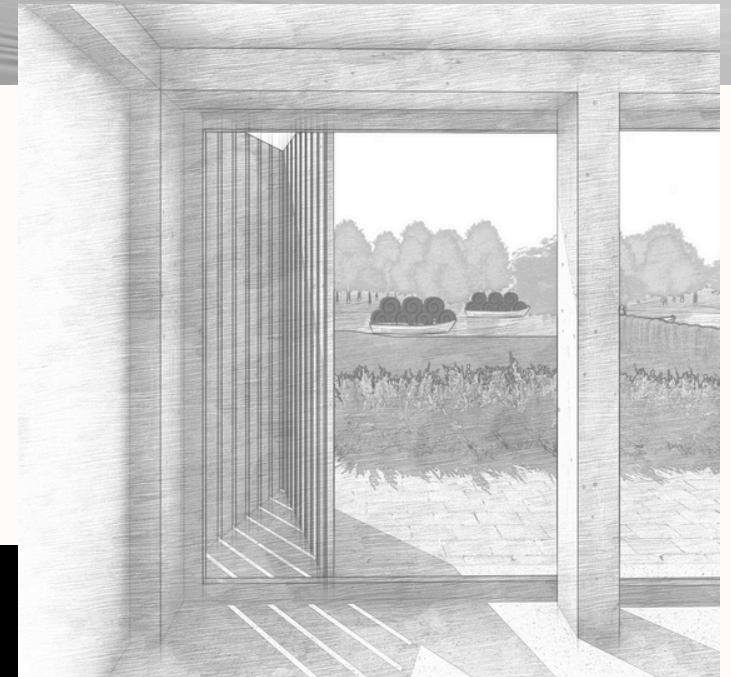




VLIETPOORT

*LIVING IN A CHANGING
RURAL ENVIRONMENT*

GRADUATION PROJECT



NIELS DE RIJKE

TU DELFT
MSC ARCHITECTURE, URBANISM
AND BUILDING SCIENCES
ECOLOGIES OF INCLUSION
2023-2024

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MIDDEN- DELFLAND

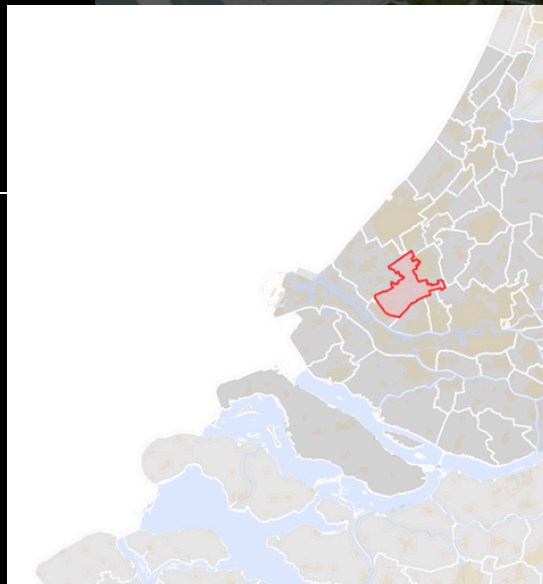
"Last open peat meadow in South-Holland"

MUNICIPALITY MIDDEN-DELFLAND

"It is important to be careful with Midden-Delfland. If we don't, you will see that in a quarter of a century, it will be gone. I don't think we should want that. We desperately need Midden-Delfland in this large, petrified environment."

AHMED ABOUTALEB, MAJOR ROTTERDAM

Midden-Delfland, located in South Holland, Netherlands, is a charming municipality known for its rural landscapes and strategic position within the Randstad region. Formed in 2004 from the merger of Schipluiden and Maasland, it serves as a green oasis amid urban areas. Renowned for agriculture and traditional farming, Midden-Delfland offers picturesque scenery, historic architecture, and a quiet retreat from city life. Embodying the harmonious blend of nature and modern living.



LOCATION

AGRICULTURE



Midden-Delfland is known for its agricultural environment, primarily focused on livestock. For centuries, this area has produced milk, butter, and cheese. The farming activities and historic farms provide an authentic experience and identity to the region.

Located below sea level, Midden-Delfland remains dry through polder systems that pump water out of the polders. The landscape has many recreational activities such as water sports, nature, hiking trails and restaurant facilities.



ICONIC ARCHITECTURE



RECREATION

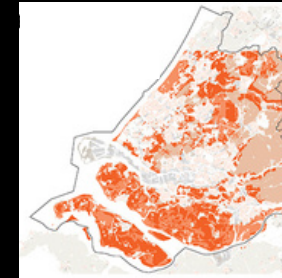


POLDER SYSTEM

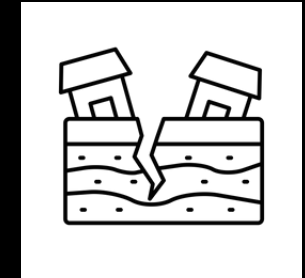
PROBLEM



SALINIZATION



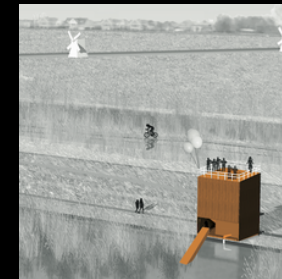
URBANIZATION



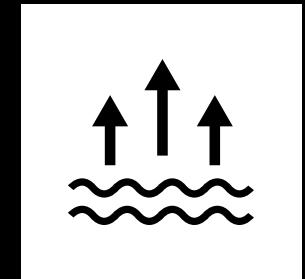
SUBSIDENCE



EXTREMES



ENDLESS PUMPING



OXIDATION

The outward characteristics of rural landscapes are under pressure. Green open peat landscapes, once kept dry by pumps, can no longer be maintained dry. Due to land subsidence, oxidation, and salinization, the soil and water quality deteriorate, biodiversity decreases and they become less resilient to extreme weather conditions.

Adjusting the groundwater level of polders to match the landscape level is therefore deemed necessary. However, this will force farmers to seek alternative forms of agriculture, which put the historical identity of the green open peat landscapes at risk. Additionally, urbanization continues to expand due to population growth and the demand for new housing,

resulting in the disappearance of green landscapes. Preserving historic buildings, such as farms, is crucial. Farms significantly contribute to the experiential value and identity of various regions through their distinctive appearance and region-specific architecture. They form an essential part of the Dutch landscape and are indispensable for maintaining its character.

SOLUTION

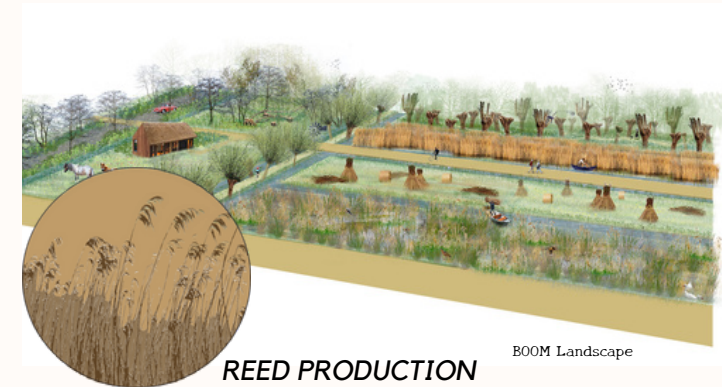


BUTTER, MILK
& CHEESE

BUILDING
MATERIALS



SWAMPY POLDERS



REED PRODUCTION

The solution to the problems of oxidation, subsidence and salinization is to flood polders. This makes the area swampy and farmers have to adapt their agricultural purposes. Farmers can no longer produce milk with their livestock and have to change their farming goals to producing building materials. We don't have to sacrifice the area but new opportunities with the swampy area are possible for farmers and nature management. Moreover, there is more biodiversity and the landscape can better withstand extreme weather influences.



ZUS-URBAN PLAN

Zones Urbaines Sensibles (ZUS) designed several zones to transform the polder to a swampy area. As a result the peat is always under water and the problems no longer occur. Due to the changing landscape, new housing projects must be able to withstand rising water levels and swampy soil. As a consequence, new problems

RESOURCE PRODUCTIVE LANDSCAPE

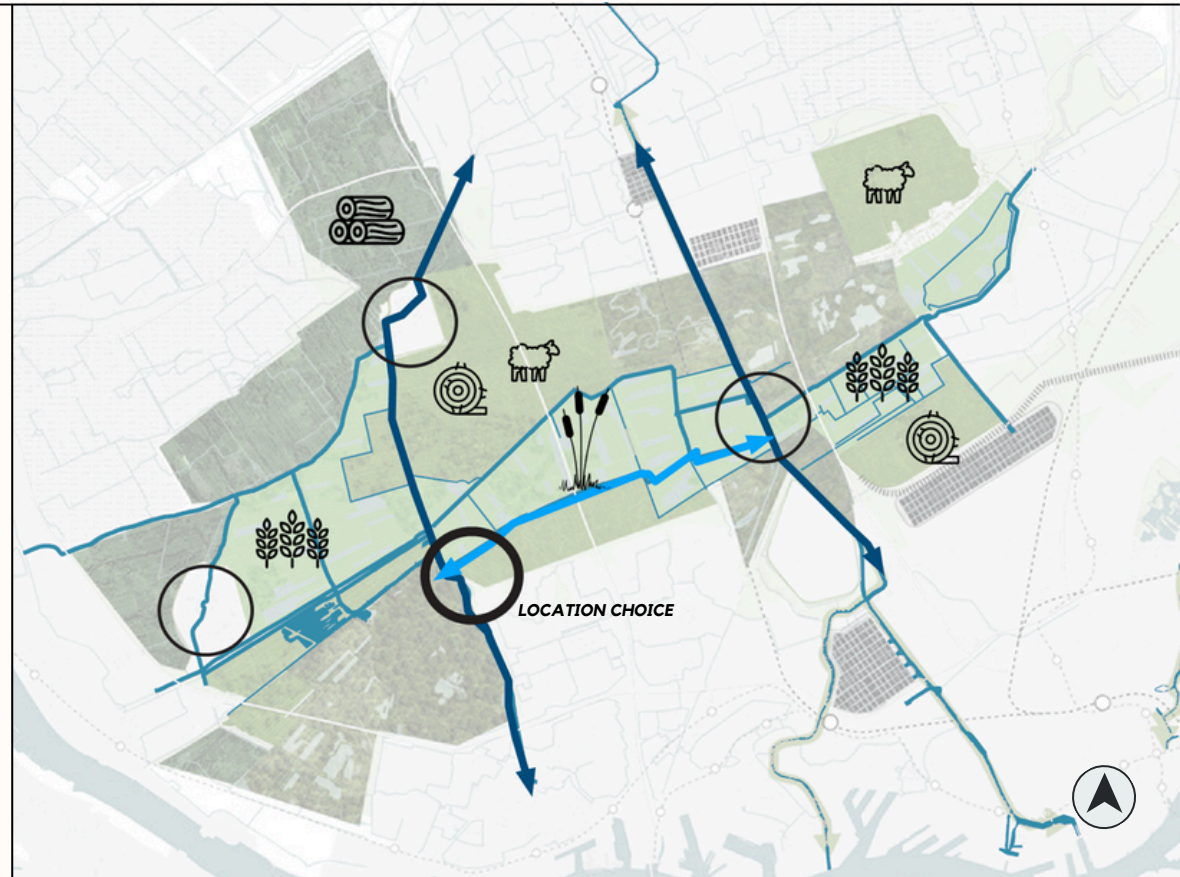


The swampy landscape can produce a limited diversity of materials. This landscape is suitable for producing reed or cattail so farmers maintain an economic commitment to the landscape. Reeds can be used for roofing and cattail for insulation boards. In addition, part of the land remains dry where building materials such as flax, hay or hemp can be grown.



