BRACKET

Where Past Meets Present

Lara Jaeger | SS24

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UNIVERSITÄT LIECHTENSTEIN

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Upend

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01 Abstract

Approach and methodology: Innovation isn‘t necessarily born from entirely new constructions; rather, it emerges from the transformation of existing structures, which can yield fresh attributes such as distinctiveness, depth, and intricacy. Embracing methodologies like maintenance, repair, reuse, and repurposing in design enhances architectural character and, as we argue, reintroduces architectural relevance within society. In this view, buildings evolve into repositories housing both material and cultural wealth, serving as reservoirs of knowledge and memories throughout their lifespan. Our process begins with what already exists, eschewing the blank canvas. By tapping into existing materials, building stocks, and exemplary references, we identify and explore material resources and typologies. Central to our design methodology is the creative fusion of existing structures, inventories, and new typologies. Our aim is to craft concise architectural works that serve as restored or newly amalgamated and inhabited storehouses of building elements, characterized by tectonic clarity and rich atmospheric presence.

Studio Upcycling tries to build on these points and strives to minimize the waste of resources by developing solutions for reuse, redesign and adaptive reuse. This semester, an old knitted house with adjoining stable building, which is located in Kapfstrasse in Eschen, is being treated. With the help of an existing material catalog and as-built plans, the design planning will focus on using as few new resources as possible and as many as necessary. The following question is to be answered for the development of the subsequent design project for an upcycling project for a vacant building:

> “How can the vacancy of a building be avoided through the upcycling of a timber-frame residential building and an adjacent barn in Eschen, to prevent demolition on one hand, and to create an innovative housing concept that adds value for the residents and minimizes the use of new resources on the other?“

Over the course of the semester, the project was viewed from different perspectives and continuously refined and improved through the application of various development techniques such as sketching, analyzing, planning and modeling. The result is a multi-generational building that adapts to earlier forms of living and is characterized by circularity. The design of „Bracket“ along with its associated illustrations, plans, and models, underwent development and editing as a collaborative effort with Nina Gragl. The project is also characterized by contrasts, but finds a common denominator in an extension. The design unites two large families with several generations and is characterized by a clear spatial structure.

02
Introduction

fig. 01: residential building

Repurposing and recycling efforts, along with zero-waste campaigns, repair movements, and the embrace of second-hand goods, are now integral components of a growing movement toward sustainable resource and building management. Yet, an examination of our architectural heritage in the Alpine region reveals that these principles are not new; rather, they have simply fallen into obscurity. Throughout history, necessity and scarcity have consistently driven sustainability practices, prompting improvisation and fostering creativity.

> „Refurbishment: Modernizing or overhauling a building and bringing it up to current acceptable functional conditions. It is usually restricted to major improvements primarily of a non-structural nature to commercial or public buildings. However, some refurbishment schemes may involve an extension“ (Wong, 2016, p. 22).

In the summer semester 2024, the Advanced Studio Upcycling „UPEND: Upcycling, Upscaling, Upvaluing“ under the direction of Dipl. Arch. SIA Csaba Tarsoly and Prof. Dr. Daniel Stockhammer, dealt primarily with the topic of upcycling, reuse and zero-waste initiatives. The focus here is primarily on the reuse of existing materials from an older residential building with adjoining barn in Eschen. The reason for this is, on the one hand, to promote resource-conserving use and prevent the demolition of the building, but also to minimize emissions and material consumption in the construction industry.

The building analyzed for this purpose is located at Kapfstrasse 2 in Eschen, a municipality in Liechtenstein. This semester focuses on the conversion of a historic single-family house and a barn in Eschen, FL, into a multi-party house The design process is divided into an analysis phase, the actual design process and the development of the final project. The „Bracket“ design, as well as the associated illustrations, plans and models, were developed and edited in a team together with Nina Gragl.

During the analysis phase, you gain an understanding of the dimensions of the building and its past. Objects and inventory serve as the foundation for material and planning considerations in preserving and repurposing these resources. Selected exemplary models are used to explore various contemporary living styles. Design focuses on creatively blending existing and new typologies. The studio aims to create concise architectural works that serve as restored or newly assembled and inhabited storehouses of building elements, characterized by clear tectonics and rich atmospheric presence. During the seminar week on Alpine Architecture, three historic buildings are being extensively examined. The following research question arises during the analysis phase:

> “How can the vacancy of a building be avoided through the upcycling of a timber-frame residential building and an adjacent barn in Eschen, to prevent demolition on one hand, and to create an innovative housing concept that adds value for the residents and minimizes the use of new resources on the other?“

As the design process progresses, the concept of multi-generational living in Eschen is constantly being adapted. The design was developed with the help of various models ranging from a scale of 1:250 to a scale of 1:33 and finally 1:20. In addition, a new material catalog is being developed to illustrate the variety of Reuse elements. The result is the final design of a multi-generational home, which is characterized by circularity and visual axes. Finally, an atmospheric image will be generated to emphasize the different floor levels and visual references.

2.1 Upcycling and circularity

Upcycling

In recent times, upcycling has gained prominence in architecture, particularly in the revitalization of unused and vacant buildings through redesign. However, this process is often challenging, as fulfilling every wish of the building owner may not be feasible, and renovation is typically associated with higher costs. Consequently, many still choose demolition to have complete freedom in planning a new structure. Here, reuse becomes crucial. Through careful dismantling and detailed material analysis, previously utilized resources are repurposed in constructing a new building. This reimagining can take various forms, and reuse may not always be immediately apparent. Yet, materials can also be intentionally integrated to preserve their signs of use, thereby conveying their charm and history (Stockhammer, 2021).

Upcycling, a term derived from „up" meaning „upward" and „to recycle," describes the practice of reusing and upgrading used building components or materials by transforming them into a higher-quality or higher-value category. In contrast, „downcycling" refers to reusing in a lower-quality or lower-functioning capacity. Coined by Reiner Pilz in an interview with Thornton Kay, the term „Upcycling" criticizes the conventional notion of „Recycling," which often involves the destruction of materials and should thus be termed „Downcycling." Pilz advocated for „Upcycling," wherein old products gain value rather than lose it. Furthermore, the utilization of reuse and repurposing as a design principle in architecture is a significant aspect of Upcycling (Stockhammer, 2021).

Circularity

We live in a time of constant change. The traditional construction and real estate industry consume the most natural resources of our planet and generate large amounts of waste. Not only are finite resources depleted, but the production and transportation of building materials also result in significant greenhouse gas emissions. An average new construction project emits more greenhouse gases during the construction phase than during its 60-year operational lifespan. There is now increasing recycling of building materials during demolition or renovation projects, but it is far from sufficient and often entails significant loss of value. Circular building means closing loops. It adds a value-preservation loop to the current value-destruction loop of the present system, fundamentally changing the entire system (Circular building, n.d.).

Insight: Ownership entails responsibility. When we buy something today, we unwittingly take on a responsibility we cannot fulfill. We acquire not only what we think we are buying but also various things we do not perceive. For example, when the laptop on which this book is written stops working, we only have one option: to take it to a recycling center, hoping it will be properly „disposed" of. But even in this word lies the problem. The device is full of valuable materials that we should be ensuring are preserved. However, we as individual users are completely overwhelmed with responsible handling. We cannot take care of all the materials processed in this laptop, let alone ensure their reuse. Worse yet, we usually do not even know which raw materials or materials are in the laptop, let alone their properties. We are unable to assume long-term responsibility. Even if we suspect that there are some non-compostable materials hidden inside the devices. Even if we suspect that some are too valuable for incineration at the landfill. Even if we suspect that some are highly toxic or dangerous to flora, fauna, humanity, or the climate upon contact. Ownership entails obligations, as stated in the German Basic Law. But we do not fulfill this obligation because we cannot. We suspect it. We know it. But we do not want to admit it. Because we are overwhelmed (Rau & Oberhuber, 2021).

> „Today, a new kind of deconstruction is happening in architec ture, a literal deconstruction in which a large proportion of the materials used are designed to be demountable and reused in the future... As with so many products today, from shoes to phones, designers have been so preoccupied with the realization of the object that they have neglected the millennia-old unders tanding that a product's deconstruction is inevitable in the considerably near future. In fact, thinking about undoing as well as doing, that is, thinking in time as well as in space, is a key component to a sustainable and circular future" (O'Donnell & Pranger, 2020, p. 193).

Circularity involves reducing, reusing, repurposing, and regulating. Eco-efficiency aims to reduce toxic waste, resource consumption, and product size, but these measures alone do not solve the problems of resource depletion and environmental destruction; they merely delay them. While reducing hazardous emissions in industrial waste is an eco-efficient goal, even small amounts can have long-term impacts on biological systems. Fine particles from combustion processes can be harmful to health. Waste incineration, landfilling, and recycling each have their own problems, such as the release of dioxins and toxins. Even sludge from conventional sewage treatment plants can contain harmful substances. Recycling, especially downcycling, often results in quality loss and additional environmental pollution. Materials are often treated with harmful chemicals for recycling. Eco-efficiency alone is not sufficient as it does not address the fundamental design problem.Laws and regulations may force companies to reduce emissions, but they do not necessarily lead to a comprehensive solution (Braungart & McDonough, 2014).

Eco-efficiency is a good concept but not sufficient for long-term success as it does not address the fundamental design problems. Instead, it could lead to the industry continuing harmful practices if it relies solely on eco-efficient measures (Braungart & McDonough, 2014).

> "On the way towards a circular economy, recycled and recyclable buildings postpone or ideally prevent the entry of their respective materials into landfills and by and large alleviate the constant consumption of raw materials associated with the building industry. As in the original „3 Rs," one further key certainly is to use less, to reuse what we use, and to remember that recycling (even when circular) should be the last alter-native. Circular construction technologies and designs will help in this perspective" (O'Donnell & Pranger, 2020, p. 202).

fig. 02: exterior detail Kapfstaße 2

2.2 Context and site

Liechtenstein is geographically located in the center of the European Alpine arc between Switzerland and Austria. With an area of just 160 km², it is the fourth smallest state in Europe. The national border stretches 41 km to the west and south along the Swiss cantons of St. Gallen and Graubünden. To the north and east, Liechtenstein shares a 37 km border with the Austrian state of Vorarlberg. In comparison, its western neighbor, Switzerland, is around 260 times larger than Liechtenstein (Liechtenstein national administration, 2018).

The Principality of Liechtenstein has a rich cultural landscape with important archaeological and architectural monuments. The research, care and preservation of this cultural heritage is enshrined in law and international law. Archaeological investigations here date back to the 19th century, and the first law on the protection of monuments was passed as early as 1944. Since then, scientific findings on sites and historical buildings have been published and made accessible to the public. The merger of state archaeology and monument preservation in 1998 reinforced the commitment to the preservation of cultural assets and the communication of the latest research findings. Modern investigation and documentation techniques are essential for the research of monuments and archaeological objects. The Monument Preservation and Archaeology Department makes an important contribution to Liechtenstein's cultural identity by researching, appreciating and preserving traces of the past (Frommelt & Stehrenberger, 2010).

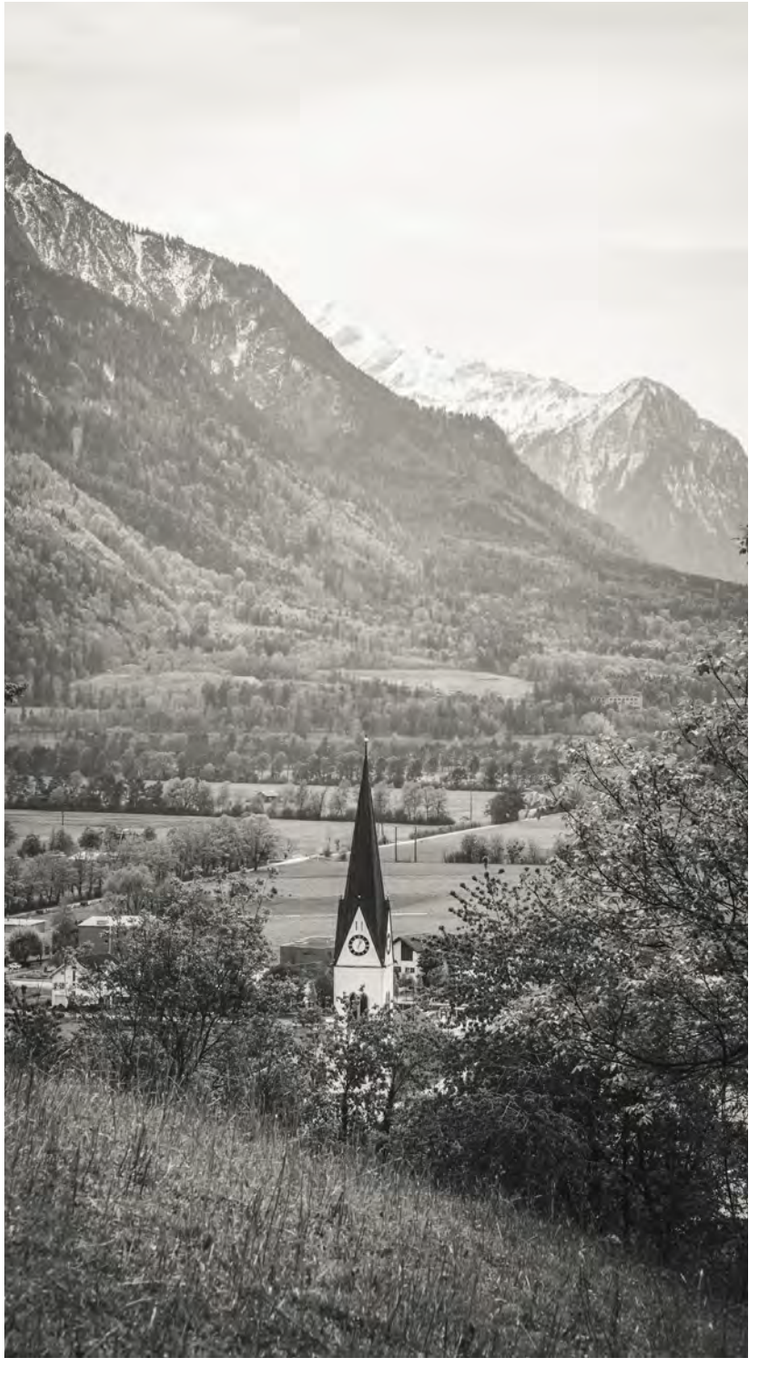


fig. 03: St. Martin church in Eschen

2.3 Regional architecture

The development of house types in the Principality of Liechtenstein

The names of houses such as Liechtensteiner Haus, Walser Haus, Rheintaler Haus, Montafoner Haus and Appenzeller Haus go beyond their mere geographical origin. They also provide insights into building typological affiliations and developments. For example, Poeschel described the Liechtensteiner Haus as a wooden building in „Kreuzstrick“ on a brick base, which is typical of the Rhine Valley. These designations provide information about the uniform room layout inside the buildings, while at the same time there are differences in the construction methods between the Oberland and the Unterland (Albertin, 2000).

