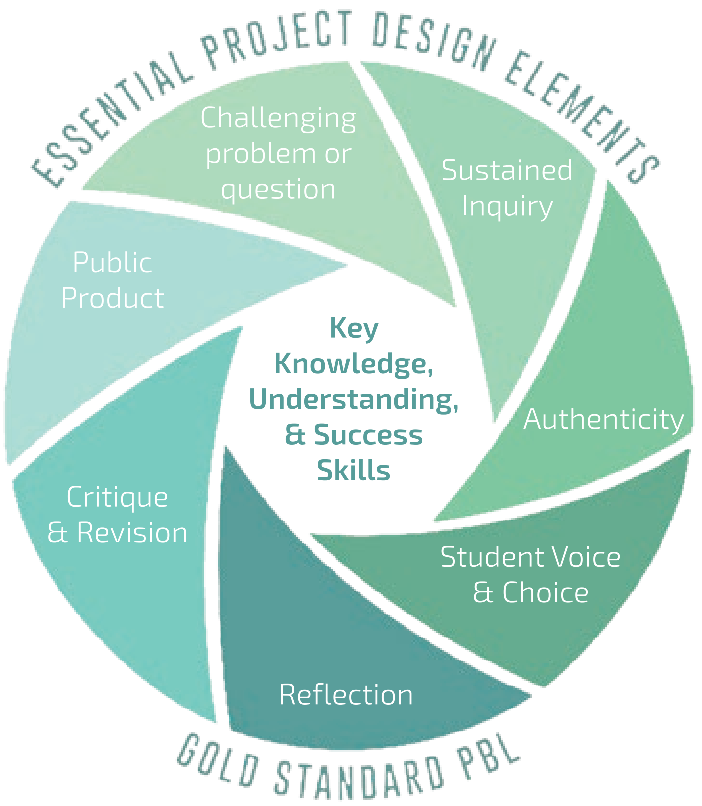
THE GRETA THUNBERG ACADEMY

Pedagogy

Project Based Learning



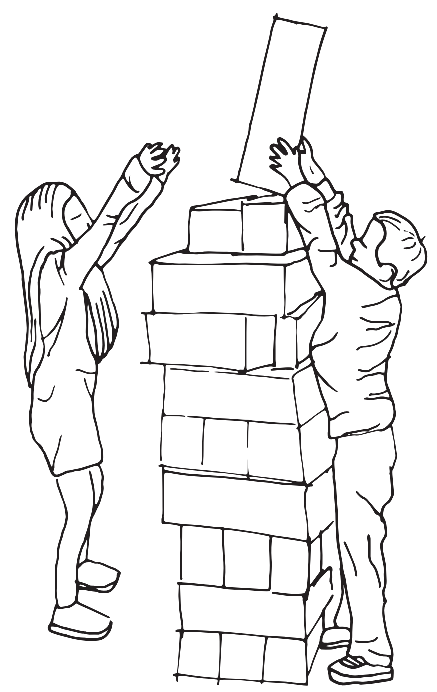
Project based learning teaches kids many values, and allows for more control and independence in their way of learning.

Project based learning will be implemented in the school. The children will be learning mainly in groups (small or large) and there will be chances for individual projects for children in higher year groups.

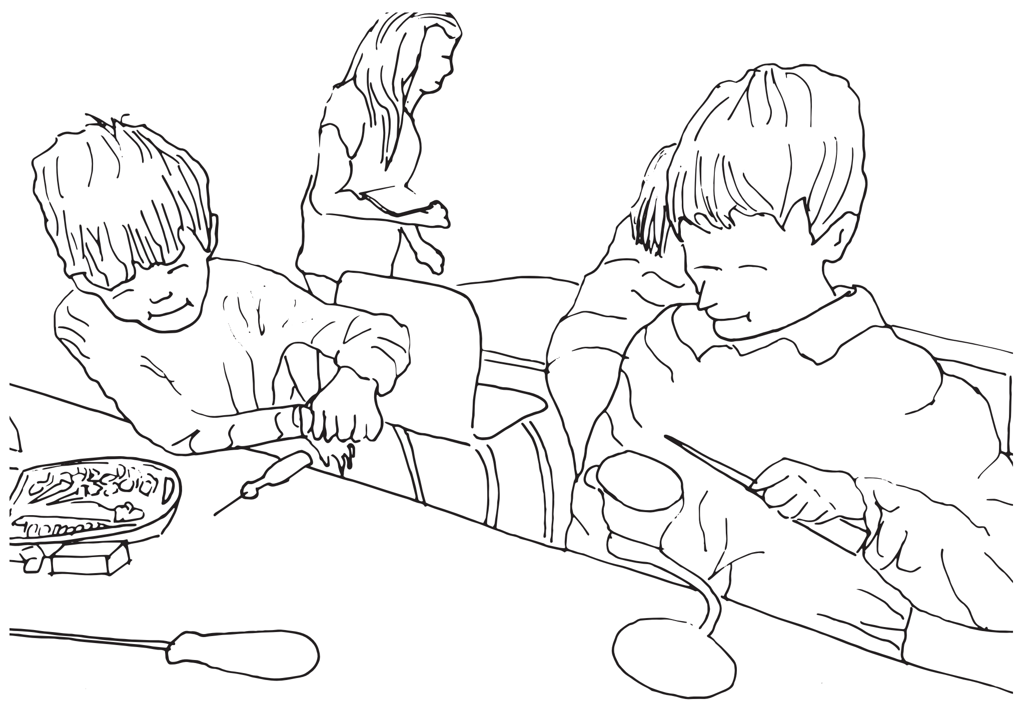
Mentoring System

The school will run a mentoring scheme wherein children in higher year groups (Years 4,5, and 6) would act as mentors to children in the lower years, forming partnerships as they work together on projects.

Kids work on unique projects in a more suitable environment, not behind the typical rows of desks in classrooms.



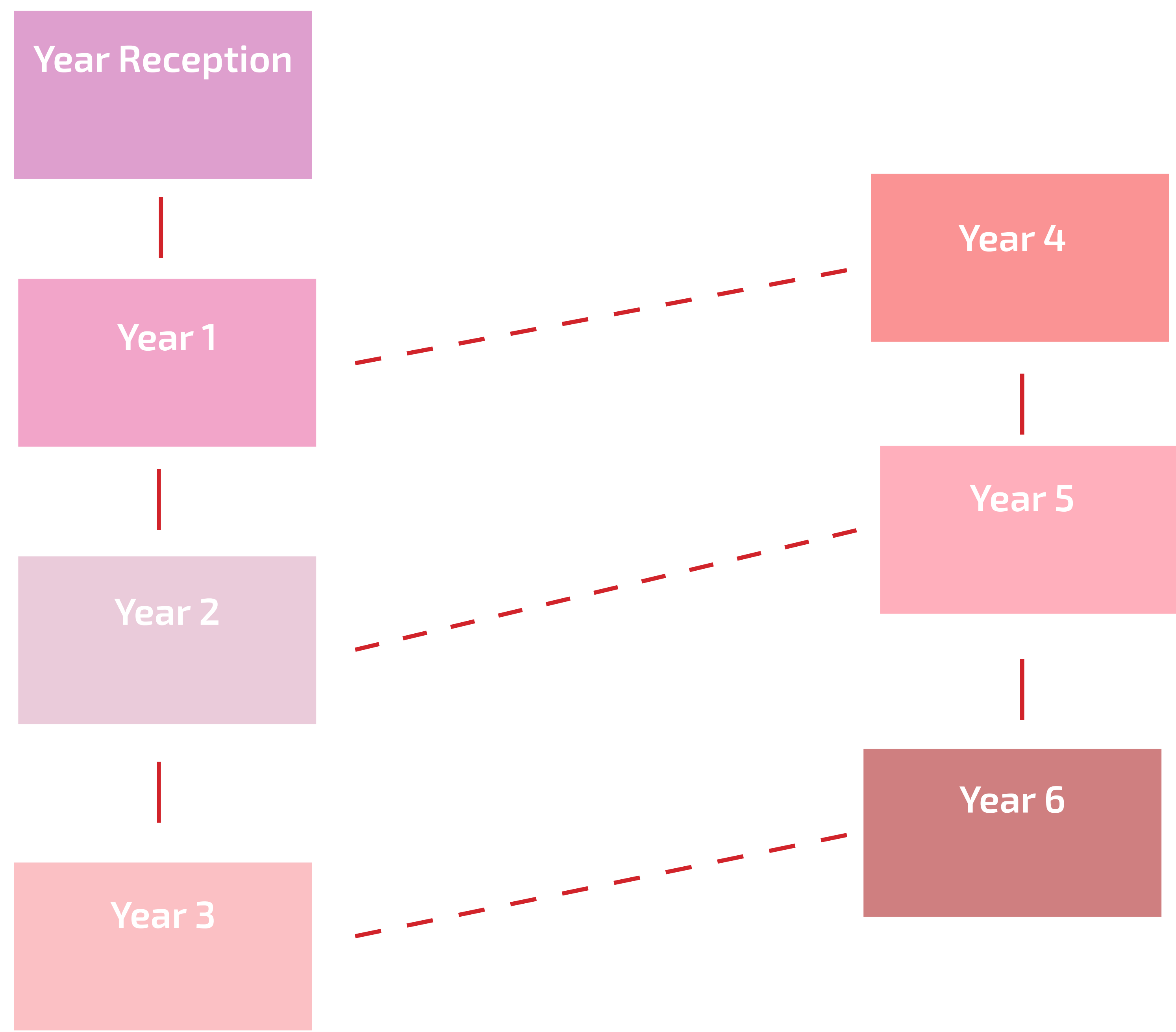
They learn to work together cohesively on projects.



They get experience using various tools early on, have more control over their teaching and work in a social classroom environment.

Classroom Dynamic

The classes will interlink as the students from different year groups collaborate on projects. They will share the same learning facilities when working on group projects. Year Reception, however, is taught separately to help the young students get familiarized to the new environment.

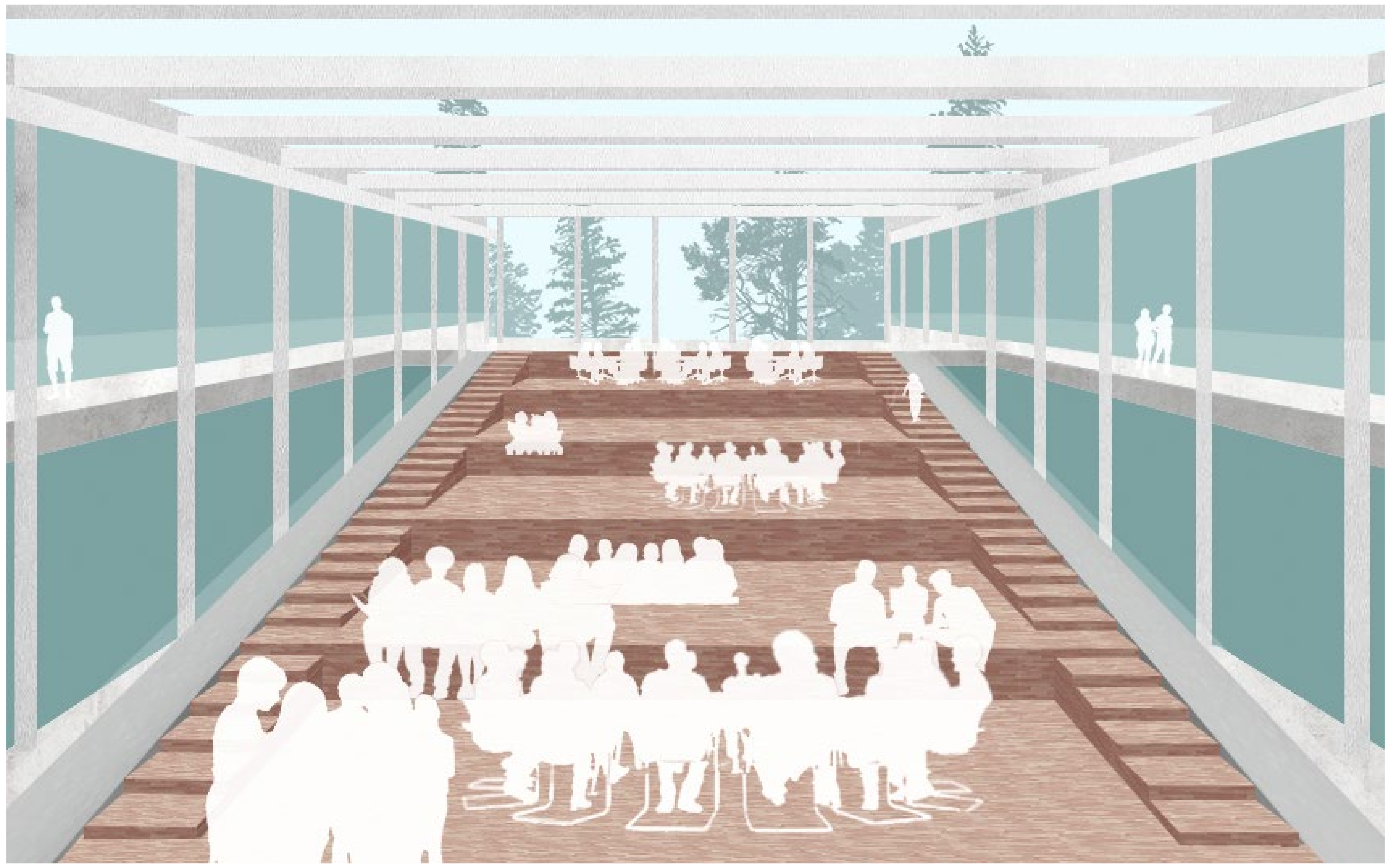


Sustainability - Greta Thunberg Academy

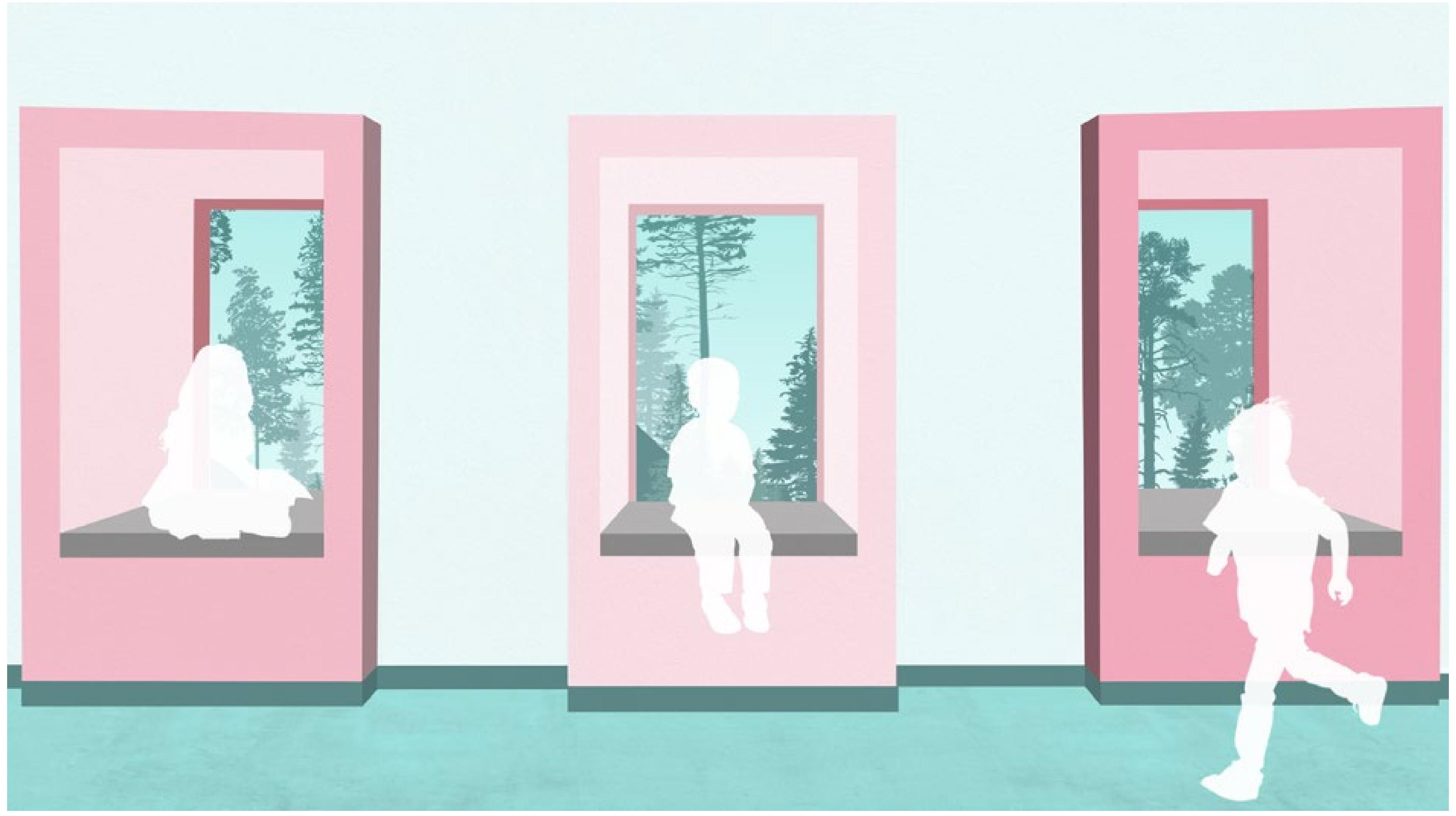
The school is inspired by Greta Thunberg and so is moved by the notion of environmental design and sustainability, integrating key design features relating to these themes. The building is maintained as carbon neutral as possible, and the children are encouraged to walk to school.

School Narrative - Day in the Life

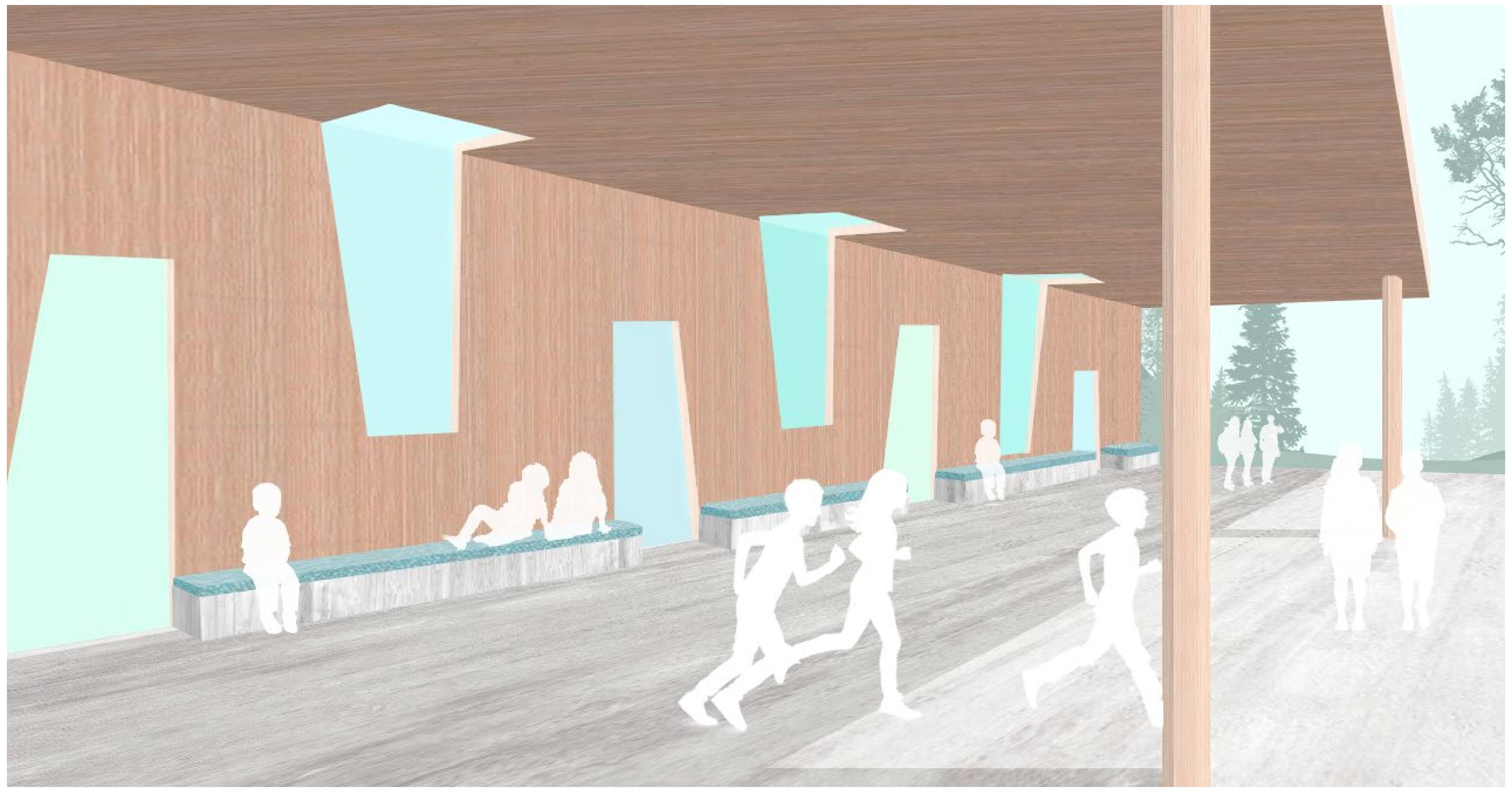
A riverside art room for creative activities where special guests from the creative hub in the eagle building from P3 can come along and teach the class something new. Can also be used after school hours for creative classes (e.g. painting, pottery, etc), inspired by the scenic views.



Stairs can be a space of social interaction and also a beneficial mixed study space as well as a means of getting around. Vertical learning is encouraged in these spaces as students from different classes can meet and interact.



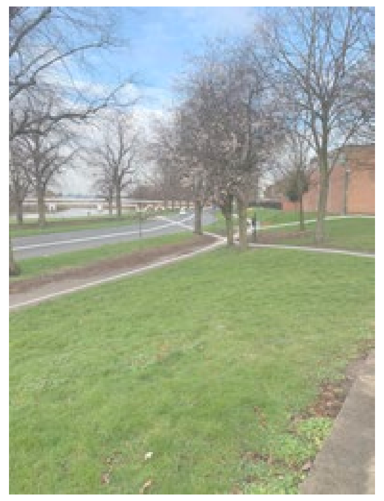
Individual study spaces offer a sense of calm and peace for students looking to tackle tasks on their own at their own pace. A view outside also connects them to the environment,building on the environmental theme of the Greta Thunberg Academy.



Covered outdoor play spaces that are overlooked by various colourful windows connect the interior and exterior, also aiding in the ability to easily monitor children from indoors. Various different spaces offer activities for individuals, small groups or even a large group of children during break.

Site Analysis - Site Plan and Solar Study


Busy road Victoria Embankment


Access points

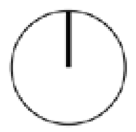

New housing development sheltered by trees


Public footpath splitting field


Single day solar study of the site during the Summer Solstice.


Single day solar study of the site during the Winter Solstice.

Site Plan 1:1000




'Crossing point' to River Trent


Site level change


The Meadows Recreation Ground


Single day solar study of the site during the Spring Equinox.

Site Analysis - Wider Context

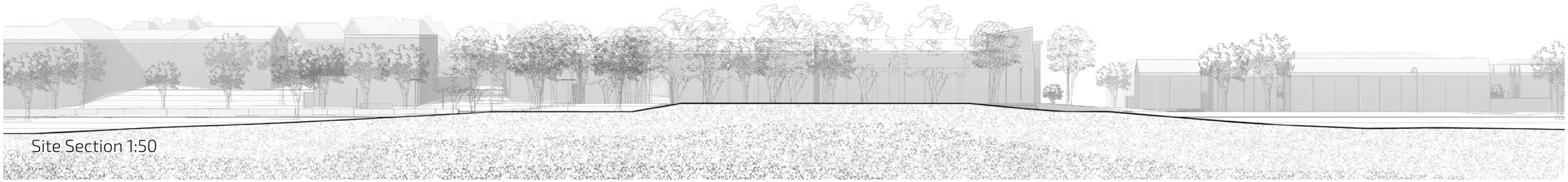
1:5000 Site plan showing bus stops and routes near the site. Routes 48 and 48X found on the west and routes 11 and 11C found in the east.

1:5000 Site plan showing tram stops and route near the site. Tram routes clifton south and phoenix park accessible from site, heading into/from city centre.

1:5000 Site plan showing 2 minute walking distance from site. The entirety of the map is roughly an 8 minute walk or a comfortable 1 minute bike ride.

Materiality on site is very monotone, with grey tones of concrete, stone, paving dominating as well as the overpowering common red brick buildings surrounding the site. Elements of nature are evident throughout the site, bursting through the cracks in the concrete. The River Trent is also near, proving to be a useful source of inspirational views that can be exploited. Building materials could be used to make the site feel less imposing and more natural.

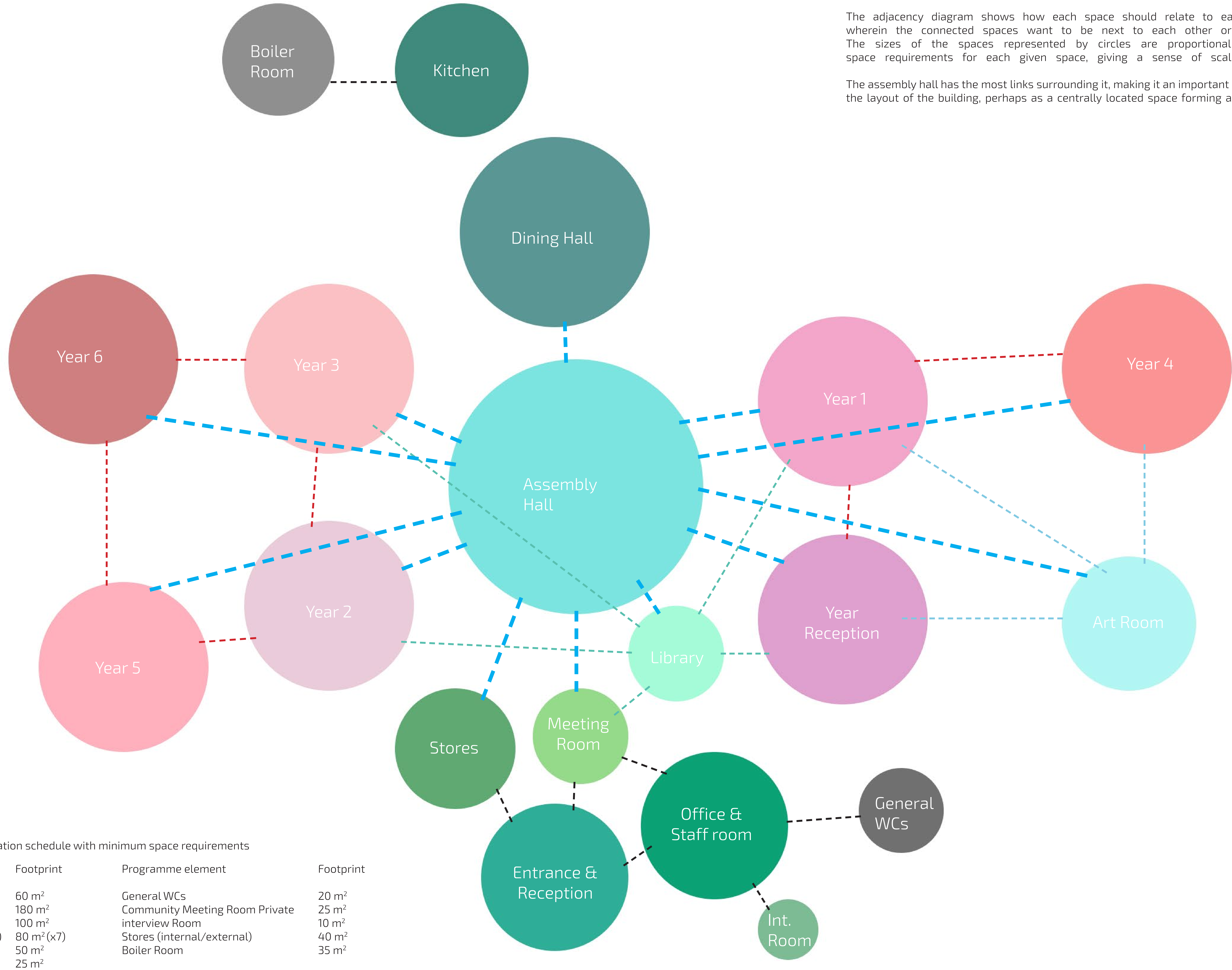
The site itself slopes in all directions, sitting at the top, giving authority to the site making it feel more important and unlocking views in all directions. The slope is gradual towards the East, dropping down roughly 3 meters over a long stretch. A sidewalk interrupts this slope in the middle offering a soft boundary between the school and the public fields next to it. The site is surrounded by trees on the north edge, forming a protective shield from the housing units behind them.



