



# journal

aE studio / NR II 2021/2022



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# News aE in action

## Introduction Architectural Engineering and The New Architect

text **Thijs Asselbergs**

### Does architecture still belong to the architect?

Building is getting more and more complicated. Today an architect must be able to work across multiple disciplines. A new generation of architects attach less importance to 'authorship'. Do architects see themselves as independent consultants any longer? They increasingly act as entrepreneurs who are part of a team of various disciplines and fields. Responsibility for a building or work of art is borne by several parties instead of just the architect. Does the team jointly take responsibility for architectural quality? In other words, does architecture still belong to the architect?

### Influence of users

Influence of end-users is very important for every building. In the twentieth century we started with huge home productions. Many people had to be housed. Today there is a much greater need for how such mass production can adapt to the people themselves. How can you provide an answer to what is needed? We are working on mass customised building systems to optimise the high demand for housing. In the twentieth century, an architect

said, "It's not what they want, it's what you want." This attitude seems completely reversed and requires new answers from the architect. Another factor is that new digital technologies linked to machine-based production methods give great freedom in manufacturability. Think of 3D printing, robotics and CNC milling, for example. More freedom of design is generated. The "new architect" can play an ingenious role in this. In terms of process and product. Connecting digitisation and materialisation integrally.

### Architectural sustainability

The aesthetic aspect will never be subordinate. You don't just demolish a well-designed building. We attach ourselves to it. The aim must be to make sustainability and circularity an integral part of the creation of architecture. The implementation of the assignment can consist of assembling numerous different components, each of which also has its own life cycle. Designers together with clients must take the lead in this. We need new inspiring examples in the field of architecture that show society how we can build sustainably and intelligently. Government and investors must stimulate this.

### Create valuable neighbourhoods

We must continue to work on making our own

identities and culture visible. And we have to strengthen it. Diversity must remain linked to local and climatic conditions and the availability of materials. It is precisely by making use of the local availability of energy, materials and of the mobility that can be enhanced on site (such as water), that design choices remain inspired and influenced by local circumstances. Especially now that we are increasing parametric design and implementing digital systems in our daily practice, it requires new digital craftsmanship.

### The new architect

Well-trained architects across all scales must be the pioneers of smart buildings and urban structures that also have cultural added value. This should be encouraged. It is called 'value by design'. The complexity of our assignments is huge. Major architectural issues in urban and landscape environments await us, where it is of paramount importance that these can be tackled by the right talents with the right attitude. They must be supported in this by science, education, professionals, industry, politics and clients. This requires an attitude from the architect that I summarise as "the new architect". This attitude is of added value to our society at all levels of the use of our built and unbuilt environment. This attitude is the guiding theme for aE. The future is now.

## VR expo

### From Analogue to Digital



The covid-19 situation has led to not only digital education but also a transformation of the aE graduation show into a digital place. Based on the traditional "news of progress" layout, you can now virtually make a tour yourself along all themes and design projects.

Making the VR expo was more than converting hard copy into digital but led to new ways of expression as well. Looking at the models for example, it became possible to - instead of

viewing from a distance - walk around in the creations itself. It brings space and material closer and gives a new dimension to sharing it.

Many thanks to Axel Beem of VRchitects for developing the virtual graduation show.

[www.thevrchitects.nl](http://www.thevrchitects.nl)



## CBE Award 2021

### aE Studio Winner

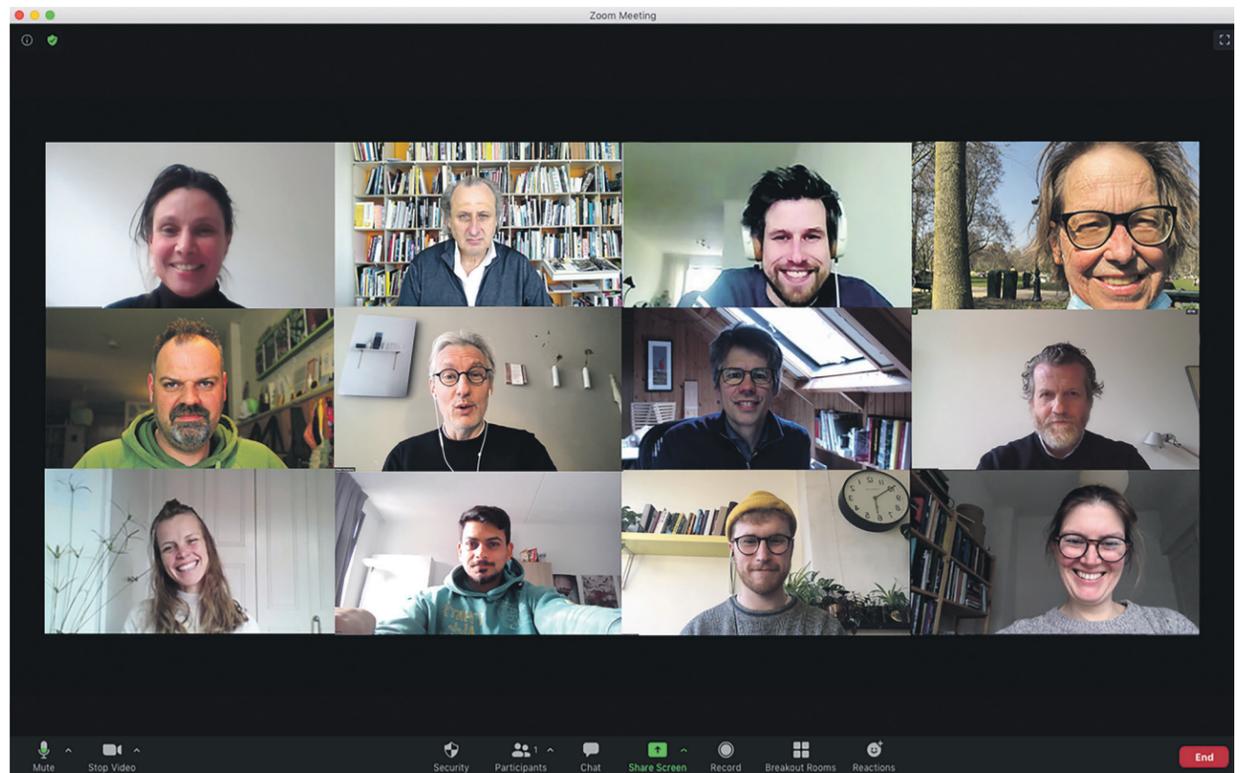


aE student Job van den Heuvel won first prize in the Circular Built Environment Award with his WeGrowCo graduation project, a social and ecological strategy for bio-based neighbourhood development with locally grown hemp as the main ingredient for housing construction (see p. 7). The new annual CBE award recognizes the contribution of BK graduation students to the transition towards a circular built environment and aims to stimulate research and innovation. Job's project is also selected as one of BK's nominees for the Archiprix 2021.

aE in action **News****Teaching and Learning from Change A Year Into Corona**text **Mauro Parravicini****Exactly one year ago, March 2020, life before Corona ended on a Friday 13.**

Fortunately, immediately, we kept going. Online. Apparently, everyone managed to adapt. The beginning was almost adventurous. We were surprised of the incredible potentials of digitization. Working from home, office, everywhere: the most engineering-oriented of us really started to even enjoy it. Exams were held online, and sometimes in a desolated lecture room. Masks on, masks off, our hands became dry from cleaning gels.

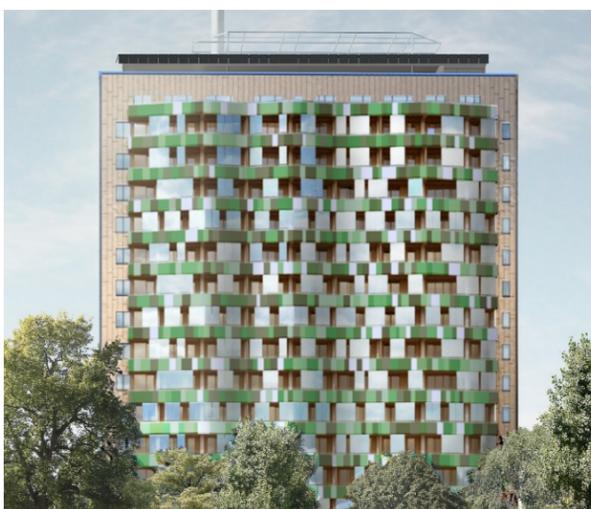
We thought it all would finish, sooner or later. Then we realised that life would not be the same anymore. Statistics say that 25% of Dutch employees are willing to keep working online. Office spaces are re-adapting, and the challenge of providing one million homes to the Dutch housing market might become a challenge towards home/work units. And our students? They suffered the most, and still do. Contact, exchange of ideas, casual encounters on a background of architectural utopias, are gone. Teachers are pictures on a screen, accessible only at dedicated time slots. Sketching is almost impossible, discussions are held on social media, or not at all. And our lovely espresso bar with its accidental talks? Gone.



But this can also be a time for change and new ideas. It will not be the same as before, but also not as bad as it seems. It's a chance to work and keep talking to each other in different ways. It's a time to be curious and to explore new methods of collaboration. Another global event is awaiting us: the climate crisis. Let's not be afraid, let's be equipped. After all,

as architects, we will keep on creating better living environments. And, when the future is unknown, we have to design for change.

So, whether for a pandemic, a climate crisis, or the rise of robotization and digitization, let's embrace change: the new architect will still be an architect.

**aE Alumni Lecture**  
Sauerbruch Hutton

This year's alumni lecture was given by Johanna Wörner, who is currently working at Sauerbruch Hutton (Berlin). During her graduation, she was focussing on natural material use within the self-built context of Indonesia. Currently she is seeking to change the system through co-operative research and innovation projects in the field of circularity. Together with her colleague Falco Herrmann she gave a lecture about the sustainability evolution of Sauerbruch Hutton's projects and reflected upon how sustainable architecture can be practiced.

**Open Building NOW!**

## Digital Workshops with 5 Generations of Architects

**After a successful first edition of Open Building NOW! in November 2020, the second edition of this event took place in March 2021. This is to encourage the exchange of knowledge and experience with Open Building: the building strategy described by N. John Habraken in the 1960s, that has seen a major reappraisal in recent years.**

Open Building advocates a physical division of building components that have different life cycles. In doing so, Open Buildings incorporate not only a flexibility to move with social tendencies, climate change and new regulations, but also form the basis for a circular construction economy. According to the principles of Open Building, the infill needs to be flexible, adaptable, demountable and – anticipating future regulations – as circular as possible. In what way will new technologies (digitization, prefabrication, VR/AI, customized manufacturing) contribute to smoother processes and circular, affordable and comfortable buildings? The workshop designs are presented as digital configurators. Some of the proposals will be used in a hackathon in the coming period. The task for the

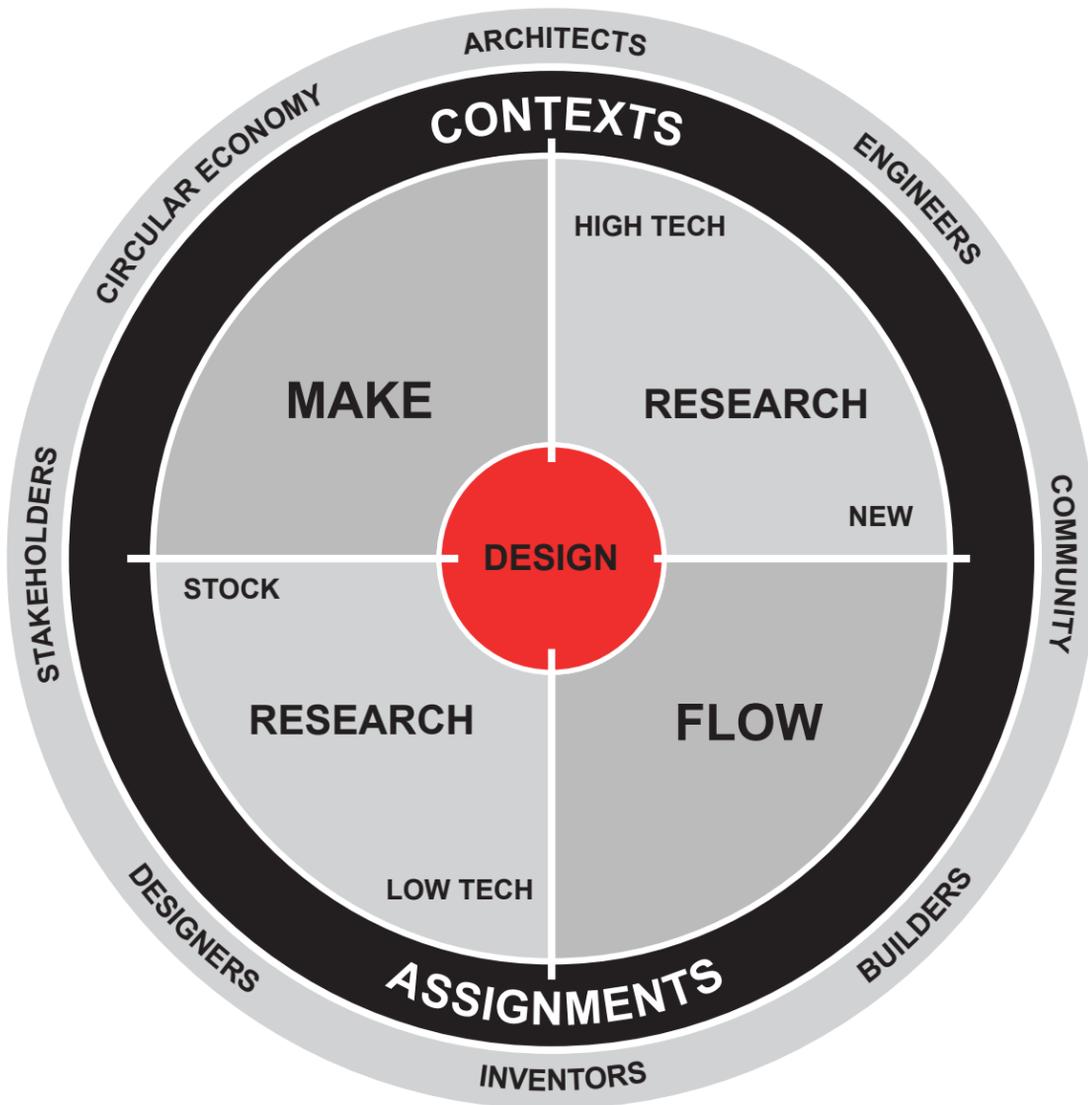
**OPEN BUILDING NOW!**

15 MARCH - 19 MARCH 2021 ONLINE WORKSHOP + LECTURES

**2. THE INFILL FESTIVAL**  
COMFORT IN CIRCULARITY

coming decades is clear: we must work on circular, flexible and adaptable structures and anchor them well to the urban context and society. Within the research project IM Homes, aE studio works with an array of stakeholders from the industry on the development of strategies to address this task. The principles of Open Building promote a separation of support (base building) and installation systems, creating flexibility in layout, use and function.

