ARCHITECTURE AND THE CITY

4th Year Students - AAR 4711 Arkitektur og by – Prosjektemne A
5th Year Students - AAR4731 Arkitektur og by – Prosjektemne C

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ARCHITECTURE AND THE CITY

- 15 credit **design studio** course and a 7.5 credit **knowledge course**

- A **collaborative studio** addressing **urban**, **architectural** topics across a **range of scales.**

- Theme is **Transforming the Zwischenstadt (or In-Between City)**

- **5th Year Students –** will be encouraged to develop ideas and themes that they can develop further into their masters thesis semster.

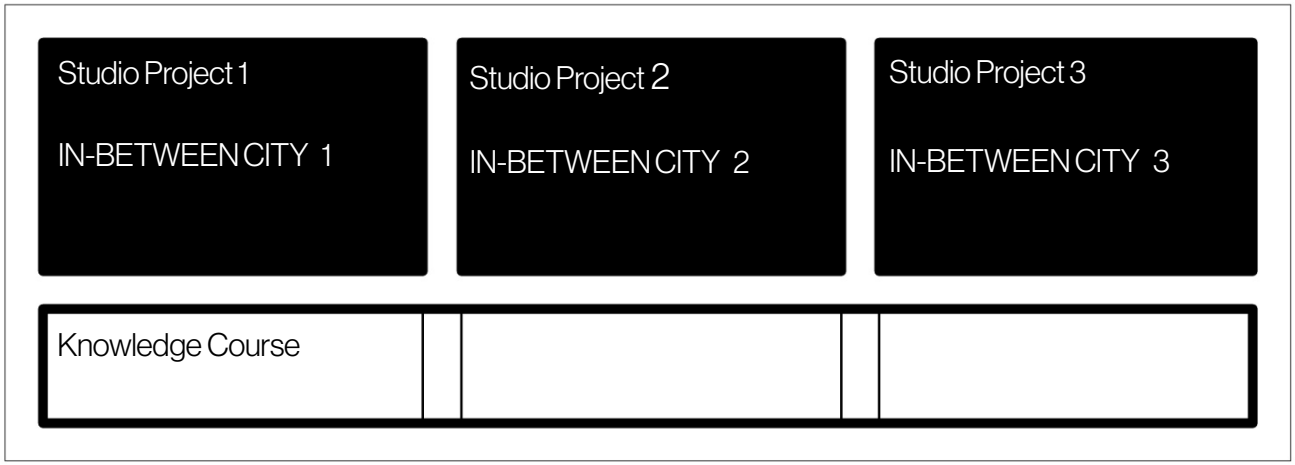
Previous student work examples:

JOINT STUDIO NTNU (cargo.site)

One Joint Theme – Many Projects

THEME - **TRANSFORMING THE ZWISCHENSTADT (or In-Between City)**

PROJECTS



At the start of the semester, you will be able to choose a project brief that investigate the shared theme of the Zwischenstadt or In-between City in different ways

Semester will start - 20th August 2024

One studio with a shared field of investigation

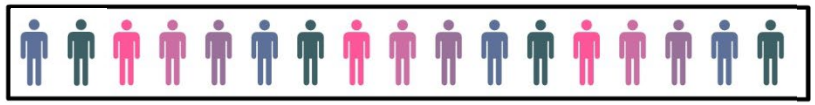
Commencement

Intermediate weeks -
formal or informal
collaboration + study trip

Mid-term Critiques

Intermediate weeks -
formal or informal
collaboration + study trips

Final Review + Assessment



Shared events across the studio

Lectures project reviews study trips

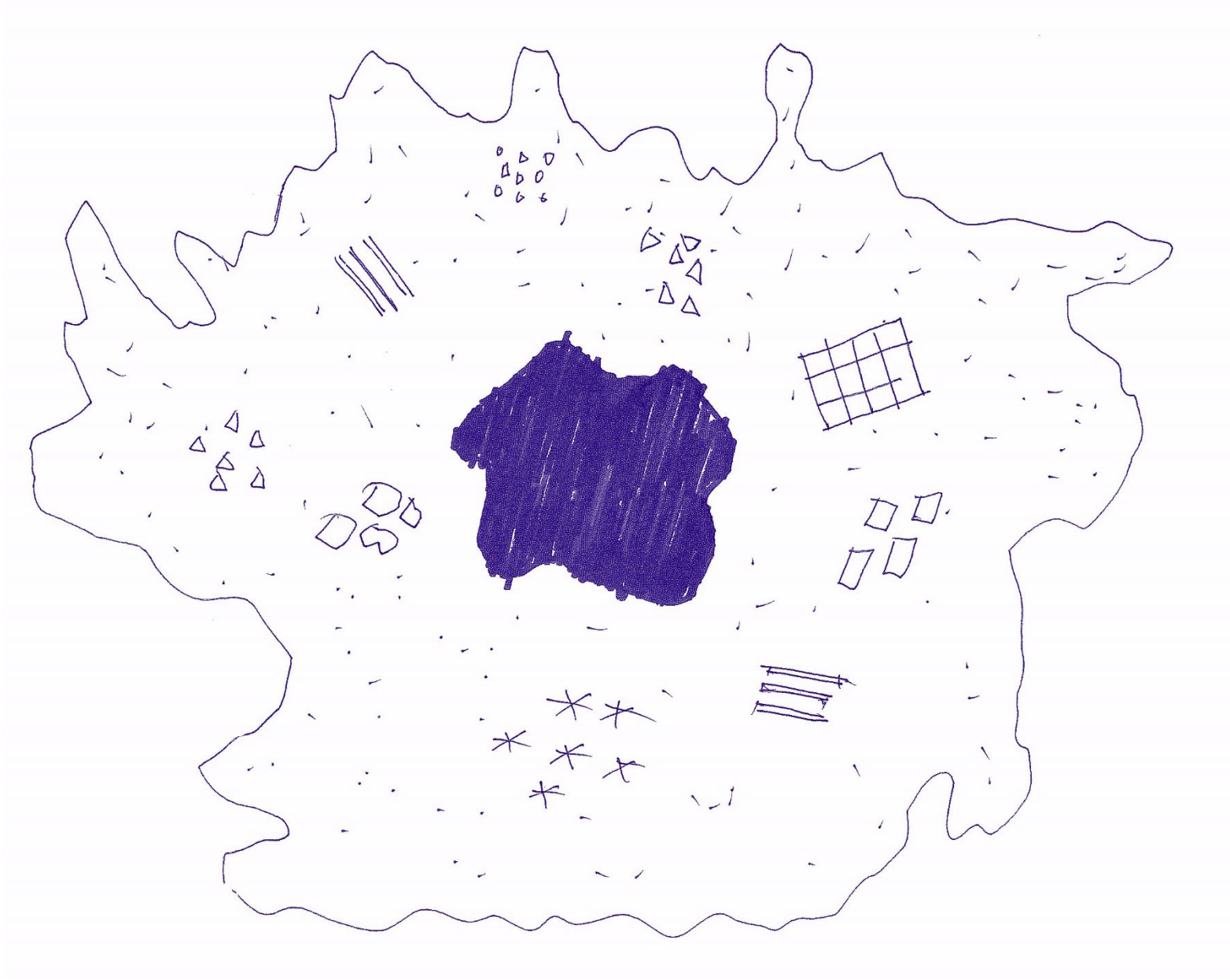
Transforming the Zwischenstadt

Autumn 24 Theme

Zwischenstadt

In-Between City

What is the Zwischenstadt?



Zwischenstadt – the city landscape **in-between** the historic city centre and the landscape

Zwischenstadt – a fragmented landscape of suburban housing, industry, shopping centres, infrastructure, agricultural and natural landscapes

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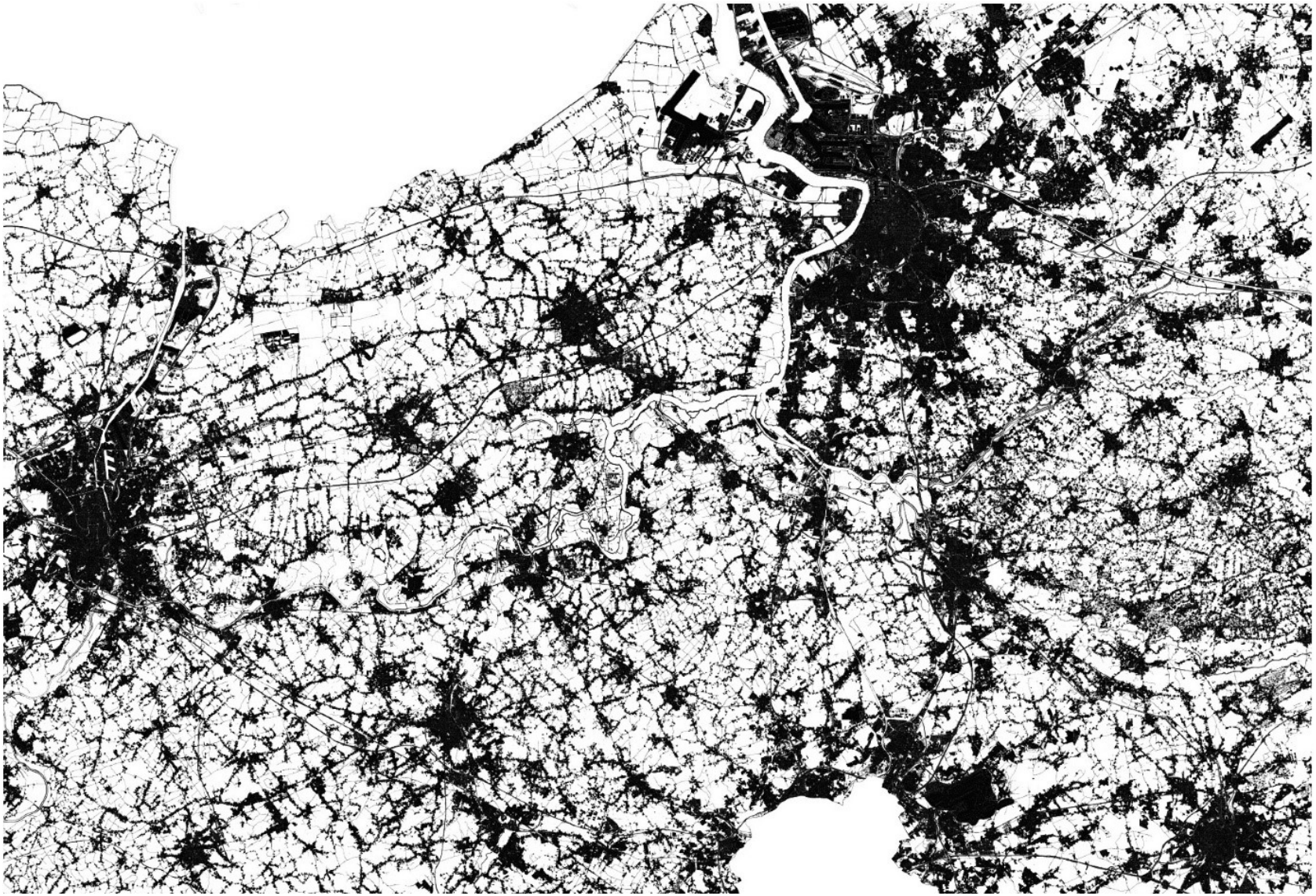


The growth of this urban sprawl is unsustainable – it destroys an fragments the natural systems and our agricultural landscape

The growth of this urban sprawl is unsustainable – it destroys an fragments the natural systems and our agricultural landscape

Zwischenstadt landscapes

' Prospector Park, Subdivision Phase I, Lot 29, looking Southeast toward Masonic Hill' - 1980
Lewis Baltz

' Paris, Monparnasse' - 1993
Andreas Gursky

' Liege, Fussballspieler' - 1984
Andreas Gursky

' Ratingen Schwimmbad ' - 1987
Andreas Gursky

'Dusseldorf Flughafen, Sonntagsspazierganger' - 1995
Andreas Gursky

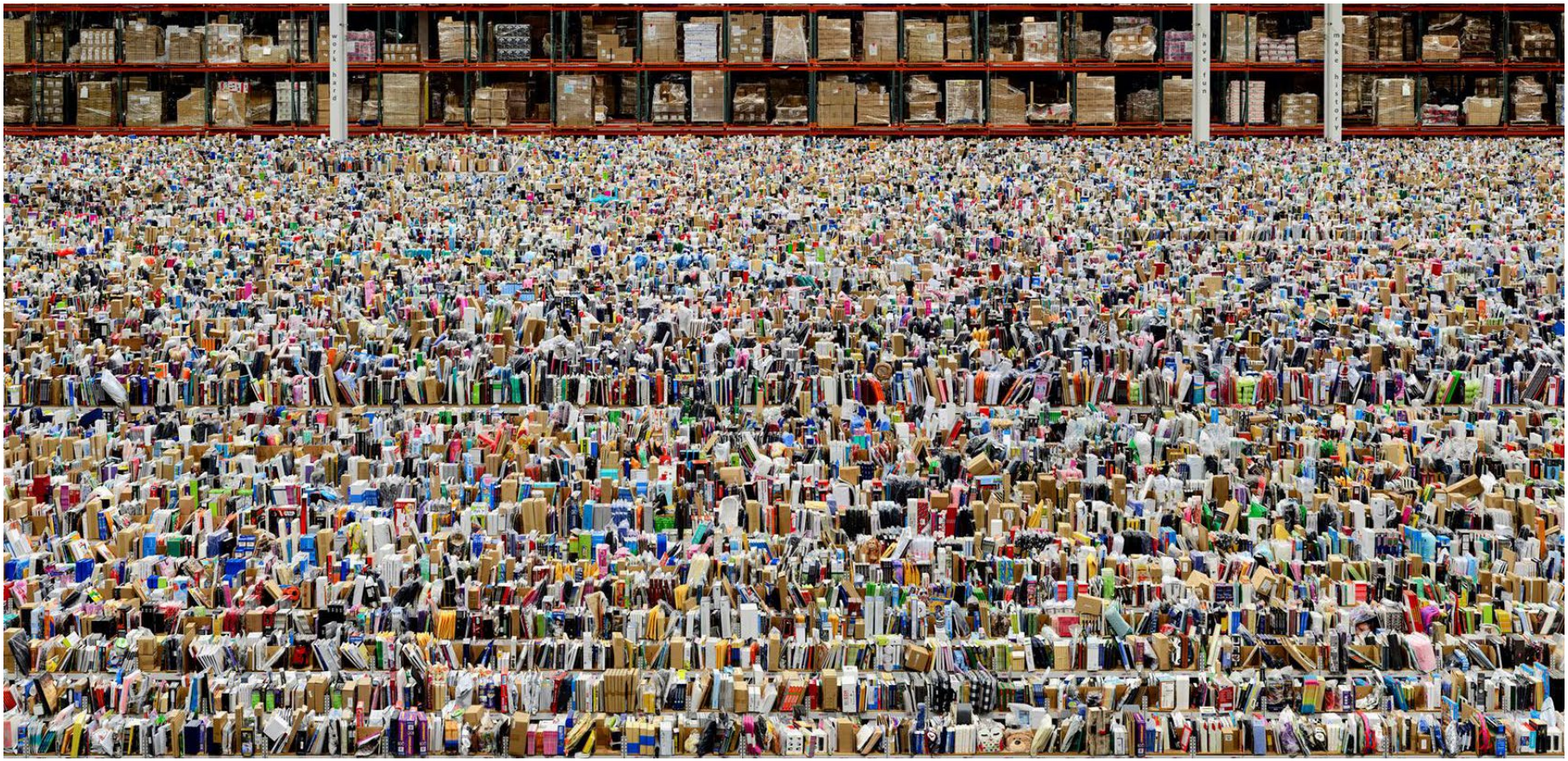
' Duisburg, Bruecke' - 1985
Andreas Gursky

