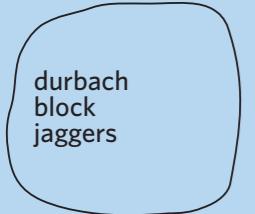


# POWERHOUSE ULTIMO REVITALISATION

Architectural  
and Urban  
Design Report

## RESPONSE TO SUBMISSIONS



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TYRRELLSTUDIO

OPENWORK

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## Introduction

This Addendum Design Statement (Statement) for Powerhouse Ultimo supports the Architectural Design Report submitted with the SSDA. The Statement outlines the design changes that have been made as part of the design development of the project as well as changes made in response to submissions received from the public exhibition of the SSDA.

The following document explains design changes made in response to feedback received during public exhibition and design development with the client and end user.

There has been ongoing design development since lodgment of the SSDA. This has principally concentrated on creating efficiencies in back of house and circulation spaces. The drawings lodged with the Response to Submissions include these updated designs.

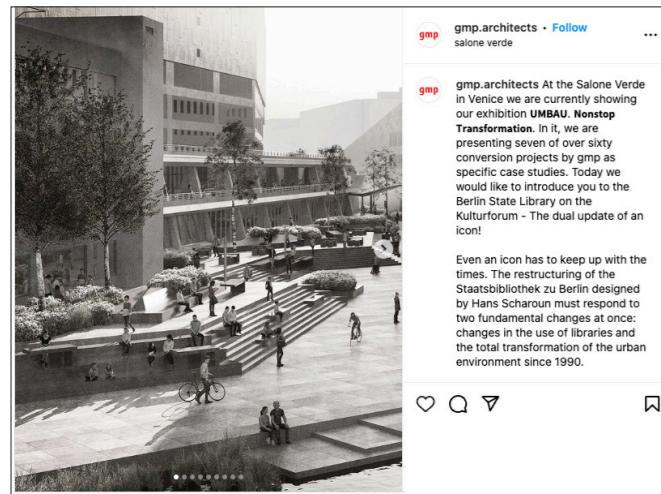


DBJ Large Scale sketch model

# Museum Evolution

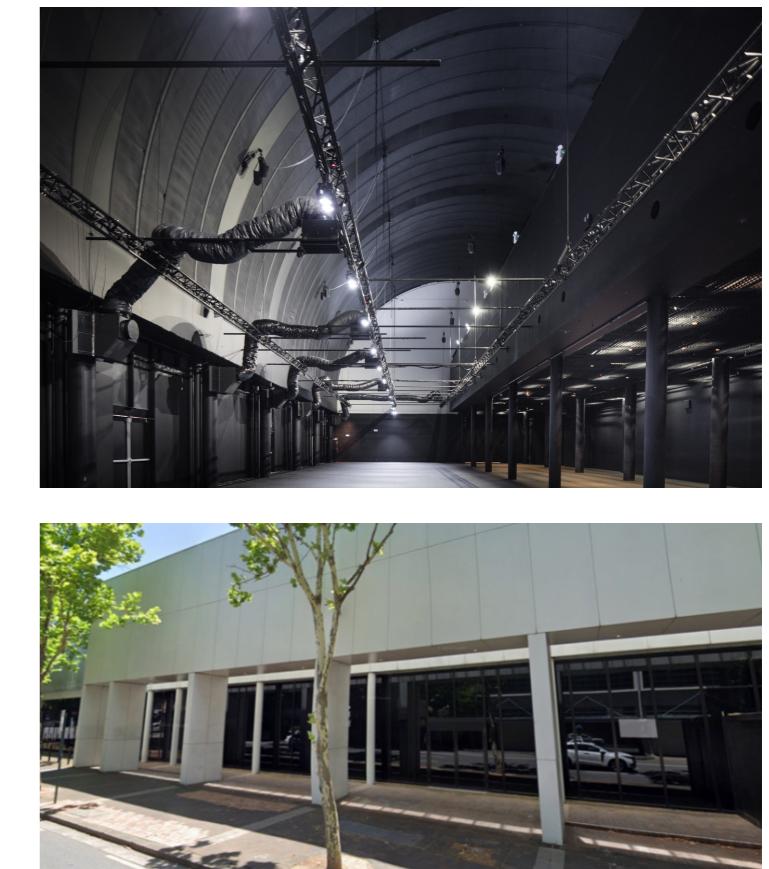
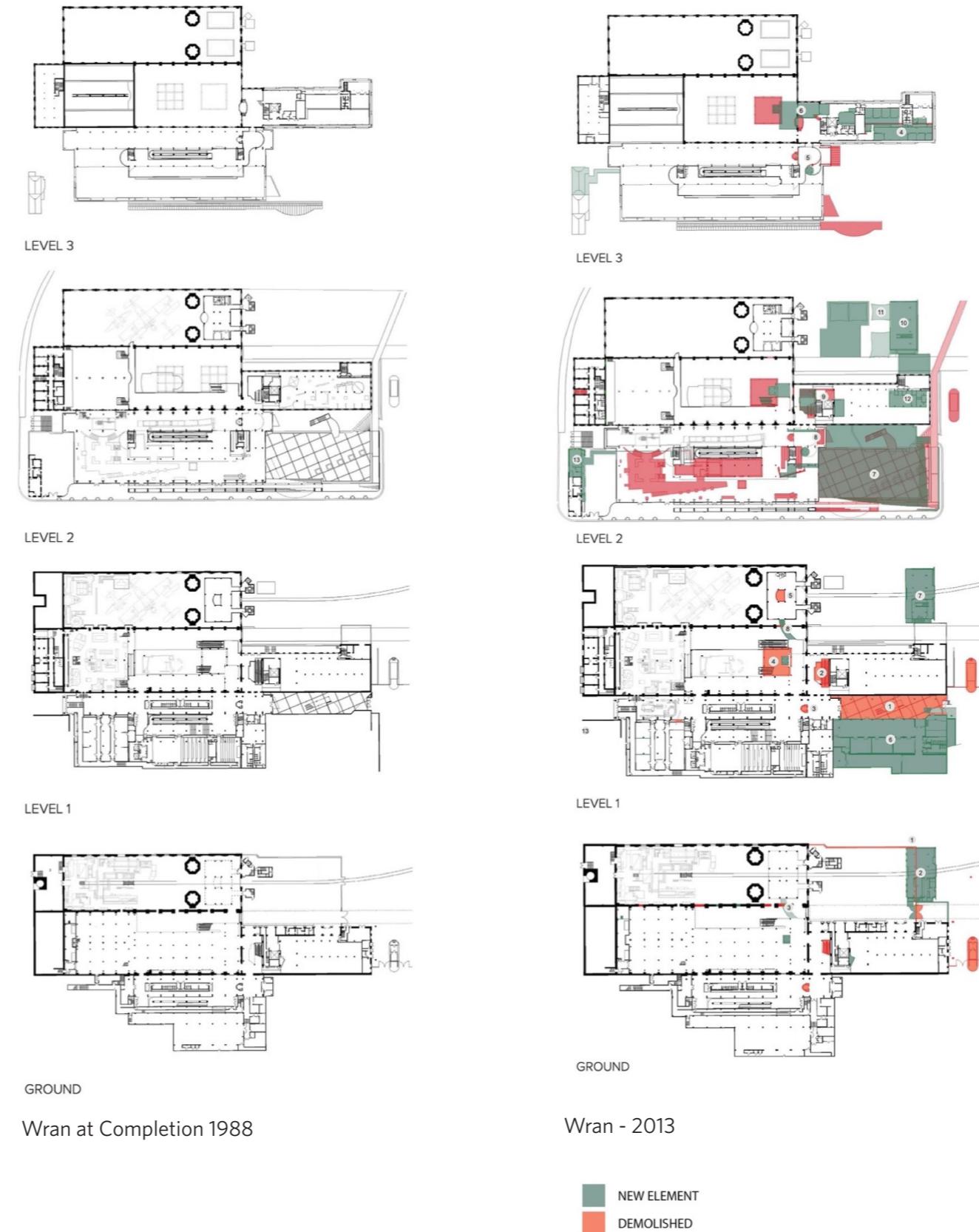
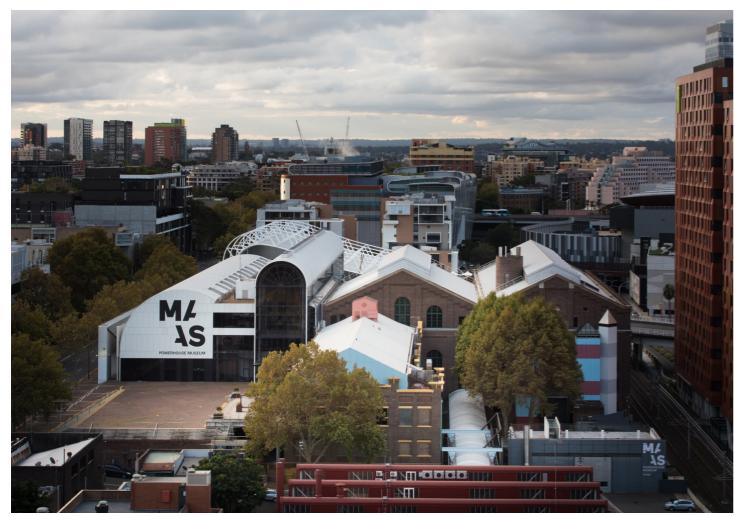
'Even an icon has to keep up with the times. The restructuring of the Berlin State Library designed by Hans Scharoun must respond to two fundamental changes at once: changes in the use of libraries and the total transformation of the urban environment since 1990'

GMP Architects



The recent heritage listing of the museum recognises the evolution of the museum on this site: 'changes to the Powerhouse Museum buildings and spaces since opening demonstrate the need for museums to continually evolve in response to contemporary museum standards.'

Powerhouse Ultimo has changed significantly since opening in 1988, with key changes including the conversion of the Wran Building to exhibition space, modification of entrances and attempts to clarify circulation and servicing.



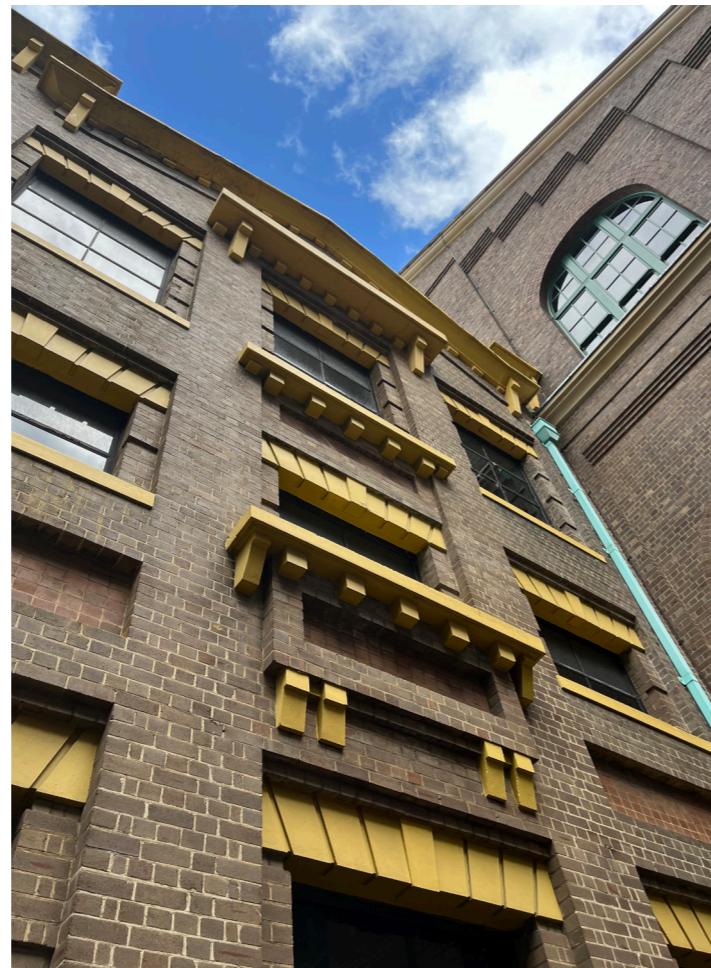
These diagrams illustrate multiple changes to the Wran building since its completion in 1988.

The Wran Hall was originally the front door and shop, accessed from Harris Street. Subsequent re planning moved the front door to the south end of the galleria, changing the Wran to an exhibition space.

As a result all internal surfaces and glazing were blacked out. This space has struggled to be a flexible or environmentally suitable space for exhibitions. It has a number of internal columns supporting mezzanine services and offices which interrupt the use of the space.

The blackened windows deaden Harris Street for much of its length.

