

### **PO** Project Posters

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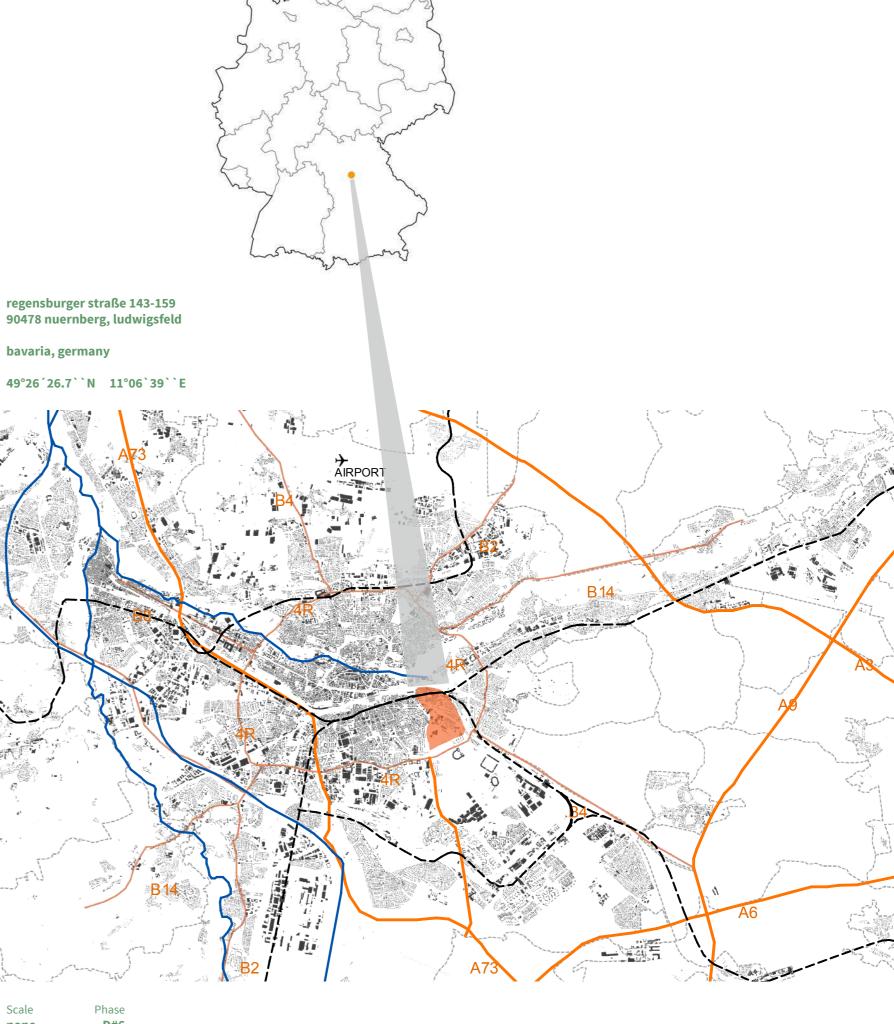


## **Design Challenge – Site Integration**

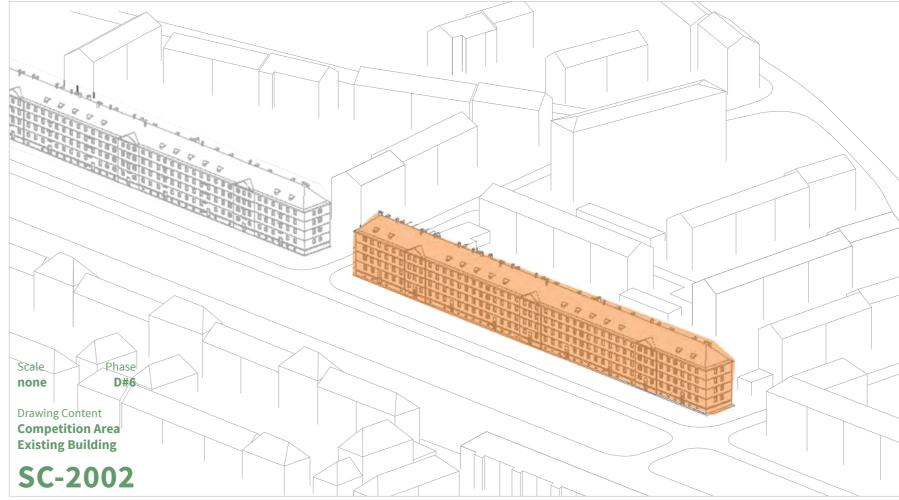
significant upgrade for the residents and the adjacent neighbourhood. It is not only construction and its new association with the city, but the architecture also highlights to almost all of the existing buildings in the neighbourhood and thus contributes to a culture, sport, and living. sustainable transformation.

