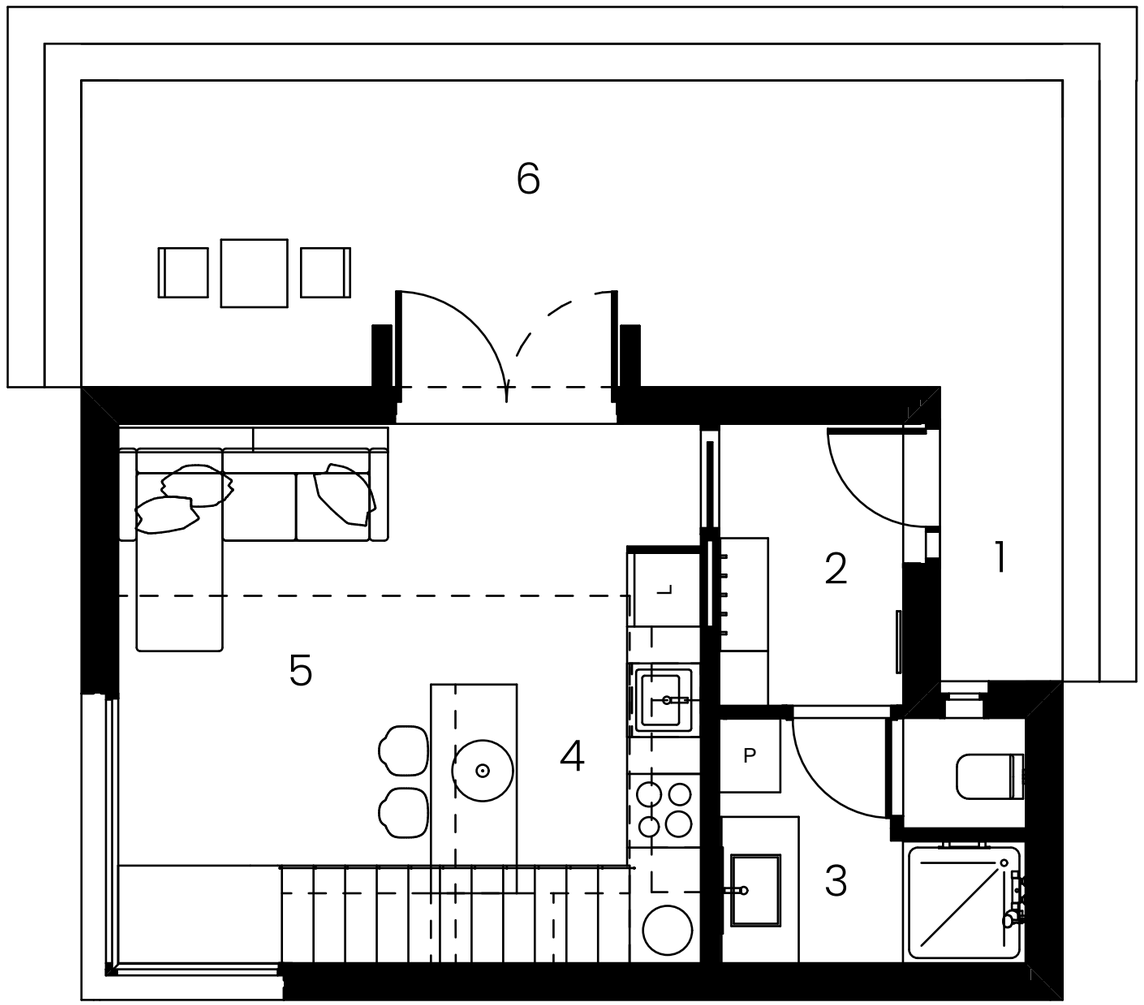

## LEGEND

1 NEW MAIN RAILWAY STATION
2 PETROV
3 VAŇKOVKA SHOPPING MALL
4 WINNING GROUP ARENA
5 DORNYCH SHOPPING CENTER
6 ŠPILBERK OFFICE CENTRE