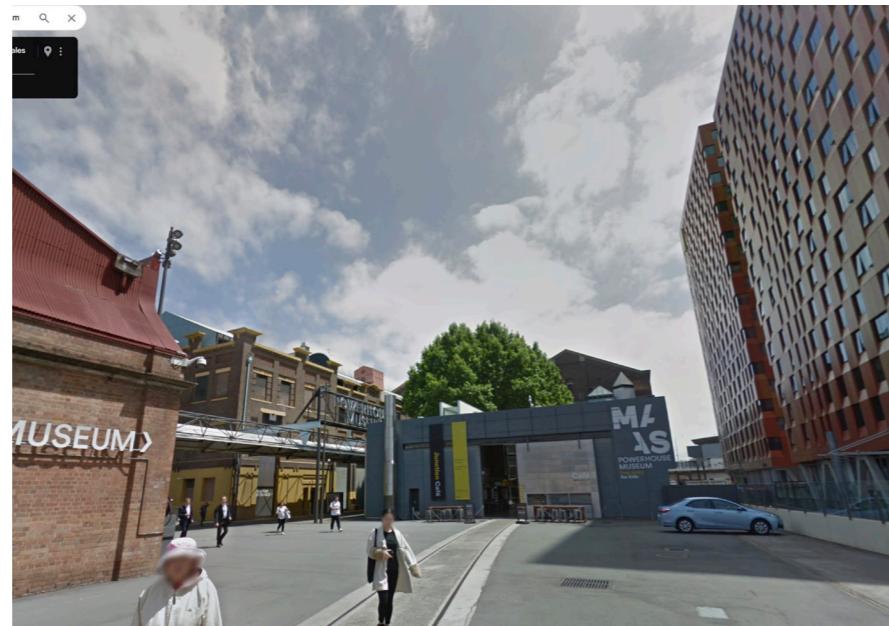
## Museum Evolution



Switch House - Brick and Rendered lintels



Boiler House - Brick and Sandstone



Existing Conditions- Good Line

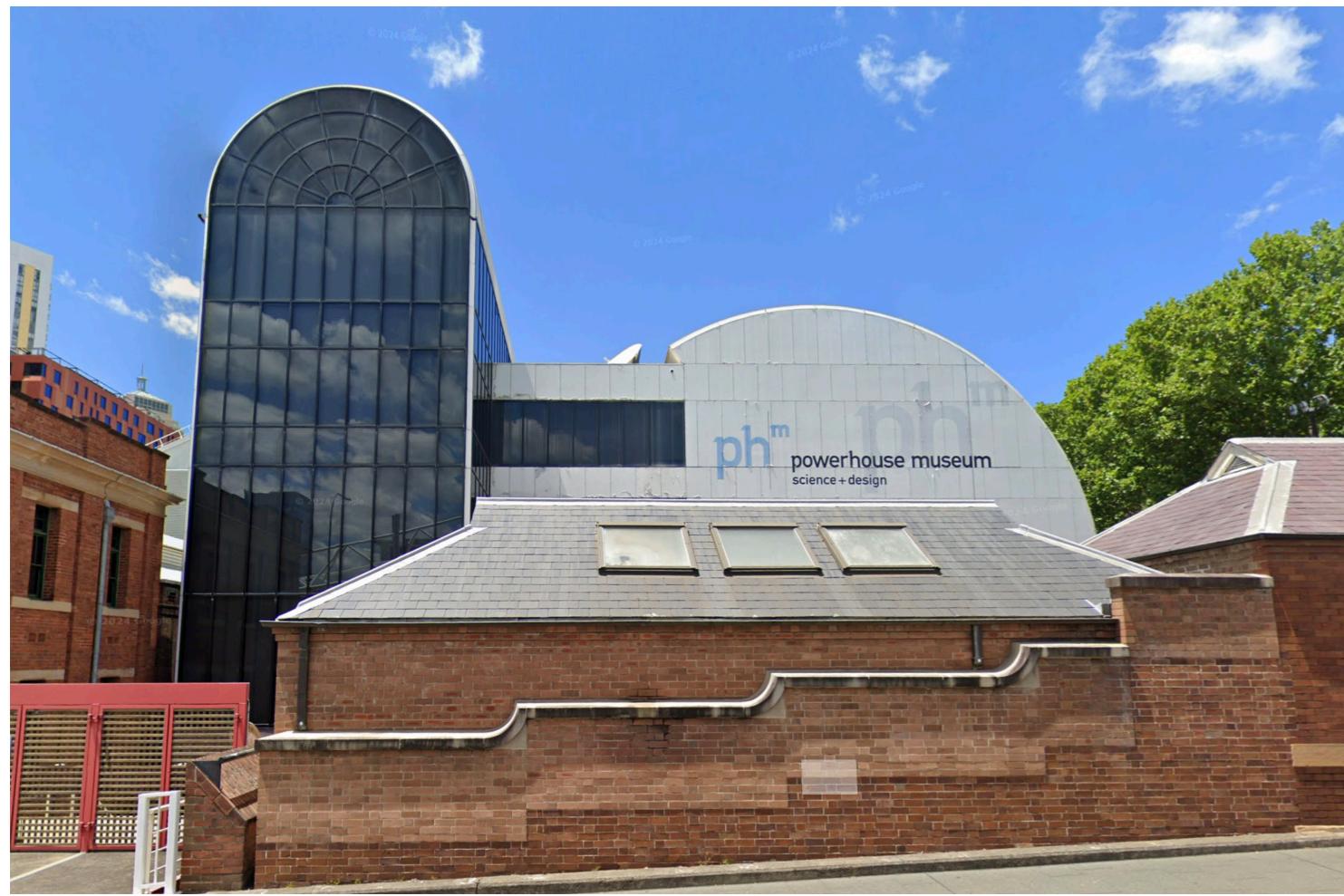


## Museum Evolution



Existing Conditions- Macarthur Street

## Museum Evolution



Existing Conditions- Harris Street



Existing Conditions- William Henry Street

# Museum Evolution

In addition to the internal changes, the urban landscape surrounding Powerhouse Ultimo has also changed. The creation of Darling Square through the removal of multi level car parks and the monorail has brought the activity of the city to the eastern side of Powerhouse. The opportunity to engage with this address and to welcome visitors from this aspect is a significant opportunity. Macarthur street has become a major pedestrian connection between Ultimo and the city. It is hoped that this street could become a shareway in time, prioritising pedestrians.

Key evolutions proposed by the design include:

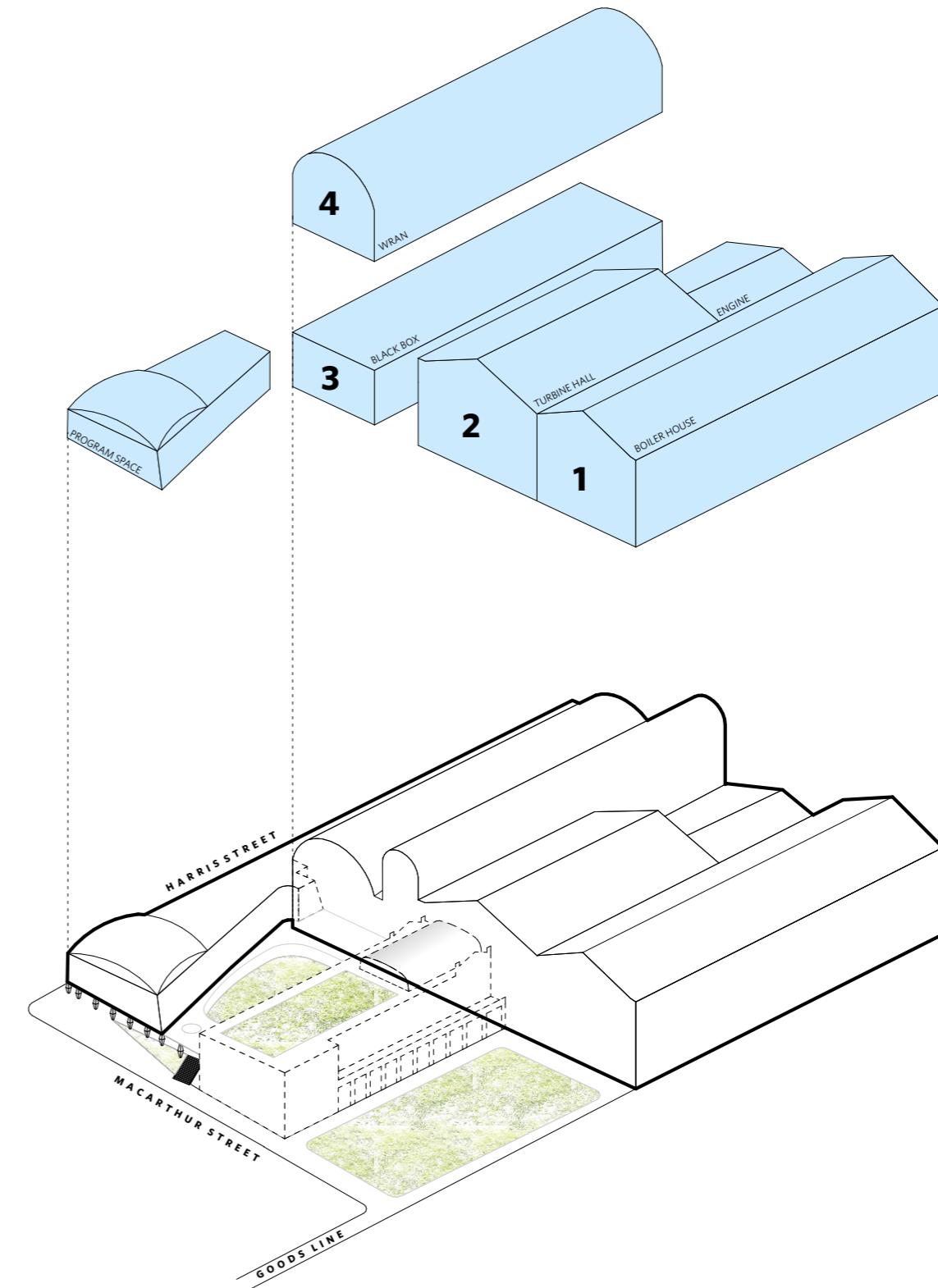
- A new address- creation of a public square to the currently disconnected northern end of the Goods Line. This enables a strong and welcoming entrance point to the museum interior through a landscape-prominent public square. Over 80% of the large scale exhibition spaces will be at the ground level, simplifying the circulation within the museum.



## Diagram: Exhibition Spaces

The diagram illustrates the location of the four major column free presentation spaces and the program space. Additional smaller scaled spaces are located in the Switch House. Over 80% of the exhibition spaces are located at the ground floor adjacent to the primary entry on the Goods Line terrace.

The program space on the corner of Harris and Macarthur streets and its adjacent courtyard is located at an interim level between the Goods Line Terrace and Harris Street (Level 1). This provides a direct connection to Macarthur Street either via a level entry or landscaped stairs.



# Museum Evolution

- Functional spaces- completion of the Wran Building arch through removal of mezzanine spaces and ramp enables creation of a dedicated and fit-for-purpose exhibition space for the museum. The retrofitted exhibition space in the Wran Building is brought up to standard through removal of columns and creation of a cohesive, mechanically suitable, sound and light isolated space.

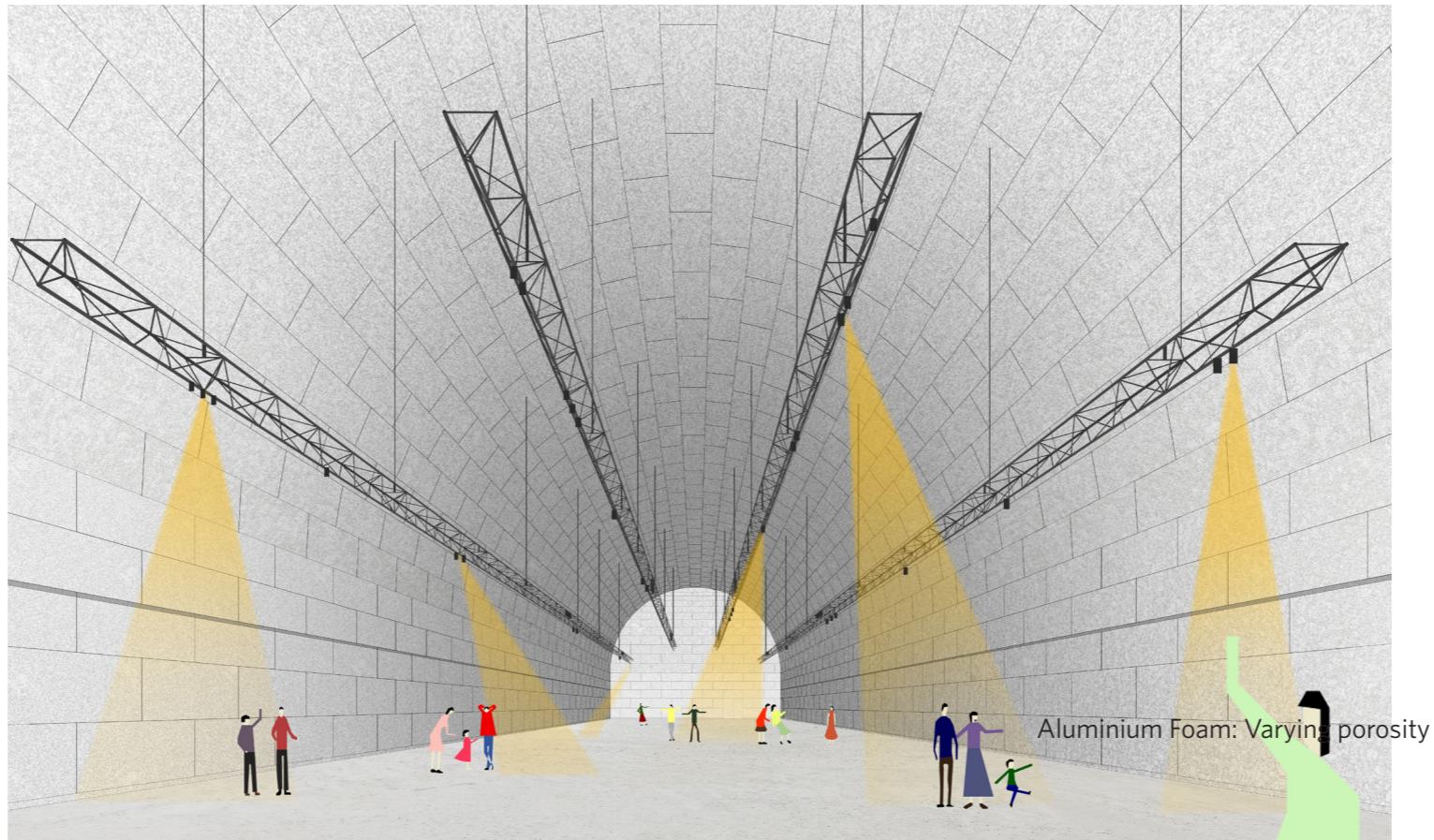
- The Galleria space is re-lined to form a cohesive and simplified backdrop for a range of museum activities, including the exhibition of collection items. The proposed expanded aluminium foam (a recycled material) relines the inside face of the existing columns to create a remarkable uncluttered soaring museum room. Each existing opening in the Turbine hall is remade through this new lining, creating deep framed reveals with views into the Turbine Hall. Lighting is designed to highlight the rhythm of these openings.

