



UNIVERSITÀ POLITECNICA DELLE MARCHE

FACOLTÀ DI INGEGNERIA

Corso di Laurea Magistrale in Ingegneria Edile - Architettura

ARCHITETTURA CIRCOLARE

NEI TERRITORI INTERNI

Trasformazione di una ex scuola in un polo educativo
e residenziale innovativo

CIRCULAR ARCHITECTURE

IN INNER TERRITORIES

Transformation of a former school into an innovative
educational and residential hub

Relatrice:

Prof. Arch. Maddalena Ferretti

Tesista:

Giulia Mataloni

Correlatori:

Prof. Dott. Arch. Paolo Fusi

Dott. Ing. Claudia Massioni

A.A. 2023/2024

“The architects of tomorrow will no longer just have to build, but will have to learn how to give new life to what has already been built.”

- Renzo Piano

ABSTRACT	I
INTRODUCTION	III
RESEARCH STRUCTURE	VII
METHODOLOGICAL FRAMEWORK	IX
BACKGROUND	XI
01 KNOWLEDGE ACQUISITION	
01.01 WHAT IS A CIRCULAR ECONOMY?	3
01.02 THE ROLE OF DESIGN IN THE CIRCULAR ECONOMY	7
01.03 CARBON NEUTRALITY FRAMEWORK: THE EUROPEAN AND ITALIAN CONTEXT	11
01.04 EXISTING BUILDINGS AND EVERYDAY HERITAGE	13
01.05 ATLAS OF BEST PRACTICES FOR THE CIRCULAR DESIGN PROCESS	15
01.06 DESIGN TOOLKIT	47
02 EXPLORATION PHASE	
02.01 TERRITORIAL ANALYSIS OF THE APPENNINO BASSO PESARESE-ANCONETANO	51
INHABITANT SYSTEM: POPULATION	
INFRASTRUCTURE AND NATURAL SYSTEM	
MATERIAL MAP: MATERIAL RESOURCES AND DISTRIBUTION	
WEAKNESSES AND STRENGTHS	
02.02 LOCAL ACTORS	61
02.03 CASE STUDY SELECTION	65
02.04 CONTEXT AND ARCHITECTURE ANALYSIS OF ARCEVIA	67
THE NINE CASTLES OF ARCEVIA	
CURRENT PLANNING POLICIES	
INFRASTRUCTURES	
LANDSCAPE	
TOURISM ANALYSIS	
02.05 CONTEXT AND ARCHITECTURE ANALYSIS OF SASSOFERRATO	81
CURRENT PLANNING POLICIES	
INFRASTRUCTURES	
LANDSCAPE	
TOURISM ANALYSIS	
03 DESIGN APPLICATION	
03.01 A CIRCULAR AND TRANSCALAR APPROACH	95
INTERPRETATION	
03.02 CASE STUDY: FORMER PRIMARY SCHOOL IN CASTIGLIONI, ARCEVIA	111
03.03 PROJECT REFERENCES	133
03.04 TRANSITION HAUS: INNOVATIVE EDUCATIONAL AND RESIDENTIAL HUB	141
URBAN STRATEGY	
MASTERPLAN	
FLOOR PLANS	
ELEVATIONS	
SECTIONS	
CIRCULAR DESIGN CONCEPT	
VISIONS	
STRATEGY: STRENGTHENING CIRCULARITY TO ACHIEVE CONSERVATION AND ENHANCEMENT OF EVERYDAY ARCHITECTURAL HERITAGE IN MARGINAL CONTEXT AND INNER TERRITORIES	169
CONCLUSIONS - FUTURE OUTLOOK	170
SOURCES: BIBLIOGRAPHY AND SITOGRAPHY	172
ATTACHMENTS	175

ABSTRACT

The difficult accessibility and the limited availability of essential services, such as education, transportation, and healthcare, led nine municipalities in the Marche region to be recognised as Inner Areas by SNAI (National Strategy for Inner Areas).

In this context, worsened by current **climate change** and the hydrogeological and seismic risks that these areas face, there has been a significant reduction (and aging) of the population. This is also due to emigration flows towards larger urban centers, leading to consequent **architectural degradation** within these areas.

The purpose of this thesis is to investigate two case studies located within the municipalities of **Arcevia** and **Sassoferrato**, which belong to the province of Ancona and are recognized as **Inner Areas** by SNAI.

This thesis made use of a **period of research** abroad, carried out at **HafenCity University** in Hamburg, Germany (chair of Urban Design, Prof. Dott. Arch. Paolo Fusi), with the aim of investigating architectural and energy upgrading strategies applicable to residential buildings built between the **1950s and 1970s**. This time interval was chosen because it represents a time when **energy efficiency regulations** were still absent, making these buildings particularly vulnerable from an energy and environmental point of view. The selection of this range of dates was also made in collaboration with the research being carried out by Dr. Claudia Massioni.

The **ordinary built heritage** in the municipalities of the Inner Areas was mostly constructed after World War II and is quite **obsolete**, degraded, and energy-consuming.

Therefore, the need for **architectural and energy regeneration** is crucial and useful as a catalyst for reactivating a circular economy based on **reuse** and the **involvement of local stakeholders** and citizens, who are the main actors of the process. It should also be considered that the significant demographic decline over time has been accompanied by **changing community needs**, making the design of flexible spaces and functions that evolve with

the community inevitable.

The research in the field will be developed using the **trans-scalar approach** adopted by **B4R – Branding4Resilience**, PRIN 2017 – Linea Giovani, funded by the Ministry of University and Research, coordinated by the Marche Polytechnic University (P.I. Maddalena Ferretti), in collaboration with the University of Palermo, the University of Trento, and the Polytechnic University of Turin.

It also will try to introduce the philosophy adopted in **Circular Design** (Jörg Schröder, Riccarda Cappeller, Alissa Diesch, Federica Scaffidi (2022) *Circular Design: Towards Regenerative Territories*), which arises from the need to reduce **CO2 consumption** derived from the building sector.

In fact, of all the total consumption produced in Europe, 36% comes from building construction and demolition (Eurostat 2020), highlighting the significant impact that the construction sector has on **climate change**.

Therefore, to make Europe the first climate-neutral continent, it is essential to change the way architecture is practiced: reuse, recycling, and renewable materials must be used in design.

The entire **preliminary phase** of the project was developed in parallel with my colleague Lucy Caterina Evangelista, who will present her work later. In this thesis, therefore, there will be an initial part of **territorial analysis** of the two municipalities of **Arcevia** and **Sassoferrato**, and then an in-depth analysis of the project developed in the hamlet of Castiglioni di Arcevia, where the project building is located: the former primary school.

The main **objective of this thesis** is to apply the principles of **circular design** to the building chosen as case study.

The project aims to **avoid demolition**, promoting instead the **valorisation of resources** already present in the area. This approach is realised through the use of **local materials**, the design of **flexible spaces** and the creation of a renewed sense of belonging for areas that have been abandoned for too long, giving them a new vitality and meaning within the urban and social context.

ABSTRACT

è stato accompagnato dal **cambiamento dei bisogni delle comunità**, rendendo inevitabile la progettazione di spazi e funzioni flessibili che evolvano con la comunità stessa.

La ricerca sarà sviluppata utilizzando l'**approccio trans-scalare** adottato da **B4R – Branding4Resilience**, PRIN 2017 – Linea Giovani, finanziato dal Ministero dell'Università e della Ricerca, coordinato dall'Università Politecnica delle Marche (P.I. Maddalena Ferretti), in collaborazione con l'Università di Palermo, l'Università di Trento e il Politecnico di Torino. Si cercherà inoltre di introdurre la filosofia adottata nel ****Circular Design**** (Jörg Schröder, Riccarda Cappeller, Alissa Diesch, Federica Scaffidi, 2022 – **Circular Design: Towards Regenerative Territories**), che nasce dall'esigenza di ridurre il consumo di **CO2** derivante dal settore edilizio.

Infatti, del consumo totale prodotto in Europa, il 36% proviene dalla costruzione e demolizione degli edifici (Eurostat 2020), evidenziando il significativo impatto che il settore edilizio ha sul **cambiamento climatico**.

Pertanto, per rendere l'Europa il primo continente a impatto climatico neutro, è essenziale cambiare il modo in cui si pratica l'architettura: riuso, riciclo e materiali rinnovabili devono essere integrati nella progettazione.

Tutta la **fase preliminare** al progetto è stato sviluppata in parallelo insieme alla mia collega Lucy Caterina Evangelista, che esporrà il suo lavoro successivamente. In questa tesi sarà quindi presente una prima parte di **analisi territoriale** dei due comuni di **Arcevia** e **Sassoferrato** e si approfondirà poi il solo progetto sviluppato nella frazione Castiglioni di Arcevia, in cui è presente l'edificio di progetto: l'ex scuola elementare.

L'**obiettivo di questa tesi** è applicare la filosofia del **circular design** all'edificio scelto come caso studio. Il progetto mira a evitare la **demolizione**, promuovendo la **valorizzazione delle risorse** già presenti sul territorio. Questo approccio si concretizza nell'impiego di **materiali locali**, nella progettazione di **spazi flessibili** e nella creazione di un rinnovato senso di appartenenza per aree abbandonate da troppo tempo, restituendo loro una nuova vitalità all'interno del contesto urbano e sociale.

INTRODUCTION

“In our current economy, we take materials from the Earth, make products from them, and eventually throw them away as waste – the process is linear. In a circular economy, by contrast, we stop waste being produced in the first place.”

Ellen MacArthur Foundation

The waste of the construction sector significantly contributes to the total waste stream: in fact, it is responsible for **36% of global energy consumption** and emissions (Eurostat 2020). Excluding soil consumption, waste from buildings mainly results from the use of various materials, such as **concrete, bricks**, wood, glass, metals, plastics, and solvents (European Commission: EIP on Raw Materials. Raw Materials Scoreboard, 2018, Giorgi et al., 2018). This impact not only has irreversible socioeconomic and environmental effects but also rapidly consumes non-renewable resources (soil, water, energy).

With the **European Green Deal**, Europe has set the goal of reducing energy consumption produced by its member countries, aiming to achieve **carbon neutrality by 2050**. The construction sector has been identified as one of the most important sectors to intervene in order to achieve this objective.

The European Union's Action Plan for the Circular Economy emphasizes several initiatives aiming at managing construction waste. These include promoting sorting systems, encouraging recycling, and implementing design improvements to enhance the circularity of construction waste throughout Europe (European Union, 2015). Also, the New European Bauhaus initiative (European Commission 2022c) aims to guide design and architecture disciplines, combining sustainability with aesthetics, technology with art, and an overall cultural change. To achieve the goal of a climate-neutral Europe, it is essential to go beyond the big cities and consider the strategic role of marginal territories and rural areas in the circular transition. These territories can become real laboratories of sustainable innovation.

The objective of this research is to apply the

principles of circular design to two buildings constructed between the 1950s and 1970s, located in the municipalities of Arcevia and Sassoferrato, in the province of Ancona, in the heart of the Inner Area Appennino Basso Pesarese Anconetano.

This area was the first one identified by the National Strategy for Inner Areas (SNAI) in the Marche region and represents a context of great interest for the sustainable recovery of the existing building heritage.

The thesis makes use of a preliminary research period carried out in Hamburg, Germany, where architectural and energy rehabilitation strategies applicable to public buildings of the same historical period were analysed. This time period was chosen because it was characterised by the absence of energy efficiency regulations, making these buildings particularly obsolete from an environmental point of view. Through the analysis of best practices developed in Germany, the work aims to transfer concrete solutions for the regeneration of the buildings studied, adopting an approach that enhances local resources and promotes community involvement.

The research analysis was conducted in collaboration with my colleague Lucy Caterina Evangelista, using a trans-scalar approach promoted by the B4R - Branding4Resilience project (PRIN 2017), coordinated by the Università Politecnica delle Marche in collaboration with the Universities of Palermo, Trento and Turin. In parallel, the research was inspired by the Circular Design principles (Schröder et al., 2022), which highlights the urgency of reducing CO2 emissions through the reuse of materials, recycling and the integration of regenerative practices in architectural design. Indeed, a large portion of the building stock in the municipalities of the Inner Areas was built after World War II and is now

INTRODUZIONE

Il settore delle costruzioni contribuisce in modo significativo al flusso totale di rifiuti: infatti, è responsabile del **36% del consumo energetico globale** e delle emissioni (Eurostat 2020). Escludendo il consumo del suolo, i rifiuti derivanti dagli edifici sono principalmente il risultato dell'utilizzo di vari materiali, come **calcestruzzo, mattoni**, legno, vetro, metalli, plastica e solventi (Commissione Europea: EIP on Raw Materials. Raw Materials Scoreboard, 2018, Giorgi et al., 2018). Questo impatto non solo ha effetti socioeconomici e ambientali irreversibili, ma consuma rapidamente risorse non rinnovabili (suolo, acqua, energia).

Con il **Green Deal Europeo**, l'Europa ha fissato per la prima volta l'obiettivo di ridurre il consumo energetico prodotto dai paesi membri, puntando a raggiungere la **neutralità carbonica entro il 2050**. Il settore delle costruzioni è stato identificato come uno dei settori più importanti su cui intervenire per raggiungere tale obiettivo.

Il Piano d'Azione per l'Economia Circolare dell'Unione Europea sottolinea diverse iniziative volte a gestire i rifiuti da costruzione (CWM). Tra queste vi sono la promozione di sistemi di separazione, l'incoraggiamento al riciclo e l'attuazione di miglioramenti progettuali per aumentare la circolarità dei rifiuti da costruzione in tutta Europa (Unione Europea, 2015). Inoltre, l'iniziativa New European Bauhaus (Commissione Europea 2022c) mira a guidare le discipline del design e dell'architettura, combinando sostenibilità ed estetica, tecnologia e arte, favorendo un cambiamento culturale complessivo.

L'obiettivo di questa ricerca è applicare i principi del circular design a due edifici costruiti tra gli anni '50 e '70, situati nei comuni di Arcevia e Sassoferrato, nella provincia di Ancona, nel cuore dell'Area Interna dell'Appennino Basso Pesarese Anconetano. Quest'area è stata la prima individuata dalla Strategia Nazionale per le Aree Interne (SNAI) nella regione Marche e rappresenta un contesto di grande interesse per il recupero sostenibile del patrimonio edilizio esistente.

La tesi si avvale di un periodo di ricerca preliminare svolto ad Amburgo, in Germania, dove sono state analizzate strategie di riqualificazione architettonica ed energetica applicabili a edifici pubblici dello stesso periodo storico. Questo intervallo temporale è stato scelto poiché caratterizzato dall'assenza di normative sull'efficientamento energetico, rendendo tali edifici particolarmente obsoleti dal punto di vista ambientale. Attraverso l'analisi di best practices sviluppate in Germania, il lavoro mira a trasferire soluzioni concrete per la rigenerazione degli edifici studiati, adottando un approccio che valorizzi le risorse locali e promuova il coinvolgimento delle comunità.

L'analisi di ricerca è stata condotta in collaborazione con la mia collega Lucy Caterina Evangelista, utilizzando un approccio trans-scalare promosso dal progetto B4R – Branding4Resilience (PRIN 2017), coordinato dall'Università Politecnica delle Marche in collaborazione con le Università di Palermo, Trento e Torino. In parallelo, la ricerca si è ispirata alla filosofia del Circular Design (Schröder et al., 2022), che evidenzia l'urgenza di ridurre le emissioni di CO2 attraverso il riuso di materiali, il riciclo e l'integrazione di pratiche rigenerative nella progettazione architettonica. Infatti, gran parte del patrimonio edilizio nei comuni delle Aree Interne è stato costruito nel secondo dopoguerra e risulta oggi degradato, energivoro e scarsamente utilizzato. La **rigenerazione architettonica basata sul circular design** diventa così un catalizzatore per innescare processi di economia circolare, coinvolgendo stakeholder locali e cittadini, e rispondendo alle esigenze di comunità che hanno subito un marcato spopolamento e un progressivo cambiamento dei bisogni.

Il lavoro di ricerca si è concentrato su una doppia analisi territoriale dei comuni di Arcevia e Sassoferrato, evidenziando da un lato carenze infrastrutturali e di servizi, dall'altro punti di forza legati al turismo naturalistico e architettonico, nonché alle tradizioni culinarie. La strategia territoriale utilizzata si è basata sul Cityforming Protocol di Maurizio Carta,

progressive change in needs.

The research work focuses on the territorial analysis of the municipalities of Arcevia and Sassoferrato, highlighting on the one hand infrastructural and service deficiencies, and on the other hand strengths linked to nature, architectural tourism and culinary traditions.

The territorial strategy used was based on Maurizio Carta's Cityforming Protocol (2015), articulated in three successive phases, the first of which is of fundamental importance, as it is generated with bottom-up actions, essential to understand the real needs of the community and then intervene later with more substantial investments.

The next phase is a descent of scale, where the research work focused on the hamlet of Castiglioni di Arcevia, where the building under study is located: the former primary school, built in the 1960s and currently managed on loan for use by a sports association.

This building represents a pilot project for circular design, with the intention of serving as a replicable example for other hamlets in the municipality and neighbouring territories.

My colleague Lucy Caterina Evangelista, on the other hand, will later present the study carried out in the municipality of Sassoferrato in which she developed a project in the building of the former municipal police, also built around the same time.

The decision to intervene in the small hamlet of Castiglioni, located in a municipality as large as Arcevia, was guided by the intention of creating a pilot area for circular design.

This hamlet, due to its social and territorial characteristics, lends itself to becoming a replicable model both for the other hamlets of Arcevia and for the neighbouring municipalities of the Inner Areas.

The main objective is to test a circular design approach on a small scale, exploiting the strong sense of cohesion and active participation of the local community. This cohesive and dynamic context makes it possible to test innovative solutions, which can then be adapted and applied

to larger and more complex territorial realities. As the building under intervention is a former primary school and considering Castiglioni's role as a pilot hamlet, the project aimed to transform it into a multifunctional space capable of integrating different needs and promoting a circular approach. Prominent among the planned functions is the creation of an architecture school for the young and very young, conceived to make the new generations aware of the principles of circular design from their earliest years of education.

The municipality of Arcevia is also known for its commitment to cultural and social policies: it hosts an important reception centre for migrants and has promoted important artistic initiatives, such as the Ar(t)cevia project. It is also famous for its nine historic castles, including that of Castiglioni. Considering these peculiarities, the project aimed to make the building sensitive to two central themes: the inclusion of migrants and the enhancement of art. For this reason, temporary residences were designed for artists and migrants, creating a space that fosters cultural integration and artistic production, in line with the territory's identity and potential.

In parallel, my colleague Lucy Caterina Evangelista developed the project for a building located in Sassoferrato, a former municipal police headquarters built in the same period, in which the intervention aims to identify the building in question as an important element of connection between the historical village of the municipality of Sassoferrato and the new sports centre, developed near the Sentino river, an important landmark for the area.

The overall objective of this thesis is to demonstrate how architectural regeneration based on circular design can offer a concrete response to the need for redevelopment of buildings in the Inner Areas, contributing to the economic, social and cultural revitalisation of the territory. The chosen approach aims to transform the limitations of obsolete buildings into opportunities, promoting the reuse and enhancement of local resources, with a design sensitive to the context and the evolving needs of communities.

articolata in tre fasi successive di cui la prima risulta di fondamentale importanza, in quanto generata con delle azioni di "bottom up", essenziali per comprendere le vere esigenze della comunità e intervenire poi successivamente con degli investimenti più ingenti.

La fase successiva è costituita da una discesa di scala, dove il lavoro di ricerca si è concentrato sulla frazione di Castiglioni di Arcevia, in cui si colloca l'edificio oggetto di studio: l'ex scuola elementare, costruita negli anni '60 e attualmente gestita in comodato d'uso da un'associazione sportiva. Questo edificio rappresenta un'area pilota per la progettazione circolare, con l'intento di fungere da esempio replicabile per altre frazioni del comune e per i territori limitrofi.

La mia collega Lucy Caterina Evangelista, invece, presenterà successivamente lo studio effettuato nel comune di Sassoferrato in cui ha sviluppato un progetto nell'edificio degli ex vigili urbani, costruito anch'esso intorno agli stessi anni.

La scelta di intervenire nella piccola frazione di Castiglioni, situata in un comune ampio come Arcevia, è stata guidata dall'intento di creare un'area pilota per la progettazione circolare. Questa frazione, per le sue caratteristiche sociali e territoriali, si presta a diventare un modello replicabile sia per le altre frazioni di Arcevia sia per i comuni limitrofi delle Aree Interne.

L'obiettivo principale è sperimentare su una scala ridotta un approccio basato sul circular design, sfruttando il forte senso di coesione e la partecipazione attiva della comunità locale. Questo contesto coeso e dinamico consente di testare soluzioni innovative, che possano poi essere adattate e applicate a realtà territoriali più ampie e complesse. Essendo l'edificio oggetto di intervento un'ex scuola elementare e considerando il ruolo di Castiglioni come frazione pilota, il progetto ha mirato a trasformarlo in uno spazio multifunzionale capace di integrare diverse esigenze e promuovere un approccio circolare. Tra

le funzioni previste, spicca la realizzazione di una scuola di architettura per giovani e giovanissimi, concepita per sensibilizzare le nuove generazioni ai principi del circular design fin dai primi anni di formazione.

A questa funzione educativa si aggiungono spazi di coworking e aree destinate all'organizzazione di eventi per la comunità locale, con l'obiettivo di favorire la coesione sociale e il senso di appartenenza.

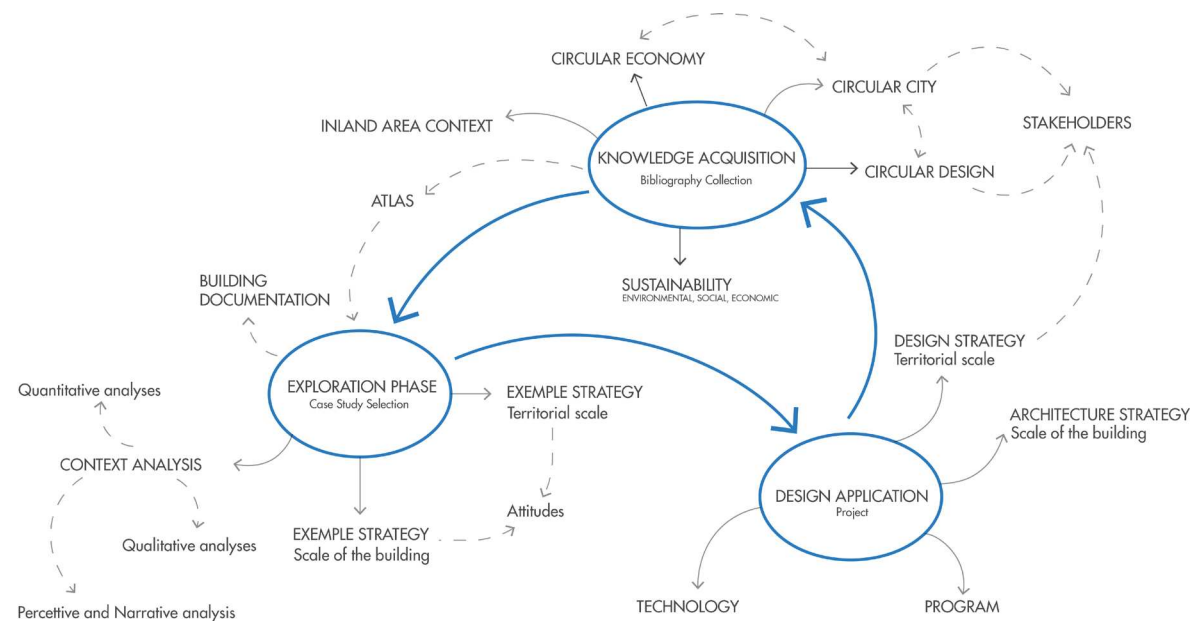
Il comune di Arcevia, inoltre, è noto per il suo impegno in politiche culturali e sociali: ospita un importante centro di accoglienza per migranti e ha promosso iniziative artistiche di rilievo, come il progetto Ar(t)cevia. È anche celebre per i suoi nove castelli storici, tra cui quello di Castiglioni. Alla luce di queste peculiarità, il progetto ha voluto rendere l'edificio sensibile a due tematiche centrali: l'inclusione dei migranti e la valorizzazione dell'arte.

Per questo motivo, sono state progettate residenze temporanee destinate ad artisti e migranti, creando uno spazio che favorisca l'integrazione culturale e la produzione artistica, in linea con l'identità e le potenzialità del territorio.

In parallelo, la collega Lucy Caterina Evangelista ha sviluppato il progetto per un edificio situato a Sassoferrato, un'ex sede dei vigili urbani costruita nello stesso periodo, in cui l'intervento mira a identificare l'edificio in questione come un importante elemento di connessione tra il borgo storico del comune di Sassoferrato e il nuovo polo sportivo, sviluppato nei pressi del fiume Sentino, importante landmark per il territorio.

L'obiettivo complessivo di questa tesi è dimostrare come la rigenerazione architettonica basata sul circular design possa offrire una risposta concreta alla necessità di riqualificazione degli edifici delle Aree Interne, contribuendo al rilancio economico, sociale e culturale del territorio. L'approccio scelto punta a trasformare i limiti degli edifici obsoleti in opportunità, promuovendo il riuso e la valorizzazione delle risorse locali, con una progettazione sensibile al contesto e alle esigenze in evoluzione delle comunità.

RESEARCH STRUCTURE



The research was divided into **three fundamental phases**, interconnected and structured in a multi-scalar and directional logic, each with a specific and complementary role in the various project phases. The phases are outlined as follows:

KNOWLEDGE ACQUISITION

In this initial phase, was developed during the stay in Hamburg in collaboration with Prof. Paolo Fusi, the main objective was to **understand the state of art** and the reference context at European and international level regarding circular architecture. The importance of the topic was deepened and the current implementations were analysed in terms of both regulations and applications. Using the **Research by Design methodology**, an Atlas of design solutions was created. This approach considers the project as a research tool to develop innovative solutions adaptable to the context of intervention, promoting a critical understanding of design opportunities.

EXPLORATION PHASE

This phase was dedicated to the **analysis of the context** through a **trans-scalar approach**. The characteristics and dynamics of the intervention sites were assessed through an **in-depth analysis of infrastructure, natural and cultural systems**. The analysis included the identification of associations, museums and accommodation facilities, with the aim of **mapping strengths and weaknesses**. This phase was crucial for defining targeted strategies to strengthen and improve the specific needs of the two municipalities under study.

DESIGN APPLICATION

The last phase involved integrating and applying the information gathered in the previous phases, translating it into concrete design proposals. The activity **focused on the building scale**, developing application visions of circular architectural solutions, with the aim of offering **replicable and adaptable models** for sustainable regeneration.

Il percorso di ricerca e sviluppo si è articolato in **tre fasi fondamentali**, interconnesse e strutturate in una logica multiscalare e direzionale, ognuna con un ruolo specifico e complementare nelle varie fasi progettuali. Le fasi sono delineate come segue:

ACQUISIZIONE DELLA CONOSCENZA

In questa fase iniziale, l'obiettivo principale è stato quello di **comprendere lo stato di fatto** e il contesto di riferimento a livello europeo e internazionale **riguardo all'architettura circolare**. Si è approfondita l'importanza del tema e sono stati analizzati i contributi attualmente implementati sia sul piano normativo che applicativo. Utilizzando la **metodologia del Research by Design**, è stato creato un **Atlas di soluzioni progettuali**. Questo approccio considera il progetto come uno strumento di ricerca per sviluppare soluzioni innovative e adattabili al contesto di intervento, promuovendo una comprensione critica delle opportunità progettuali.

FASE ESPLORATIVA

Questa fase è stata dedicata all'**analisi del contesto** attraverso un **approccio trans-scalare**. Sono state valutate le caratteristiche e le dinamiche dei luoghi di intervento mediante un'**analisi approfondita delle infrastrutture**, dei sistemi naturali e culturali. L'analisi ha incluso l'identificazione di associazioni, musei e strutture ricettive, con l'obiettivo di **mappare punti di forza e criticità**. Questa fase si è rivelata cruciale per definire strategie mirate, destinate a rafforzare e migliorare le necessità specifiche dei due comuni oggetto di studio.

APPLICAZIONE PROGETTUALE

L'ultima fase ha avuto il compito di integrare e applicare le informazioni raccolte nelle fasi precedenti, traducendole in proposte progettuali concrete. L'attività si è concentrata sulla **scala dell'edificio**, sviluppando visioni applicative di soluzioni architettoniche circolari, con l'obiettivo di offrire modelli replicabili e adattabili per una rigenerazione sostenibile.

METHODOLOGICAL FRAMEWORK

Given the complexity and richness of the territory and the need to create a cognitive background with respect to the methodological approaches of circular design, **the research operates with different qualitative-quantitative tools** and with an integrated, multi-scalar and **trans-disciplinary approach**, envisaging a subdivision into different temporal and operational steps.

On the one hand, the **interpretation of the territory**, its data, and values, were of fundamental importance to frame, in the first instance, the area under study and understand its problems and potential.

On the other hand, the **research and analysis of good practices** allowed us to delve into the issue of sustainable and **circular design as a tool for the rehabilitation of marginal contexts**. In a context such as that of inland areas, it is evident that there are many issues that need to be dealt with and addressed in order to create a better future through the continuous development of new knowledge, through a search for strategies, methods and different modalities (Roggema, 2016). (B. di Leo, p.358)

It is for this reason that the methodology of **research by design** in parallel with the methodology adopted by **B4R** was considered the most suitable to address the problems of the Inner Area of the Appennino Basso Pesarese Anconetano.

THE PROJECT AS A KNOWLEDGE TOOL RESEARCH BY DESIGN

Research is both the study of the project and the process of knowledge production that occurs through the project action itself (Viganò, 2010).

It is a **circular process** in which **the architectural project**, which is, after all, one of the most important tools for embodying ideas, itself becomes both **medium and object of study**, dynamic and responsive to changes in the context in which it is to be carried out. (Wakkary, 2005) (Hauberg, 2011) (Glanville, 1999) (B. di Leo, p.358).

In this sense, the chosen method of analysis of **‘multiple case-studies’** is at the core of the research investigation **for the understanding**

of adaptive and circular reuse solutions, the analysis of multiple case studies ensures a detailed and broad understanding of the topic; the use of this type of research investigation is generally established in research and popular studies on the topic of adaptive reuse Baum & Christiansee 2012; Bollack 2013; Wong 2016, Robiglio 2017, Plevoets & Van Cleempoel 2019, Lang et al 2022. (F.Chiacchiera p.16)

The municipalities of the Inner Areas are, therefore, continuously compared, decomposed, recomposed and re-imagined: the research leads to the construction of possible scenarios at different scales, which are constantly verified through the project tool, fundamental for the dialogue with the local administration and for the triggering of new material and immaterial relations between municipalities. (B. di Leo, p.358)

THE B4R METHODOLOGY

The **B4R methodology** is based on the integration of **quantitative and qualitative tools** to broaden **direct knowledge and experience** of places and to establish contacts and carry out interviews with both institutional actors and citizens. Among the tools, **field research** can be conducted **through questionnaires** and surveys **with the local community**, through a series of semi-structured questions, but also in a qualitative way, with **site visits**, **photo campaigns**, open dialogues with the inhabitants. (M.Ferretti, p.40)

Perceptual-narrative exploration is conducted with different forms of **storytelling** that aim to reveal the hidden qualities of the analysed areas.

Storytelling is also used **as an exploration tool** in its analytical-communicative sense, to understand places in a simple and direct way, **but also as a planning tool**, to prefigure transformative visions. Finally, in order to explore the focus areas, the architectural, landscape, urban planning, development project is used as a **‘reading tool, of conceptual innovation’** useful for its selective and reassembling processes, as well as for its anticipatory and visionary quality.

QUADRO METODOLOGICO

zioni di riuso adattivo e circolare, l’analisi di casi studio multipli garantisce una comprensione dettagliata e vasta del tema; il ricorso a questa tipologia di indagine di ricerca è generalmente consolidata negli studi di ricerca e divulgativi sul tema del riuso adattivo Baum & Christiansee 2012; Bollack 2013; Wong 2016, Robiglio 2017, Plevoets & Van Cleempoel 2019, Lang et al 2022. (F.Chiacchiera p.16)

I comuni delle Aree Interne vengono, dunque, continuamente comparati, scomposti, ricomposti e ri-immaginati: la ricerca porta alla costruzione di possibili scenari a diverse scale, che vengono verificati costantemente tramite lo strumento del progetto, fondamentale per il dialogo con l’amministrazione locale e per l’innescare di nuove relazioni materiali e immateriali tra comuni. (B. di Leo, p.358)

LA METODOLOGIA B4R

La metodologia **B4R** si basa sull’integrazione di **strumenti quantitativi e qualitativi** per ampliare la conoscenza diretta e l’esperienza dei luoghi e per stabilire contatti e realizzare interviste sia con gli attori istituzionali sia con i cittadini. Tra gli strumenti, la ricerca sul campo può essere condotta **attraverso questionari e indagini con la comunità locale**, tramite una serie di domande semi-strutturate, ma anche in modo qualitativo, con **visite in loco**, **campagne fotografiche**, dialoghi aperti con gli abitanti. (M.Ferretti, p.40)

L’esplorazione **perceptivo-narrativa** è condotta con diverse forme di narrazione che mirano a svelare le qualità nascoste delle aree analizzate.

Anche lo **storytelling** viene impiegato **come strumento di esplorazione** nella sua accezione analitico-comunicativa, per comprendere i luoghi in modo semplice e diretto, **ma anche come strumento progettuale**, per prefigurare visioni trasformative. Infine, per esplorare le focus area, il progetto di architettura, di paesaggio, di urbanistica, di valorizzazione è utilizzato come **“strumento di lettura, di innovazione concettuale”** utile per i suoi processi selettivi e di riassetto, nonché per la sua qualità anticipatoria e visionaria.

BACKGROUND

This research follows the goals of the inner areas and uses methods from the PRIN **Branding4Resilience** project, which explores the territory and the potential of branding in the small villages and landscapes of four inland Italian areas, in this way small cities and towns, as well as villages and hamlets that have been excluded from the usual discourses, are now rediscovered by lines of investigation of architecture and urban design on smaller centres.

In this framework, the focus goes beyond city limits and includes areas that are often overlooked.

With activities such as **recycling**, reuse and reactivation, **rural and shrinking settlements** can be regenerated (Carta et al., 2017). Especially in territories suffering from **marginality** and abandonment such as the **Italian Inner Areas**, the reactivation of the built heritage has been studied in its potential as a stimulus for **local development** and resettlement of inhabitants. (Ferretti, Di Baldassarre and Rigo, 2022:2).

Furthermore, as C. Massioni argues in order to **combat marginalisation** and create a **circular metabolism**, design practice oriented towards the transformation of the built environment must be combined with a transcale approach, reconnecting the built heritage to territorial complexity. In this sense, **circular design** also embodies a new approach for the analysis and interpretation of **transformation processes** in marginalised contexts.

Demographic changes in the European Union (EU) are far from uniform, some areas, especially **rural or peripheral ones**, are progressively **ageing**, as a result of the polarisation of settlement processes, at the same time, differences are growing between thriving cities and areas that are losing population, leading to more inequality.

In recent years, the proof of these processes

has brought attention to the growing problem of **territorial inequalities**, leading to a strong renewed discussion and new public policies at both the European and national levels.

Inland and remote places have common issues despite their different perspectives, these challenges include **poverty**, unemployment, **social exclusion**, and environmental damage. Even in Italy, where marginality and abandonment in inland territories are the result of a temporally stratified process in which long-term and very long-term dynamics are intertwined and overlap, the issues of territorial imbalances and spatial inequalities have been at the centre of the disciplinary debate for several years now and are at the heart of the interesting experience of the **SNAI - National Strategy for Inner Areas**.

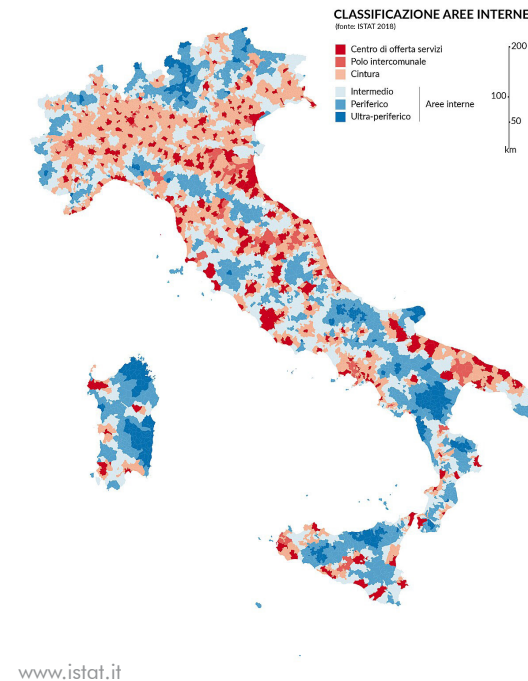
BRANDING 4 RESILIENCE

<https://www.branding4resilience.it/>

SNAI (NATIONAL STRATEGY FOR INNER AREAS)

It represents an innovative **national policy** for territorial development and cohesion aimed at counteracting the marginalization and demographic decline typical of the inner areas. Throughout Italy the so called 'inner areas' are areas that are anything but residual and, on the whole, **represent almost 53% of the Italian municipalities**, which are home to 23% of the population - almost 13540 million people - and cover about 60% of the country's entire territory. (B.Lino, B4R)

This strategy was initially launched for a first season from 2014 to 2020, in which a total of 72 areas have been identified as part of the first phase. It also has renewed for a second season from 2021 to 2027 adding new areas.



The **SNAI** was successful in recognizing these areas as important places with unique identities.

It sees them as valuable opportunities for change because they hold different ways of living compared to typical urban settings. These areas showcase the diversity and richness of the country's neighborhoods, especially regarding their natural surroundings, history, architecture, and community strengths.

Within the **SNAI** framework, various research projects have been launched in Italy to study the challenges and opportunities in **rural areas** that are **losing population** and are far from key services like schooling, health care, and transportation.

The **B4R** research suggests changing the focus from simply looking at inland areas to a wider view of internal territories, including regions facing challenges like demographic decline, isolation, older populations, and lack of services and infrastructure. These areas are seen as **complex and vulnerable spaces** that require careful planning and management, going beyond the limits set by the **SNAI** classifica-

BACKGROUND

tion.

Inner areas are seen as **mixed environments** that need to become productive and highlight their untapped strengths. It's important to view these regions as **places with potential** for growth and social progress, that can create strong identities based on their rural characteristics and build new connections that combine their history with **creativity and social change**. To make the most of these opportunities, we need to work improving **local resources** and historical sites. This includes **restoring abandoned buildings** and other unused places for both tourists and local residents.

Small centers are often characterised by many old and unused buildings, which can be a big problem for upkeep costs for both the local government and property owners, by finding new ways for them to be used, especially in culture and local economic activities, is a great chance to **build new community facilities**, public service areas, and housing options.

We need to change how we plan by focusing on **making inner areas appealing**, this means thinking about how the government can support and promote a different way of living beyond large urban centres. Additionally, we should emphasize **working together** and building relationships within the community, this will help everyone **share resources** and make the most of opportunities for the benefit of all.

The goal for this areas, in this sense, is to develop new, strong, and **sustainable ways of using land** by designing solutions that focus on **recycling and reusing existing buildings**, following circular design principles.

MARCHE REGION INNER AREAS

The Marche region, in central Italy, characterised by a great variety of settlement, cultural and natural spaces, is an emblematic example of how SNAI has been implemented at local level.

In fact, the region was the third in Italy to participate in SNAI, immediately identifying three internal areas, **Appennino Basso Pesarese e Anconetano, Alto Maceratese and Ascoli Piceno**, for a total of 44 municipalities and 86,407 inhabitants involved, these areas serve as the SNAI pilot area for the Marche Region and are also the focus area of the Marche Polytechnic University within the ‘Branding4Resilience’ project.

This strategy aims to **revitalize the region’s inner areas** through a series of interventions that promote **local development** and improve essential services for citizens, such as healthcare, transportation, and education, focusing on addressing depopulation and marginalization issues that characterize many of these areas by adopting an **integrated approach**.

In addition to these, with the new 2021-2027 programming period, **three further areas have been added** by the SNAI, presented based on the priority order of the new inner areas for access to national funds by the Marche Region: Montefeltro e Alta Valle del Metauro, Appennino Alto Fermano, Potenza Esino Musone. The Inner Areas Strategy focuses on addressing depopulation and marginalization issues that characterize many of these areas by adopting an integrated approach.

As mentioned in atlas B4R, in addition to the issues of depopulation (-9.33% of residents between 2011-2019) and the consequent abandonment of the built heritage and territory, with problems of guardianship and care, it is necessary to consider the **great vitality of these places** and the many qualities they have to offer. First and foremost, the **natural resources**, such as parks and protected reserves, particularly the well-known Gola del Furlo to the north

and Grotte di Frasassi to the south, make this green Apennine more accessible to conscientious and respectful tourists (+31.46% of the tourist population in summer 2019). However, there is also data on the planning dynamism that demonstrates the **ability to intercept strategies** and projects on a supra-municipal scale (ABPA participates in three Local Integrated Projects and three River Contracts) and the administrations’ vitality, which is influenced, for instance, by the area’s comparatively young average age and by the administrators’ comparatively youthful average age (45/69 years).

From the point of view of **settlement structure**, the Marche region has a varied landscape that goes from the mountains of the **Umbro-Marchigiano Apennines** to the **Adriatic Sea**. It has a comb-like structure with roads and ecological pathways that act as the main support for the area. **Productive valleys** and reliefs intersect with remains of rural settlements throughout the region, **urban centers** are predominantly located **along the coast** and near river systems and infrastructure, whereas mountainous areas exhibit a distinct distribution of villages situated within reserves and natural parks of significant value.

The **Focus Area** is intersected by two significant **historical routes**: the **Via Flaminia** to the north and the **Strada Clementina** to the south. It is situated between the municipal centers of Urbino and Fabriano, which are the nearest locations within the Marche Region that provide essential services such as education, health, and mobility. **The access to the two cities is challenging**, as they are connected solely by provincial roads and a partially present but **disused railway line**, the **Fabriano-Pergola** section, which was closed in 2013, and reopened in 2021 solely for scheduled tourism rides.

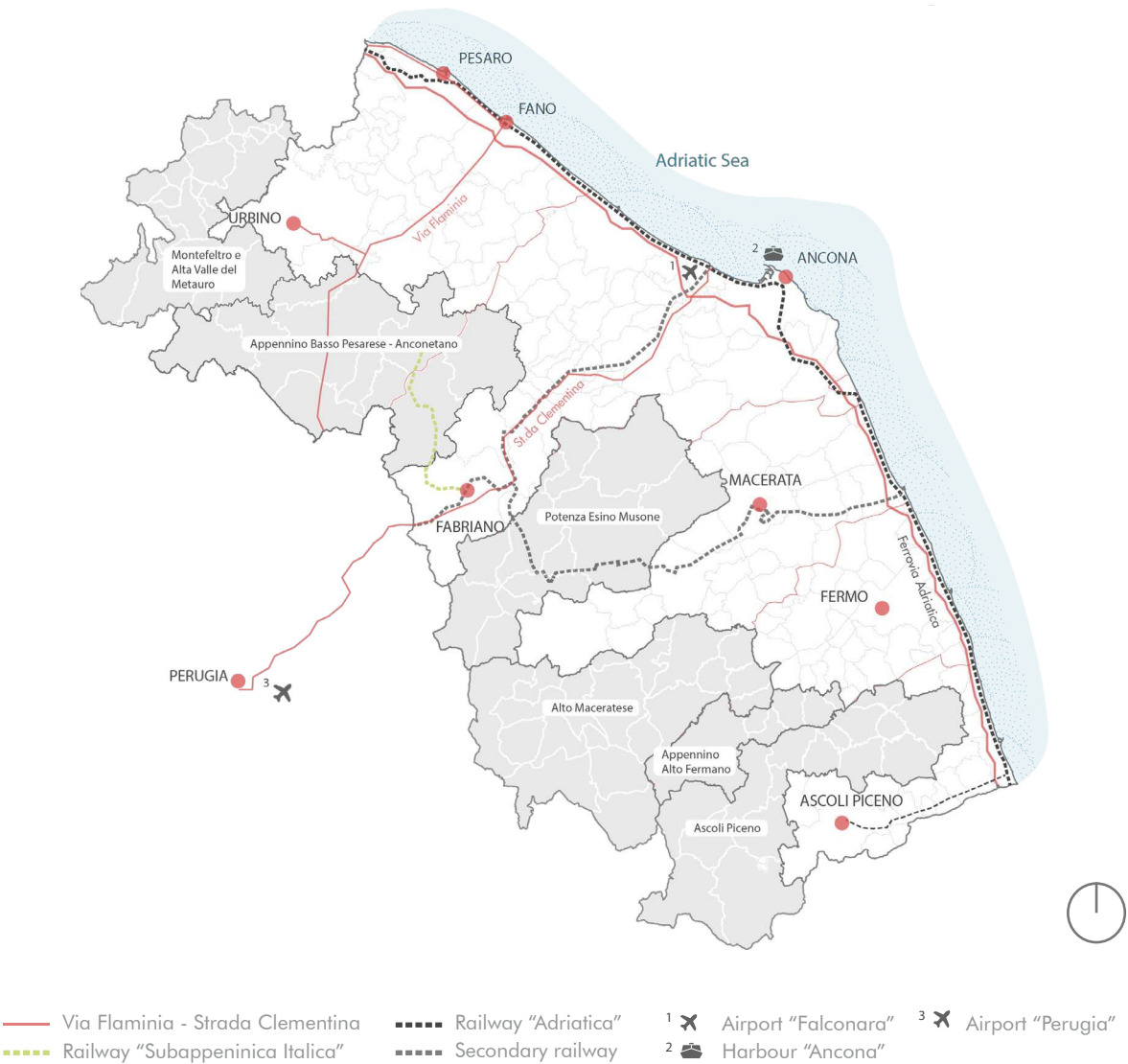
There are current plans that propose interventions along the entire railway section extending to the city of Urbino, aimed at enhancing the interconnected territorial, landscape, and

economic-productive systems from the coast to the inland areas. Furthermore, as highlighted also by the B4R project, it was noted that **rising altitude** influences **population density**; a notable example is the municipality of Apecchio, which, being among the three highest-altitude municipalities, exhibits the lowest population density. In contrast, Acqualagna, the municipality with the lowest altitude, exhibits a population density nearly twice that of the other municipalities.

Fabio Renzi recognizes the **potential of the Apennines**, as a contemporary inhabited

area, challenging the ‘physical and social forms of the future rather than the present’ and reconceptualizing it as a ‘large polycentric urban mountain space’.

It is crucial to analyze and **improve the strengths** of the intervention area, adopting a **circular strategy** that economically revitalizes these internal regions and mitigates the current depopulation. This can be accomplished by establishing **new centralities** to tackle local services and needs, **utilizing existing resources** such as the **active human capital** in the region and the material and natural assets that support the **development of rural villages**.



01 KNOWLEDGE ACQUISITION

01.01 WHAT IS A CIRCULAR ECONOMY?

This first chapter aims to provide an overview of the current topics and issues related to **sustainability and circularity** in building construction, with a particular focus on the role of architecture as a fundamental driver of innovation.

By emphasizing architecture's role and its transcalar approach, this research seeks to bridge the gap between theory and practice, demonstrating how **circular principles** can be effectively applied in diverse spatial contexts, particularly in marginal and sparsely populated areas, where architectural regeneration is not only a technical necessity but also a means of **reactivating local economies, fostering social cohesion**, and preserving cultural heritage.

As mentioned in the book "Circular Construction and Circular Economy", in September 2020, during her State of the Union address, Ursula von der Leyen, the President of the European Commission, emphasized the aim of creating a completely circular economy in the EU. The Circular Economy Action Plan (CEAP) included this goal in its publication in March 2020. She highlighted the building industry as having a significant duty because, according to the Commission, it used 50% of the main raw materials in the EU in 2019 and produced 36% of solid trash.

This happens because we currently think in a **linear way** about how we use resources: we take raw materials from nature, make them into goods and products for public consumption, and then throw them away.

The data from Germany shows that we've produced a lot of man-made materials worldwide, but we don't know what to do with them other than throw them away or burn them. (Circular Economy Action Plan (CEAP))

Considering natural resources are running out quickly, our cities could serve as new places to find things in the future. From this new point of view, cities could use resources but also provide them, which helps them keep growing and improving.

New York planner Mitchell Joachim says, "In the future city, there won't be a difference between waste and resources."

These "urban mines" can provide a lot of ma-

terials; in order to do that, the goal is to create new ways to build and **new technologies** to make building materials that are **eco-friendly**, easy to separate, and **cost-effective**, so they can be **reused** many times.