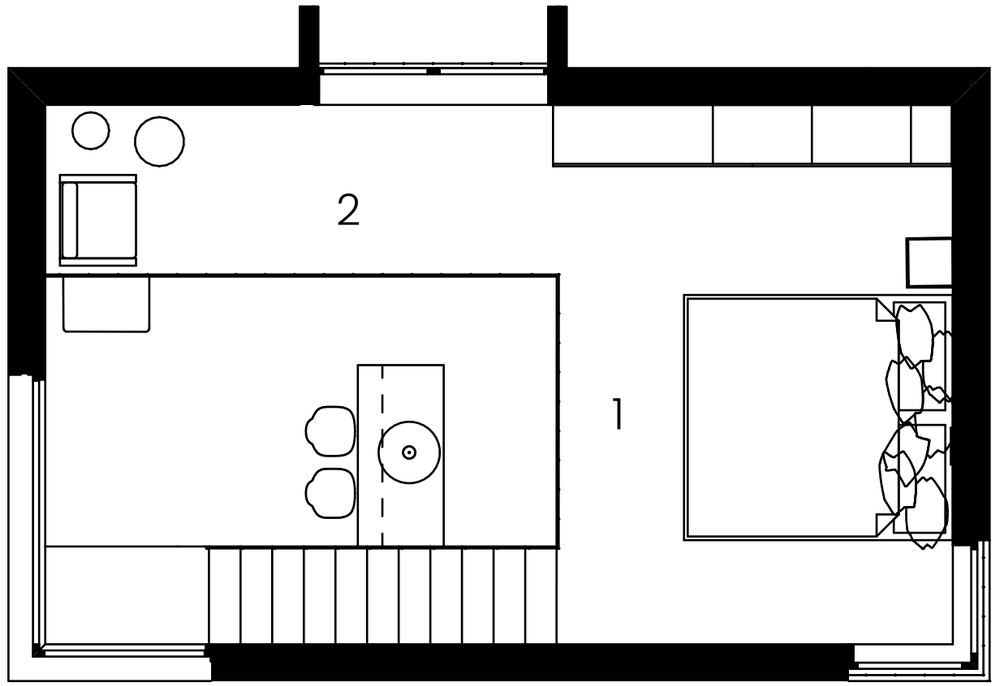


SITE PLAN 1:200




## LEGEND

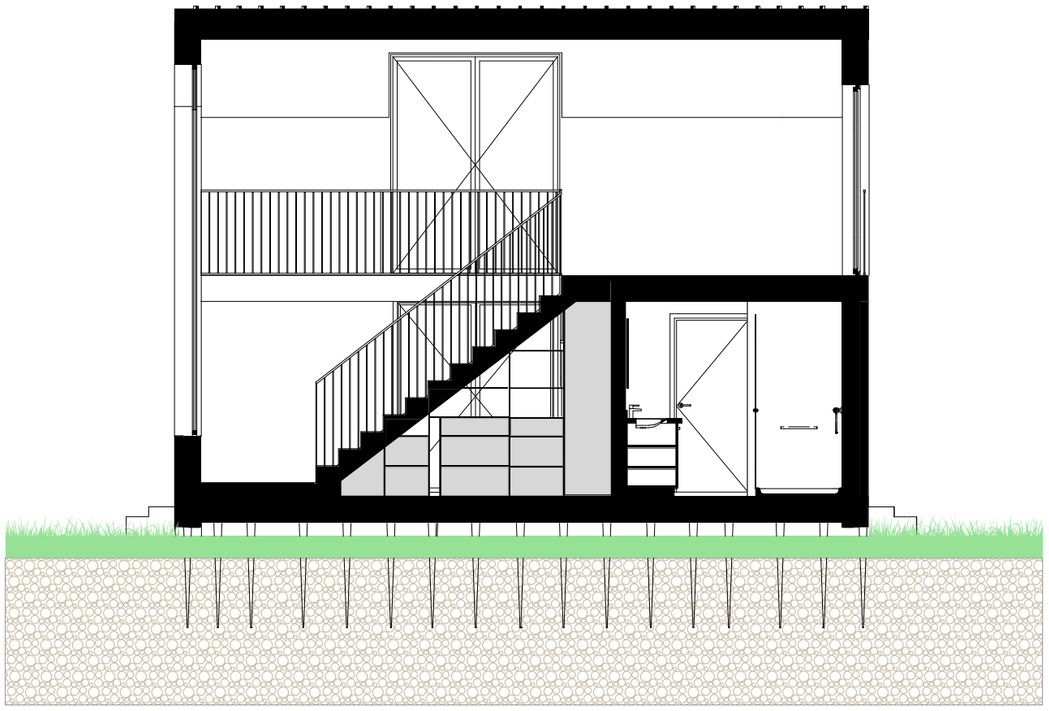
1 ENTRANCE PORCH
2 ENTRY HALL
3 BATHROOM + WC
4 KITCHEN
5 LIVING ROOM
6 TERRACE



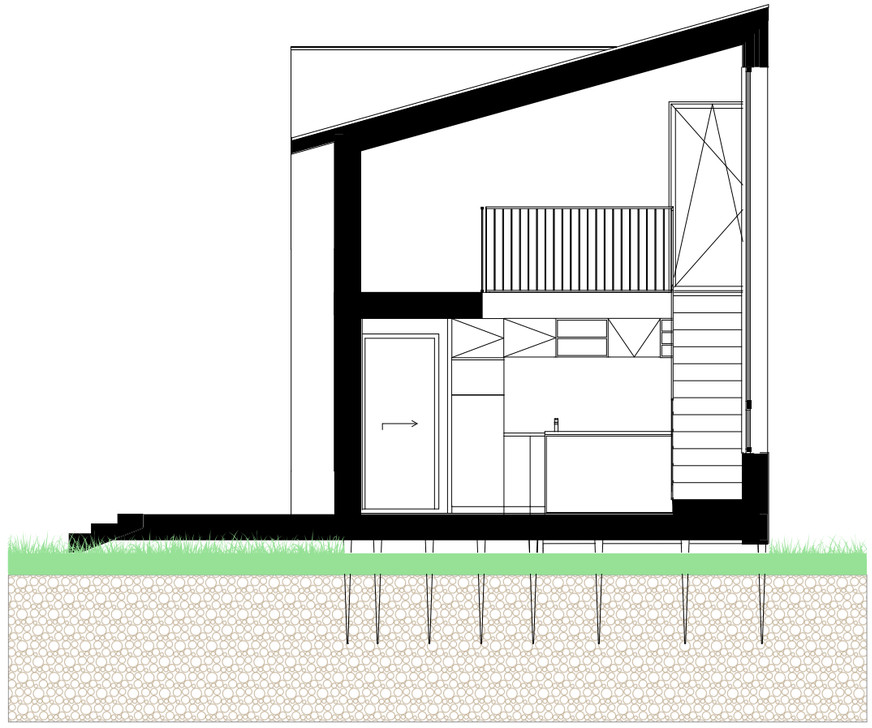