- The entire extent of clerestory glazing on the east side of the galleria is intended to be retained. Light will permeate the space through the porous Aluminium foam panels.

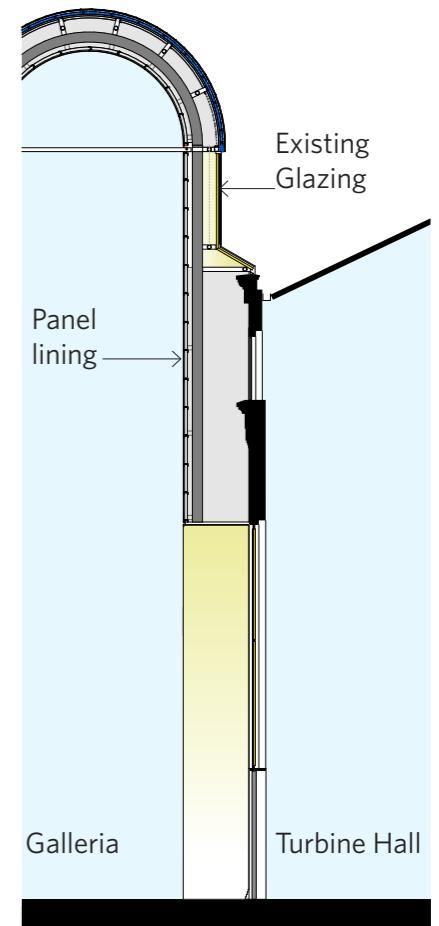
- A full width opening is located at the north end of the space looking out across a new elevated landscape and on to the heritage post office.

On the southern end an opening allows for light and views to enter the galleria from the new level 1 courtyard space. A high figured window is also located in the arched gable at the southern end of the galleria.

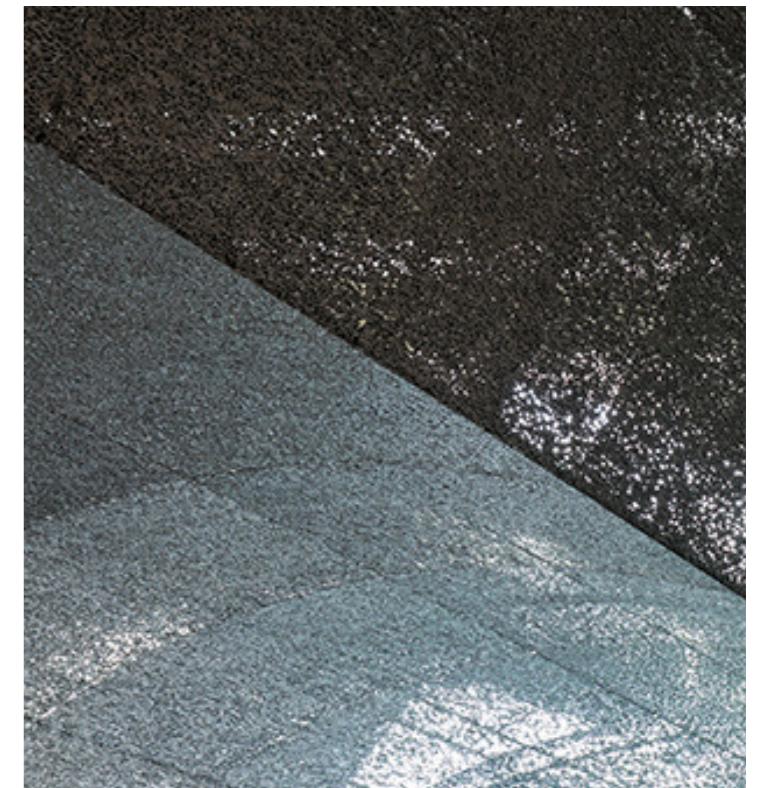
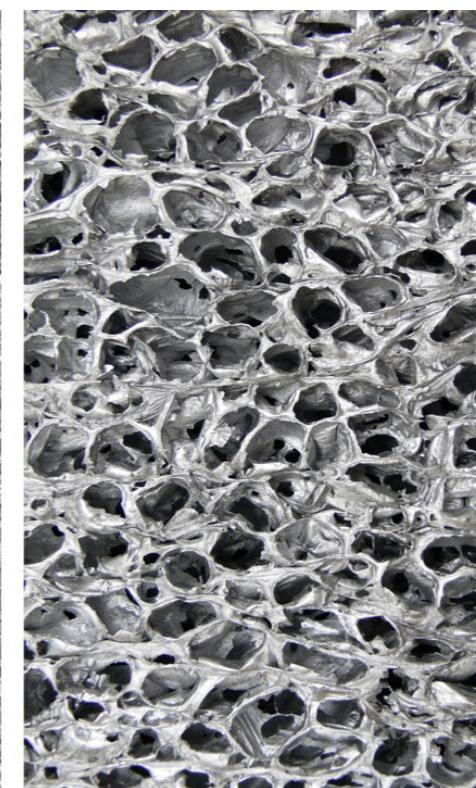
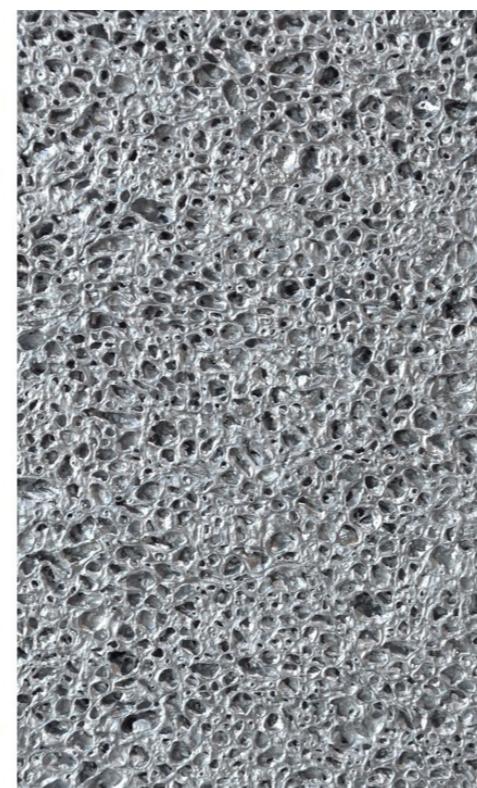
Whilst views to elements of the Turbine Hall western façade will be masked by the lining, the concept is completely reversible and independent of the heritage fabric



Wran Exhibition Interior



Aluminium Foam: Varying Porosity



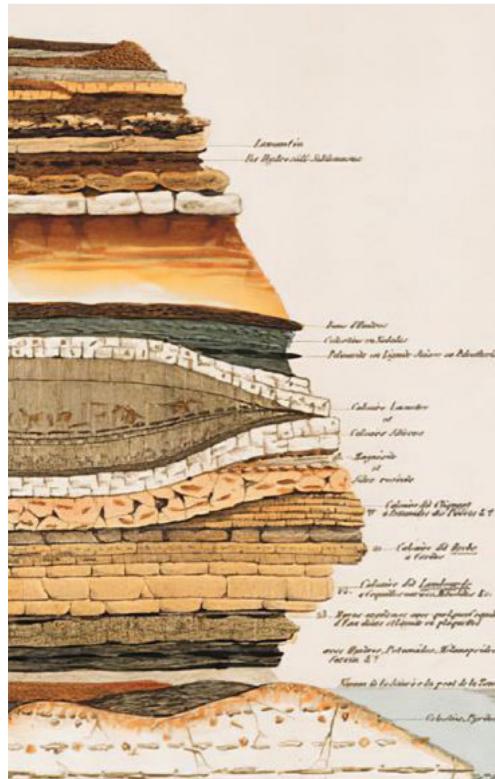
Aluminium Foam: filtered light

## Materials

A significant amount of feedback has been received in relation to the proposed use of masonry throughout the Harris Street buildings. The former power station structures are characterised by face brick with sandstone or render cappings.

A key design driver for the use of brick within renovated and new build elements is the creation of a 'campus identity' for the museum that will provide a strong element of recognition that is sympathetic to the former power station structures. A common palette for buildings from different eras establish a sympathetic built language. Overall the effect is one of cohesiveness with the new and old sitting side by side in harmony.

Brick has been chosen as the material of both continuity and longevity for the revitalised Powerhouse. New gable ends to the Wran at the North and South ends replace damaged lightweight fabric that has not stood the test of time. The proposed renovation of the Wran and new building along Harris Street explores a contemporary interpretation of hand laid brick with concrete capping to form a sympathetic yet contemporary intervention within the site.



## Stratigraphy

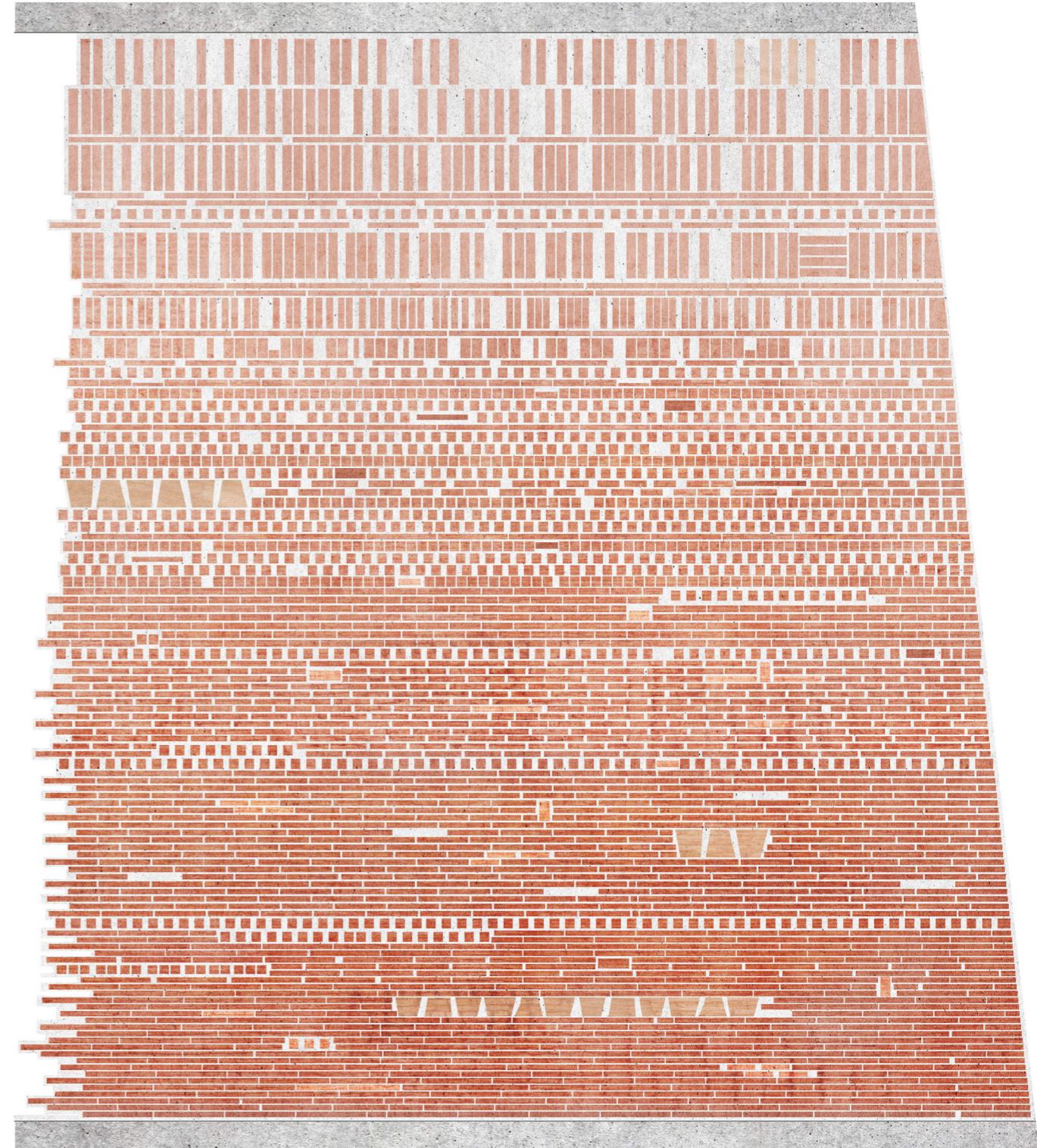
The brick façade concept has been further developed in response to the project's Connecting with Country Design Narrative. The concept of stratigraphy has been enhanced through a simple pattern that transitions in bands from horizontal to vertical, through a central band of square bricks. The pattern is both simple and variegated. Occasional stone inserts, gradual increasing of render and small variations creates a sense of organic and incidental change across elevations, an artisanal hand laid effect.

Brick is preferred material as it is an enduring, noble material, associated with a civic gravitas. The recent heritage listing of the entire museum site encourages the sense of permanency of the institution on this site, which is recognised through the use of the an enduring masonry palette. The idea of permanence is evoked through the use of strong materials such as the brick and concrete and complemented by the use of zinc cladding for the curved roof forms. These materials are natural, strong and civic in nature.

The desire for a sustainable solution for the future of Powerhouse Ultimo is a further driver in the choice of materials. Brick, concrete and zinc are durable and relatively maintenance free. This will enable the structure to maintain permanence on the site whilst also ensuring an overall reduction in embodied energy requirements through ongoing replacement and repair.