Unfortunately, the vast majority of the existing built environment is made of materials and ways that are difficult to take apart and reuse and was neither designed nor built with **deconstruction** or reuse in mind.

Circular construction focuses on the future and requires all new buildings and renovations to follow the guidelines of using one type of material that is also easy to take apart. The purpose of buildings is to store materials for future reuse and **recovery**.

To change the building sector to follow **circular construction principles**, we need to completely rethink how we manage resources during construction and in the buildings we create.

The goal in the **circular economy** is to create a record that shows what materials are available for reuse or **recycling**, including their amounts and types, and when and where they will be available in the future.

According to the book "Circular Construction and Circular Economy" (Felix Heisel, 2022), in order to comprehend material flows and facilitate their integration into closed cycles, circular construction necessitates the creation of comprehensive passports.

A **materials passport** is a digital record of all materials, components, and products used in a building, including detailed information on quantities, qualities, dimensions, and positions of all materials.

However, addressing circularity only at the material level is not sufficient; it is crucial to consider broader spatial and territorial dynamics, particularly in marginal and rural areas.

Another essential aspect for a **circular approach** to architecture is integrating a **transcalar perspective** as a solution to these challenges. The transcalar approach emphasizes the interplay between **architectural regeneration** and **territorial reactivation**, ensuring that interventions are

not limited to single buildings but also contribute to broader **socio-economic and environmental strategies**.

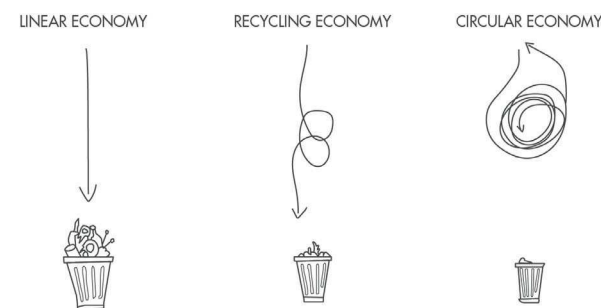
In this sense, the transcalar approach used in projects such as **B4R – Branding4Resilience** highlights the necessity of operating at multiple scales, from material selection to territorial strategies. This methodology ensures that circular principles are effectively integrated at different levels, offering a comprehensive framework for **sustainable development**. In particular, the study explores how architecture can act as a catalyst for **reactivating abandoned** or underutilized **spaces**, fostering local engagement, and creating new opportunities for social and economic resilience, especially in inner and **peripheral areas** where depopulation and economic decline are major concerns.

The next pages explain the basics of circular building and circular economy ideas in order to inspire new and completely sustainable ways of thinking and acting.

KNOWLEDGE ACQUISITION

“The circular economy is a system where materials never become waste and nature is regenerated. In a circular economy, products and materials are kept in circulation through processes like maintenance, reuse, refurbishment, remanufacture, recycling, and composting. The circular economy tackles climate change and other global challenges, like biodiversity loss, waste, and pollution, by decoupling economic activity from the consumption of finite resources.”

Ellen MacArthur Foundation



Author's re-elaboration from Circular Flanders (2017)

The 20th century was characterized by unprecedented global economic growth, accelerated by technological and scientific progress and global trade relations. However, the linear (“take-make-waste”) economic model and its reliance on fossil fuels are costing us dearly today.

This is particularly evident in the construction sector, where climate change has highlighted the inefficiency of the **linear economy** based on the continuous extraction of raw materials, mass consumption, and the generation of waste once products reach their end of life (Andrews, 2015; Ghisellini et al., 2018).

The vast majority of **raw materials**—whether fossil fuels or materials for construction—are still extracted from finite deposits in the earth’s crust and then processed, used, and finally disposed of or incinerated, emitting large quantities of **greenhouse gases** in the process.

If this pattern of destruction continues, we will not be able to meet the future demand for building materials within **closed cycles**.

In any existing system that we strive to optimize, there will eventually be a point where the system’s limits are reached and any further innovations are marginal and possible only at significant cost.

Since the mid-20th century, the construction industry has been developing ever better, ever higher-quality materials and products with improved characteristics: they are better and faster to

install, more **durable**, more **long-lasting**, easier to use, cheaper to procure, more widely available, and so on, but what was not considered is what happens to these—mostly mixed and composite—materials after their (often ever shorter) service life; this is not a question the linear system poses.

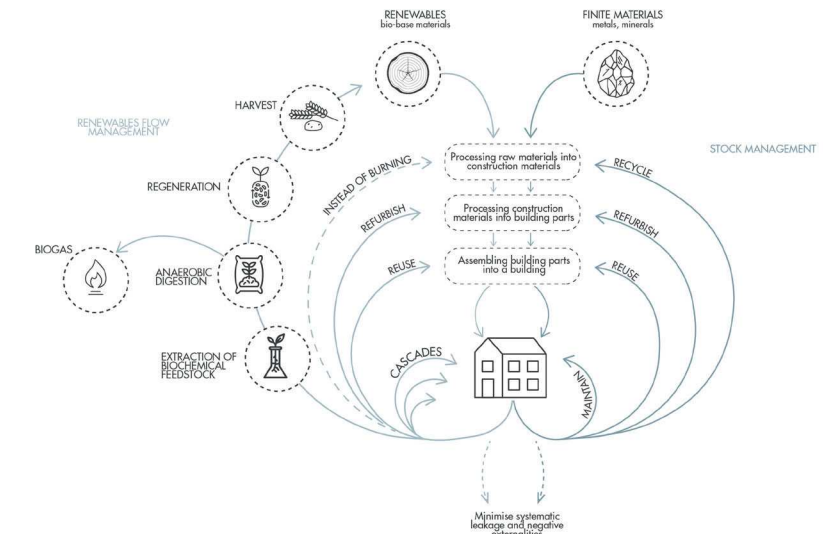
More than a decade earlier, Braungart and McDonough (2002) described several core ideas of today’s understanding of circular economy in their seminal work, **Cradle to Cradle**. These include waste = food, aiming to design out waste and define materials as nutrients for the next pathway; a shift to clean energy and renewables; a celebration of diversity; and the goal to restore and regenerate natural capital.

Also, economists like Nicholas Georgescu-Roegen (1971) have intervened on this issue, proposing to replace the linear approach with a circular one, aiming to promote reuse and reduce environmental impact.

The concept of the **circular economy** has gained momentum in the last decade, following the significant depletion of resources and environmental degradation.

It has been particularly elaborated by the Ellen MacArthur Foundation, which defined it as “an industrial system that is restorative or regenerative by intention and design” (MacArthur, 2013). The circular economy calls for the design of con-

KNOWLEDGE ACQUISITION



CE system diagram, adapted from the Ellen MacArthur Foundation (2013)

sumer goods, building materials, and components to be maintainable, repairable, and reusable in a closed loop.

The circular economy is not just about recycling but an **economy that “can regenerate itself by reintegrating biological material flows in a circular manner”** (Ellen MacArthur Foundation, 2019).

Towards this goal, **reuse infrastructure** represents a key component to capture available resources and make them efficiently and effectively available to those who perpetuate their useful existence.

Reusing materials helps reduce waste and landfill volumes. Reuse also reduces the need for the extraction of raw materials and the production of new items—actions that impact the global climate crisis—while providing **economic development opportunities**, green jobs, and key resources at the local level and community.

Reuse provides affordable alternatives to materials or products that are sold for a “low price” while carrying high environmental and social costs.

The ‘**butterfly diagram**’ is often used to explain this concept and represents a powerful and holistic view of the main assumptions driving the shift towards a circular economy.

Is characterized by two continuous cycles that vary based on the materials used in manufactu-

ring: the biological cycle (left side of the diagram) and the technical cycle (right side of the diagram).

Both cycles create closed loops, forming a butterfly-shaped diagram. This method cuts down on or gets rid of waste, expands the ways that materials can be supplied, and raises the value of goods. It will also create new, more environmentally friendly business models (Witjes and Lozano, 2016) that can separate environmental damage from economic growth (Elia et al., 2017).

According to the Ellen MacArthur Foundation approach, the circular economy must drive innovation in three dimensions:

1. Design out waste and pollution
2. Keeping products and materials in use
3. Regenerating natural systems

By adapting the principles of the circular economy to the way we design buildings, infrastructure, and other elements of the built environment, we can **reduce greenhouse gas** emissions while simultaneously creating cities that are more livable, productive, and sustainable.

These three dimensions must be adapted to the culture and society in order to design life cycles for buildings and cities that can be carbon-free while also ensuring well-being in inclusive, accessible, and affordable ways.

01.02 THE ROLE OF DESIGN IN THE CIRCULAR ECONOMY



“Design is fundamental for a circular economy”
(Ellen MacArthur Foundation, 2021)

The approach of **circular design** should not be seen merely as a necessity driven by **climate change** but also as a means of expressing a new aesthetic that also influences the economy, and we, as architects, play a significant role in enabling its application.

In this sense the architecture sector must move beyond designing new buildings for circularity but also consider better ways of utilizing existing buildings to minimize or reverse the social, economic, and **ecological damage** that the building industry is causing to our planet and its inhabitants.

As mentioned in the book “Circular Economy and Circular Construction” (2022) in order to switch to **circular construction**, it is important to distinguish between **recycling materials** through better reprocessing processes, reusing building elements and products by effecting a shift from demolition to deconstruction, and reusing entire structures through conversion and **adaptive reuse** instead of new construction.

Jorg Schröder, in his book “Circular Design: Towards Regenerative Territories” (2023) proposes going even further by seeking a connection

between the principles of circularity, design, and city-making.

Through a methodology that takes into account the full life cycle of materials and resources, Schröder is committed to incorporating the circular economy’s tenets into urban and spatial design. He highlights the necessity to focus on the regeneration of **urban and territorial ecosystems rather than just recycling**.

By rethinking how we design our built environment using **new technology** and **creative business** models, we can increase the value of our current assets, keep resources and construction materials in the economy, and prevent them from going to waste.

FROM DEMOLITION TO DECONSTRUCTION

Demolition can be defined as both the engineering and the act of safely and efficiently tearing down and removing a building or other artificial structure from a specific location.

Deconstruction, on the other hand, is the engineering and act of safely, carefully, and systematically **dismantling a building** or other artificial structure with the goal of maximizing the recovery of valuable materials and architectural components for **reuse or recycling**. In the process

of clearing the site, it can prevent the generation of waste and direct materials back into the marketplace, supporting a circular economy paradigm within the construction sector.

It also has the potential to honor the craftsmanship, materials, and stories of the original building; it offers opportunities for **green jobs** and additional **skills development**, along with the chance to build a more equitable workforce.

Deconstruction is essentially a new term for an old process.

“What is innovative and exciting is how communities can potentially use this process—deconstruction—to support and complement other community objectives. Deconstruction could help train and hire unskilled and unemployed people, help small businesses start up and grow by using the materials that are salvaged from deconstruction projects, and protect the environment by keeping valuable resources out of overcrowded landfills and putting them to good use. This would allow deconstruction to pay for itself by making money and lowering the costs of disposal and landfills.” (NAHB Research Center, 2001)

Thoughtful and effective deconstruction projects will require the creation of green jobs and skill training to strengthen the local workforce. For every one job created through demolition, six to eight jobs are created through deconstruction. People increasingly view green jobs as a way to address equity issues within a community. Such jobs tend to be accessible for those with lower education levels, yet there is less income inequality within the green job sector as compared to other sectors. By their nature, such jobs tend to stay within the community, and many generate higher local and state revenues than other job sectors. These jobs also allow for **on-site training**.

On the other hand, both new construction and renovation could make use of the enormous stock of materials found in the existing buildings.

Why don’t we already mine reclaimed materials from existing buildings and transfer these into new cycles of use?

KNOWLEDGE ACQUISITION

The fact is that the buildings demolished today were never constructed with **reuse** or **recycling** in mind.

The problem is that most of the materials used in conventional construction are **hybrid products** comprised of different material types that are typically inseparably connected. These products were not conceived or designed for **cycles of reuse**.

When buildings are conceived to be **disassembled** at the end of their service life so that their individual constituents can be cleanly reclaimed and reused, then they can serve as a resource—a material depot—for coming generations.

ADAPTIVE REUSE

Another key strategy in **circular architecture** is **adaptive reuse**, which focuses on **revitalizing existing buildings** by adapting them for different uses rather than demolishing them and starting over.

The concept of adaptive reuse is extensively discussed in book like “Adaptive Reuse: Extending the Lives of Buildings” (Wong, 2023), in particular, this approach focuses on the creative reuse of existing buildings, transforming them for new purposes without completely demolishing them as a sustainable practice that combines historical preservation, **architectural innovation** and respect for the urban context.

This approach prioritizes the conservation of materials, **reduces construction waste**, and extends the useful life of buildings; rather than tearing down outdated structures, it transforms them into **spaces that serve new purposes**, whether that means converting an old factory into residential apartments, repurposing a church into a library, or turning a warehouse into office space.

By keeping much of the original structure intact, one of the greatest advantages of adaptive reuse is its ability to **preserve the embodied energy** of a building, which refers to the total energy used in the creation and assembly of its original materials.

Adaptive reuse also contributes to **urban revitalization**, as it can breathe new life into neglected areas, making them vibrant and functional again without losing their original character.

Older buildings often have unique architectural features or historical significance that, if preserved, add cultural and aesthetic value to modern cities. This blending of old and new not only respects the history of a place but also creates spaces that feel authentic and connected to their surroundings.

Another critical benefit is the **reduction of construction waste**, which makes up a large portion of global landfill material. By **reusing and adapting structures**, we discard fewer materials and minimize the need to extract raw resources like timber, steel, or concrete. This makes adaptive reuse not only environmentally responsible but also economically efficient, as it often reduces the costs associated with demolition and the purchase of new materials. Additionally, this strategy encourages innovative architectural solutions, as architects and designers must find creative ways to **adapt older buildings** to meet modern requirements.

Urban areas, with limited space and growing demand for housing, offices, and public spaces, highlight the importance of adaptive reuse. Instead of expanding into undeveloped land, this strategy makes **better use of what is already built**, reducing urban sprawl and protecting natural ecosystems. It also supports community development by creating spaces that meet current needs while preserving the local identity. For example, turning an abandoned school into a community center or a hospital into affordable housing can address pressing social issues while maintaining the integrity of the existing structure.

By rethinking how we approach **existing structures**, adaptive reuse demonstrates that **sustainability and innovation** can work hand in hand to create a more resilient and **resource-efficient future** for the built environment.

Jörg Schröder
Riccarda Cappeller
Alissa Diesch
Federica Scaffidi

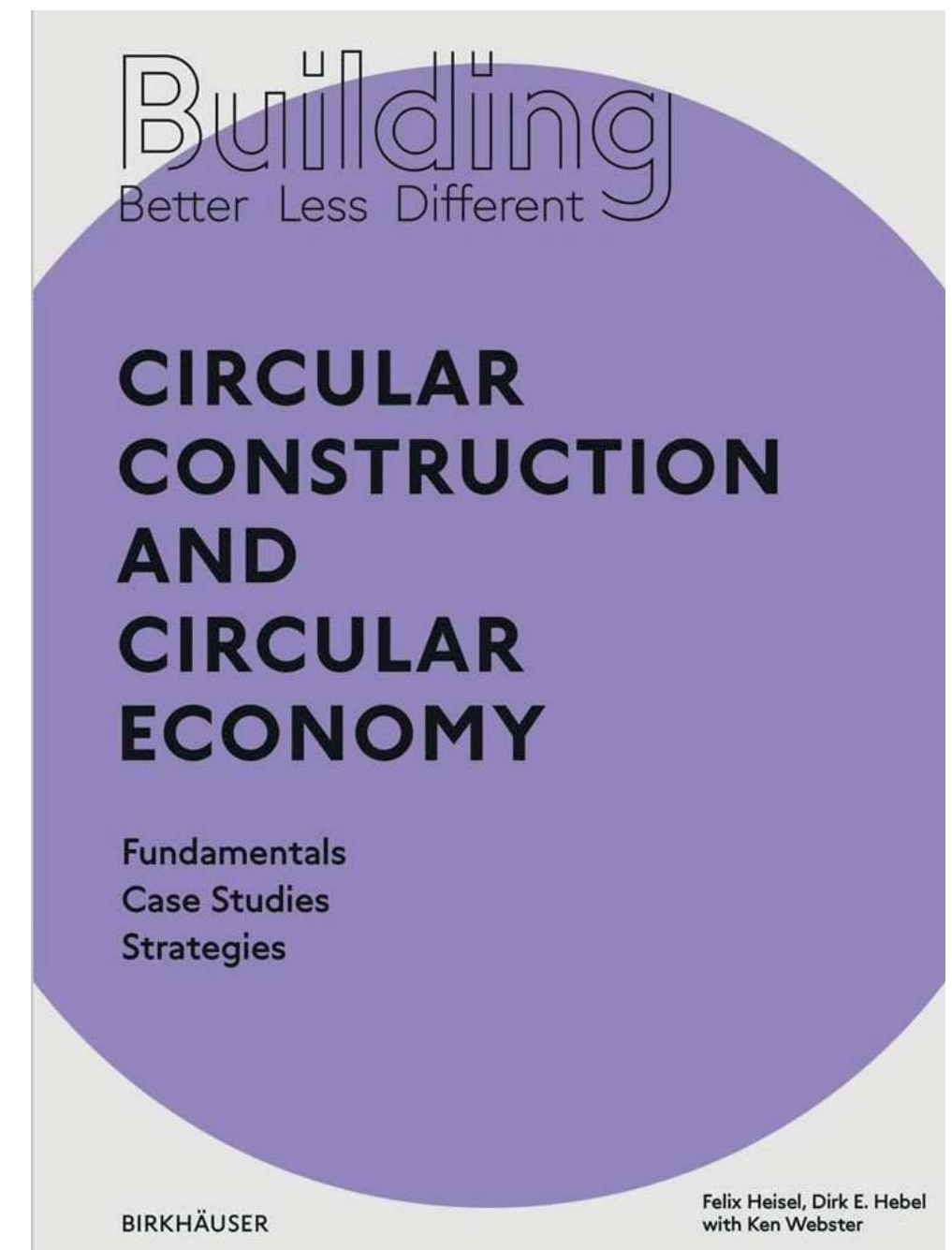
Circular Design

Towards Regenerative Territories

ity has become a major topic. ble materials are fashionable ideas er to establish the new paradigm urban and territorial dimension or resilience and sustainability. design-thinking for analysis, cesses of transformation. Featuring te creative narratives in urbanism ar Design aims to activate dynamic ace, oriented to circular principles.

jovis

Books used in the knowledge acquisition phase



01.03 CARBON NEUTRALITY FRAMEWORK: THE EUROPEAN AND ITALIAN CONTEXT

EUROPE

By 2050, the European Union (EU) wants to be the first continent to achieve climate neutrality. The European Climate Act was passed by the Parliament on June 24, 2021, making the targets of achieving climate neutrality by 2050 and a 55% reduction in emissions by 2030 legally binding.

This objective was codified in the **European Green Deal**, a comprehensive plan designed to drastically cut greenhouse gas emissions and encourage the shift to a more resilient and sustainable economy.

A key factor in this transformation is the buildings sector, which accounts for roughly 40% of all energy use and 36% of CO₂ emissions in the EU.

To address these challenges, the EU has developed a regulatory framework that includes directives, regulations and policy initiatives, among which are:

- The Energy Performance of Buildings Directive (EPBD), which sets minimum energy performance requirements for new and existing buildings. A central aspect is the obligation for Member States to ensure that new buildings are nearly zero energy buildings (NZEB) and to promote **retrofitting in existing buildings by integrating renewable energy sources**.

The definition of a nearly zero-energy building is "A building with a very high energy performance, whose very low or nearly zero energy needs should be covered to a very significant extent by energy from renewable sources" (EPBD, Art. 2, para. 2).

- The Energy Efficiency Directive (EED) seeks to cut overall energy usage by 32.5% by 2030. Renovating public buildings' floor areas by 3% annually and implementing energy audits to track performance are important steps.

- The Green Deal's Renovation Wave Strategy seeks to treble the rate of building renovation and encourage broad retrofitting, to **renovate at least 35 million buildings by 2030**.

The necessity of addressing energy poverty and ensuring that all citizens benefit from energy efficiency are also emphasized by this strategy.

Three areas are given priority in the strategy:

1. Heating and cooling decarbonization
2. Addressing inefficiencies and energy poverty
3. Renovating public structures like offices, hospitals, and schools

A distinctive feature of European policies is the **integrated and transnational approach**, which recognises the importance of combining environmental, social and economic objectives.

In this context, the focus is not only on energy efficiency, but also on the **adoption of sustainable materials**, the improvement of housing quality and the inclusion of vulnerable social groups.

The European Directive 2010/31/EC assigned member states the task of setting minimum energy performance requirements for buildings and building elements in order to achieve energy performance levels that result in the lowest cost over the entire life cycle of buildings.

To this end in Italy the DM 26/6/2015 'REQUISITI MINIMI' was derived.

ITALY

The DM 26/6/2015 is an Italian regulation that sets minimum **energy performance standards** that buildings must meet to ensure adequate energy efficiency.

It is one of the key measures introduced by the Italian government to align with European targets for reducing CO₂ emissions and promoting energy efficiency.

The main objectives include:

1. **Reduction of energy consumption:** Buildings must be designed and renovated to consume less energy for heating, cooling, hot water and lighting. This implies the adoption of more efficient technological and architectural solutions.

2. **Increased energy efficiency:** In order to reduce environmental impact and energy demand, criteria are introduced that improve the efficiency of installations and building envelopes, such as thermal insulation, choice of materials and integration of renewable instal-

-lations (e.g. solar panels, heat pumps, etc.).

3. **Sustainability and reduction of emissions:** Buildings must contribute to the European decarbonisation and CO₂ emission reduction targets.

The DM 26/6/2015 is a key component of Italian policies for energy transition and is part of a broader regulatory framework that also includes the national law on tax bonuses (**Superbonus 110%**) and other initiatives to promote energy efficiency and the use of renewable sources.

These policies are in line with the objectives of the European Green Deal and the National Energy Transition Strategy, which aims to decarbonise the Italian economy and reduce dependence on non-renewable energy sources.

NEW EUROPEAN BAUHAUS

The New European Bauhaus (NEB) represents the **cultural and creative face** of the European Green Deal. While the latter focuses on technical goals, such as decarbonisation and energy efficiency, the NEB focuses on the **human and cultural dimension** of the **ecological transition**, involving architects, designers, artists, engineers and citizens in a collaborative process.

In essence, the NEB aims to redefine the concept of beauty in architecture and design, adapting it to **contemporary challenges** related to the climate crisis and **social inequalities**. This approach aims at a design that is not limited to aesthetics, but that **integrates energy efficiency**, environmental quality and human well-being in a functional way.

The NEB promotes a development model based on three key principles:

1. **Sustainability:** Promoting design solutions in line with the ecological transition, through the use of environmentally friendly materials, circular design and energy efficiency.

2. **Aesthetics:** Realising spaces that combine functionality and beauty, overcoming the utilitarian approach to create environments that inspire and improve the quality of life.

KNOWLEDGE ACQUISITION

3. **Inclusion:** Ensuring that urban and built transformations are accessible to all, including diverse communities and cultures, with a focus on the most vulnerable.

The NEB argues that environmental innovations can only emerge through **radical changes** that are not only **technological**, but also **economic, cultural and behavioural**. These must influence worldviews and personal beliefs, redefining our relationship with the environment and with others. Furthermore, the NEB attributes a central role to art and culture, recognising them as fundamental tools for improving the quality of life and stimulating profound social transformation. According to the New European Bauhaus vision, the ecological transition cannot be separated from a parallel **cultural and social transformation**, acting as a catalyst for a more equitable, creative and **resilient society**.

NEW BAUHAUS CITY

The New Bauhaus City initiative of Jorg Schröder draws inspiration from the European Commission's New European Bauhaus to promote creative action and drive the transformation of urban environments towards **climate neutrality**.

It focuses on cities as dynamic arenas where multiple sectors converge such as **green building, sustainable mobility, circular economy, and renewable resources**. These cities are envisioned not just as functional spaces but as catalysts for enhancing livability and inclusivity in response to the challenges posed by climate change.

The Territorial Design Studio projects under New Bauhaus City (Schröder, Cappeller 2021) are centered on **smaller living environments** beyond major metropolitan areas, where a significant portion of Europeans reside.

These places, often neglected in mainstream discussions, present **unique architectural and urban planning challenges**, including issues like vacancy, decay, and inadequate infrastructure.

The initiative employs **research-driven design methodologies** to propose sustainable urban transformations, emphasizing community resilience and the enhancement of qualitative density.



The existing building stock represents a central resource not only for its historical and cultural value, but also for its impact on **environmental sustainability**. The regeneration of existing buildings - through renovation and redevelopment - offers a **sustainable alternative to new construction**, reducing environmental impact and promoting a circular economy (European Environmental Agency, 2022).

In this context, initiatives such as the **European Union's Renovation Wave** emphasise the importance of working on the existing stock with strategies based on the principles of energy efficiency, circularity and architectural quality (European Commission, 2020a).

It is not only a matter of improving the technical performance of buildings, but also of **enhancing their cultural and social significance**, especially in inland areas, where the renovation of buildings can become an **engine for local development**.

In this perspective, **inland areas** play a crucial role as a field of experimentation for innovative regeneration strategies.

Indeed, the process of abandonment of these

areas, often related to the lack of infrastructure and essential services, can be reversed through the recovery of the built heritage, helping to regenerate historic centres, stimulate the local economy and strengthen the sense of community (Silva, 2021).

However, it is crucial that these actions are not limited to monumental buildings, but also include the **ordinary heritage**, which is often neglected despite its intrinsic value to **local communities** (Silva, 2021).

Ordinary buildings, often referred to as 'unclassified', constitute a significant part of the built landscape, especially in **inland areas**. These buildings, made for the everyday life of families and communities, have long been overlooked in comparison to architectural masterpieces, but represent a fundamental testimony to the social and cultural life of the past (De Pieri & Zanfi, 2019).

The concept of '**everyday heritage**' emphasises how even apparently anonymous buildings can acquire historical and cultural value when viewed through a lens that considers their influence on people's everyday lives (Spoormans, 2023).



From the point of view of circularity, a crucial role is played by **building documentation**, which can be used as a tool for a circular approach to building renovation.

The documentation process becomes essential not only to **plan sustainable renovation** interventions but also to promote integrated resource management on a territorial scale. (Massioni, n.d.)

This **transcalar approach** is essential to connect the built heritage with the metabolism of the territory, promoting an **environmental, social and economic regeneration** (Amenta, Russo, and van Timmeren, 2022).

A crucial role in the documentation and conservation of modern heritage is played by organisations such as **Docomomo** (Documentation and Conservation of the Modern Movement). Founded in 1988, Docomomo is dedicated to the cataloguing and **protection of modern movement buildings**, which are often threatened by demolition or inappropriate interventions (Docomomo, n.d.).

Over the years, Docomomo has expanded its

scope to include not only iconic buildings, but also those examples of '**everyday modernism**', i.e. everyday buildings that represent the social, cultural and economic context of their time (Chang, Zhuang, and Soh, 2023).

This approach allows the **valorisation of often neglected buildings from the twentieth century**, recognising their contribution to collective history and their potential for circular recovery. (Massioni, n.d.)

It is evident that the current practice used in the renovation of existing buildings, especially in inland areas, requires a **paradigm shift that focuses on circularity** and on the perception of such buildings heritage. In this, it is clear that organisations such as Docomomo play a crucial role in promoting a documentation-oriented culture that is open to innovation.

It is precisely through integrated and circular approaches that it is possible to transform existing buildings into resources for the future, contributing to the sustainability and wellbeing of the community.

01.05 ATLAS OF BEST PRACTICES FOR THE CIRCULAR DESIGN PROCESS

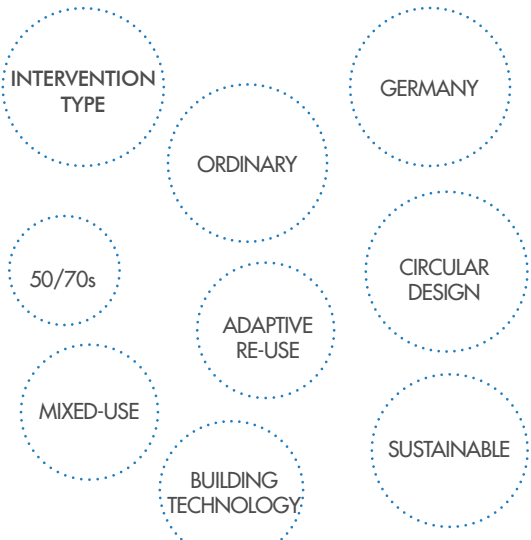
“How do project from unique backgrounds come together with their different characteristics and perspectives to make change happen?”

Through the collection and study of various reference cases in different European countries, a design toolkit was developed. It seeks to provide a starting point for circular recovery interventions of ordinary buildings, taking into consideration the complexity that these bring, linked to the specific context in which they are placed and therefore to the aesthetic parameters to which they must respond in order to integrate modern technologies and materiality with a historical formal context. This toolkit aims to give a starting point for further implementations, with a view to becoming adaptable to other contexts.

BEST PRACTICES SELECTION

The search for best practices took place following criteria that could be aligned both with the characteristics of the buildings on which we then focused in the design phase, and with the context in which these buildings are located. Namely, when relevant for the research objectives, we mainly selected ordinary heritage in marginal and inner territories, or we picked practices that have at least one of these two characteristics. The first fundamental requisite for the research was to focus the selection on existing buildings constructed between the 1950s and 1970s, which had undergone renovation and reuse operations that were attentive to the theme of circularity.

The choice of the period of reference reflects the current need to intervene on a built heritage that does not only concern protected buildings, but also on an ordinary heritage that was built in the early post-war period, a period in which there was not yet a sensitivity and legislation that took into account design technologies attentive to the theme of environmental sustainability, and for this reason they are currently obsolete and in need of interventions to restore their functionality without the need to demolish, with consequent strong environmental impact. In this sense, organisations such as DO.CO.



MOMO are already trying to bring about a

change, providing answers to the many problems related to the knowledge and preservation of the vast and still insufficiently recognised architectural heritage of the 20th century. This knowledge is of fundamental importance and indispensable for targeted and conscious intervention in the built environment.

C.Massioni in her research is attempting to extend the knowledge and documentation of the architectural heritage of the 20th century to ordinary buildings, this growing interest was the motivation for which through this research we wanted to make a contribution through possible design solutions applied to the two buildings selected for architectural design in the municipalities of Sassoferrato and Arcevia.

Another selection criterion at this stage was the relationship with the context, size and materiality; this criterion helped us in the selection as not all the solutions found lend themselves to dialogue with the context in which the two project buildings are located.

Part of the research began by taking advantage of our stay in Hamburg in order to select and visit some of the case studies, especially with regard to innovative and circular technological so-

lutions, as the topic of sustainability is very much felt and present in Germany, and many of the concepts that are reported throughout the research were elaborated and introduced from this experience.

The complexity and nature of the context, which was very distant from that of the rural contexts of the Marche region, led us to subsequently extend the research outside the confines of Hamburg, selecting a series of case studies throughout Germany, which could be technologically adaptable to the project context, while with regard to aspects more related to aesthetics, the research fell on Mediterranean contexts that would adopt technological solutions that would be coherent

CIRCULAR DESIGN TOOLKIT CATEGORIES

SUSTAINABILITY

The first category deals with sustainability, so that we can develop a knowledge base on the circular strategies currently in use to be transferred and adapted to our case studies, focusing more on the technologies used for the interventions taken as references.

ADDITION

The second category deals with intervention strategies aimed at adding new volumes to the existing, with a view to adding new functions and implementing the space available in the building, but also to overcome natural and artificial barriers present in the intervention sites by inserting service volumes.

MIXED-USE

The third category concerns the flexibility of the spaces with a view to creating mixed-use buildings, to keep the building active according to a circular perspective.

AESTHETIC

The last category must deal with the aesthetics of the building, in this case the selecting criteria must be those linked to the context and materials of the place in addition to the age of the building.

KNOWLEDGE ACQUISITION

with the historical architectural context in which they are located. Given the complexity and multiplicity of aspects to be selected, the following Atlas aims to encompass through 4 main category some of the possible design solutions, keeping circular design as the main guideline. For this, each intervention is represented by means of a Representative Analysis Sheet that was developed to show: type of intervention, circular solution adopted, stakeholder involvement in the design process, a brief description of the intervention and where it was possible to obtain information on its environmental and social impact. The result was the creation of a good practice toolkit with which to approach the circular rede-

REPRESENTATIVE ANALYSIS SHEET

PROJECT

LOCATION: **
YEAR OF CONSTRUCTION: **
ORIGINAL FUNCTION: **
ACTUAL FUNCTION: **
EXTERNAL INTERVENTION: **
INTERNAL INTERVENTION: **

CIRCULARITY STRATEGY (C.S.)

R0- Refuse
R1- Increase building utilisation
R2- Design for longevity
R3- Design for adaptability
R4- Design for disassembly
R5- Refuse unnecessary components
R6- Increase material efficiency
R7- Reduce the use of non-renewable material
R8- Use of carbon intensive materials
R9- Design out pollutant material
R10- Design for nature

ACTION STRATEGY

External refurbishment
Interior refurbishment
New external volumes
New interior volumes
Interior demolition
External demolition

FUNCTION

Education
Cultural events
Residence
Theatre
Religious
Sanitary
Library
Exhibitions
Cooperative spaces
Bar
Sportive
Office

AREA

- m²
\$/m²

ABOUT THE PROJECT

Debis intemperum evento omni occus imil
essunt, sanditatos et occume et omnis
asperumet random ut occoepe rontendit id
exereic tore, officabores enissi consed ma-
ximus ad que et quibus ea quas id quam
hililit vel is delit essit ommost, aut qui volo-
ra dello doles que simus, im lantia quatem
harumto commoloribus nati nasa descili
sindus, veles pro que aut laui quatiam ex
etur rote endipsam repapis est pos nihili
dolorep elitat latiore sequatiatur silatque
volessum fugit est quam quam vellorundus
ulparume plicidis ef, tes ant a int.
Volum rent et doluptamet am exces ma-

CIRCULAR STRATEGY

xima vidisimum aut occullonibus sequibus,
ut omnis res mos quant lab ipis eiusdae
et qui aut optatum dis eventibus ut lat rem
hant vollecaterm repelec aborro, estolote
doluptaqui quo to ipiciat eatur, sam rem
re officiderio. Itatur senduciendit ex estru-
mquis explissi volectatam qui ommolat ad
quatam, od quant magnim eossinc fore-
sentium es maion remodi ulem assunt id
exero in et que mi, et et arum res sitecto
eostrumqui velique sim ligidus valorit ipis
es rem que et re pro berchicti aut de do-
lupta tioria perepud igeniendis quo dolup-
tatur?

“Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”
(Gro Harlem Brundtland, 1987)

CATEGORY: SUSTAINABILITY

In this dimension, the Ellen MacArthur Foundation comes in handy as it has defined a starting toolkit for applying circular strategies and actions in the field of construction. The toolkit consists of 11 strategies as reported by the Ellen MacArthur Foundation:

BUILD NOTHING

R0-Refuse: This strategy aims at avoiding the intensive material use linked to the construction of a new building by first reassessing if a physical building is necessary for the envisioned requirements, and if so, assessing if an existing building can be used to meet them.

BUILD FOR LONG-TERM USE

R1-Increase building utilisation: his strategy aims to reduce upfront resource consumption by maximizing the utilization of spaces and avoiding use-free periods in the building program. Considerably optimized utilization can be achieved through the exploration of the “Space sharing” and “multi-use” concepts, following the sharing schemes already deeply present and successful in other sectors. The future utilization potential is explored under “Design for Adaptability”.

R2-Design for longevity: At the building level, it aims to preserve the timeless architecture that people love and care for by designing and selecting durable products that can stand the test of time. At the component level, the strategy aims to use durable products and materials that guarantee a long life, preferably beyond the necessary service life, so they can be adapted and reused in the future.

R3- Design for adaptability: this strategy considers two design principles for adaptability: versatility and convertibility, which are in turn related to the required level of system adaptations. This strategy is most appropriate for sites and typologies where changes of use are likely.

R4- Design for disassembly: this strategy aims at enabling the disassembly potential at the end of service life. The useful life of some components

in buildings outlasts their service life as part of a system.

It is important to design upfront for the practical disassembly of components in order to recover residual value at the end of their service life.

BUILD EFFICIENTLY

R5- Refuse unnecessary components: This strategy aims at meeting the project requirements with minimal material consumption.

At all levels, it fosters simple design approaches and thoughtful consideration of the real need of components and materials.

It aims to question if certain components can be refused without compromising the ability for the project to function at the desired performance level.

R6- Increase material efficiency: This strategy aims to meet the project requirements with minimal material consumption. At all levels, it aims for an efficient use of materials at a maximum level of performance.

It looks at avoiding inefficient building material volumes (high-rise, transfer, long-span, cantilevers, or deep underground structures) and selecting efficient systems and forms. It also looks at the use of high-performance products and materials and advanced engineering methodologies.

BUILD WITH THE RIGHT RESOURCES

R7- Reduce the use of virgin and non-renewable material: this strategy aims at the prevention of virgin abiotic material consumption (particularly critical raw materials) and the promotion of secondary products and materials.

At all levels, it aims to promote the use of reused products and recycled materials, as well as promoting the use of renewable and biobased materials.

R8- Use of carbon intensive materials: this strategy aims at reducing the use of carbon intense materials.

It prioritizes suppliers which use reused products, recycled materials, renewable and bio-based materials or products and that use clean energy

in their manufacturing processes.

R9- Design out hazardous/ pollutant material: this strategy aims at preventing the use of materials that have a negative impact on the health and wellbeing of building users.

Materials which pose a potential risk to human health are likely to prevent the reusability of building structures and components in the future, thus impeding the value retention potential.

R10- Design for nature: The actions within this strategy help to prioritise the documentation of existing habitats, emphasise interventions that enhance ecology, promote circular use of water resources and enable circular municipal waste management. This strategy also focuses on the use biomimetic principles in the design of buildings, prompting designers to consider how nature-inspired solutions can influence decisions as diverse as material selection, lighting design and ventilation strategies.

(Ellen MacArthur Foundation)

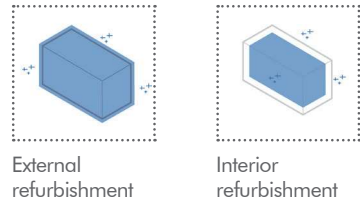
BEST PRACTICES

PROJECT ADMINISTRATION BUILDING TIERPARK
 LOCATION: BERLIN-FRIEDRICHSFELDE
 YEAR OF CONSTRUCTION: 1960s
 ORIGINAL FUNCTION: GDR system building
 ACTUAL FUNCTION: Administration building
 EXTERNAL INTERVENTION: New facade
 INTERNAL INTERVENTION: Internal refurbishment

CIRCULARITY STRATEGY (C.S.)

R0-Refuse
 R2-Design for longevity
 R4- Design for disassembly
 R7- Reduce the use of non-renewable material

ACTION STRATEGY



ABOUT THE PROJECT

The zoo administration building, which was built in the 1960s, was saved from demolition by a refurbishment of the building envelope carried out in 2019.

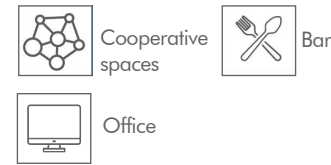
The administration building is an example of **resource-saving refurbishment** and represents a sustainable, resource-saving and economical alternative to demolition and new construction. The existing structure originally consisted of prefabricated concrete sandwich panels, it now consists of **prefabricated insulated timber panel** elements that are connected to the existing frame construction.

Once the façade of the existing building had been dismantled, it was scanned three-dimensionally so that the new façade elements could be prefabricated and fitted precisely.

The new timber façade is considerably lighter than the original sandwich elements, so that **no additional structural measures were required**.

As part of the refurbishment, the building services were also renewed, while some of the original interior fittings from the construction period were retained.

FUNCTION



AREA
 3.345 mq
 \$/m²
 843 \$/m²

CIRCULAR STRATEGY

From the dismantling of the existing structure, a sorting of the **recovered material** was carried out and, where possible, subsequent recycling. Also, by **preserving the main skeleton** of the building dating back to the 1960s, the environmental impact was significantly reduced as well as creating an opportunity to recycle the internal structure itself, thus preserving the character and history of the building.

The solutions adopted in the project together with the use of **sustainable material** such as wood allows, according to the principle of circularity, a subsequent dismantling and **circular reuse of the wood**, thanks to the prefabrication of the cladding panels, which can be easily **disassembled** and recycled by means of specially designed hooks, as well as giving a **rapid installation**, economy of the intervention and lightness to the structure, a peculiarity that allowed the project not to perform structural calculations.

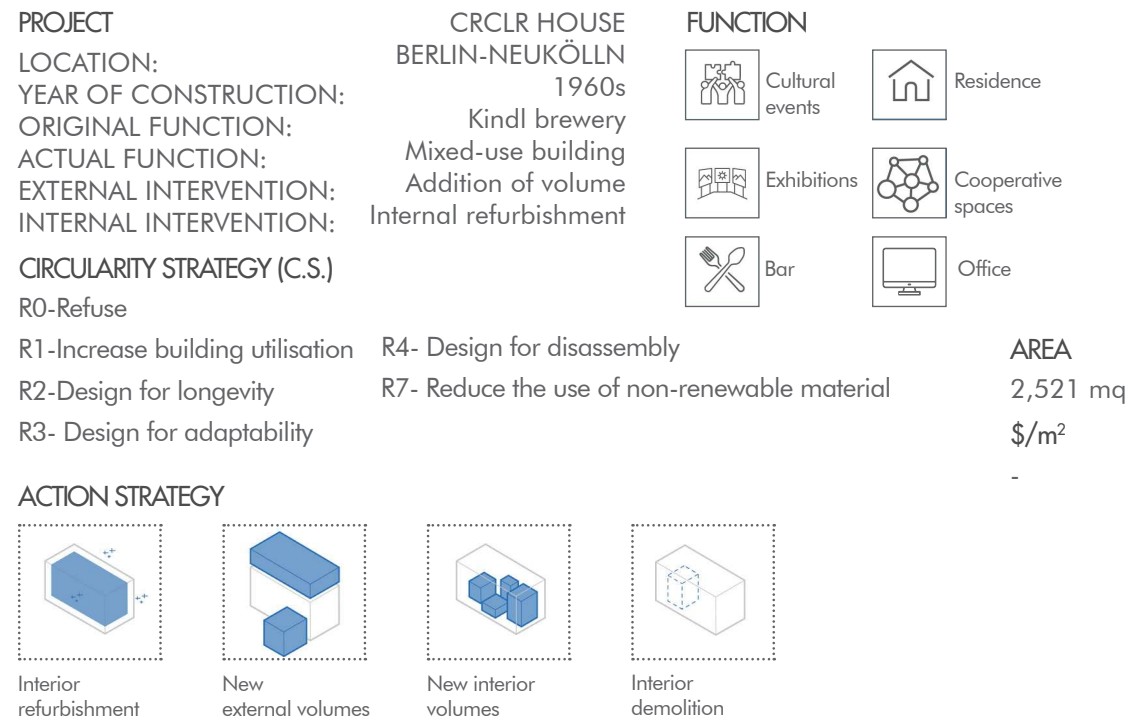
In addition to these aspects, **prefabrication** lends itself effectively to various contexts of use, being a **minimal and easily reversible intervention**.

KNOWLEDGE ACQUISITION



ZRS ARCHITEKTEN

BEST PRACTICES



ABOUT THE PROJECT

The **CRCLR house** is being built in a section of the former Kindl brewery in Berlin Neukölln., which through the extension and adaptive reuse of the structure, adapts and modifies itself according to the principles of the Circular Economy. The aim is to create living, working and commercial spaces interconnected together with the urban environment, form mutual scenarios and communities of interest that ideally serve the district's material, social, economic and cognitive cycles.

During construction, great value was placed on the **recyclability of the materials**, including the use of secondary building materials and **disassembly strategies** that could be integrated. For example, resources were conserved by installing **second-hand windows**. The existing building was made functional with **minimal interventions** and served for a time as an event venue, coworking space, and artist studio for the CRCLR community. It has provided, since completion, a home for Impact Hub Berlin, coworking space, laboratory facilities, and a diversified event program.

CIRCULAR STRATEGY

An important part of the project development was a joint learning process on circular construction between users, experts and planning groups involved, through studies of existing buildings in other parts of Europe and workshops that led to the definition of **11 basic principles for circular construction** and a broadening of knowledge.

The process of **dismantling and recovering** the materials took place with the support of a large community, the **collective construction** was developed with people who had previously worked for festivals, exhibition design, art and culture. Up to 30 trained and **self-taught people**, some of them permanently employed by the client, made windows, doors, staircases and partitions out of leftovers and waste, circular interior insulation, re-used façade cladding disassembled and re-assembled as well as general renovation work. From this group and with the prospect at the CRCLR site, the construction company **heap59** was born, which is dedicated to circular construction and has set up its production workshop in the basement of the building.

KNOWLEDGE ACQUISITION

A not inconsiderable effort was made in the **recycling of materials**: steel lattice girders removed and the steel purlins from the existing roof of the pavilion were **reused** as roof supports in the greenhouse and as stair uprights in a static load-bearing function for the extension.

Even before the planning of the new building began, a sufficient number of **reclaimed wood-aluminium windows** were purchased from the dismantling of an old residential building.

For the external envelopes as well as for internal partitions, it was decided to opt for sustainable materials by using **pre-assembled straw and clay panels**.

About 70% of the raw materials and products used are recycled or sustainable. The material concept of circular construction moves in the area of tension between use-as-is and upcycle. The materials used come from demolition sites, trade fairs, museums, stockpiles or scraps from carpentry workshops.



ZRS ARCHITEKTEN- IMPACTHUB BERLIN



ZRS ARCHITEKTEN- IMPACTHUB BERLIN

BEST PRACTICES

PROJECT	KAROLINE GOLDHOFER DAYCARE	FUNCTION	
LOCATION:	MEMMINGEN (DE)	 Education	 Cultural events
YEAR OF CONSTRUCTION:	1960s	 Residence	 Sanitary
ORIGINAL FUNCTION:	-		
ACTUAL FUNCTION:	Day care centre		
EXTERNAL INTERVENTION:	New facade		
INTERNAL INTERVENTION:	Internal refurbishment		
CIRCULARITY STRATEGY (C.S.)		AREA	
R0-Refuse	R8- Use of carbon intensive materials	1123 mq	
R1-Increase building utilisation	R10- Design for nature	\$/m ²	
R3- Design for adaptability		-	
R7- Reduce the use of non-renewable material			

ACTION STRATEGY



ABOUT THE PROJECT

The concept for the daycare centre originates from the **Reggio pedagogy** applied in it, which was consciously chosen by the non-profit Alois Goldhofer Foundation.

In this pedagogy reusing and taking care of the old is essential.

This shapes the design concept of the daycare and can be experienced by the children in its architecture.

Another elementary aspect is that the strengths of the existing building are used rather than its weaknesses.

For this, the stock was carefully **preserved**, exempted and encased under a new, translucent shell. The resulting spaces between old and new are **space extensions** for the daycare and **elements** of the sustainable energy concept.

So, in total 75 % of the existing building stock could be maintained and was reused again.

CIRCULAR STRATEGY

The important value of **sustainability** is expressed in the reuse and activation of the founder family's old house. Its repair means sustainable conservation of old and new resources as an aspect of **circularity**.

Construction, materiality, and details of the old residential house become perceptible elements of the new purpose and space: The existing walls support the new roof.

The new shell made of **recyclable polycarbonate** is a collector of light and energy. It allows the existing walls to remain uninsulated and as a historical layer.

The **passive solar energy** gained through the façade is used for the building's heat balance. By reducing and reusing building materials and "grey energy" as well as cutting CO₂ to 5 kg/m²a the **climate target of 2050** is already met now.

Additional **materials** are used **raw** or **untreated** for their reusability and to make the building process visible for the kids.