Although the Walser buildings on Triesenberg follow the pattern of internal room layout, they separate the stable and barn from the dwelling house, in contrast to the preferred structural unity of the Liechtenstein houses. Manorial courtyards such as the Meierhof near Triesen or the Gamander near Schaan represent a unique form in rural architecture, forming a closed square and consisting of a main house, farm buildings and enclosure walls (Albertin, 2000).

It becomes clear that houses are not just simple buildings, but are also testimonies to history. They reflect the social, economic and societal environment of their builders and inhabitants. The documentation and research of historical buildings by the provincial government and municipalities provides insights into the building culture of Liechtenstein and neighboring regions beyond their mere geographical origin.One interesting example is the oldest house in Eschen, the so-called Allgäu House, which has a contrasting architectural style with its steep roof and architecture and is therefore unique in the region (Albertin, 2000).

Another example of a building about 10 minutes away from Kapfstrasse 2 with a similar design is the farmstead in St. Luzi-Strasse in Eschen. The farmstead, which is located at St. Luzi-Straße 8 in Eschen, is situated in Eschen‘s front village near the village center with the church of St. Martin and its archaeologically proven predecessor buildings as well as other traces of settlement dating back to Roman times. It forms the northern end of a short, strongly staggered row of houses along the old main road to Bendern (Frommelt & Stehrenberger, 2010).

The farmstead consists of a single-family dwelling from 1871, a stable barn from 1849 and an intermediate wing from 1873 with a passageway. While the dwelling house stands directly on the roadside, the stable barn is set back by a carriage length. The history of the property dates back to 1810, when it was mentioned as „a house and stable“ belonging to Sebastian Hasler (1756-1812). The new buildings were erected by Jakob Meier, who acquired the property in 1856. The dwelling corresponds to the three-room house type with a kitchen, parlor and adjoining room on the first floor and an anteroom and two chambers on the upper floor. The structure of the building has largely been preserved true to the original. The stable barn was built in 1849 with a cattle shed, threshing floor and barn room, with characteristic elements in the façade decoration (Frommelt & Stehrenberger, 2010).

An intermediate wing, which has connected the residential building with the farmhouse since 1873, provides a passageway to the street on the first floor and houses the barn room on the upper floor. The building and room structures of the farmstead as well as its interior fittings have been preserved largely true to the original from the respective construction period (Frommelt & Stehrenberger, 2010).

Architectural characteristics in Liechtenstein

Buildings can be typologized in various ways, for example according to their spatial structures, building structures and architectural design features. The arrangement of rooms and their allocation of functions reflect different regional developments and vary greatly depending on time and place. There is also a purpose limitation of spatial planning that distinguishes between residential buildings for different agricultural or representative purposes (Albertin, 2000).

The architectural design of buildings is influenced by many factors, including spatial planning, the choice of building materials, the purpose of the construction and the economic situation of the builders. The development and availability of building materials such as window glass also play an important role. Fashion trends and aesthetic preferences also shape architectural design and change over time (Albertin, 2000).

Compared to neighboring regions, spatial planning in the Principality of Liechtenstein was relatively linear and traditional, influenced by the economic and political conditions of the time and the country‘s geographical location as a buffer zone between different cultures and claims to power. The layout of the rooms in the dwellings is often linked to the development of the hearth, while in the economic part the respective economic system plays a decisive role. The study of building structures shows that the three main construction methods - masonry, post and beam and knitted construction - were frequently used, although a certain development can be seen over time. Roofs and architectural design elements such as windows and façade cladding also characterize the appearance of buildings and are subject to various historical developments and fashion trends (Albertin, 2000).

There is interpretable evidence of dwellings in this country from around 1380, initially only sparsely and increasingly from the late 15th century. These buildings are all two-storey and usually have a partial basement. In contrast, temporary residential buildings are single-storey and have no cellars. It seems that in the late Middle Ages and early modern period, post-and-beam buildings were the most widespread and dominant construction technique (Albertin, 2000).

The architecture and appearance of buildings are significantly influenced by their roof shapes. In Liechtenstein, the saddle roof is the most common. The flat pitch of these roofs of 18 to 28 degrees indicates that they were originally covered with stone-weighted board shingles and are considered typical of the late Middle Ages and early modern period. From the 18th century onwards, tiled roofs were increasingly used, with older roof trusses being aligned more steeply to accommodate the tiled roofing. From around 1830, some gabled roofs show frontal hipped roofs similar to Biedermeier and hipped roofs. Roof trusses were generally upright structures with roof beams. It was only towards the end of the 18th century and in the 19th century that horizontal roof trusses with rafters were also used, particularly in conjunction with tiled roofing. In most house types, the roof ridge is predominantly at right angles to the kitchen axis. In a small number of buildings, however, the roof ridge runs parallel to the kitchen axis (Albertin, 2000).

In addition, in the 15th and 16th centuries, window openings were often small and glassless, typically between 20x20 cm and 30x50 cm. In Triesen, there is even a house from 1420 with a tiny perforated window measuring just 7x15 cm. At the beginning of the 15th century, bull's-eye panes were initially used on parlor windows, and in order to improve the incidence of light, three to six such bull's-eye windows were joined together to form row windows. Even in the 17th century, chamber lucides often remained small and without glass (Albertin, 2000).

fig. 04: interior detail - tiled stove in the house part

03
Analysis

fig. 05: existing stable

3.1 Eschen

The emergence and development of a municipality in Liechtenstein

The community development in Liechtenstein is exemplified by the village of Eschen, the largest political municipality in the Lower Country of Liechtenstein with 4,249 residents as of 2011, spread over 10.33 square kilometers. Situated at an elevation of 453 meters, Eschen lies on the southern slope of the Eschnerberg. In the southeastern part of the village lies the hamlet of Nendeln (at 455 meters), separated by the slightly lower-lying area called Riet, through which the Esche stream flows. The eastern part of Nendeln features steep wooded areas, comprising about 20% of the municipal territory. Furthermore, 53% of Eschen lies in the valley plain, 20% on the hillsides of Eschnerberg, and 7% on the slopes of Nendeln. Adjacent to the northeast lies the hamlet of Auf Berg (Schindler, 2011).

In the southwest, Eschen has an exclave comprising meadows and farmland, surrounded by the municipal territories of Gamprin, Vaduz, and Schaan. To the north, Eschen shares its border with Schellenberg, to the west with Gamprin, and to the southwest, the Swiss municipalities of Buchs and Sennwald border the Liechtenstein municipality. Mauren lies to the northeast, while the eastern border reaches the Austrian town of Frastanz, and to the south lie Planken and Schaan (Schindler, 2011).

Through the development of new residential areas in the 20th century, Eschen evolved from a clustered settlement with clearly defined neighborhoods into a dispersed settlement with a tendency towards densification in the center. The old neighborhoods of Schönabüel, Rofaberg, Mösma, Aspa, Auf Berg, and Nendeln hold historical significance within the municipality. Since medieval times, the area around the parish church has served as a kind of center, housing the school since the 19th century and, since 1968, the municipal administration along with the community hall and the post office. Eschen has had various names over the years, evolving from Essane (in 842/43) to Estanes (1045), Eschans (1178), Escam (1208), Escans (1236), Eschan (1246), to its current name, Eschen (1422). The name's origin lies in the Celtic word for water, closely associated with the name of the Esche stream. Additionally, the Nendeln district lay on the ancient Roman road from Bregenz to Milan (in medieval times, the imperial road from Lindau to Milan), a crucial north-south connection between Italy and Germany (Schindler, 2011).

These days, a major transit route cuts through the municipality of Eschen, connecting the Swiss A13 highway with the Austrian A14. Since 1872, the ÖBB railway line (Feldkirch – Schaan – Buchs) has also run through Eschen, making a stop at Nendeln station. Until 1808, Eschen served as the judicial center for the Schellenberg lordship and the lower region, thus being considered the hub of the Lower Country.
The drilling in Eschner Riet in 1990 (Jodameder) provided insights into the climatic and vegetative evolution of the habitat since around 7000 BC. Grain pollen dating back to 4000 BC suggests agriculture, with intensive farming during the Iron Age. Bronze Age settlements emerged in the Malanser area, and late Bronze Age hill settlements appeared in the Alpine Rhine Valley. Around 15 BC, the area was integrated into the Roman Empire, with a Roman estate in Nendeln (Schindler, 2011).

Medieval history shows the transition from the Hunfridings to the Udalrichings, and eventually to the Counts of Montfort. From 1258 onwards, the Montfort, Werdenberg-Sargans, and Werdenberg-Heiligenberg lines shared rights over the Eschnerberg. In the 15th century, Wolfhart Freiherr von Brandis consolidated the lordship rights, and the term „Herrschaft Schellenberg" became common. The modern era brought political changes, including the transfer of rights to the Counts of Sulz, Hohenems, and ultimately to the Princes of Liechtenstein. The introduction of the Landammann constitution in the 15th century led to self-administrative rights and the communalization of jurisdiction. The 19th century saw industrial developments, including the founding of ThyssenKrupp Presta AG. In the 20th century, Eschen transitioned from an agrarian society to an industrial hub (Schindler, 2011).

The municipality of Eschen gained political autonomy in 1808 and underwent various phases, including the formation of citizen cooperatives in 2002. Agriculture played a central role in the 19th century, followed by an industrial boom in the 20th century. Today, Eschen is a significant hub for financial services and industry in Liechtenstein. The architectural history of Eschen is reflected in the preservation and renovation of churches, rectories, and other historical buildings. The municipality exhibits modern development with well-established infrastructure, a diverse economic sector, and cultural activities (Schindler, 2011).

3.2 Kapfstraße 2

The existing property, owned by Alfred Peter Hoop Liechtenstein, is located at Kapfstrasse 2 in Eschen. It comprises a residential building in the knitted style and a half-timbered stable building. The rural property is located at the intersection of Dr. Josef Hoop-Straße and Kapfstraße, on a meadow hilltop on the southern slope of the Eschnerberg at an altitude of 520 meters above sea level. The history of this area dates back to the 14th century, when farmsteads and orchards are documented. The original residential building with plot number 671, which was built in 1619, no longer exists today. The ensemble at Kapfstraße 2 consists of a residential building, an adjoining farm building to the south-east, a more recent extension made of brickwork with a pitched roof on the north-west side and a separate stable barn. The two-storey residential building facing Kapfstrasse is divided in structure and appearance and has one and a half storeys above a brick first floor. Access is via a two-storey porch on the gable end, which is semi-open on the first floor and designed as a covered balcony on the upper floor. The decorative wooden elements include pillar shapes with profile cuts, decorative sawn board parapets and the door leaf of the entrance, which is kept in a simple Art Deco style (Hopp, n.d.).

Land register extract

According to the land register excerpt, the plot of land with the number 662 in the municipality of Eschen belongs to Hoop Peter Alfred, born on 12.05.1950, and is located at Dr. Josef Hoop-Straße 38 in Eschen. The property, known as Mösma and shown on plan number 8, covers an area of 2,107 square meters. It consists of a garden, arable land, meadows and pastures as well as an access road for buildings. The last mutation took place on 04.09.2015 under mutation number 941 and document number 909/503. The acquisition title dates from 17.02.1977 and took place by inheritance (document 476/045). There are no annotations or reservations for this property, but any rights of succession can be viewed in the mortgages. There are no easements or encumbrances as noted in the land register (Municipal administration Eschen, n.d.).

fig. 06: photo of the 1:250 model

3.3 Building characteristics

The building that the Upcycling Design Studio is working on this semester is located in Eschen, Liechtenstein, specifically at Kapfstraße 2 on a slope. To reach the building from the roundabout at the entrance to Eschen, near the highway, you would take Eschener Straße, turn left onto Haldengasse, followed by a right turn onto Eichenstraße. Then, you would turn right again onto Schönbühl and proceed up the slope until reaching Kapfstraße. The building is situated on the right side of the street (Inventory, 2023).