Adjacency Diagram

The adjacency diagram shows how each space should relate to each other on plan, wherein the connected spaces want to be next to each other or near each other. The sizes of the spaces represented by circles are proportional to the standard space requirements for each given space, giving a sense of scale for the project.

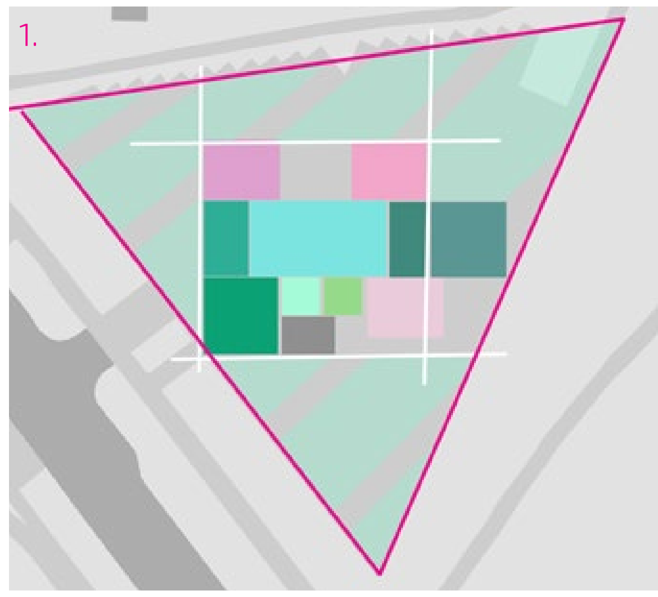
The assembly hall has the most links surrounding it, making it an important space that will drive the layout of the building, perhaps as a centrally located space forming a fat school scheme.



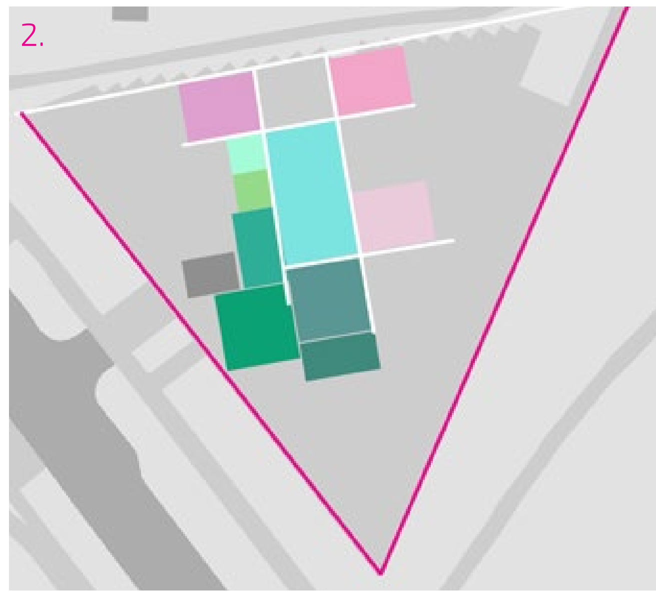
Accommodation schedule with minimum space requirements

Programme element	Footprint	Programme element	Footprint
Entrance/Reception/Gallery	60 m²	General WCs	20 m²
Assembly Hall	180 m²	Community Meeting Room Private	25 m²
Dining Area	100 m²	interview Room	10 m²
Classroom (including storage & WC)	80 m² (x7)	Stores (internal/external)	40 m²
Art Room	50 m²	Boiler Room	35 m²
Library/Resource Room	25 m²		
Kitchen	50 m²	Approximate Total (including general	1,500 m²
Head's Office/Staff room	60 m²	circulation and internal wall area)	

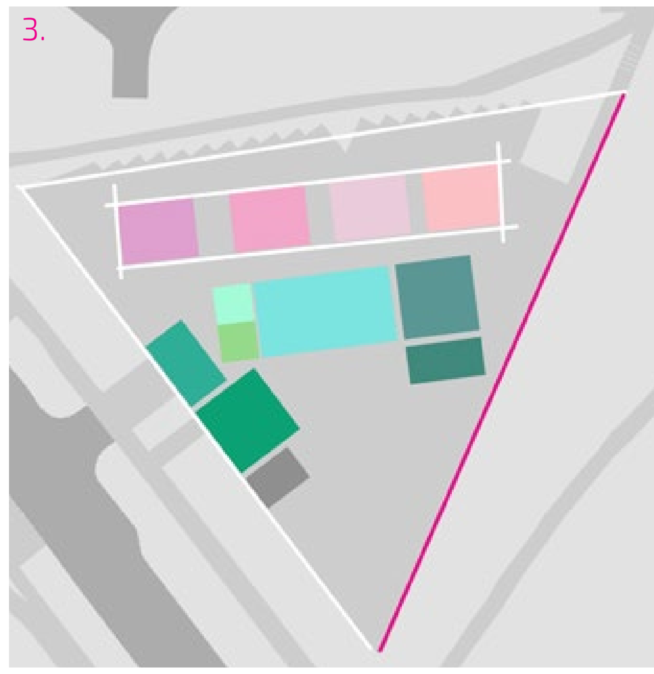
Site Strategy- Massing



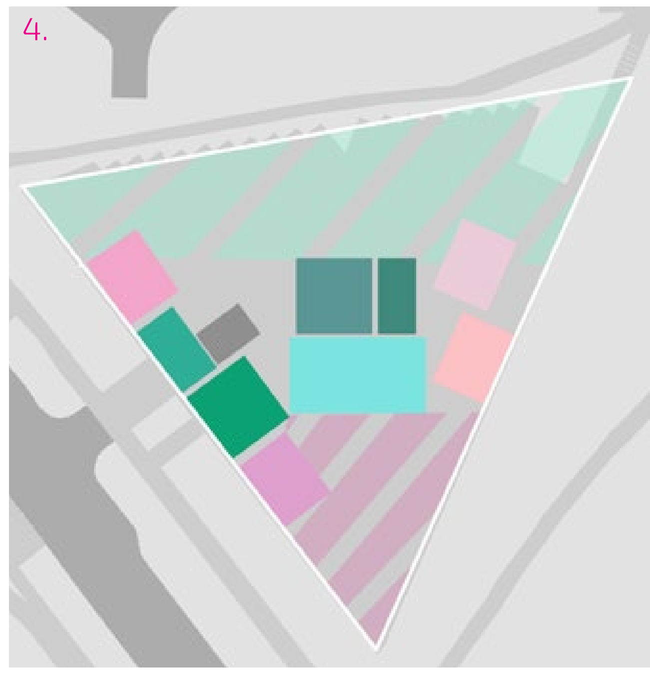
Central hall creating 3 courtyards



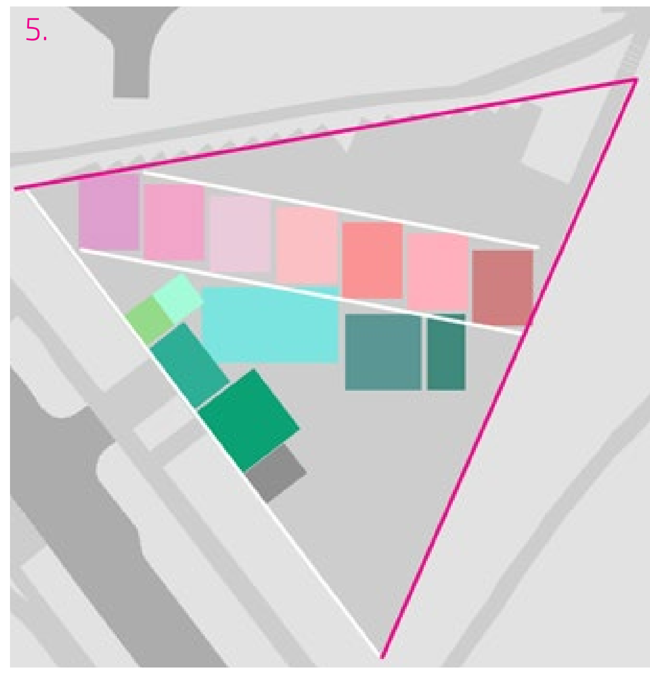
Lining up building to boundaries



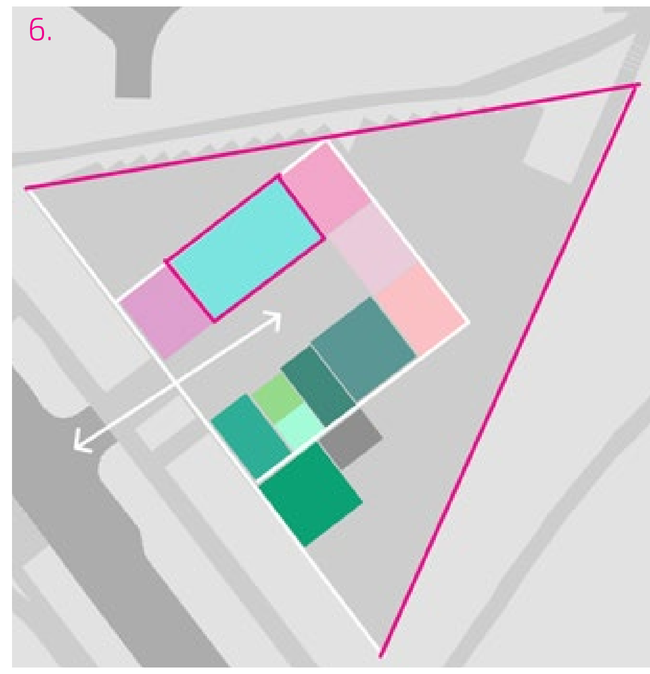
Central hall with 3 wings



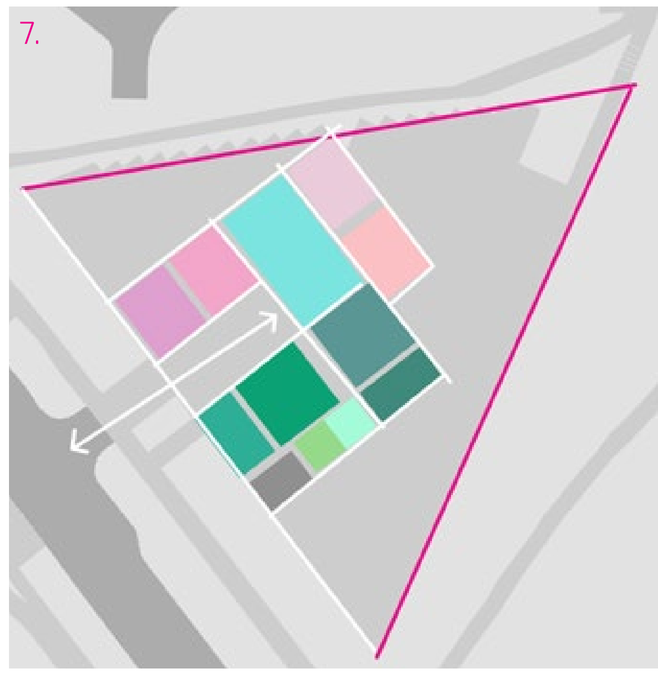
Classes split on either side of site



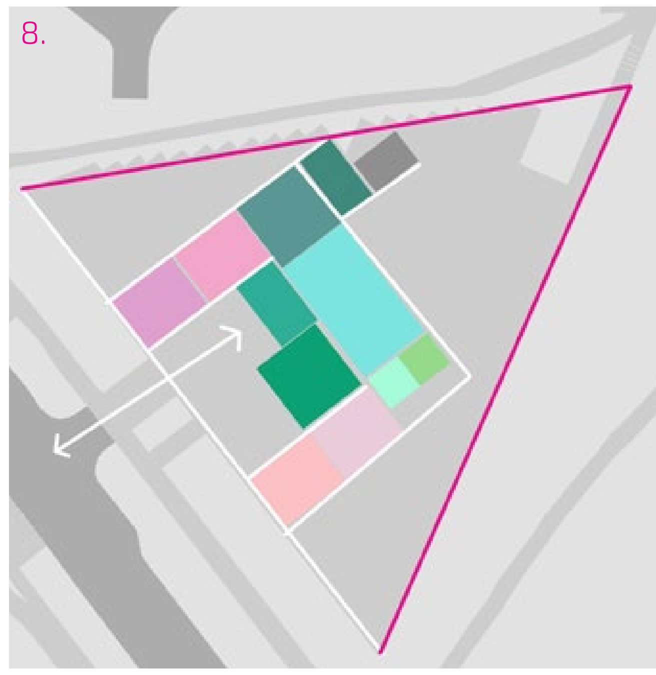
Row of classes angled to create courtyard



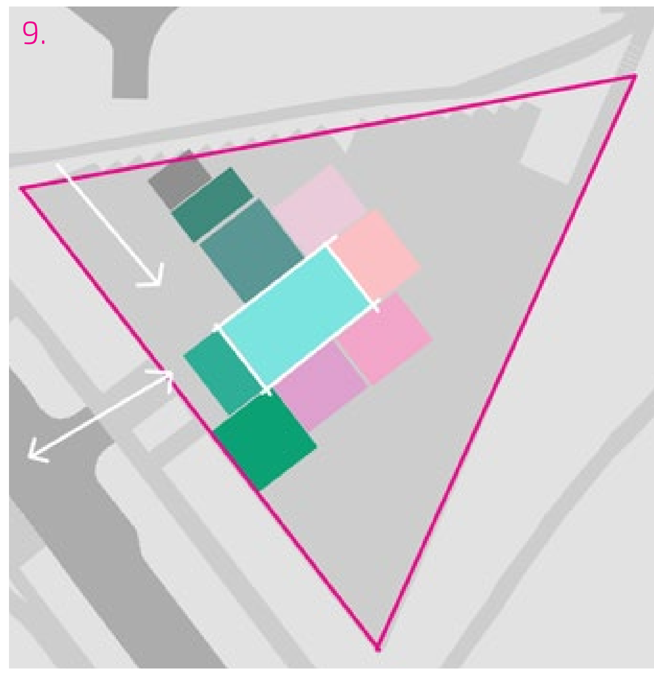
Access through site with central classes



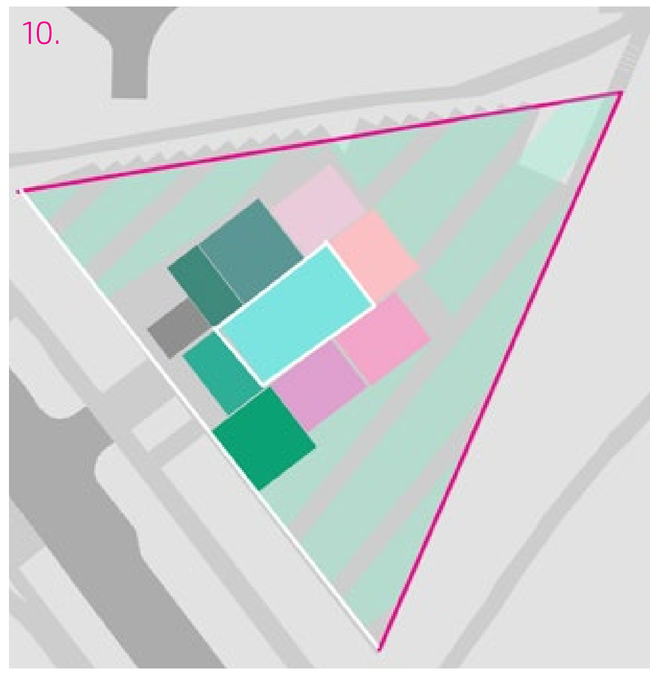
Access through site with a central hall



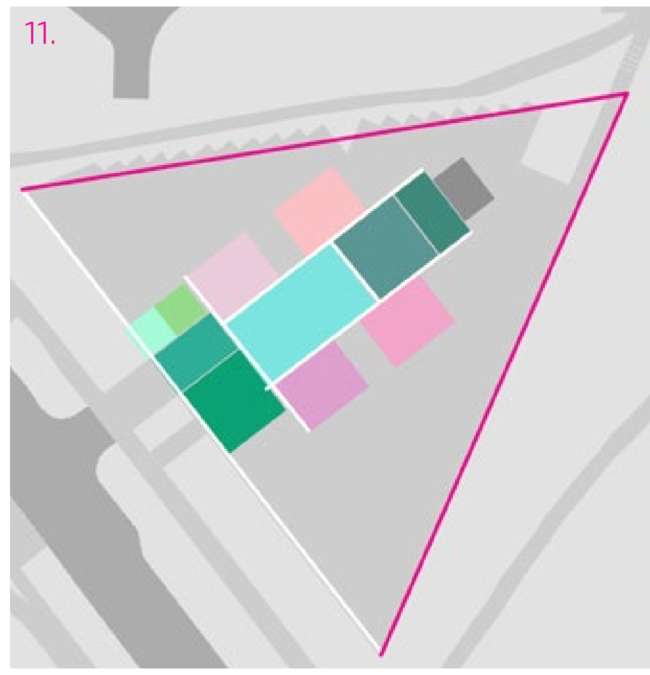
Central hall open out onto main courtyard



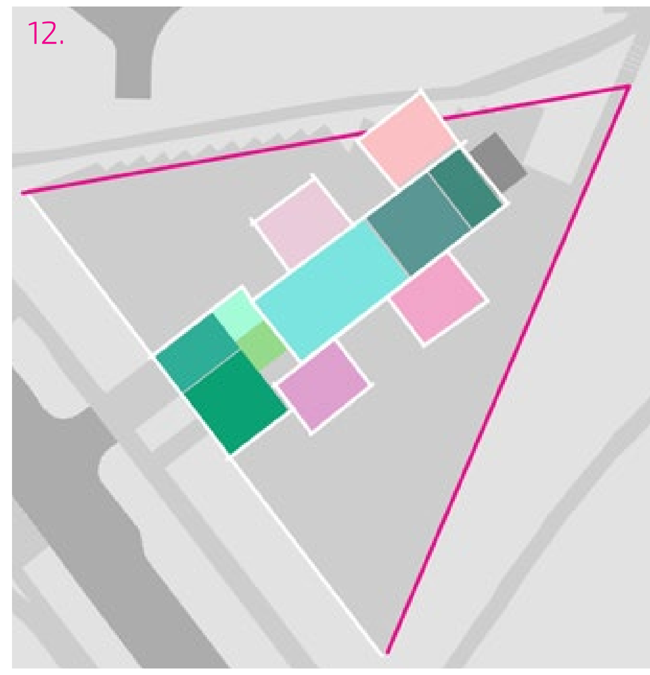
Grabbing the middle of the site



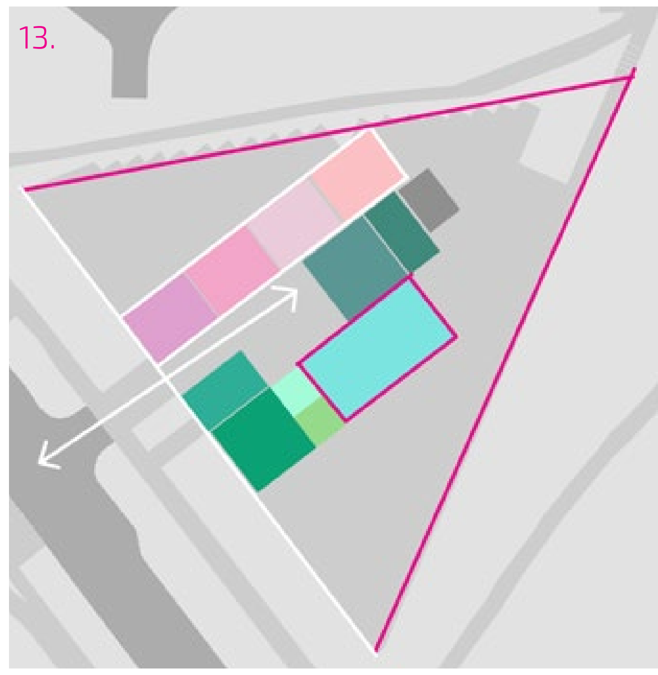
More uniform layout on middle of site



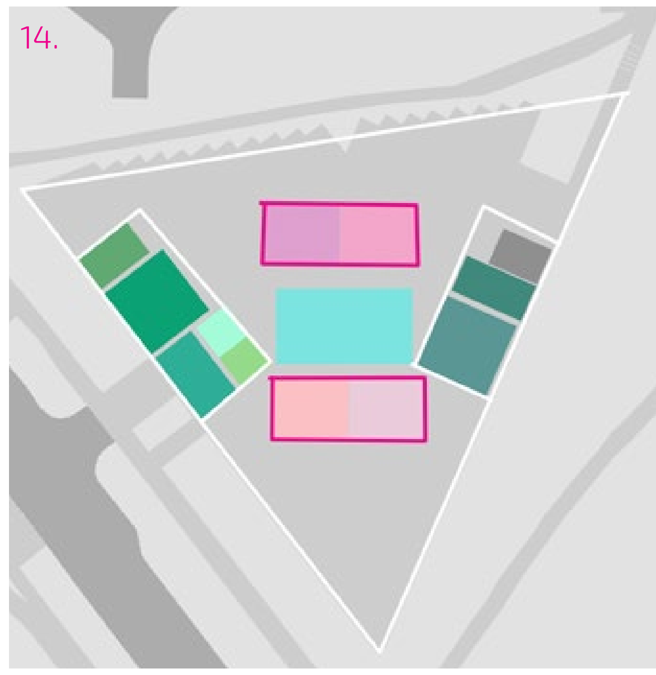
Linear building lining up with entrance



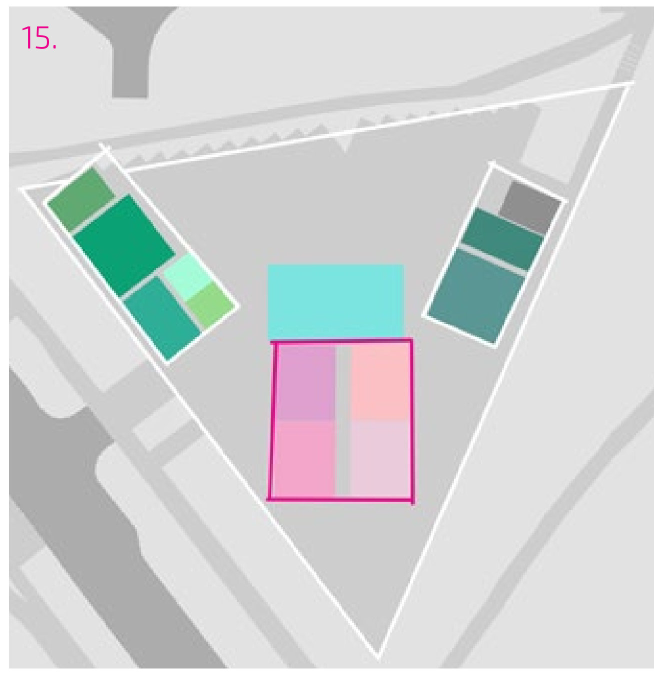
Staggering classes create small play spaces



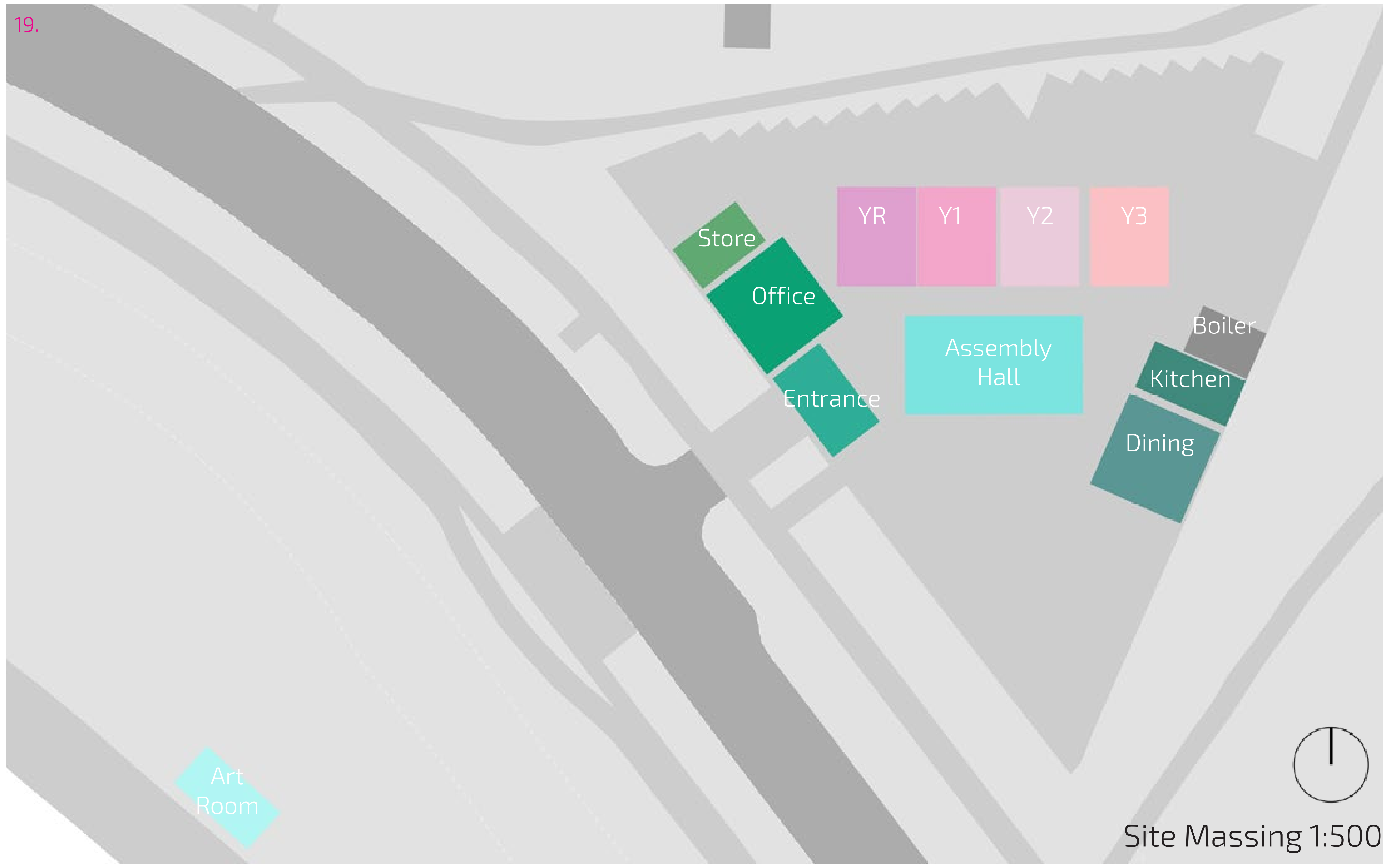
Central entrance path through building



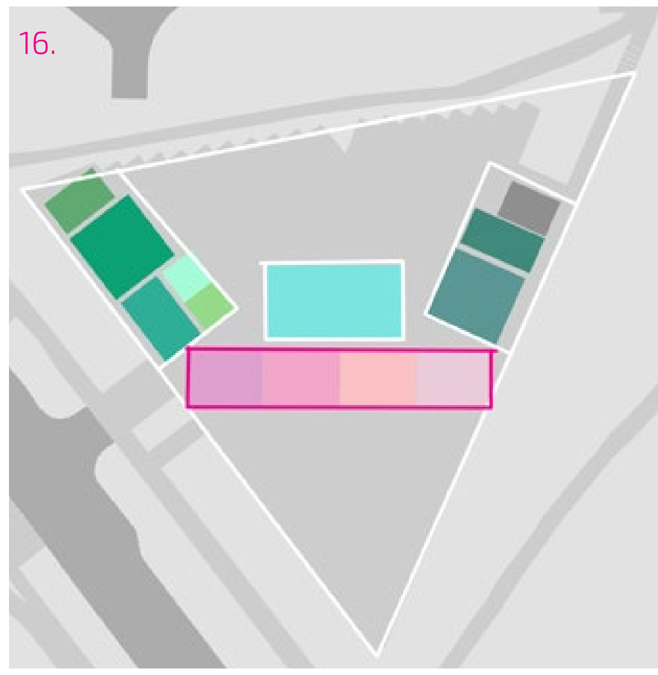
4 wings around central hall



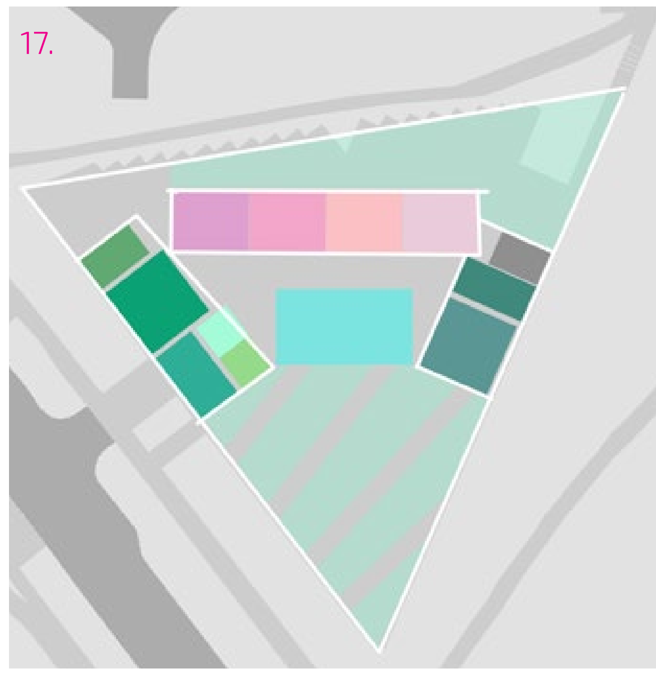
3 wings 'disconnected'



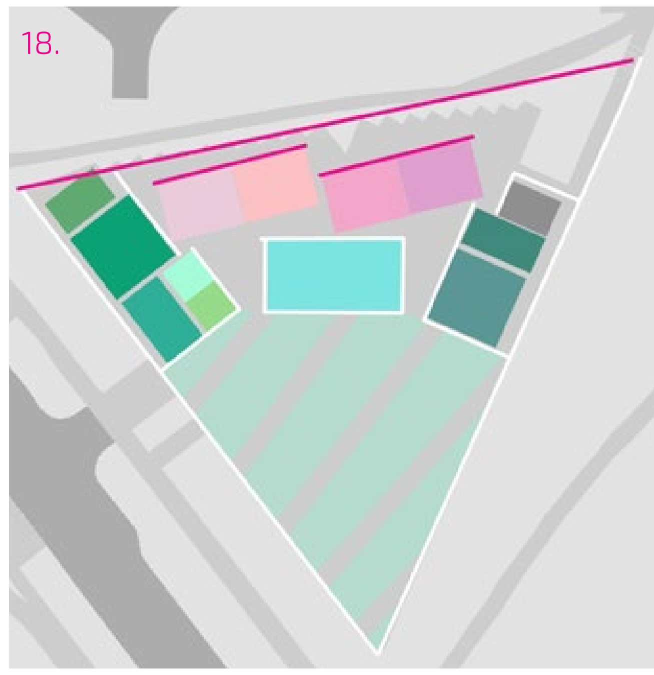
After experimenting with numerous layouts and various strategies, I settled on the massing scheme shown above at scale 1:500. It includes the art room by the riverside and a fat plan strategy surrounded by three 'wings' orientated to their boundaries.