KNOWLEDGE ACQUISITION



HEILERGEIGER ARCHITEKTEN UND STADTPLANER BDA

“Mixed-use development is deemed necessary for producing a resilient, vibrant, and sustainable urban that is generative, creating value through increased interaction and utility of urban activities, increasing mobility by increasing proximity and accessibility, accommodating a diversity of populations, and creating cohesion, purpose, dialogue, and a sense of place”
(Wardner, 2014)

Mixed use helps to create more dynamic and resilient communities. In a circular perspective, this means that communities can support each other and share resources, reducing the need for transport and social isolation, two factors that negatively impact both the environment and people’s well-being. In addition, one of the key elements

of mixed use is flexibility: designing multifunctional buildings and spaces allows them to adapt to new needs over time, avoiding demolition and construction from scratch, keeping the building working and always ready to change with the needs of the community

BEST PRACTICES

PROJECT	IMPACT HUB BERLIN	FUNCTION
LOCATION:	BERLIN (DE)	 Cultural events
YEAR OF CONSTRUCTION:	1960s	 Cooperative spaces
ORIGINAL FUNCTION:	-	 Bar
ACTUAL FUNCTION:	Office	 Office
EXTERNAL INTERVENTION:	-	 Sanitary
INTERNAL INTERVENTION:	Internal refurbishment	
CIRCULARITY STRATEGY (C.S.)	AREA	
R0-Refuse	600 mq	
R1-Increase building utilisation	\$/m²	
R3- Design for adaptability	-	

ACTION STRATEGY



ABOUT THE PROJECT

The new design of Berlin's Impact Hub provides a platform for innovation and society in which people work together across cultures and generations.

The project intervention works like a **second skin** from the inside of the new Impact Hub Berlin slots into the **existing space** of the building designed by Werner Düttmann in the 1960s on Friedrichstrasse in Berlin's Kreuzberg district.

The design reflects the corporate philosophy of the Impact Hub Berlin as a co-working space and start-up centre for start-ups in the field of social entrepreneurship.

It acts as a catalyst at the intersection of innovation and society, enabling people to work together.

The concept envisions a blend of structured work areas, chill-out areas, independent office space, workshop, event and meeting rooms. The design features interplay between communication and peace, dynamics and concentration.

Its simple design forges a warm and open atmosphere that meets the needs of the young and dynamic start-up scene.

CIRCULAR STRATEGY

From a circular point of view, this intervention is interesting because following the criteria identified by the Ellen MacArthur Foundation, through its extensive functional programme it creates the opportunity to keep the **building active** at all times. Also through the use of sustainable materials that can be adapted to different functional requirements over time, a circular perspective is reflected.

The sculptural wooden installation, which envelops the existing walls as a functional element, is transformed from a walk-in kitchen to seating platforms, shelves and fixed tables. A box, serving as a **"house within a house"**, contains office and meeting rooms. The wide and daylight-flooded area of the entrance area can be divided into zones with translucent sliding walls and can, therefore, react **flexibly** to different uses without losing its open character.

Another important element in the realisation of the project was that during time the users of the space were involved in the planning process as well as in its direct implementation. This was crucial to achieve a **user-friendly design**.

KNOWLEDGE ACQUISITION

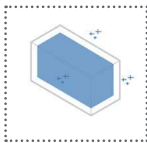


LXSY ARCHITEKTEN

BEST PRACTICES

PROJECT	OPEN LAB CO-WORKING
LOCATION:	ALTENBURG (DE)
YEAR OF CONSTRUCTION:	1960s
ORIGINAL FUNCTION:	-
ACTUAL FUNCTION:	Office
EXTERNAL INTERVENTION:	-
INTERNAL INTERVENTION:	Internal refurbishment
CIRCULARITY STRATEGY (C.S.)	AREA
R0-Refuse	180 mq
R1-Increase building utilisation	\$/m²
R3- Design for adaptability	-

ACTION STRATEGY



Interior refurbishment

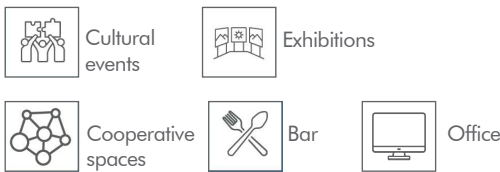
ABOUT THE PROJECT

The space, located in Altenburg and featuring a shopfront facing the street and a unique rear section with a curved roof constructed of glass bricks, was repurposed for the Stadtmensch initiative. This initiative sought to create a dynamic environment catering to diverse community needs and activities.

Designed to accommodate handicraft courses, start-up seminars, parties, co-working spaces, and a café, the space required a high degree of flexibility. It needed to be easily adaptable to various uses, allowing for efficient division and reconfiguration to suit different activities. Additionally, ample storage solutions were necessary to support its multifunctional purpose, along with accessibility for a diverse group of users.

The adaptive reuse of this space not only supports the practical demands of the community but also embodies principles of sustainability and circular design, ensuring that the area remains functional and relevant over time.

FUNCTION



CIRCULAR STRATEGY

The project aimed to transform a unique location within the city into a vibrant and connective space for residents, characterized by expressiveness and joy. The design approach sought to enhance the inherent qualities of the existing building without making intrusive alterations, thereby respecting its original structure and promoting sustainability.

To highlight the spaciousness of the room, an organic, flowing pattern was painted on the linoleum floor, creating visual continuity and dynamism. Curtains with integrated window openings were employed to define flexible areas within the space, offering acoustic dampening and discreet storage solutions. The kitchen was thoughtfully designed as an open counter within the room, fostering inclusivity and encouraging communal interaction, reinforcing the principles of circular design by maximizing functionality and adaptability.

KNOWLEDGE ACQUISITION



MEIER UNGER

“When expanding existing buildings, the key is to think of the building as a whole system, not just as a space to add on, but as a resource to be reconfigured and adapted for future needs.”
- Ellen McArthur

As mentioned in the book ‘Adaptive Reuse’ by Wong, adding as an intervention to reuse a building expands the structure through a change in size and purpose and is not mathematically reduced to adding volume but is a real change in the structure that implies a repercussion on several fronts, from the structural aspects of the host structure but also to an aesthetic language that modifies the perception of the surrounding environment.

WHOLE NUMBERS

As Wong suggests, the term addition can be finalised with different types of intervention. Among these, a widely used intervention is to increase the volume of a building by enlarging the top part of the latter or by adding one or more floors

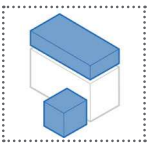
to the existing building.
In this way the volume of the building increases but the original footprint remains the same.
A second type of intervention can be recognised in the lateral extension of the building, in which case the intervention can become an integral part of an urban project in which the added volumes create new nodal points for the community and reduce architectural barriers.

SUMMATION

This is another form of addition, which refers to the addition of staircases, ramps, corridors and balconies, which by themselves do not constitute a discrete volume but are necessary elements in the renovation of an existing building.

PROJECT	TREEHAUS	FUNCTION
LOCATION:	HAMBURG (DE)	 Residence
YEAR OF CONSTRUCTION:	1950s	
ORIGINAL FUNCTION:	Appartment	
ACTUAL FUNCTION:	Appartment	
EXTERNAL INTERVENTION:	New volume	
INTERNAL INTERVENTION:	Internal refurbishment	
CIRCULARITY STRATEGY (C.S.)	AREA	
R0-Refuse	8800 mq	
R1-Increase building utilisation	\$/m²	
R3- Design for adaptability	2159 \$/m²	
R7- Reduce the use of non-renewable material		

ACTION STRATEGY



New external volumes

ABOUT THE PROJECT

The brief was to densify, modernize and energetically renovate a 1950s residential area in an attractive suburb of the city. The existing buildings were characterized by the parsimonious use of materials and the high exploitation of static reserves in the construction and foundations, in line with the era in which they were built.

In this context it was decided to extend the building using a lightweight construction made of prefabricated wooden panels, which also had the advantage of being able to construct the new building on top of the existing inhabited building in a relatively fast time and with little noise from construction.

CIRCULAR STRATEGY

All of the wall panels and ceiling elements of the new wooden stories were prefabricated at the factory (including mineral wool insulation) and assembled on location. On the facades of the upper floors, wood was used in its natural diversity in the form of sawn cedar shingles. In this way the lightness of the construction is transmitted to the outside, the new building clearly stands out from the massive existing buildings and at the same time relates to the trees that surround it. The large green spaces between the buildings, preserved thanks to the expansion concept, have been enriched with communication and play areas.

The new apartment designs prioritize family-friendly configurations and dimensions, aiming to appeal to younger tenants in the future. Overall, the planning strategies focused on maximizing the estate's usable area, with the goal of doubling its space while simultaneously reducing CO2 emissions by 50%.



BLRM ARCHITEKT*INNEN

BEST PRACTICES

PROJECT ARCELORMITTAL R&D HEADQUARTERS
 LOCATION: AVILES (SPAIN)
 YEAR OF CONSTRUCTION: 1970
 ORIGINAL FUNCTION: Office
 ACTUAL FUNCTION: Office
 EXTERNAL INTERVENTION: New volumes
 INTERNAL INTERVENTION: -

FUNCTION



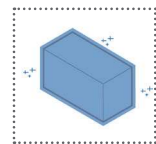
Cooperative spaces



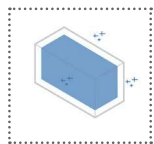
Office

CIRCULARITY STRATEGY (C.S.)	AREA
R0-Refuse	-
R1-Increase building utilisation	\$/m ²
R4- Design for disassembly	-
R6- Increase material efficiency	-
R8- Use of carbon intensive materials	-

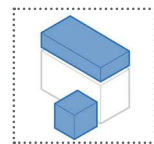
ACTION STRATEGY



External refurbishment



Interior refurbishment



New external volumes

ABOUT THE PROJECT

The project stems from the need of ArcelorMittal's Global R&D Centre in Alviles to renovate and extend the old building from the 1970s to contemporary requirements.

The architectural structure of the building is typical of that period, with a **reinforced concrete structure** and exposed brickwork.

The designer's concept for the redevelopment of this building is based on the creation of a **new shell** and new volumes attached to the existing building that will serve as new **meeting room spaces**.

CIRCULAR STRATEGY

An interesting element of the project is the **use of steel as a cladding material**, through the use of **perforated sheet metal**, but also as a structural material for the new elements added, in fact the choice of the latter is not accidental but falls on the choice of a **local and sustainable material**, specifically the steel used comes from 70% recycled steel and is completely demountable. In addition, the steel allowed rapid assembly of the structure.

KNOWLEDGE ACQUISITION



[BARAGAÑO]

CONTRAST OR HARMONY?

The need for the reconstruction of the building and the construction of new parts of it may be due to the re-profiling of the building or the expansion of its areas for new functions.

The protection of the architectural historical environment as part of the cultural heritage acts in these conditions as an urgent issue of our time, requiring deliberate decisions.

Modern city planners are faced with the difficult task of preserving the architecture of past eras for future generations and supplementing it with new objects, without destroying the integrity and originality of the existing historical environment.

According to Ilyanenko and Panteleeva, there are three main formal and compositional methods for integrating new buildings into a hi-

storical environment: **sympiosis or merging the new structure** with the historical surroundings, **fitting or adapting** the new structure to the environment, and **contrast**.

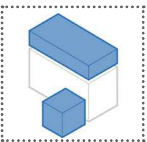
The first two methods are similar, involving the incorporation of a new structure or part of a historical structure into the existing architectural composition in a way that complements the overall ensemble.

However, due to the **use of new technology**, construction methods, and materials in modern adaptations, contrast is often unavoidable. **Contrast**, as an architectural method in this sense, could be used to enhance the expressiveness of significant urban spaces, to create urban dominants, to form accents in panoramas that are homogeneous in character.

BEST PRACTICES

PROJECT	SECONDARY SCHOOL EXTENSION	FUNCTION
LOCATION:	PALMA DE MALLORCA (SPAIN)	 Education
YEAR OF CONSTRUCTION:	1970s	 Office
ORIGINAL FUNCTION:	High School	
ACTUAL FUNCTION:	High School	
EXTERNAL INTERVENTION:	New volume	
INTERNAL INTERVENTION:	-	
CIRCULARITY STRATEGY (C.S.)	AREA	
R0-Refuse	698 mq	
R1-Increase building utilisation	\$/m²	
R3- Design for adaptability	-	
R5- Refuse unnecessary component		
R8- Use of carbon intensive materials		

ACTION STRATEGY



New external volumes

ABOUT THE PROJECT

The new extension of the Josep Sureda i Blanes High School is proposed as an extension of the characteristics of the existing building, which does not want to overpower and be obsolete in relation to the context in which it is integrated. The volume is seamlessly integrated with the existing school building, maintaining direct continuity without any separation. To minimize costs, shared access points, including stairs and lifts, have been incorporated between the new and existing structures. The 9-meter span of the extension is achieved using prefabricated slabs, which create a column-free space, allowing for future expansions.

CIRCULAR STRATEGY

The use of locally sourced materials forms the foundation of this project, aiming to achieve two key objectives: first, to reduce the ecological footprint by minimizing the “resource map,” and second, to situate the building within a broader context that includes both economic and cultural dimensions. One of the few construction materials available on the island that does not rely on imports is precast concrete. The adoption of concrete blocks as the “new traditional” construction system in Mallorca has fostered the growth of a small but thriving industry of local manufacturers who use indigenous aggregates to produce a wide variety of building components. This approach not only supports sustainability but also serves as an exploration of the visual potential of these everyday materials, commonly used in local architecture. It is also interesting from a technological point of view, as these elements are repurposed to be used in an alternative way as bries soleil, which create characteristic and suggestive plays of light within the structure itself.

KNOWLEDGE ACQUISITION

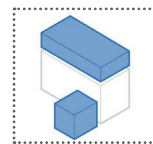


SMS ARQUITECTOS

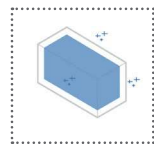
BEST PRACTICES

PROJECT	TOY LIBRARY AND OFFICES
LOCATION:	BARCELONA (SPAIN)
YEAR OF CONSTRUCTION:	-
ORIGINAL FUNCTION:	-
ACTUAL FUNCTION:	Mixed use
EXTERNAL INTERVENTION:	New volume
INTERNAL INTERVENTION:	Internal refurbishment
CIRCULARITY STRATEGY (C.S.)	AREA
R0-Refuse	1058 m ²
R1-Increase building utilisation	\$/m ²
R2-Design for longevity	2.854 \$/m ²
R3- Design for adaptability	
R6- Increase material efficiency	

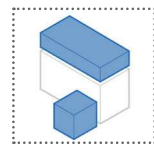
ACTION STRATEGY



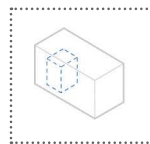
External refurbishment



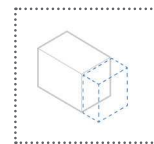
Interior refurbishment



New external volumes



Interior demolition



External demolition

ABOUT THE PROJECT

The project stems from the idea and the need to restore a Gothic quarter in the city of Barcelona, transforming an old, disused and obsolete building into a container for public use, in the strategy the idea of wanting to maintain a dialogue between the historic city and innovative technologies for the reconstruction of the now irretrievable parts of the building remains firm. The new addition is designed with light and contemporary materials that fit in with the context, in fact the façades attempt to pick up on and reinterpret the Gothic style by using stone lamellas that create a semi-transparent skin that filters the view between inside and outside. With a view to becoming a community space, the ground floor space of the existing part opens up to the urban space of the square and becomes permeable.

CIRCULAR STRATEGY

The most damaged part of the building is demolished to make room for a new construction, with part of the factory overlooking the square in the historic centre being preserved, so that the latter also maintains a dialogue with the architectural structure of the place.

The new section of the building is designed to engage with the existing tower, creating a dynamic relationship where the masonry of the tower becomes the fourth façade on all floors. The structural framework was constructed prior to the deconstruction of the original building, ensuring stability for the neighboring structures. Subsequently, work progressed simultaneously on the finishing of the upper floors and the archaeological excavations on the ground floor, with the goal of lowering the foundation to accommodate a subterranean level. The building systems are carefully designed to address the unique challenges of the site, focusing on waste minimization, energy efficiency, durability, and ease of maintenance.

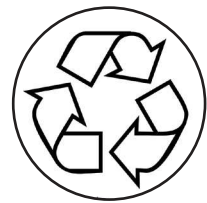
KNOWLEDGE ACQUISITION



TALLER 9S ARQUITECTES

Through this analysis, it was possible to identify recurring and characteristic elements in each of the projects examined, resulting in the definition of ten fundamental principles of circularity. These indispensable elements represent essential guidelines for responsible design, oriented towards the principles of circular architecture.

These principles of circularity proved to be indispensable tools for integrating a circular and transcalar approach into our projects. However, the objective was not limited to their practical application but also aimed to leave a methodological legacy, a reference for all future projects wishing to adopt the principles of circular design.



RECYCLE MATERIAL

Take recycled materials from old disused buildings and reuse parts of the building to give it a new purpose.



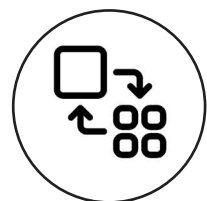
BIO-BASED MATERIALS

Promoting the use of biodegradable materials to reduce environmental impact.



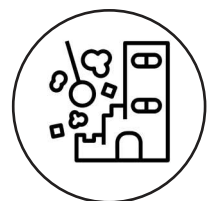
LOCAL MATERIAL

Favouring the use of raw materials from the local area, developing new technologies to reduce environmental impact and favour local businesses.



DESIGN FOR DISASSEMBLY

Design new interventions in such a way that they can be easily disassembled and reused for other functions, discouraging the use of bonded materials.



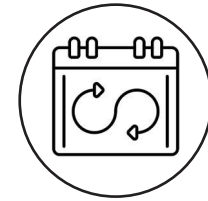
NOT DEMOLISH

The first aim of circular design is not to demolish, but to conserve and reuse what is there, not only recycling materials but also the building itself



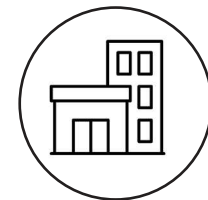
BARRIER-FREE DESIGN

Promoting interventions and additions that are essential to create a barrier-free project.



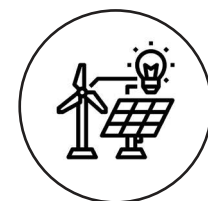
FLEXIBILITY DESIGN

Favour open spaces and flexible partitions to make the space adaptable to changing building functions over time.



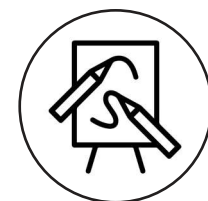
CUSTOM MADE DESIGN

Adopt technological solutions and aesthetic choices that are respectful of the surrounding environment while retaining their contemporary character.



BIOCLIMATIC DESIGN

Designing Interventions That Exploit Bioclimatics To Reduce The Building's Energy Consumption



CO-DESIGN

Involvement of stakeholders in the building recovery process, allowing for a holistic level of design

The Appennino Basso Pesarese - Anconetano area includes ten municipalities with a total population of about 34,000 residents. Six of these belong to the Catria Nerone Mountain Union, based in Cagli, a central entity in developing the area's territorial strategy. The region extends along the ridge marking the border with Umbria, surrounded by the towns of Urbino, Fabriano, Gubbio, and Città di Castello, and includes the river basins of the Metauro, Cesano, and Misa.

The prominent geographical features are Monte Catria (1700 m) and Monte Nerone (over 1500 m), which define the area's rugged landscape.

The territory is naturally divided into three altitudinal zones:

- The upper areas are dominated by expansive forests, which make them ideal for forestry and tourism. These spaces offer year-round opportunities for outdoor activities, enhancing their attractiveness for recreation.
- Moving to the intermediate zone, we find most of the settlements, characterized by a polycentric pattern of villages, castles, and hamlets that blend historical and scenic value. These settlements form the core of the region's tourism industry, which, although expanding, remains unevenly distributed among the municipalities.
- At lower altitudes, the landscape reflects its agricultural heritage, shaped over centuries by sharecropping practices. This zone is characterized by small land parcels, cultivated fields, and farmhouses that define the rural fabric.

The investigation on this territory aims to highlight the strengths but also the weaknesses of these nine municipalities in the inland area.

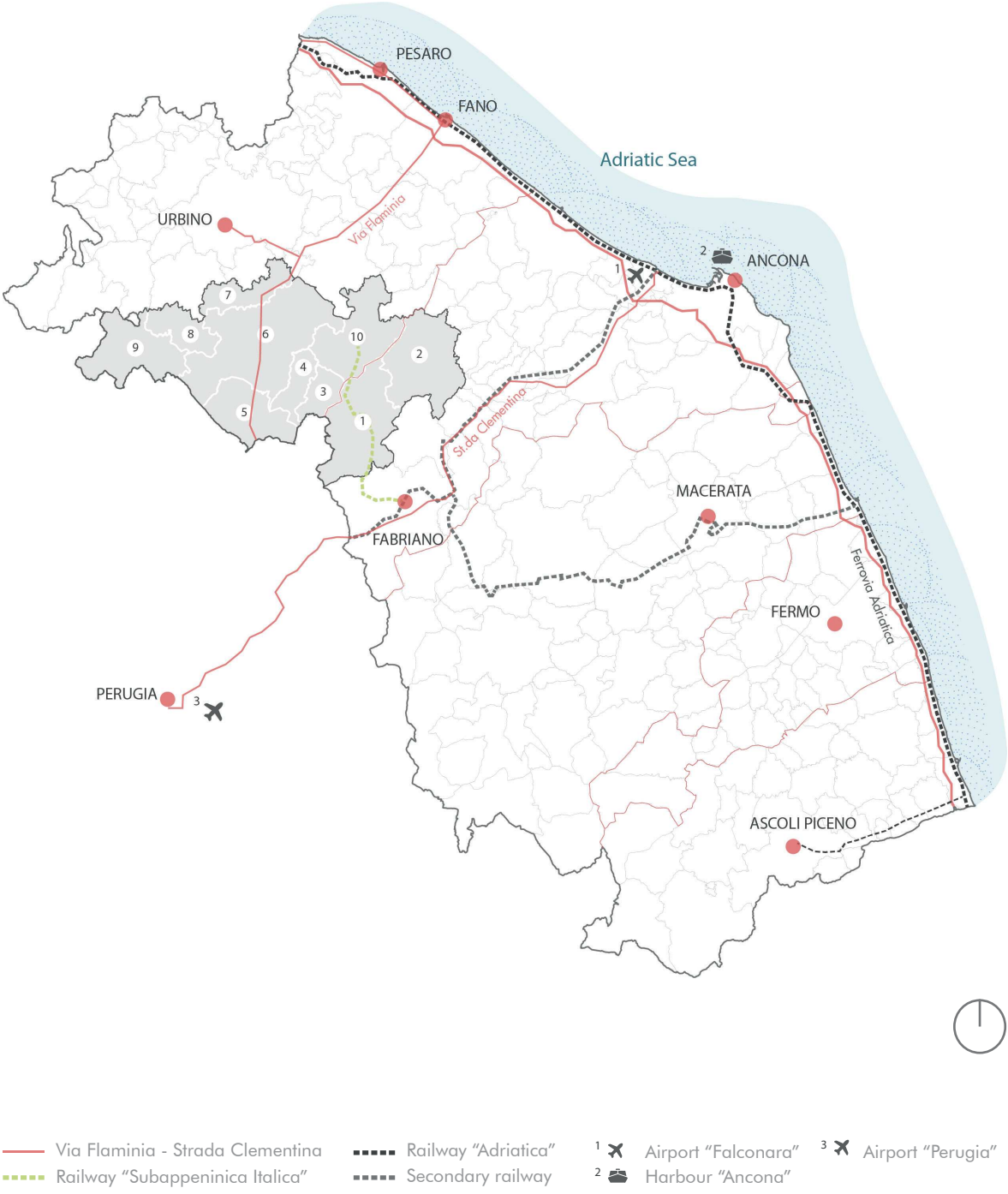
One of the main challenges that this territory is facing is the significant demographic decline. This decline has resulted in an imbalance that is difficult to resolve, even with record levels of immigration. Aging populations, high mortality rates, and low fertility rates further complicate the prospect of reversing the trend. While a focused policy to attract new residents and foster job cre-

ation could help, a more realistic goal involves slowing the demographic decline and gradually rebalancing the age distribution towards younger generations. To address this issue, a demographic analysis was conducted, comparing age structures across the municipalities and examining population density. The results highlight a stark imbalance between the area's vast geographical extent and its sparse current population.

Infrastructure also poses a critical challenge in the region. To address this, an evaluation of the existing road and rail networks was undertaken to assess their capacity to connect the area with neighboring regions and the Marche coastline. These connections are vital for enhancing the region's accessibility and fostering its economic development.

The Appennino Basso Pesarese - Anconetano is distinguished by its rich and diverse landscapes, a major draw for tourism. It is precisely for this reason that we wanted to create an overview of those parks that are subject to landscape constraints and that give value to this area that has not yet been sufficiently exploited.

Finally, integrating circular design principles into the study has been a key focus. Efforts have included mapping active and inactive quarries and identifying prevalent local construction materials. This approach ensures the potential for using locally sourced materials in the thesis project, contributing to an environmentally conscious design strategy.



INFRASTRUCTURE AND NATURAL SYSTEM

INFRASTRUCTURE

The designated territory includes the Inner Areas, including the municipalities of Cagli, Sassoferrato, Arcevia, Serra Sant’Abbondio, Frontone, Apecchio, Piobbico, Acqualagna, and Cantiano. This study examines the primary infrastructure of the region, emphasizing the established links between the Umbria region and the Adriatic coast.

The region is traversed by the historic **Via Flaminia**, an ancient Roman consular road linking the Adriatic coast to Rome, passing via the towns of Acqualagna, Cagli, and Cantiano.

The sole **railway** line is the **Pergola-Fabriano**, traversing the municipality of Sassoferrato. This is a single-track, non-electrified railway that is currently inactive, except for the transit of historic trains.

Despite these constraints, the region sustains direct links with significant hubs including Fabriano, Jesi, Città di Castello, and Rome, along with seaside cities like Senigallia, thereby facilitating internal mobility.

The **Alte Marche Cycle Route** is a strategic initiative aimed at enhancing the Alte Marche region, which is rich in historical, natural, and cultural heritages. The **primary aim is to foster slow and sustainable tourism** that links ancient villages, significant natural landscapes, and local communities via an integrated network of cycling routes. The cycling route traverses minor roads, bike paths, and nature trails, providing an experience appropriate for both seasoned riders and families seeking accessible and appealing routes. This initiative seeks to establish a **network of linkages among the minor towns** of the countryside and adjacent regions, incorporating ancient routes like the Via Flaminia, which traverses municipalities including Acqualagna, Cagli, and Cantiano. Cyclists can engage with stunning natural environments, such as the Gola del Furlo Nature Park and Monte Cucco Park, which present a distinctive blend of biodiversity and spectacular scenery.

A strategic zone has been delineated surrounding the project area, comprising sixteen com-

munities chosen based on criteria of geographical closeness and the density of socio-economic and institutional connections.

The principal hubs in the strategic region are:

- Urbino, a university town offering supra-municipal services (15,000 residents).
- Fabriano, the predominant mechanical manufacturing center in the region (31,000 residents).

The good road infrastructure in the central belt (Acqualagna, Cagli, Frontone and Cantiano) makes the project area permeable to the social and economic dynamics of northern Marche. For example, the municipalities of the project area were included in the intervention plans for the crisis of the Fabriano manufacturing district and the Pesaro furniture sector.

The project area maintains significant connections with the adjacent Umbria, though to a lesser extent. The primary Umbrian centers involved are Città di Castello, adjacent to Apecchio, and Gubbio, reachable from Cantiano and Serra Sant’Abbondio via the Hermitage of Fonte Avellana.

These centers, possessing a greater population and superior services compared to the inland communities, create considerable appeal for the citizens of the project region.

On the coastal side, the focal points are Fano for the municipalities in the province of Pesaro-Urbino and Senigallia for those in the province of Ancona.

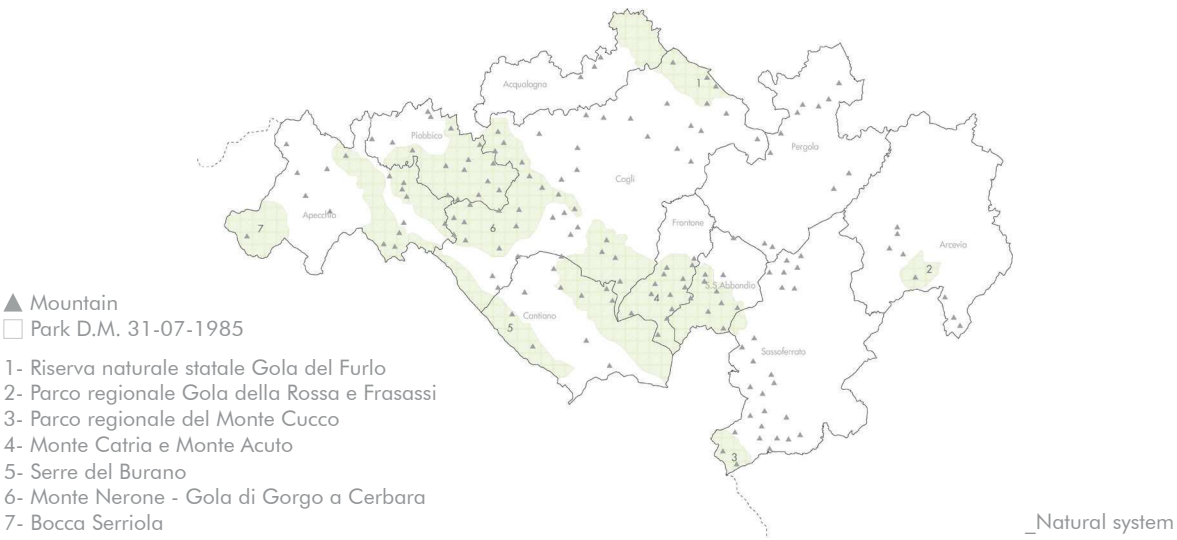
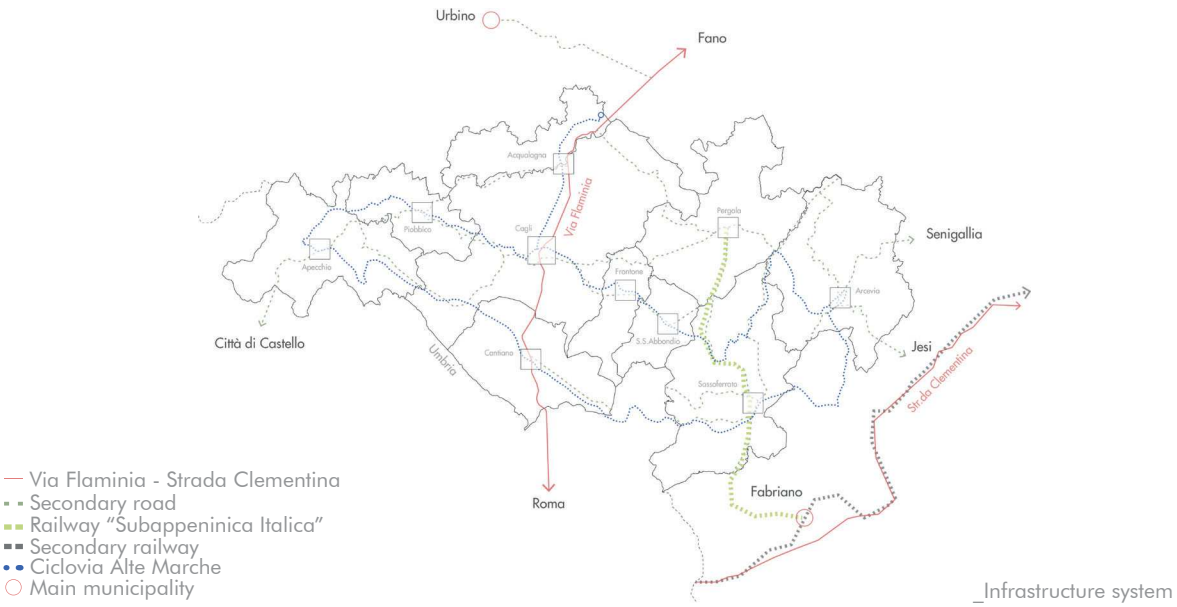
NATURAL SISTEM

The landscape heritage of the inland area of the lower Pesaro-Ancona Apennines is a resource of inestimable value, capable of narrating the history, culture and identity of a territory unique for its extraordinary variety and beauty. **This territory extends along the ridge that marks the border with Umbria**, in a quadrant delimited by the cities of Urbino, Fabriano, Gubbio and Città di Castello, falling within the hydrographic basins of the Metauro, Cesano and Misa rivers. **Its predominantly mountainous and hilly morphology** contributes to the creation of landscapes of rare quality, recognised as **valuable landscape** assets by the Galassini Decree of 31 July 1985.

EXPLORATION PHASE

Among the most outstanding sites are Monte Catria, with its 1,700 metres in height, and Monte Nerone, which exceeds 1,500 metres, both characterised by breathtaking views and a rich ecosystem. The Furlo Gorge stands out as a geological wonder, where the imposing rock faces are intertwined with protected flora and fauna, creating a natural environment of extraordinary charm. The areas of Monte Catria, Monte Nerone and Gola Rossa are also protected, being among the landscapes recognised by the decree as worthy of protection and enhancement.

Local administrations, in close collaboration with the communities, are implementing policies aimed at preserving and enhancing this heritage, promoting slow and sustainable tourism. Activities such as cycling and hiking allow people to fully experience the beauty of these places, while preserving their integrity and ensuring a harmonious relationship between man and nature. These interventions contribute to making the area not only a symbol of cultural identity, but also a virtuous example of a balance between economic development and environmental protection.

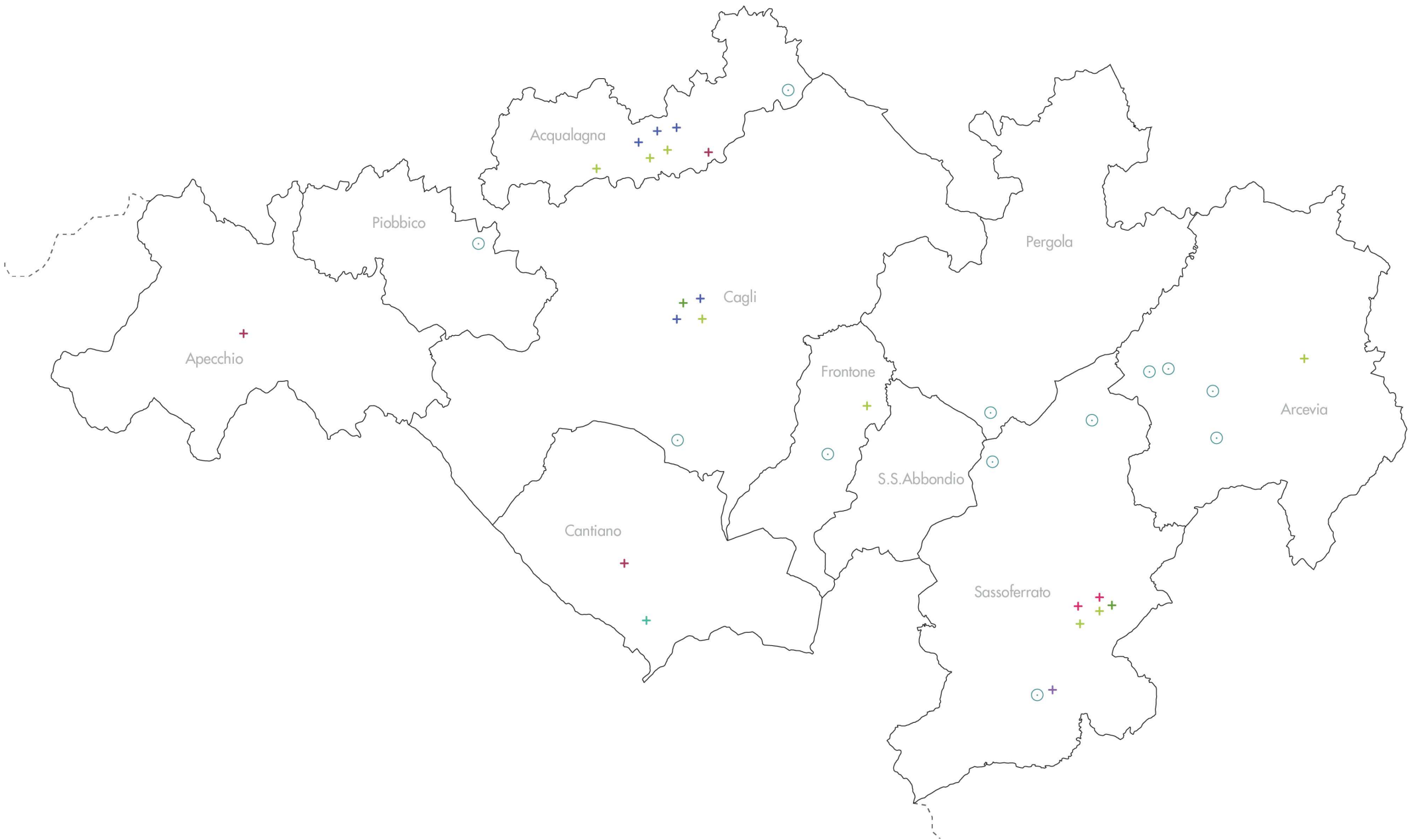


The **theme of circularity** is the central focus of this research, which sets out to map and **analyse the quarries**, both active and disused, present in the inland area of Appennino Basso Pesarese-Anconetano.

The analysis showed that most of the quarries are concentrated in the municipalities of **Arcevia** and **Sassoferrato**, chosen as case studies for the project. These quarries, mostly dedicated to the extraction of **sand, gravel and stone**, have played a fundamental role in the construction of the territory’s architectural identity. The extracted materials, in fact, were **widely used both as structural elements** and for the decoration of local buildings, giving them a unique and recognisable character.

An example of particular historical and cultural importance is the **sulphur mine of Cabernardi**, a small hamlet of Sassoferrato. This mine, no longer in operation, drove the economy of a large area for decades, involving not only Sassoferrato, but also Arcevia and Pergola. Its historical value is today preserved and enhanced through the **Archaeology and Mining Park** and the **Sulphur Museum**, both located in the hamlet, which offer tangible evidence of its past importance.

In parallel, the materials currently resold in the area were analysed, with the aim of **integrating as many local resources as possible** into the circular design process. Involving **recyclable materials**, together with the contribution of the **area’s craftsmen**, also strengthens community ties, encouraging a respectful and innovative approach to design and the **reuse of available resources**.



- + Floor tiles
- + Timber
- + Inert
- + Buildings materials
- + Minerals (stone, marble)
- + Metals (steel, aluminium)
- + Glass
- Quarries (sand and gravel, limestone, sulphur)

_Materials map

WEAKNESSES AND STRENGTHS

WEAKNESSES

The inland area of the Appennino Basso Pesarese-Anconetano presents some criticalities that affect the quality of life and the socio-economic development of the territory.

In terms of mobility, there are difficulties in transport, especially for students, elderly and disabled persons, who struggle to reach places of care and socialisation. Despite plans and proposals for more flexible mobility, the lack of coordinated inter-municipal management has limited the effectiveness of interventions.

In the health sector, the territory has a high rate of avoidable hospitalisation and limited home care for the elderly. Projects have been launched to improve services, including new organisational models, telemedicine and integrated care solutions. However, the implementation of these initiatives is still ongoing.

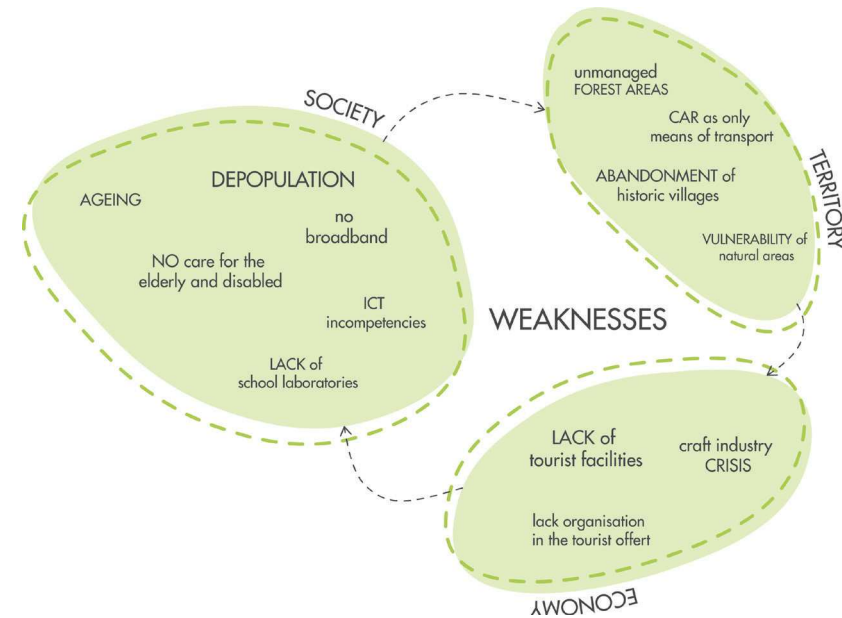
With regard to education, the lack of infrastructure such as laboratories and gyms is combined with institutional fragmentation: many high schools are branches of institutions located outside the area. This makes it difficult to plan unified educational strategies. Efforts have been

made to improve school equipment and strengthen teaching, but challenges remain related to orientation, psychological support and school-to-work alternation.

The digital divide is another major problem. Despite investments, many remote areas are not adequately served by broadband, penalising access to digital services. The region plans interventions to bring at least 30 Mbps to inland areas, but coverage remains incomplete.

At the demographic level, the population is expected to decline and the average age to increase, leading to a reduction in the number of students and the need to establish multiple classrooms in the most remote municipalities. To counteract the demographic decline, it would be necessary to encourage immigration and create new job opportunities, but current conditions do not allow this.

Finally, the economic fabric is transforming, focusing on tourism, multifunctional agriculture and services, while the manufacturing sector is losing its centrality. This change, aggravated by imbalances and underutilised resources, makes it complex to create new jobs and achieve economic stability.



Author's re-elaboration from "Asili d'Appennino le dimore della Creatività nelle Alte Marche"

EXPLORATION PHASE

STRENGTHS

The inland area of the Appennino Basso Pesarese-Anconetano is distinguished by several points of strength that enhance its territorial, economic and social heritage.

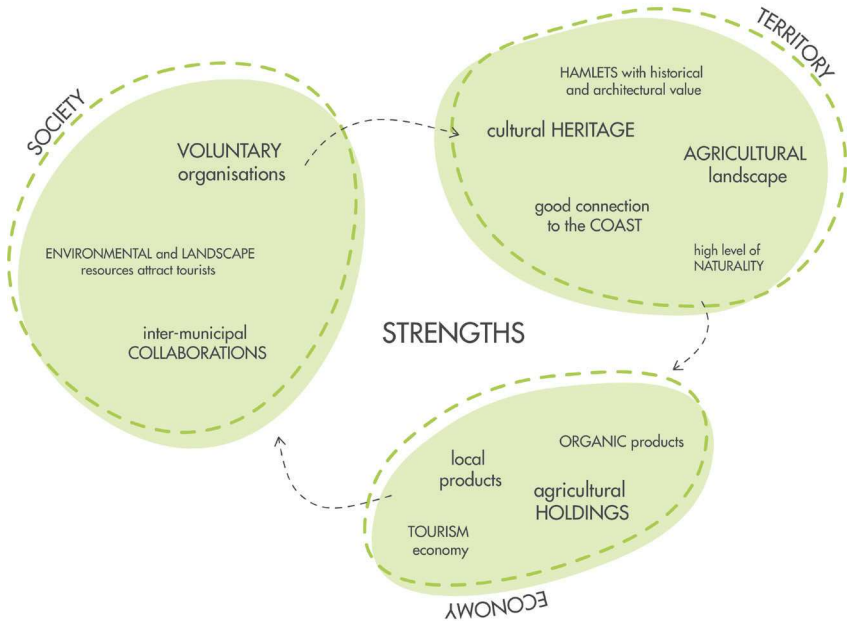
The territory boasts a high level of naturalness in the mountain areas, while the hilly areas preserve the typical polycultural agrarian landscape of mezzadria (sharecropping).

The accentuated polycentrism, with villages, castles and hamlets of historical-architectural value, is accompanied by a widespread cultural heritage and good or excellent accessibility, particularly for the municipalities along the arterial roads connecting with the coast.

On the economic level, the area is renowned for its quality agri-food products, such as truffles, wine, craft beer and bread, and for a rapidly expanding organic sector. The presence of solid production and commercial organisations and multifunctional farms contributes to the valorisation of local resources and the consolidation of the agri-food chain, also at an international level.

At the social level, six municipalities belong to the same Mountain Union, joining forces for the development of inter-municipal functions. The area has attracted new Italian and foreign residents, often well-off and educated, fascinated by the quality of the environment and landscape.

The presence of an active volunteer network, especially in the areas of culture and the environment, strengthens the social fabric. Moreover, the tourist economy is growing, thanks also to the proximity and relations with strategic centres such as Urbino, Fabriano, Gubbio and Città di Castello.



Author's re-elaboration from "Asili d'Appennino le dimore della Creatività nelle Alte Marche"

02.02 LOCAL ACTORS

The research path on the municipalities of the inner areas was enriched by the **meeting and support of relevant figures**, who partly influenced the choice of the municipalities considered as project areas.

In particular, our work started thanks to the meeting with **Claudia Massioni**, a doctoral researcher at HCU Hamburg. She invited to embark on a parallel path to her PhD research, focused on the inland areas of the lower Pesaro-Ancona Apennines, specifically Arcevia, Sassoferrato and Serra Sant'Abbondio.

Her investigation is focused on the documentation of residential buildings constructed between the 1950s and 1976, not yet subject to energy efficiency regulations (L.373/76), and belonging to ordinary architecture. The main objective of her research is to adapt the documentation tools used by Docomomo to case studies recalling modern qualities and not designed by well-known authors, in order to protect and transform this specific part of the architectural heritage.

Initially, we intended to investigate one of her case studies. However, as these buildings were privately owned, it turned out that **finding in-depth information would have required direct contact with the owners, making the work particularly complex**. Based on this difficulty, we got in touch with the technical offices of the municipalities of Arcevia and Sassoferrato, where we were able to collaborate with Geom. Roberto Gasparetti and Geom. Alioscia Sartarelli. Both proved to be extremely helpful and attentive to our research, respectfully supporting our thesis work.

Thanks to this confrontation, we shared our goal of **identifying case studies built in the same period** as the buildings analysed by Claudia Massioni. Through careful research and field inspections, and with the direct support of the two surveyors, from Arcevia and Sassoferrato, we were able to select the buildings to be considered for our project.

Despite the small size of the municipalities of Arcevia and Sassoferrato, **we found local communities very active** and caring about the area. This also resulted in significant help from other

figures, such as Arch. Lucrezia Vitaletti. Besides being a practising architect in her family's technical office, Arch. Vitaletti is also active at municipal level. In fact, for the municipality of Sassoferrato, she was in charge of drafting the **Plan for the Elimination of Architectural Barriers (PEBA)**. She illustrated the municipality's focus on the **creation of accessible spaces, promoting inclusive tourism**. Sassoferrato, in fact, stands out from Arcevia for its strong commitment in this area, as demonstrated by the achievement of the Lilac Flag for accessible tourism.

In addition to the cooperation of the technical offices, we have received a warm welcome from the **local population**, which has shown itself to be involved and willing to help us. To further enhance the community's contribution, we **administered an online questionnaire** to the inhabitants of Arcevia and Sassoferrato. The aim was to **involve a wider audience** and collect useful information on the needs related to the project buildings, as well as knowledge of the PEBA, circular design and energy efficiency issues.