' Gursky Dusseldorf Flughafen, Sonntagsspazierganger' - 1995
Andreas Gursky

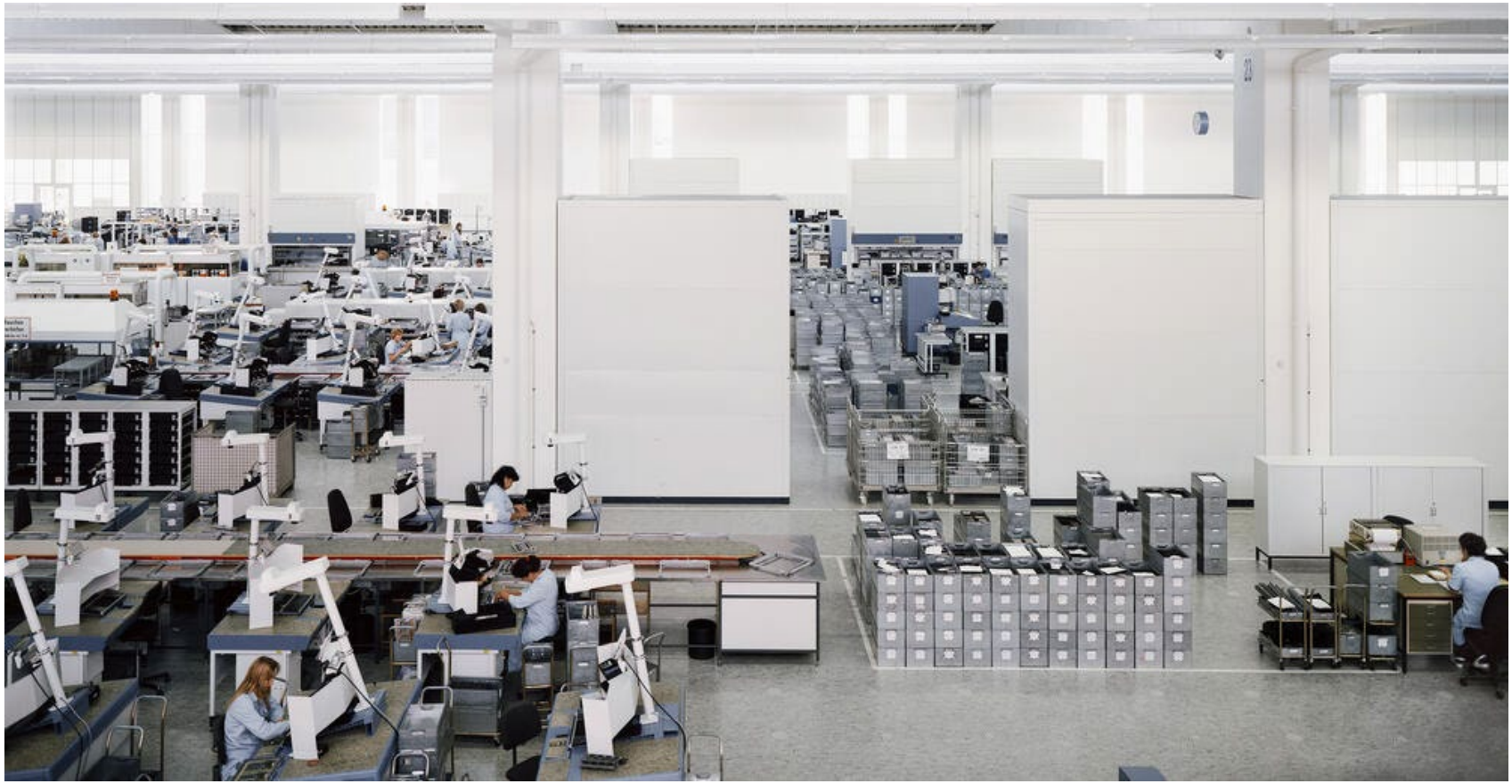
'99 Cent' - 1999
Andreas Gursky

The New Industrial Parks
Lewis Baltz

'Toys 'R' Us' - 1999
Andreas Gursky



'Amazon' - 2016
Andreas Gursky



' Amberg, Siemens' - 1991
Andreas Gursky

' Ohne Title XIII' - 2002
Andreas Gursky

Transforming the Zwischenstadt

The Zwischenstadt is the zone of the city where architects and urban designers have a societal responsibility to:

Densify	livable, compact, mix-use districts
Urbanise	integrated city uses, public spaces, transport systems
Re-naturalise	blue-green networks, climate adaption, natural systems

Develop new building typologies	hybrid buildings
Implement low-carbon building	circular construction and bio-based
Establish new productive landscapes	food and energy systems)

City Practices

- The densification of the existing city sprawl and in-between city to make a compact, urban, plural and polycentric city fabric.

- The retention and diversification of the existing city programmes as a model for the creation of a city structure of interconnected neighbourhoods with complementary functional mixes.

- The programming and design of new hybridities and hybrid typologies which orientate around emergent economies, circular economic models and sustainable urban living.

- The urbanising and re-naturalising of the open space of the Zwischenstadt with outdoor living spaces (squares, streets, parks, sports...), climate adaption structures and ecological systems (energy production, food production, water management, green-blue networks...).

- The implementation and integration of multimodal transportation networks which reduce the impact of movement of people, resources and goods.

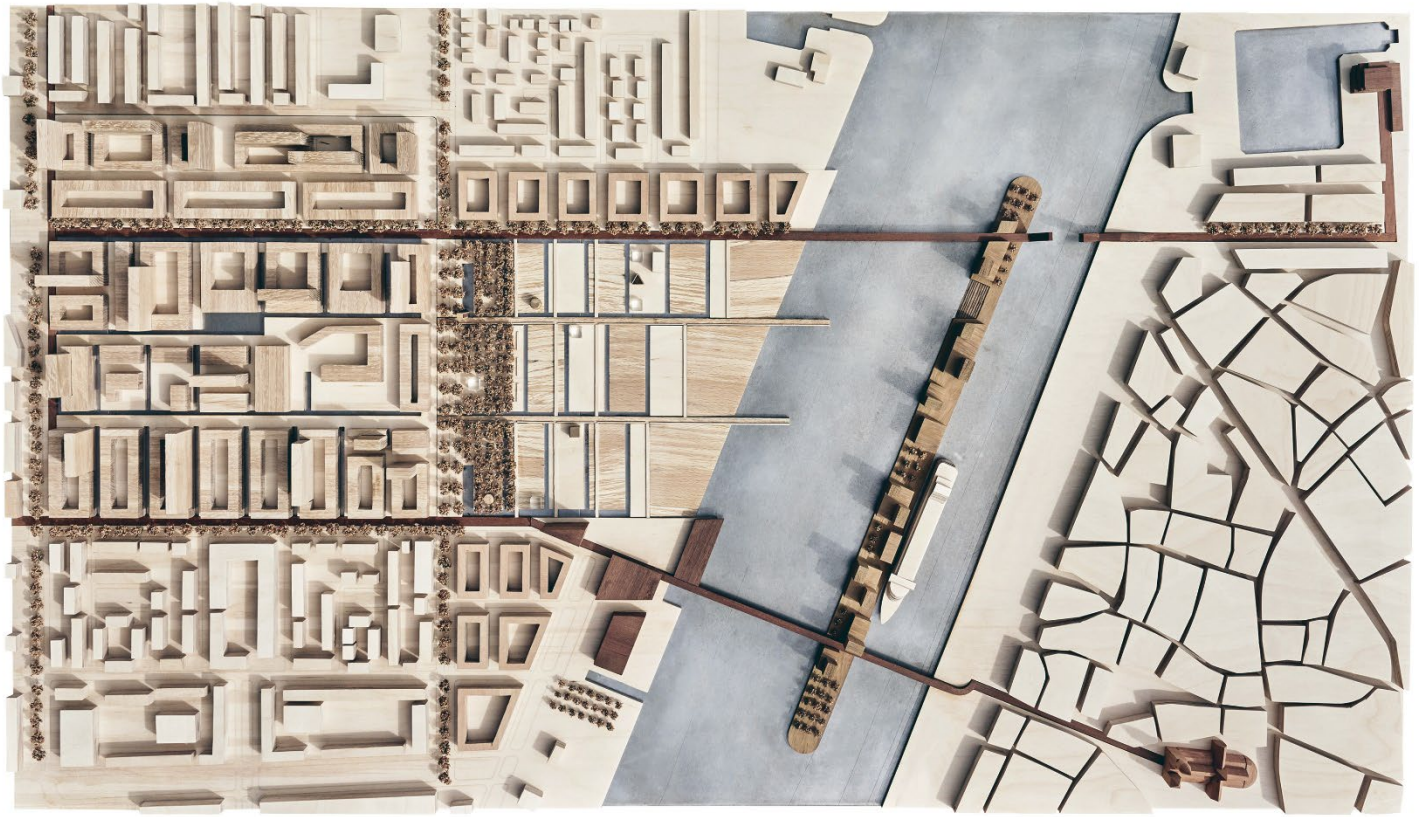
- Time-dimensioned, process-orientated urban development. Development of societal models, communities, economies and institutions.

Architectural Practices

- The retention, re-use and transformation of all viable existing buildings irrespective of their cultural or historic value.
- Design of Intelligent Ruins – time-dimensioned buildings that are easily maintained, reprogrammed and designed-for-disassembly.
- New tectonics based on bio-based materials and the ‘material-mine’ of existing resources and building elements that already exist.
- Developing material, aesthetic and spatial practices and that give meaning and rhetorical power to these new tectonics and practices.

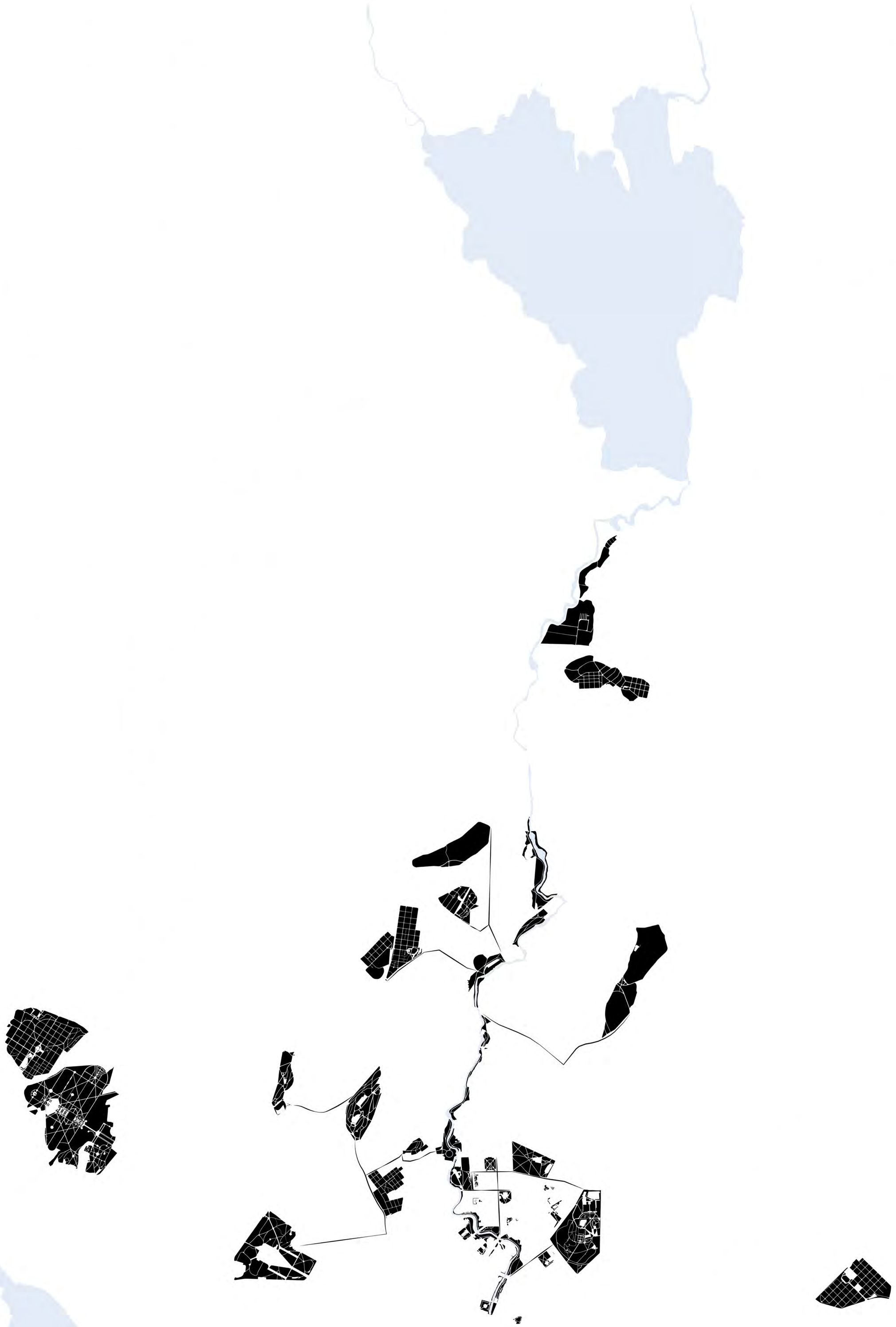
How Can We Transform?

