

Daryln Sia
6217044

Klaske Havik
Pierre Jennen

The River and Its Industrial Ghosts

Tallinn, Estonia

A Matter of Scale *Methods of Analysis and Imagination*
Logbook

First impressions of Tallinn → Demand

out of scale
juxtapositions

houses of 200 on 7th day

Kalamaja → displacement & relocation → gentrification

old factory → become creative

design as projection

10.11.2024 damp, dark, cold, material, oozy

- fortifications along coast → investing etc.
- Sander Kost
- Kalamaja? some milk drink, Estonian specialty traditional farmers drink.
- Ledoux, "l'abattoir-pauvre", & Filarete, "Vitruvius' Acton"
- perception of space modified by scale.
- Tallinn has different spatial conditions of scale.

9th floor → 33cm Old city of Tallinn was built using that scale

SCALE ANALYSIS

CONTEXT → retrieval & current circumstances that determine a built environment
PROBEG → "city" within "city" = widening

DISCREPANCY → buildings as repository of architectural knowledge

HURISTICS → learning by trial or error

- anything can be done into something of extraordinary
- presence of nature in the very strong in Tallinn

Start to read article by APTON & WITHELM? → article

45 ECTS = 1260 hours (1 ECTS = 28 hours)

!!! Keep track of graduation Report logbook

Summarize weekly work in logbook + graduation guide

!!! Study the EMMA grad of rhetoric + graduation guide

!!! Start MyCase & check data management Checklist

Describe mentor tests before W2.4

traditional crafts of Estonia

- weaving
- embroidery
- embroidery
- pottery → e.g. Estonian wooden spoon
- pottery → Estonian clay pot
- Estonian ceramic

Emerging trend for security social divide is also influenced by landscape

Lasnamäe & Pirita / Maarjamäe separated by coastline

DATA Olympic Yachting Centre

ERAT

- ① Rectangular
- ② Participatory

then can the user can re-learn of the outdoor space facilitate landscape in Tallinn the city of Tallinn?

200-year old pine trees 120 bird species Part of UNESCO 2000

can the project be an activation of the river valley? → a form of connection

entertainment facilities is limited to Tallinn city itself → increasing pressure on city centre

current trends: adaptive reuse → gentrification, recreation?

10.11.2024

the top clouds hang nearby low in the sky. Reflecting, repetitive, grounded, with many bananas have turned dull the people largely miss the best ser. no context, just cold hard road with walking

Analysis & Synthesis

- the first movie-goer is every one
- ↳ people who go to react to it
- the second movie-goer is the interpreter of the movie
- ↳ viewed through ideological leaning
- the third movie-goer is the protection of movie-goer
- ↳ how is it done?

Reverse engineering: prescribing function instead of name

a particular way of observing reality can produce better understanding of it

to extract knowledge from the object

[polytechnicity]

descriptive Analytic ↔ prescriptive Synthesis

Buildings do many things at the same time a sum of many parts

How can the yachting centre be broken down into smaller parts of analysis?

short biography of the yachting centre

- ① secure + tracking human life
- ② empty
- ③ infrastructural - residential
- ④ connective elements
- ⑤ unique & intriguing → corner & gaps
- ↳ for the 1st admitt supposed to be the 1st

① descriptive

- ① hug & h
- ② add & (space slip)

1. can the landscape facilitate social cohesion & integration between different socio-economic-demographic groups?

2. can the landscape inform the practice of building? in terms of materials?

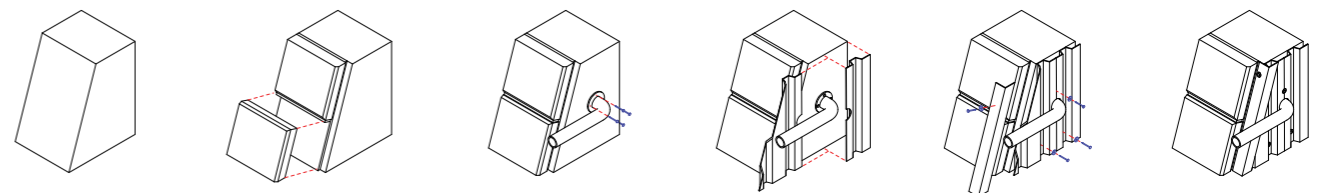
3. how the landscape provide the necessary materials for production without relying on public expenditure?

a' return to the landscape and end-of-life

PREPARE TRANSPARENT WITH THE DOWN THE RIVER

The first week focused on the selection of a building in Tallinn as a precedent study, whereby, in pairs, a series of sequence diagrams had to be made of a particular joint detail of interest from the studied precedent.

Due to a shared interest in the water, Balint Duma and I chose the Olympic Yachting Centre in Pirita as a suitable precedent to analyse. We looked into the balcony railing, as it seemed rather joyful and arguably injected a certain degree of "human-scale" to an otherwise out-of-scale building.



**A reciprocal relationship between building and landscape:
the case of the Olympic Yachting Centre in Pirita**

One of these "reactions" which presents a strong relationship between the building and the landscape is the Olympic Yachting Centre located in Pirita. This unique relationship of reciprocity between these two actors became a starting point to delve into this thematic typology in Tallinn.

The Olympic Yachting Centre was constructed for the Moscow Summer Olympic Games in 1980, by a group of architects: Henno Sepmann, Peep Jänes, Ants Raid and Avo-Himm Looever. Despite the event being primarily held in Moscow, Tallinn, at the time still a member of the Soviet Union, was selected to host the sailing events of the Olympics.

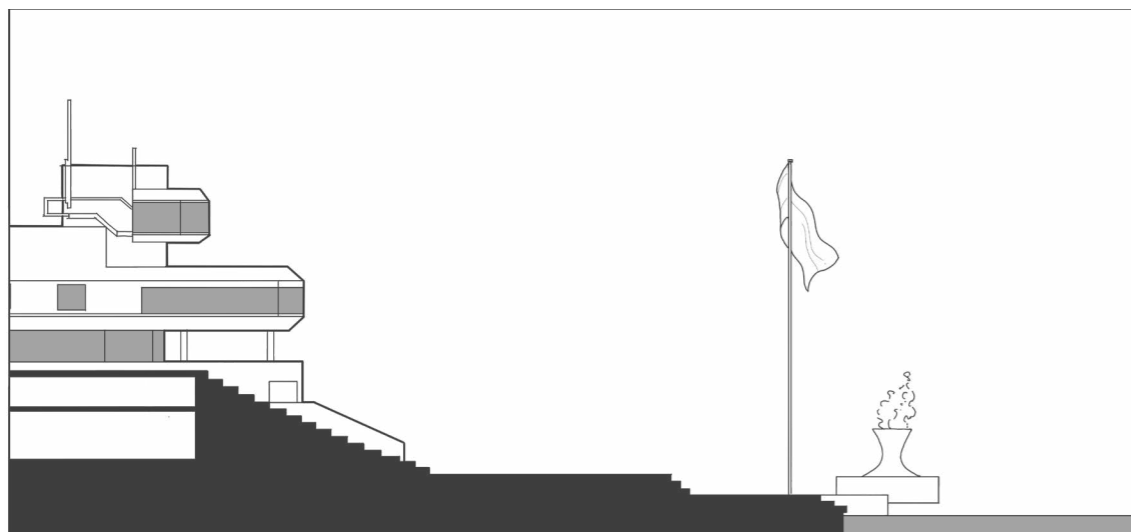
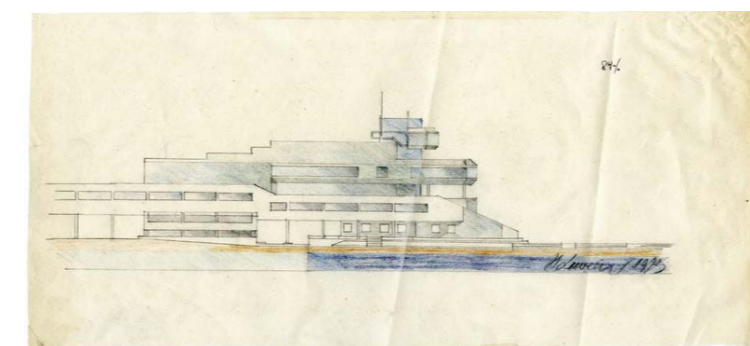
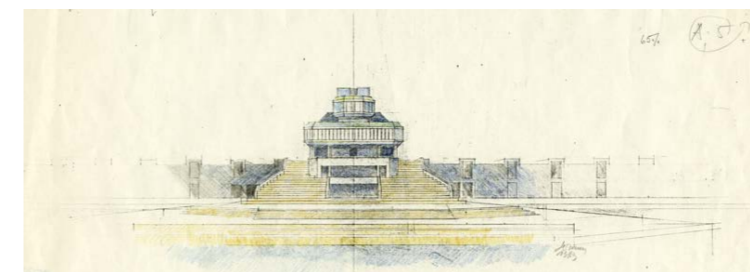
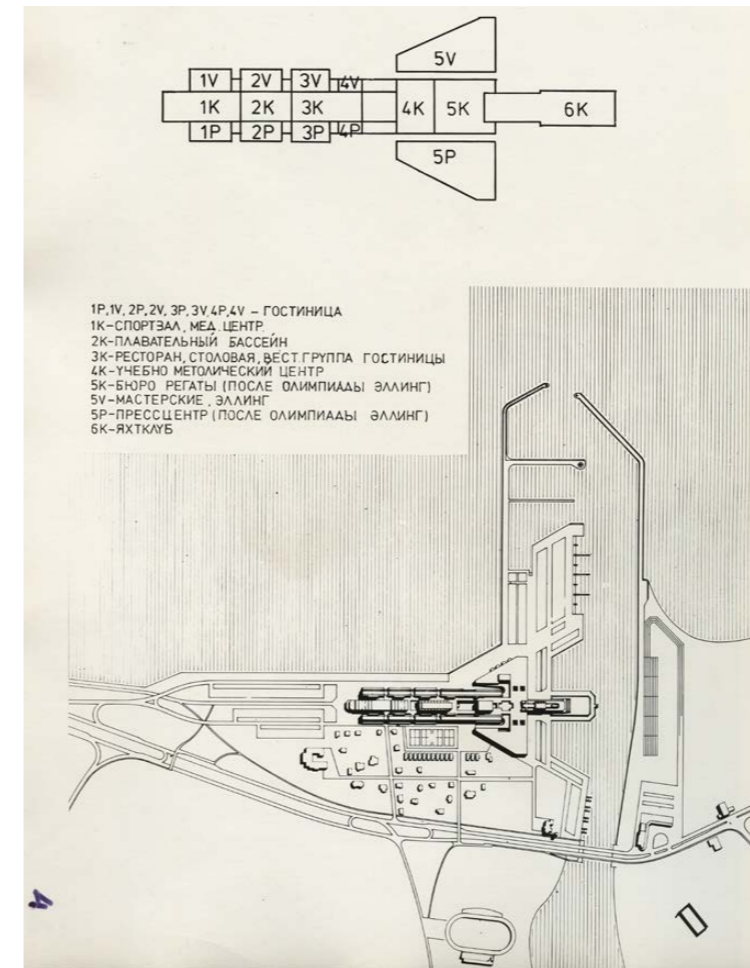
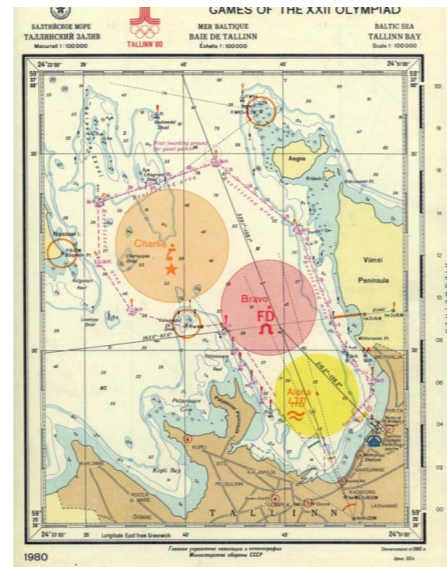
This presents the first point of landscape-building reciprocity -- landscape as function. it can be simply put that the Olympic Yachting Centre was constructed purely because of its immediate landscape. The reason why Tallinn was selected as the host of the sailing events was entirely dependent on its geographical construct. It simply could not be held in Moscow as it is a landlocked city. Meanwhile, Tallinn has access to the Baltic Sea via Tallinn Bay, and its form ensured that it was essentially a sea with ideal, protected conditions to host the event. The building was thus built directly next to the sea, and also at the mouth of the Pirita River -- as some events favoured the conditions of the river.

There is also another aspect of this reciprocity to be considered: landscape as influence.

Upon reviewing archival material, what stood out was the recorded opening ceremony of the 1980 Olympics. Due to the games being held in Moscow and Tallinn, the opening ceremony was split across two days -- with the main opening ceremony being held in the Grand Arena of the Central Lenin Stadium on 19th July and a specific opening ceremony held at the Yachting Centre on the 20th.

Thus, both the sea and the building became activated as a stage for the opening procession. The sea becomes more than a purely functional entity at the site, but rather an actor actively influencing the perception of Tallinn -- and by extension, Soviet-Estonia -- to an international audience. Certain design gestures of the Yachting Centre are surfaced, with the staggering steps facing the sea-stage becoming seats for the audience.

It also explains the monolithic nature of the Yachting Centre: the building wasn't designed at the scale of the human, but rather at the scale of the vast Baltic Sea.





(Top) The second week involved a social scales exercise whereby insights were obtained from three encountered persons in Tallinn and translated into a map and a written text each. Due to a shared interest in the sea, Balint Duma, Tjitske Henstra and I thus decided to scout out Noblessner marina, eventually stumbling across the port master (Tonu), a cafe barista (Eva), and a young mother (Maria).

Notes of interest included a lack of public spaces in Tallinn which, if more introduced, could contribute to a livelier marina. Older generations might still hold an aversion towards public spaces due to avoiding past communistic tendencies during Soviet rule, and that Estonians enjoy social gatherings centred around food.

(Right) In the hairy drawings workshop conducted by LLRLLRR, a series of rapid prompts had to be answered by an annotation on a map of Tallinn.



What was perhaps the most crucial takeaway from this excursion was independently tracing the path of the River Harjapea through the city of Tallinn which took place over a couple of days of walking. Below is a short excerpt of this encounter:

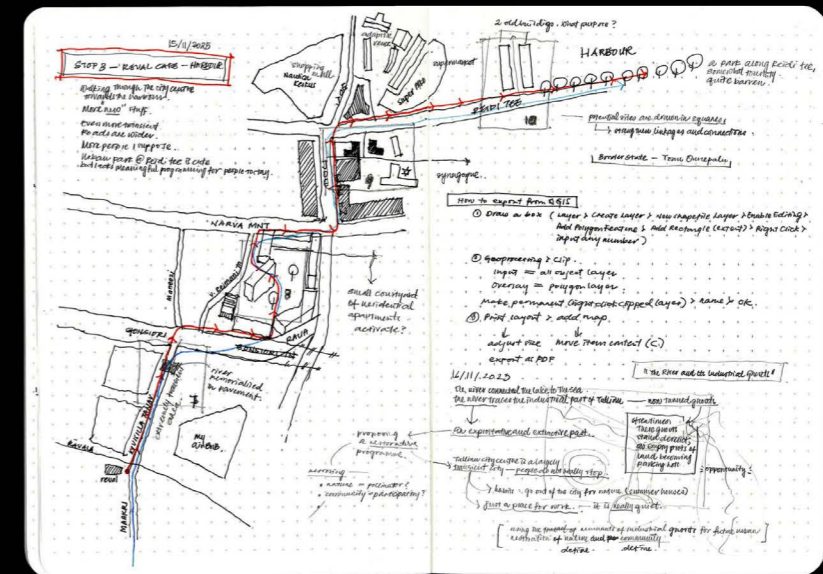
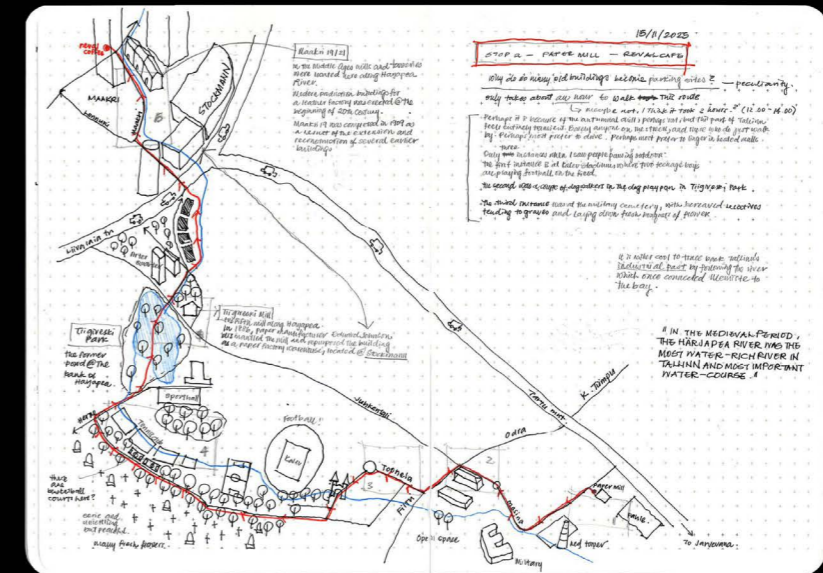
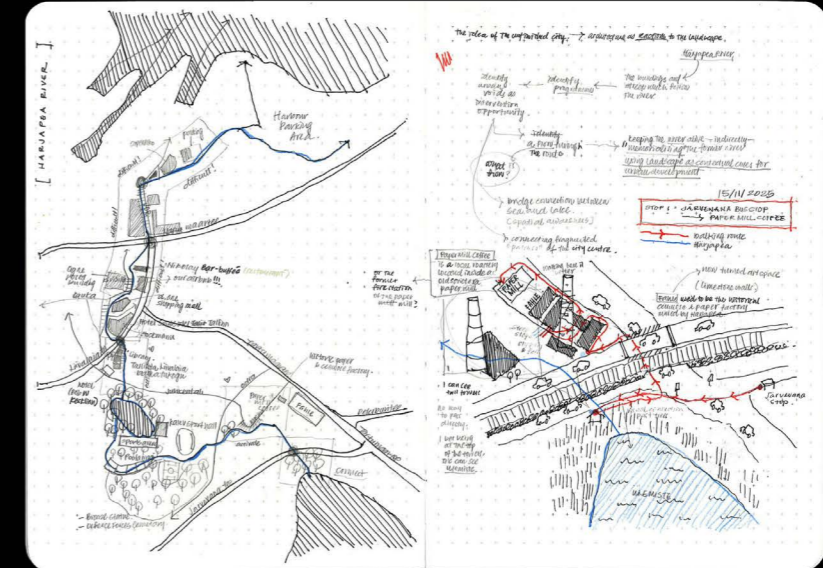
The forgotten river.