From the street view, you first notice a small attached shed made of brick masonry, followed by the main house with a base of brick masonry, white plaster, and a wooden structure on top. The facade is adorned with small rounded wooden shingles in a greenish-blue-gray color. A notable feature is the prominent loggia with four columns and intricately carved heads, located in front of the entrance. The loggia extends over two floors, providing a small balcony for the residential house. Adjacent to the main house on the left side is a stable building constructed of lightweight wood, with a facade made of wooden boards (Inventory, 2023).

At the back of the residential house, there is a cellar accessible through a rear entrance, constructed of natural stone with rough stone walls and a natural floor. From the cellar, a staircase leads upstairs to a corridor. From the main entrance on the street side, the staircase is on the right side. In addition to the staircase, there is an entrance to an annex containing a toilet, a room with a small fireplace, and a boiler. Turning left from the entrance leads to the kitchen and dining area, while going straight leads to a living room. Continuing straight ahead from the entrance leads to a second living room. The two living rooms are connected by a door. To the right of the centrally located main living room is the bathroom, which also features an old wood-burning stove for heating. An old spiral staircase leads upstairs to a balcony. Continuing straight ahead from the corridor leads to a bedroom. Turning left from the street side leads to a room with a fireplace and another bedroom, with access to the attic (Inventory, 2023).

In the barn, towards the residential house, there is a wooden structural wall in good condition. The main room is open up to the ceiling to accommodate machinery. Towards the left side, the floor of the stable area slopes slightly downwards with a mezzanine level inserted. The lower area of the barn was likely used for housing cows or pigs, while the upper floor presumably served for storing straw and hay (Inventory, 2023).

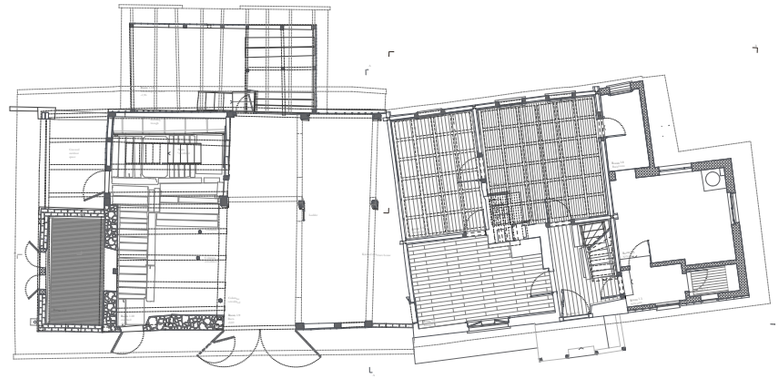
Analysis of floor plans, sections, and views indicates that the oldest part of the building, colored dark red, dates back to around 1793. According to building researcher Ulrike Gollnick, this red section was relocated to the current site on Kapfstraße in 1861. The same applies to the pink-colored section. The dark blue section likely dates back to 1821 and was altered when the main residential house was moved in 1861. The light blue section, mainly comprising the barn roof, is believed to date to 1862. The dark green section of the barn was most likely added in 1898. The gray annex was added around 1919, identifiable as the unpainted masonry section to the right of the building entrance. Finally, the orange extension at the rear end, enlarging the barn, was added around 1950 (Inventory, 2023).

fig. 07: 1.33 model section stock

3.4 Inventory and materials

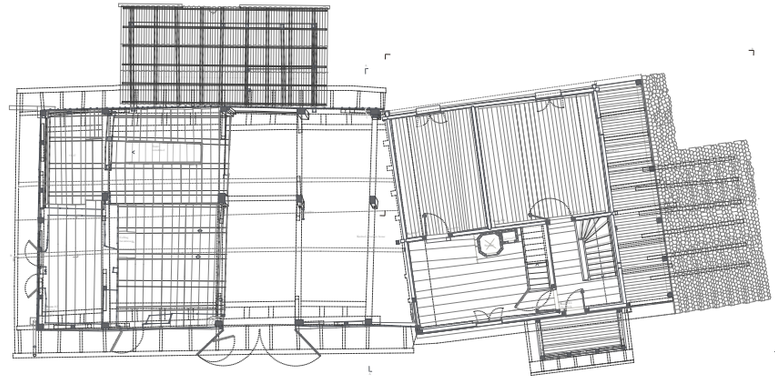
An existing material catalog was used so that the design project could be linked to it later. The residential house features a timber-framed construction, while the adjacent stable building is crafted in traditional half-timbered style. The as-built plans were used to create a 1:33 model, which is divided into five parts.

fig. 08 & 09: photo 1.33 model compiled and existing floor plans



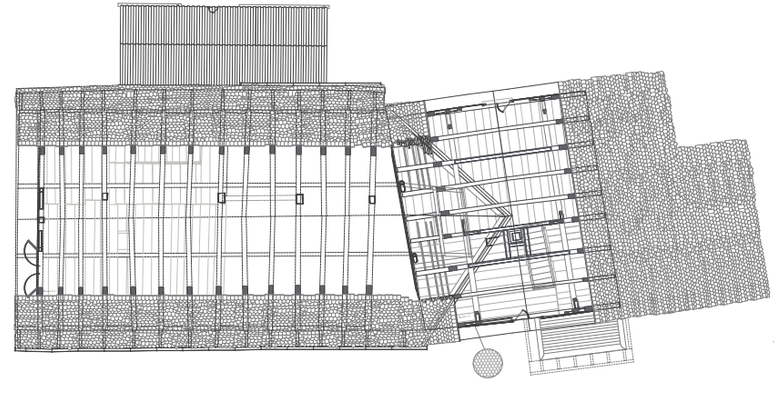
Kamaelan Mustafa and Franz-Felix Jorn
Carmen Garcia and Pepe Rodriguez

Barn-farmhouse floorplan 1:33



Kamaelan Mustafa and Franz-Felix Jorn
Winkelmann Valerie and Reinprecht Leon

Barn-farmhouse First floorplan 1:33



Tan Tugba and Uncal Kasler

Attic floorplan 1:33

fig. 10: atmospheric picture of the 1:33 model

3.5 Procedural planning

In addition to understanding the property and appreciating its historical substance, it is of great importance that the restoration of historical buildings is handled professionally. The special features and requirements of listed buildings require careful planning and coordination between all parties involved in order to preserve the quality of the building. This requires guidelines that provide a step-by-step guide from the analysis to the approval of the construction project. This guideline serves as an orientation for all parties involved in the construction, including the client, architect and monument conservator. It is advisable for clients and architects to contact the relevant heritage and building authorities at an early stage to ensure optimal preparation and coordination. A face-to-face meeting on site allows those involved to present their ideas and requirements and at the same time discuss the monument conservation aspects. The involvement of the building authorities is also important as it is part of the approval process. A rough timetable for the various steps should be established, allowing sufficient time for unforeseen challenges during the conversion (Office for culture Liechtenstein, 2023).

A comprehensive inventory that takes into account the history and context of the monument forms the basis for dealing with the property. All relevant information is researched and collected and then analyzed. Investigating the settlement and construction history is crucial to gaining a comprehensive understanding of the building. Various archives are consulted, from municipal archives to image archives, in order to gather relevant information. In addition, information can be found in the holdings of the federal government and the townscape inventories of the municipalities (Office for culture Liechtenstein, 2023).

The basics include detailed drawings and plans of the existing building and the planned measures compatible with the monument. The concept must be agreed again with the heritage office and the planning application submitted to the relevant authority. It is possible to apply for financial support from provincial or monument preservation departments for the restoration of a protected object, whereby the application procedure must be submitted to the monument authority before construction begins (Office for culture Liechtenstein, 2023).

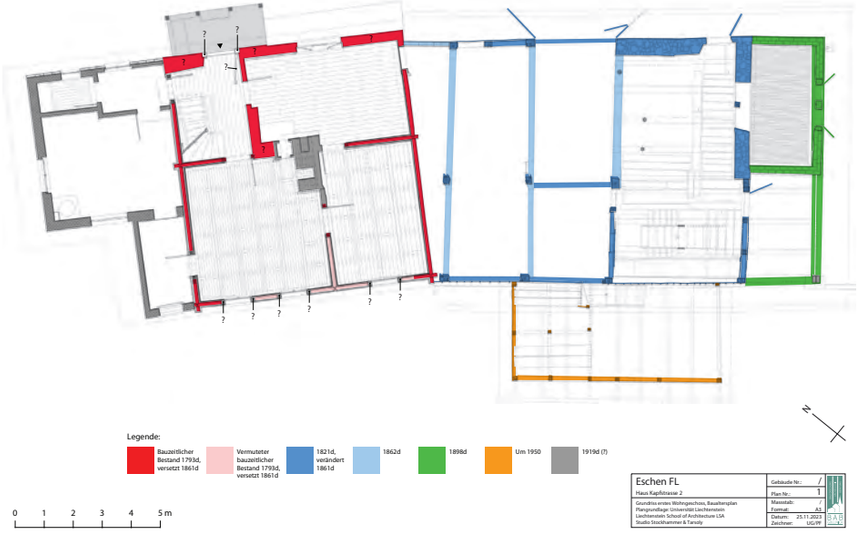


fig. 11: building age plan

04
Process

fig. 12: existing staircase

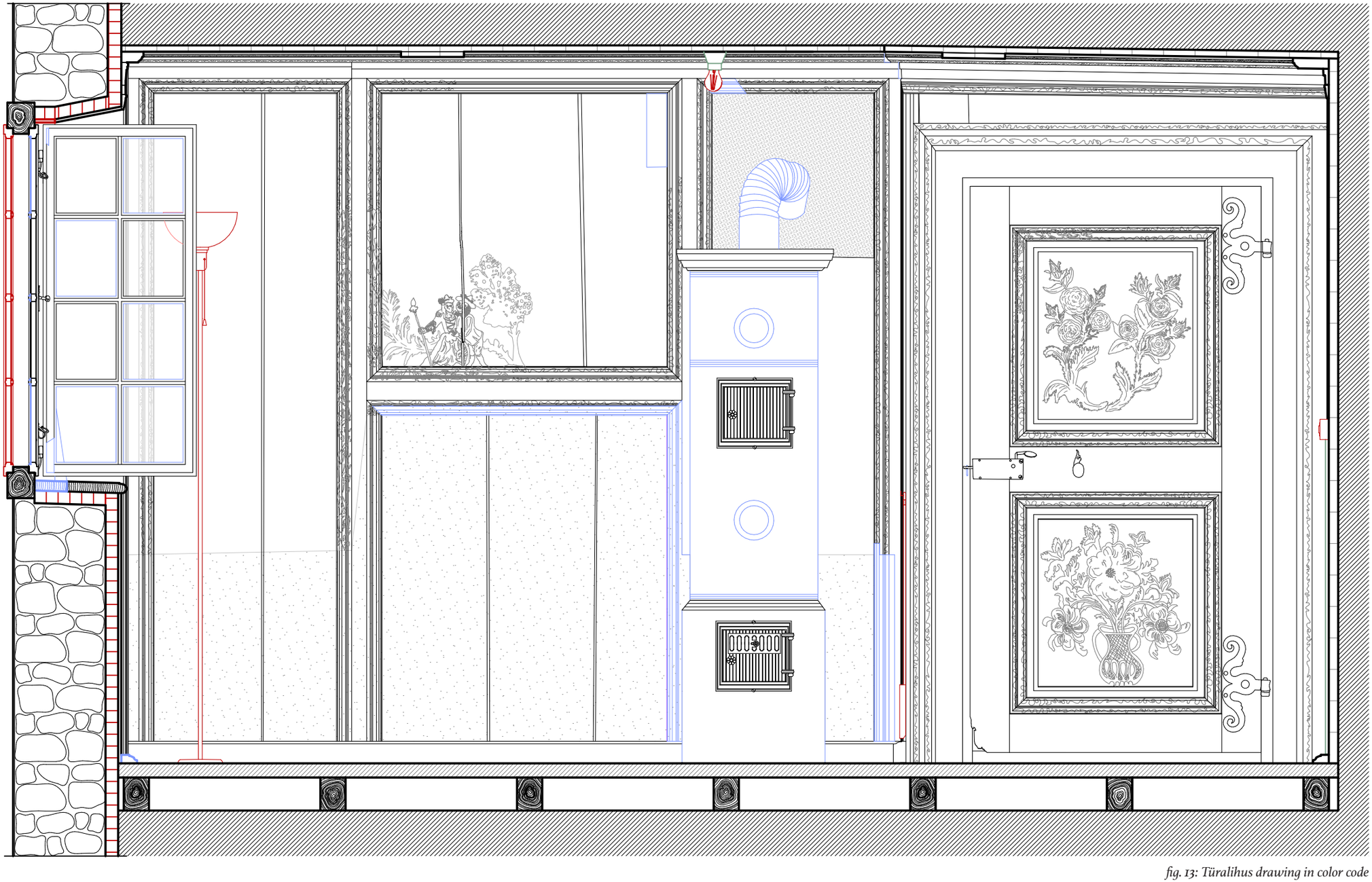


fig. 13: Türalihus drawing in color code

4.1 Case studies

During the seminar week, insights were provided into three renovated houses that were carefully managed to preserve the existing structures.