Linkeroever, Antwerpen, BE (International Competition Winner)
Stuart Dickson



Linkeroever, Antwerpen, BE (International Competition Winner)
Stuart Dickson

South Gate, Budapest, HU (Competition Finalist)
Stuart Dickson

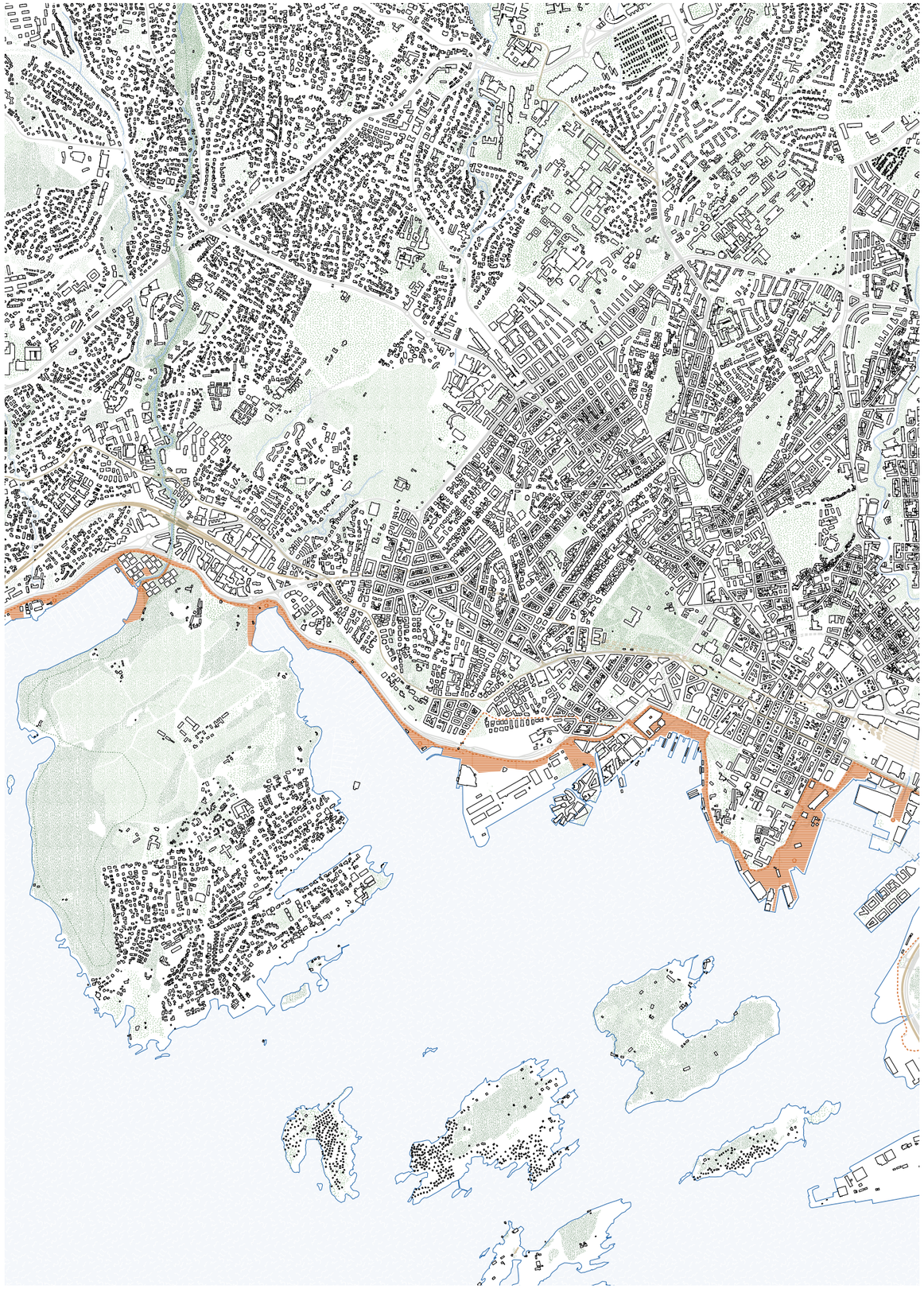


GREEN AREAS CONNECTION 1.20000

City plan

Original scale: 1:5500

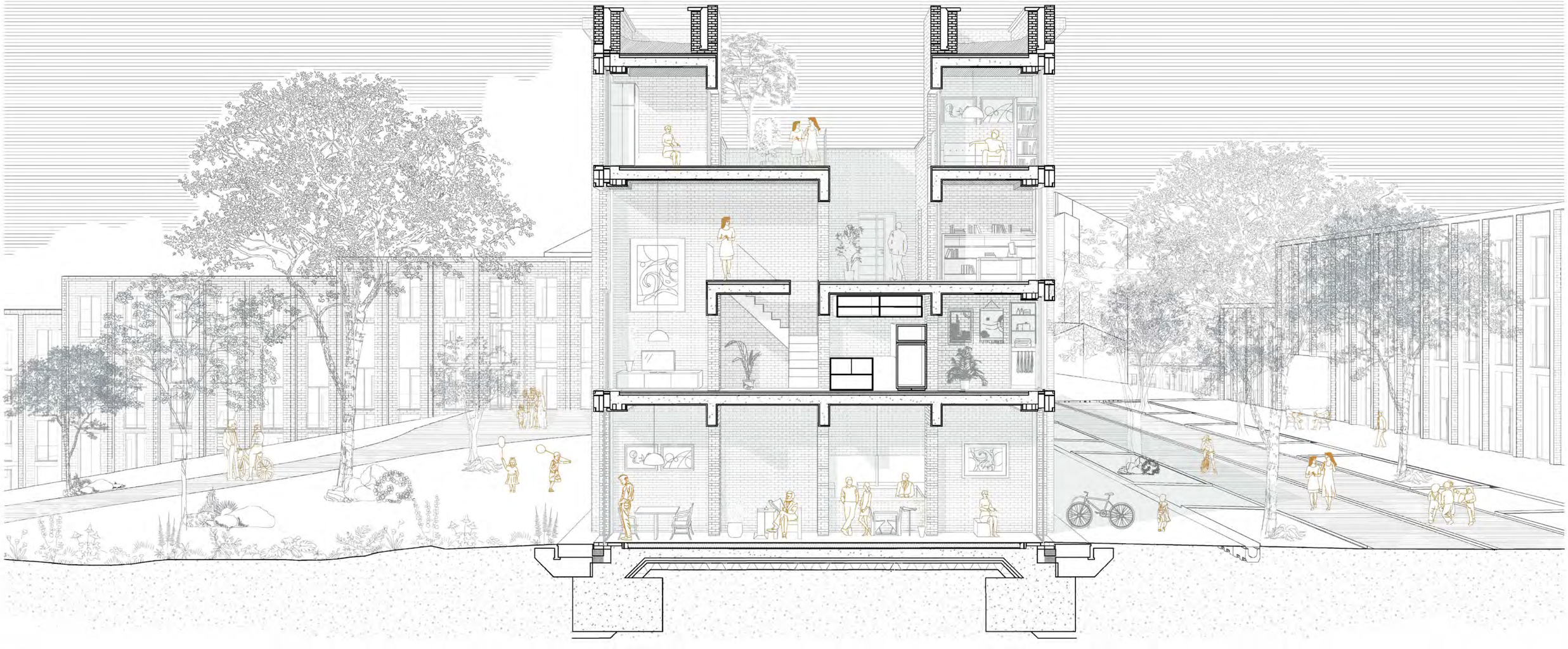
City Plan | 1:10 000

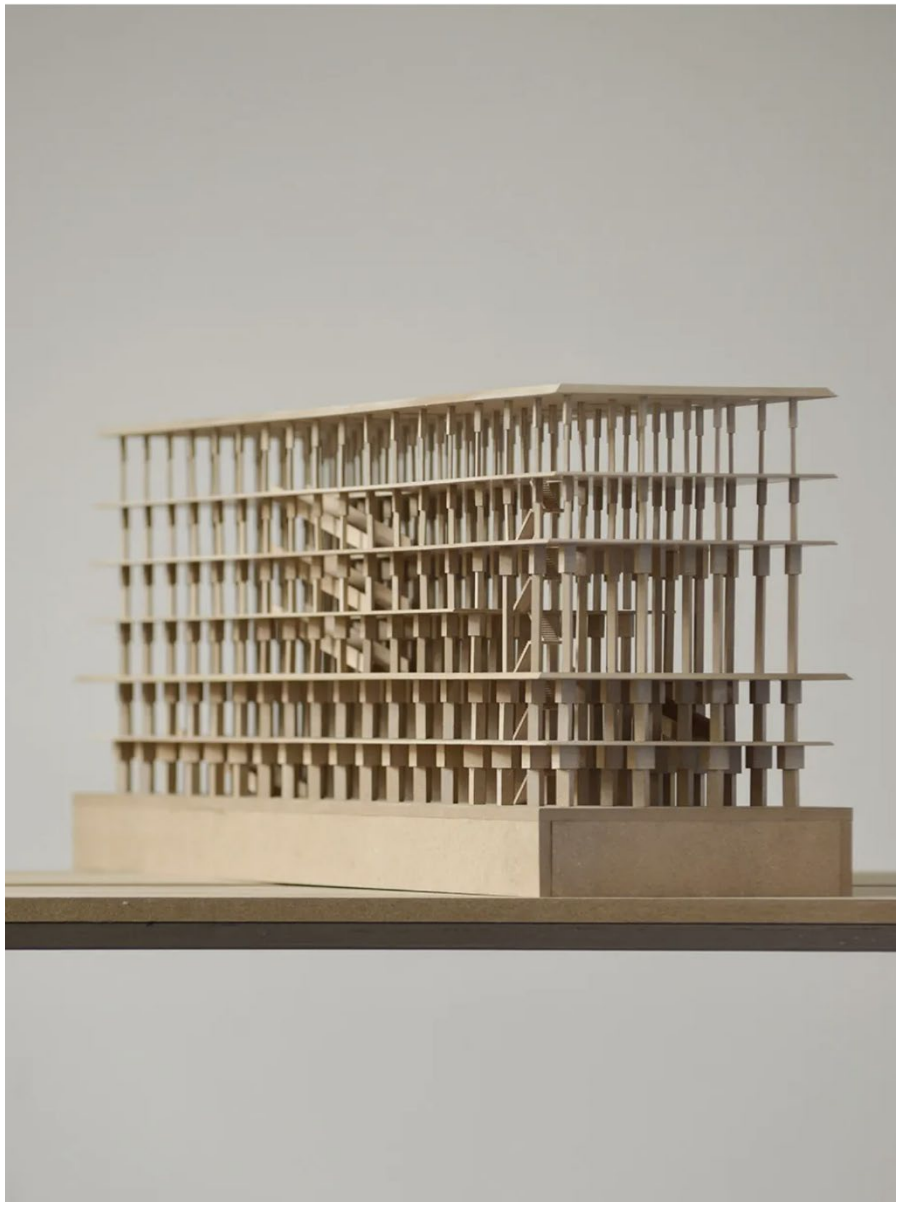


CITY PLAN

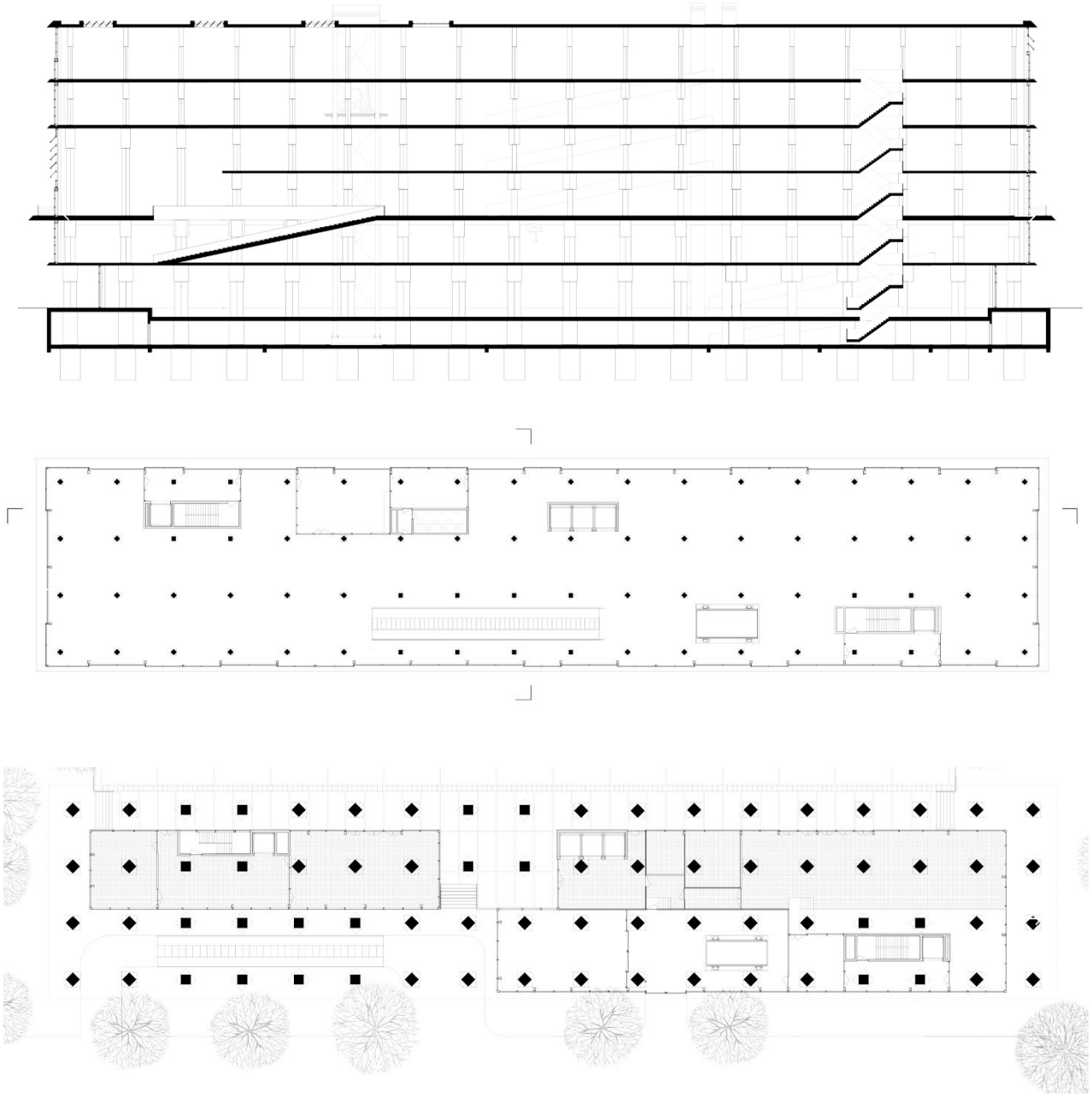
1:10000

Urban Figure in Neighbourhood Plan

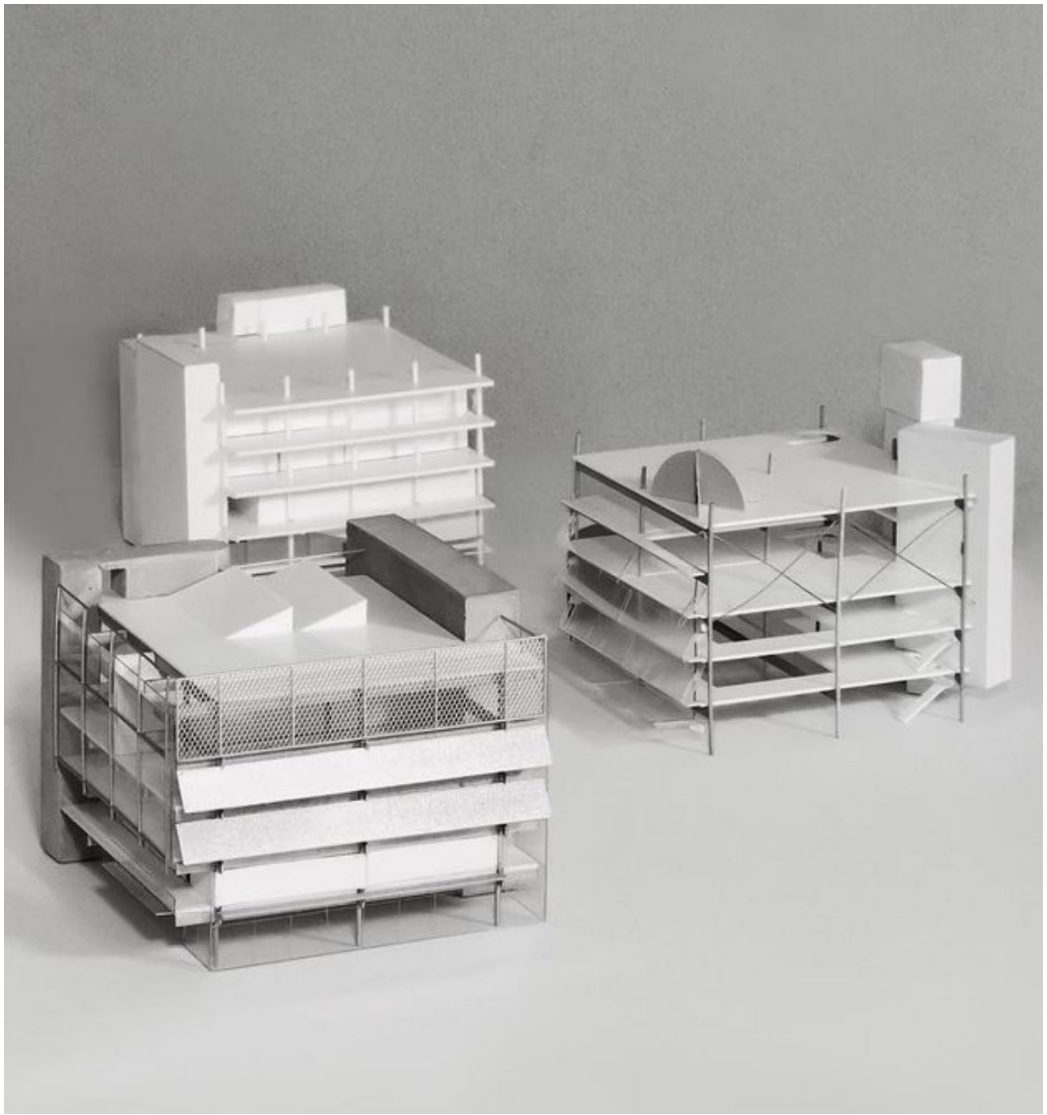




Intelligent Ruins – Buildings designed for re-programming and adaptive maintenance