3 wings creating two courtyards

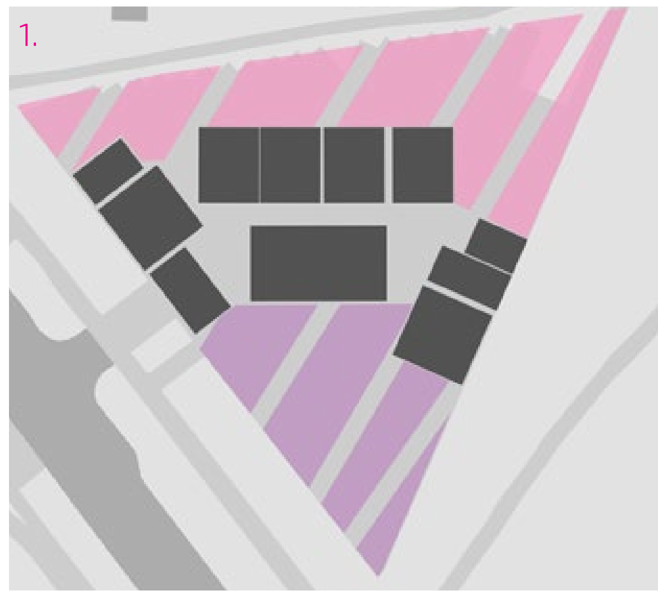


3 wings creating one big courtyard

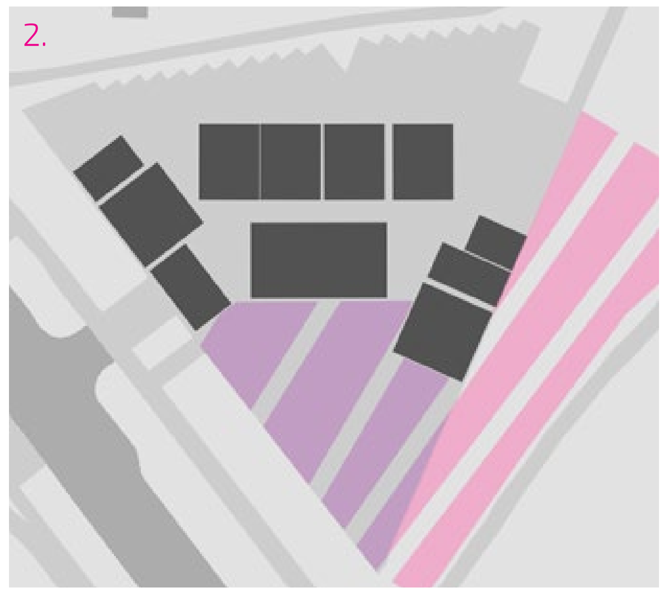


Classroom wing parallel to site boundary

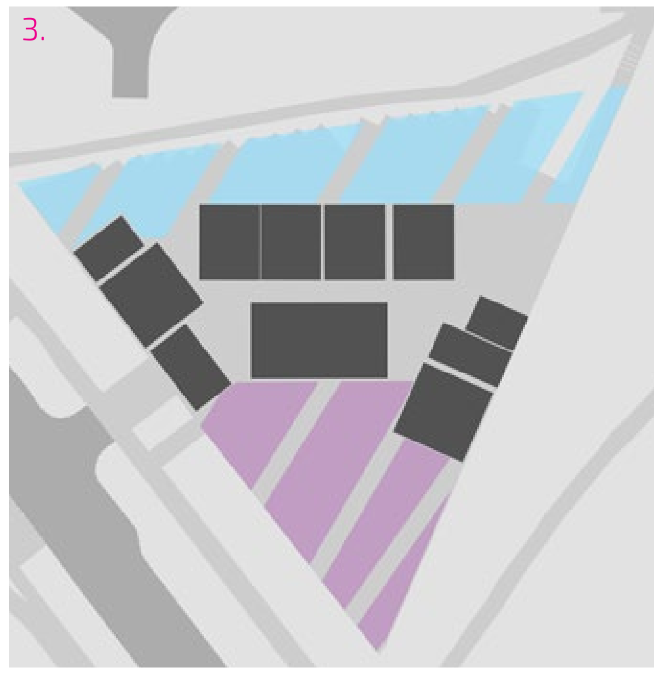
Development Work - Exploring Negative Space



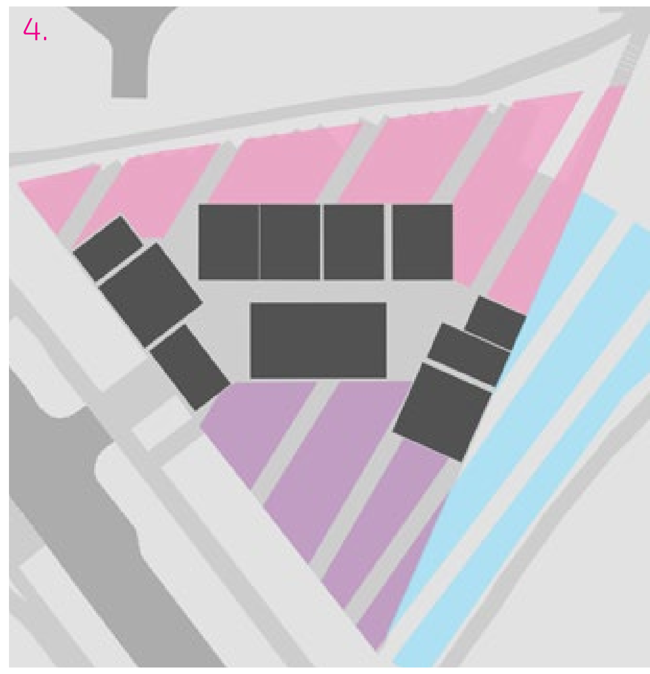
Creating an upper and lower courtyard



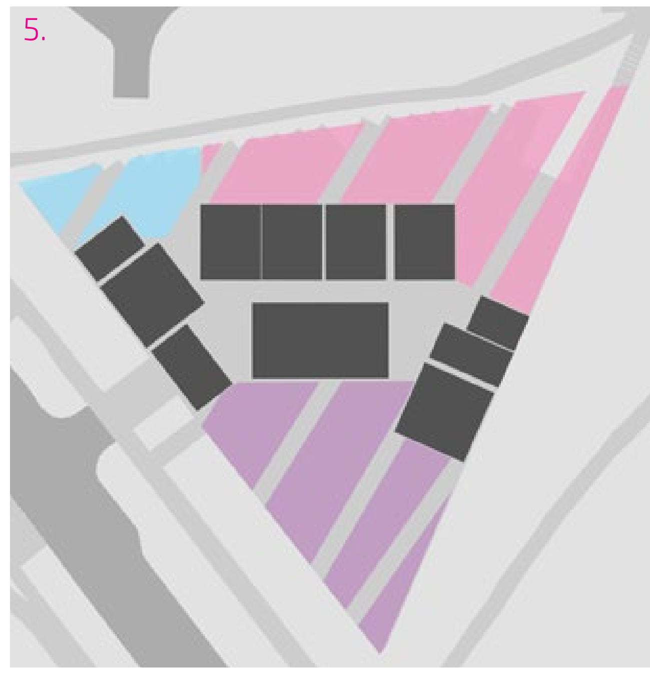
Shifting courtyards and exploring boundary



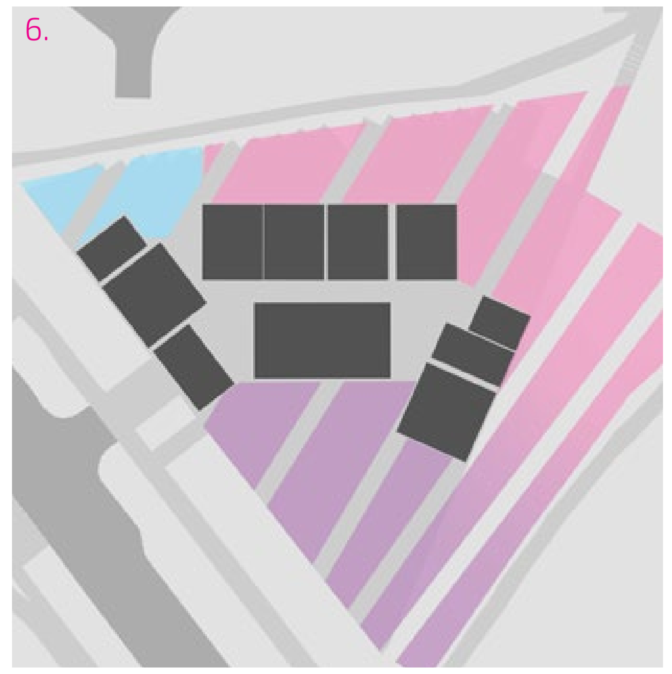
Looking to create a public side



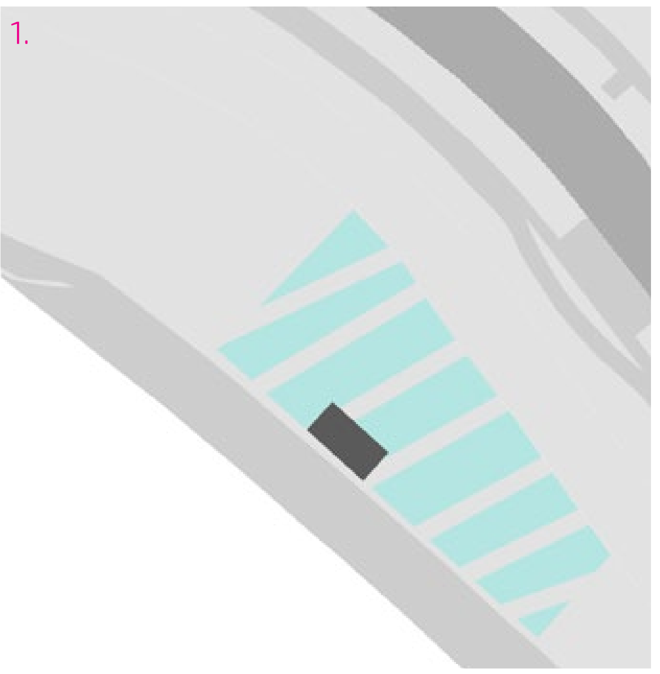
Integrating public side by embankment



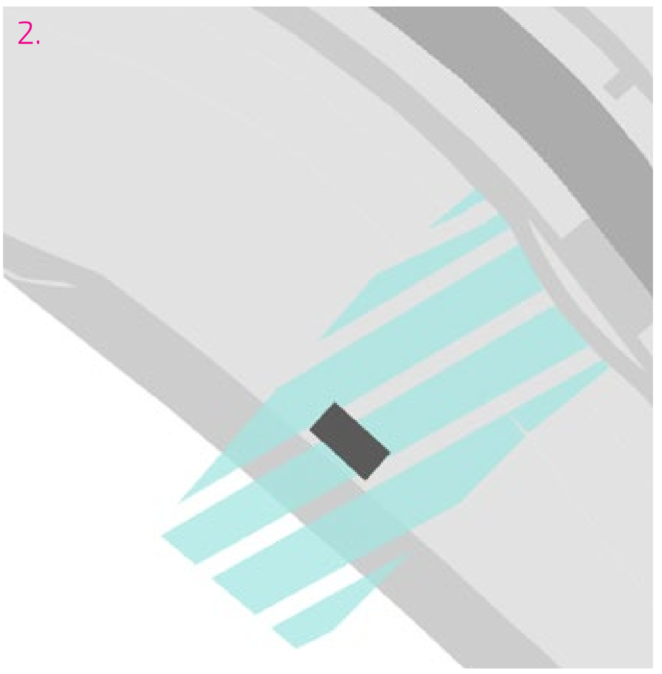
Creating a public corner



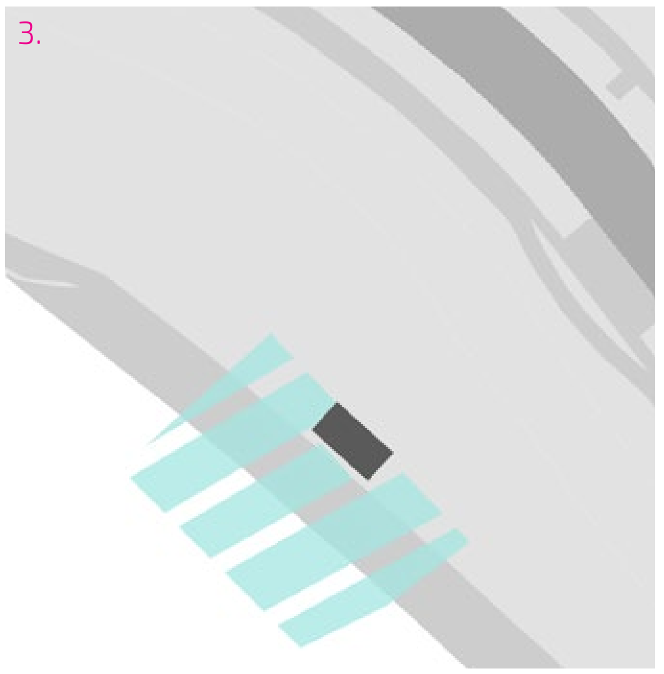
Merging courtyards at the side



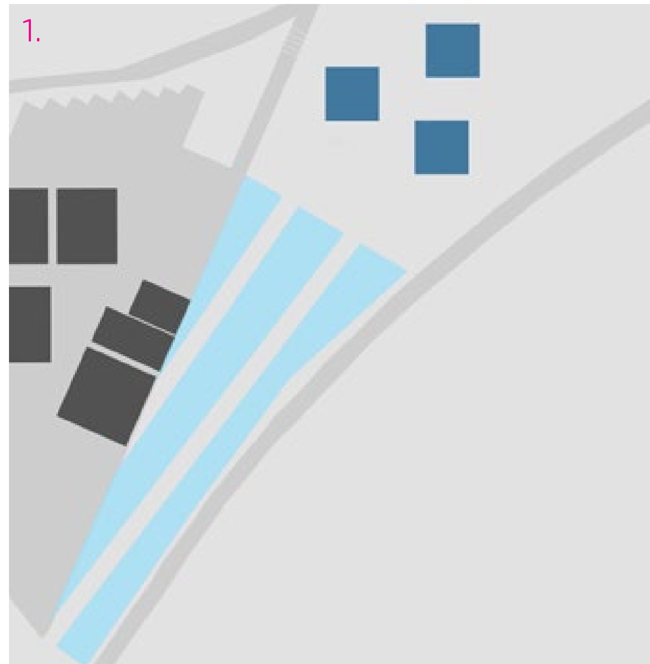
Art room with front garden



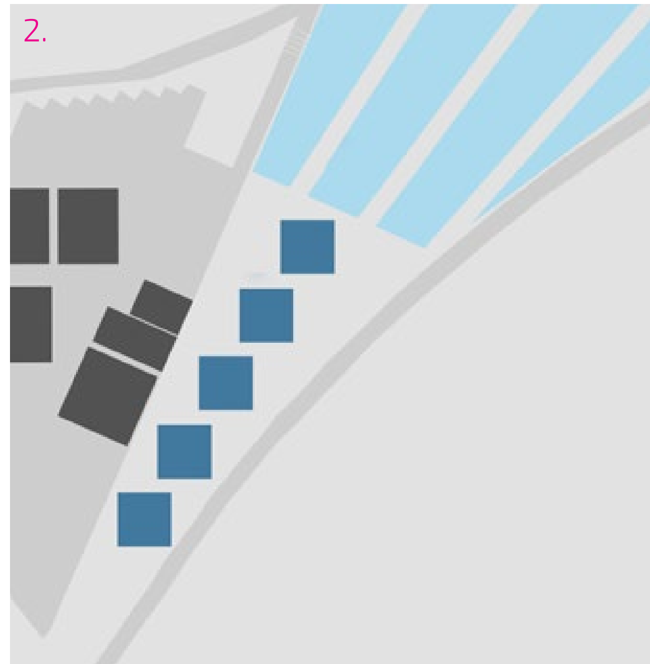
Art room with linear connection to school



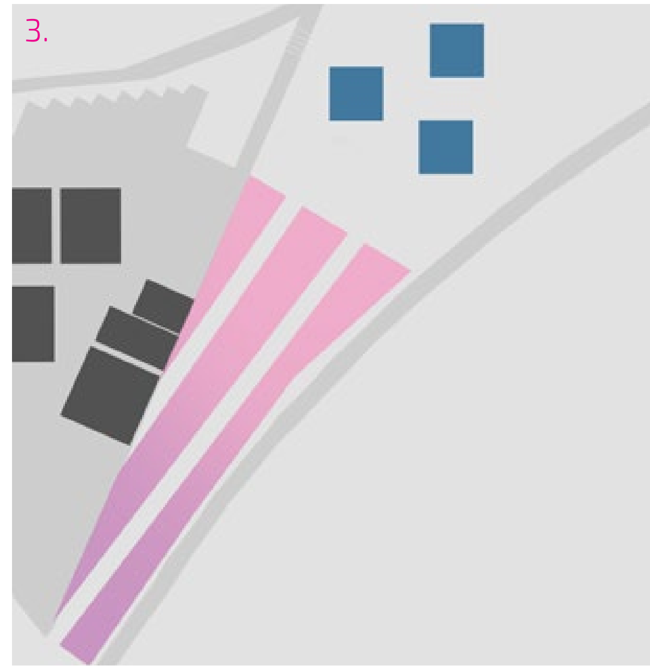
Art room with deck open to river



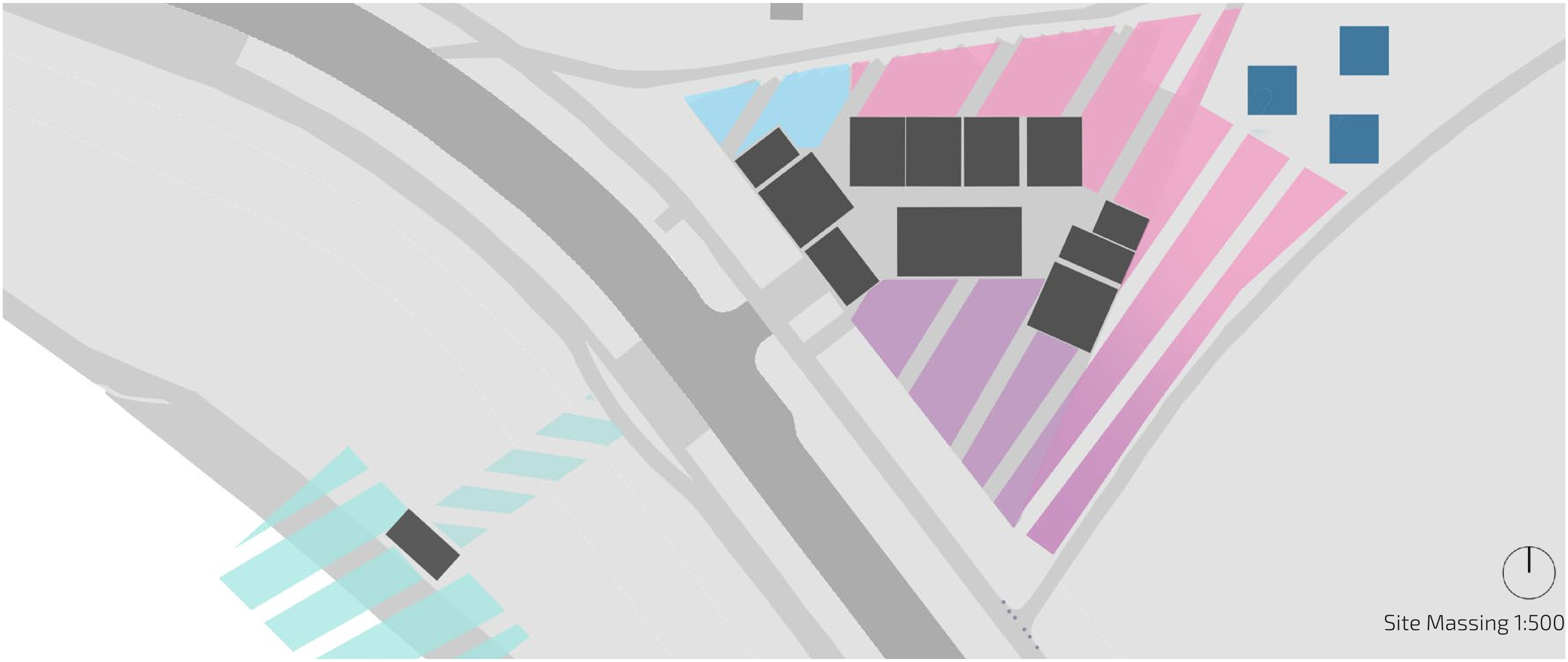
Public space with pavilions



Pavilions along school side with public cor-ner



Merging courtyards next to pavilions



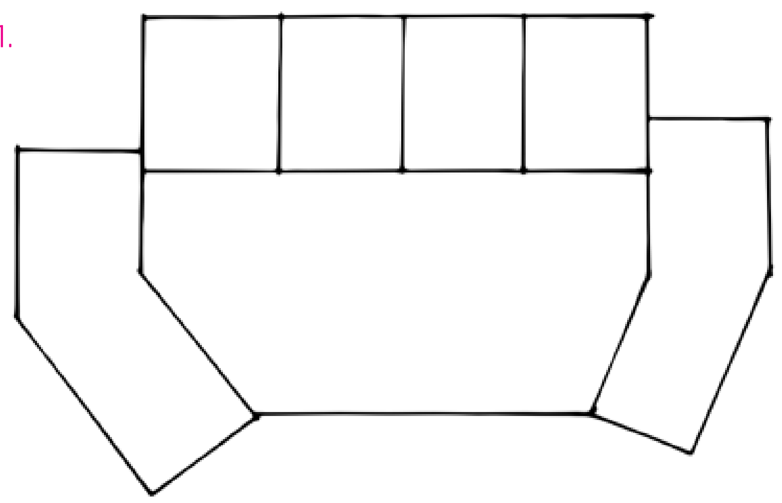
Key:

- Lower Courtyard
- Upper Courtyard
- Pavilion Space
- Public Space
- Art Room Deck
- School Building Mass

Combining all elements gives two separate courtyards merging in the middle, pavilion spaces by the side, an art room with deck expanding into the river and a public corner by the store.

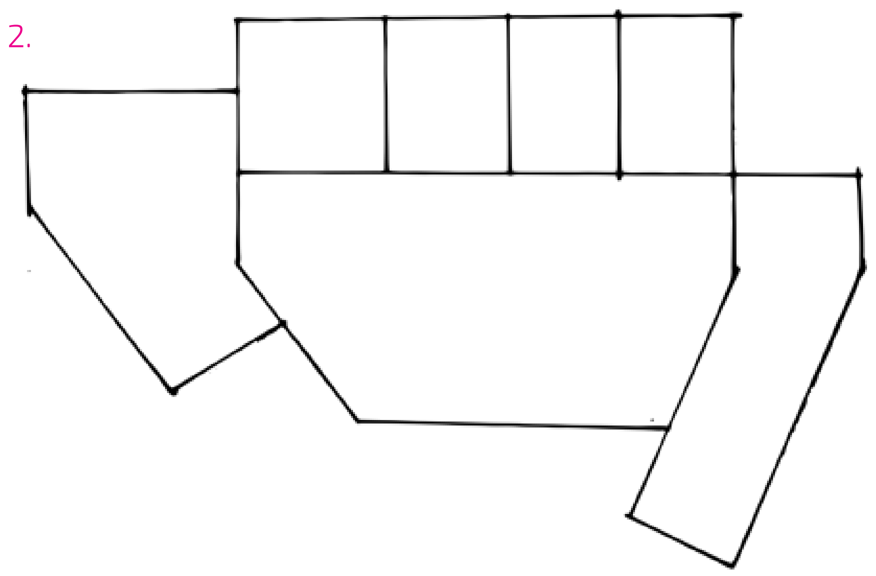
Development Work - Plan Configuration

1.