LEGEND

1 BEDROOM
2 GALLERY

## LONGITUDINAL SECTION

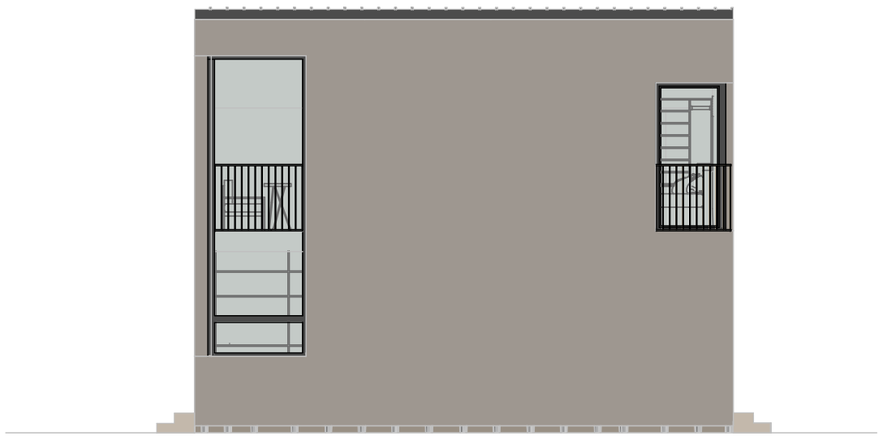


## CROSS SECTION

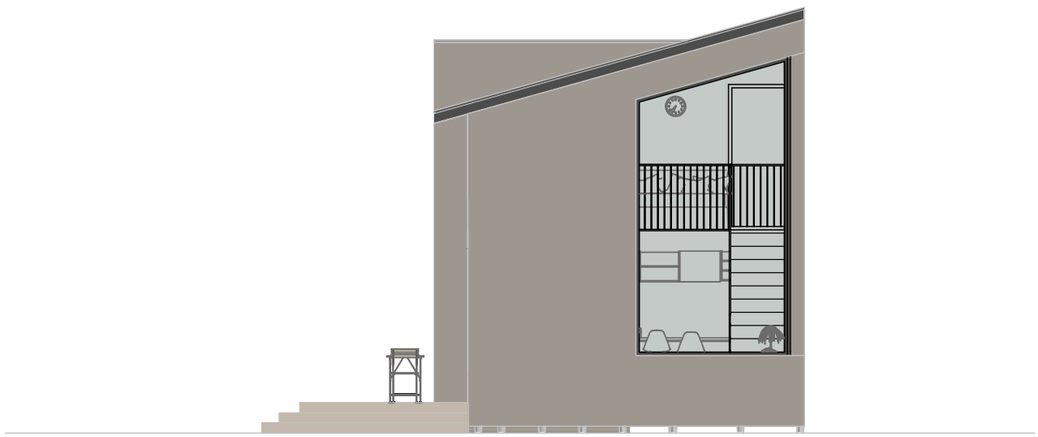


SOUTHEAST

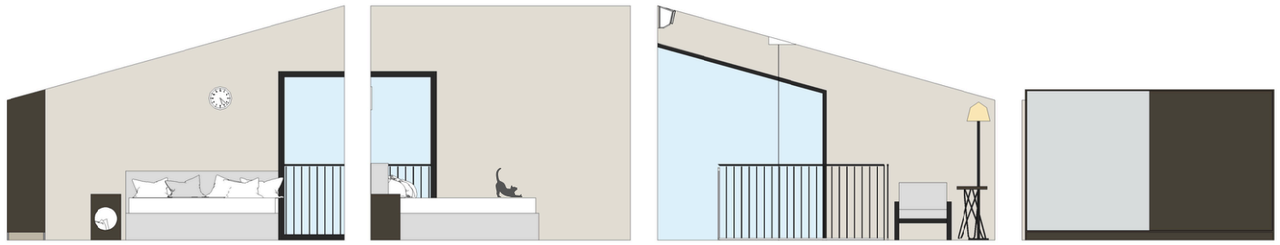
SOUTHWEST