# Introduction aE graduation studio



## Approach

In the aE/Intecture graduation studio we are looking for innovative solutions in engineered architectural design, while encouraging students to explore their role as architects in facing today's challenges. Understanding existing potentials, knowing the possibilities of renewal and discovering how to design, innovate and initiate change are central themes in the aE/Intecture graduation studio. Under the guidance of a team of enthusiastic (guest) lecturers and tutors, students search for innovative technical solutions for diverse problems in various contexts. The three main research by design domains promoted in the aE /Intecture studio are 'Make', 'Flow' and 'Stock', as described below on this page. Each domain requires a different approach and offers unique design solutions, while creating multiple value for the built environment together.



FLOW

In Flow we see buildings as structures interwoven with their wider system. The sustainable performance of buildings has everything to do with flows. Well managed flows of people and resources contribute to valuable, comfortable and healthy spaces and cities.



STOCK

Stock is about the potential of the existing by looking differently to what is already there, by making use of a technical fascination, in relation to current or future needs. Ideas for intervention can vary: the upgrade of existing housing stock, office buildings or product development of interiors.

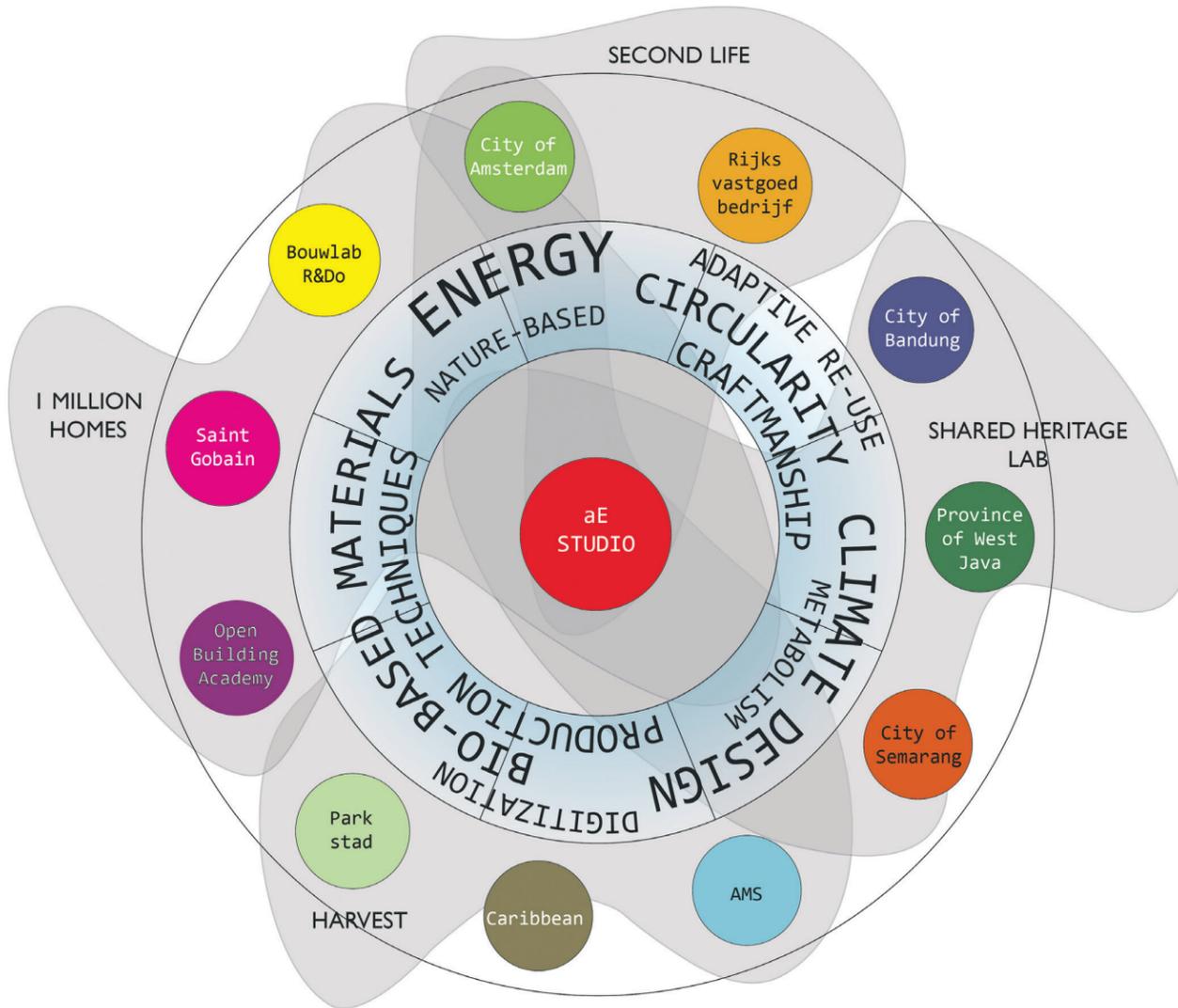


MAKE

Make is about new (digital) production methods, the (re)-use and development of materials and systems for existing and new applications. How do we change the future of our environment, our homes and our cities, using a bottom up approach towards a better and more sustainable future?

# Assignment Introduction

## Collaboration & Knowledge Exchange

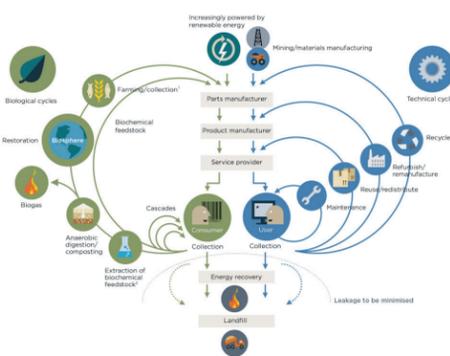


aE/Intecture combines design and technical innovation throughout all scales in architecture. In our Architectural Engineering program we seek innovative and inspiring architectural solutions for environmental and societal issues together with various stakeholders. With today's local and global challenges we are driven by the need to think differently about materials, craftsmanship, energy generation and efficiency, user participation and bottom-up or top-down approaches. In view of the current and constant changes of society, we need to see the built environment and the role of the architect in a new perspective. A vast amount of buildings are vacant and unused while a large percentage of the existing housing stock does not meet today's requirements. But also new buildings have to deal with changing circumstances. Smart and responsible solutions are therefore vital in refurbishing and designing new future-proof buildings.

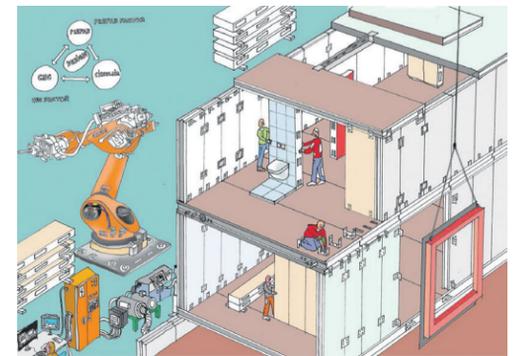
## Agenda



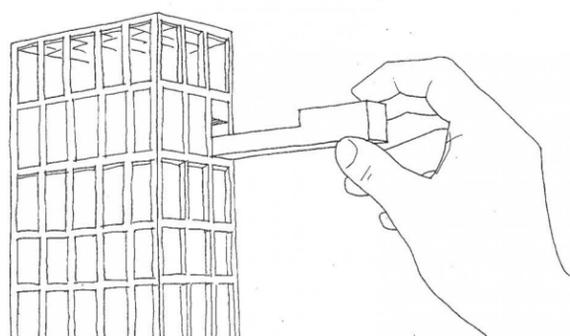
UN SUSTAINABLE DEVELOPMENT GOALS



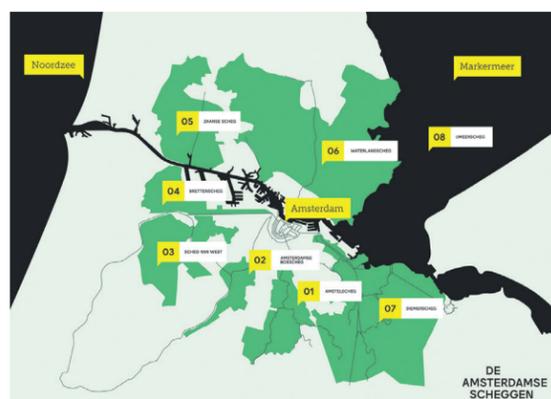
CIRCULARITY



DIGITALISATION



OPEN BUILDING



HARVEST



SECOND LIFE

# Program | Million Homes

## Exploring the Circularity Potential of Open Building

text **Thijs Asselbergs**

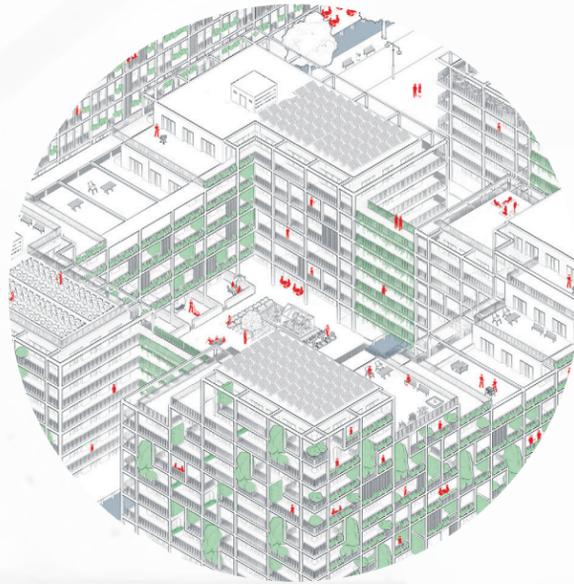
**Large-scale industrial housing can contribute to reducing the housing shortage. In the past, however, this has strengthened the position of builders, and thereby limited the influence of residents and the adaptability of the housing stock. How can Open Building, in combination with digitization and automation, contribute to a sustainable solution for the housing shortage and at the same time give residents more influence?**

Open Building is an architectural and urban development approach, in which renewability and adaptability are central. About dimensioned building in the basic construction (the support) is combined with light construction of the built-in (the infill). Open Building was developed since the 1960s by John Habraken and various colleagues. Now it inspires a group of architects who connect through the Open Building platform. In Open Building, the built environment changes part by part in a continuous and dynamic process of design and construction. A distinction is made between different layers, which change at different speeds and to which design and decision-making are geared to. The layers are also reflected in the technical systems in construction, which are linked together in such a way that one system can be replaced or adapted independently of the other.

New homes to be built must become renewable and adaptable. Open Building offers a structure to achieve the necessary renewability and adaptability. Digitization and automation in design, production and logistics are in full development. Mass customization reduces additional costs for non-standard designs, and large-scale industrial construction and residents' influence can go hand in hand. Open Building in combination with support and installation can contribute to a sustainable answer to the unpredictable housing demand.

In addition, the high demand for homes can also be achieved by using existing homes more efficiently and by transforming non-homes. Many existing buildings have carrier qualities, even if they have not been developed according to Open Building. To take advantage of the opportunities, existing carriers must be identified, new financing constructions explored and possibilities for scaling up mass customization must be further explored. In order to achieve the CO2 targets, preservation of valuable buildings and limit housing costs, it is also better to renew existing buildings. This prevents demolition and thus the loss of raw materials, energy and CO2 storage due to limited recoverability.

Within the domain of IMhomes / Open Building, graduates from aE studio conduct design research and show their results that can contribute to adaptable and valuable environments. See also [www.openbuilding.co/academy](http://www.openbuilding.co/academy)



### OPEN BUILDING SYSTEMS

by **Jan Vader**

The project proposes a future proof neighbourhood of an open building system in order to deal with the housing shortage, circular economy, and changing needs in society; through a design toolbox. The toolbox will be used by different architects to design building blocks in collaboration with the users who can create their own home with pre-designed assemblies and start a sharing community based on shared values and interests.



### SHARING COMMUNITY

by **Szymon Marciniak**

This master thesis focused on the exploration of shared-living models in relation to use of circular economy principles within the architectural design of housing. Case study of the implementation of researched strategies on the scale of a neighbourhood located on post-industrial site of Suiker Unie Terrein in Groningen.



### VERTICAL GARDEN-CITY

by **Niels Bezuijen**

Amsterdam is a growing city that aims to build 7,500 houses per year in the coming years. At the same time people are moving away from Amsterdam to live in more green, spacious and healthier environments. This project aims to introduce the qualities of the Western Garden Cities to the Marineterrein in the center of Amsterdam by applying this system in a vertical manner. Depth of high-rise gardens and indoor spaces can be negotiated and modified.



### DESIGN FOR DISASSEMBLY

by **Steven Lammersen**

Research and design for a more circular built environment, focused on the 'open building typology' and the technical aspects of 'design for disassembly'. Design focused on the city of Groningen. The project starts from the assumption that quality can be introduced in peripheral neighborhoods by allowing diversity and adaptability.