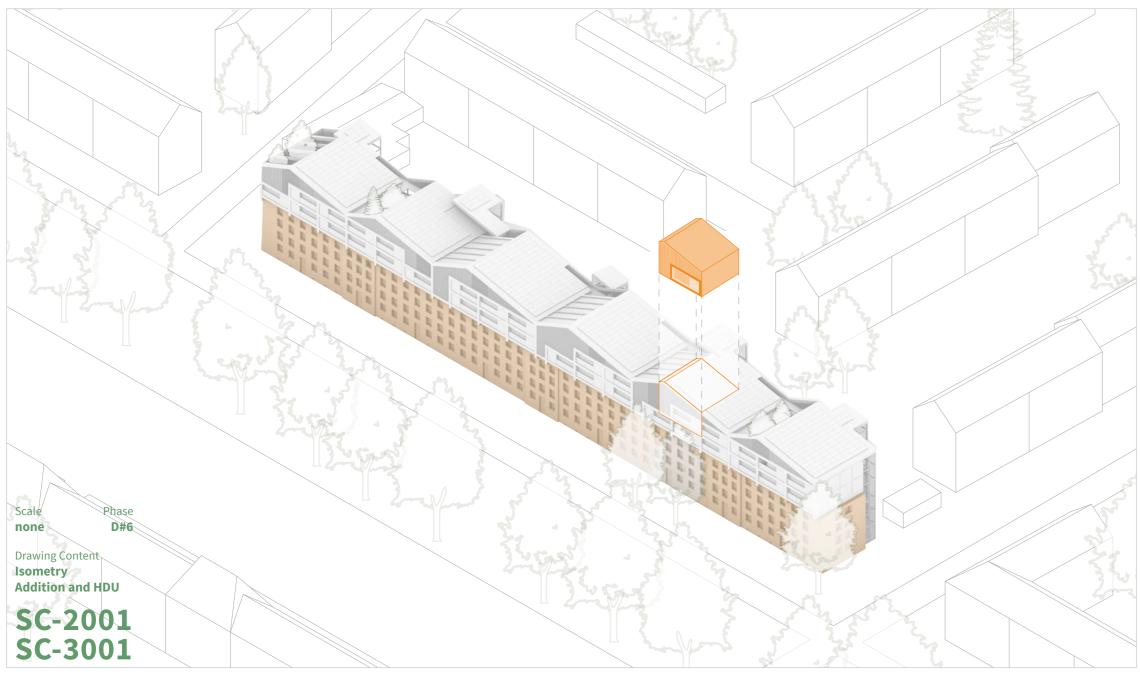
SDE 2021/22 addresses many of the current major challenges in the building sector of Ludwigsfeld, located in the south-eastern part of Nuremberg, is characterized by a heour time: climate change, environmental degradation, the extinction of species, resour- terogeneous population. The mixed nature of the district is also reflected in the archice scarcity, land degradation, and lack of affordable housing. We see the greatest po-tecture and elongated apartment blocks dominate the urban development. "levelup" tential for housing expansion in an urban context in "renovation & addition of storeys" offers an innovative solution for identifying and upgrading such neighbourhoods witfor buildings built between the 1950s to 1970s. This sustainable and affordable housing hout without building on undeveloped 'green' spaces. To integrate the heterogeneous is to be built using modular timber construction that can be adapted to rapid chan-population in the neighbourhood into the overall architectural picture, an expressive, ges in society. Communal areas, green spaces and attractive architecture represent a visionary architecture is to be created that consciously sets itself apart from the existing architecture of the surrounding development. The lack of perspectives and the create a accomplished by drawing ones attention to the "levelup" system of modular timber—diverse potential for positive, future-oriented urban development. The aim is to create added value for all residents. The design not only expands the usable living space of the the issue of sustainability in the neighbourhood. The "levelup" system can be applied existing building, but creates additional possibilities for high-quality spaces for leisure,

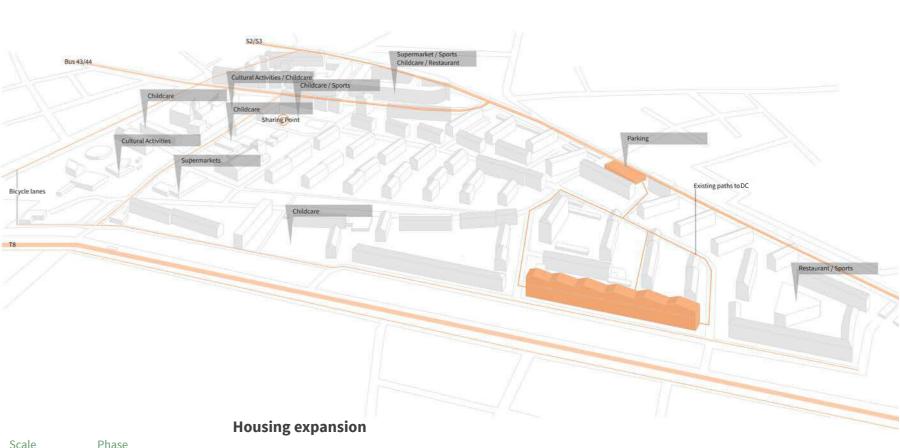




**Drawing Content** Site Plan Zoom Nürnberg **SC-0002** 

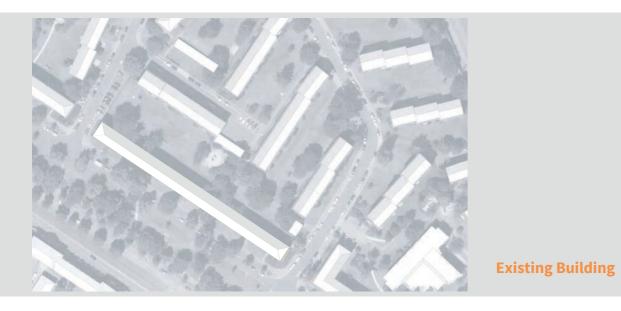


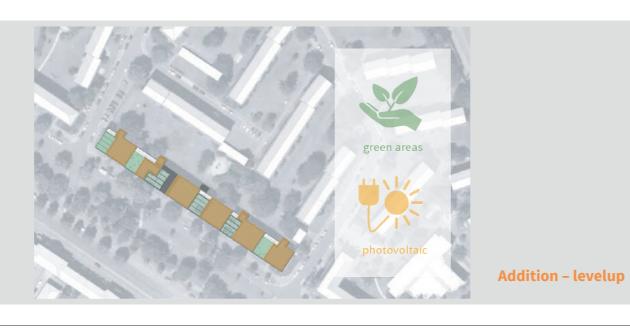


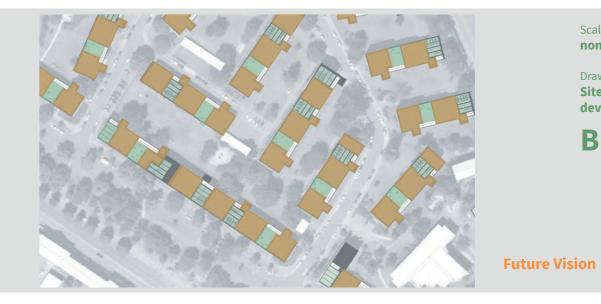


Drawing Content **Urban Mobility** Ludwigsfeld **SC-1001** 

We present a system that can identify existing inefficient development structures in a future-oriented way. The special unique selling point is that the increase in density is achieved using a modular construction system that can be adapted to a large number of existing building constructed between the 1950s to the 1970s. The positive aspects of modularity and flexibility also extend to the actual living level and manifest themselves in a new centre of life. The additional stories create places and a breeding ground for a new generation of neighbourly coexistence.