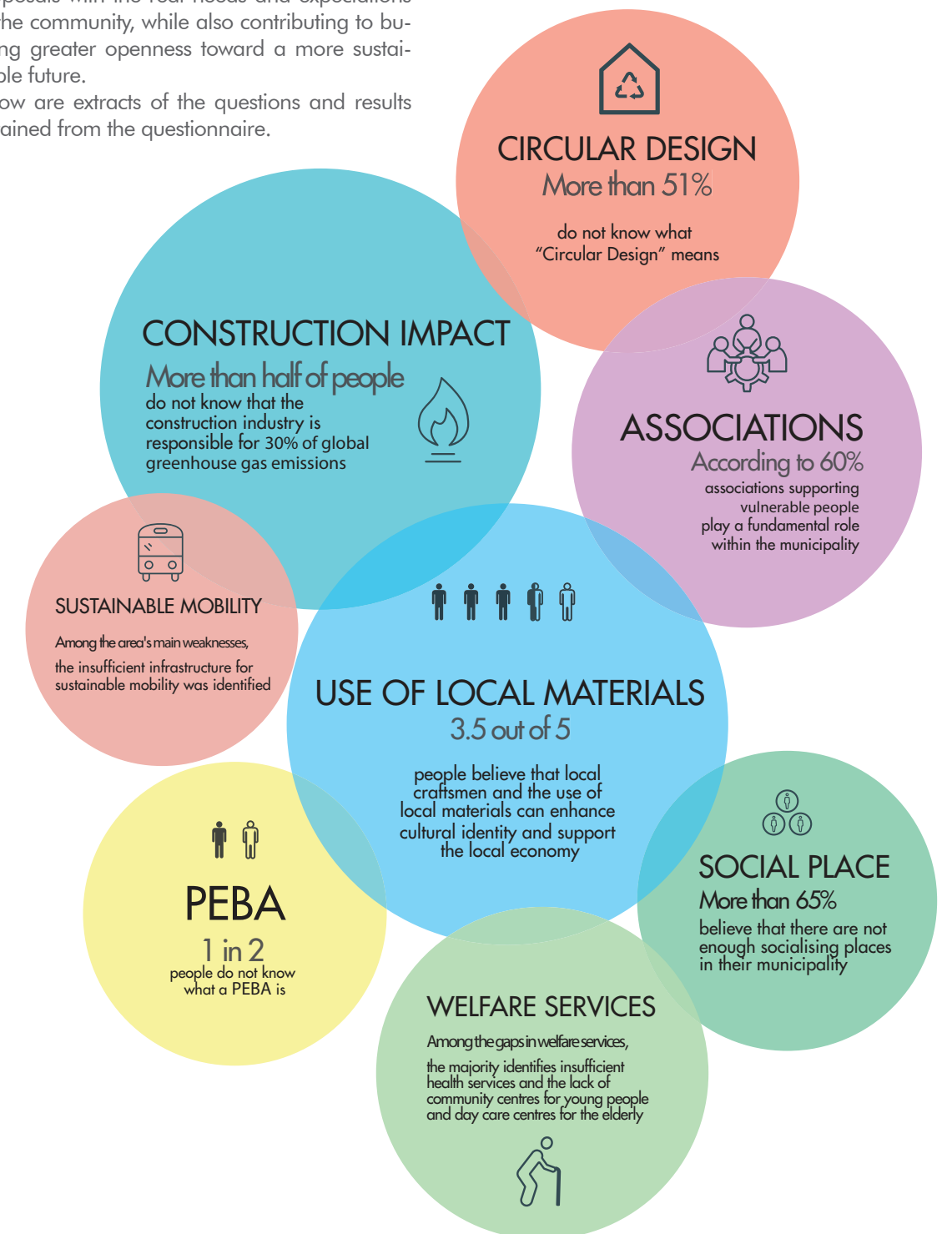
Our goal was to listen to the people who experience these spaces daily, gather their insights on strengths and weaknesses, and identify where they saw the greatest potential for improvement.

Through a **form**, distributed via social media, we asked citizens to **share their views on various aspects of the area**, also exploring their awareness of key issues such as urban accessibility and the PEBA plans for removing architectural barriers. At the same time, we wanted to understand their level of sensitivity toward environmental problems related to the construction sector and their interest in more sustainable and circular architectural recovery solutions.

This survey was not just about gathering data, but also aimed at raising awareness and encouraging reflection on the topics addressed. Understanding the community's level of awareness helps us gauge how open they are to innovative and sustainable solutions, while also offering an opportunity to foster a dialogue about alternative approaches that could be adopted, even starting from small everyday actions.

Ultimately, this listening process provided us with a **clear picture of the territory's challenges and opportunities**, enabling us to align our design proposals with the real needs and expectations of the community, while also contributing to building greater openness toward a more sustainable future.

Below are extracts of the questions and results obtained from the questionnaire.

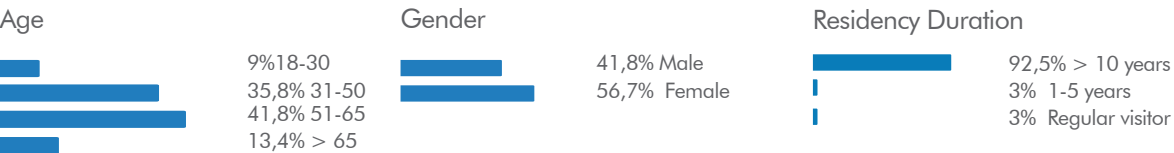


_Social survey answers

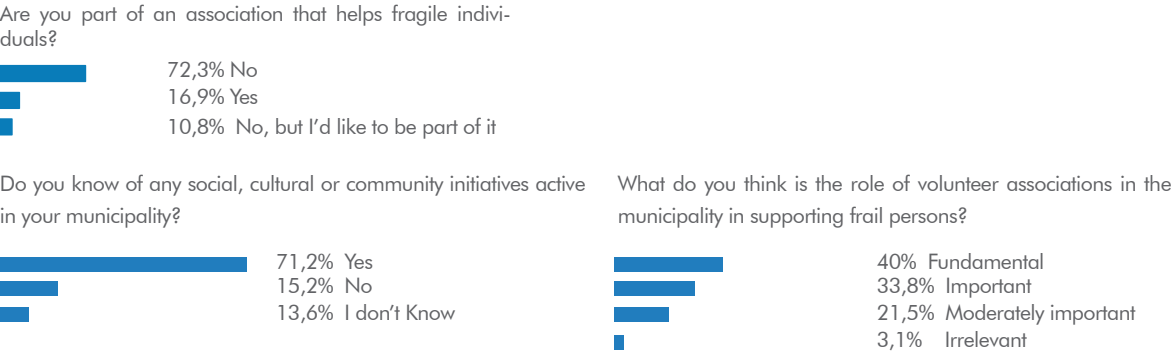
“What makes you want to live in an inner area community?”



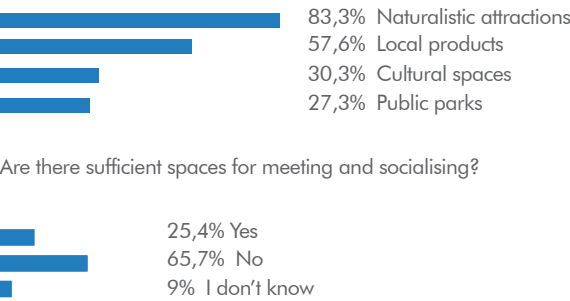
BASIC INFORMATION



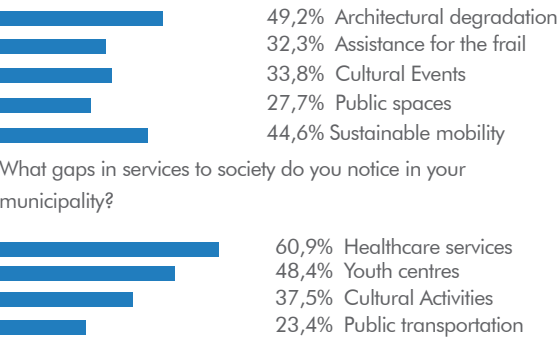
ASSOCIATION



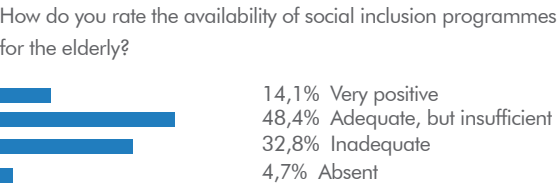
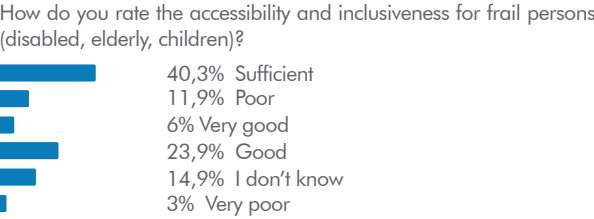
STRENGTHS OF THE TERRITORY



WEAKNESSES OF THE TERRITORY



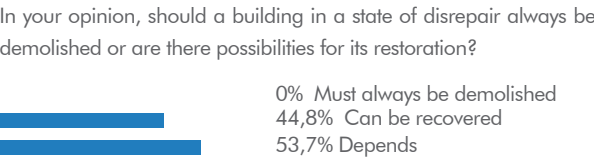
ACCESSIBILITY



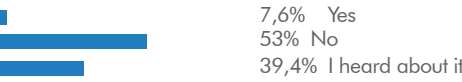
Do you know what a PEBA is?



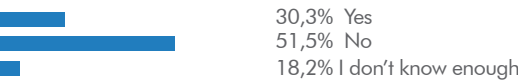
CIRCULAR DESIGN



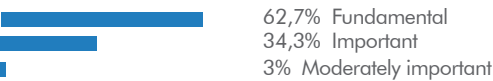
Are you aware that demolition in the construction sector is responsible for about 30% of global greenhouse gas emissions?



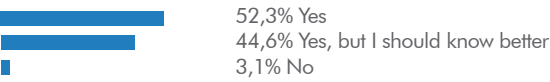
Have you ever heard of 'circular design'?



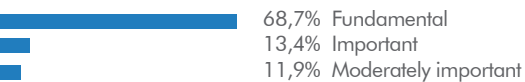
How important do you think it is for a building to be upgraded using local materials?



Do you think this kind of approach can be useful in reducing environmental impact and improving the local economy?



How important do you think it is for the environmental impact that a building redevelopment project integrates sustainable technologies?



02.03 CASE STUDY SELECTION

The choice of the municipalities of Arcevia and Sassoferrato as areas for our project was motivated by multiple reasons combining territorial, social, and practical factors, in addition to the significant support received during the research phase.

1. TERRITORIAL AND ARCHITECTURAL CONTEXT:

Both municipalities belong to the inland areas of the lower Pesaro-Ancona Apennines, an area characterised by a rich but often neglected architectural and cultural heritage. Arcevia and Sassoferrato present buildings constructed mainly between the 1950s and 1970s, a crucial period that represents the focus of our study. These buildings have not yet been subjected to energy efficiency interventions and belong to what can be defined as 'architecture of the ordinary,' making them suitable for investigating innovative redevelopment solutions that respect the historical and architectural context.

2. SUPPORT FROM LOCAL INSTITUTIONS:

Collaboration with the technical offices of the two municipalities was a decisive element. Geom. Roberto Gasparetti (Arcevia) and Geom. Alioscia Sartarelli (Sassoferrato) showed great support and attention to our work, helping us to select significant buildings as case studies. Furthermore, the contribution of Arch. Lucrezia Vitaletti in Sassoferrato further enriched our path, allowing us to better understand municipal dynamics related to inclusive and sustainable design.

3. ACTIVE AND COLLABORATIVE LOCAL COMMUNITIES:

Arcevia and Sassoferrato stand out for the liveliness of their communities, which proved not only welcoming but also deeply involved in our project. This allowed us to collect useful information through questionnaires and interviews, gaining valuable insights into local needs and perceptions of the issues addressed, such as accessibility, energy sustainability, and architectural restoration.

4. COMMITMENT TO ACCESSIBILITY AND SUSTAINABILITY:

Sassoferrato, in particular, has shown a special sensitivity towards accessibility, with the elaboration of the Plan for the Elimination of Architectural Barriers (PEBA) and the obtaining of the Lilac Flag for accessible tourism. This commitment has also been a reference model for Arcevia, prompting us to consider both municipalities as significant examples for integrating accessibility, building redevelopment, and care for the territory.

5. POTENTIAL FOR A REPLICABLE APPROACH:

Finally, the choice of two municipalities with small dimensions and similar characteristics allowed us to work on case studies that, although belonging to local realities, present problems that are widespread in many other Italian contexts. This approach makes it possible to develop project solutions that can be replicated in other inland areas, favouring the enhancement and revitalisation of often marginalised territories. In short, Arcevia and Sassoferrato represent ideal locations for our project, offering a combination of historical context, institutional availability, and community participation that has enriched and facilitated our research work.

EXPLORATION PHASE



02.04 CONTEXT AND ARCHITECTURE ANALYSIS OF ARCEVIA

EXPLORATION PHASE

Arcevia, located on the slopes of Monte Cischiano, stands out as one of the most fascinating centres of the Marche hinterland for its history, monuments, and unique landscape. This hilly territory, part of the pre-Apennine ridge between Marche and Umbria, comprises 18 hamlets, including the nine historical castles of :

Avacelli, Castiglioni, Caudino, Lorello, Montale, Nidastore, Palazzo, Piticchio, and San Pietro.

These castles, built between the 14th and 15th centuries, are one of the main attractions of the area. Even today, they stand out for their excellent state of preservation, retaining their original features intact. They form a ‘satellite’ system around the centre of Arcevia, recognising themselves as part of a common identity while preserving cultural and historical peculiarities that make them unique. This plurality of settlements, distributed in a hilly context of great beauty, helps to define the distinctive character of the municipal territory.

Arcevia’s strategic position, closing the Misa valley on one side and facing the Apennine ridge on the other, has made it an important cultural and commercial hub since the Middle Ages.

The settlement system of Arcevia, with its castles and central village, is an example of a ‘hinge settlement’ between the hilly and mountainous worlds.

The territory’s history has roots that go back to Roman times, when the area was populated by small rural settlements without an autonomous centre. According to tradition, a first organised settlement took shape during the invasion of the Franks between the 7th and 9th centuries AD. However, the first documentary evidence of a fortification on Monte Cischiano dates back to 1130, while the development of the village, then known as Rocca Contrada, began with the foundation of the municipality in 1201 near the present-day Porta di S. Lucia.

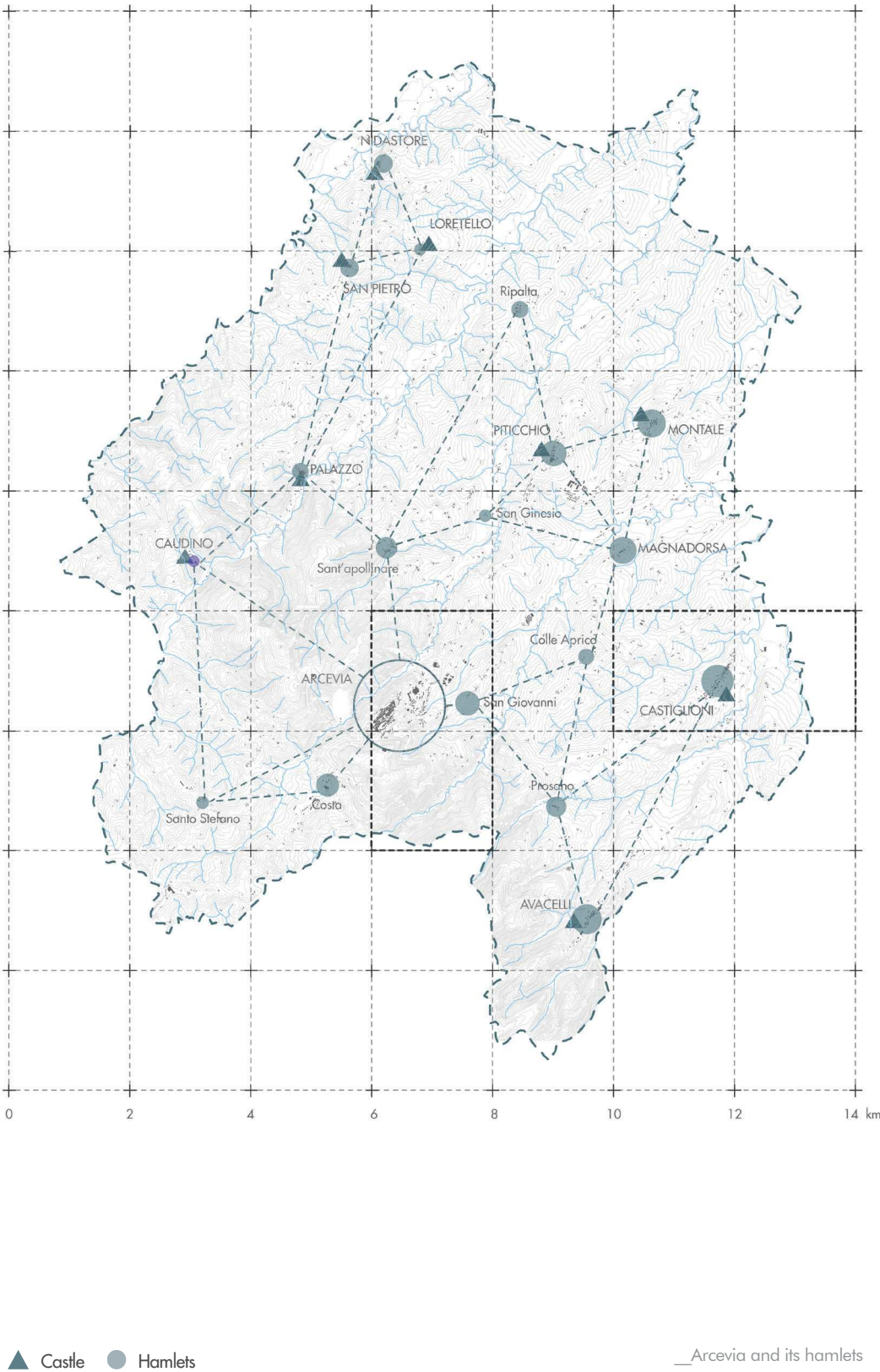
In 1817, Pope Pius VII renamed Rocca Contrada with the name of Arcevia, a Latinisation combining the terms ‘arx’ (fortress) and ‘contrada’

(street), based on historical reconstructions elaborated in previous centuries. This name symbolically represents the union between the function of a defensive garrison and the role of a communication and cultural exchange route.

During the Middle Ages, the surrounding castles were distinguished by their different administrative affiliations: Castiglioni was part of the Senigallia Committee, Avacelli and the Sant’Ansovino area depended on Camerino, while Lorello, Palazzo, San Pietro, and Nidastore were under the jurisdiction of Fossombrone. This mosaic of dominions contributes to the historical and cultural richness of the area. Over the centuries, Arcevia consolidated its role as a cultural and strategic crossroads, becoming a meeting point between Marche, Umbria, and the Duchy of Urbino. This strategic value was recognised in 1449, when Pope Nicholas V awarded the city the title of ‘Propugnaculum Ecclesiae’ for its loyalty to the Church and its contribution in the struggle against Francesco Sforza.

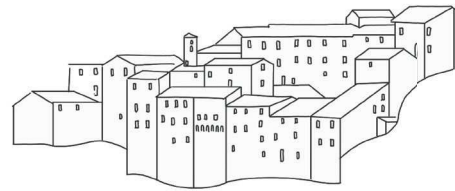
Today Arcevia, with its village and castles, is a perfect combination of history and nature. The town dominates the Misa valley with a panoramic view sweeping from the Adriatic coast to the Apennines. Surrounded by greenery, it enjoys a mild climate and healthy air that have made it, over the centuries, an ideal destination for summer stays.

Its approximately 1,000 inhabitants in the historic centre and the more than 5,000 distributed in the hamlets and castles form a community linked to the territory, which has been able to preserve its traditions.



THE NINE CASTLES OF ARCEVIA

To better understand the structure and peculiarities of this territory, it is useful to frame the **nine castles** individually in order to extrapolate the complexity and settlement uniqueness that characterises them and has made them a system with its own strength, in which respect for the historical landscape and more recent human works must work together to enhance and not weaken the **peculiarity of these settlements**.



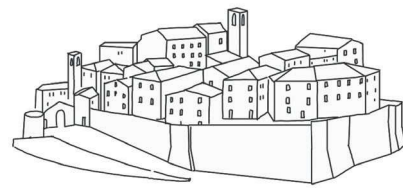
AVACELLI

Annexed to the municipality of Rocca Contrada in 1248, its fortification did not take place until the 15th century with a walled enclosure that still retains its original structure today. Over time, Avacelli Castle has experienced conquests and dominations that have enriched its artistic and cultural heritage.



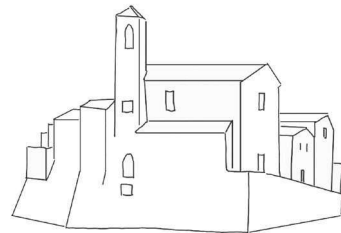
CASTIGLIONI

Built in the year 1000, standing on the last slopes of the Arcevia hillside, it was much coveted for its strategic position and in 1228 it was attacked and destroyed. Restored in 1400, the defensive structure of the castle is still in excellent condition today.



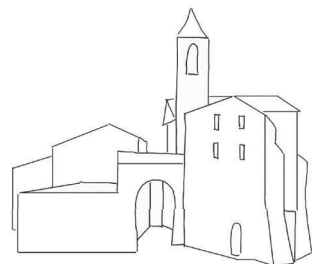
PITICCHIO

The earliest traces of this castle date back to the 13th century, when it was also destroyed and dominated by Rocca Contrada, its 15th-century style is due to the complete restoration that followed.



MONTALE

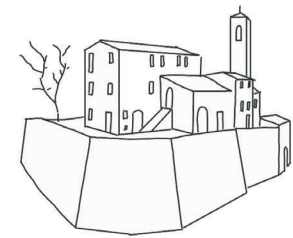
First mentioned in 1223, Montale Castle is located on a hillock and therefore strategically interesting for the nearby Rocca Contrada, which destroyed it twice, in '250 and '280. The castle's current appearance is due to the reconstruction of the town.



CAUDINO

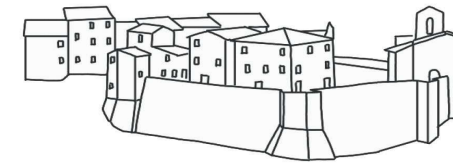
Built by Rocca Contrada as a Palace in 1338 to encompass and defend the surrounding villas, Caudino was fortified and elevated to a Castle in 1400 for defensive needs and control of the strategically important territory.

EXPLORATION PHASE



SAN PIETRO IN MUSIO

As a small castle not far from Loretello, its earliest traces date back to 1230. With an almost intact 15th-century town plan, the Castle of San Pietro in Musio retains very few traces of its original walls, except for the wall with the patrol walkway.



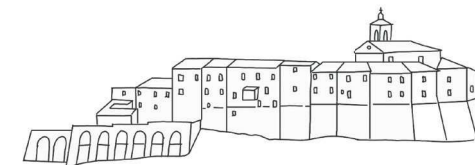
LORETELLO

One of the oldest, dating back to 1072. The walls, which can be traversed, the access bridge, the large round tower and the loopholes that are still visible, owe their current appearance and excellent state of preservation to an extension between the 16th and 15th centuries.



PALAZZO

A true walled village perched on a hillock, Castello Palazzo has an almost intact and distinctive medieval urban structure, with narrow streets and alleyways climbing up the slopes of Mount Caudino. The only castle built and not conquered by Rocca Contrada in the late 14th century, for the area's defensive needs, sections of the mighty stone and terracotta walls and a 15th-century access gate are still clearly visible here.



NIDASTORE

The northernmost of Arcevia, it has been much disputed since its beginnings, dating back to around the mid-1600s.

CURRENT PLANNING POLICIES

NEW CASTLE TOURIST ROUTE FOR THE ENHANCEMENT OF THE ECOMUSEUM OF THE UPPER MISA VALLEY

The strategy involves connecting the 9 castles of the Municipality of Arcevia with **cycling and walking routes**, divided into three different lengths within the typical Marche landscape, where nature and history meet to create an immersive experience.

There are various **strategies for activating cycle paths in the inland areas**; this one specifically proposes itself as the “New Castle Tourist Route for the Enhancement of the Ecomuseum of the Upper Misa Valley.”

Within this itinerary, the aim is to **revive cultural and gastronomic appeal by identifying points of interest that highlight local production** through the “excellences of the territory,” which are a typical feature of the inland areas throughout the Marche region.

Among these, the wine excellences and olive oil production stand out.

Along the route, there are rest areas and information points where basic information about the historical evolution of the castles is provided. Among the 9 castles, the Loretello castle will be the “visitor center,” where one can start and organize the various itineraries.

AR[T]CEVIA PROJECT

Since 2008, AR[t]CEVIA has been a major **event for contemporary art**, transforming the Arcevia area into a reference point for creativity and culture. Every year, from the first Saturday in August to the last Sunday in September, the festival welcomed artists and visitors from all over the world, offering a unique experience capable of **celebrating art as a universal language and opportunity for encounter**.

AR[t]CEVIA was not just an exhibition but a multidisciplinary festival combining contemporary music, experimental theatre, recitals, performance and video art. An event designed to excite, amaze and make people reflect, enriching the cultural landscape with moments of confrontation and inspiration.

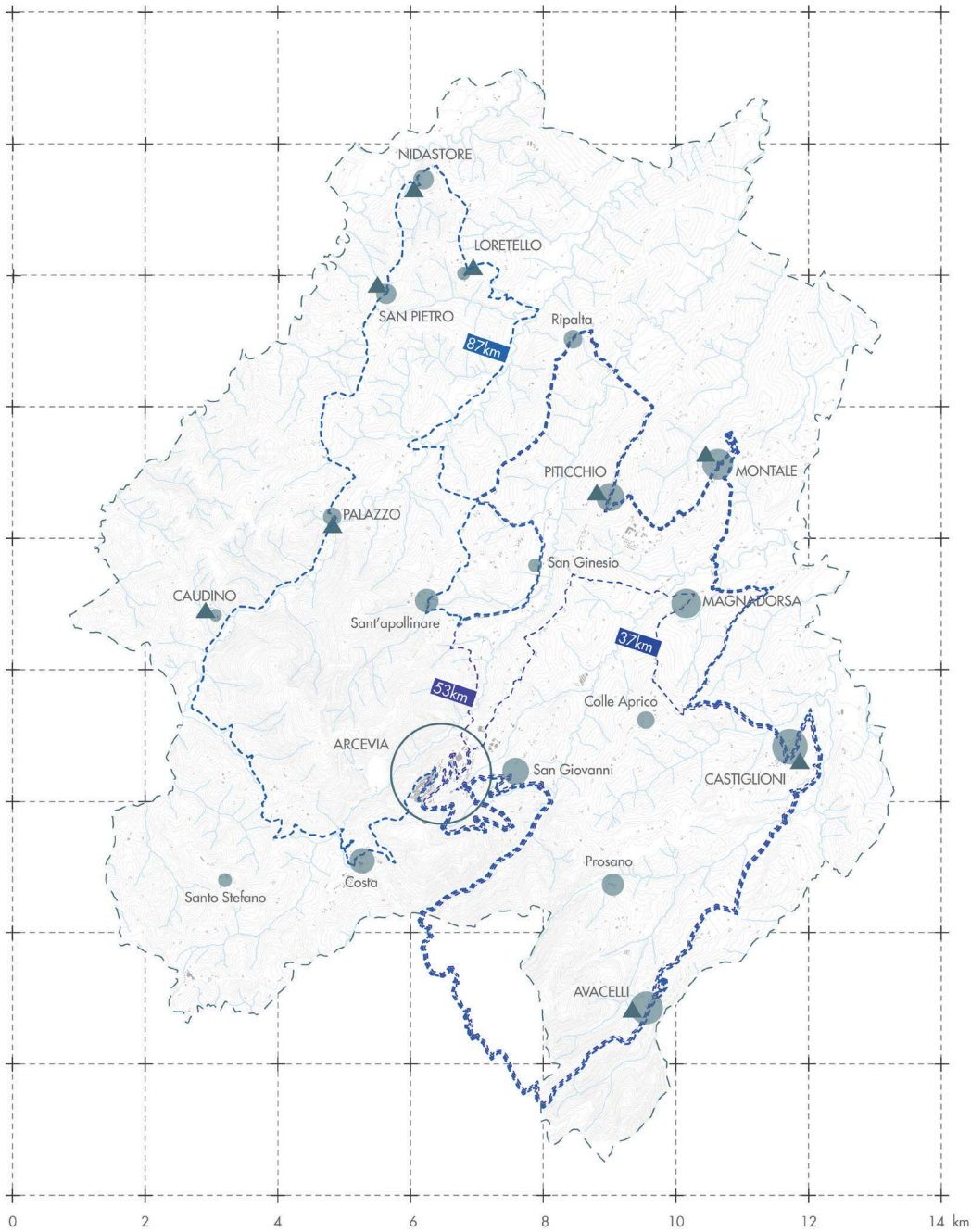
The festival had built a network of collaborations with national and international institutions, foundations and cultural operators, involving Italian entities and partners from countries such as France, Germany, Brazil, Japan and many others. This ability to create connections had transformed AR[t]CEVIA into a platform for emerging and established artists, offering them visibility through the distribution of the official catalogue and participation in contemporary art fairs.

Nestled in the picturesque hinterland of the Marche region, AR[t]CEVIA emphasised the deep connection between art and territory. The natural and historical beauty of Arcevia and its castles merged with the innovation of the festival, creating a unique dialogue between tradition and modernity. This bond had contributed to making AR[t]CEVIA an iconic event, among the most appreciated in the Italian cultural scene.

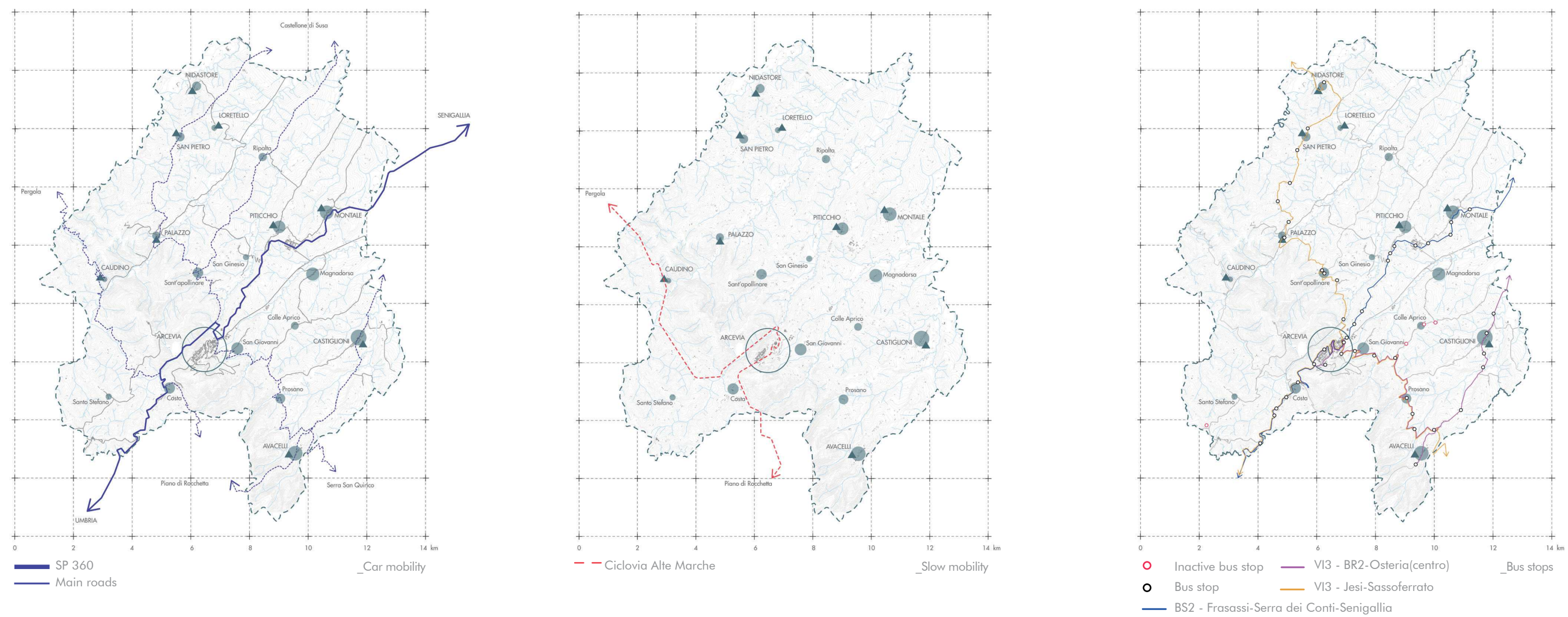
Unfortunately, over time, the festival ceased to be a fixed appointment in the territory, marking the end of a cultural policy that had brought prestige and visibility to Arcevia. Its absence leaves a void not only in the artistic community but also in the local cultural fabric, depriving the territory of an initiative that had demonstrated how art could be an engine of transformation and growth.

AR[t]CEVIA nevertheless remains in the memory of those who participated and those who shared its innovative spirit, as an example of how a small village can **become a symbol of cultural excellence and openness to the world**.

EXPLORATION PHASE



— Castle touristic routes



The municipality of Arcevia is crossed by the provincial road SP 360, which connects the Marche coast with the northeastern part of Umbria. This road passes through the main centers of Arcevia and Sassoferrato before reaching the municipality of Scheggia e Pascelupo, where it intersects with the state highway SS 3 Via Flaminia.

Additionally, Arcevia is served by 5 state roads (SS), although they do not effectively connect the 18 hamlets of Arcevia with each other. These hamlets remain disconnected from the town center and are not easily accessible except by car.

Although Arcevia's public transport network offers connections to some major centres such as

Jesi, Senigallia and Fabriano, it has major shortcomings that penalise the vast municipal territory, particularly its many hamlets and historic castles. These limited connections create difficulties for the residents of the more peripheral areas, who often find themselves excluded from the social and economic life of the municipality, with serious repercussions on their quality of life. Arcevia's hamlets, such as Piticchio, Magnadarsa, Lorello and others, represent an invaluable historical and cultural heritage, but the absence of adequate public transport makes access complex for both residents and tourists.

Even where bus services are available, their frequency is reduced and timetables inflexible, making it difficult to plan journeys for daily needs

such as work, school or medical treatment. This situation not only isolates local communities, but also limits the tourism potential of the area, which could benefit from the unique beauty of its hamlets and castles.

Tourists arriving in Arcevia without their own means find themselves unable to explore the surrounding area, depriving these areas of an important economic and cultural flow.

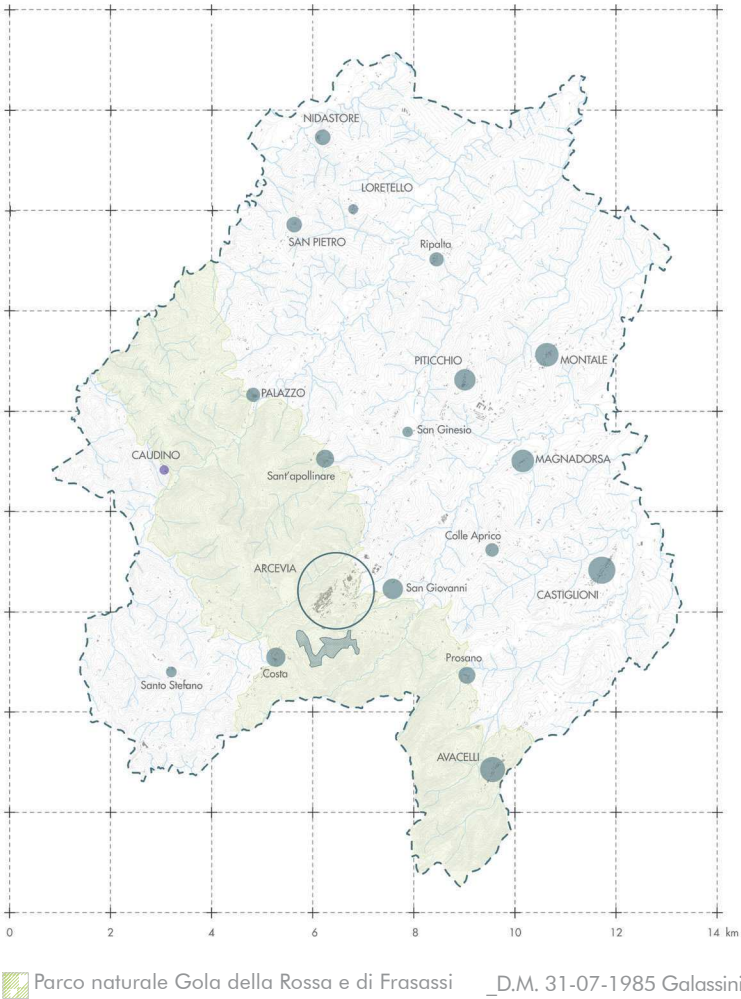
This makes promoting sustainable mobility somewhat challenging because the various areas of the municipality lack adequate infrastructure to avoid the use of cars for transportation.

Despite this, being one of the 9 municipalities in the inland areas, Arcevia is crossed by the CAAM (Ciclo Appenninica Alte Marche) which is a large 200 km loop strongly supported by the Union of Catria and Nerone Mountain Communities.

This route is fully signposted and equipped with ten cycle stations for recharging and maintaining any type of bicycle, whether electric or traditional.

It tries to connect the nine municipalities of the National Strategy for Inner Areas. The central municipality of Arcevia also has several small trails that can be used for hiking excursions near Monte della Croce.

LANDSCAPE



An analysis of the territory of Arcevia shows a prevalence of cultivated fields, characterising the municipality as an area with a strong agricultural vocation, rather than a densely populated one.

A distinctive element is the vast strip of woodland that crosses the territory diagonally, connecting Palazzo, Caudino, Arcevia and the hamlet of Avacelli. This area falls under a landscape constraint defined by the Ministerial Decree of 31 July 1985 (Galassini), which protects the Regio-

nal Natural Park of the Gola della Rossa and Frasassi.

Established in September 1997 (Regional Law no. 57 of 2 September 1997), the park covers 10,026 hectares, making it the largest protected area in the Marche region and including the famous underground complex of the Frasassi Caves.

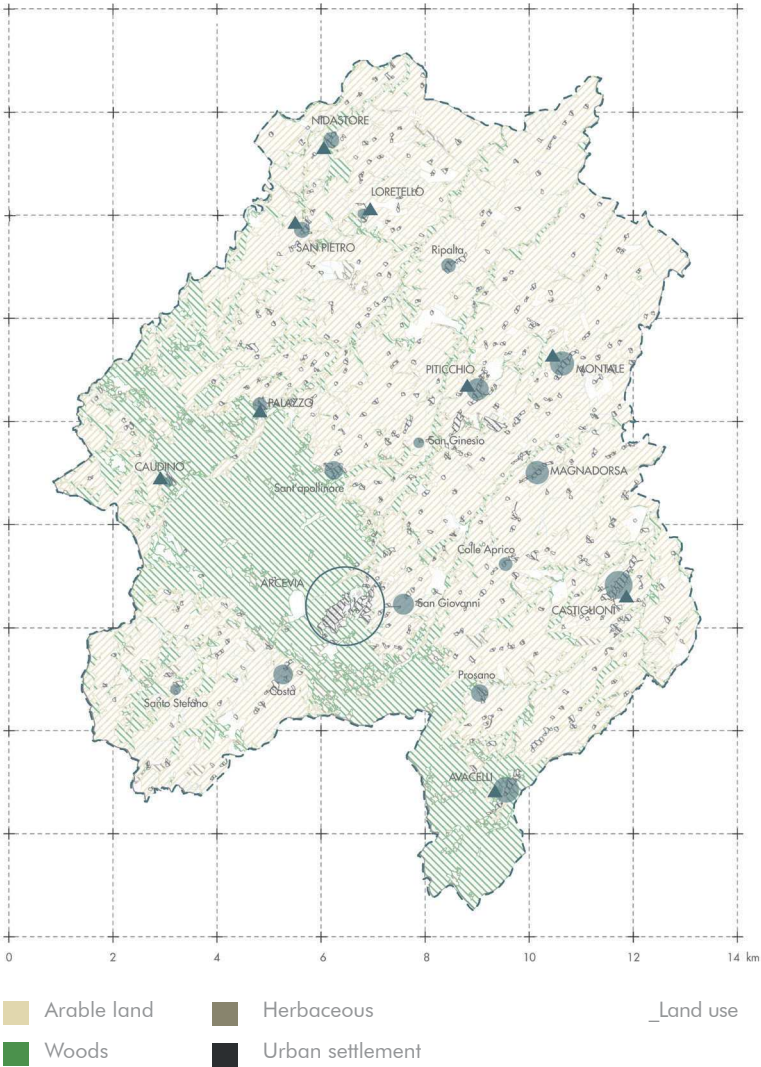
Urban settlements, however, appear limited and scattered, emphasising the predominance of na-

EXPLORATION PHASE

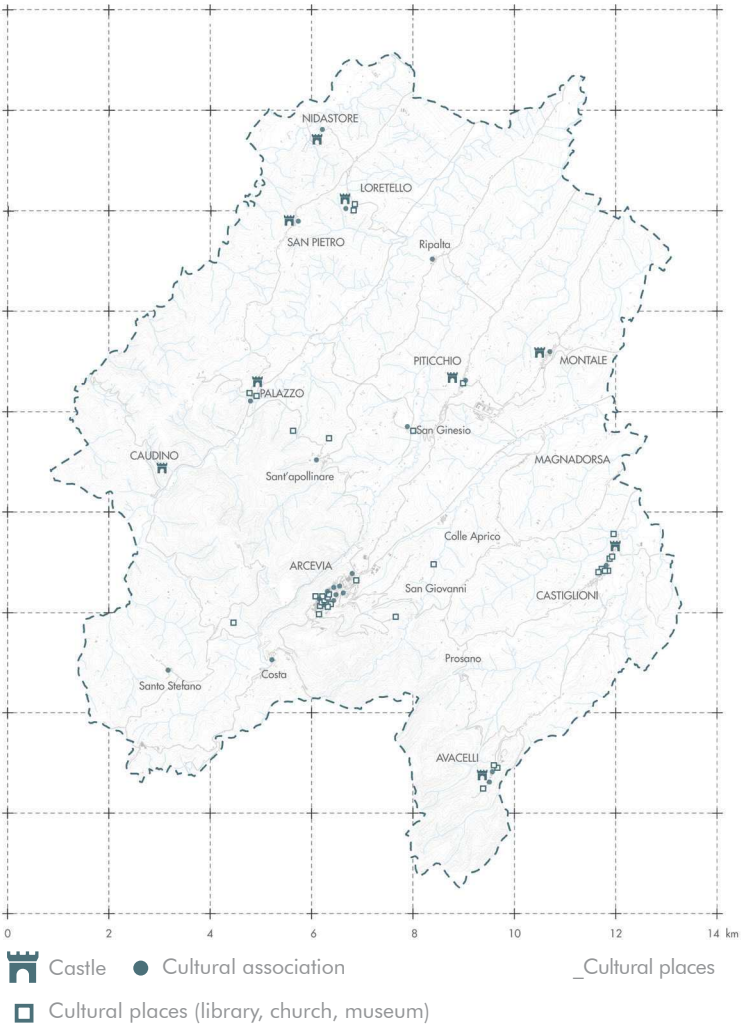
ture in this landscape context.

Not far from the historical centre of Arcevia, precisely in the hamlet of Monte Croce Guardia, is a prehistoric settlement subject to archaeological constraint under Article 142m. This site, the subject of two excavation cam-

paigns, dates back to the Proto-Villanovan age (12th-10th century B.C.). It is a settlement on high ground, with huts dug into the rock, whose strategic position suggests defensive purposes. The finds unearthed are currently housed in a dedicated section of the State Archaeological Museum in Arcevia.



TOURISM ANALYSIS



Arcevia stands out for its extraordinary **historical and cultural heritage**, in which its nine castles, authentic mediaeval jewels scattered throughout the territory, stand out.

These fortified villages—such as Piticchio, Palazzo, Lorello, Castiglioni, and Avacelli—represent not only evidence of local history but also **landmarks** for the area’s cultural identity. Each castle preserves unique traces of the past, including well-preserved walls, towers, and churches that tell centuries of history and traditions. Alongside this architectural heritage, Arcevia bo-

asts a dense network of active cultural associations that are dedicated to enhancing and preserving the territory. These local realities organise events, exhibitions, and activities related to the promotion of Arcevia’s culture and history, helping to keep alive the link between past and present and to involve both residents and visitors.

In terms of landscape, Arcevia offers numerous nature trails, particularly around **Monte della Croce**, a short distance from the historic centre. These paths allow one to immerse oneself in an

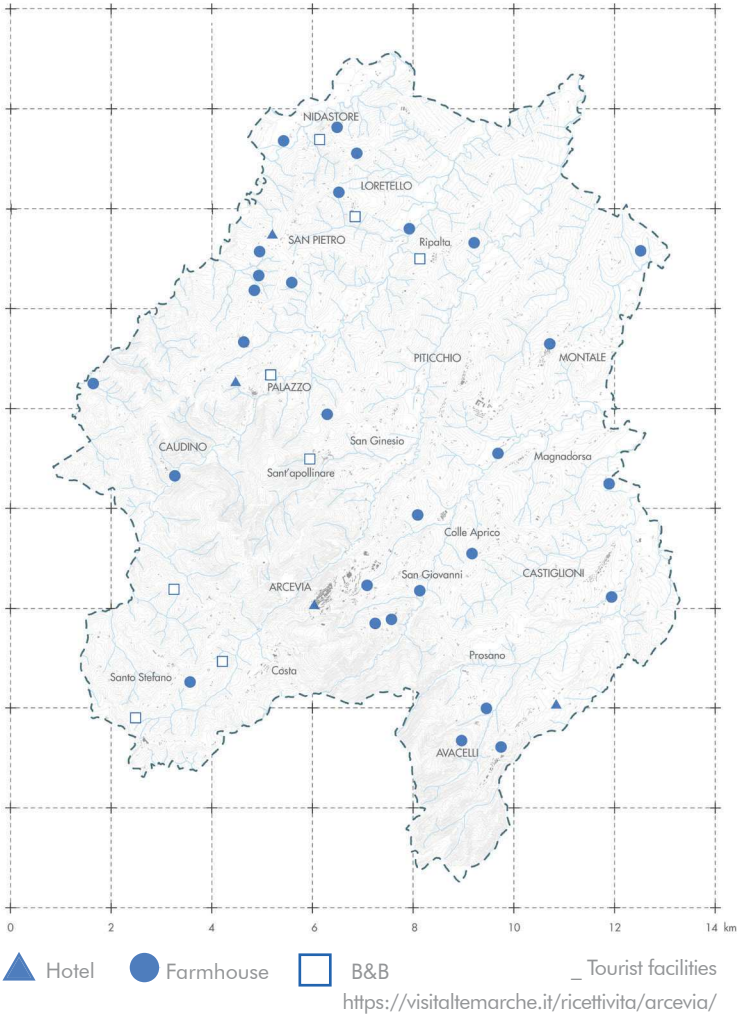
EXPLORATION PHASE

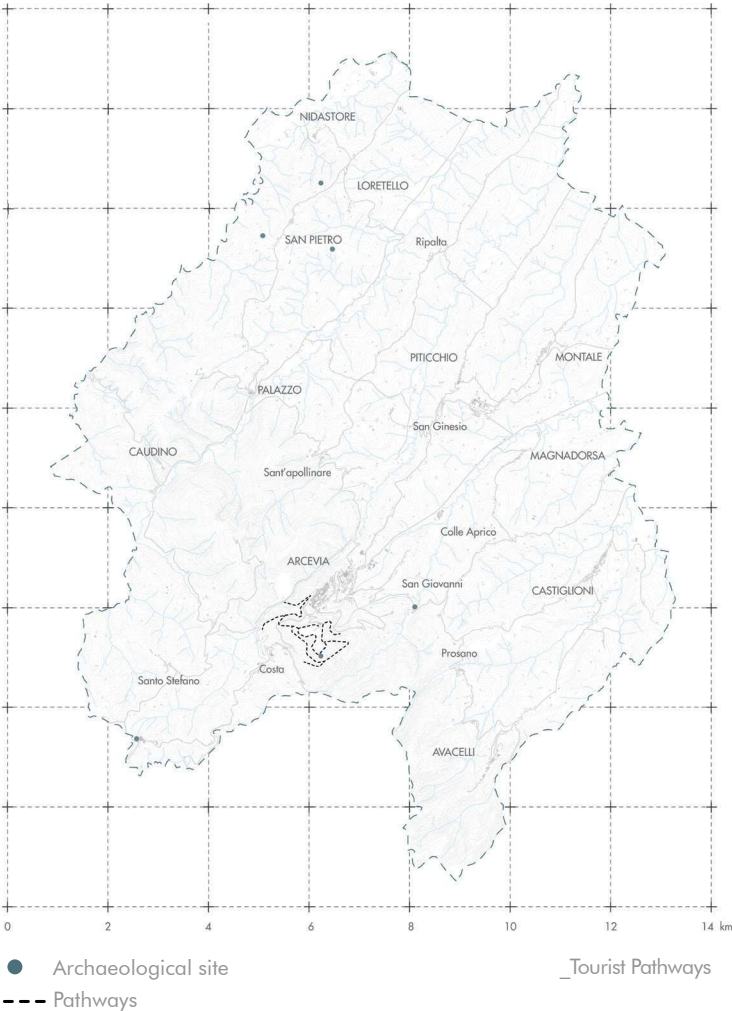
uncontaminated environment, ideal for excursions on foot or by bicycle, with panoramic views ranging from the woods to the cultivated countryside.

Completing the picture of the richness of the area are several archaeological sites, the best known of which is the proto-Villanovan settlement of **Monte Croce Guardia**, dating back to the 12th-10th centuries BC. Huts dug into the rock have been found here, evidence of an organised community life and a

strategic choice related to defence. Despite this extraordinary cultural, historical, and naturalistic offer, Arcevia’s territory presents a significant **limitation**: the lack of organised accommodation facilities to welcome broader and more diversified tourism.