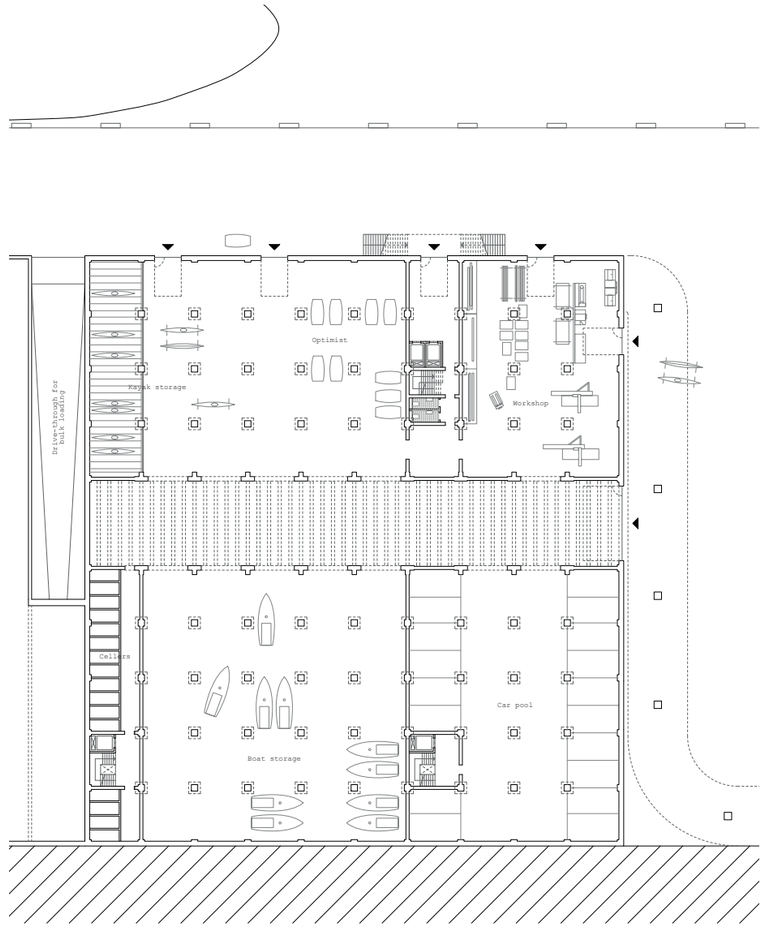


Intelligent Ruins – Buildings designed for re-programming and adaptive maintenance



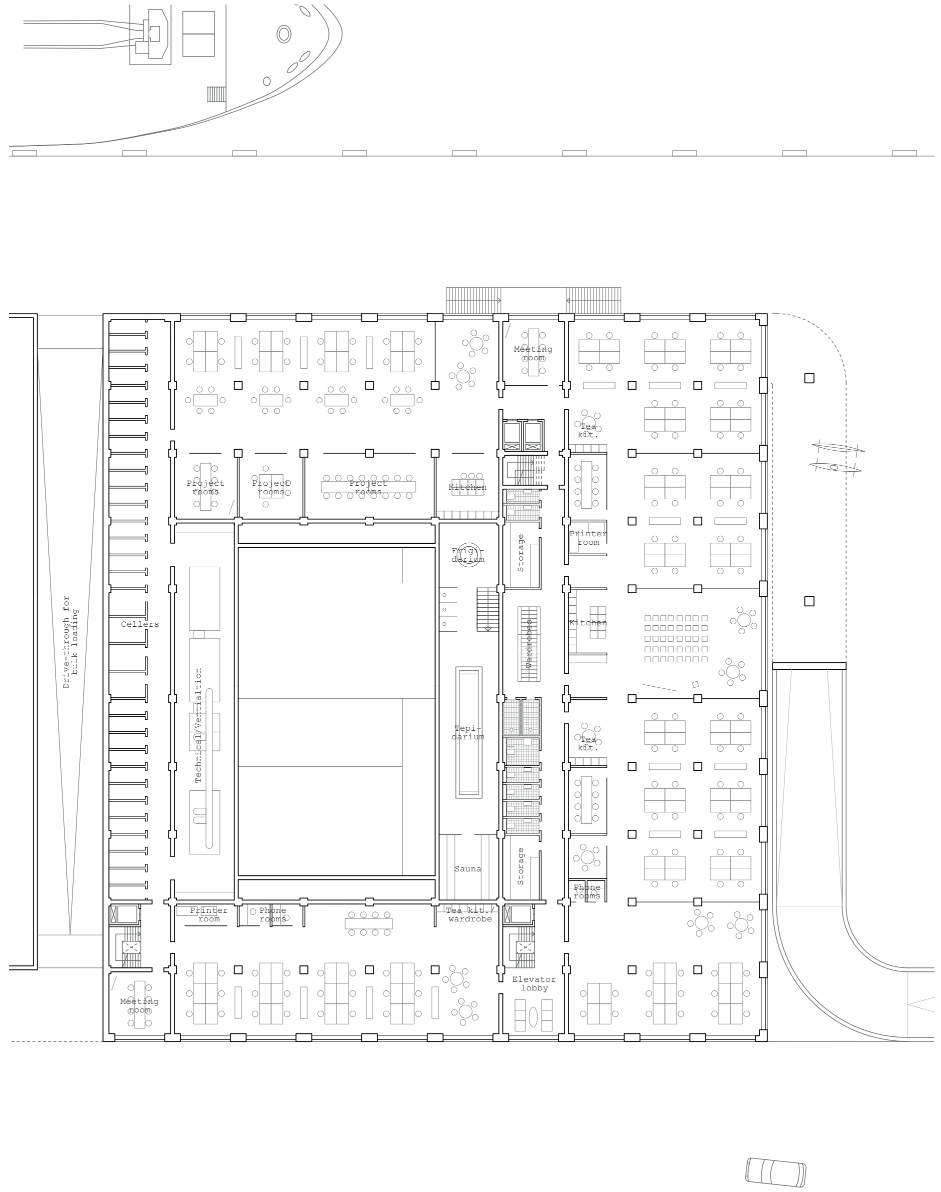
Intelligent Ruins – Buildings designed for re-programming and adaptive maintenance

Exisiting column structure Grid = 5000 x 5160 mm Foto: Schrøder (Sverresborg)

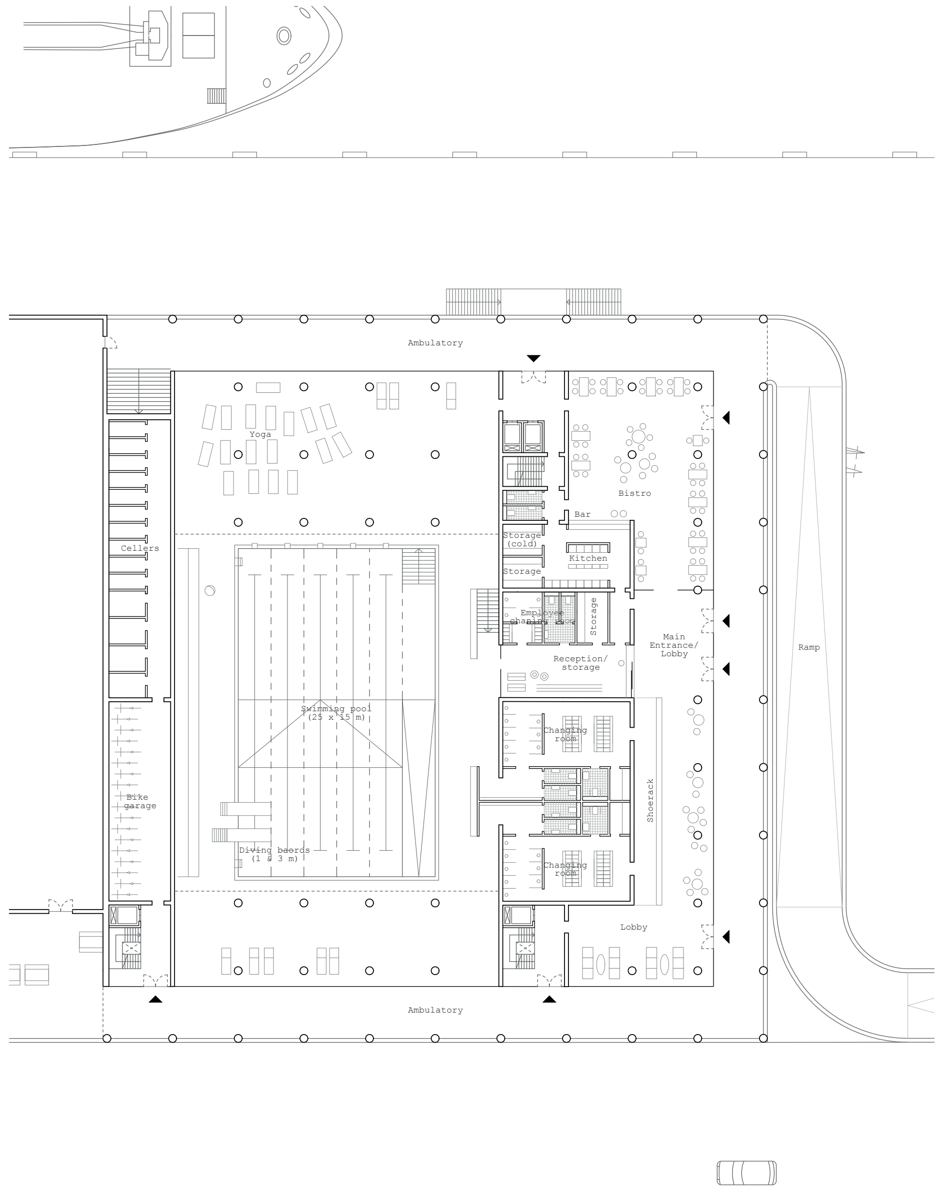


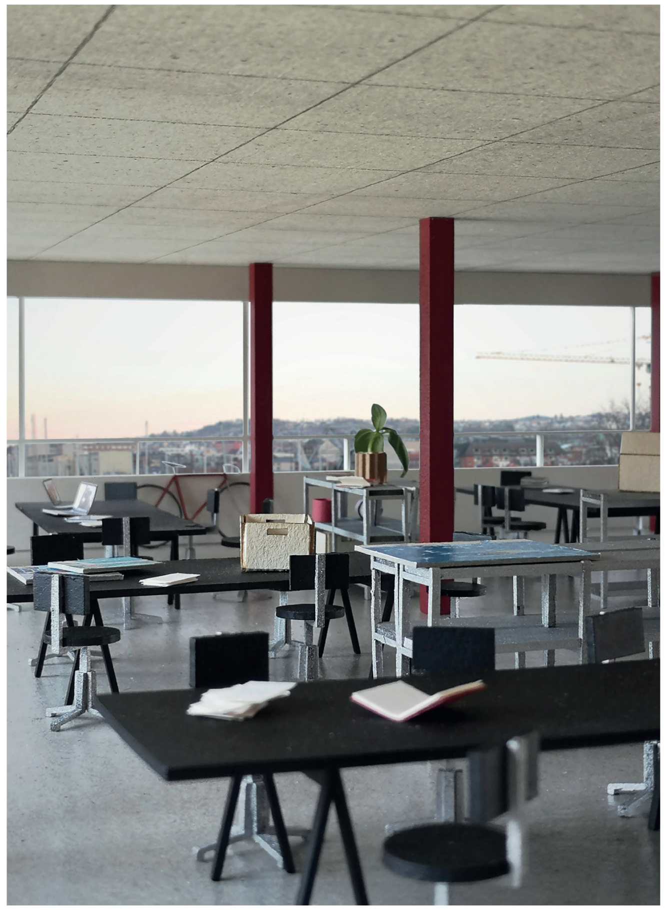
Boat storage, workshop and car pool Plan 0th floor 1/400

Maintenance in the basin Model (1/20)



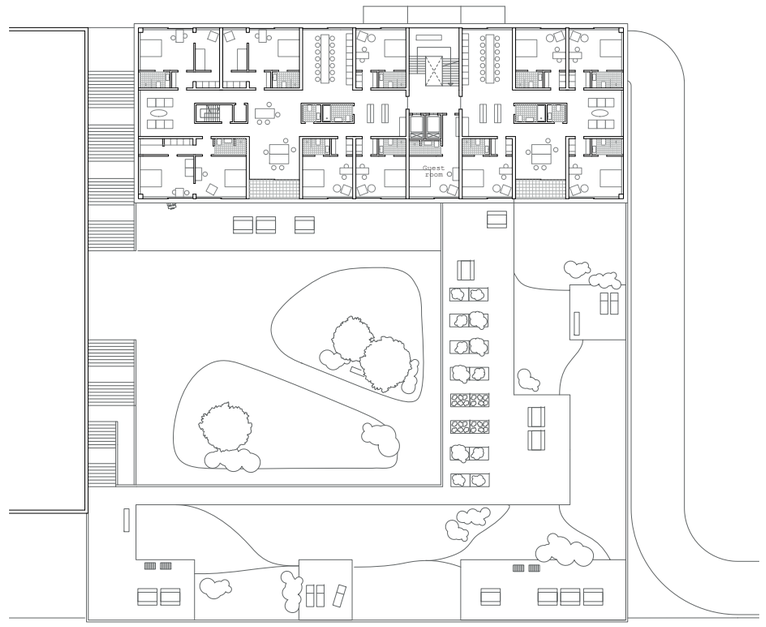
Offices and health baths Plan 2nd floor 1/400


Ambulatory
Yoga
Cellers
Bistro
Bar
Storage (cold)
Kitchen
Storage
Employee changing room
Storage
Main Entrance/ Lobby
Reception/ storage
Ramp
Swimming pool (25 x 15 m)
Changing room
Bike garage
Shoerack
Diving baords (1 & 3 m)
Changing room
Lobby
Ambulatory




Fitness room
Gym
Cellars
Storage
Printer room
Phone rooms
Tea kit./ wardrobe
Elevator lobby
Meeting room


Roof Garden
Allotment
Gardens



STRUCTURE

Due to the design's add-on DNA, the additional structure is based on the column grid from the existing pillar structure in the warehouse. The concrete pillars are arranged in a dense grid of 5000 x 5160 mm, which for a modern steel construction would be a relatively frequent pace of repetition. However, we have made it the governing standard for the new steel structure and all the floors above. When distributing the load on this many columns, the dimensions can be heavely reduced, as each column supports only 25 m^2 per. floor. Under guidance by our structural supervisor, Engineer Bunji Izumi, we have concluded with square profiled steel columns of only 200 x 200 mm for the lower floors and even slimer dimension for the upper floors, reaching down as far as 100 x 100 mm. For the housing departments, the steel structure is capsuled almost in its entirety within the partition walls, making the issue of fireproofing less problematic.

The existing concrete pillars are reinforced to make columns of 600 x 600 mm. Additional reinforcement for the pillars and floating fundaments underneath the slab would be needed. The columns will keep it's size, but receives an outer steel layer of 30 mm, making it a hybrid column of steel and concrete.

On the 3rd floor ambulatory, as a transition between the concrete- and steel systems, we introduce a round, cladded, steel column. The cladding answers to the exposure to salty, humid air from the coast, and inside, chlorine-filled swimming hall damp. The columns are wrapped in a marine grade stainless steel coat, with chrome finish. The circular profile communicates an idea of publicity, as the round column naturally keeps adjoining walls on distance, with the result of large open spaces.

Horizontal loads are handled by the three concrete cores for vertical circulation.

The floor decks of steel addition are filigree concrete slabs. The short spans are also in this this case benefitting material reduction.

Course of seven columns Axonometry 1/100

1 Introduction

What to do when a new building is needed but there is already a structure present?

The field of architecture is increasingly challenged with such questions, as the construction industry is one of the largest polluters. The conventional way of building, where demolition and new construction are at the heart of the business, is becoming more and more unjustifiable.