PLACE OF INTERVENTIONS

The villages in Midden-Delfland can be a production community that produces natural materials in the surrounding area and share them with each other through the water. These communities import or export their produced building materials through the water. One transshipment point was missing at a crossing of the north-south and east-west connection. A transshipment point where materials can be transported from the boezemsystem to the polder throughout the entire Midden-Delfland region. This intersection can also provide a storage facility of these naturally produced wet materials.



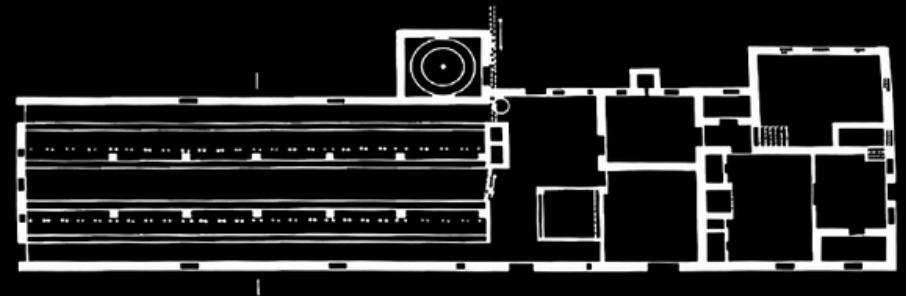
IMAGES OF LOCATION OF INTERVENTIONS

CONCEPT

LEARNING FROM THE PAST

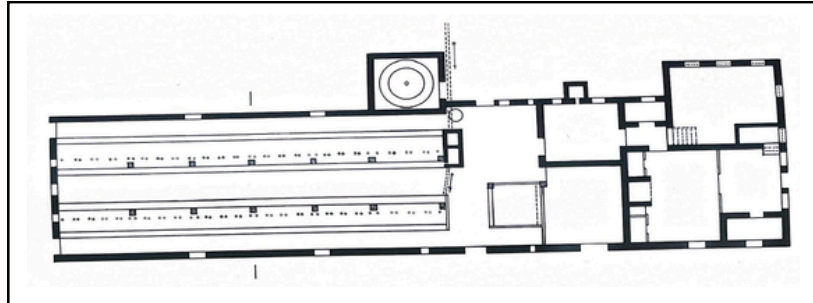
LIVING & WORKING SETTLEMENT

The combination of living and working is not unknown in Midden-Delfland. The past centuries, people lived and worked in the same building. It is crucial to translate the significance of the Midden-Delfland area into a contemporary design solution that combines living and working. Midden-Delfland is a unique area with a rich history, green polders, waterways and agricultural activity but also iconic architecture. This area has an important cultural and ecological value, which should be preserved and enhanced in any future development. Through this, it elaborates on the cultural heritage and identity, there is aesthetic harmony, and it will be more quickly accepted by the community who have strong relationship with maintaining the area in its original state.



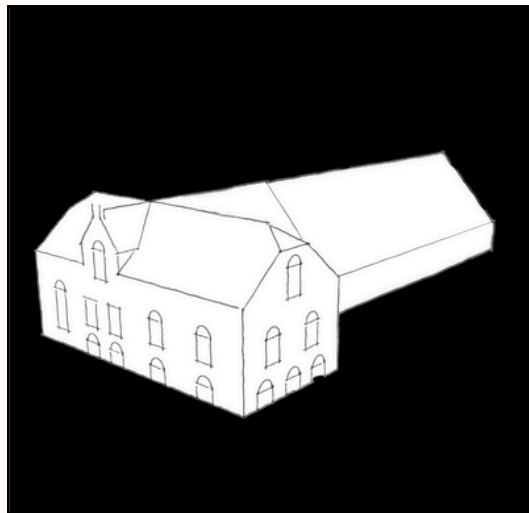
RESEARCH

FLOOR PLANS

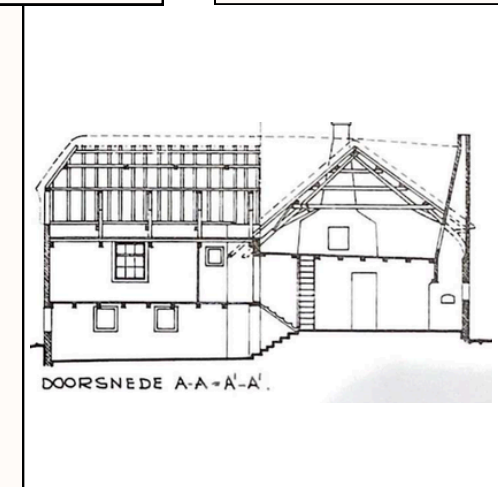


The architectural concept is a living and working settlement. Where farmers with new agricultural goals are integrated with independent residents. This creates an awareness of economic dependency and seasonality of the landscape. Moreover, the changing landscape is accepted by residents because they are now involved in it.

The design of this living and working settlement will be based on iconic architecture from the area. With living in the front house and working in the back house. Bring elements from vernacular architecture back into architecture with contemporary application. Not only the appearance but also functionally.



MORPHOLOGY & FACADE

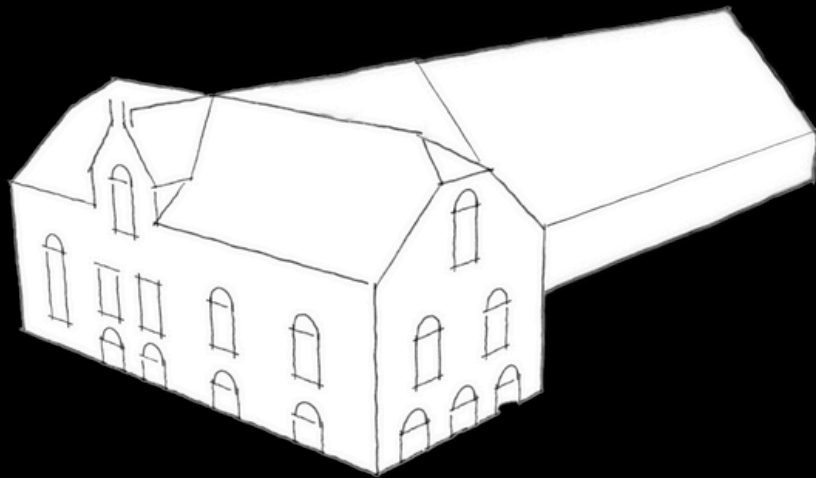


STRUCTURAL DESIGN

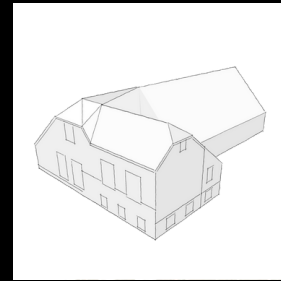
INTERIOR

RESULTS

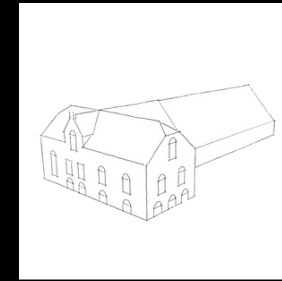
MORPHOLOGY



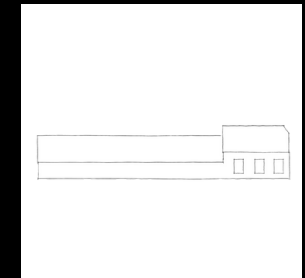
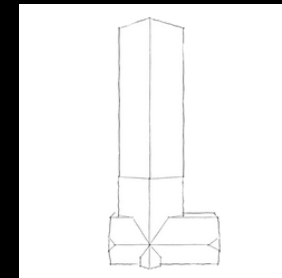
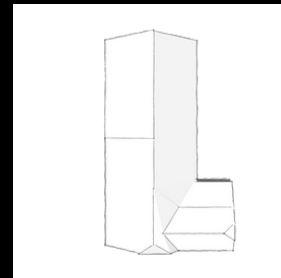
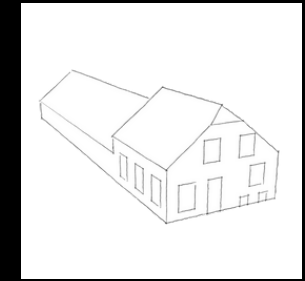
KRUKHOUSEFARM



T-HOUSE FARM



LONGHOUSE FARM



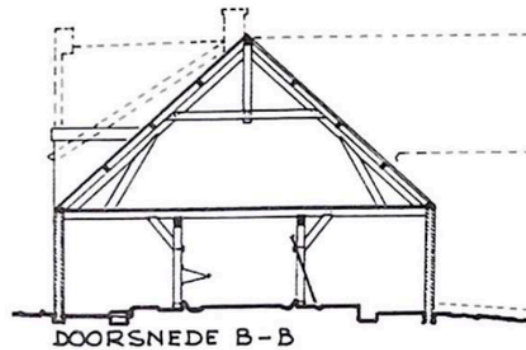
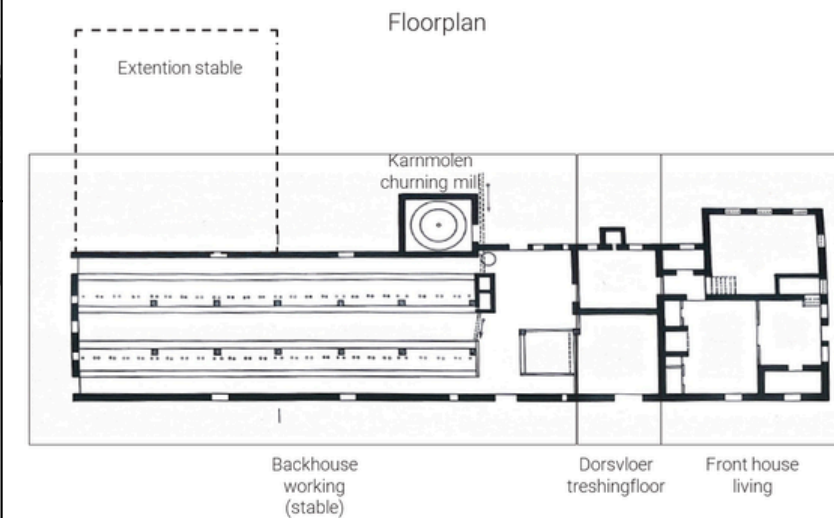
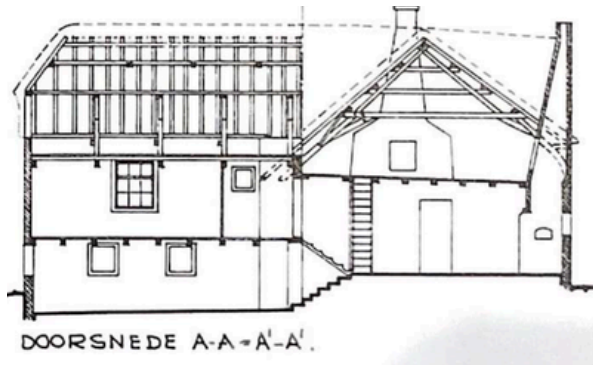
Midden-Delfland has several types of farms. The first is the kruk house farm. Recognizable by its L-shaped floor plan, with the stable connected to one side of the front house. Making the roof of the front house overflow into the lower gutter height of the back house.

The second is the t-house farm where the back house is built perpendicular to the front house. The third is the longhouse farm where the back house is built in the direction as the ridge and sidewalls. These farm typologies share common features.

STRUCTURAL DESIGN

INTERIOR

FLOOR PLANS



The farms are built with a timber frame construction that has been modified over time by the changing livestock arrangement. Called anchor beam timber frames.