This lens then led to the realisation of the past presence of a river which once ran between Tallinn Bay and Lake Ulemiste, the Härjapea, which was what drove the independent contextual analysis for a few days during the excursion. Mapping was done to further support the qualitative observations obtained on site after several walks along the path of the former river.

The river also revealed the industrial history of Tallinn and the ways in which the Harjapea River became "lost" in the present-day due to industrial pollution, having little to no tangible evidence of this former river, with only its course traced in palimpsestic nature through parks, roads, and some residual buildings of that bygone industrial era on the surface.

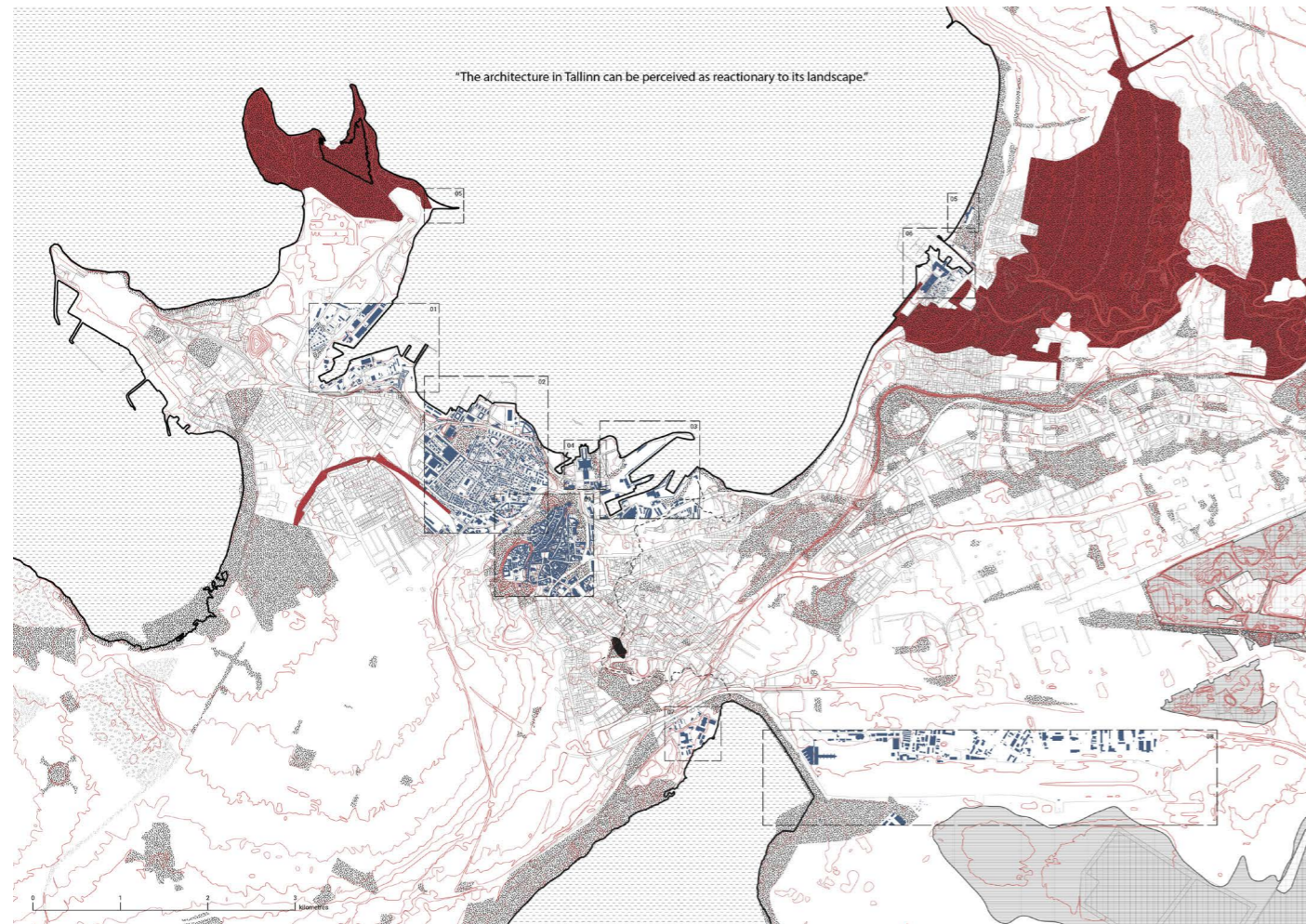
It can be observed that some parts of the city line up with the river -- in particular the valley along the edge of the cemetery (now turned into tennis courts), Tiigiveski Park, along Maakri Street which continues onto Kivisilla Street -- and, at the very least, it explains why Jõe (lit. "River") Street is named that. Little is perceptible of the river's presence along the route, save for some idle information boards for the transient passer-by.

The lines become blurred closer to Lake Ulemiste and Tallinn Bay. A main highway and railway run along the lake which makes following the route of the original river rather difficult, and streets do not go along the path until one reaches the cemetery. Towards the bay, one can walk along Reidi Street when emerging from Jõe Street to roughly approximately follow the path of the river, but whereabouts it once discharged into the sea is imperceptible.



02 Formulating the Assignment

(W2.3-2.5)



Post-excursion, my first endeavour is to retrace my steps and formally surface my position and findings via a series of maps. Backed with GIS data, the relationship between Tallinn's built and geographical landscape is framed as a series of architectural "reactions", making a catalogue between landscape and anthropocene (right).

This map was later zoomed in to trace the River Harjapea, through archival information and notes made on the excursion.

landscape

function

anthropocene
extractive ; restorative

sea

leisure
sailing
fishing
trading
transport

beach
marina, yachting centre
fishing village *kalamaja*
port harbour
passenger terminal

river

sailing
industry
ecology

yachting centre
mills
nature reserve *pirita*

lake

drinking water
transport

processing plant
airport

hill

administration
defence

parliament, palace *toompea*
old town walls + towers

limestone
(klint)

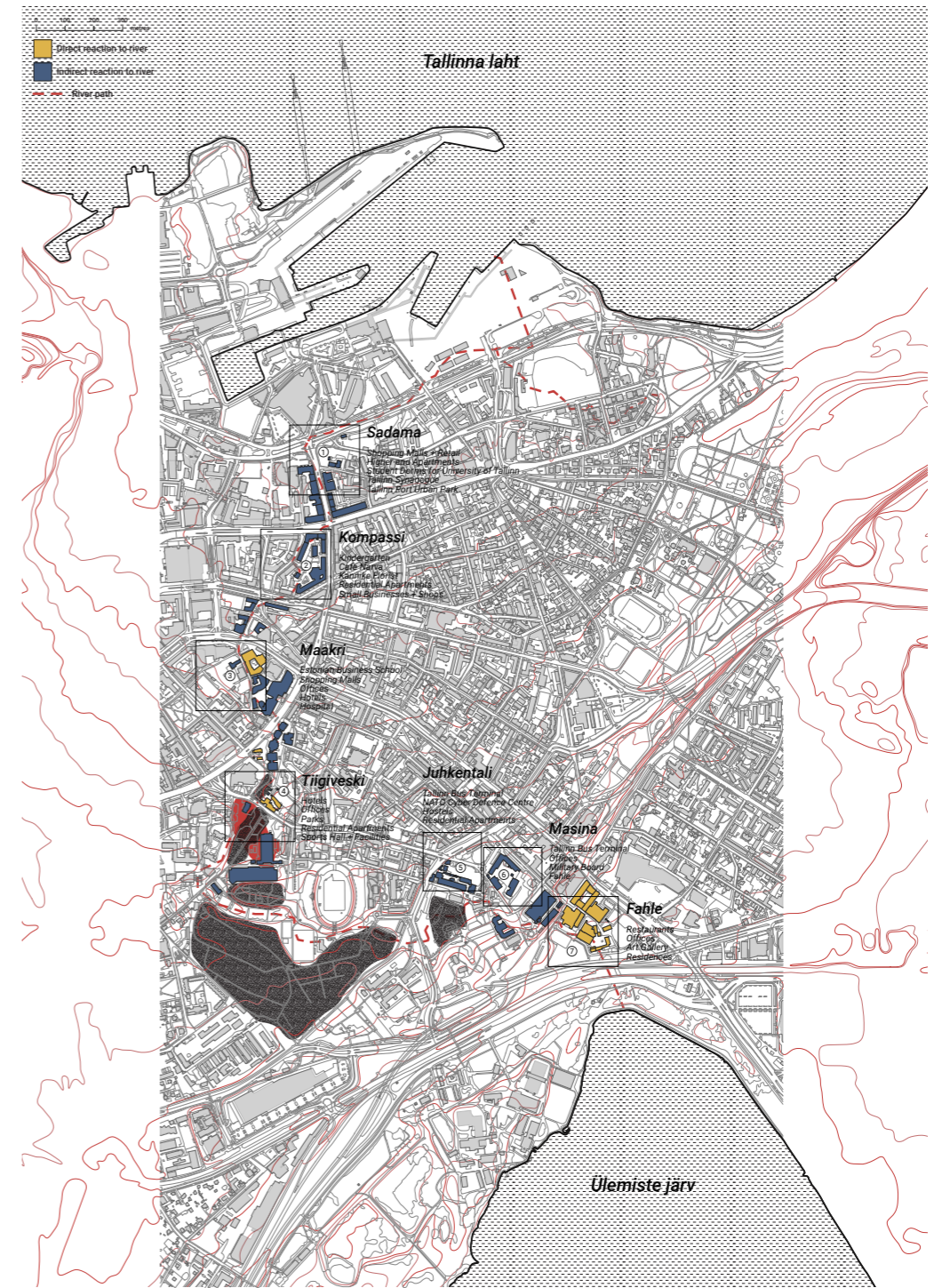
construction

quarry

forest

ecology

nature reserve
pollinator highway



The endeavour of tracing the river is made possible through a projected course from the 19th Century overlaid onto the present-day map (see left). It was intriguing to see how buildings, streets, and the ground condition still largely follows the course of this river, building upon a palimpsestic narrative in Tallinn's urban condition.

"Reactions" to the river are highlighted in blue.



These reactions were then separated into direct and indirect reactions, highlighting present-day remnants of the industrial period when the river was still present in Tallinn. Yellow buildings are mostly mill buildings from this bygone industrial era. The condition of empty carparks and unused buildings along this path became site opportunities. My interest drew me to the site at Tiigiveski, which is a protected but currently unused paper mill.



28/11/2025

Thursday - focus on scale. → invert the relation → then Jorge talk.

prepare {

- 1) starting definition of scale. What does it mean for you?
- 2) why does scale matter?
- 3) what is it & what role does it play in the formulation of design assignment?

Tallinn 2025 -

- 1) sea-city
- 2) green & blue infrastructure
- 3) Bar - make it fun & engaging to go there.
- 4) Cinahall sauna location.

graduality → reflect on inside-outside relationship introduced in Estonia. climate makes a very black & white distinction of made-outside.

in it in, out it out

decentralize humans: connecting green network + animals.

what does that mean? + animals.

sympatric? → antagonistic activities coexist in the same environment.

The urban context at a new site: "Natur in der Stadt." → niches: where do animals stay in buildings?

my project poses an enquiry into:

- 1) To what ways should architecture react to landscapes?
- 2) + how should people interact & inhabit these reactions?

Migration hasn't really caught on with citizens due to colonial & oppressive history but they are spiritual.

markets are the site social opportunity for many people in Tallinn.

Is gentrification a bad thing? → it is a B & W worldview.

(CASE #13 - issue of gentrification)

"How and counterforce of gentrification"

What makes perfect combination? limestone & wood.

like van concrete + stone + brick + cream + natural water + jelly + tomato + carrot.

art of composing the background of building: social anthropologic structure [Manhattan Transcripts]

sequences of spaces: spaces of affect, vibrant group.

Norme → a neighbourly interaction. paljasaare → interventions to make places more open to the public.

Half House → half of a house is designed and half is left empty.

Charles Jencks → architecture building-landscape-people.

landscape - building - people - time. → consider this layer.

temporality seasonality: summer, winter, intervention. "use the landscape", "repair the landscape".

reappraisal, restorative: [regenerative, the act of rethinking?]

spatial agency, spaciousness: [peaking lots]

Industrial ghosts are left in migration.

Could the practice of building & landscape pose as a strategy for spatial agency amongst transient inhabitants?

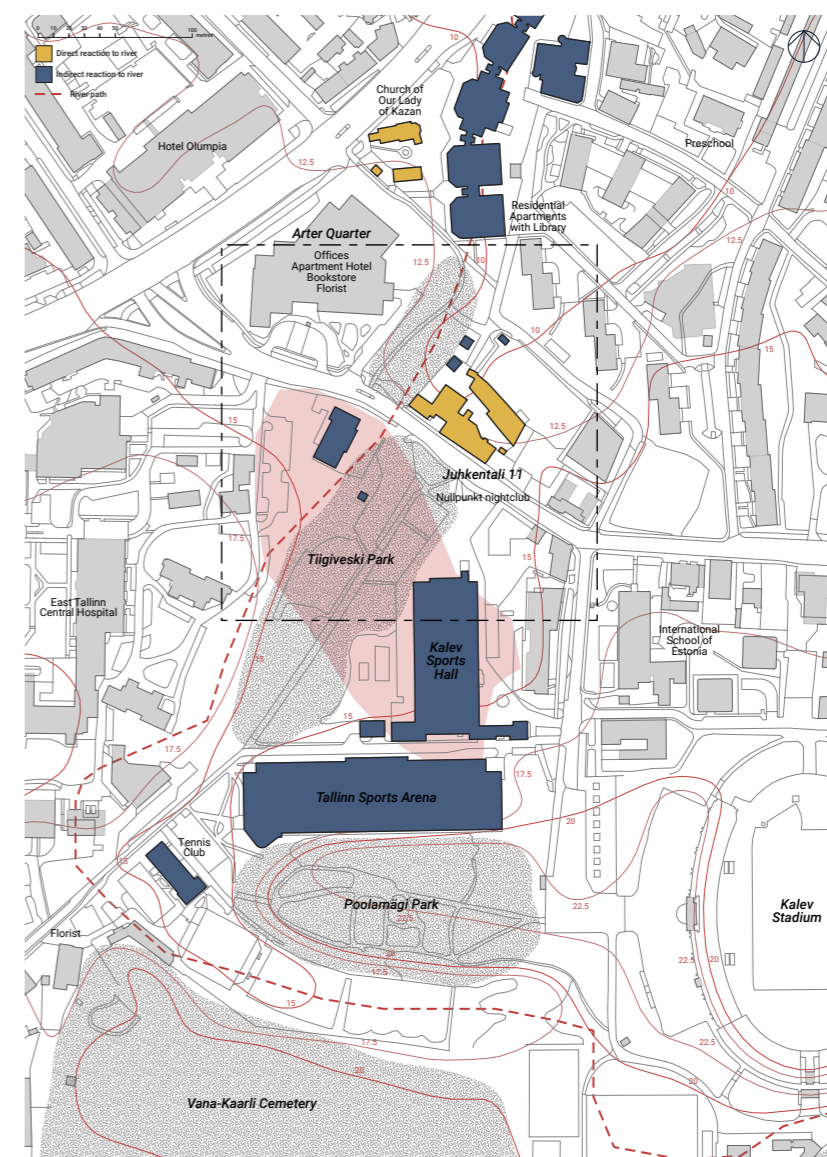
What is the architectural question at hand?

can architecture stand on its own without the programming? people contribute to the building.

[try to make the architectural act require the activity to function.]

a deliberate building of perpetual unfinishedness?

Thoughts and internal notes largely focus on the formulation of the design assignment, between formulating the project's driving concept and understanding the site at Tiigiveski.



Site constraints: Juhkentali 11 and Tiigiveski Park?

stream, pond, none, stagnant

programming? → materials? narrative of industrial & productive origins. workshops & maker spaces.

ideas generated in the centre can be "tested" and experimented on Tiigiveski Park & other identified sites along Harjupea.

Who could be a help making body for TM?

the area has quite a number of school-aged children for sports for school. "a place for parent-by".

write public read, market workshops by material, paper, wood, soil, textile, cafe, exhibit - displaying of suited, market space - for local market, garden - have to tend to.

A RANGE OF MAKER & CREATIVE SPACES ARE BUILT TO GENERATE SPATIAL ATTACHMENT & SPATIAL AGENCY THROUGH THE PROCESS OF MAKING & UNMAKING.

[making]

- 1) the in between place.
- 2) as a programmatic device
- 3) the landscape
- 4) the building.

or maybe I'm just biased for these sorts of spaces... because I like them haha

WATER - pond, stream, park, transient flows (moves) high → low.

transience: passing through or by a place with only a brief stay or sojourn. Lack of passing-by programming. The state or quality of being transient. [people goes to places].

temporary, brief, fleeting. e.g. the comedy club in bar.

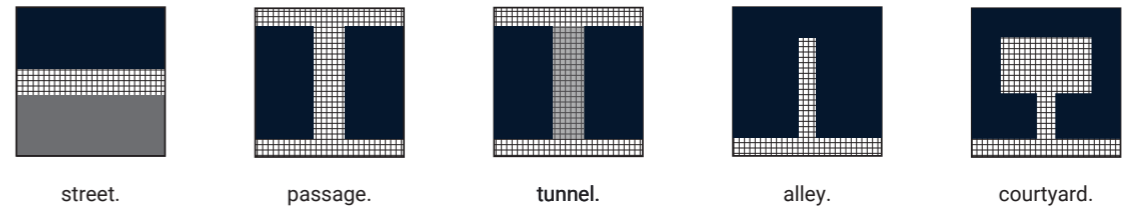
permanent, lengthiness, endurance, transience. univers: perhaps the project celebrates the transient nature of the city?

What are the typologies of transience? [highway] you can't pass by them. [pavement] passageways, tunnels, courtyard, alleyways.

Juhkentali 11 having a passing-by nature through its form of courtyard/passageway.