## Brick Samples

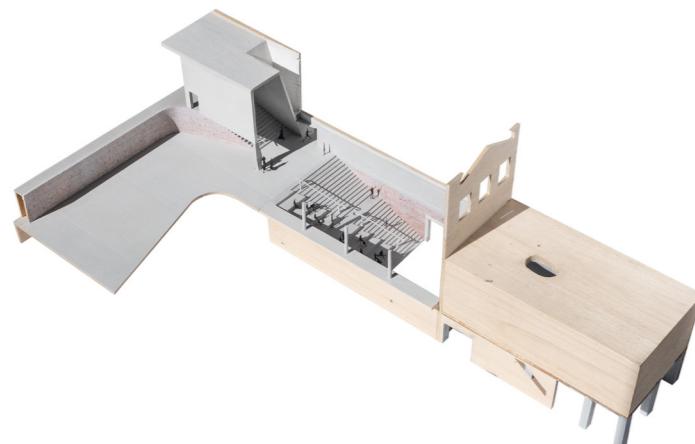


## Brick Facade Pattern

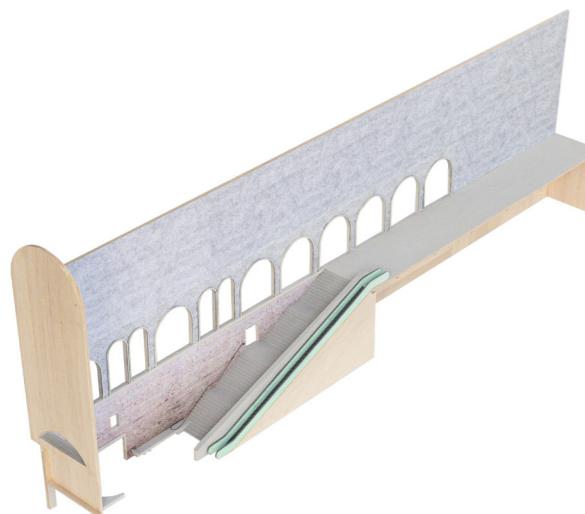
## Circulation

The proposal maintains the clarity in circulation with clear north-south and east-west circulation spines. Adjustments have been made to the lift locations within the intersection of these spines to make the lifts more visually prominent from the entrance at The Terrace. This will enable greater clarity in wayfinding for visitors to the museum. This also ensures that visitors from both entries gather on the ground floor in the concierge to begin their museum experience.

The grand stair within the intersection of the spine has been modified to incorporate informal bleacher seating. This will enable informal gathering at the main entrance point to the museum. It could also house talks and events.



Model- East West Circulation



Model- North South Circulation

### Diagram: Central Circulation

The central circulation follows a simple East-West and North-South arrangement. All circulation ends in daylight, and gardens, encouraging outdoor use and ease of navigation.

The major East west circulation connects the concierge at the Goods Line terrace to Harris Street via grand stairs and bleachers. Visual connections enable intuitive way finding. Lifts are centrally located to be easily visible from the concierge.

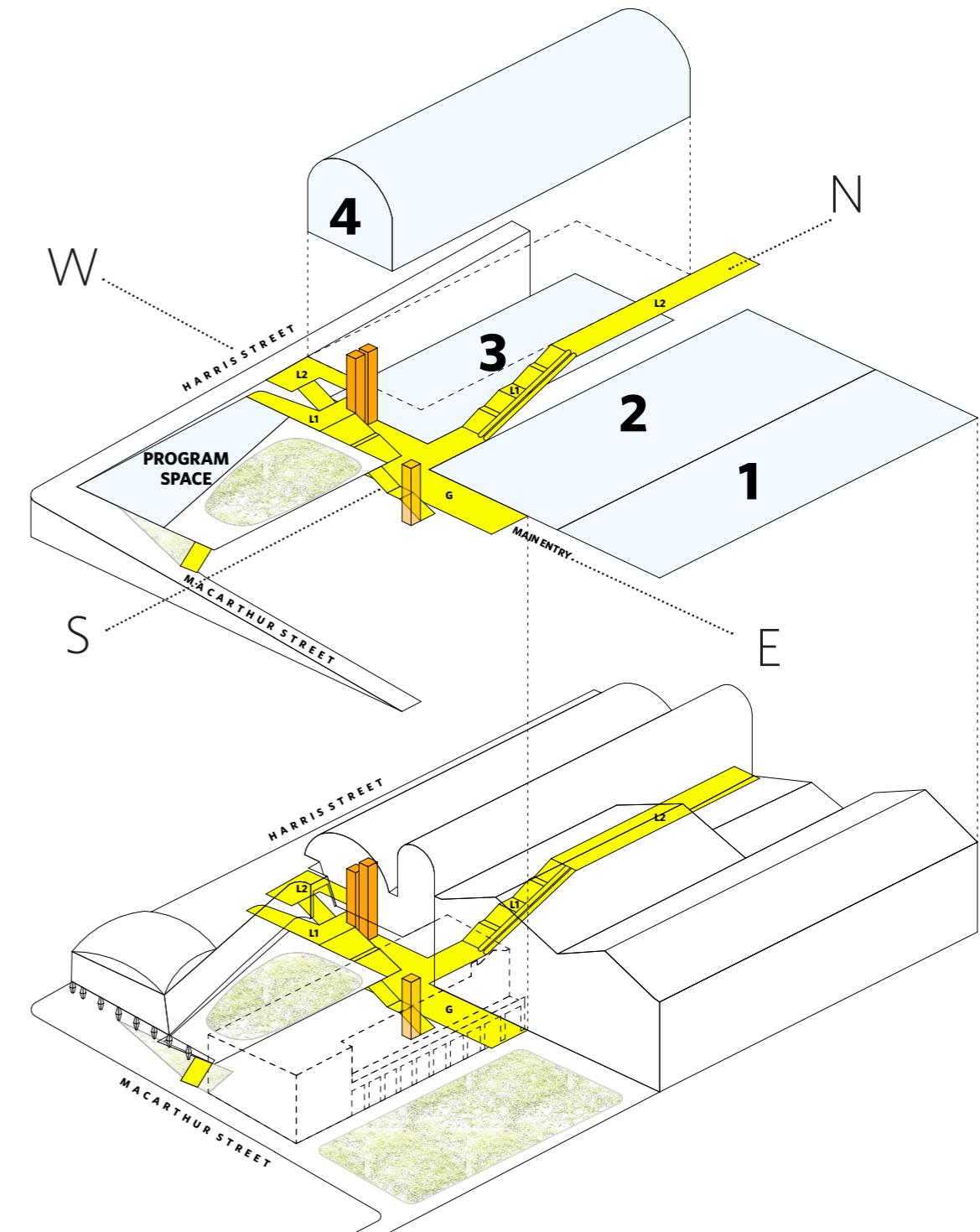
The north south circulation connects the ground floor to the Exhibition Space 4 (Wran Building) within the galleria via a grand stair and escalator. Again, visual connections contribute to ease of way finding.

An existing lift is retained in the Switch house. The final leg of the fire stair is opened between ground and level 1, to allow direct and visual connection to the new central courtyard.



Model East West

Model North South



# Central Courtyard

The design of the Central Courtyard has been modified to include a greater density of planting. The area of planting has substantially increased, enhancing the amenity of this space.

The stairs between Macarthur Street and the Central Courtyard have been narrowed and altered in shape. It is critical that this access point reads as a secondary and informal entrance to the museum. The Harris Street and Terrace entrances maintain their primacy. Reducing the extent of stairs in this location enables a greater amount of landscaping along this street edge, softening the building to Macarthur Street.

The design of the Central Courtyard has been developed. The design includes a 60/40 split of planting to paving, the concept that builds on the Connecting with Country Design Narrative as a form of rock gently eroded by water. The pathway design creates a direct and intuitive flow, whilst maintaining a 1,500mm path width.

The proposed planting palette includes:



Comparison:  
SSDA Scheme  
330sqm planting.  
760 sqm paving.

Revised SSDA Scheme  
620sqm.  
440sqm paving.

Sufficient soil volume is provided through a 1m set down slab and planted berms up to 400mm above the paved level. Paving will be placed on Stratavault where required to accommodate root growth, with rootballs anchored to the slab. Overall each tree is provided with 45 square metres of soil at an average depth of 1 metre.

## Level 1 Courtyard Trees and Deep Soil

- Trees have a minimum of 45sqm soil at 1,000mm depth.
- Rootballs will be anchored to the slab.



## Level 1 Courtyard Section looking north

- 1m set-down in courtyard slab allows for ample soil volume.
- Planted berms mound gently to a peak of 400mm above the paved level of the courtyard.
- Paving on Stratavault where required to allow accommodate for roots.
- Free draining stone at the interface of buildings.

1 Free-draining edge at buildings.  
2 Paving slab on Stratavault.



## Switch House

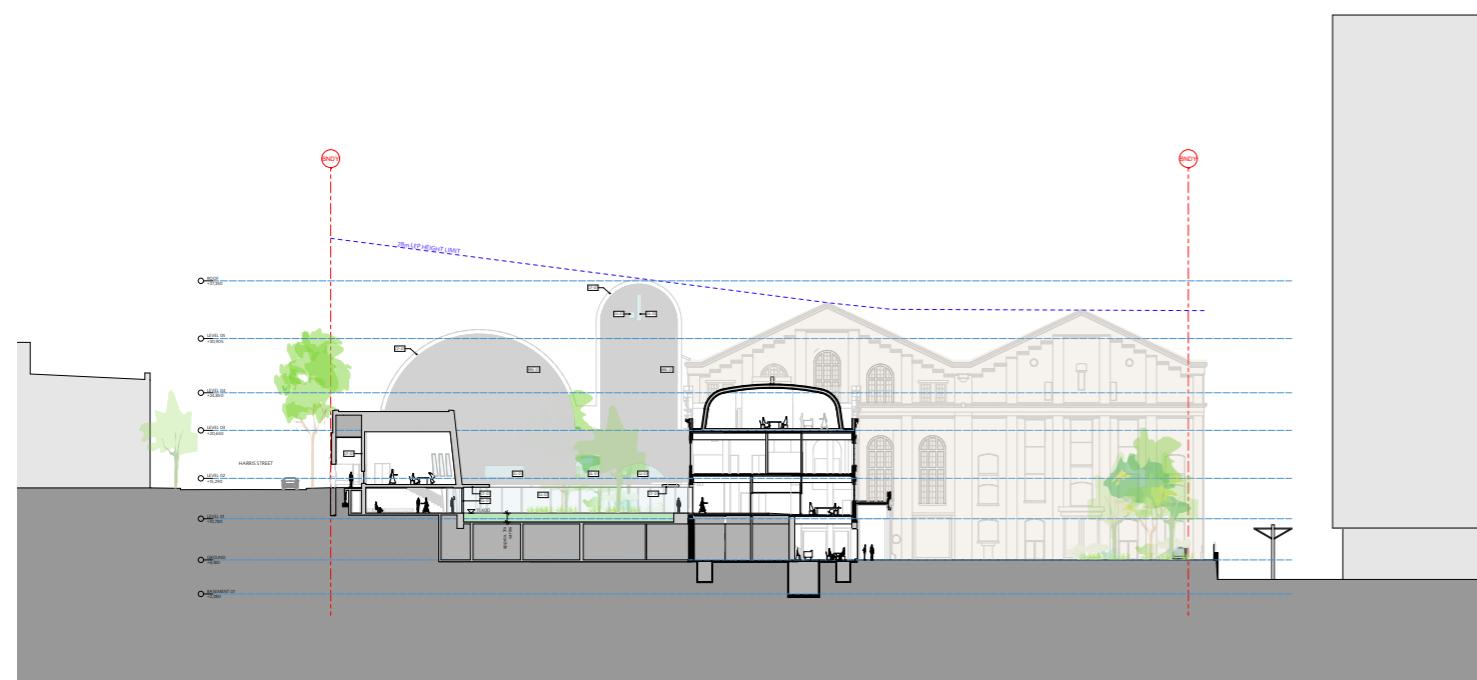
The design of the food and beverage structure on the Switch House Rooftop has been further developed. The addition of amenities and continuation of the lift from the ground floor into this space enhances the ability of this space to operate separately to other museum spaces.

The design of the food and beverage bar has been further developed to enable it to cater for a range of uses throughout the day and into the evening.

The external form of the structure has been developed to include a curved roof that evokes the same language as the dominant curved roof form of the Wran and Galleria Buildings, and reflecting the proposed new building at the corner of Harris and Macarthur Streets.