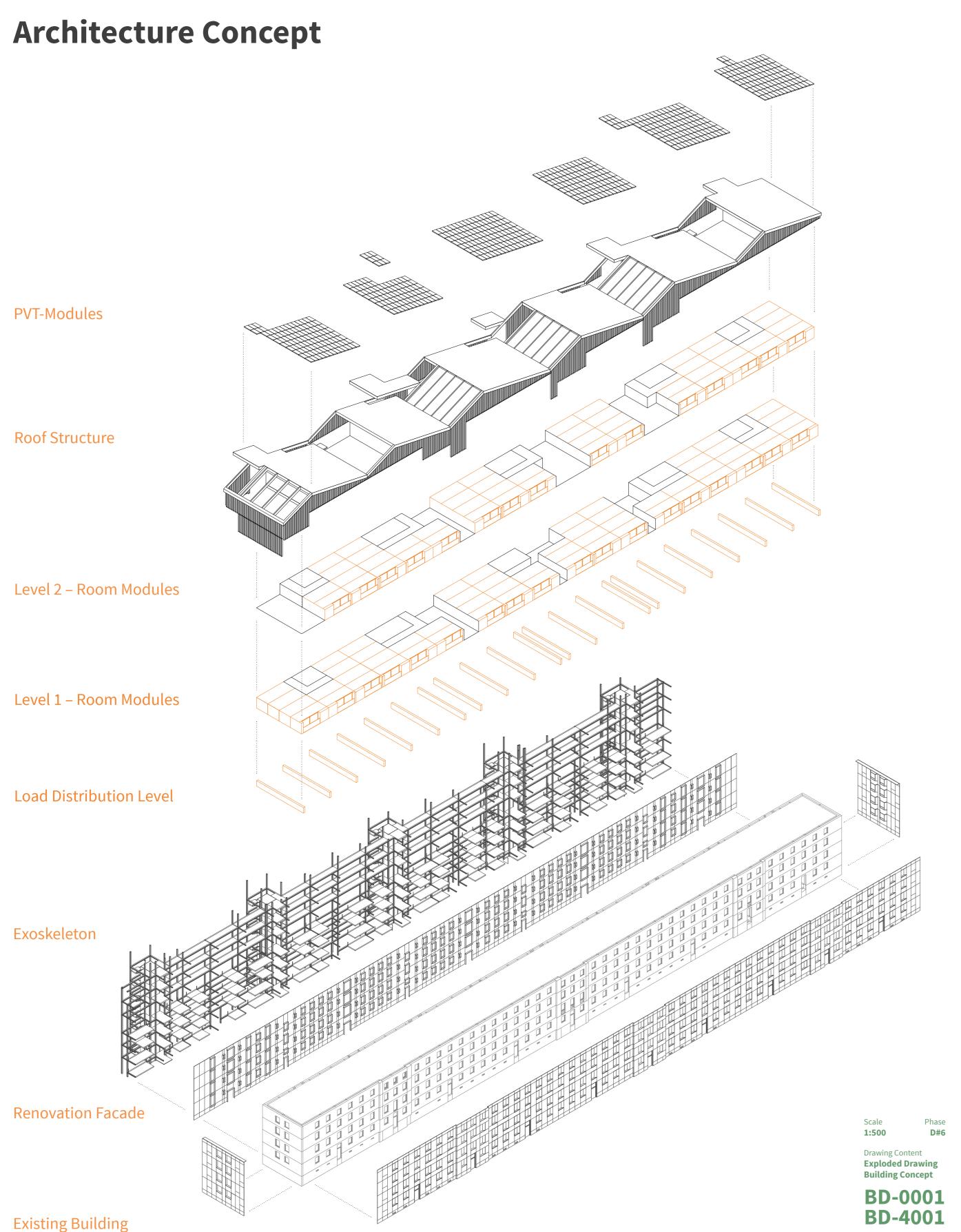




Drawing Content Site Plans developement **BD-1001** 







#### Our building includes...



Year-round greenery in the indoor common areas. Outside, green roof terraces and facade greening on the exoskeleton.



habitat for animals

The flower-rich vegetation can be used as bee pasture and provides nesting opportunities for birds. This helps to increase biodiversity in the neighborhood.



urban farming

Urban farming can be practiced by the residents on the roof of the extension. This encourages community and a connection to nature.



minimized living space

The private living space in our building is minimized to the bare minimum. Instead, there are additional areas that can be used by all residents.



common areas

Both inside and outside our extension are communal rooms with different uses. They are a place of rest and communication.



New lifts provide barrier-free access to parts of the existing building and all of the addition of storeys. All flats can be adapted to the needs of their residents.



modular building structure For a fast construction phase, we use prefabricated wooden modules for the



living areas of the addition of storey. These can be easily transported by truck.



processed regionally, thus reducing the negative impact on our environment.

rainwater harvesting To irrigate the biodiversity in a resource-saving way, the direct use of rainwater



With a greywater treatment system, drinking water can also be saved during

dry periods by supplying the toilet and washing machine with service water.



energy generation

is an option. Rainwater is ideally suited for watering plants.

Most of the energy is generated on the roof, where more than 1000 m<sup>2</sup> of



D#6

Drawing Content

Group of Resident
of the Building

**BD-5001** 

#### **Constructive and energetic solutions**

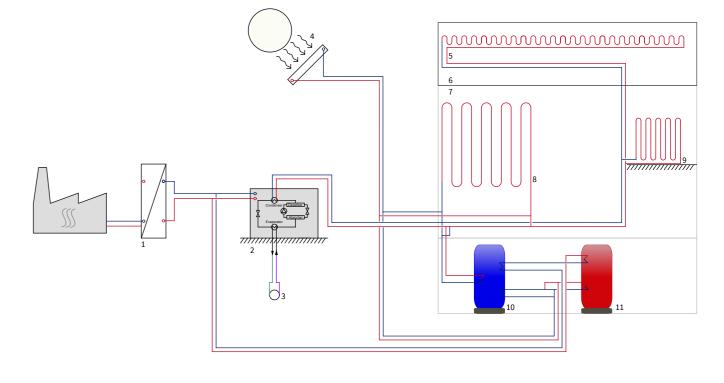
The existing building serves as the basis for our addition of storeys. The existing roof is removed and a layer of beams is placed as a substructure for the modules. These span from the outer walls as 2-span girders, over the load-bearing centre wall and are positioned exactly under the addition. The modules of the extension are transported to the construction site prefabricated and placed on the load distribution girders. The two levels with room modules form the habitable floors. Horizontally, the module joints always consist of two solid wood walls and an intermediate joint with insulation. Similarly in the vertical, the ceiling of one module and a floor of the module above always form a two-layer ceiling package. This decoupling enables us to guarantee a high level of acoustic insulation. The walls of the modules are made of stacked board elements covered with diagonal formwork. The ceilings and floors are designed as hollow box elements. This offers the advantage of large spans with low material usage. In addition, cables and pipes can be laid in the hollow spaces, before the intermediate space is filled with shredded tiles, which are to be obtained from the demolition of the existing roof, and will function as addition acoustic insulation.