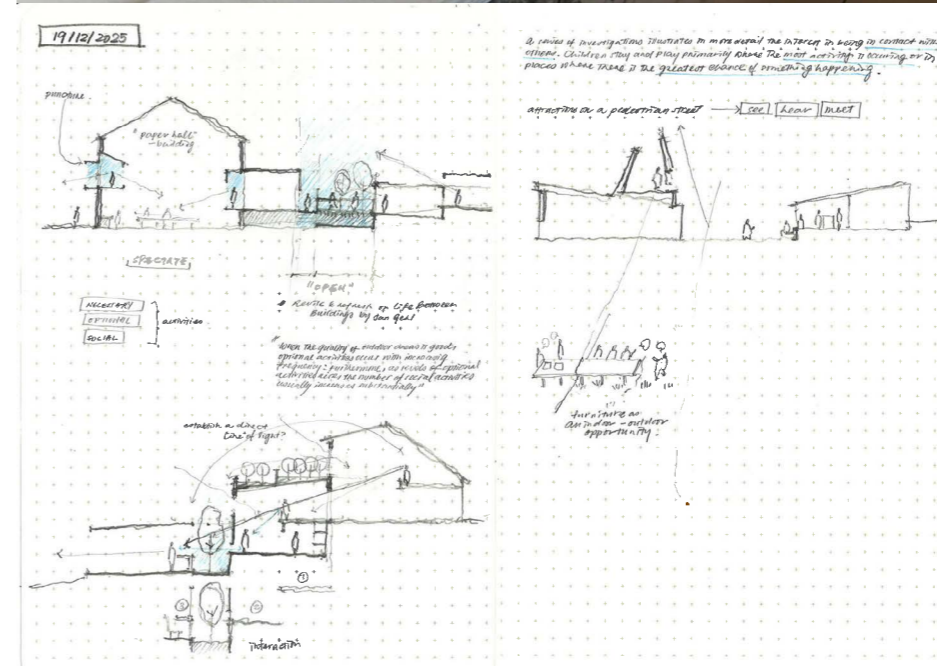
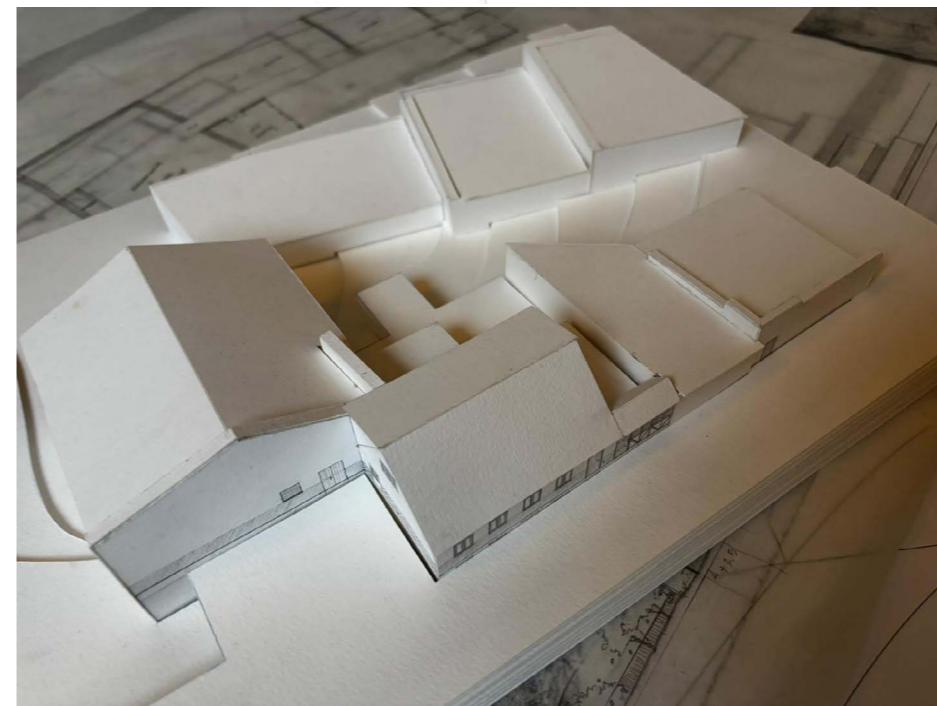
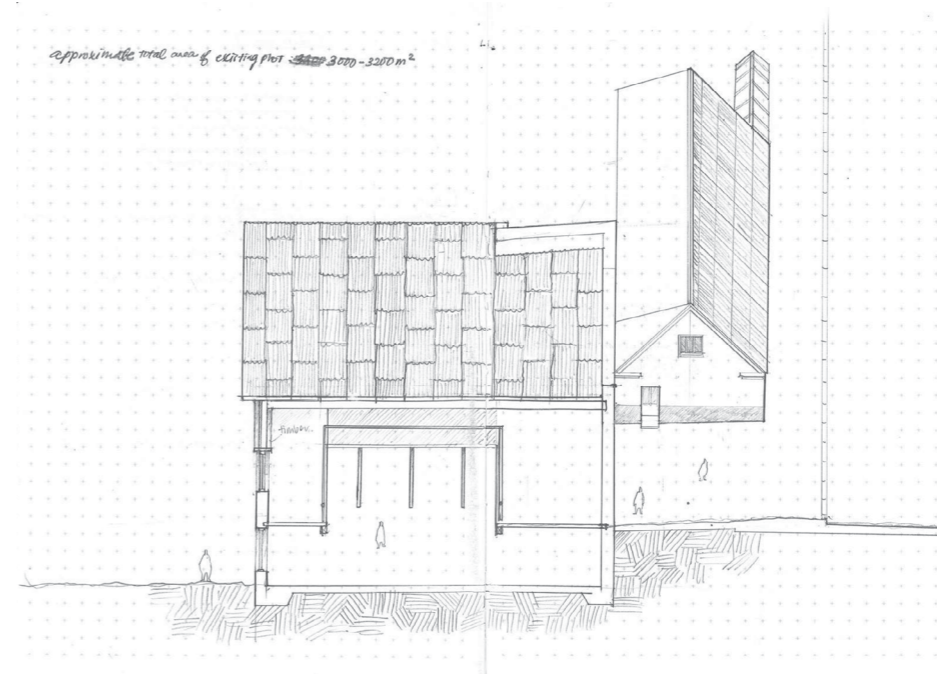
pavement, street, passage, passageway, tunnel, courtyard, pond, alleyway, garden.

transience as a design language → design them into programmes of staying.



03
Preliminary Design
Development

(W2.6-2.10)

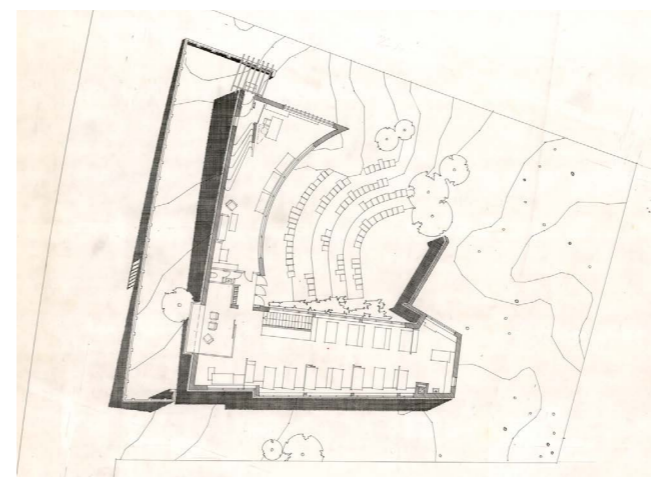
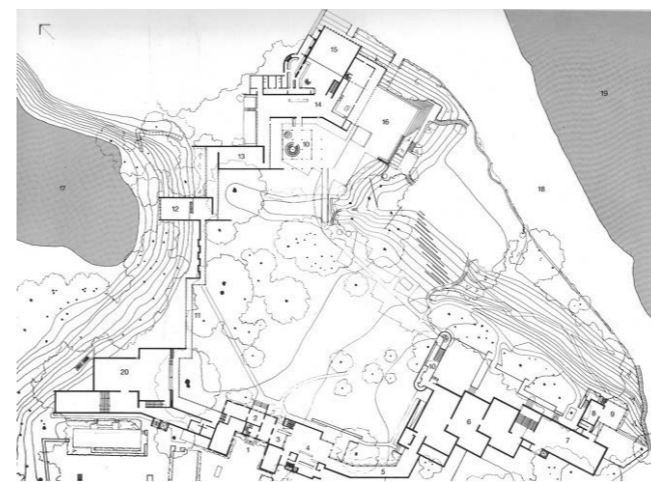
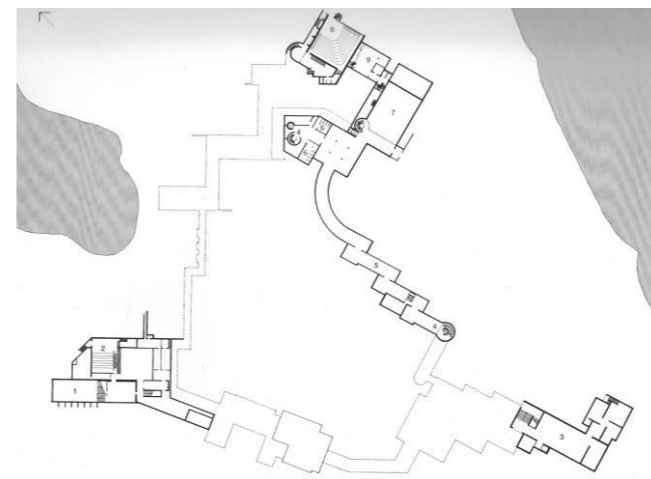
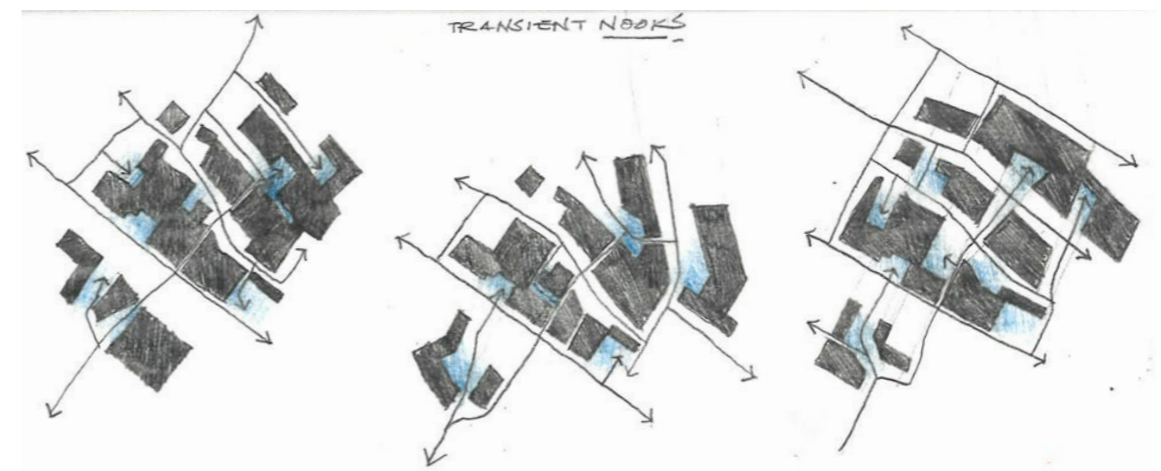
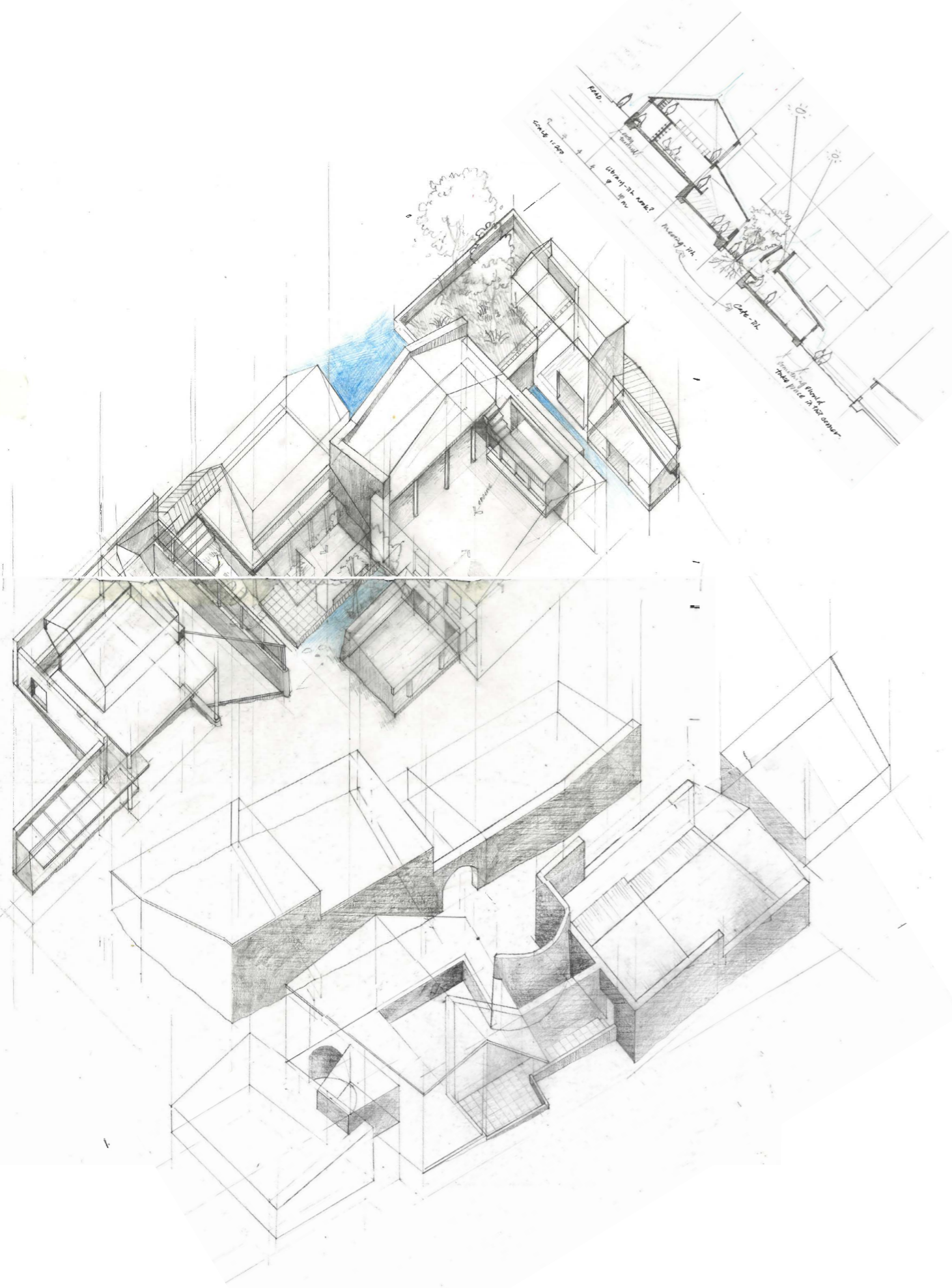


W2.6

The site at Tiigiveski is further analysed through the method of tracing. Due to the subtle topographical differences still present at the site, a paper model was constructed to understand the building as it currently sits on the ground.

A series of speculative sections were then drawn based on this volumetric model. Floor heights were drawn based on speculation derived from positions of doors and windows. The drawings served as a strategy to not only capture the site's formal construct, but also its atmospheric condition.

These sections enabled the basis of working towards a design, by iterating spatial relationships and relationships between ground and space.



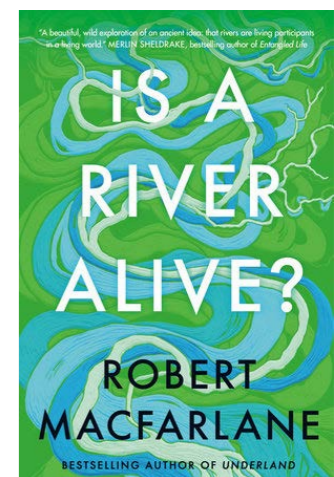
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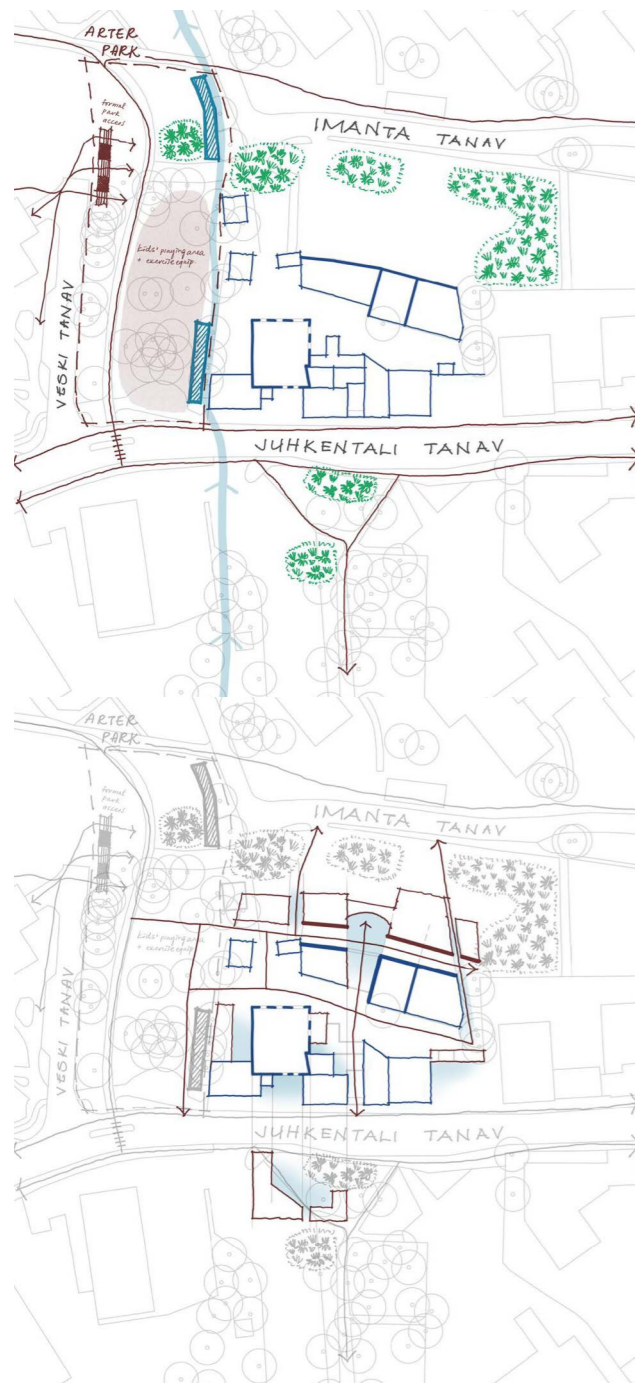
Initiated the growing drawing, which is an axonometric projection of the site acting as a basis to test design ideas in a volumetric approach. The initial approach was to play around with the paths of going through the site, and manipulating volumes to create nooks of gathering (see top).

Looked briefly into a couple of precedents whereby the building is built with particular attention to the ground in its topography. The first precedent was the Louisiana Museum of Modern Art in Copenhagen. The building is similarly placed in a park. It also similarly building upon an existing building, Villa Louisiana. It reveals several strategies which might inform a methodology of building with the landscape: by preserving existing trees (and building around them), rejecting monumentality, playing with topography and variation of space, and using windows as frames of surrounding landscape. The plan reveals this intentional manoeuvring of built space with the ground and trees.