At present, **hospitality** is mainly based on **bed & breakfasts** and **private houses** that, while offering an authentic welcome, do not always manage to meet the needs of modern and structured tourism.





CULINARY EXCELLENCES

The **agrifood heritage** represents one of the main **strengths** of the inner area of the Appennino Basso Pesarese-Anconetano, with the municipality of Arcevia standing out for the quality and variety of its production. In recent years, there has been a growing importance of products of excellence, such as **truffles, bread, wine, and craft beer**, which have gained an important place in both the national and international markets. Arcevia, specifically, is renowned for a number of **excellent food products**, including:

- Il **Calcione**, a traditional Easter product with a characteristic shape and unique flavour, an

expression of the local gastronomic culture.

- **Verdicchio dei Castelli di Jesi**, one of Italy's most famous white wines, which finds in these lands the ideal conditions to best express its taste qualities.
- **Polenta**, prepared according to traditional recipes, recalling the genuine flavours of peasant cuisine.
- The **Roccacontrada Octofile** corn biscuits, a niche product that valorises an ancient local variety of corn.
- The **craft beer**, the fruit of an expanding tradition that skilfully combines innovation and local raw materials.

02.05 CONTEXT AND ARCHITECTURE ANALYSIS OF SASSOFERRATO

EXPLORATION PHASE



Sassoferato, in the province of Ancona in the Marche region, is a town with a complex history that reflects the development of settlement and construction in an area strongly influenced by its **geographical position** and **natural resources**. Its origins date back to the **Middle Ages**, with the founding of the first settlement **around 1150**. A castle built on a hill by Count Attone di Genga marked the beginning of what is now the upper town. This elevated position was not accidental; it responded to a precise need for **defence** and **territorial control**. In fact, medieval castles were strategically placed to dominate the surrounding valleys and to protect the communities from external invasions.

Over time, the village expanded down the valley, giving rise to a second residential nucleus, known as the **lower village**, located along the **Sentino river**. This **watercourse** played a crucial role in the development of the municipality, not only as a resource for agriculture, but also as an element that facilitated trade and transport. The presence of the river favoured the establishment of **productive activities** along its banks, perfectly integrating it into the economic life of the lower town.

One of the peculiarities of Sassoferato is that the town is built on **two levels**: the **upper town**, with its medieval layout and **defensive role**, and the **lower town**, built in a more recent period to meet the needs of **trade** and **production**. This stratification is not only geographical, but also historical and cultural, as it represents the community's adaptation to political, economic and technological changes over the centuries.

An important chapter in the history of Sassoferato is linked to the **Fabriano-Pergola railway**,

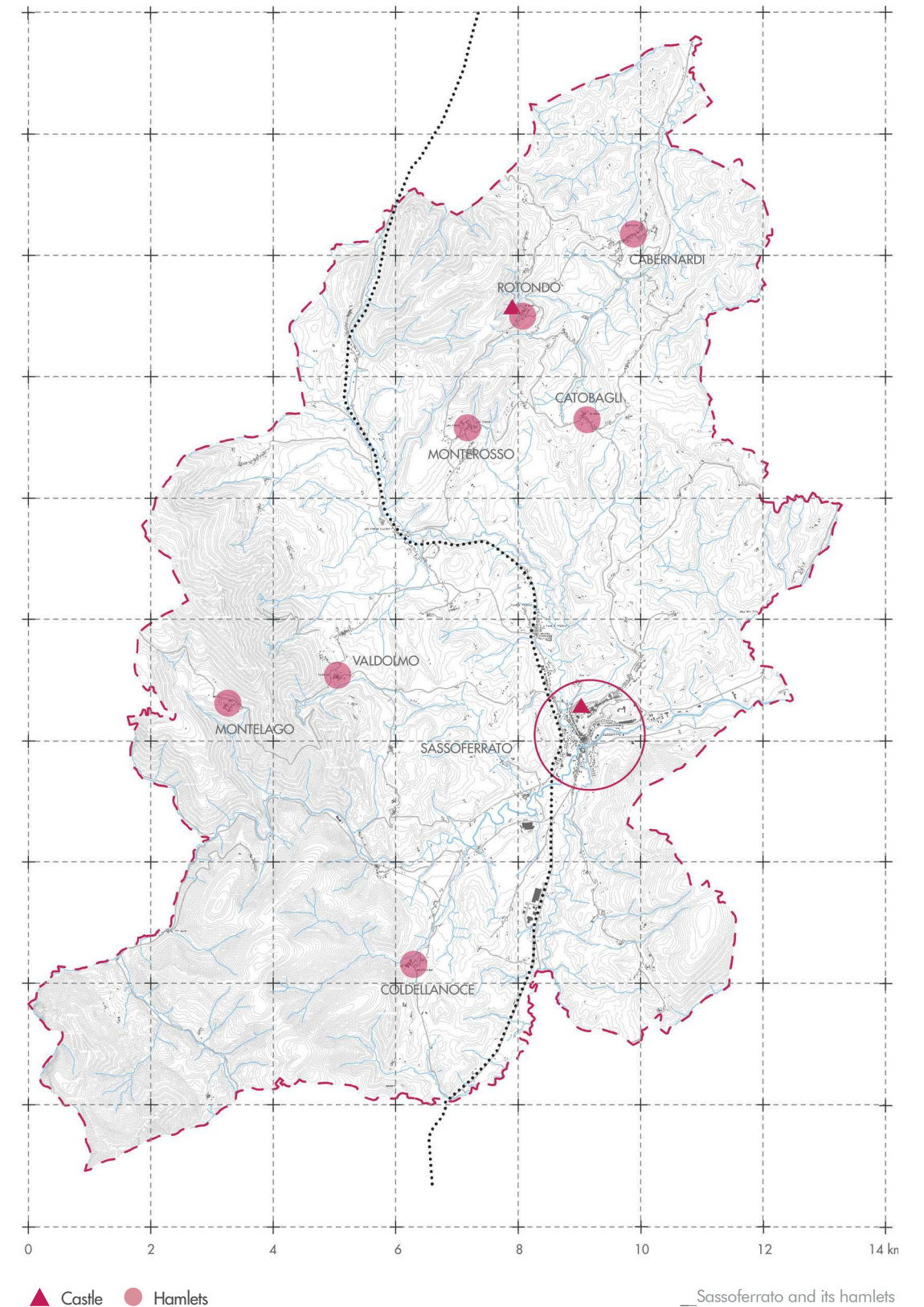
inaugurated in 1895 as part of the wider **Subappennina Italica** railway project. The aim of this ambitious project was to link the inland areas of the Marche region with Romagna, thus improving connections between the hinterland and the Adriatic coast.

Over time, however, the decline in railway use and the modernisation of transport systems led to the closure of the line. Today, the Fabriano-Pergola is used exclusively for **historical tourist routes**, a **cultural attraction** and a magnet for visitors interested in discovering the area and its history.

From a natural point of view, the Sentino river system and the surrounding landscape have had a decisive influence on the development of the town. The valleys crossed by the river not only favoured the formation of settlements, but also helped to define the routes linking the inland areas with the coastal ones. This natural system of communication was reinforced by the arrival of the railway, which strengthened the integration of Sassoferato with the surrounding areas, allowing the town to play a central role in the regional exchange network.

From an architectural and urbanistic point of view, Sassoferato preserves traces of its various development phases, witnessing a gradual transformation from a **fortified medieval settlement** to a more articulated urban centre. In the upper town, buildings such as the **Palazzo dei Priori**, which dates back to the 1400s, and other civil and religious buildings testify to a time when the community enjoyed greater freedom. In the lower town and the expansion areas, on the other hand, there are signs of more recent development, brought about by changes in the economy and modern needs.

The difference between the upper and lower villages, the Sentino river and the Fabriano-Pergola railway tell a story of **resilience** and **change**, where nature and infrastructure work together to make the area what it is.



CURRENT PLANNING POLICIES

The town of Sassoferrato is starting a development plan that includes improving culture, encouraging sustainable transportation, and making sure that everyone feels welcome. At the same time, the town is also dealing with problems related to **accessibility** and making sure that projects will last for a long time in order to help the area grow.

The municipality participates in various regional and national programs, such as the “Local Development Strategy” promoted by GAL Colli Esini, which aims, through sustainable and innovative interventions, to enhance the cultural, artisanal, and entrepreneurial resources of the municipality and the neighbouring municipalities.

In particular, he was involved in the Integrated Local Project (ILP), called “RICREA: Landscapes and Civilisations of Making,” which also included the municipalities of Fabriano, Matelica, Cerreto d’Esi, and Genga. This project aimed to enhance the **tourist appeal** of the area through the promotion of **local artisanal knowledge** and skills in the fields of excellence **manufacturing** and traditional and innovative **agri-food**.

YELLOW FLAG



The Municipality of Sassoferrato has obtained the “Yellow Flag” of **Bicycle-Friendly** Municipalities for the fourth consecutive year, a recognition awarded by the Italian Federation for the Environment and Bicycle (FIAB) to administrations that stand out for their commitment to promoting cycling and sustainable mobility.

This recognition attests to the adoption of policies and infrastructure aimed at promoting the use of **bicycles**; in fact, initiatives have also been carried out to raise awareness among citizens about **sustainable mobility**, improve urban quality of life, and simultaneously encourage sustainable tourism.

Though, after verifying the situation on site, it seems that this statement does not correspond to

the reality of the places. The cycling connections need to be made better so that they are easy for everyone to use, especially since the municipality is growing on a **steep slope**.



“Bandiera Lilla,” an initiative launched in 2012 with the aim of promoting tourism for people with **disabilities** or **special needs**. This award is given to municipalities that stand out for their commitment to **accessibility** and **inclusion**, making their territories more usable and welcoming for everyone.

The Mayor of Sassoferrato, M.Greci, highlighted that obtaining the Purple Flag is the result of concrete projects, including the approval of the Plan for the Elimination of Architectural Barriers (PEBA), which aims to improve accessibility in various parts of the city.

Such recognition originates with a tourist’s nature but also assesses the quality of life of residents, emphasising the importance of having a professional evaluation to understand the current level of usability of one’s spaces.

MAM’S (Museum of Modern and Contemporary Art of Sassoferrato)



The artist residency project at MAM’S is an initiative that fits into the territorial context with the aim of promoting the **culture** and **artistry** of the municipal area. These residencies are created with the aim of attracting and involving **contemporary artists**, offering them a physical space to develop new projects while simultaneously interacting with the **local community**.

Residencies, in fact, allow artists to work more deeply by engaging with the surrounding context, made up of history, culture, and natural

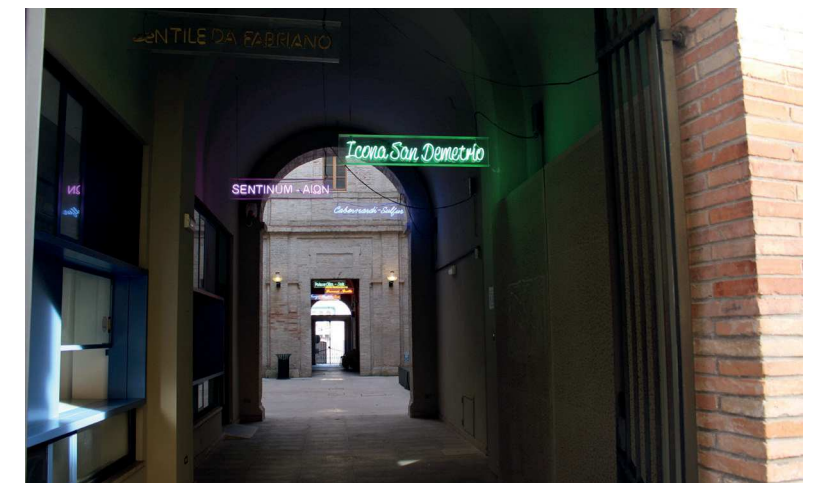
EXPLORATION PHASE

elements, which characterise these territories as catalysts for a slow-paced lifestyle.

Such a project has had multiple benefits, contributing to **reinvigorating** the local cultural scene, promoting events, exhibitions, and activities that have attracted visitors and enthusiasts from outside the city, as well as enhancing the region’s cultural network, since they have made MAM’S a reference point for contemporary art and a mee-

ting place between art and the community.

Initiatives like these prove to be positive, as they allow marginal areas to once again attract both people from outside the city and engage residents, promoting greater **social inclusion** and stimulating the creation of transitional scenarios towards new urban realities.



INFRASTRUCTURES

EXPLORATION PHASE



From an infrastructure perspective, the SP360 traverses the municipality of Sassoferatto, serving as a crucial route for both local and tourist traffic. On one side, it extends to the coast, ending at Senigallia, one of the main seaside and tourist centres of the Marche region; on the other side, it connects to the nearby region of Umbria.

The secondary roads, essential for connecting numerous districts to the town centre, show a more varied situation. In some cases, the local road network is sufficient to ensure a good level of accessibility, allowing the inhabitants of the hamlets to reach Sassoferatto for essential services such as schools, healthcare, and commer-

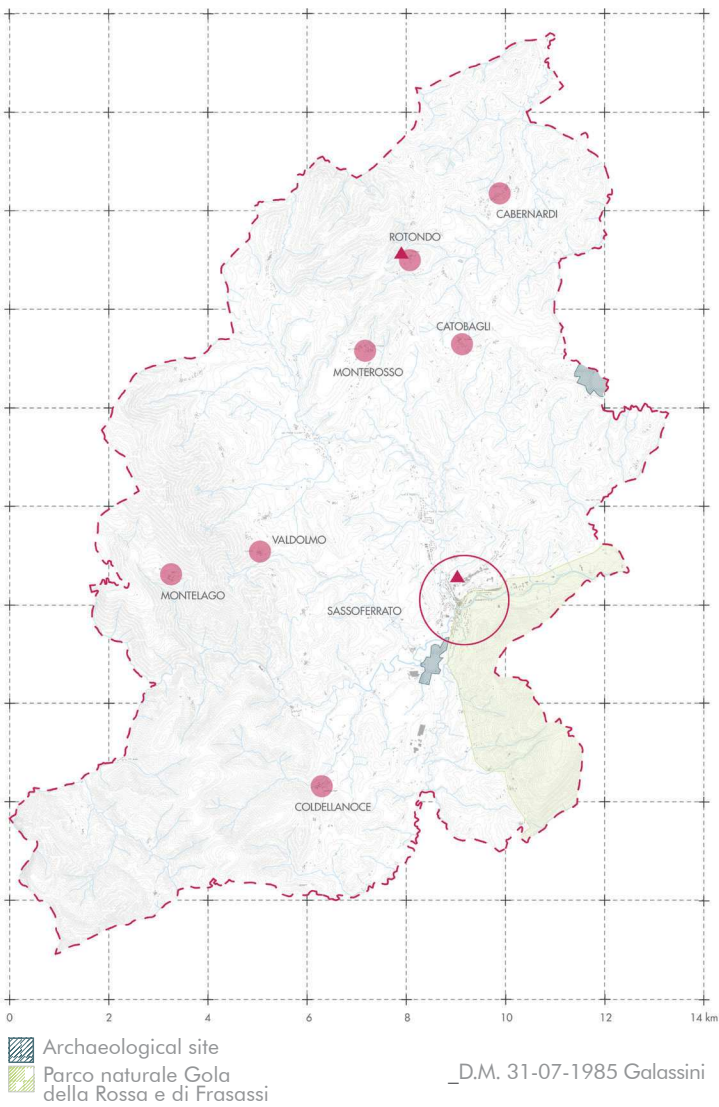
ce. However, many of these roads suffer from structural problems, including insufficient public lighting, inadequate or absent signage, and road surface degradation, especially in hilly and mountainous areas. This can represent a significant obstacle for the mobility of elderly people or for emergency vehicles, as well as for the tourist development of the more remote villages.

The public mobility system based on buses constitutes the main means of collective transport with connections to neighbouring municipalities, including Fabriano and Arcevia. However, the frequency of the services, especially in the evenings and on holidays, is insufficient to provide a

true alternative to private transportation.

The Alte Marche Cycle Path is an important piece of infrastructure for the area. It crosses the central parts of the Marche region and serves two purposes: it promotes sustainable tourism and the landscape, and it also gives people in the area an environmentally friendly way to get around, connecting them to a network of growing importance for cycle tourism.

But for it to fully fit in with the city and main roads, more work needs to be done, like putting up clear signs and making it easier to connect bike paths to interesting places in the city.



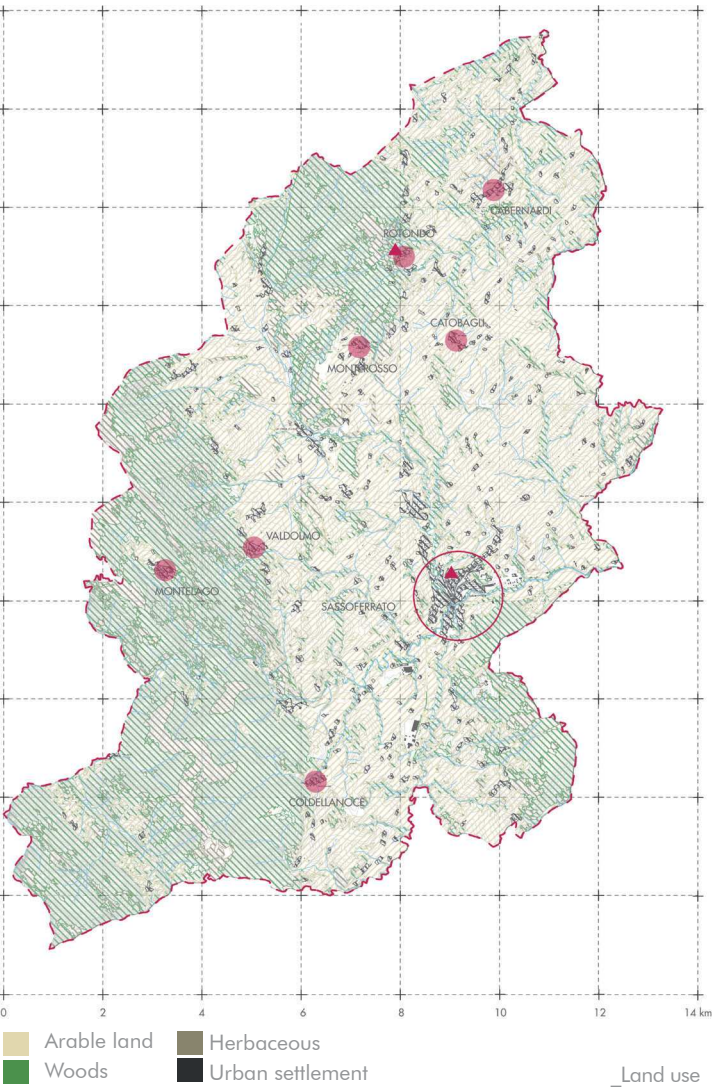
When looking at the land for the first time, it's clear that the municipality of Sassoferrato is mostly **mountainous**. This is because the Umbro-Marchigiana Apennine range forms the border with the nearby region of Umbria. Having this meaning makes it both a place with plenty of natural obstacles and a great place for mountain-themed tourist activities. This is especially true for **Monte Strega** (1278 m), which dominates the landscape of Sassoferrato and is a great place to learn about nature and history thanks to its old paths and traditions connected to shepherding and rural life.

However, like most inland areas, the municipality is primarily based on agriculture. Numerous hamlets and farmhouses testify to this agricultural past, which is still active today due to the presence of small farms producing **local products**. This landscape is dominated by the Sentino River, whose path has helped shape the identity of the municipality and in some areas also provides opportunities for excursions and leisure activities. It is also a **landmark** for people visiting the Frasassi Caves in nearby Genga, which are part of the Natural Park of the Gola della Rossa and

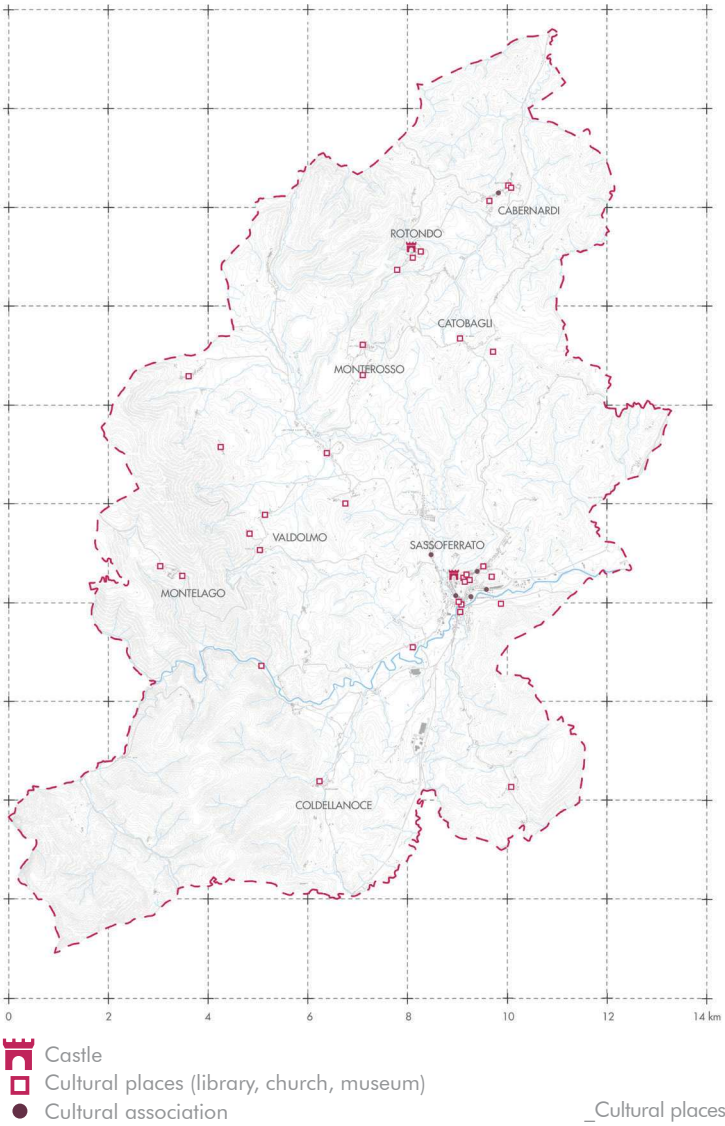
Frasassi and were formed by water.

Another element of significant importance is the presence of the **Archaeological Park of Sentinum**, which serves as a reference point for understanding the origins and strategic role of the territory in antiquity.

The settlement system, primarily centred in the historic village of Sassoferrato, is embedded in this natural context, albeit with some small hamlets that don't seem to have their own independence from the Municipality's central hub.



TOURISM ANALYSIS



Part of the investigations focused on the analysis of the **tourist infrastructures** available in the municipal territory, examining them both from the perspective of the attractions present and that of accommodation. As emerges from the representations and considerations previously expressed, the municipality of Sassoferrato has numerous places of tourist interest linked to the natural system. Among these, there is a vast network of

hiking trails, mountain bike routes, and spaces dedicated to winter activities, as well as the presence of the **Archaeological Park of Sentinum**, which each year attracts visitors interested in history and archaeology.

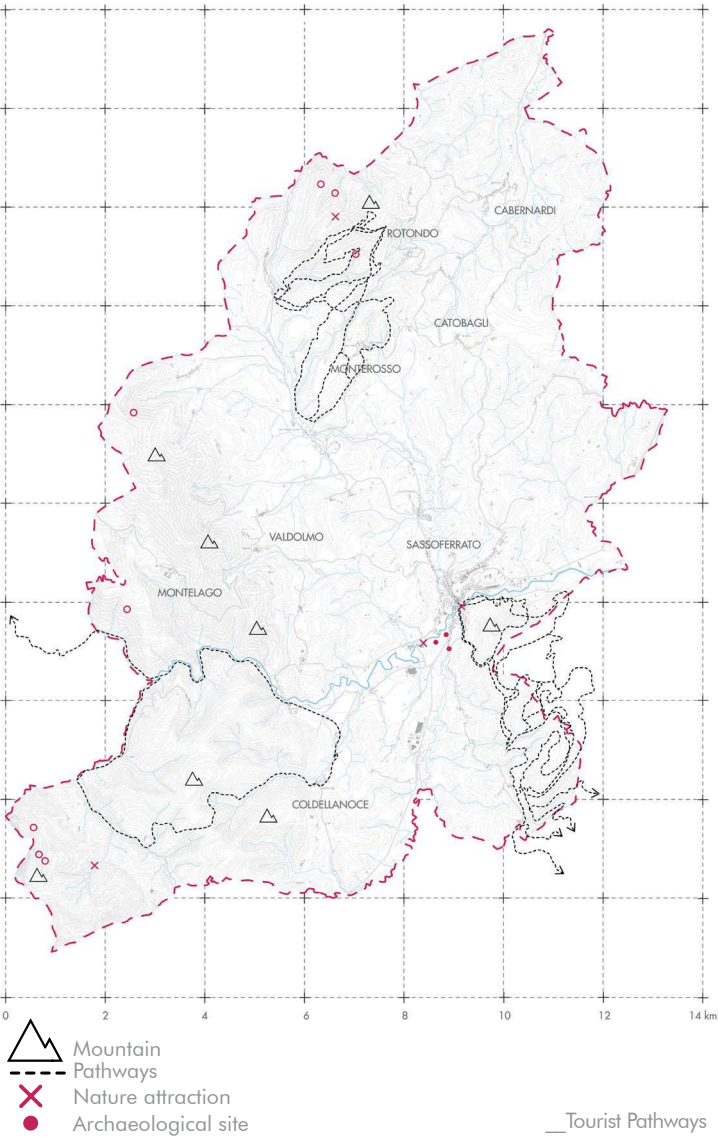
From a cultural perspective, the area boasts a multitude of attractions of historical and artistic significance, with particular attention to the hi-

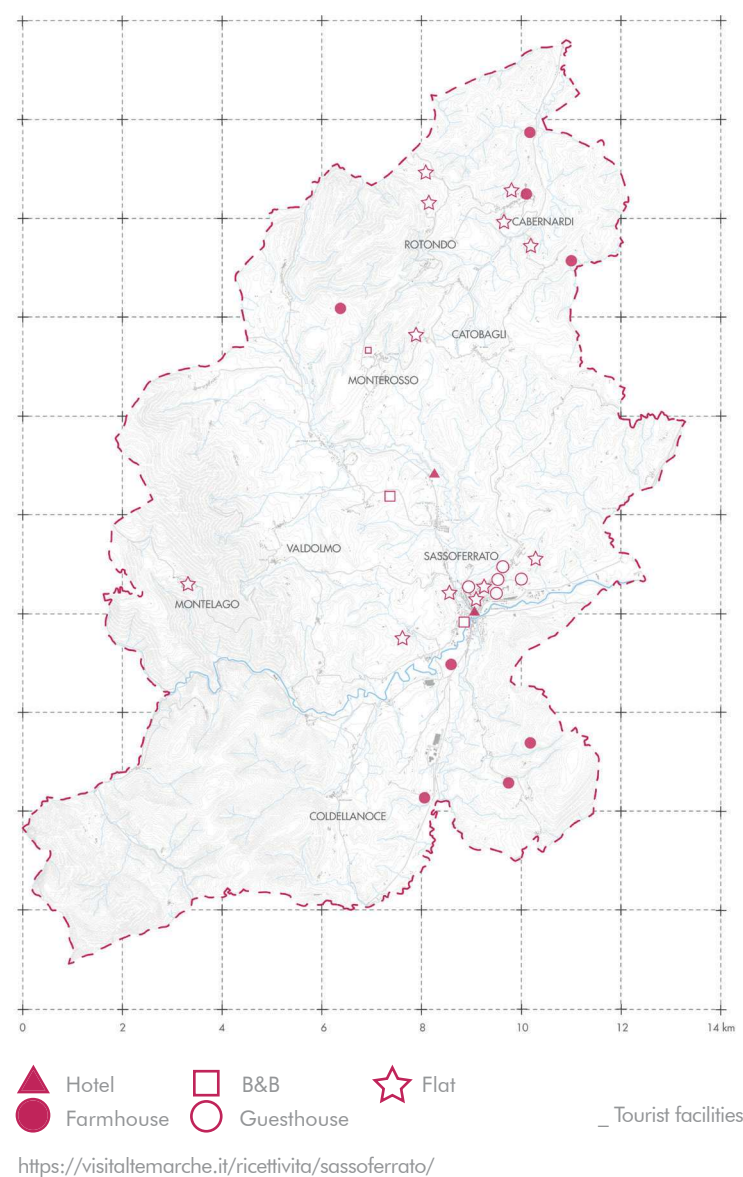
EXPLORATION PHASE

storic centre of the municipality. Among the main cultural highlights are the **MAM'S** (Museum of Contemporary Art), the **Rocca Albornoz**, a testament to the historical significance of the place, and the **Palazzo Oliva**, which houses important elements of the local historical and cultural heritage.

However, the analysis of tourist accommodation has highlighted some critical issues related to the adequacy of the available facilities in relation to the demand generated by such attractions. Based on interviews and analyses of the area, it

became clear that most of the accommodation in the municipality comes from **private users**, like **rented rooms** or **apartments**. There aren't many, if any, hotels in the area that can handle large groups or more complex needs. This problem makes it harder for the area to become a tourist destination. Specific steps need to be taken to improve the lodging options and encourage more use of the area's tourism potential.





CULINARY EXCELLENCES

From the perspective of culinary excellence, the area is renowned for the production of high-quality cured meats and cheeses, which are the result of traditional methods and a strong connection to the territory.

Among the most famous specialities, we find dishes based on truffles or mushrooms, grilled *crescia*, *pencearelle*, eight-row corn polenta, typical bread, traditional meats, and old-fashio-

ned sweets.

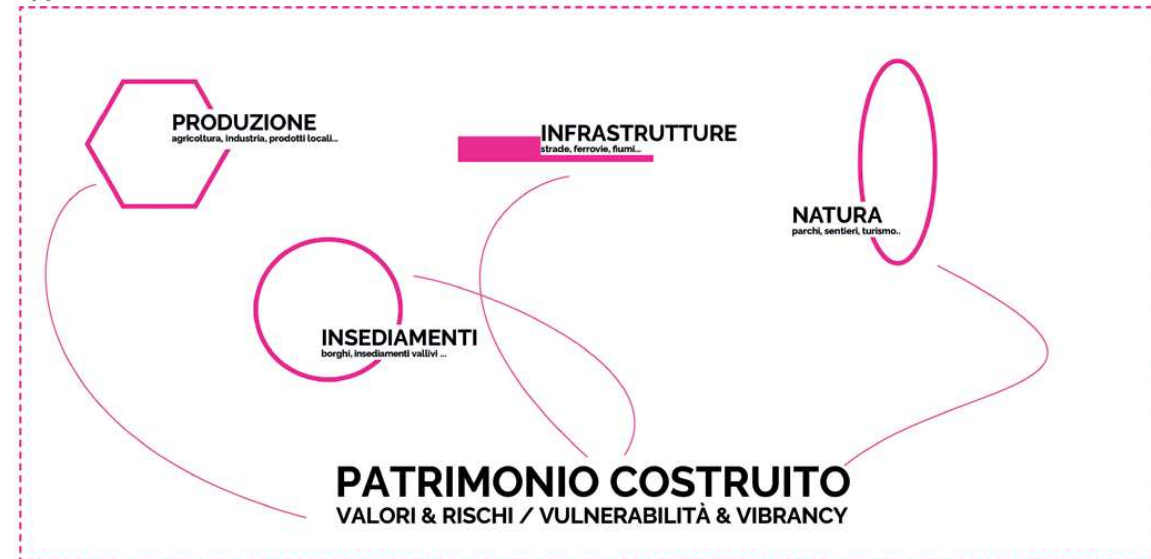
Sassoferrato also hosts events that celebrate local gastronomic traditions, such as “*Sapori e Colori*,” a shop that offers fruits, vegetables, preparations, and specialities from the area, promoting organic food products.

Here the land is generous and offers excellent raw materials that, carefully selected and prepared according to a tradition of passed-down recipes and experimentation, yield a truly unique array of specialities.



habitat

approccio relazionale trans-scalare



Pattern analysis as a system of relationships of the built heritage with the territory.

Conceptual elaboration by Ferretti M., graphic elaboration by Di Leo B., 2021 ©Branding4Resilience, UNIVPM, 2020-2024

After having thoroughly analysed the territorial context of Arcevia and Sassoferrato, we came to the conclusion that these two municipalities should not follow parallel paths but, on the contrary, should be considered as a **single area** of intervention.

This strategic choice makes it possible to unite resources, potential and challenges in a shared vision, in which to develop a project strategy capable of responding in a systemic manner to common criticalities.

Arcevia and Sassoferrato, like many inner areas, suffer from structural problems such as the progressive **loss of population** and the **degradation** of the cultural and architectural heritage that uniquely characterises them.

The regeneration of these marginal areas requires an **innovative approach**, capable of recovering their peculiarities. The approach used to analyse the municipalities of Arcevia and Sassoferrato and to develop a shared strategy is based

on the integration of two key concepts for inland areas.

The first is the **transcalar** vision initially adopted by B4R, which considers the territory as a **habitat** interconnected with other systems, characterised by multiple dimensions and scales of intervention. This approach allows the territory to be analysed and designed through different levels of action, guaranteeing a comprehensive and articulated reading.

A new awareness has been added to this vision: the urgency of applying the principles of the **circular** economy to architecture as well. In this context, the contribution of Schröder, with his book *Circular Architecture: Toward Regenerative Territories*, was fundamental. From him, we learnt that circular architecture must be based on collaboration, **community involvement**, the use of local or recycled **materials** and the creation of **flexible** spaces that can be adapted to people's needs.

The union of these two paradigms - **transcality** and **circularity** - guided the development of the strategy for the Arcevia and Sassoferrato area. In particular, we were inspired by the philosophy of Maurizio Carta and the three phases of the CityForming Protocol (M. Carta, B. Lino, D. Ronzavalle, *Re-cyclical Urbanism. Visioni, paradigmi e progetto per la metamorfosi circolare*, 2016), which we have declined into a specific strategic model for the two municipalities.

Cityforming proposes a model of urban regeneration based on incremental and adaptive phases. This approach is developed through partial results that generate value and serve as the basis for subsequent **transformations**, allowing change to be addressed in a gradual, sustainable and resilient manner.

The project is divided into **three main phases**: colonisation, consolidation, and development. Each of these phases contributes to the transformation of the territory, progressively building the conditions for structured renewal.

1. The **colonisation phase** involves small interventions 'bottom up,' characterised by actions that respond directly to the needs of **local communities**. These interventions may include the reuse of existing buildings or spaces for functions appropriate to the context, without radically changing their nature, but rather recovering and reinterpreting them strategically. These spaces, defined as 'stem spaces,' are grafted through design actions that integrate them into the pre-existing urban fabric, allowing the community to re-appropriate them and attribute new functions to them. Although their transformative intensity is low, these interventions have a strong territorial recognisability and act as landmarks of transformation. They symbolically communicate a new reputation of the area and constitute the first agents of urban marketing. The prevailing urban planning paradigm in this phase is tactical urbanism, which operates through short-term projects with a time horizon of approximately **three years**. During this period, the foundations are laid for moving on to the next phase, consolidating the first results obtained.

2. The **consolidation phase** acts on the new ecosystem generated in the colonisation phase, introducing more structured functions capable of generating economic and social value. These interventions aim to strengthen the urban fabric through the recovery of latent resources already present in the area, which have been positively stimulated by the previous phase.

In this phase, the process becomes less punctual and more networked, losing the **self-sufficiency** of individual interventions to expand and take root in the territory. The grafting of new functions gradually blends in with the local context, strengthening its identity and expanding development opportunities.

A crucial aspect of this phase is the increase in **social stability**, favoured by the arrival of new inhabitants attracted by the renewed attractiveness of the area. This change leads to an increase in demand for services and the strengthening of territorial care through forms of collaboration, such as agreements between local communities and public or private actors. The time horizon for this phase is about **five years**, during which the foundations for lasting and systemic change are consolidated.

3. The **development phase**, with a horizon of at least ten years, represents the moment when the area's new urban **metabolism** reaches full maturity. Following the transformations of the first two phases, a **masterplan** is drawn up that defines the new identity of the area and the guidelines for its complete transformation. This master plan is not a static instrument but builds on the results and opportunities created by the previous phases. In this phase, more substantial economic and entrepreneurial resources are accessed, generated by new inhabitants, services, and economic activities. The territory can then face the substantial investments needed to complete the regeneration, transforming itself into a resilient, attractive, and sustainable urban system.

Based on this philosophy, we also applied our strategy to the two municipalities in the inland area by considering the latter divided into 3 macro-phases, just as explained by CityForming.

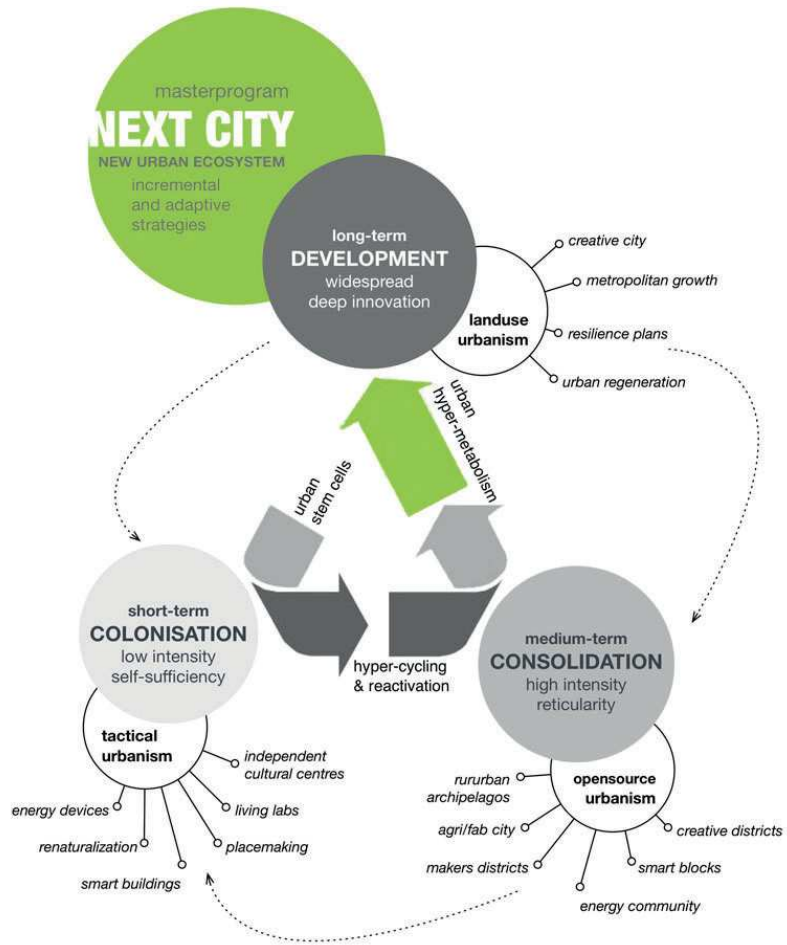
Also in our strategy, the first phase is the most essential to allow the subsequent phases to take root, which is why we also focused on incorporating best practices of **bottom-up** actions that could also take place in these municipalities and emphasise particular needs to be filled in the subsequent phases.

From here, however, we wanted to make the strategy our own not only by basing it on 3 different time frames characterised by larger investments and the involvement of larger territorial areas, but we also wanted to emphasise how the role of **transcality** and **circularity** was the main protagonist for **our strategy**.

In fact, as can be read later, each phase of the strategy was also enriched with information on

what **actors** are involved and what **circular strategies** are envisaged. The actors present certainly have a greater hierarchy of importance going forward with the development of the strategy, starting in the early stages with the involvement of ordinary citizens of the village or associations active in the area that do not go on to make economic investments in the municipality but which give the incipit for the actors in the later stages to want to make more substantial and concrete investments in the area.

The same logic is also applied for **circular strategies**: starting first with the appropriation of open spaces accessible to the public and ending with the reuse of public or private buildings (in agreement with the owners) thus generating a progressive reactivation of the area.

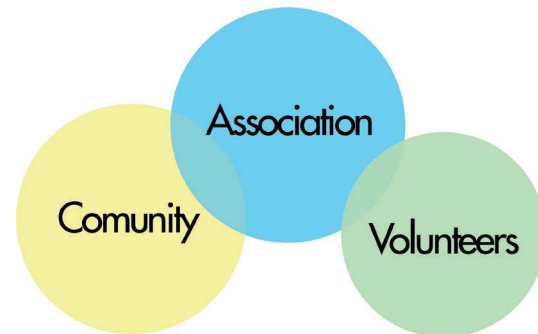


The three phases of the CityForming Protocol: colonisation, consolidation, development, and their paradigms and devices. (Source: M. Carta)

A CIRCULAR AND TRANSCALAR APPROACH: PHASE 1

ACTORS

In the first phase, interventions must remain as **flexible** and **inexpensive** as possible, relying on the sense of community of local people who can breathe new life into **disused spaces** through their actions. **Associations** play an important role in these first phases, acting as the **first financiers** and through events can give rise to new centralities.



CIRCULAR STRATEGY

The first phase of urban regeneration is based on a **bottom-up approach**, that is, on interventions that actively involve citizens in the enhancement of the territory through the **reuse** of **existing spaces** and **buildings**. The objective is to stimulate the local community to re-appropriate disused places, perhaps through the use of recycled materials and the direct involvement of the inhabitants, thus creating a sense of belonging and social cohesion.

RECYCLE MATERIAL
BIO-BASED MATERIAL
LOCAL
DESIGNED FOR DISASSEMBLY
CO-DESIGN
BOTTOM-UP

ACTION

Among the many initiatives studied, we have identified **five best practices** that lend themselves to being applied to the regeneration strategy of the two municipalities:

1. MITFAHRERBANK (SHARED BENCH):

In rural areas, a simple bench can become an opportunity to **improve mobility**. People waiting on these benches indicate their destination on a visible sign; passing motorists, if heading to the same place, can **offer a lift**. In this way, the mobility of the person waiting improves and, at the same time, the **social bond** in the community is strengthened. In addition to the social benefits, there is also an important environmental aspect: passenger benches help to **reduce empty trips**, thereby helping to protect the environment.



2. METROMARKET:

The St. Louis MetroMarket is a mobile market that operates in areas with little access to fresh and **healthy food**. This innovative initiative allows local communities to purchase fresh, local and affordable produce, bringing it directly to the most marginalised areas. Since 2016, MetroMarket has partnered with local organisations to expand its impact, also offering tastings, food education and awareness programmes.



3. PARKEING:

this is an urban action that has led to the transformation of a **car park** into a **park**. This space became the symbol of a new public area available to the neighbourhood. The initiative was praised by residents as a symbolic gesture of **reclaiming urban space** for people, restoring value to an area that was previously dominated by cars.



4. ICEBERG - PERESTRELLO 3.0:

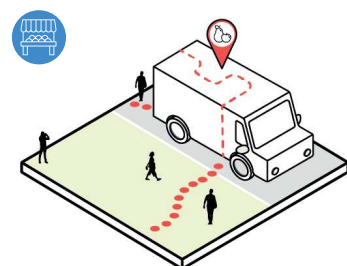
The Iceberg project represents a small graft within the vast area of Largo Bartolomeo Perestrello, and is part of a larger process. The intervention is designed to be completely **reversible** and does not substantially alter the context in which it is inserted. The objects realised during the 'Iceberg - Perestrello 3.0' workshop are intended to form a designed system of urban space and to be the first infrastructure to foster community gathering in the area.



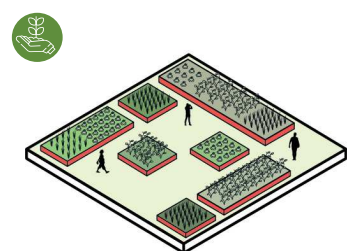
5. ESTO NO ES UN SOLAR:

The project is proposed as an initiative to **clean**, **rehabilitate** and maintain **abandoned land** within the city, in order to return it to the community as **open spaces** and **meeting places**, after negotiation with the respective owners.

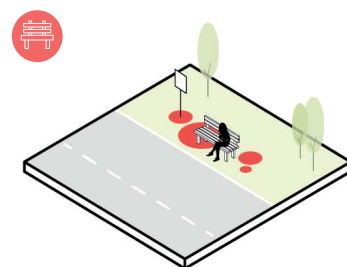




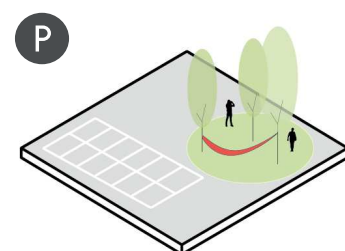
Travelling FOOD TRUCK



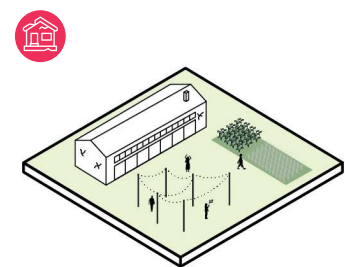
URBAN GARDEN for self-consumption and educational workshops



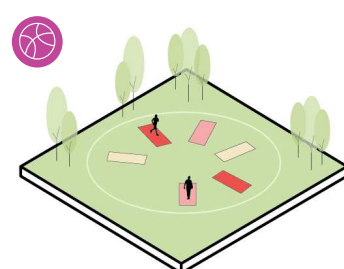
SHARED BENCH to be used as a request for car rides



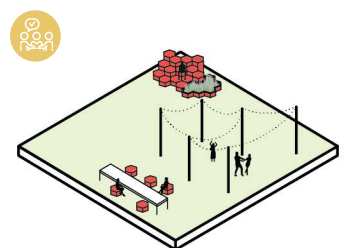
Renaturation of PARKING AREAS



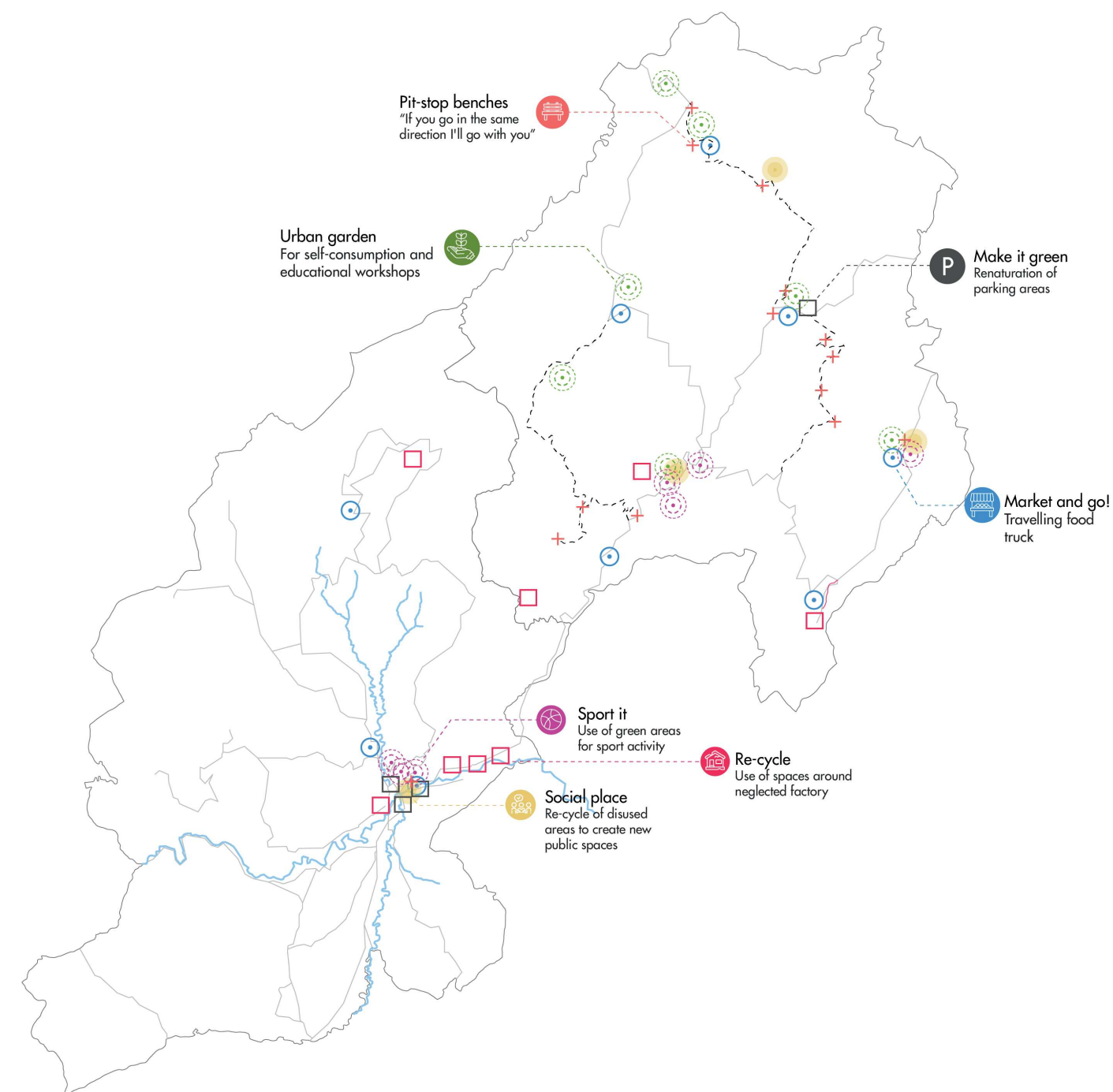
Use of spaces around NEGLECTED FACTORY



Use of green areas for SPORT ACTIVITY



Recycle of DISUSED AREAS to create new public spaces



ACTORS

In the second phase, the success and growing interest in specific urban areas create a favorable environment for attracting larger-scale investments.

