The Existing as a Resource:
Adapting the Europa-Pavillon in Vienna for Living

Pamela Carolina Maldonado Vallejos

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Adapting the Europa-Pavillon in Vienna for Living

Diplomarbeit

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unter Leitung von

Tina Gregoric Dekleva
Univ.Prof.Dipl.-Ing. M.Arch (AADist)

Institut für Architektur und Entwerfen
Forschungsbereich Gebäudelehre und Entwerfen E253-01

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von

Pamela Carolina Maldonado Vallejos, BSc
01429093

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Kurzfassung

Schlüsselwörter: Gebäude der 1990er Jahre, adaptive Wiederverwendung, barrierefrei, Wohnen, materielle Wiederverwendung, minimaler Abriss, gemischte Nutzung, Wiederverwendung vor Ort.

In Wien ist es üblich, Bebauungspläne zu ändern, um einen Abriss zugunsten eines Neubaus zu rechtfertigen. Wir reißen Gebäude der späten 1990er Jahre aufgrund veralteter Programme ab, auch wenn die hohe Material- und Konstruktionsqualität einen Umbau unterstützen könnte. Im Vergleich zu älteren Gebäuden, bei denen ein Umbau oft nicht möglich ist, müssen Gebäude aus den 1990er Jahren nicht im Großen verändert werden, da die Wahrscheinlichkeit größer ist, dass sie bereits bestimmte Vorschriften in Bezug auf: Barrierefreiheit, Brandschutz und Energieeffizienz erfüllen.

Diese Diplomarbeit stellt die erklärte Obsoleszenz des jetzt abgerissenen 23 Jahre alten Europa-Pavillons in Wien in Frage und schlägt eine Alternative zum Totalabriss vor. Die Kombination aus adaptiver Wiederverwendung und materieller Wiederverwendung wird angewandt, um die Lebensdauer des Gebäudes zu verlängern. Es gibt zwei wichtige Prinzipien, die den Designprozess begleiten: Erstens, Abriss so weit wie möglich zu vermeiden, zweitens, das Wiederverwendbarkeitspotenzial von Materialien und Komponenten nutzen, um die Designentscheidungen zu leiten.

Dieses Vorgehen führt dazu, dass ca. 80 % der Bausubstanz vor Ort verbleiben und ca. 60 % der ausgebauten Bauteile in das neue Design integriert werden. Das umgebaute Europa-Pavillon bietet barrierefreie Wohn-, Atelier- und Arbeitsräume. Ein neues Stockwerk fügt mehr Dichte hinzu und bietet neue Typologien innerhalb der Beschränkungen des Bestandes.

Die Bauindustrie ist für ein Drittel des weltweiten Abfalls verantwortlich.[1] Wenn sich die gleichen Vorgehensweisen gegenüber Bestandsgebäuden nicht verändern, wird die Menge des erzeugten Abfalls zunehmen. Ein grundlegender Wandel in unserer Einstellung zum Baubestand ist dringend.

Abstract

Keywords: 1990s Building, Adaptive Reuse, Barrier-Free, Housing, Material Reuse, Minimal Demolition, Mixed-use, Reuse on Site.

It is common practice in Vienna to change development plans to justify demolition in favor of new construction. We are demolishing buildings of the late 1990s due to the obsolescence of their program, even if the high quality of their materials and construction could support a change of use. Compared to older buildings in which rehabilitation is often not possible, buildings of the 1990s do not need to be changed to the core since there is a bigger chance that they already comply with specific regulations regarding: accessibility, fire protection, and energy efficiency.

This diploma challenges the declared obsolescence of the now-demolished 23 years old Europa-Pavillon in Vienna and proposes an alternative to total demolition. The combination of adaptive reuse and material reuse is used to extend the life of the building. Two critical principles accompany the design process: first, avoid demolition as much as possible, and second, use the reusability potential of materials and components to guide the design decisions.

This approach results in approximately 80% of the building remaining on site. Around 60% of the extracted components are relocated on-site and integrated into the new design. The Europa-Pavillon adaptation offers barrier-free housing, ateliers, and working spaces. A new floor adds more density and provides new typologies within the existing constraints.

The construction industry is responsible for a third of the world's waste.[1] If the same practices towards existing buildings prevail, the quantity of generated waste is destined to grow. A fundamental shift in our attitude towards the existing building stock is urgent.

1 Norman Miller, "The Industry Creating a Third of the World's Waste," Www.bbc.com, December 16, 2021, https://www.bbc.com/future/article/20211215-the-buildings-made-from-rubbish.

I Demolition Waste in the EU and Austria

Insight Into Status and Actions

It is expected that by 2050 half of the current building stock in Austria will be replaced.[1] In Vienna, 579 buildings were demolished between 2013 and 2014. The demolitions are only partly covered by the building inspection department, the MA37. These activities, usually justified for the sake of densification, are also linked to the pressure of land use due to higher land prices and the ever-increasing demands on buildings performance.[2] As a consequence, the lifespan of buildings is decreasing. The average age of a demolition object is between 20 and 50 years. Demolition not only destroys the building itself but also affects its context's scale and identity. Regardless, only the more significant buildings may cause a public reaction. If the building is not on a protected site, has registered historical value, or has outstanding architecture, its demolition may pass unnoticed.

Demolition activities also result in large amounts of material waste that must be dealt with. The type of waste depends on the construction period and building use. Buildings from the pre-war era are usually made of bricks with lime mortar, a type of construction that allows the materials to be easily separated and therefore recycled or reused. Whereas in buildings from the post-war, the use of reinforced concrete is prevalent. In the case of buildings from the 90s and forward, selective dismantling is significantly more problematic because the use of plastics and composite systems increases. If the demolition frenzy continues, the new materials and technologies introduced daily will become the waste of the future.

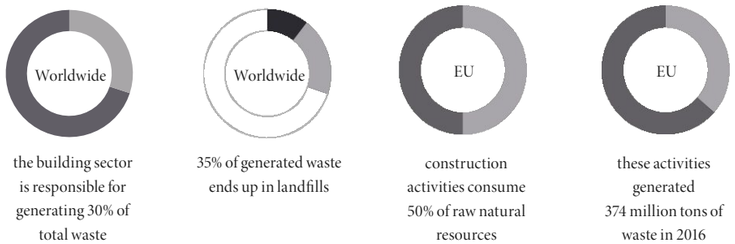
1 Verband Abfallberatung Österreich, "Baurestmassen," VABÖ 2019, no. 2 (2019), https://www.vaboe.at/wp-content/uploads/2019/07/VAB%C3%96-2.19.WEB-1.pdf.

2 Annette Hillebrandt et al., Manual of Recycling : Buildings as Sources of Materials (Munich: Detail Business Information, 2019), 58.

What is the Status of Demolition Waste in the EU and Austria?

The building sector follows a linear economic model based on the assumption that natural resources are available, abundant, easy to source, and cheap to dispose of. The building sector is the major resource-consumer responsible for generating 30% of total waste worldwide.[3] About 35% of the generated waste ends up in landfills and, therefore, is untreated.[4] In the European Union, construction and demolition waste are the largest waste item, with 374 million tons generated only in 2016 (excluding excavation material).[5] In addition, 50% of raw materials and energy consumption is related to building construction and use.[6] These activities are stretching beyond the planet's boundaries.

Dealing with construction and demolition waste is a priority area for the European Union defined by the Green Deal in march 2020. The Circular Economy Action Plan (EC 2015) is central to the Green Deal and works towards achieving a circular economy. It promotes maintaining the value of products, materials, and other resources for as long as possible. The goal is to enhance the efficient use of resources in production and consumption and, therefore, reduce the environmental impact of their use at all stages of their life cycle. On this account, The Waste Framework Directive (WFD) set a mandatory target for countries of the EU to recover 70% of construction and demolition waste by 2020.



1. Diagrams depicting the relation between construction activities and waste

3 Fridolin Krausmann et al., "Global Socioeconomic Material Stocks Rise 23-Fold over the 20th Century and Require Half of Annual Resource Use," Proceedings of the National Academy of Sciences 114, no. 8 (February 6, 2017): 1880–85, https://doi.org/10.1073/pnas.1613773114.

4 Maria Menegaki and Dimitris Damigos, "A Review on Current Situation and Challenges of Construction and Demolition Waste Management," Current Opinion in Green and Sustainable Chemistry (2018), https://doi.org/10.1016/j.cogsc.2018.02.010.

5 European Environment Agency, "Construction and Demolition Waste: Challenges and Opportunities in a Circular Economy — European Environment Agency," January 16, 2020, https://www.eea.europa.eu/publications/construction-and-demolition-waste-challenges.

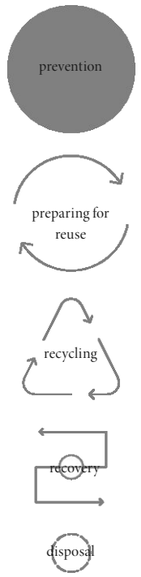
6 European Commision, "Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on Resource Efficiency Opportunities in the Building Sector," July 1, 2014, https://ec.europa.eu/environment/eussd/pdf/SustainableBuildingsCommunication.pdf.

In Austria, the total waste volume was around 71,26 million tons in 2019. Since then, primary waste has increased from 57,10 million tons in 2015 to 68,44 million tons. The increase is attributed to the rising quantities of construction and demolition waste (including excavated materials) linked to the increased construction activity and improved statistical records. Consequently, the construction and demolition waste also increased and amounted to around 11,51 million tons in 2019. However, these statistics only consider non-hazardous mineral construction and demolition waste. Wood waste resulting from these activities accounted for the largest share of the total wood waste, with around 513,100 tons out of 1,216,000 tons. Other construction materials, such as polystyrene from insulation, are listed under the category of domestic waste as packaging.[7]

We could conclude that we live in a situation where waste is abundant and resources scarce. However, our perception strongly depends on how we define waste. What if we flip the concepts? Resources abundance, waste scarcity. Is there a material constraint if we start to think this way? Or is it that an abundance of resources needs to be discovered?

2. The status of construction and demolition waste in Austria

7 Bundesministerium für Klimaschutz, Umwelt, Energie, Mobilität, Innovation und Technologie, "Die Bestandsaufnahme Der Abfallwirtschaft in Österreich - Statusbericht 2021," May 12, 2021, https://www.bmk.gv.at/dam/jcr:04ca87f4-fd7f-4f16-81ec-57fca79354a0/BAWP_Statusbericht2021.pdf.



3. Waste hierarchy in the EU

What Happens to the Enormous Amounts of Materials After Demolition?

To encourage recycling and provide legal certainty regarding waste management options, the European Union introduced the waste hierarchy and the end-of-waste criteria. The top priority is waste prevention, followed by recycling, energy recovery, and disposal. The end-of-waste criteria determine when waste ceases to be waste and becomes a product or a secondary raw material. According to the Waste Framework Directive, certain waste ceases to be waste if it is part of a recovery operation. Only Austria, Belgium, France, and the Netherlands developed such national criteria.[8]

The Waste Management Act in Austria defines which movable and non-movable objects are waste. In the Vienna Waste Management Plan from 2018, the main focus is to avoid waste and promote reuse in construction. It states that "[...] *buildings in the city of Vienna should continue to be preserved and renovated as far as possible since the best possible waste prevention effect can be achieved by preserving the building fabric and continuing to use it*".[9] It also recognizes the potential for recyclable materials from construction and demolition activities. Since 2018, the national norm ÖNORM B 3151 has established the obligation to perform a recycling-oriented demolition in the event of demolition from buildings with more than 750 tons of waste. The generated waste must be separated and treated. Before any conventional demolition work begins, the investors are obliged by the ÖNORM B 3151 to hire experts to scan the building for possible contaminants, and list materials for recycling and components with potential for reuse.

The Austrian Recycling Building Materials Ordinance of the Building Material Recycling Association regulates the requirements and properties that make a material fit for reuse or recycling and therefore defines the end-of-waste criteria and product status of recycled building materials. Materials that do not comply with these requirements have to be disposed of. The Landfill Ordinance regulates which waste from construction and demolition activities fulfills the requirements for being permissible and suitable for landfill disposal.

Following the European goals for a circular economy, the Vienna Municipal Council announced in 2019 that it will set regulatory standards regarding life-cycle and recycling-oriented planning and building through two economic strategies: the Smart City Wien Framework 2019-2050 and the Vienna 2030 Economy and Innovation Strategy. The main goals are to establish maximum resource conservation as a standard for new construction and renovation and to reuse or recycle 80% of waste from demolition by 2050.

8 European Environment Agency, "Construction and Demolition Waste: Challenges and Opportunities in a Circular Economy — European Environment Agency," January 16, 2020, https://www.eea.europa.eu/publications/construction-and-demolition-waste-challenges.
9 Magistratsabteilung 48-Abfallwirtschaft Straßenreinigung und Fuhrpar, "Wiener Abfallwirtschaftsplan Und Wiener Abfallvermeidungs-Programm (Planungsperiode 2019-2024)," 2018, https://www.digital.wienbibliothek.at/wbrup/download/pdf/3906022.

In Austria, there is the motivation and the expertise supported by a legal framework to reduce the amount of waste generated by construction and demolition activities through the material and building reuse. Nevertheless, from the 11,5 million tons of mineral construction and demolition waste generated in 2019, 1,3 million tons ended up being discarded and represented the largest item of dumped waste in the landfills.[10] The capacity of the only Viennese landfill for construction waste, Langes Feld, was foreseen to be exhausted in 2020. As a consequence, the Viennese Waste Management plan and Viennese Waste Prevention Program proposed the expansion of the landfill, a temporary measurement which would extend its capacity only up to 2038.[11]

The largest proportion of construction and demolition waste, 9,4 million tons, was sent to treatment and recycling plants. Around 8,6 million tons of recycled building materials were produced in 2019. Around 3% (246,000 tons) of this was used in construction.[12] These high rates may imply a closed loop for the circular economy, but recycling usually happens as downcycling. Concrete aggregate is usually used for backfilling or road construction, crushed bricks are used as plant substrate, wood is mostly thermally treated, and metals are sold at high cost.[13] Recent changes in The Waste Management Act might influence this situation since discarding will become more expensive than recycling starting in 2024.[14]

The market for reused components in Austria is limited. Barriers are often linked to socioeconomic factors. Social stigma is still prevalent when proposing reused materials and components, especially for social housing, because they are still considered trash. From the planning and building point of view, time pressure is a major factor and affects the evaluation of components fitted for reuse, which has to be organized before a building is handed over to the demolition company. There is some interest in tiles from older buildings, but materials and components are only salvaged if there is a buyer or when the owner wants to keep certain things. Furthermore, new materials provide security due to certifications and insurance, and the logistical and storage issues make it difficult to reuse components.

10 (Bundesministerium für Klimaschutz, Umwelt, Energie, Mobilität, Innovation und Technologie 2021) 149.
11 (Magistratsabteilung 48-Abfallwirtschaft Straßenreinigung und Fuhrpar 2018) 69.
12 (Bundesministerium für Klimaschutz, Umwelt, Energie, Mobilität, Innovation und Technologie 2021) 72.
13 Kleemann, F., et al., Using change detection data to assess amount and composition of demolition waste from buildings in Vienna. Resour Conserv Recy (2016), http://dx.doi.org/10.1016/j.resconrec.2016.06.010, 9.
14 Baustoff-Recycling Verband, "Baustoff-Recycling Ist Die Erste Wahl!," Baustoff-Recycling Verband, July 27, 2021, https://brv.at/deponie-verbot-fuer-beton-asphalt-strassenaufbruch-baustoff-recycling-ist-die-erste-wahl/.

Personal Position

The laws and goals mentioned in the previous section of this chapter show an inclination toward circularity. Although they help clarify selective dismantling and consider buildings as mines rich in resources, in the end, they work around demolition. In addition, if the focus lies primarily on reusing individual materials or components instead of buildings, there is a potential risk of destruction for harvesting. As an alternative, promoting selective dismantling in combination with building adaptation could simplify the process by using as much as possible of what is already on site. If materials are relocated on-site, it could ease the logistic issues since the storage would be only temporary.

Following a circular model that focuses on reusing the existing building stock would impact the average lifespan of a building from 64 years to 91 years and lower the need for new construction in the long term.[15] The design of new constructions should be supported by a legal context that focuses on design for longevity, durability, and disassembly to minimize the risk of structural issues, allow for easy replacement and maintenance of the building to comply with future changes in requirements and the event of its eventual readaptation. Other potential benefits of reuse are the prevention of environmental impact related to manufacturing new products; reduction of construction and demolition waste; creation of local jobs (dismantling, preparation, conditioning, surveying); destroying less; and use of better materials, to mention a few. The points mentioned motivate a more respectful approach towards the existing building stock and its components.

15 European Environment Agency, "Construction and Demolition Waste: Challenges and Opportunities in a Circular Economy — European Environment Agency," January 16, 2020, https://www.eea.europa.eu/publications/construction-and-demolition-waste-challenges. 28-29.

II The Case Study: Europa-Pavillon, Vienna

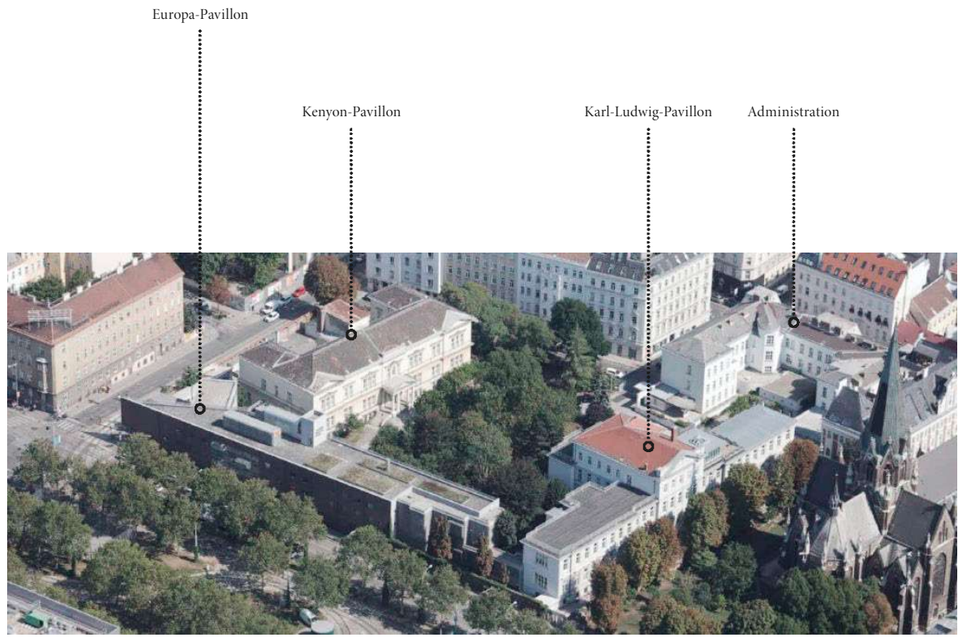
4. Satellite image of the context of the Sophienspital area with district borders (2021)

The Sophienspital Area

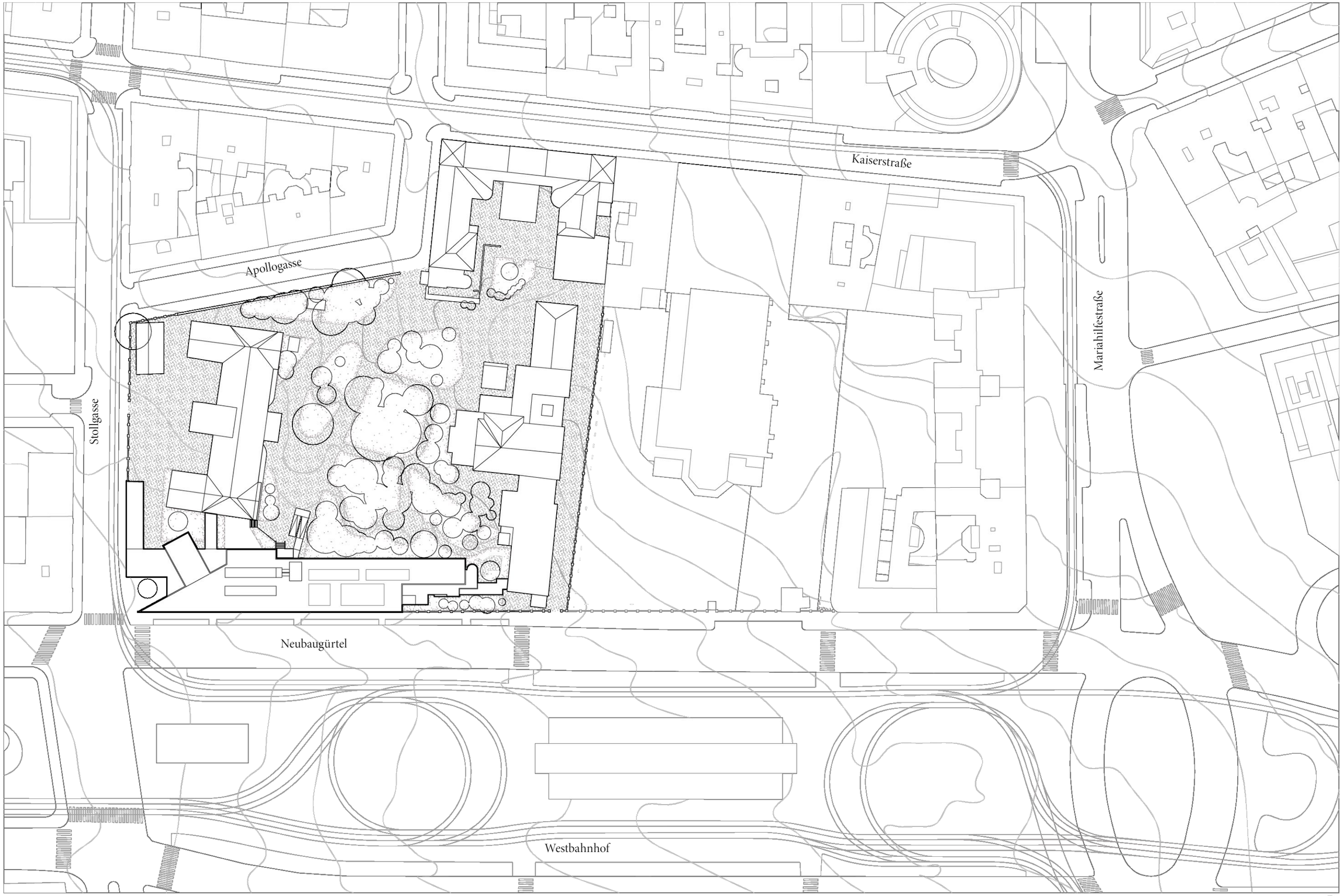
Located on the Neubaugürtel, one of the busiest streets in Vienna and the border of two city districts, Neubau and Rudolfsheim-Fünfhaus, the Europa-Pavillon is part of the former medical center Sophienspital in Vienna and forms an ensemble with three other historical buildings. Its central location is accentuated by good accessibility and mobility due to its proximity to the main road, the west railway station Westbahnhof, the tramway, buses lines, the pedestrian zone Mariahilfestraße and scattered options for supply, culture, and social infrastructure.

The site is an exception in the densely built 7th district, Neubau. Out of the total surface area of 168 hectares, 117,38 hectares are built, and only 2% of the total surface area, which counts as 3,2 hectares, is a green area. The buildings of the former Sophienspital clearly define a green inner courtyard with a significant tree population, and the position of the Europa-Pavillon contributes by acting as a barrier towards the loud street.

With three floors, the Europa-Pavillon gives an appropriate scale concerning the existing historic buildings. It provides a spatial conclusion for the opposite square in front of the railway station Westbahnhof, the Europaplatz.



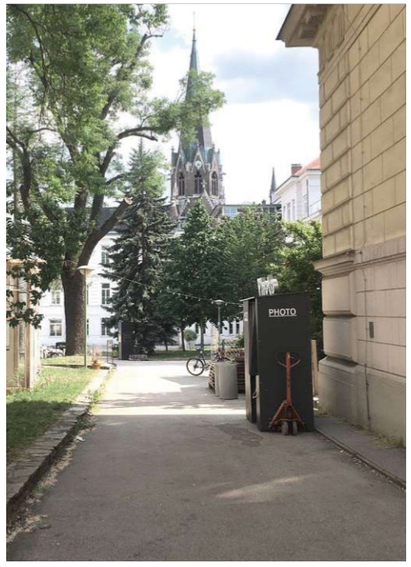
5. Aerial view of the Sophienspital area (2019)



6. Situation Plan - 1:1000

7. View of the Neubaugürtel and the Europa-Pavillon (2021)

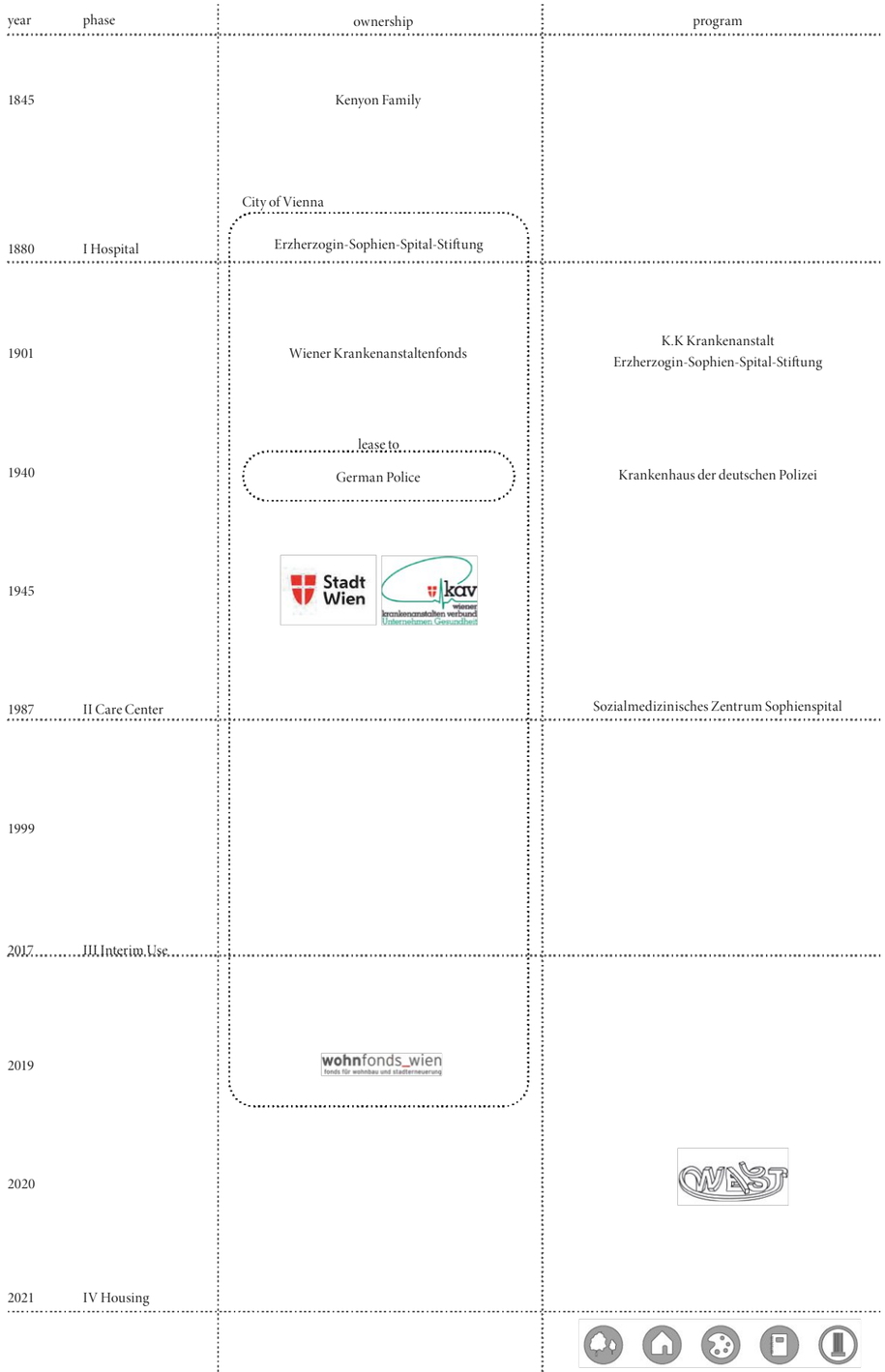
8. View of the Stollgasse towards the Neubaugürtel (2021)



9. View of the Church from the Sophienspital area (2021)

10. View from the courtyard with the Europa-Pavillon in the background (2021)

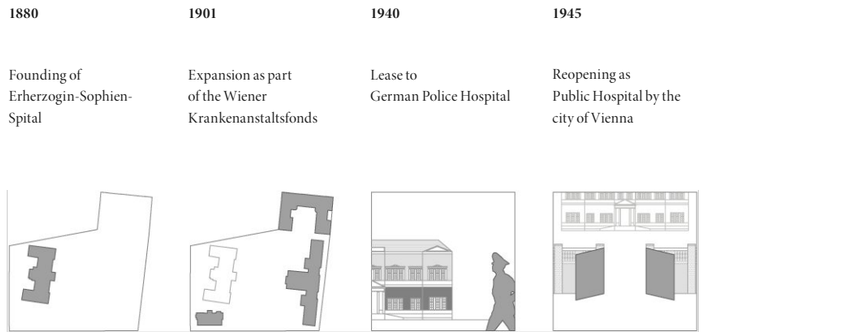
11. View from the courtyard of the Europa-Pavillon and the Kenyon-Pavillon (2022)



12. Timeline of the Sophienspital area

Historical Overview of the Site

The 141 years of the Sophienspital area are split into four main phases: The Sophienspital area as a hospital (I), as a care center (II), the interim use (III), and the housing (IV). Different stakeholders, owners, and users reinterpreted and developed the material and programmatic aspects of the Sophienspital. The next phase of the Sophienspital, the housing (IV), is currently in progress and involves demolishing the Europa-Pavillon to build new housing. First, it is important to understand the background of this decision in order to address the problem.



13. Key moments and site plan of the Sophienspital area as a hospital

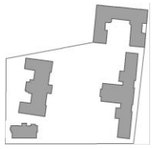
The Hospital

Starting around 1720, the area between Neubaugasse and Zieglergasse became densely built. Later in 1777, when the Schottenfeld area became a center for the textile industry, the influx of craftsmanship and workers increased. In 1850 the former suburbs of Neubau, Neustift, Spittelberg, and Schottenfeld, as well as parts of Laimgrube, Mariahilf, St. Ulrich, and Altlerchenfeld were to become part of the city of Vienna as a consolidated district: Neubau. The new 7th district of Vienna was delimited southerly by the Mariahilferstraße and to the west by the outer line of fortification, Linienwall. The Linienwall was demolished in 1894 to make way for the new street, the Wiener Gürtel. These borders are still relevant today.

The property of the Sophienspital area belonged to the Kenyon Family. By the wish of Eugenie Louise Kenyon, it should be used as the site for a new public hospital for the population of the 6th and 7th districts of Vienna. The committee for the construction was set up in 1872, and the future hospital in Neubau was to be named after the recently deceased mother of the Kaiser Franz Joseph I, Erzherzogin Sophienspital. Later, the Erzherzogin-Sophien-Spital-Stiftung was founded and took over the care and administration of the estate. The construction of today's Kenyon-Pavillon, with a capacity for 80 beds, began in 1879, and the Erzherzogin-Sophien-Spital opened in 1881.
In 1900, the hospital was incorporated into the Vienna Hospital Fund (Wiener Krankenanstaltenfonds) under the title "k. K. Hospital Erzherzogin-Sophien-Spitals-Foundation". The facilities were expanded between 1901 and 1906 with the construction of the Karl-Ludwig-Pavillon and the administration building. The hospital functioned as a public hospital until 1940. The German police used the facilities until the end of the Second World War in 1945.

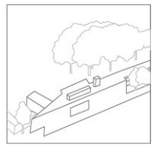
1985

Conversion of the facilities into a care center



1999

Construction of expansion Europa-Pavillon after architectural competition

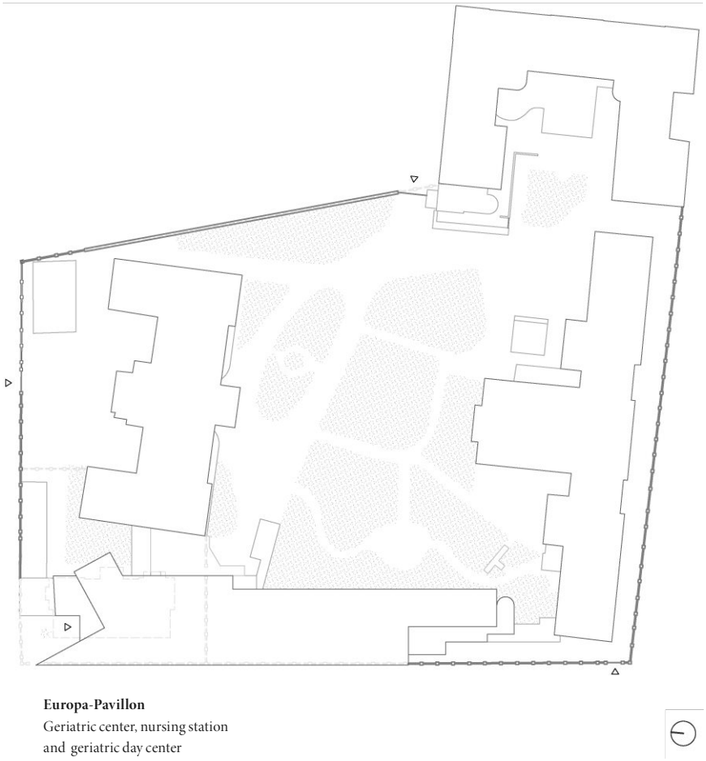


2015

Transition of the institution to Ingrid-Leodoltar House in the 15. district

2017

The care center Sophienspital closes without future plans for the site



14. Key moments and site plan of the Sophienspital area as a care-center

The Care Center

The city of Vienna took over the Sophienspital in 1945, reopening it as a public hospital. The municipal council decided in 1985 to convert the facilities into a care center. In 1997 an EU-wide architectural competition was announced. The expansion was to be positioned in the west area of the site, along the Neubaugürtel. The new building should act as a noise barrier, accommodate two nursing stations with 48 beds, an institute for physical medicine, and house the General Vienna Polyclinic. The rehabilitation of mainly older people is the most important task of the new building.

The competition winner was the Viennese architect Martin Kohlbauer. The new building, called Europa-Pavillon, was completed in 1999. The Europa-Pavillon was built along the boundary line of the site to the Neubaugürtel and the volume only gets narrower to accommodate the existing trees.

The care center Sophienspital closed its doors in 2017 due to the master plan for hospitals, Wiener Spitalskonzept 2030, which aims to regroup scattered medical centers into four zones in Vienna.