The second precedent was Studio Aalto, located in Helsinki. The plan reveals the integration of a functional landscape, allowing the topographical difference to guide the formal construct of space and becoming a temporal amphitheatre.

Started reading "Is a River Alive" by Robert Macfarlane, who argues that rivers ought to be viewed as living, legal entities. Perhaps that could become the approach of the project, by treating the River Harjapea as a friend to be re-encountered.





W2.8

This week was focused on the writing of the report draft, which helped me to find ways to consolidate design ideas into a series of broad strokes for the sake of simplicity.

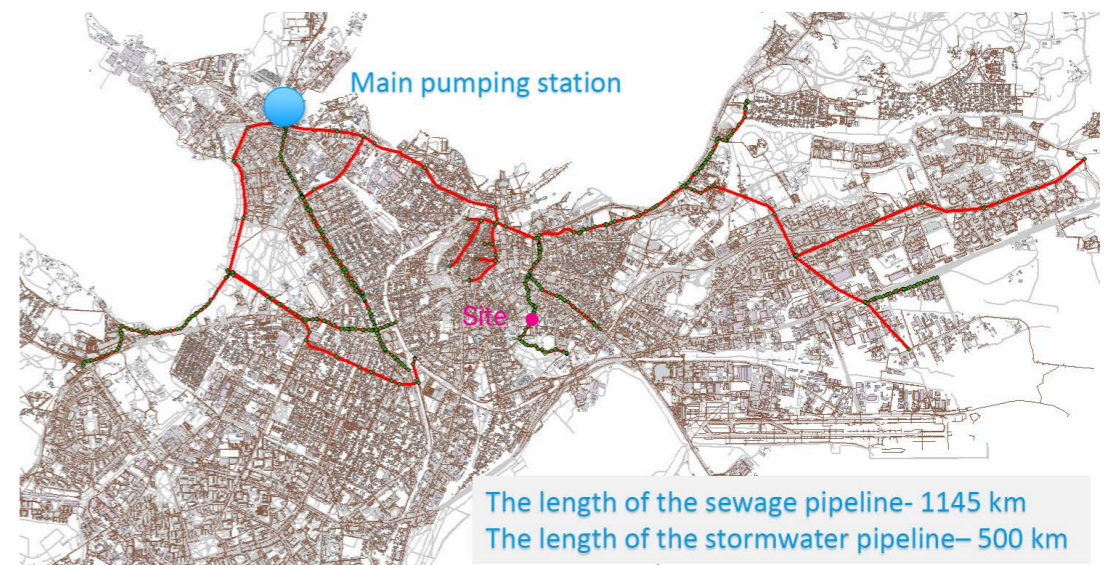
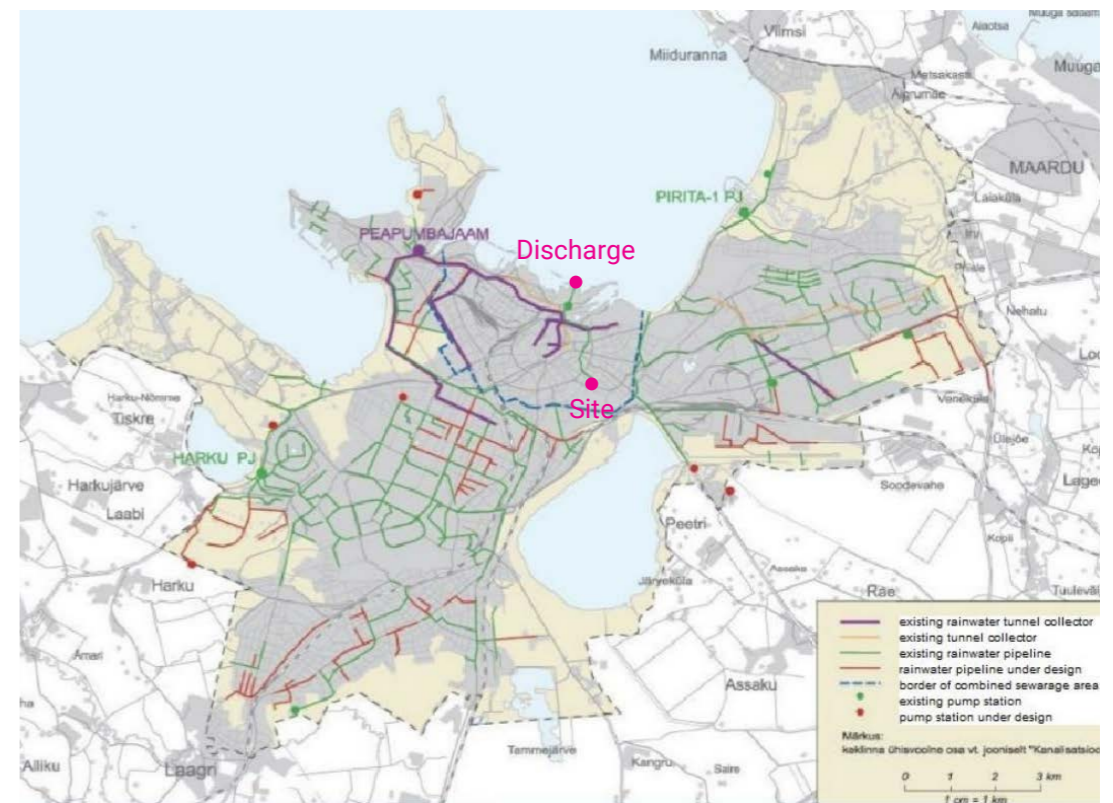
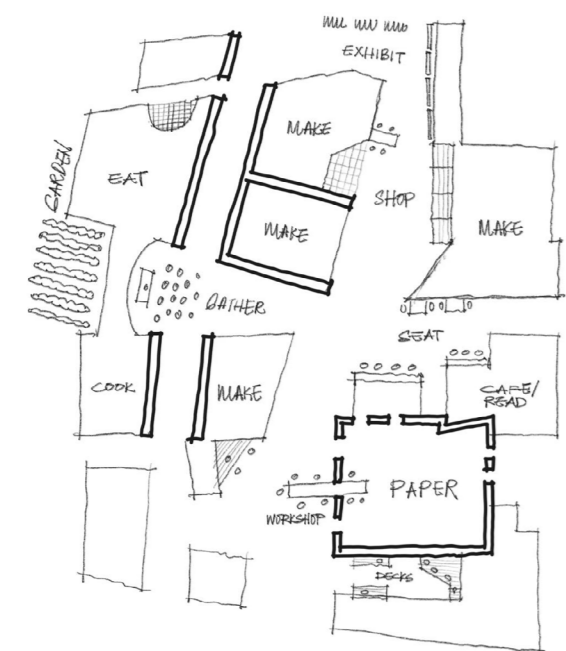
The initial idea for the project was built upon the idea of encounters due to the juggling of three scalar entities, which were the landscape, building, and pedestrian. Strategies were thus built upon 1) the encounter between the river and the city (daylighting River Harjapea), 2) the encounter between building and landscape (manipulating the existing buildings to coincide with the ground), and 3) the encounter between pedestrian and place (the creation of nooks and spaces for in-between gatherings).

Overall, I felt that the approach was still quite jumbled-up and lacked a simpler, more straightforward approach which required further thought.

Nevertheless, this week was helpful in formulating a stream daylighting strategy for the project, aided via consultation with Pierre Jennen. It became evident that the project would be incomplete without daylighting the river along this particular site, which brought along its own series of challenges -- of which, the most prevalent being that the site is situated within the confines of a combined sewage and stormwater system. Daylighting the river via conventional means would require the construction of a completely separate channel from the lake to the sea in order to properly separate freshwater and wastewater.

Then I came across recent reports whereby Tallinn is seeking to upgrade its current wastewater management systems as it is unable to deal with current stormwater capacity. Moreover, 80% of collected stormwater is sent to the main wastewater processing plant in Paljasaare instead of being discharged directly into the sea. Stormwater which does get discharged to the sea often bring along with it a large amount of sediments and impurities (see right). With increasing unpredictable rainfall volumes, the stream daylighting strategy is proposed to become a stormwater management strategy instead, whereby instead of using water directly from the lake, the stream can be "daylighted" as a catchment area of stormwater from the site's immediate vicinity. This is a similar strategy to the canals built at Kadriorg Park:

"Stormwater at Ülemiste junction is directed to Kadriorg Park. The historical circular canal in front of Kadriorg Palace was reconstructed and stormwater facilities, a cascade with five levels, a pond and stormwater outlet into the sea were built in the course of the reconstruction work" (Tallinn City Government, 2014).



The length of the sewage pipeline- 1145 km
The length of the stormwater pipeline- 500 km

Tallinn sewer system unable to handle torrential rains, flash flooding

NEWS
By Eio Ellermaa, Vahur Lauri
11.07.2016 20:08

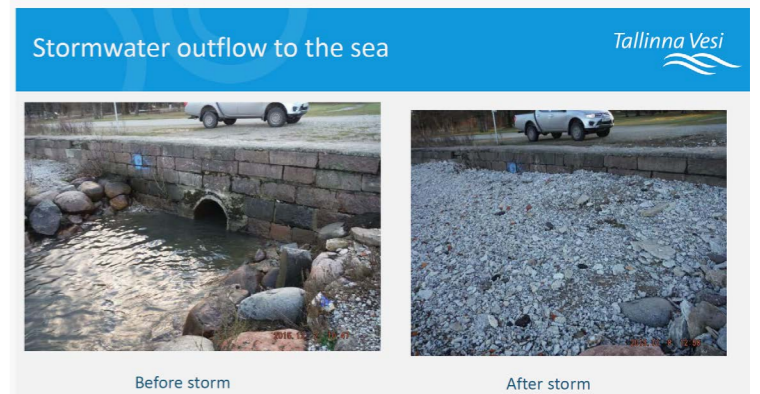


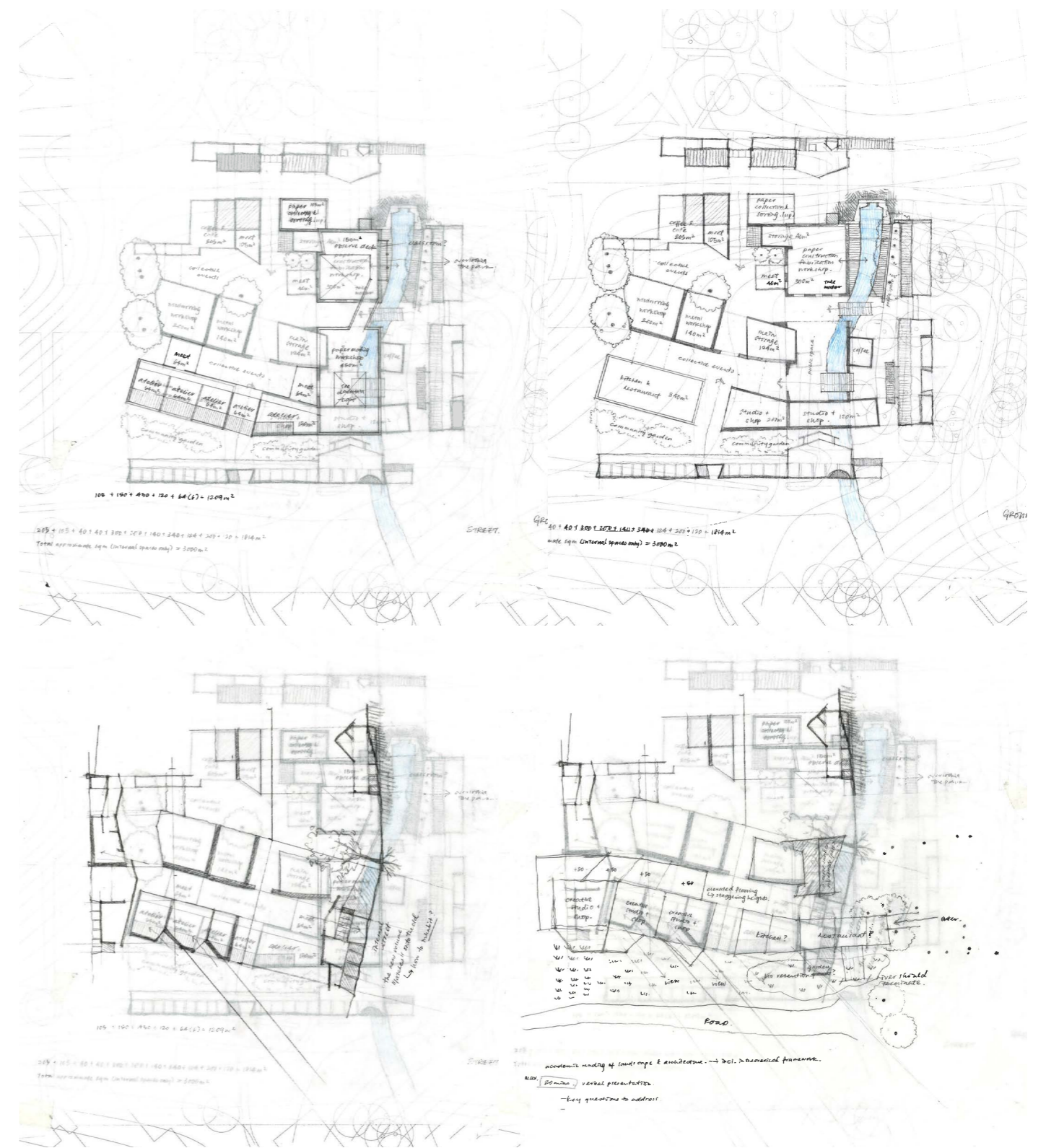
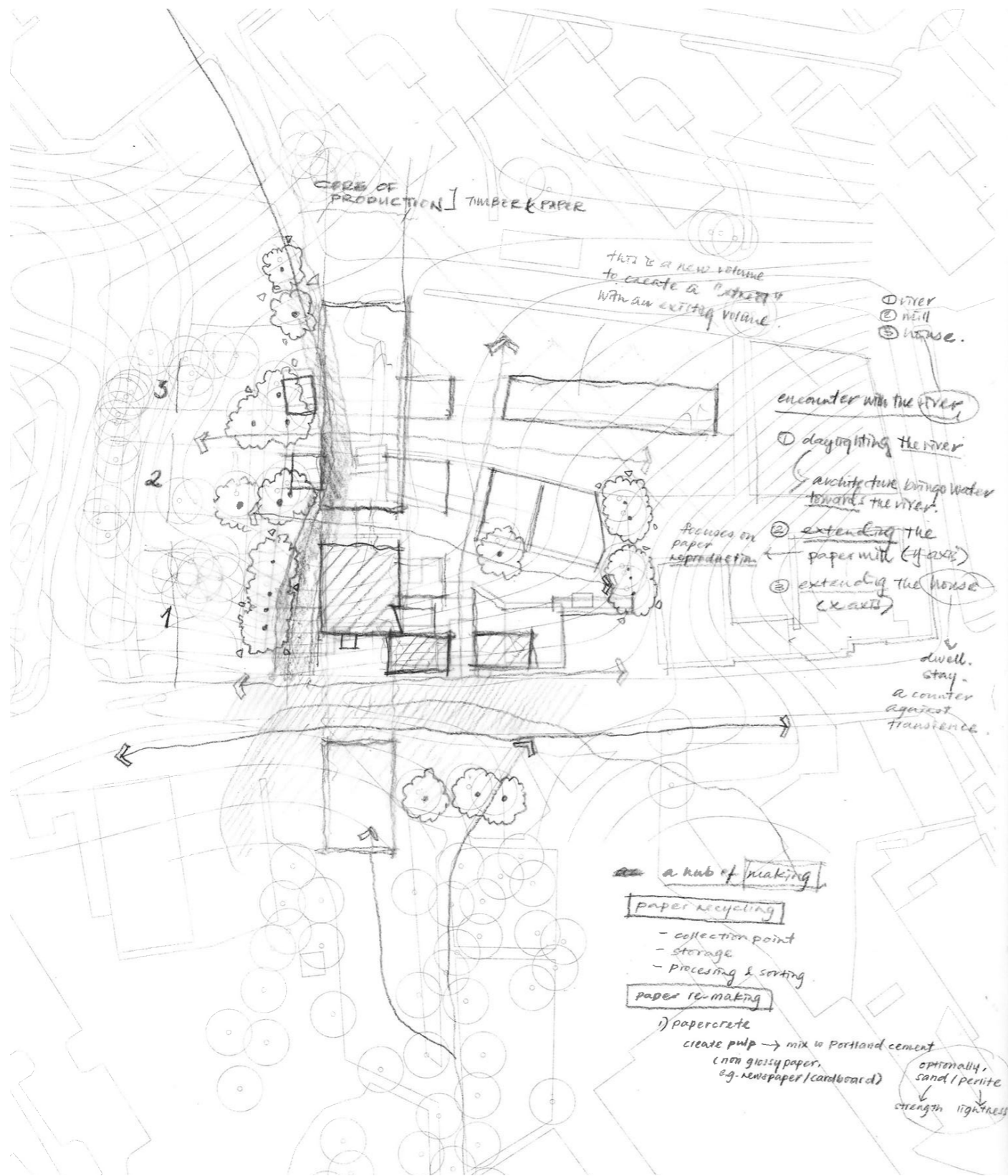
Tallinn hit by heavy rainfall and extensive flooding Tuesday night

NEWS
ERR
26.07.2023 11:27



Flooding on Reidi tee in Tallinn, overnight July 25-26, 2023. Source: Tallinn Transport Board traffic camera footage.