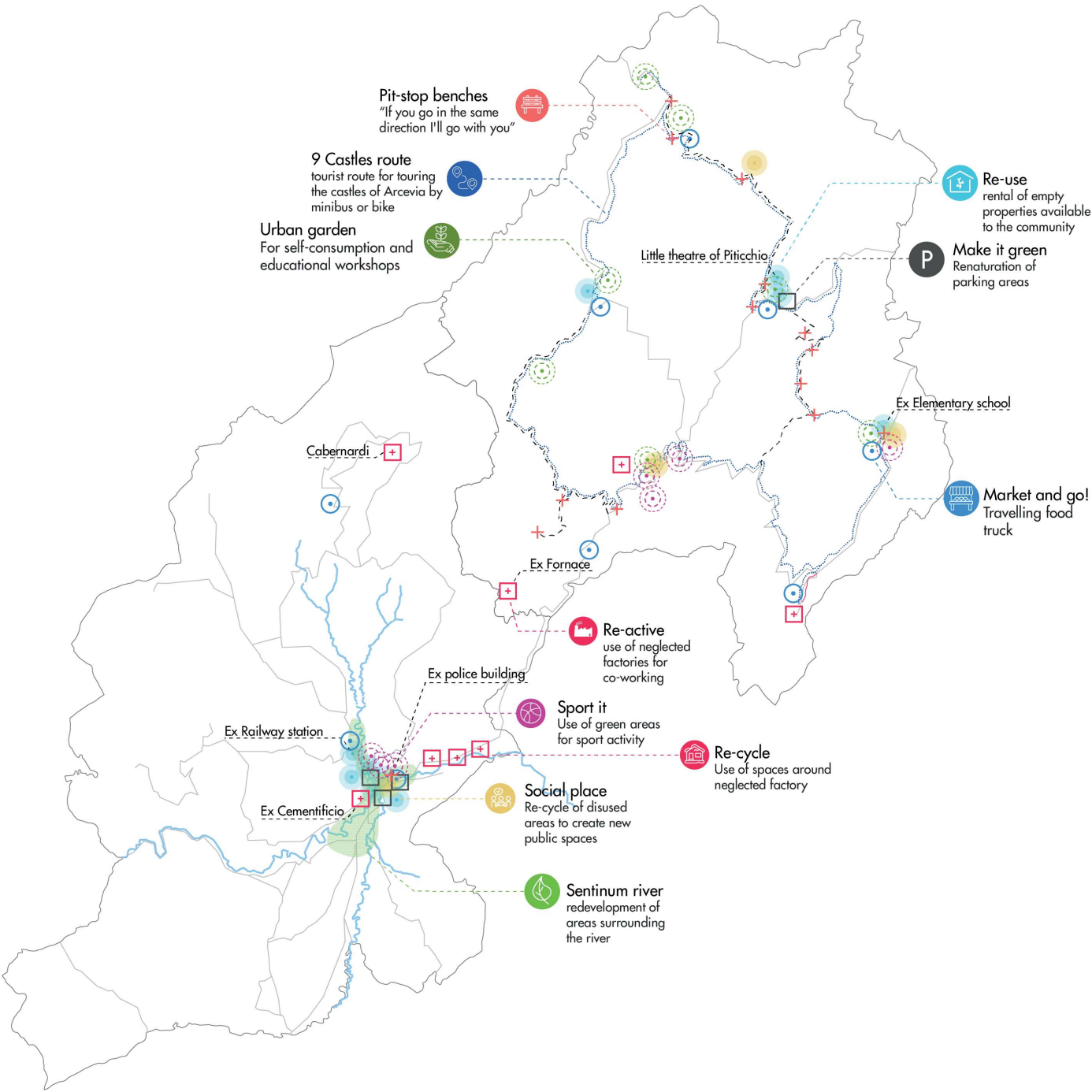
At this stage, the key players become private individuals and municipal administrations, who can choose to make properties available for community initiatives, for example, through rental agreements at reduced rates or by granting the use of unused municipal buildings. A concrete example of this dynamic is the former Municipal Police building in Sassoferrato, handed over to local associations for management, and the former school in Castiglioni, currently granted in free use to a sports association for organizing community events.



CIRCULAR STRATEGY

In this phase, the sustainability of interventions becomes crucial. This can be achieved by revitalizing vacant buildings in the city center as well as disused industrial properties, making them available to users at reduced prices. Innovative approaches can be used to assess the collective interest in how these spaces are utilized. The idea is to rent out parts of the building in successive phases to different types of users based on their space needs. This approach helps to reduce vacancies while fostering new creative, cultural, and commercial connections, offering fresh experiences for residents, investors, and tourists alike.

RECYCLE MATERIAL
BIO-BASED MATERIAL
LOCAL
DESIGNED FOR DISASSEMBLY
CO-DESIGN
BOTTOM-UP



_ Territorial Strategy, Phase 2

ACTORS

In the final phase, the success of the previous stages leads to increased interest in larger investments compared to those already initiated.

This includes not only the energy and structural renovation of buildings, but also the implementation of policies and strategies to significantly improve the infrastructure system. In this phase, investors such as **entrepreneurs** and **architects**, as well as provincial and regional public administrations, play a key role.

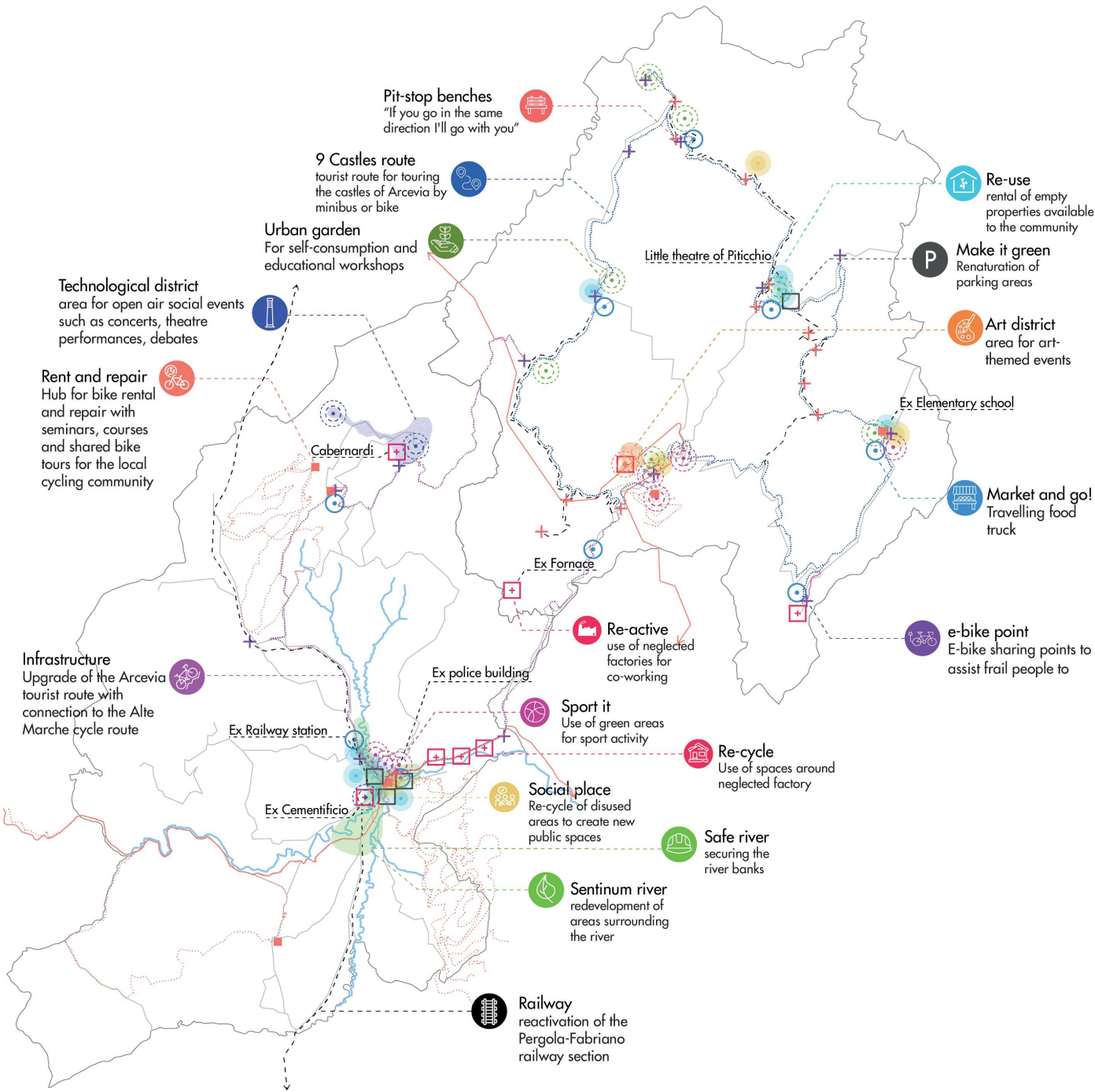


CIRCULAR STRATEGY

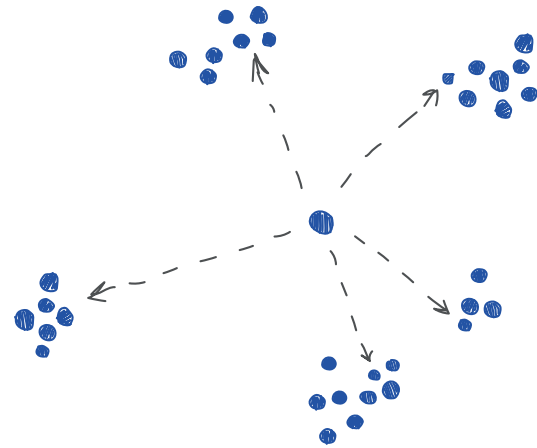
In the final phase, the strategy focuses more on **buildings**, implementing renovation solutions based on a **circular approach**. Cooperation between local artisans and designers creates new synergies, allowing not only the renovation of spaces but also the development of a self-sustaining economic network. The success of previous steps also enables the promotion of more costly initiatives that bring the community closer to the concept of urban sustainability.

These include adopting green local and regional transportation systems, such as **e-bikes** and **trains**, for example by reactivating the **Fabriziano-Pergola railway line**.

RECYCLE MATERIAL
BIO-BASED MATERIAL
LOCAL
DESIGNED FOR DISASSEMBLY
CO-DESIGN
BOTTOM-UP



INTERPRETATION



The choice of Castiglioni, a small hamlet in the municipality of Arcevia, as a pilot and experimental area for this project stemmed from the desire to apply a **circular design approach** in a small-scale context. The objective is to transform Castiglioni into a laboratory for **architectural experimentation**, proposing a new design paradigm that prioritises environmental sustainability and the reuse and reactivation of unused spaces.

The peculiarity of this initiative lies in its ability to test a regeneration model in a **marginal area** with a cohesive and enterprising community and then replicate this approach in other similar realities. Until now, circular design has been developed mainly in **metropolitan contexts**, neglecting the potential of inner areas, often characterised by specific problems such as depopulation and degradation of the architectural heritage.

This project aims to fill this gap, demonstrating that even in a small village it is possible to activate a regeneration process capable of enhancing the territory, inspiring similar interventions in other rural or peripheral areas. The choice of Castiglioni, among the 18 hamlets of Arcevia, was guided by the particular

dynamism of its community. Despite its small size, the village is distinguished by the presence of individuals and associations actively engaged in the promotion of social, cultural, and recreational events. Notable examples include the **Infiorata**, an artistic event during which the streets are covered in floral mosaics, and the **Festa del Pane**, which celebrates a local tradition with bread-making workshops and activities. The hamlet is also home to a **sports association**, which, thanks to the use of a municipal building, organises concerts, community dinners, bocce tournaments, and other activities that encourage social gathering.

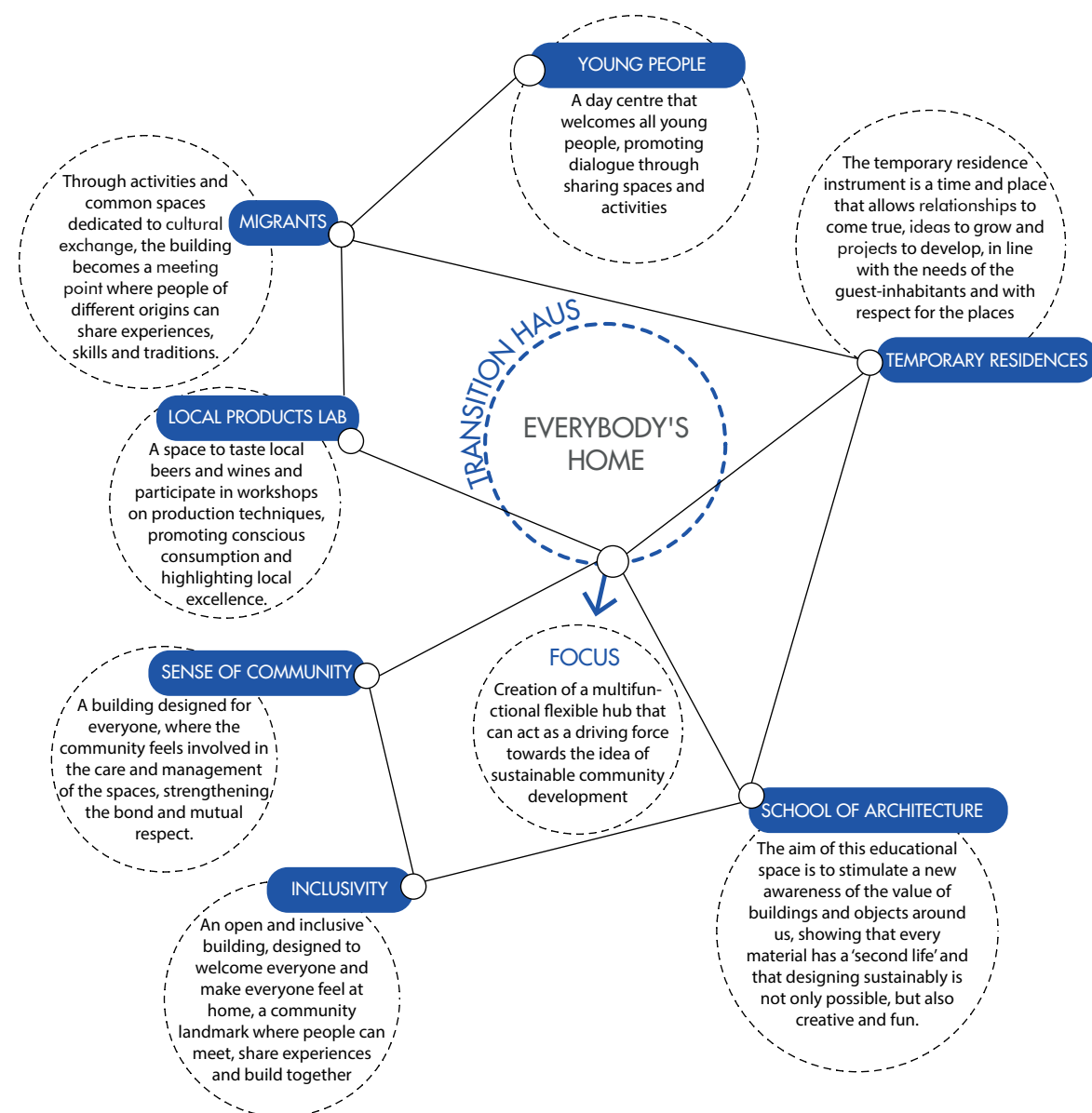
The centrepiece of the project is a key building, renamed **Transition Haus**. This name, chosen in **German** to recall the training experience in Hamburg, represents a **manifesto of change**: a symbolic and physical house that welcomes and promotes the transformation of the territory and the community.

The Transition Haus will be a **flexible and inclusive** space, capable of adapting to the diverse needs of the community and becoming a place of learning, meeting, and awareness. The building will embody the principles of circular design and will host activities that raise awareness among citizens, especially the younger ones, about the importance of responsible architecture that respects the natural environment and resources. It will be a **'home for all,'** designed to include new people and address the challenge of depopulation and an ageing population. A crucial aspect will be the connection with the themes of welcome and inclusiveness, already central to the municipality of Arcevia, which hosts a large centre for migrants.

The project aims to extend this vision to Castiglioni, proposing the creation of **temporary residences** around the main building. These spaces, designed to host migrants, tourists, or artists seeking a quiet place surrounded by nature, will help revitalise the hamlet and foster social integration. The strategy will be developed in several sta-

DESIGN APPLICATION





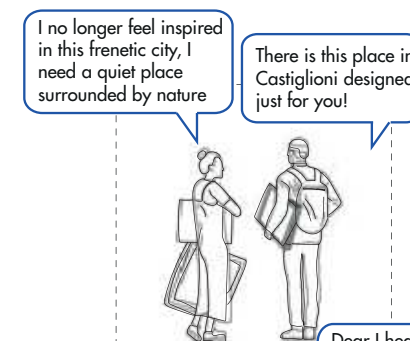
ges, inspired by Maurizio Carta's Cityforming Protocol, with the aim of ensuring a gradual and participatory transition.

The starting point will be **bottom-up actions**, in which the local community will play a leading role in the re-appropriation of **abandoned spaces** through simple and sustainable actions, such as the use of salvaged materials and the organisation of shared activities.

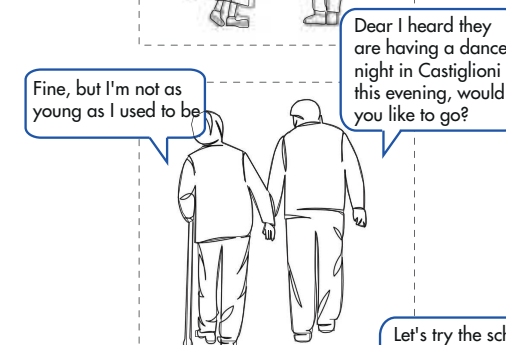
This first phase will lay the foundations for a targeted and progressive transformation of the area, with a well-defined time horizon.

The Transition Haus will act as a **landmark** of this evolution, becoming the symbol of a new identity for Castiglioni and demonstrating that innovation can be born even in marginal contexts and then spread to a wider scale.

THE ARTIST



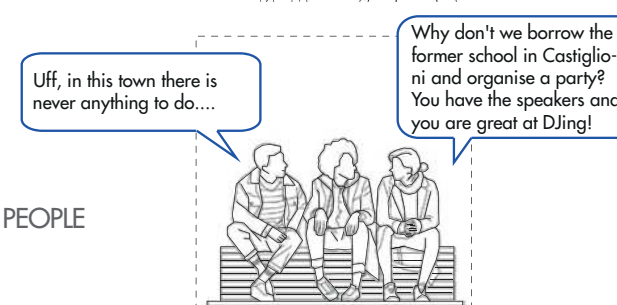
INHABITANTS



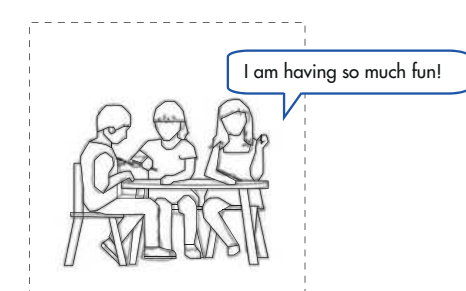
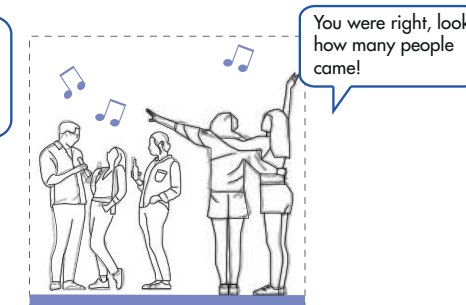
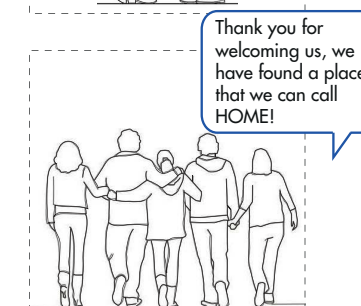
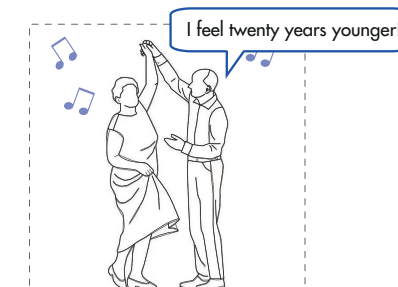
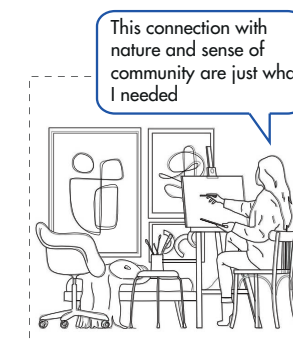
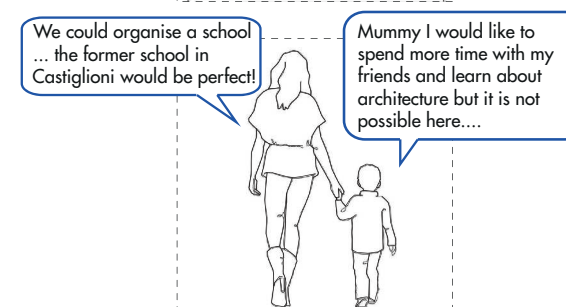
THE FOREIGNERS



THE YOUNG PEOPLE



THE CHILDREN



03.02 CASE STUDY BUILDING: FORMER PRIMARY SCHOOL IN CASTIGLIONI, ARCEVIA

DESIGN APPLICATION

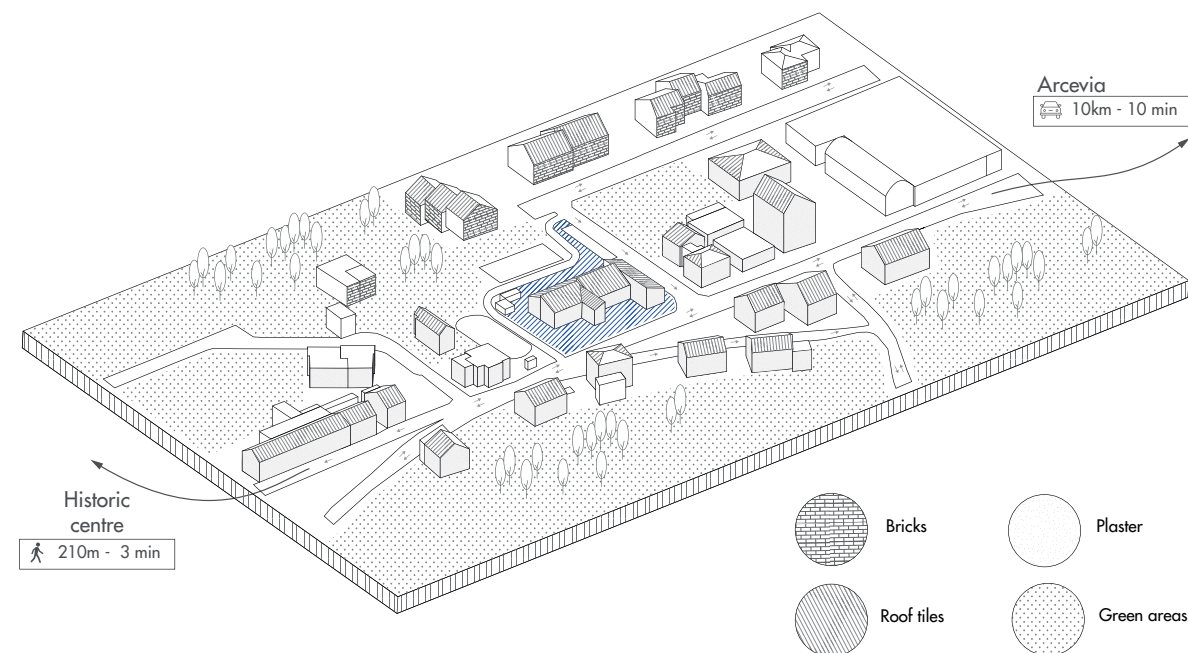
As mentioned in the previous chapters, the identification of the case study projects in this thesis was guided by well-defined criteria, aimed at selecting buildings constructed between the 1950s and 1970s. This period represents a crucial phase in architecture, in which technological innovations and social changes helped to define the language of modernism.

The research, developed in parallel with C. Massioni's PhD, made it possible to identify specific elements that characterise modernist architecture, integrating them as guiding parameters in the selection of case studies. In order to identify buildings that could belong to this architectural current, the seven distinctive traits of modernism were used (Gibberd, 2017:7). The building chosen as case study, located in the hamlet of Castiglioni, reflects an architectural composition that expresses some of the cardinal principles of modernism: the absence of superfluous ornamentation, a rigorous aesthetic defined by clear geometries and the use of local materials such as white stone, and a profound interaction with the natural context. For example, the stone plinth, apparently decorative, underlines a precise functional logic: the presence of a basement and a floor raised above ground level. This kind of 'constructive honesty' not only reveals

the building's internal structure, but contributes to a design clarity that translates into formal integrity and simplicity. The colour scale of the building also aligns with the principles of modernism. The light grey of the plaster and the white stone of the base reflect the intention to avoid excessive colour contrasts, emphasising instead the relationship between light, shadow and materials. This chromatic approach, combined with the volumetric composition, demonstrates the building's adherence to the principles of formal purity and functionality that characterise modernism.

The Castiglioni school has not served its intended function for an extended period. However, in recent years, it has been managed under a concession by the municipality to the "Associazione Dilettantistica Castiglioni." This association utilizes portions of the building for storage while designating other areas as communal spaces, where it organizes activities aimed at maintaining community engagement, such as sports events, dinners, and local festivals.

The exact construction period of the building remains indeterminate due to insufficient documentation provided by the municipality, which precludes a definitive dating of the structure. Nevertheless, a visual analysis of



the construction techniques employed, supplemented by information from residents, suggests that the building likely dates from the 1950s to the 1960s. Over time, the structure has undergone minor modifications to accommodate varying usage requirements.

From a spatial distribution perspective, the building extends over three floors, although only the ground floor, elevated by a base distinguishable by a change to stone material, is currently usable. The gross usable area measures 597.57 m², with an additional 1070 m² of adjacent space. Photographic analysis indicates that the structure is of a mixed nature, featuring floors constructed of composite brick and concrete, with vertical supports comprising masonry and reinforced concrete.

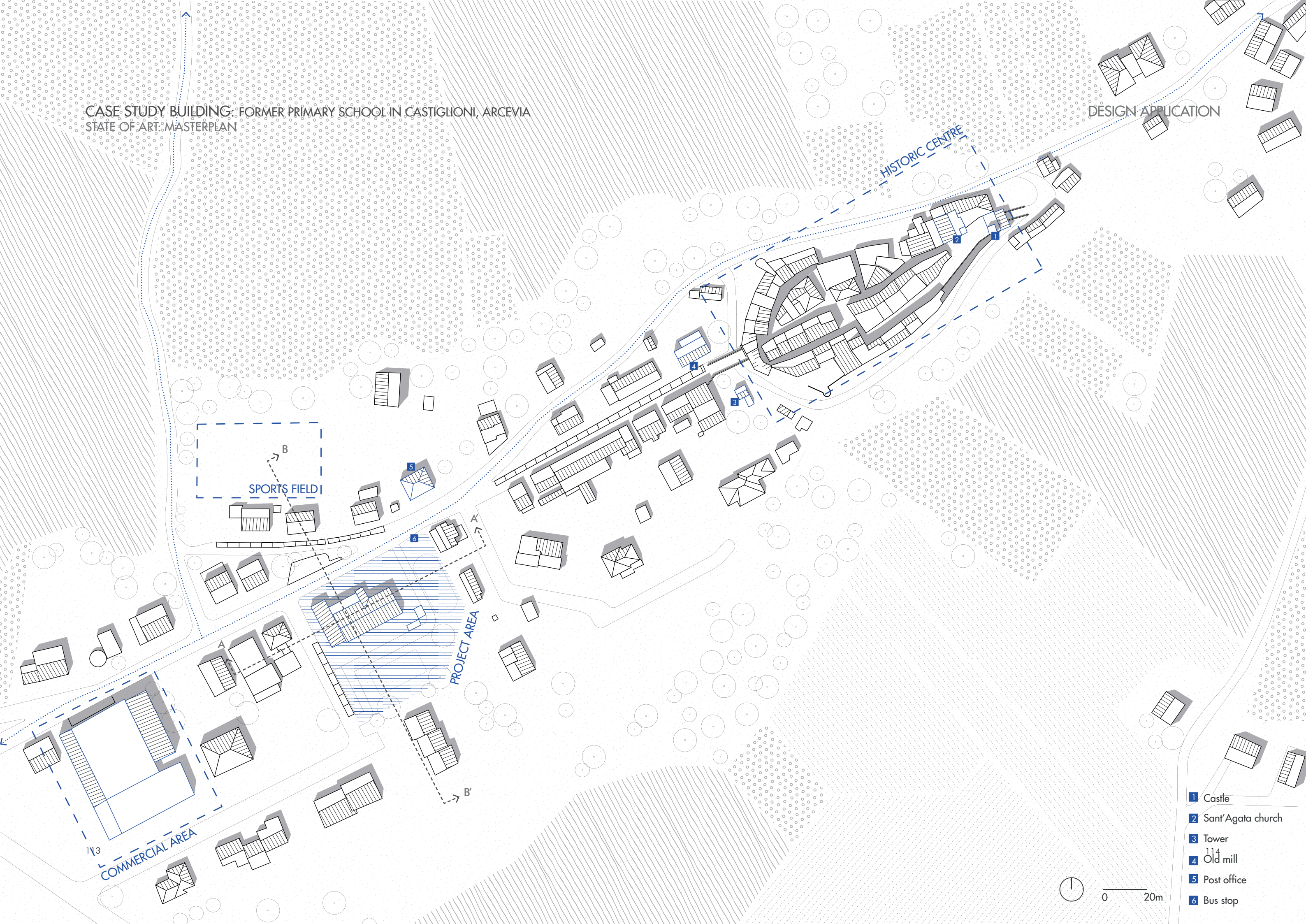
The building is situated within Zone F1, as designated by the PRG, which is earmarked for structures intended as community facilities or infrastructure. Each construction, expansion, or renovation project within this zone must adhere to the specified maximum indices and parameters:

Uf: 1,5 mq/mq	Dc: 7,5 ml
H: 12,00 except for technical spaces;	Ds: 10,00 ml
Ic: 0,8	De: 15,0 ml

Presently, the building does not comply with the minimum performance standards outlined in the 2015 Minimum Requirements Decree, thereby categorizing it as "non-sustainable."

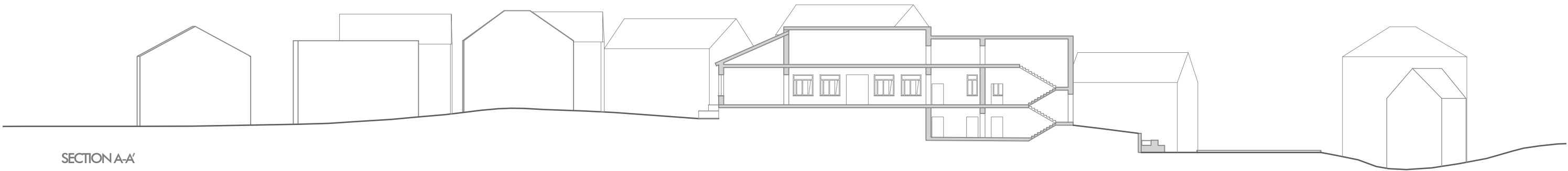
CASE STUDY BUILDING: FORMER PRIMARY SCHOOL IN CASTIGLIONI, ARCEVIA
STATE OF ART: MASTERPLAN

DESIGN APPLICATION

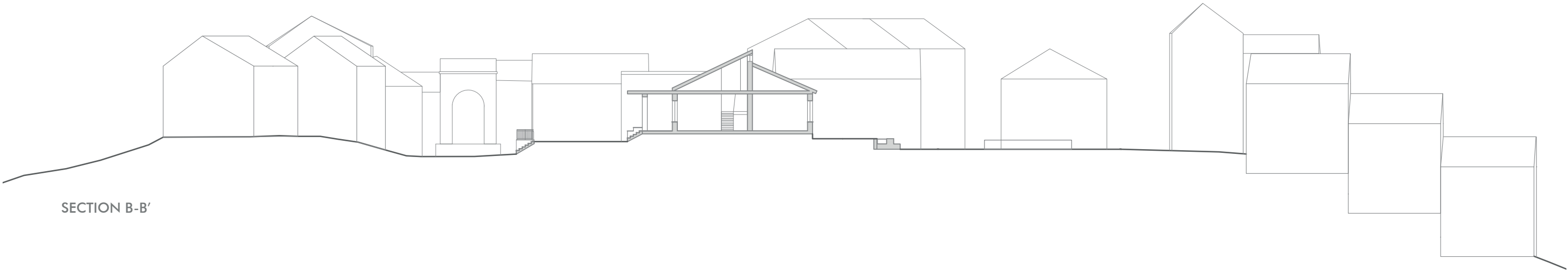


- 1 Castle
- 2 Sant'Agata church
- 3 Tower
- 4 Old mill
- 5 Post office
- 6 Bus stop





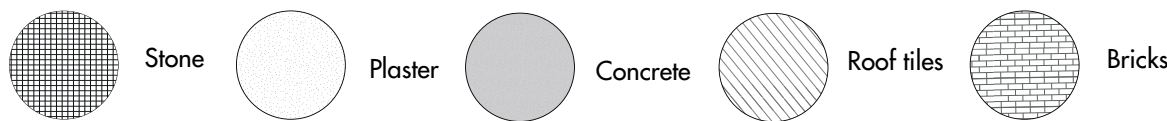
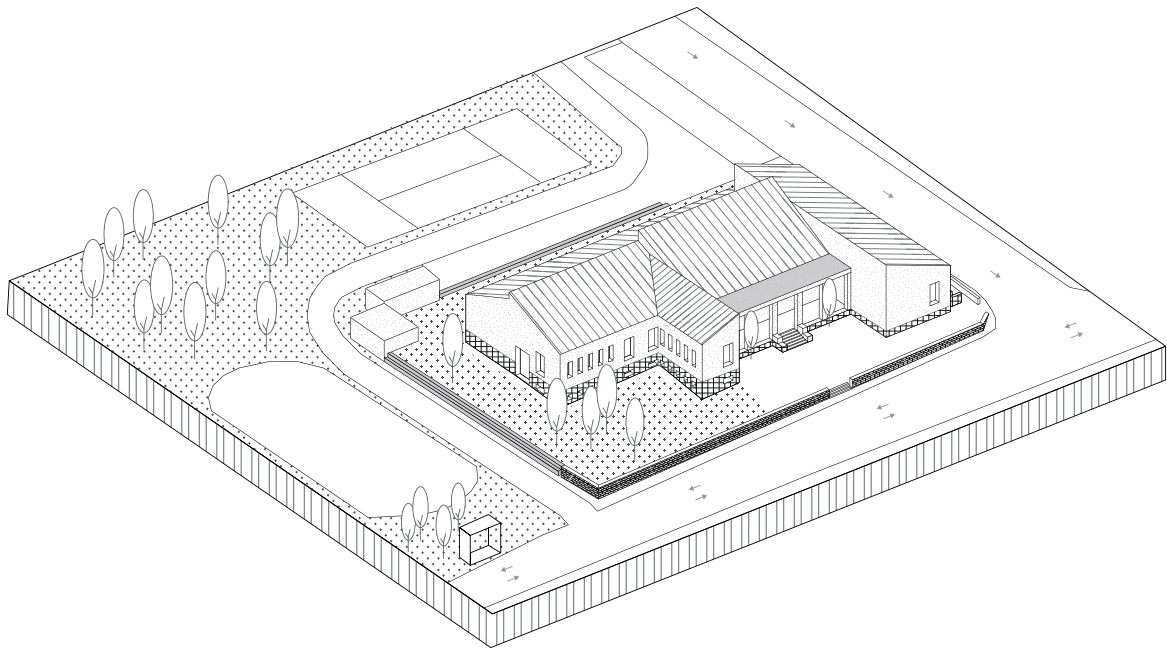
SECTION A-A'



SECTION B-B'

0 5m

CASE STUDY BUILDING: FORMER PRIMARY SCHOOL IN CASTIGLIONI, ARCEVIA
STATE OF ART: BUILDING ANALYSIS



The building of the former elementary school in Castiglioni, built around the 1960s, exemplifies a typical **mixed structure** of that era, characterized by a combination of **masonry walls** and **concrete slab floors**.

The load-bearing walls are made with a mix of **bricks and stone**, materials that lend the building both solidity and character. Externally, the structure is coated with a **white plaster** finish that gives uniformity to the facade, while a **white stone** base enhances the overall aesthetic, highlighting the elevated volume of the building due to the presence of a **basement level**.

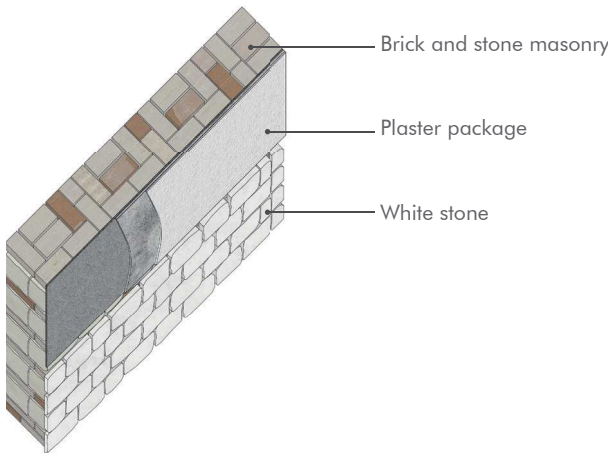
This configuration raises the ground floor, making it accessible via a **staircase**, a detail that adds elegance and architectural distinction to the building.

The recurring use of white stone, featured in both the structure and the exterior finishes, prompted an investigation into its origin, as other buildings from the same period in the area display a similar characteristic. It was hypothesized that this stone might come from the **Furlo quarry**, known for its production of white, red, and pink scaglia stone, widely used in local constructions of the time. Another possible source could be the former **Caverni quarry** in San Simone, located near Arcevia and currently disused, where a similar white stone was available.

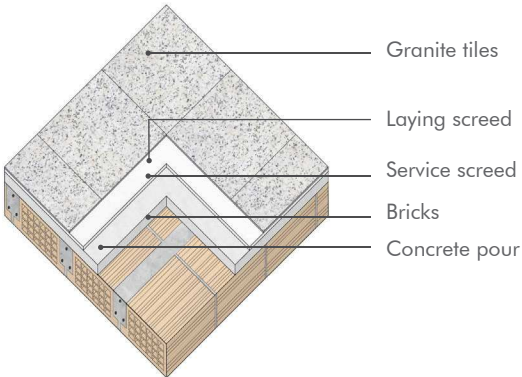
These inquiries into the materials' provenance not only provide historical insights into local building development but also highlight the use of **natural resources** from the territory in support of the construction techniques of the time.