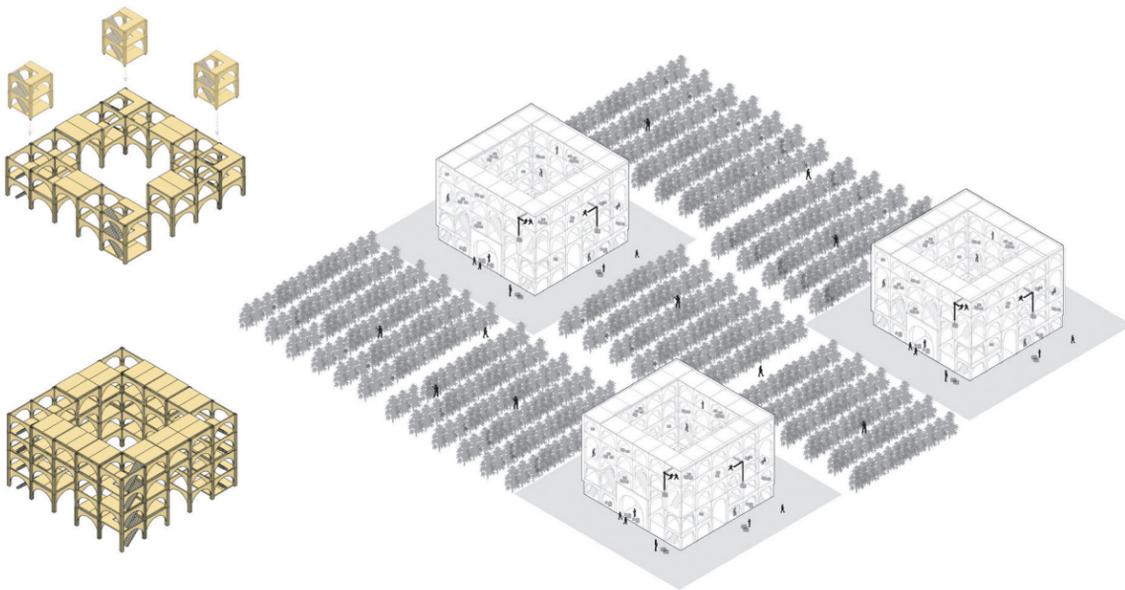
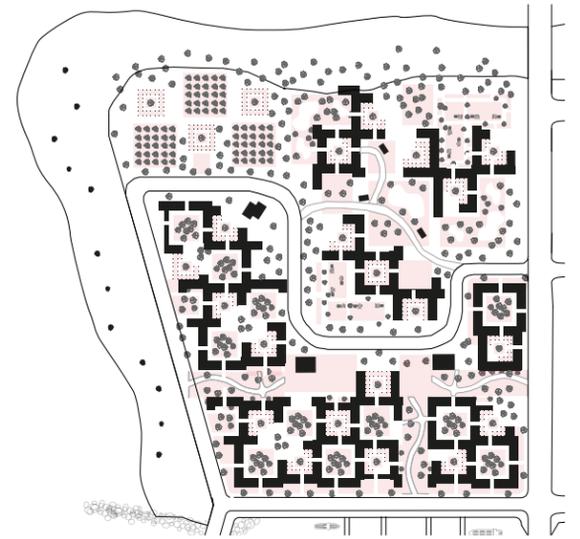


**WEGROWCO**

by **Job van den Heuvel**

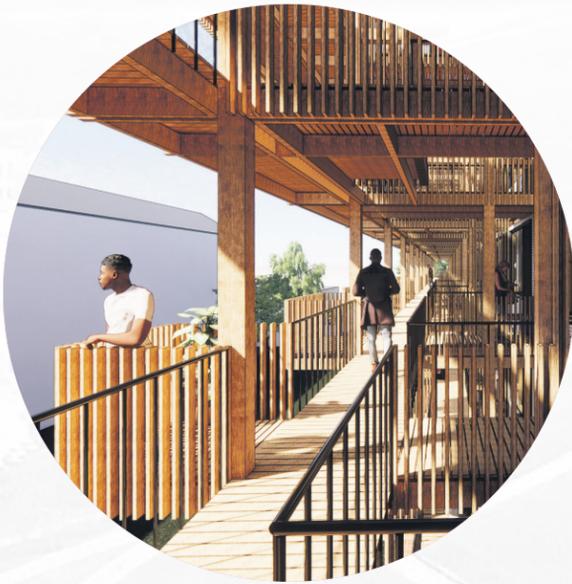


WeGrowCo explores how the new of Strandeiland can be organically grown from an ecological and social perspective. The main focus of the ecological approach can be in three steps: (1) grow hemp to fertilise the ground, (2) harvest hemp to make bio-based building materials and components and (3) build a completely bio-based and self-sufficient. The social goal is to be adaptable for co-creation and give opportunities for inhabitants to choose their own infill of shared spaces, layout of dwellings and facades through open-building practice. The neighbourhood itself can change in shape and size, introducing the idea of city as a living process.



# Program | Million Homes

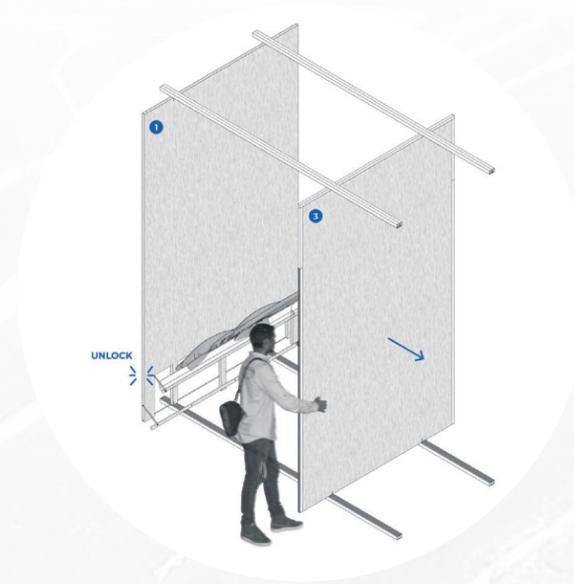
## Open Building and Mass Customisation: A Digital Challenge



### NEW TRANSITION ZONES

by **Bas Smidt**

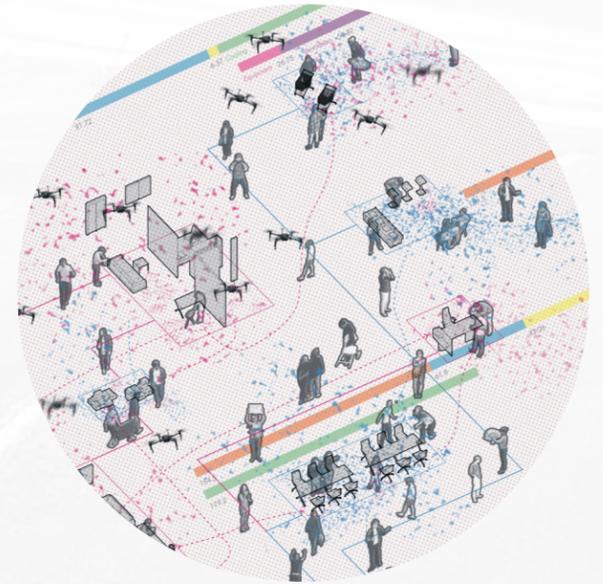
Providing places in the Lodewijk van Deysselbuurt that enable and encourage the residents to appropriate, modify and participate in their built environment. This is accomplished by creating conditions for the design, commissioning and future of the new transition zones in the collective, circulation, entrance and outdoor spaces of a transformed residential building.



### RETHINKING FUTURE LIVING

by **Jasmijn van der Harst**

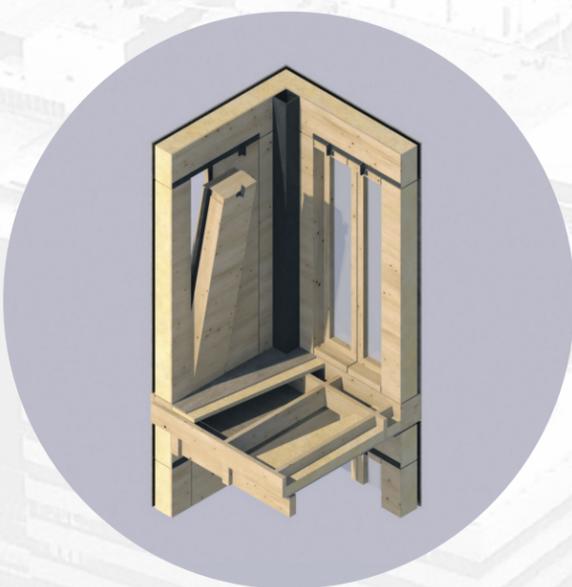
This thesis proposes a blueprint for a sustainable new way of life that maximises the density of a city whilst creating a higher quality of life. The project envisions the world as a network of interconnected communities, providing their nomadic inhabitants with ultimate freedom to travel around the globe by inhabiting adaptable minimal units within a community where common functions can be shared.



### 100-STEP-CITY

by **Xinyuan Zhang**

This project focuses on how to provide a multifunction and inter-disciplinary scenario for a new lifestyle group: the homebodies. Specifically in relation to their economics, design and fashion. It also investigates the identity of a residential construction shifting from a pure private property to a mixed-use social design, as well as completing the goal of energy balance.



### DYNAMIC MOBILE HOMES

by **Justin van der Kooij**

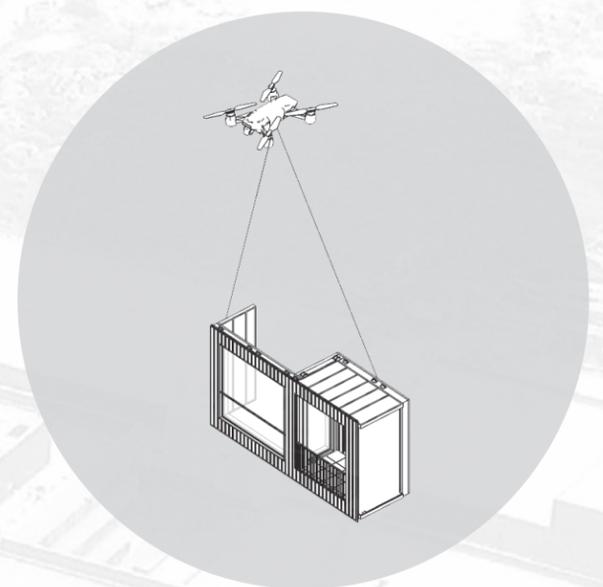
The current building environment in the Netherlands has a lack of adaptability, and features largely single-use technologies such as wet connections. In addition, despite a national housing shortage, some sites intended for development can remain empty for decades. The answer? Portable dwellings for temporarily unused areas.



### BETTER LIVING ONE

by **Bowen Chen**

A community for young people to settle down in the city that advocates natural ventilation, use of natural resources, and a flexible structure system enabling small spaces for living as well as big spaces for social events and working. A concrete future proof megastructure supports timber infill elements that create different communal and private spaces.

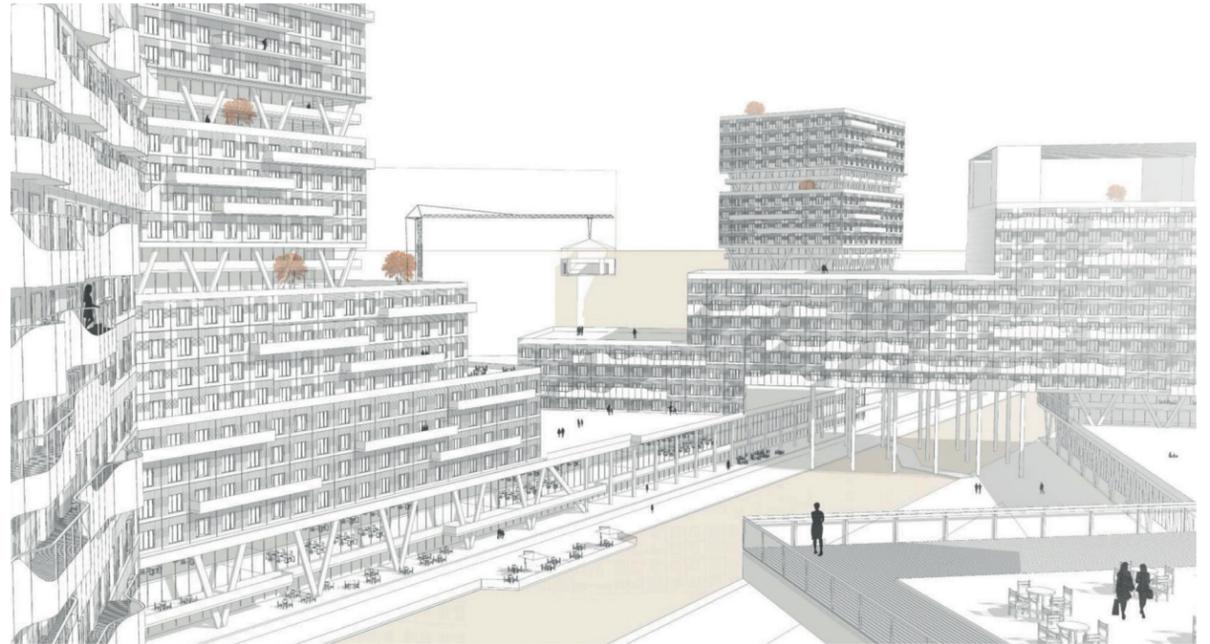
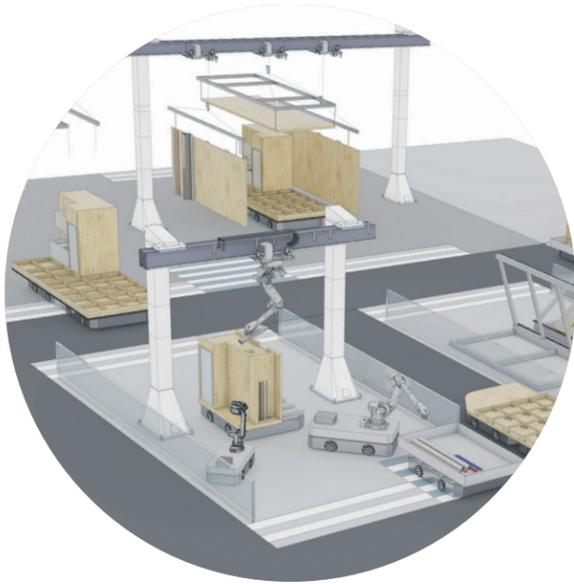


### REBLT

by **Léon Veldhuis**

REBLT is a re-mountable wooden building system that provides buildings with a lifespan of 10-15 years, made out of a system that lasts 100+ years, made possible through design-for-disassembly. CO<sub>2</sub>-storage, flexibility and dynamic architecture are embedded within this system.