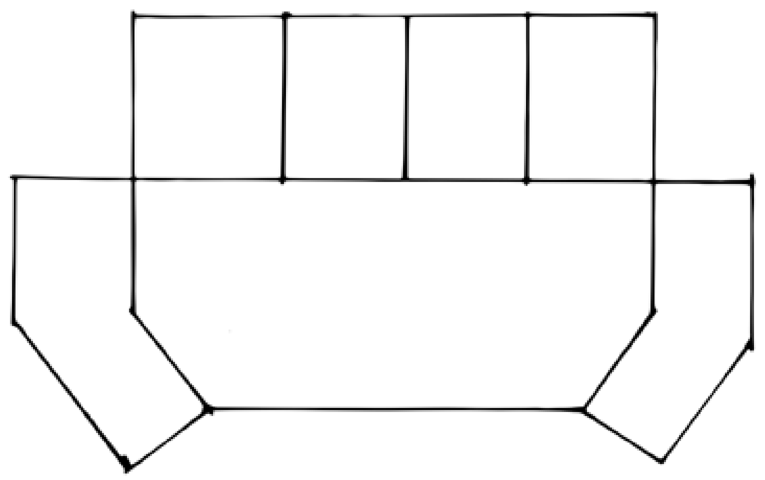
Orientating building towards edges, grabbing the site boundary

2.



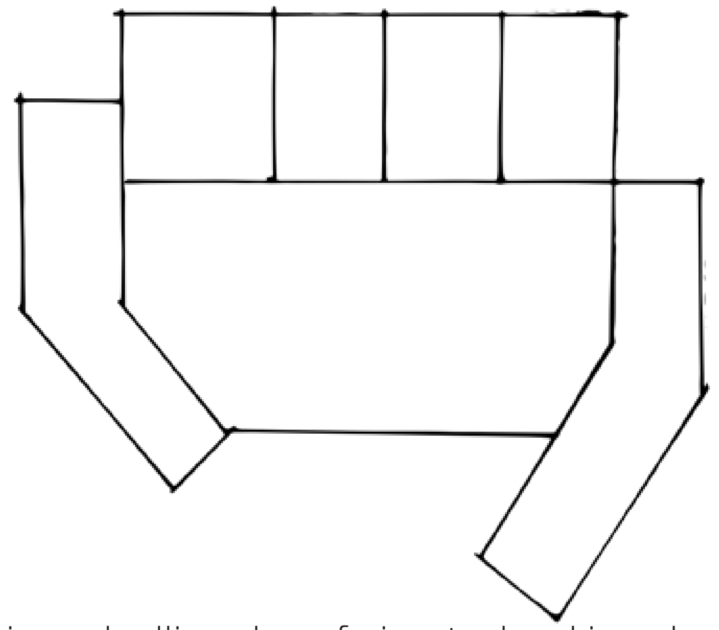
Pushing and pulling the wings to create more distinct spaces

3.



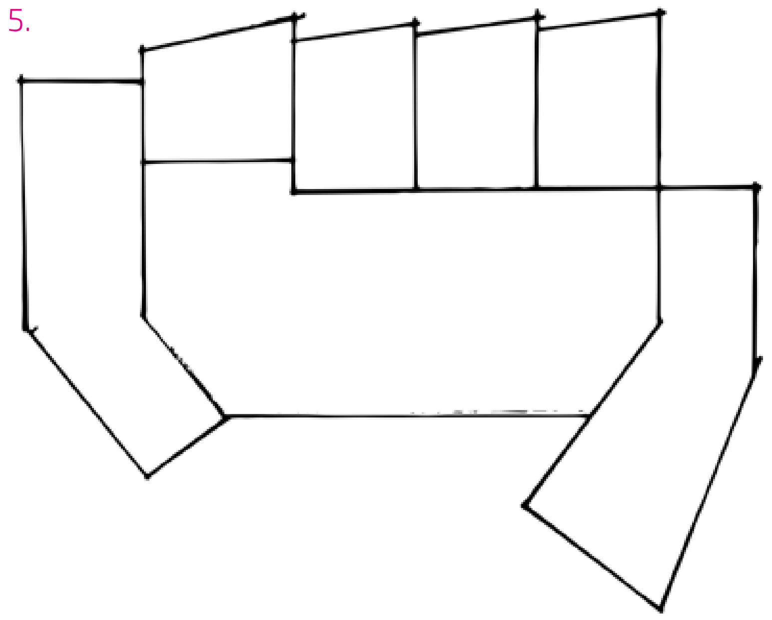
Making central hall uniform to create a more aesthetic plan

4.



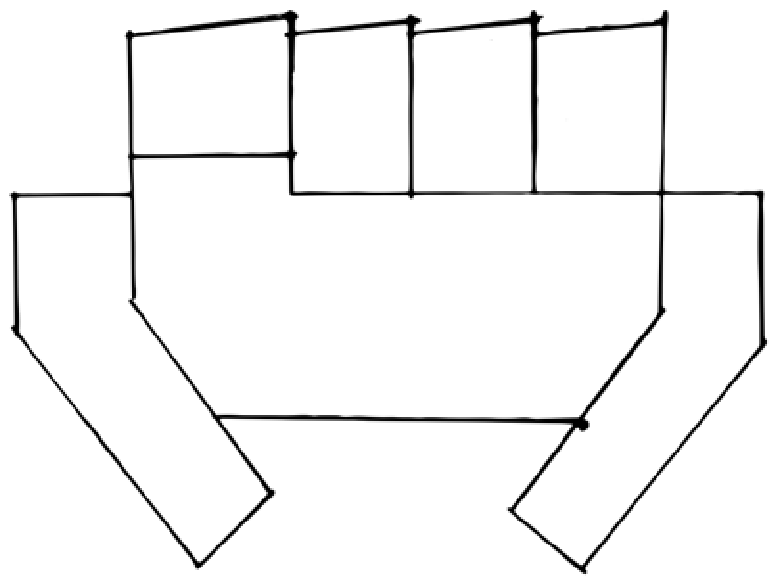
Pushing and pulling edges of wings to show hierarchy

5.



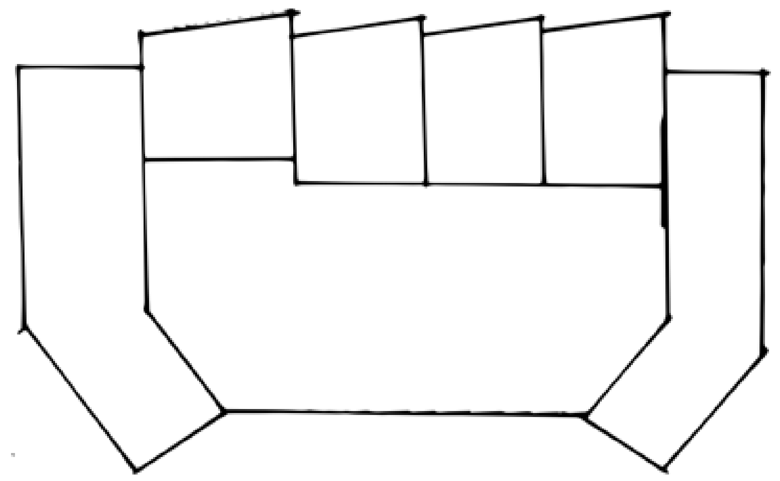
Grabbing the edges with the wings again, as the symmetry has separated the wing from the boundary

6.



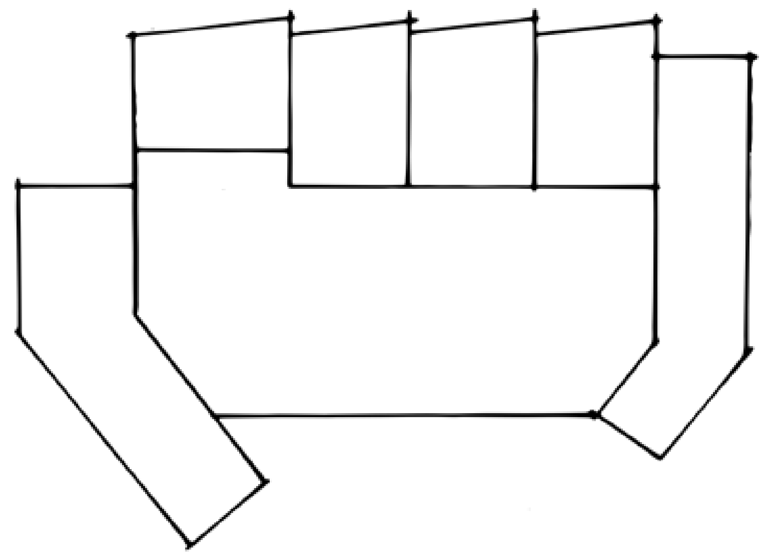
Extending both wings and orientating north facade to be paral-lel with boundary and allow more direct light in

7.



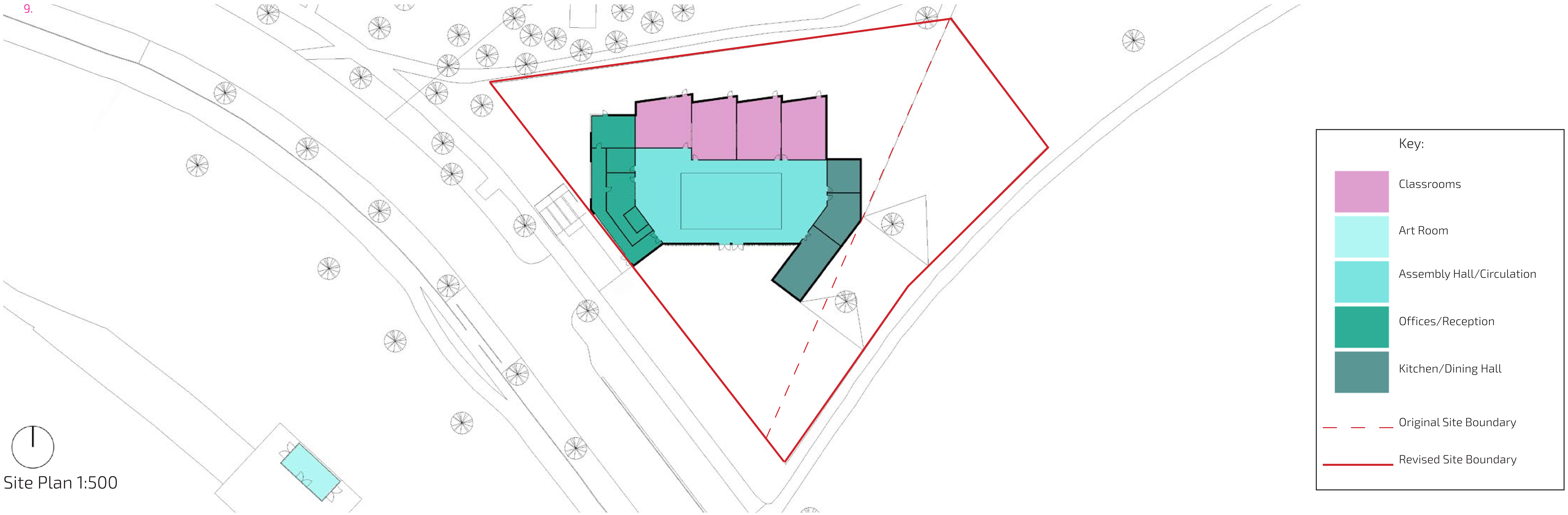
Extending wings towards the back, maintaining symmetry for a more aesthetic approach

8.



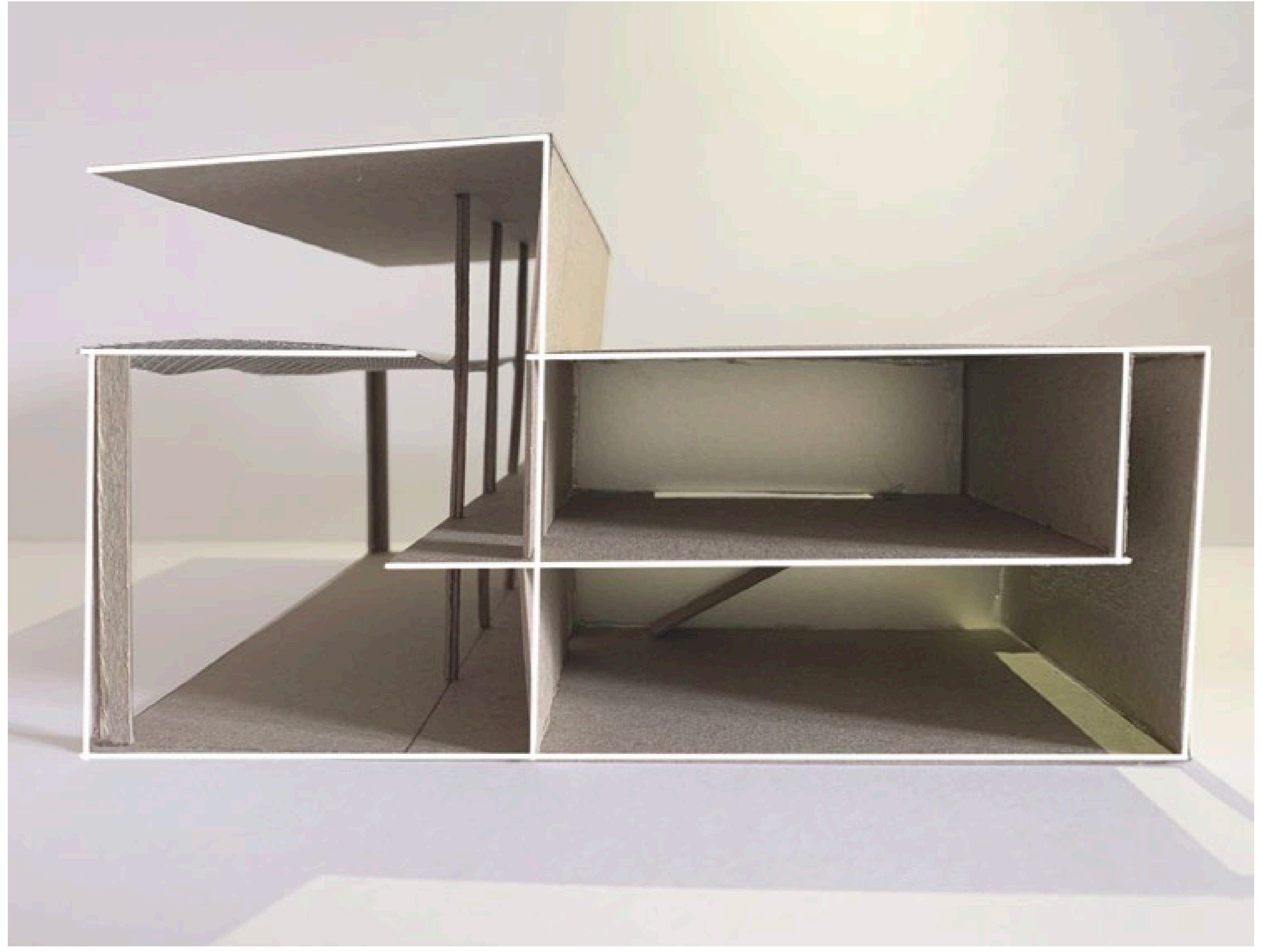
Pushing and pulling wings yet again to show hierarchy and difference in spaces in plan as well

9.

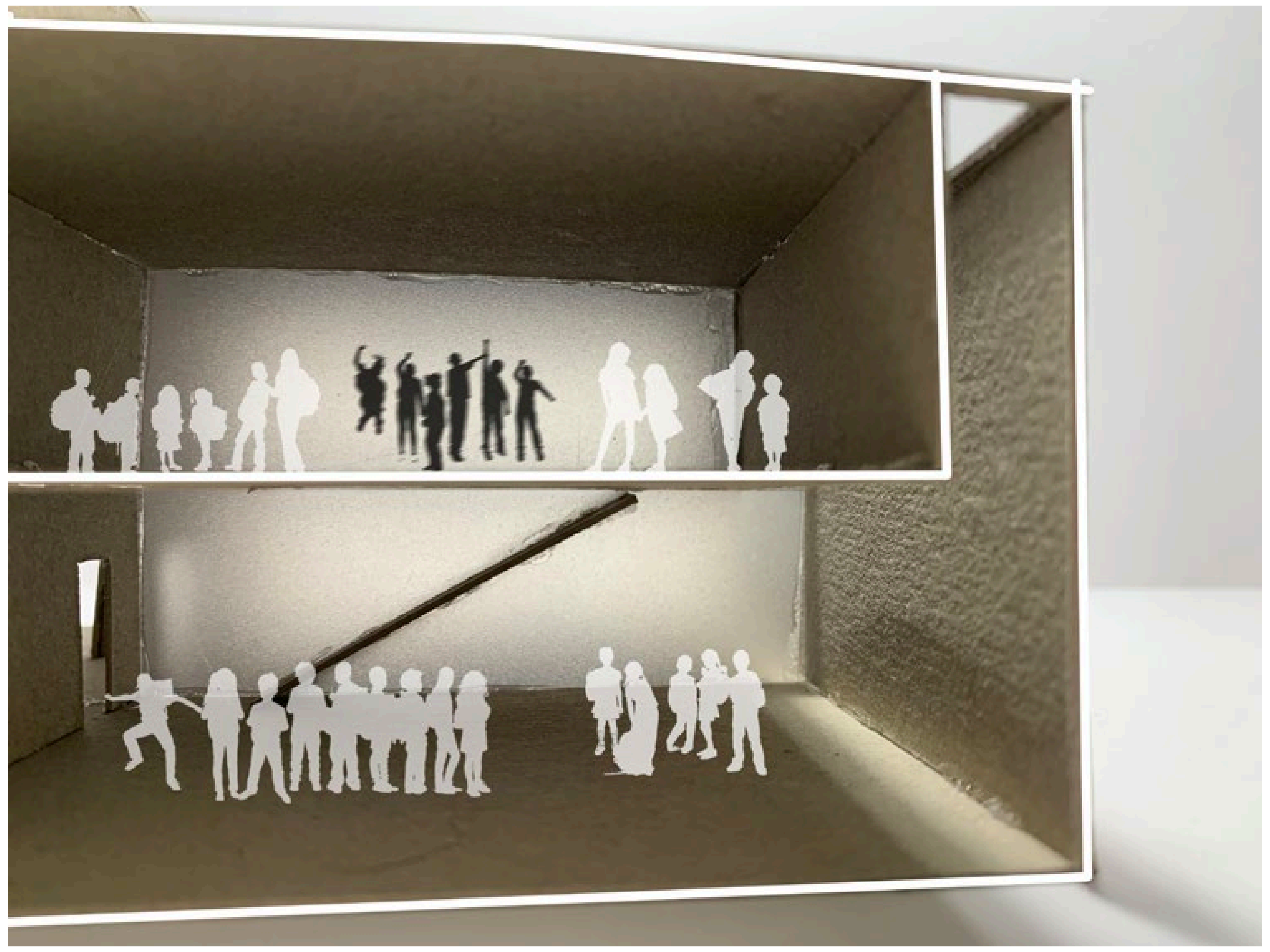


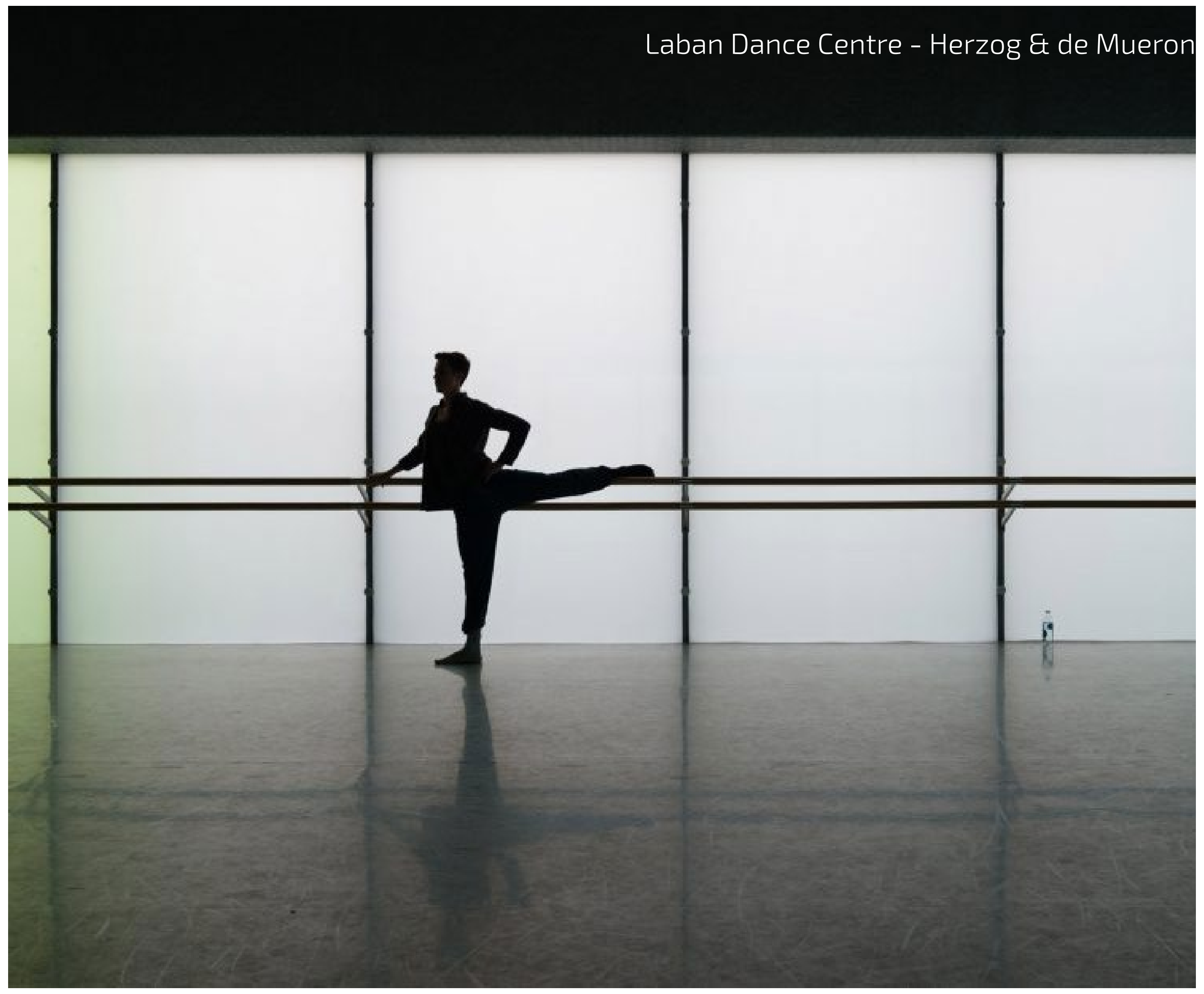
Site Plan 1:500

Development Work- Initial Model

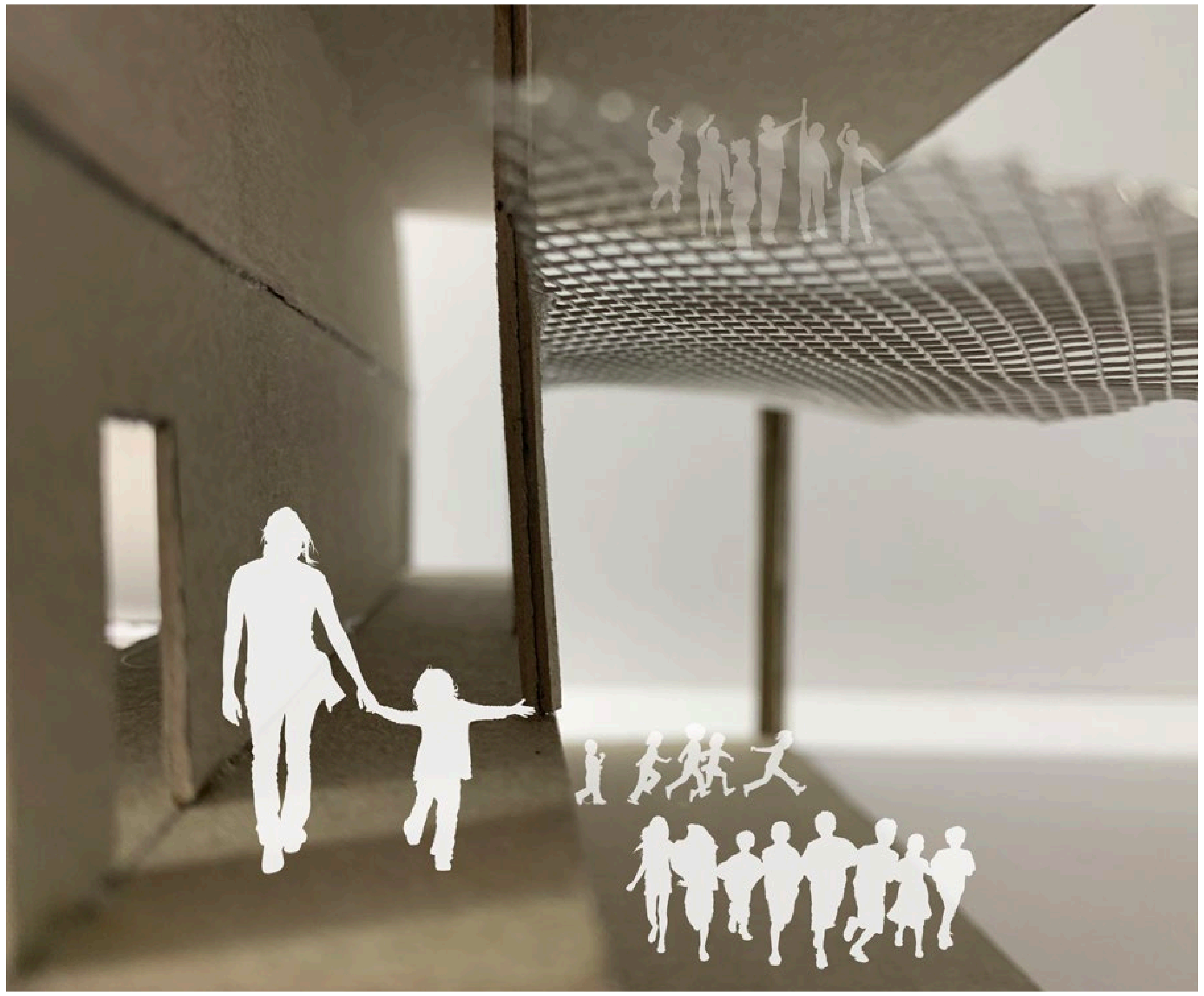


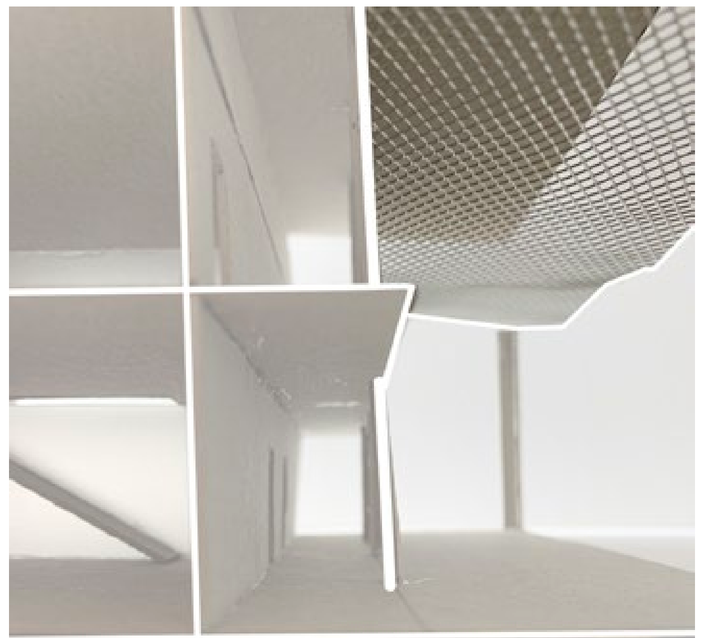
1:100 Model, mapping out spaces and testing light-wells and circulation in sectional view. Light-wells allow light into the bottom classes, if window placement on walls are restricted.