Türalihus, Valendas Graubünden

The baroque townhouse with its striking stair tower is located in the heart of the historic village center of the mountain village of Valendas in Graubünden. Over the course of various construction phases, the original building from 1485 was extended, heightened and a stair tower named Türali, after which the house was named, was added around 1545. The imposing core building was gradually extended over a period of three centuries. The building was given its current appearance by the Baroque conversion of 1775. Inside, the house was decorated with richly ornamented wall and panel paintings. On the ceiling of the living room is a carved alliance coat of arms of Gallus von Marchion and Claudia von Arms from 1775. In 2007, the long vacant house was acquired by the foundation Ferien im Baudenkmal. After a gentle renovation, the two apartments have been offering space for up to 11 people to spend their vacations in the historic building since 2014 (Foundation holidays in a historic building, n.d.).

Schindelhaus, Oberterzen St. Gallen

The Schindelhaus in Oberterzen, built in 1755 and later renovated, shows how historical architecture and modern comfort can be combined. It was saved from demolition when an architecture enthusiast bought it from the municipality. Under the direction of architect Paula Giger, the house was restored and its original structure restored. The core building was retained, while the side extensions were rebuilt. Modern amenities were integrated into the extensions and the main façade was given new shingles, with remnants of the original paintwork preserved. The house, now privately owned, is rented out through the foundation (Foundation holidays in a historic building, n.d.).

Stüssihofstatt, Unterschächen Uri

The Stüssihofstatt, built in 1450 and one of the oldest farmhouses in Uri, is a remarkable example of unaltered historical architecture. The two-storey log building with a flat pitched roof corresponds to the Gotthard type and was restored in 2014 under the direction of architect Hanspeter Odermatt. The renovation was carried out in close cooperation with the Uri heritage conservation authority and emphasized the preservation of the historical substance (Foundation holidays in a historic building, n.d.).

During the restoration, the original character of the house was preserved, including the worn floors and the rustic kitchen. The Stube and Stipli on the first floor were restored, while the entrance and kitchen area was transformed into a central room with modern facilities. New stairs were installed to access the upper chambers and the façades were given new wooden cladding (Foundation holidays in a historic building, n.d.).

The Stüssihofstatt, an important cultural heritage site in the Schächental valley, was inhabited by farming families until it was taken over by the Arnold family in 2010 and later acquired by the Ferien im Baudenkmal foundation. The renovation work, which was completed in 2014, skillfully combined history and modernity, equipping the house with modern amenities and adding Swiss design classics (Foundation holidays in a historic building, n.d.).

La Contenta, Aita Flury

Another reference example is the „La Contenta“ project by Aita Flury. The two-story design of Aita Flury‘s La Contenta and its varied visual axes were notable features. The interplay of different room heights was particularly appealing, and these components were integrated into the design.

The multi-family house La Contenta draws inspiration from Palladio‘s Villa Foscari – La Malcontenta. The design emphasizes spatial interests derived from Palladio‘s work, including the visual balance of the building, the interweaving of interior and exterior spaces, the blending of pillars and walls, and the building‘s response to its surroundings through facade hierarchy (Schwarzer, n.d.).

A key focus is the balance of interior spaces, reminiscent of Palladian designs without corridors, where nearly square rectangles relate to each other. These spatial cells are distinct yet often visually connected through large sliding doors. The design negotiates tranquility and dynamism, openness and closedness, with variations across floors. The Minergie-standard building, located in a core zone with a pitched roof requirement, includes 11 apartments (2.5/3.5 rooms) and a commercial space. Constructed as a solid building with a compact facade and locally applied acoustic bricks, these bricks serve as secondary ornaments to structure the facade and are placed where tactile interaction with the exterior occurs (Schwarzer, n.d.).

fig. 14: atmospheric picture of „La Contenta“

Upcycling in architecture: An input lecture

The concept of using buildings as material banks introduces a sustainable strategy where structures are seen as temporary repositories of reusable materials. This approach emphasizes the importance of deconstructable materials. For instance, timber buildings like Peter Zumthor's pavilion in Hannover, which was constructed using stacked timber held together with cables, showcase the potential for reusability and deconstruction (Stockhammer & Tarsoly, 2024).

A significant takeaway from this lecture was the principle of „Use what you have." Upcycling involves reusing existing components creatively, such as using noble doors arranged as facade elements or repurposing glass bottles as window elements by utilizing their bottoms. This method not only gives new life to old materials but also presents unique design challenges and adaptations. For example, when reusing windows, the way they open might differ from their original installation, requiring thoughtful integration into new designs (Stockhammer & Tarsoly, 2024).

A particularly inspiring example of this is Märkli Walenstadt, where a mix of different materials was used to create a distinctive facade. Such projects demonstrate how reusing elements for purposes other than their original intentions can lead to innovative architectural solutions. By applying a new grid adjacent to the old structure, different sizes and shapes of reused materials were incorporated, leading to principles like clean corners and the use of pillars to define room heights. The lecture also highlighted the importance of maintaining a connection to the past while innovating. This involves understanding and continuing the thought processes of previous architects. The blending of different architectural styles, such as Renaissance and Baroque, as seen in Luigi Moretti's works, can create a harmonious fusion that embodies the soul of both eras. The merging of styles, even when using a variety of materials and forms, can still achieve a clean and cohesive aesthetic. Examples like the railway bridge in Porto by Gustave Eiffel illustrate how historical and modern elements can coexist seamlessly (Stockhammer & Tarsoly, 2024).

The lecture also touched on the history of consumption and how design philosophies like the Japanese approach to repair, where a scar becomes a beautiful feature, can inform sustainable practices in architecture. Overall, the lecture emphasized the creative potential and environmental benefits of upcycling in architecture, encouraging architects to see buildings as dynamic entities that can evolve over time through thoughtful reuse and recomposition of materials (Stockhammer & Tarsoly, 2024).

fig. 15: Türalihus

4.2 Renovating methods

> „Renovation does not add anything new to the building stock, nor does it replace old with new. Instead, it maintains the value and the function of the existing building through competent upkeep“ (Giebeler, 2009 cited from Wong, 2016, p.23).

Common renovation methods include refurbishment of the building fabric, replacement of building elements, modernization of installations, insulation and improvement of energy efficiency, redesign of the interior, preservation and restoration, integration of barrier-free elements and consideration of sustainability aspects. These methods are adapted and combined depending on the specific requirements, objectives and budget of the renovation project (Daibau, n.d.).

> “Upgrading and repairing an old building to an acceptable con dition, which may include works of conversion”
> (Douglas, 2006, cited from Wong, 2016, p. 23).

fig. 16: atmospheric picture midterms

4.3 Multi-generational living

The advantages of multi-generational living

In the realm of multi-generational living, a rich tapestry of benefits weaves together the lives of residents, fostering a dynamic and supportive community. At its core, this living arrangement nurtures social bonds across age groups, encouraging intergenerational interaction and mutual learning. Through shared experiences, younger members absorb wisdom while older ones thrive on youthful energy. Practical advantages also abound. The collaborative atmosphere enables mutual aid in daily tasks, easing burdens and fostering a sense of collective responsibility. Community activities further enrich daily life, promoting camaraderie and enhancing overall well-being.Moreover, multi-generational living facilitates longer residence within familiar surroundings, particularly for seniors, preserving independence and reducing the need for institutional care (Supa group constructions, 2023).

Beyond the interpersonal and practical, this lifestyle also bears economic and environmental benefits. Resource sharing drives cost efficiencies while promoting sustainable practices.In essence, multi-generational living epitomizes a holistic approach to residential life, fostering social cohesion, practical support, and environmental responsibility (Supa group constructions, 2023).

4.4 Property utilization

In this design, the existing plot is divided in half and divided into a northern and a southern half. The architectural design is located on the northern half in order to make optimum use of the upper parcel. The southern half is mainly intended as a garden area where residents can, for example, create raised beds to grow some of their own food. Alternatively, there is the option of selling the lower half.

fig. 17: three photos of Kapfstraße 2

05
Re:Barn

fig. 18: main entrance of the stable

5.1 Bracket - Past Meets Present

Reviving the tradition of entire families living together under one roof is a central theme of our design. The goal is to transform an old farmstead into a multi-generational sanctuary, reimagining rural living to accommodate all ages. This semester project focuses on the old farmhouse located on Kapfstraße in Eschen. The aim is to convert this currently uninhabited detached house, with its attached stable, into a multi-family residence. The emphasis is on fostering connections between different generations within this new residential concept.

Why bracket?

Throughout the semester, numerous design ideas and corresponding titles were explored, such as „Re:Barn", „Converge" and "Core:Shell". However, the title should ideally reflect the core concept of the design in a single word. The final design encompasses and integrates existing structures, which led to the selection of „Bracket".

The „Bracket" project at Kapfstraße 2 brings together two architectural worlds under one roof. Much like a bracket, the new structure envelops the existing one, expanding the original rooms and linking different spatial structures. This multigenerational house blends tradition and modernity, reflecting the principle of the Janus head, which signifies having two sides. The building presents two distinct faces: the historical facade, visible from the entrance, which reflects the house's history, and the new facade, facing the garden, which embodies contemporary architecture. Initially, the distinction between the existing structure and the new addition will be clear. However, over time, the building is intended to merge into a single, cohesive volume.

Why multi generational living?

Multi-generational living fosters social cohesion and practical support by encouraging intergenerational interaction and mutual assistance, while also promoting economic and environmental sustainability through shared resources and knowledge. This living arrangement strengthens family bonds and creates a more sustainable and supportive community (Supa group constructions, 2023).

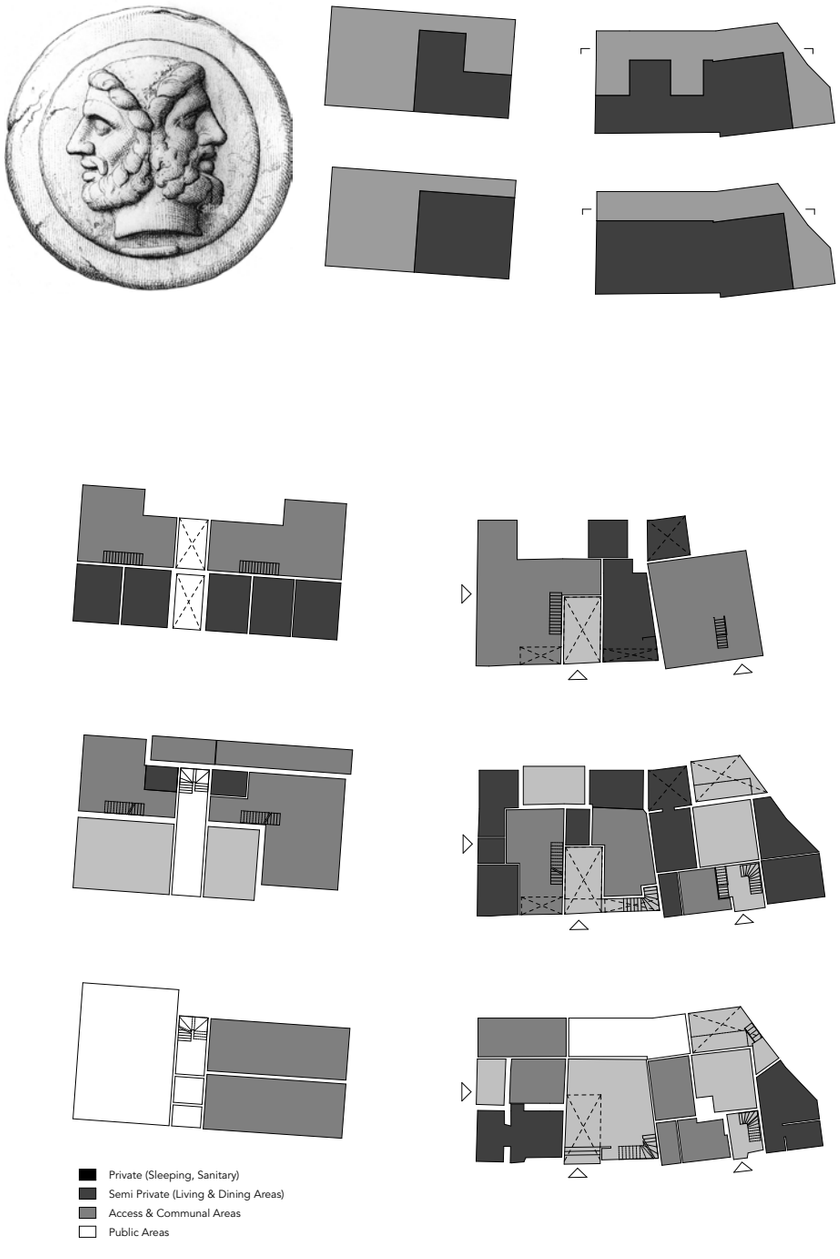


fig. 19: concept drawing of „Bracket"

fig. 20: atmospheric picture of „Bracket“ (top floor)

Concept

As the volume evolved, our design „Bracket“ gradually developed. From the beginning, there was a focus on creating sightlines through the building, an additional concept that remained integral to the project. In an architectural metamorphosis intertwining history and modernity, the building undergoes a captivating transformation. The core remains unchanged, preserving its historical significance while being surrounded by a modern layer. This new shell adds both aesthetic appeal and functional innovations.