The farms have a half-embedded milk cellar with an upstairs (opkamer) room above. This creates a split level in the interior. Moreover, the wooden beam construction is part of the interior appearance.

The farms contains a front house with milk cellar and living rooms. Behind it was a fire wall with a threshing floor behind it where vehicles drove in and out. Behind that was the stable with livestock. Over time, farmers expanded their farms due to economic growth. This was often in an L or U shape.

POSITION

"Critical regionalism is not imitating past times. It is the relationship between the context and the new architectural objects and proposes references to local architecture."

KENNETH FRAMTON, ARCHITECT

The position I chose in designing architecture with references to tradition is critical regionalism. Critical regionalism is not imitating past times. It is the relationship between the context and the new architectural objects and proposes references to local architecture. Critical regionalist Architect Frampton said 'how to become modern and return to sources'. For example, the design of town hall in Finland applied traditional red masonry shaped in a court-and-tower model of a civic center.



Case study: Säynätsalo Town Hall (1952), Finland Architect: Alvar Aalto

CRITICAL REGIONALISM

Case study: Sri Lankan Parliament
Architect: Geoffrey Bawa

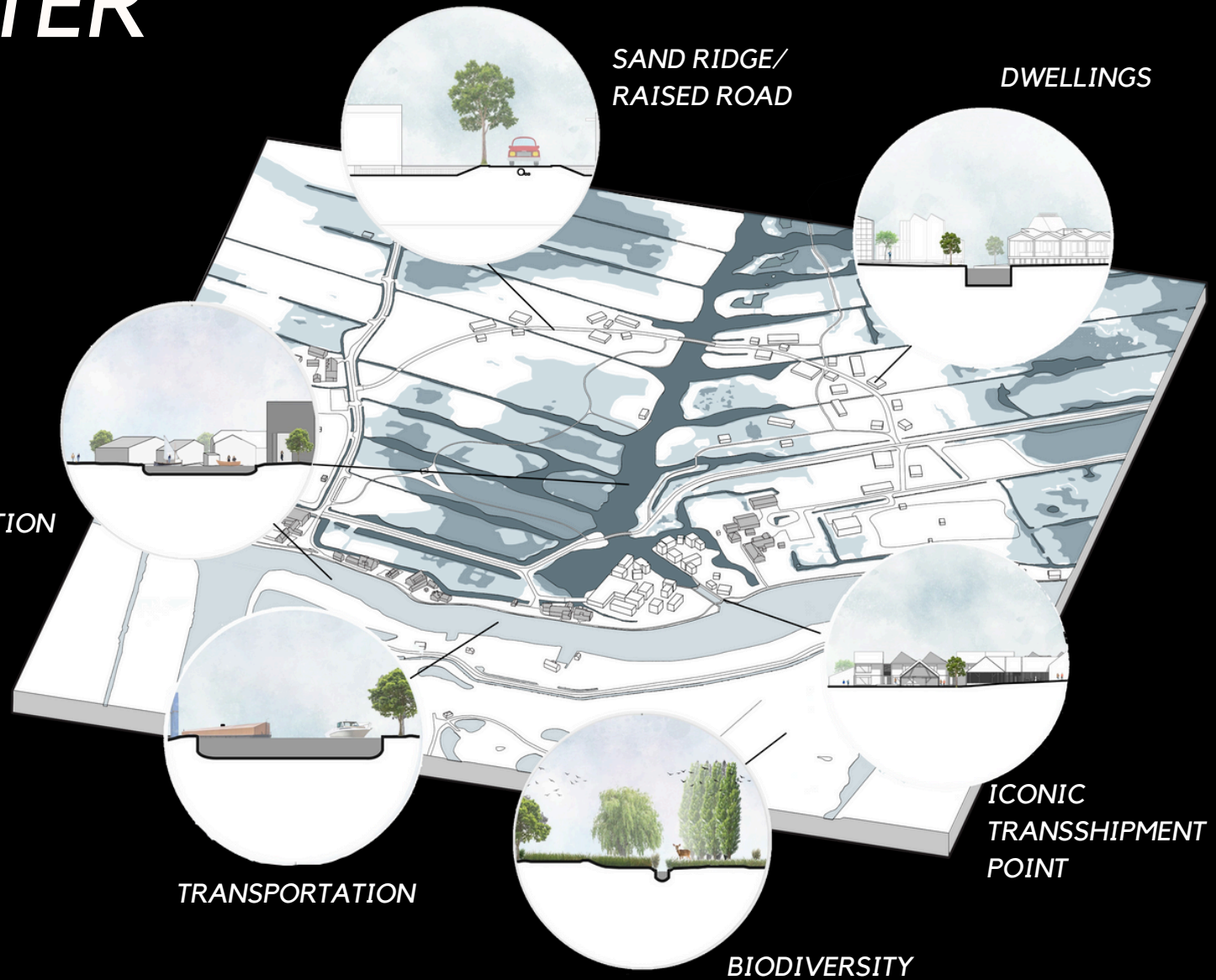


Another example is the Parliament of Sri Lanka with references to traditional buildings. The building employ traditional elements such as courtyards, verandas, and roof overhangs with local materials such as clay, stone, or timber to handle unforgiving climates.



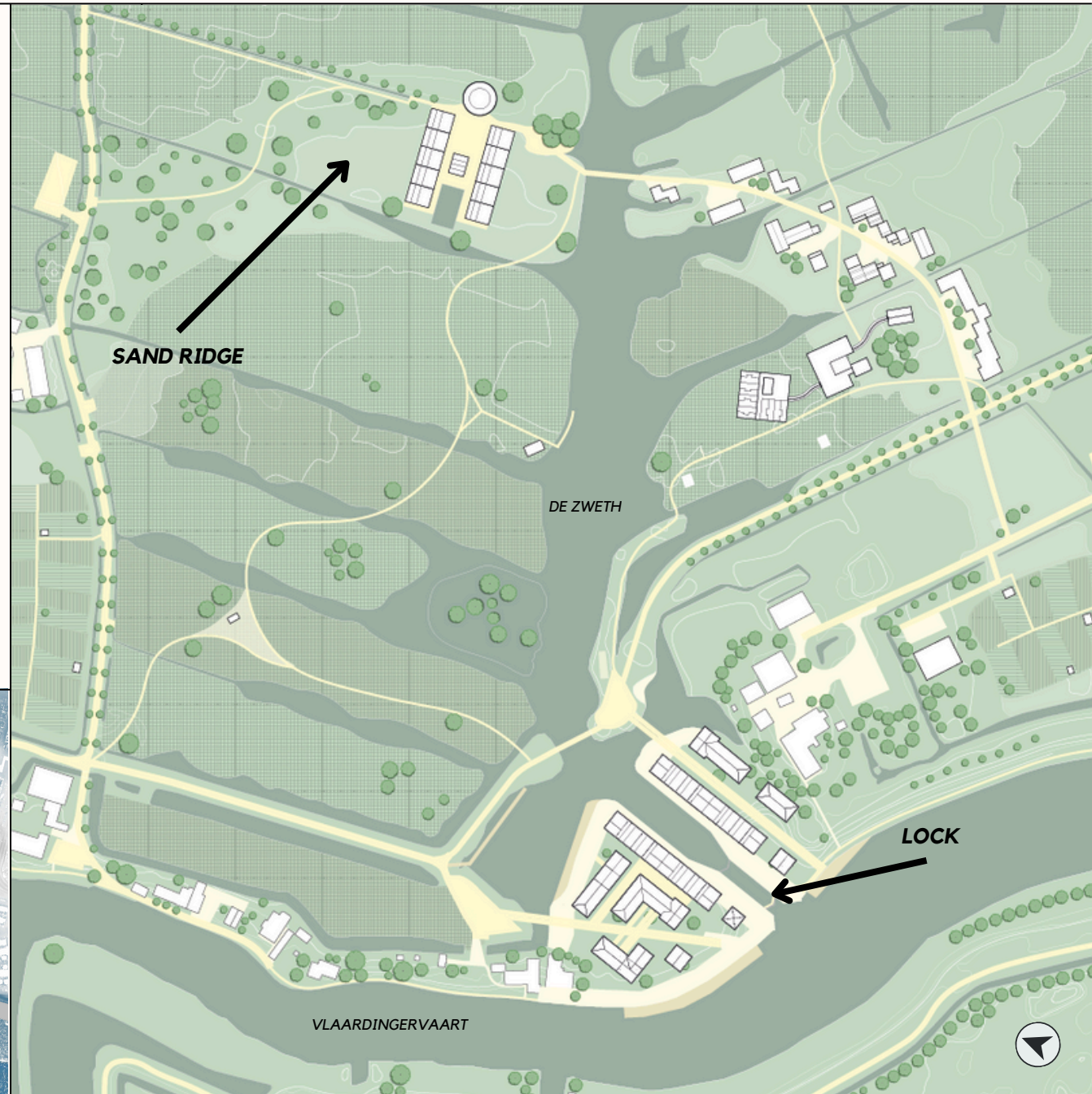
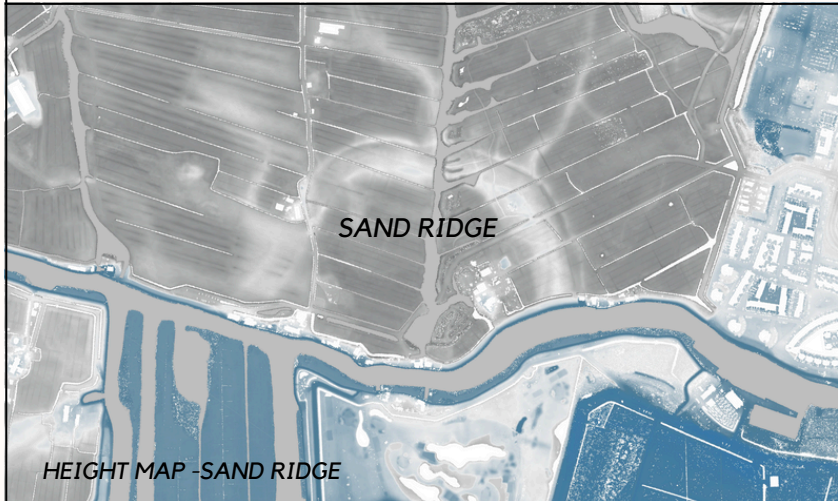
RISING WATER LEVELS

When a rainfall of 9mm per hour occurs, which happens once every 100 years, and in the future due to climate change maybe more common, the buildings will stay above water level and remain dry. Through various interventions this area is not only made habitable, but also suitable for other purposes.



MASTERPLAN

A sand ridge that was formed earlier due to water tides. We saw its opportunity to let this become as a starting point of our interventions because if the water level will rise inhabitants will keep dry feet. The intersection contains a lock so vessels can bridge the different polder levels. The design firm of ZUS that made the landscape design of Midden-Delfland, designed a new boezemsystem of the Zweth. We thought this is a huge operation to build new dikes because you need 11,000 trucks to build this. This is the reason why we introduced the lock. To enable transport between the two height levels of Vlaardingersvaart and De Zweth. There will be no need for trucks to build the new dikes along De Zweth that overrules the entire landscape. So it is more sustainable and has less negative impact to the surroundings.