2017

Temporary use as shelter, event and exhibition space

2018

Development study by distric representatives

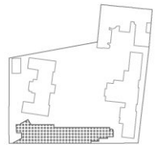
2019

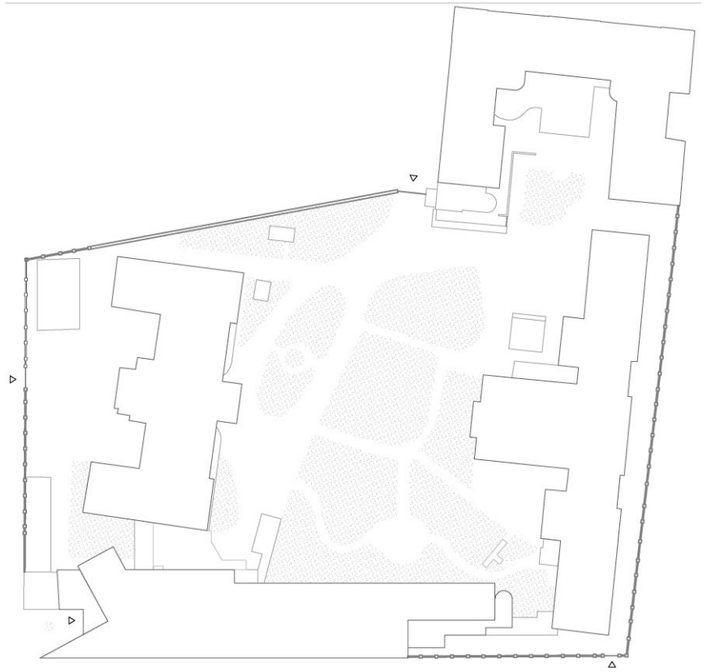
Handover of property to to Wohnfonds Wien

wohnfonds_wien
fonds für wohnbau und stadterneuerung

2020

Temporary use of the Europa-Pavillon as cultural platform





Administration Building
Empty

Kenyon-Pavillon
Empty

Karl-Ludwig-Pavillon
Empty

Europa-Pavillon
Temporary use as shelter, offices, exhibition space and cultural platform

15. Key moments and site plan of the Sophienspital area during interim use

The Interim Use

Without plans for the future of the site, the buildings of the former Sophienspital were given temporary use as shelter, exhibition, and event space. In 2018, a meeting with 180 participants was organized by district representatives to discuss the plans for the site.The most important wishes of the participants were the potential of the inner courtyard as a public park and the possibility of getting directly to the Neubaugürtel through the site. Other propositions include housing, gastronomic and cultural spaces in the historic buildings. Some site plans are visible in the photographic documentation of the meeting. It is clearly noticeable that the Europa-Pavillon is not represented in those plans as part of the existing building stock.[16]

16 Agenda Neubau, "Wünsche an Das Sophienspital – Ergebnisse Der BürgerInnenbeteiligung," Verein Lokale Agenda 21 Wien, November 7, 2018, https://www.la21wien.at/blog-detail-la21/wuensche-an-das-sophienspital.html.

16. The west facade of the Europa-Pavillon (2004)

Architecture: Martin Kohlbauer
Client: Wiener Krankenanstaltenverbund
Location: Neubau District, Vienna, Austria
Program: Care and Physical Therapy Center
Completion: 1999
Demolition: 2022

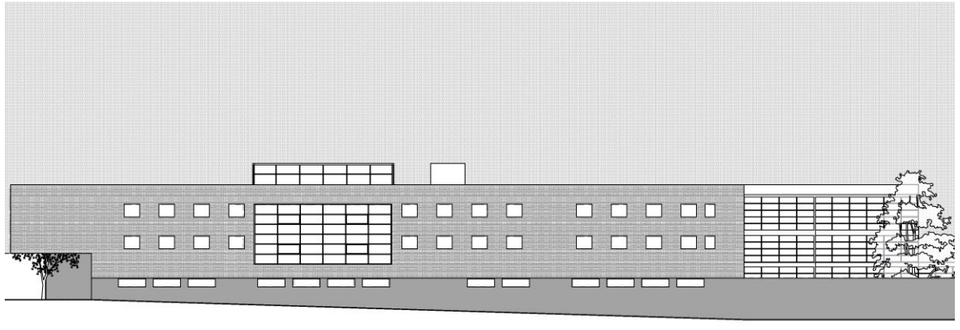
The Europa-Pavillon

Built in the 1990s, The Europa-Pavillon facade emphasizes the use of a glass and aluminum curtain wall in combination with a contrasting dark clinker. The building develops as a continuation of the existing brick wall. The brick enclosure of the adjacent church extends into the dark clinker of the Europa-Pavillon. A motif of relief expands throughout the full height of the building, where the clinker facade is broken up with aluminum and glass to mark the shared spaces within the existing plan and allow the user to establish a dialog with the different external circumstances of the surroundings. An open corner in the north end marks the entrance to the building. The east facade towards the inner courtyard is perforated with large windows reflecting the trees and the historical pavilions on the site.

The rehabilitation of mainly older people was the most important task of the Europa-Pavillon. The program is organized in layers: service spaces oriented to the street, patient rooms for 60 beds and multi-purpose shared spaces towards the trees, and a central corridor throughout the whole length of the building. The idea for circulation is movement as a tool for healing. A therapy terrace on the roof allows patients the connection to the pulsating city and reconnects the two very different sides of the place.

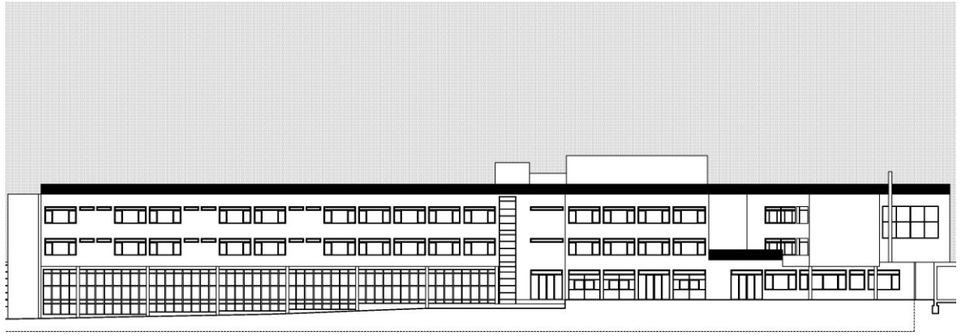
17. Ground floor of the Europa-Pavillon - 1:500

18. View of the north end corner and main entrance (2013)

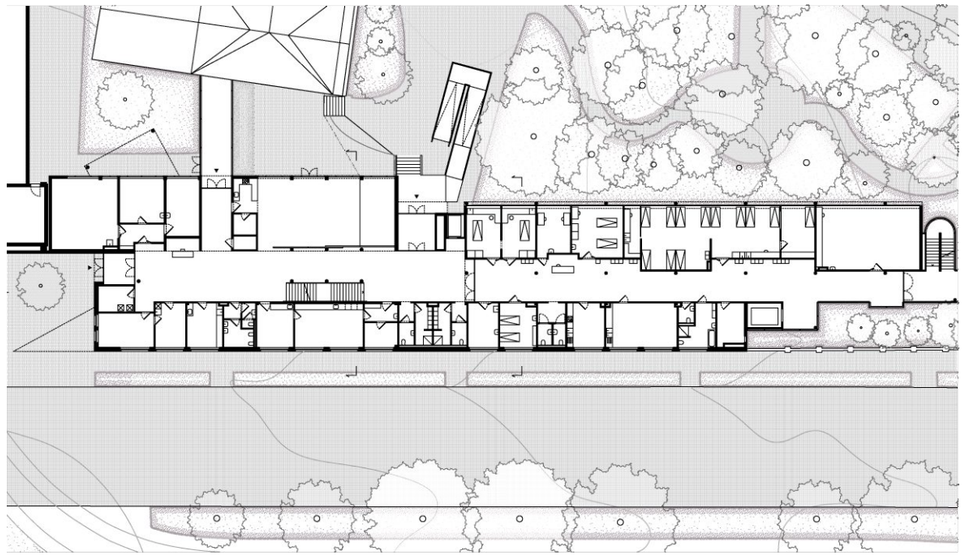


19. West elevation

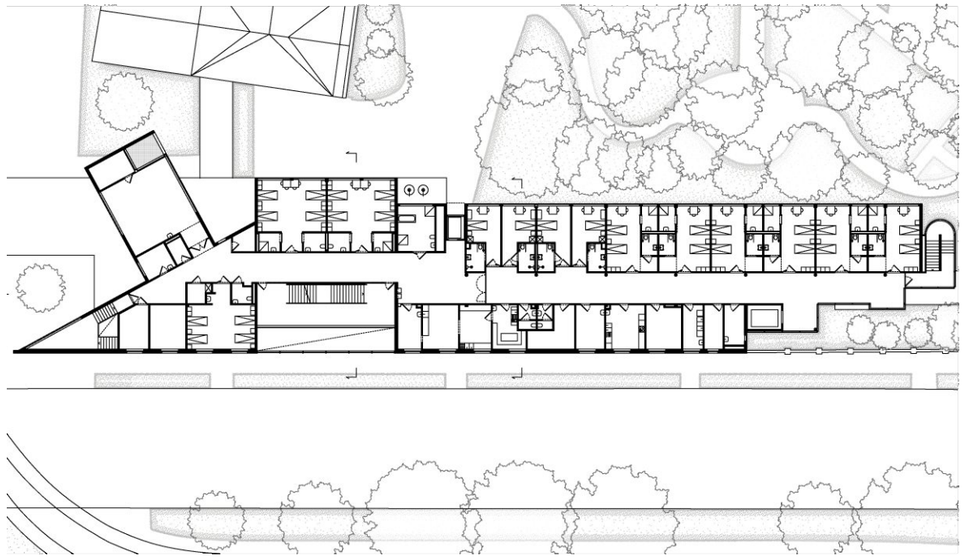
20. View of the Europa-Pavillon from the courtyard (2022)



21. East elevation

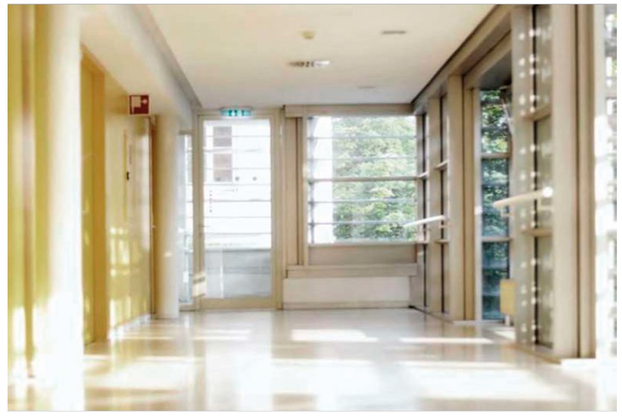


22. Ground floor



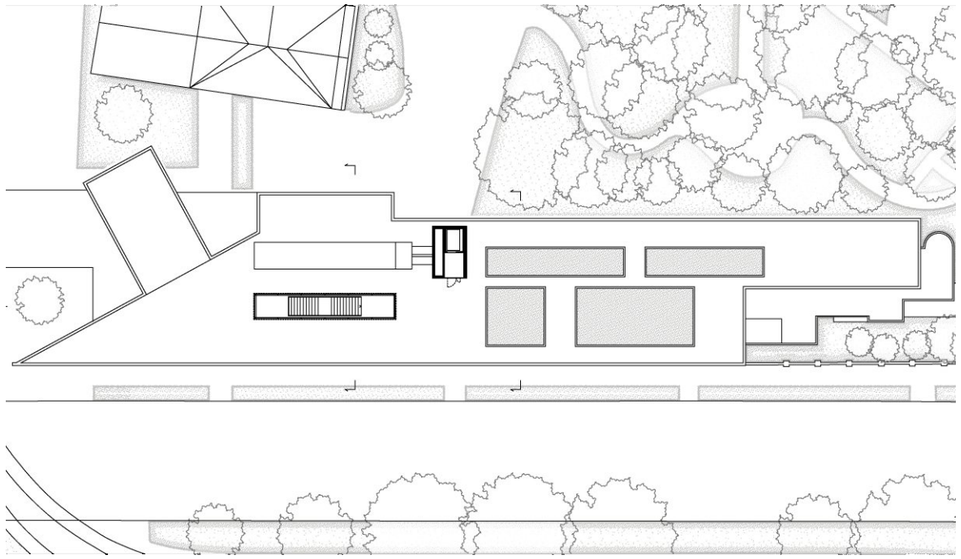
23. First floor

24. Patient rooms



25. Circulation

26. Service rooms (2021)

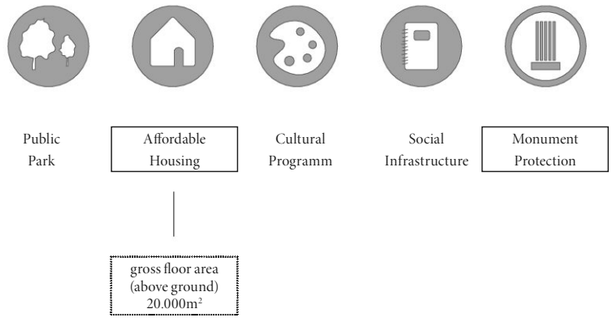


27. Roof terrace

28. Section through gallery space

29. Section through patient rooms

30. View from the roof terrace to the south (2021)



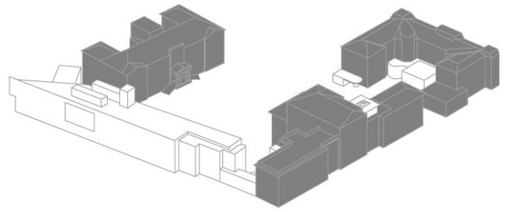
31. Vienna's goals and program for the Sophienspital area

Current Developments on Site

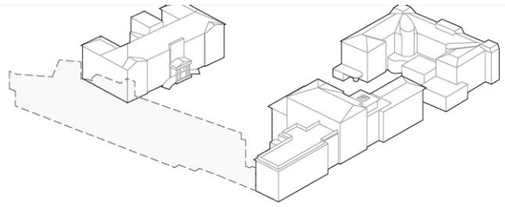
In 2019, the property was handed over to wohnfonds_wien to define what will come next. Wohnfonds_wien is a limited-profit organization that works with property developers, owners, municipal departments, and service centers of Vienna to coordinate how to provide land for city-subsidized housing construction and supervise the restoration of historical buildings. The current president of wohnfonds_wien is the city councilor responsible for living, housing, and urban renewal in Vienna, Kathrin Gaál. In the same year, Vienna released the urban development guidelines for the former Sophienspital. The general objectives for the site include the preservation of the historic building structure in terms of monument and ensemble protection, which involves the facade and building height, as well as the examination of expansion and extension possibilities. The creation of 20.000m² of affordable housing; social infrastructure (childcare, education). The opening of the inner courtyard is a public park. Most of the general objectives comply with taking into account the qualities and potentials of the site. The transformation of an old hospital through new mixed-use housing, cultural spaces in the historical buildings, and an accessible park will benefit the dense surroundings. However, their density goals fail to consider the site's very concrete qualities - the existing building stock.

The requirement of keeping the original building height and the monument protection of the historic buildings limit their expansion for densification. In addition, the existing green courtyard should be preserved. The logic of these requirements implies that the only option is to replace the Europa-Pavillon with a new 35-meter-tall building. Further into the guidelines, another objective of the future project should be the conservation of resources, specifically concerning energy supply and mobility. The preservation or the reuse of existing building stock from a perspective of conservation of resources is not proposed. The aim for an "environmentally friendly construction site management" is also mentioned but is too general a statement to assume that it proposes selective dismantling and reuse beyond what is obliged by the building code. [17]

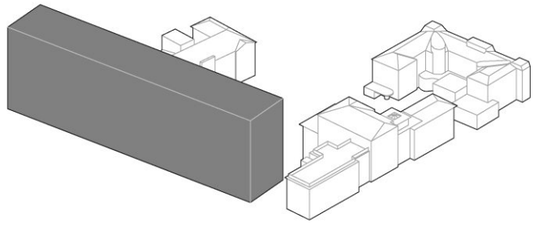
17 Stadtentwicklungskommission (STEK), "7., Sophienspital Städtebauliche Leitlinien," October 15, 2019, https://www.wien.gv.at/stadtentwicklung/projekte/pdf/stek-sophienspital-leitbild.pdf.



From 2020, Vienna protects historic buildings of the Sophienspital area



The Europa-Pavillon from the 1990s does not fall into this category

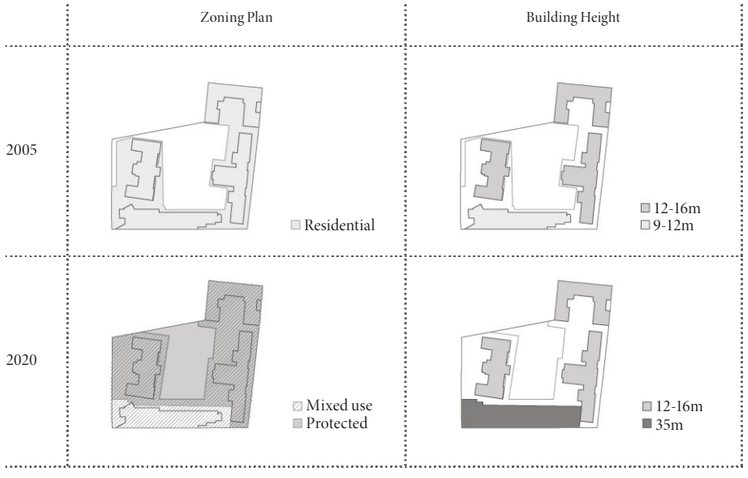


The 23 years old building will be demolished and replaced with a 35 meters high building

32. Vienna's approach towards the existing building stock of the Sophienspital

How Will It Be Possible to Achieve the Desired Density?

It is common practice in Vienna to change development plans, especially regarding the allowed building height, to justify demolition and favor new construction. The Vienna building code mentions special measurements against demolishing buildings built before 01.01.1945. The Department of Architecture and Urban Design is in charge of the permits for demolition. It states that from the point of view of urban design, the local cityscape can lose value due to demolishing buildings in protected zones. Unfortunately, when it comes to younger buildings like the Europa-Pavillon, there is no official regulation regarding their demolition, neither from a perspective of preservation nor from a perspective of resource conservation. The complete demolition of buildings outside protection zones or areas with a construction ban does not require a permit.



33. Changes in the zoning plan and the allowed building height between 2005 and 2020

34. Visualization of the winning project (2020)

35. East elevation of the winning project (2020)

The Competition „Apollogasse“

Since the City of Vienna already defined its objectives for the site, the following step was announcing the non-anonymous, public developer competition named “Apollogasse”. The competition was part of the project “Wohnbau-Offensive 2018-2020”. The “Wohnbau-Offensive” is the city of Vienna‘s reaction to population growth; therefore, its main goal is to produce affordable housing in large quantities and fast. The strategy is the “intertwined” process in which specific project-related modifications on the competition site are introduced directly into the development plan. The competition lasted until 2020 and was performed in three stages. The first and second stages formed the basis for the zoning and development plan, as described in the previous section of this chapter.

Parallel to the competition, wohnfonds_wien carried out a selection process for the temporary use of the Europa-Pavillon. The result was WEST, a combination of offices, studios, ateliers, gastronomy, and hotel. The temporary use of the Europa-Pavillon offered a great opportunity to test its possibilities beyond what was initially intended. If the temporary use had been done before the competition, maybe the requirements and the outcome would have differed. Nevertheless, Europa-Pavillon was not considered part of the existing building stock. In the competition description of the existing buildings, the Europa-Pavillon is omitted, and later is clearly stated that a new building should come in its place. [18]

In 2020 the winner of the competition “Apollogasse” was announced. The results of the new allowed building height have a major effect on the scale of the site. What is the point of protecting historic buildings when their context is affected like this? The barrier effect of the new building is accentuated because of its exaggerated contrast with the historic buildings. Are there other ways to achieve density without oversaturation?

18 wohnfonds_wien, “Apollogasse,” in Bauträgerwettbewerbe 2020 (Wolkersdorf: Holzhausen Druck GmbH, 2021), https://www.wohnfonds.wien.at/media/Website%20PDF-INFO%20Downloads/Publikationen/Neubau/BTW_Buch_2020.pdf.

36. View of the Europa-Pavillon from the courtyard (2022)

37. View of the demolished Europa-Pavillon from the courtyard (2022)

This diploma will not further examine the winning project since the focus lies on how the city of Vienna reacted towards the 23 years old Europa-Pavillon. The competition requirement in regards to resource conservation and ecology lies mainly on energy saving measurements, as can be read in the following statement about the new project made by the wohnfonds_wien:

"[...] *With regard to ecological structural measures, the focus is on effective shading photovoltaic pergolas on the flat roofs, a combination of district heating and geothermal energy, „light" component activation, external sun protection and fresh air flow in the stairwell. Sound-absorbing materials and massive parapets are used to reduce the noise from the Gürtel. To prevent overheating in summer, ventilation gaps between the buildings allow winds to pass through.*"[19]

The key criteria focus solely on operational energy efficiency. Following this strategy, how fast will the next building become irrelevant and obsolete? The lifetime of the building is not taken into account, and this approach fails to address that replacing an existing building must entail more energy consumption than adapting and maintaining one. We must consider the energy embodied in the materials, the production and assembly of components, and the construction and demolition processes. Resources do not include only materials but also spatial, social, cultural, and historical values, which can not be salvaged after demolition. The first step must be to assess if a building should rather remain. Reusing existing building structures and their parts should be addressed, evaluated, and tested in buildings with apparent program obsolescence. As discussed in the first chapter of this diploma, construction and demolition waste represent the largest item in total waste. Suppose the same practices towards existing young buildings prevail. In that case, this quantity is destined to grow since many of the materials used in buildings after 1945 are harder to dismantle and therefore recycle or reuse. Prolonging the life of an existing building is sensible regarding ecologic and economic motives, but also social and cultural ones.

The Europa-Pavillon has been completely demolished as of today, the fall of 2022.

19 wohnfonds_wien, "Apollogasse," in Bauträgerwettbewerbe 2020 (Wolkersdorf: Holzhausen Druck GmbH, 2021), https://www.wohnfonds.wien.at/media/Website%20PDF-INFO%20Downloads/Publikationen/Neubau/BTW_Buch_2020.pdf.

III Analysis from the Perspective of Reuse

"[...]is about using what we already have. It is about considering the existing as a valuable resource, not as unsatisfactory or constraining."[20]

Anne Lacaton

20 Anne Lacaton, "Make Do," in The Materials Book, ed. Ilka Ruby and Andreas Ruby (Berlin: Ruby Press, 2020), 58.

Diploma Process

04.09.2020

News article announcing winning project for the replacement of the Europa-Pavillon

08.06.2021

First Site Visit

Task definition of Diploma

29.07.2021

Material list based on existing plans and component catalogue

18.08.2021

Europa-Pavillon Visit

exploration of spatial and material qualities

39. Doors into former patient rooms (2021)

21.09.2021

Site Visit

testing the possibility of material and component reuse on site

25.03.2022

Open Mine Day by BauKarrussel

41. Lamps part of the exhibition of salvaged components of the Europa-Pavillon (2022)

04.08.2022

proposing an alternative to the demolition of the Europa-Pavillon

Europa-Pavillon Status

Interim use as co-working space

38. Interim use of space (2021)

End of interim use

Empty

40. Closed access to Europa-Pavillon (2021)

Selective dismantling

42. Damaged door after removal of metal hardware (2022)

Total demolition

43. View of the demolished Europa-Pavillon from the courtyard (2022)

Reuse includes on-site material and spatial resources

Reuse as a design principle requires understanding how materials and spatial resources relate to each other within an existing building. The materiality of the building contains the program and shapes its space plan. Regarding life span, the material and the program influence each other but remain independent. Program obsolescence does not equal material obsolescence and vice versa.

Avoid demolishing; instead, readapt and reuse.

Every intervention in the Europa-Pavillon is oriented to the requirements of the future program and is guided by the reusability potential of the material. Although every intervention involves some degree of demolition, the goal is to keep it as a last resort and try to find new meaning in the existing building structure. It is necessary to consider what happens to a material or component when it leaves a building and what happens to the building when the material leaves. Materials and components that are hard to dismantle, reuse or recycle should stay in the building and the design will work with them. If the dismantled components and materials are reintroduced and relocated within the same structure on site, the whole building and its parts cycle continue.

Reuse ensures the potential for future readaptation of the space.

Any transformation of the existing building will not be the last. The architecture of reuse is not about a final product but about recognizing that the design is part of a larger process in which others have already worked and others will. It is not about preserving the building for the sake of conservation but rather preparing the building and the materials to have several lives beyond the current use. It is about how the architecture could enable new interactions between activities, the different ways these activities can be performed, and the variety of users that inhabit or visit the space.

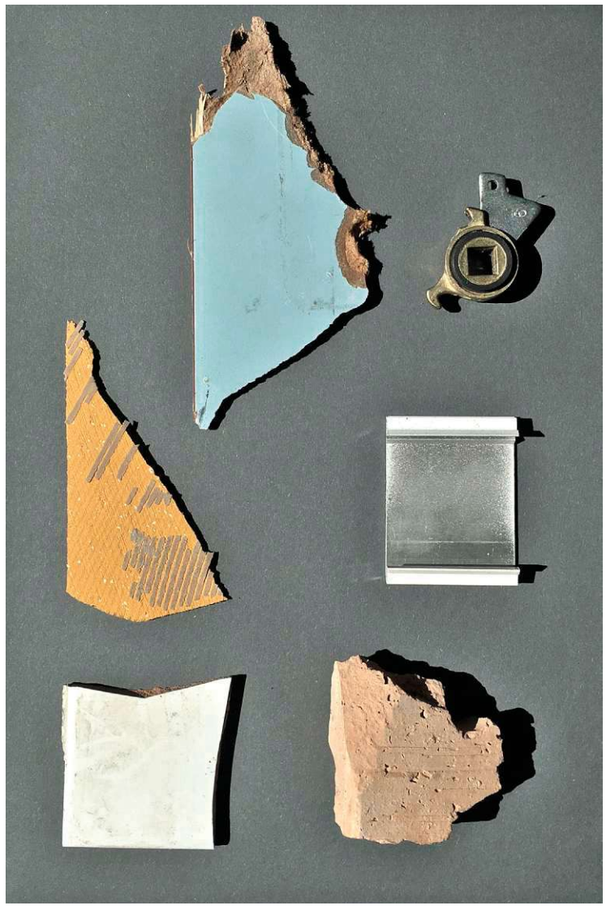
Flexibility and adaptability should accompany the design process

The architecture of reuse does not follow a linear, step-by-step approach from a larger to a smaller scale. Working with the existing means confronting physical, tangible materials, and spatial situations before grasping any abstract design idea. The design follows the available materials and this demands flexibility and creativity in the planning process.

Material and Building Reuse as Design Principles

This diploma proposes an alternative to the total demolition of the Europa-Pavillon, by combining building and material reuse for the adaptation of the existing structure. Building reuse, or adaptive reuse, supports a continuum of growth and change, where the life of a building is extended regardless of its historical significance by retaining all or part of the structure, installations, envelope, and interior materials, along with finding a new purpose for an otherwise obsolete program. Material reuse supports the extension of the life of components and materials of an existing building by retaining or dismantling them for repair, relocation, or recycling. In response to Vienna's plans for the site, this diploma challenges the declared obsolescence of the now-demolished 23 years old Europa-Pavillon and proposes an alternative to its total demolition.

How much of the Europa-Pavillon can be kept, readapted, or reused within the same structure? Furthermore, since the existing qualities determine the future program, what kind of housing does the existing typology allow?



44. Material samples of the Europa-Pavillon collected during the Open Mine Day (2022)

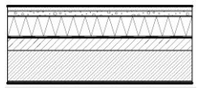
Material and Component Catalogue

Materials allow the existence of architecture. Spatial perception is conditioned by their properties and the user's personal and subjective senses. Beyond their role in the experience of space, materials are a very tangible thing. They are charged with gray matter from their production; they risk becoming environmental hazards once removed from a building; their discarding is linked to potential penalties, and regulations and certifications influence their use.
It is necessary to approach the components and materials in the existing building individually to understand their qualities and disadvantages. The fragmentation of the materiality is not an architectural intention but a tool to simplify the understanding of the material composition of the existing building and come faster to a conclusion regarding reusability potential. It is important to consider what happens to materials when removed from a building and what happens to the building when a material is removed. Moreover, from a design perspective, it means asking these questions repeatedly throughout the design process.

The Material and Component Catalogue is an overview of the material composition of the Europa-Pavillon. It describes the properties, types, locations in the building, and a material's reusability potential (or lack thereof).

The recollection of this information was done before the demolition process began based on renovations plans found at the Baupolizei (MA37), the department for Building Regulations in Vienna, informal interviews, and site visits - Deviations and assumptions are possible. the catalog was updated with information from the first "Open Mine Day" organized by BauKarrussel. BauKarrussel was commissioned to survey the building and assess which components could be salvaged. The event occurred on the 25th of March 2022 in the Europa-Pavillon. It was the last time the building was open before its demolition. The "Open Mine Day" was an opportunity to show the result of their work with a small exhibition. After doing some initial research about the building components, it was shocking to see that only minor components, like lamps, were salvaged. An employee of BauKarrussel suggested that SOZIALBAU AG and WBV-GPA (Wohnbauvereinigung für Privatangestellte), the main investors of the upcoming project, did not discuss reuse or recycling on-site. The employees of BauKarrussel also remarked that the Europa-Pavillon structure was in good condition and enabled a flexible floor plan that could be extended vertically and horizontally.

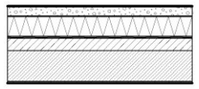
R1



Inverted roof, accessible

Concrete pavers	4
Gravel 16/32	4
Filter layer	0.5
XPS	16
Bituminous seal	1.5
Sloped concrete	4-18
Reinforced concrete	25
painted, plasterboard	0.5

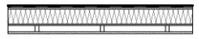
R2



Inverted roof, gravel

Gravel 16/32	8
Filter layer	0.5
XPS	16
Bituminous seal	1.5
Sloped concrete	4-18
Reinforced concrete	25
painted, plasterboard	0.5

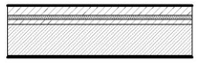
R4



Roof over connecting wing

Titanium zinc sheet	0.7
Bitumen cardboard	
Mineral wool	12
between woodboard	2.5
Vapor barrier	
Steel trapezoidal sheet on steel	
structure	5
painted, plasterboard	0.5

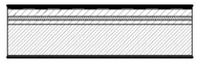
S1



Floor slab, patient rooms

Rubber flooring	0.5
Screed	7.5
Separating layer	
Mineral Wool	3
Leveling screed	4
Reinforced concrete	25
Plaster, Plasterboard	1.5

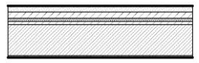
S2



Floor slab, wet area

Ceramic tiles	1.3
Bituminous seal	0.2
Screed	6
Separating layer	
Mineral Wool	3
Leveling screed	3
Moisture proofing	0.2
Reinforced concrete	25
Paint, Plasterboard	0.5

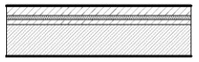
S3



Floor slab, circulation

Terrazzo tiles	5
Screed	5
Separating layer	
Mineral Wool	2.5
Leveling screed	2.5
Reinforced concrete	25
Paint, Plasterboard	0.5

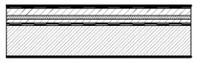
S4



Floor slab over basement

Rubber flooring	0.5
Screed	7.5
Separating layer	
Mineral Wool	3
Leveling screed	4
Reinforced concrete	25
Paint	0.5

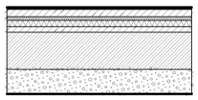
S4a



Wet area over basement

Ceramic tiles	1.3
Bituminous seal	0.2
Screed	6
Separating layer	
Mineral Wool	3
Leveling screed	3
Moisture proofing	1.5
Reinforced concrete	25
Paint, Plasterboard	0.5

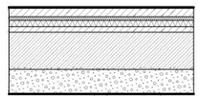
S5



Ground slab, wet area

Ceramic tiles	1.3
Bituminous seal	0.2
Sloped screed	5-8
Vapor barrier	
Mineral Wool	3
EPS	5
Leveling screed	4.5
Watertight concrete	30
Gravel	20

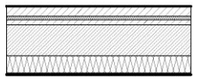
S6



Ground slab, heated area

Rubber flooring	0.5
Screed	7
Vapor barrier	
Mineral Wool	3
EPS	5
Leveling screed	4.5
Watertight concrete	30
Gravel	20

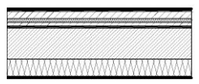
S9



Shared space over outside air

Rubber flooring	0.5
Screed	7.5
Vapor barrier	
Mineral Wool	3
Leveling screed	4
Reinforced concrete	25
Mineral wool, plaster	14

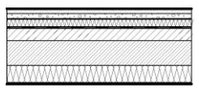
S9a



Wet area over outside air

Ceramic tiles	1.3
Bituminous seal	0.2
Screed	6
Separating layer	
Mineral Wool	3
Leveling screed	3
Moisture proofing	1.5
Reinforced concrete	25
Mineral Wool, plaster	14

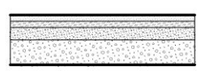
S10



Loggia over outside air

Concrete pavers	5
Gravel	4-8
XPS	6
Filter layers	
Bituminous seal	1.5
Leveling screed	4-8
Reinforced concrete	20
Mineral Wool, plaster	14