Meeting the high fire protection requirements of building class 5 required by the Design Challenge, means that the walls have to be encapsulated, which is accomplished with two layers of twenty-two millimetre thick clay building boards. The roof surface of our addition is fitted with trusses that support the sheet metal roof with the PVT collectors and the fenestrated roof of the common rooms / greenhouses. The energetic renovation of the existing facade is carried out in timber element construction. The curtainwall facade elements serve as an insulating layer and house the photovoltaic technology and a facade cooling / heating system. On the north side, five of the existing staircases are moved to the outside and made barrier-free with lifts. This links the existing building and the addition of storeys.



mmmmm Heating / cooling ceiling Heating / cooling ceiling Addition of storeys Addition of storevs Existing Building Existing Building Facade activation Facade activation

Phase D#6 **Drawing Content System Detail Facade Cooling** 



Scale Phase D#6 none **Drawing Content Energy Concept** for the whole Building

1 - District heating 2 - Absorption heat pump 3 - Groundwater

6 - Addition of storeys

5 - Undergroundfloor heating/cooling

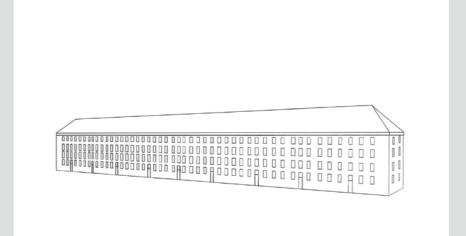
8 - Facade heating 9 - Existing radiators 10 - TW preheating

**BD-3001** 

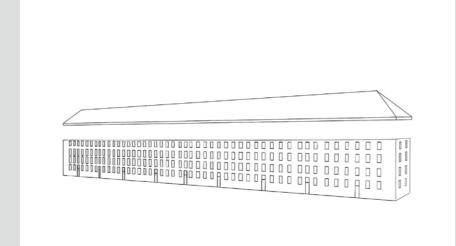
11 - TW reheating

7 - Existing building

**Start here with our story...** 



**Existing Building** street side



**Dismantling** the roof





### The levelup System

primarily concerned with developing a system that could be adapted to existing buil- of the modules is subject to a strict grid, which can be adapted to numerous building, dings from the 1950s and 1970s.

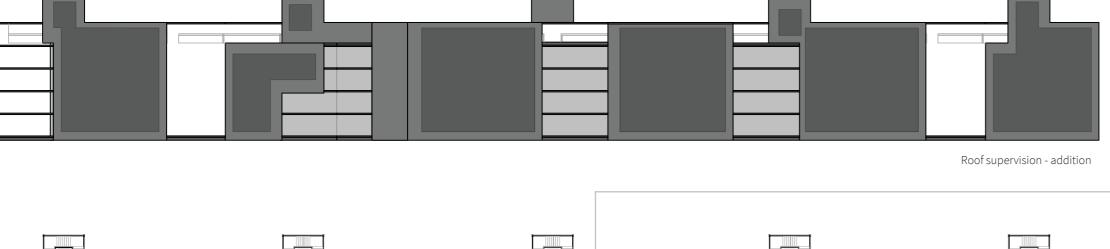
curring similar building characteristics of these building types, such as building widths cores in such a way that a maximum number of room cells can be placed between them between 9.0 - 10.50 meters, building lengths between 30 - 150 meters, structures built in order to close off the gap to the staircases with a threshold. The distances between with reinforced-concrete ceilings, with load-bearing exterior walls, and a load-bearing the existing staircase cores and the modular addition of storeys may vary slightly based interior wall. We see the innovation and the special unique selling point of our design in on varying existing and newly installed geometries. These must be "bridged" using nonthis modular adaptability. We chose a modular system consisting of wooden modules modular installations around the staircases; however, such connecting areas are to be with the following dimensions: length 7.50 metres X width 2.95 m X height 3.10 m. The kept to a minimum, as the goal is to build using modular, prefabricated units.

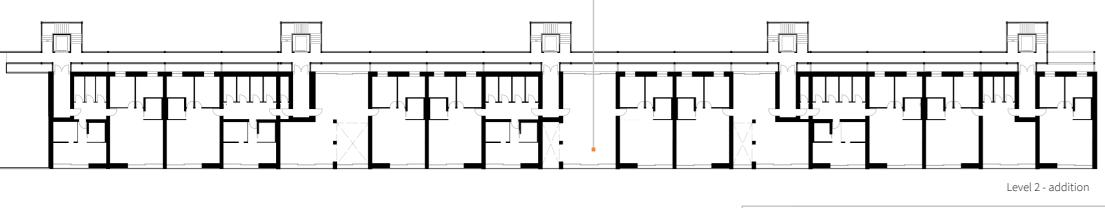
In addition to a forward-thinking and innovative architectural language, our team was resulting dimensions are derived from current lorry transport sizes. The arrangement respectively. The staircases play a central role, as they represent both vertical and hori-The "levelup" system was developed in such a way that it can be flexibly adapted to re-zontal constraint points. The modules are arranged between the "immovable" staircase