### Switch House Uses

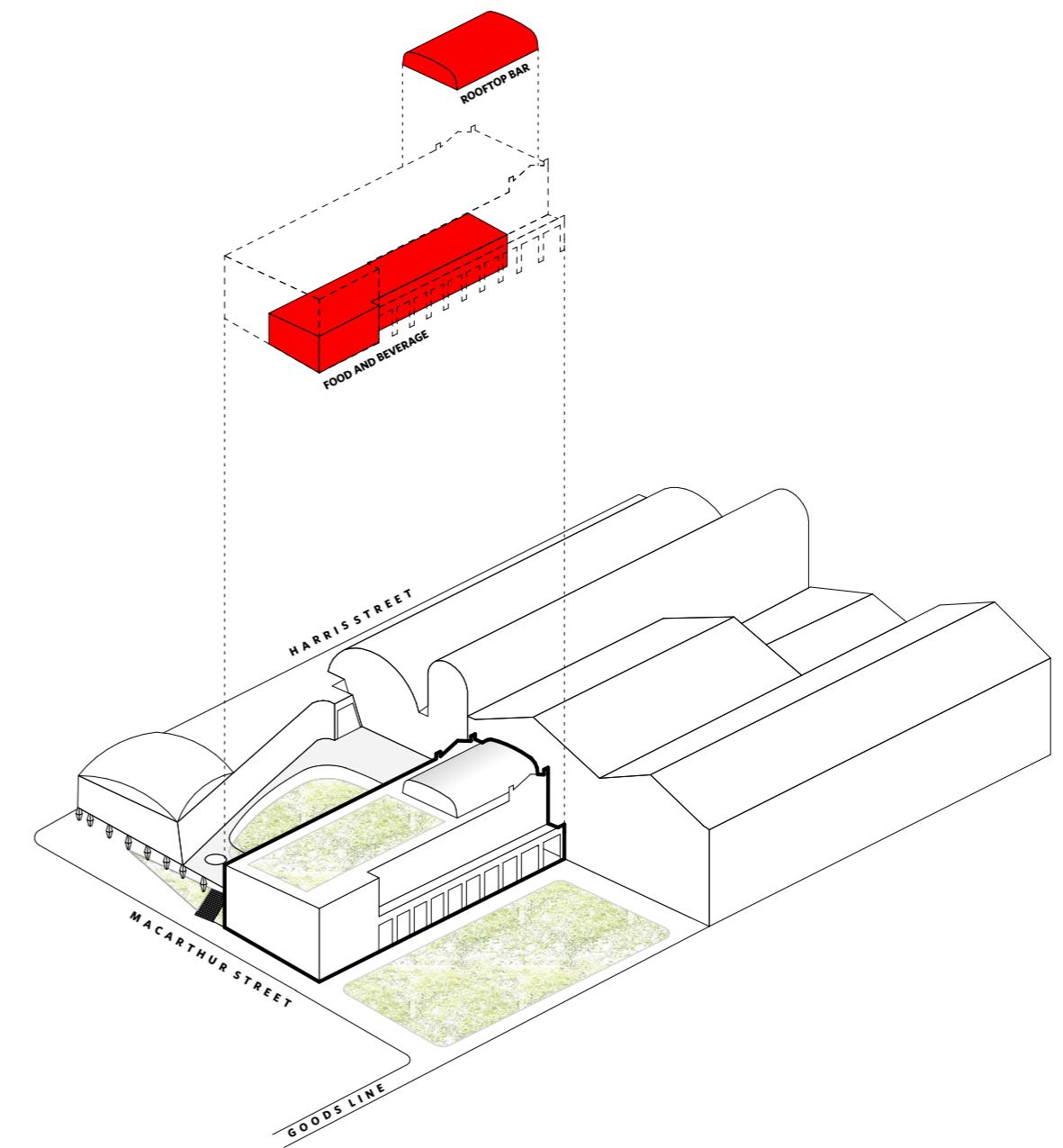
The uses within the Switch House have been amended with the office and library spaces changed to museum space. The office and library will remain in the Harwood Building enabling the entire level 1 of the Switch House to be dedicated as program space for a range of museum exhibition uses. This results in an additional 300 square metres of museum program spaces.



Revised Section

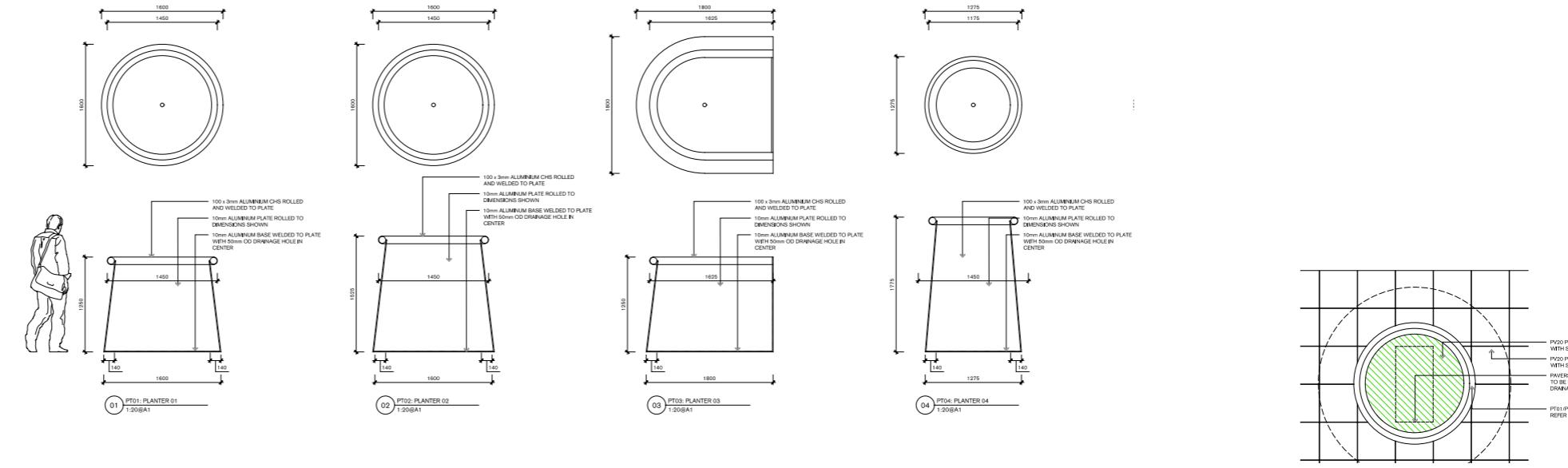
### Diagram: F+B

Major F+B spaces are located in the Switch House, at the ground floor opening directly to the goods Line Terrace and on the rooftop. Both spaces are able to operate independently of the museum to activate public outdoor spaces.

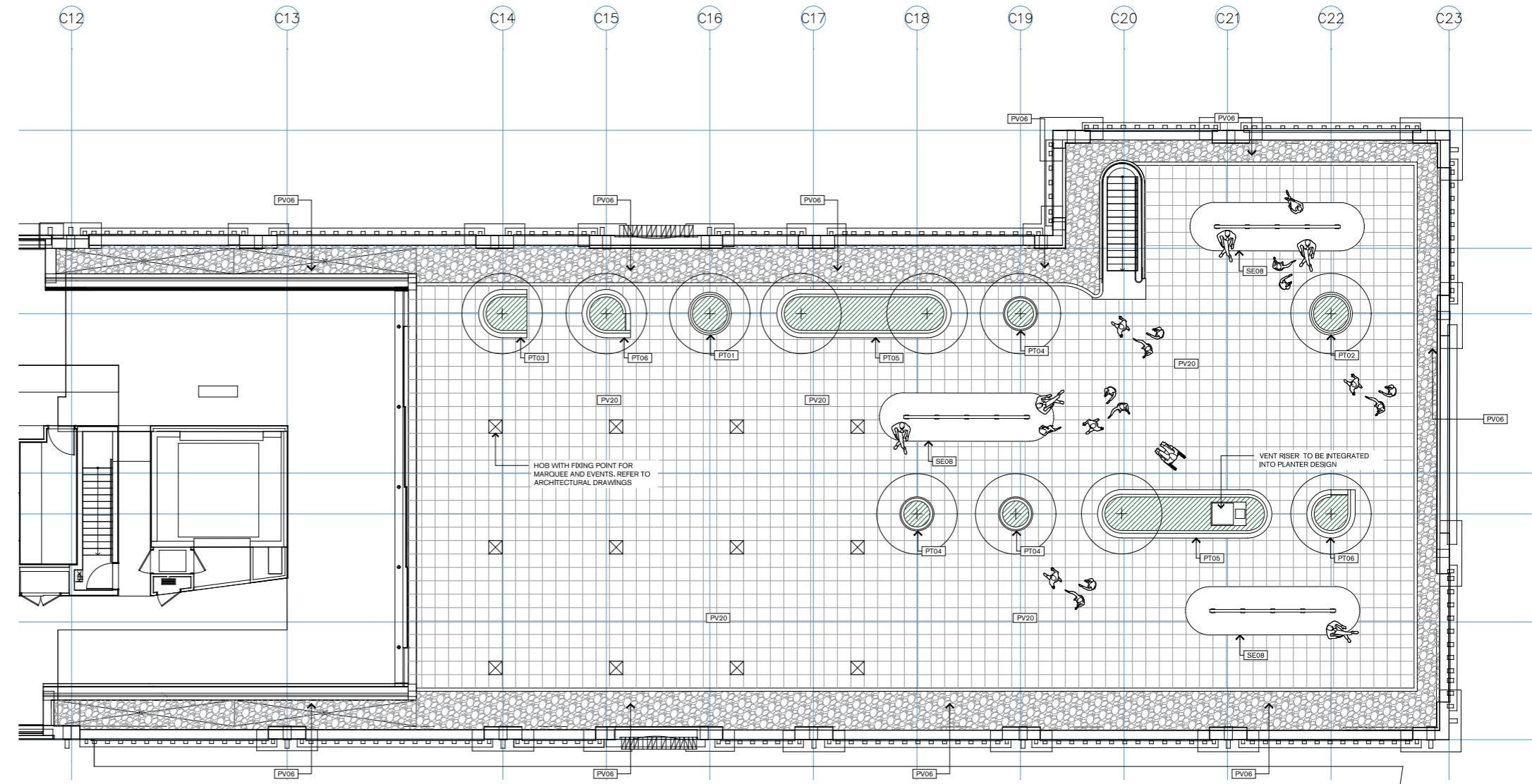
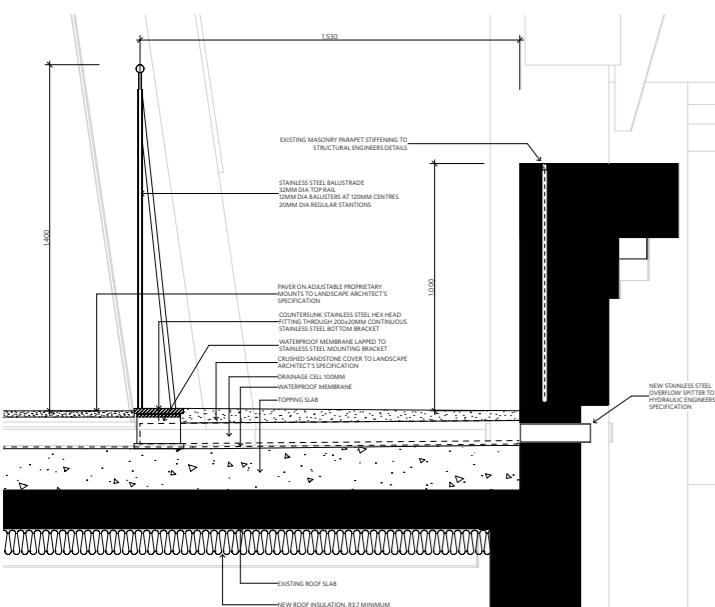


Switch House

Following structural investigations, the roof to the Switch is able to support trees in some locations. Open work Studio have been developing the design of this space.



## Detail of Switch House Handrail-set back from parapet wall



## Views

Comments have been received in relation to the loss of views to the Wran Building as a result of the new built form at the corner of Macarthur and Harris Streets. Whilst the proposed building will change the views at this location, consideration needs to be given to the following factors:

- The site of the powerhouse is constrained by valuable existing buildings. The existing open areas of the site are to the east at the goods line and on Harris Street. The relocated front door and the creation of a terrace at the end of the Goods Line is fundamental to the museum's future revitalisation and connection to its immediate urban environment. This space is dedicated to the New Gathering Terrace.

- Amenity- the existing Harris Street forecourt, whilst providing open space, lacks amenity. The noise and fumes of traffic from Harris Street significantly impact this space. There is no soil available for trees or sufficient structural capability for planting means this space struggles to function as a pleasant outdoor space. In the revitalisation of the Museum, the main public outdoor space will be the Goods Line Terrace.

- The existing views to the Wran Building from this corner are not as apparent in reality. (Refer Museum Evolution p.6) The existing street trees, brick walls and elevated forecourt obscure views to the Wran Building and its curved roof form.

- The view of the Wran gable ends will form a key elevation of the new central courtyard, highly visible from Macarthur street, a much used pedestrian link between the city and Ultimo. The height of the new building aligns with the Switch House, creating cohesive edges to the courtyard, while foregrounding the profile of the Wran.

The largest street trees at the corner of Macarthur and Harris Streets are proposed to be retained. As such the obstacle these trees provide for views will remain.

The new building- on the corner of Harris and Macarthur Streets creates a new protected courtyard. Lowering the courtyard and separating from the Switch house , revealing its full heritage elevation for the first time.

The new building is a modest structure, a continuation of the low scale of the creative commercial lining Harris Street. It includes a new entry centred on the Switch House Gable, a covered connection on Harris Street and a program space.

This space is intended to be flexible, available for both programming and presentation. Its domed roof makes a connection to the arched forms of the Wran building, providing concealed plant and top lighting. The room is linked to the central courtyard and across to the Switch house, providing cover for informal gathering and outdoor events, enlivening and softening Macarthur Street.



View: Macarthur Street



Masking of Existing Switch House by Wran and raised terrace



Switch House Facade fully revealed

## Back of House

Further design development regarding the operational requirements of the museum has been undertaken to the loading and back of house spaces. A more efficient design has been based on the expected demand for loading vehicles and frequency. This has resulted in an overall reduced footprint for the loading dock area with consequent reduction in excavation.

Despite the reduction in area, the loading dock retains the following:

- Ability to accommodate 2 x MRV and 1 x SRV vehicles concurrently.
- An 83 square metre waste room.
- End-of-trip facilities including 2 female and 2 male showers/ WCs along with change areas and lockers.
- Bike storage capable of accommodating 8 bicycles.
- Storage rooms separating collection and food and beverage goods.
- The back of house area also houses a security office, accessible amenities, commercial kitchen, forklift holding area and services areas including fire pump room, comms room and plant..