S12



Terrace on ground

Concrete pavers	5
Gravel 2/5mm	5
Gravel 0/18	10
Gravel 0/30 0/55	20

S13

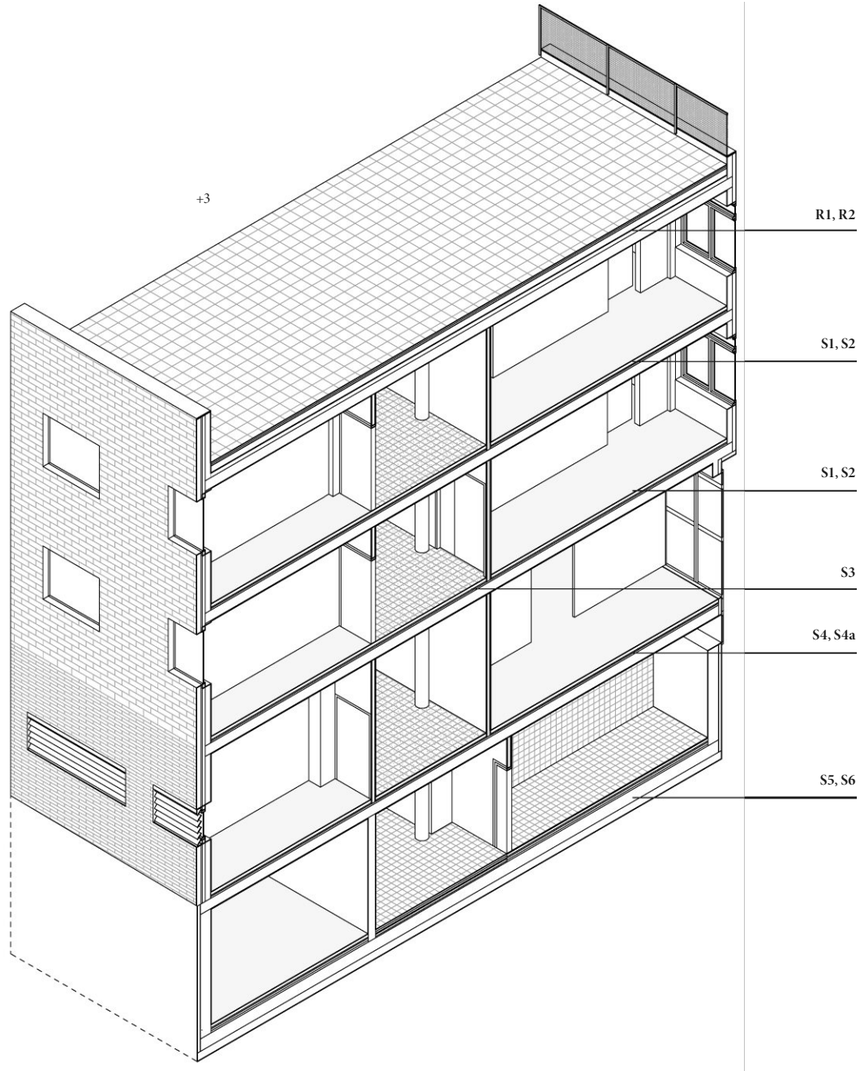
Outdoor slab, entryway

Concrete pavers, mortar	8
Reinforced concrete	20

S13a

Outdoor ramp, entryway

Asphalt	3
Reinforced concrete	15



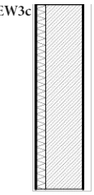
45. Catalogue of existing slabs

46. Axonometric section depicting the location of slabs

EW3a

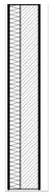
Basement wall, heated area	
XPS	8
Bituminous seal	1
Reinforced concrete	29
Paint, Plaster	0.5

EW3c



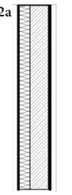
Basement wall, watertight concrete	
XPS	8
Reinforced concrete	30
Paint, Plaster	0.5

EW2



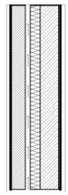
External wall, plaster, EWIS	
Plaster	8
EPS	9
Reinforced concrete	15
Paint, Plaster	1.5

EW2a



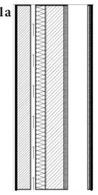
External wall, plaster, EWIS	
Plaster	8
EPS	9
Reinforced concrete	15
Ceramic tiles	1.3

EW1



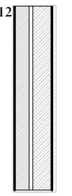
External wall, ventilated clinker facade	
Curtain clinker facade	12
Ventilation	4
Insulation	8
Reinforced concrete	15
Plaster	1.5

EW1a



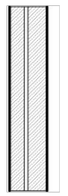
External wall, ventilated clinker facade, installation wall	
Curtain clinker facade	12
Ventilation	4
Insulation	8
Reinforced concrete	15
Installation wall	22.5

EW12



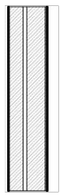
Brick enclosure	
Clinker	12
Mortar	3
Reinforced concrete	15
Plaster, paint	0.5

W4



Prefabricated elevator shaft, basement	
Reinforced concrete	12
Separation layer	3
Reinforced concrete	15
Plaster, paint	0.5

W4a



Prefabricated elevator shaft	
Reinforced concrete	12
Separation layer	3
Reinforced concrete	15
Plaster, paint	1.5

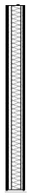
IW5

Partition patient room/patient room	
Plasterboard	2.5
Mineral Wool between metal construction	5
Plasterboard	2.5

IW6

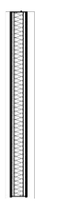
Partition patient room/corridor	
Plasterboard	2.5
Mineral Wool between metal construction	7.5
Plasterboard	2.5

IW7



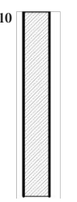
Partition patient room/wet area	
Plasterboard	2.5
Mineral Wool between metal construction	7.5
Plasterboard	2.5
Ceramic tiles	1.3

IW8



Partition treatment room/ treatment room	
Plasterboard	2.5
Mineral Wool between metal construction	7.5
Plasterboard	2.5

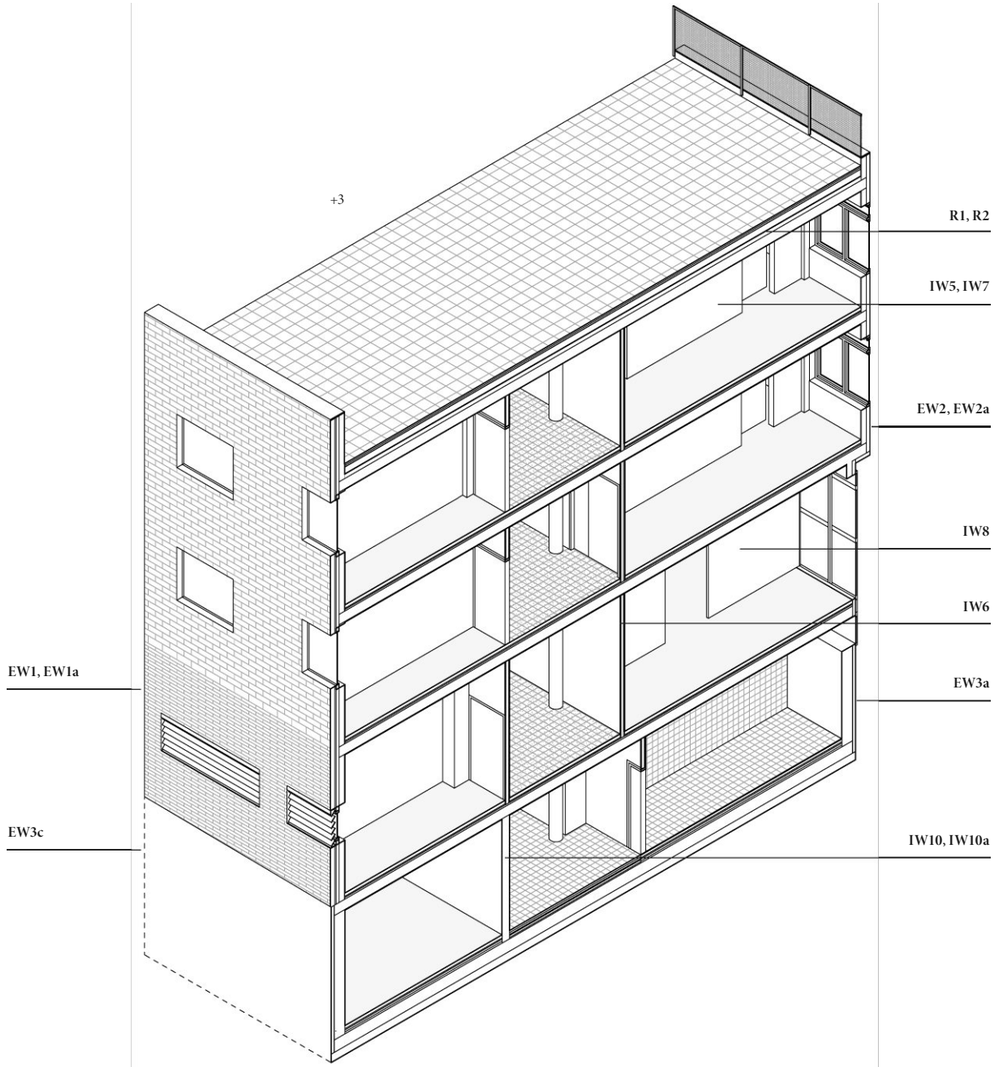
IW10



Reinforced concrete wall, basement	
Plaster, paint	0.5
Reinforced concrete	20
Plaster, paint	0.5

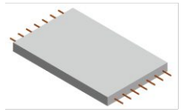
IW10a

Reinforced concrete wall	
Plaster, paint	1.5
Reinforced concrete	20
Plaster, paint	1.5

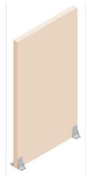


47. Catalogue of existing walls

48. Axonometric section depicting the location of walls



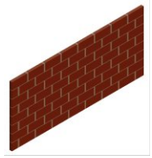
01
Concrete



02
Plasterboard

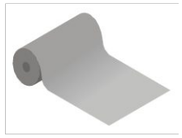
03
External Wall Instulation System

04
Aluminum and Glass Facade



05
Clinker

06
Tiles



07
Rubber Flooring

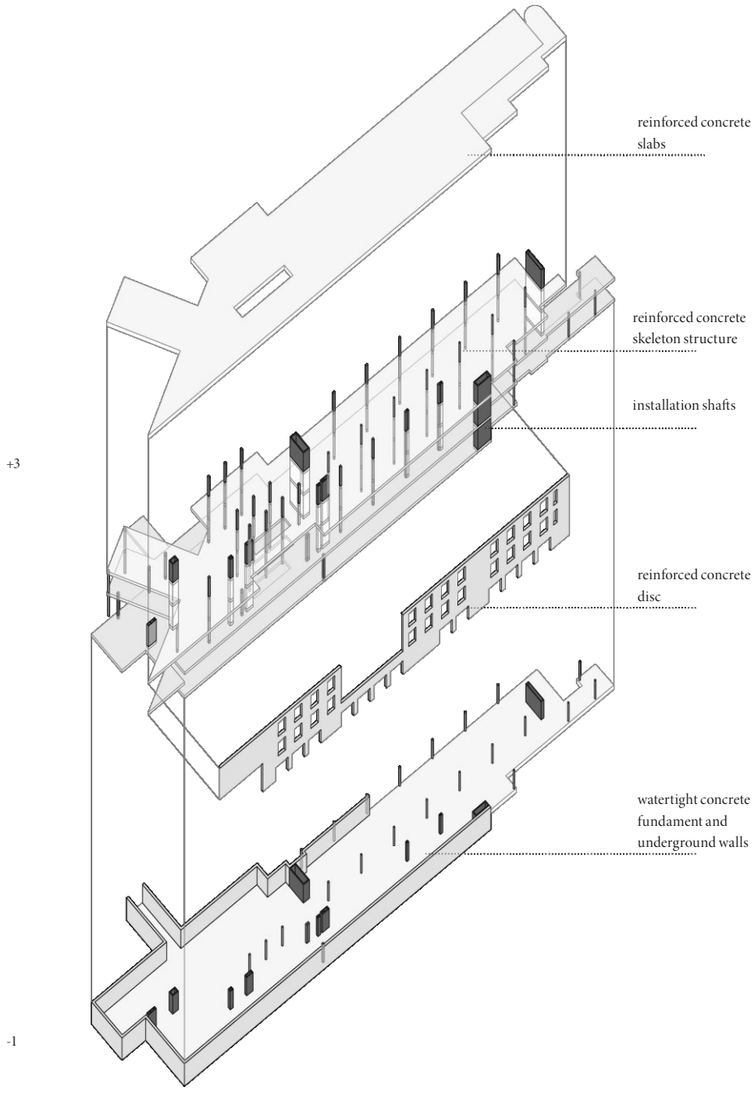
08
Doors

09
Windows

10
Railing

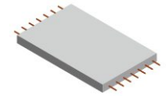
11
Sanitary Equipment

49. Overview of main materials and components in the Europa-Pavillon



50. Axonometric representation of the load-bearing elements and the installation shafts

01
Concrete



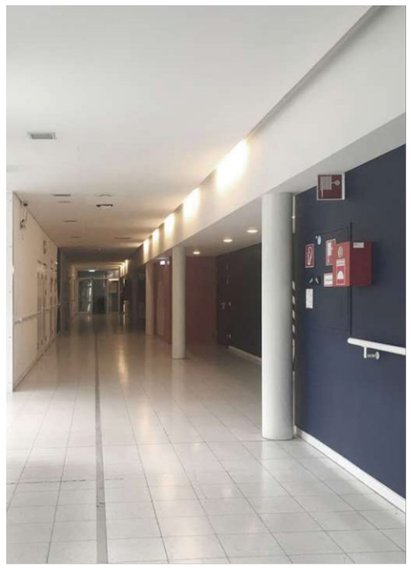
General Properties and Presence in Building

A reinforced concrete structure can last at least 100 years. It is weatherproof, frost-resistant, and non-flammable. It can serve as a heat storage mass and soundproofing material.
The load-bearing structure of the Europa Pavillon consists of reinforced concrete skeleton construction. Structural reinforcement is provided by two elevator shafts made of prefabricated concrete and a reinforced concrete disc on the west side. The columns follow a raster of 7,02 m with some variations in the longitudinal direction along the floor plan. The foundation is executed as a "white tub" with waterproof concrete.

Reuse potential

Prefabricated concrete elements can be reused but require good logistics and transport. Concrete fragments resulting from demolition are normally downcycled for road construction or backfilling. The broken concrete is more exposed to carbonization and needs to be controlled before use. The fragments can also be mixed as aggregate for new concrete. However, the new concrete mixture needs a higher amount of cement, a product associated with high energy consumption and pollution. The concrete mixture also needs new sand, gravel, and steel parts.The mentioned points almost nullify the advantages of recycling.[21]

21 Manfred Hegger et al., Baustoff Atlas (Basel/Berlin/Boston: Walter de Gruyter GmbH, 2012)

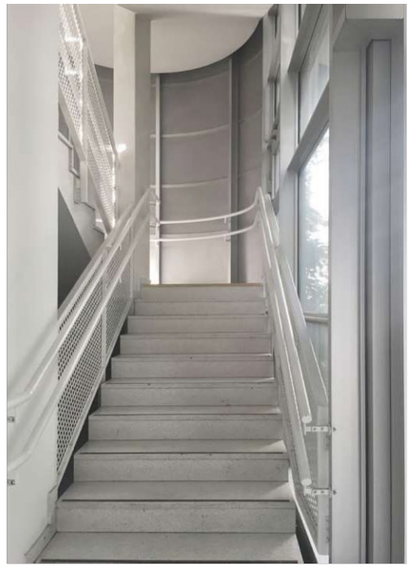


51. Load-bearing columns in the circulation (2021)

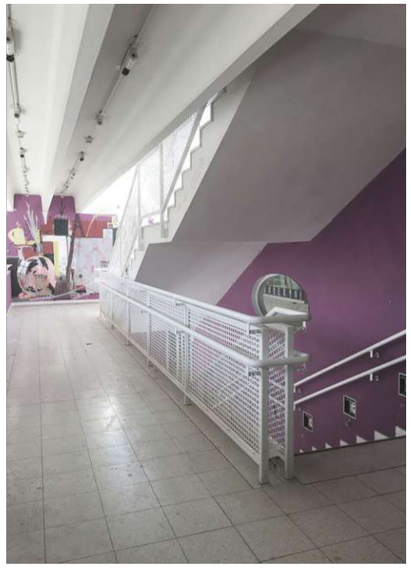
52. Load-bearing columns in the exterior (2021)

53. Load-bearing wall (2022)

54. Reinforced concrete visible in demolished walls and slabs (2022)



55. Prefabricated concrete two-flight stairs (2021)



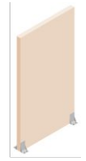
56. Prefabricated concrete single stair (2021)

57. Elevator shaft and concrete pavers (2021)

58. Other non-load-bearing concrete elements (2021)

59. Partition plasterboard wall (2021)

60. Partially demolished partition wall with exposed insulation (2022)



02
Plasterboard

General Properties and Presence in Building

The drywall and ceiling cladding are made of plasterboards clammed to a metal substructure. Depending on their location, they are painted or covered with tiles. Drywalls simplify the repair of installations and are suitable for a skeletal structure, as seen in the Europa-Pavillon. Plasterboard usage is limited to the interior due to its low moisture resistance but provides good fire protection.

Reuse potential

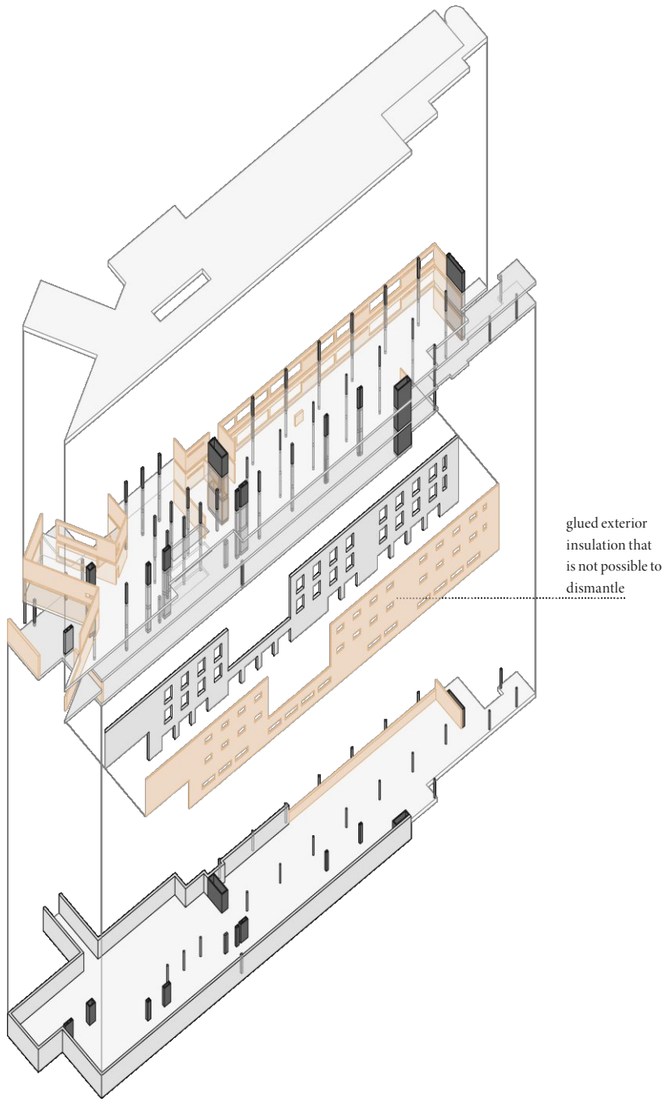
In the case of conventional demolition, the gypsum in plasterboards presents a problem due to the sulfate load that can contaminate other materials. The same issue applies if they are being discarded because they can contaminate the ground and water. As of January 1st, 2026, there will be a ban on dumping gypsum plasterboard.[22] Another delicate issue regarding the drywall is the insulation. Mineral wool produced prior to 1996 must be classified as carcinogenic. If the material was produced between 1996 and 2002, an investigation is required.[23] In the Austrian Recycling Building Materials Ordinance, gypsum products and mineral wool are listed as contaminants and therefore have to be removed before starting any dismantling work. The European Commission communicated on this issue in 2018: "*New chemicals are constantly marketed while others are forbidden when they are found to pose a risk. This on-going process has the implication that products legally produced today may contain a substance that later may be forbidden*".[24]

Discarding these materials is expensive and will soon be forbidden in Austria. Therefore regulations should give more attention to the impact on future recycling and reuse. On the other hand, the regulations for hazardous materials on existing buildings should be consequent: either keep them or exchange all of them. Destroying a big part of the existing building stock or turning a blind eye can not be the only option.

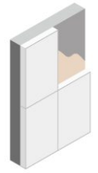
22 Baustoff-Recycling Verband, "Verwertung von Gipsplatten Und Gipsbauteilen Aus Dem Rückbau," Baustoff-Recycling Verband, August 31, 2022, https://brv.at/verwertung-von-gipsplatten-und-gipsbauteilen-aus-dem-rueckbau/.

23 Helmut Melzer, "Krebsgefahr Durch Dämmen?," Medienstelle für nachhaltiges Bauen, November 12, 2015, http://www.nachhaltiges-bauen.jetzt/krebsgefahr-durch-daemmen/.

24 European Commission, "Communication on the Implementation of the Circular Economy Package: Options to Address the Interface between Chemical, Product and Waste Legislation," January 16, 2018, https://ec.europa.eu/docsroom/documents/27321/attachments/1/translations/en/renditions/native.



61. Axonometric representation of the external wall insulation envelope in relation to the concrete elements



03
External Wall Insulation System

General Properties and Presence in Building

The external walls of the Europa Pavillon - excluding the West Facade - are constructed as an external wall insulation system, which consists of a combination of concrete, eps insulation, and plaster. EWIS Walls can have a life span between 40 and 60 years and are the selected construction method due to the low cost compared to other types of construction.

Reuse potential

The ÖNORM B 3151 defines composite systems as "material made of different materials for which a single type separation is technically or economically disproportionate."[25] The materials are glued to each other and therefore present a challenge for selective dismantling and recycling. Due to the very porous characteristic of the insulation, the boards can not be salvaged without being destroyed and contaminating the area.

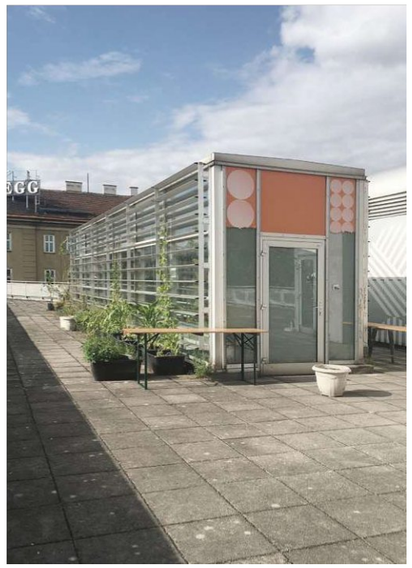
The envelope of the Europa Pavillon will remain in its current location. Since the EPS is glued to the concrete, it is hard to dismantle and salvage the material, which could consequently end up being discarded. Even though the potential for the dismantling of EWIS is low, the life span of this system is large, and therefore, these walls should be kept and integrated into the new design.

25 ÖNORM B 3151, "Dismantling of Buildings as a Standard Method for Demolition" (2014), https://www.ris.bka.gv.at/Dokumente/Bundesnormen/NOR40187245/II_290_2016_OeNORM_B_3151.pdf.

62. East Facade - View from the courtyard (2013)

63. West Facade - View from the Neubaugürtel (2013)

64. South Entry - View from the courtyard (2021)



65. Stair to the roof terrace (2021)

04
Aluminum and Glass Facade

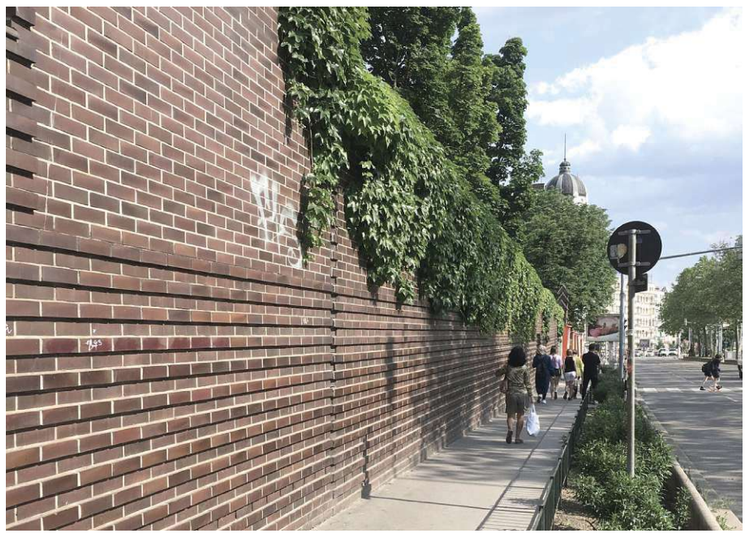
General Properties and Presence in Building

The mullion transom facade, made of aluminum profiles and glass elements, is mostly present in the south area of the building. On this one end, the building almost dissolves into the graded glass construction that creates a courtyard with trees to act as a puffer against the loud street. This element is also present on the ground floor level of the east facade, towards the park. Aluminum jalousies provide exterior sun protection for these areas of the building.

Reuse potential

BauKarrussel had the intention to disassemble this element to salvage the noise protection glass, but as it is common for this type of component, the deep and size distinction of the profiles leads to complex joints that are mostly glued seals. For this reason, BauKarrussel did not complete the disassembly. Reusing the entire element in another project could be possible instead of separating its parts. It would have been possible to salvage the aluminum jalousies, but due to the lack of maintenance, selling the components as spare metal seemed more profitable than preparing them to be reused. This situation raises the importance of taking care of existing buildings while they are being used.

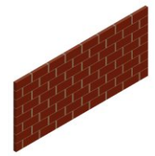
The aluminum and glass facade marks the shared spaces within the existing space plan and allows the user to establish a dialog with the different external circumstances of the site. The spatial qualities that this component enables, combined with their lack of reusability, leads to the conclusion that it should remain on site and that the future design should benefit from it. The aluminum jalousies are considered an integrative part of the logic and functionality of the envelope and should be repaired.



66. Clinker relief on the west facade (2021)

67. The demolished clinker facade (2022)

05
Clinker



General Properties and Presence in Building

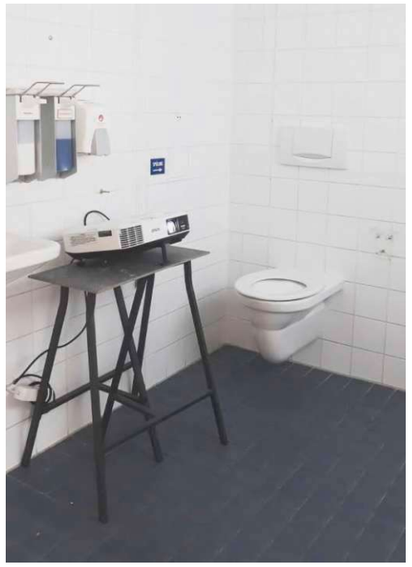
The west facade is constructed as a reinforced concrete disc with clinker on a ventilated metal substructure. The motif of a relief-like dark clinker acts as a continuation of the existing brick enclosure of the historical buildings and the church next to the site. Clinker is a renovation-free material with an appropriate aging process for the emission-intensive Neubaugürtel.

Reuse potential

Clinkers could present a great opportunity for reuse because of the high material quality, durability, and almost no signs of aging besides some variations in color due to exposure, if it was not for the adhesive mortar used for laying them. Up to this date, there is no reliable and economical way of separating the mortar. Clinkers that break during disassembly are seen as unfit for reuse since the homogeneity and amount of the batch are reduced.[26]

26 Annette Hillebrandt et al., Manual of Recycling : Buildings as Sources of Materials (Munich: Detail Business Information, 2019)

68. White square tiles on plasterboard wall (2021)



69. White and blue square tiles in a bathroom (2018)

70. Terrazzo square tiles in the circulation (2021)

06
Tiles

General Properties and Presence in Building

Two main tile types are found in the interior of the Europa-Pavillon: Terrazzo-tiles for circulation, including the stairs, and glazed tiles for wet spaces.

Reuse potential

Although their dismantling is delicate, tiles can represent a great opportunity for reuse, either on-site or through the professional channels of material resellers. Careful dismantling should aim to ensure the integrity of the tiles and a certain uniformity of the batches. Dismantling tests make it possible to verify the feasibility and profitability of the removal. The type of laying (cement/lime mortar, adhesive mortar, adhesive) and the characteristics of the joints (thickness, composition) strongly affect the possibility of cleanly dismantling the material. Tiles with adhesive residue are often sold as they are, which would imply special arrangements at the time of laying.[27]

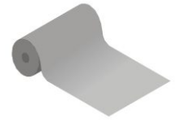
The market for reused tiles focuses mostly on those with historical significance or intricate design, of which the tiles in the Europa-Pavillon do not form part of. Nevertheless, standard tiles should be addressed since their quality does not depend on subjective aesthetic values.

27 Interreg North-West Europe, "Reuse Toolkit: Material Sheets," www.nweurope.eu, November 9, 2021, https://www.nweurope.eu/projects/project-search/fcrbe-facilitating-the-circulation-of-reclaimed-building-elements-in-northwestern-europe/news/reuse-toolkit-material-sheets/.

71. Yellow rubber flooring in the former therapy room (2018)

72. Dark blue rubber flooring in a space on the ground floor (2021)

07
Rubber Flooring



General Properties and Presence in Building

Synthetic rubber flooring is resistant to chemicals, has good fire protection properties (flame retardant), is easy to clean due to water and dirt-repellent properties, and has a seamless surface that ensures accessibility and high walking comfort. The petroleum-based plastics are of fossil origin and represent the most common material in construction today. Plastics can be extremely durable and take around 450 years to decompose. Nevertheless, its performance in a building deteriorates very quickly and estimates to have around 50 years of service life. [28]

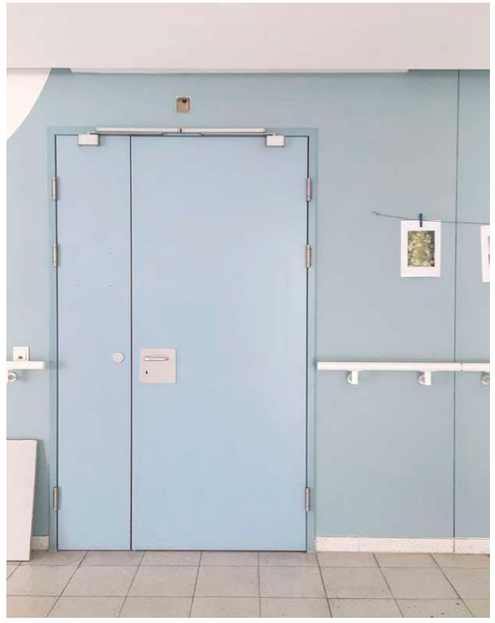
The main floor finish in the Europa-Pavillon is synthetic rubber flooring, as it is common for hospitals, and originally follows the color concept of the entire building and comes in dark blue, light blue, and yellow.

Reuse potential

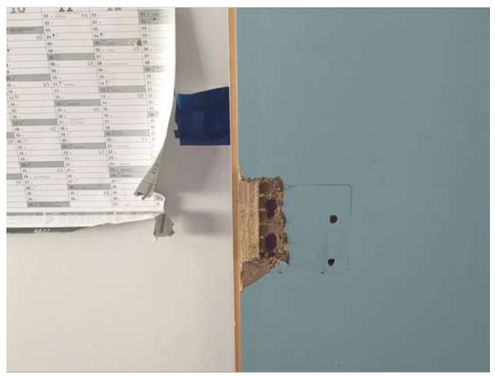
The purity of salvaged plastics is essential for their reuse, a state that is often compromised by adhesives. Thermal recycling is not possible in synthetic rubber, as would be the case for other types of plastics (thermoplastics). Granulation is the most common way to reintroduce salvaged rubber material for new flooring.

Floor coverings and construction are usually the first things to be removed when renovating an existing space to ease the demolition of walls and update the heating system. Due to the quality of the recycling, the existing rubber floor should be carefully removed to ensure its reintroduction in a new material.

28 Annette Hillebrandt et al., Manual of Recycling : Buildings as Sources of Materials (Munich: Detail Business Information, 2019), 61–62.



73. Light blue patient room door on the first floor (2021)



74. Damaged door after removal of metal hardware during selective dismantling (2022)

75. Exhibited dismantled hardware during the „Open Mine Day" (2022)

08
Doors

General Properties and Presence in Building

The Europa-Pavillon doors comply with a hospital's requirements, such as barrier-free dimensions and use, noise insulation, and fire resistance. The doors have a matte finish to avoid unnecessary reflections and glare and have different surface colors based on the healing color concept from the initial project: dark blue on the ground floor, light blue on the first floor, and yellow on the last floor. These characteristics make it possible for people with physical or cognitive impairment to find and recognize the entrance to patient rooms and shared spaces. Doors for other spaces have a white matte finish. Entrance doors are made of glass and aluminum frames per the facade.

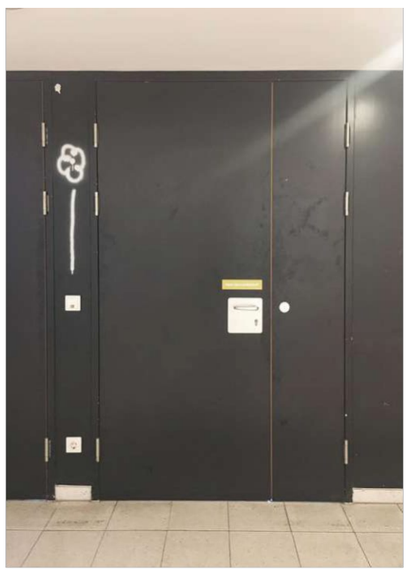
Reuse potential

The dismantling of doors is generally easy. The door leaves can be removed without damage, compared to the more vulnerable frames. The hardware should be removed as well in order to ensure full reusability. Each part plays a role in fire resistance when it comes to fire doors. This makes removing fire doors more difficult to ensure the perfect integrity of the elements. If only the door leaf (and its hardware) can be removed, it can be installed in a new frame with new hinges. The re-installation of a reclaimed door raises the same points of attention as a new one: dimensions, accessories, material, operation, and certification. Regarding the last point, when a reclaimed fire door does not comply with the current regulation resulting from new fire safety standards or minor damages, the door can be reinstalled as a "classic" door.[29]

It was shocking that in the exhibition during the Open Mine Day, only the metal hardware was shown as valuable materials that could be sold as spare metal. It was suggested that nobody has an interest in the doors. Even if they know that doors are fit for reuse, BauKarrussel only dismantles something if it has been sold already because they lack storage.

29 Interreg North-West Europe, "Reuse Toolkit: Material Sheets," www.nweurope.eu, November 9, 2021, https://www.nweurope.eu/projects/project-search/fcrbe-facilitating-the-circulation-of-reclaimed-building-elements-in-northwestern-europe/news/reuse-toolkit-material-sheets/.