DESIGN PROCESS



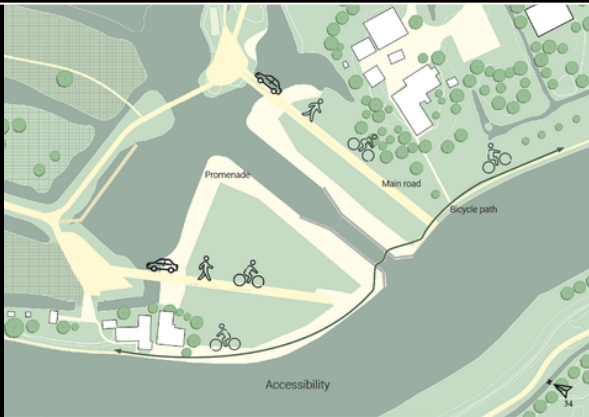
1. ORIGINAL SITUATION



2. LOCK



3. GRADUAL OVERFLOW DIKE LEVEL



4. ACCESSIBILITY



5. FARM TYPOLOGIES



6. APARTMENTS & DIKEHOUSES

MASTERPLAN TRANSSHIPMENT- POINT



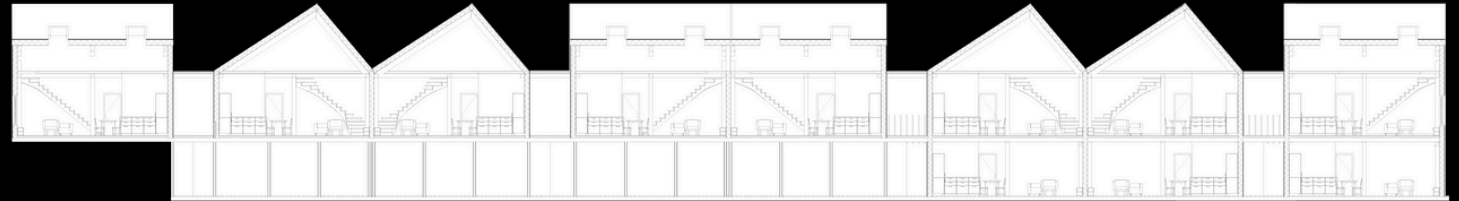
APARTMENTS



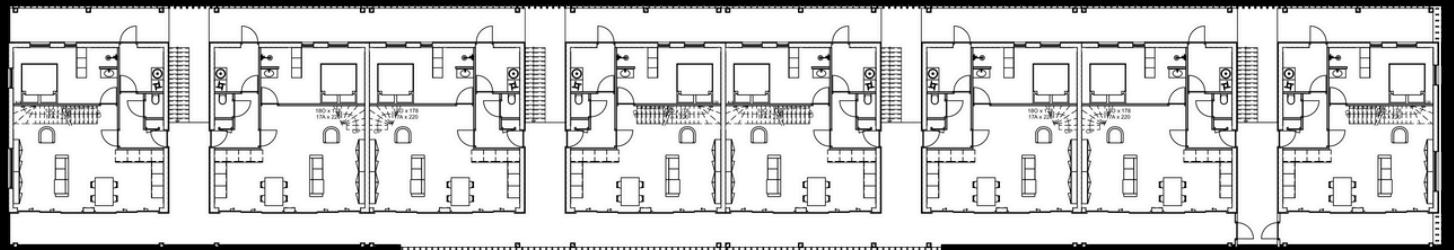
MASTERPLAN FIRST FLOOR



MASTERPLAN GROUND FLOOR

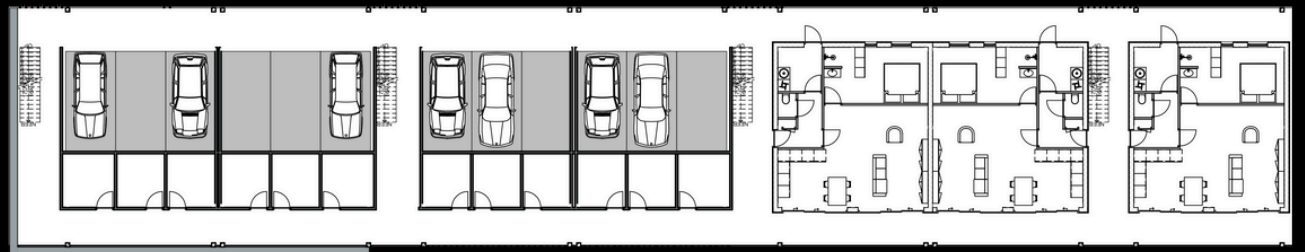


SECTION



FIRST FLOOR

WATERFRONT

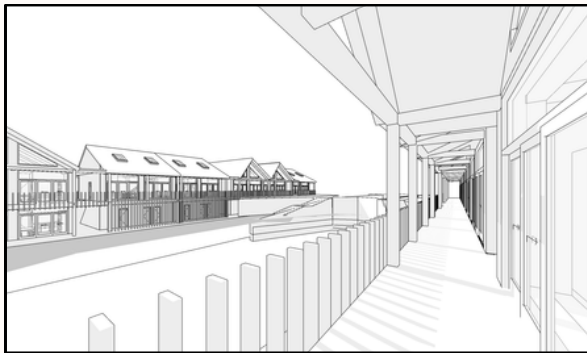


GROUND FLOOR

WATERFRONT



PROMENADE



BALCONY



STAIRWELL

The ground floor contains parking lots, storages and three apartments. These three apartments would be easily accessible for elderly. Staircases are located between the blocks. The stairwells separate blocks from each other's volumes. The repetition of the two different types of volumes creates more dynamics in the facade. Applying apartments creates a mixed environment with different residents. This creates a mixed community of different lifestyles.



INTERIOR

TRANS-SHIPMENT POINT

The harvest period will take place in winter in December and January. First, the reeds are harvested and transported to the docking locations. Once on shore, forklifts and tractors move materials to storages. In this harvest season, it will be busier in the area. In the summer the reed will be taken out of the sheds and transported to building locations. The storage barns have a capacity to store at least 40 hectares of wet harvest, the dark green area. There is also space for dry materials such as hay or flax of up to 20 hectares of land. The light green area.



LIVING & WORKING SETTLEMENT

In the busy harvest season weeks, there is a lot of activity on the streets. Doors are opened and storages will be filled with wet produced materials like reed and cattail. After these couple of weeks the materials has to dry out and the streets are very calm and clean. During summer the materials are dry and can be taken out of the storages and can be transhipped to construction sites. Reed for roof cladding and cattail for insulation for example.



HARVESTING SEASON WINTER

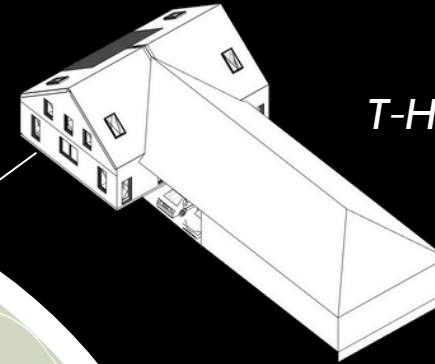


DRYING PERIOD

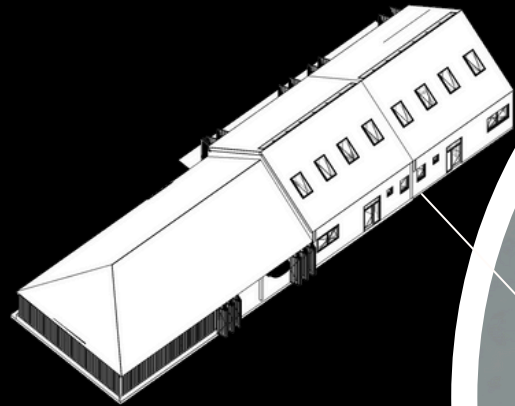


SUMMER: ROOFING SEASON

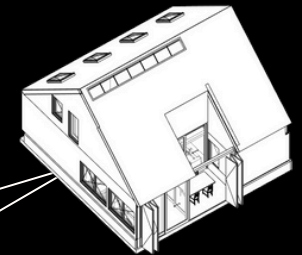
(SEMI)-DETACHED



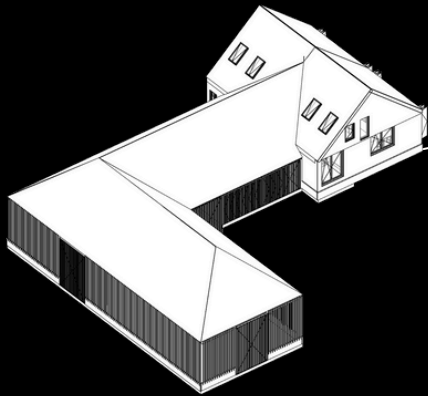
T-HOUSEFARM



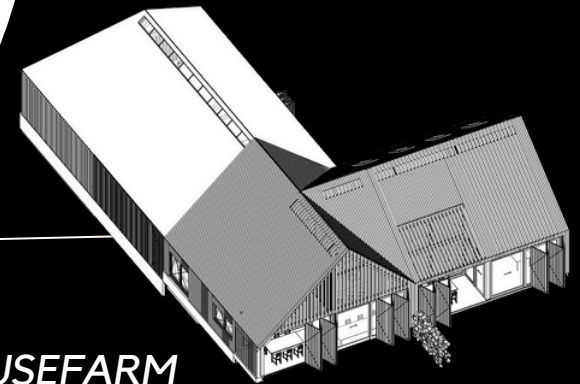
LONGHOUSEFARM



DIKEHOUSE



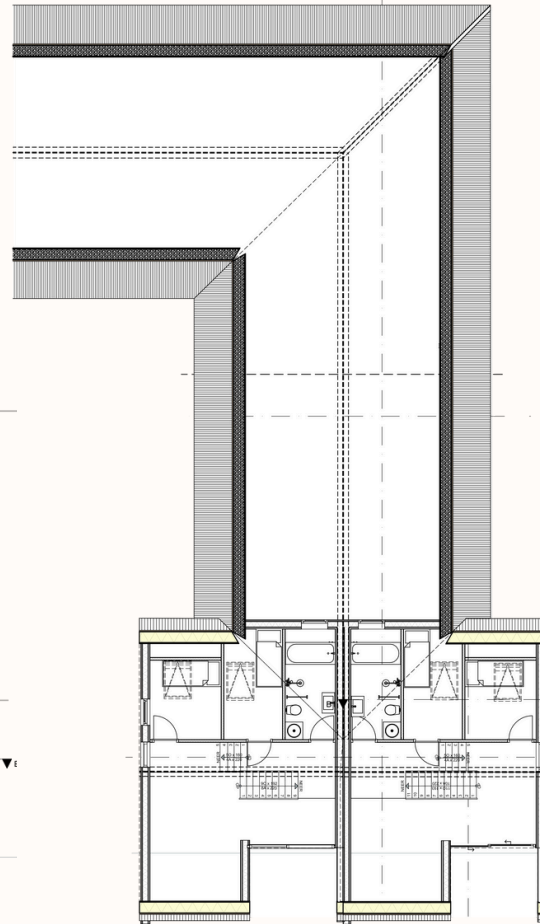
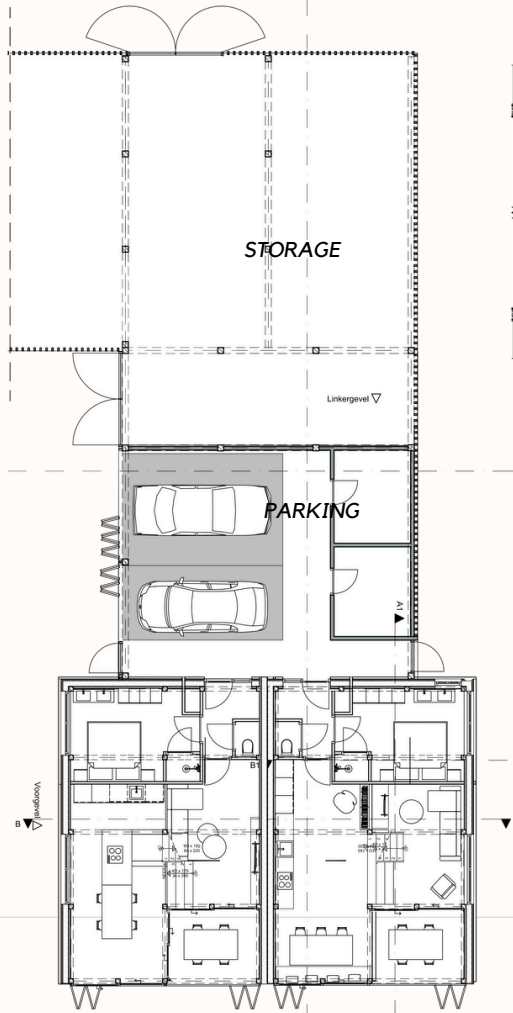
T-HOUSEFARM