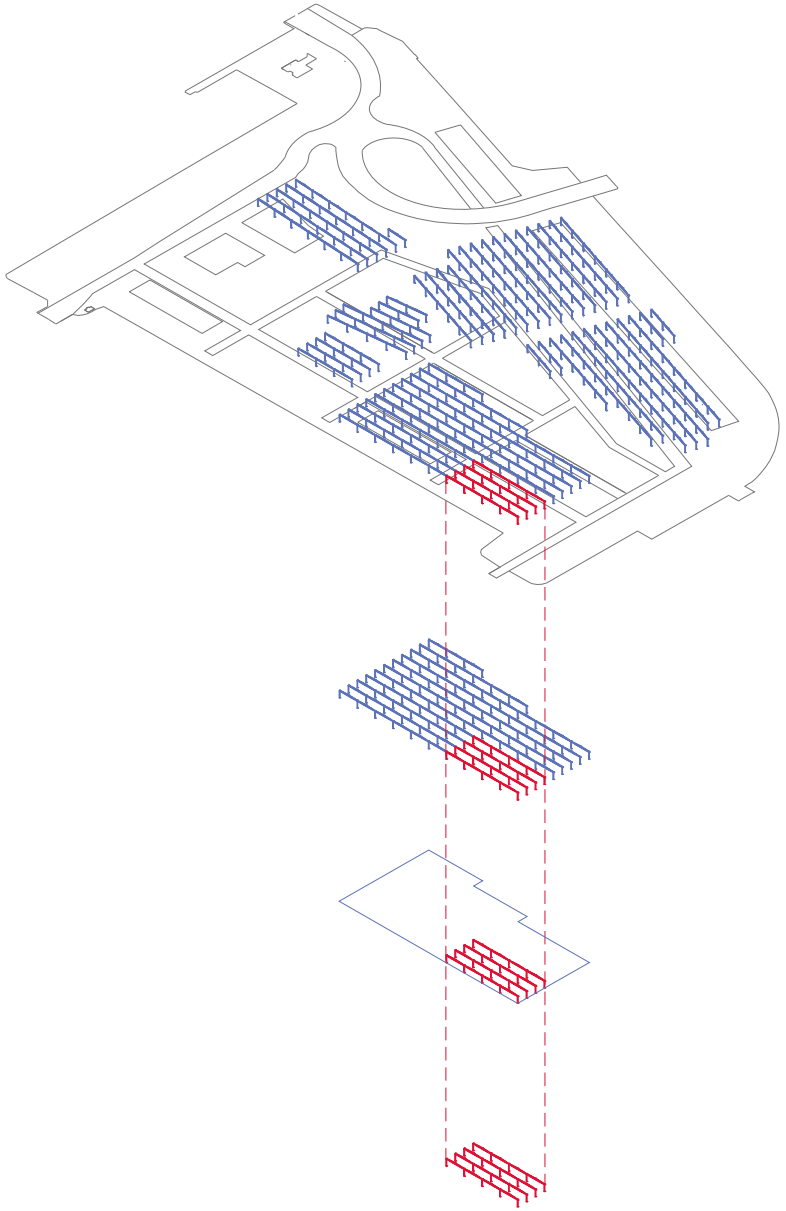
Lacaton & Vassal's mantra "Never demolish, never remove or replace, always add, transform and reuse!"[1] offers an answer to this, and that philosophy reverberates loudly throughout this master's thesis. This awareness can be seen as one of the more recent developments within the field of architecture.

When applying this mantra to architectural interventions, the methodology will always be different because there is no one-size-fits-all solution when working with pre-existing structures. Each intervention will have its own parameters and limitations set by its unique environment. On top of this, what a culture decides is worthy of preserving varies wildly and further complicates things.

This project offers a solution for preserving pre-exisiting structures not solely for their historical or cultural value, but for the potential to create something greater out of it by reassembling common elements found in commercial architecture.

1
Webcontent. (2022). "Never demolish. Always transform, with and for the inhabitants": Anne Lacaton delivers inaugural Jaqueline Tyrwhitt Urban Design Lecture. Harvard Graduate School of Design. https://www.gsd.harvard.edu/2022/04/never-demolish-always-transform-with-and-for-the-inhabitants-an- ne-lacaton-on-urban-design-and-architecture/

3.2 The dismantled structures (blue) and the preserved structures on the site (red).



3.3 The Mexico Island in the north in relation to the city in the south (left).[5]

5
Google. (n.d.) [Satelite image of the Mexico Island in Antwerp in relation to the city towards the South]. Retrieved June 13, 2023, from https://www.goo.gl/maps/

4.4

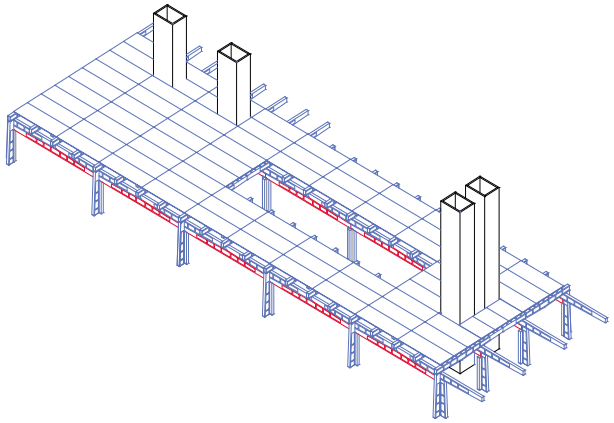
(4) Concrete cores are added for circulation and for stabilization. The salvaged TT-slabs span between the new beams. Cantilevering beams outside of the plot are cut off, except at the main entrances to emphasize them.

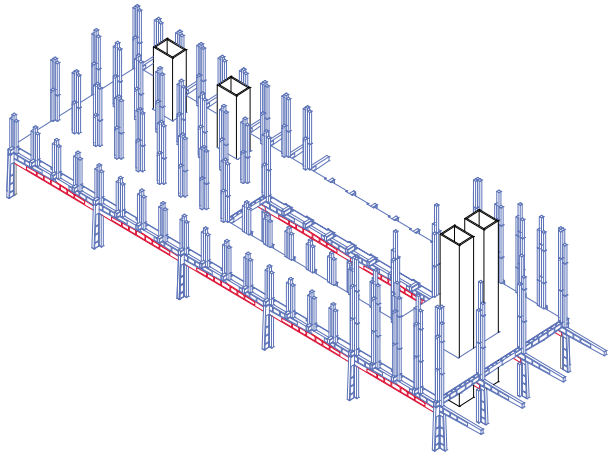
4.5

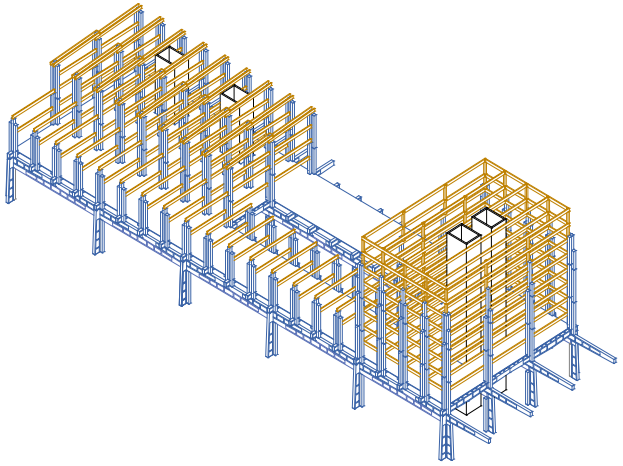
(5) Spare colums are stacked on top of the existing grid to carry the additional floors.

4.6

(6) CLT beams span between the new columns.





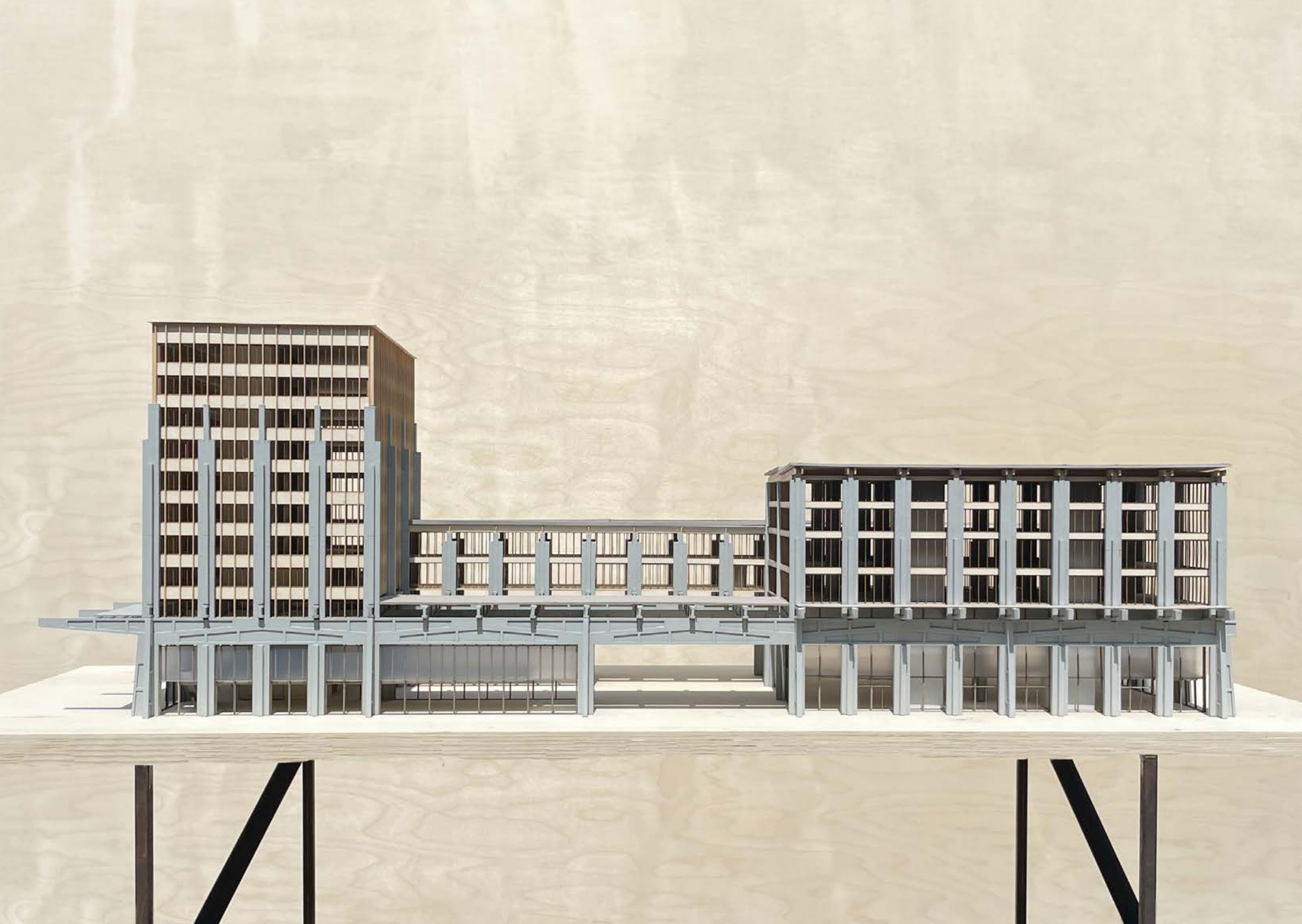


4 Reassembly

First of all, additional floors are needed. The original one storey structure was not designed to support eight more additional floors. We search for structural principles that connect and stack the prefabricated concrete elements using the existing grid.

Columns are combined by tying them together with steel belts in order to carry more loads. The load bearing capacity of the beams is increased by stacking them on top of each other and fastening them as well.

The original 11-metre-high factory hall becomes the plinth of a new high rise. Situated on the corner of two quays, the new high-rise serves as a recognizable beacon of the new neighbourhood.

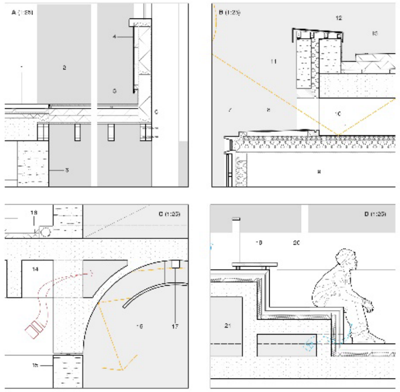


AT.4.1 Adam Spreckley **Urban Crematorium.**

My Thesis proposal for Oswald Street takes the form of an Urban Crematorium. The proposed building accommodates a variety of public occasions but is fine tuned in terms of programme, to cater for the collectivised rituals of human life, namely births, marriages and deaths. Coupled with a sensitive and considered approach to materials, construction techniques and the harnessing of natural light, the building represents a symbiotic relationship between architecture and technology. Only through an integrated design solution can this building succeed as a integral piece of the city of Glasgow in the 21st Century.

Like a traditional church, the building's organisation is flexible enough to cater for multiple, often different events, within the same space throughout the entire day, every day of the week. The proposed building's organisation caters for the common sequence from arrival to congregating, undertaking a ceremony, catering and departure. Each space is architecturally and technologically calibrated for phases within the sequence, with careful articulation of sources of natural light, levels and changes in materiality. The tectonic of the circulatory spaces marks an important transitory state change for visitors moving between ceremonial rooms as they navigate the building.

The building adopts a consolidated grid-type structural layout, allowing for a monolithic 'inhabited' perimeter wall to the building- this accommodates for a multitude of services such as vertical circulation between ceremonial rooms, fire escape and most poignantly performs as a framework to store the ashes of cremated persons after a funeral (the Columbarium). The building is a provocation of how to deal with death in the 21st century city. The perimeter wall acoustically and structurally supports the main ceremonial spaces located in the centre of the width of the plan, where the light timber frame structure supporting the roof acts independently of the rest of the building.



1 - 50mm Rough-cast Concrete Floor, 50mm Battens w/ underfloor heating, 12mm Ply deck, 50mm Thermal Acoustic insulation, 300mm reinforced concrete waffle slab

2 - 18mm Birch Flooring, 50mm batten void, 2x 90mm EPS Acoustic insulation, 18mm Oak Soffit, 75x200mm Sanded glulam timber beams

3 - Hidden low-level strip lighting

4 - Sanded Oak timber sill w/ fixed flush set frosted acoustic glazing, 6mm Oak Facia, 50mm batten service void, 6mm plywood, 150x50mm timber stud wall w/ full fill acoustic insulation, 6mm oak panel

5 - Concealed timber fixings between exposed glulam beams and auditorium timber roof beams, coordinated at even spacings

6 - 400mm Rough cast Rammed Concrete load bearing wall

7 - Angled timber profile to edges of projecting cemetery boxes

8 - Powder Coated Aluminium Covering, 12mm Plywood, Levelling Zone, 50mm Thermal Insulation, 12mm Ply Deck, 100mm Thermal Insulation

9 - Ash Storage void within projecting cemetery plot

10 - Fixed hidden clerestory glazing w/ timber frame

11 - 200mm Rammed Concrete, Waterproof membrane, 100mm Thermal Insulation Vapour Control Layer, 300mm Rammed Concrete

12 - Metal gutter lapped under white powder coated aluminium capping, laid to falls

13 - EPDM, 200mm Rigid Insulation, 18mm Ply Deck, Levelling Zone, 300mm Exposed Reinforced Concrete Slab

14 - Coordinated ventilation openings to plenums in pre-cast concrete spanning element

15 - 400mm Rough-cast Rammed Concrete load-bearing wall (90 minute fire resistance) w/ 15mm vibration dampener to concrete spanning element above

16 - 10mm sanded oak Soffit suspended from pre-cast concrete roof

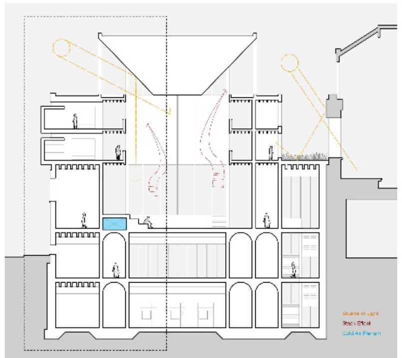
17 - Surface mounted strip lighting

18 - 50mm Rough-cast Concrete Floor, 50mm Battens w/ underfloor heating, 12mm Ply deck, 50mm Thermal Acoustic insulation, 300mm reinforced concrete waffle slab, w/ integrated cold air ducts to edge

19 - Detachable timber seating

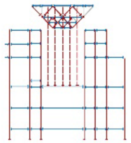
20 - 20mm Portland Stone, 8mm Bonding Layer, 12mm Ply Deck, 50mm X 50mm decoupled timber battens w/ Acoustic insulation, 200mm 300mm Reinforced Concrete Slab

21 - Ventilation Plenum w/ coordinated openings in balcony floor level to auditorium