76. Yellow patient room door on the second floor (2021)



77. Dark blue consultation room door on the ground floor (2021)

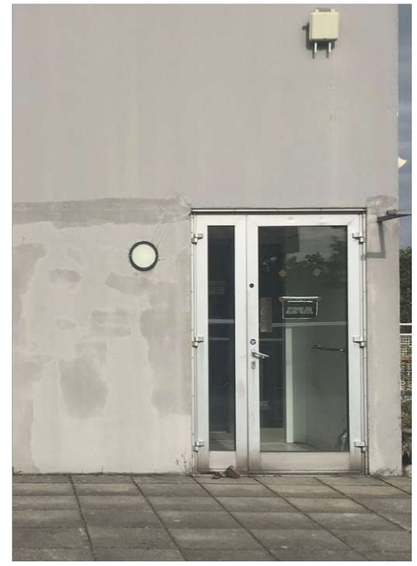
78. Inner Single Leaf Door with Circular Opening (2021)

79. Inner Single Leaf Door (2021)

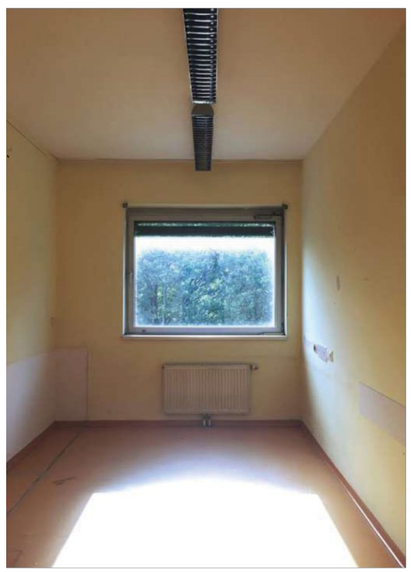
80. Glass and aluminum interior door to stairs (2021)

81. Glass and aluminum double-leaf entry door (2021)

82. Glass and aluminum door to the loggia (2022)



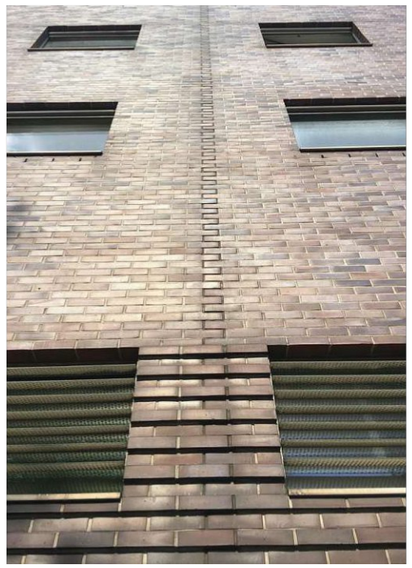
83. Glass and aluminum door from the elevator to the roof terrace (2021)



84. Soundproof window with a high parapet on the street side (2021)

85. Windows with low and high parapets on the courtyard side (2021)

86. Large windows with exterior jalousies in the corner (2021)



87. Ground floor windows with integrated perforated metal shading (2021)

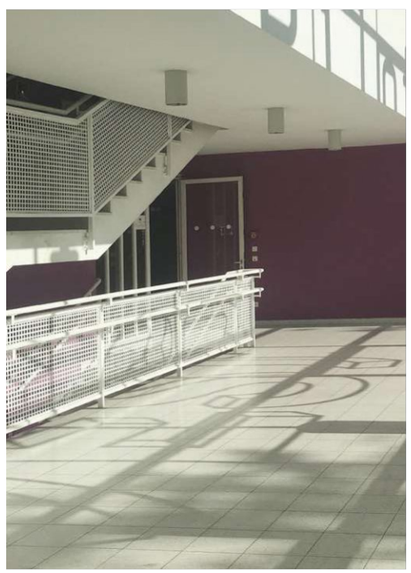
09
Windows

General Properties and Presence in Building

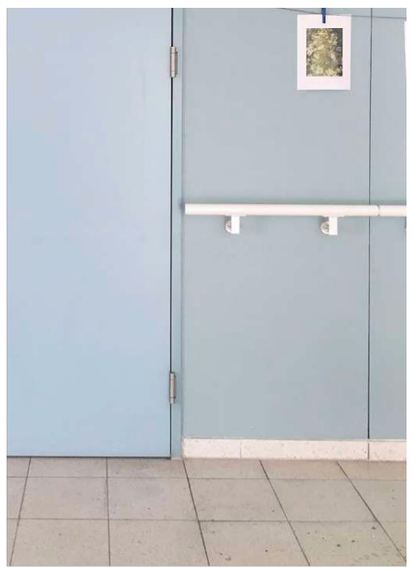
Light and ventilation play a crucial role in maintaining the hygiene of the spaces for the original program. The large windows let sufficient light enter the room, and the low parapet height allows wheelchair users or people on bed rest to have an uninterrupted view of the adjacent park. From the outside, the trees are reflected on the glass surface and the aluminum frame, giving the illusion of the park's expansion.

Reuse potential

The dismantling of windows, independent of their material (plastic, wood, or aluminum), is technically possible but requires knowledge about the installation technique in order to ensure the integrity of the component.

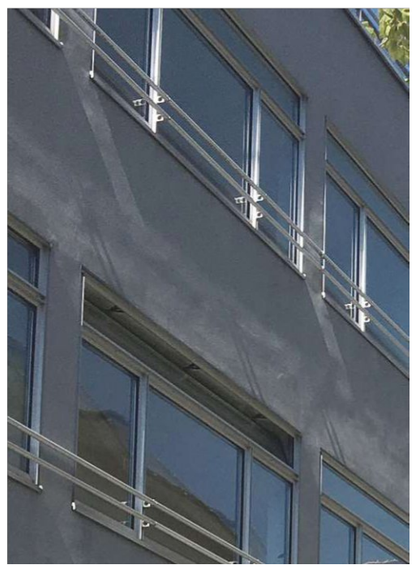


88. White-coated railing with perforated panels on main stairs (2021)



89. White-coated handrail in the corridor (2021)

90. White-coated railing with perforated panels on the roof terrace (2021)



91. Railing as an element of the facade in front of windows with low parapet height (2021)

09
Windows

General Properties and Presence in Building

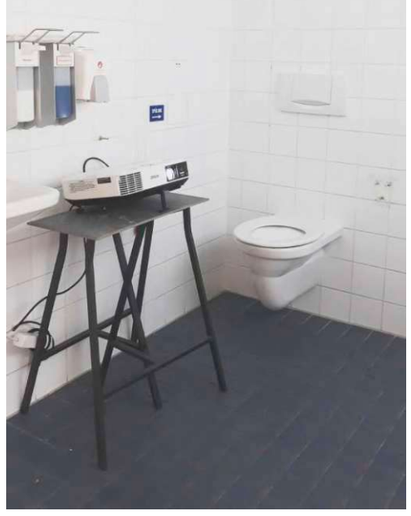
The coated steel railing is used in the interior along staircases and the circulation area. Railing coated for exterior use is found as fall protection from the roof terrace and the windows with low parapet height. The design of the railing follows the structural raster (¼ of the raster). Circular posts are at a distance of approximately 1,75 meters with a perforated sheet with a square motif.

Reuse potential

The elements can be unscrewed and relocated within the existing building as necessary. Currently coated in white, the color can be changed.

92. Showerhead with adjustable slide mount and grab bars (2022)

93. Wheelchair-accessible sink (2022)



94. Wall-mounted toilet (2018)

10
Sanitary Equipment

General Properties and Presence in Building

The sanitary objects include washbasins, baths, shower trays, toilets, and their corresponding fittings. The most commonly used materials are ceramic, acrylic, and steel enamel. The average service life of sanitary objects is around 40 years.[30] The sanitary equipment found in the Europa-Pavillon ensures accessibility for wheelchair users.

Reuse potential

In the case of a demolition, sanitary objects are often found in good quality and large amounts. These objects can be dismantled with little effort, and after a thorough cleaning, there is usually no visual difference with a new product. The main issue against reusing sanitary equipment is due to a cultural barrier.

Reusing components with specific properties requires ensuring the appropriate space for their use. In this case, reusing the accessible sanitary equipment will consequently determine a barrier-free design for future intervention.

30 Interreg North-West Europe, "Reuse Toolkit: Material Sheets," www.nweurope.eu, November 9, 2021, https://www.nweurope.eu/projects/project-search/fcrbe-facilitating-the-circulation-of-reclaimed-building-elements-in-northwestern-europe/news/reuse-toolkit-material-sheets/.

What remains on-site?

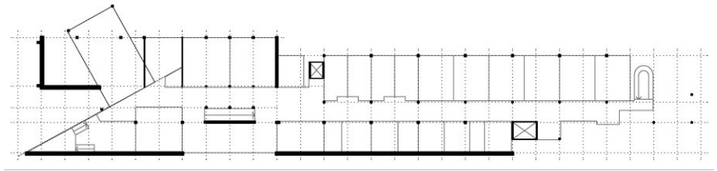
Concrete, plasterboard, the external wall insulation system, and the aluminum and glass facade remain as the base structure of the existing due to their supporting properties, and due to the difficulties, they present if being demolished. The design will work with these existing elements and aim to keep demolition to a minimum.

What can be recycled?

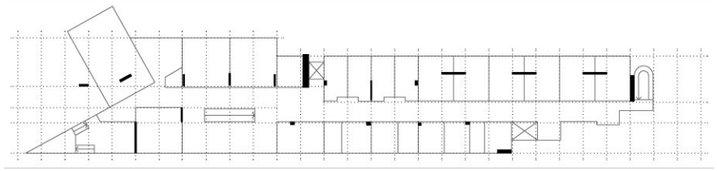
Clinkers, tiles, and rubber flooring can be recycled in the case of demolition. Nevertheless, the goal will be to avoid this as much as possible and reintegrate the recycled materials into the new design.

What can be reused?

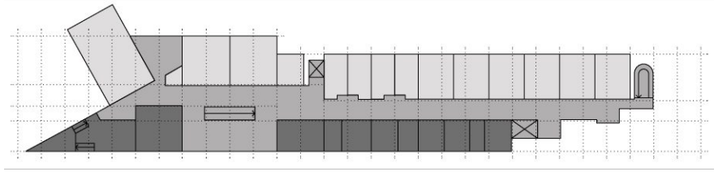
Doors, windows, railing, and sanitary equipment can and will be relocated onsite or stored for future reuse in another project.



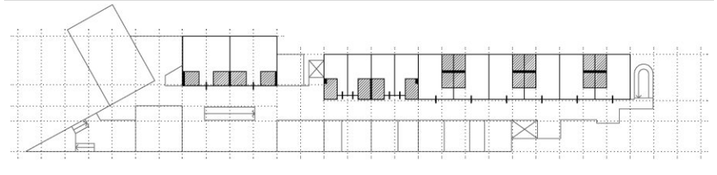
Load-bearing elements



Installation shafts



Layered spaces. From top to bottom: Patient rooms, circulation, services areas



Existing patient rooms with adjacent wet areas

95. Diagrams depicting the existing spatial organization in relation to the structure and installations with the second floor as an example

Spatial Qualities and Potential

The research in the Material and Component Catalogue builds the foundation for a better understanding of the materials and how they relate to each other. It helps to understand the spatial qualities and limits of the existing to decide what to keep. Most of the materials and components in the Europa-Pavillon are problematic if removed. However, understanding the quantity and distribution of materials is not enough. It is necessary to address the materials and components individually, locate them in their context and understand how they interact and relate to each other. This process changed the initial approach toward the existing building. A lot of the things that were considered to be problematic became essential for the design. Therefore, attempting to preserve most of the existing building stock on-site is ultimately the most circular strategy.

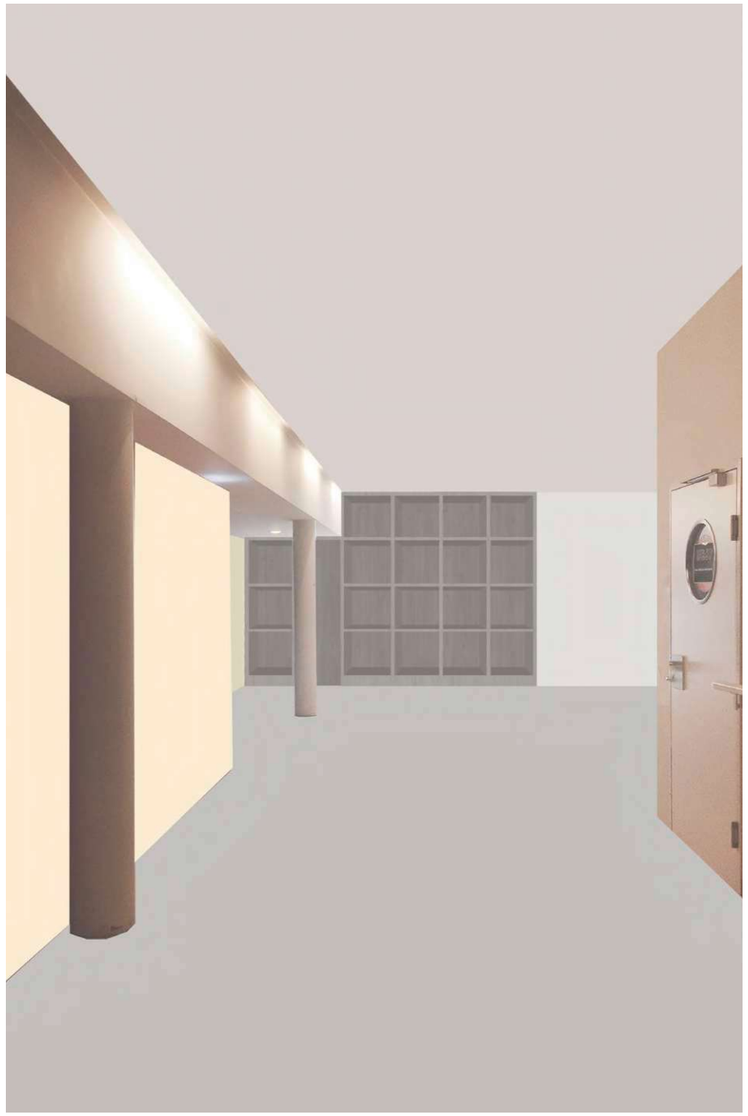
The Structure

The load-bearing structure of the Europa Pavillon follows a raster of 7,02 m with some variations in the longitudinal direction along the floor plan. The location of the installation shafts does not always follow the grid of the load-bearing structure, but rather, it corresponds with the internal rhythm of the different room types. The shafts should remain in place and extended when necessary.

The Typology

The Europa-Pavillon was configured to function as a care center. The typology can be considered a residential-like building with room for 60-beds. As a reaction to the Gürtel, the program is organized in layers: service spaces oriented to the street and patient rooms to the inner courtyard. A single corridor extends throughout the entire length of the building. Besides its functional aspects, such as being wide enough to ensure the easy movement of beds, it is designed as a therapy path for patients. This idea is movement as a tool for healing. A therapy room with ramps and stairs is positioned in the angular corner at the north end of the building. The main single-flight staircase connects all the floors, from the basement to a roof terrace. On the opposite end of the corridor is a two-flight staircase that only goes up to the second floor. This staircase should be extended up to the rooftop for fire safety reasons. To conclude the vertical circulation, two elevator shafts made of prefabricated concrete are part of the load-bearing structure; one is a passenger elevator, and the other is a bed lift.

What are the possibilities within the existing typology? How much intervention is necessary to make the future program work while keeping demolition to a minimum? Furthermore, lastly, what type of housing is possible in the Europa-Pavillon?

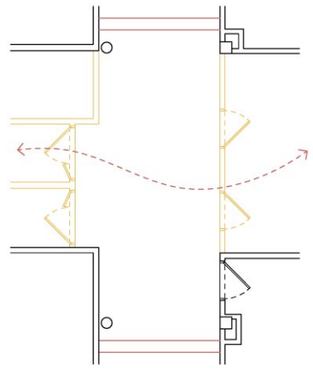


96. Collage of the possibility of dividing the corridor

The Circulation

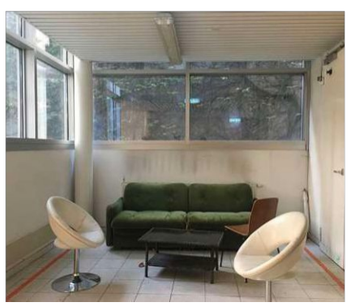
When first observing the regular rhythm of the structure in combination with the central corridor, the reaction was to break the existing layers and propose double-sided duplex apartments. Soon, several issues were encountered. When limiting the size of the apartments to the raster (3,51-7,02 meters), the units are either very small or too big in proportion to the inner apartment stair. The building varies in depth and height, complicating the position of the apartment stair. The existing patient rooms in the building do not always follow the structural raster, nor do the installation shafts. Replacing this organization would mean demolishing most of the existing partition walls and rethinking the installation logic. The Europa-Pavillon was initially designed to be a care center, which means the spaces and the equipment are barrier-free. The design must not lose this existing quality for a "logical" typological reaction. It did not suit the existing. In addition, the distribution of the possible duplex would block access to existing stairs and elevators, forcing the creation of new vertical circulation.

97. Existing condition of the corridor (2021)

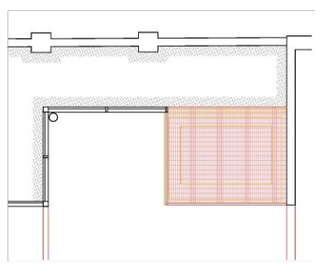


98. The implications of the changes on the floor plan

99. Collage of the possibility of removing the elevator and creating an outdoor space in its place

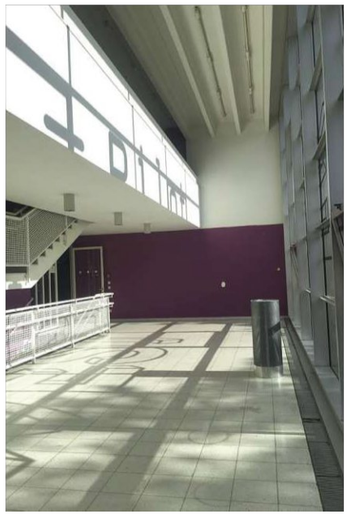


100. Existing condition next to the elevator (2021)

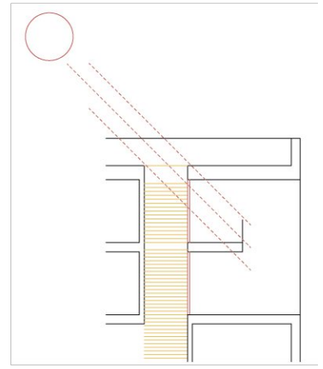


101. The implications of the changes on the floor plan

102. Collage of the possibility of transforming the space into a double-height unit and creating a light shaft in the place of the stairs

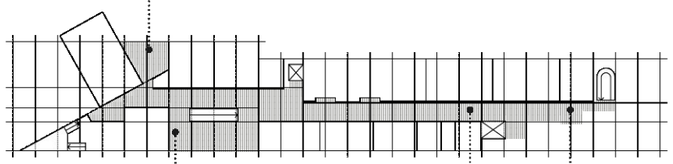


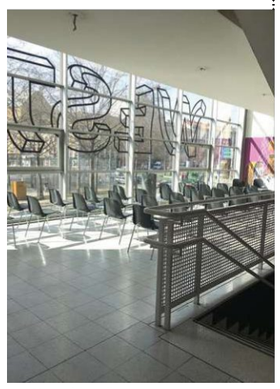
103. Existing condition of stairs and gallery space (2021)



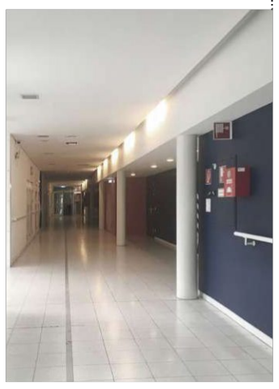
104. The implications of the changes in the section

105. View of terraces on the ground floor and first floor (2021)

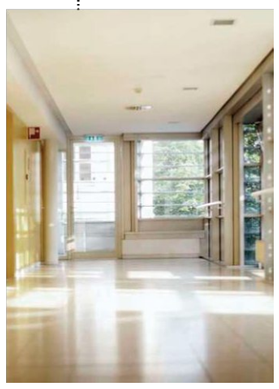




106. View of the gallery space toward the street (2022)



107. View of the central corridor



108. View of the corridor toward the trees (2018)

The corridor is a special moment worth keeping. It is part of the logic of the circulation and the entire typology. The corridor varies in depth by keeping a comfortable width of at least two meters, where neighbors can meet or keep a good distance, people can move their furniture easily, or, in some cases, organize gatherings. The corridor goes from darker areas to ones full of light coming through the existing glass facade. The corridor provides a view of the busy Gürtel in the Gallery Space, a view of the tall trees and the historic brick wall when it gets very angular in the south end, and lastly, it opens to a shared terrace oriented to the public park. Concerning the future housing program, the mentioned characteristics of the circulation give it the potential to become a continuation of the urban space, a "street" inside the buildings where different levels of privacy and users interact. Another essential element of the circulation are the double-leaf doors in different colors: dark blue, light blue, and yellow. The existing color concept helps with the orientation inside of the building. Most of these doors should remain as entrance doors for the units, and the rest can be relocated for new units in the same building.

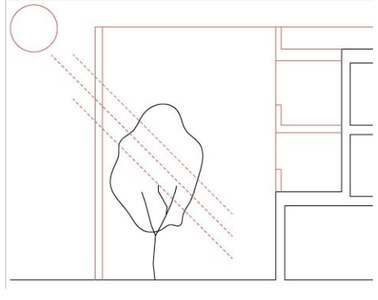
109. Collage of the possibility of closing the corner with a filter and creating a patio

The Corner

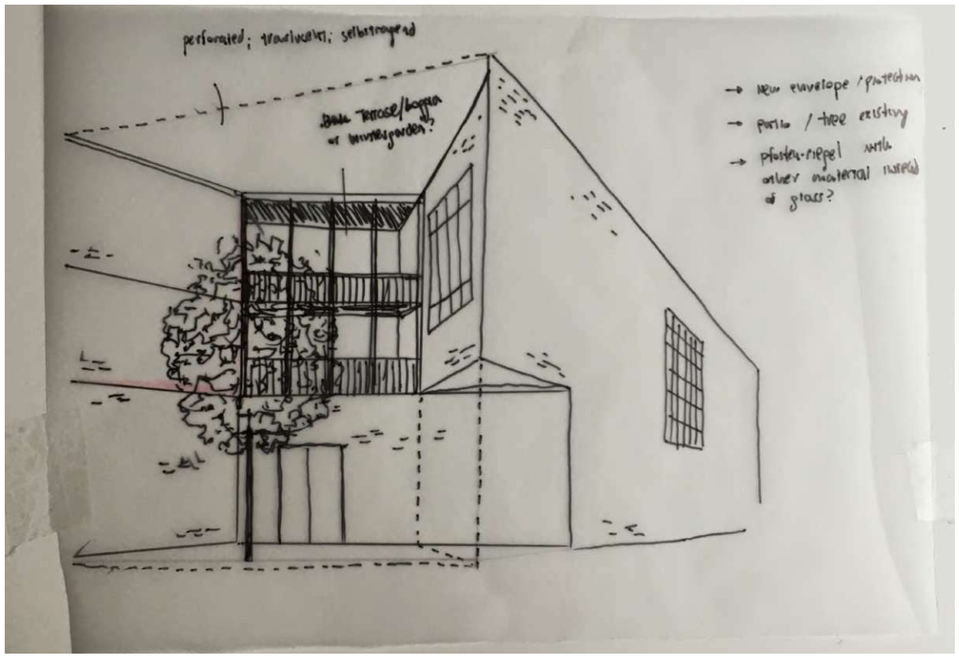
The dominant corner, where the clinker facade continues only at ground floor level, marks the entrance to the building. In the higher levels, the clinker is cut abruptly with a sharp corner, and a new facade of gray plaster begins. The idea of continuation of the brick enclosure is extended throughout the two existing facades. Rather than creating a contrast between what is old and new, the subtle differentiation happens by using salvaged ceramic tiles in accordance with the color scheme of the original clinker.

In the corner, the entrance remains delimited by the cantilever, but it gains definition through a perforated brick wall. The patio encloses an existing tree and provides a transition zone from the busy streets before entering the building. The surroundings of the Europa-Pavillon are very crowded and loud. The new brick enclosure defines a transition space into the building. The building is expanded in this area to provide two new floors.

110. The existing condition of the corner (2013)

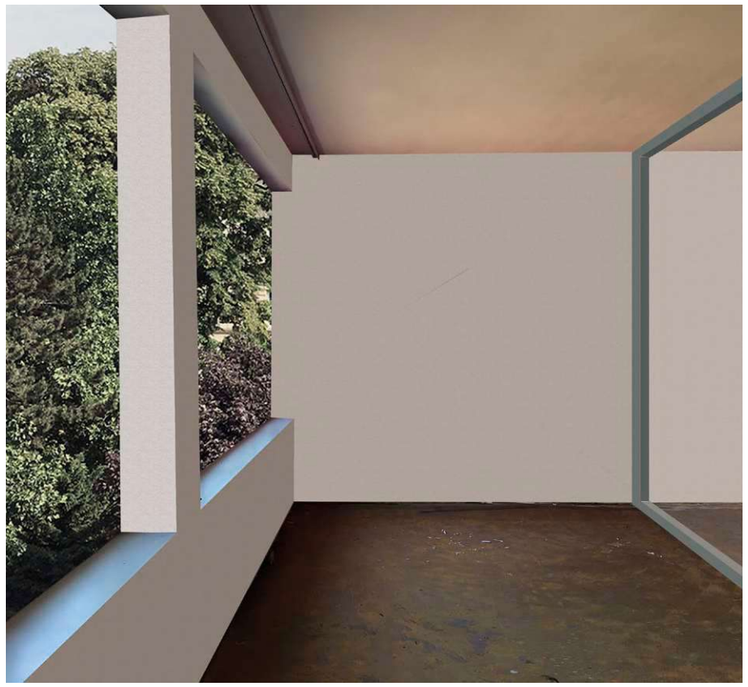


111. The implications of the changes in the section



112. Sketch of the possibility of expanding the building in the corner

113. Existing condition of the corner (2013)



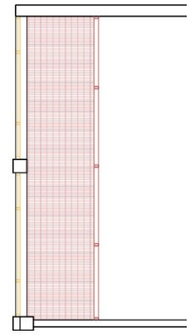
112. Collage of the possibility of removing the windows to create a loggia toward the trees

The Envelope

When approaching from the southwest, the adjacent church's brick enclosure extends into the Europa-Pavillon's dark clinker at first as a low wall. A motif of relief expands throughout the full height of the building, and an aluminum and glass facade breaks the clinker facade to mark the shared spaces within the existing plan and allow the user to establish a dialog with the different external circumstances of the site. Finally, an open corner in the north end, where the clinker facade continues only at ground floor level, marks the entrance to the building. In the higher levels, the clinker is cut abruptly with a sharp corner, and a new finishing of gray plaster begins. The gray plaster extends throughout the east facade in the direction of the park. The east facade is perforated with large windows reflecting the trees and the historical pavilions on the site.

The interaction between the park and the building should happen beyond a reflection. A new layer of private outdoor spaces is the response. The first thought was to create a new layer with balconies. This idea would not work for several reasons: The building is generally relatively deep, and a balcony layer would compromise the light exposure; A balcony layer means creating access from the units, and the demolished external wall insulation system is problematic when removed; the expansion of the building's footprint will take away from the park removing important existing trees. To conclude, the decision was to create loggias. The Europa-Pavillon has large windows that can be dismantled. New patio doors delimit the thermal separation, and the warmer area is reduced, which results in less area to be heated. The new dialogue with the park introduces a new quality to the existing.

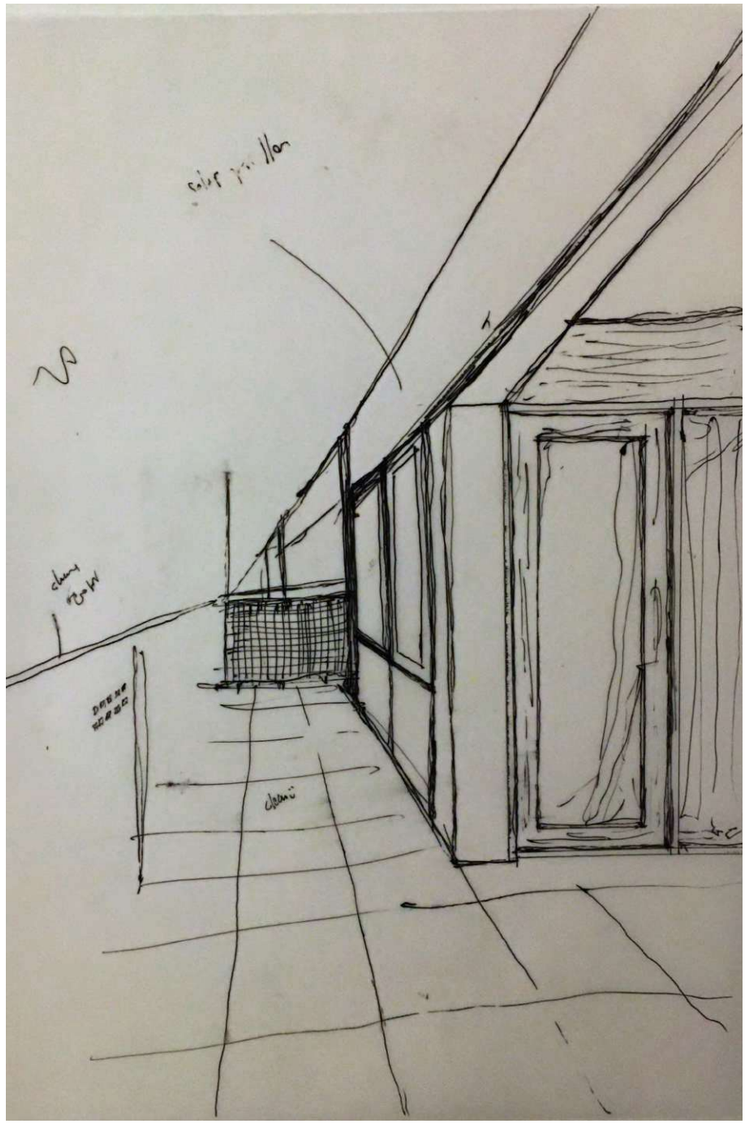
113. Existing condition (2022)



114. The implications of the changes on the floor plan

115. Sketch of the possibility of adding loggias and changing the envelope

116. The existing condition of the envelope (2013)



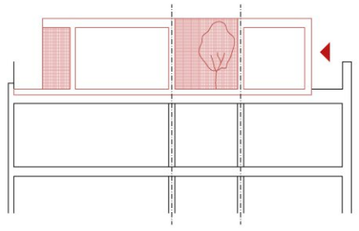
117. Sketch of the possibility of adding a new floor on the roof terrace

The Roof Terrace

According to the architect Martin Kohlbauer, the goal of the roof terrace is to act as a therapeutic space, where convalescent patients can connect with the pulsating city life. [31]

The building's cubature with a flat roof terrace offers the potential for an extra floor though it is important that part of the terrace remains as a shared space. An extra floor opens up the chance of designing apartments with larger possibilities such as cross ventilation, different light exposure, private patios, or duplex apartments.

118. Existing condition of the roof terrace (2021)

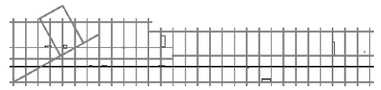


119. The implications of the changes in the section

31 Markus Kristan, Martin Kohlbauer: Buildings and Projects 1992-2004 (Springer, 2004).

IV Design Response

The Transformation



1

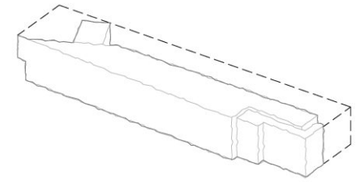
Define what remains on-site

2

Relocate dismantled

existing components

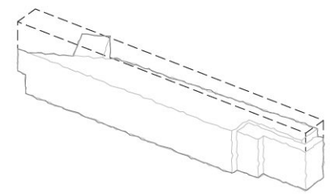
+ complement with new materials



3

Refurbish envelope

and create new outdoors spaces

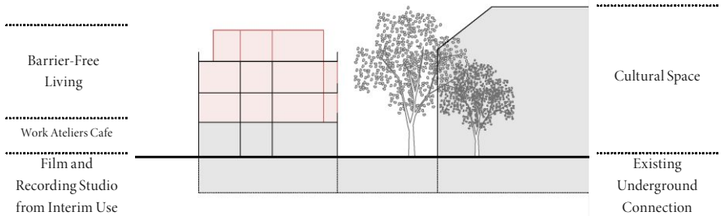


4

Addition and extension

121. Diagrams depicting the intervention of the Europa-Pavillon

120. Aerial view of the transformed Europa-Pavillon



122. The program

123. The new outdoor spaces

The Program

The project involves the minimal demolition and expansion of the Europa-Pavillon. The design goal is not to fulfill an exact program but to reuse the existing conditions of the materials and the spatial configuration. The approach to the transformation of the Europa-Pavillon is to provide barrier-free housing in combination with a cafe, atelier, workspaces, and a physical therapy center. The idea is to change the original private character of the building into different levels of privacy: personal, shared, and public spaces. In this way, the spaces create a new dynamic between the existing building and the site, where different users with different needs can interact.

The Transformation of the Existing Floor Plans

The ground floor spaces oriented to the courtyard are used as a physical therapy center and a cafe, which can be directly accessed from the public park. The ground floor and basement spaces that are not well exposed to natural light are used as working spaces, ateliers, or other non-residential functions.

The former multipurpose spaces on the first and second floors are transformed into a shared kitchen and a workshop/atelier space. The remaining space on the first floor that cannot be used for living is used as a library. A new shared loggia complements the existing shared terrace on the first floor.

Most internal walls of the former patient and service rooms on the first and second floors remain in place. Some new wooden frame walls are added to define living spaces to create apartments. Another significant aspect of the intervention is the new layer of loggias in the direction of the courtyard. This way, a new interaction with the outdoors is brought into the existing space without taking square meters from the park. The plastered east facade is refurbished with ceramic tiles in accordance with the west clinker facade to unify them.

The Extension

A timber frame extension of the first and second floors is added to the north end of the building. The main entrance to the building gains definition because of the new volume. A perforated brick wall encloses the existing tree and creates an entrance patio that acts as a transition zone from the busy Neubaugürtel before entering the building. On the ground floor, a new passage connects the entrance patio to the courtyard. The service areas can also be accessed from here.

The extension provides two 3-bedroom apartments that can be accessed from the existing corridor. When entering the apartments, the first space is oriented to the entrance patio and opens into a central space that doubles as a kitchen. Two others living spaces are oriented to the opposite side and have access to a terrace with a view to the historic buildings.

The Addition

A timber frame addition occupies the available area of the former roof terrace. The addition is supported on new concrete beams, and the load-bearing walls follow the existing rhythm and grid of the skeleton structure of the floors below. The position of the existing installation shafts is also considered for the design. The new floor accommodates ten new apartments and a shared space with a small kitchen. The apartments range from 1 to 4 bedrooms, with a separate kitchen and at least one private outdoor space. The idea is to achieve variety in the floor plans within the existing constraints and provide larger units than those on the floors below.

The new floor is accessed by the existing elevator and main staircase in the center of the building. The stairs in the south end of the building are extended for fire safety reasons. In order to keep the existing circulation in use, besides two duplex apartments, all units have one floor. This decision is further justified by the goal of accessibility, a matter that is important for temporary and permanent reasons. The entry to the apartments is from an open walkway on the side of the street, which extends from one end of the building to the other. Changes in direction and size break its length. It offers views to the west, north, and south.