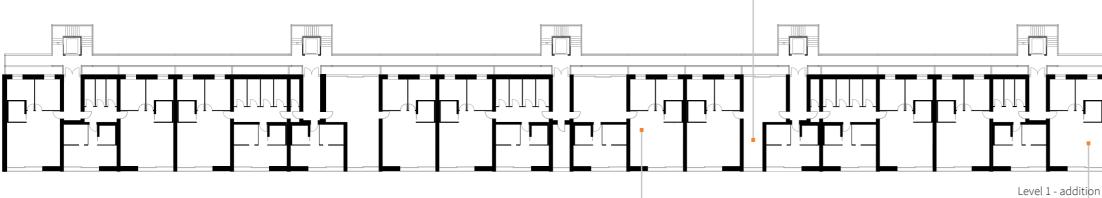


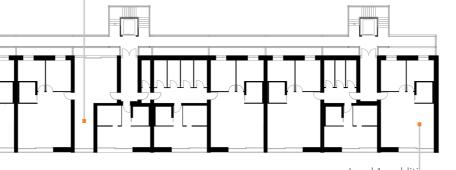
**Drawing Content Community Area** 

**BD-0003** 







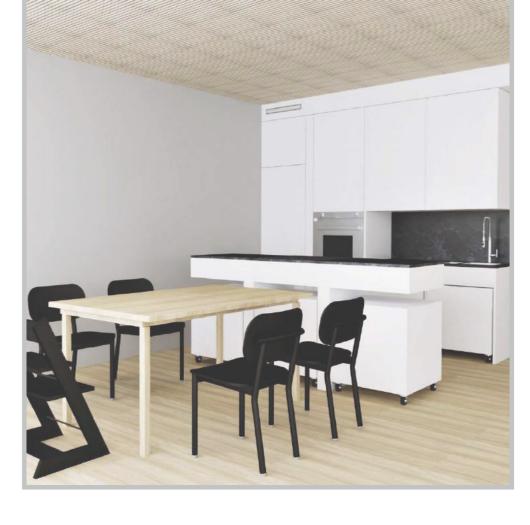


Phase **Drawing Content Community Area** Level 1

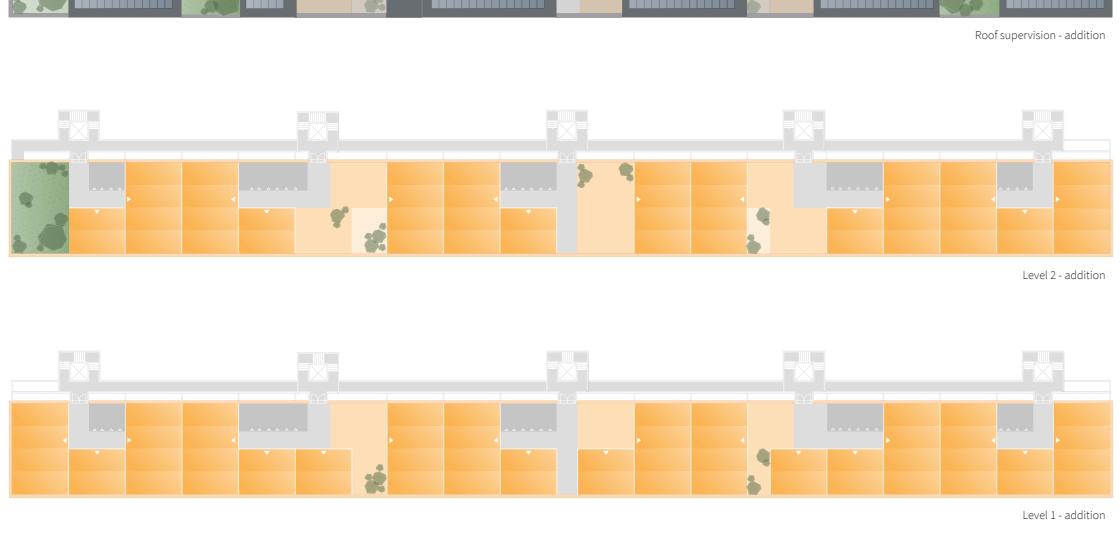
**BD-0004** 

1:500 1:500 D#6 **Drawing Contest Drawing Contest Roof Plan** Floor Plans of the Addition of the Addition **BD-1201** 





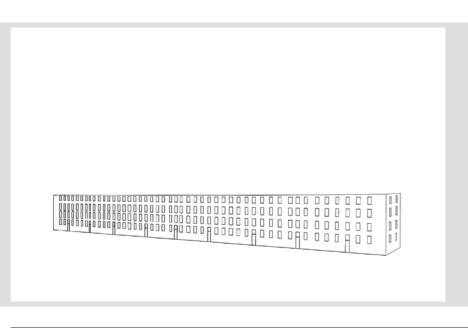
none **Drawing Content Living Space** Kitchen Area **BD-0005** 





**Living Space Entrance Area BD-0006** 

Scale 1:500 1:500 D#6 D#6 Drawing Content Drawing Content Schematic Roof Plan **Schematic Floor Plans** of the Addition of the Addition BD-1202 BD-1102