DESIGN APPLICATION

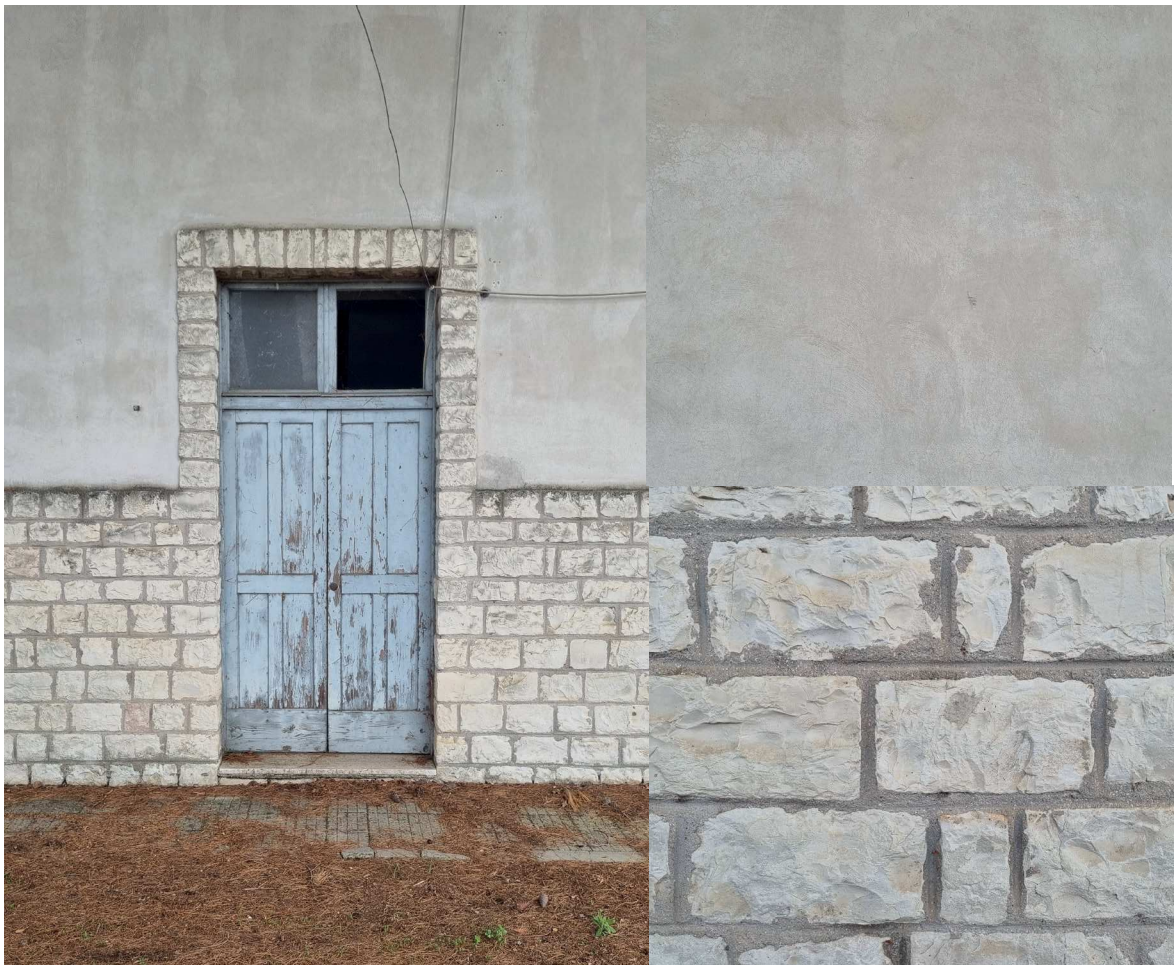
STRUCTURE AND MATERIALS



_ Stratigraphy of the exterior wall



_ Stratigraphy of the floor

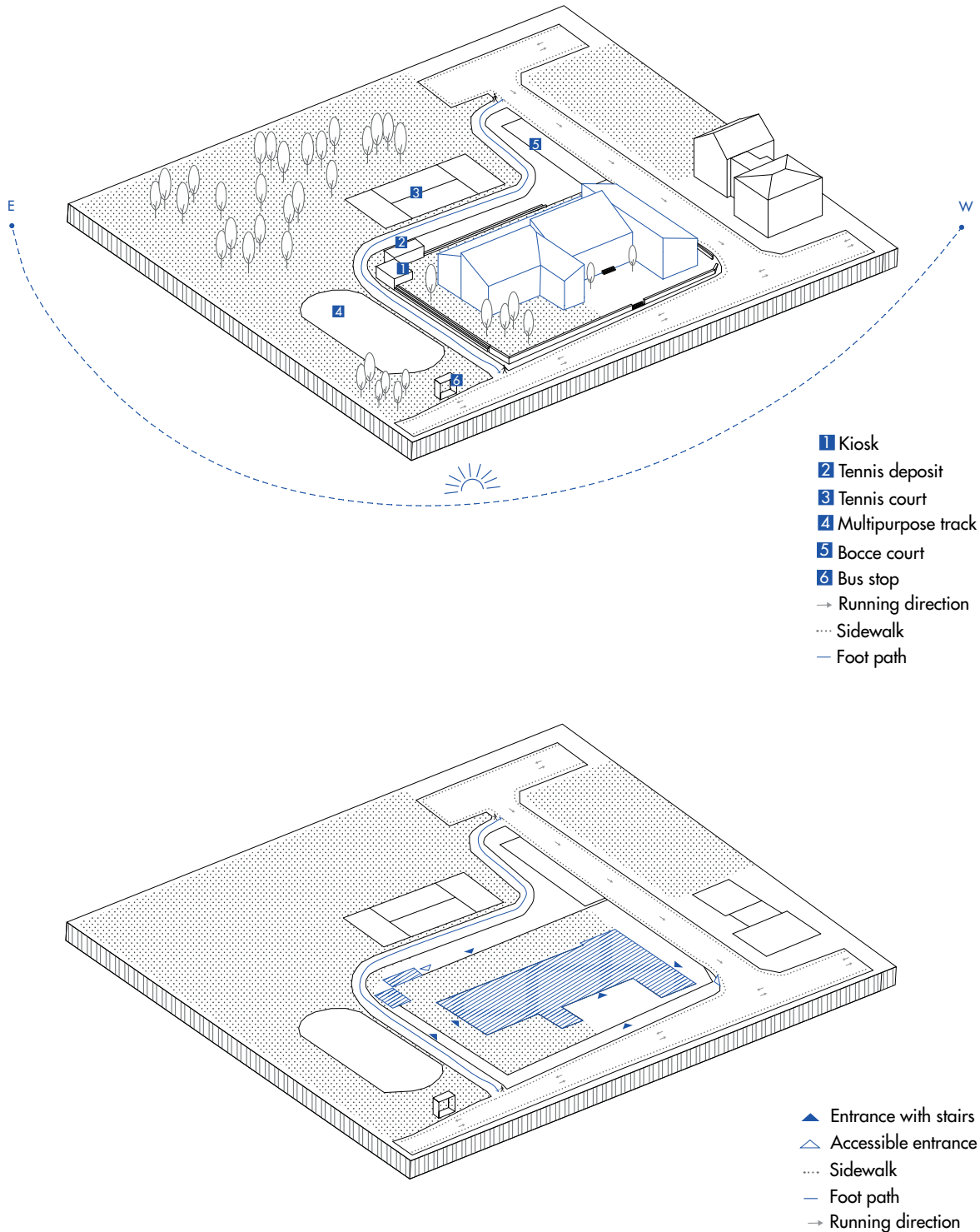


CASE STUDY BUILDING: FORMER PRIMARY SCHOOL IN CASTIGLIONI, ARCEVIA
STATE OF ART: BUILDING ANALYSIS

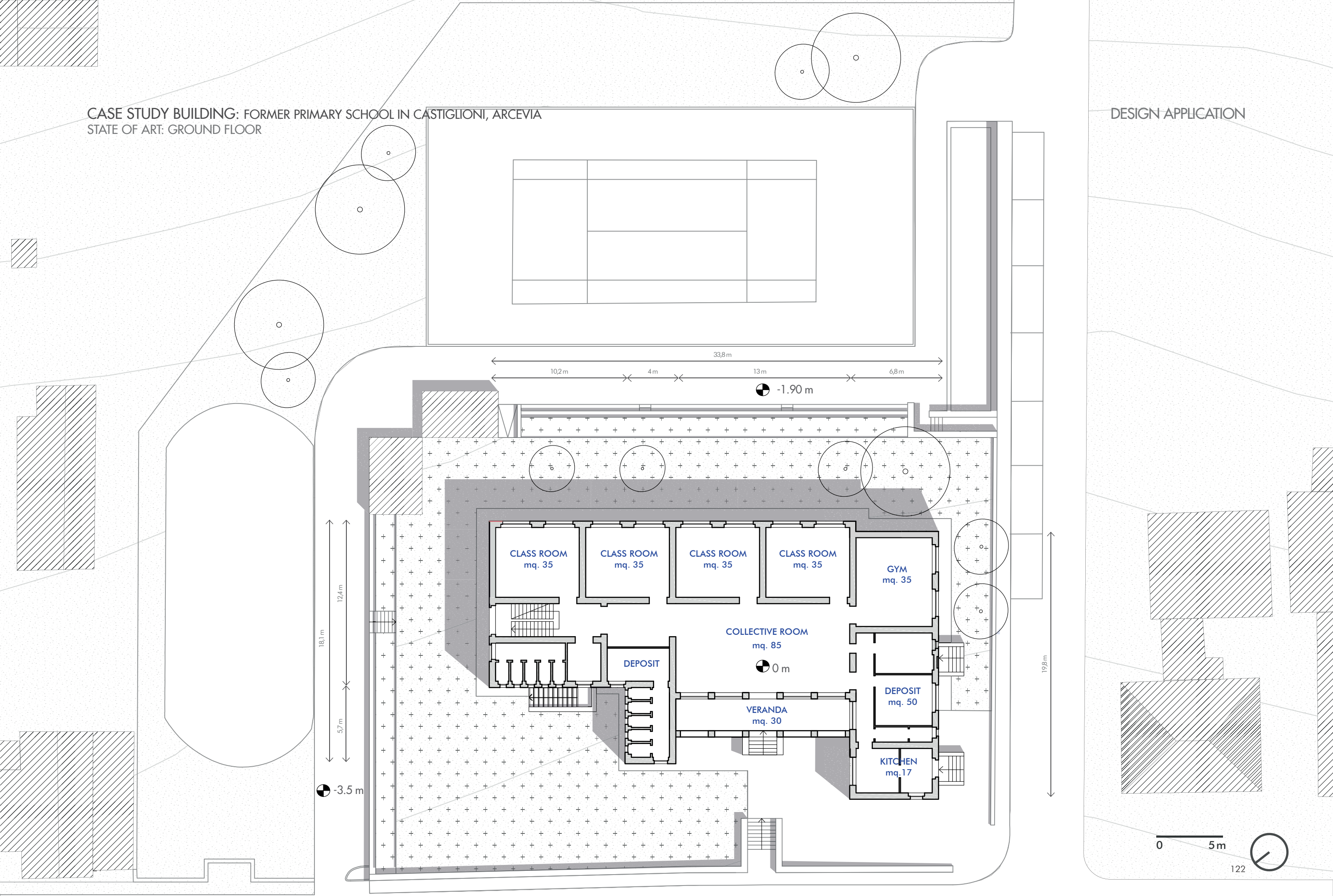


DESIGN APPLICATION

FEATURES AND ACCESSIBILITY

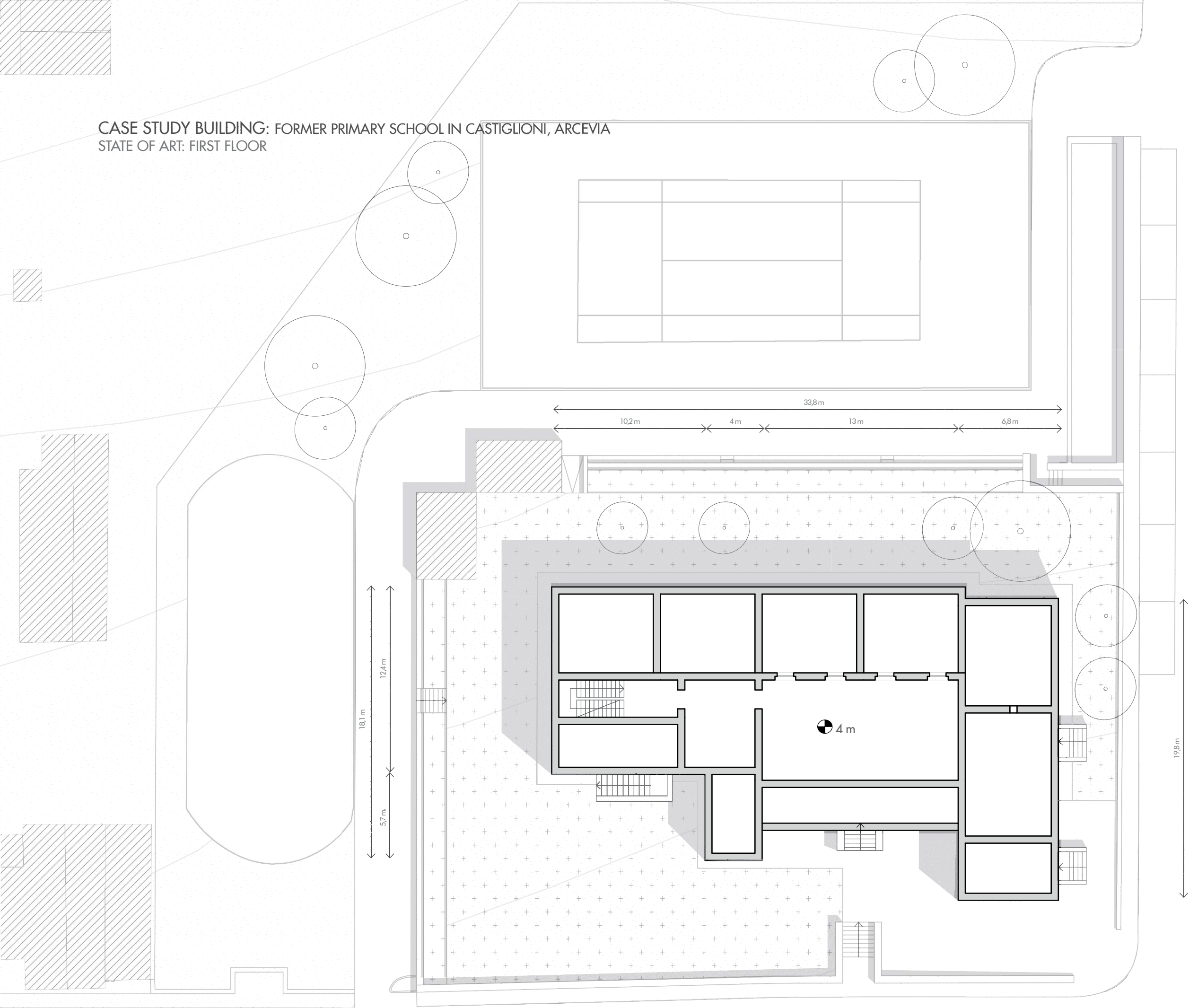


CASE STUDY BUILDING: FORMER PRIMARY SCHOOL IN CASTIGLIONI, ARCEVIA
STATE OF ART: GROUND FLOOR



DESIGN APPLICATION

CASE STUDY BUILDING: FORMER PRIMARY SCHOOL IN CASTIGLIONI, ARCEVIA
STATE OF ART: FIRST FLOOR

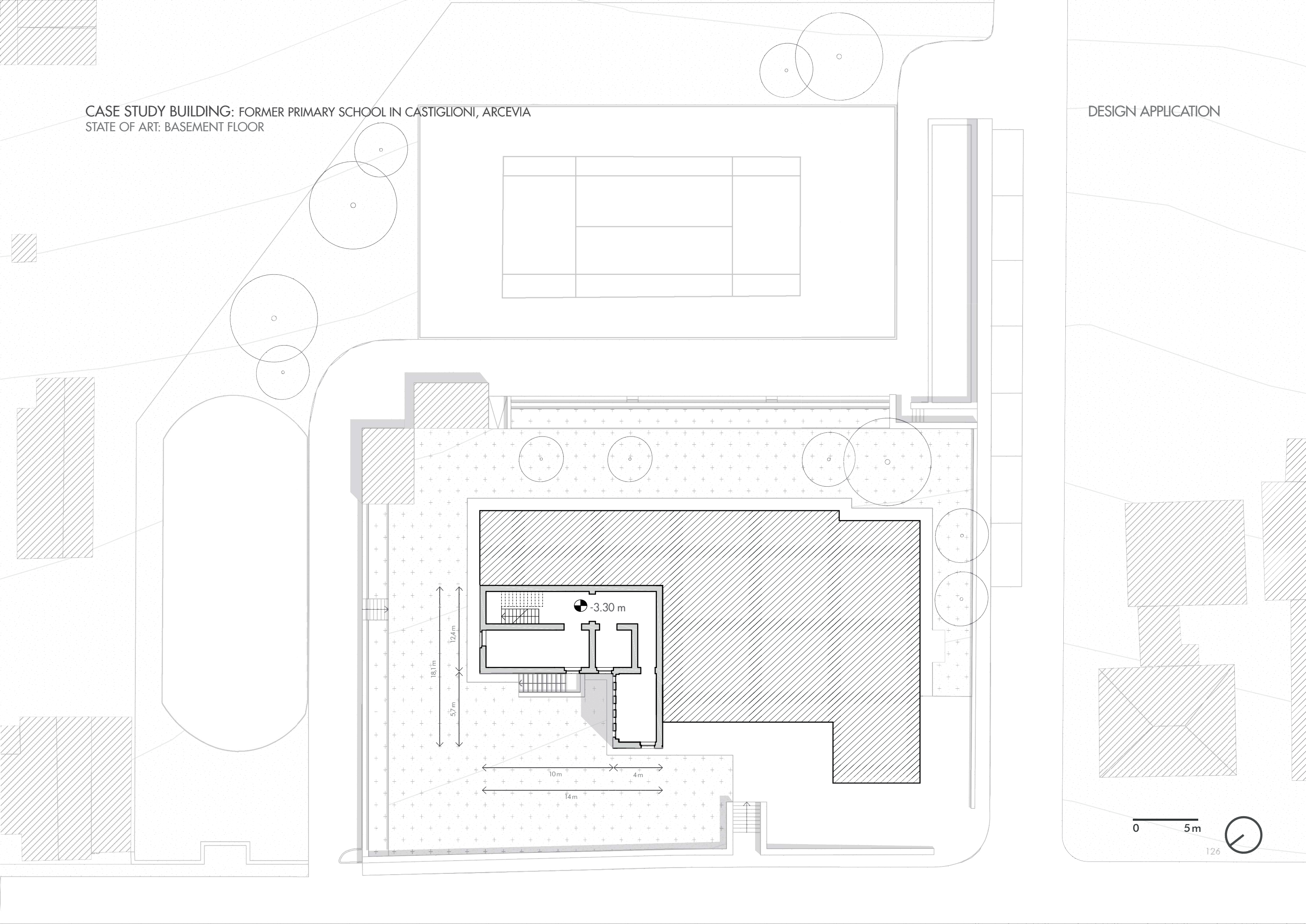


DESIGN APPLICATION

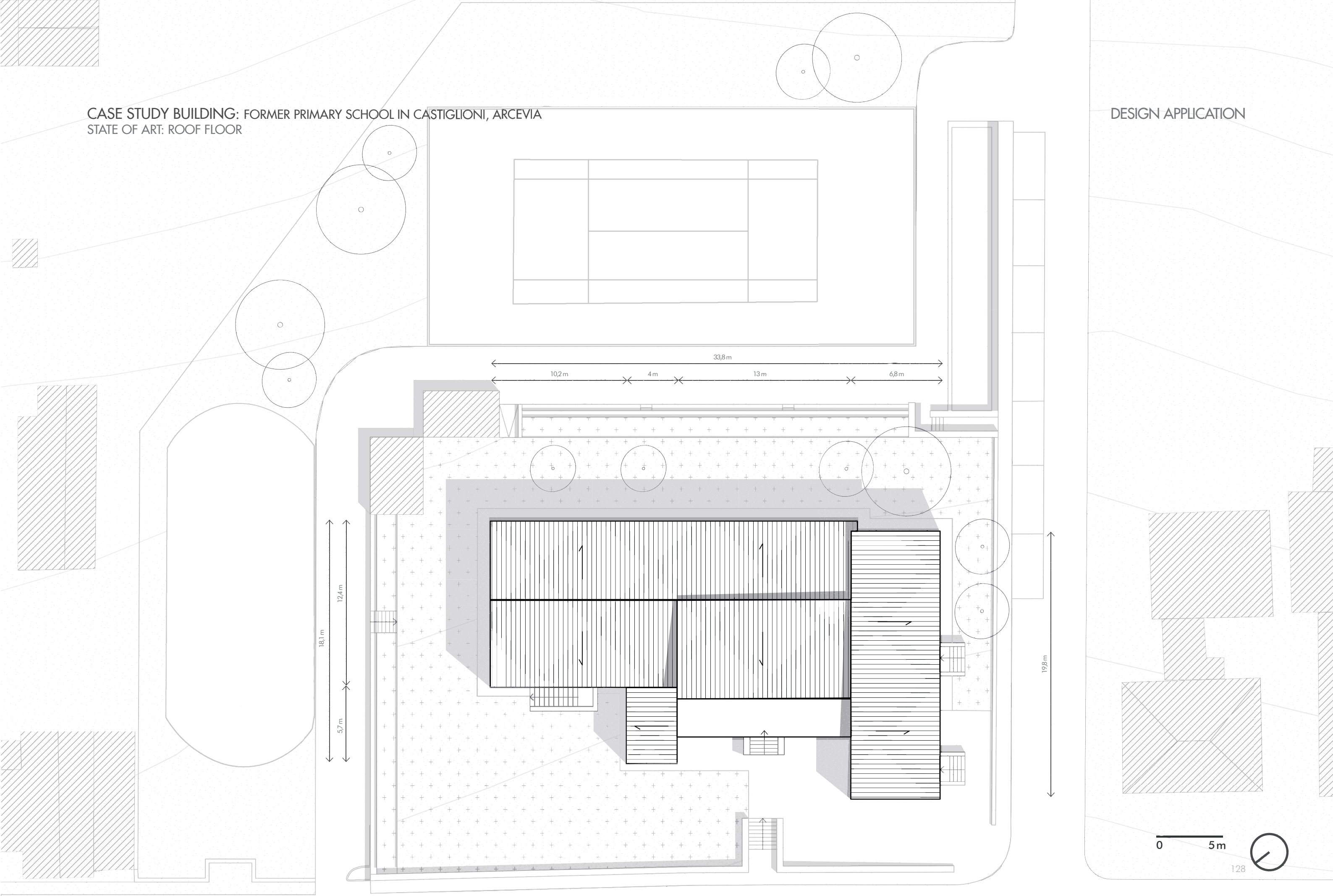


CASE STUDY BUILDING: FORMER PRIMARY SCHOOL IN CASTIGLIONI, ARCEVIA
STATE OF ART: BASEMENT FLOOR

DESIGN APPLICATION



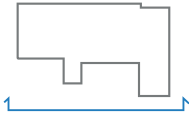
CASE STUDY BUILDING: FORMER PRIMARY SCHOOL IN CASTIGLIONI, ARCEVIA
STATE OF ART: ROOF FLOOR



DESIGN APPLICATION

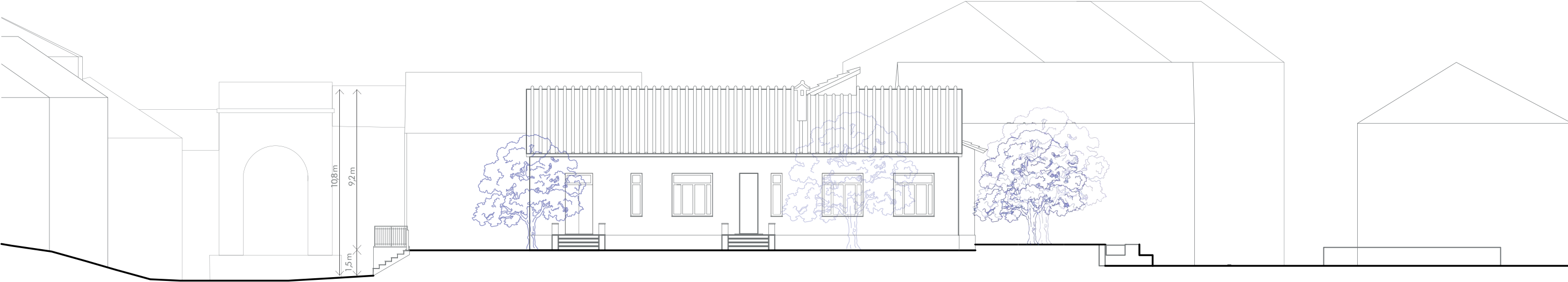


NORTH-WEST

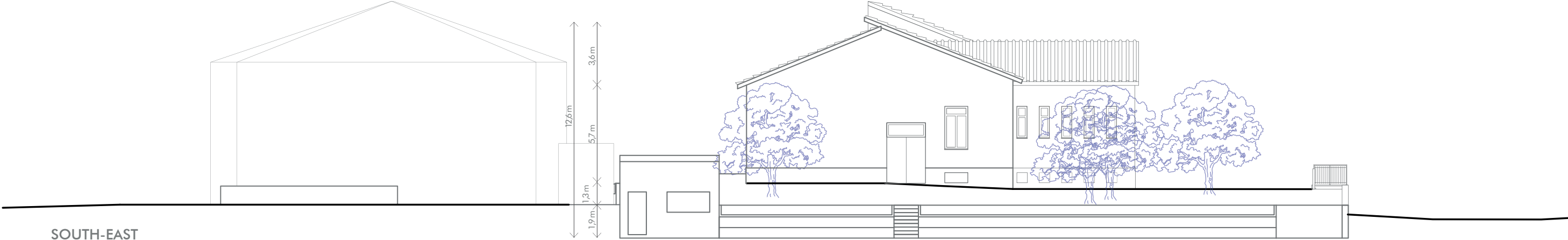
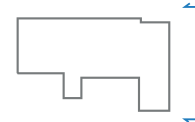


SOUTH-EAST

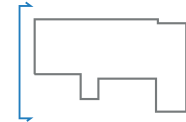




SOUTH-WEST



SOUTH-EAST



0 5m

A significant part of our work was dedicated to the search for **design references** and quality parameters that could guide and inspire project development.

We selected **six project references**, three for the hamlet of Castiglioni and three for the municipality of Sassoferrato, with the aim of identifying solutions consistent with the context and principles of circular design.

My colleague Lucy Caterina Evangelista will present the references for Sassoferrato in her Master's thesis at a later stage, while here we will focus on the three projects that influenced the concept for Castiglioni.

The choice of these references was guided by the desire not to alter the nature of the existing building, integrating **recyclable** and **easily dismantled materials** to ensure **flexibility** and **sustainability**.

The first case study is the **Simone Veil school complex**, selected for the design of its distinctive roofing. These, with their fluid and dynamic course, recalled the geometries present in the building in Castiglioni. In addition, the project uses **sheet metal** as the cladding material, a choice that seemed particularly suitable for our intervention. The use of sheet metal not only lends itself to replication through **recycled materials**, but also allows for an appearance that respects the architectural essence of the

original building.

The second reference project is a **kindergarten** located in **Bolzano**, chosen both for the volumetric similarities with Castiglioni's building and for the adoption of the Reggio school's educational method. This approach is also reflected in the architectural design, which emphasises the connection between spaces. In particular, we took our cue from the **glass connection** between the various volumes of the kindergarten, which will be reinterpreted in our design as an **entrance greenhouse**. This choice not only enhances the functionality of the space, but introduces an element of transition between inside and outside that dialogues with the surrounding context.

The third and last reference is the project **Casa-Asilo** by Maria Giuseppina Grasso Cannizzo, which we identified as the most akin to our intervention. This building, built in the same years and originally intended for the **same function**, has a very similar aesthetic and urban context to Castiglioni. From Grasso Cannizzo's work, we were inspired by the **respectful approach** towards the pre-existing building, which results in **minimal** and **discreet** interventions in the surrounding context. This has guided us in our choice of an architecture that integrates with sensitivity in its setting, without disrupting the historical and cultural identity of the place.

SIMONE VEIL SCHOOL COMPLEX AND DOJO

BADIA BERGER ARCHITECTES

01

YEAR: 2024
LOCATION: BONDOUFLE (FR)

The school complex, strategically positioned in the heart of the neighborhood, serves as a landmark and catalyst for urban development. Its “C”-shaped layout encloses secure, functional spaces, integrating green areas and public spaces harmoniously. Distinctive roof volumes unify the design while highlighting individual program elements, creating a village-like atmosphere.

Key features include private garden-facing classrooms for the kindergarten, upper-level primary classrooms with playground views, and centrally located spaces like the library and mobility games room, each with unique architectural treatments. The dining area stands out as a distinct and inviting space, enhancing the community experience.

Sustainability and adaptability are central to the project, with a flexible post-and-beam structure and durable materials like clay bricks and zinc-clad roofs. The facility combines warmth, functionality, and architectural cohesion, fostering a sense of calm centrality while serving as a model for innovative urban design.



<https://badia-berger.com/project/ecole-et-dojo-simone-veil/>

KINDERGARTEN TERENTEN

FELD72

02

YEAR: 2020
LOCATION: BOLZANO (IT)

Kindergarten Terenten, designed by **feld72**, is located in a mountain village in South Tyrol, Italy, and acts as a **mediator** between traditional and contemporary architectural elements. The building integrates with the **sloping terrain**, blending into the landscape while maintaining a distinct identity. Its layout forms an organic ensemble with surrounding public facilities, creating a cohesive urban context.

The design includes three interconnected “houses” with varying heights, connected by glazed elements. Classrooms are facing south, with multi-level interiors featuring galleries and bridges, encouraging **spatial exploration** and **interaction**. Large windows and skylights connect the interior to the surrounding mountain scenery. Classrooms also open onto wood-decked patios, providing direct access to outdoor spaces.

The lower ground floor hosts activity rooms, a teaching kitchen, and the largest classroom, with spaces designed to **stimulate creativity** and **flexibility**. Staff facilities and a **multipurpose room** enhance the functionality of the structure.

The building employs **sustainable materials**, such as larch wood and exposed concrete, and incorporates energy-efficient features like underfloor heating, mechanical ventilation with heat recovery, and a renewable energy source for heating. These elements have earned the building a “KlimaHaus A” rating. The integration of indoor and outdoor spaces, along with the use of traditional and modern materials, creates a daycare centre that is both functional and innovative.



https://www.archdaily.com/93632/kindergarten-terenten-feld72?ad_medium=gallery

CASA-ASILO

MARIA GIUSEPPINA GRASSO CANNIZZO

03

YEAR: 2018
LOCATION: MAZZARRONE (IT)

The reflection on the new use of the Casa-Asilo starts from the definition of **restoration**, conceived as a transitory form of superfetation, capable of guaranteeing adaptability and reversibility for hypotheses of future occupation. Architecture is considered living matter, capable of regenerating itself through new meanings and functions.

The project has been able to enhance an anonymous civic building from the 1960s, preserving its geometric lines and original spatiality. In the past, the garden represented the boundary between the inhabited area and the Sicilian countryside, while the interior was organised around a long central space, with classrooms on the long sides and services on the blind ones. The architecture, although free of structural disruptions, was in a poor state of preservation.

Through the removal of harmful materials such as asbestos cement and the adoption of contemporary, **eco-friendly solutions** (fibre cement sheets, thermal insulation, replacement of window frames), the building was transformed. The original spaces have been reinterpreted to meet the needs of contemporary living: the long central corridor has become an **area shared** by the family nucleus; the former classrooms are now **intimate spaces**; the former refectory, while maintaining its role as a **common space**, is the heart of domestic conviviality.

The project demonstrates how architecture is **temporary** and **changeable**, bound by the uses to which it is put, but capable of being reborn through a vision that links past and future.



<https://divisare.com/projects/444401-maria-giuseppina-grasso-cannizzo-giulia-bruno-lcm-2018-casa-asilo>

03.04 TRANSITION HAUS: INNOVATIVE EDUCATIONAL AND RESIDENTIAL HUB

The project is based on the redevelopment of a building constructed between the 1950s and 1970s, chosen as an example of anonymous and **neglected architecture** and as a pretext for developing an architectural intervention based on the principles of **circular design**.

The main objective, pursued during all the design phases, was to operate with the utmost respect for the **existing building**: limiting demolition, favouring **local materials**, and adopting **demountable** and **recyclable** solutions. Particular attention was paid to the use of **local materials**, with an in-depth analysis of building material producers, active quarries and craftsmen in the area, conducted for the entire inland area of the Appennino Basso Pesarese-Anconetano. The objective was to identify local retailers capable of stimulating the area's economy and promoting local production at the expense of industrial production, thus strengthening the concept of circularity and the connections between **resources** and the **territory**.

The project favoured **recyclable**, **easy-to-install** and **demountable** materials, in line with the principles of circularity and reversibility of interventions. The roof of the former Castiglioni school, for example, was conceived as a **steel structure** covered in aluminium sheet.

This choice was supported by the mapping of materials developed for the internal areas, which highlighted the presence of three municipalities specialised in the treatment and sale of metal: Apecchio, Cantiano and Acqualagna.

Most of the other materials used in the project are **wood**, the availability of which was confirmed by the presence of two retailers in Sassoferrato, a municipality adjacent to Arcevia. For the remaining materials, such as flooring, insulation systems and other building components, several suppliers were identified in neighbouring municipalities, including Arcevia, Sassoferrato, Frontone and Acqualagna.

This approach demonstrates how the use of local resources can not only enhance the area's tangible and intangible heritage, but also contribute to the **economic and social regeneration** of the Apennines by encouraging circular and context-friendly production practices.

The building and the elements realised within the project are configured as **flexible volumes**, designed to adapt and transform over time.

The former primary school in Castiglioni, already recognised as a **landmark** for the local community thanks to its **educational history**,

presents itself as a building characterised by **plastered external walls** and a **local stone base**.

The architectural peculiarity lies in the system of independent pitches, which give the building the appearance of a set of interconnected volumes, similar to a **small village**.

The most significant change concerned the re-roofing. Steel, a recycled material, was adopted, chosen for its lightness, speed of assembly, and ability to make the spaces on the first floor easily accessible. The new roofs maintain the volumetric independence of the previous ones, creating dynamism and integrating harmoniously with the existing building.

This intervention has transformed the central volume of the school into a place for **socialising and meeting**, conceived as a transit space that can host moments of relaxation, exhibitions, and conferences.

Activities are developed around this central core. The classrooms, characterised by equipped walls and differentiated by distinctive colours, offer flexible spaces for learning and play, adaptable to different needs. The rooms can be **opened up** or combined to create further configurations. In addition, craft workshops dedicated to woodworking, a co-working space, a cafeteria, and study areas for students have been provided.

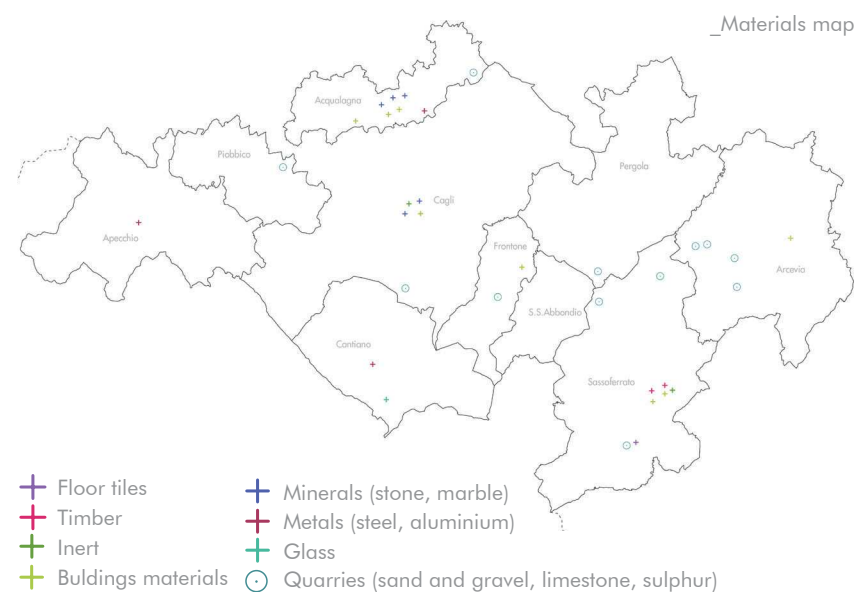
The area surrounding the building has been divided into **two main zones**. The part facing the street, which is more artificial, is conceived as a paved space with **squares** and rest areas to encourage socialisation. On the panoramic side, on the other hand, the design is more natural, with green spaces and light, **temporary elements** that blend in with Castiglioni's agricultural landscape. In this area, there are wooden paths resting on the ground, which encourage interaction with nature, and small wooden structures, built with the involvement of the **local community**, intended for temporary markets and art exhibitions.

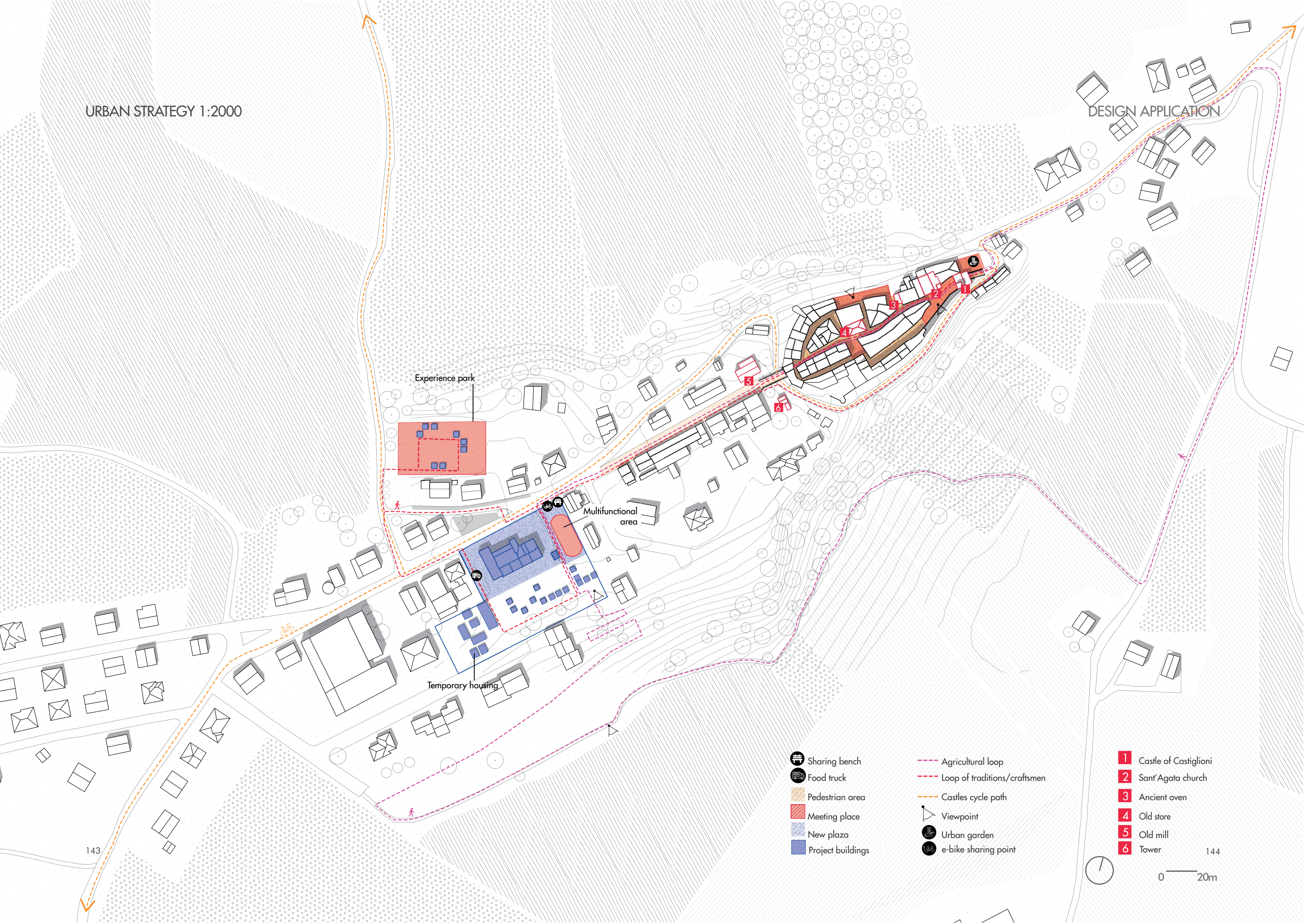
DESIGN APPLICATION

In addition to the roof renovation, volumes were added for temporary residences for artists, migrants, and tourists. These are **modular elements**, available in single or double bed configurations, all sharing an art workshop. Creative activities such as painting, graphic design, and photography can be carried out here, with a view to cultural stimulation and regeneration of the area.

In addition, a glulam structure was also added to the multi-purpose track already present around the building and used for the organisation of **social events**. The choice was made in order to be able to cover and make the space more attractive.

This project is not only an example of sustainable architecture but also an opportunity to reactivate a **marginal territory**, addressing the problem of isolation that often characterises these inland areas. The introduction of circular design—widely used in metropolitan areas—represents an important step towards conscious regeneration, proposing an innovative model of architectural and environmental development adaptable to rural contexts.





- Sharing bench
- Food truck
- Pedestrian area
- Meeting place
- New plaza
- Project buildings
- Agricultural loop
- Loop of traditions/craftsmen
- Castles cycle path
- Viewpoint
- Urban garden
- e-bike sharing point

- 1 Castle of Castiglioni
- 2 San' Agata church
- 3 Ancient oven
- 4 Old store
- 5 Old mill
- 6 Tower

MASTERPLAN 1:500

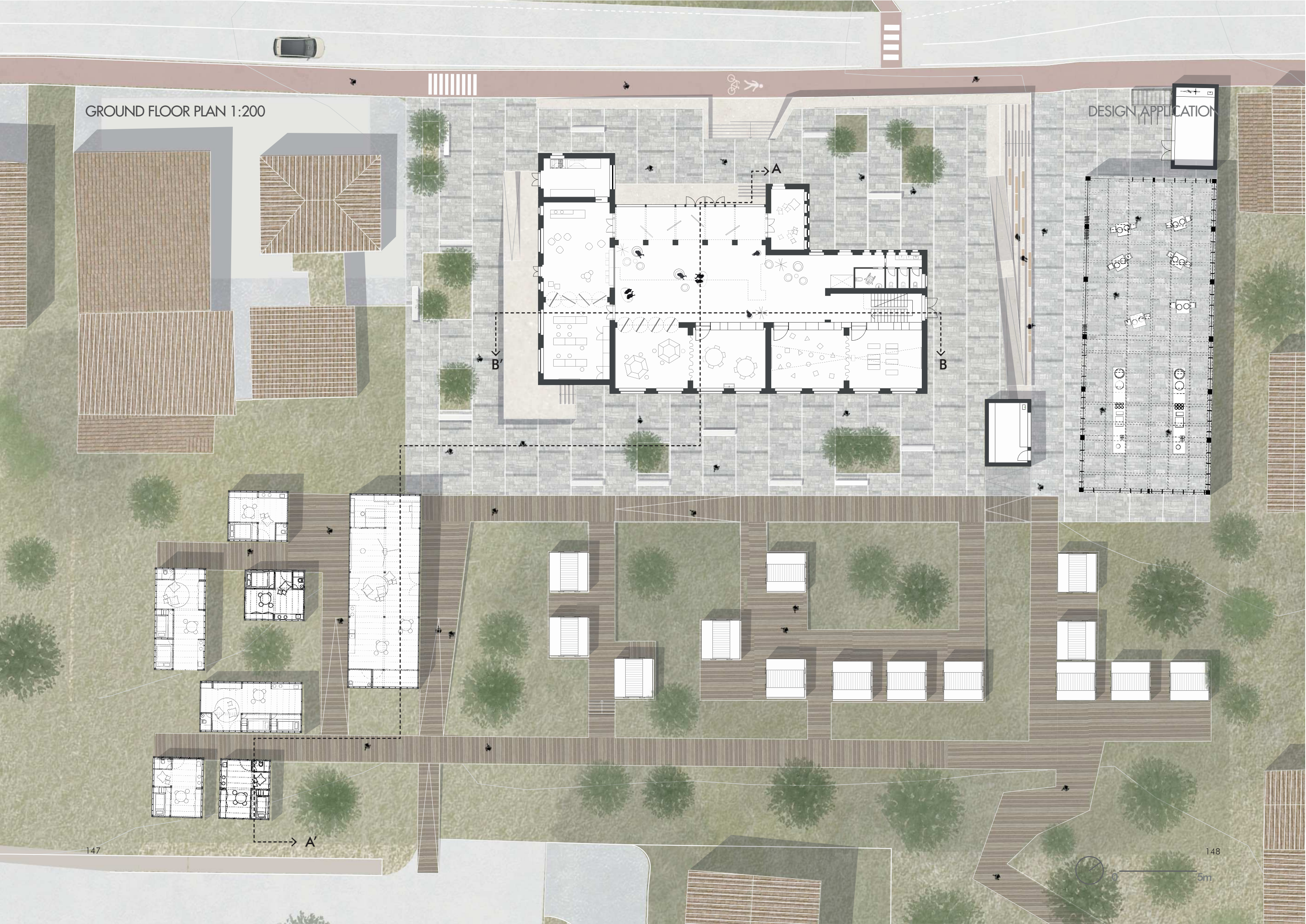
DESIGN APPLICATION



0 10m

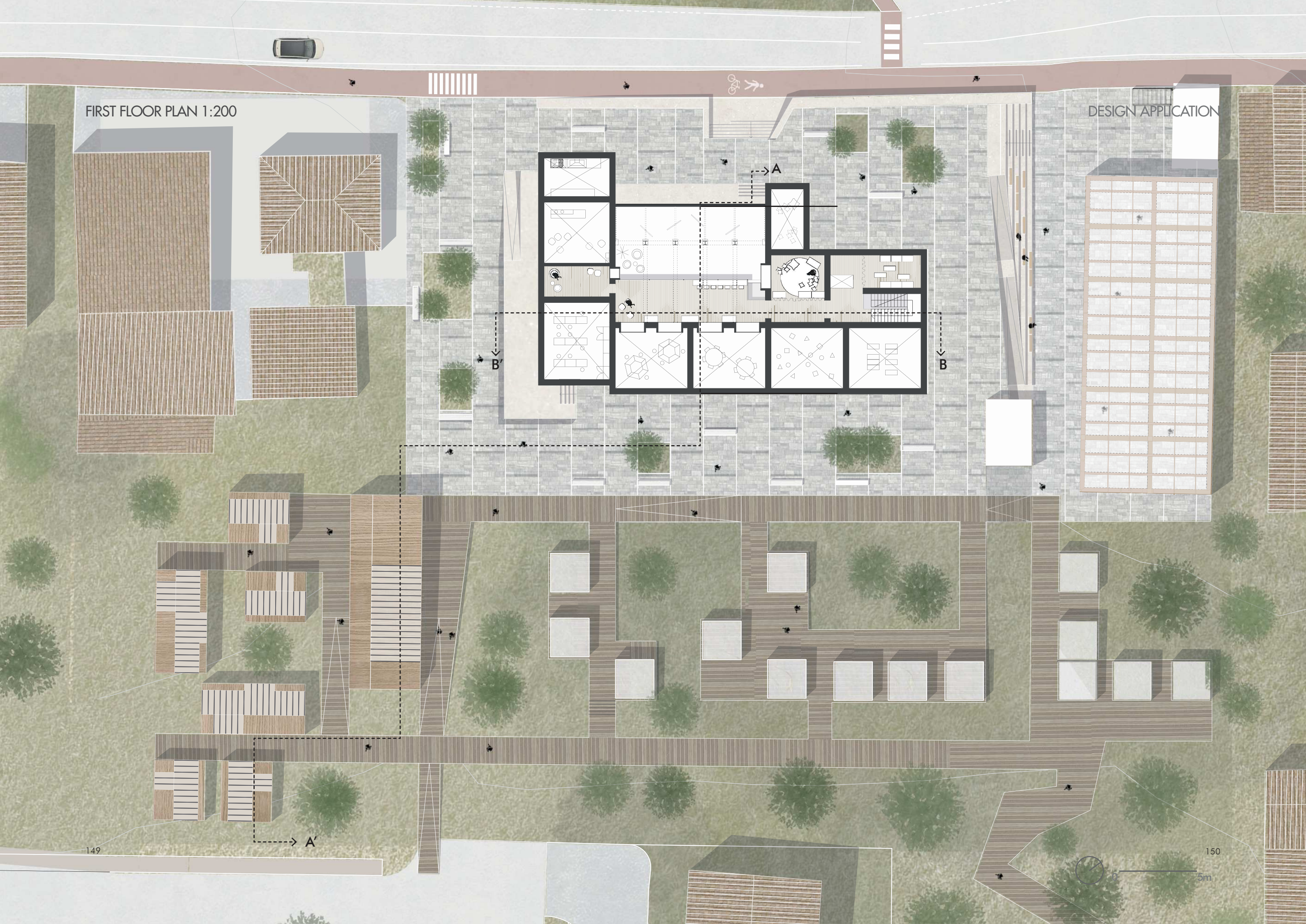
GROUND FLOOR PLAN 1:200

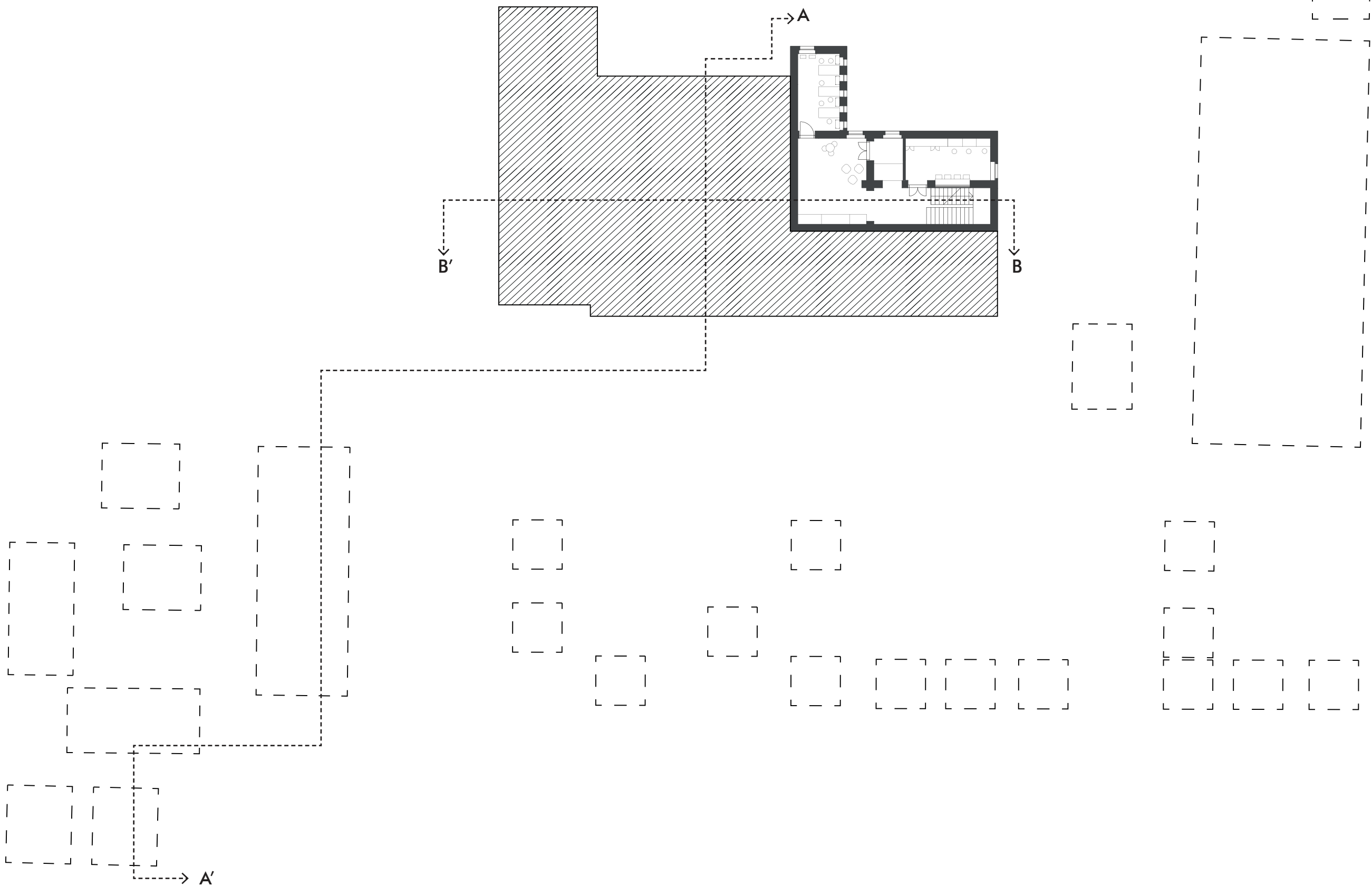
DESIGN APPLICATION

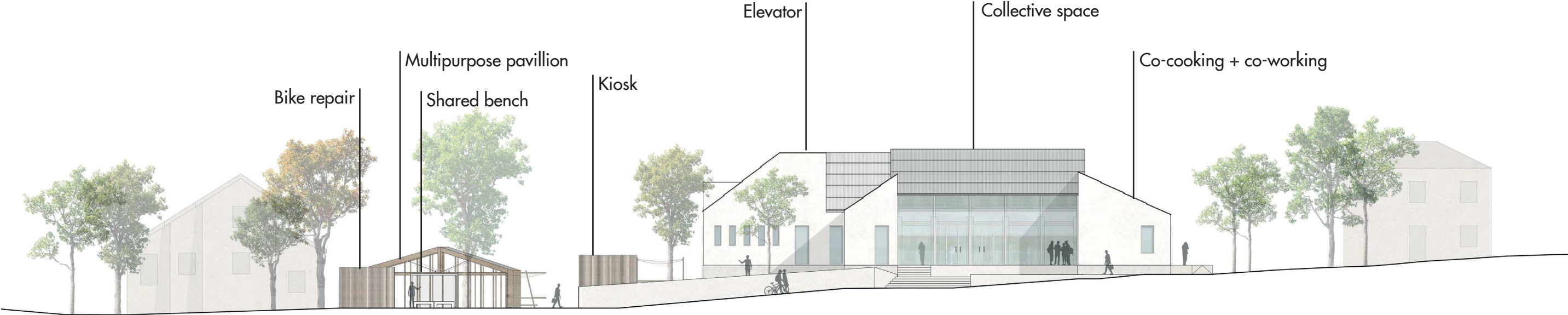


FIRST FLOOR PLAN 1:200

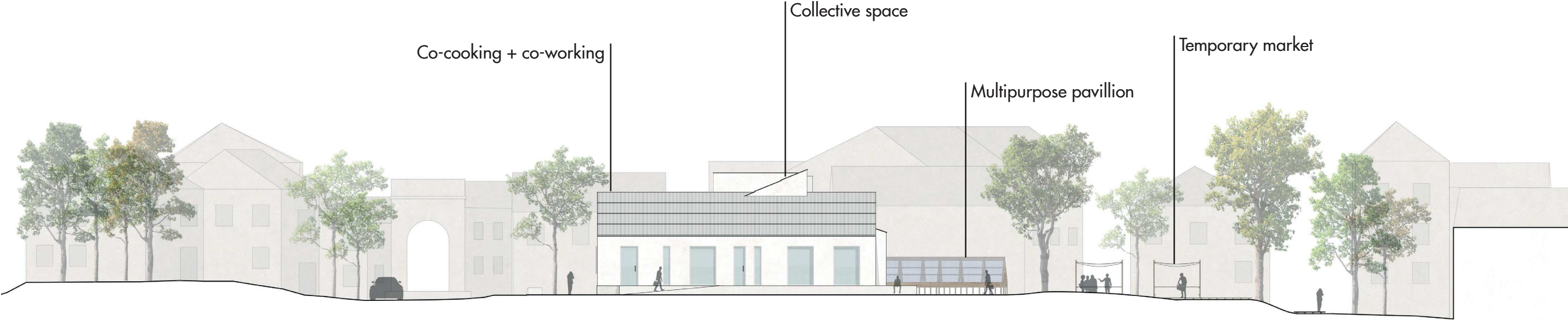
DESIGN APPLICATION





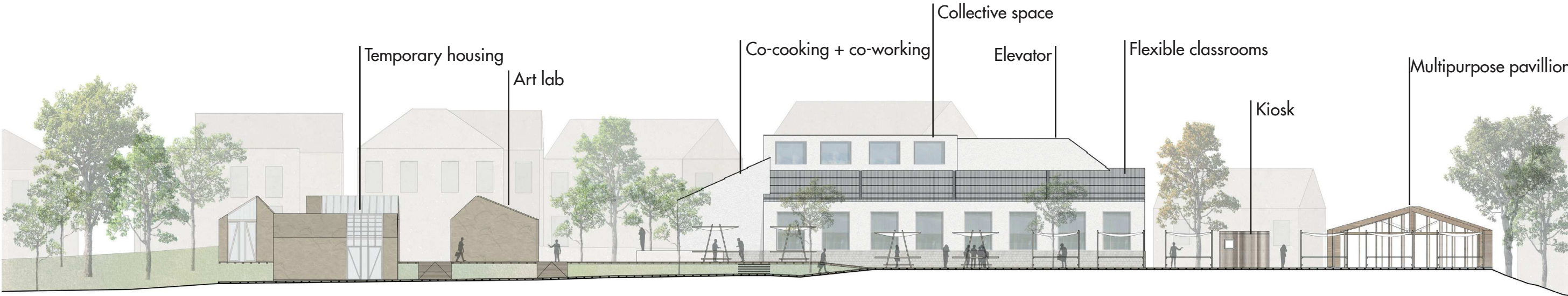


NORTH-WEST

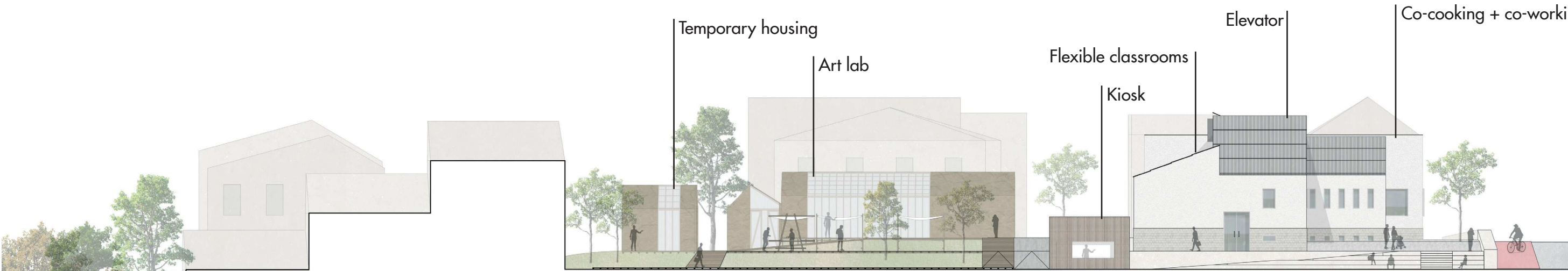


SOUTH-WEST

0 5m

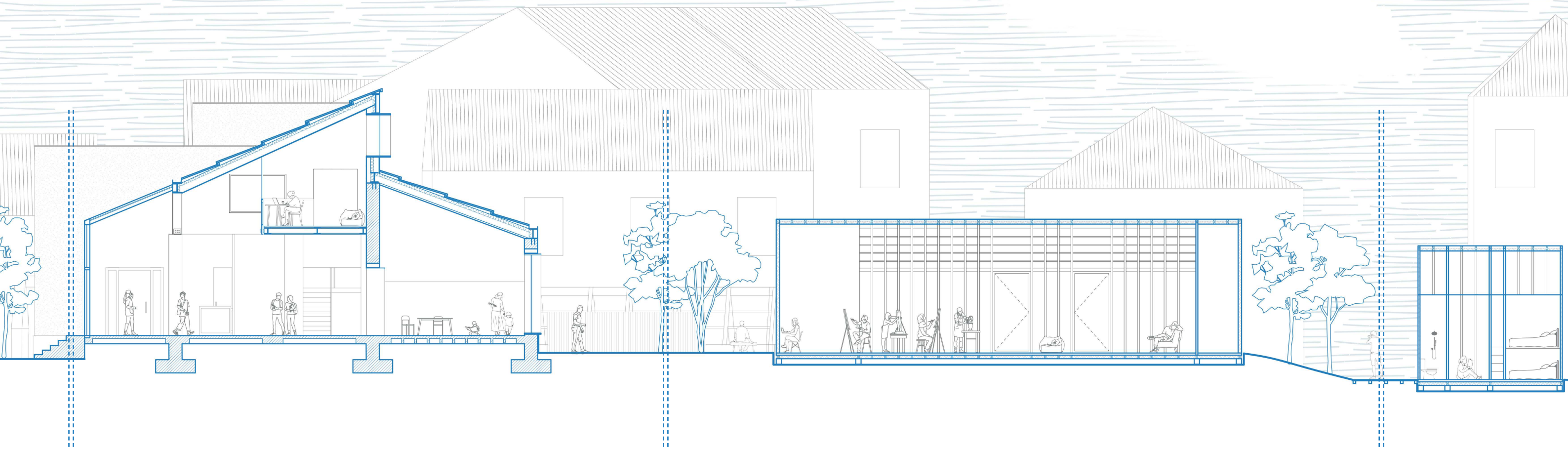


SOUTH-EAST

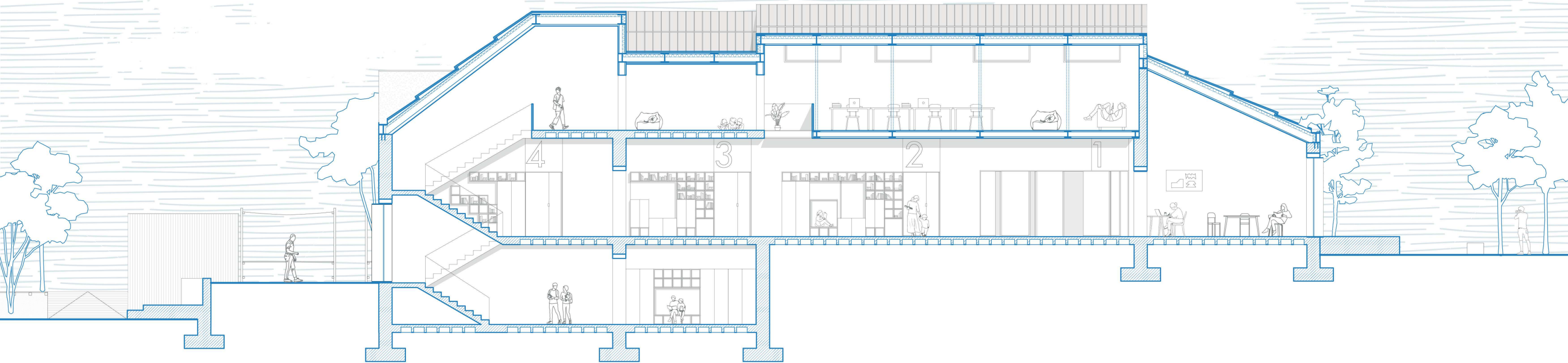


NORTH-EAST

0 5m



0 2,5m



0 2,5m

As already mentioned, these two types of volumes were conceived with the intention of creating light and unobtrusive spaces, integrating harmoniously with the context and using **local materials**. These are simple volumes, without any particular material complexity, but characterised mainly by the use of **wood**. This material, easily available in the municipality of Sassoferrato as indicated by the materials map, contributes to reinforcing the principle of **circularity** and promoting a **sustainable design approach** that respects territorial resources.