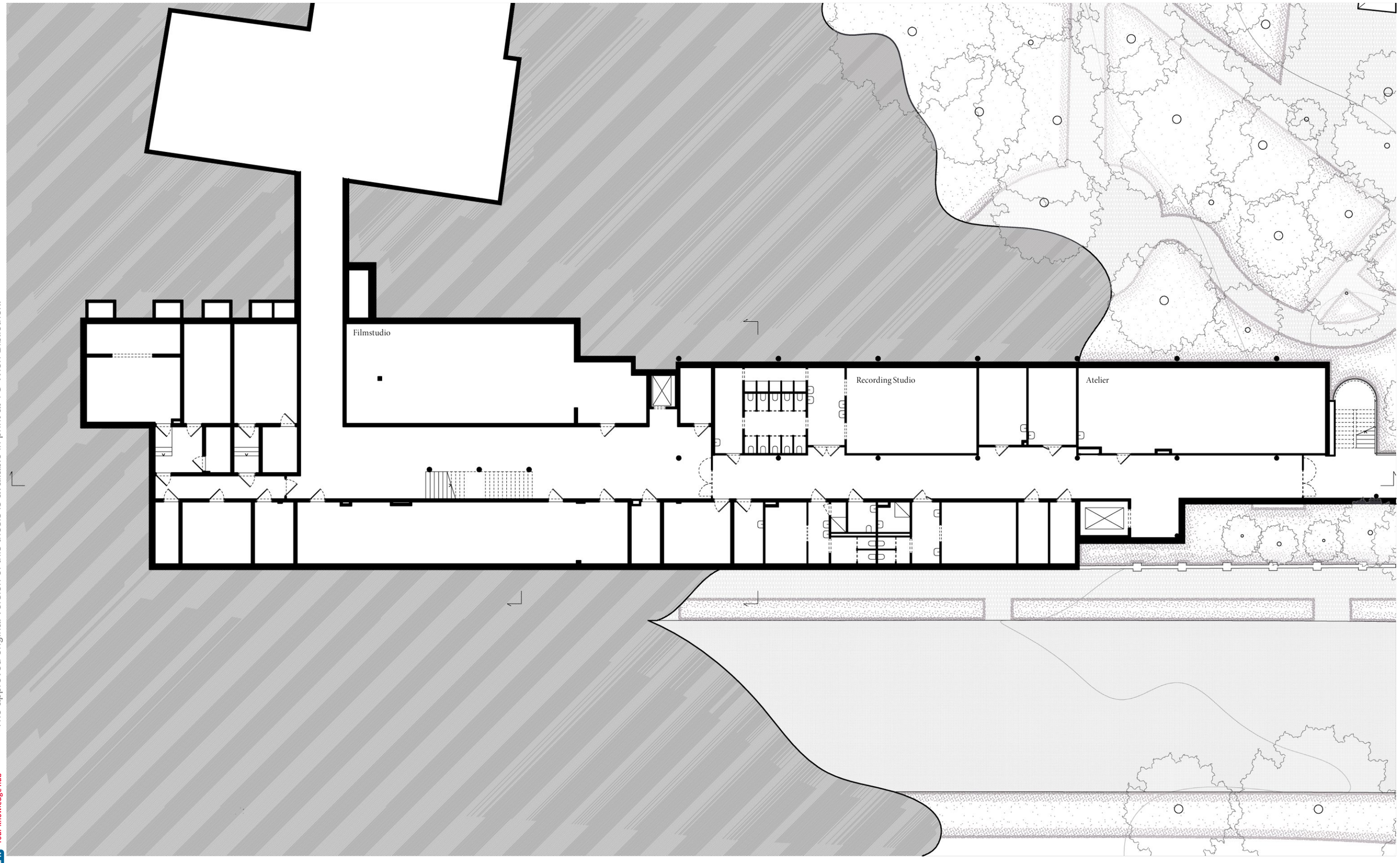
Flexibility is provided by a resilient floor plan that adapts to changes and offers a variety of atmospheres. All rooms can be accessed separately from a central space that doubles as a kitchen. The main living spaces are oriented to the park and have access to a covered terrace. A barrier-free bathroom and a secondary “extra” space are oriented to the street.

The New Envelope

The composition of the openings for the new elevations follows the existing rhythm. The strictness of the facade is broken by the variation in distance between the openings in order to accommodate the interior spaces. The windows and doors have the same proportions. Keeping future reuse in mind, having a batch of the same elements is essential in case of a dismantling process. Contrasting the frame of the openings to the color of the facade is also relevant for a barrier-free space.

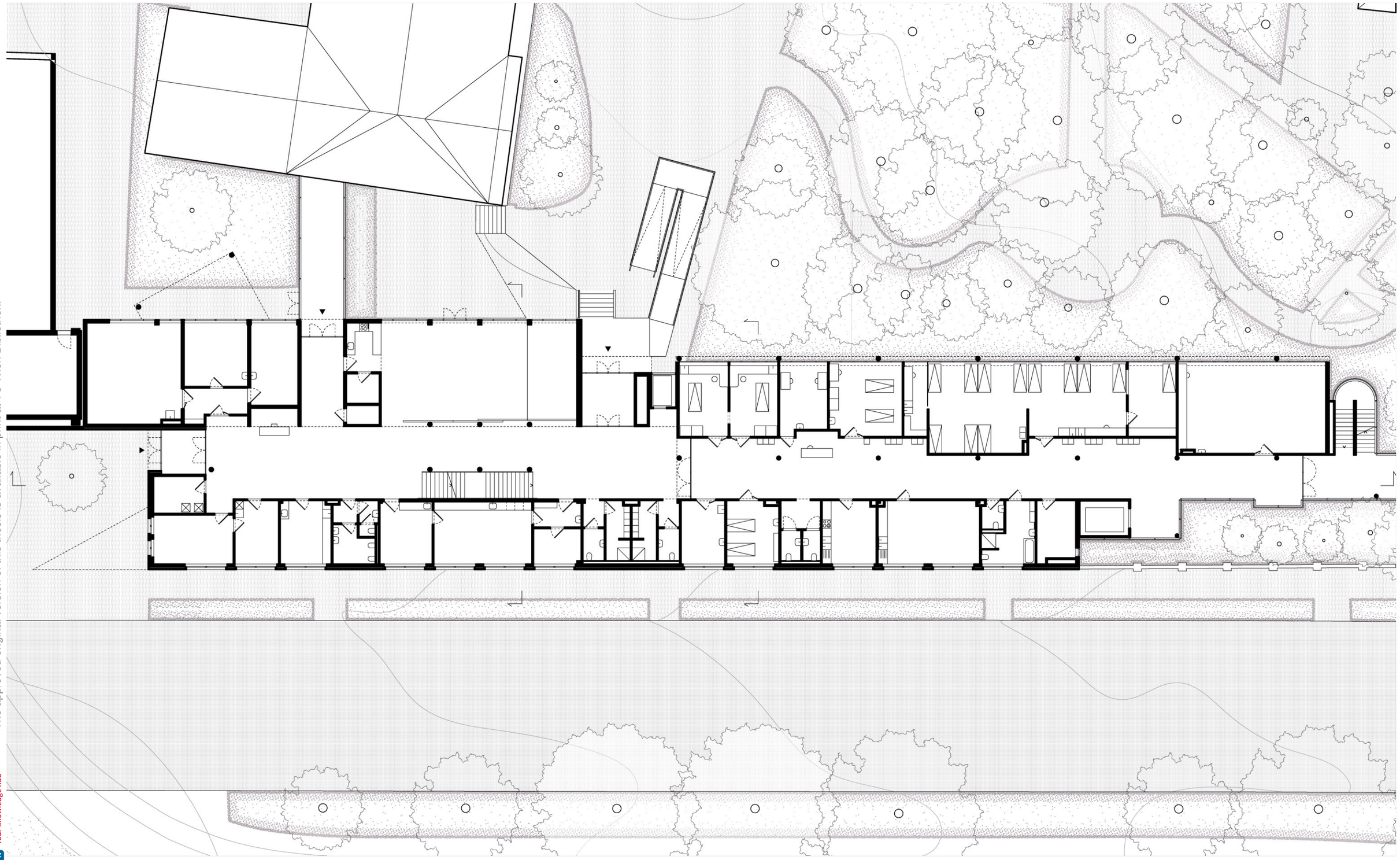
The new facade is a suspended ventilated system because construction and finish remain independent from each other and can be adapted to future circumstances. Choosing this construction is significant because the finish of the facade is an open question that depends on the available materials to be reused. The materials chosen for the drawings and visualizations of the project represent an intention and not a rule. When the goal is to incorporate reused materials and components into the architecture, aspects of the design need certain openness. The idea is to define a material‘s properties in terms of performance, surface, color scheme, and anything else that would serve the architecture. It is proposed to reuse ceramic tiles in a light tone that contrasts with the rest of the Europa-Pavillon but takes from the color palette of the neighboring historic buildings. Ceramics are a renovation-free, resilient material that can be dismantled and reused in the future.