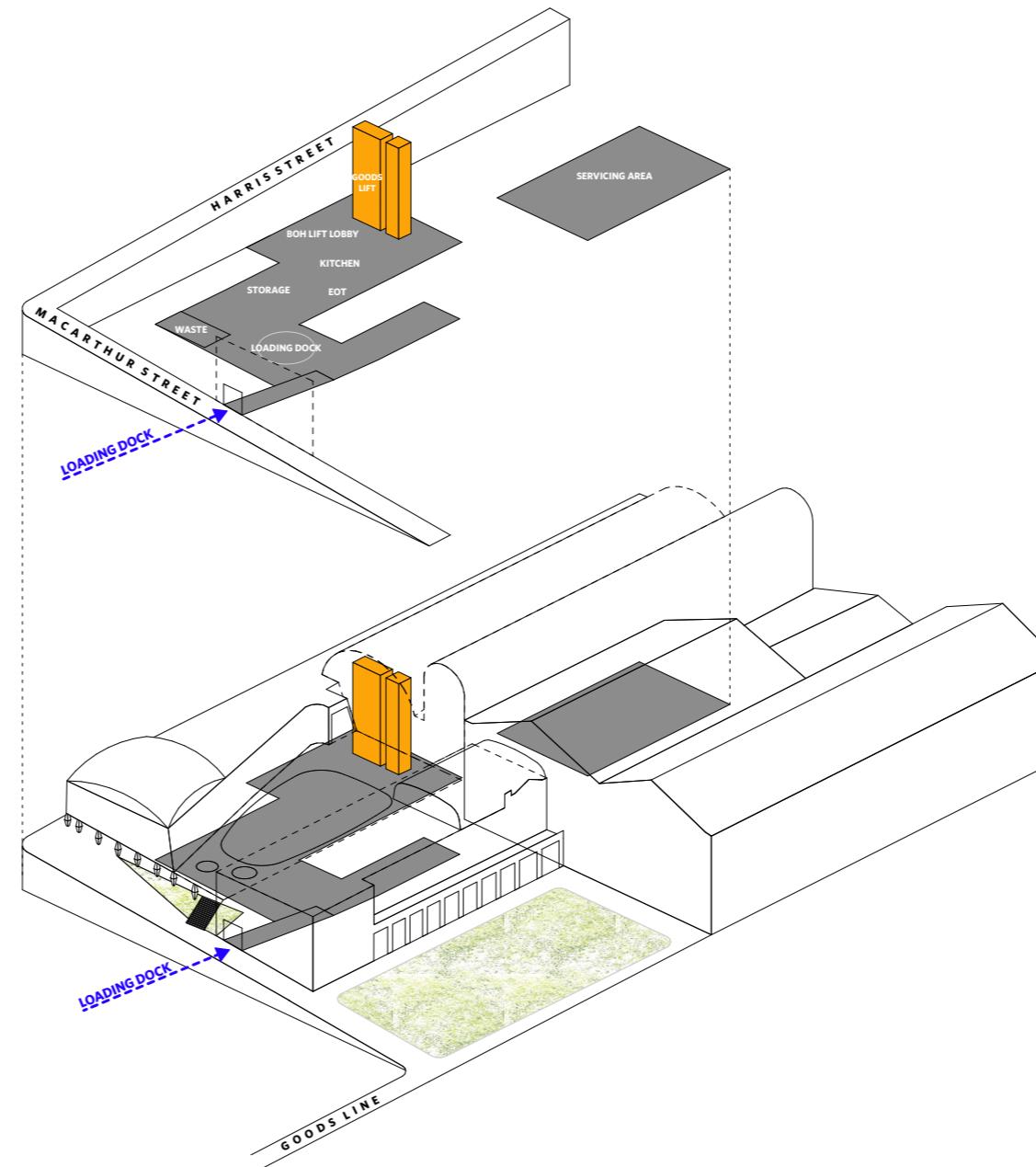
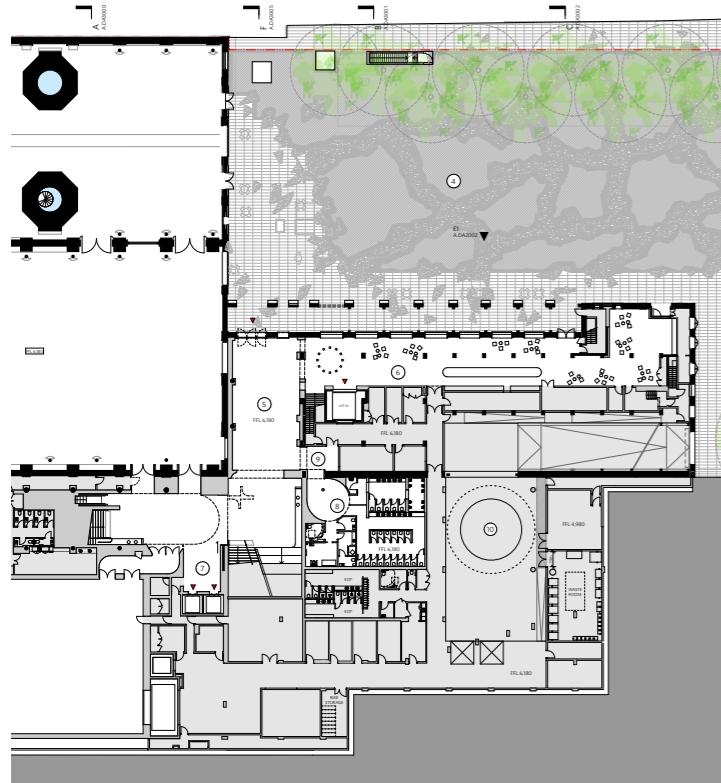


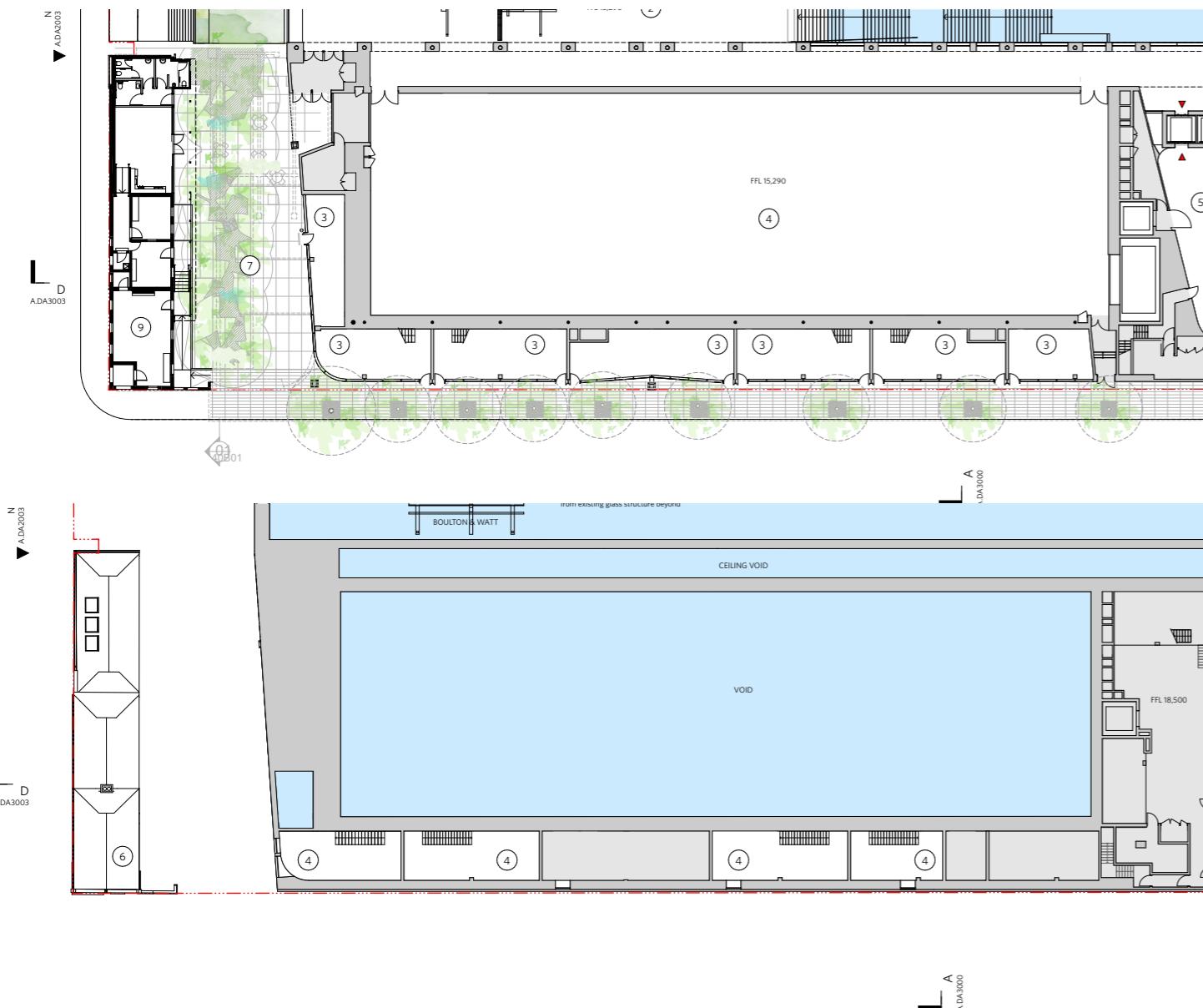
Diagram: Back of House Spaces

Dedicated loading is located at the ground floor of the building in an excavated area below ground on Harris Street. The loading is accessed from MacArthur Street, through an enlarged existing opening in the Switch House. This simple crossing minimises intrusion to the public domain, allowing for uninterrupted pedestrian use. A goods and arts lift are centrally located to provide easy BOH servicing of exhibition spaces. An additional service area in between Exhibition Spaces 2 and 3 provides back of house services and a staging area for exhibition object installation.