„Bracket - Where past meets present“ reflects the concept of the new construction clinging to the existing structure, particularly on the garden side, creating a harmonious connection between old and new. Dormers on the roof further encapsulate this addition, emphasizing the cohesive design. This is also why there is only one dormer in the second building and not two - to reinforce the bracket concept. „Where Past Meets Present“ highlights the convergence of historical and modern elements.

The old structure is visible from the northeast facade and within the interior, symbolizing the blending of eras and the dialogue between tradition and progress. This design creates a space where past and present coexist seamlessly. The historic structure stands as a testament to bygone eras, while the modern addition showcases innovation and adaptation. Together, they form a harmonious fusion of tradition and progress. To highlight this blend, the cladding was removed, making the knitted construction visible and connecting it to the outside with a new shell. This approach not only respects the heritage of the original farmhouse but also adapts it for modern multigenerational living, fostering a connection between different generations within the new residential concept.

Site plan

Our upcycling project centers on an old stable building with an adjoining residential structure, located at Kapfstrasse 2 in Eschen, Liechtenstein. The traditional construction methods of this building continue to captivate us, especially as knowledge of these techniques has declined over the years, highlighting the importance of preservation over demolition. Reducing CO_2 emissions further strengthens the case for reuse and upcycling, making it imperative to retain elements like the timber frame walls.

To enhance the property‘s usability and appeal, we have designated the lower part of the site as a garden and pool area for the residents. Our architectural design efforts are focused primarily on the upper subdivision, where we aim to blend traditional and modern elements seamlessly.

fig. 21: site plan of „Bracket“

fig. 22: south west facade

fig. 23: north east facade

fig. 24: south east facade

fig. 25: north west facade

fig. 26: north west facade

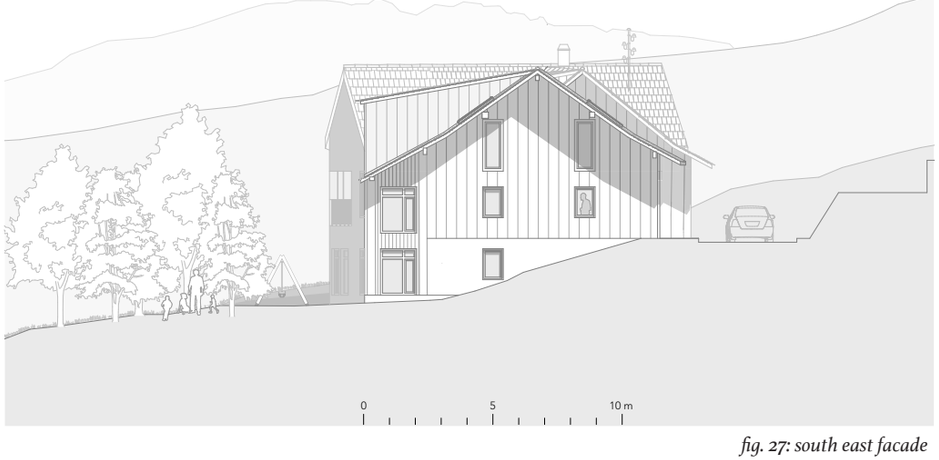
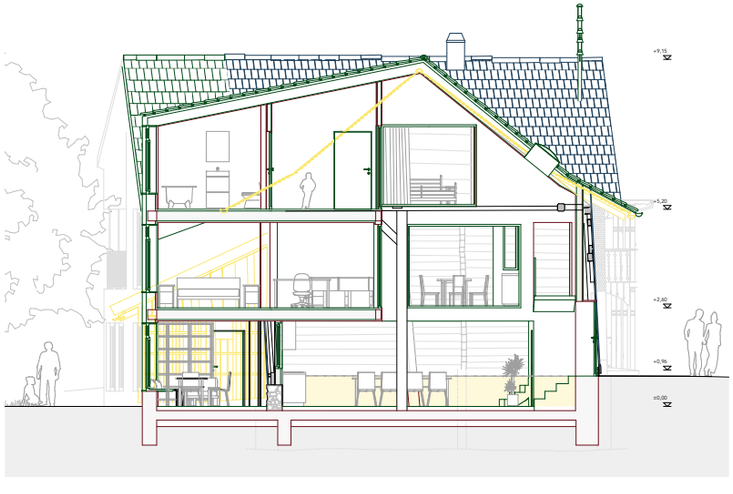


fig. 27: south east facade

fig. 28: atmospheric picture top floor, different lighting mood

fig. 29: ground floor plan



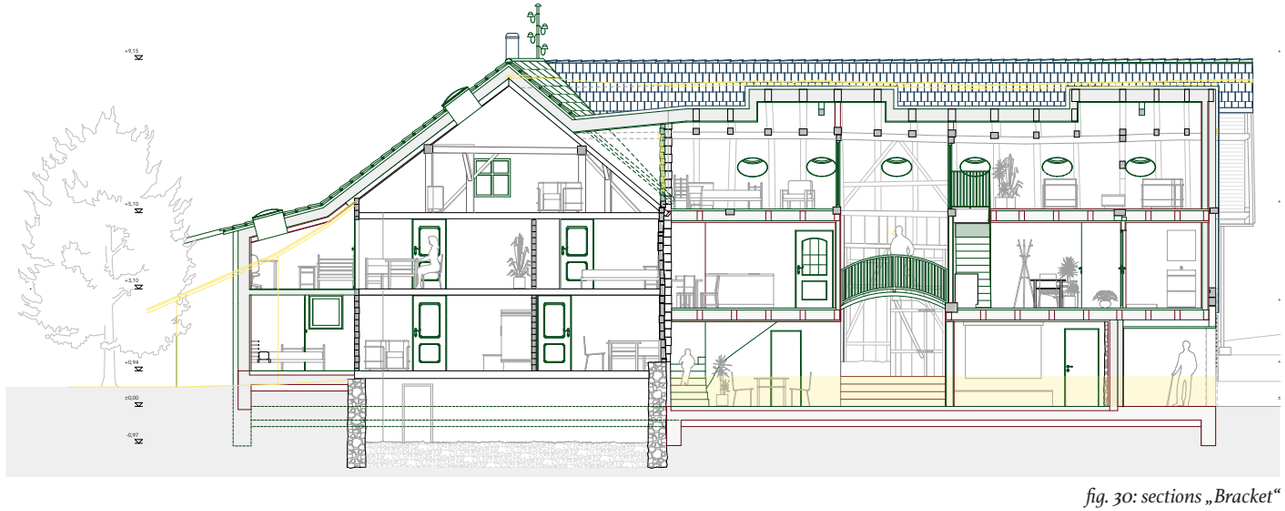


fig. 30: sections „Bracket“

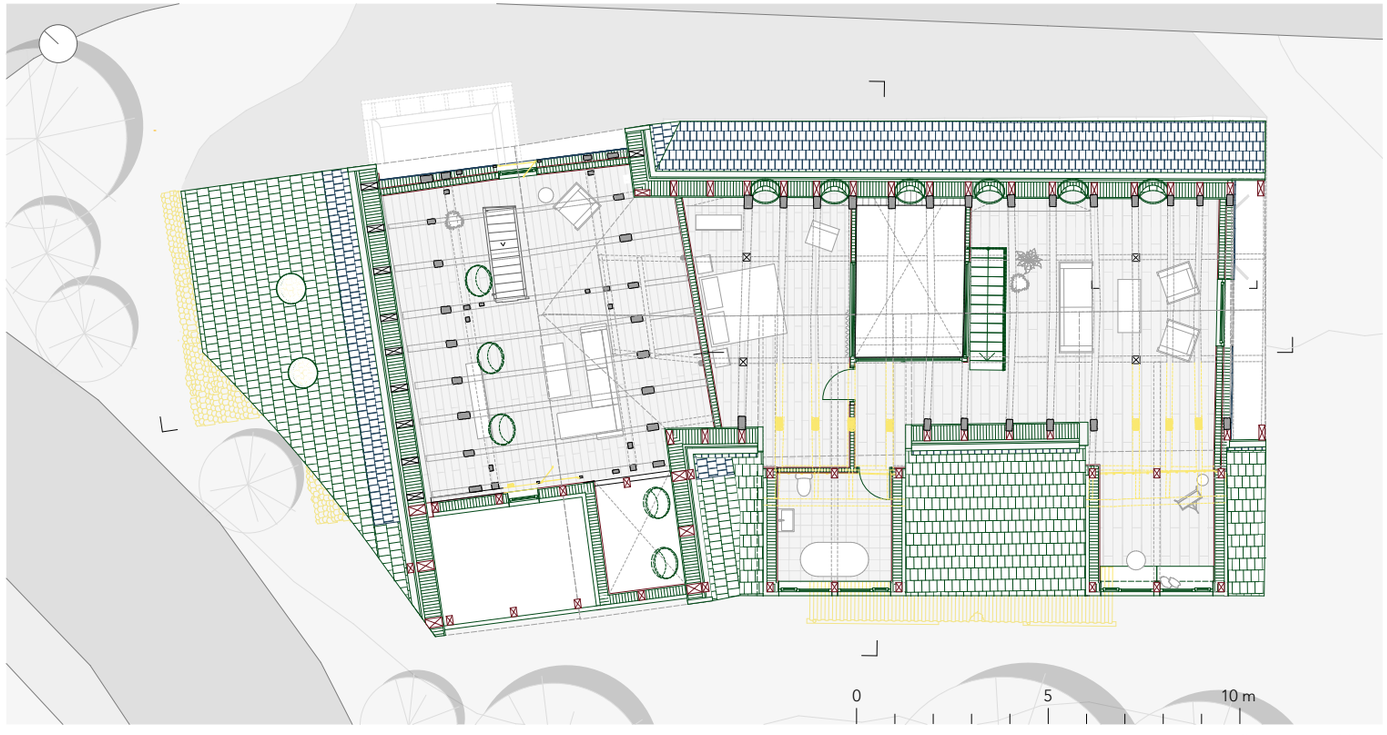


fig. 31: second floor

fig. 32: first floor

Old horse stable

In the plans for the old horse stable, it is evident how the new volume integrates with the existing building. Initially, the plan was to convert the old horse stable solely into a garage and workshop space. However, over time it became clear that not as much workshop space was needed, and that residential use should also be part of this building. Instead of multi-generational living, the space will consist of separate, regular apartments.