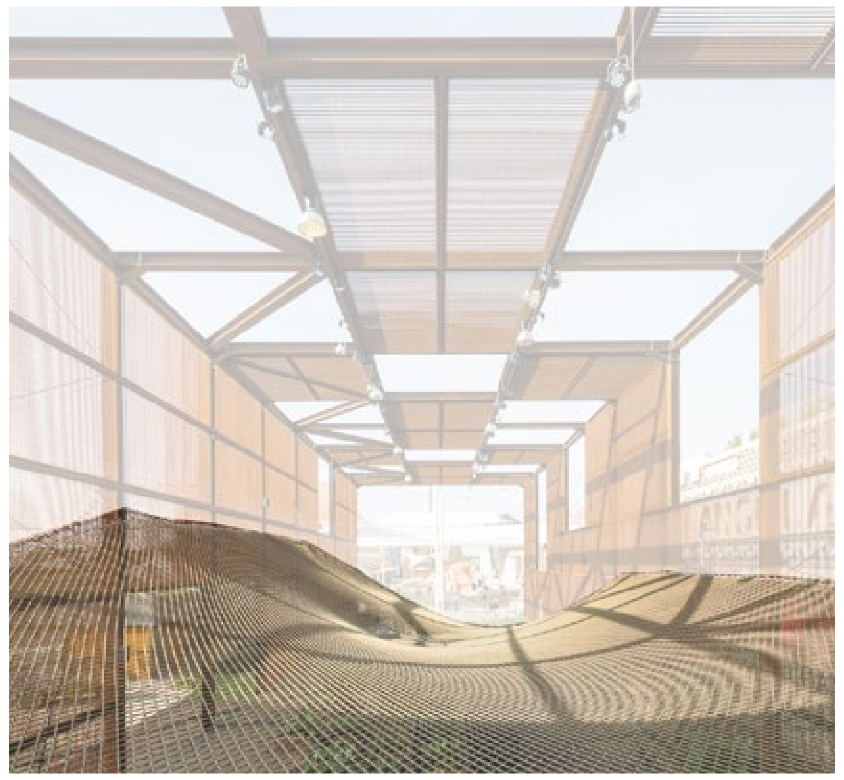


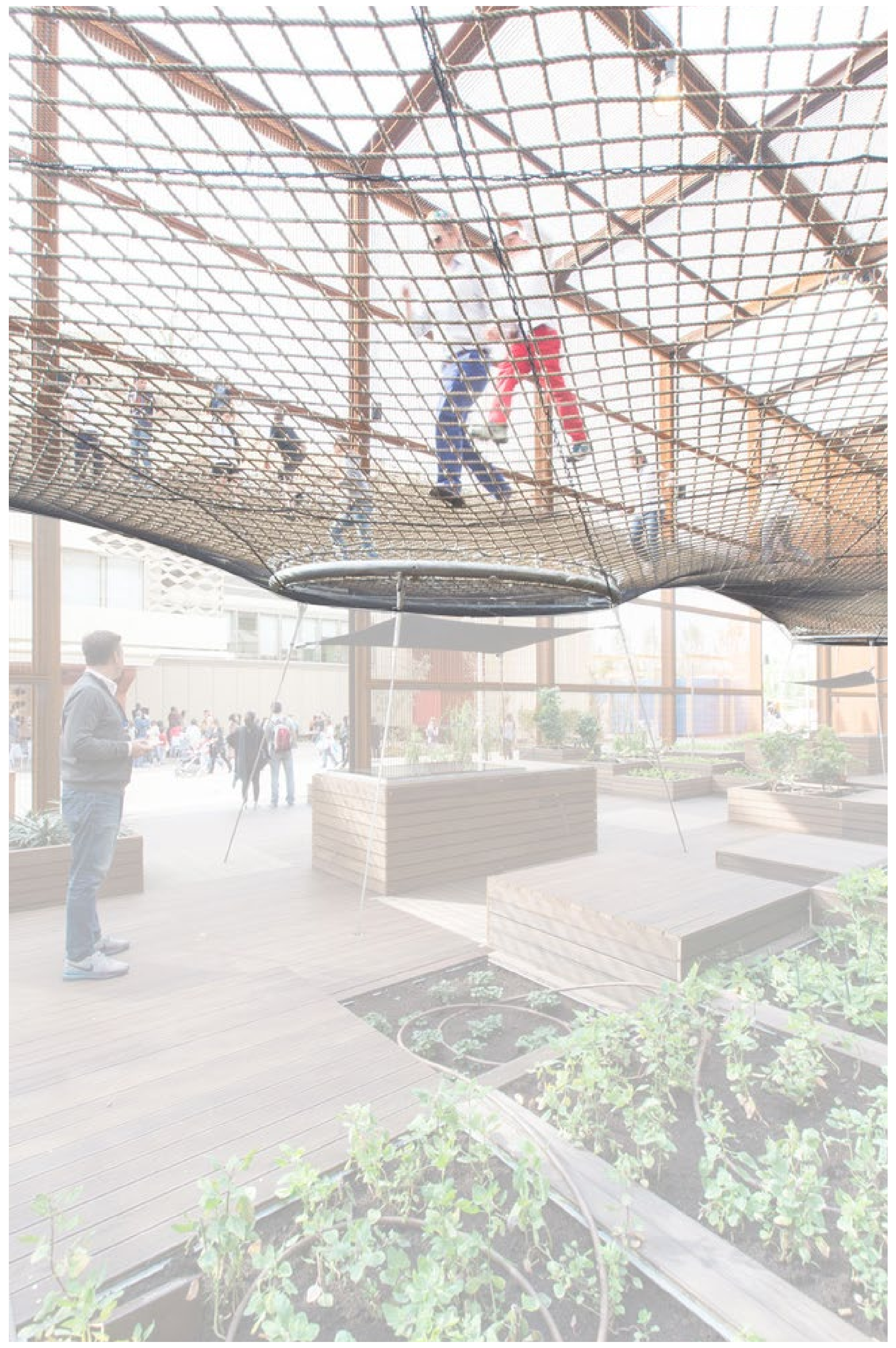
Frosted glazing wall to separate adjacent classrooms help create a feeling of connectivity and also allows the users to see motion in other classes, but not distract them too much from their learning. The silhouettes created add to the atmosphere of the space, similar to that of the Laban Dance Centre.





A double height assembly hall creates sufficient space for indoor activities. It is covered by a mesh flooring creating a single height play space above the assembly hall, essentially making the hall a triple height space when the play area is not used above. Skylighting can be implemented to create shadow-play from the mesh flooring.

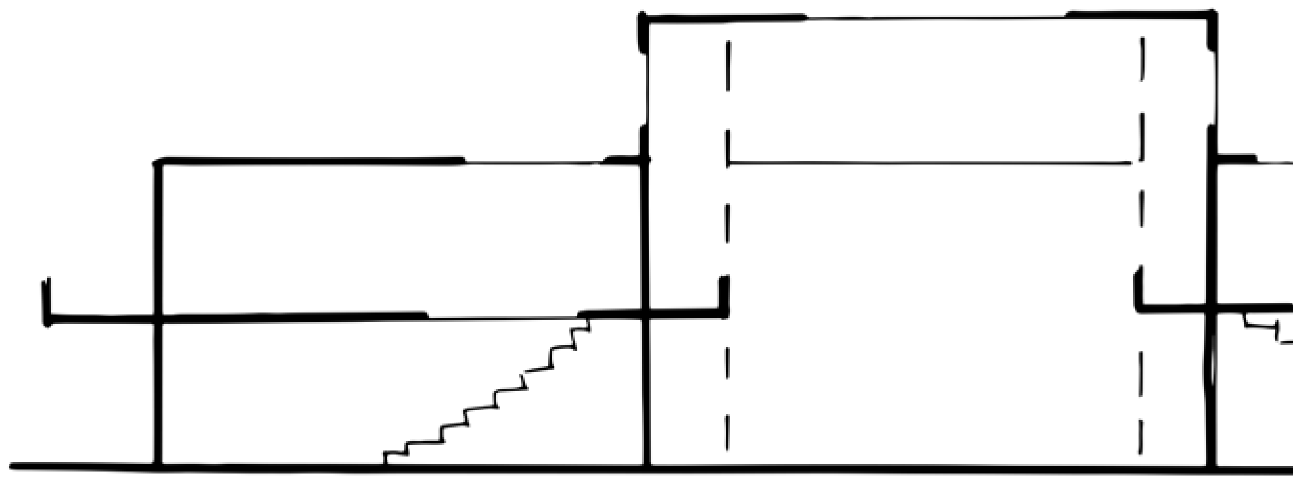




Brazil Pavilion, Milan Expo 2015 - Studio Artur Casas & Atelier Marko Brajovic

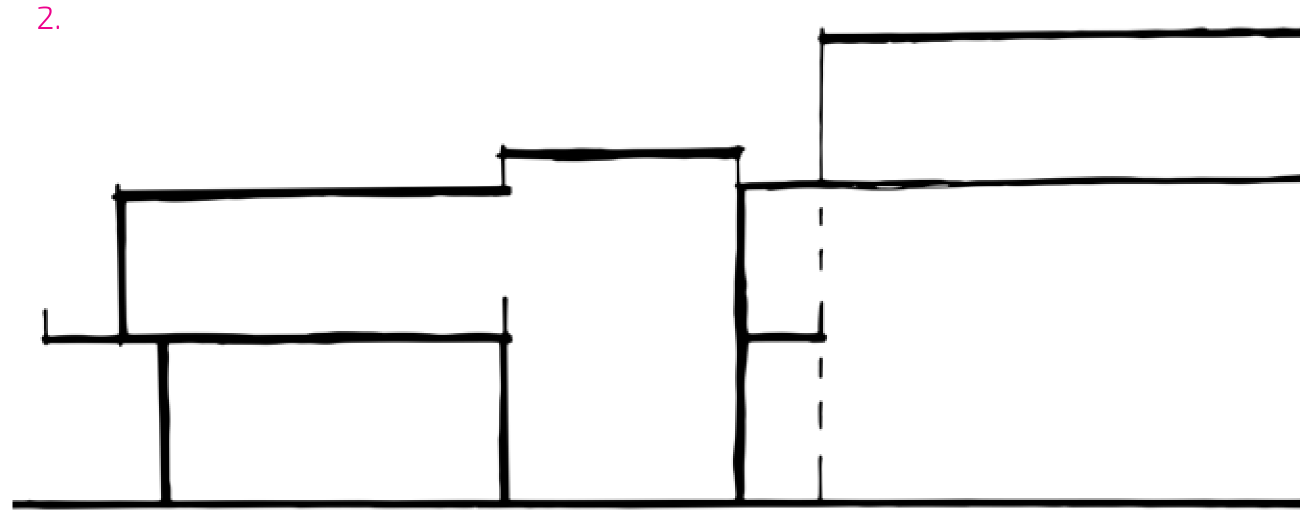
Development Work- Sectional Study

1.



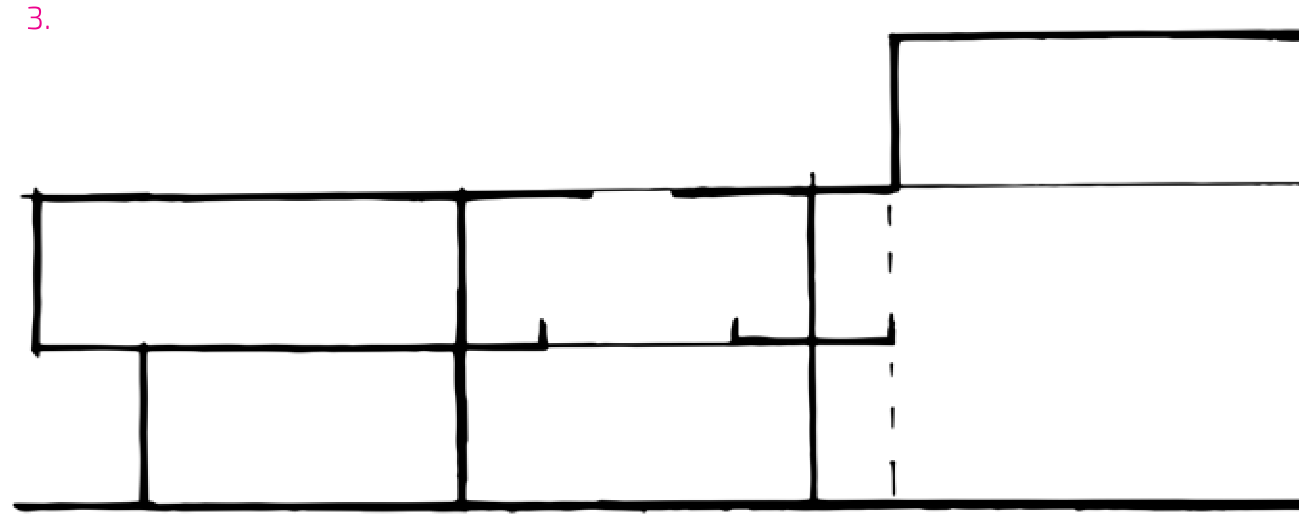
Classroom relationship to main hall and play space above main hall

2.



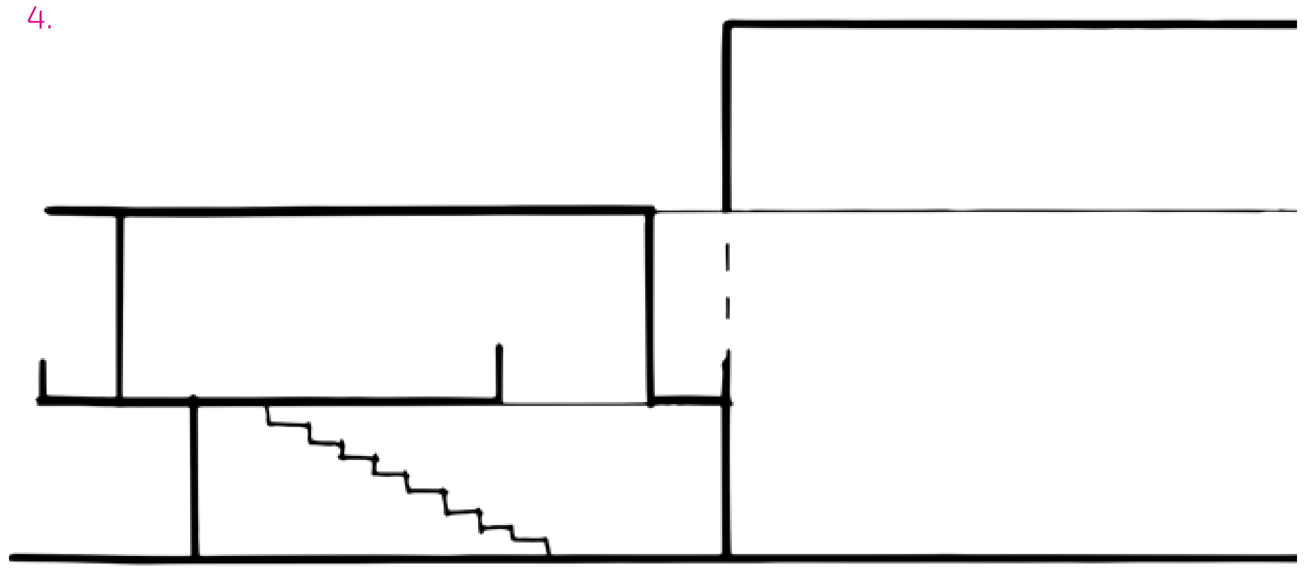
Making double height mixed classroom space connected to single height spaces

3.



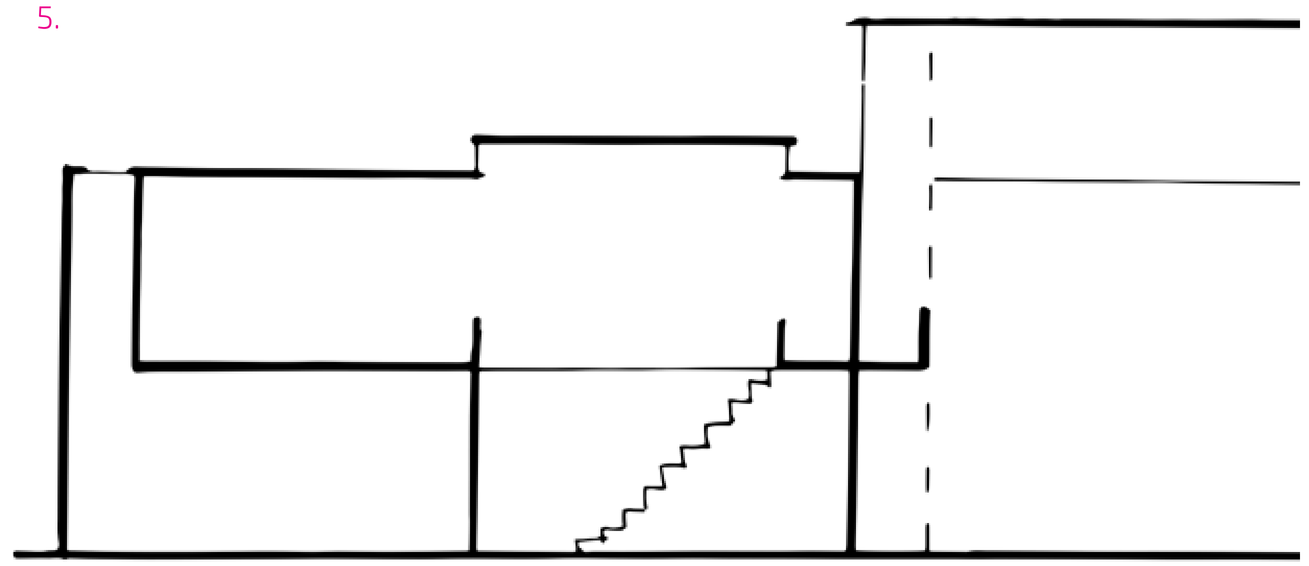
Introducing top lighting and internal balconies, creating overhang externally

4.



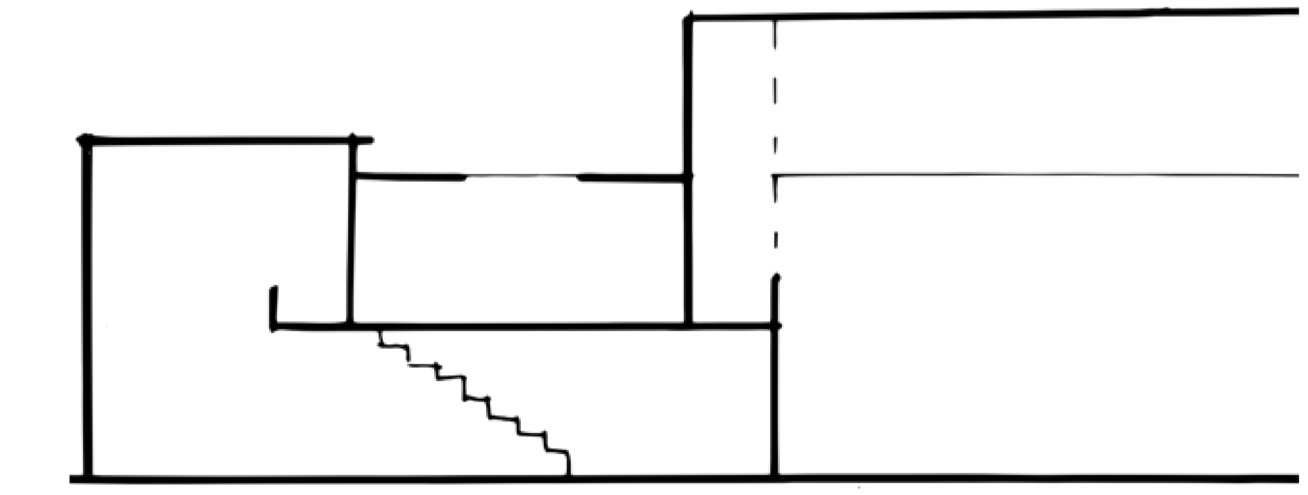
Top lighting along corridor around main hall, cutting into class room

5.



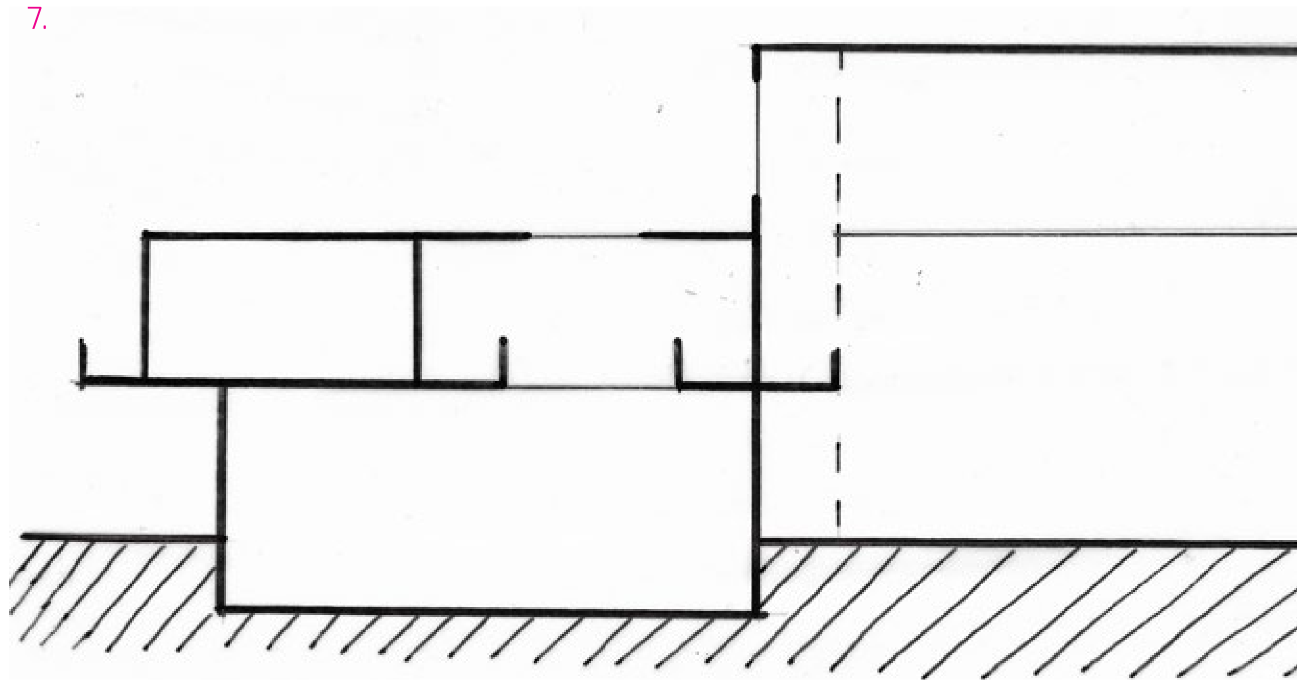
Introducing light wells at the rear of classroom to bring more light into ground floor

6.



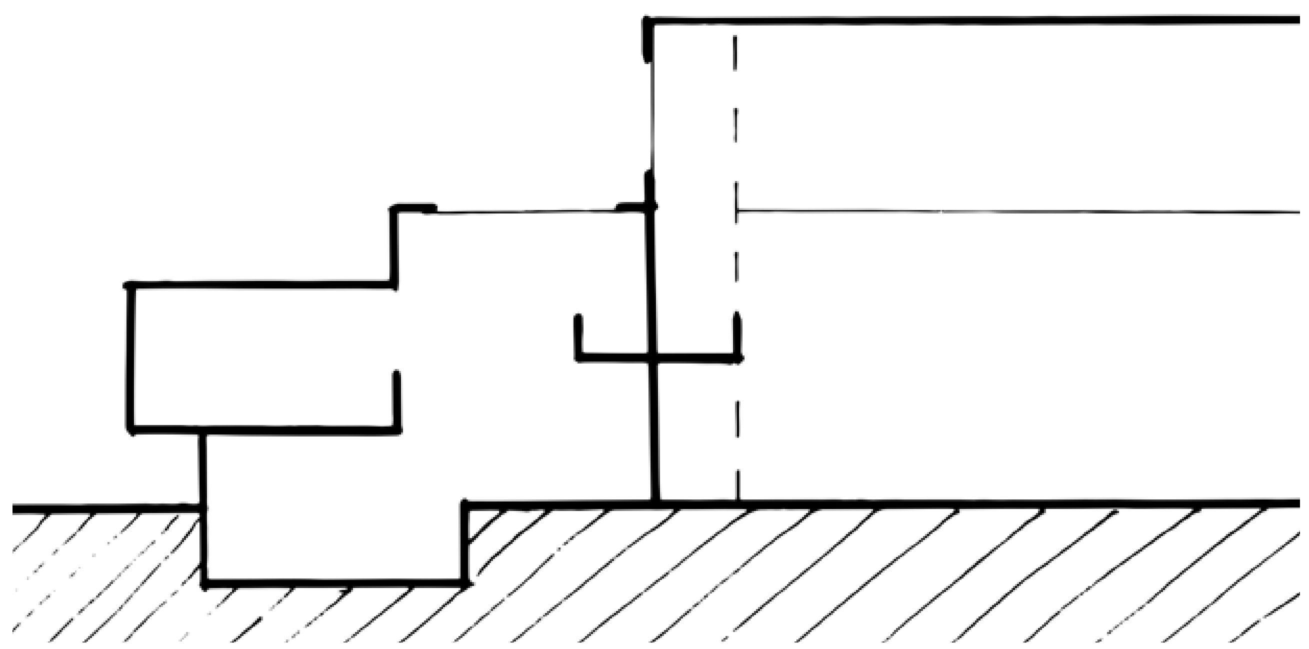
Moving double height space to the rear of building, top-lit single height classroom space

7.



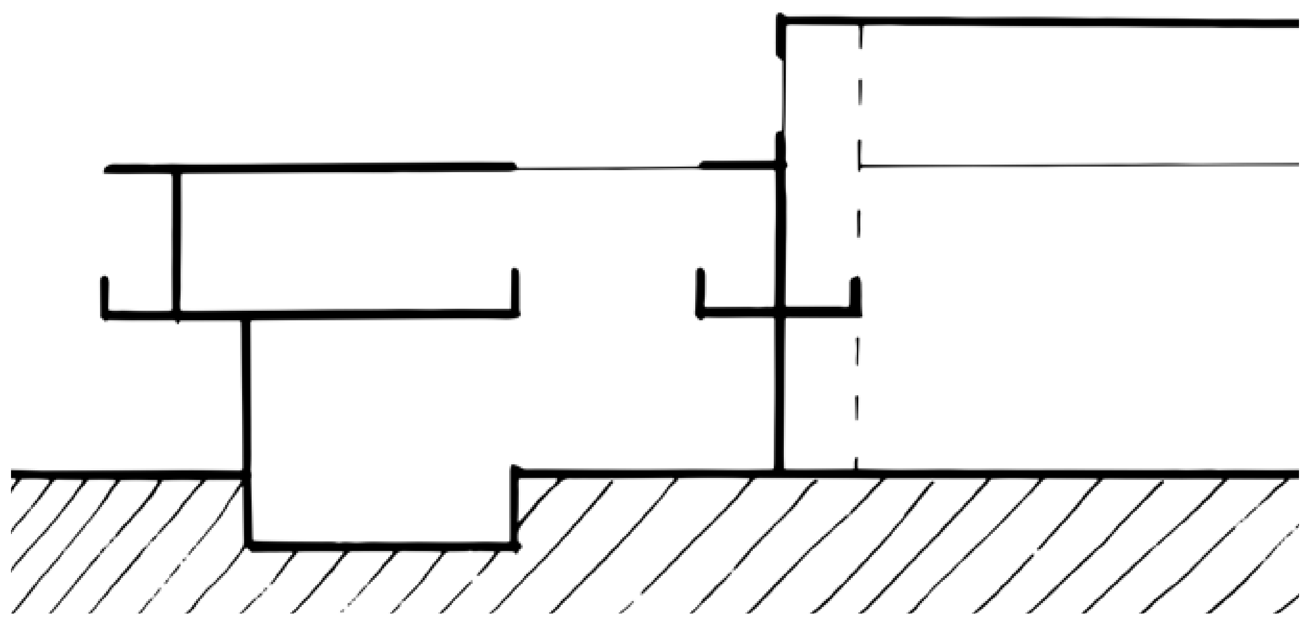
Cutting into site to lower the groundfloor classroom, increasing internal height

8.