KRUKHOUSEFARM

FLOORPLANS

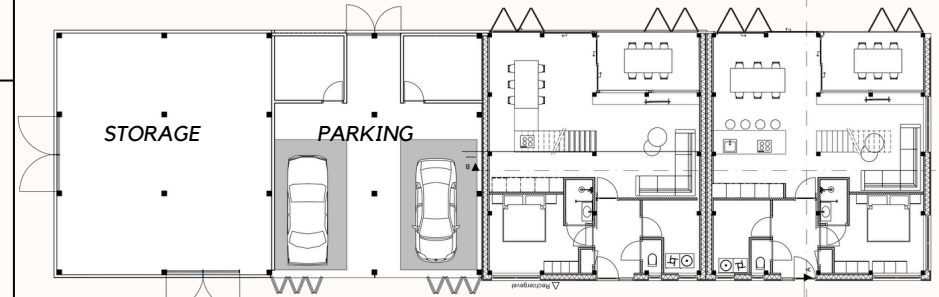
T-HOUSEFARM



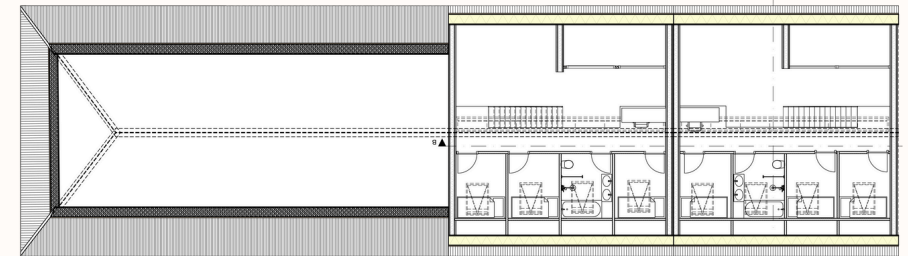
GROUND FLOOR

FIRST FLOOR

LONGHOUSEFARM

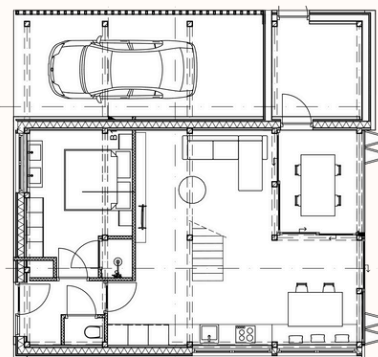


GROUND FLOOR

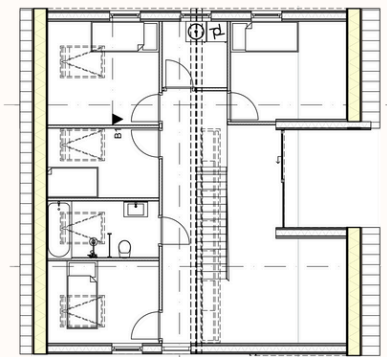


FIRST FLOOR

DIKEHOUSE



GROUND FLOOR



FIRST FLOOR

GROUNDLEVEL
KRUKHOUSEFARM

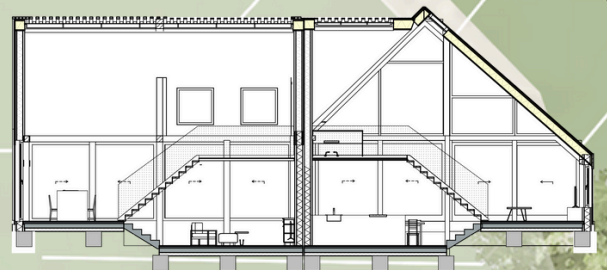


FIRST FLOOR KRUKHOUSEFARM

-2m

-1,5m

-1m

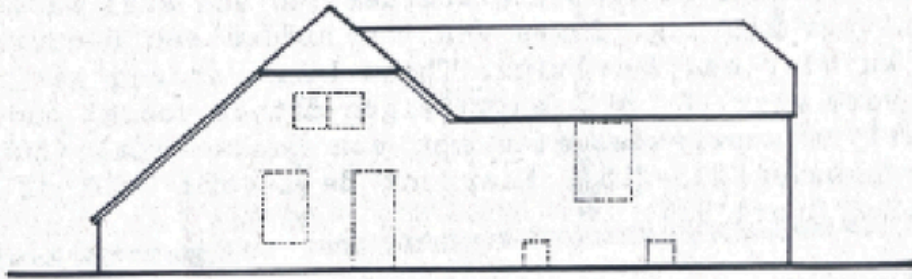


SECTION B

Because the buildings are designed on a hill, a splitlevel will bridge the height difference from entrance to backyard. This also links to the milk cellar with 'ópkamer' that creates a split level in the farmhouses of the surrounding area. All houses have a kitchen, laundry, living and bedroom on ground floor. A notch with a terrace provides a shelter in the garden from public street. The first floor can be accessed via a void the bedrooms with a bathroom



EXTERIOR

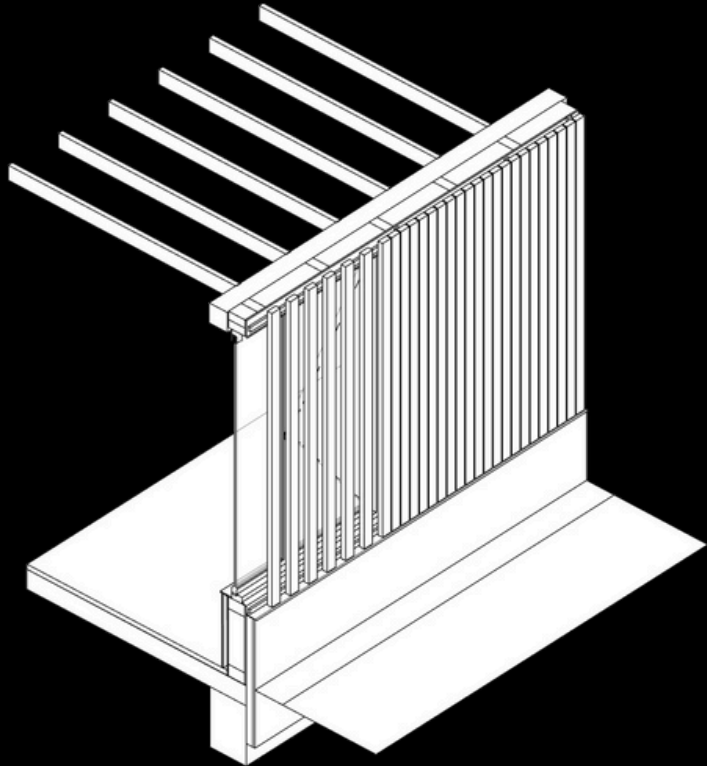


The buildings have recognizable characteristics of architecture from the area. Like different material of the roofing from the front and backhouse, gutter height difference, and the shape. This is a very common shape in Midden-Delfland. This is the krukhusefarm typology. You can see comparisons but it is applied in a contemporary way. With refinement in composition, detail, and smartly adapted to surroundings. Also known as critical regionalism.

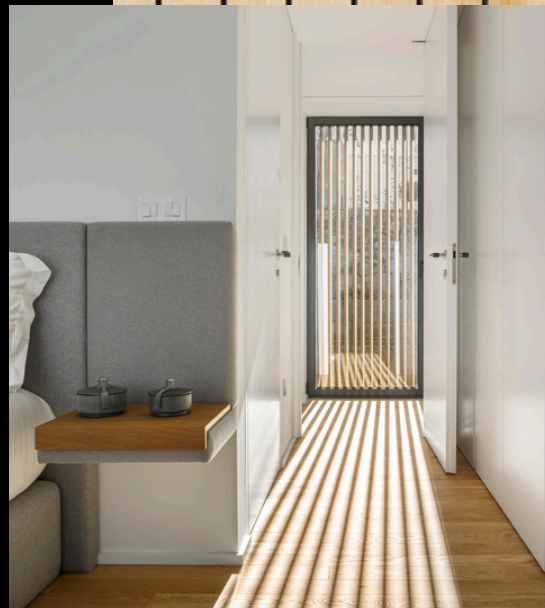




FACADE



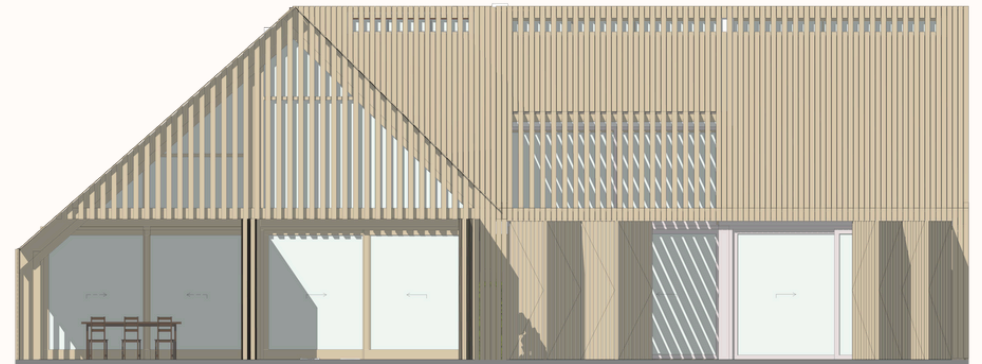
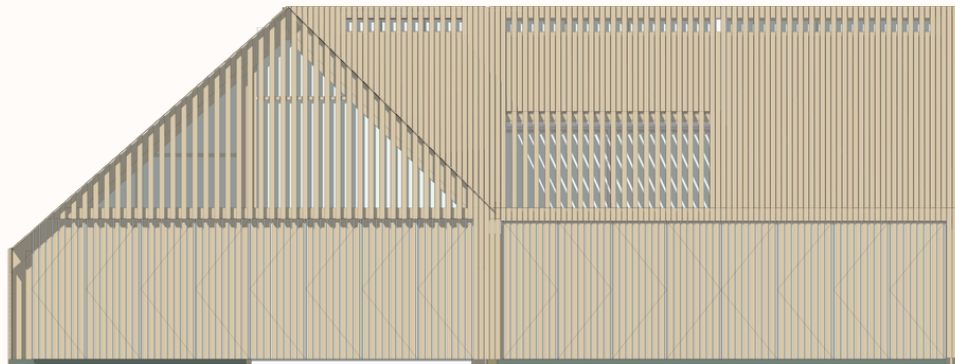
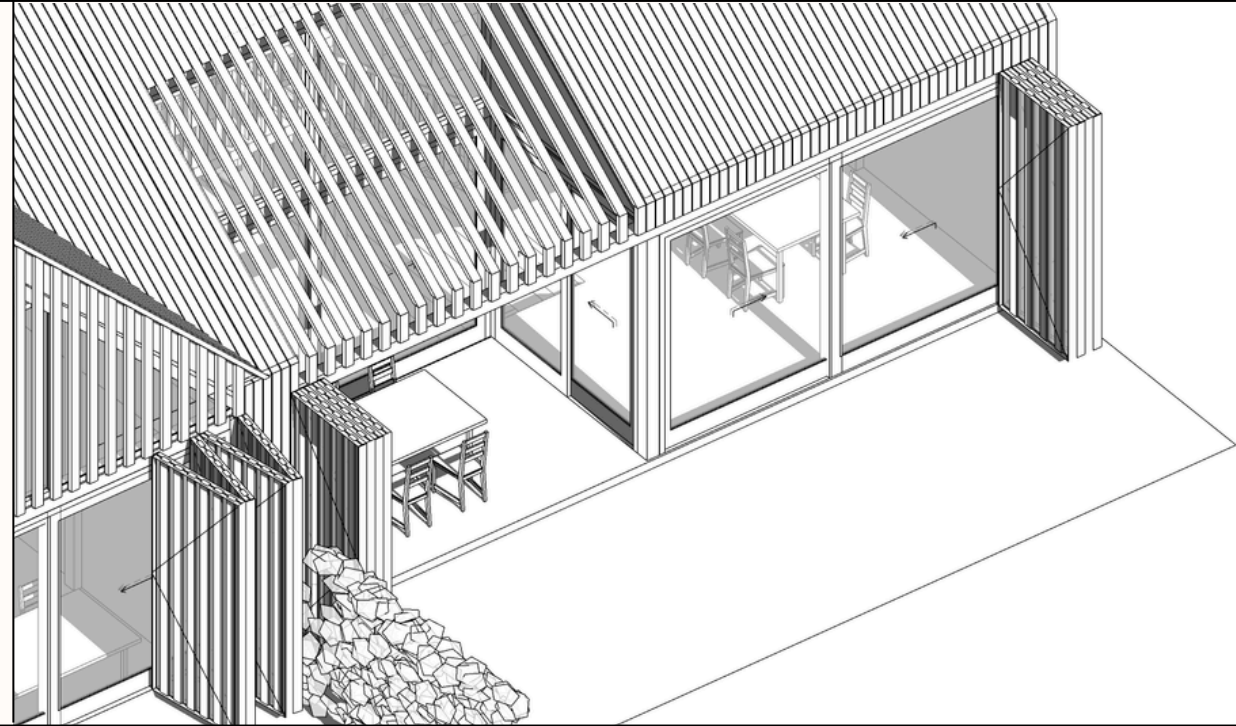
Wooden slats are used as cladding. Which ensures sunshading and privacy for private rooms. In addition, wooden cladding offers regulation of safety, accessibility, ventilation and weather resistance. By applying folding doors, residents have the choice to adapt the facade to desired situation.