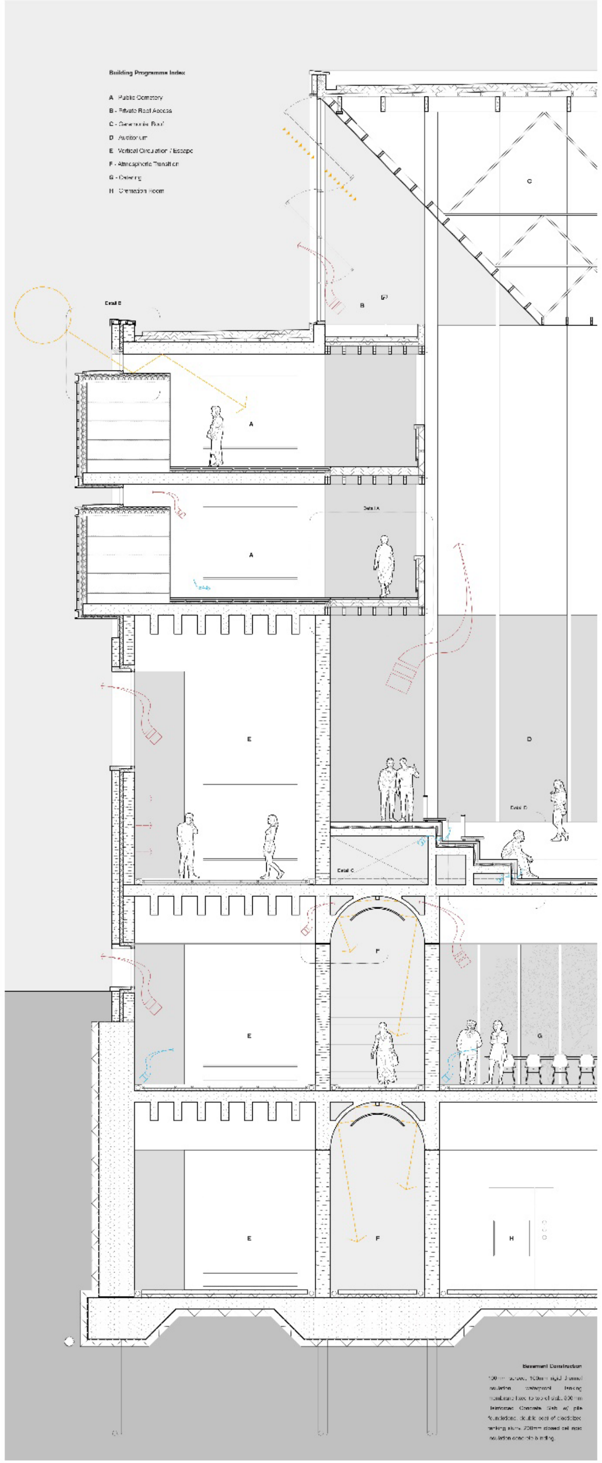
Cross Section (1:200)

Structural Concept Model



Structural Strategy

The building adopts a structural grid across the length of the site, creating spaces that vary in size and atmosphere. A monolithic inhabited perimeter wall to the building satisfies the requirements for contained fire escape as well as providing lateral stability to the building, allowing the ceremonial roof structure to act autonomously- demonstrated through the load path diagram above.



Building Programme Index

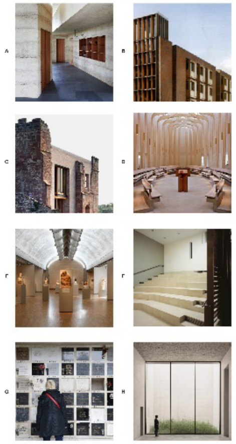
A - Public Cemetery
B - Private Roof Access
C - Ceremonial Roof
D - Auditorium
E - Vertical Circulation / Escape
F - Atmospheric Transition
G - Catering
H - Cremation Room

Basement Construction

100mm screed, 100mm rigid thermal insulation, waterproof tanking membrane lapped to top of slab, 300mm Reinforced Concrete Slab w/ pile foundations, double coat of electrolytic tanking slurry, 200mm closed cell rigid insulation concrete blinding.

Detail Cross Section (1:50)

Tectonic Reference Index



Construction Assembly Index

1 - 18mm Birch Flooring mounted on 50mm batten void

2 - Framed 24mm Triple Acoustic Glazing

3 - Natural Timber Cill with bevelled handrail

4 - 9mm Oak Facia, 50mm batten service void, 6mm plywood, 150x50mm timber stud wall w/ full fill acoustic insulation, 9mm oak panel

5 - 2x 90mm EPS Acoustic Insulation

6 - 18mm Oak Soffit, 75x200mm Sanded glulam timber beams

7 - 150x400mm Douglas Fir Timber posts supporting roof structure

8 - 20mm Portland Stone, 8mm Bonding Layer, 12mm Ply Deck, 50mm X 50mm decoupled timber battens w/ Acoustic Insulation

9 - Detachable timber seating

10 - 300mm Reinforced Concrete Slab

11 - Ventilation Plenum w/ coordinated openings underneath seating

12 - 300mm Reinforced Concrete Slab

13 - 10mm sanded oak Soffit suspended from precast concrete roof

14 - Vibration dampener between rough cast rammed concrete and spanning concrete above

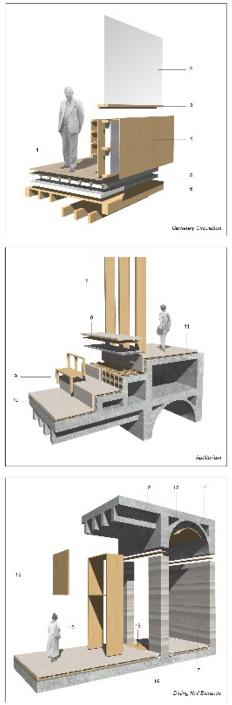
15 - Oak infill panel

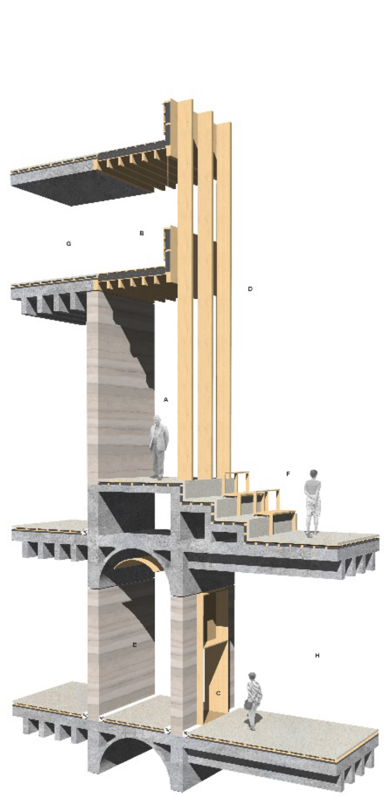
16 - Sanded Oak screen to line door opening within rammed concrete

17 - 400mm Rough cast rammed concrete load bearing walls, fire resistance of 90 minutes

18 - Timber threshold floor panel within opening to load bearing wall

19 - Cool air supply to perimeter edge of floor zone



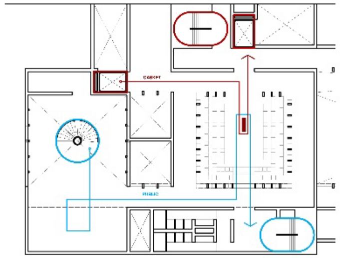


Structural Development Model (1:100)

Structural Hierarchy

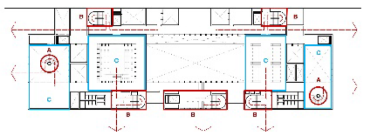
The ceremonial room adopts a structural hierarchy where deep, thin timber columns demarcate peripheral circulation and intimate seating to the auditorium. These timbers are the load bearing structural elements that support the auditorium's roof structure, allowing sub-structure framing the clerestory glazing to act independently, releasing them from being overbearing elements on the building's exterior.

Church Structural Story



Public / Private Circulation (1:250)

Fire Strategy (1:500)



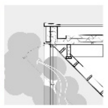
Fire Strategy Index

A - Fire Curtains to prevent spread of smoke between floor levels

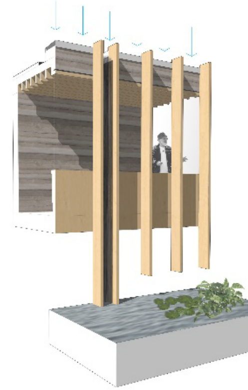
B - Protected fire escape zones within inhabited perimeter wall

C - Compartmentalised public gathering spaces with fire doors and fire resistant construction build ups

Fire Curtains to entry stairs



Smoke Vents to Auditorium

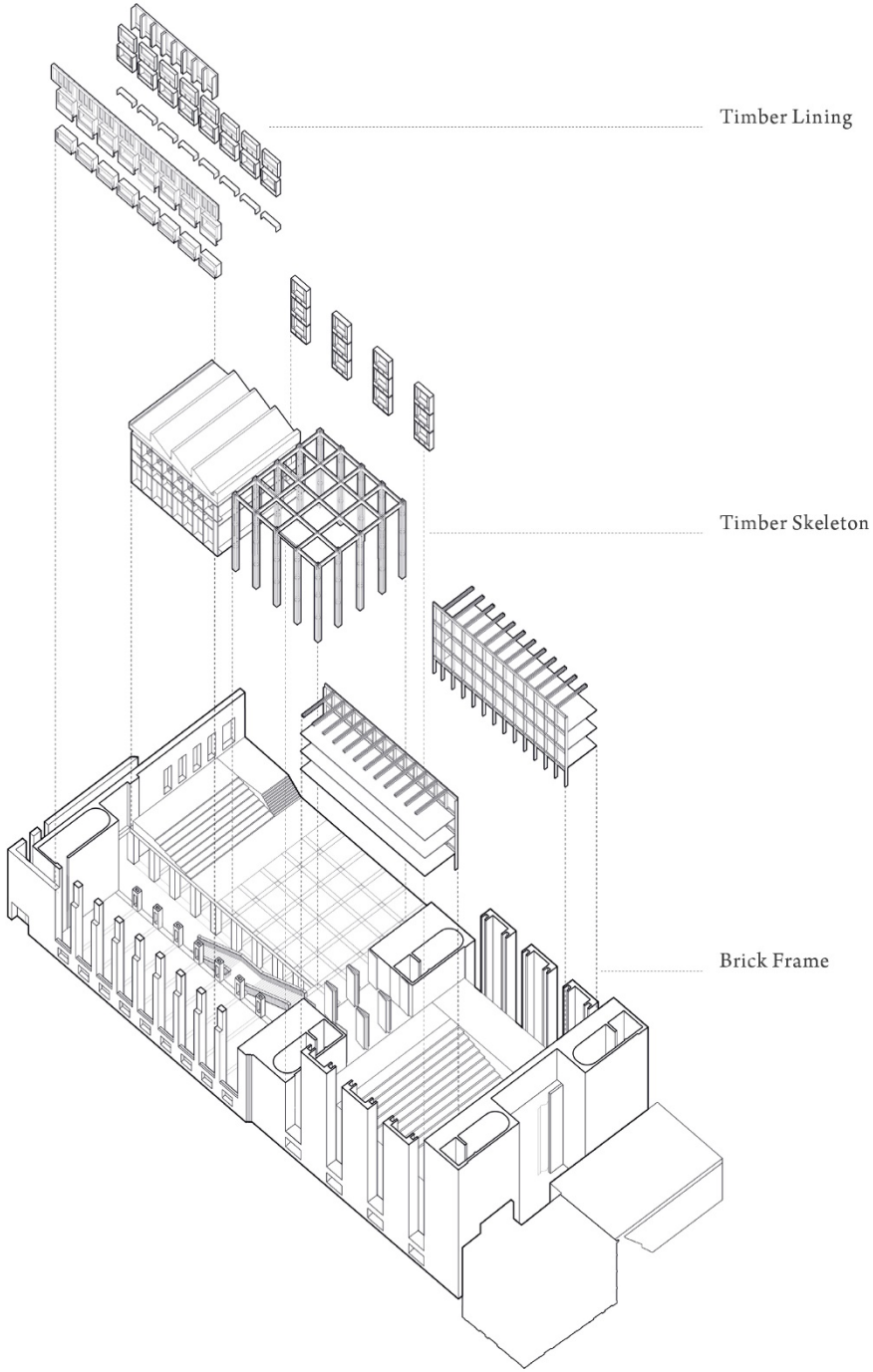


Water Retention Diagram

Carlo Scarpa - Brion Cemetery

Water Retention Strategy

To help in to achieve an atmosphere of contemplation and reflection to the dining halls, the structural timbers lining the cemetery circulation have been coordinated to integrate irrigation channels, allowing water to collect on the roof of the building and to flow down between the coupled structural timber posts into the water gardens.



Nesting of Elements

Timber Skeleton

Public Square Facade

ARCHITECTURAL TECHNOLOGY

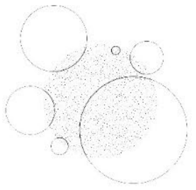
JOSHUA PAGE
Stage 4

ARCHITECTURE

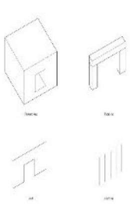
The building begins with the premise that culture is conceptualised as a diversity of separate societies, each with its own culture. We live in a primarily democratic and globalised world, where these cultures must life side by side, for a productive society. This does not mean to neutralise are differences, rather celebrate them, to create an agonistic territory where our differences can gather.

The building serves as an establishment for this agonistic condition, for different cultures to meet, discuss and interact around the medium of theatre. The architecture aims to embody this clashing of opinions and cultures through the overlapping of different spatial characters and conditions. The programme overlaps a community centre, three performance theaters and a public thoroughfare to the central station. Tectonically, this clashing of characters is embodied through the changing use of masonry construction, overlapping with a skeletal timber frame. The tectonic aims to highlight the separation of these different characteristics, through a celebration of threshold in light, material and space.

This overlapping of forms and materials creates many challenges. It can lead to inefficiencies and doubling of structures, circulation and materials. Therefore the primary challenge is to create a coherent scheme that celebrates these different forms, makes them explicit.



AGONOSTIC TERRITORY



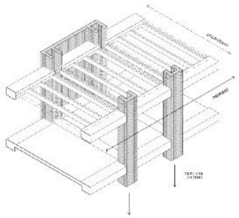
TECTONIC STRATEGY

STRUCTURE

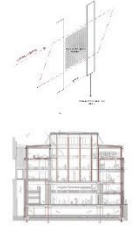
The super-structure system is primarily masonry load bearing walls, with concrete rib deck spanning between, whilst the sub-structure is a concrete tanked basement with pile foundations. The load bearing walls are 215mm deep, with 900mm brick piers at 3600mm centres. These piers carry the primary load of the building, from roof down to pile foundation. As you rise up the building, the carried load reduced, therefore the piers thin out. This thinning facilitates the masonry tectonic strategy, of stereotomic, to tectonic, to veil. The concrete rib deck varies in depth, from 560mm to 900mm, depending on the span, whilst the slab thickness remains constant at 225mm. The rib deck has a primary span longitudinally, whilst the secondary spans between piers. The deck is divided into 3000mm bays, with 600mm gaps in-between for servicing.

Nested inside this masonry outer frame is the timber skeleton, which hosts the debate chamber, pedagogical theatre, rehearsal studio and political theatre balconies. These skeleton is a lightweight frame, made from LVL. It is supported by a transfer structure on the second floor, requiring a 1000mm deep rib deck. The debate chamber columns are quad-columns, made from four 150mm members, fixed together with shear blocks.

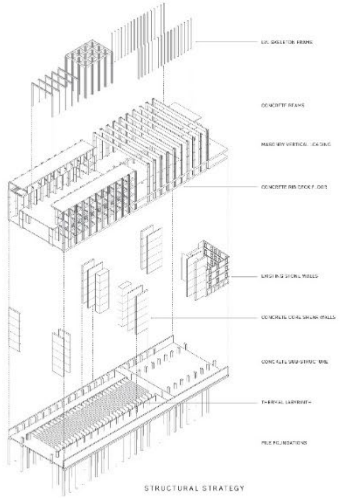
The main structural difficulties is the large spans of 16m on the cross section on the second floor, the 28m roof span across the theatre, and the transfer structures of the timber skeleton. The load-path is simple, with loads passing the roof and concrete deck, onto the masonry piers, and down into the concrete substructure and pile foundations. The lateral stability is provided through shear planes. On the ground floor it is the masonry walls which prevent racking, whilst on the upper floors it is the concrete cores.