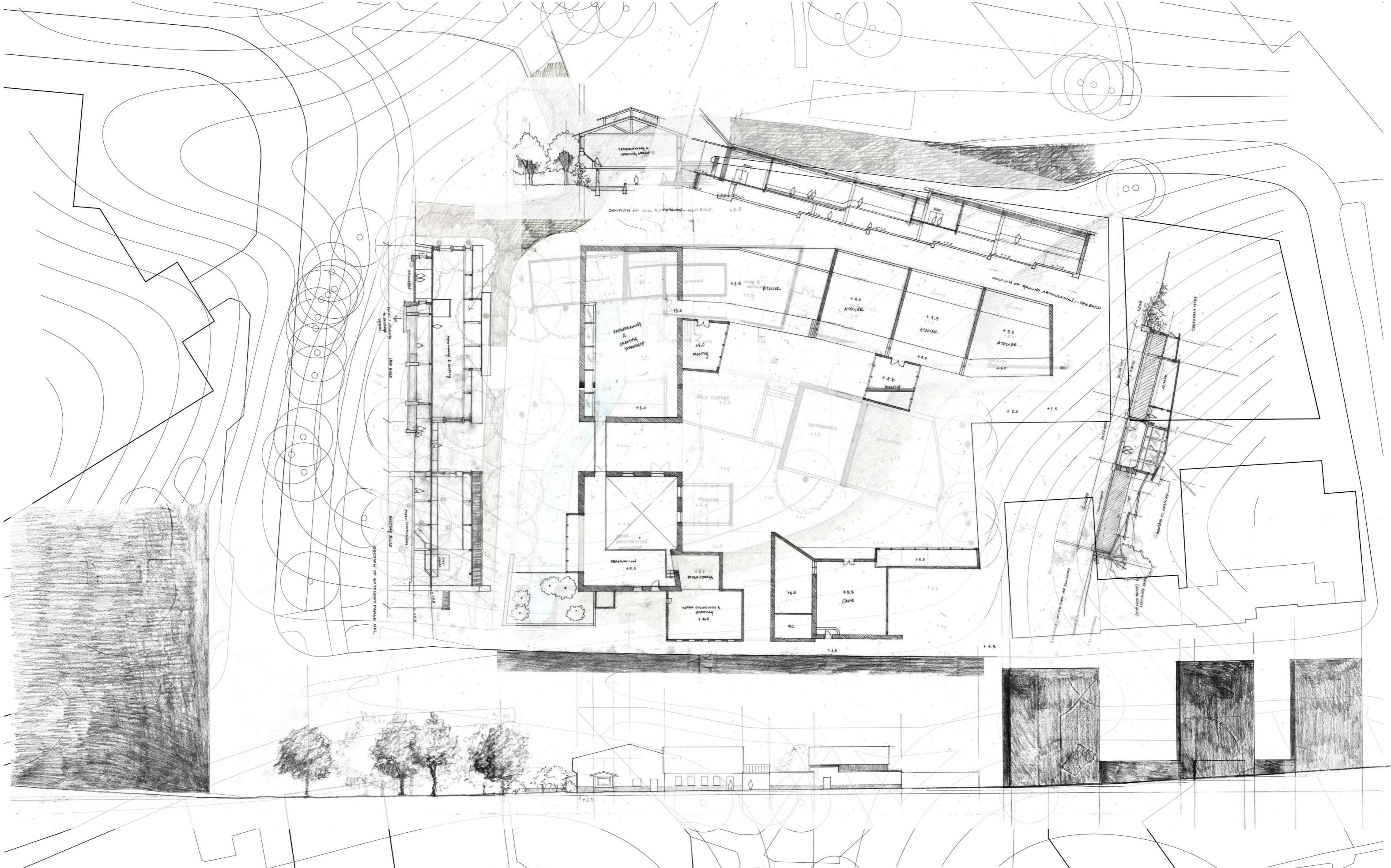


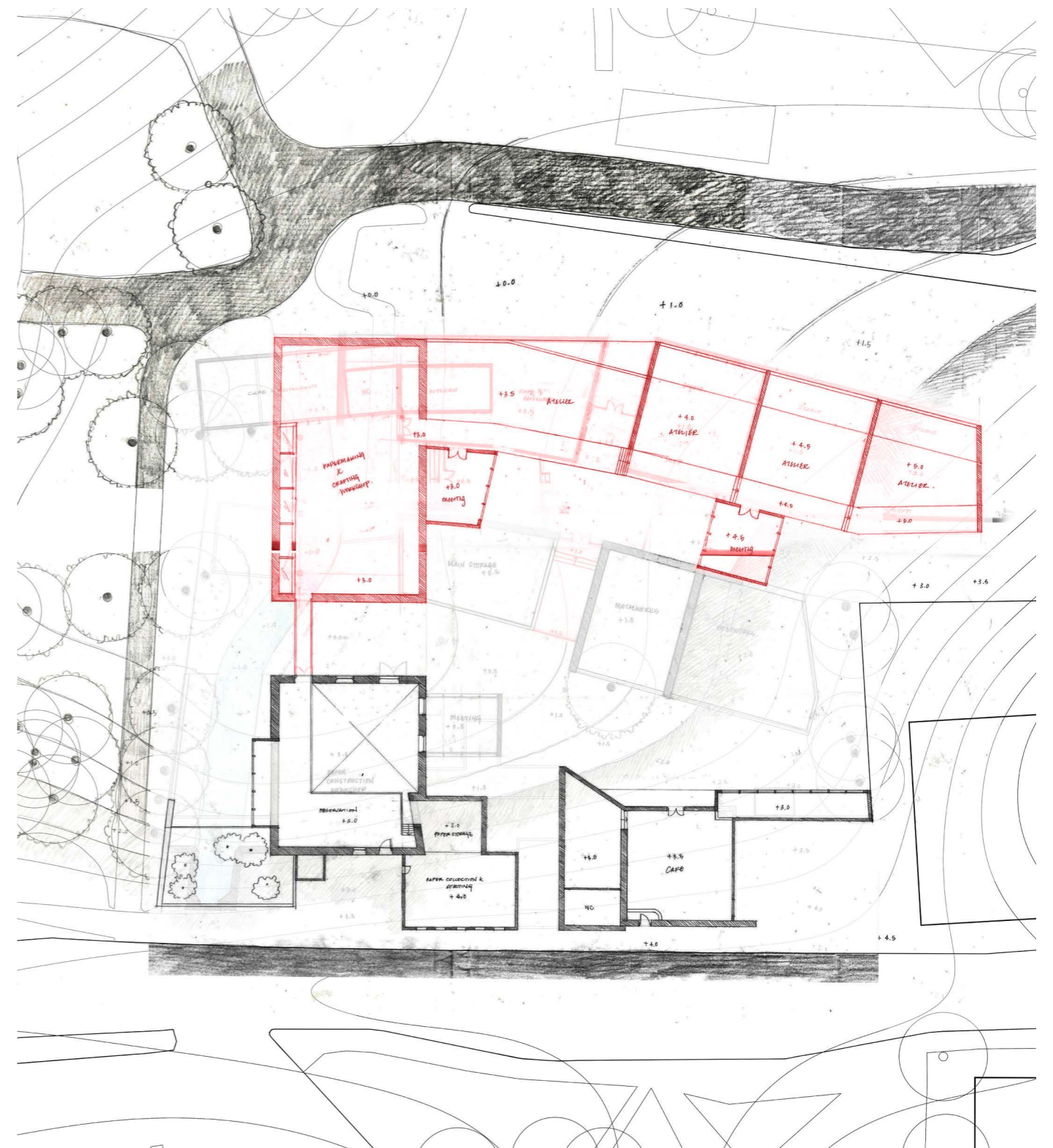
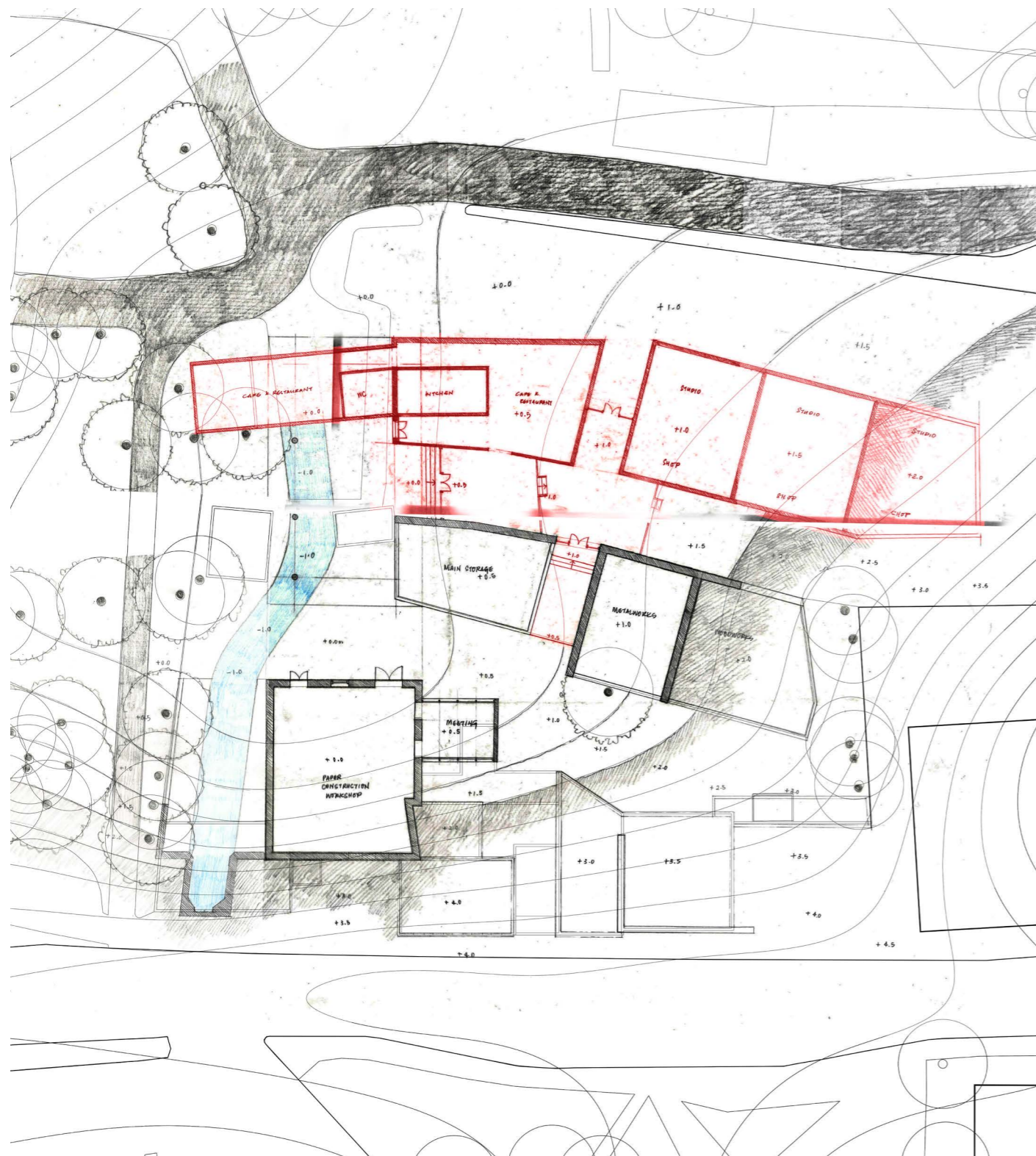
W2.9

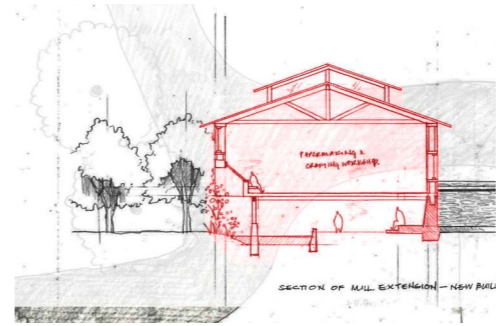
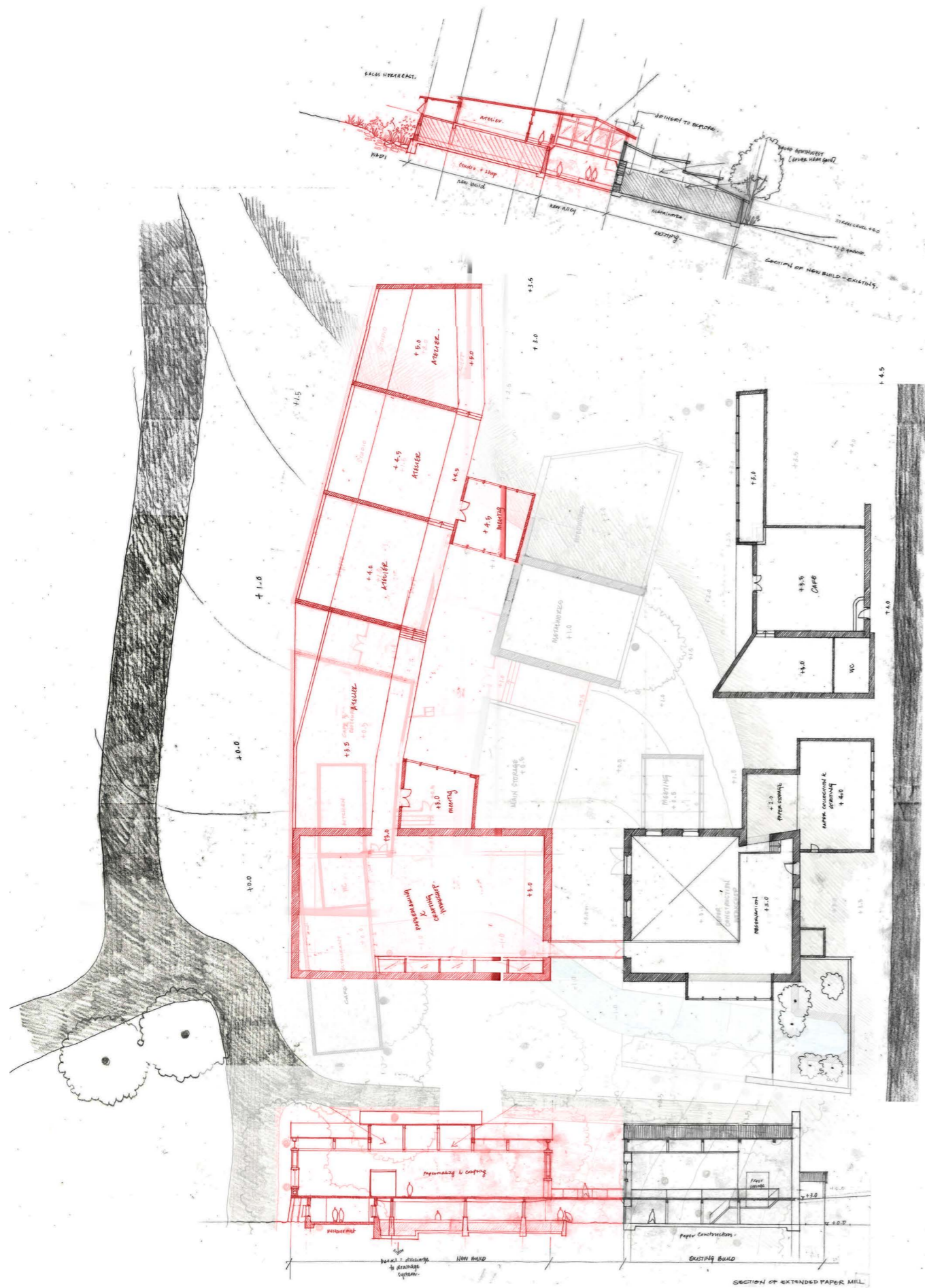
Focused on simplifying the project approach and consolidating loose ends, the project now stands as an encounter between the river and the city. This is formed by two main moves, firstly being the reintroduction of the river back to the surface through its original course. The second design direction is centred on the Tiigiveski paper mill, and looking into both an adaptive reuse and extension of the mill – adapting the mill to become relevant in the present context yet retain its historical legacy. Thus the programme is now shifted into a sort of paper waste “re-making” hub, taking paper waste and programmatically centred around its reuse in crafts, construction, and gardens (this decision was made after a report which showed that Estonia largely ships its paper waste to neighbouring countries for processing).

Moving forward, construction methods will take significant reference from “Building with Paper: Architecture and Construction” by Knaack, Bach and Schabel.

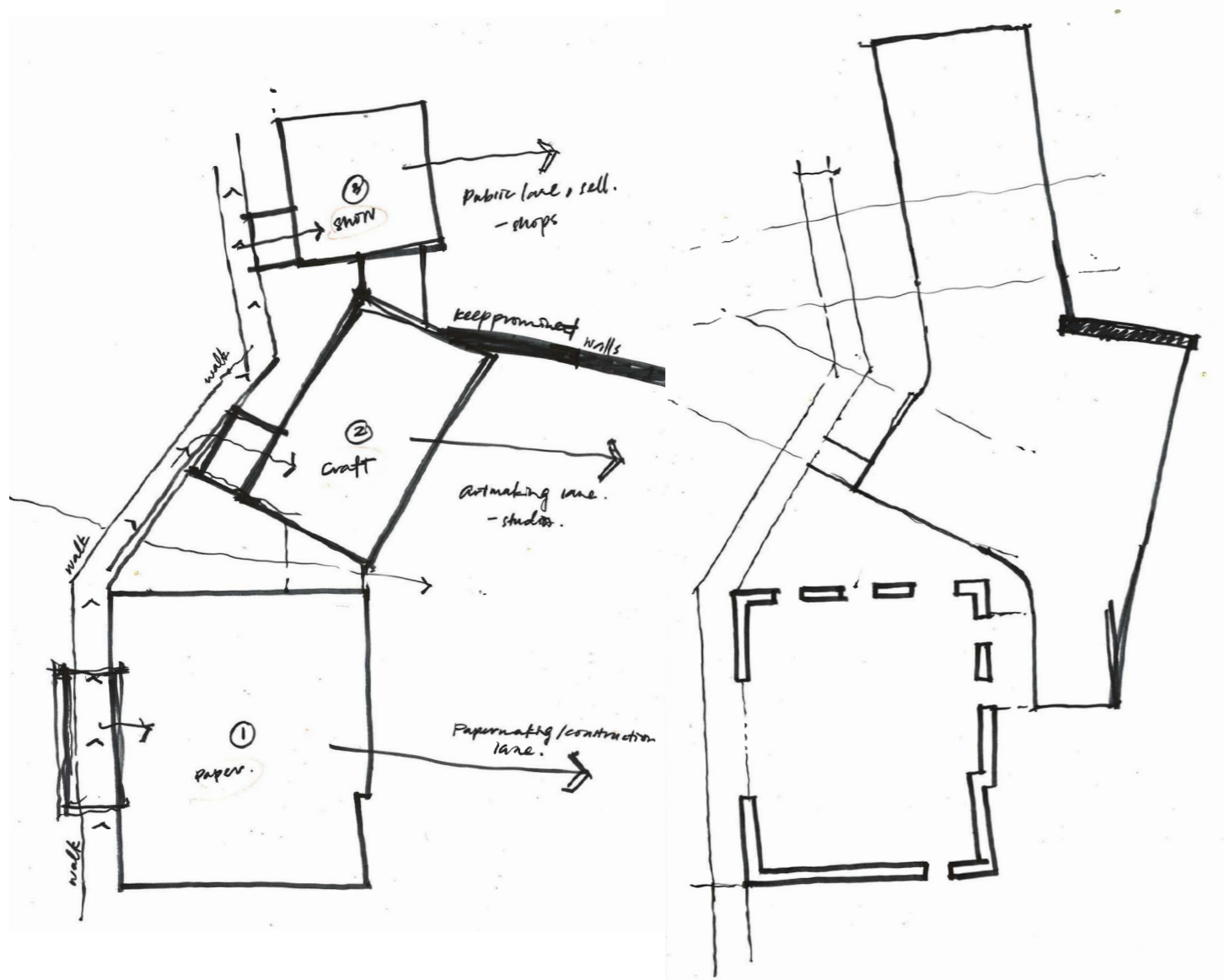
Moving towards the A1 presentations, this week was focused on the production on a first series of technical drawings for the design as it currently stands, with particular attention on planar and sectional projections.