1. PRIVACY
2. SAFETY
3. ACCESSIBILITY
4. VENTILATION
5. CLADDING
6. SUNSHADING
7. REGULATING

ADAPTABLE

The wooden slats continue from facade to the roof slats. In the south facade, the slats continue over the notch of the outdoor space for shading and creating a shadow pattern. Also, the slats are continuous in the folding shutters that can block out the sun in summer or separate the outdoor space. The facade is not only aesthetic. But it also offers residents choice in regulating accessibility, climate and privacy. Privacy is especially important during peak seasons of material transport around the homes.

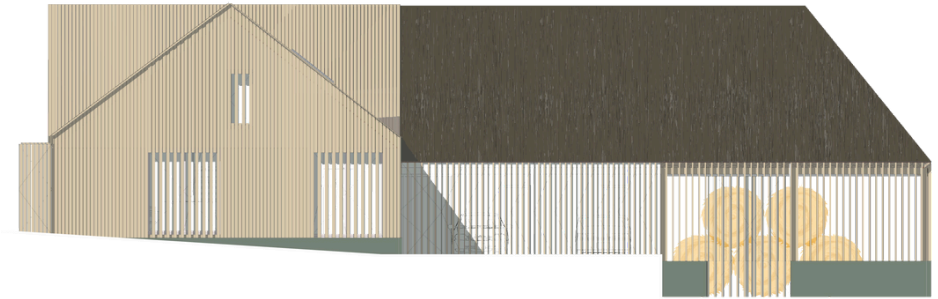


SOUTH FACADE

STORAGE

The storage with harvested materials in the sheds are visible through the slats. This gives the street definition of natural materials storage. And the awareness of economic dependence to the landscape. So from the street side the reed storage can be seen. Secondly this space must be naturally ventilated so the wet materials can easily dry.

The doors of the carport and storage sheds are in harmony with the rhythm of the facade. Through the wooden slats, the space behind the doors is visible from the street side. When you drive past you can gradually see through it. When opened, the space behind becomes even more visible.



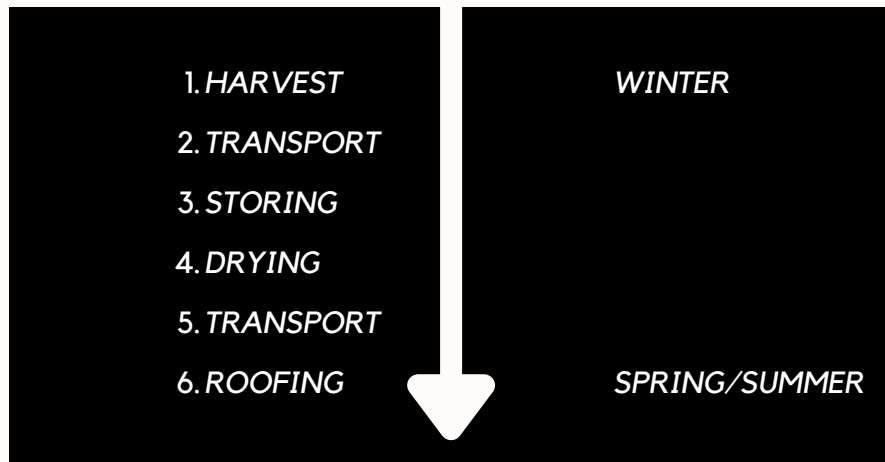
EAST FACADE

The storage of harvested materials is separated of the house through a carport. In the past, vehicles were also driving in and out between the front house and the barn behind to thresh grain.



DRYING PROCESS

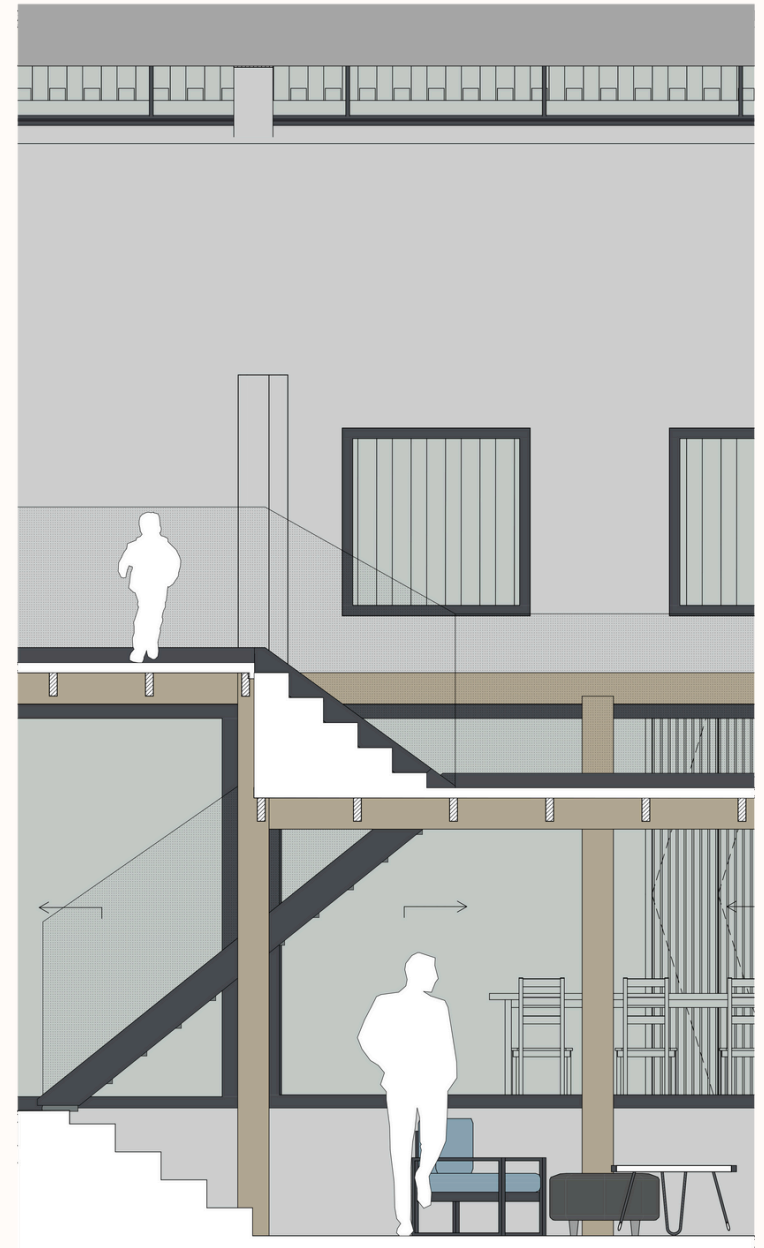
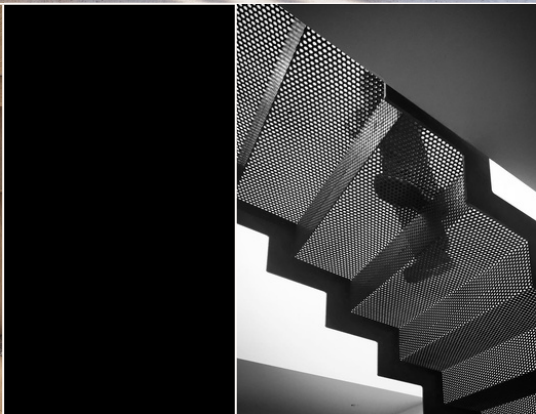
In the busy harvest season weeks, there is a lot of activity on the streets. Doors are opened and storages will be filled with wet produced materials like reed and cattail. After these couple of weeks the materials has to dry out and the streets are calm and clean. During summer the materials are dry and can be taken out of the storages and can be transshipped to construction sites. Reed for roof cladding and cattail for insulation for example.