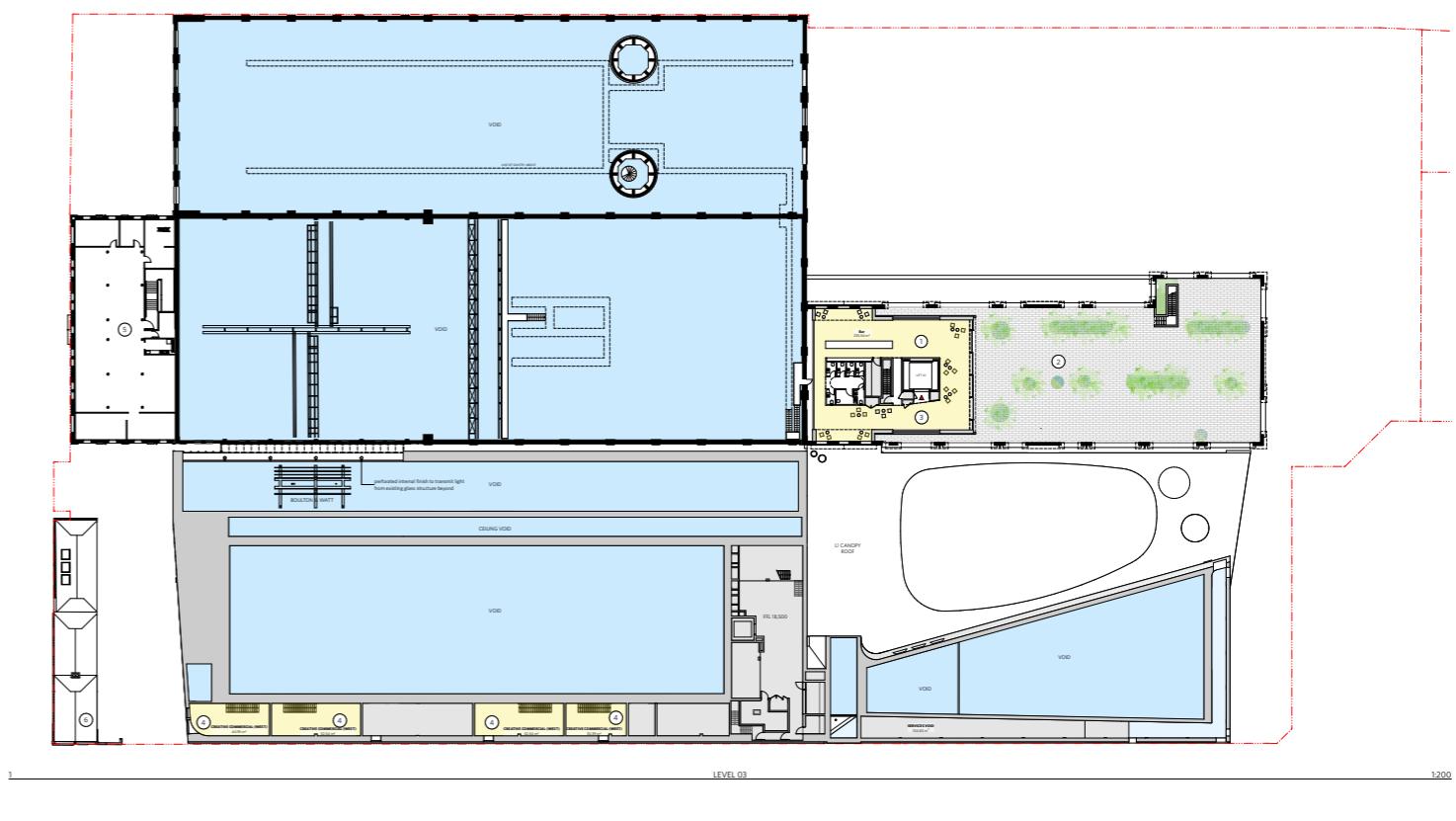
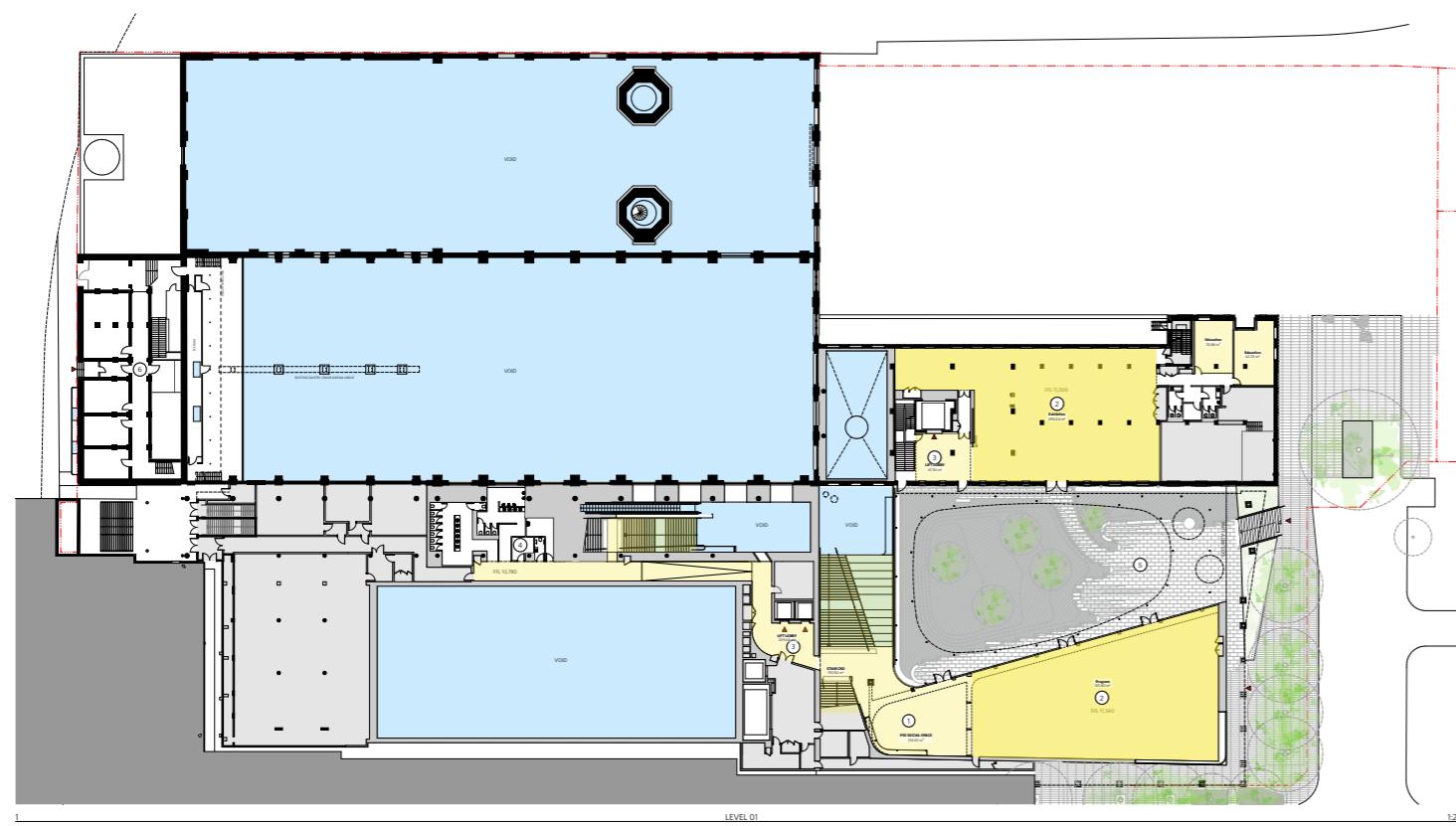
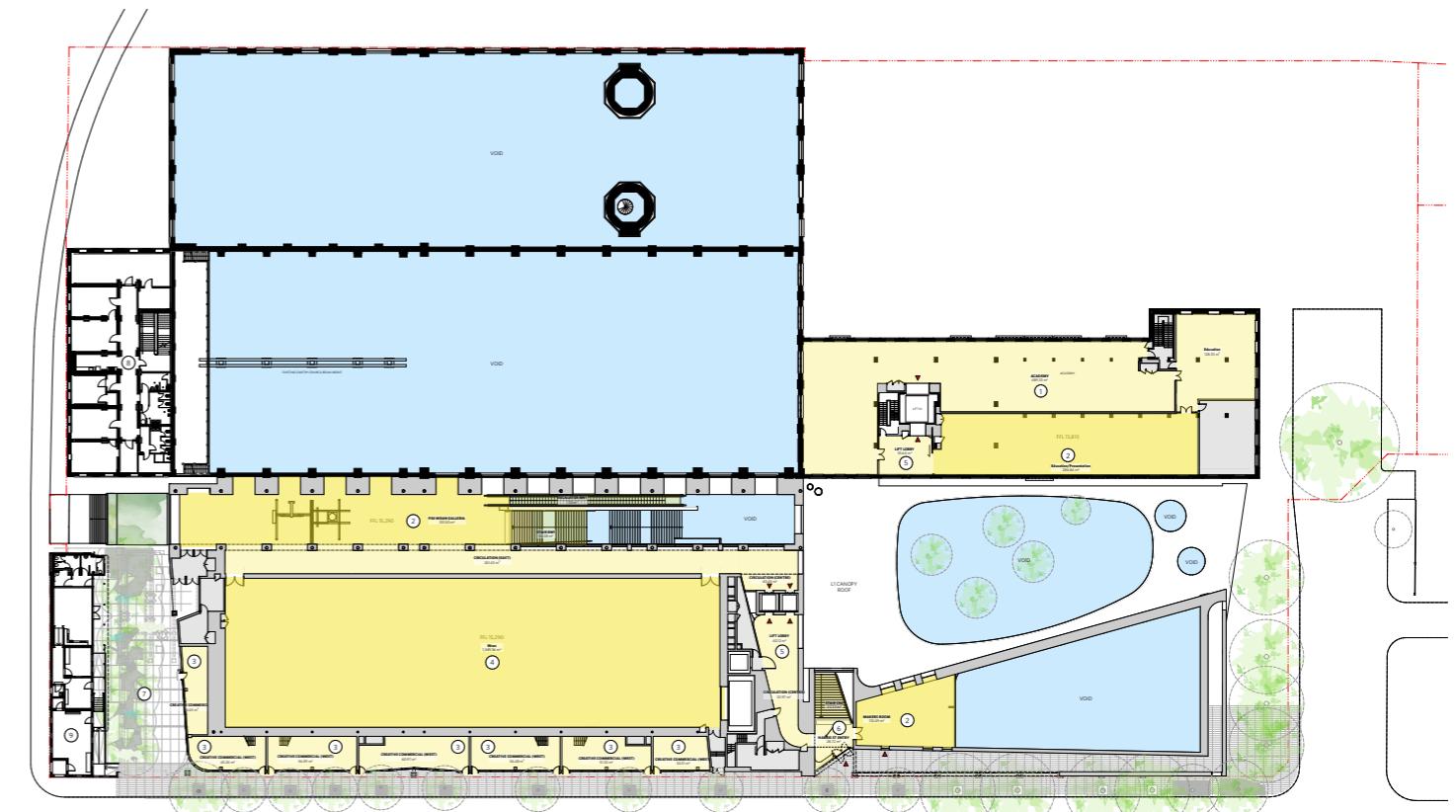
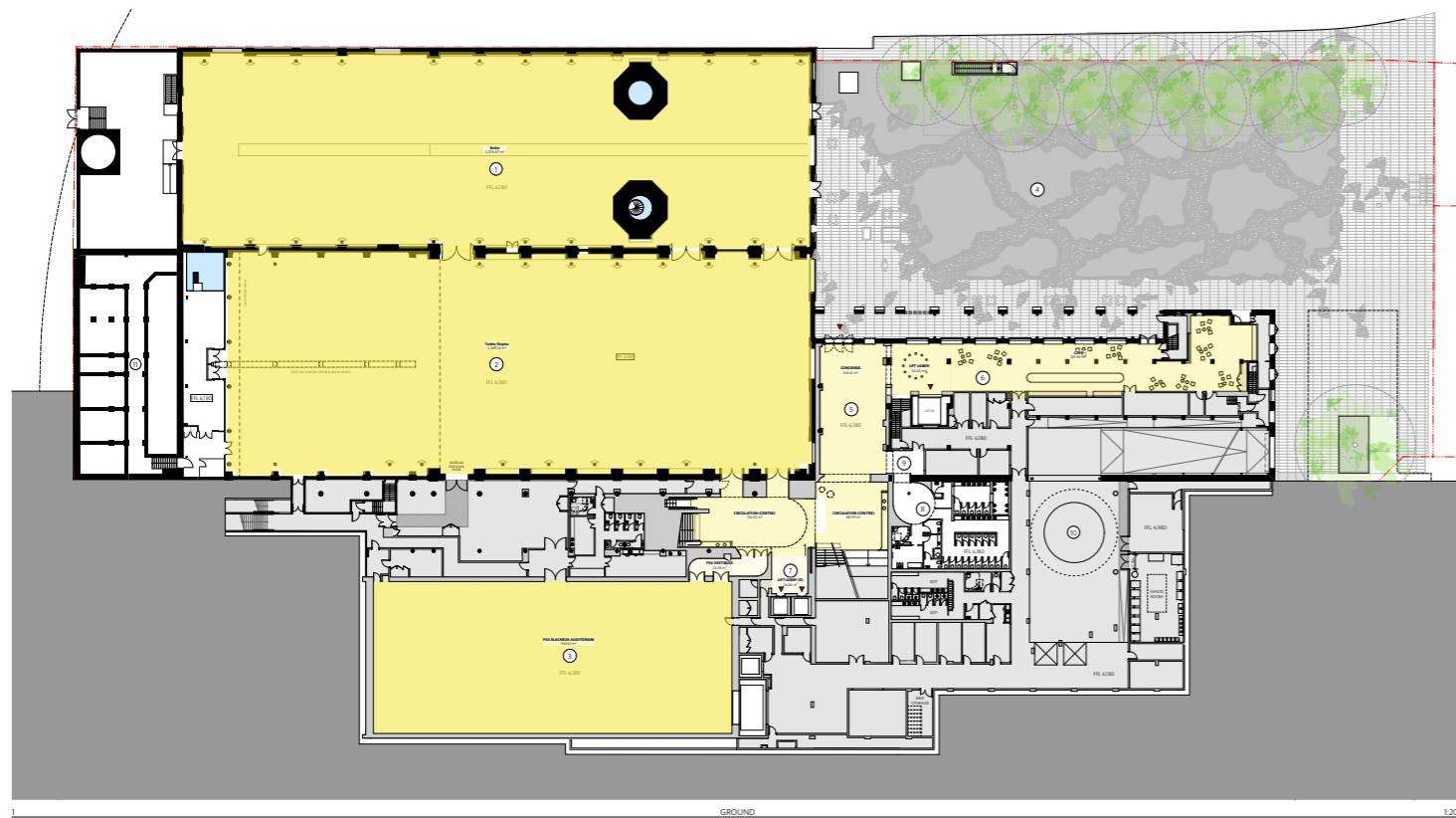
## Creative Industries

The creative industry studio at the corner of Harris Street and the Post Office Courtyard has been increased in size at the northern corner to allow more suitable space.

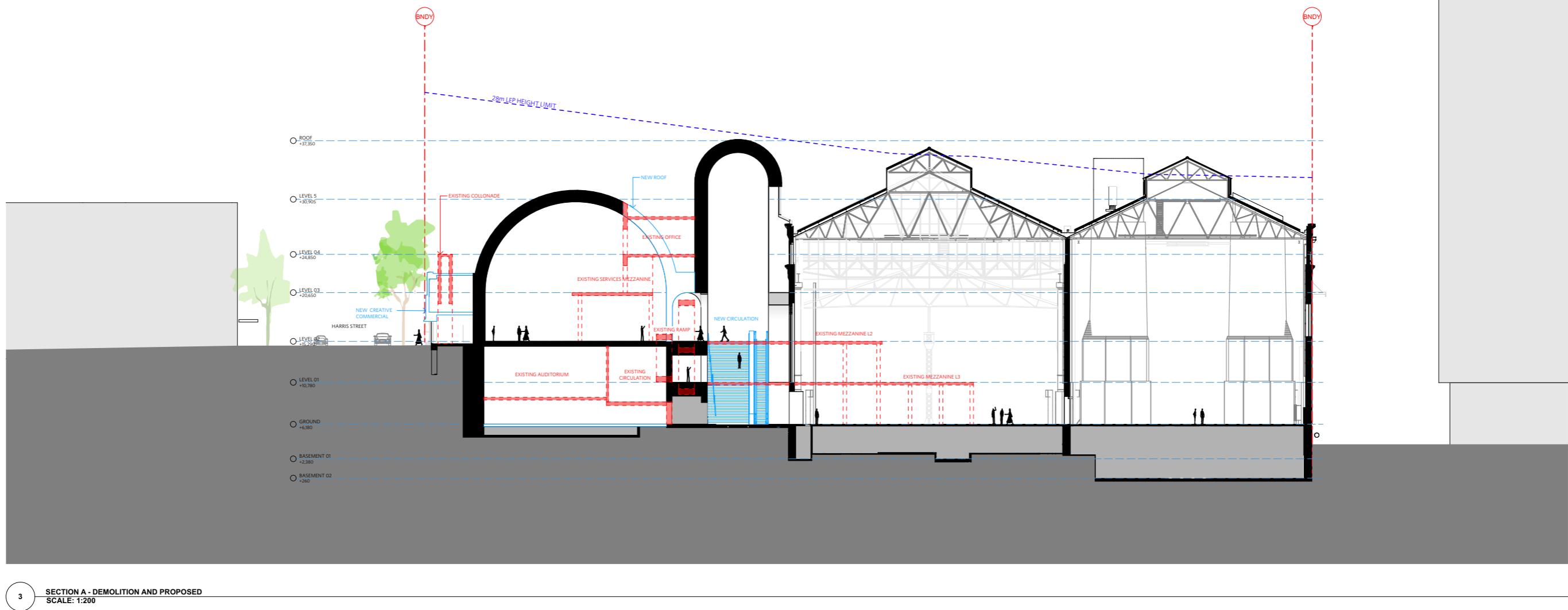
Two creative industry studios have had mezzanine levels added which will increase the range of potential creatives that can occupy these spaces.