TEMPORARY MARKET

The integration of new volumes into the project site was carefully thought out so as not to alter the context and to ensure spaces that can be easily **dismantled** and **reassembled** elsewhere if necessary. Among these, the temporary market represents a key element: small pavilions designed to host the sale of **local products** or to serve as **exhibition spaces**. However, their real strength lies in the collective approach to their realisation.

Through **workshops** open to the community, these elements are constructed from simple materials, such as wood and screws, promoting collaboration and reinforcing a **sense of belonging**. This participatory process not only enriches Castiglioni's landmark, but also en-

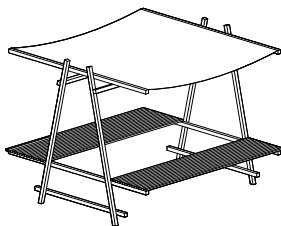
courages moments of **sociality** and **sharing**, involving people in the creation of structures that become symbols of **flexibility** and **circularity**. The construction is deliberately essential and accessible: all that is needed are a few materials, a spirit of cooperation and a good dose of enthusiasm. The result is a **functional** and **versatile** product that fully embodies the principles of circular design.

TEMPORARY HOUSING

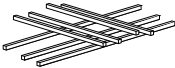
The same guiding principle has been applied to the design of **temporary residences**. These housing units are conceived as **prefabricated modules** - bathroom, bed, kitchen and wardrobe - which, when combined, make up a single structure. The spaces between the modules are covered with **recycled polycarbonate**, a material that clearly defines areas of conviviality versus privacy, while adding a distinctive aesthetic to the entire volume.

The assembly of these residences is **quick** and **intuitive**. The modules are placed on wooden feet, around which the floor is laid. Subsequently, the various elements are joined by means of roof battens, and the structure is completed with recycled wood or polycarbonate panels, as required. This constructive simplicity makes it possible to create practical and **sustainable temporary housing**, perfectly in line with the ethos of the project.

TEMPORARY MARKET



YOU WILL NEED:



RECYCLED WOOD



SCREWS

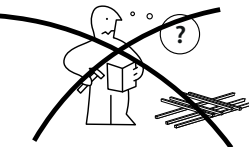


FABRIC

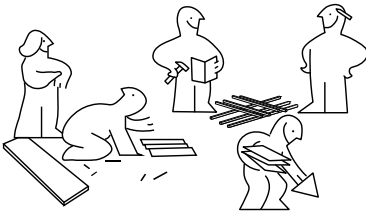


SENSE OF COMMUNITY

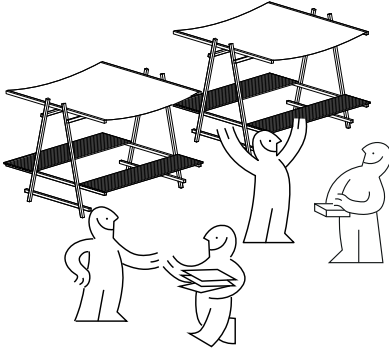
1. NEVER ALONE



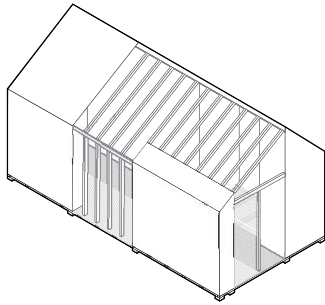
2. BUILD TOGETHER



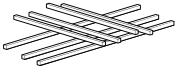
3. ENJOY!



TEMPORARY HOUSING



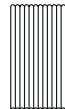
YOU WILL NEED:



RECYCLED WOOD



SCREWS

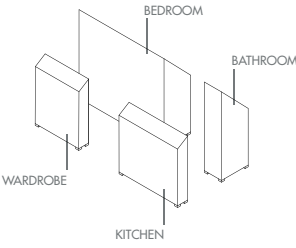


POLYCARBONATE

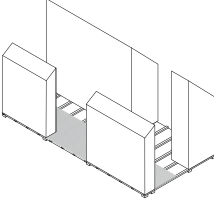


THERMAL INSULATOR

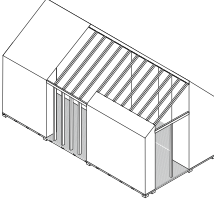
1. DEPLOYMENT



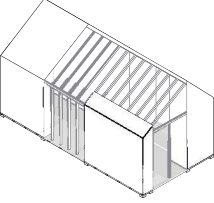
2. FLOOR



3. ROOF



4. VOILÀ!









STRATEGY: STRENGTHENING CIRCULARITY TO ACHIEVE CONSERVATION AND ENHANCEMENT OF EVERYDAY ARCHITECTURAL HERITAGE IN MARGINAL CONTEXT AND INNER TERRITORIES

The presented project is the result of a long and articulated research path, which allowed to build a solid theoretical and methodological basis to develop innovative and context-sensitive solutions.

The work was based on **transcalar approach** adopted by **B4R** - Branding4Resilience, PRIN 2017 - Linea Giovani, funded by the Ministry of University and Research, coordinated by the Università Politecnica delle Marche (P.I. Maddalena Ferretti), in collaboration with the University of Palermo, the University of Trento and the Polytechnic University of Turin. - and, above all, on the concept of **circular design**. The latter was explored through the resources made available by the **Ellen MacArthur Foundation**, which proved to be fundamental tools for exploring the principles of circularity applied to architecture and for imagining new design scenarios. Toolkits, video guides and literature materials offered a clear and detailed perspective on how to integrate circular design into design processes. An essential contribution came from the work of **Jörg Schröder(2023)**, whose book "Circular Design: Towards Regenerative Territories" enriched our understanding of the topic, extending the approach proposed by the MacArthur Foundation and applying it to the way of conceiving and building more conscious and resilient cities.

Furthermore, the research period spent in **Hamburg**, with the support of Prof. Paolo Fusi, was a key moment in the development of the project. During this phase, an atlas of circularity was developed, an indispensable tool to guide our work. This atlas had precise research requirements: firstly, we chose to analyse buildings constructed between the post-World War II period and 1976, i.e. before the introduction of energy efficiency legislation. Another key aspect was the focus on the architecture of the **ordinary**, thus excluding signature buildings in order to concentrate on an often **neglected**, but equally significant architectural heritage. Although this choice made the research more complex - as finding information on ordinary buildings is often difficult - the result obtained was satisfactory. The work carried out made it possible to construct a **circularity toolkit** consisting of

ten guiding points, which are fundamental for conscious planning on the topic.

These tools provided the theoretical basis for addressing the complexity of the territory chosen for the project: the municipalities of Arcevia and Sassoferrato, located in the inland area of the Basso Pesarese-Anconetano Apennines. These territories represent a fragile and complex reality, characterised by depopulation, an ageing population and the degradation of the architectural and environmental heritage. In fact, they are included in the SNAI programme (National Strategy for Inner Areas), which aims at fighting these problems through targeted enhancement and regeneration interventions. It is in this context that our project strategy fits, strongly inspired by Maurizio Carta's **CityForming Protocol**. The objective was to introduce the principles of circular design in inland areas, a significant innovation since, until now, this methodology has been applied mainly in metropolitan contexts, neglecting rural realities.

The project's challenge was to demonstrate how circular design can also be an effective solution for **marginal areas**, transforming it into a tool capable of responding to the specific needs of these territories. The proposed approach aims not only at solving local criticalities, but also at enhancing the territory, reactivating the local economy and promoting **traditions** and **craftsmanship**. The ordinary buildings selected for the project - built between the 1950s and 1970s - have been reinterpreted as elements to be protected and regenerated, becoming symbols of an architecture that not only should be preserved, but also **renovated** and **adapted** to contemporary needs.

Ultimately, this project represents an attempt to introduce new design visions that can offer concrete answers to the challenges of the present. Through a **circular** and transcalar approach, Arcevia and Sassoferrato have been imagined as laboratories of experimentation where circularity, architecture and community meet to build a more resilient and shared future.

CONCLUSIONS - FUTURE OUTLOOK

on the role of architecture in restoring meaning to places, creating spaces that are part of an integrated system, where community and environment can coexist in balance.

Ultimately, the project aspires to become a starting point for **systemic change**, a vision that does not limit itself to solving contingent problems but, on the contrary, stands as a contribution to imagining a future in which architecture is a tool for connection, circularity and shared progress.

This research is not intended to be an exercise in itself, nor is it limited to the mere objective of developing a localised project in the municipalities of an inland area. On the contrary, the intention of this project has always been to transcend the specific boundaries of the context in which it was conceived, to become part of a broader vision and a larger system. As already mentioned in the exploration of Castiglioni's project, the aim of this research was to propose a series of interventions in a **pilot area** that could serve as a model adaptable to other similar realities.

The strength of this work lies in its potential to be **replicable**, to act as a **scalable prototype** to face the challenges of inland areas. Through the developed strategies, the idea is to provide a concrete cue to intervene in similar contexts, addressing common problems such as depopulation, architectural decay and loss of local identity. The project, in this sense, does not end with the realisation of a specific intervention, but is configured as a contribution to the construction of a new operational paradigm, capable of **inspiring** other communities and territories.

The ambition of this research is to leave a tangible mark, a legacy that can be translated into a set of practical and theoretical tools. The atlas of circularity, drawn up as the initial outcome of the study, together with the strategies experimented in Arcevia and Sassoferrato, is intended to be a **guide** for developing other 'buildings of transition'. These buildings are not only physical spaces, but **catalysts of change**, capable of initiating paths of **transformation** that redefine the way of designing and living architecture in a more circular key, attentive to environmental and social needs.

With this in mind, the project aims to change perspective, proposing a model of architecture that is not only the construction of spaces, but also the regeneration of relationships, territories and communities. The approach adopted here invites us to **rethink** the ways of intervening in inland areas, with the aim of transforming them into liveable, resilient places capable of responding to the challenges of the future.

This is an invitation to a deeper reflection

CIRCULAR DESIGN

Schröder, J., Cappeller, R., Diesch, A., & Scaffidi, F. (2023). Circular Design: Towards Regenerative Territories.

Wong, L. (2017). Adaptive Reuse: Extending the Lives of Buildings.

Heisel, F., & Hebel, D. E. (2022). Building Better – Less – Different: Circular Construction and Circular Economy.

Malhotra, A., and Dobriyal, R. (2023). Adaptive Reuse of Heritage Architecture as a Sustainable

Chiacchiera, F., & Mondaini, G. (2023). Another Chance: Adaptive reuse of the built heritage strategies for circular creativity. *Journal of Contemporary Urban Affairs*, 7(2), 74-84. <https://doi.org/10.25034/ijcua.2023.v7n2-5>

Schröder J. (2022) Circular Design: design-led innovation for circular territories. Preprint. Hannover, Institutionelles Repositorium der Leibniz Universität Hannover. DOI: <http://dx.doi.org/10.15488/12542>.

European Commission. (2022). New European Bauhaus Compass. <https://europa.eu/new-european-bauhaus/compass>

Amenta, L., Russo, M., & van Timmeren, A. (Eds.). (2022). Regenerative Territories: Dimensions of Circularity for Healthy Metabolisms.

Massioni, C. (n.d.) Everyday buildings unlocked: Adapting heritage documentation tools on overlooked housing towards circular renovations. Ongoing PhD dissertation, HafenCity University, Hamburg.

BR4

<https://www.branding4resilience.it>

Ferretti, M., Favargiotti, S., Lino, B., & Rolando, D. (2024). Branding4Resilience | ATLANTE: Ritratto di quattro territori interni italiani. LetteraVentidue. https://issuu.com/letteraventidue/docs/atlante_b4r_issuu

Ferretti, M., Favargiotti, S., Lino, B., & Rolando, D. (2022). Branding4Resilience: Co-Design as a Tool to Enhance and Transform Inner Territories Through Architecture.

TRANSCALAR APPROACHES

Ferretti, M.; Di Baldassarre, M.G.; Rigo, C. Reactivating Built Heritage with Shared, Creative, and Transcalar Approaches: An Exploration of the Marche Apennine Inner Area. *Sustainability* 2022, 14, 16196. <https://doi.org/10.3390/su142316196>

Ferretti, M. (2017). Land stocks: nuovi paesaggi operativi della città e del territorio.

Schröder, J., Carta, M., Ferretti, M., & Lino, B. (2018). Dynamics of Periphery: Atlas for Emerging Creative and Resilient Habitats.

Schröder, J., Carta, M., Ferretti, M., & Lino, B. (2016). Territories: Rural-Urban Strategies.

Di Leo, B. (2022). RESETtling APPennines: Il progetto architettonico come strumento di ricerca per una ri-attivazione dell’Area Interna dell’Appennino Basso Pesarese e Anconetano.

Stavrides, S. (2024). Common Space: The City as Commons.

Ferretti, M., & Di Leo, B. (2023). Making Things. Practicing co-creation in the marginal territories of central Apennine. *Practices in Research*, 4. <https://doi.org/10.5281/zenodo.10567717>

SITOGRAPHY

<https://www.ellenmacarthurfoundation.org/>
<https://www.ellenmacarthurfoundation.org/topics/circular-design/tools>
<https://www.tudelft.nl/bk/circular-design-atlas>
<https://circularityforeducators.tudelft.nl/>
<https://www.regione.marche.it/>
<https://www.comune.sassoferrato.an.it/hh/index.php>
<https://www.comune.arcevia.an.it/>
<https://giscartografia.regione.marche.it/portal/apps/webappviewer/index.html?id=d90da92b5cc-d477eb1896ddb1fac4765>
<https://visitaltemarche.it/>
<https://visitaltemarche.it/itinerari-2/di-castelli-monti-e-antiche-leggende/>
<https://visitaltemarche.it/territorio/arcevia/>
<https://visitaltemarche.it/territorio/sassoferrato-2/>
<https://docomomo.com/>
<https://www.reterurale.it/flex/cm/pages/ServeBLOB.php/L/IT/IDPagina/8084>
<https://www.agenziacoesione.gov.it/strategia-nazionale-aree-interne/>
<https://www.arceviaturismo.it/>
<https://www.arceviaturismo.it/citta-cultura-2/arcevia-ed-i-suoi-castelli/>
https://www.ferrovieabbandonate.it/linea_dismissa.php?id=25
<https://www.regione.marche.it/News-ed-Eventi/Post/78606/Riattivazione-del-treno-Fabriano-Pergola-Baldelli-Una-linea-colpevolmente-dismissa-riprende-vita-e-sar%C3%A0-funzionale-alle-Marche-interconnesse-e-intermodali>
<https://www.corriereproposte.it/cosa-sapere/sassoferrato-la-storia.html>
https://new-european-bauhaus.europa.eu/index_en
https://sites.unipa.it/mcarta/CITYFORMING/Cityfoming_eng.html
<https://recycleitaly.net/estratto/iper-strategie-del-riciclo/>
<https://www.valmisa.com/arcevia/arceviastoria#:~:text=L'origine%20di%20Arcevia%20risale,vera%20e%20>

PROJECT

<https://www.zrs.berlin/project/verwaltungsgebaeude-tierpark/>
<https://www.zrs.berlin/en/project/crclr-house-2/>
<https://www.archdaily.com/957704/karoline-goldhofer-daycare-centre-heilergeiger-architekten-und-stadtplaner-bda>
<https://lxsy.de/en/projects/impact-hub-berlin>
<https://www.archdaily.com/995764/open-lab-co-working-altenburg-meier-unger>
<https://www.archdaily.com/318366/treehouses-bebelallee-blauraum>
<https://www.archdaily.com/301608/renovation-and-extension-of-arcelormittals-baragano>
<https://www.archdaily.com/486459/high-school-extension-sms-arquitectos>
<https://www.archdaily.com/311518/toy-library-and-offices-taller-9s-arquitectes>
<https://ecosistemaurbano.com/parkeing/>
<https://www.archdaily.cl/cl/02-349303/esto-no-es-un-solar-reconvirtiendolo-parcelas-vacias-en-espa-cio-publico-parte-ii>
https://www.orizzontale.org/portfolio_page/iceberg/
<http://mitfahrerbank.com/so-gehts/anleitung/>
<https://www.operationfoodsearch.org/programs/metro-market/>
<https://badia-berger.com/project/ecole-et-dojo-simone-veil/>
https://www.archdaily.com/93632/kindergarten-terenten-feld72?ad_medium=gallery
<https://divisare.com/projects/444401-maria-giuseppina-grasso-cannizzo-giulia-bruno-lcm-2018-casa-a-silo>

IMAGE LINK

<https://www.domusvini.eu/en/crisp-refreshing-discovering-allure-of-white-wine/>
<https://www.crushsite.it/it/incontri/2022/beer-tasting-trentino.html>
<https://www.ferrarainbici.it/notizie/691/fiab-comuniciclabili-assegnate-le-prime-51-bandiere-gialle-il-2021.html>
<https://www.economyup.it/blog/bandiera-lilla-per-il-turismo-accessibile/>
<https://www.sassoferratoturismo.it/en/mams-contemporary-art-gallery-3/>
<https://www.istockphoto.com/it/foto/salumi-di-norcia-gm487801476-73159437>
<https://laviadeisapori.com/en/learn-about-the-origins-of-smoked-scamorza-how-its-prepared-and-its-nutritional-values/>
<https://www.beninisrl.it/pane-schiaccia-pizza/>
<https://toscanamia.blog/tag/focaccia/>
<https://www.arceviaturismo.it/mangiare-bere/prodotti-tipici-arcevesi/>

ATTACHMENTS

PANEL 1-2

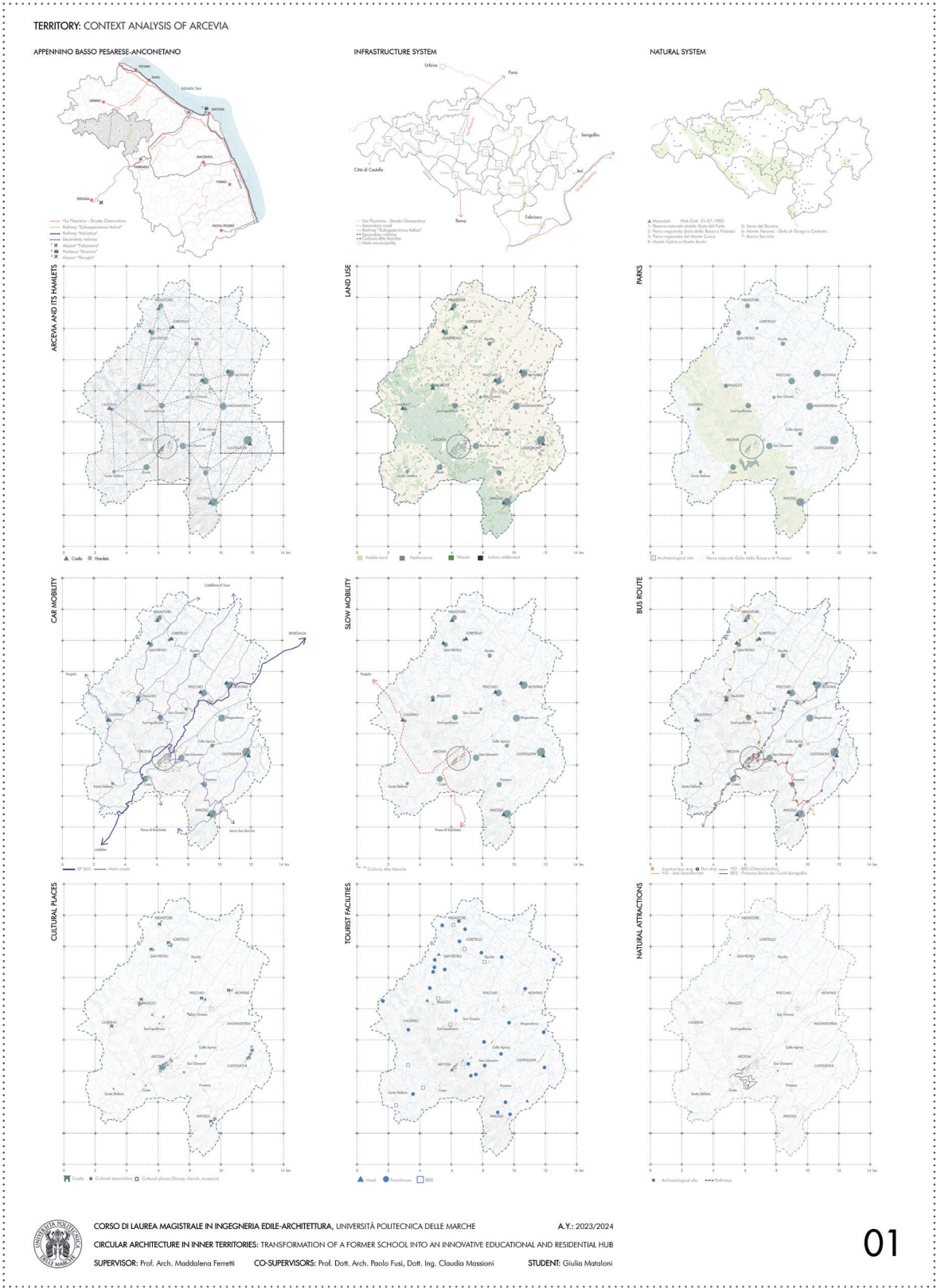
TERRITORY: CONTEXT ANALYSIS OF ARCEVIA AND SASSOFERRATO

PANEL 3

STRATEGY: A CIRCULAR AND TRANSCALAR APPROACH

PANEL 4-5-6-7

TRANSITION HAUS: INNOVATIVE EDUCATIONAL AND RESIDENTIAL HUB



TERRITORY: CONTEXT ANALYSIS OF SASSOFERRATO

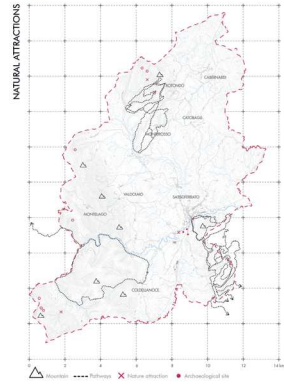
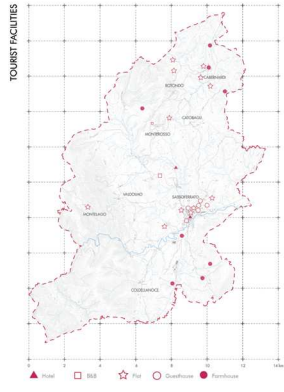
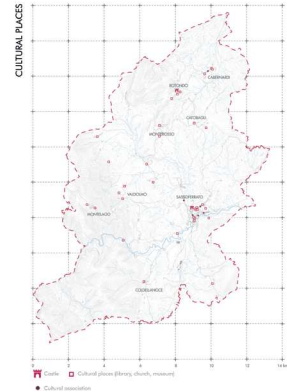
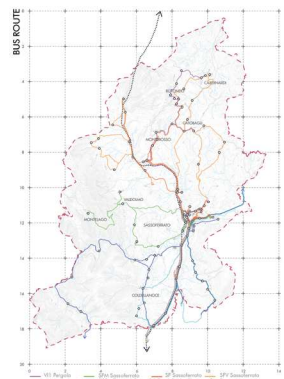
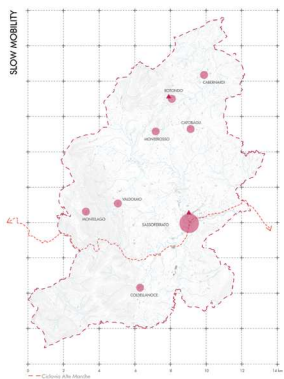
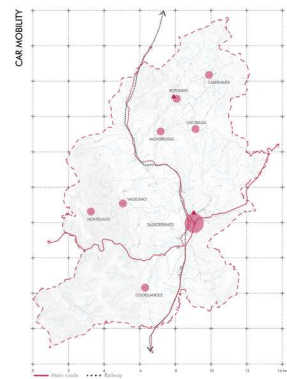
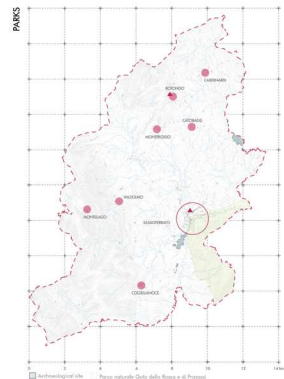
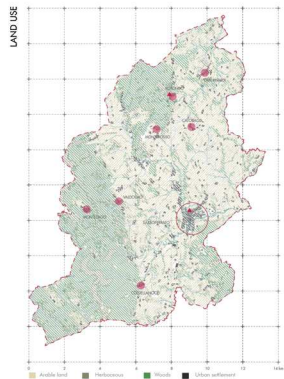
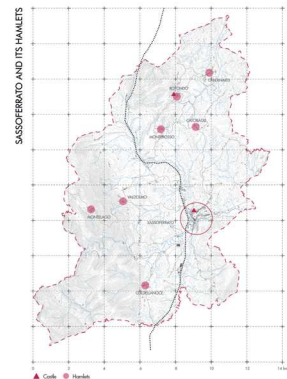
WEAKNESSES AND STRENGTHS



INHABITANTS/KM2



MATERIAL MAP



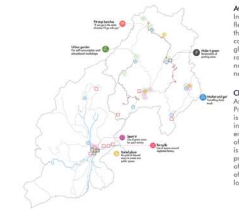
STRATEGY: A CIRCULAR AND TRANSCALAR APPROACH

STRATEGY CONCEPT

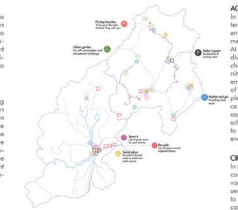


PHASISATION

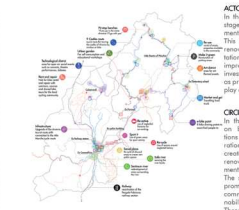
PHASE 1



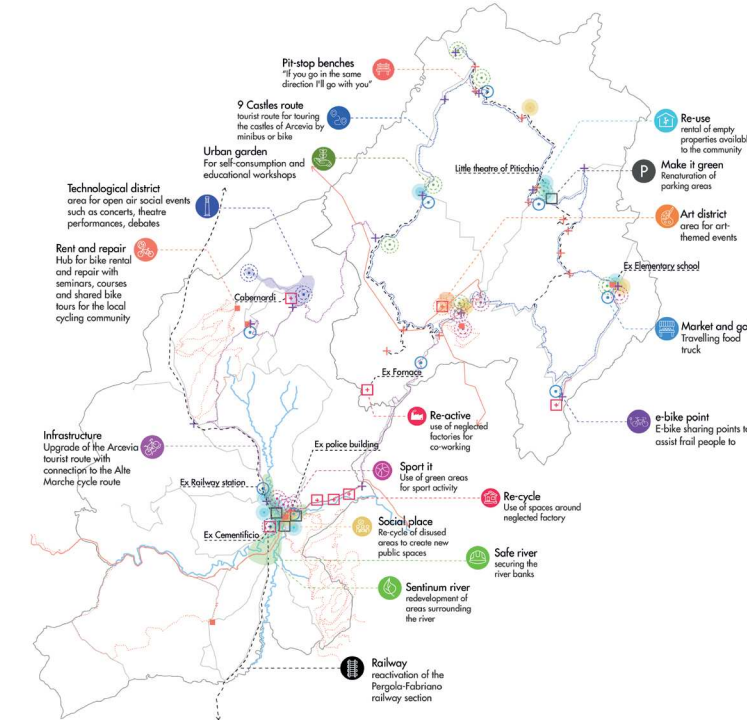
PHASE 2

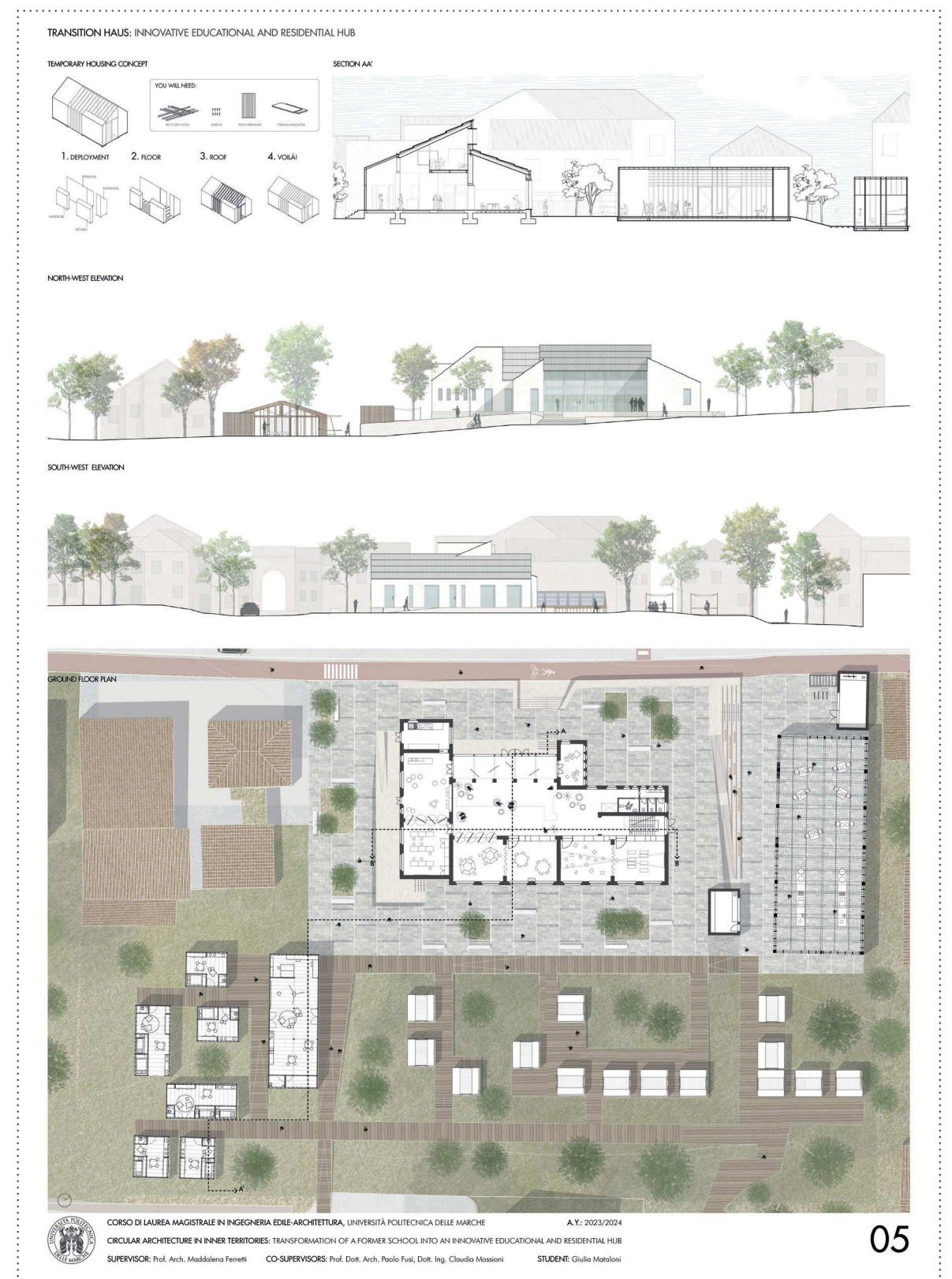
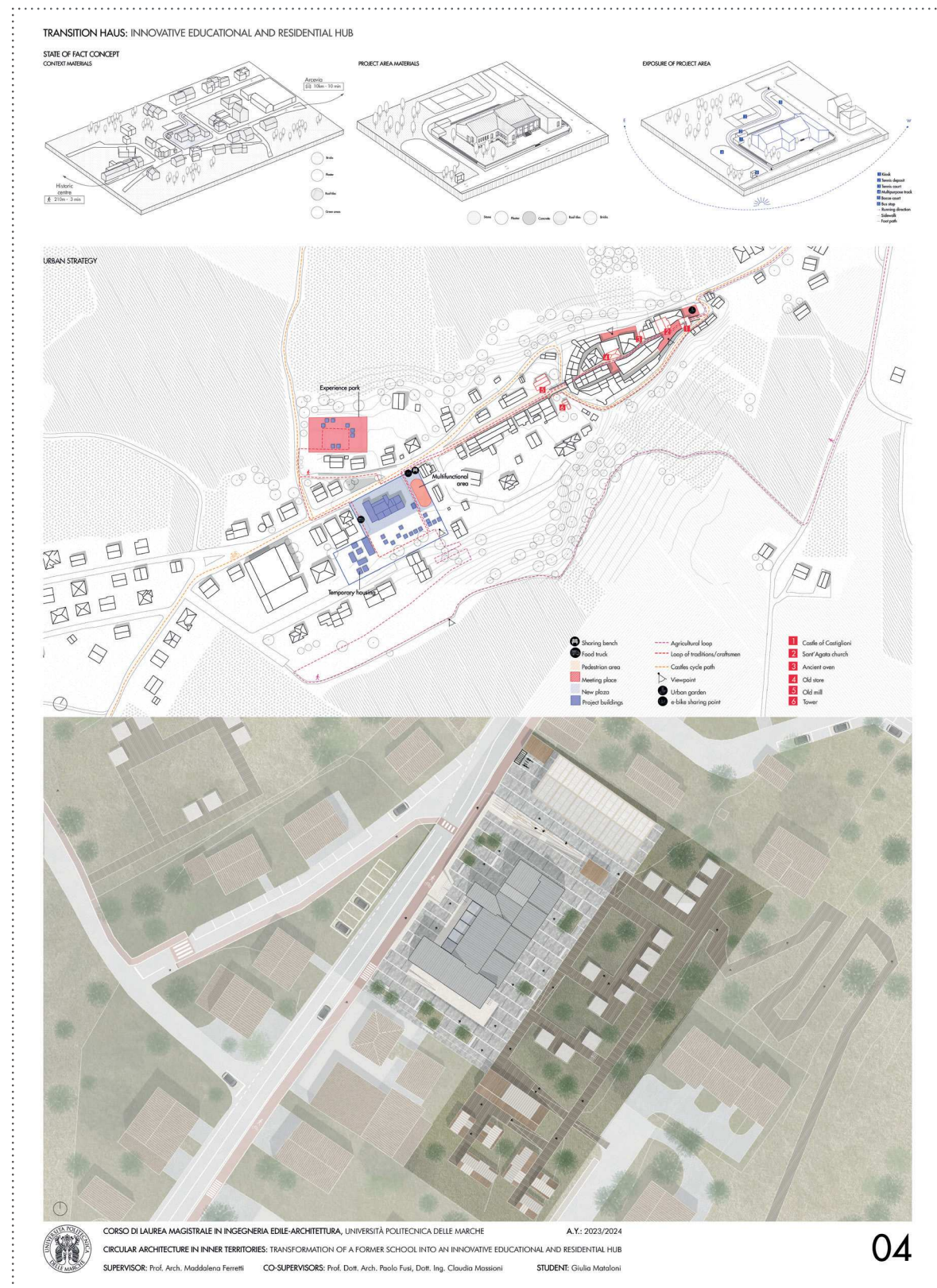


PHASE 3



STRATEGY



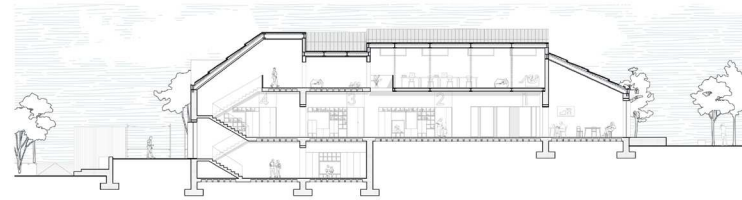


TRANSITION HAUS: INNOVATIVE EDUCATIONAL AND RESIDENTIAL HUB

MARKET CONCEPT



SECTION BB'



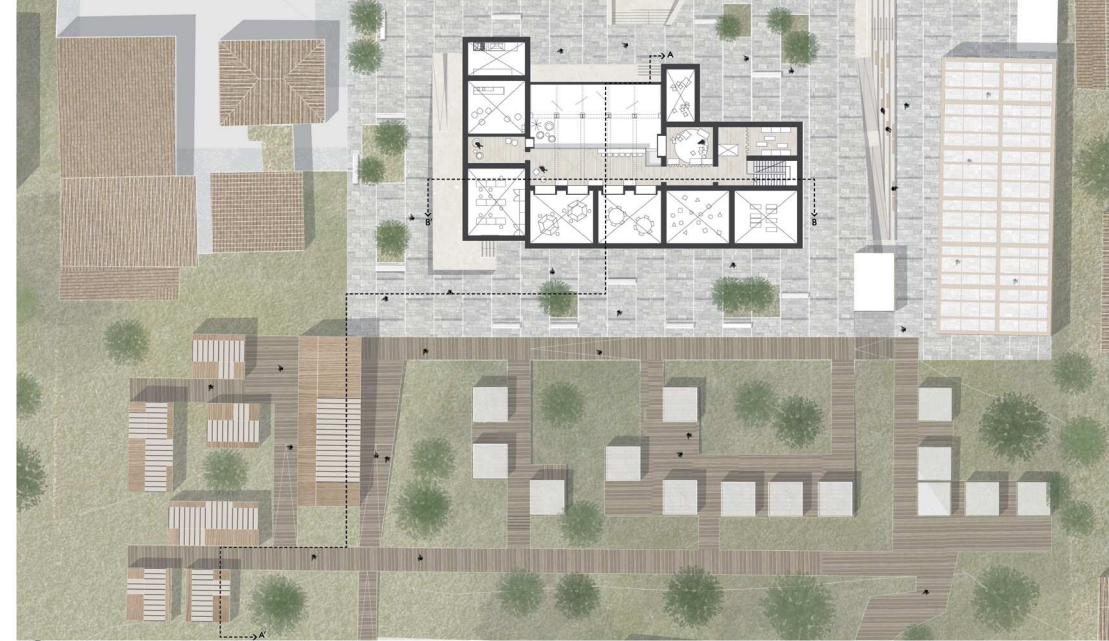
SOUTH-EAST ELEVATION



NORTH-EAST ELEVATION



FIRST FLOOR PLAN



CORSO DI LAUREA MAGISTRALE IN INGEGNERIA EDILE-ARCHITETTURA, UNIVERSITÀ POLITECNICA DELLE MARCHE
A.Y.: 2023/2024
CIRCULAR ARCHITECTURE IN INNER TERRITORIES: TRANSFORMATION OF A FORMER SCHOOL INTO AN INNOVATIVE EDUCATIONAL AND RESIDENTIAL HUB
SUPERVISOR: Prof. Arch. Maddalena Ferretti CO-SUPERVISORS: Prof. Dott. Arch. Paolo Fusi, Dott. Ing. Claudia Massoni STUDENT: Giulia Mataloni

06

TRANSITION HAUS: INNOVATIVE EDUCATIONAL AND RESIDENTIAL HUB



EXTERNAL VISION OF THE TEMPORARY MARKET



INTERNAL VISION

EXTERNAL VISION OF THE MAIN ENTRANCE



CORSO DI LAUREA MAGISTRALE IN INGEGNERIA EDILE-ARCHITETTURA, UNIVERSITÀ POLITECNICA DELLE MARCHE
A.Y.: 2023/2024
CIRCULAR ARCHITECTURE IN INNER TERRITORIES: TRANSFORMATION OF A FORMER SCHOOL INTO AN INNOVATIVE EDUCATIONAL AND RESIDENTIAL HUB
SUPERVISOR: Prof. Arch. Maddalena Ferretti CO-SUPERVISORS: Prof. Dott. Arch. Paolo Fusi, Dott. Ing. Claudia Massoni STUDENT: Giulia Mataloni

07

RINGRAZIAMENTI

Non sono solita usare lunghi giri di parole o esprimermi con frasi sdolciate, ma ci tengo profondamente a ringraziare tutte le persone che, in modi diversi, mi sono state vicine in questo percorso.

La prima persona a cui va il mio più sincero grazie è la mia collega e, soprattutto, la mia grande amica Lucy. Sei una persona straordinaria: capace, creativa, dolce e timida. In questi anni mi hai sempre supportata e, soprattutto, sopportata, assecondando ogni mio impulso di perfezionismo nei progetti e restando al mio fianco nei momenti più difficili.

Sei la persona che chiunque vorrebbe accanto, e io sono onorata di averti avuta al mio fianco. Questo traguardo è anche tuo, e non vedo l'ora di festeggiare il tuo momento.

Thank you, Karim, for making our experience in Hamburg something unforgettable, beyond all expectations. For believing in us, for welcoming us as part of your family, for being our best roommate and a precious friend.

Thank you for introducing us to Ava, our little German teacher, with whom we instantly fell in love because of her sweetness and friendliness. And thank you to Theresia, who welcomed us with the same affection, with a kindness we will never forget. You have been a second mother to us, and we love you.

As you taught us: Man sieht sich immer zweimal im leben.

Un grazie immenso alla mia relatrice, la professoressa Maddalena Ferretti, che non ha esitato un istante davanti alla sfida di una tesi all'estero. Ha creduto in noi e investito il suo tempo e il suo impegno per permetterci di vivere un'esperienza tra le più belle e formative della nostra vita. La sua disponibilità, la passione per il suo lavoro e la sua vicinanza agli studenti sono qualità rare, e gliene sono profondamente grata.

Grazie anche al professor Paolo Fusi, che ci ha accolte con grande gentilezza e ci ha guidate nel nostro percorso all'Università di Amburgo, offrendoci un punto di vista sempre prezioso e stimolante.

E un grazie speciale alla nostra correlatrice, Claudia, che fin dal primo momento ci ha aper-

to le braccia con il sorriso, sempre pronta a darci una mano.

Infine, grazie alla mia famiglia—mia mamma, mio papà e mio fratello—per avermi sostenuta anche nei momenti più difficili, per avermi capita quando credevo di non farcela e per avermi sempre spronata a guardare avanti.

Un grazie di cuore agli amici di sempre, soprattutto Gemma e Sofia, e alle mie colleghe, che sono diventate grandi amiche.

Con loro ho condiviso gioie, difficoltà e spensieratezza, e con loro ho l'onore di raggiungere questo traguardo, che è ancora più bello vissuto insieme.