124. Ground Floor - Change Plan - 1:500



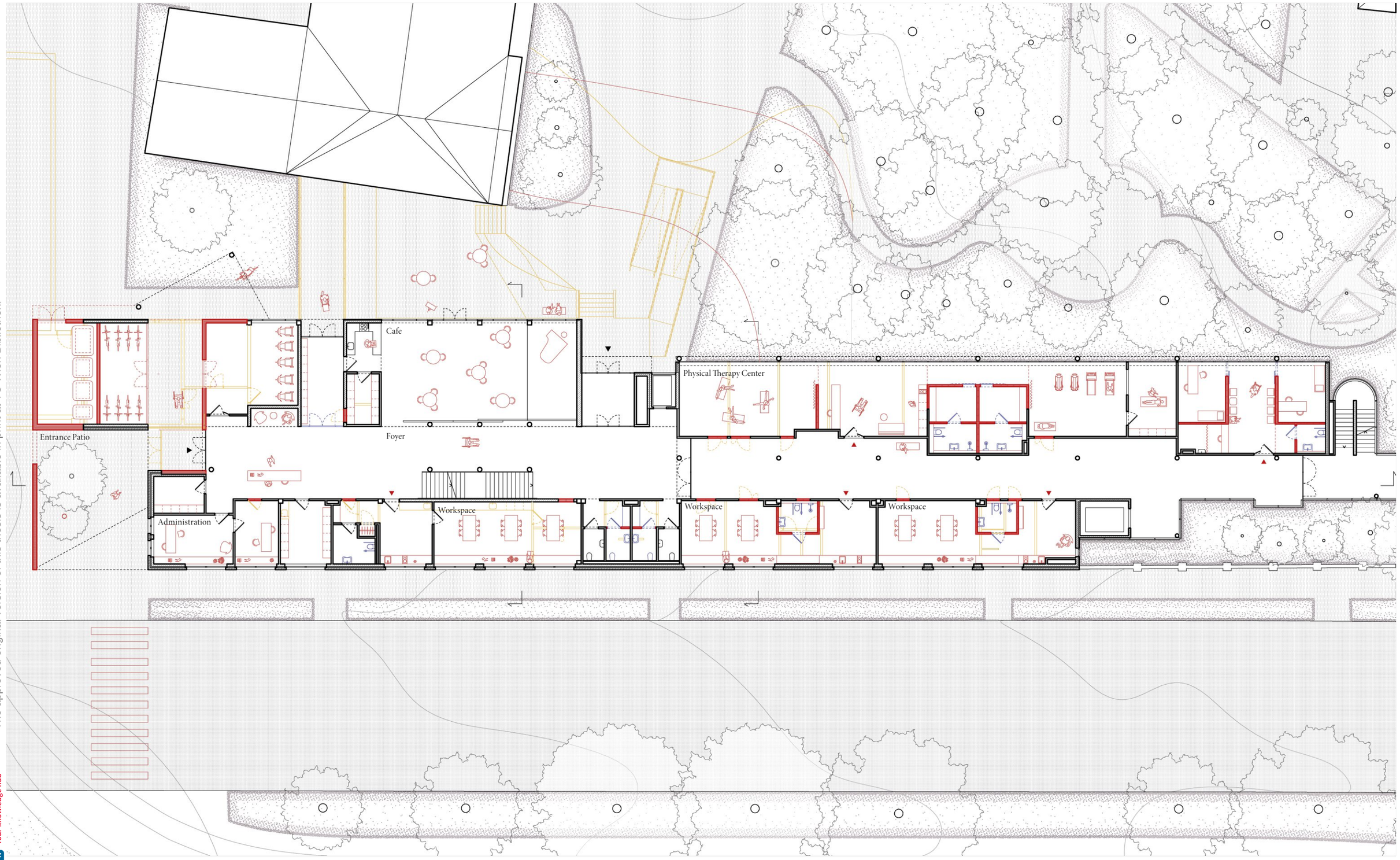
125. Basement - Existing Plan - 1:250

0 10m



126. Ground Floor - Existing Plan - 1:250

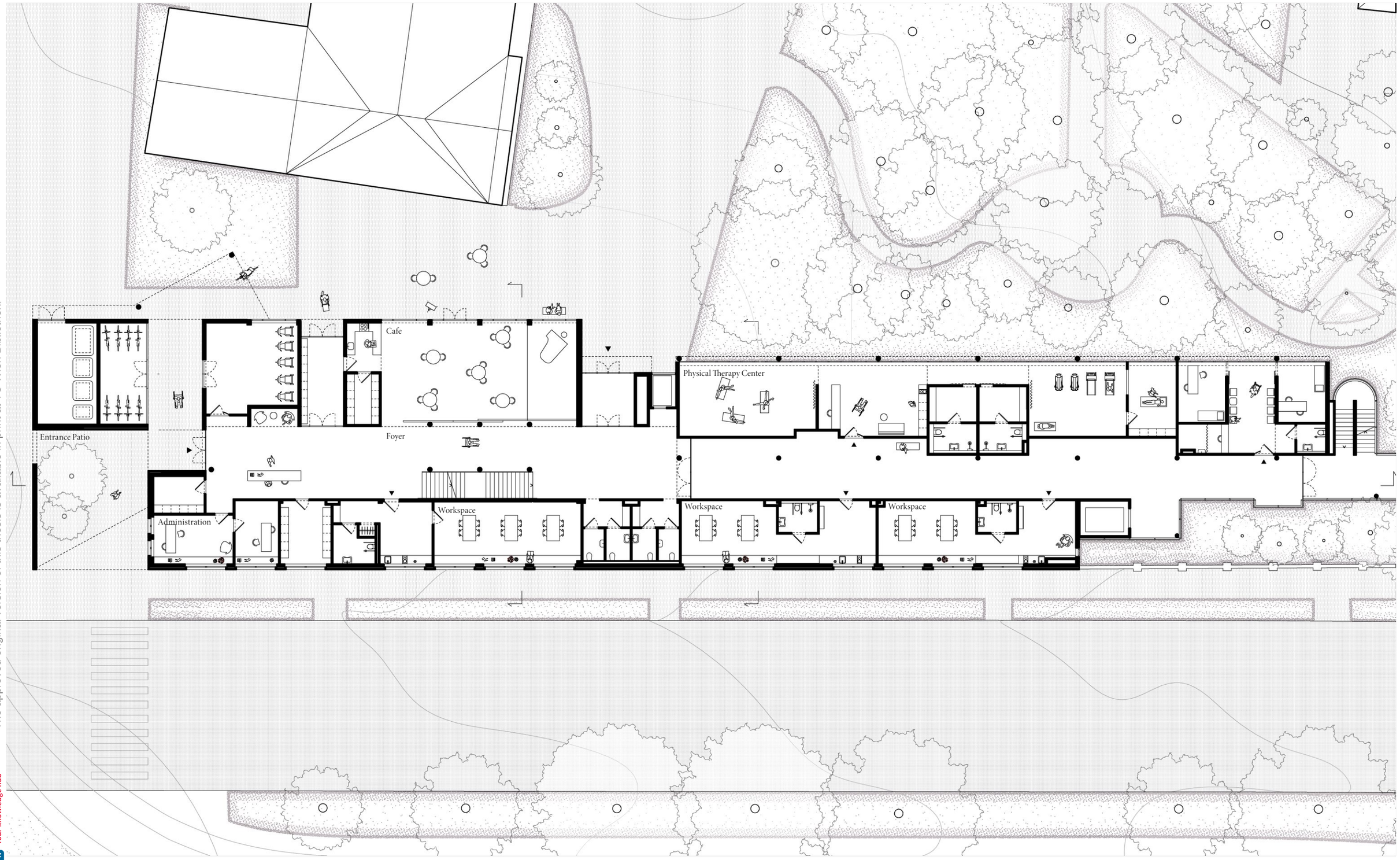
0 10m



Existing Demolished New Relocated

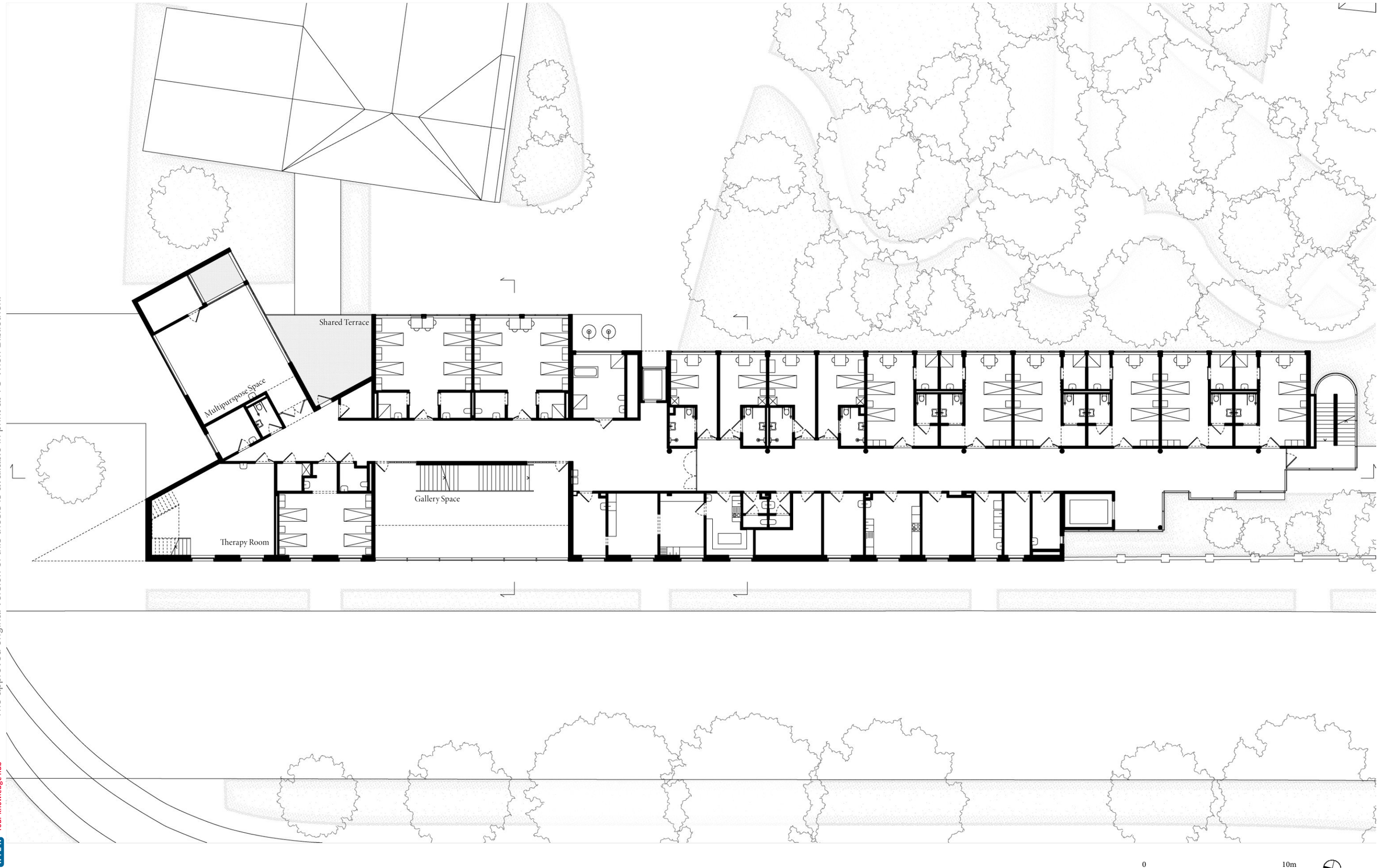
127. Ground Floor - Change Plan - 1:250

0 10m



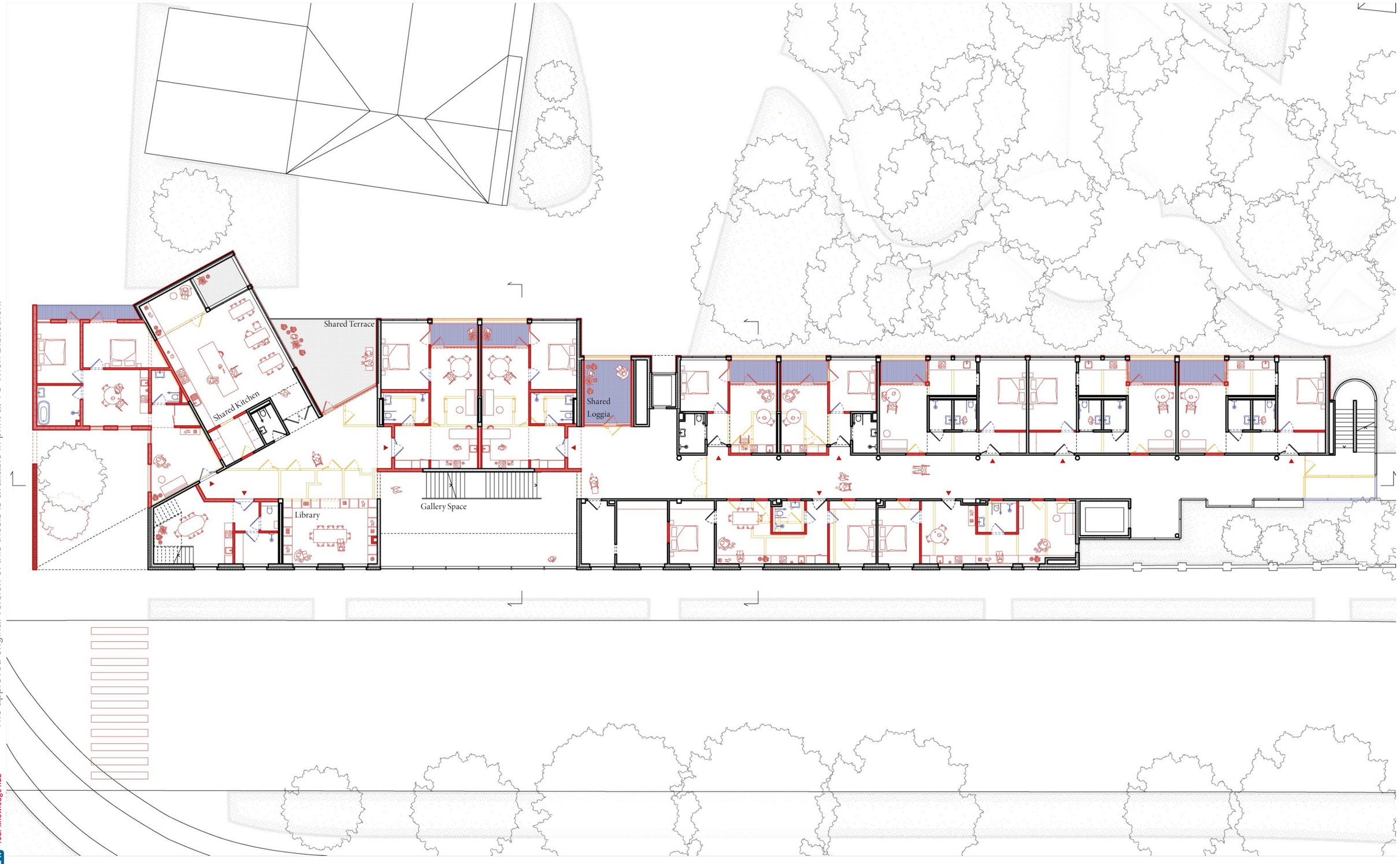
128. Ground Floor - 1:250

0 10m

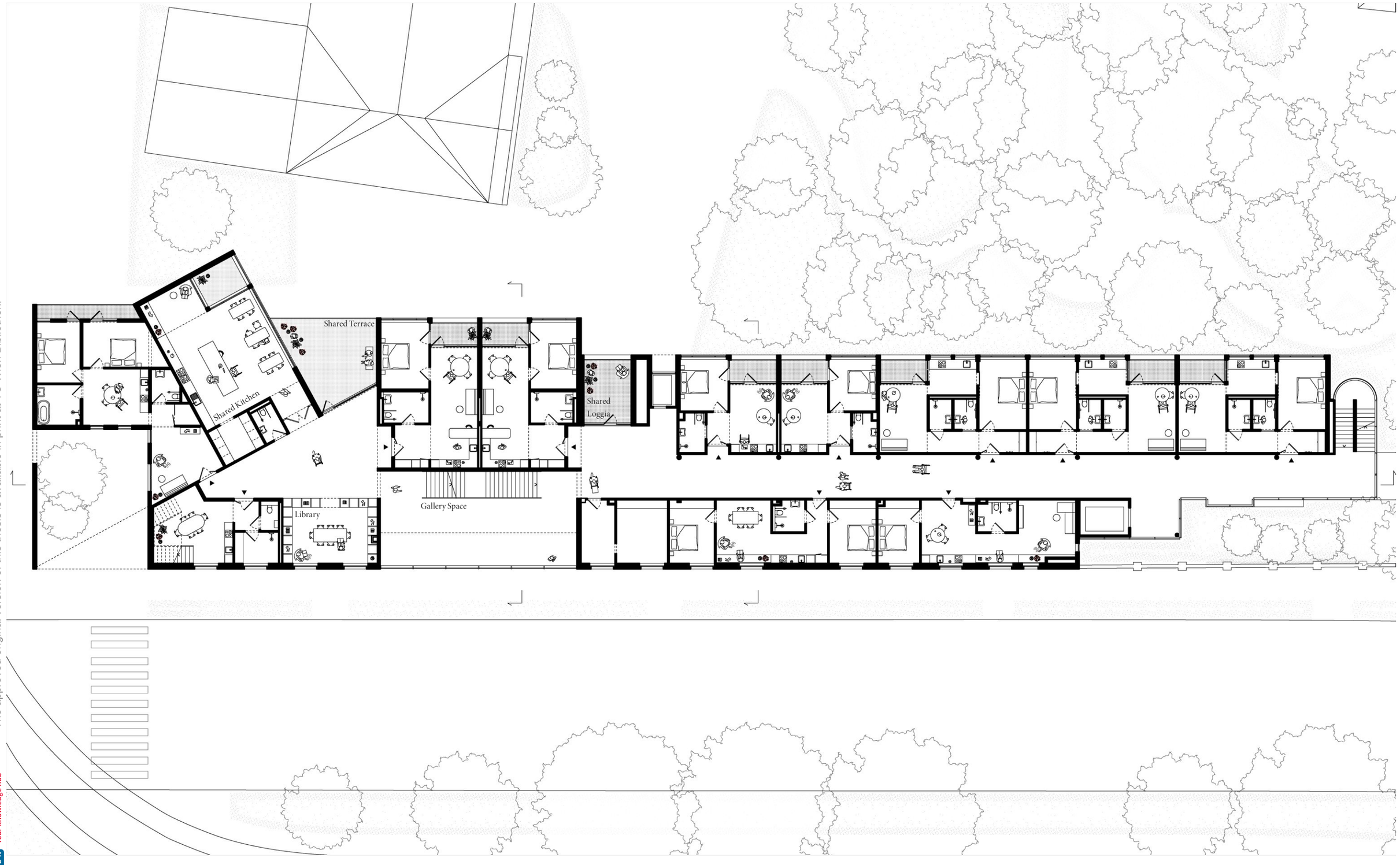


129. First Floor - Existing Plan - 1:250

0 10m

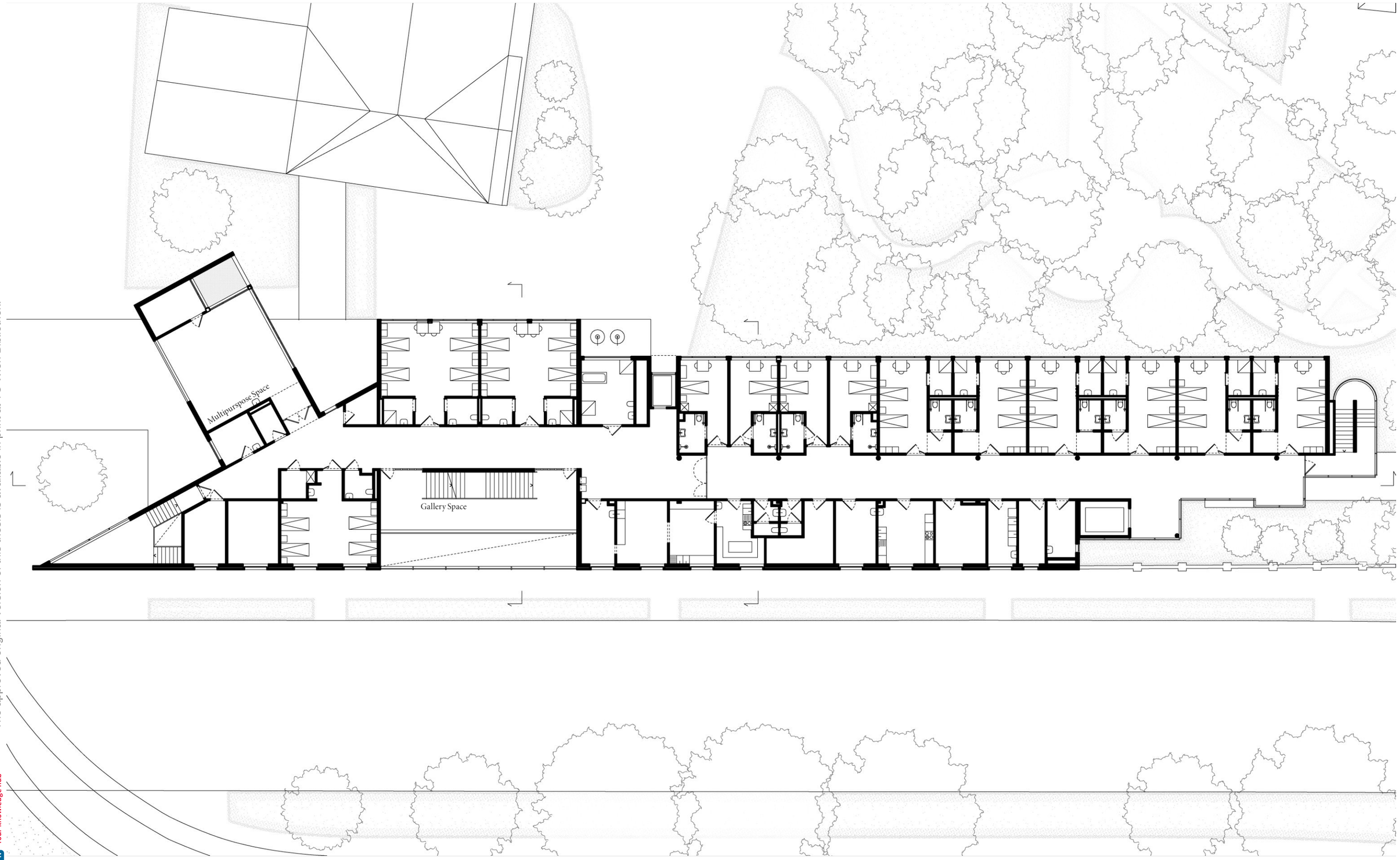


130. First Floor - Change Plan - 1:250



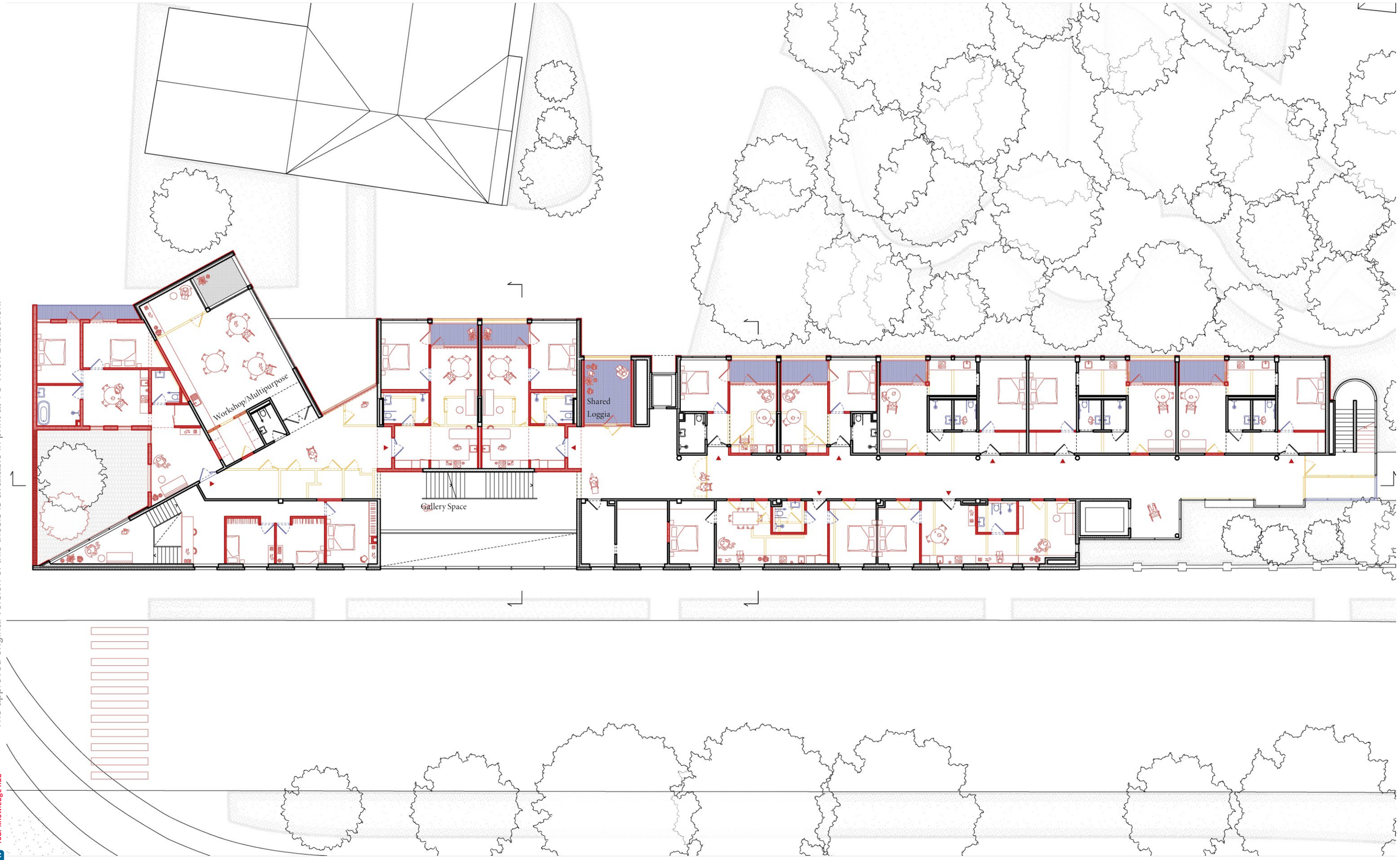
131. First Floor - 1:250

0 10m

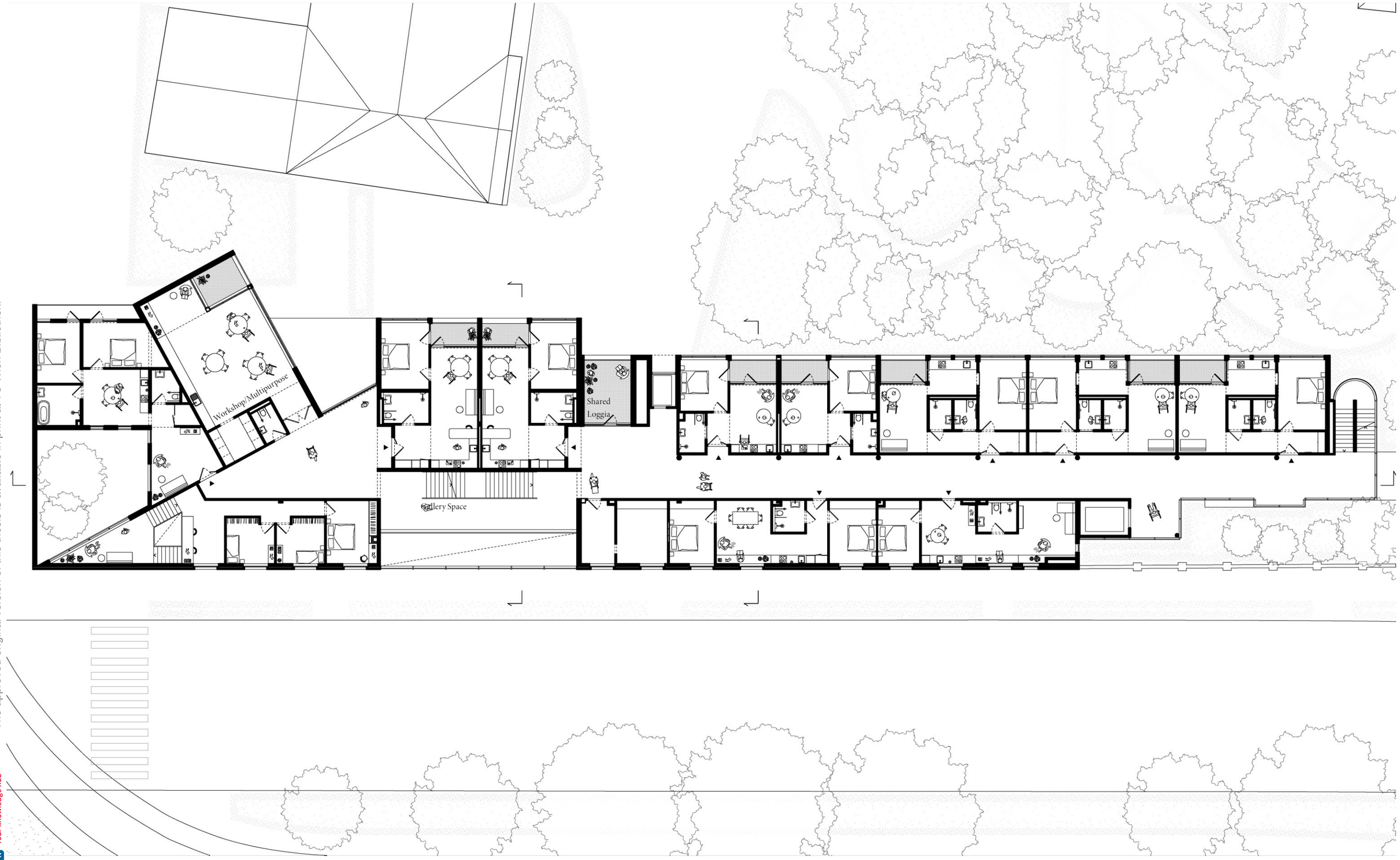


132. Second Floor - Existing Plan - 1:250

0 10m

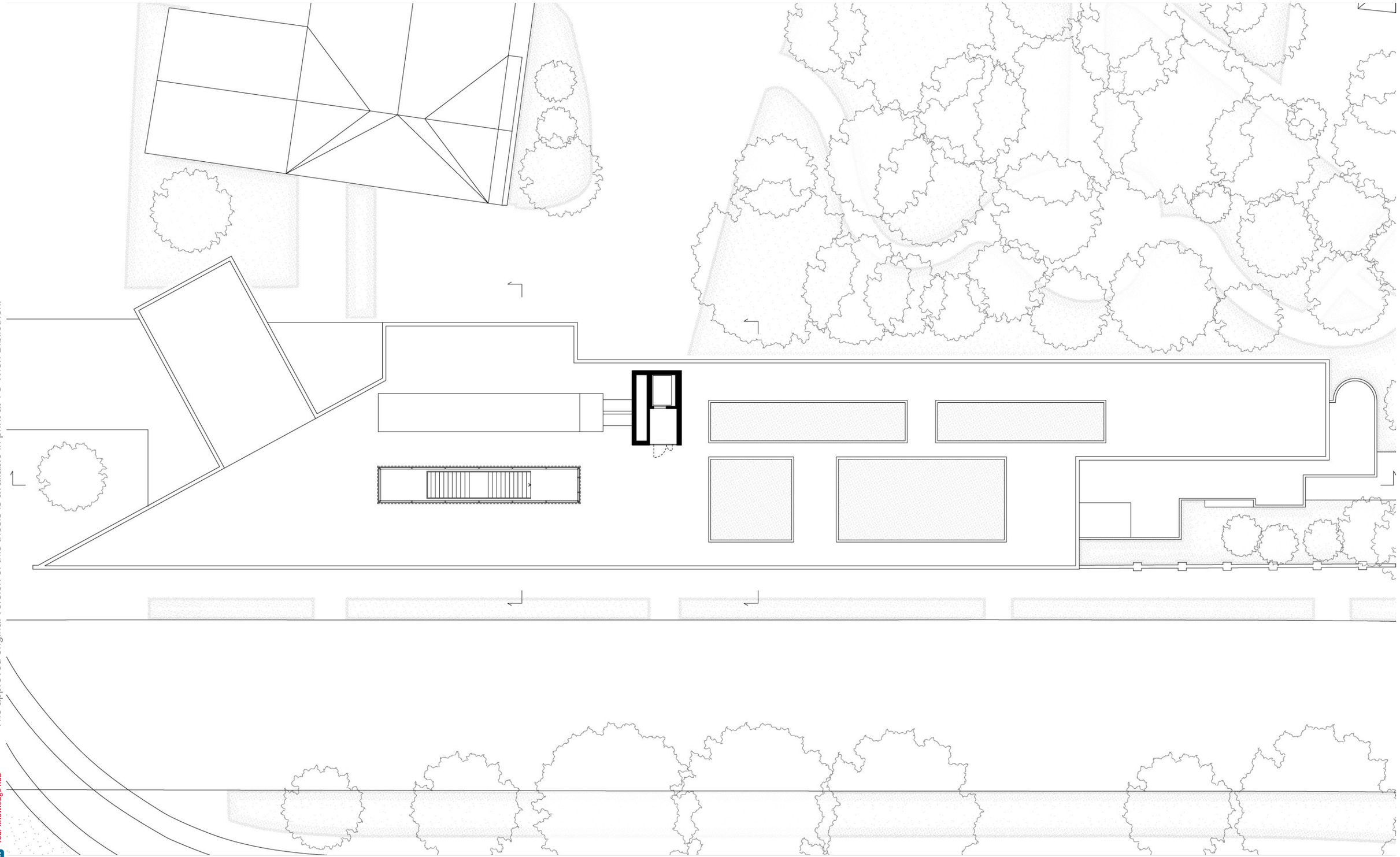


133. Second Floor - Change Plan - 1:250



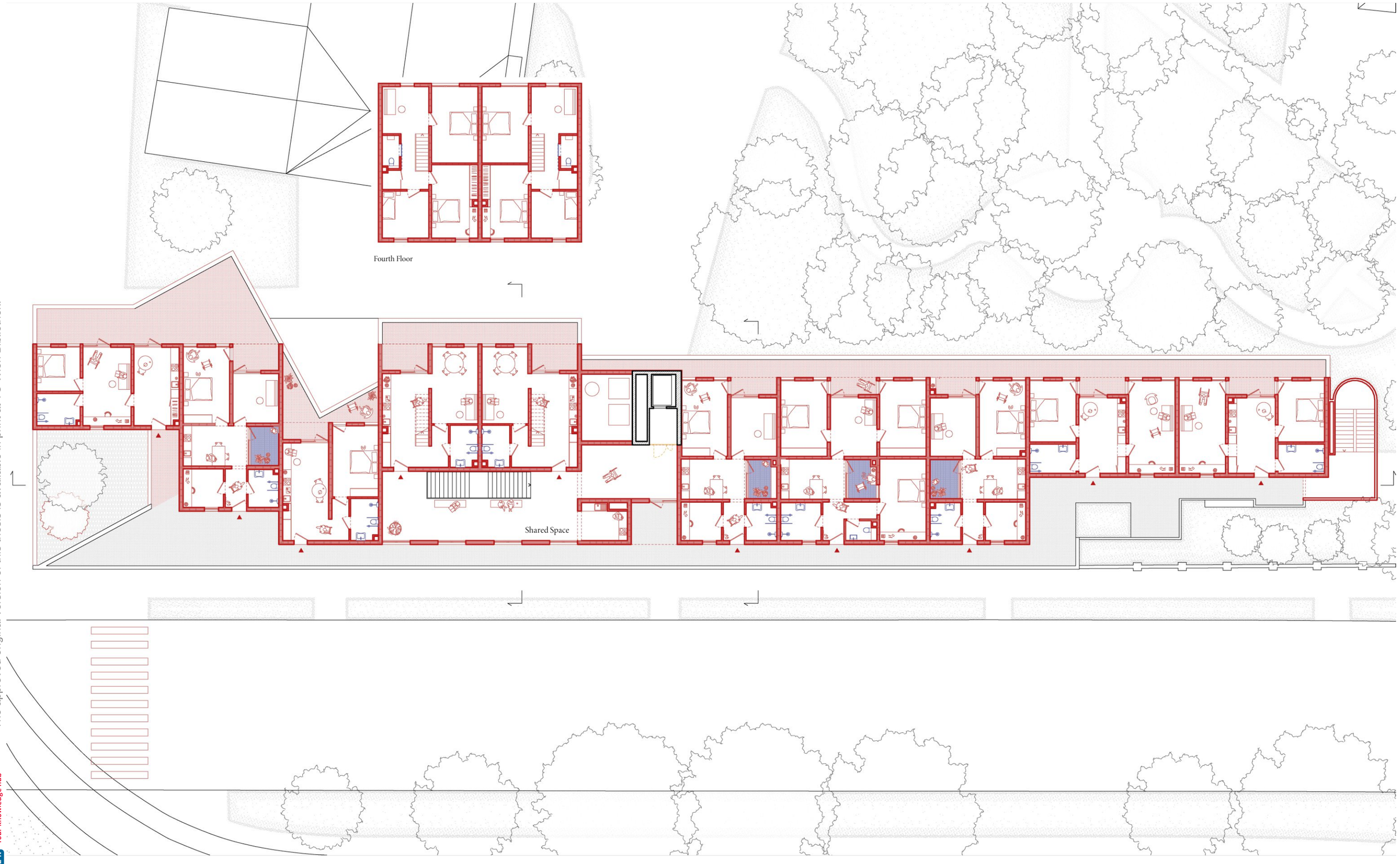
134. Second Floor - 1:250

0 10m

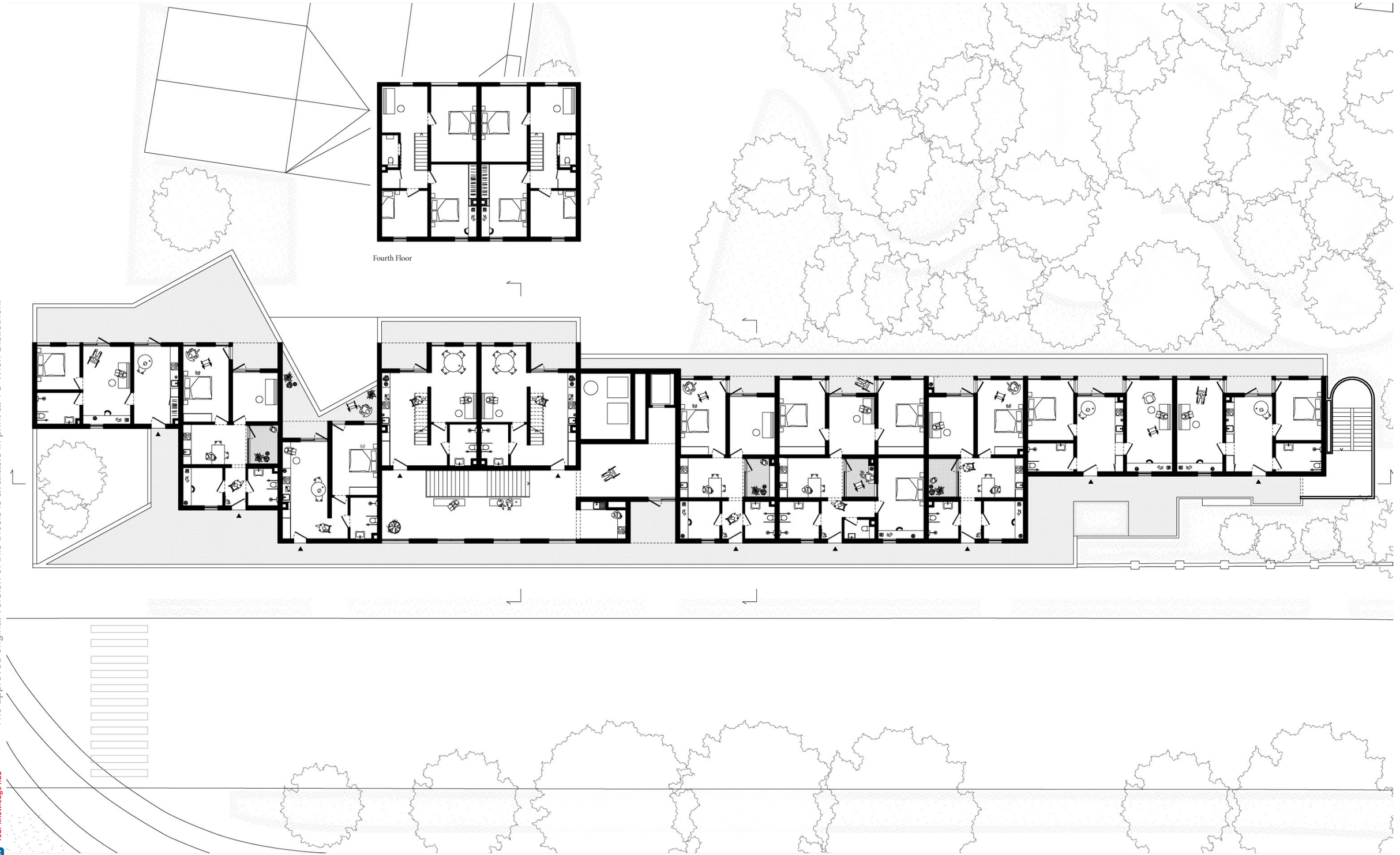


135. Third Floor - Existing Plan - 1:250

0 10m



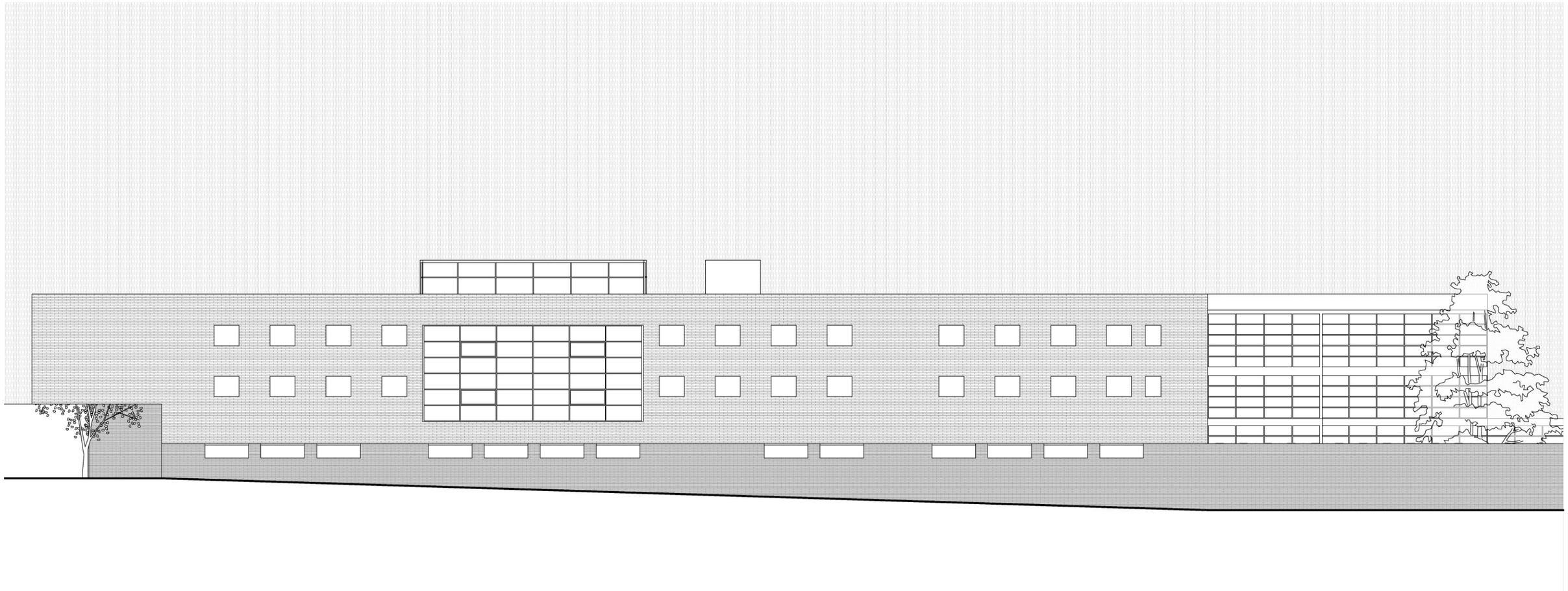
136. Third Floor - Change Plan - 1:250



Fourth Floor

137. Third Floor - 1:250

0 10m



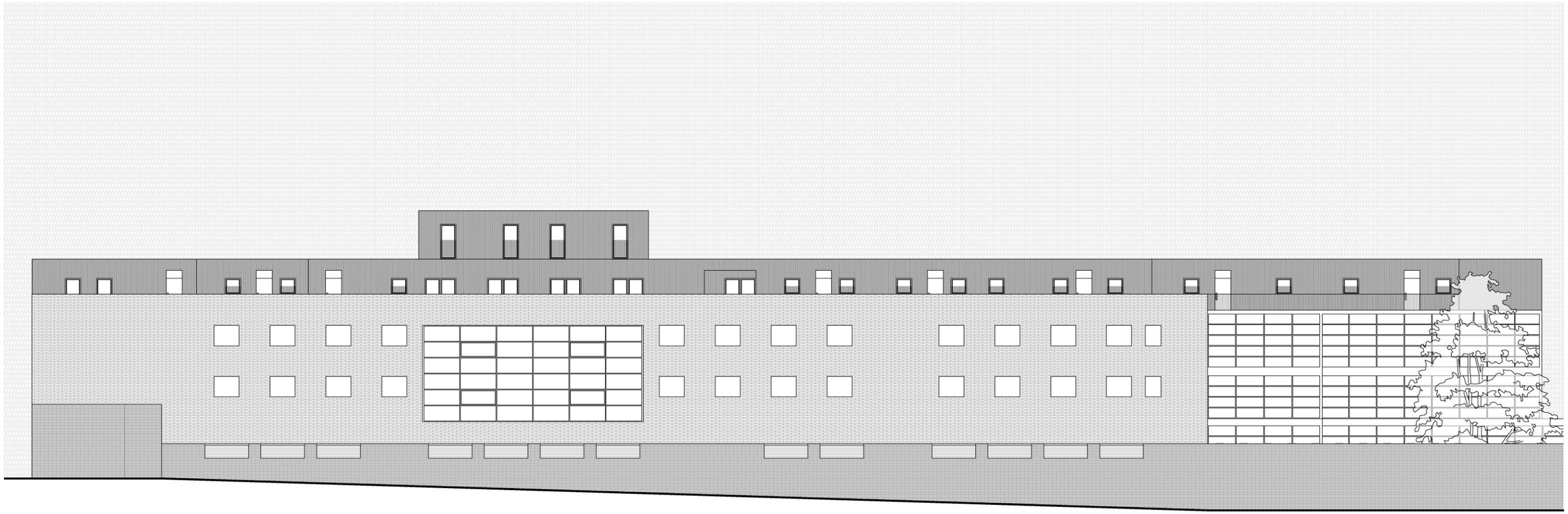
138. West Elevation - Existing Plan - 1:250

0 10m

Existing Demolished New Relocated

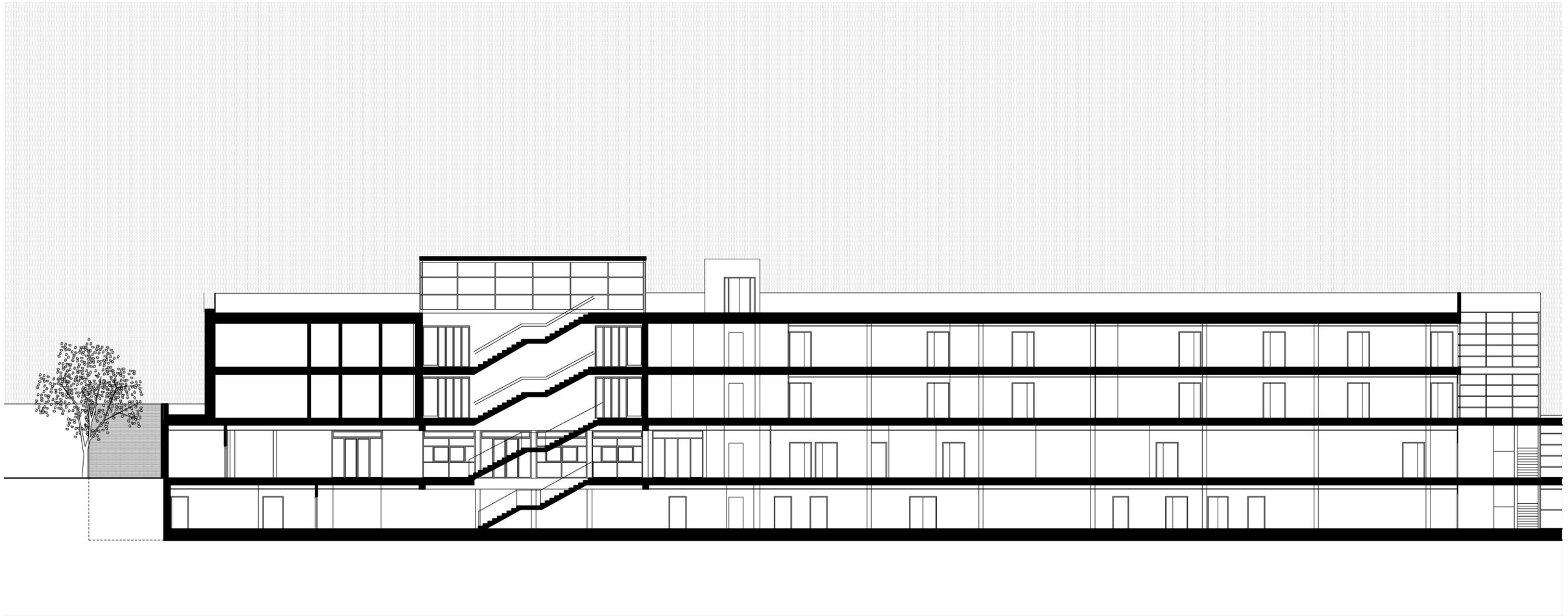
0 10m

139. West Elevation - Change Plan - 1:250



140. West Elevation - 1:250

0 10m



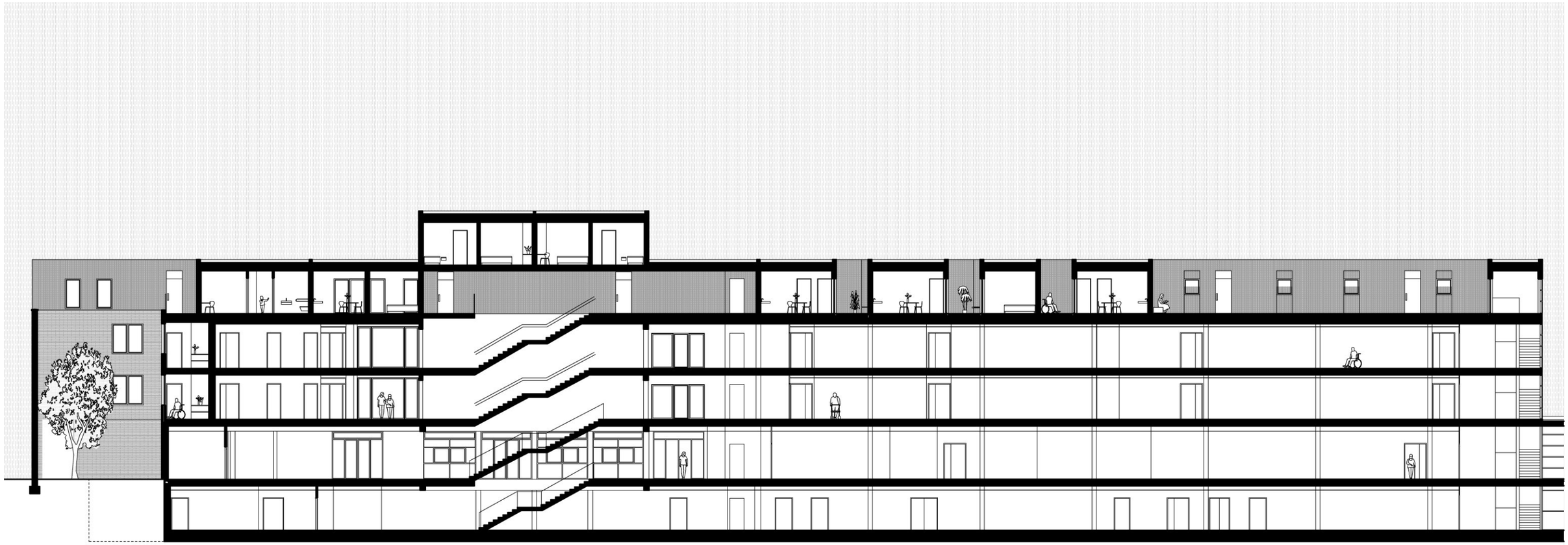
141. Longitudinal Section - Existing Plan - 1:250

0 10m

Existing Demolished New Relocated

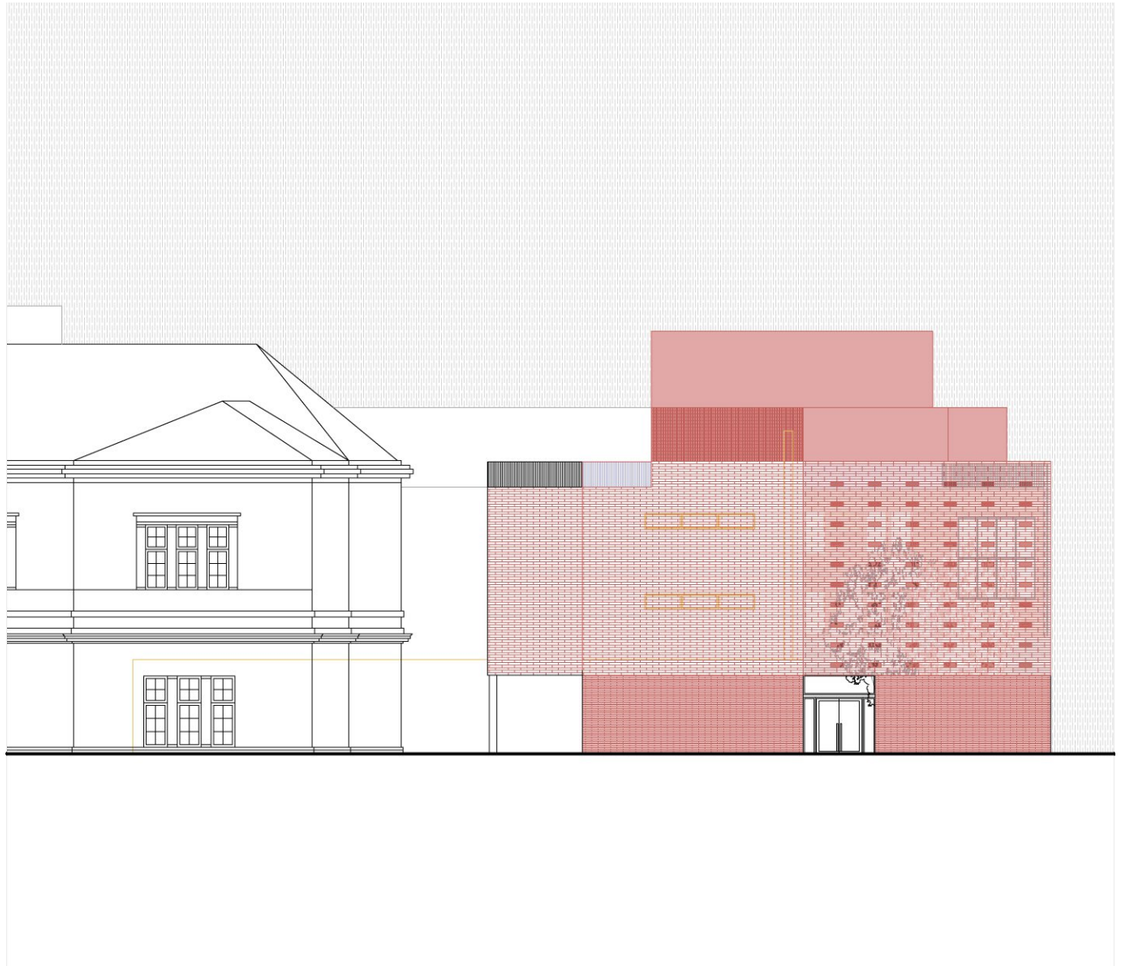
142. Longitudinal Section - Change Plan - 1:250

0 10m



143. Longitudinal Section - 1:250

0 10m



Existing Demolished New Relocated

144. North Elevation - Existing Plan - 1:250

145. North Elevation - Change Plan - 1:250

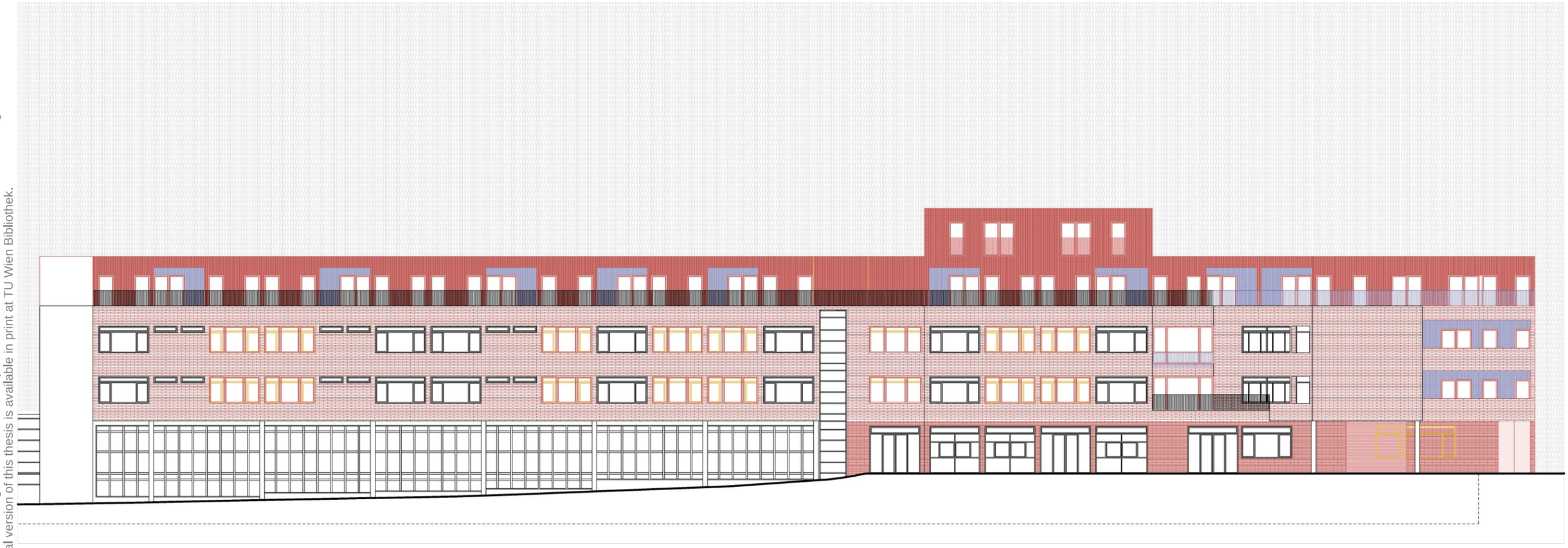
0 10m

146. North Elevation - 1:250

0 10m

147. East Elevation - Existing Plan - 1:250

0 10m



Existing Demolished New Relocated

148. East Elevation - Change Plan - 1:250

0 10m

149. East Elevation - 1:250

0 10m

Existing Demolished New Relocated

150. Section Gallery Space - Existing Plan - 1:250

0 10m

151. Section Gallery Space - Change Plan - 1:250

152. Section Gallery Space - 1:250

0 10m

Existing Demolished New Relocated

153. Section Patient Rooms - Existing Plan- 1:250

154. Section Loggia - Change Plan - 1:250

0 10m

155. Section Loggia - 1:250

0 10m

156. Existing condition of the Europa-Pavillon (2022)

157. The new envelope, the loggias, and the addition

1 External wall, EWIS, loggia

Clinker slip system	1.5
Ventilation	2
EPS	9
Reinforced concrete	15
Foam glass	4
Clinker slip system	1.5

2 External wall, wood frame, new

Clinker slip system	1.5
Ventilation	2
Battens	4/6
Counterbattens, untreated timber, screwed	4/6
Inbetween, two layers wood fiber insulation board	8
Plywood sheating	1.5
Spruce frame, untreteated	16/8
Insulation	16
Plywood sheating	1.5
Installation layer, untreated timber, screwed	4/6
Clay board with fine clay plaster	2

3 Floor slab, appartments

Parquet	2
Dry screed brick	2
Underfloor heating panel	3
Wood fiber insulation board	3
Leveling screed	4
Reinforced concrete	25
Plaster, Plasterboard	1.5

4 Floor slab, loggia

Clinker	2
Gravel	7
Foam glass	10
Leveling screed	4
Reinforced concrete	25
Wood fiber insulation board	3
Ventilation	2
Clinker slip system	1.5

5 Slab, addition

Parquet	2
Dry screed brick	2
Underfloor heating panel	3
Wood fiber insulation board	3
Leveling fill	12
Sloped concrete	4-18
Reinforced concrete	25
painted, plasterboard	0.5