Focused on the configuration of the extension of the paper mill and the programmatic functions of the new and existing volumes.



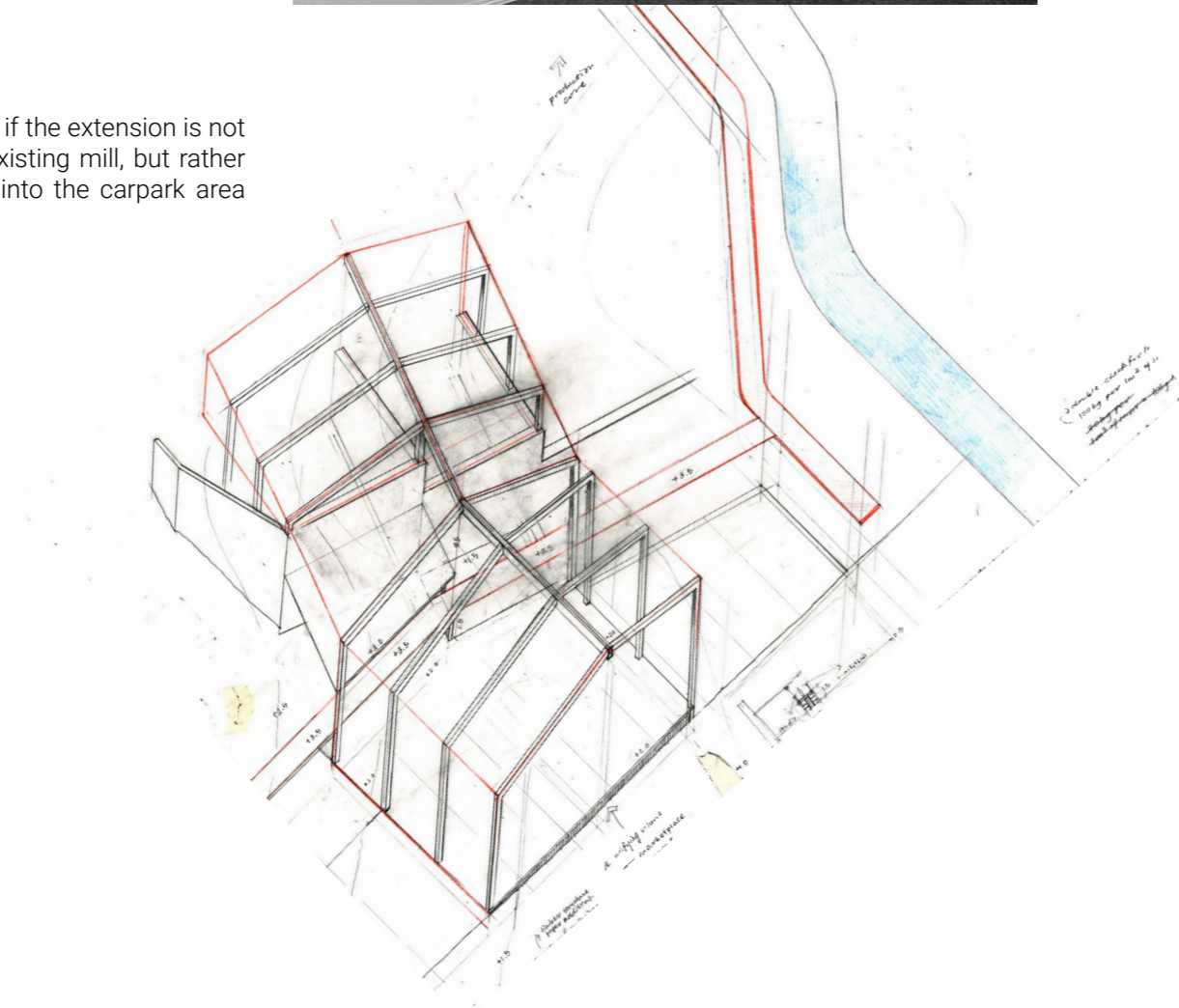


W3.3

Tested the iteration on a paper model. The new extension felt too jarring and awkwardly placed, further diminishing the presence of the original paper mill instead of complementing it.

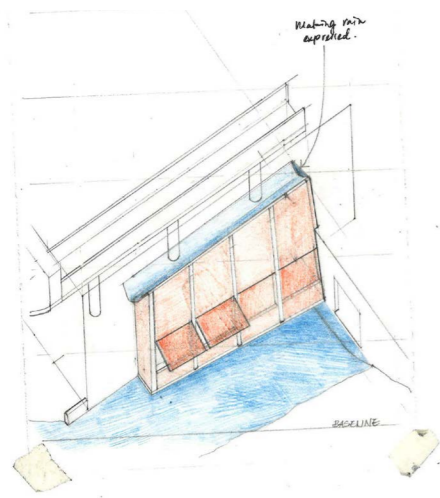
W3.4

A change in direction. What if the extension is not directly connected to the existing mill, but rather a mirror of it encroaching into the carpark area behind the site?



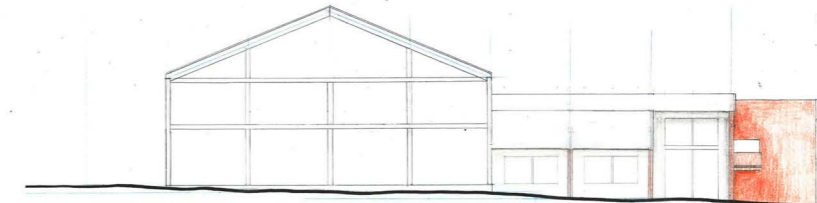
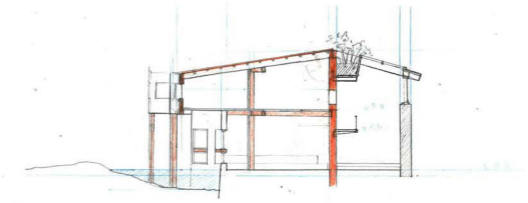
W3.5

The new volume mirrors the form of the original paper mill but straddles the existing walls, unifying the random volumes while reintroducing the river's influence by adhering to its course.



Water pit applied.

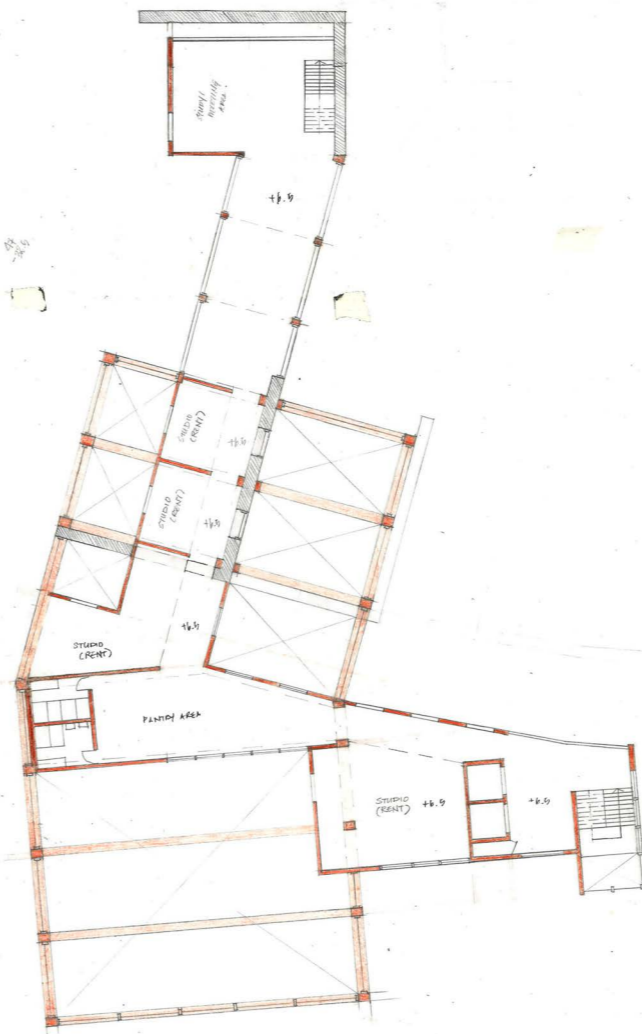
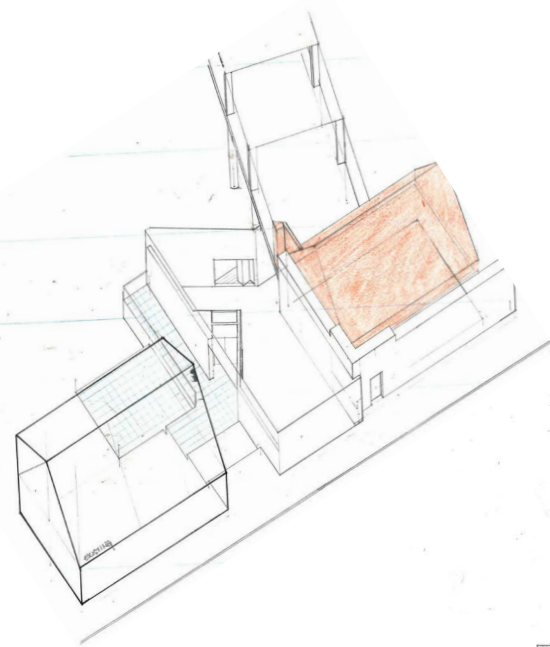
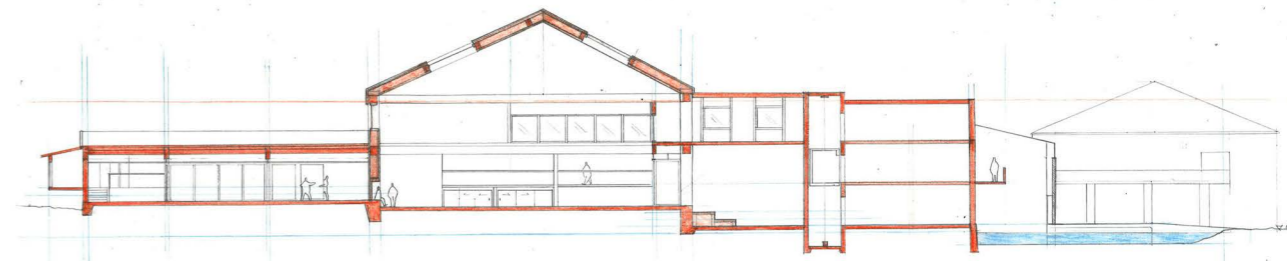
BACKLITE



External envelope egyptian

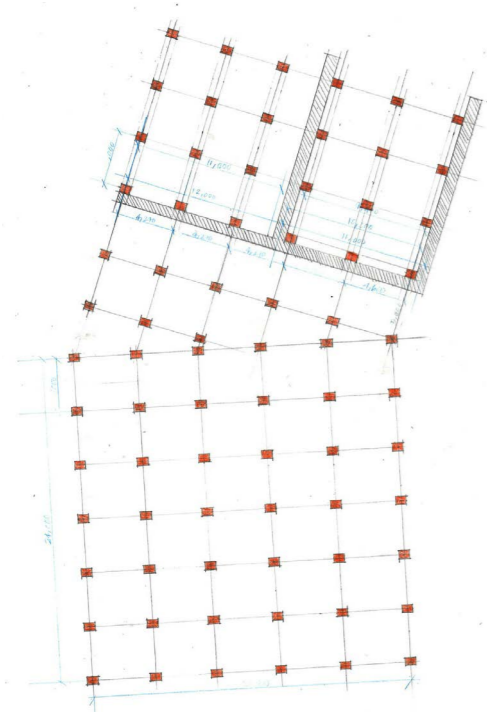
Water pit arrangement

SECTION

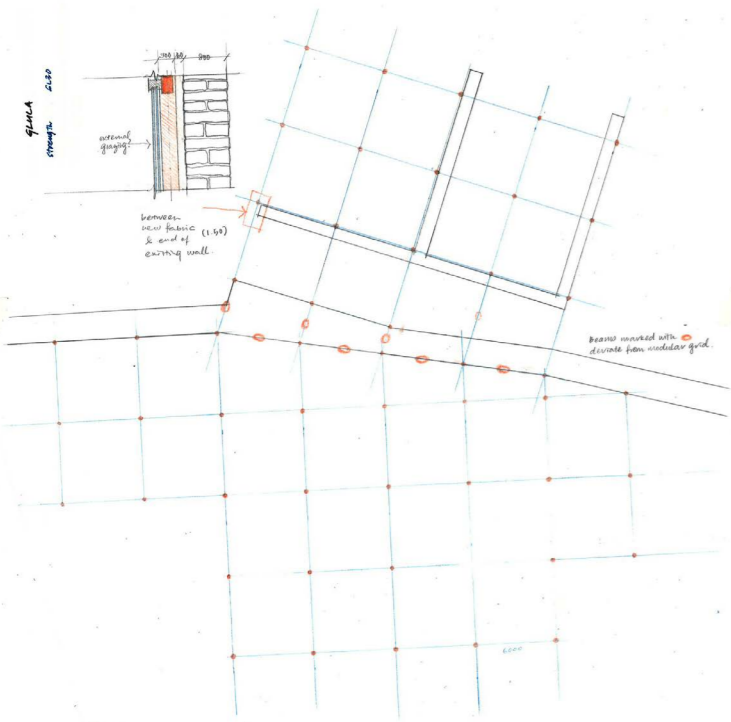


New, comprehensive floorplans inserted with programme, with explorations done in sections, elevations, and intriguing corners (axono).

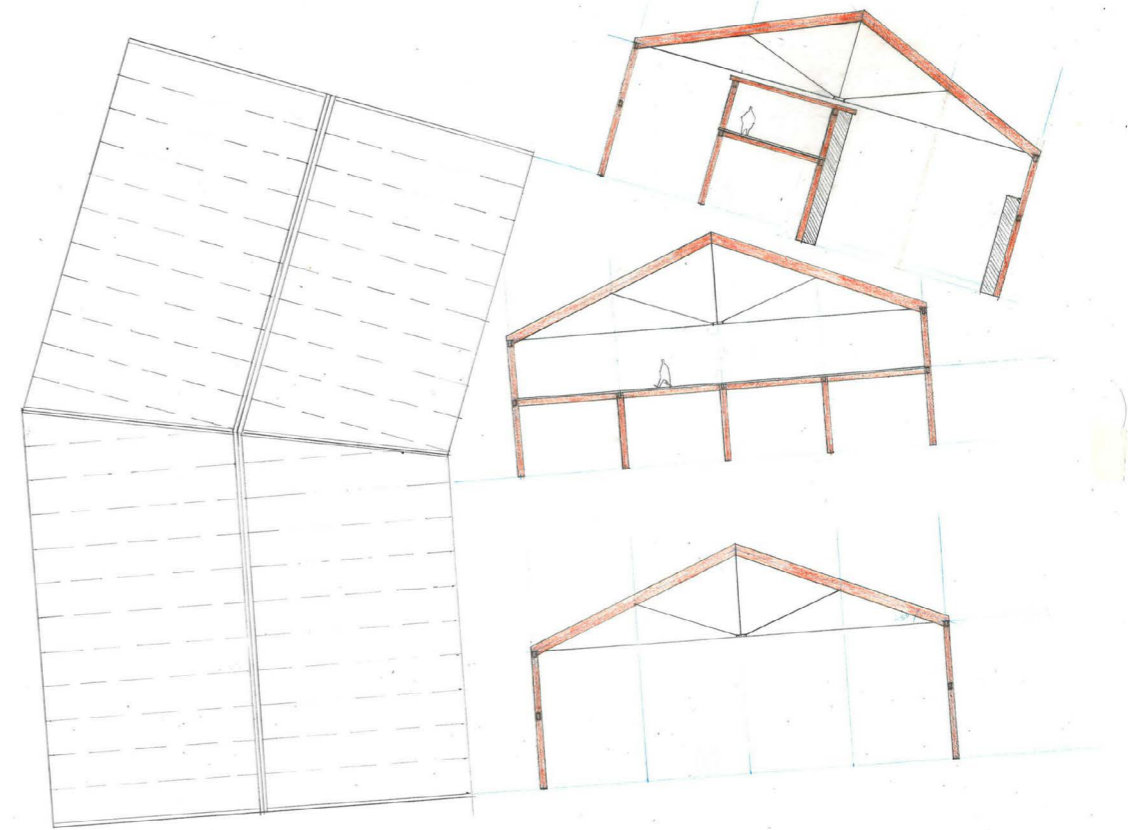
Explorations on structure. Initially wanted structural timber, but due to span constraints, decided to go with glulam post-and-beam (with reference to The Glulam Handbook, Volume 1 by Swedish Wood, published in 2024).