STRUCTURAL BAY



LATERAL STABILITY & LOAD PATH



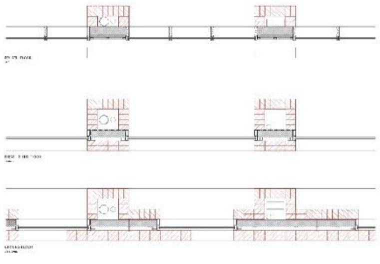
STRUCTURAL STRATEGY

CONSTRUCTION

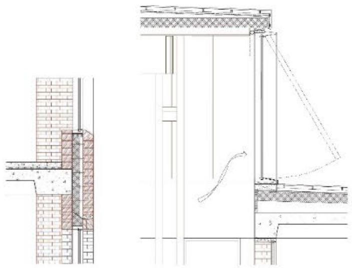
The primary construction system is a load bearing masonry frame with concrete rib decks spanning between. The traditional load bearing masonry skin would not be sufficient to support a building of this size, therefore masonry piers are utilised to carry the primary loads. The inner skin is supported by the brick piers, whilst the outer skin is expressed simply as the cladding. On the ground floor the brick skin stretches past the windows, revealing itself to have no structural function. The building utilises masonry construction honestly, behaving as designed. The openings are formed from jack arches, and all structure is expressed, with no hidden columns or brick slips. Concrete is takes the place of the brick at the basement level, where it transfers loads to the foundations below.

The relationship between the construction elements is clear, brick forms the vertical wall, concrete rib decks form the horizontal slab, and timber lines the spaces that are touched. The typical window detail highlights this strategy, with the timber window frame sitting within the brick cavity, expressing the separation of load bearing brick and cladding brick. The timber is used structurally in only the central spaces, as a skeletal frame. This skeleton is a lightweight element amongst a mass of brick, facilitating a softer and ephemeral atmosphere. It creates a separation and spatial threshold between two contrasting entities.

The sequence of construction would start with the pile foundations. A bore hole would be created, then the columns cast, in order to transfer the load deep into bedrock. Then the basement would be construction from in-situ concrete. As you move up the building, each brick wall would be built, then the rib deck slab cast on top of it. Therefore, you would only need to scaffold and focus on each floor at a time. After the final roof slab is cast, the timber skeleton would be constructed, and connected to the the deck on level two. After which, the thermal enclosure would be sealed, and made airtight. To complete the construction, the timber linings and finishes would be fitted.



MASONRY LOADBEARING CONSTRUCTION



TYPICAL CONNECTION DETAILS

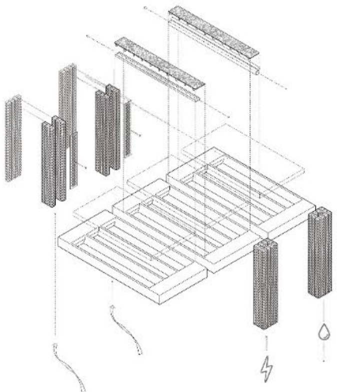
ENERGY & ENVIRONMENT

As a building with two large theatre spaces, and other specialist functions, such as a workshop and studio, there will be a high resource consumption. Therefore, for mitigation the building seeks to re-use waste and implement passive strategies throughout. As a building of many open transitional spaces, the heating strategy can be focussed in the conditioned spaces on either wing.

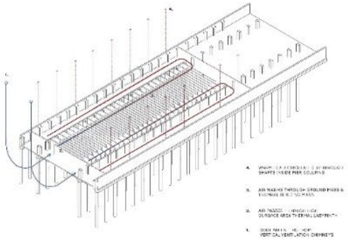
The building is both heated and cooled by a basement thermal labyrinth. This system is designed to bring in fresh air from outside, and push it through a maze of staggered concrete walls. This labyrinth maximises the surface area the fresh air is exposed to. In summer, this will cool the air with the thermal enclosure and low below ground temperatures of 10 degrees, or in winter heat the air through thermal mass retained heat. The heated / cooled air is then distributed throughout the building through ventilation risers inside the brick piers, at 3600mm centres, allowing heated fresh air to pass through every space.

These brick piers also service the building. Whilst the outer piers distribute the heating and ventilation, the inner piers host the electrics, HVAC, rainwater and wastewater. These services are carried across the floor plan through use of structural floor bays. In between each 3600mm concrete bay is a 600mm gap, lined with timber. Here the electric floor boxes and data points are accessed, whilst the HVAC pipes are hidden but accessible if needed. The waste and rainwater are carried through the piers into the basement plant. Here there are two separate rainwater collection and grey-water collection tanks, where they are filtered and treated, and redistributed up the building.

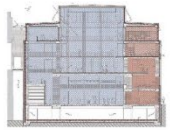
Daylight is a difficult to negotiate in a deep plan building, without a rear elevation due to the proximity of the station. Therefore the long West facade maximises daylight exposure with large expanses of glass, and the central airtum debate chamber bring light into the back of the plan. When overheating, there are built in roller blinds to block excess solar gain.



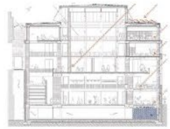
BRICK PIERS AS VENTILATION & SERVICES RISERS



PASSIVE HEATING & COOLING STRATEGY - THERMAL LABYRINTH



CONDITIONED & UNCONDITIONED SPACES

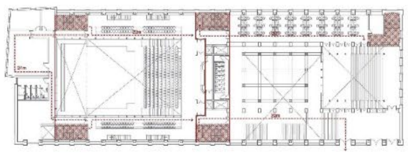


RAINWATER COLLECTION & PV

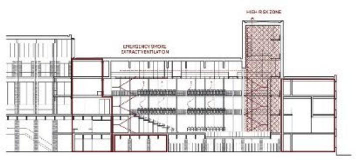
FIRE SAFETY

The fire escape strategy is designed so that there is horizontal compartmentalization between the primary spaces, to create fire enclosures. At the edges of these enclosures are two fire escape stairs, stacking through each storey. As an assembly building, the fire regulations state there must be a one directional travel distance of 15m and a directional distance of 32m. The distribution of the cores meet these standards.

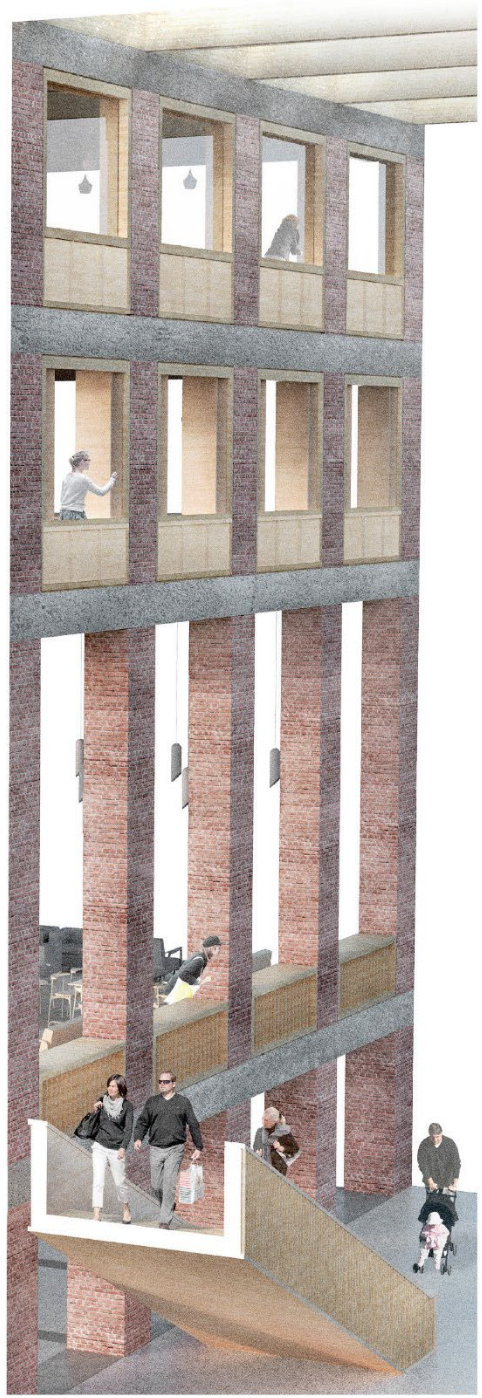
As a large building with open void spaces, the primary difficulties are the triple heights spaces for the Political Theatre an the Debate Chamber. These spaces will need an emergency ventilation system for smoke exhaust, to work in tandem with the passive ventilation system. There will also need to be a sprinkler system in place to extinguish the fire, in place with a specific strategy from a fire engineer. The theatre has specific challenges, due to the potentially hazardous specialist equipment, such as hot lamps and lighting. Therefore, there is a fire curtain which can be dropped to neutralize the fly tower area, and an emergency exhaust system above the seating to drive out any smoke away form people, and to the ventilation shoot in the tower.



ASSEMBLY BUILDING ESCAPE DISTANCES



HIGH RISK ZONE STRATEGY



Timber Objects

Internal Street Facade

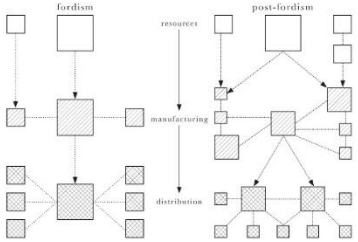
AT_01 architecture

thesis

Today the digital world gives everyone access to a vast network of resources and connectivity, which has brought about new modes of labour. Primarily Labour was a Fordist approach, where workers and resources would arrive at the place of work, and revolve around a rigid framework. New formations of labour are arising such as the 'gig economy', where free-lancers, home-workers and temporary jobs are more common. The industrial city was built around places of labour and at the heart of the civic realm.

"Glasgows history is in making, in craftsmanship. Its legacy is in buildings."
Toby Webster

My project attempts to create a new civic building in Merchant City, Glasgow, that accommodates space for creative practices to occupy and adapt. By bringing the act of crafting and creating into the public realm, the process can become the performance itself.



arrangement of labour

spatial organisation

The concept was to have a very open and accessible ground floor in which the public could access and view into creative hubs, who's program spills out into the public realm.
By creating an avenue through the site the intention would be to encourage people to walk through and explore. This central space also acts as the fly-tower, where people would see sets, unfinished constructions and artwork.
Each hub of activity (Creation, Performance & Exhibition), act as pavilions sitting within a supporting mass of program.

tectonic strategy

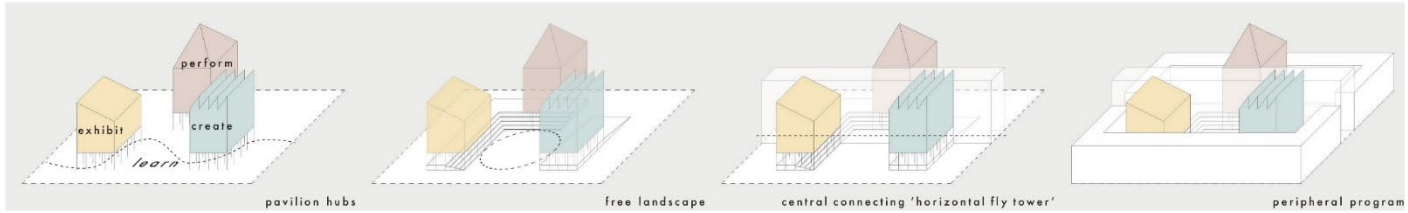
Basing the structure around the program & activity, two structural grids formed. One open and flexible, supporting the main program with the intention to be adapted over time. The second being more rigid and permanent, acting as the servant spaces to afford high flexibility within the other.

For the light structure, the use of timber would be suitable as it can be assembled and de-constructed by hand, and is typically the structure is very legible. By making the structure and connections readable (and also non-permanent), it might encourage users to adapt it to their activity.

For the heavier structure, the use of concrete blocks would achieve the mass intended to contrast the lighter frame, but also not feel too precious and again act as a legible "honest" structure.

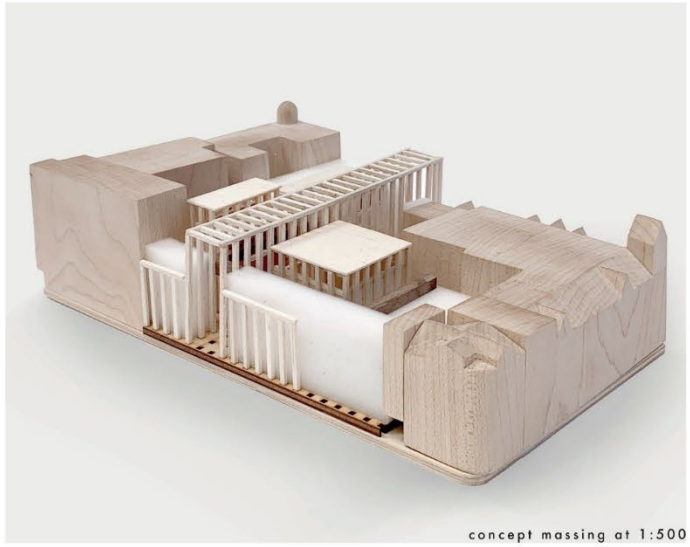
expected issues

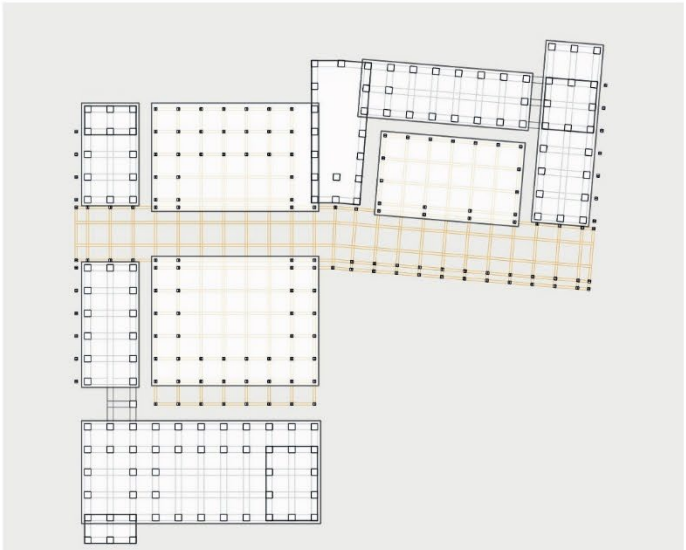
Because of the deep plan and high surrounding built environment, bringing light into the structure will be important.
To achieve the size of spaces to accommodate the program, investigation into large spanning structures will be needed. Also heating and ventilating these spaces will be paramount, by differing the systems for each area of activity, a greater efficiency might be possible.



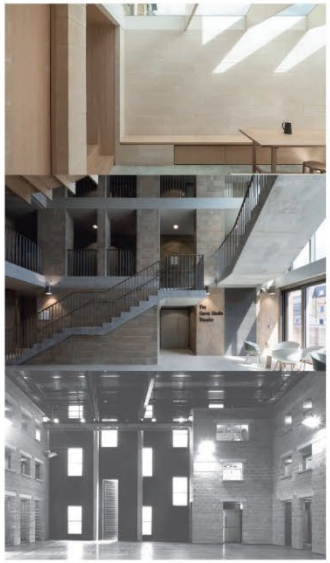
pavilion hubs | free landscape | central connecting 'horizontal fly tower' | peripheral program

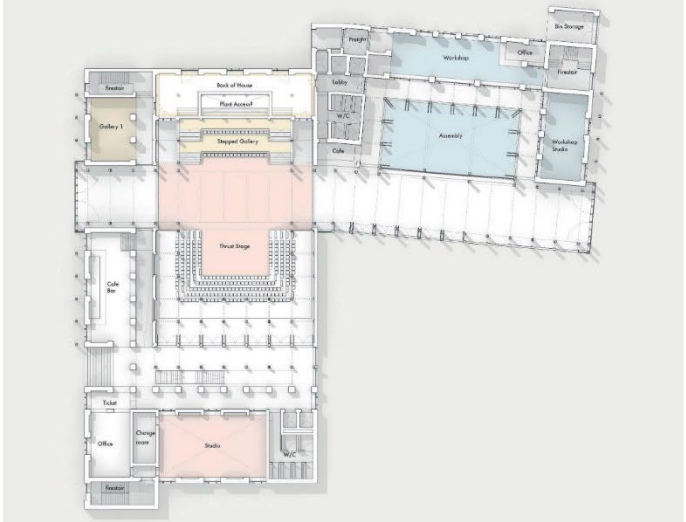
concept massing


concept massing at 1:500


tectonic relation | structure to program


timber skeleton precedent


masonry mass



1:500 ground floor

AT_02 structure

timber structural strategy

The main structural issue is achieving the 19m heigh uninterrupted volume of the horizontal fly tower which is needed to carry gantry cranes, spanning a 7m distance.