Modules and roof

come separately



Modules are set up first

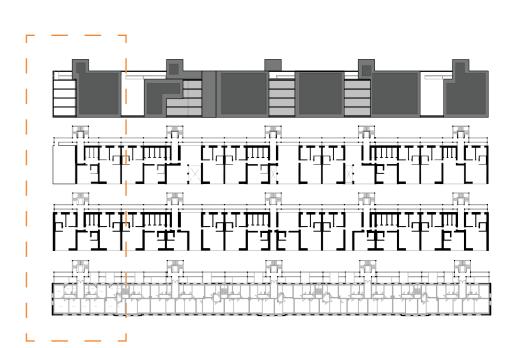


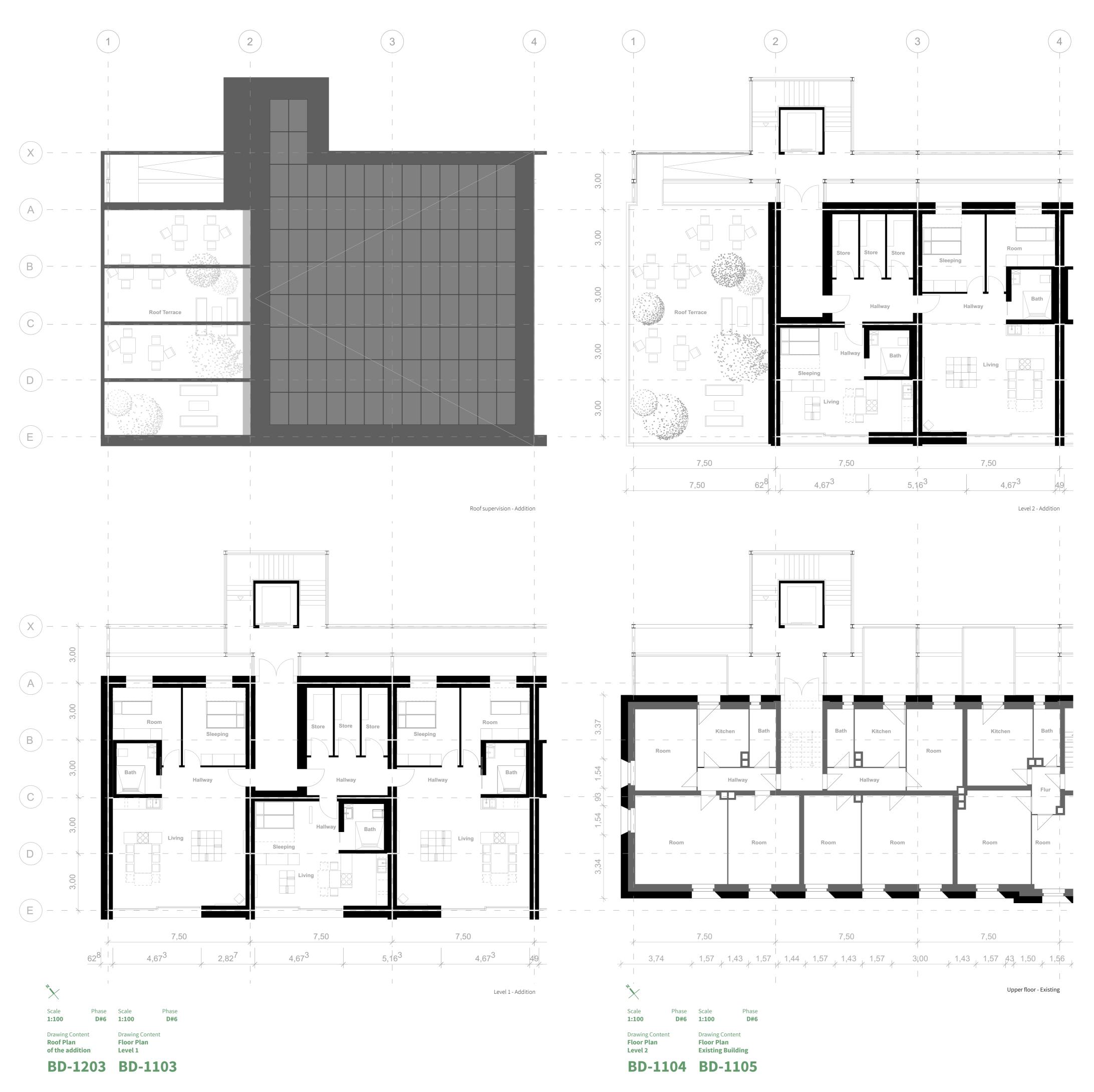


### **Floor and Roof Plans**

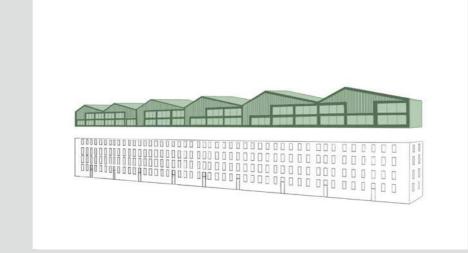
between inhabitants. These communal spaces, some of which have two-story high fenestration, create visual connections between the storeys. By offering multifunctional hbourhood social hub.

The design aims to respond to the needs of the residents with innovative, economical, The flats in the addition of storeys are composed of two or four modules. This creates and small floor plans from which flexible architectural solutions can be developed. Diaverage flat sizes between 77.9m2 and 36.7m2. This offers different floor plan sizes, verse communal areas, a wide variety of green spaces, and attractive contemporary which provides the neighbourhood with a balanced number of small living spaces, for architecture represent a significant enhancement. Communal spaces result from the different constellations of people. Our goal is that everyone should be able to live in surplus areas that the grid brings with it, which means that they are always located our addition of storeys, whether it be small families, pensioners, students, as well as near the staircases. All building residents are allowed to use these common spaces, physically impaired people. Accessibility offers many people new perspectives, and the which are intended to strengthen a sense of community and promote the connection interior spaces can also be adapted to their needs. The bathrooms and kitchens are arranged in such a way that their position utilizes pre-existing utility risers. This way, pipe lengths and shafts can be kept to a minimum. Separate storage rooms are provided for spaces and communal roof areas, the building has the potential to become a new neigeach flat on each floor, as there are no common basement or attic compartments available to the residents of the addition of storeys.