6 Inverted roof, patio

Clinker pavers	2
Gravel 16/32	4
Filter layer	0.5
XPS	16
Bituminous seal	1.5
Sloped concrete	4-18
Reinforced concrete	25
painted, plasterboard	0.5

7 Wood frame floor, new

Parquet	2
Dry screed brick	2
Underfloor heating panel	3
Wood fiber insulation board	3
Plywood sheating	1.5
Spruce frame, untreteated	16/8
Plywood sheating	1.5
Installation layer, untreated timber, screwed	4/6
Clay board with fine clay plaster	2

8 Wood frame green roof, new

Extensive vegetation	4-20
Vegetation support layers	3
Substrate	3
Filter layer	
Drainaige layer	1.25
Waterproof layer	1.5
XPS	4
Plywood sheating	1.5
Spruce frame, untreteated	16/8
Insulation	16
Plywood sheating	1.5
Installation layer, untreated timber, screwed	4/6
Clay board with fine clay plaster	2

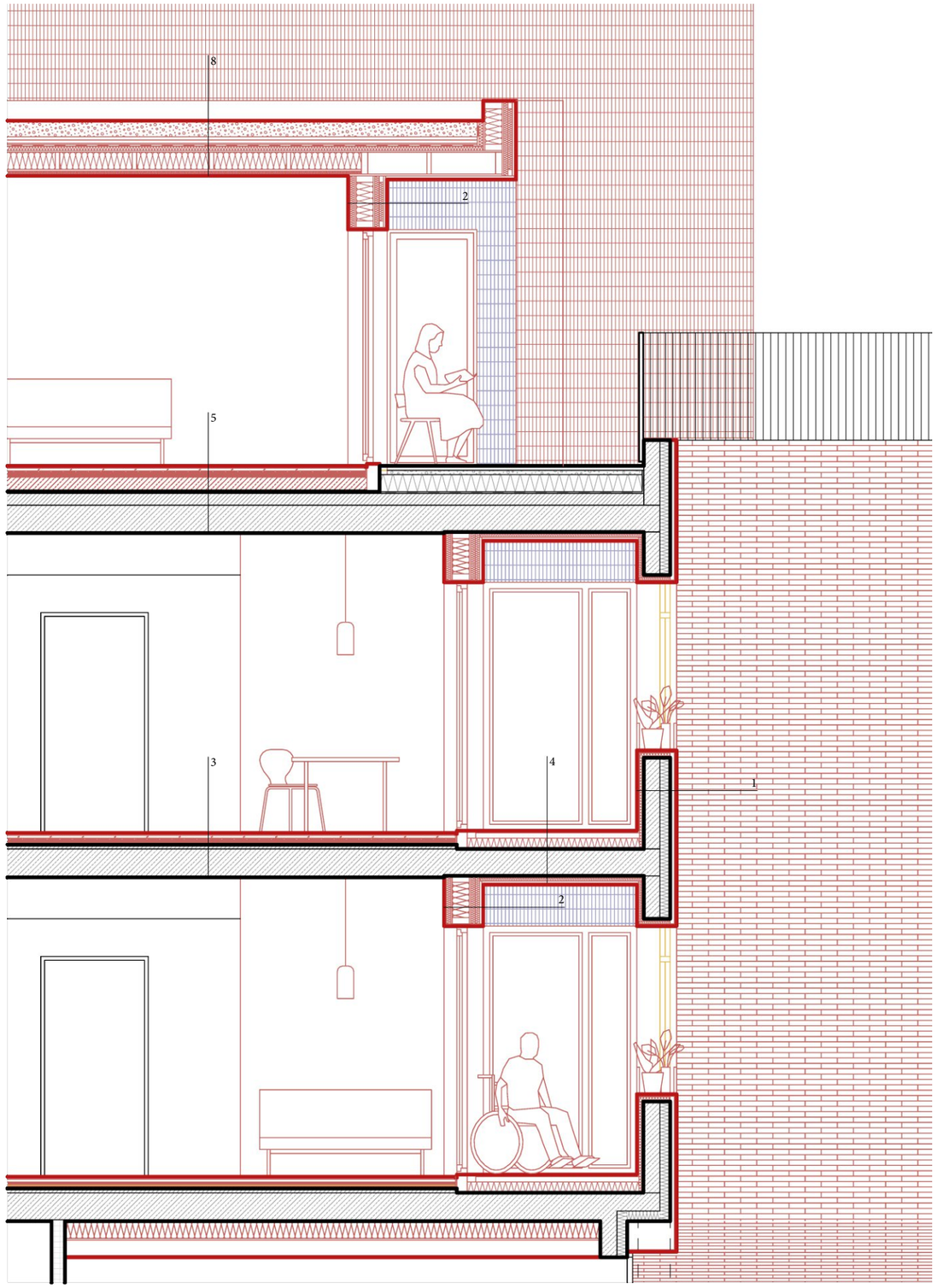
9 Wood frame roof, new

Concrete pavers	5
Gravel	15
Filter layer	
Waterproof layer	1.5
XPS	4
Plywood sheating	1.5
Spruce frame, untreteated	16/8
Insulation	16
Plywood sheating	1.5
Installation layer, untreated timber, screwed	4/6
Clay board with fine clay plaster	2

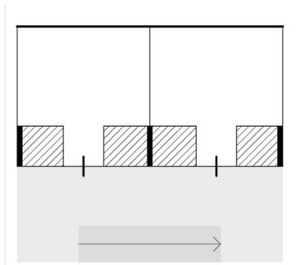
10 Partition wall, appartment and circulation

Clay board with fine clay plaster	2
Plywood sheating	1.5
Spruce frame, untreteated	6/6
Inbetween, wood fiber insulation board	6
Plywood sheating	1.5
Clay board with fine clay plaster	2

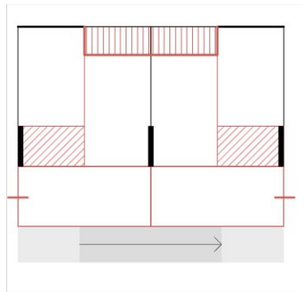
Existing Demolished New Relocated



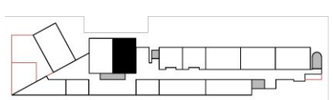
158. Section Loggia - 1:50



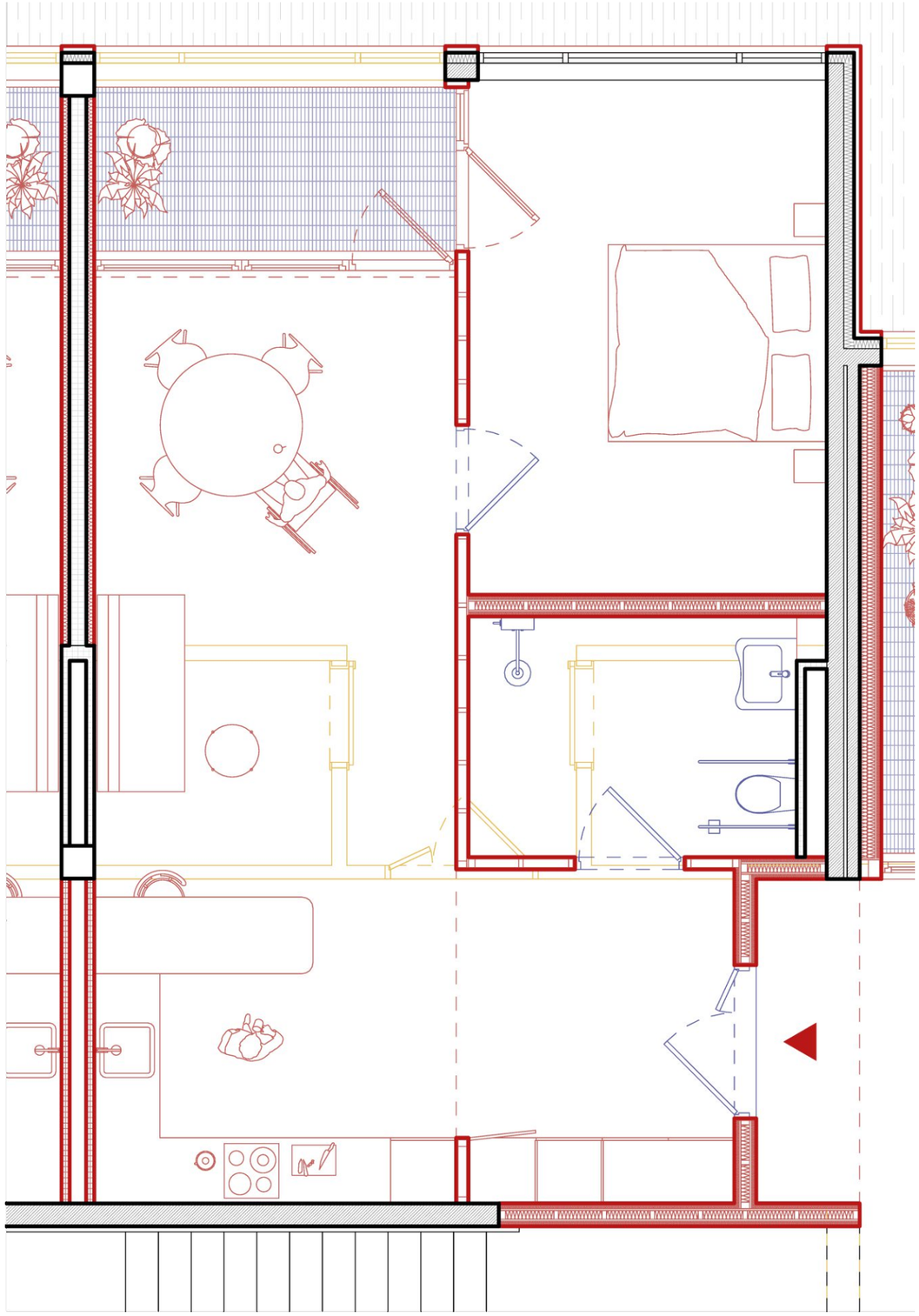
159. Before



160. After



Existing Demolished New Relocated

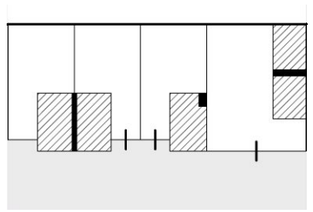


161. Type I - 1:50

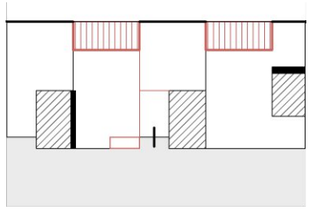
0 2m

162. Existing condition (2022)

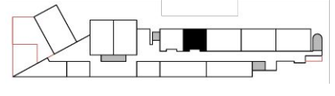
163. The new loggia



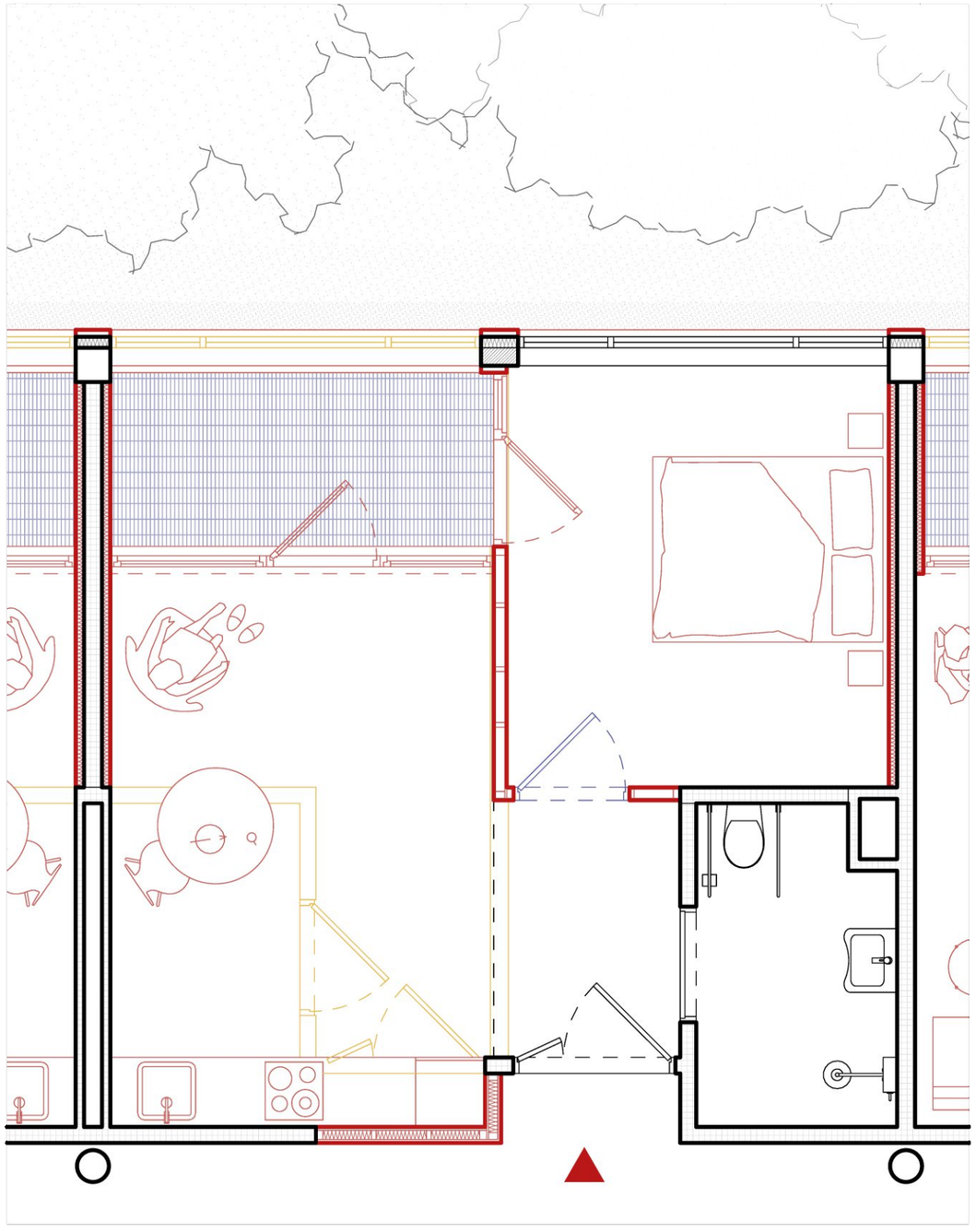
164. Before



165. After

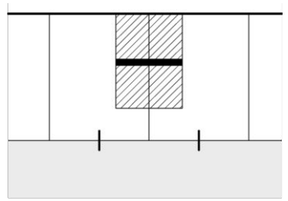


Existing Demolished New Relocated

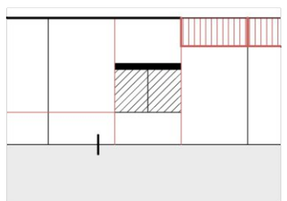


166. Type II - 1:50

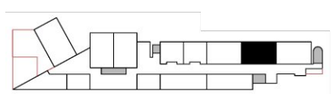
0 2m



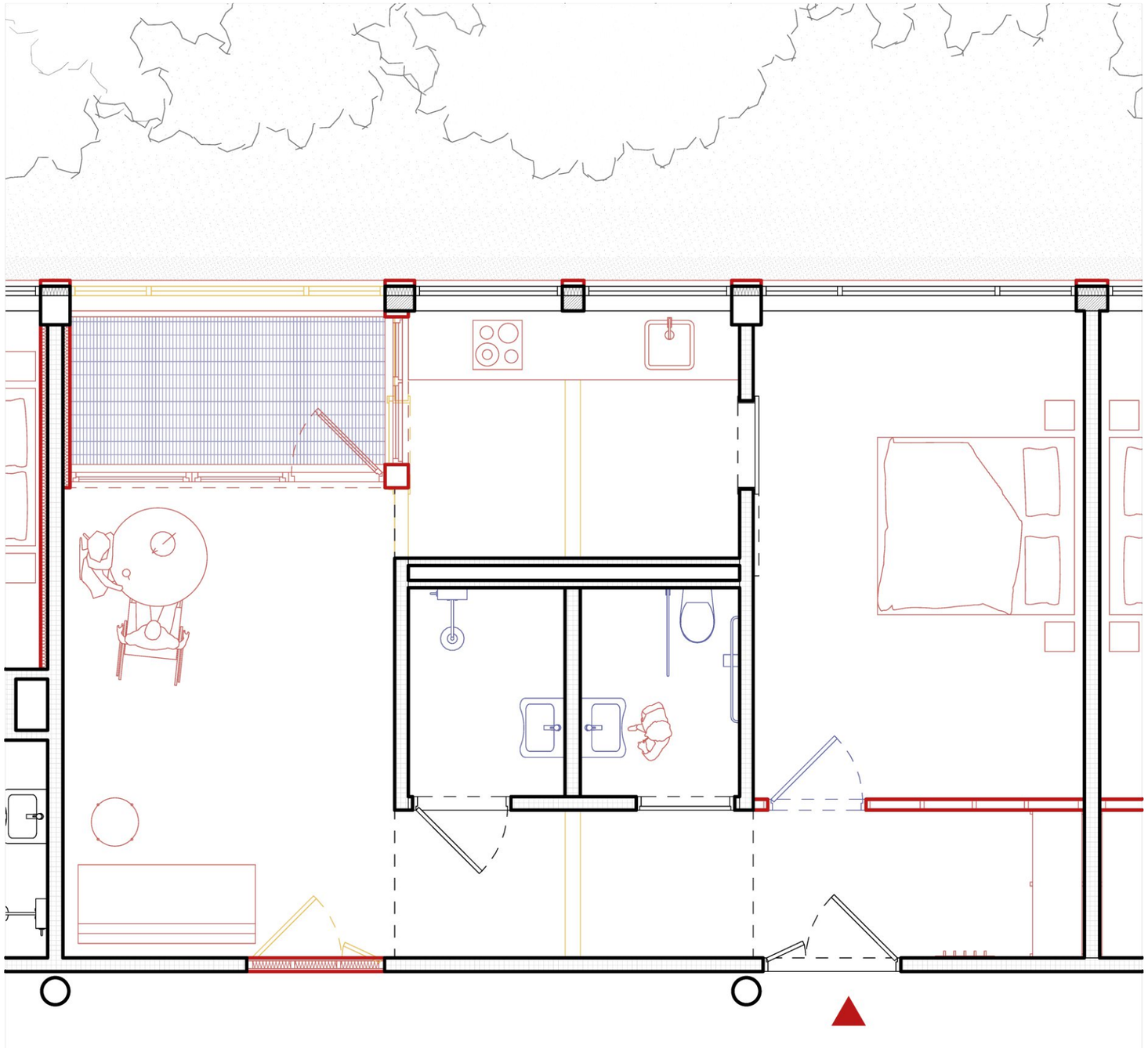
167. Before



168. After



Existing Demolished New Relocated

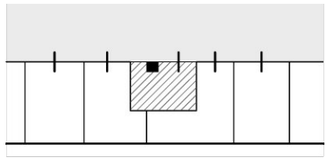


169. Type III - 1:50

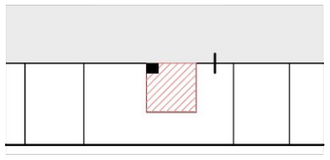
0 2m

170. Former patient room (2020)

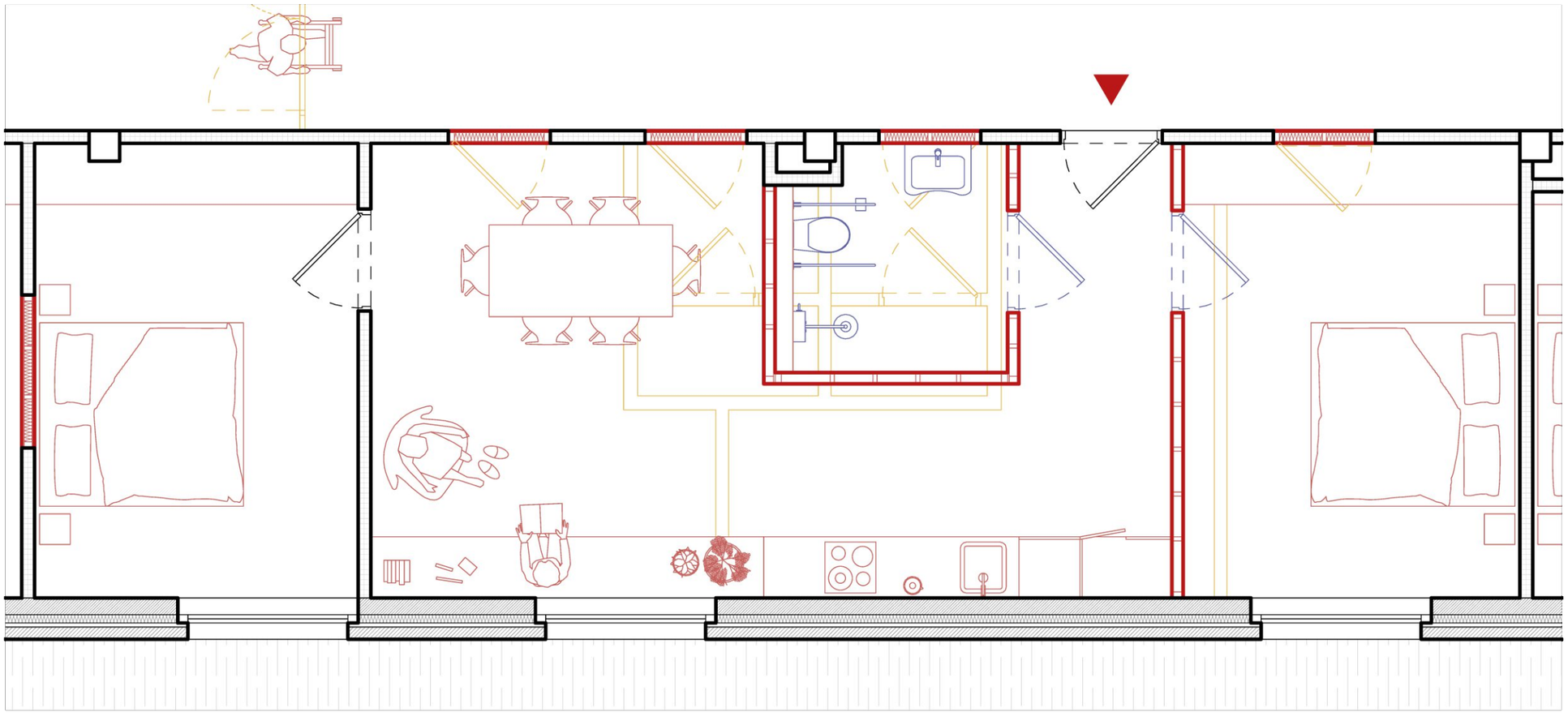
171. Living space and kitchen with outdoor connection



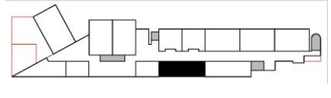
172. Before



173. After

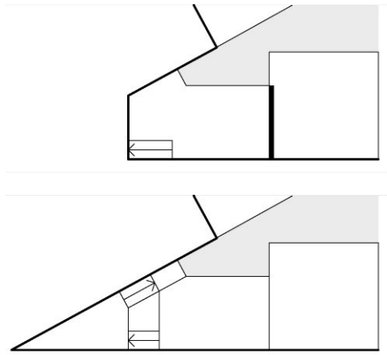


174. Type IV - 1:50

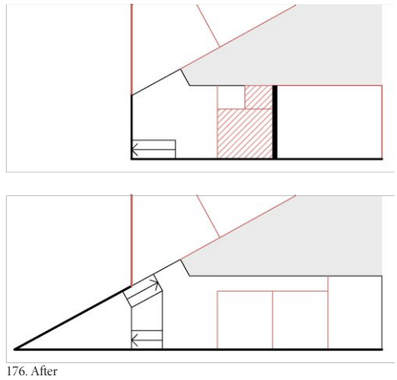


Existing Demolished New Relocated

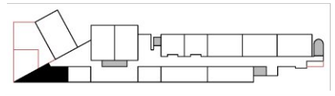
0 2m



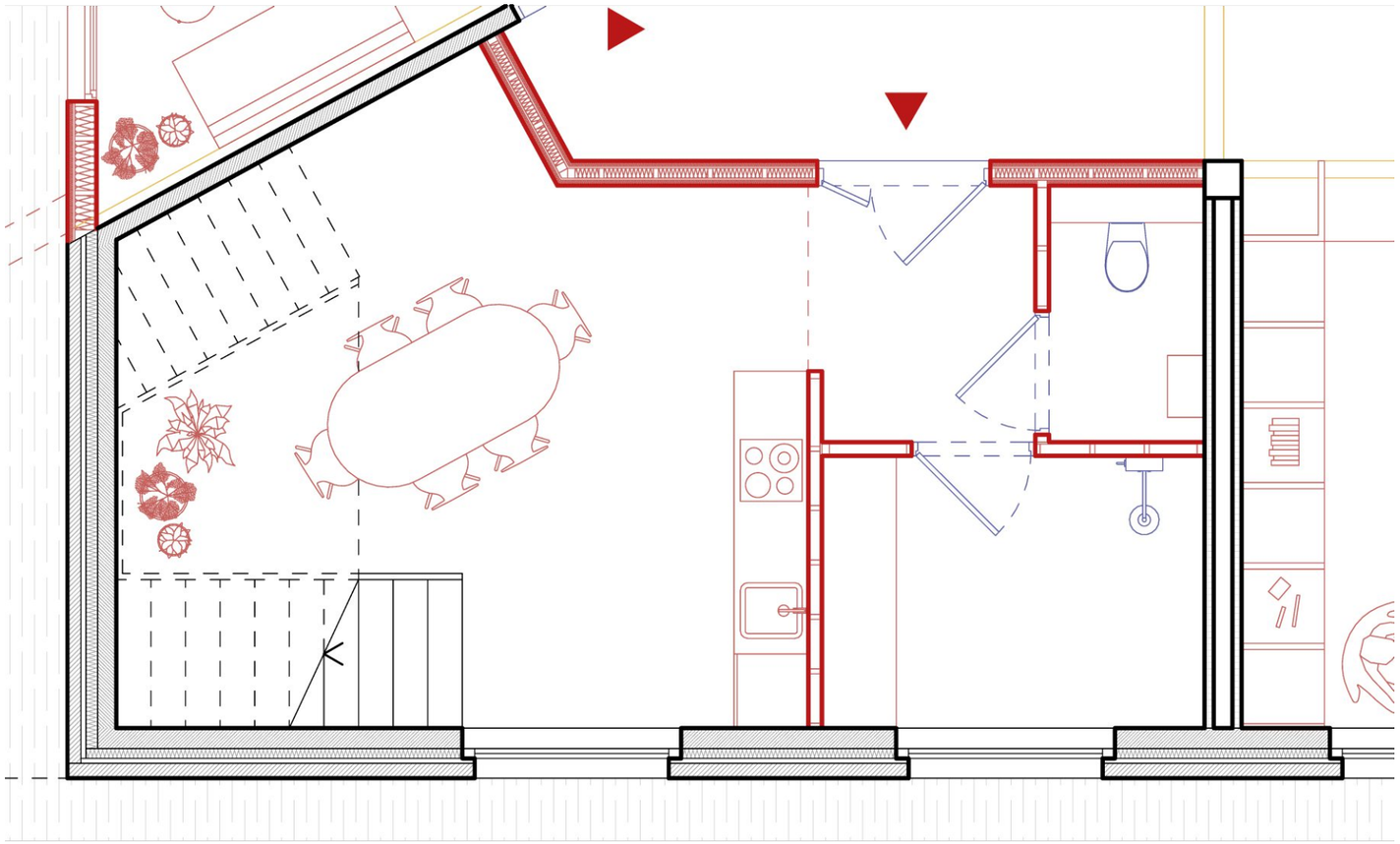
175. Before



176. After

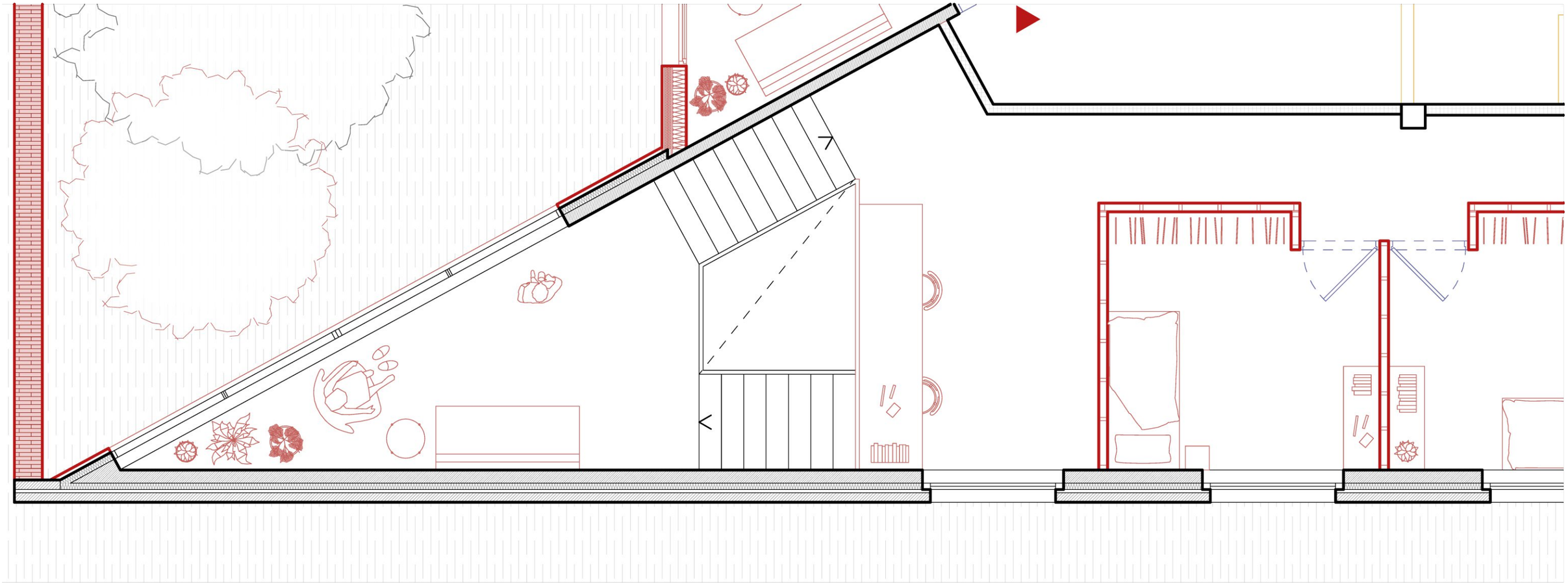


Existing Demolished New Relocated



177. Corner Duplex - Entry level - 1:50

0 2m



Existing Demolished New Relocated

178. Corner Duplex - Upper level - 1:50

0 2m

1 External wall, EWIS, loggia

Clinker slip system	1.5
Ventilation	2
EPS	9
Reinforced concrete	15
Foam glass	4
Clinker slip system	1.5

2 External wall, wood frame, new

Clinker slip system	1.5
Ventilation	2
Battens	4/6
Counterbattens, untreated timber, screwed	4/6
Inbetween, two layers wood fiber insulation board	8
Plywood sheating	1.5
Spruce frame, untreteated	16/8
Insulation	16
Plywood sheating	1.5
Installation layer, untreated timber, screwed	4/6
Clay board with fine clay plaster	2

3 Floor slab, appartments

Parquet	2
Dry screed brick	2
Underfloor heating panel	3
Wood fiber insulation board	3
Leveling screed	4
Reinforced concrete	25
Plaster, Plasterboard	1.5

4 Floor slab, loggia

Clinker	2
Gravel	7
Foam glass	10
Leveling screed	4
Reinforced concrete	25
Wood fiber insulation board	3
Ventilation	2
Clinker slip system	1.5

5 Slab, addition

Parquet	2
Dry screed brick	2
Underfloor heating panel	3
Wood fiber insulation board	3
Leveling fill	12
Sloped concrete	4-18
Reinforced concrete	25
painted, plasterboard	0.5

6 Inverted roof, patio

Clinker pavers	2
Gravel 16/32	4
Filter layer	0.5
XPS	16
Bituminous seal	1.5
Sloped concrete	4-18
Reinforced concrete	25
painted, plasterboard	0.5

7 Wood frame floor, new

Parquet	2
Dry screed brick	2
Underfloor heating panel	3
Wood fiber insulation board	3
Plywood sheating	1.5
Spruce frame, untreteated	16/8
Plywood sheating	1.5
Installation layer, untreated timber, screwed	4/6
Clay board with fine clay plaster	2

8 Wood frame green roof, new

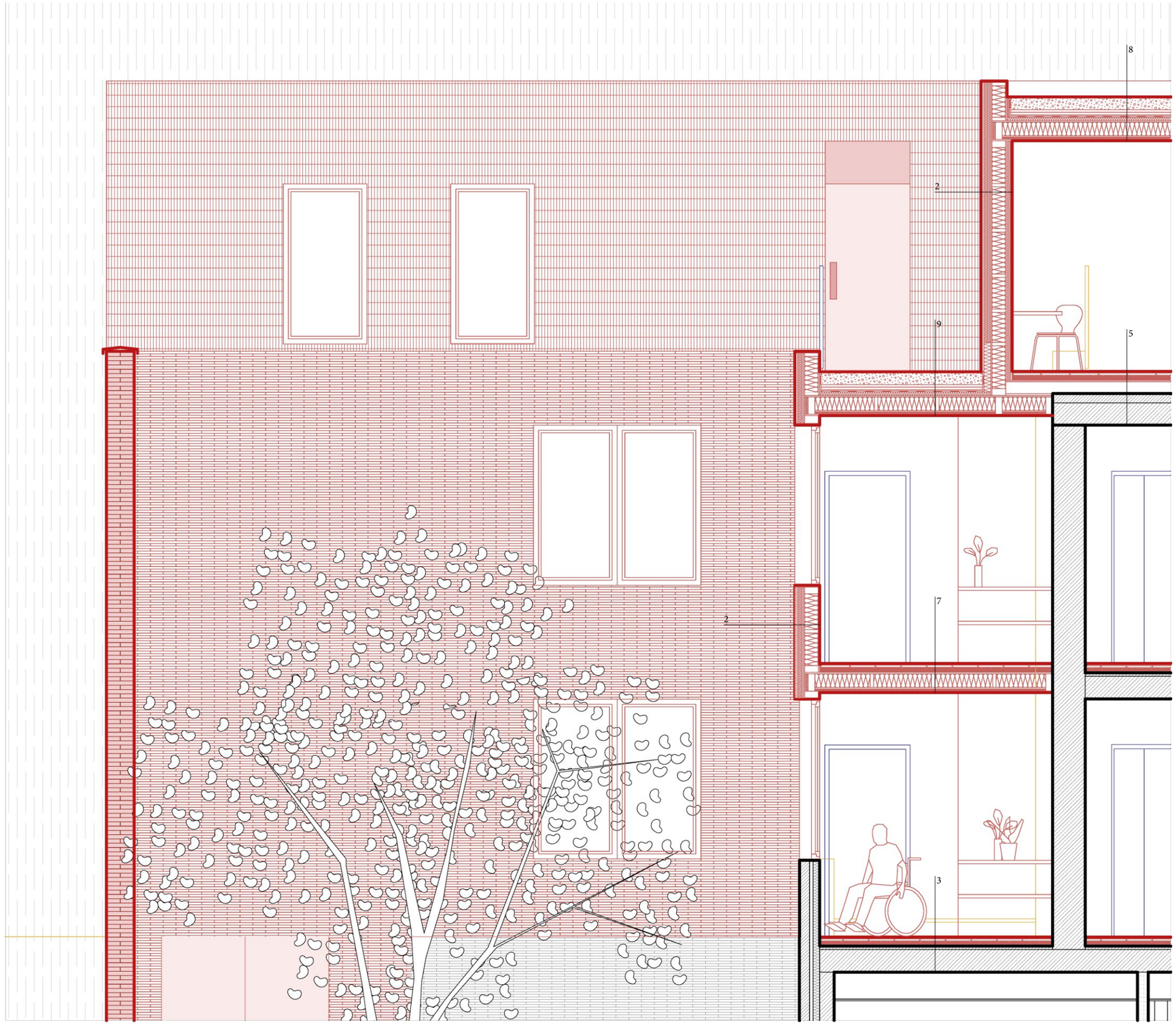
Extensive vegetation	4-20
Vegetation support layers	3
Substrate	3
Filter layer	
Drainaige layer	1.25
Waterproof layer	1.5
XPS	4
Plywood sheating	1.5
Spruce frame, untreteated	16/8
Insulation	16
Plywood sheating	1.5
Installation layer, untreated timber, screwed	4/6
Clay board with fine clay plaster	2