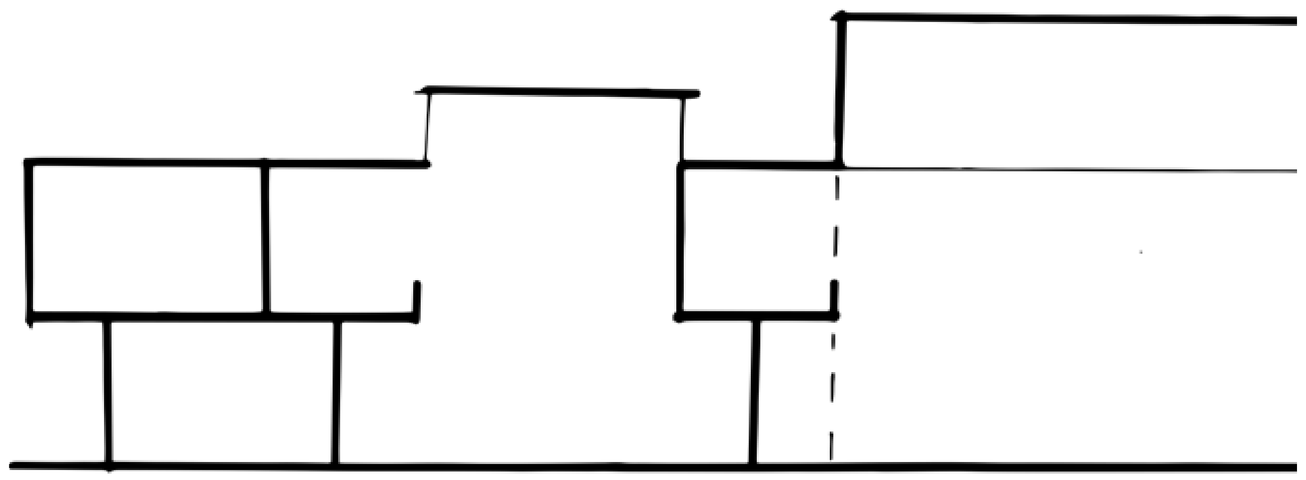
Only cutting in part of classroom, creating more variation in levels and half levels

9.



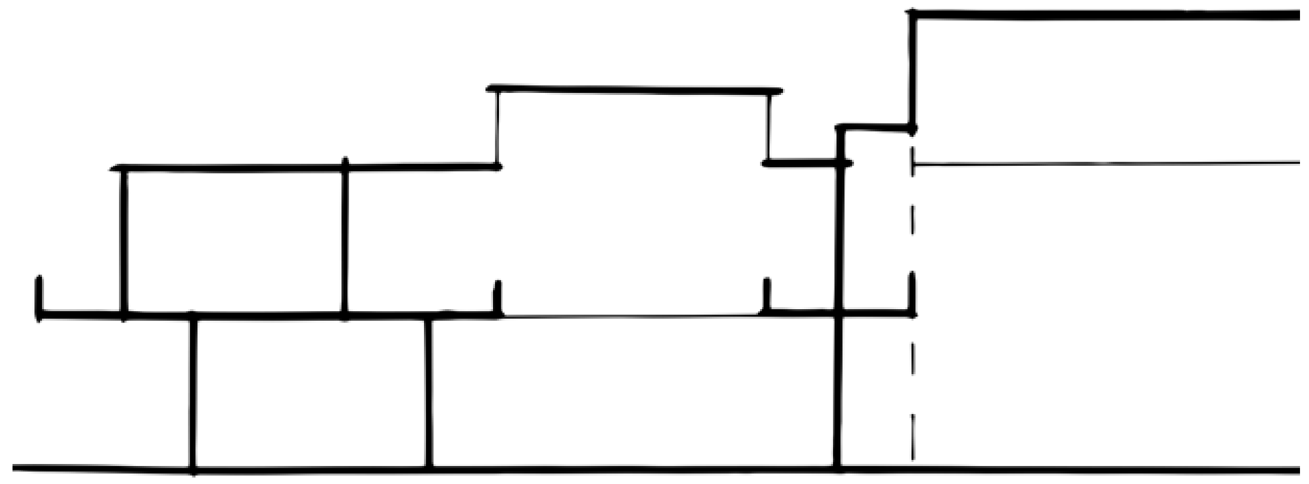
Combing balconies, overhangs and cutting into site, maintaining three distinct levels

10.



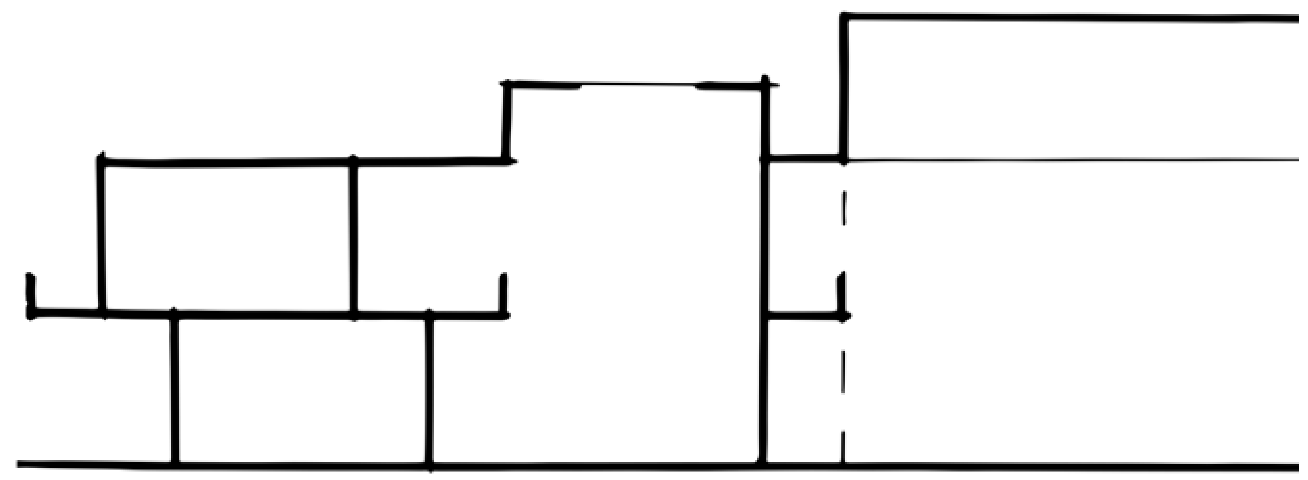
Two separate single height study spaces joining onto a double height top-lit mixed space

11.



Introducing balconies and variation in corridor height along the main hall, also top-lit

12.



Varying the internal balcony and corridor layout, creating more spacious double height class

Development Work- Colour Precedent Study

Colorée une Pause - Daniel Buren

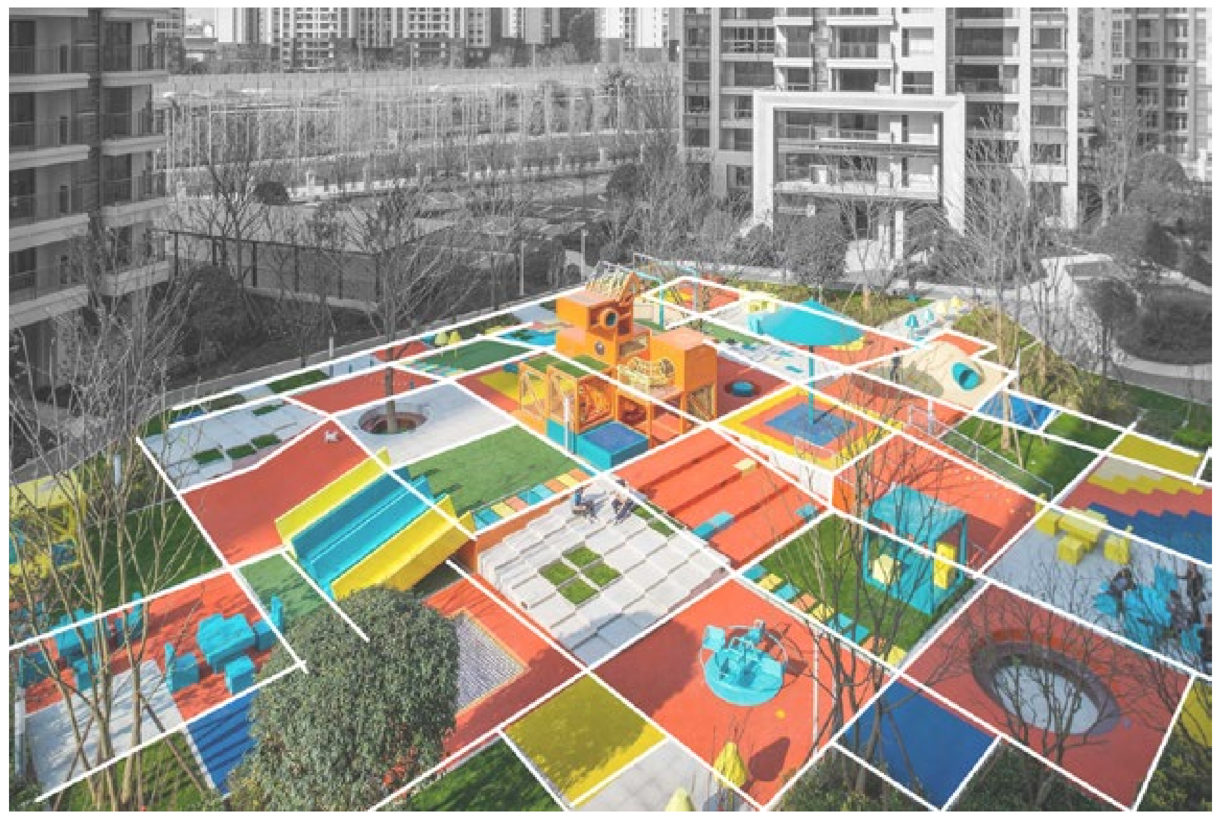
Colour coding year groups along corridors using chromatic lighting can be an interesting way to show the purpose of the spaces created.

Harmonic Convergence

ARoS Aarhaus Kunstmuseum - Olafur Eliasson

Archifest Pavillion - DP Architects

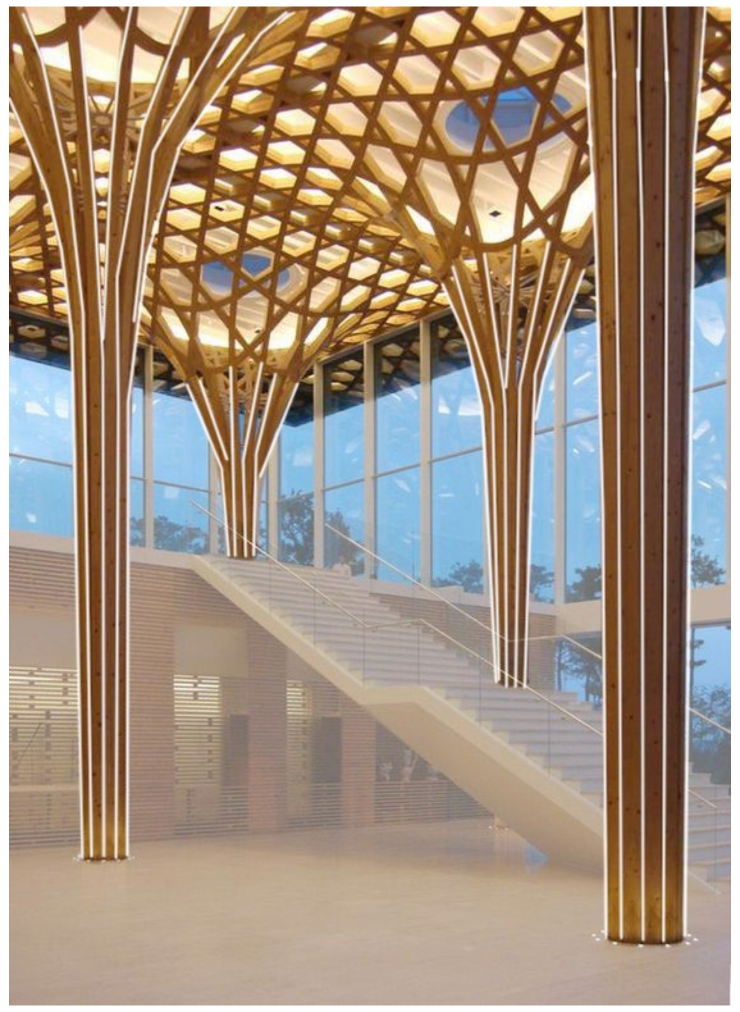
Nanyang Primary School - Studio 505



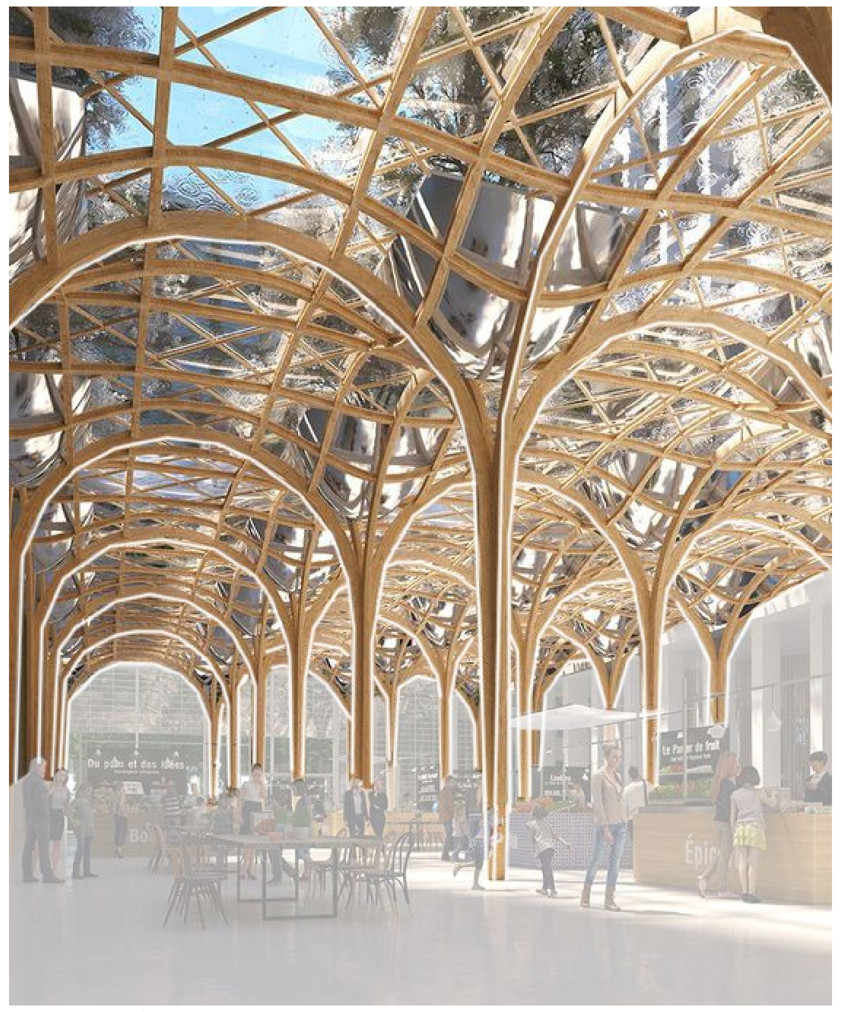
PIXELAND - 100architects

Colour coding can continue outdoors onto the playgrounds to separate the spaces. Level changes, slides, steps, and stairs can be implemented along with bushes and trees for landscaping to create a more interesting architectural experience outside. Repeated geometry can mimic the triangular nature of the site and tessellate within that region.

Development Work- Material Study



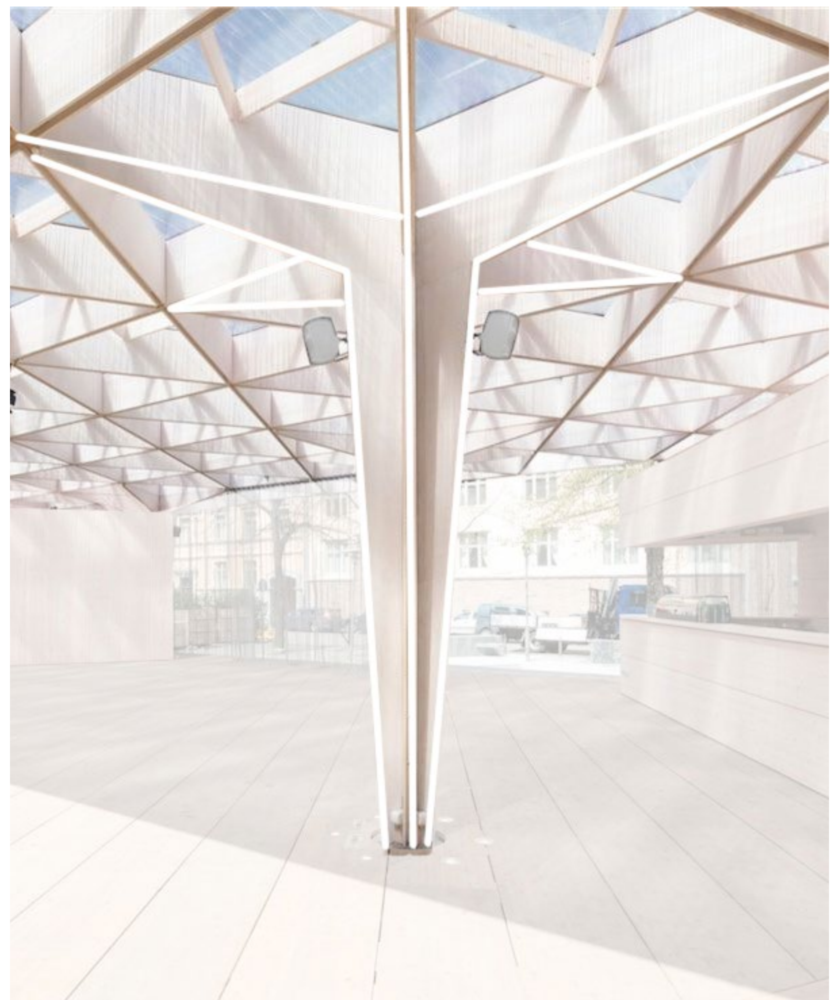
Nine Bridges Country Club - Shigeru Ban



Réinventer Paris Competition - Shigeru Ban

Christchurch Cathedral Square -Shigeru Ban

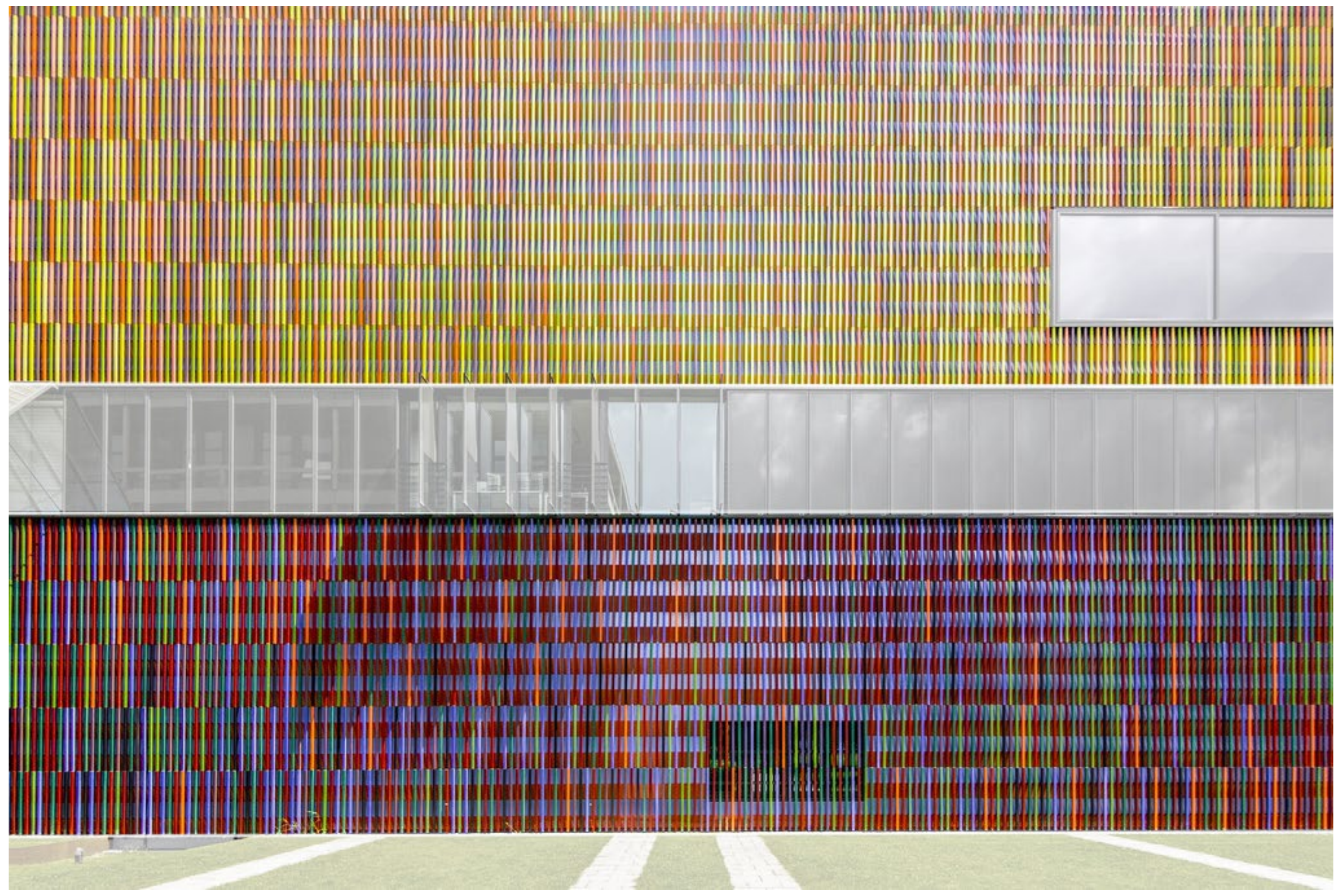
Curved timber columns representing trees bring a more natural feel to the buildings, often paired with concrete to contrast the two different material finishes, creating a nice balance. This also helps create a more inviting and comfortable environment to be in.



World Design Capital Helsinki 2012 Pavilion - Aalto Uni.

Parapules- Hess Timber Product

More abstract versions of these tree columns help create a timber roof structure that is usually paired with glazing to highlight the geometry and create a unique shadow play.



Brandhorst Museum - Sauerbruch Hutton

Multicoloured vertical ceramic fins colour code the building, separating spaces (floor by floor). Each zone has assigned colour combination.

Oxford Biochem. Building - Hawkins Brown

Translucent glass fins transition in colour.

The Ronda Building - Estudio Lamela

External horizontal fins change colour from deep red to yellow, help inhibit direct solar gain.

Year 6 Year 5 Year 4 Year R Year 3 Year 2 Year 1

The year groups have been colour coded on a spectrum transitioning from blue to pink with Year 1 and Year 6 on either ends and Year Reception directly in between the two extremes. These colours extend outside of the classroom as well, marking the territories of the upper and lower years respectively on the playground. The louvres will also span in this spectrum of colour.

Accoya Timber Cladding

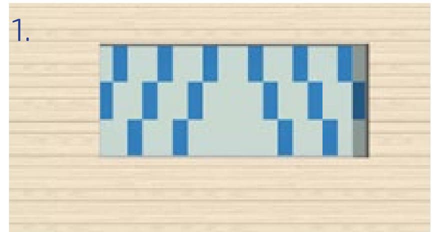
Interior Wall Finish

Smooth Finish Concrete

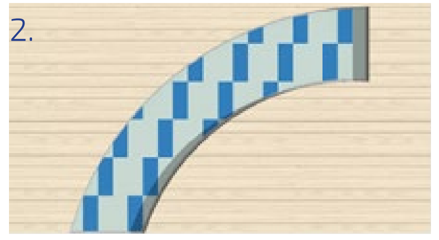
Both internally and externally the building will be constructed using muted colours in materials, helping to create a contrast from the colour-coded classes which bring vibrance to the scheme.