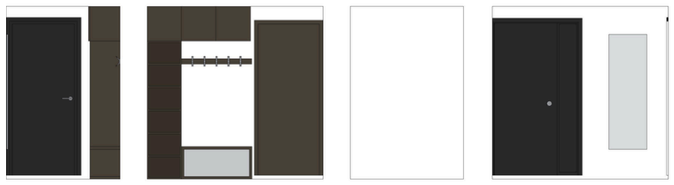
NORTHEAST



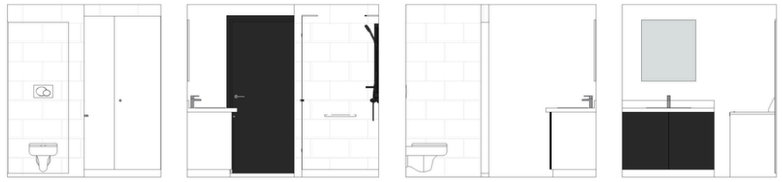
NORTHWEST



BEDROOM

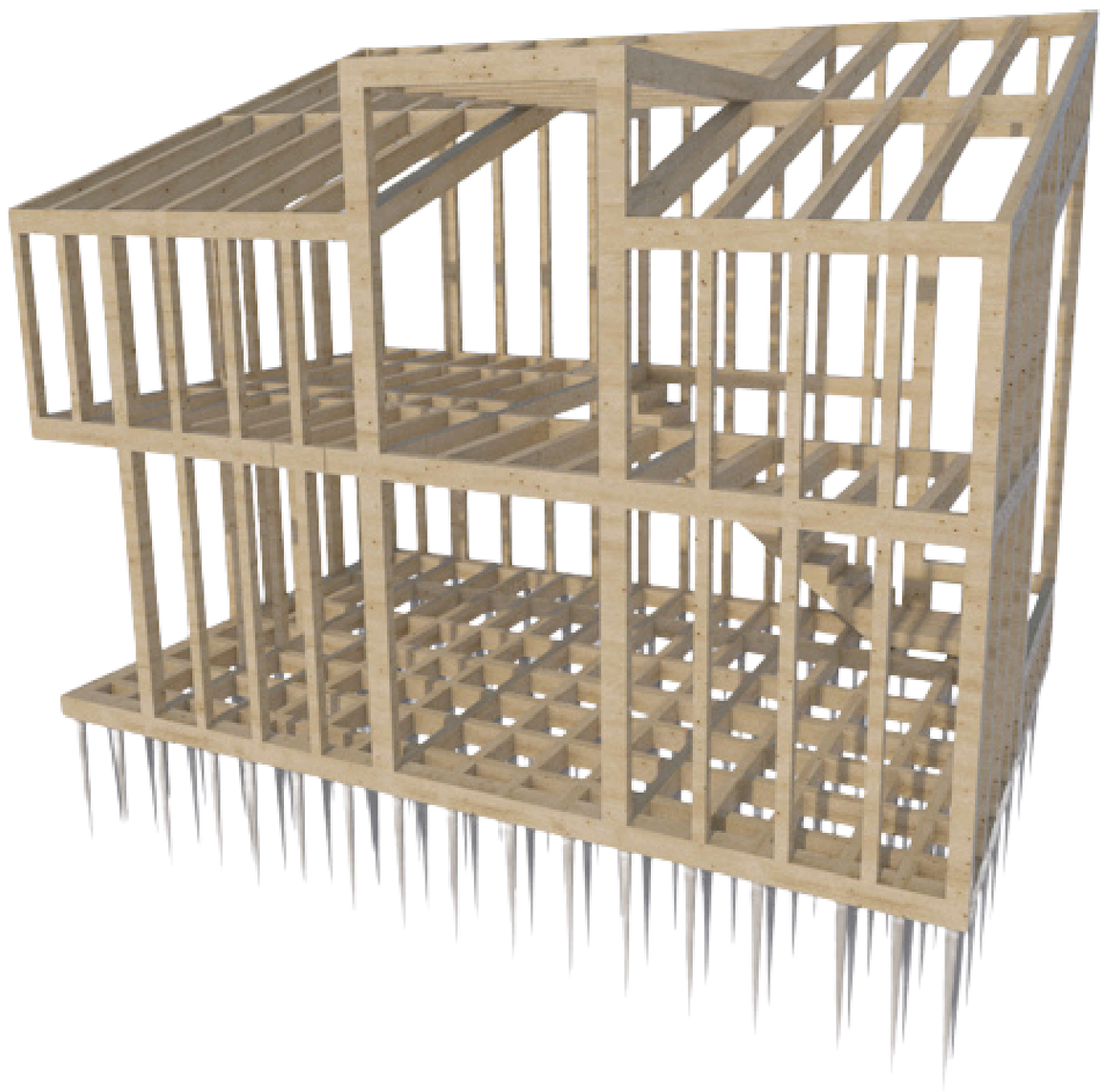


ENTRY HALL



BATHROOM + WC

LIVING ROOM
+ KITCHEN