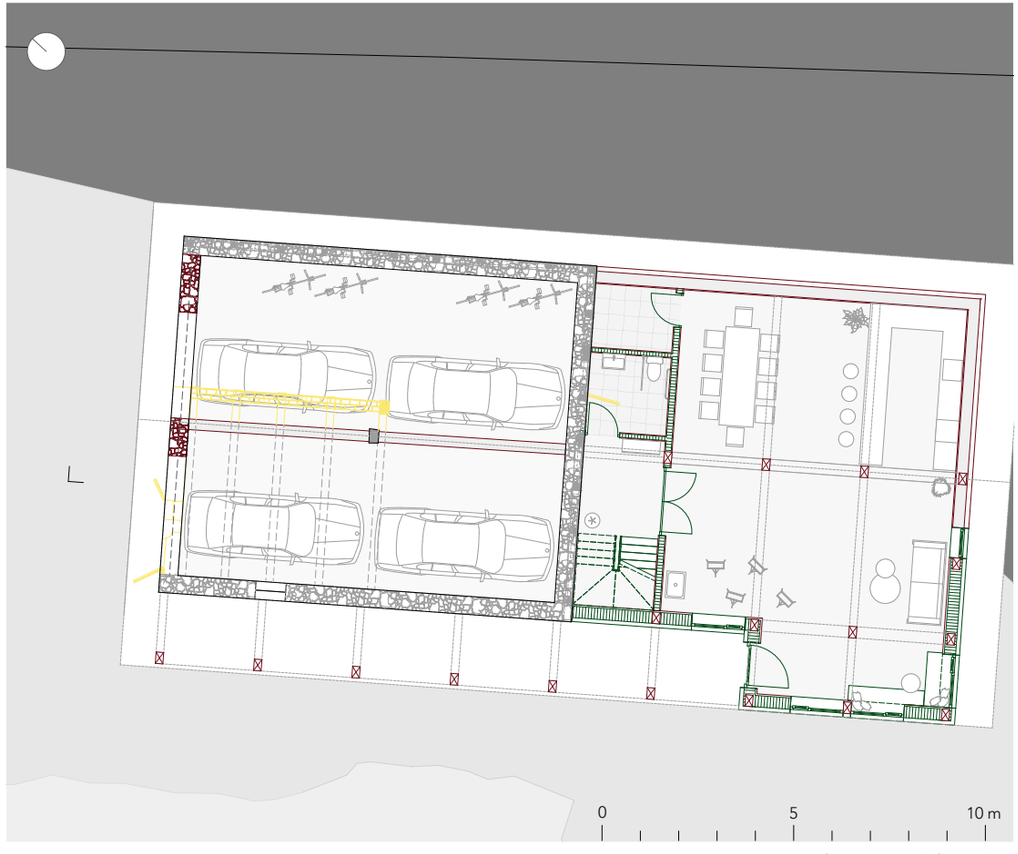


fig. 33: ground floor plan

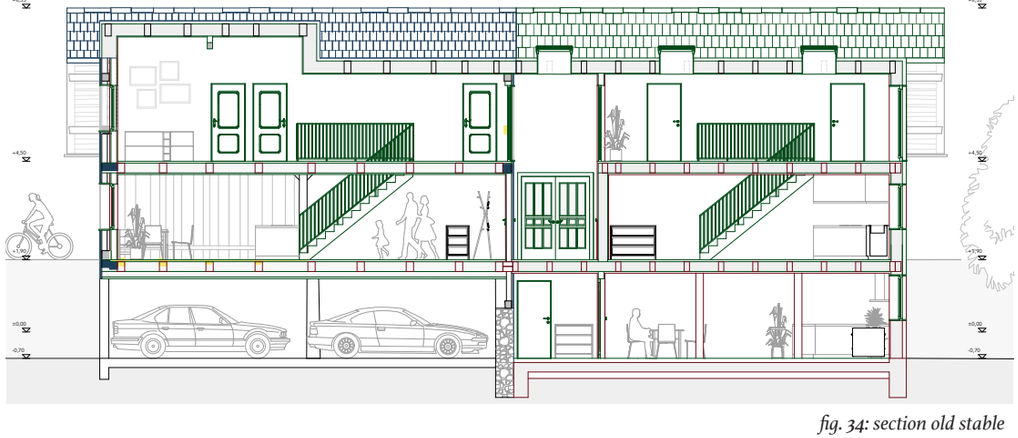


fig. 34: section old stable

fig. 35: second floor

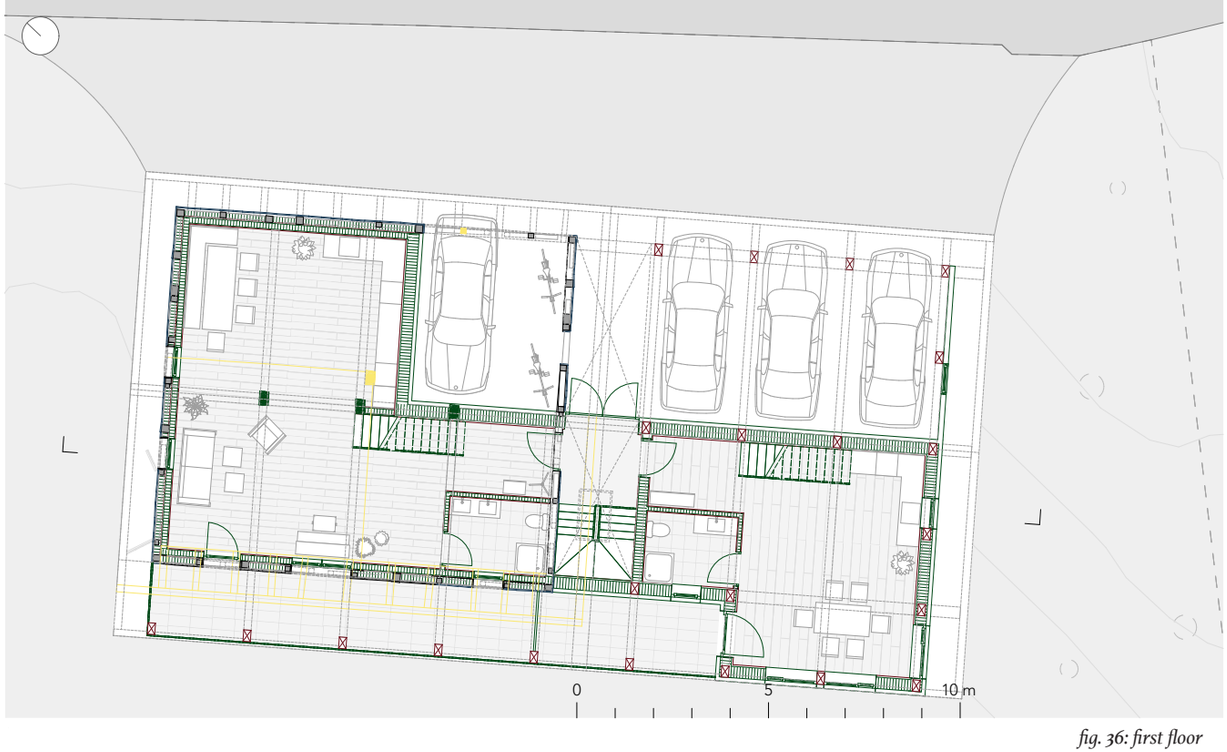
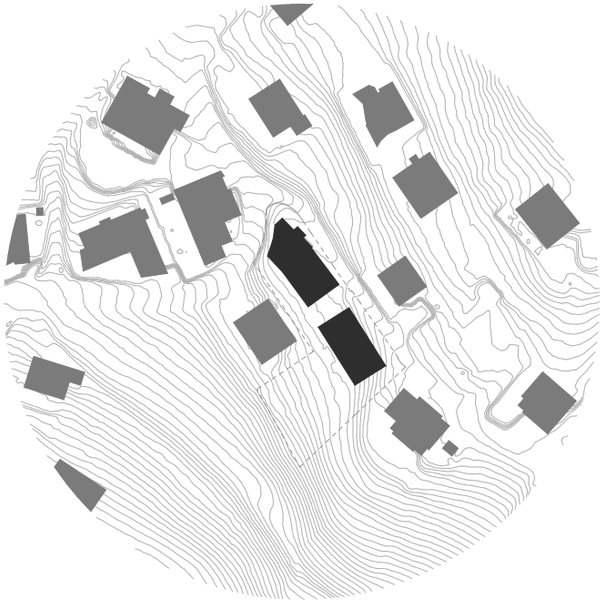


fig. 36: first floor



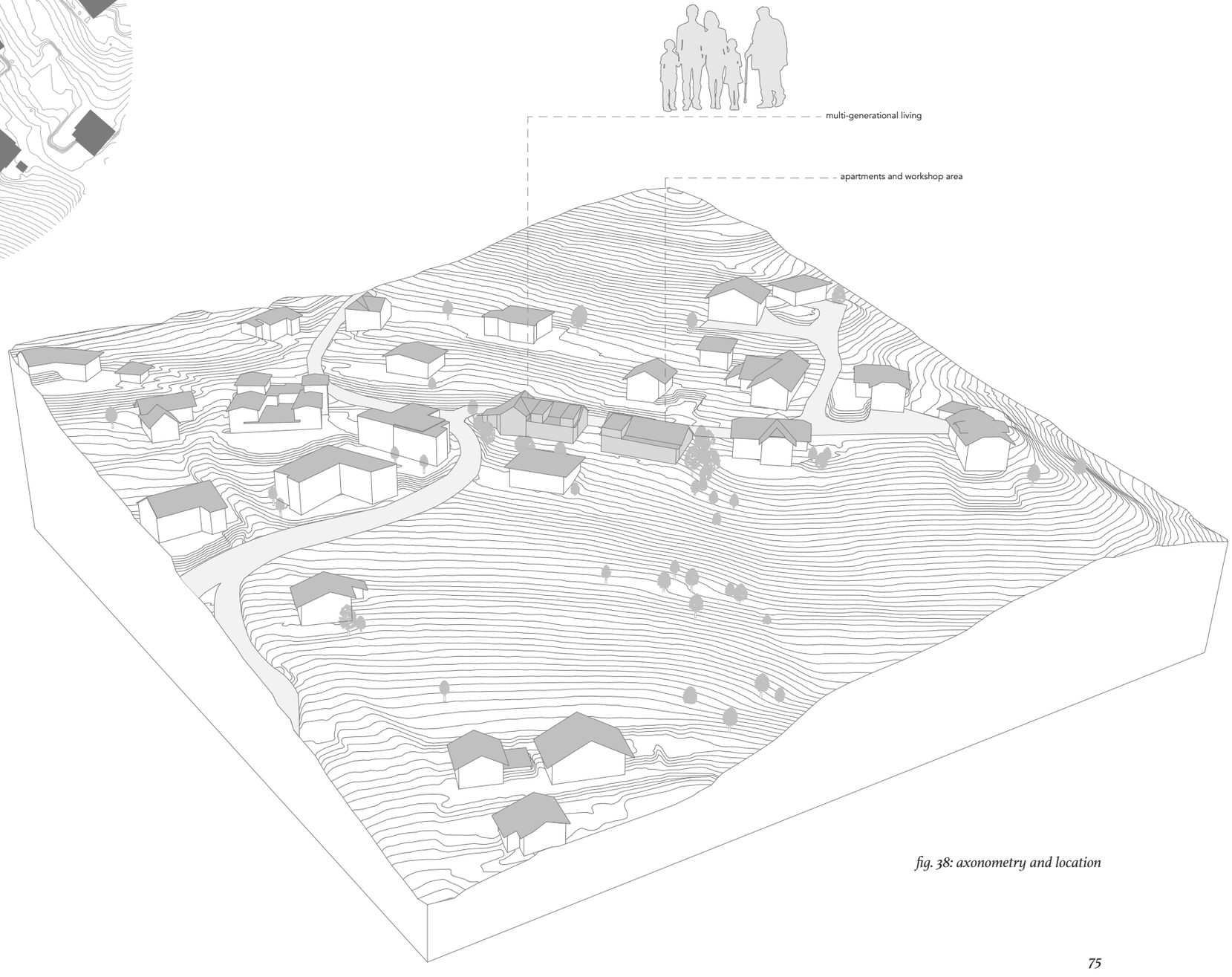


fig. 38: axonometry and location

General overview

The existing building can accommodate two families spanning multiple generations. It is divided into two sections: the house and the barn. The house can house up to six people, while the barn can accommodate up to eight. The ground floor is designated for the elderly, with the upper floors intended for younger generations. Communal areas such as the kitchen and living room are located on the ground floor to facilitate shared living across all generations within the building. This arrangement is supported by flexible room divisions in the barn and doors within the house.

Additionally, there is a third section of the main building, the bracket, located on the southwestern side. This adaptation and extension from the two houses also serves as a connection between the two families.

The new building is an extension of the old horse stable. Here, the building volume is duplicated to create two residential units on the upper floors and a workshop area on the ground floor. The Janus-faced aspect is evident here as well, blending old and new elements.

The house

The house has space for up to six people. Upon entering the house, you come to the central access core, which retains the same structure as the old house, with no walls being removed or relocated. The only new additions are the bathrooms, located on the street side. The ground floor features a circular movement through all the rooms.

The ground floor also contains areas for the elderly, including a sleeping room and a bathroom. Other parts of this level can also be used by younger generations living on the upper levels. The extension includes a small living space that leads to the garden and a room connecting the two families, which can be used by all residents.

The upper floor is designed for a family with two children and includes a small tea kitchen, a more private living area, bedrooms, and a loggia. An important feature is the elevated section, providing better access from the upper level and creating new space for two additional bedrooms. One of these bedrooms is unique as it spans both the old and new parts of the building. The upper floor also has an open floor plan that can be used as a play area for children or as a living space.