Development Work - Window Study

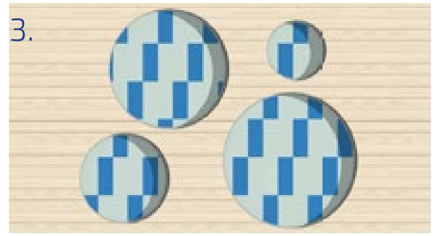
Exterior Window Study - 1:100



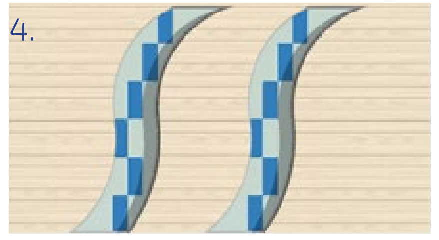
Colour coded chromatic window 30% fill



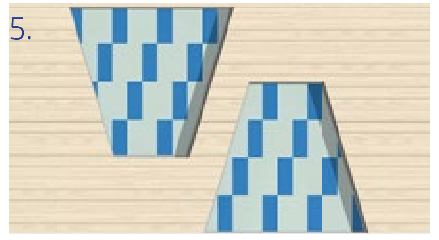
Curved window to soften rectangular architecture



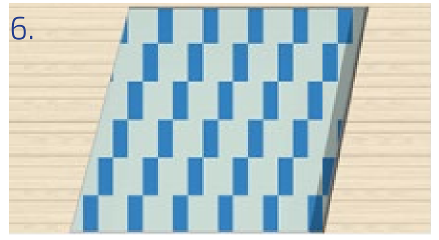
Circular windows bring element of playfulness



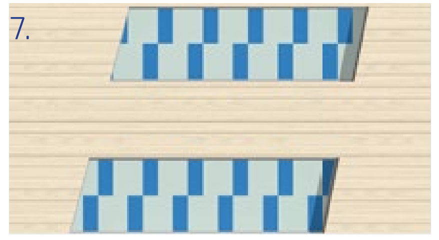
Sweeps carry on theme of playfulness and softer forms



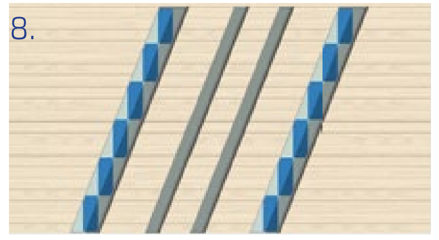
More angular shapes tie in with building's architecture



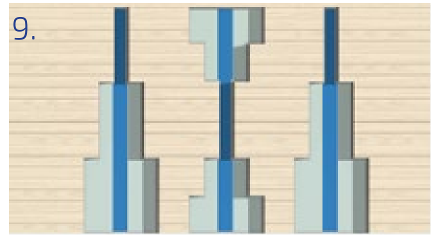
Full size window running from floor to ceiling



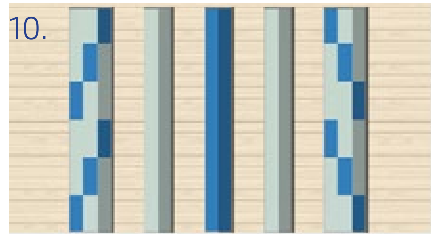
Limit solar gain and create interesting shadow play



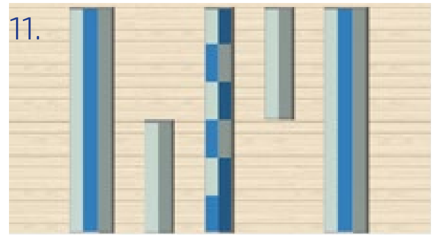
Slanted vertical slits allow for playful exploration



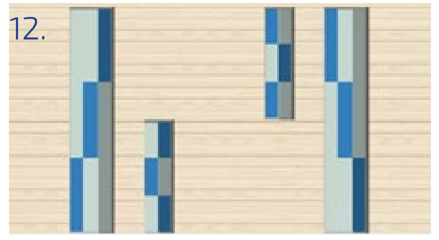
Staggered pyramid shaped windows create seating



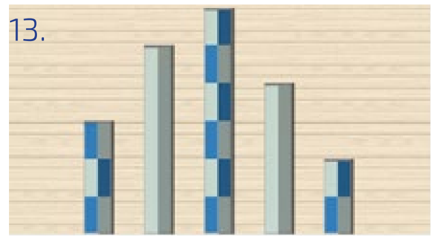
Verticality of the building reflected in windows



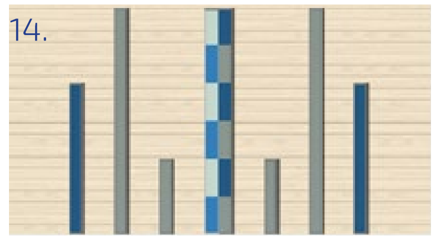
Changing sizes of the slits, keeping symmetrical



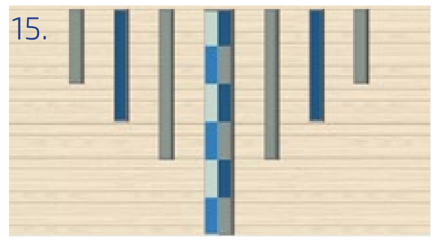
Framing views and creating more 'negative space'



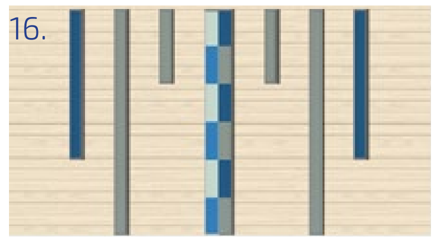
Asymmetric pyramid/ triangle



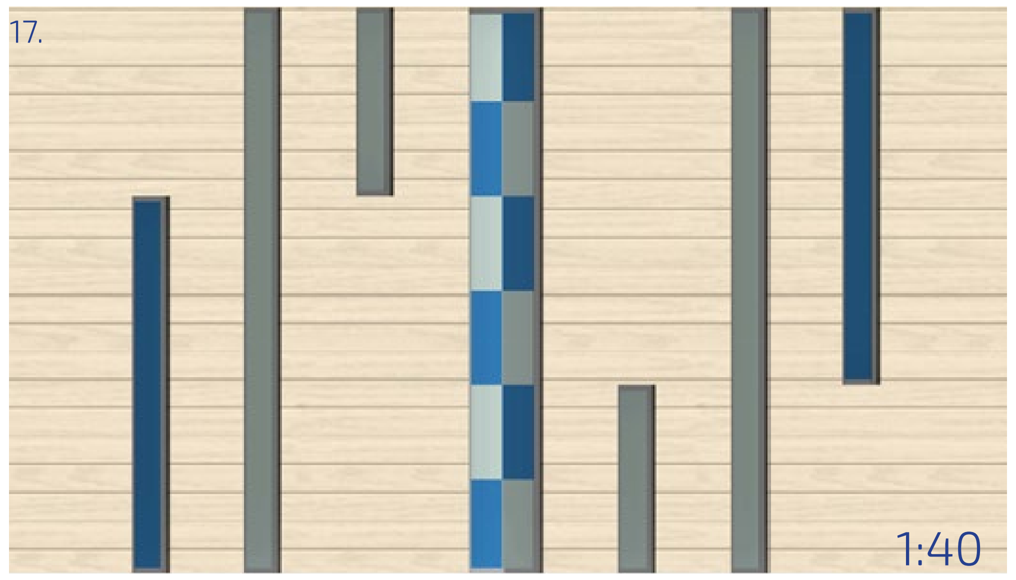
Randomized slit distribution more interesting



Inverting the pyramid to allow in more sunlight

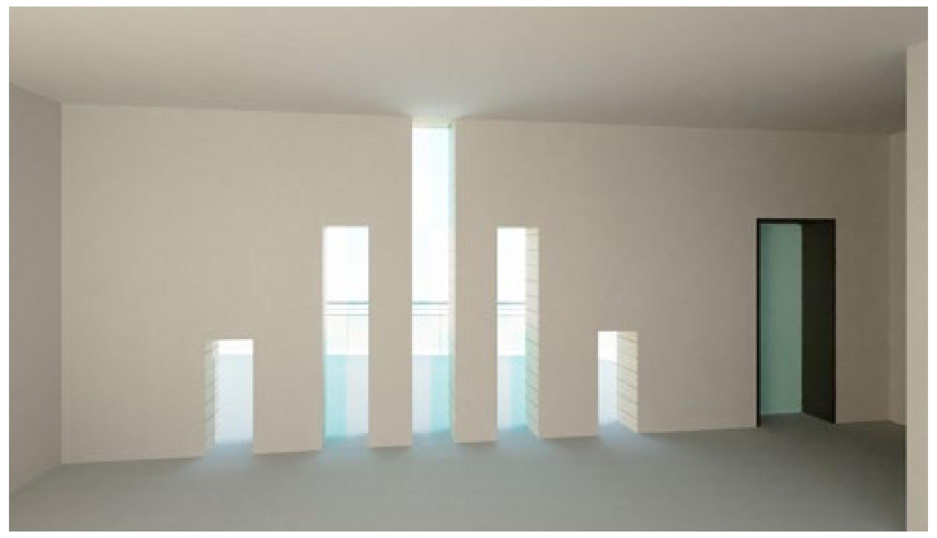


Inverting the slits to allow in more sunlight



Creating a more aesthetic slit orientation by making it symmetrical, also making sure to have many windows start from floor level.

Interior Window Study

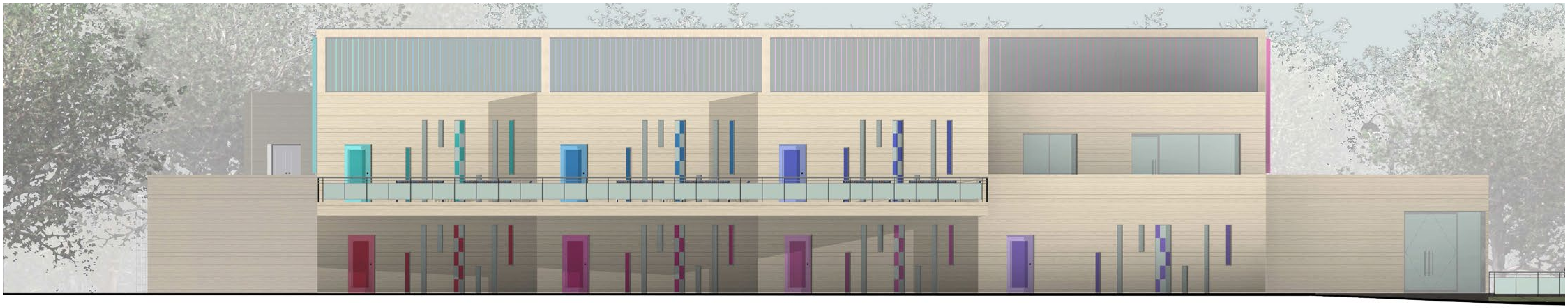


Identified the dark corner by the door, prompting a change in door materiality to allow in light.

Testing a different window design, identifying some windows may be too tall for practical use by the students.

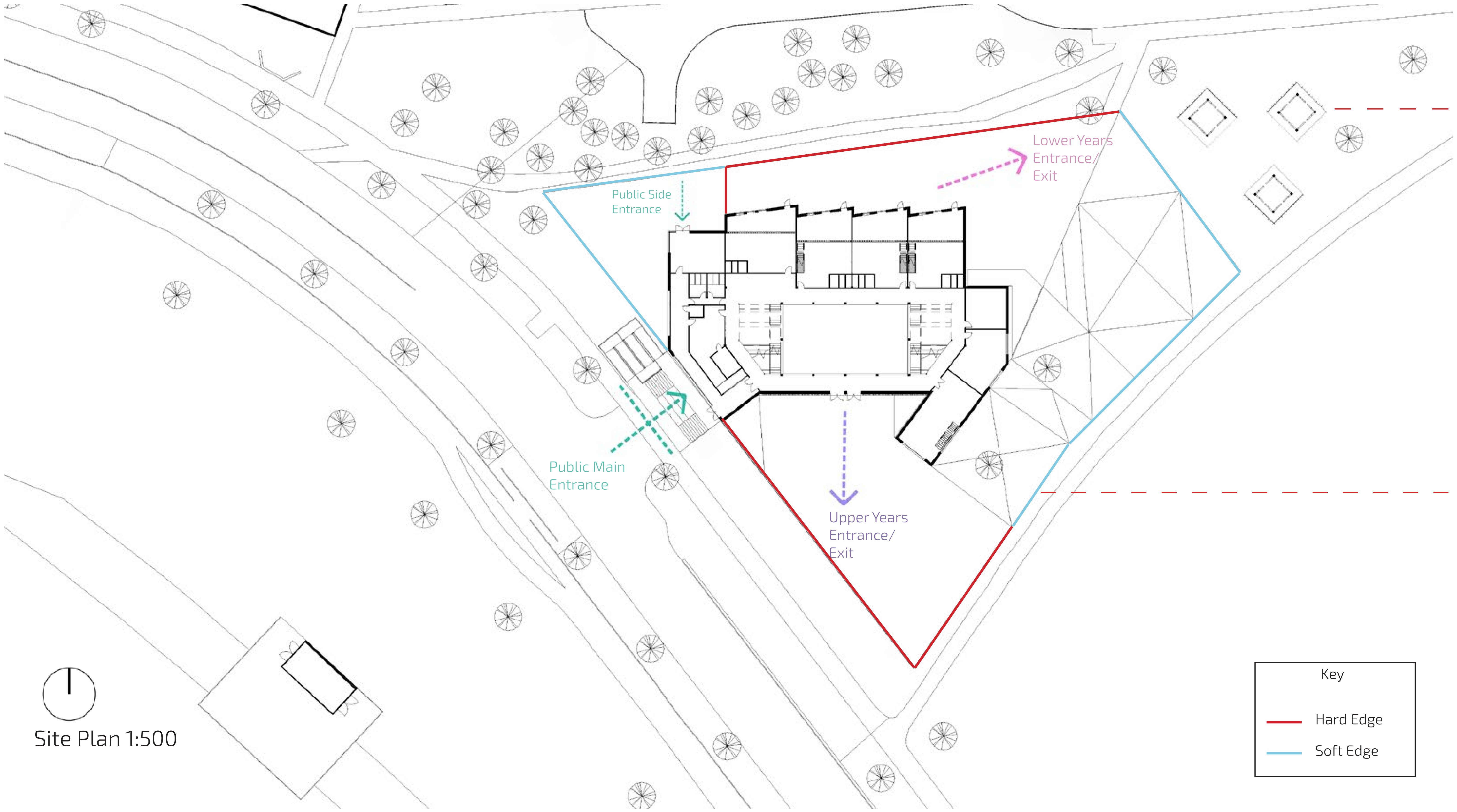
Checking the final iteration, making sure enough light enters the classroom. More variation in window placements leads to more usable windows and a more aesthetic symmetrical design.

Window Study - 1:100 North Elevation



1:100 North Elevation showing all the windows to the classes, colour coded in the system of colours set out earlier when exploring materiality. Maintaining a ratio of 30% colour fill in the windows allow for a efficient work environment that is also more comfortable than just normal clear glazing and has capabilities to reduce solar heat gain, as found in my dissertation study. The checkered window pattern add some complexity and symmetry to the design which are both heavily linked with ratings of aesthetic quality of a space.

Development Work- Landscaping



Pavilions

MPavilion - Amanda Levete

Kitchen21 - TU Wien Institute

The scheme will incorporate pavilions on the public side of the school, offering parents a place to sit and wait when they come to pick their kids up after school. It is also a place for people to rest who come by the park.

The materiality will reflect the main hall in the design, supported by timber columns shaped like tress branches and glazed all around covered by louvers in the same colour scheme as the main hall.

Playground

The external playground will be reminiscent of the landscaping by 100architects, but guided by the site's triangular nature. Instead of forming various sized rectangles and squares, it will be constructed from triangles. The colour scheme will also be less random, driven by the colour-coded year groups, marking their territories.

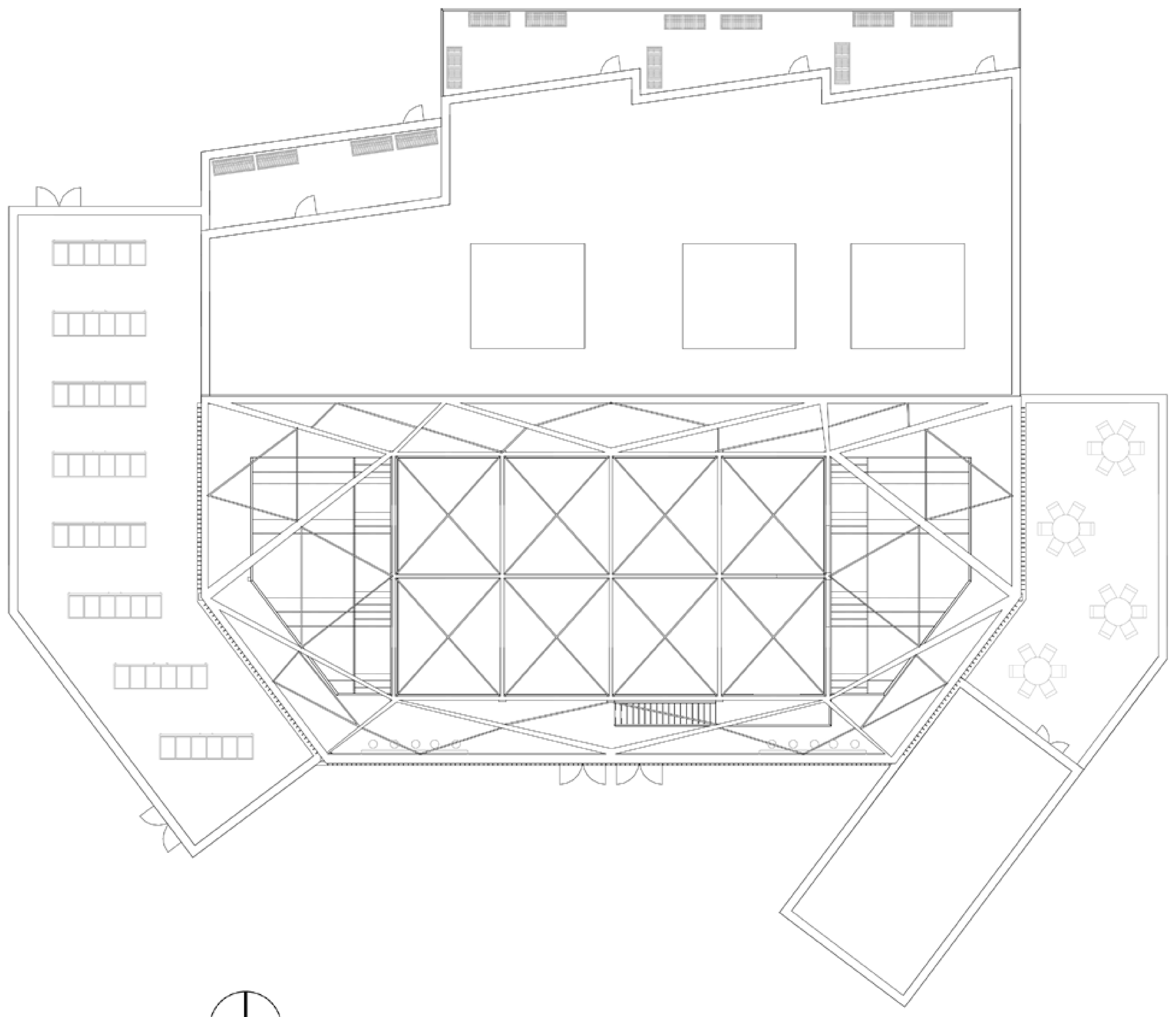
Hard Edges

Hard edges are formed along the street front and the sidewalk running by the northern side. Hard edges around the site will be formed using natural elements. Bushes help shape the site boundary, integrated with seating spaces made of natural wood. Fences will also be used where necessary, creating a harsh boundary street-side as a means of protection for the students.

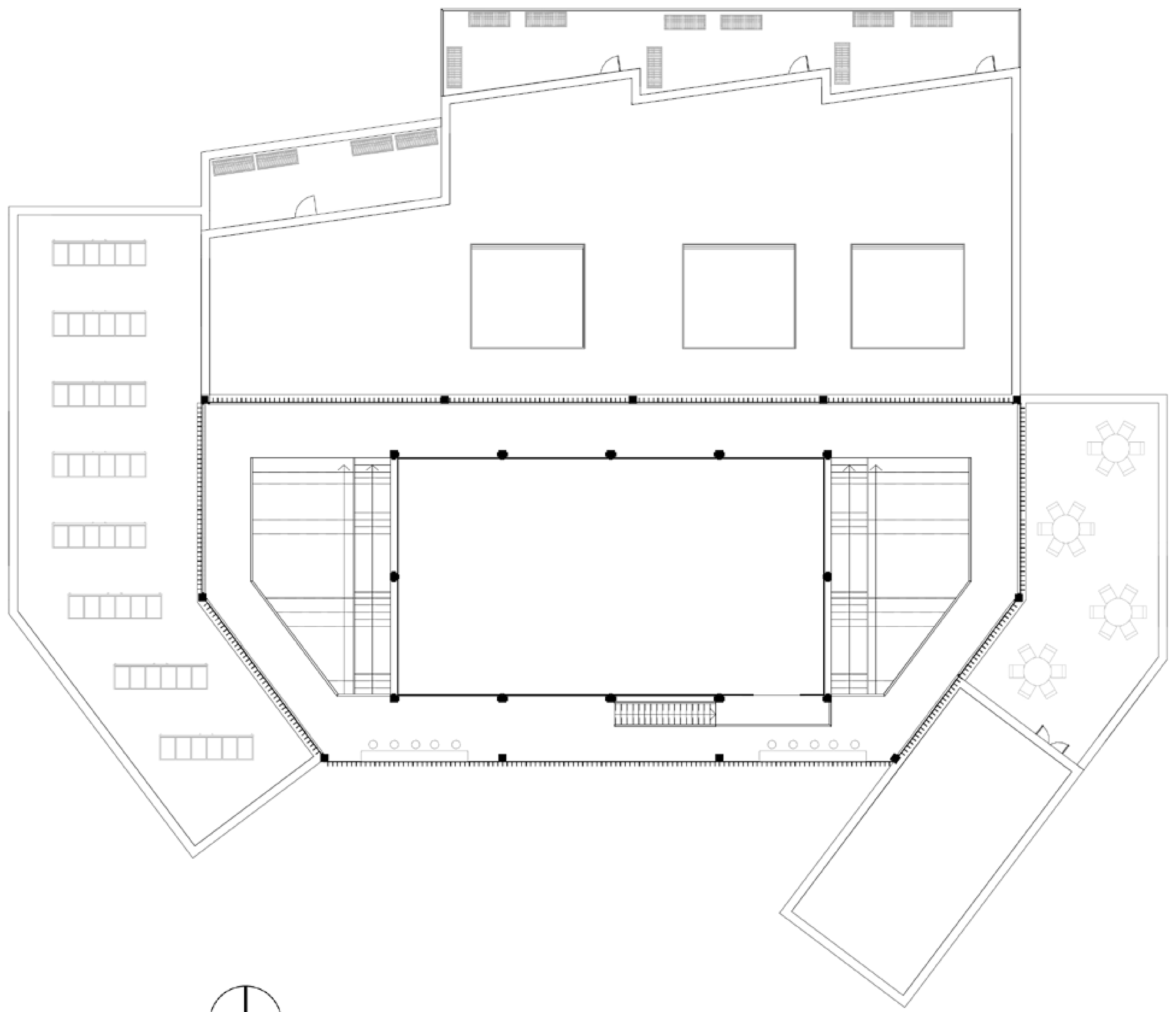
Soft Edges

Soft edges are created by the fields, creating a more integrated site to its surroundings instead of cutting it off. Soft edges will be formed using seating areas, mainly benches to mark out the edge of the site, orientated for use by the students. The public corner in the north-western side will also feature a very soft edge to make it an inviting and welcoming space to be in.