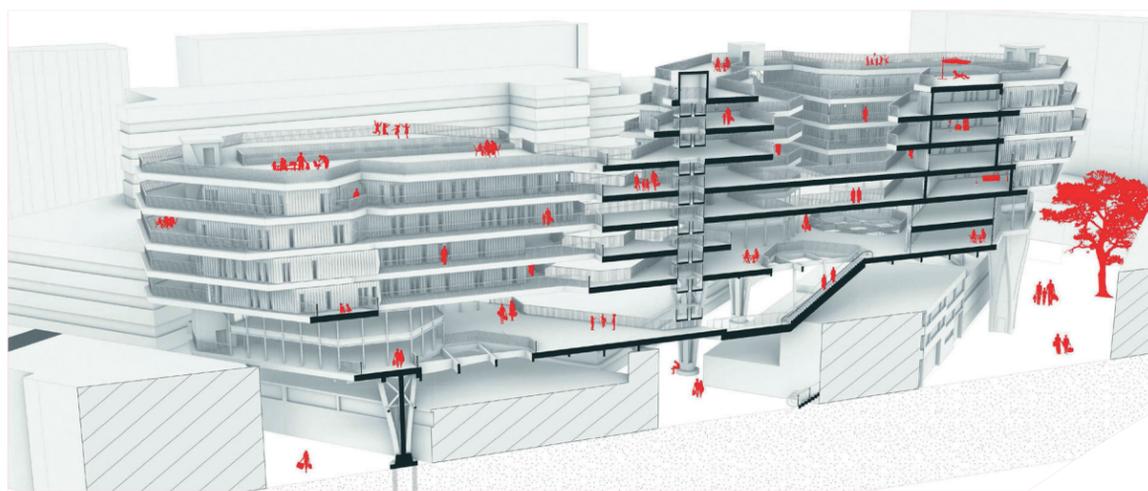


## THE FUTURE OF MAKING



by **Chris Aerts**

Established industrial manufacturing methods combined with parametric design can disrupt conventional design-to-manufacturing processes in building industries. Parametric platform based building systems offer design flexibility and enable industrialised production. Only by integrating our value chain are we able to respond to the challenges of housing shortage, climate crisis, material depletion and inclusive living.

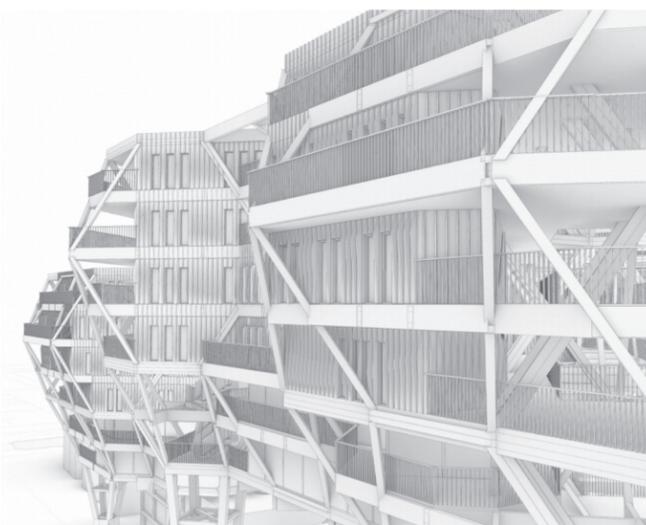
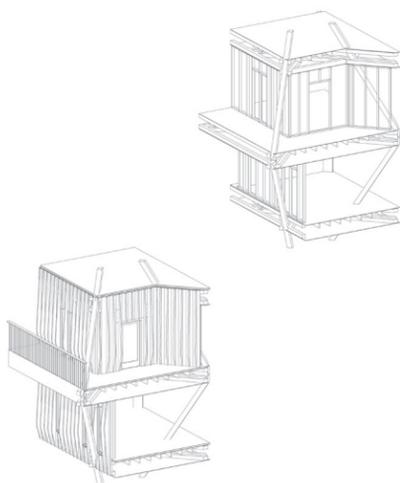


## UPCYCLING URBAN TISSUE



by **Ronen Dan**

Upcycling complex urban tissue in densifying cities. The new building system is able to be weaved into the existing urban fabric, doubling the density without wiping out its urban character and history. It utilises the design and optimisation principles of a membrane structure, enabling different functional adaptations. The perforated structure enables street-like outdoor spaces that are also suitable for urban families.



# Program Second Life

## Exploring Context and Adaptable Re-use

text **Anne Snijders**

**Second life puts a “second life” on the agenda for Post 65 buildings in general and specifically those of the government. We all know the headlines about CO2 emissions, material scarcity and the depletion of scarce resources. This will certainly not diminish, the problems are piling up. Exceeding nitrogen values is the latest news, resulting in protest and conflicts.**

The construction industry has a substantial share in these problems. Continuing with old known methodologies as “end of lifespan” is simply no longer the way.

But how? Regarding climate change, innovation in construction is of public interest. In addition, buildings and their components that are produced with a lot of energy and CO2 emissions deserve a second life.

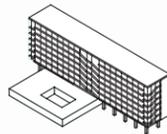
By putting the topic of “Second Life” on the agenda, we have made a start to put this complex matter on the map, whereby the existing building stock is seen as an opportunity.

Use of existing structures will diminish CO2 and NO2 emissions. It will diminish the question for more infrastructure and built environment but asks for better and careful design related to climate goals and a healthy living environment. Space can be re-used for flexible working environments or harvested for urgent societal questions such as the pressing housing question. Skin renovation and transformation will be part of research. New business models will be needed, as well as strategies for material use and the degree of adaptability.

The focus is in particular on office buildings from the period 1965-1995. Many of these buildings are in the spotlight locally and will be given a different function or renovation in the near future. History and appreciation also play an important role in this. They are often monotonous colossi, often with a valuable concrete support structure.

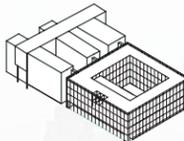
In collaboration with the Central Government Real Estate Agency has been worked on meaningful examples for five case studies. Students of the aE graduation studio worked through “research by design” on the existing structures with the aim of investigating their potential and discovering the function they can fulfill in the contemporary urban fabric. Material circularity, energy management and flexible living-work environments were used as a starting point for design.

It's not only a search for technical interpretation, but is often a search for intelligent solutions, aimed at a combination of a long lifespan, user-friendly design and a wealth of architectural innovation.



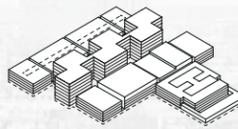
### SLAB

TAX OFFICE, LEEWARDEN, 1970  
PIET ZANDSTRA, DE CLERCQ ZUBLI & PARTNERS



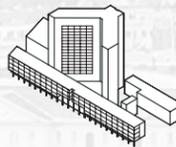
### CARRÉ

PALACE OF JUSTICE ARNHEM, 1963  
FRANK SEVENHUIJSSEN



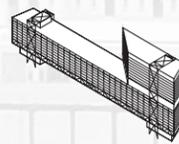
### CLUSTER

AMC AMSTERDAM, 1982  
ARCHITECTS DUINTJER & VAN MOURIK



### TOWER

DE KNIP, AMSTERDAM, 1994  
ABE BONNEMA



### BRIDGE

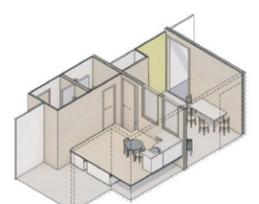
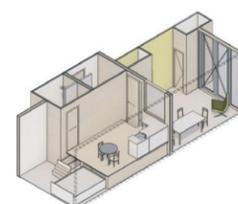
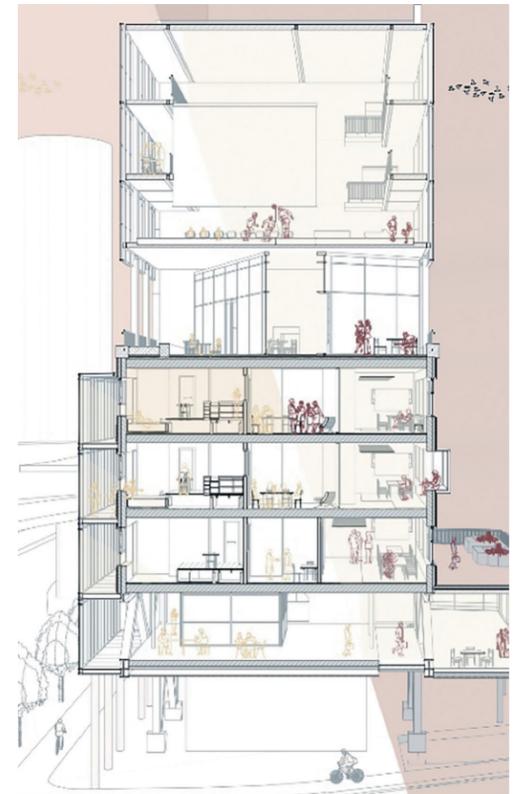
EASTERN BRIDGE BUILDING, 1999  
ZWARTS & JANSMA ARCHITECTS

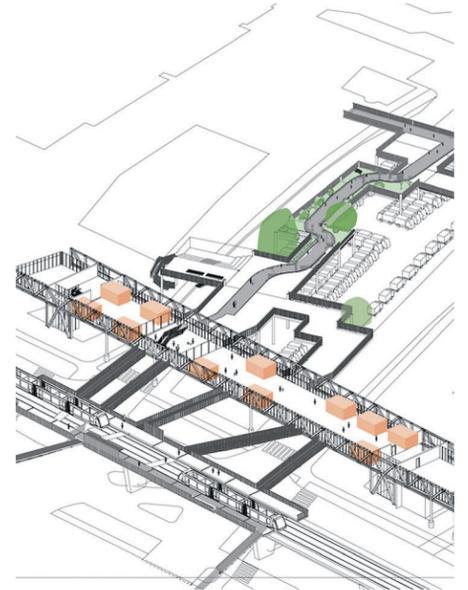
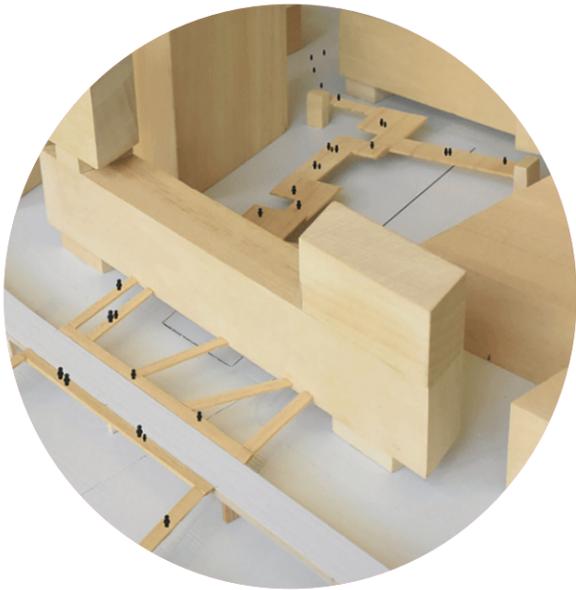


### WEWO BUILDING

by **Robert-Jan Altena**

Increasing lack of space in the Netherlands drives us to transformative interpretations of multifunctional buildings to reduce vacancy and increase effective use. By combining commercial, housing, working, recreational and dining facilities, new flows are created, and symbiosis is required between living and working spaces. Adaptability achieved by prefabricated units makes the building suitable for the future use.





**FUTURE FOOD SUPPLY CHAIN** 

by **Sebastiaan Brouwer**

The way food is grown, distributed and consumed changed over the years. Technologies in mobility changes, the behaviour of people changed, restaurants emerged and gigantic supermarkets have a huge impact on thousands of cities. What is the impact of these trends and innovations on the built environment and how will the city respond to the next trend? This question had a central role in the research paper. The design project gives the answer in the creation of an urban distributing hub centrally placed in the city of the Hague on top of the A12, connected to public transport and sustainable local transport. The position decreases the amount of movements and the amount of motorised covered kilometers within the city. It creates a multi-functional food facility and connects on a local scale two districts. The project makes the Grotiusplaats to a renewed shared space with a public food court.

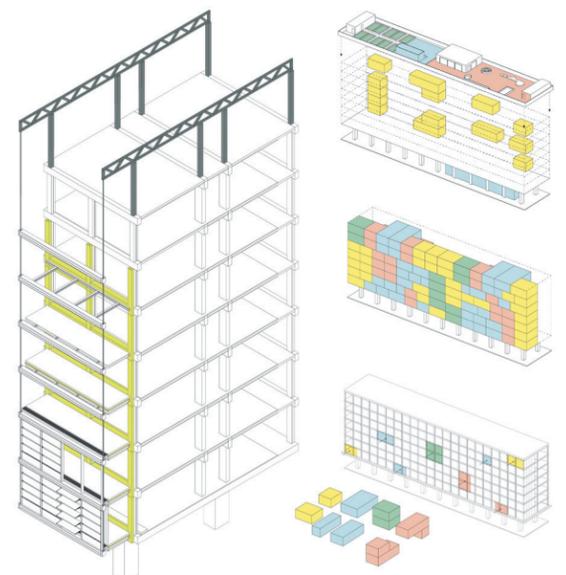


**USERS AS DRIVERS**

by **Thomas Edes**

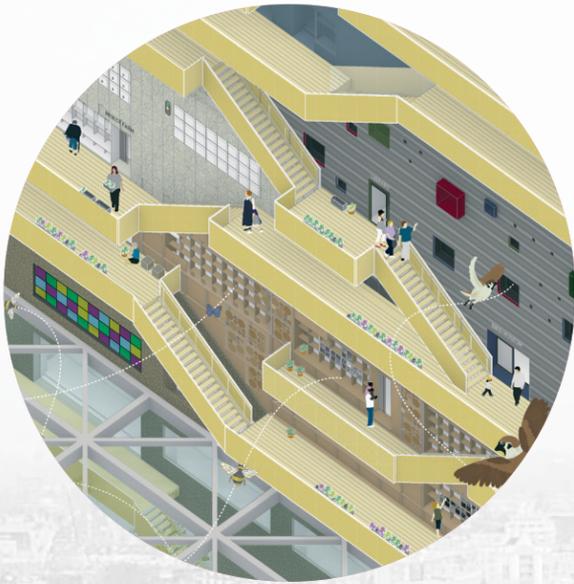


Situated in an office park on the edge of the historical city centre, the 80m tall, 1970s Tesselschade 4 building offers the opportunity to influence its surroundings positively via conversion, and to showcase the potential for bottom-up transformation of mono-functional office parks. 80 future residents will have the option to realise their preferred housing type. A second façade, hanging from an added roof structure serves as a thermal and acoustic buffer for the housing units, which can be reached via galleries and corridors in the north façade and the center of the building. The users are the drivers behind not only the use, but also the development of the project.