fig. 39: atmospheric picture top floor

fig. 40: atmospheric picture first floor

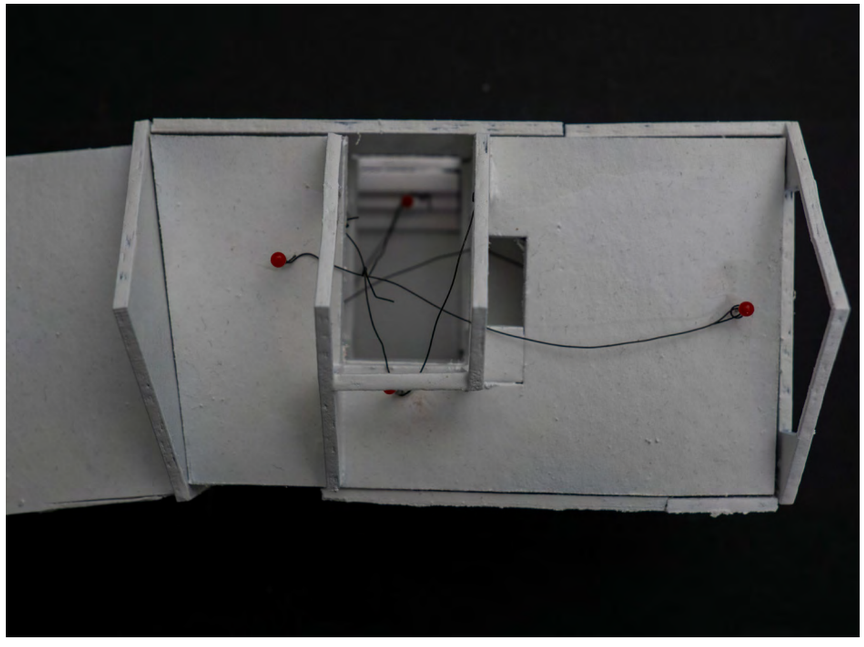


fig. 41: visual axes concept model

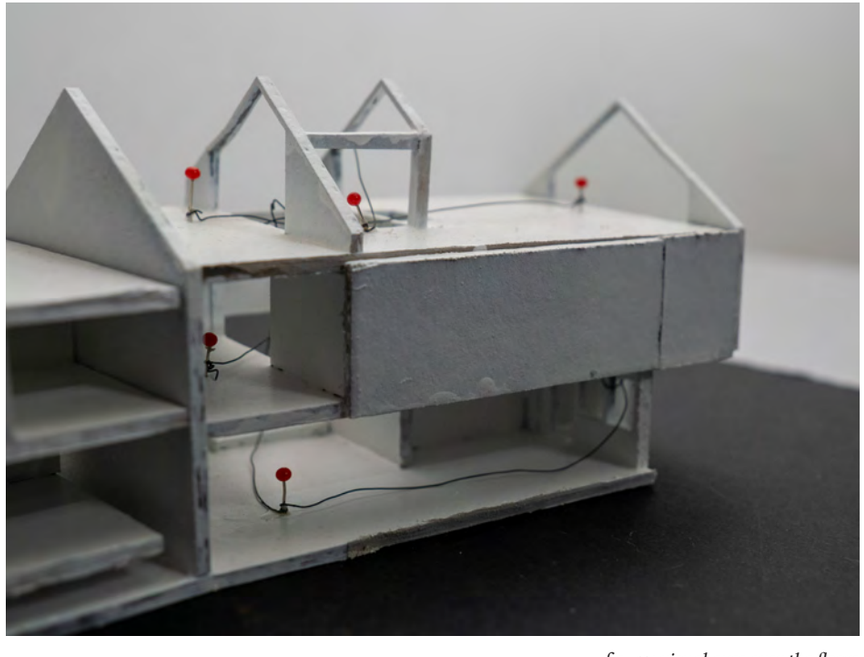


fig. 42: visual axes over the floors

The barn

The main entrance to the barn is through the old barn door. Upon entering, descending four stairs leads to the main area of the barn, designed for communal use by all residents in this part of the house. The barn features a vertical breakthrough through all floors, creating visual connectivity. There is a designated space for the grandparents that can be closed off for privacy or opened up to create a large communal area, which includes a kitchen, a spacious living area, and an office space.

The first floor contains a small apartment suitable for one or two people, equipped with a tea kitchen and bathroom, ideal for the generation in between. The second apartment is designed for a young family with two children. It includes a kitchen and two children's bedrooms on the first floor, and a large living room with a view on the upper floor. The upper floor also features an additional bedroom for the parents with an exclusive bathroom in the dormer, maintaining visual connectivity with the other apartment and the downstairs area.

Visual axes

The barn boasts various visual axes, offering a sense of openness and vertical space despite the low ceilings. Horizontal axes link the different living units, creating visual connections that foster a sense of community and closeness while maintaining individual spaces. These generous sightlines encourage interaction between generations, supporting the concept of shared living. For example, the conceptual model developed during the semester illustrates different sightlines within the barn, contrasting with the more closed and circular movement of the rooms in the house.

Atmospheric pictures

The atmospheric pictures depict views from the sleeping area across to the other building and down to the lower level. Additional pictures showcase the atmospheric qualities of the space, emphasizing the visual connections and the ambiance created by the design.

The horse stable

The modernized stable serves as a transport hub on the ground floor for cars and bicycles, with living spaces on the upper floors. The section facing the street is backfilled to provide access to the upper floor, which includes a carport for four cars and visitor parking spaces for the workshop. The ground floor houses two garages, each accommodating two cars for the residents of the house and barn.

Sections

A corridor between the buildings showcases the connection between the old and new roofs. The ground floor is at level minus one (-1), with access through the first floor (street level). The new horse stable contains two two-story apartments and a workshop area for residents and external users. The workshop space allows elderly residents to share their experiences and teach traditional skills, such as cooking methods and drawing sessions. This integration of modern functions within the historic property fosters resident participation and enriches the community.

Views

The idea is that, in the initial years, the existing structure and the new build can be clearly distinguished. Over time, these two worlds will gradually merge into one. From the street side, everything remains predominantly as it is, preserving the original appearance. However, there will be a moment of surprise as you walk around the house and discover the new volume and facade consisting of reused materials. The primary facade of our design is the southwest side. We have integrated for example reused windows from an old office in Zurich, which play a key role in shaping the exterior appearance. There are 89 of these windows available.
The façade design should clearly highlight that the new section stands out from the existing building. Moreover, the views are characterized by a developed grid system that adapts to the floor plans.

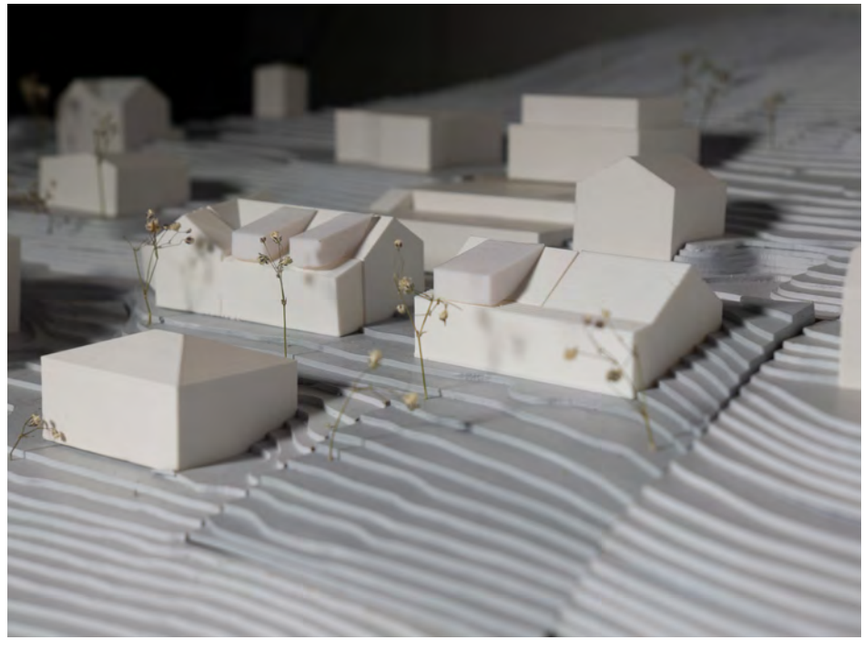


fig. 43: photo of the 1:250 model

fig. 44: second photo of the 1:250 model

fig. 45: sectional model of in scale 1.33

fig. 46: one part of the model 1.33

fig. 47: detailed view of the 1.33 model

fig. 48: model construction 1.33

fig. 49: complete sectional model in scale 1.33

fig. 50: sectional model 1.33

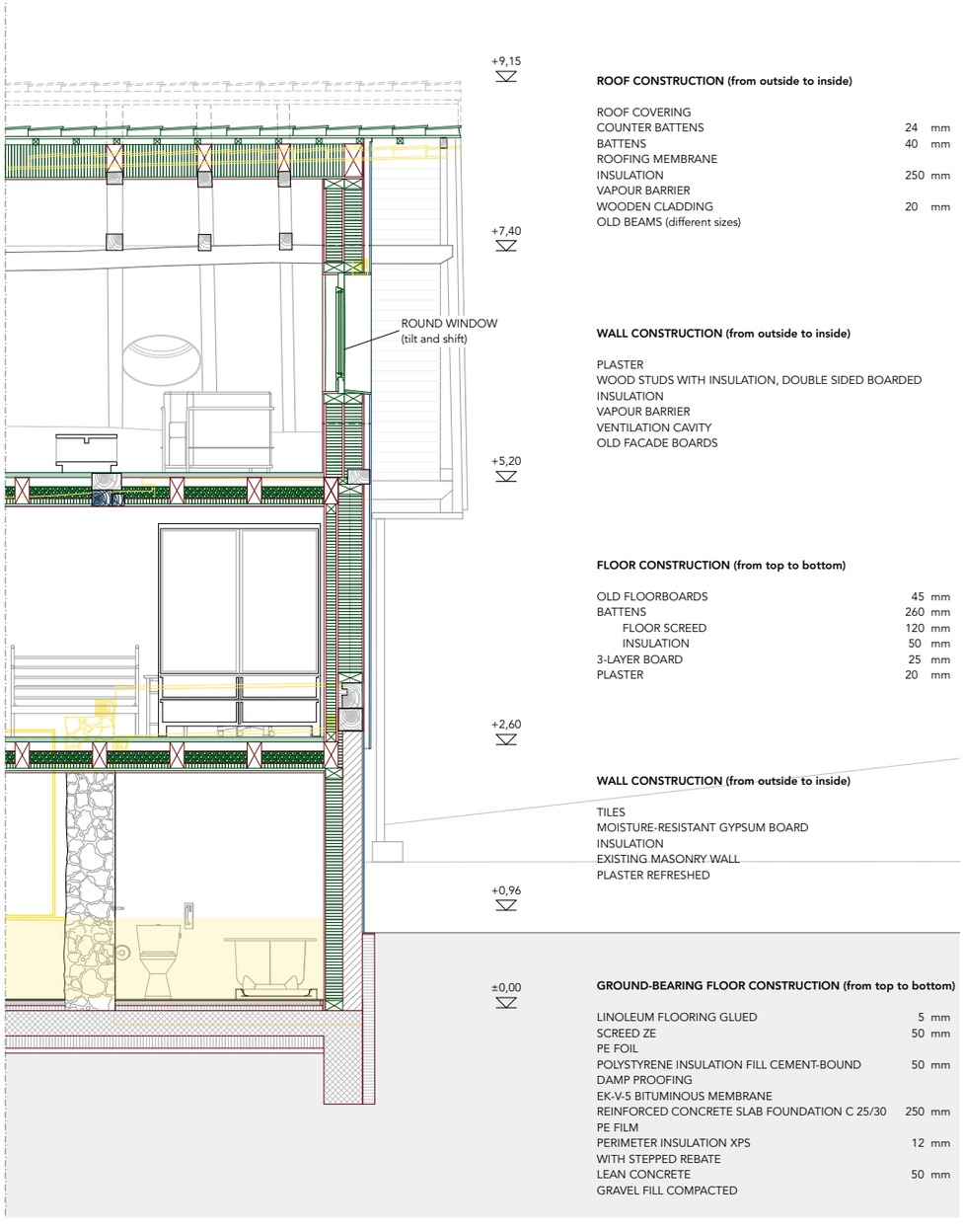
fig. 51: sectional model 1.33 with attachment

Model 1.33

The model highlights the bracket, the extension from the existing building. It includes a section model through the dormer and the facade of the new part, showing the new structure with its different grid placed in front of the existing structure. Part of the model excludes the roof cladding to reveal the underlying structure.

The new building attached to the old horse stable

A corridor between the buildings showcases the connection between the old and new roofs. The ground floor is at level minus one (-1), with access through the first floor (street level). The new horse stable contains two two-story apartments and a workshop area for residents and external users. The workshop space allows elderly residents to share their experiences and teach traditional skills, such as cooking methods and drawing sessions. This integration of modern functions within the historic property fosters resident participation and enriches the community.



ROOF CONSTRUCTION (from outside to inside)

ROOF COVERING		
COUNTER BATTENS	24	mm
BATTENS	40	mm
ROOFING MEMBRANE		
INSULATION	250	mm
VAPOUR BARRIER		
WOODEN CLADDING	20	mm
OLD BEAMS (different sizes)		

WALL CONSTRUCTION (from outside to inside)

PLASTER
WOOD STUDS WITH INSULATION, DOUBLE SIDED BOARDED
INSULATION
VAPOUR BARRIER
VENTILATION CAVITY
OLD FACADE BOARDS

FLOOR CONSTRUCTION (from top to bottom)

OLD FLOORBOARDS	45	mm
BATTENS	260	mm
FLOOR SCREED	120	mm
INSULATION	50	mm
3-LAYER BOARD	25	mm
PLASTER	20	mm

WALL CONSTRUCTION (from outside to inside)

TILES
MOISTURE-RESISTANT GYPSUM BOARD
INSULATION
EXISTING MASONRY WALL
PLASTER REFRESHED

GROUND-BEARING FLOOR CONSTRUCTION (from top to bottom)

LINOLEUM FLOORING GLUED	5	mm
SCREED ZE	50	mm
PE FOIL		
POLYSTYRENE INSULATION FILL CEMENT-BOUND	50	mm
DAMP PROOFING		
EK-V-5 BITUMINOUS MEMBRANE		
REINFORCED CONCRETE SLAB FOUNDATION C 25/30	250	mm
PE FILM		
PERIMETER INSULATION XPS	12	mm
WITH STEPPED REBATE		
LEAN CONCRETE	50	mm
GRAVEL FILL COMPACTED		

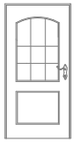
fig. 52: detail section

fig. 53: detailed view of the south west facade

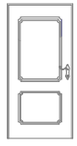
RE-USE MATERIALS

doors:

entrance door
w 180 x h 220
source: willhaben



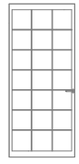
interior door with
cloudy glass
w 90 x h 185
10 pieces available
source: willhaben



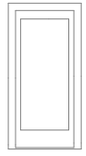
interior door
w 90 x h 185
25 pieces available
source: willhaben

farmhouse wooden door antique
w 90 x h 217
source: useagain

interior doors (white)
w 90 x h 185
20 pieces available
source: useagain

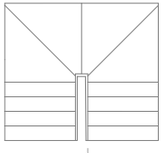


wooden
balcony door
(white)
w 90 x h 210
5 pieces
available
source:
useagain



balcony door
source: useagain

stairs:

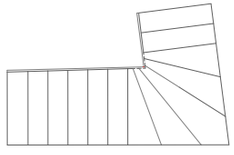


staircase u form
w 180 x h 210
2 pieces
source: willhaben

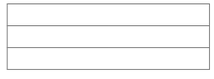
stair railing
410 length
source: useagain

solid wood
staircase
including
banister
2 pieces | 13
steps
w 90 x l 300
d 23
source:
useagain

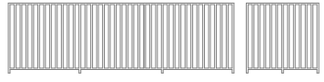
solid wood
staircase
13 steps
w 90 x l 320
d 24,6
source:
willhaben



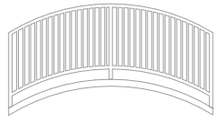
corner staircase including railing
13 steps
source: useagain



staircase 3 steps
w 90 x h 280
source: willhaben

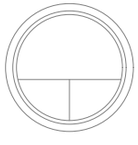


railing
up to 3m length
10 pieces | h 95
source: willhaben



garden bridge
w 90
bridging 280
source: willhaben

windows:

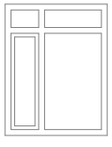


round window
diameter 175
250€
source: willhaben

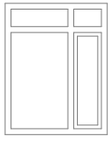
roof window
w 89 x h 122 x d 9
source: useagain

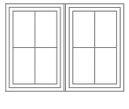
ship star
glass-nickel
finish 77€ |
diameter 80
20 available
source: ebay

wooden window (white)
w 80 x h 120
20 pieces available
source: useagain



windows with
fixed glazing
and tilt
function
140 x 180
89 pieces
source:
salza.ch

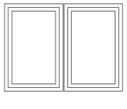




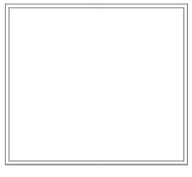
wooden window (brown)
w 160 x h 120
source: willhaben

glass with frame
w 300 x h 220
2 pieces
Zurich region
source: useagain

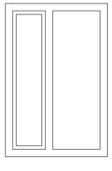
glass with frame
w 280 x h 220
Zurich region
source: useagain



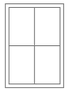
wooden window
w 160 x h 120
source: willhaben



glass with frame
w 250 x h 220
2 pieces
Zurich region
source: useagain

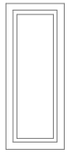


balcony door with
glazing
w 140 x h 210
source: useagain



double-glazed window
with brass bars
made of wood (joinery)
w 80 x h 115
source: willhaben

elongated window
w 80 x h 220
2 pieces
Zurich region
source: useagain



windows
(double
glazing)
w 80 x h 200
2 pieces
available
source:
useagain

double-glazed
window
once with and once
without brass bars
w 90 x h 90
source: willhaben

glass floor
w 140 x l 320
source: ebay

shutters
made from
reuse - wood
wood source:
willhaben

double-glazed
window
w 80 x h 110
source: useagain

double-glazed
window
w 97 x h 110
source: ebay

building materials:

roof tiles
200 m²
source: landwirt | ebay

Holzboden Eiche
70 m²
source: willhaben

rigips boards
200 m² | 5,50 € per m²
source: willhaben

various insulation
materials 300 m² + 200 m²
source: willhaben | ebay

boards in spruce
l 600
150 m2
source: willhaben

wooden panels multiplex
various boards 18mm thickness
source: useagaim

boards in spruce
h 264
200 m2
source: useagain

fig. 54: re-use materials

5.2 Rethinking rural living

The concept of rethinking rural living revolves around creating future-oriented, sustainable spaces that harmonize with existing structures and local heritage. This approach integrates modern living standards with traditional architectural practices, ensuring both the preservation of cultural identity and the adaptation to contemporary needs.
To build sustainably and responsibly in rural areas, several key principles are followed:

Preservation and adaptation: Emphasizing the importance of preserving existing buildings, the goal is to maintain and enhance their historical and architectural value. This involves careful restoration and adaptive reuse, ensuring that the essence of the original structure is retained while introducing modern functionalities (Norwalk, 2019).

Sustainable materials and methods: Using locally sourced, renewable, and recyclable materials minimizes the environmental impact of new constructions. Timber, for example, is a preferred material due to its renewability and ability to sequester carbon. Additionally, techniques such as upcycling and reusing materials from deconstructed buildings contribute to sustainability (Sancell, 2023).

Community-centric design: Rural living should foster community interaction and support intergenerational living. Designing spaces that encourage social cohesion, such as communal areas and shared gardens, enhances the quality of life for residents and promotes a sense of belonging (Desert springs healthcare, 2024).

Integration with the natural environment: Ensuring that new constructions and renovations blend seamlessly with the natural landscape is essential. This not only preserves the aesthetic beauty of rural areas but also supports biodiversity and ecological balance (Pacheco, 2023).

Future-proofing: Building with flexibility in mind allows structures to adapt to changing needs over time. This includes designing spaces that can be easily modified for different uses, ensuring their longevity and relevance (Abernathy, 2023).

By adhering to these principles, rethinking rural living becomes a holistic approach that respects the past, meets the needs of the present, and anticipates future challenges. This method not only preserves the cultural and historical significance of rural areas but also contributes to a sustainable and resilient built environment.

fig. 55: photo of the 1:2000 model

fig. 56: development process 1.250

06
Annex

fig. 57: current south east facade

6.1 Conclusion and self reflection

The project „Bracket“ provides a potential solution to the question: „How can the vacancy of a building be avoided through the upcycling of a timber-frame residential building and an adjacent barn in Eschen, to prevent demolition on one hand, and to create an innovative housing concept that adds value for the residents and minimizes the use of new resources on the other?“

As part of the Advanced Studio Upcycling, the design addresses the currently vacant building at Kapfstraße 2. The design proposes various interventions, focusing on circularity, a new envelope with an additional layer, preservation of the historical core, multi-story living, sightlines, and multi-generational housing. The goal is to delineate from the existing structure, preserve it, complement the plot area with a new structure, and make the resulting spatial sequences usable for multiple generations. I would like to express my gratitude to my teammate, Nina Gragl, for the collaboration. Additionally, I would like to thank the professors for their cooperation and valuable input.

fig. 58: group photo of the studio

fig. 59: left: Lara Jäger
right: Nina Gragl

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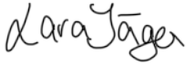
6.3 List of figures

All representations, including photos, plans, and other materials, were created by myself or in collaboration with Nina Gragl. The atmospheric picture was produced during a preliminary exercise in conjunction with Nina Gragl and Patricia Defranceschi.

6.4 Affidavit

I hereby declare under penalty of perjury that the present paper has been prepared independently by myself and without unpermitted aid. Anything that has been taken verbatim or paraphrased from other writings has been identified as such.
This paper has hitherto been neither submitted to an examining body in the same or similar form, nor published.

Dornbirn, 17.06.2024



Lara Jäger

6.5 Building surveys

As previously mentioned, the students of the Winter semester 23/24 conducted a detailed survey of the building at Kapfstraße 2, documenting all the building elements present in the structure. This thorough assessment provided a foundation for further work. Additionally, a group of students extended this effort by conducting a survey of the adjacent horse stable. The students who focused on the horse stable were responsible for creating the corresponding plans.

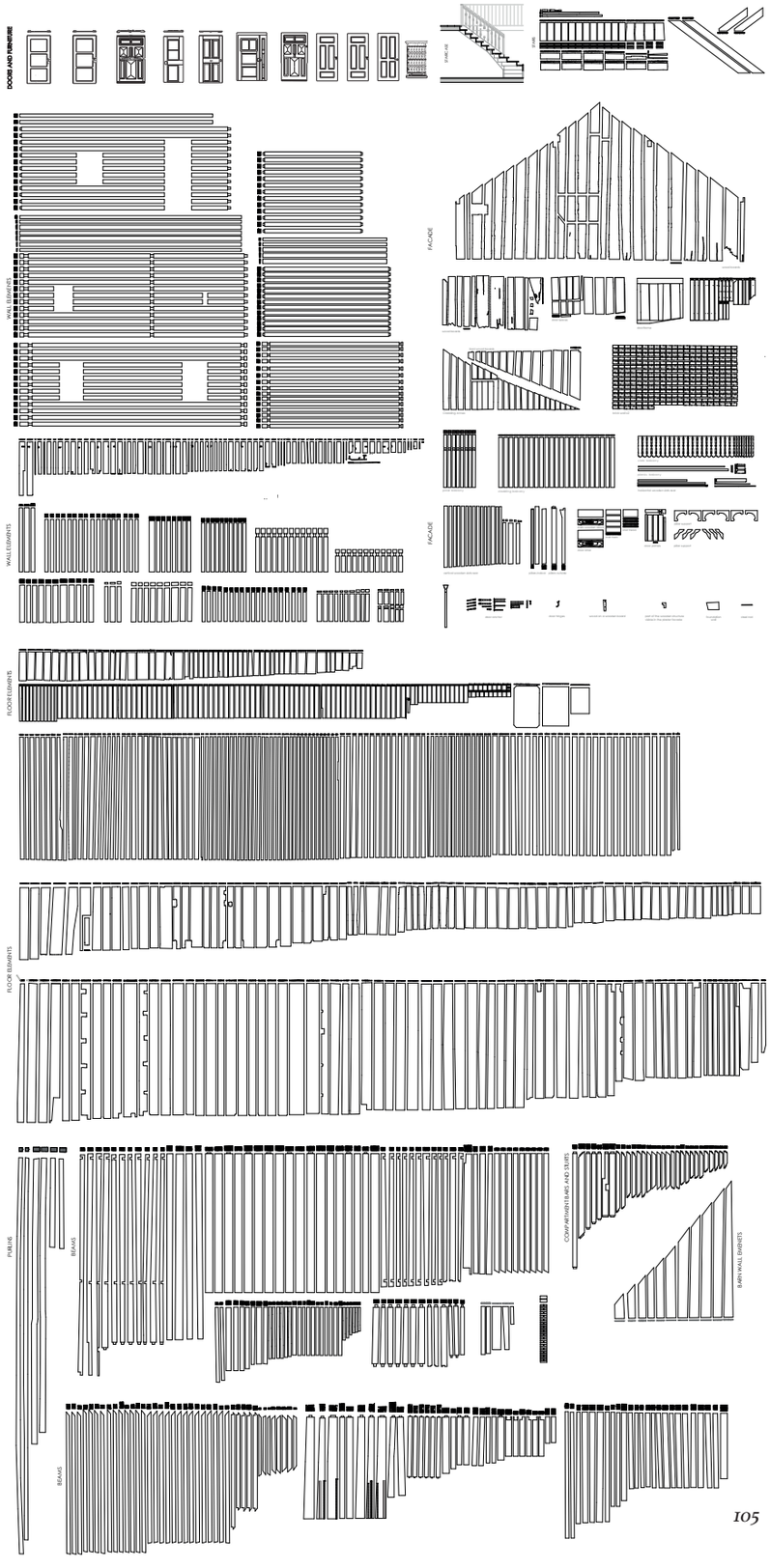


fig. 60: inventory elements

Drawing Code Explanation

The drawing code employs various colors to represent different aspects of building preservation and renovation strategies:

Black (building inventory) signifies the preservation, maintenance, and care of the existing structure. This approach emphasizes avoiding demolition and maintaining as much of the original building substance as possible. Actions include cleaning and refreshing the structure, as well as surface renewals such as applying lime, clay, or paint coatings. These efforts are considered the most sustainable building measures.

Blue (repair) represents repair, refurbishment, and restoration. The goal here is to return defective objects or components to a functional state. When parts are beyond repair due to material fatigue or decay, they are replaced as necessary.

Green (reuse) stands for the reuse of materials. This principle aims to save raw materials and reduce pollutant emissions by reusing materials that are no longer needed in one place in another location. Reuse can involve maintaining the original form and function of components, such as reusing old door fittings on new doors. Alternatively, it can mean reusing materials in different functions while retaining their form, such as using roof tiles as garden borders.

Orange (repurposing) describes the reprocessing of materials, which involves breaking down the form and function of materials through production processes to recycle raw materials and save resources. This method has an energy expenditure and pollutant emission comparable to new production. For example, the CO_2 balance of recycled concrete. The orange color represents a combination of yellow (demolition) and red (new production).

Red (new production) refers to newly manufactured components and building materials primarily made from new raw materials. This strategy emphasizes avoiding the consumption of non-renewable resources. When new components and materials are used, they should be made with recyclable materials and construction systems, such as constructions that can be disassembled and separated without damage, and using natural materials like clay and wood.

Yellow (demolition) is used for demolition. Demolition can clarify the architectural character of a building and improve health by removing synthetic building materials, such as suspended ceilings and synthetic paints. The goal is to conduct demolition in a way that allows for the maximum amount of reuse and further use of components, ensuring that materials are separated as purely as possible for recycling. Demolition and disposal in landfills should be avoided whenever possible.
These color-coded strategies collectively aim to promote sustainable building practices, preserving historical elements while incorporating modern innovations and environmental considerations (Stockhammer & Tarsoly, 2024).