Two glulam members of 100x300mm make up each column with a second row of column for carrying the facade and creating lateral stability. The horizontal span is achieved with glulam beams of 100x300, two beams connect each set of columns creating a deep truss.

Cross bracing cables are used for lateral stability acting as Whipple truss. The longitudinal structural stability is achieved through sheer walls when the timber structure connects to concrete cores.

The primary vertical members are the glulam columns that carry the weight from the horizontal members to the steel flitch connection into the concrete substructure. Primary beams span between the columns with secondary beams spanning between each truss. Tertiary members support the floor-plates and facade build-up.

mass structural strategy

The use of concrete blockwork as structural bring problems in achieving the strength needed to carry the weight of the 3-4 story structure. Large 800x800 blockwork piers at 3m centres are used to carry the vertical load to the concrete substructure.

The structure must also span up to 8m in places, so the use of pre-cast concrete floor plates are used. The floor plates span longitudinally between each blockwork pier, a 1200mm deep beam carries the load from the floor plate while also incorporating a service zone, ribbed beam floor plates span between each beam (ribs 750mm deep at 1000mm centres, floor plate 250mm thick).

The blockwork piers act as the primary vertical member. The pre-cast floor plate has primary-tertiary members, with the primary load-path spanning between each column, the ribbed deck spanning between each primary beam, and the slab acting as a tertiary span for the floor build-up.

Sub | Super Structure

The substructure is made up of a pre-cast concrete plinth, which holds the basement and plant which rest on pile foundations.

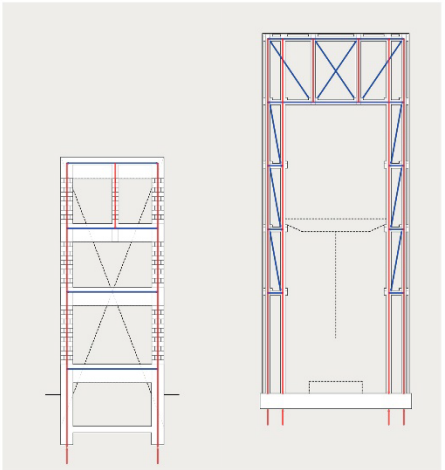
Concrete fire and wet vertical cores are constructed primarily at one end of each blockwork structure and along the timber fly-tower, to provide lateral stability through shear walls.

The blockwork and pre-cast floor-plate superstructure form the perimeter of the block, sitting on the plinth.

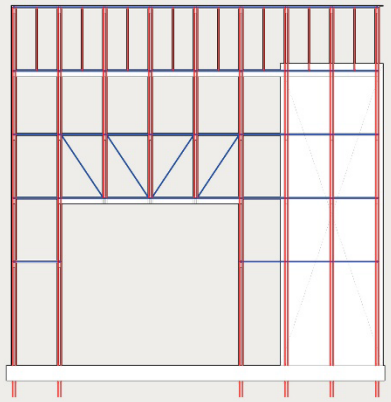
The timber fly-tower is constructed between the blockwork masses, which help with lateral stability and loading.

The timber pavilions sit between the fly-tower and blockwork masses. An extended block protrudes from the blockwork column to support the timber beam. The timber cladding and secondary structure help with lateral stability.

The exterior glass, timber and zinc skins sit on the timber and within the blockwork structure.

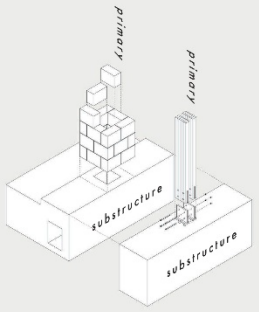


masonry load path timber load path

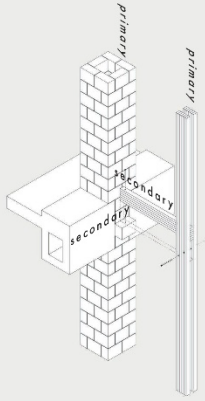


timber load path cross section

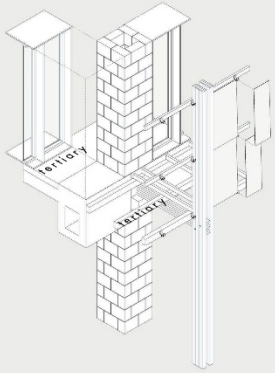
structural concept model



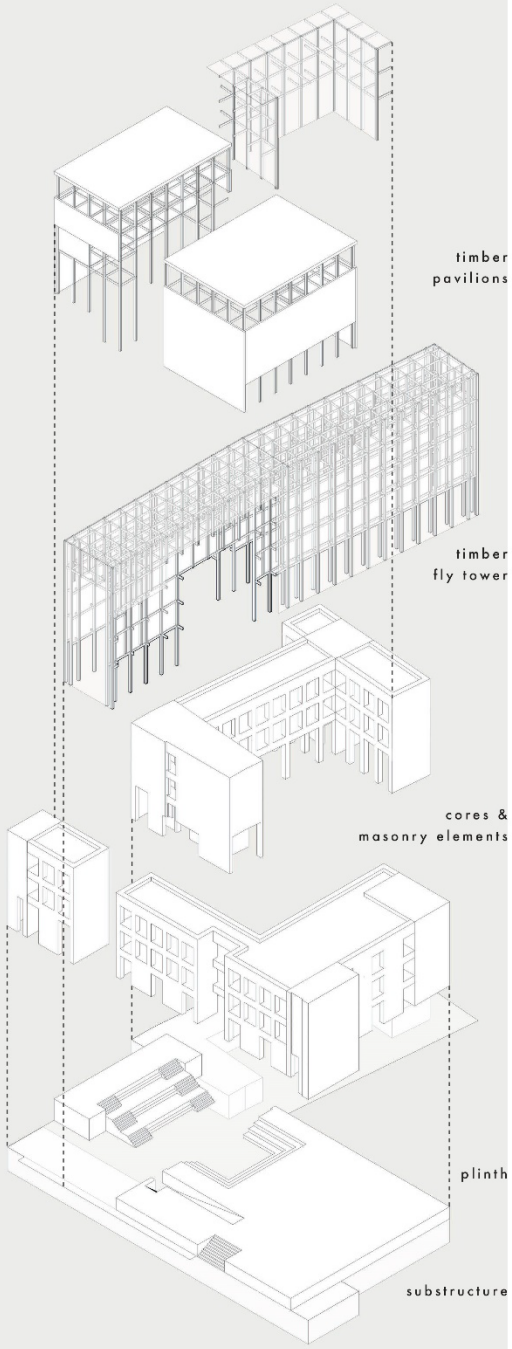
ground connection



timber-masonry connection



tertiary facade build-up



exploded axo

AT_04

energy & environment

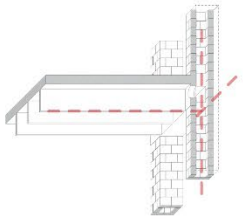
environmental factors

Due to the large size of the build and its spaces, ventilating and heating is integral to the design. To reduce the environmental impact of the building, less than half the building is heated regularly, with the larger spaces only being conditioned when in use.

Integrated ventilation

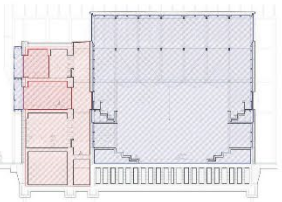
The pre-built timber window boxes use built in openable shutters, plus passive ventilation through porous stone blocks to prevent drafts. Allowing the user to control their environment helps with thermal comfort.

integrated services



The large blockwork piers are hollow to allow for vertical distribution of warm air extraction and mechanical ventilation. The deep floorplates allow for servicing to run into each space. Electrical sockets drop from the ceiling to allow for open floor arrangement.

conditioned spaces



The layering of conditioned spaces help to reduce heat loss through the building fabric. The masonry portion of the building are heated with underfloor wet heating and the thermal mass of the floor helps to keep an even temperature. The large spaces are heated intermittently with dry heating, using a thermal labyrinth to warm the air and a heat exchanger to extract the heat from the stale air from the rest of the building. Plenum are used to pump heating under the seating.

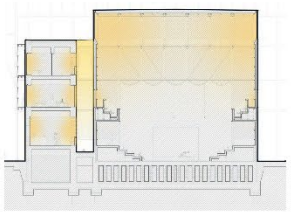
water retention

Green roofs help to retain the water, which is then distributed vertically through the wet cores and used for sink water and toilet flushing

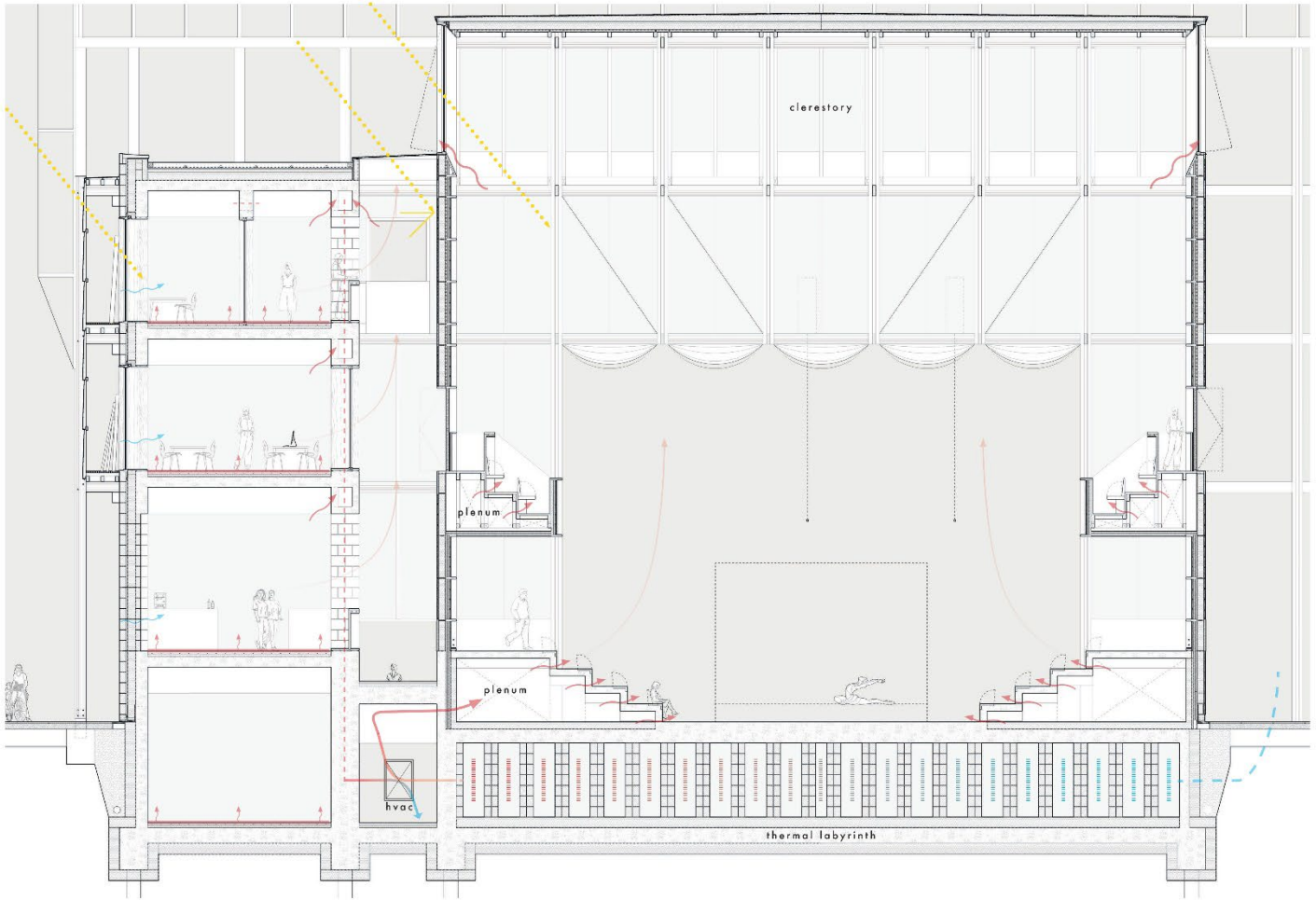
future proofing

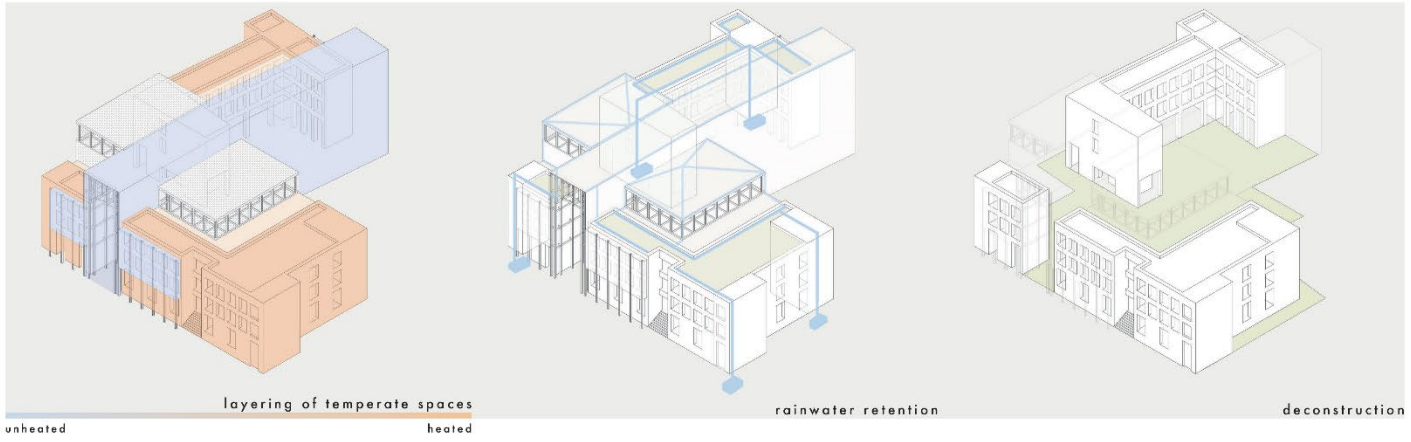
The building program aims to operate without the timber pavilions, if removed later in its lifespan. Lime mortar and precast elements also allow for the building to be de-constructed.

light and environment



Due to the depth of the building and built up environment, the building is split up into thin floor plates to allow light to enter via atria. Each pavilion space has a clear story to allow top light through the timber structure.





ARCHITECTURE AND THE CITY

4th Year Students - AAR 4711 Arkitektur og by – Prosjektemne A
5th Year Students - AAR4731 Arkitektur og by – Prosjektemne C

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ARCHITECTURE AND THE CITY

- 15 credit **design studio** course and a 7.5 credit **knowledge course**

- A **collaborative studio** addressing **urban**, **architectural** topics across a **range of scales.**

- Theme is **Transforming the Zwischenstadt (or In-Between City)**

- **5th Year Students –** will be encouraged to develop ideas and themes that they can develop further into their masters thesis semster.

Previous student work examples:

JOINT STUDIO NTNU (cargo.site)