# Program Second Life

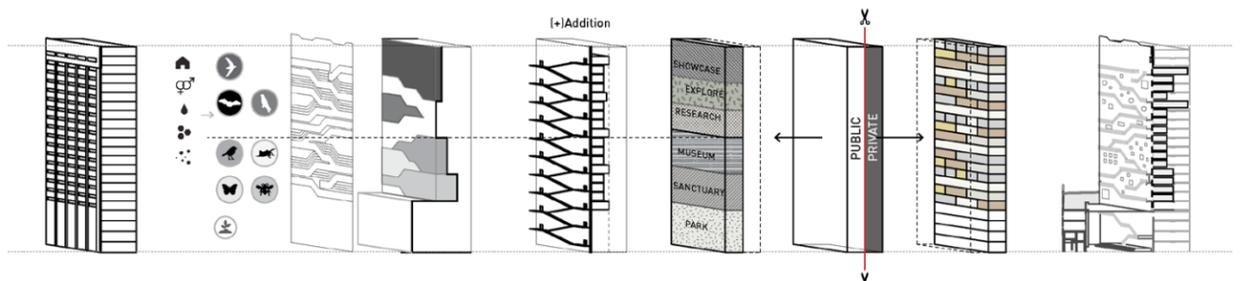
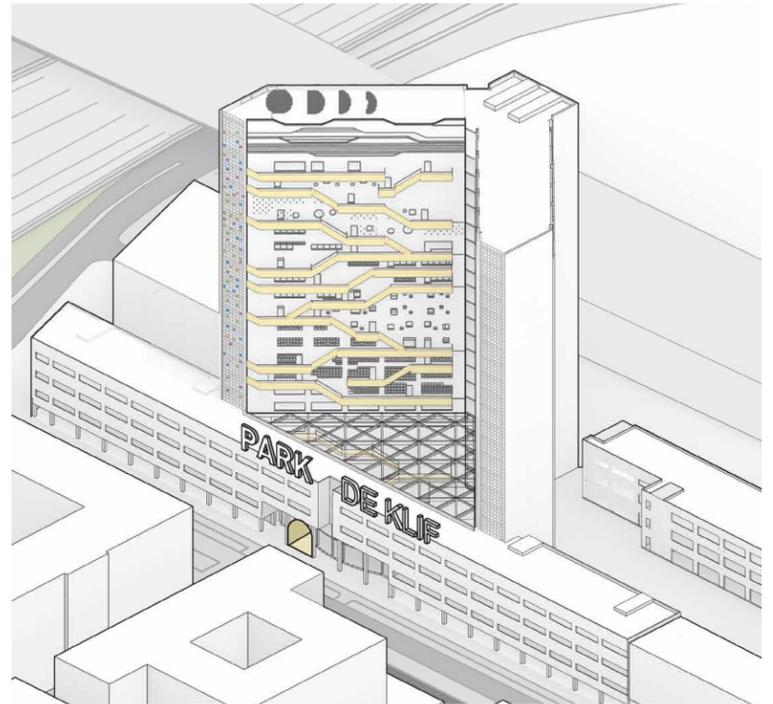
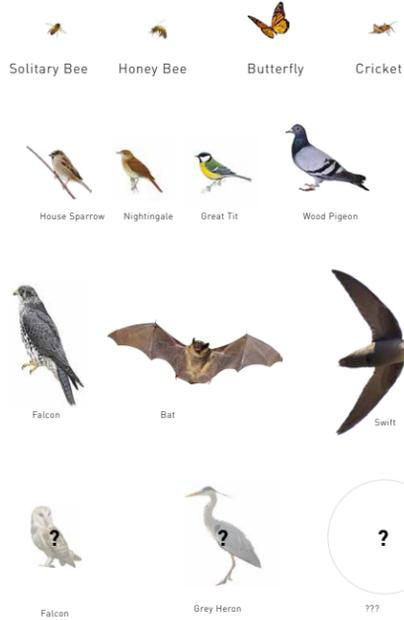
## Exploring the Skin



### ECO-LANDSCAPE

by **Yvonne Yuen**

The impact of urbanism on biodiversity is beyond question and as cities prevail to become the new landscape, more connections should be drawn between conservation and built environment design. What are the opportunities of the numerous surfaces in our city? The assorted facade follows a design toolbox to demonstrate various possibilities in a vertical landscape. It makes urban ecology visible and tangible and promotes nature connectivity.



### THE SCIENCE COLLECTIVE

by **Nienke Scheenaart**

TU Delft aims to have a CO2 neutral and circular campus by 2030. The goal of this graduation project is to design a renovation strategy for the Applied Physics building, by re-using as many of the existing materials. The concrete structure covers 93% of the building and will be re-used. Thermal performance will be enhanced by adding prefab bio-based panels. The energy flows will be solved on a local level by a variety of interventions.



### THE NEW VERNACULAR

by **Mimi Oldenhave**

The new vernacular is about the best of two worlds; it's a combination of an existing industrial structure enriched with elements which influence aesthetics, functionality and technique in order to create attractive environments. The new vernacular is based on three rules: it creates liveliness by location specific and personal facades; it makes changes in use and preferences possible; and only biodegradable materials and dry connections are used.

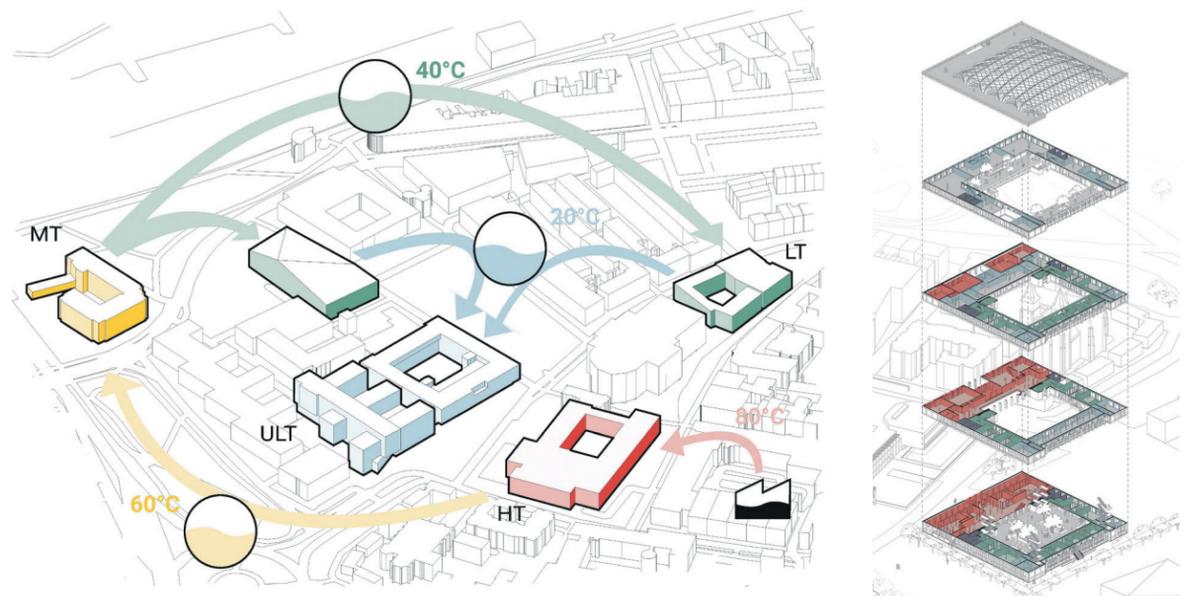


### CIRCULAR CONCRETE

by **Martijn Baelemans**

This project explores the possibilities and limitations of a circular material strategy in an architectural transformation challenge, based on open building principles. Problematic elements in the existing structure are resolved, adding architectural quality. The transformation is executed by reusing and recycling existing materials, resulting in an environmental impact (CO2) that's only a fraction (14 %) of the impact of a new construction.



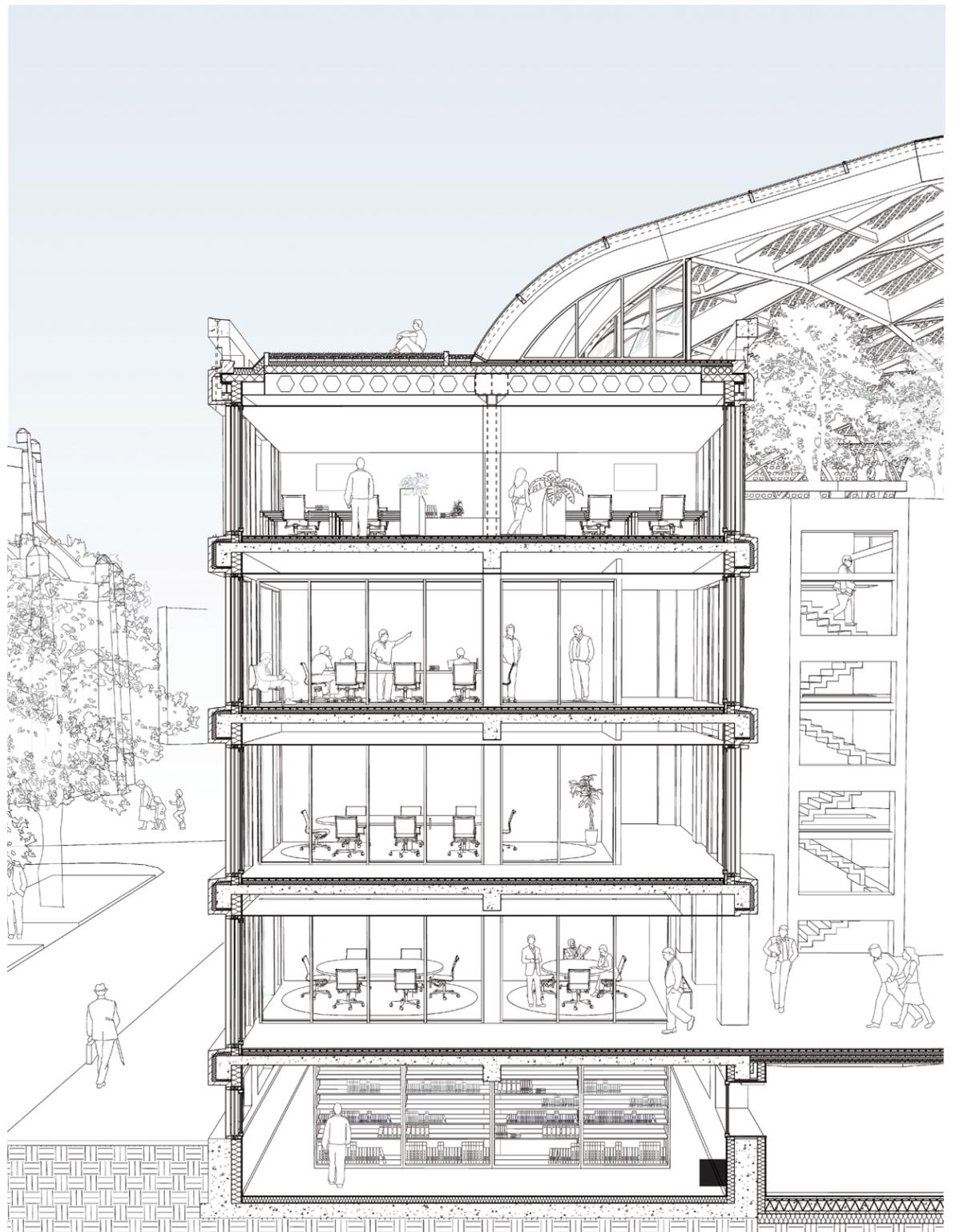


## ENERGETIC CATALYST

by **Daan Reinders**



The built environment is a major consumer of energy in which many improvement steps have to be made. This project investigates how energy can be more efficient by reducing, reusing and producing energy on an urban and building scale. The research showed that the implementation of a sustainable collective heating system around the Palace of Justice can significantly reduce the energy consumption for heating. Comprehensive renovations improving the building energy performance reduce the energy consumption to a minimum. The proposed sustainable integrated renovation of the Palace of Justice shows what such renovation can look like. The combination of modern sustainable techniques and more common interventions opens up the traditional approach to energetic sustainability resulting in a monumental nearly zero energy building. With its role as an energetic catalyst, the addition of public functions and the increase of accessibility, the Palace of Justice is firmly embedded in the city and society and can therefore last for many years to come.



# Program Harvest

## Rethinking the Garden City Concept

text **Anne Snijders & Mo Smit**

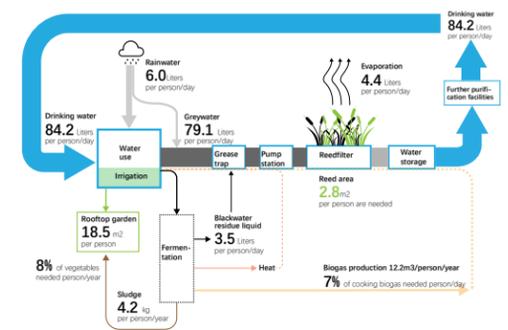
**Working on healthy cities and landscapes asks for multi-scalar design strategies and decision making with regard to the integration of urban resource flows within the built environment. Circular value chain thinking is needed to find regenerative and inclusive solutions for the future.**

Students from Architectural Engineering took the chance to rethink the concept of the Garden City and experiment with regenerative strategies leading to strong designs for productive and recreational landscapes, valuable neighborhoods, buildings and (infrastructural) objects. Sustainable solutions for urban resource management are increasingly organised in a decentral way and need to be spatially embedded and supported by local communities. This transition therefore requires new forms of design processes for the (re)development of urban areas.

As part of the cross-domain Harvest program, research has been done in the working fields of urban metabolism and urban ecology. Closing the loops of urban resources, such as water, materials, energy and food, forms the starting point for interventions leading to interesting new programs, biodiversity, joy and quality of life. By looking back to earlier stages of urban developments and by innovating the urban concept of the Garden City, which combines the best of the city with the best of the countryside, past and future will be connected in a sustainable and valuable way.

By working within different geographic contexts for a longer period of time, such as Parkstad Limburg, the City of Amsterdam and the city of Bandung, we have built a living lab environment for the research by design activities where new insights and solutions can be compared and shared by with a community of stakeholders.

There is a collaboration with researchers from the department of Landscape Architecture and Urbanism. Furthermore, aE students have participated in the Waardevolle Wijken research project, which has been funded by the Design & Government Programme (Ontwerp & Overheid) of the Action Agenda for Spatial Design 2017-2020 of the Dutch Government.