INTERIOR



VANDERSALM ARCHITECTUUR
NIJENHUIS

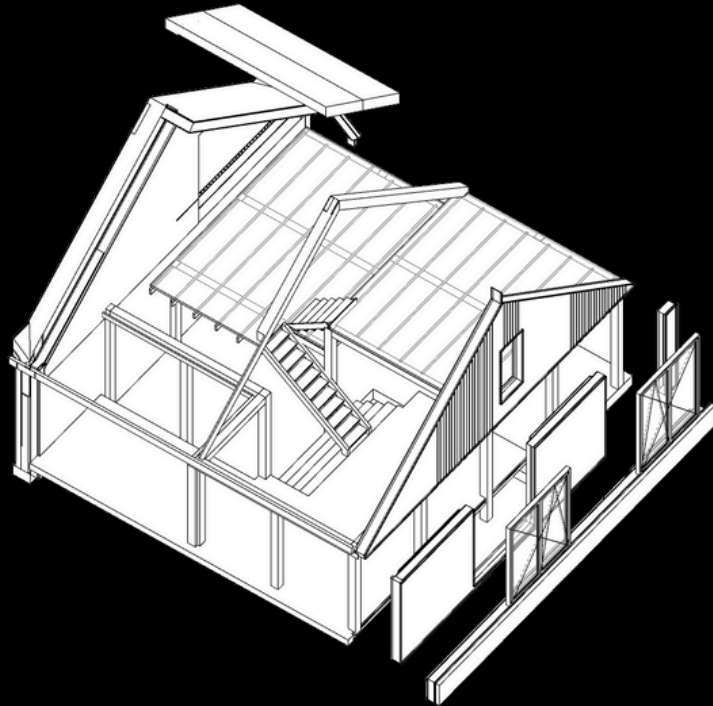


RURAL ATMOSPHERE

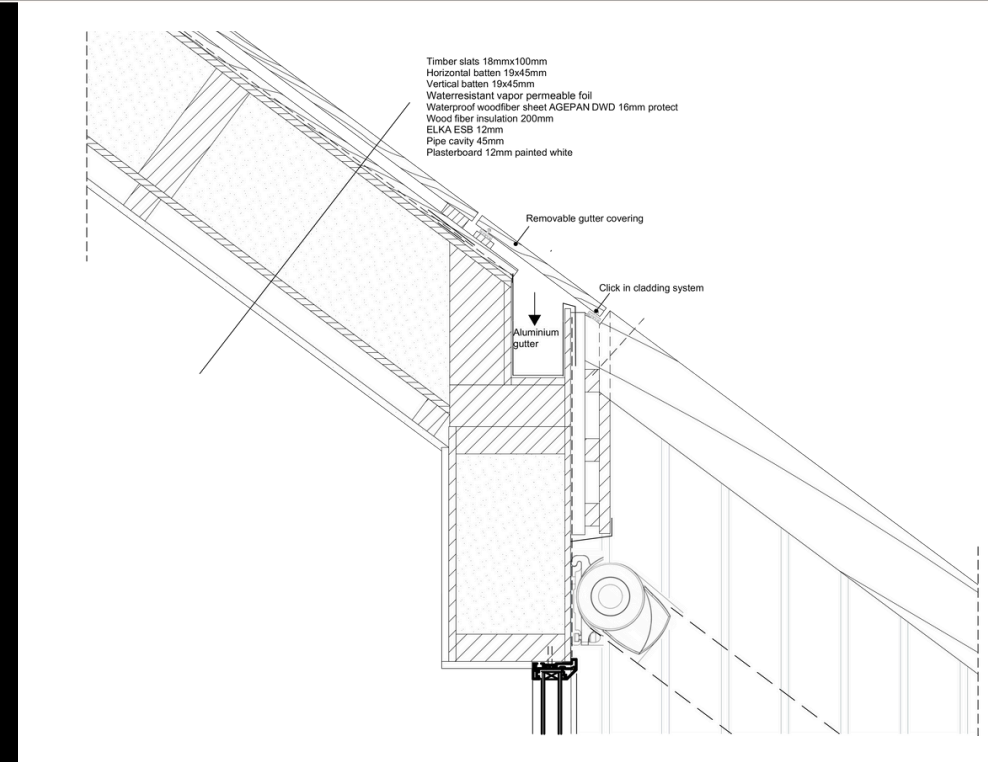
A void creates spaciousness with a sight line up to the ridge. The skylight in the roof and large windows provides daylight access. The wooden cladding that continues over the outdoor space and skylight, provides a rhythm of shade in the house. The wooden beam construction provides a rural experience from the inside. Because buildings are on a slope, the split level ensures the gardens accessibility. The staircase to upper floor is centered in the middle. Making the split level part of the circulation of the house. Perforated steel stairs will create transparency and creates contact with the first floor. It provides more light access in the living room from the large windows.



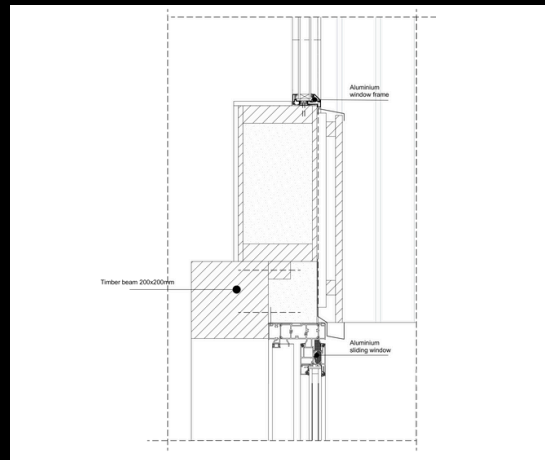
TECHNOLOGY



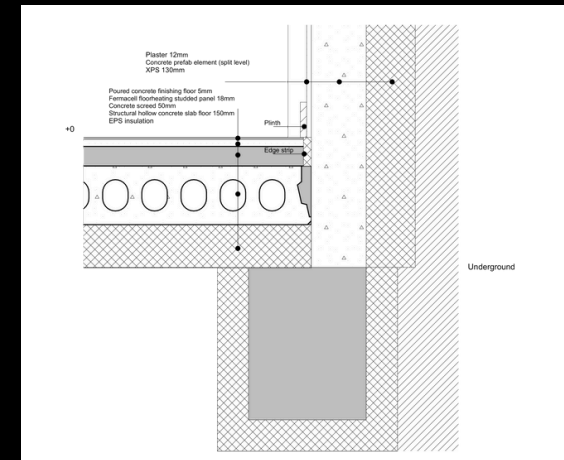
The house will be built with timber beam structure. Prefabricated elements will be placed against it that provides stability. Prefabricated construction provides a 90% reduction in material waste. Secondly you only have to transport it once to the construction site after which it can be applied quickly. And lastly it is demountable allowing for circular reuse.



GUTTER - WINDOW FRAME

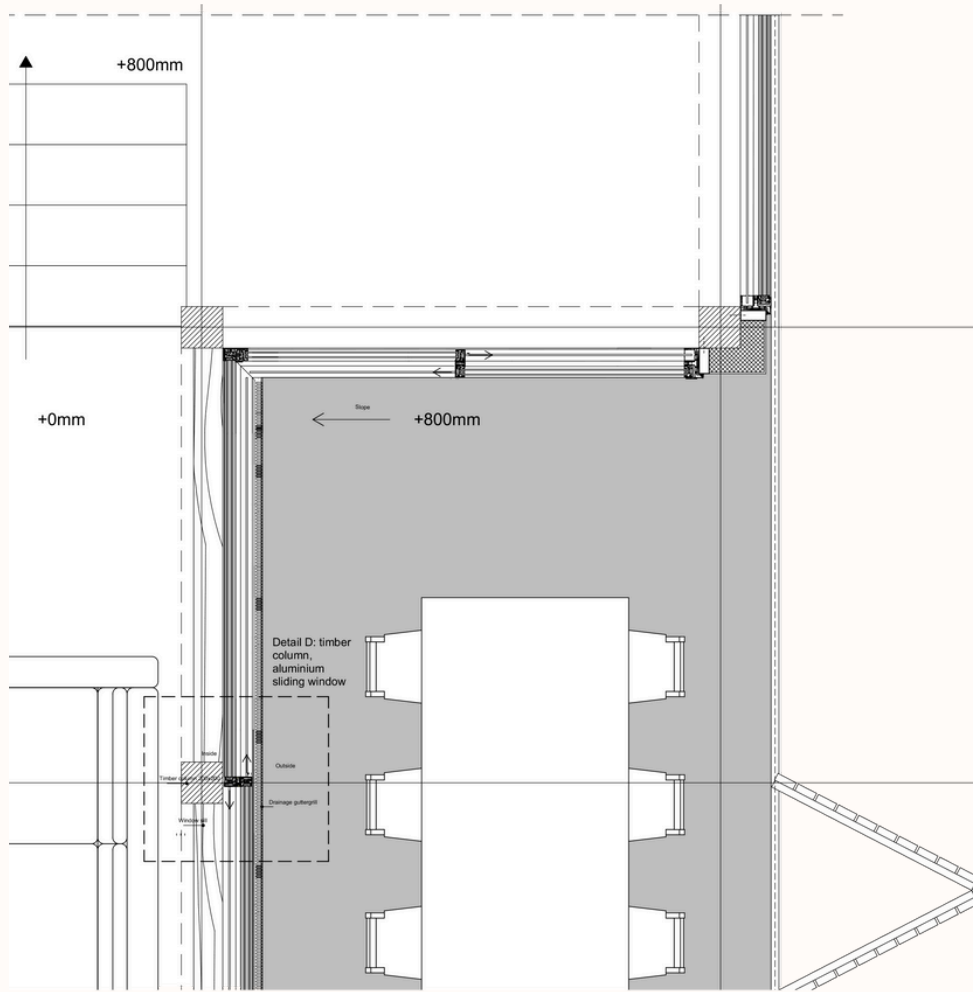


WINDOW FRAME - TIMBER BEAM



SKYLIGHT - RIDGE

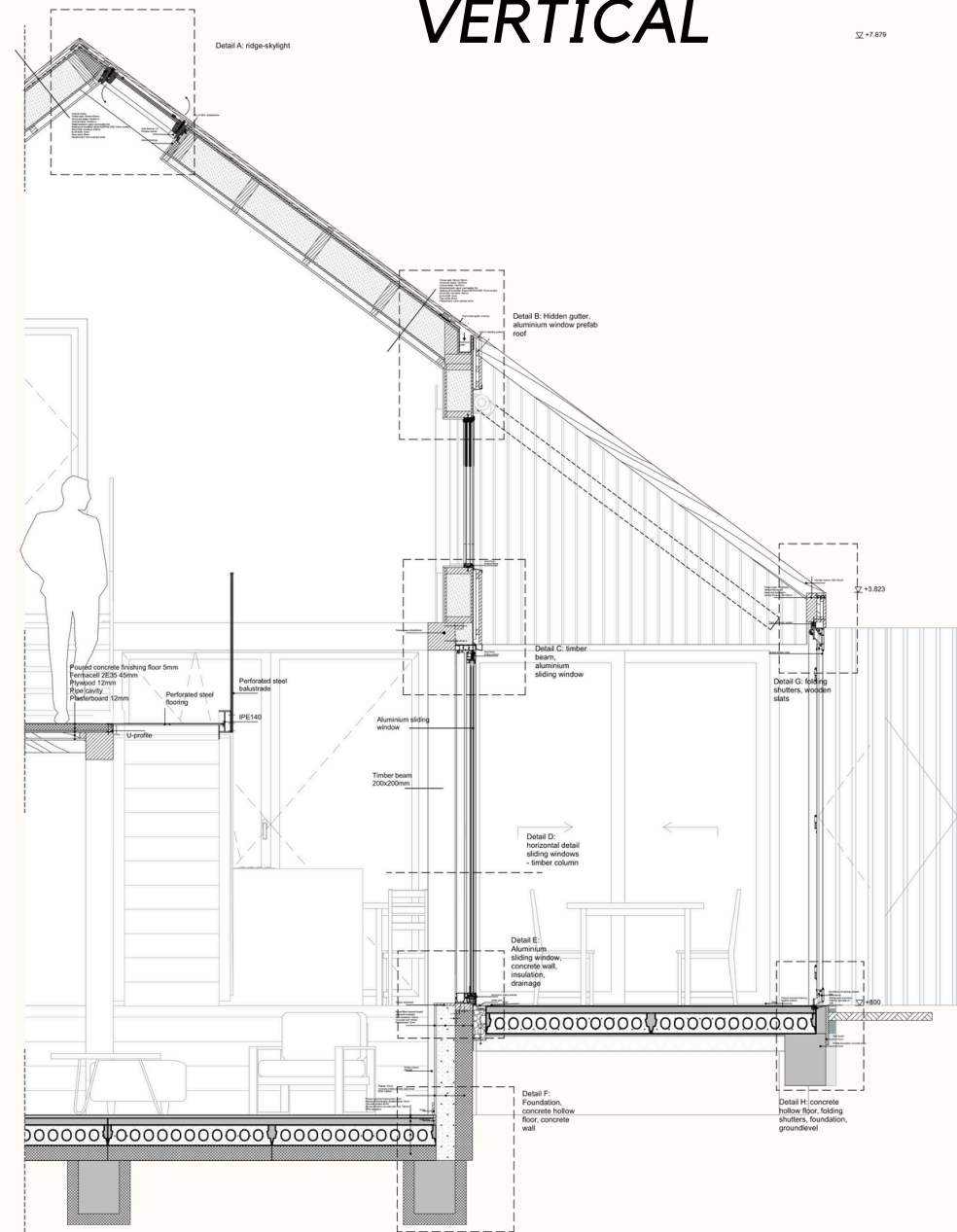
HORIZONTAL



The outdoor space is accessible through aluminum sliding doors. These can be opened for connection of inside with outside but also for night cooling. A flow of air is created up to the skylight in the ridge allowing natural cooling at night in summer. The wooden slats of the folding doors continue through the slats over the terrace, over the gutter and over the skylight. The slats above the gutter and roof light can be removed through a click system for cleaning and maintenance.