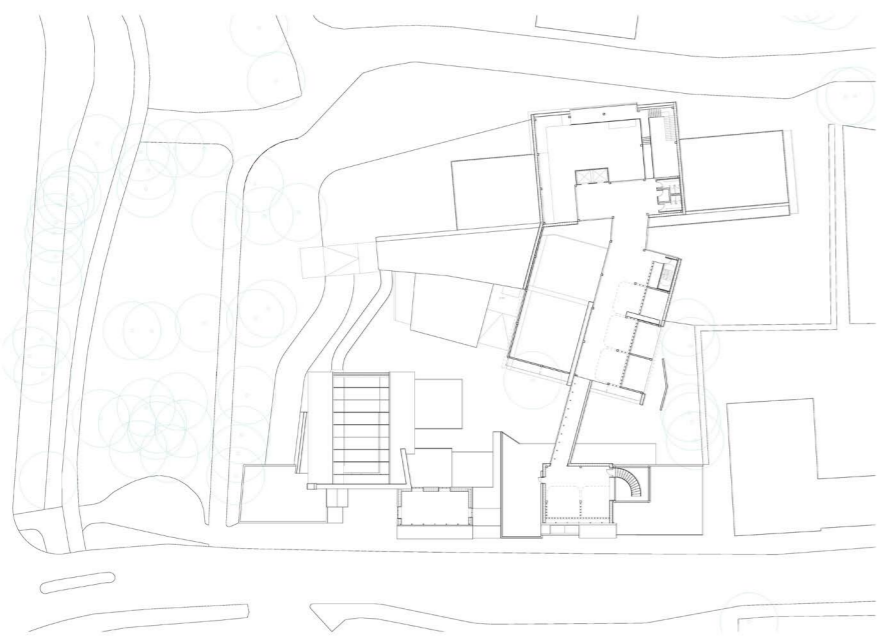
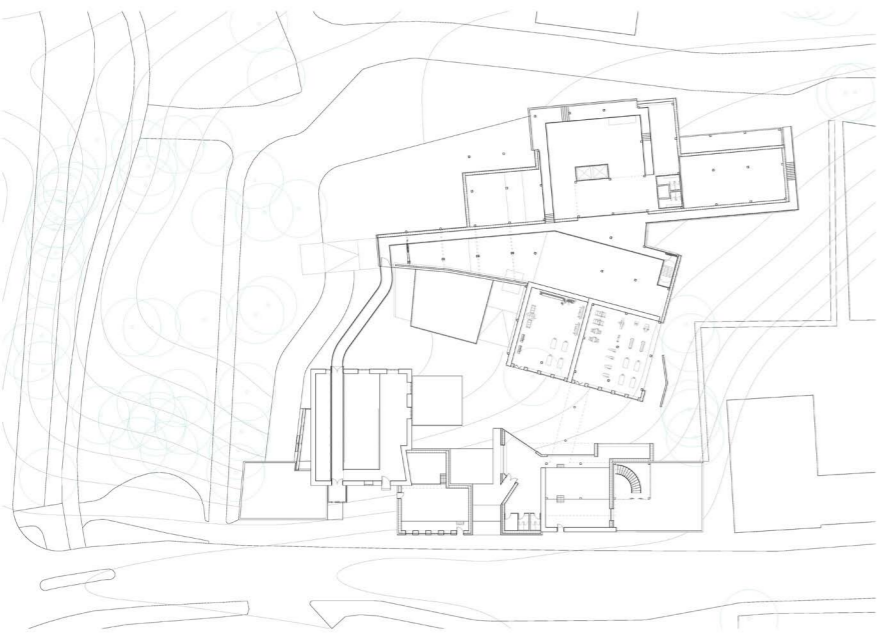
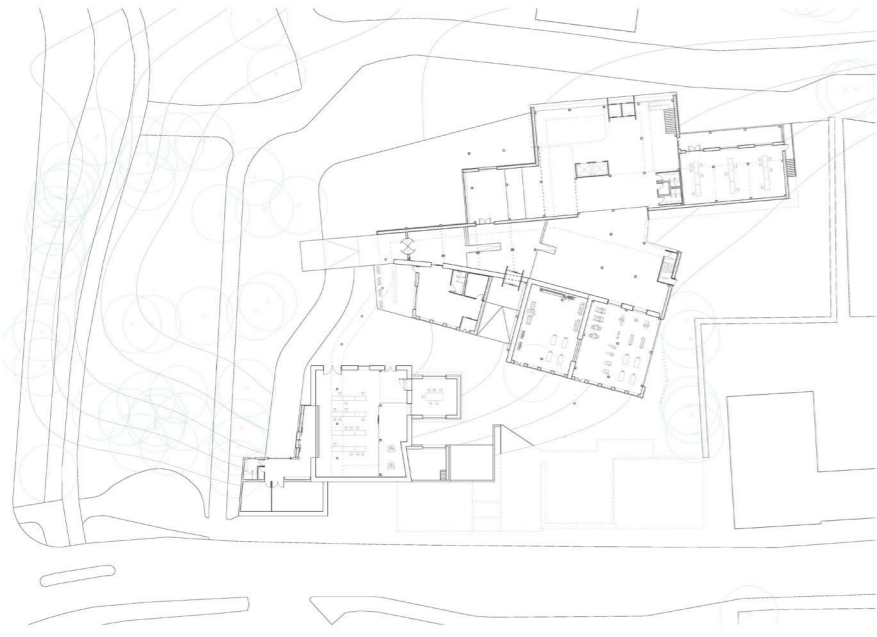
Structural timber system forming a very dense column grid.



Glulam system forming a more functional, material-efficient space.

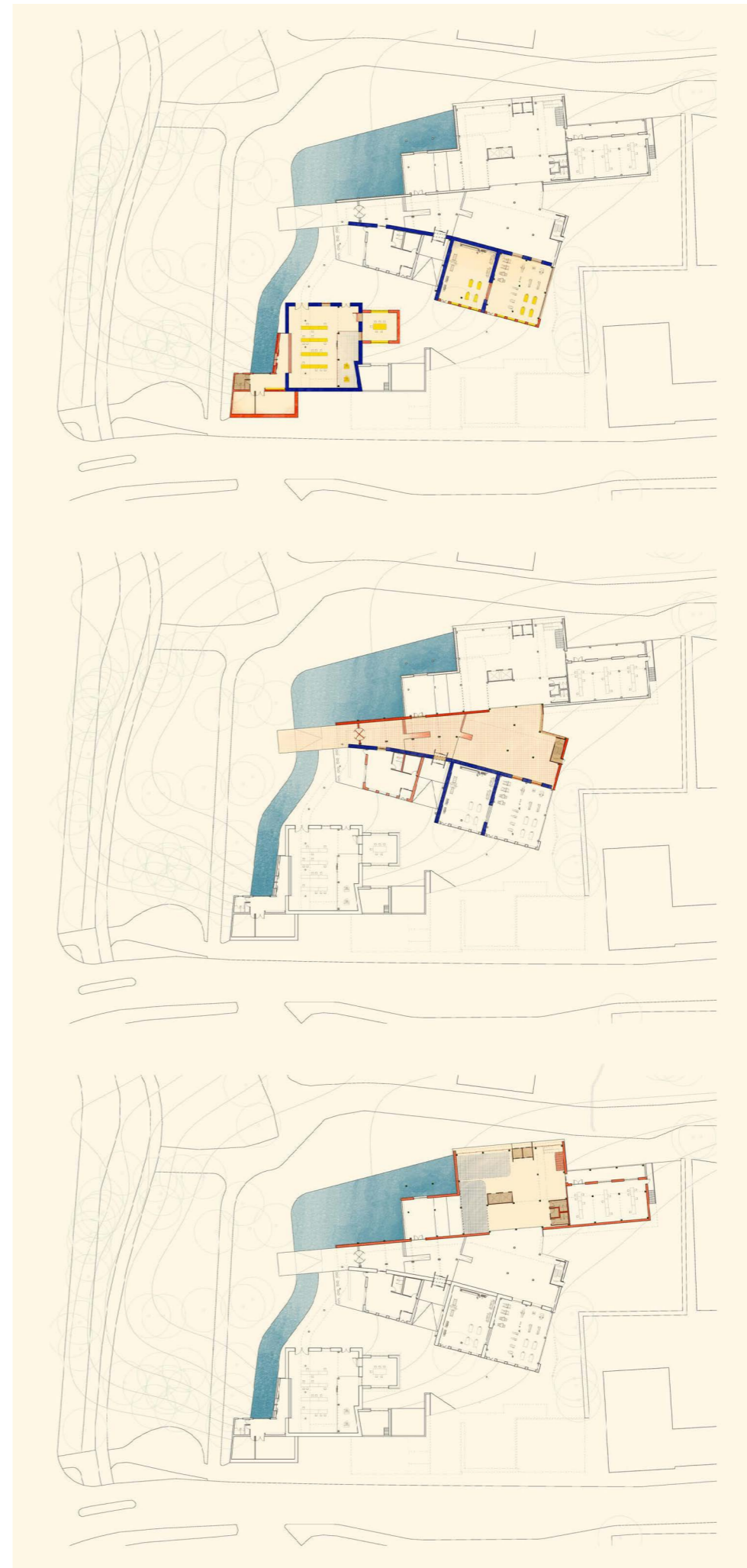


Adapting a suitable roof system and its configuration throughout the new extension.



W3.9

Produced CAD floorplans and refined digital model towards design finalisation for A2 examination.

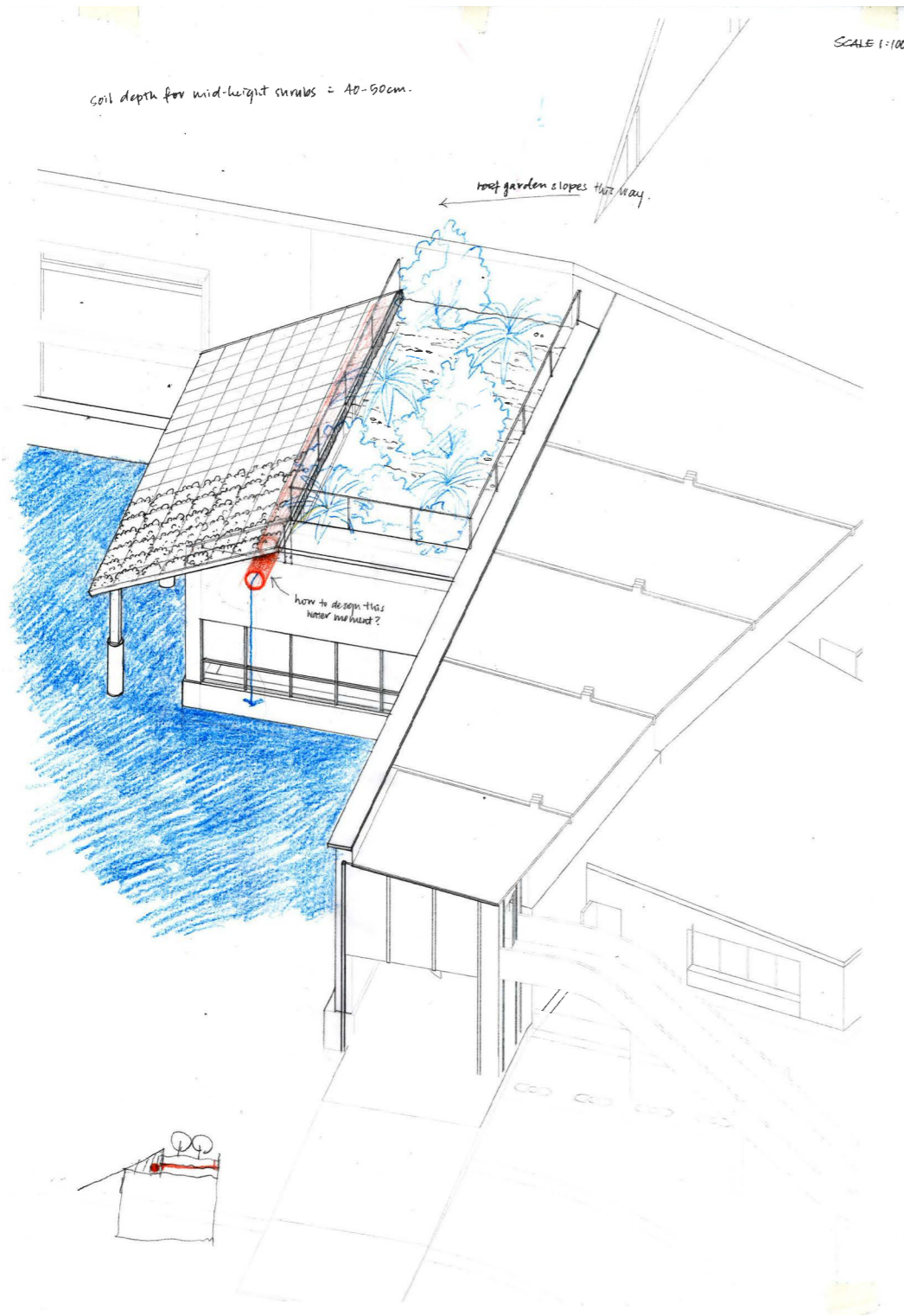


Testing out some rendering techniques

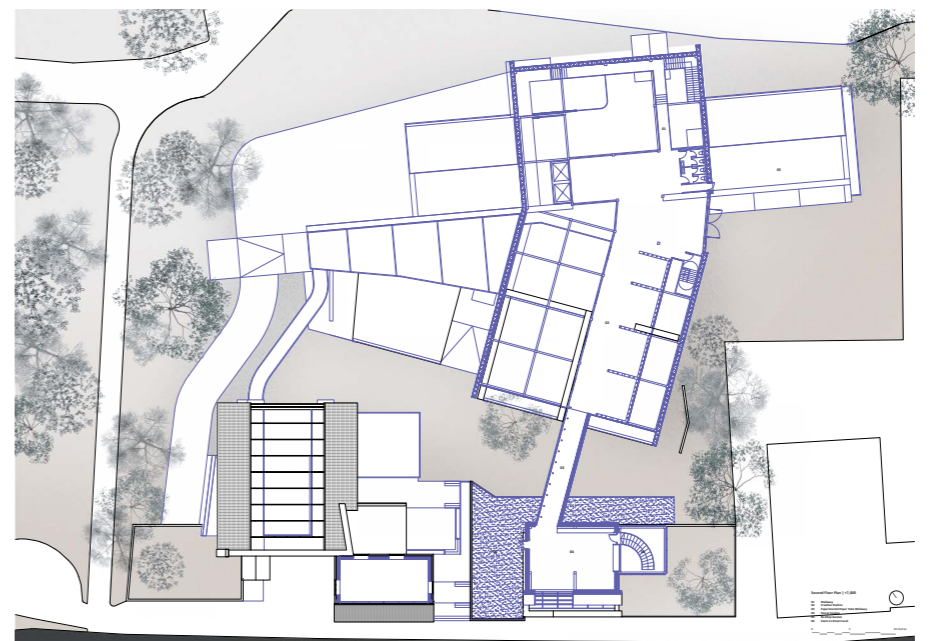
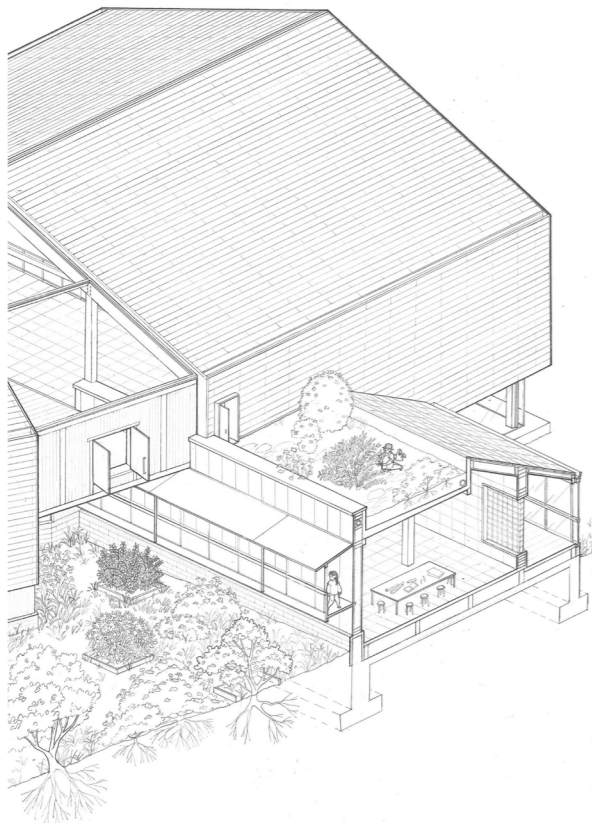
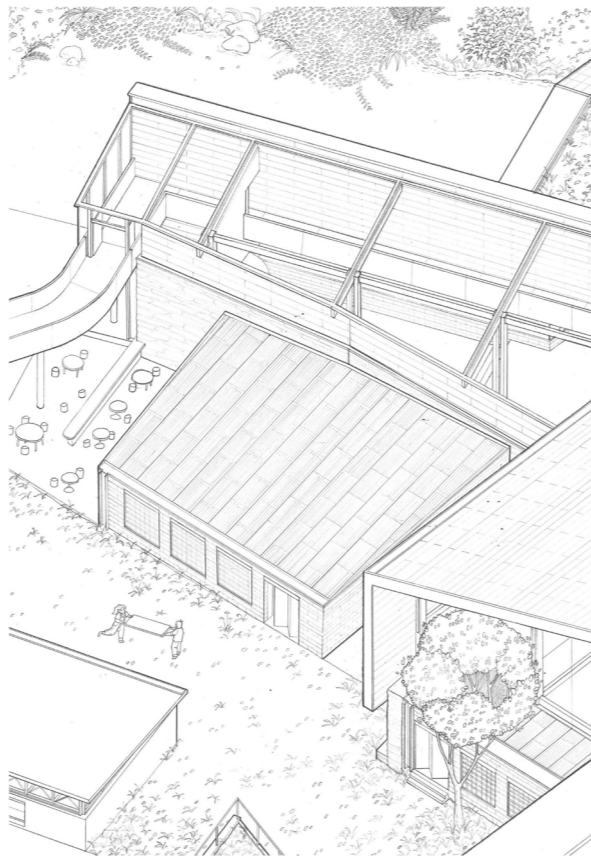
W3.10