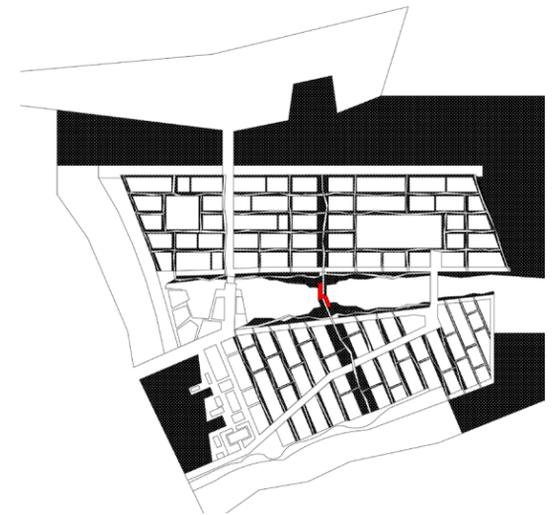


Reed based urban water management system.

### URBAN REED

by **Yaqi Shen**

Strandeiland strives to ease housing pressure and contribute to the IJburg district's natural identity. The research objective was to design a reed-bed filter system for the island that can circulate waste water into fresh water. The design focuses on a reed factory that manufactures building materials for on-site dwelling construction. This development strengthens the water resilience and enhances the island's natural identity, whilst adding value to the neighbourhood.



### ZAMBIA FISHING COMMUNITY

by **Mel Schafer**

Rural village communities in Zambia, such as the case-study fishing community of Kavalamanja, suffer from a lack of opportunities to sustain themselves. Harsh climatic conditions, such as extreme drought, put great pressure on the natural landscape and its possibilities to provide the local community with food and building materials. As an answer, a circular (re)development model is created for rural villages, consisting of a network of food production facilities and gardens based on perma-cultural principles.



### BIO-BASED WORKSHOP

by **Mees Hehenkamp**

Out of a fascination for building with wood, straw and clay a design for an educational bio-based workshop has been created. The facility empowers self-builders to prefabricate building elements of natural materials and enables the sharing of knowledge and skills. Research has been done on traditional Dutch timber frames and hybrid building skin solutions, based on earth, reed and straw as main ingredients. The workshop building is purely built with materials harvested in the local landscape.



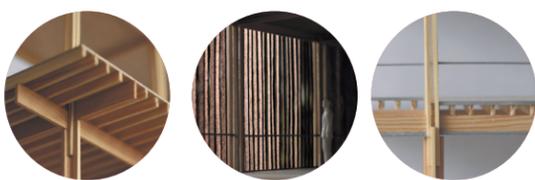
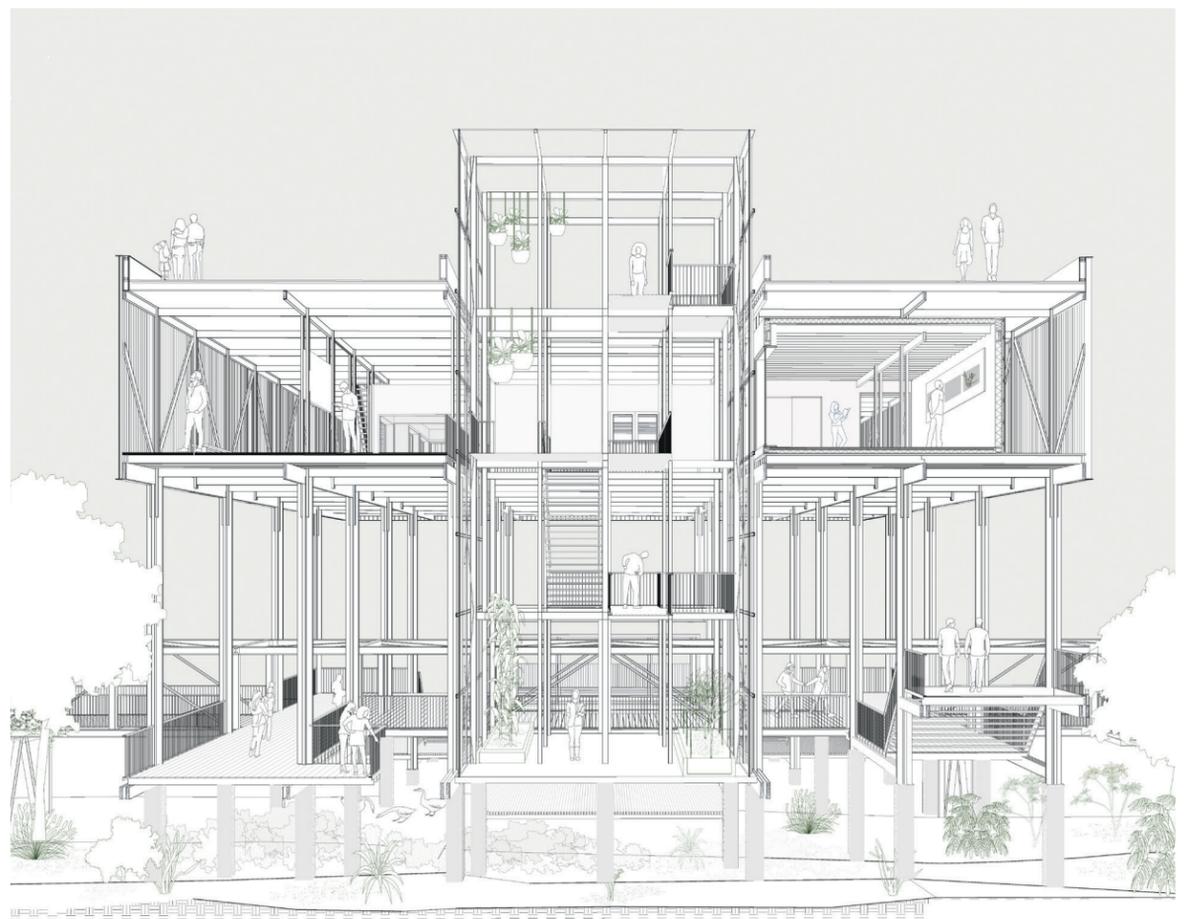


**REHABILITATING**

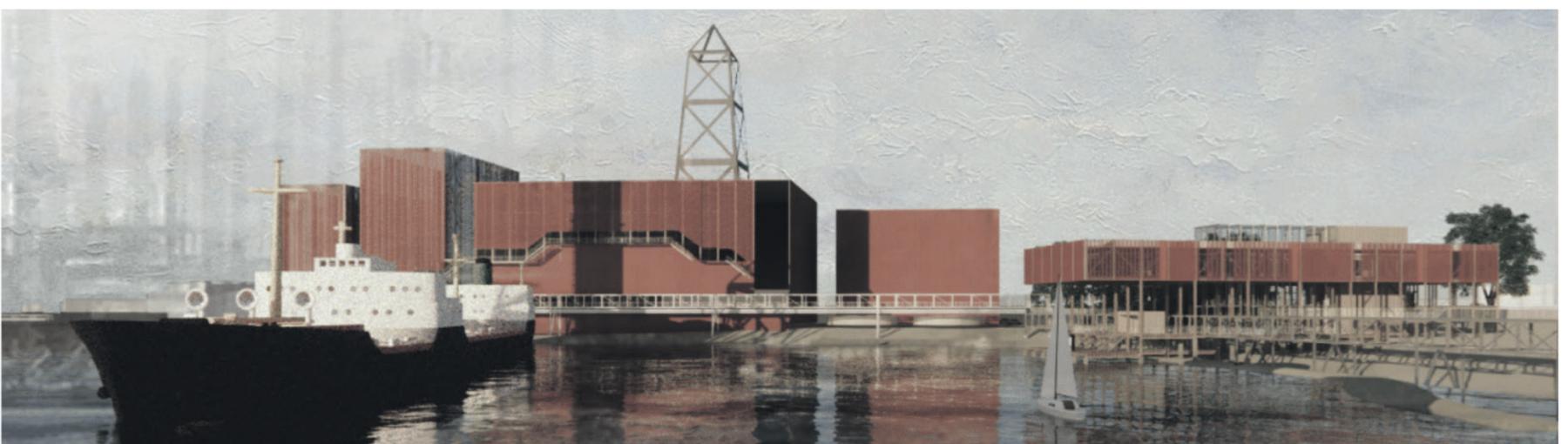
by **Karlijn Besse**



This project, rehabilitating the anthropocene, investigates the industrial site of Shell-Pernis in the Port of Rotterdam. The soils of Shell-Pernis are highly contaminated with Mineral oils, heavy metals and PAHs. In order to clean these soils and provide feedstock for a proposed bio-refinery, a set of 25 different plant species is contrived, which form building blocks for ecological interventions to transform a deteriorated, fossil-based industrial site into an accessible bio-industrial park. The interventions have the potential to make a polluted industrial area safer and healthier, and provide a pleasant stay for the public.



Materiality and architectural details.



# Program Harvest

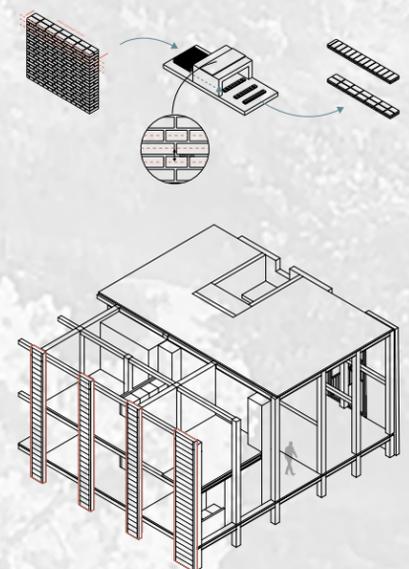
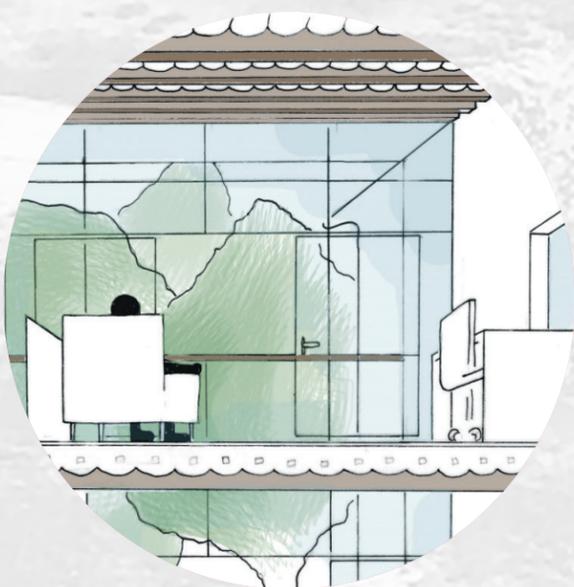
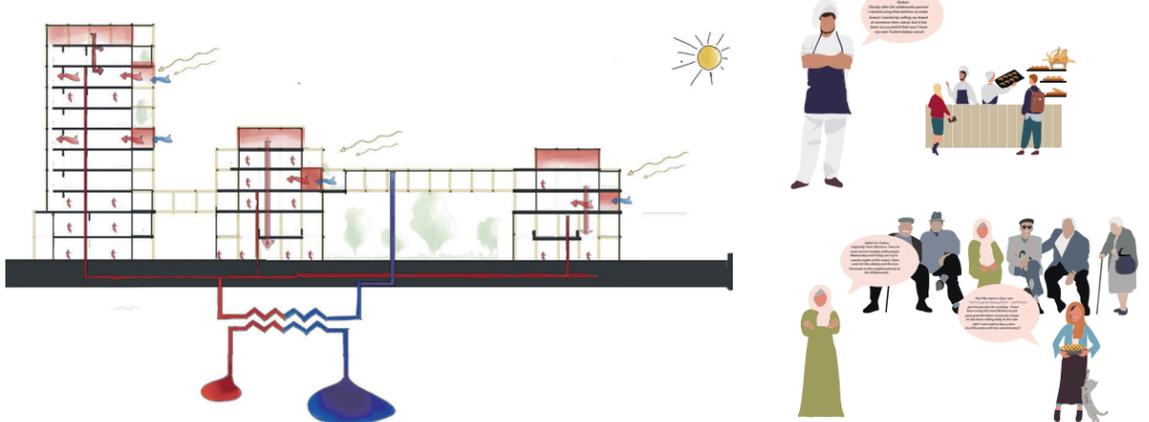
## Closing the Loops for Valuable Neighbourhoods



### GARDEN CITY FARMING

by **Joaquin Valdes Troncoso**

This project investigates how food can be produced on a neighbourhood scale, located in the Western Garden City of Amsterdam, by studying the suitability of different urban farming techniques and measuring the following indicators: food production, monetary income, job creation, water retention, energy production, aesthetic values, social values and biodiversity.



### NATURAL PASSIVE HOUSING

by **Rosemarie Escher**

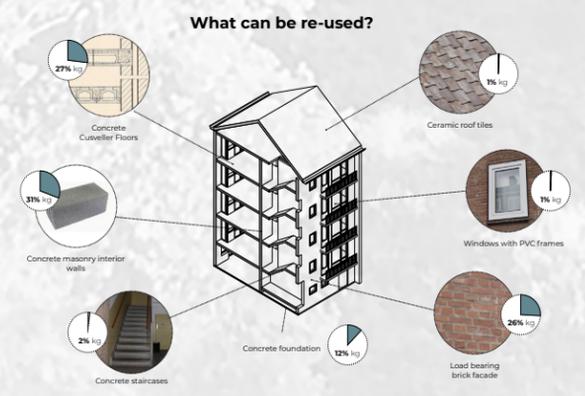
This project focuses on the design of a passive and nature inclusive housing complex in the Lange Bretten in Amsterdam. The complex offers a temporary home for the growing group of economic homeless people. Local building materials, such as wood, earth and reed are used for affordable housing construction. A positive footprint strategy has been followed, enabling a symbiosis between the residents and the natural environment.