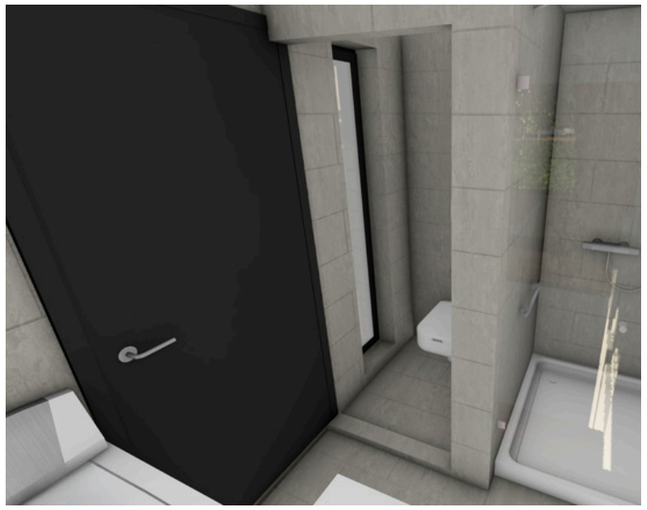


KVH TIMBER ROOF BEAMS
100x200 mm

KVH TIMBER STUD FRAMING SYSTEM
100x100 mm

STEEL GROUND SCREWS FOR FOUNDATIONS

FOLD-DOWN TABLE




DUAL-PURPOSE DOOR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