Now the extension

is complete

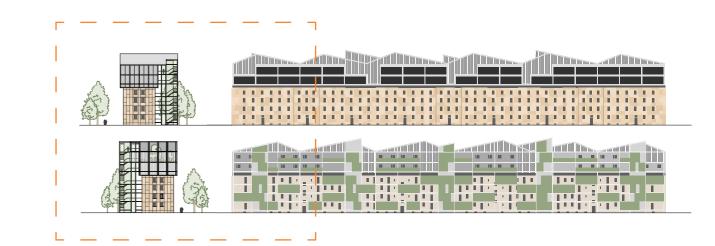


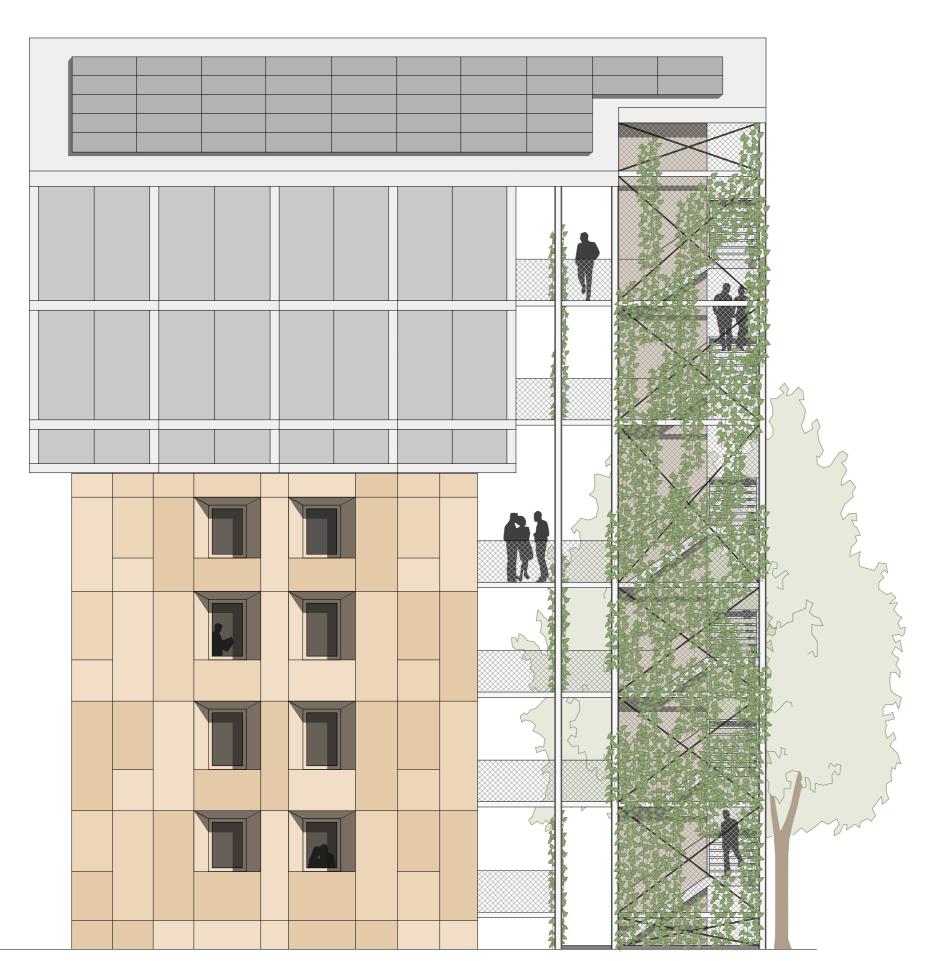
**Renovation facade** for the existing building