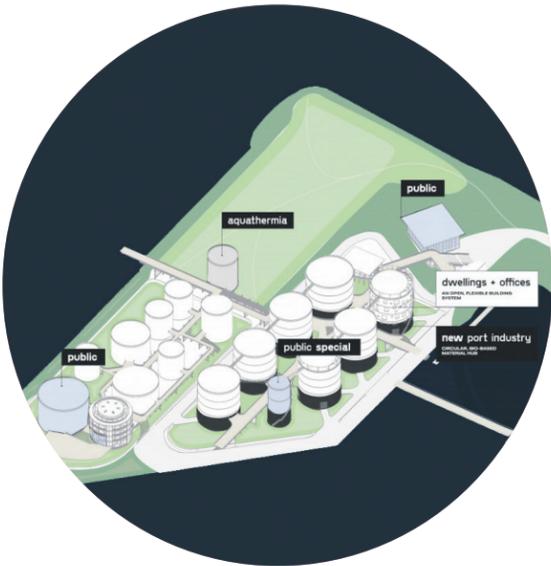


### POSTWAR MATERIAL RE-USE

by **Merijn Braam**

Moving towards the Dutch circularity goals of 2050, this project aims to diminish the amount of construction waste released by the demolition of 282 post-war dwellings in the Nieuwenhuysenbuurt in Amsterdam West. Through the use of a flexible and demountable building system, construction waste is diminished now and in the future.



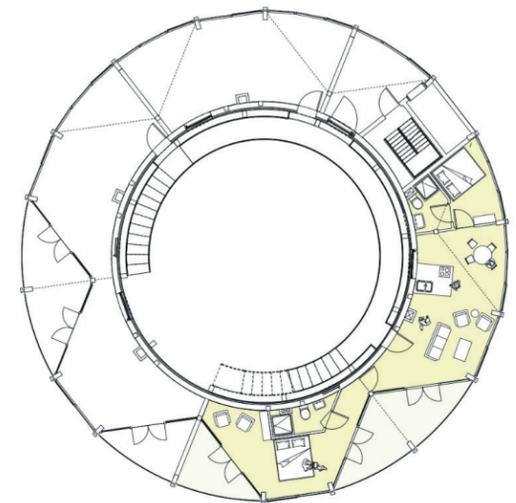
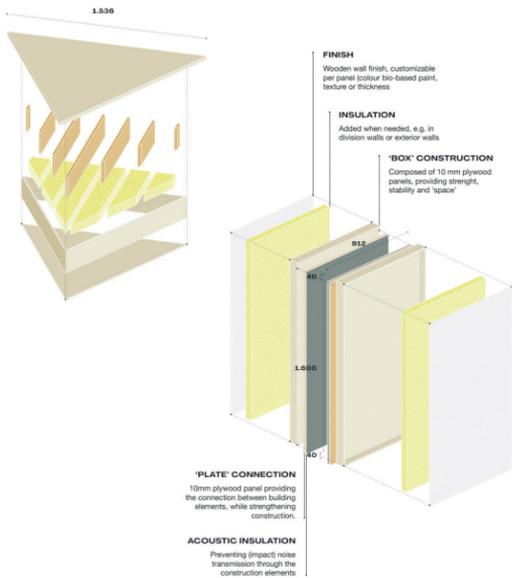
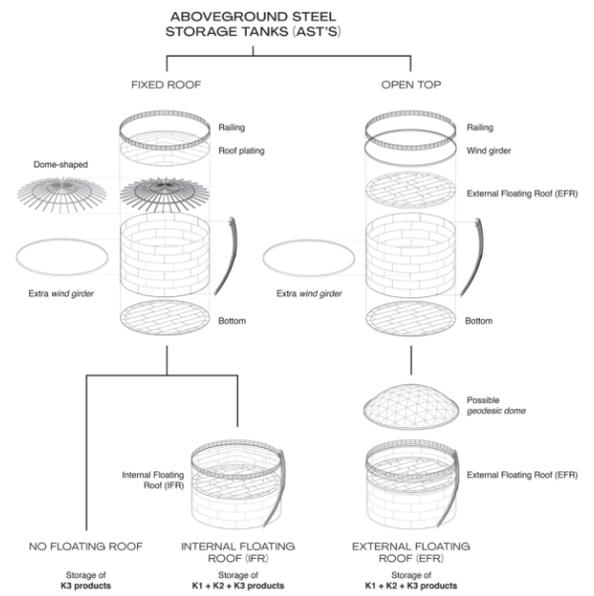


## REPURPOSING THE PORT

by **Coen de Vries**



The project 'Repurposing the Port' combines the issues surrounding fossil fuels with the challenge of port-cities, to house the expected population growth, meet climate goals, and revive the formerly intimate connection between the city and the port. The Petroleumhaven in Amsterdam is transformed to a future-proof, mixed-use neighbourhood. In this transformation both the existing structure of the area, and the available building structures (and materials) are re-used to create a fully circular re-development. The flexible wooden building system provides for a community-driven realisation, whilst achieving a carbon-negative footprint.



**MAIN-B1**  
71 M<sup>2</sup>  
LEVEL 9000



# Context Shared Heritage Lab

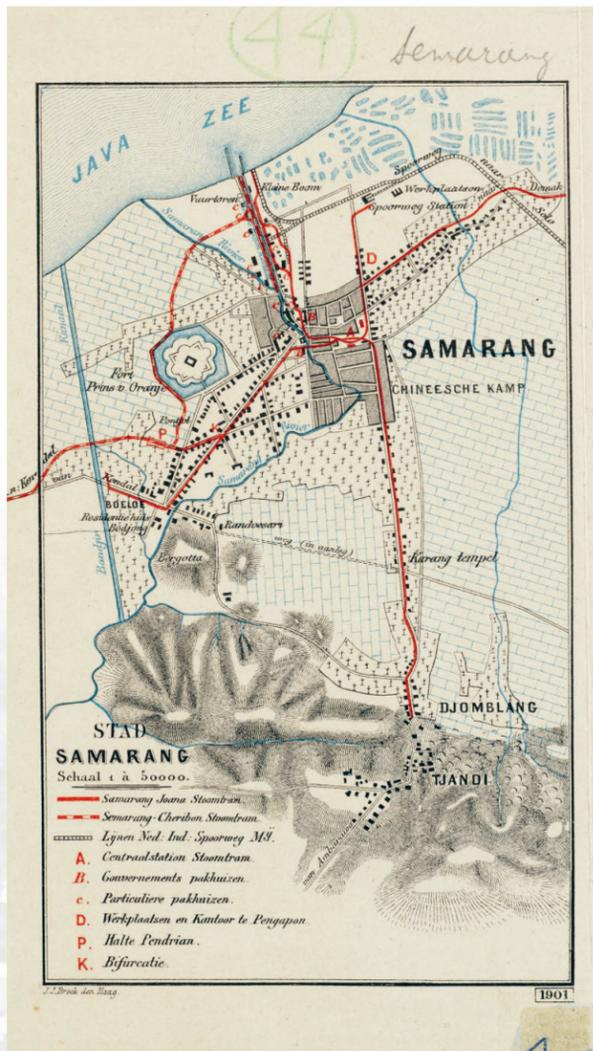
## Inclusive Revitalisation of Semarang's Historical District

text **Mo Smit**

As a result of the long period of colonization by the Dutch, Indonesia has many shared heritage sites and buildings. The question for (landscape) architects and urban planners is how their redevelopment can contribute to socially inclusive revitalisation of former colonial cities and landscapes.

The cities of Bandung and Semarang serve as case studies for the Shared Heritage Lab. The historical and future development of these cities is researched and explored, taking important urban backbones and neighbourhoods into account. A heritage-based placemaking approach is applied, including climate, habitat and building culture as the main design themes. Ultimately, the goal of the Shared Heritage Lab is to showcase Bandung and Semarang as examples of inclusive and healthy cities for working, living and leisure.

The Shared Heritage Lab is a cross-domain collaboration between Architectural Engineering, Heritage & Architecture and Urbanism (including Landscape Architecture) and the School of Architecture, Planning & Policy Development, Institut Teknologi Bandung (ITB, Indonesia). The lab is supported by the Royal Netherlands Embassy in Jakarta (Indonesia) and the Cultural Heritage Agency of the Netherlands.



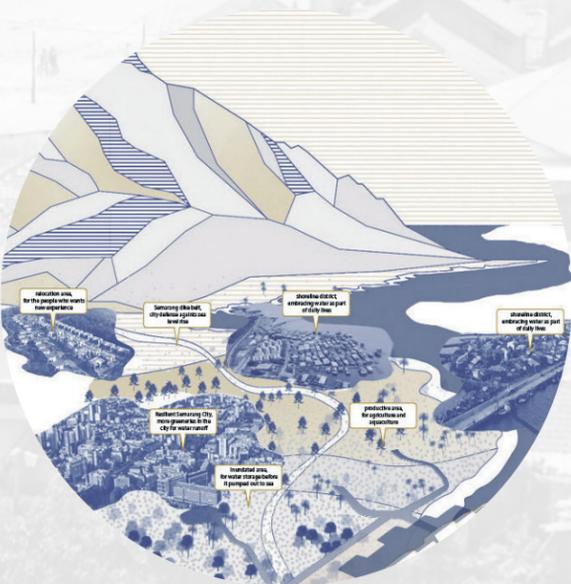
Kampung Melayu (local quarter)



Pecinan (Chinese quarter)



Kota Lama (Dutch quarter)



### RE-ASSEMBLING SEMARANG

by **Widasari Yunida Putri (U)**

With the sinking city of Semarang as a backdrop, this project aims to address the gap between soft and hard approaches in climate mitigation processes. It does so by exploring local adaptive mechanisms within the coastal case-study of Kampung Kemijen from both a social and ecological perspective. While this strategy has the scale of the kampung as a starting point, it is also translated to larger scale urban mitigation planning.



### KAMPUNG KALI

by **Joyce Fong (LA)**

To mitigate the water-related issues of the historic center of Semarang and improve the living quality of its riverside kampung communities, this project aims at creating a productive cultural landscape by regenerating the ecosystem services of the urban riverine landscape with interventions that provide economic incentives for the inhabitants, while creating spatial, ecological and social value at large.



### CULTIVATING HERITAGE

by **Ananta Vania Iswardhani (HA)**

Colonial buildings in Semarang's historical Dutch quarter embody a conflictual past. For example, the former headquarter of the NV Cultuurmaatschappij der Vorstenlanden was responsible for colonial crop cultivation and forced labour policies. The building is inclusively re-developed into a community-based urban permaculture space which re-introduces food production to the area, while revitalizing the historical district at large.



**WATER KAMPUNG**

by **Luuk Hofhuis (AE)**



Kampung Melayu, the traditional local district in the historic center of Semarang, has a rich history based on trade and commerce. However, due to extreme land subsidence and recurring floods, it is now mostly abandoned. These problems are challenged by creating a new way of living with water. A floating neighbourhood has been developed around a communal aquaponic system, which enables the local community to get access to clean water and to produce fish and vegetables.



Commercial Spine

Ventilation

Production Garden

Water Usage

Wetland Park

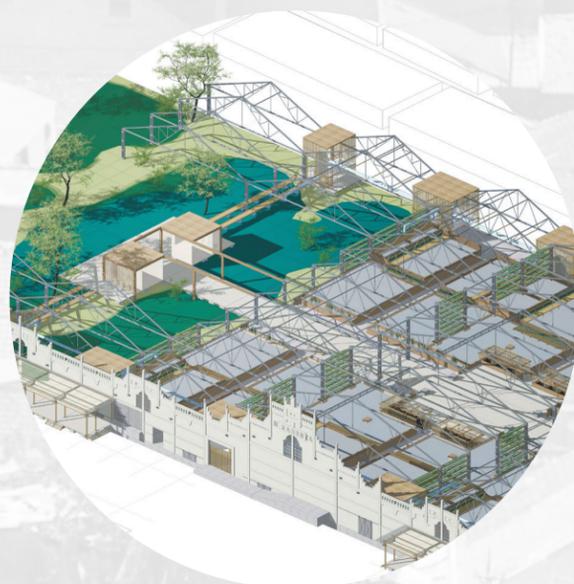


**ARCHITECTURE AS MEDICINE**

by **Marijn Heijnis (AE)**



In this project the re-use potential of abandoned colonial architecture for health care applications is explored, taking the climate and the multicultural context of Semarang as starting points. As an alternative way of dealing with the COVID-19 circumstances a new kind of healthcare center is developed, offering a mix of traditional Javanese, Chinese and Western healthcare services to the local community.



**MARABUNTA FISH PARK**

by **Charlotte Beijer (AE)**



The city of Semarang is sinking, because of excessive ground water extraction by its industries and growing population. By introducing a circular water strategy and collective work environment for the activities of the fish smoking community along the Java coast a regenerative solution is developed to halt land subsidence. The Marabunta building, a former sugar factory, is being transformed into a fish production park and publicly accessible market.



**HERITAGE OF COOPERATION**

by **Mark Keukens (AE)**



The current self-building culture of poor communities in Semarang is not resilient enough to face climatic challenges, such as sea level rising and intensifying monsoon floods. From a heritage point of view, the project addresses the loss of vernacular knowledge of how to collectively build with nature and the climate. Based on innovated vernacular building techniques, a raised housing typology from bio-based materials has been developed.

# Program Islanders at the Helm - Sint Maarten

## Climate Sensitive Design for a Resilient Island Community

text **Mo Smit**

In September 2017 the Caribbean island state of Sint Maarten got hit by a category 5+ hurricane called Irma. More than 90% of the built environment got damaged and many people lost their homes and other belongings. A situation which worsened even more under influence of heavy rainfall and another hurricane the same month.

To sustainably reconstruct Sint Maarten, which is an independent country within the Kingdom of the Netherlands, students of aE Studio focused on the development of circular and climate sensitive design solutions. A community-based approach is followed to (re-)develop affordable housing, public functions, and utility networks, taking the challenge of building in a hurricane prone area into account. Technical topics that are being investigated are for example: how to build with (hurricane related) waste materials, how to develop a healthy building culture using locally available materials, and how to enhance community resilience towards hurricanes?

The research by design activities of Architectural Engineering – BK TU Delft are contributing to the Islanders at the Helm project, a joint research programme of a.o. Leiden University / KITLV, University of Amsterdam, University of St. Martin and the University of Curaçao.