9 Wood frame roof, new

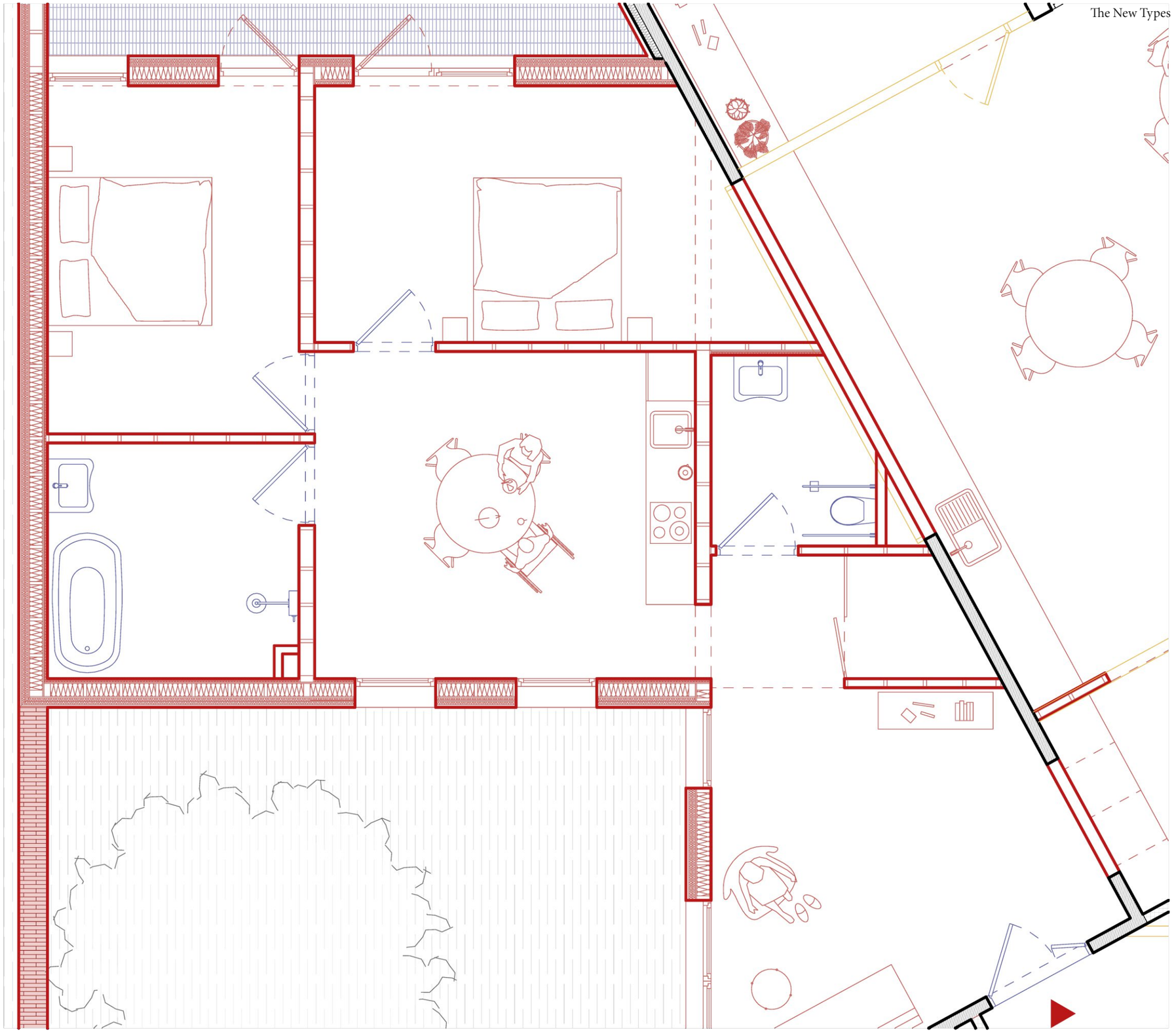
Concrete pavers	5
Gravel	15
Filter layer	
Waterproof layer	1.5
XPS	4
Plywood sheating	1.5
Spruce frame, untreteated	16/8
Insulation	16
Plywood sheating	1.5
Installation layer, untreated timber, screwed	4/6
Clay board with fine clay plaster	2

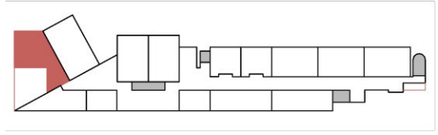
10 Partition wall, appartment and circulation

Clay board with fine clay plaster	2
Plywood sheating	1.5
Spruce frame, untreteated	6/6
Inbetween, wood fiber insulation board	6
Plywood sheating	1.5
Clay board with fine clay plaster	2



179. Extension and Entrance Patio - 1:50





Existing Demolished New Relocated

180. Extension Apartment - 1:50

0 2m

181. Partially demolished Europa-Pavillon (2022)

182. View of extension

1 External wall, EWIS, loggia

Clinker slip system	1.5
Ventilation	2
EPS	9
Reinforced concrete	15
Foam glass	4
Clinker slip system	1.5

2 External wall, wood frame, new

Clinker slip system	1.5
Ventilation	2
Battens	4/6
Counterbattens, untreated timber, screwed	4/6
Inbetween, two layers wood fiber insulation board	8
Plywood sheating	1.5
Spruce frame, untreteated	16/8
Insulation	16
Plywood sheating	1.5
Installation layer, untreated timber, screwed	4/6
Clay board with fine clay plaster	2

3 Floor slab, appartments

Parquet	2
Dry screed brick	2
Underfloor heating panel	3
Wood fiber insulation board	3
Leveling screed	4
Reinforced concrete	25
Plaster, Plasterboard	1.5

4 Floor slab, loggia

Clinker	2
Gravel	7
Foam glass	10
Leveling screed	4
Reinforced concrete	25
Wood fiber insulation board	3
Ventilation	2
Clinker slip system	1.5

5 Slab, addition

Parquet	2
Dry screed brick	2
Underfloor heating panel	3
Wood fiber insulation board	3
Leveling fill	12
Sloped concrete	4-18
Reinforced concrete	25
painted, plasterboard	0.5

6 Inverted roof, patio

Clinker pavers	2
Gravel 16/32	4
Filter layer	0.5
XPS	16
Bituminous seal	1.5
Sloped concrete	4-18
Reinforced concrete	25
painted, plasterboard	0.5

7 Wood frame floor, new

Parquet	2
Dry screed brick	2
Underfloor heating panel	3
Wood fiber insulation board	3
Plywood sheating	1.5
Spruce frame, untreteated	16/8
Plywood sheating	1.5
Installation layer, untreated timber, screwed	4/6
Clay board with fine clay plaster	2

8 Wood frame green roof, new

Extensive vegetation	4-20
Vegetation support layers	3
Substrate	3
Filter layer	
Drainaige layer	1.25
Waterproof layer	1.5
XPS	4
Plywood sheating	1.5
Spruce frame, untreteated	16/8
Insulation	16
Plywood sheating	1.5
Installation layer, untreated timber, screwed	4/6
Clay board with fine clay plaster	2

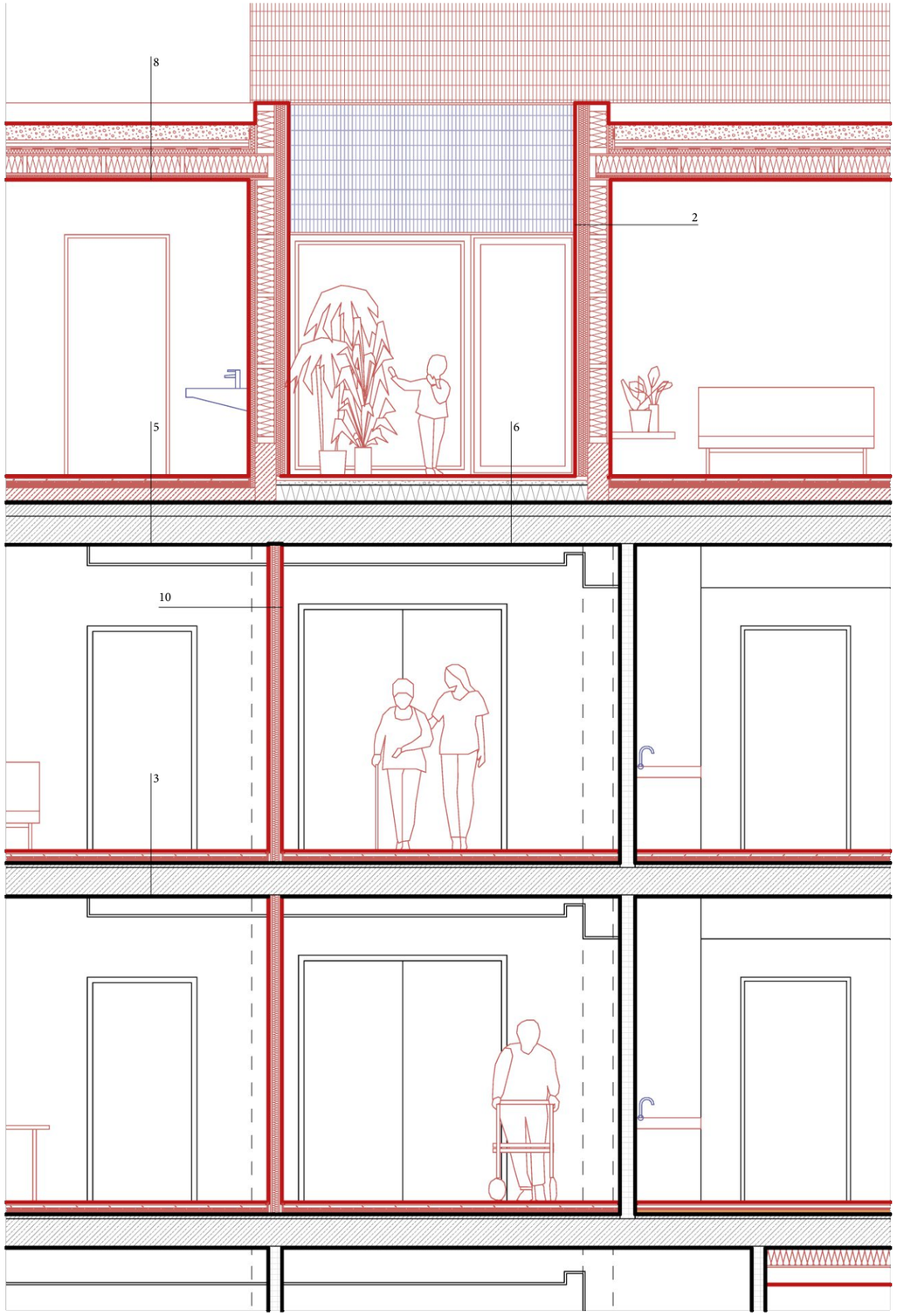
9 Wood frame roof, new

Concrete pavers	5
Gravel	15
Filter layer	
Waterproof layer	1.5
XPS	4
Plywood sheating	1.5
Spruce frame, untreteated	16/8
Insulation	16
Plywood sheating	1.5
Installation layer, untreated timber, screwed	4/6
Clay board with fine clay plaster	2

10 Partition wall, appartment and circulation

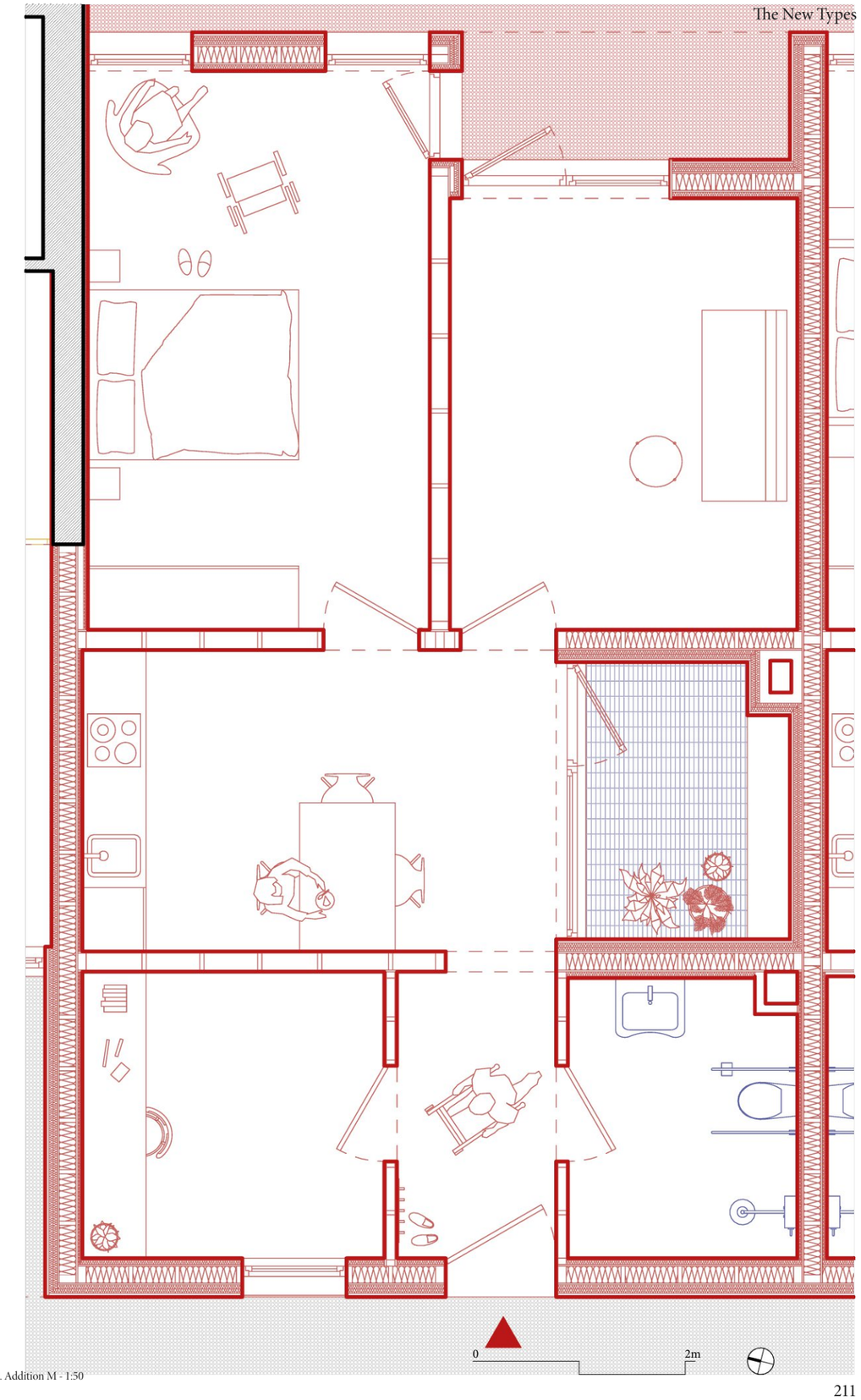
Clay board with fine clay plaster	2
Plywood sheating	1.5
Spruce frame, untreteated	6/6
Inbetween, wood fiber insulation board	6
Plywood sheating	1.5
Clay board with fine clay plaster	2

Existing Demolished New Relocated

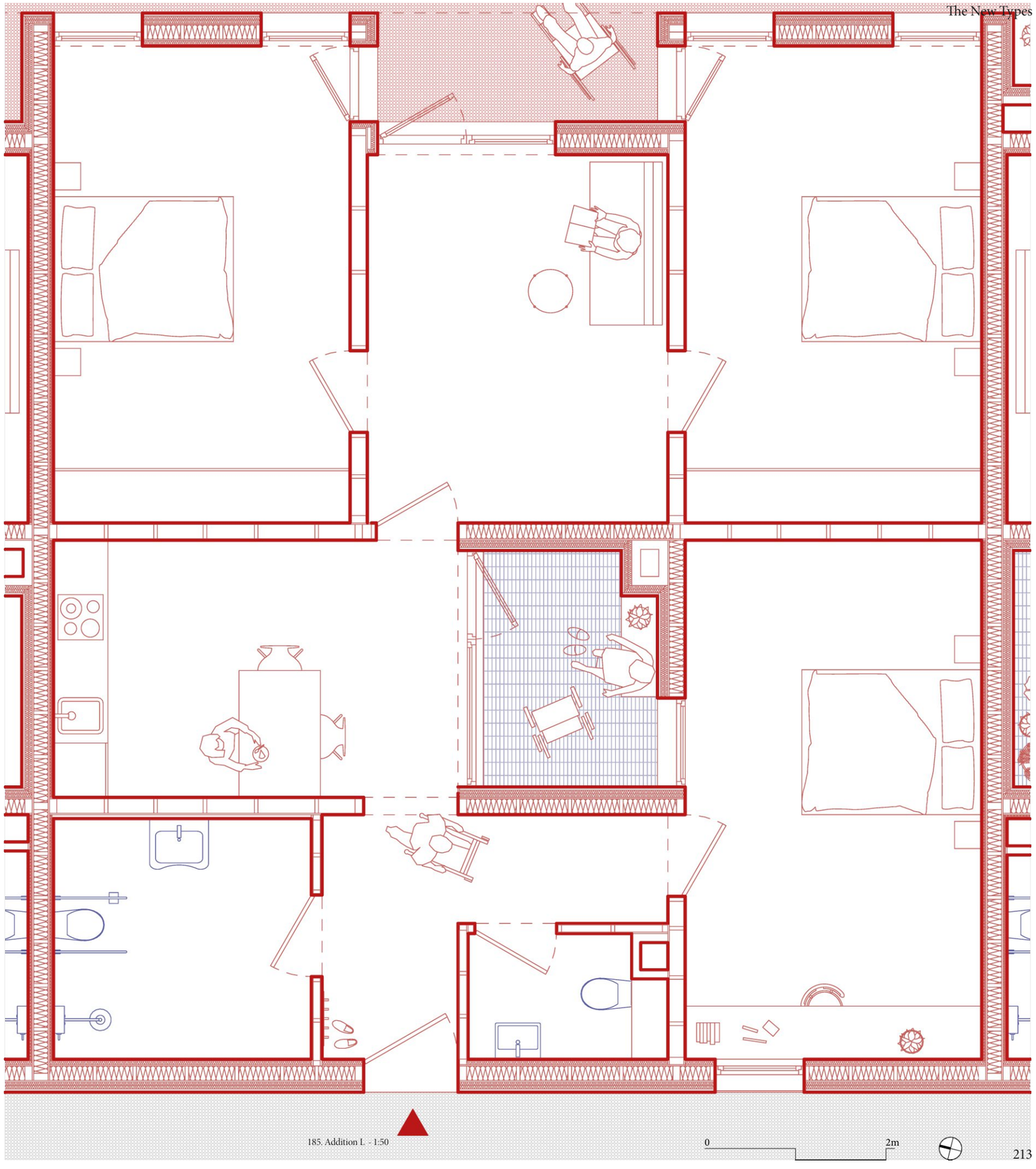


183. Section Patio - 1:50

Existing Demolished New Relocated

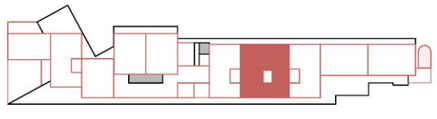


184. Addition M - 1:50

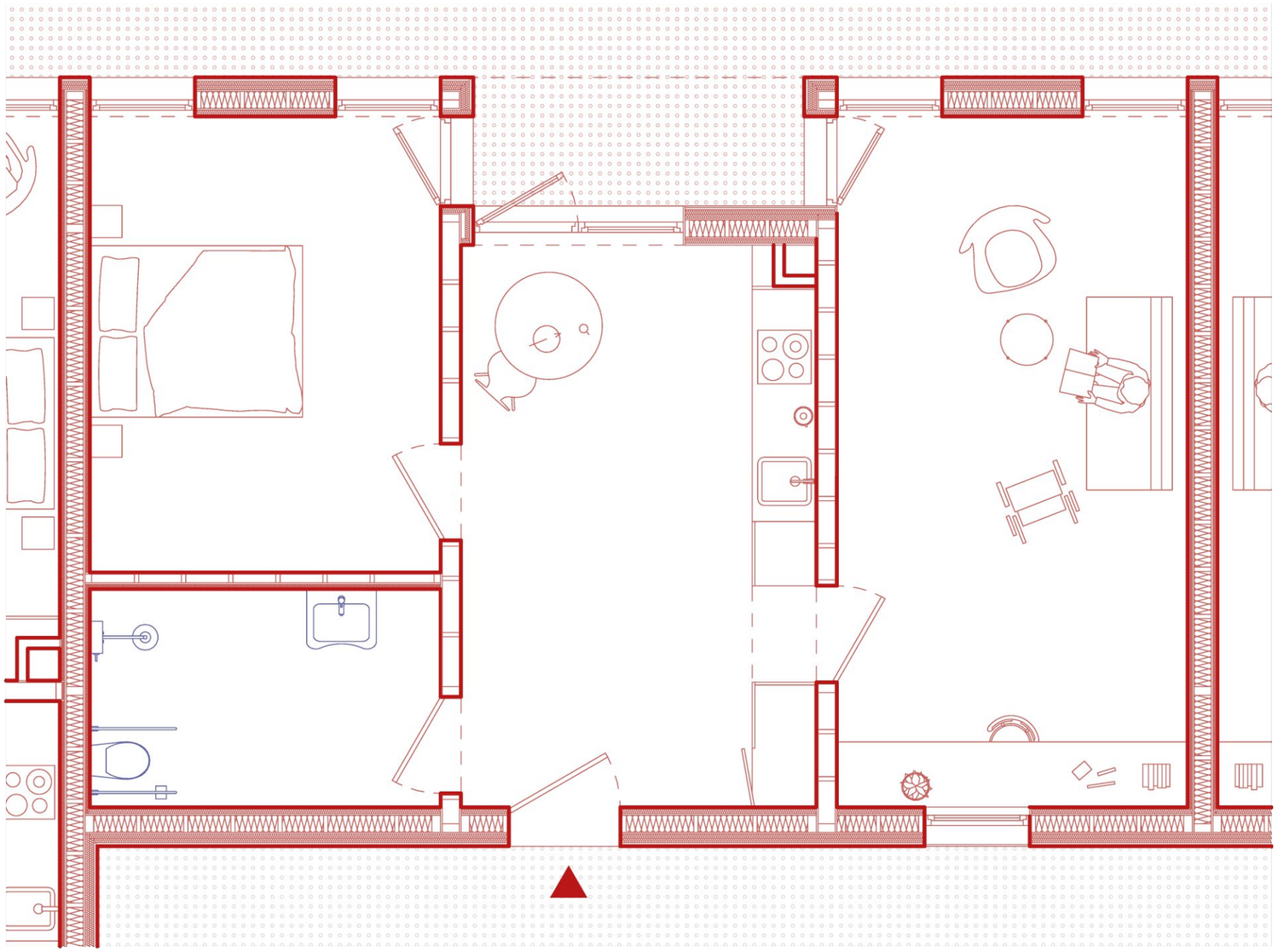


185. Addition L - 1:50

0 2m



Existing Demolished New Relocated

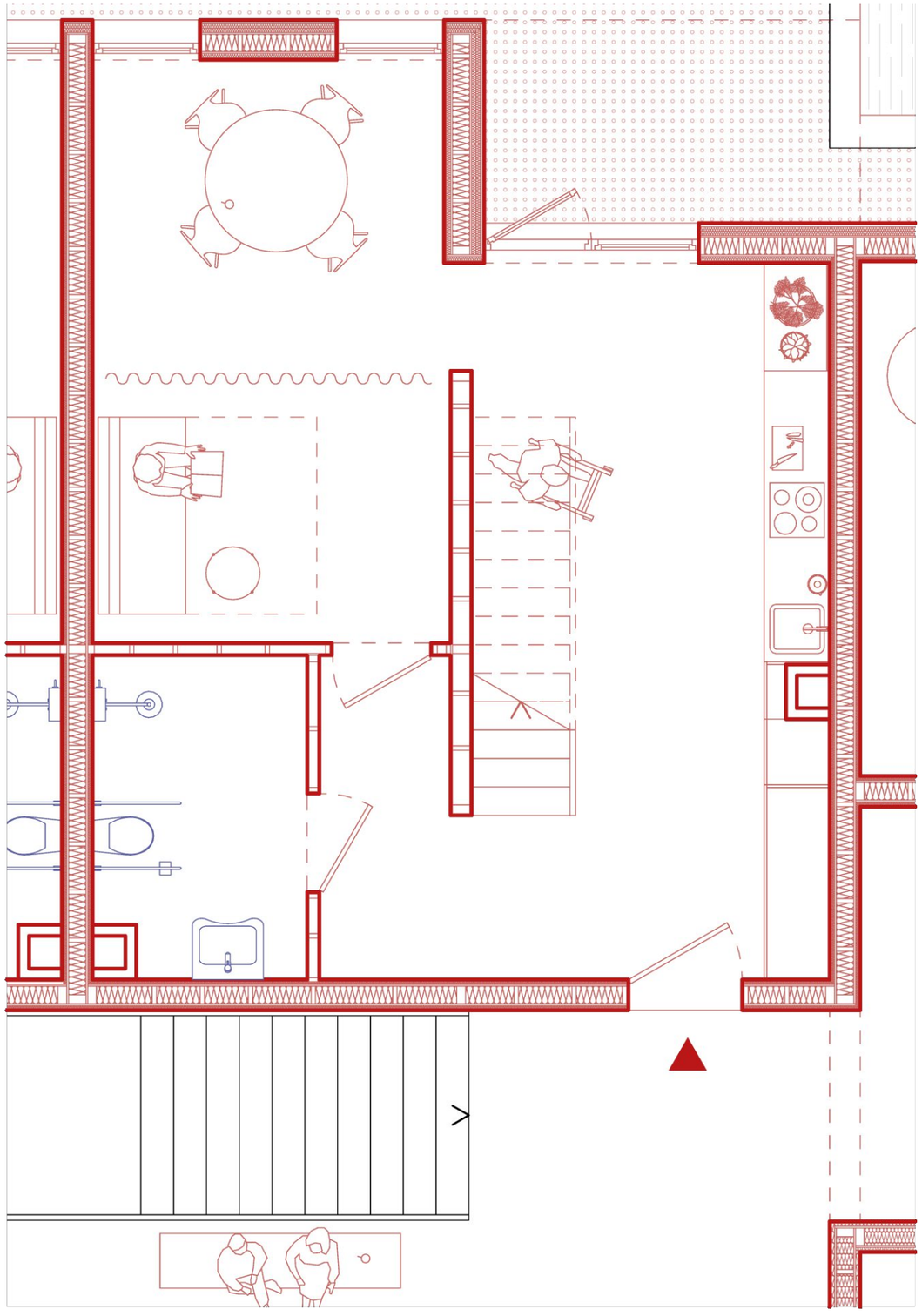


Existing Demolished New Relocated

186. Addition S - 1:50

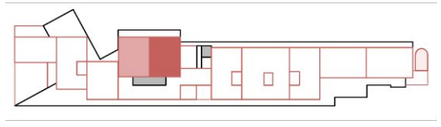
0 2m

Existing Demolished New Relocated

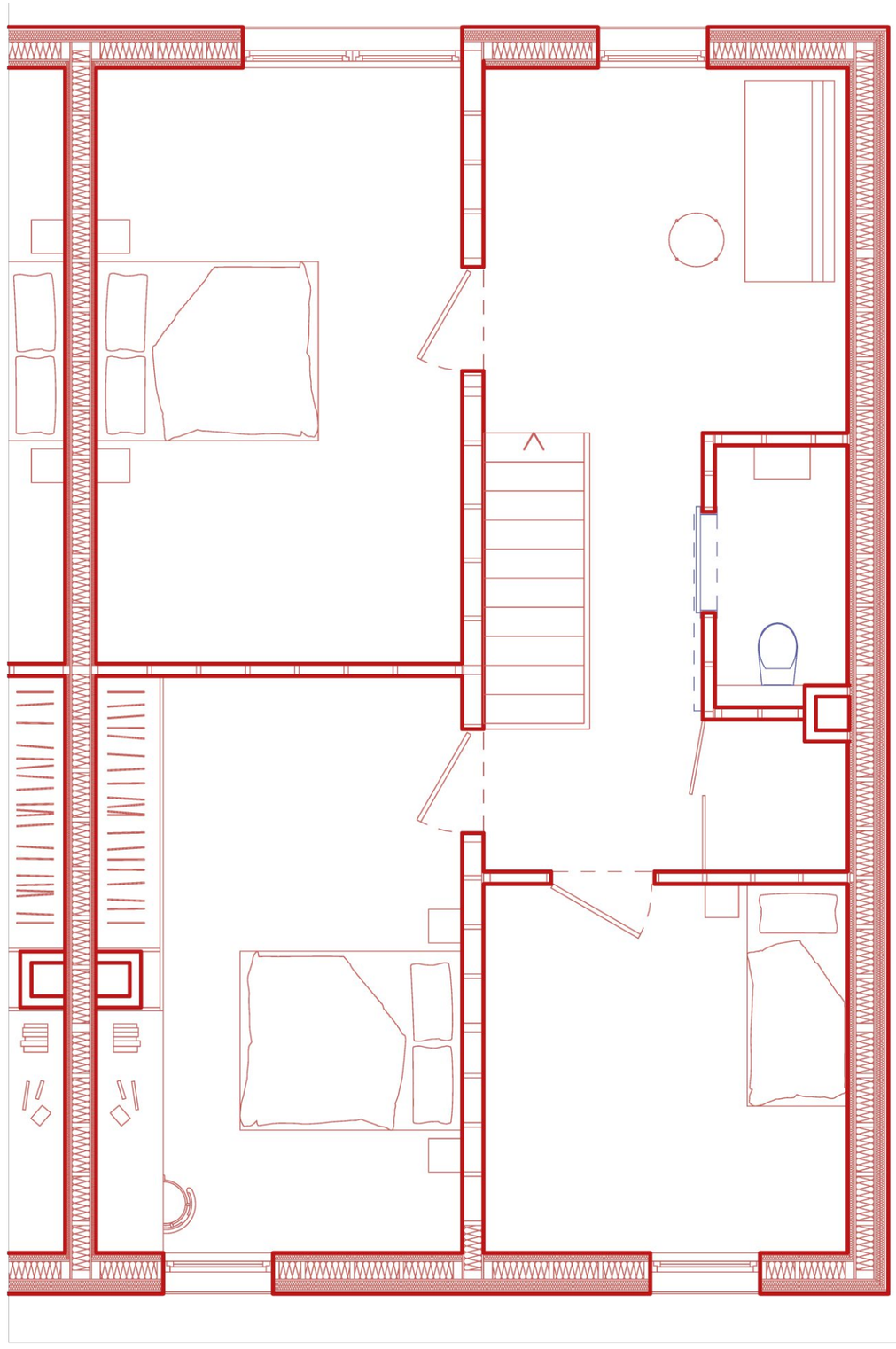


0 2m

187. Addition Duplex - Entrance Level - 1:50

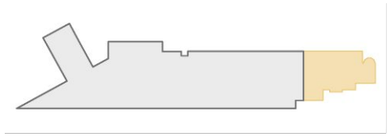


Existing Demolished New Relocated



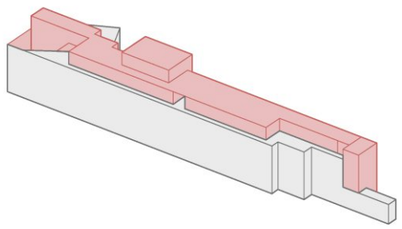
188. Addition Duplex - Upper Level - 1:50

0 2m



Around 80% of existing materials
remain on-site

Around 60% of dismantled components
are integrated in the new design



Existing 4310m² above ground	19 Apartments	54	
New 1350m² above ground	12 Apartments	42	

189. Results of the transformation with focus on reuse

Conclusion

The limits of this diploma lie in its focus: the boundaries of the Europa-Pavillon. An open question remains: how to apply these design principles on a bigger scale and throughout buildings of different eras. Questions may arise concerning construction materials, insulation, or accessibility. For example, it might be a completely different strategy to approach buildings built before the second world war as their materials are „healthier", and it is not the same thing to demolish a brick wall as to demolish an external wall insulation system. Nevertheless, the relevance of this diploma lies in showing the potential of 1990s buildings for reuse as an alternative to building obsolescence that leads to total demolition. The Europa-Pavillon is not the only case; it would sadly not be the last.

The initial goal was to incorporate components from other demolished buildings into this design. Searching for materials and components from other buildings would have been a very intense hunting process. Today's reality lacks a current platform for designers and architects to work on this matter in Vienna and Austria. In the diploma process, I approached some companies in Vienna to ask if they could provide information about available salvaged components, but the response was that there were none. On the other hand, there are examples of good initiatives like Rotor in Belgium and Zirkular in Switzerland showing the potential of reuse. This matter should be addressed strongly by political institutions coupled with economic incentives.

The city, the country, and the European Union have set goals and targets regarding waste reduction and reuse. So what is the role of an architect in this matter? On a personal level, throughout this entire diploma, I questioned over and over everything I learned so far, the way things are being taught, the way things are being done in the profession, and the way I have been doing and thinking about architecture. We, architects and designers, must learn how to incorporate this way of thinking into our designs. It is urgent that this becomes how architecture is thought and taught.

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Photography, graphics, plans and visualizations:

Pamela Carolina Maldonado Vallejos

with the exception of the following images:

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