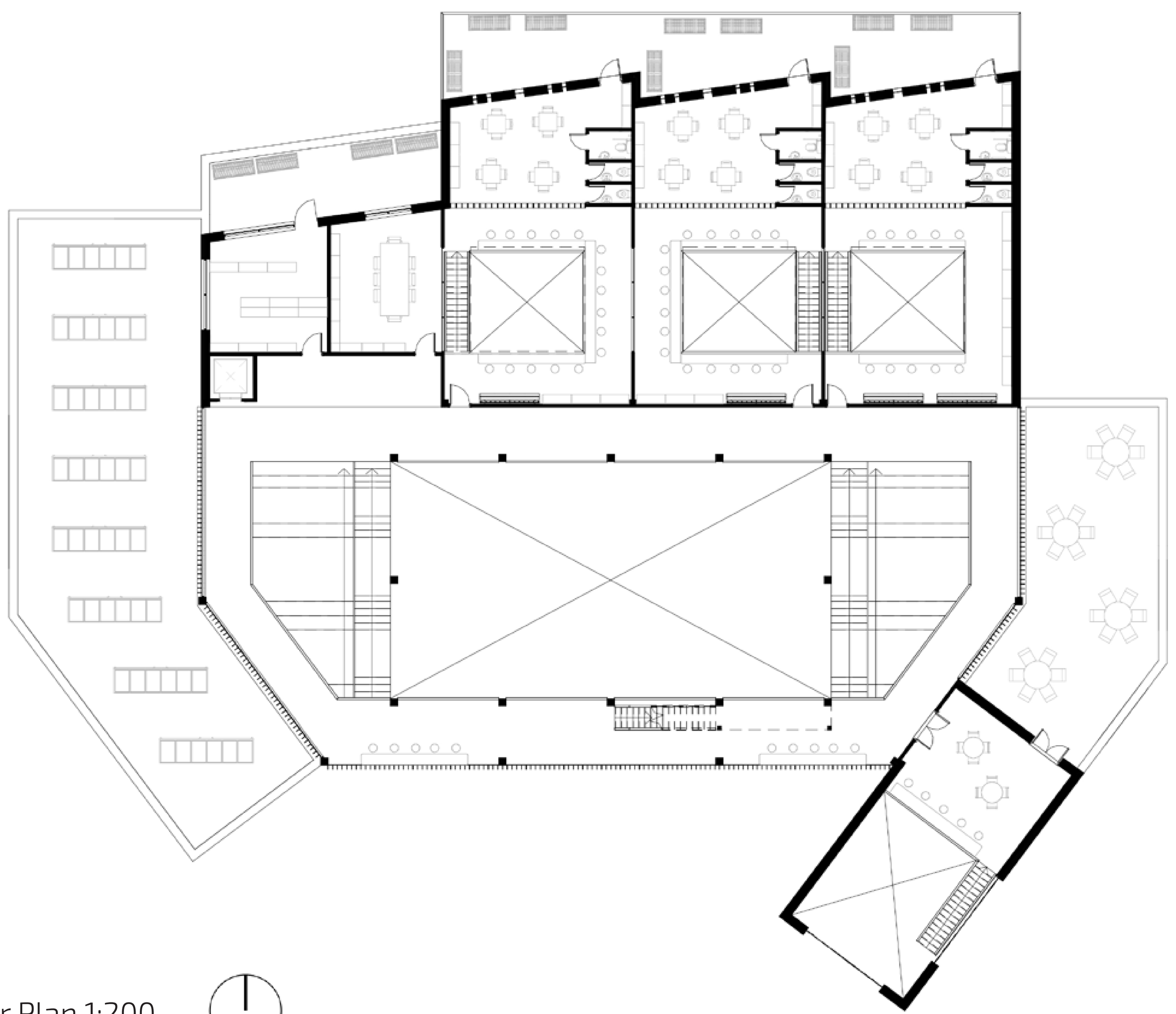
Ground Floor Plan 1:200



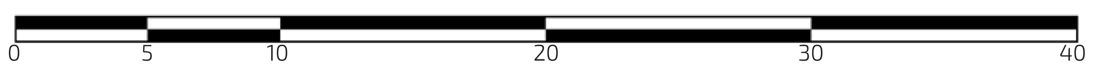
Roof Plan 1:200



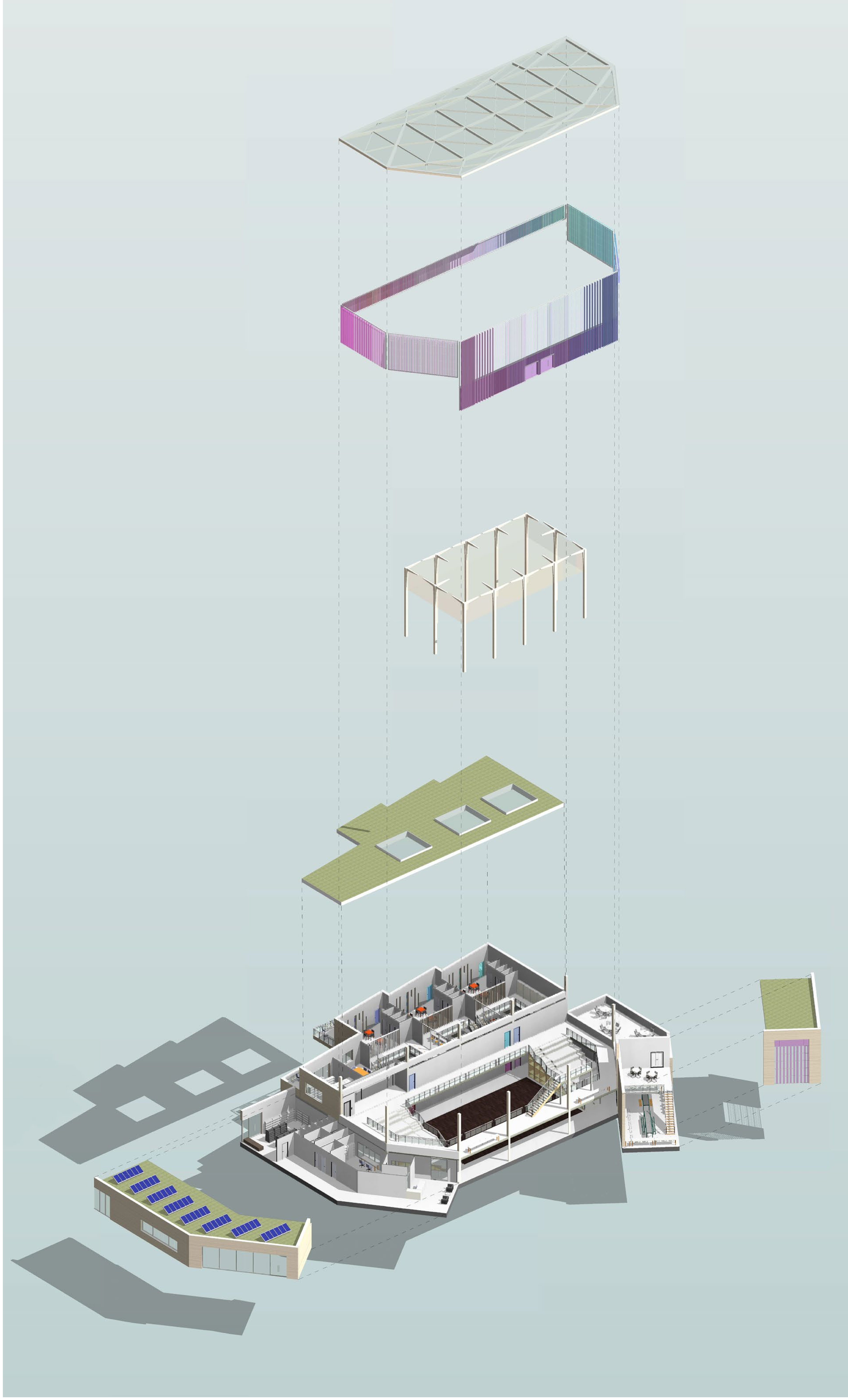
Second Floor Plan 1:200



First Floor Plan 1:200

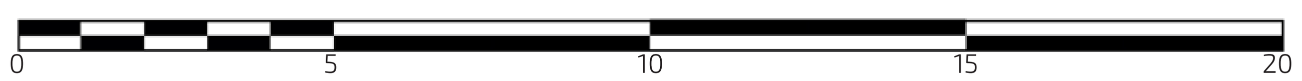


1:200 Exploded Axonometric View



1:100 Axonometric View

1:100 Scale Bar



Axonometric View in Context

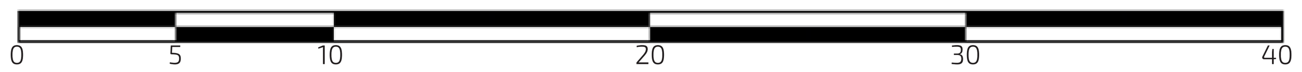
East Elevation 1:200

0 5 10 20 30 40

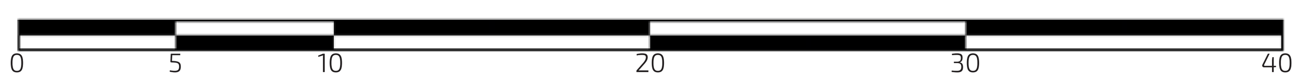
West Elevation 1:200

0 5 10 20 30 40

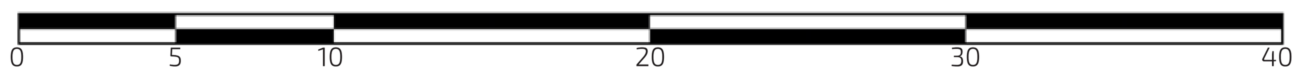
North Elevation 1:200



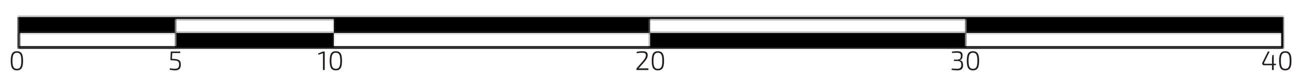
South Elevation 1:200



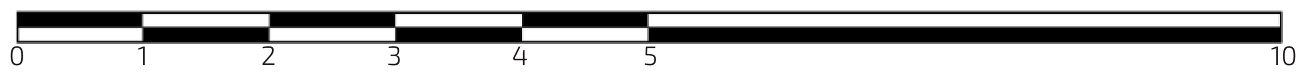
Section A-A 1:200

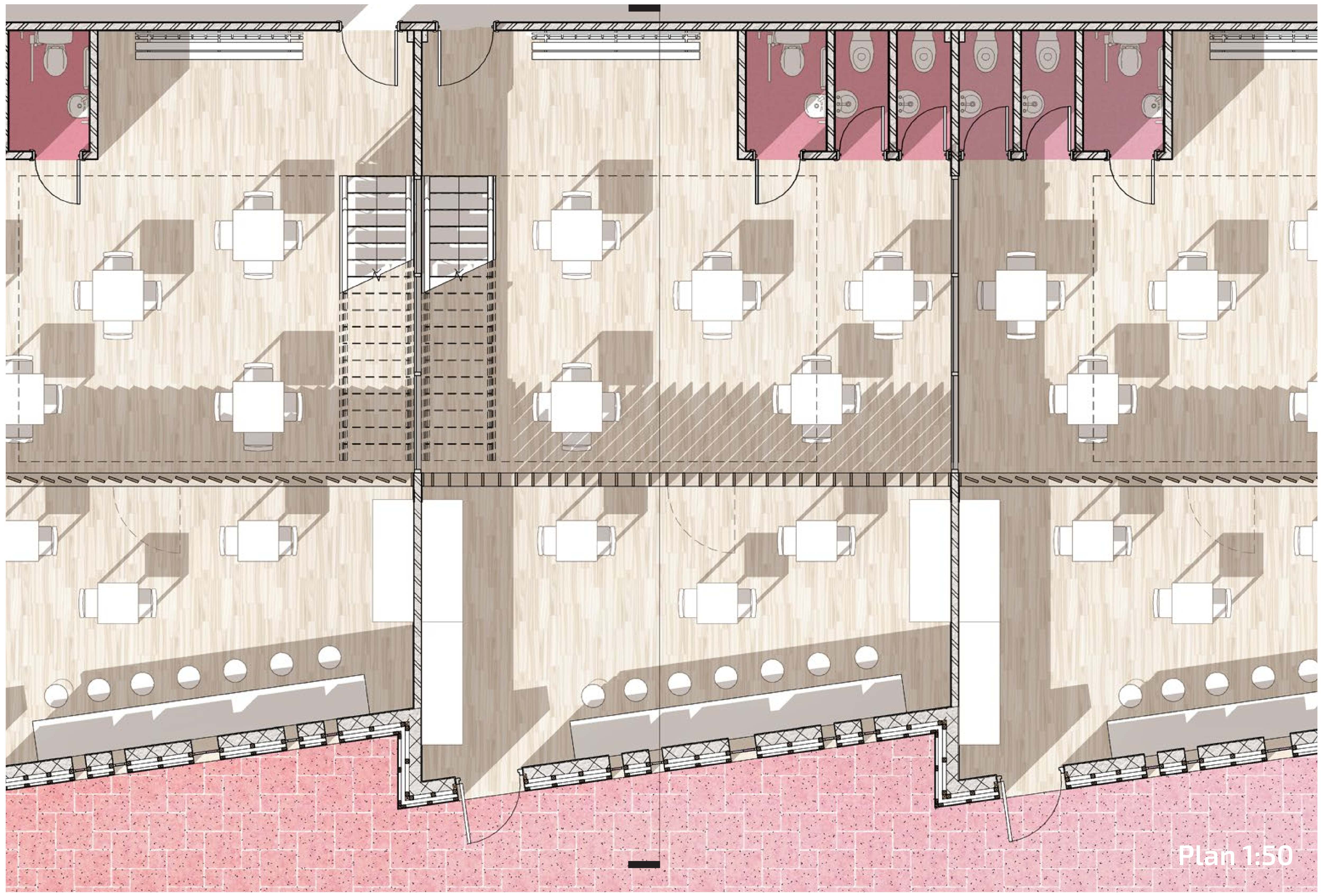


Section B-B 1:200

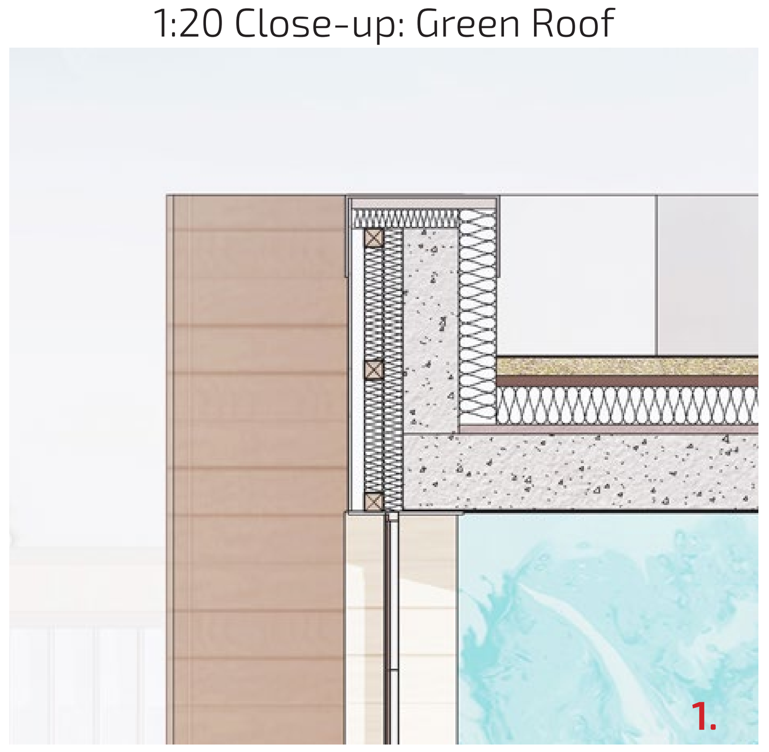


1:50 Scale Bar

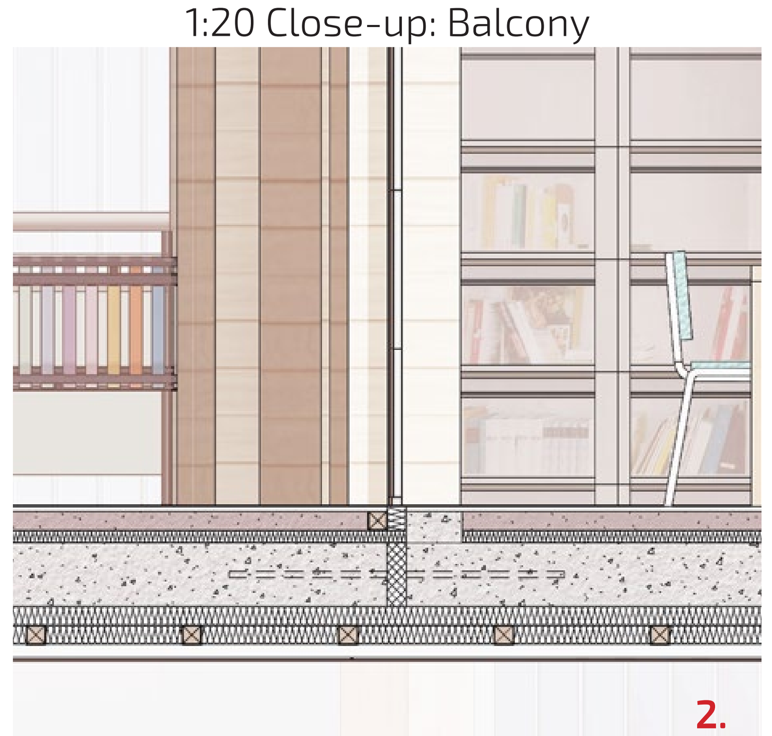




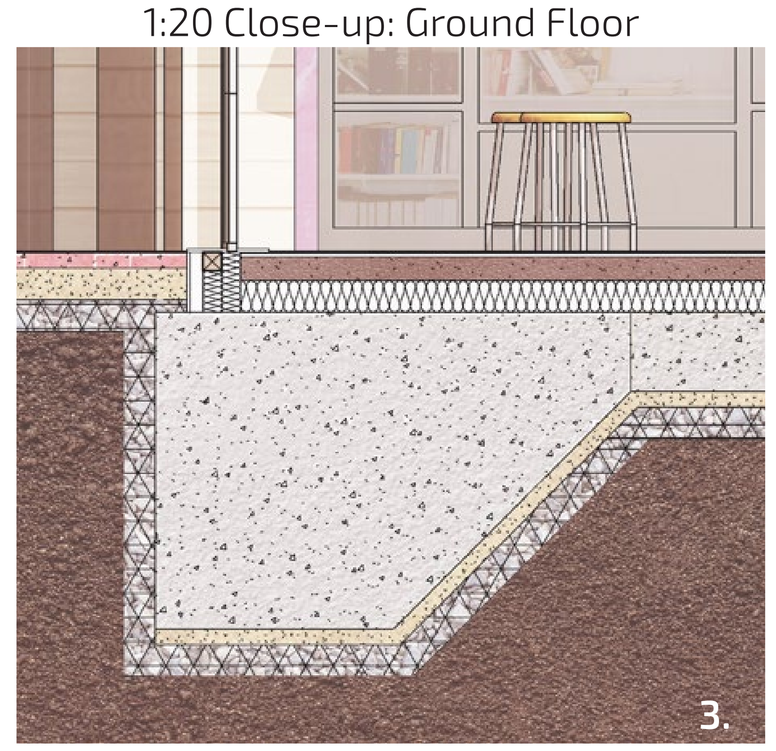
1:20 Close-up: Green Roof



1:20 Close-up: Balcony



1:20 Close-up: Ground Floor



External Wall Composition
Accoya cladding 10mm
Ventilated cavity (40 x 70mm vertical battens) 40mm
Thermal insulation (2 layers using 60 x 60mm battens) 120mm
Clay masonry 175mm
Plaster 15mm

Internal Wall Composition
Plaster 12.5mm
Brick 102.5mm
Plaster 12.5mm

Glazed Wall Composition:
Polished metal framing 50 x 100 mm
Frosted glazing (double glazed) 25mm

Partition Wall Composition
Rotating vertical wooden slats (30 x 200 x 2000mm) forming panels, including a swiveling panel used as a door

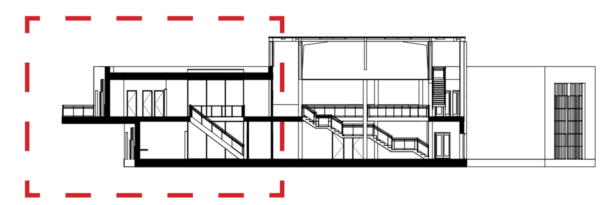
Ground Floor Composition
Laminated timber flooring 15mm
Screed 75mm
Separating layer (plastic sheet) 1mm
Thermal insulation 100mm
Concrete slab 250mm
Binding sand 50mm
Hardcore 100mm

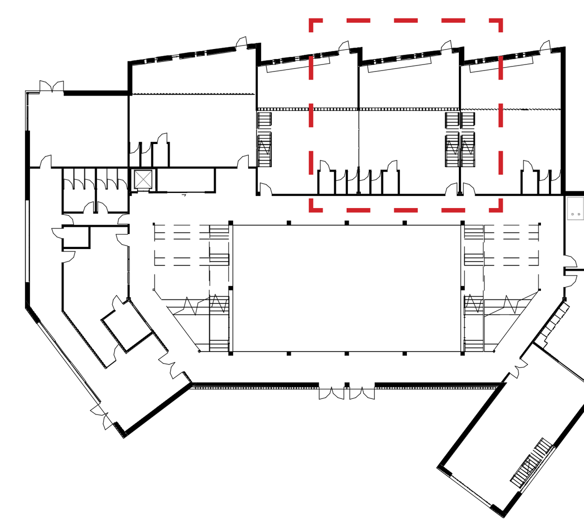
Internal Floor Composition
Laminated timber flooring 15mm
Screed 60mm
Separating layer 1mm
Impact sound insulation 20mm
Concrete 200mm

External Overhang Floor Composition
Laminated timber flooring 15mm
Screed 60mm
Separating layer 1mm
Impact sound insulation 20mm
Concrete 200mm
Thermal insulation (2 layers using 60 x 60mm battens) 120mm
Ventilated cavity 40mm
Accoya cladding 10mm

Roof Composition
Planting
Top soil 60mm
Drainage mat 35mm
Filter membrane 1mm
Thermal insulation 120mm
Vapour barrier 1mm
Screed laid to falls 30mm
Concrete slab 240mm
Plaster 5mm

Key:



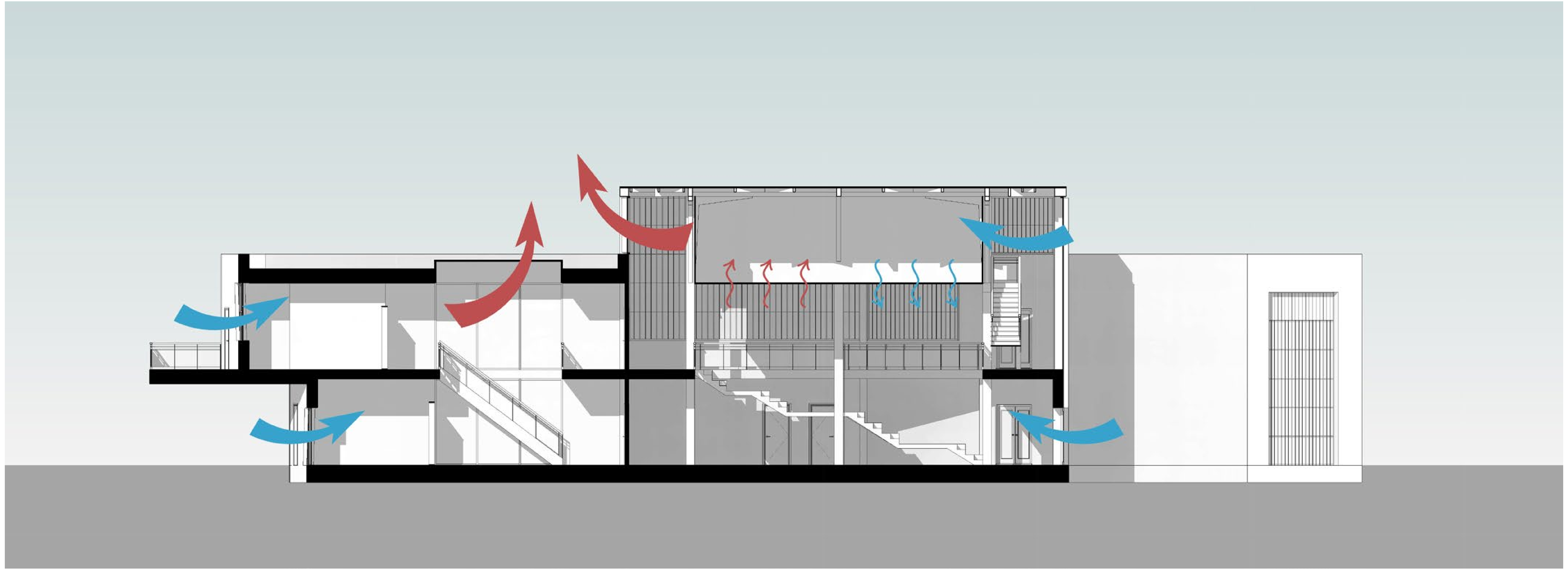


1:500

Sustainability and Environmental Strategies

Natural Ventilation Strategy 1:100

The school will be run with a natural ventilation strategy, as opposed to mechanical ventilation and air conditioning, minimizing the carbon emissions and energy load on the school building. This makes for a more sustainable design that is very environmentally friendly. The natural ventilation adopted is a top-down design in the classroom, bringing in fresh air through the back of the classroom with specifically design windows, and used air will leave through the skylight opening at the top. The main hall is then ventilated using clerestory windows, wherein fresh air and used air travel through the mesh play area flooring suspended above the hall, ventilating the entire space.



1:100 Scale Bar

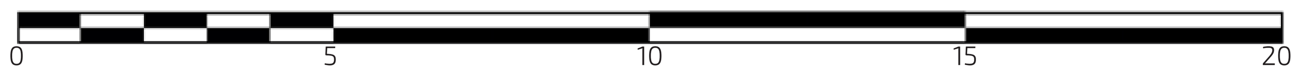
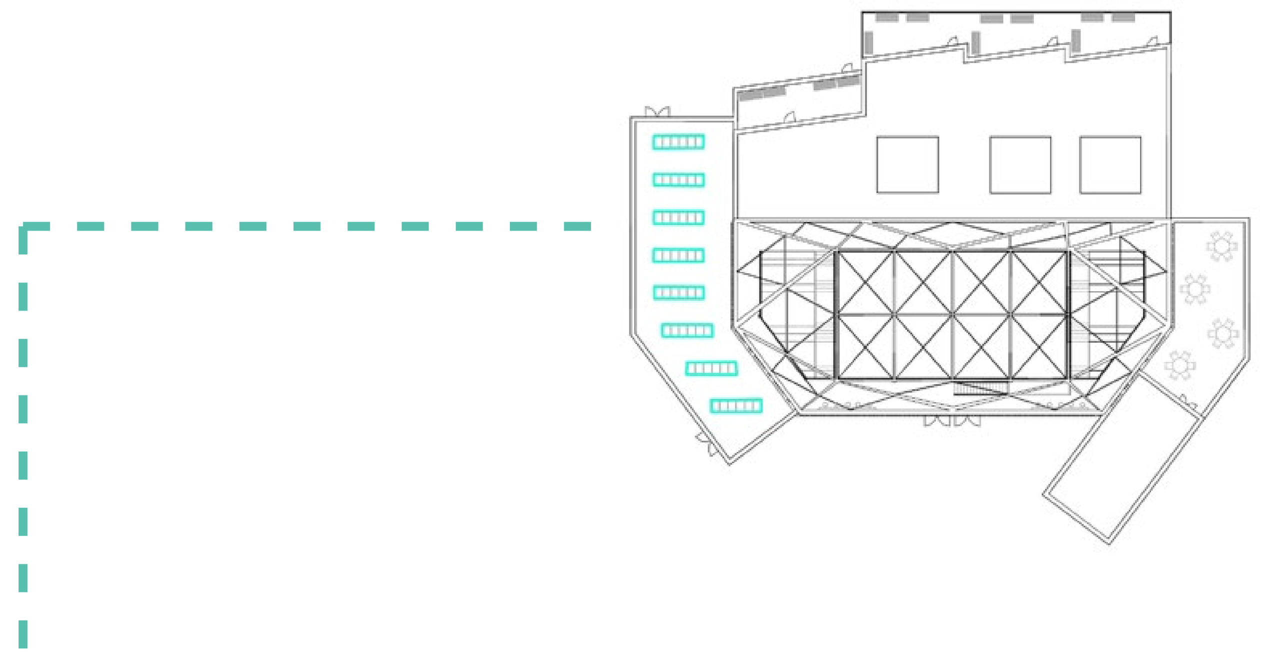


Photo-voltaic Energy

Standard solar panel units will be strategically placed on the green roofs to harvest the natural sunlight and turn it into energy to run the school facility. This is done in a bid to reduce the carbon footprint of the school and focus on the sustainability theme the school has adopted.



Mitigating Direct Solar Gain Through the Roof

Careful consideration and trial of various different methods of reducing solar gain through the glass roof has been taken out. The chosen method implemented into the school design was the use of thermo-chromic glazing which allows for the glazed surface to change colour (to purple in this case) when that surface is incident upon by sunlight. The glazing changes automatically at a set temperature to allow for comfortable conditions throughout every day of the year.

The hallway under normal lighting conditions, leading to harsh shadows, a lot of solar gain and most likely overheating that can't be resolved by natural ventilation.

The hallway at the same time of day with the implemented chromatic glazing, creating a soft environment, reducing glare and solar gain, thus inhibiting overheating.

Mitigating Direct Solar Gain Through the Roof

Another source of solar gain is through the glaze facade surround the main hall, which needs to be minimized. A system of rotating vertical louvers was implemented, maintaining the colour schemes of the school as discussed before.

When the sun is incident upon a surface that requires shading, the louvers are automatically rotated to counteract the solar gain and inhibit overheating. The two systems for windows and roof will be used simultaneously for maximum effect.

Louvers open to allow in plenty of sunlight and create views out of the main hall. Allows 'insides' of building to be seen.

Louvers closed to minimize solar gain and stop overheating. Allows for more private spaces as the 'insides' of building are hidden.

Public Main Entrance

Playground and Pavilion Spaces

External Colour-coded Play Space

Pavilion Internal Space

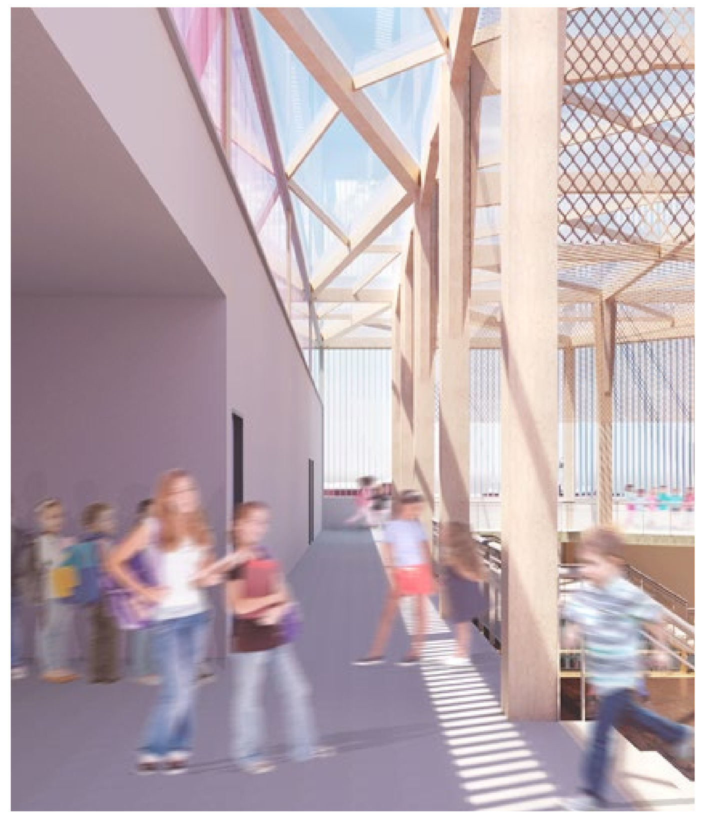
School fully integrated and embedded in its surrounding environment

Typical classroom during an eventful school day

Social Staircase and Main Hall

First Floor Dining Hall Mezzanine Level

Ground Floor Dining Hall

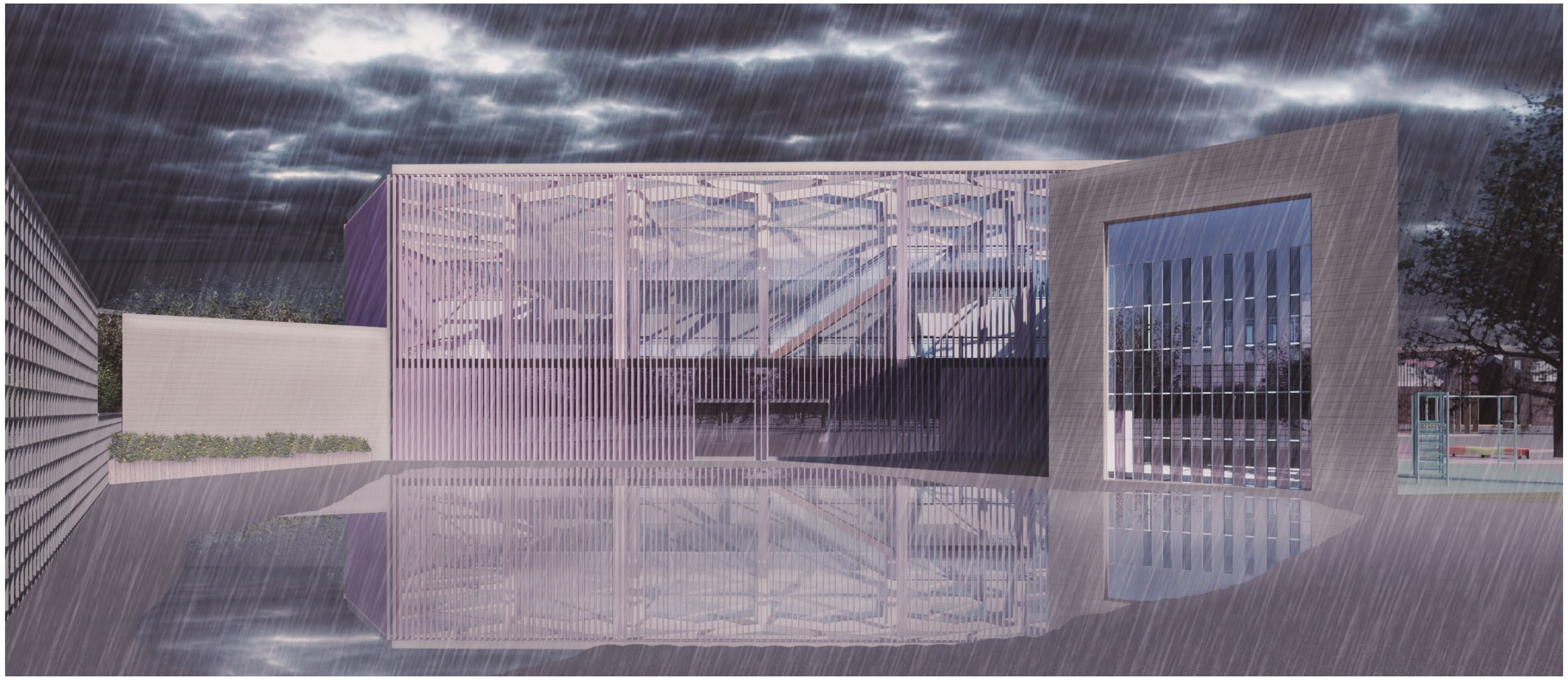


Shadow-play in circulation space

Riverside art room

Vertical louvers closed on a nice hot summers day

Glazed roof transitions to a deep purple to stop solar gain



Vertical louvers open to brighten space amids the gloom

Glazed roof fully transparent to allow maximum light through