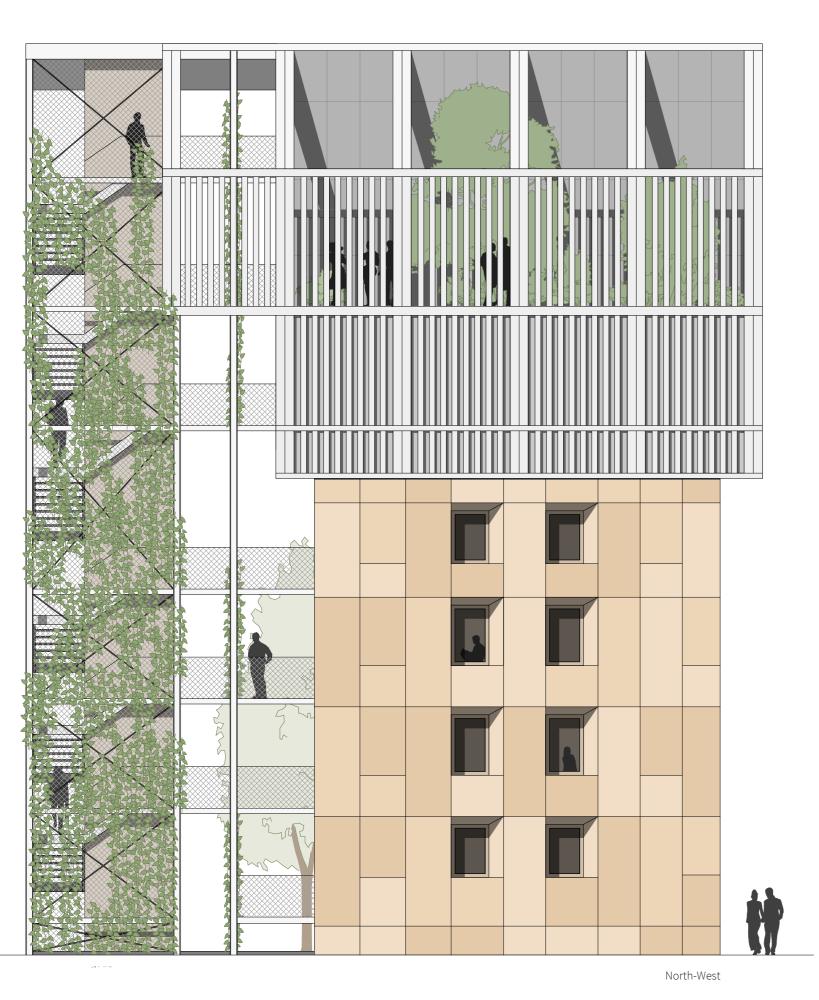


# **Building Elevations**



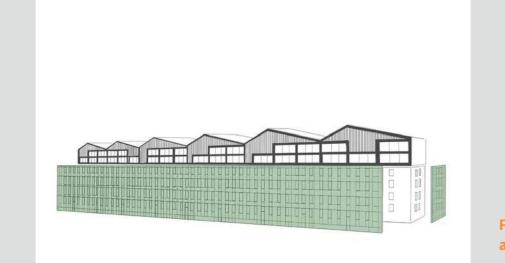












D#6

1:100

**Drawing Content Building Elevation** 

**BD-1301** 

South-East

D#6

1:100

Drawing Content **Building Elevation** 

**BD-1302** 

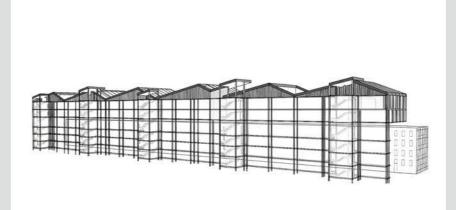
North-West

Facade contains PV modules and panel heating





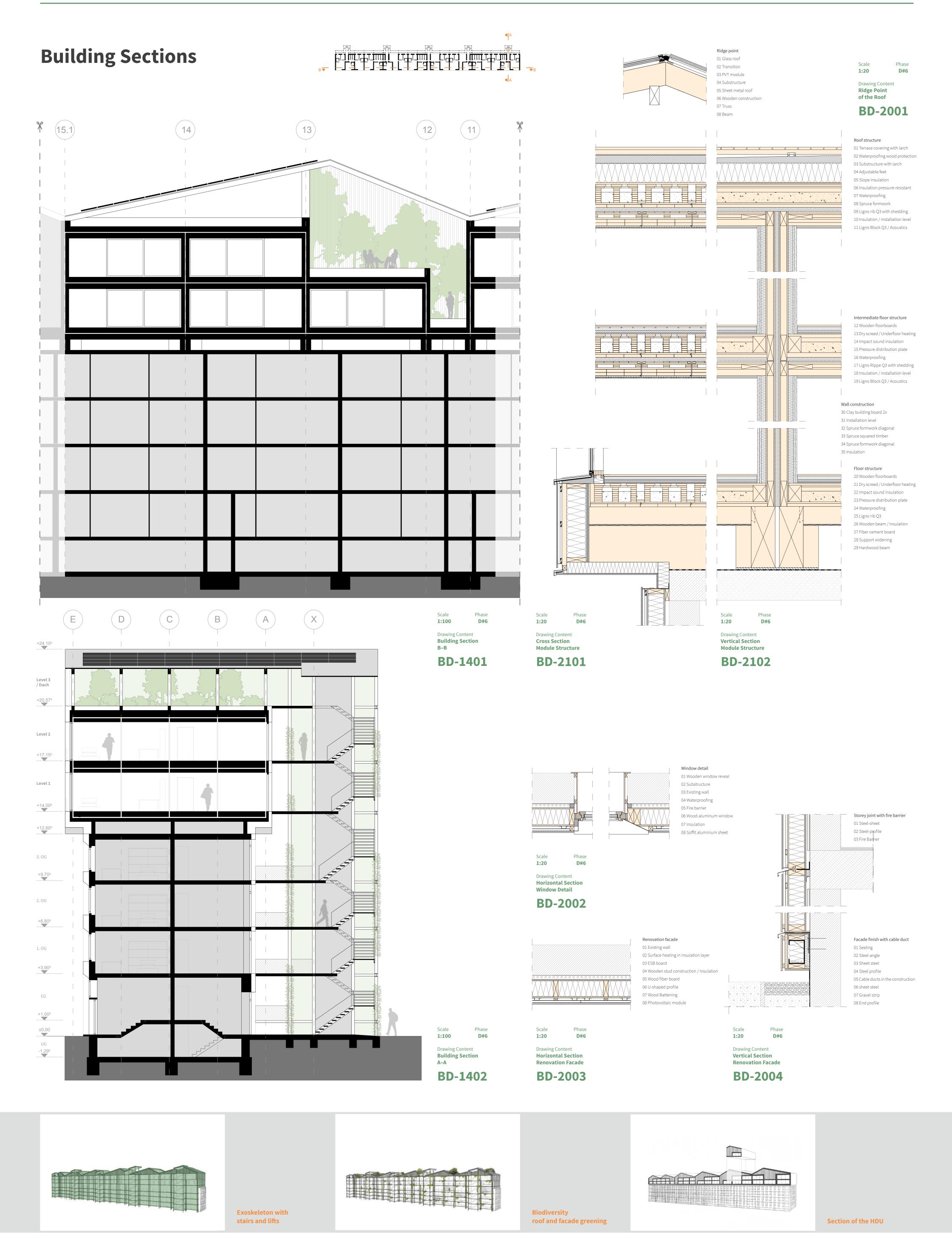
D#6



**Garden view** Installing the exoskeleton











### **Overview of the Building**



#### Community

Our building should appeal to as many different people as possible and promote diversity in the neighborhood. For this reason, all flats in the extension, all common rooms, and roof terraces, as well as many of the existing flats, are accessible via a lift. All areas can also be accessed vertically via arcades at the level of the top floors, and the transitions into the building are designed without steps. The living areas are designed in such a way that they can be adapted to the needs of their users. This means that each flat can be used and occupied barrier-free without complications. It is important that future housing concepts include all groups of people and that there is the possibility to provide living space for different groups of people.

To compensate for the reduced sizes of the floor plans, there are communal areas on each floor in our addition that can be used by all residents of the house. In addition, it is also intended to promote the togetherness of the entire neighborhood and serve as a meeting place. They are always arranged near the staircases and are therefore easy to reach. The two floors are connected via atriums, creating visual axes and connections.

The rooms serve as lounges and communication areas and are also intended to strengthen the sense of community and cohesion among the residents. Certain rooms can also be booked for private parties and leisure activities. There is also a fitness studio where equipment is available and people can take part in guided sports sessions. A café is also to be part of the concept to bring even more life into the building. Outside, the addition also offers open spaces for residents. There are roof terraces that can be actively used, especially in the summer months. These green areas can be optimally used for leisure activities and also for relaxation.

Drawing Content

**Exterior Rendering Street Side** 

SC-4001 **BD-6001** 

#### **Biodiversity**

Many positive motivations for the natural environment and land use go hand in hand with the construction of an extension. The existing green spaces in urban areas must be preserved and expanded. Our elevation can realize this because the construction measures result in minimal land sealing due to our elevations, and the majority of the existing site remains untouched. We also create additional green areas on the roof and façade and more biodiverse areas are created than are sealed. By leaving the natural topographies of the site largely untouched, we protect the soil and water cycles and the existing living organisms. Furthermore, habitat for new species is created and these areas contribute to the conservation of wildlife. Extending our system of elevation and accompanying greening to the entire neighborhood could go a long way towards cooling the urban microclimate. Biodiversity could be created that is currently not found in cities. Many creatures would find a habitat again and thus the biodiversity of the whole area would be promoted and built up. Rainwater and greywater can be used to irrigate the green spaces, which represent an ecological enhancement of the urban environment.



Phase

**Drawing Content Exterior Rendering Garden Side** 

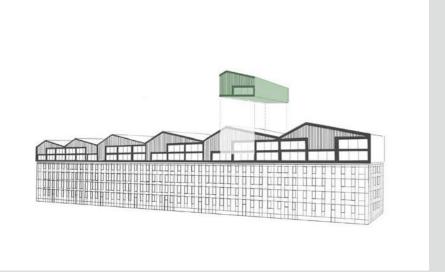
**SC-4002 BD-6002** 

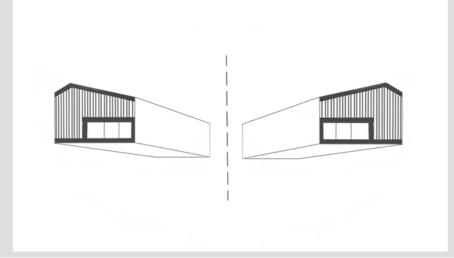




D#6 none **Drawing Content Drone Image** of the Garden Side **SC-2004** 







Mirroring the HDU for the location in Wuppertal



Drawing Content Story of the building design **BD-0002** 

**House Demonstration Unit**