### CAY HILL COOPERATIVE

by **Danique Landburg**

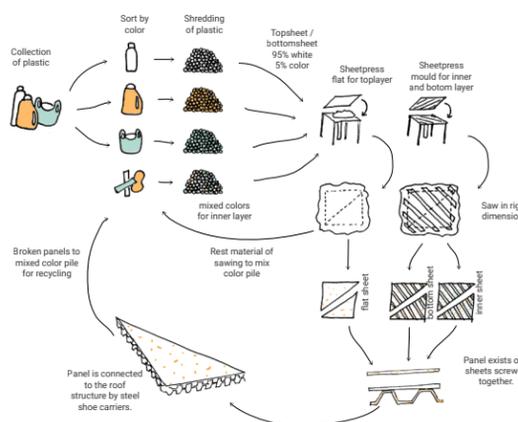
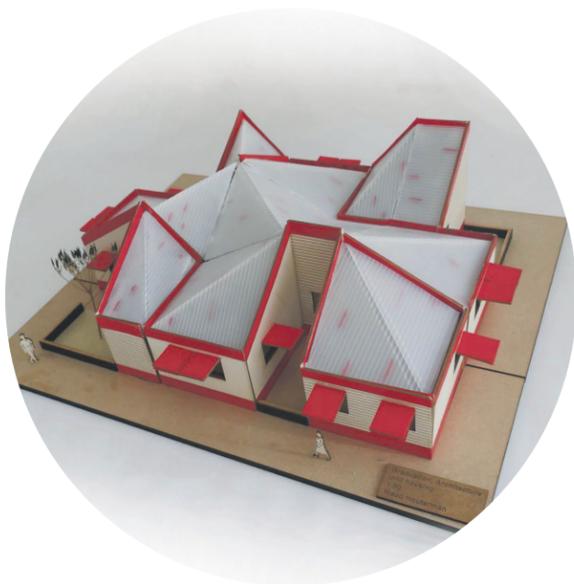
The island of Sint Maarten lacks local building resources and knowledge of how to build affordable homes in a climatically resilient way. Most of the building materials on the island are being imported. This project therefore explores the synergetic potential of local resources and craftsmanship for the community of the self-build settlement of Cay Hill. A retrofit strategy is developed, offering improved housing conditions and new cultural economic opportunities.



### TROPICALITY REINTRODUCED

by **Bram Rooijackers**

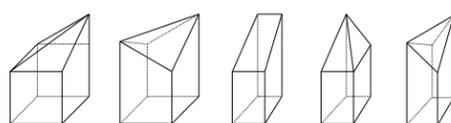
Current housing typologies and neighborhoods on the island of Sint Maarten do not respond to the tropical Savannah climate and the occurrence of hurricanes. This project challenges the ongoing housing trends of 'bunkerisation' and the use of air-conditioning systems, by (re-)introducing passive climatic building principles. A residential housing and neighbourhood typology has been developed which not only responds to St. Maarten's climate but also to its context and culture.



### A RESILIENT COMMUNITY

by **Maud Houterman**

Sint Maarten deals with a limited hurricane resilient housing stock due to the lack of building regulations and affordable materials and contractors. Most people lose their jobs after a hurricane because the numbers of tourists drop. By making resilient housing with plastic roofs, a local waste product is re-used which creates local job opportunities and resiliency.



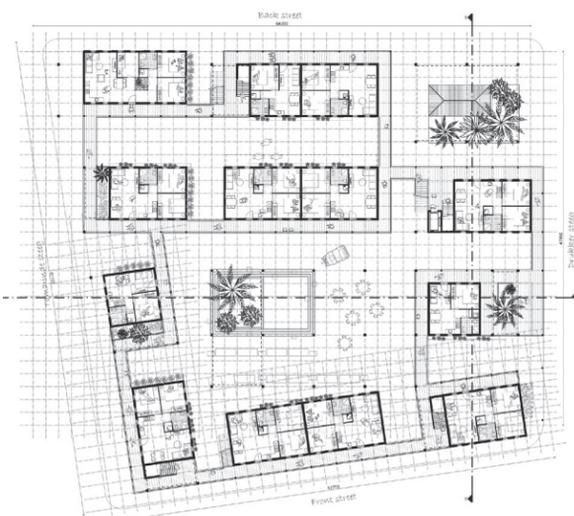
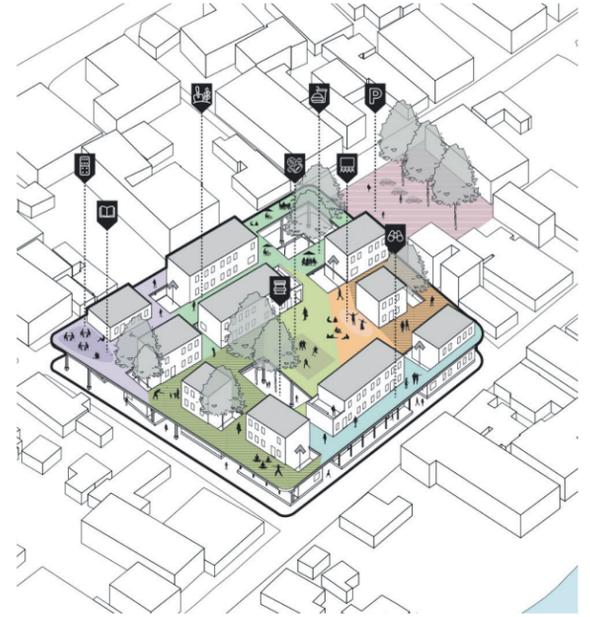


## REVITALIZING PHILIPSBURG

by **Céline Hendriks**



Throughout history, the island of Sint Maarten is connected to natural disasters. To rebuild after a natural disaster, self-building was commonly used within the local building culture. However, this tradition disappeared in the last three decades. Research into hurricane resilient building principles throughout history has resulted into the design of a mixed-use urban neighborhood typology. This project further looked into opportunities to reintroduce a form of organized self-help housing (OSHH), to give an answer to the housing shortage and turn this district of Philipsburg into a lively neighbourhood again.



### FACADE

Facade openings on the corner of a building weaken the construction.



Small facade openings minimize the risk of storm damage.



Shutters protect all facade openings to make them storm resistant.



Sash-windows that can be opened both at the top and the bottom can withstand strong winds.



Smooth corners allow the wind to slide around.

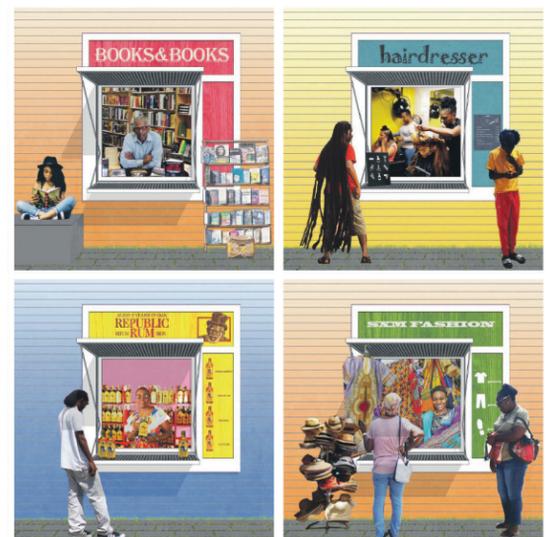


Openings in opposite facades reduce pressure build-up.



### FLOORPLAN

A regular layout of the floorplan prevents a concentration of wind pressure.



# Alumni

## Interview with aE alumni Mark Keukens



### When did you graduate @aE Studio?

I graduated on the 9th of July 2020, as part of the Shared Heritage Lab: Semarang within the Architectural Engineering Studio. My graduation revolved around cooperative residential architecture in Indonesia with an emphasis on make-ability and innovative renewable materials such as laminated bamboo.

### After your graduation you started to work at Lister Buildings. What does it have to do with your graduation project or preferences?

After my graduation, I updated my portfolio and went looking for a job in which I could stay true to my passions in architecture. I've always been inspired by social, inclusive and sustainable tectonic architecture, preferably residential. It was not long before I found a job offer for Lister Architecture. This is a new joint venture between architecture firm CePeZed and Lister Buildings, an integrated platform that offers a single point of contact for development, design, realisation and maintenance via digital twin, that aims to build over a thousand homes per year out of GLULAM, CLT and other bio-based materials. The projects are intended for social and mid-level rent and are often catered towards clients with special needs such as innovative living concepts for the elderly. There is a big emphasis on community building and nature-inclusive living environments. This ticked all my boxes and offered me a platform to build upon the knowledge I had gained during my graduation. My enthusiasm for the function landed me the job!

### How does your background as architectural engineer influence your current role within the organisation?

I've been working at Lister Architecture for a little over 4 months now and I've been able to contribute to many different facets of the work, such as system development, acquisition presentations, tenders and more detailed drawing work for specific projects. As an architectural

engineer, I find I'm able to quickly pick up new tasks in a broad variety of detail levels. From detailing to storytelling, there's a lot that I learned at the aE studio, that I'm able to apply in my work. A more specific example is that quite quickly I was put in charge of developing a material catalogue for our projects. My colleagues recognised my knack for sustainability, materiality and design for disassembly and now I'm in large part responsible for exploring which materials we as a company will use and how our buildings will look, feel and perform with regards to sustainability. It's an incredible learning experience to be able to go out, scout and connect with the current pioneers in sustainable and circular building and create partnerships with them. It is most definitely a very rewarding job and an exciting time to be a practising architectural engineer at an ambitious firm!

### Where or how do you see yourself in the future?

In the future I see myself having learned a lot from my colleagues, partners and projects and having gained a lot of experience in the field of wood-based architecture. Hopefully, our team will have a leading role in sustainable residential architecture in the Netherlands. It's impossible to say what the future holds, but I'm more than excited about my current position and I think there is a huge amount yet to be learned and discovered. Some ambitions for the future would be to revisit international contacts I've made abroad during my Master and perhaps to set up exciting local collaborations or projects in Nepal and Indonesia. I would also love to see myself do some academic work in the future. What else? Build my own house. Expose at the Biennale... I don't know, one can dream, right?



## Interview with aE alumni Lisa van Schagen



### When did you graduate @aE Studio?

I got fascinated with unused city roofs when I started my graduation. Why do we forget about our fifth façade, while it's catching all the rain, wind and sun and provides for unique green spaces with an amazing view? I graduated on 'Crown Town' on the 1st of July 2014, with the help of Mo Smit. I researched how flat roofs can contribute to both densification and greenification in existing cities, by designing a rooftop village on an existing building in Amsterdam.

### After your graduation you started to work at the Dakdokters. What does it have to do with your graduation project or preferences?

Dakdokters started out with a mission to make cities healthier by transforming our black roofs into multifunctional, green spaces. They committed not only to ideals, but to having actual impact and this really appealed to me. Since 2010 we realise hundreds of transformed roofs every year. We focus on water retention, biodiversity, qualitative outdoor spaces and even green facades. Dakdokters helped me during graduation, answering questions concerning ownership situations, how to connect to the building beneath or what political interests are in play. At the moment we start to grow a design department, that has an increased relevance considering nature inclusive building is increasingly important and also more and more required by governments.

### How does your background as architectural engineer influence your current role within the organisation?

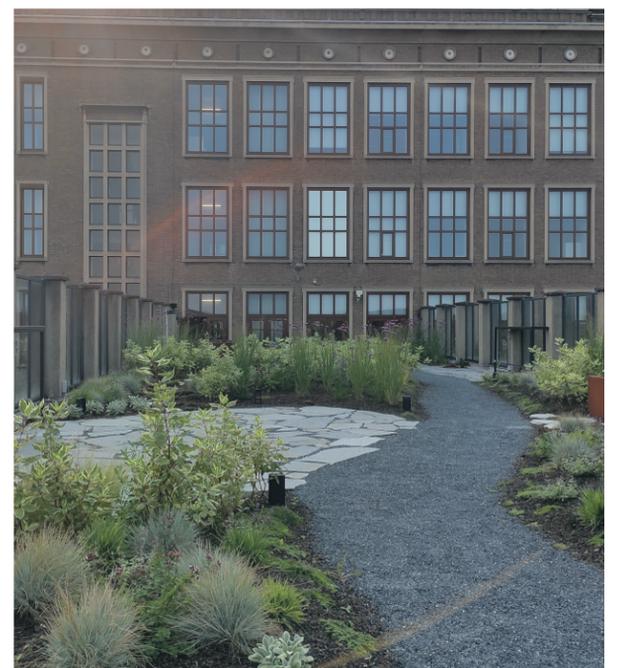
I believe aE challenges students to wonder not only about abstract ideas, but also on 'how to make it'. When I started out at Dakdokters I operated on a very practical

level, detailing furniture down to wood screw level. Next to this I felt connected to our mission and vision: how do you combine these diverging scale levels? I believe in the end the details on the smaller scale gave me the knowledge to have the actual impact, also on a larger scale. We know whether materials are not only sustainable on paper, but also in terms of lifespan and maintenance. Now, after almost 6 years of working for Dakdokters, I focus more on implementing my academic skills. Our portfolio grows, both in size and numbers. I like telling our story and excite people to become ambassador of the roof landscape. I enjoy starting collaborations with former studio mates, both on a private and a business level, for example with Dakdorpen. I try to distinguish ourselves as an innovative, diverse and mission-driven

firm, next to gaining valuable experience as (sub)contractor on green.

### Where or how do you see yourself in the future?

I really enjoy working at De Dakdokters, contributing to the international task to interlace nature and concrete better: green is no longer optional. It excites me to see that my love for roofs and the mission of Dakdokters comes together in the assignment of today and we can have true impact.





Socially-distanced kick-off meeting aE Studio nr. 10th September, 2020

#### **Design Tutors**

Prof. ir. Thijs Asselbergs  
Annebregje Snijders, MSc  
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Ferry Adema, MSc  
Paddy Tomesen, MSc  
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#### **Research Tutors**

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Fransje Hooimeijer, PhD  
Hilde Remøy, PhD  
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Nico Tillie, PhD  
Pirouz Nourian, PhD  
Pieter Stoutjesdijk, MSc  
Siebe Broersma, PhD  
Tanya Tsui, MSc  
Thaleia Konstantinou, PhD

#### **BK Research Partners**

*Building Physics & Services*  
*Building Product Innovation*  
*Climate Design & Sustainability*  
*Design Informatics*  
*Design of Construction*  
*Environmental Technology & Design*  
*Landscape Architecture*  
*Structural Design & Mechanics*

#### **Collaboration**

*I Million Homes*  
*AnnA Architect*  
*Atelier Rijksbouwmeester*  
*Bouwlab R&Do*  
*Bouwtuin*  
*IBA Parkstad*  
*Institut Teknologi Bandung (ITB)*  
*Nationaal Renovatie Platform (NRP)*  
*Openbuilding.co*  
*Space & Matter*  
*Superuse Studios*

#### **Programmes**

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#### COLOPHON

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