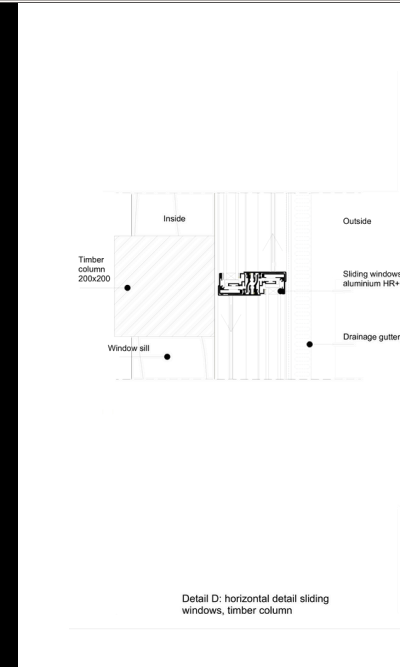
VERTICAL

Σ +7.870

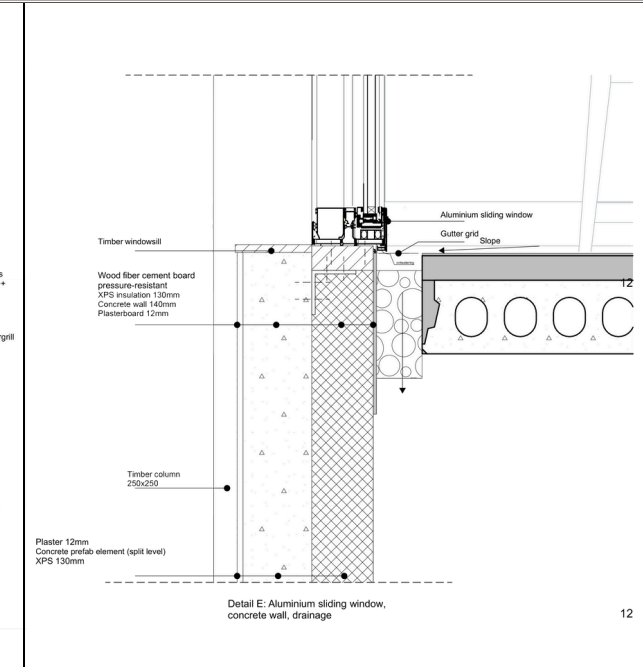


CLIMATE ADAPTATION

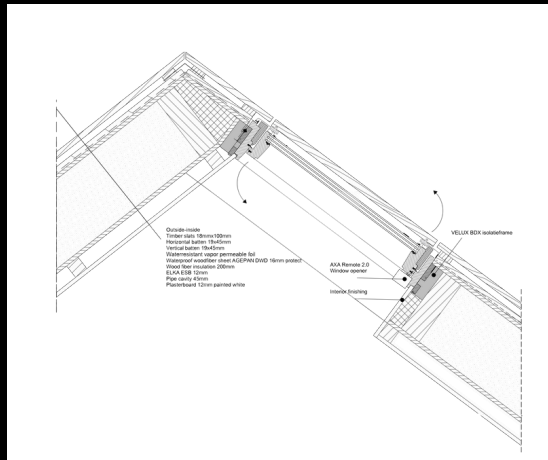
As mentioned earlier, residents can customise the facade as they wish. For example, they can open and close the aluminium sliding doors, folding shutters and skylight. All these movable elements are designed with details.



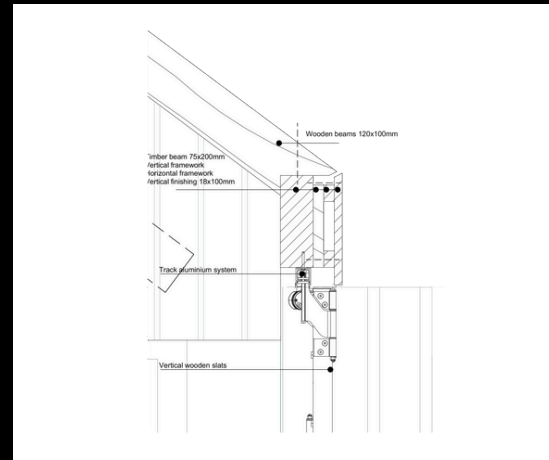
SLIDING WINDOW



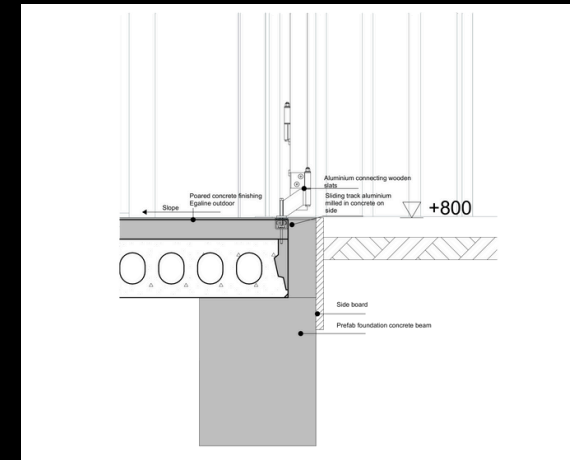
WINDOW SILL - DRAINAGE



SKYLIGHT - RIDGE



FOLDING SHUTTER TOP

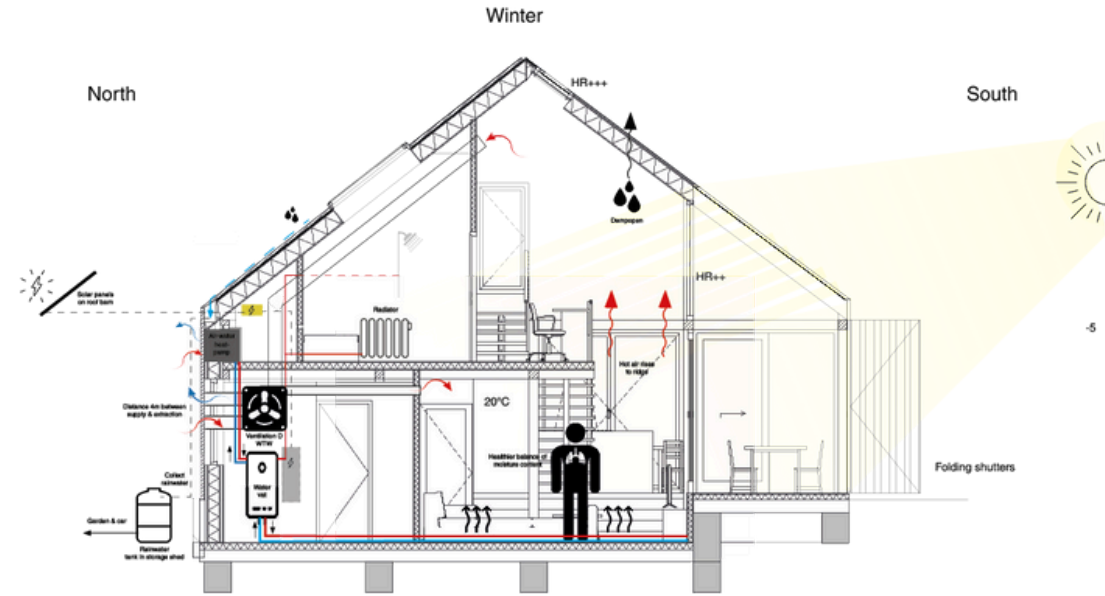
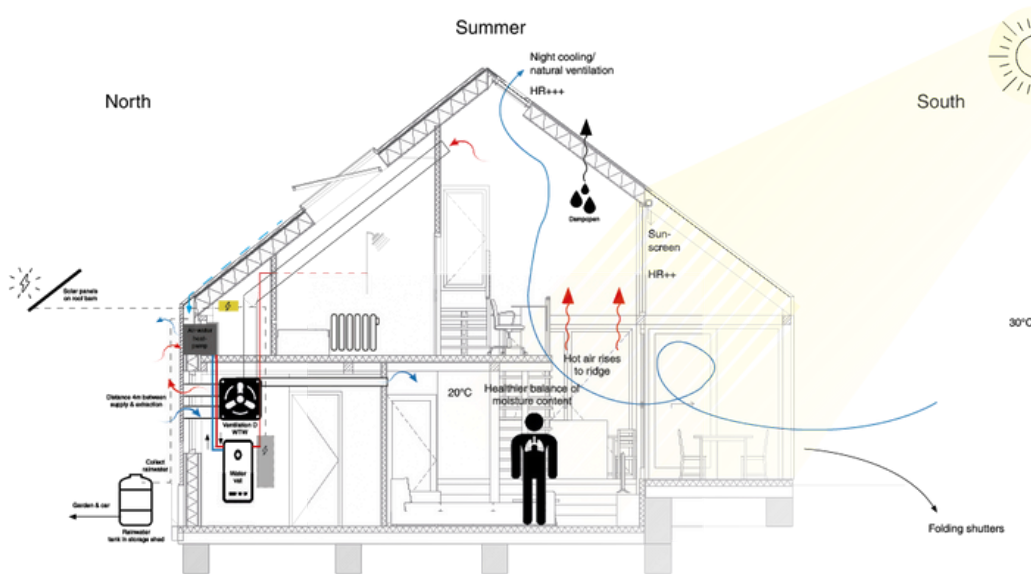


FOLDING SHUTTER BOTTOM

SECTION

During the summer there is night cooling through the folding doors, through the sliding doors to the skylight. Closing the folding doors and leaving the windows open in summer ensures safety. Besides that there is a ventilation type D with mechanical supply and exhaust with a heat recovery unit. Due to night cooling and smart shading of the slats and sunshade, the building is energy-neutral according to BENG requirements.

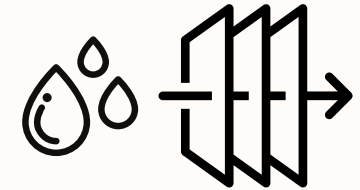
SUMMER



WINTER



ENERGYNEUTRAL



VAPOR PERMEABLE
STRUCTURE

In winter, an air-water heat pump is the source of heat. Floor heating on the ground floor creates a comfortable indoor climate. The warm air rises and is exhausted in the ridge, after which the heat is extracted from the air transferred to new fresh air and blown back into the living spaces, as a result, no heat is lost through ventilation. Folding shutters allow daylight to enter optimally, creating thermal heat during winter.



GRADUATION PROJECT
NIELS DE RIJKE

VLIETPOORT

TU DELFT

MSC ARCHITECTURE, URBANISM
AND BUILDING SCIENCES

ECOLOGIES OF INCLUSION

2023-2024