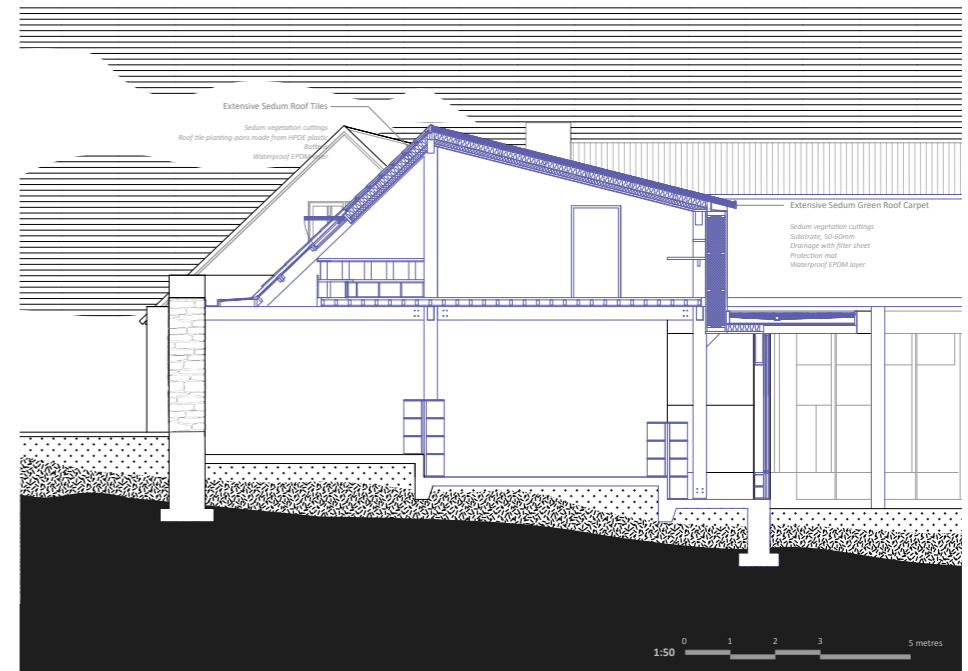
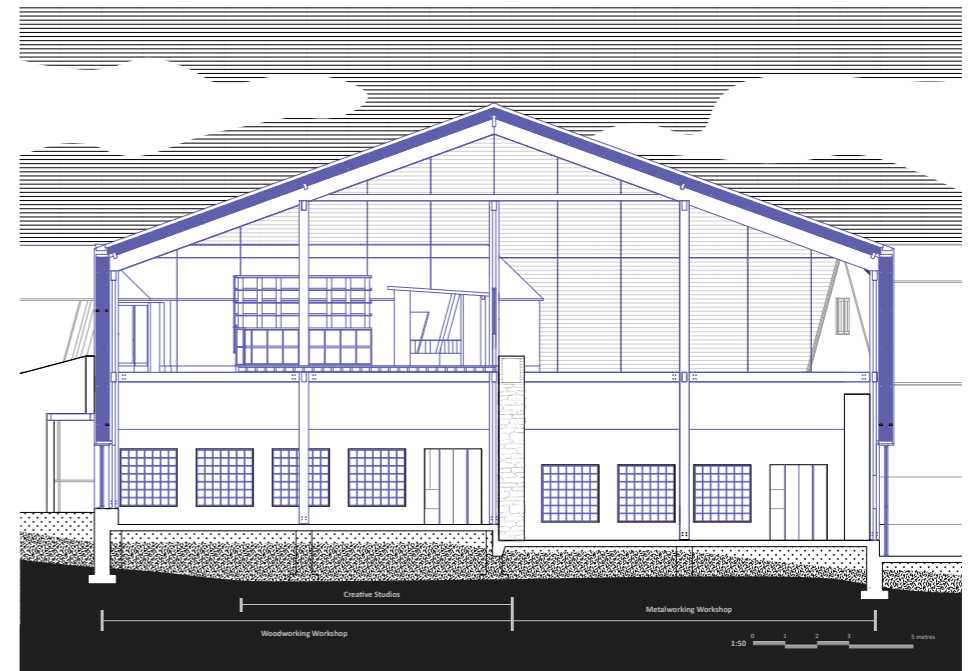
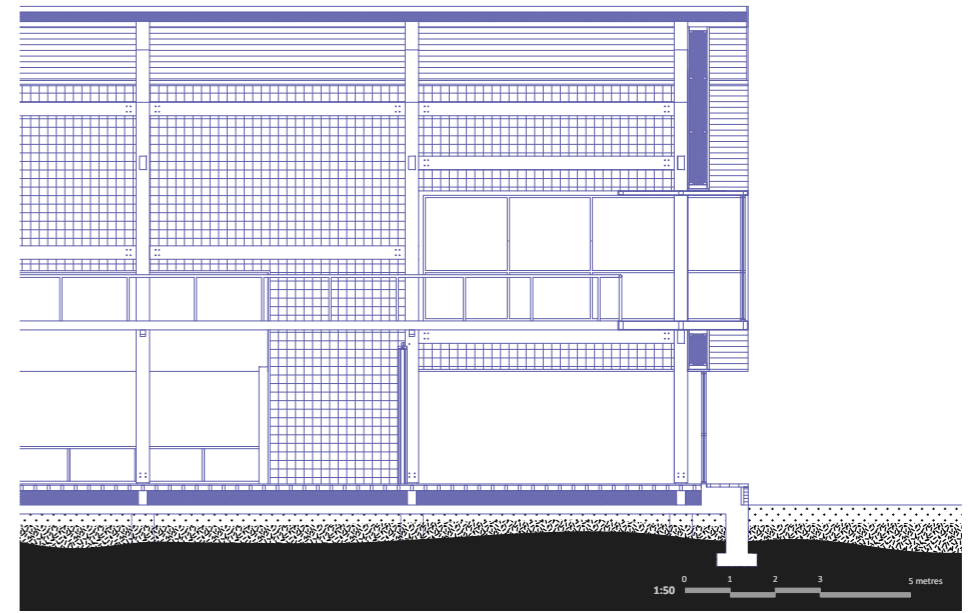
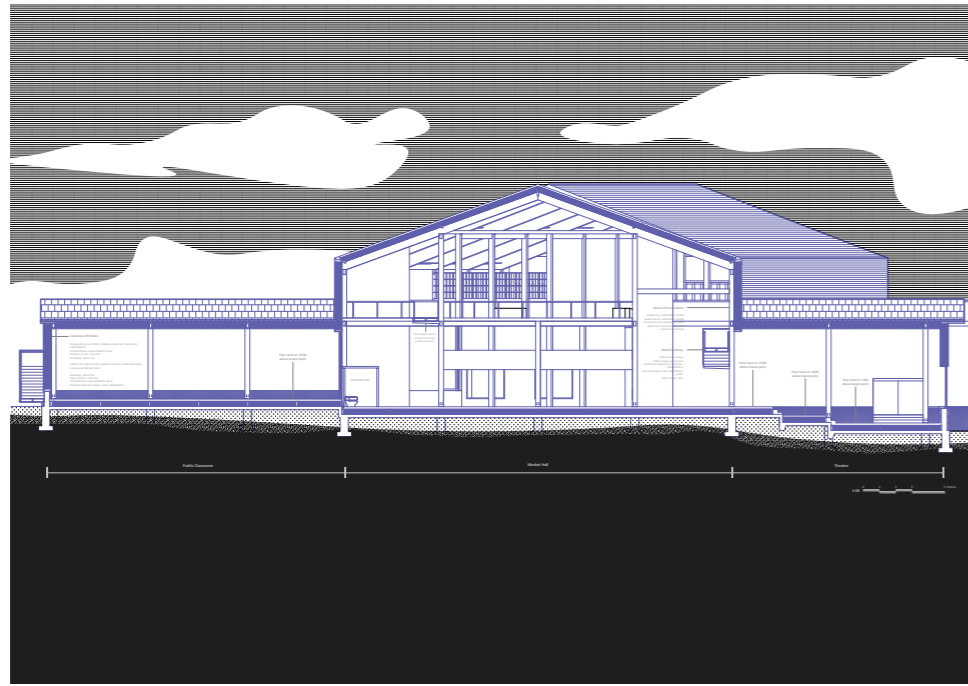
A2 examination held.

W4.1-4.2 Designing final bits and elevational study



W4.3-4.7: Production-focused with presentation-planning.

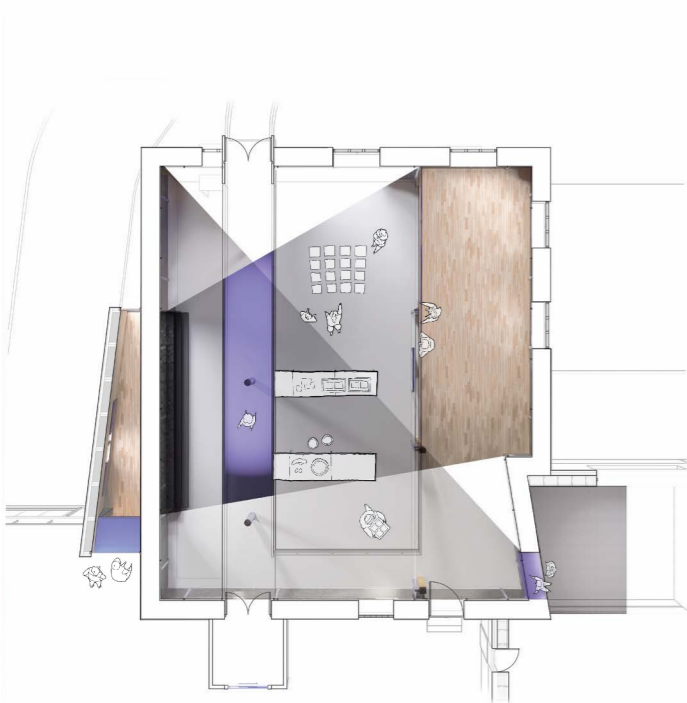




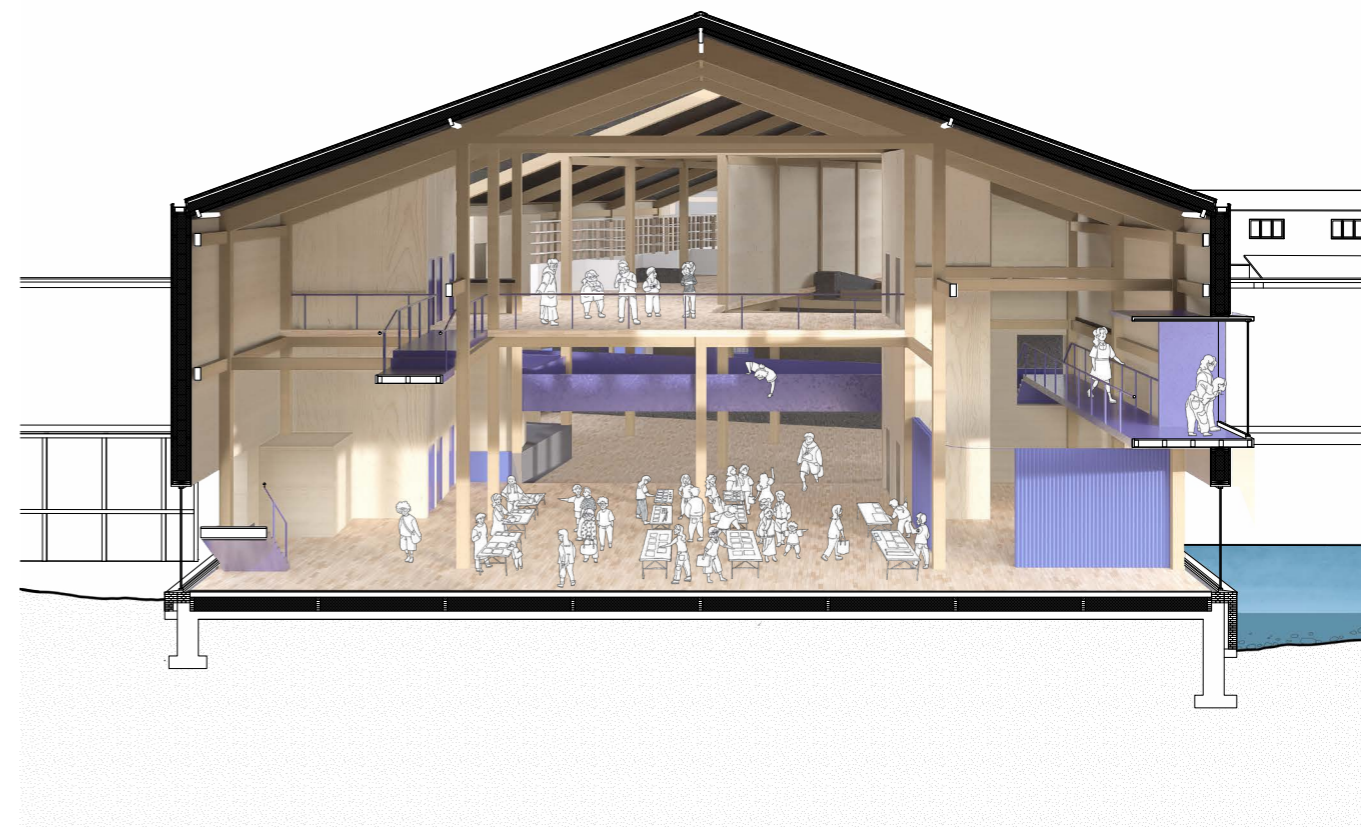
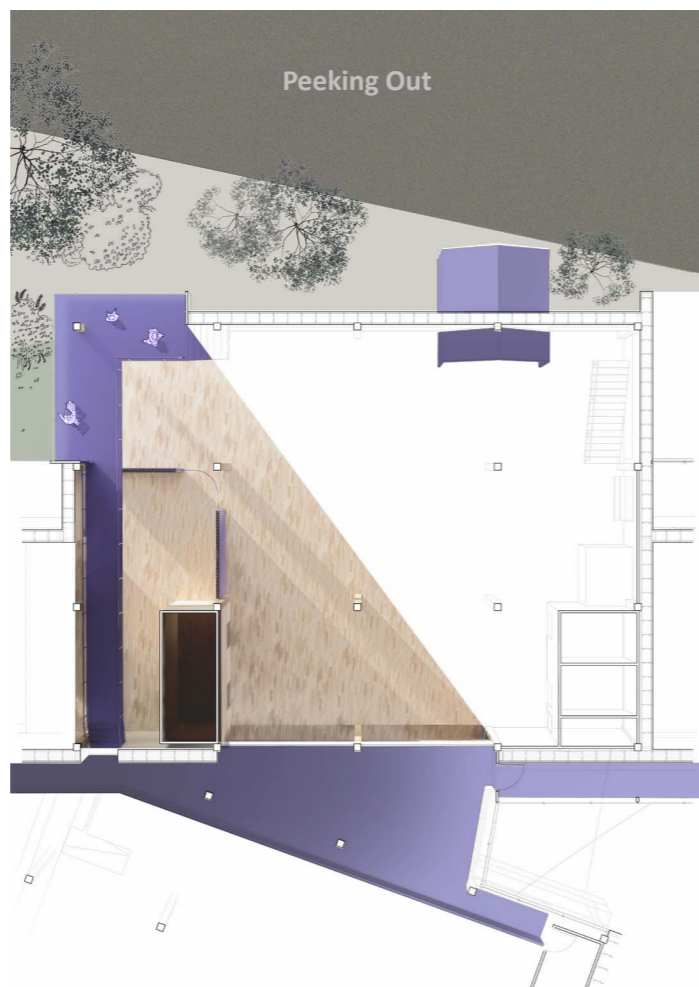
Mirroring the Elevation



Peeking In



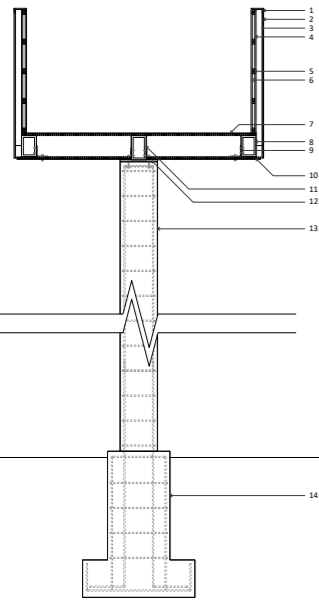
Peeking Out





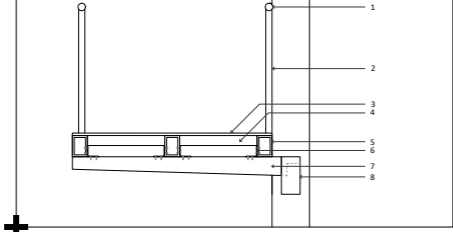
Walkway Detail | By the River

- 1 Corten railing flashing
- 2 Corten steel sheet cladding
- 3 50mm treated vertical battens
- 4 Sheathing board
- 5 Horizontal battens
- 6 Silver birch timber cladding
- 7 Stainless steel grate
- 8 Hollow structural section 170x120
- 9 Metal bracket secured with anchor bolts
- 10 Stainless steel grate
- 11 Hollow structural section 195x120
- 12 Steel cap
- 13 Reinforced concrete column
- 14 Reinforced concrete footing



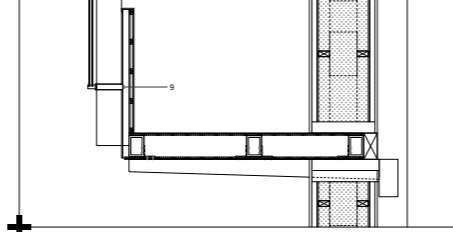
Walkway Detail | In the Mirrored Mill

- 1 Steel handrail painted to accent colour
- 2 Steel balustrade painted to accent colour
- 3 Silver birch timber cladding
- 4 Steel joint
- 5 Hollow structural section 170x120
- 6 Metal bracket secured with anchor bolts
- 7 Steel beam
- 8 Glulam beam 300x200



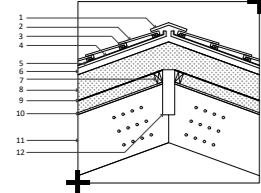
Walkway Detail | Upon Exit

- 1 Aluminium sheet cladding
- 2 Wooden battens 45x25
- 3 Roof rafter
- 4 Aluminium sheeting
- 5 Scots pine framing
- 6 Glass frame
- 7 Glass-cerby glass 8-16-8mm
- 8 Scots pine framing
- 9 Scots pine framing



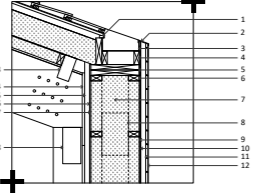
0 1 2 metres

Glulam Roof Detail



- 1 Ventilated ridge
- 2 Silver birch timber shingle
- 3 Wooden batten 45x25
- 4 felt underlay
- 5 Sheathing
- 6 Airing
- 7 Wooden stud 90x45
- 8 Dense-packed cellulose insulation 600mm thick
- 9 Vapour barrier
- 10 Interior lining
- 11 Glulam roof truss 600x200
- 12 Glulam ridge beam 370x100

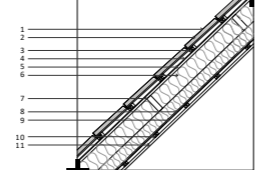
Glulam Wall Detail



- 1 Rafter vent
- 2 Metal flashing
- 3 Rain gutter 300mm wide
- 4 Blocking
- 5 Sheathing
- 6 Wooden stud 50x45
- 7 Dense-packed cellulose insulation 600mm thick
- 8 Plywood groud
- 9 Structural sheathing
- 10 Moisture barrier
- 11 Vertical batten
- 12 Silver birch tongue and groove cladding
- 13 Glulam purlin 200x100
- 14 Paper-based wall tile 600x600
- 15 Vertical batten
- 16 Vapour barrier
- 17 Sheathing
- 18 Glulam beam 300x200

0 1 2 metres

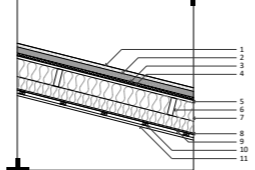
Sedum Roof Tile Detail



- 1 Plastic quick deck roof tile
- 2 Sedum plants with substrate
- 3 Wooden batten 45x25
- 4 Vapour open waterproof layer
- 5 Sheathing
- 6 XPS extruded polystyrene board
- 7 Roof rafter
- 8 Sheathing
- 9 Vapour barrier
- 10 Wooden batten 45x25
- 11 Silver birch tongue and groove cladding

0 1 2 metres

Sedum Green Roof Detail



- 1 Sedum mix blanket
- 2 Substrate
- 3 Filter fleece drainage
- 4 EPDM layer
- 5 Sheathing
- 6 Roof rafter
- 7 XPS extruded polystyrene board
- 8 Sheathing
- 9 Vapour barrier
- 10 Wooden batten 45x25
- 11 Silver birch tongue and groove cladding

0 1 2 metres



Final model making



Presentation-planning