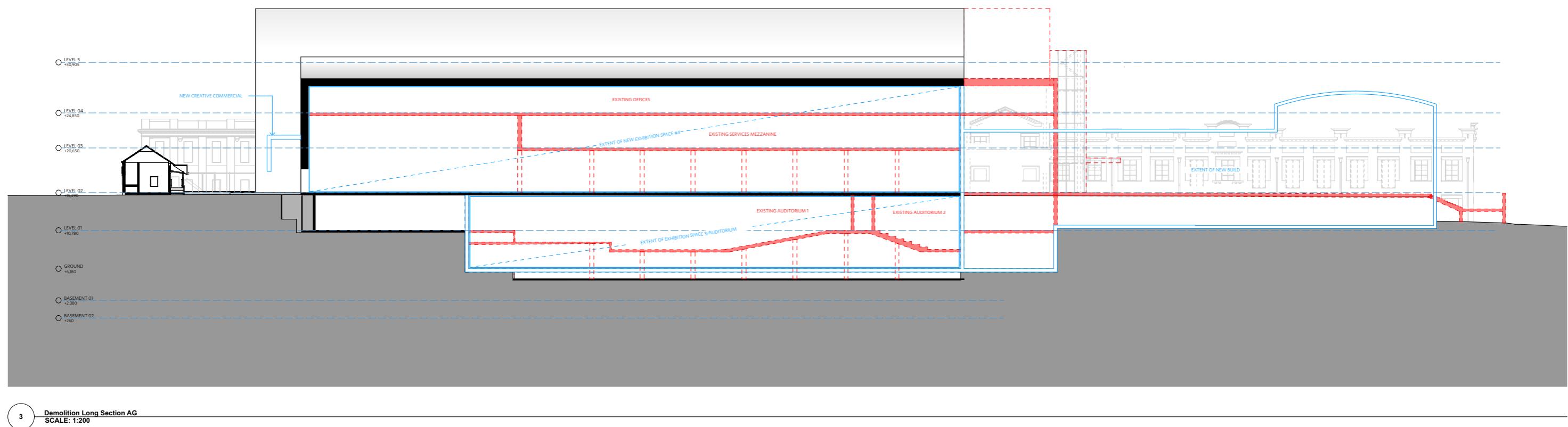
## Area Plans- Front of House



# Demolition



# Demolition



# Construction

Structural sequencing to retain existing steel and prepare volume for Exhibition space below by Arup Engineers.

## Wrang Building Construction Sequence

### Notes

1. The contractor will provide a suitable and sufficient crane to lift structural members.
2. The contractor will check the structural integrity of all stages of erection for stability, locked in stress, etc.
3. It is assumed that temporary propping and members will be designed and checked by temporary works engineers.
4. Temporary works engineers must ensure that no part of the permanent structures is overstressed by excessive construction loading or contains locked in stresses. The contractor must consult with the temporary works engineer to address loading conditions on the members and the structure resulting from transport and installation in a temporary condition.

### Stage 1:

- 1.1 Remove the cladding from the roof when appropriate.
- 1.2 Demolish the existing structures along Harris Street, which are structurally isolated from the Wrang building.

Demolish the existing structures.

### Stage 2:

- 2.1 Provide temporary props to the Vault roof and Atrium roof for stability.
- 2.2 Provide bridging members under the existing CHS columns.

Bridging twin beams

### Stage 3:

- 3.1 Locally demolish the existing concrete under the bridging members supporting the existing CHS columns.
- 3.2 Vertical excavation is required where the new footing is lower than the existing footing. It will be necessary to support the existing structures and the bridge following each 1.5m vertical cut of excavation. If defects are present, it will be necessary to stabilise them such as by the installation of rock bolts, under-reinforced shotcrete. Refer to the Geotechnical report.

Demolish concrete structure

Install new column

Vertical excavation

### Stage 4:

- 4.1 Provide temporary propping or a permanent stability system, such as shear walls, to the West side of the Vault structures.

Temporary props as required

### Stage 5:

- 5.1 Saw cut the existing concrete rib plates and install them on the new roof of the Harris Street building.

Construct new framing

### Stage 6:

- 6.1 Demolish the existing structures between the Vault and Atrium.

Demolish the existing structures

### Stage 7:

- 6.1 Install new structures between the Vault and Atrium.
- 6.1 Provide temporary propping as required by contractors.

Construct new framing

### Stage 8:

- 8.1 Temporary propping for the roof can be removed once the roof structures are stabilised by the new framing.

Temporary propping

### Stage 9:

- 9.1 Demolish the existing structures under the Vault.
- 9.2 Install new slab on the ground.

New beam and slab

### Stage 10:

- 10.1 Construct new beams, slabs and walls.

New beam and slab

### Stage 11:

- 11.1 Temporary propping can be removed once the structures are stabilized by the new framing.
- 11.2 Replace the existing members in the Atrium with the new ones.

New tie for the Atrium

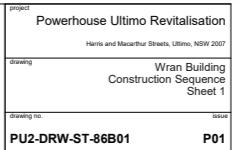
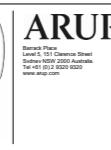
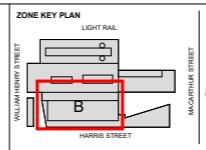
Issue	Amendment	Date
P01	Schematic Design	15.03.24
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drawn	PD	proj no 293588

**NOT FOR CONSTRUCTION**  
DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

Do not scale drawings. Verify all dimensions on site

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# Amenity

## Overshadowing

Revised shadow diagrams representing the shadow impacts of the final design are included within the revised Architectural Drawings.

- 1003 square metres (or 34%) of the Gathering Terrace will receive more than 2 hours of sunlight between the hours of 9am and 3pm on 21 June (noting that the shadow in this area is provided by existing buildings and not created by the proposal).
- 323 square metres (or 31%) of the central Courtyard will receive more than 2 hours of sunlight between the hours of 9am and 3pm on 21 June

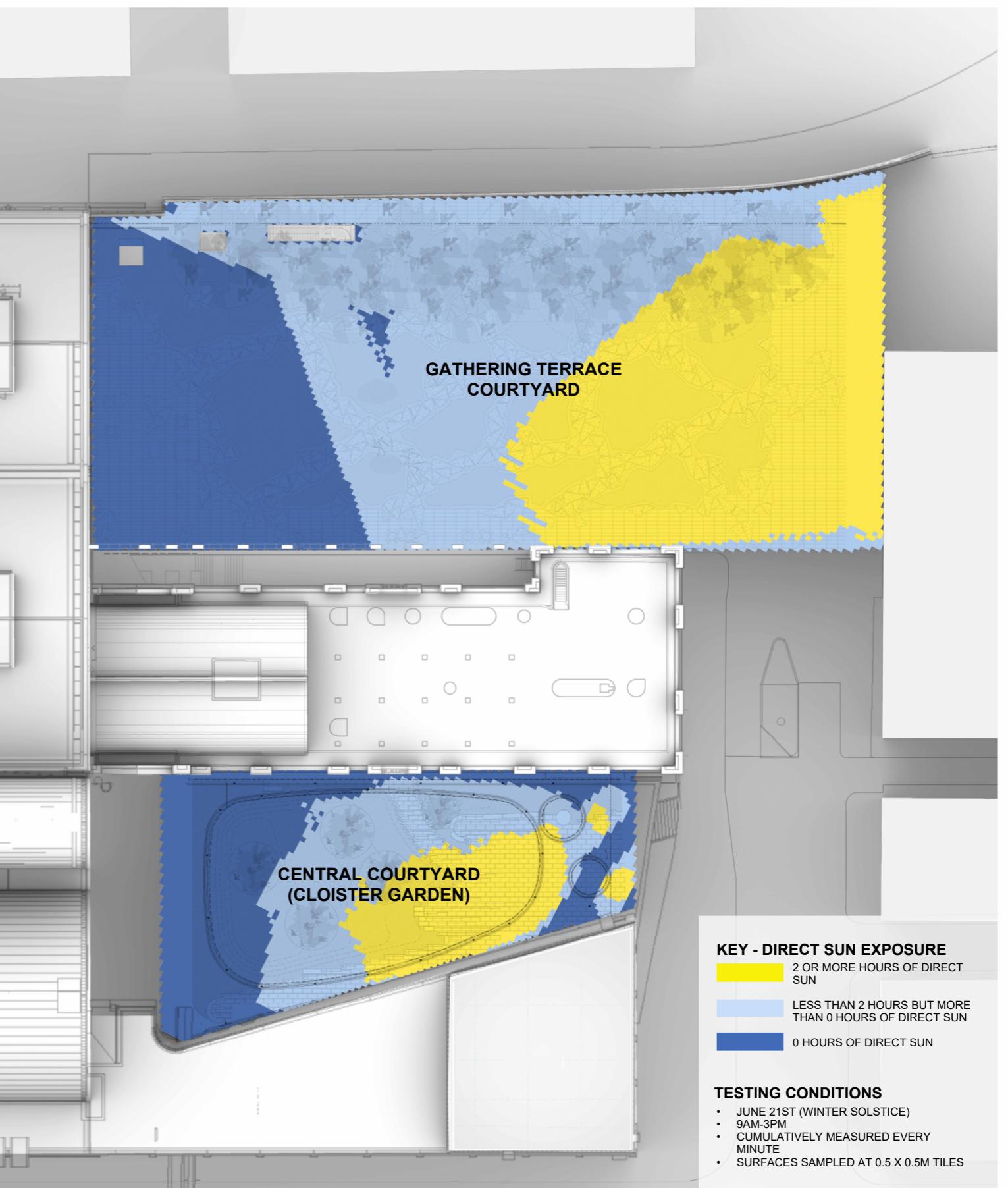
TIME	SOUTH EAST (%)	m <sup>2</sup> (2986m <sup>2</sup> total)	SOUTH WEST (%)	m <sup>2</sup> (1053m <sup>2</sup> total)
<b>Cumulative results (heatmap)</b>				
2+ hours	34%	1003	31%	323
0>>2	41%	1227	46%	484
0 hours	25%	755	23%	245
<b>% of sun every 15 minutes</b>				
9:00 AM	6.6%	197	0.0%	0
9:30 AM	4.1%	122	0.0%	0
9:45 AM	2.0%	60	0.0%	0
10:00 AM	0.2%	6	0.7%	7
10:15 AM	0.0%	0	6.1%	64
10:30 AM	0.0%	0	17.2%	181
10:45 AM	0.0%	0	21.0%	221
11:00 AM	0.0%	0	23.8%	251
11:15 AM	0.0%	0	25.2%	265
11:30 AM	0.0%	0	25.9%	273
11:45 AM	1.4%	42	25.7%	271
12:00 PM	8.8%	263	25.0%	263
12:15 PM	19.3%	576	24.2%	255
12:30 PM	30.5%	911	24.6%	259
12:45 PM	41.3%	1233	25.4%	267
1:00 PM	50.5%	1508	24.8%	261
1:15 PM	55.1%	1645	23.4%	246
1:30 PM	51.9%	1550	20.9%	220
1:45 PM	46.2%	1380	20.5%	216
2:00 PM	39.6%	1182	20.3%	214
2:15 PM	33.1%	988	19.2%	202
2:30 PM	26.0%	776	15.9%	167
2:45 PM	19.1%	570	8.6%	91
3:00 PM	11.1%	331	1.1%	12
<b>Best 2 hours of results across the day</b>				
15m	55.1%	1645	25.9%	273
30m	51.9%	1550	25.7%	271
45m	50.5%	1508	25.4%	267
1h	46.2%	1380	25.2%	265
1h15m	41.3%	1233	25.0%	263
1h30m	39.6%	1182	24.8%	261
1h45m	33.1%	988	24.6%	259
2h	31%	911	24%	255

### RESULTS - SUMMARY

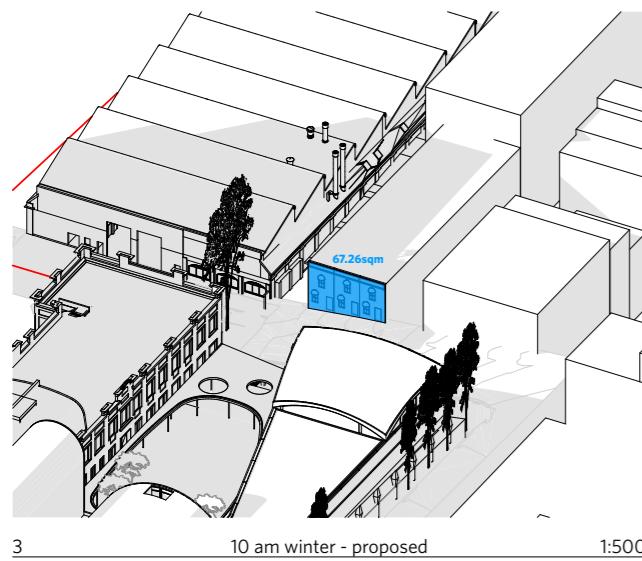
#### IN TERMS OF SHADOW IMPACTS FOR PUBLIC DOMAIN AREAS:

- 1003 square metres (or 34%) of the Gathering Terrace will receive more than 2 hours of sunlight between the hours of 9am and 3pm on 21 June (noting that the shadow in this area is provided by existing building and not created by the proposal)
- 323 square metres (or 31%) of the central Courtyard (Cloister Garden) will receive more than 2 hours of sunlight between the hours of 9am and 3pm on 21 June

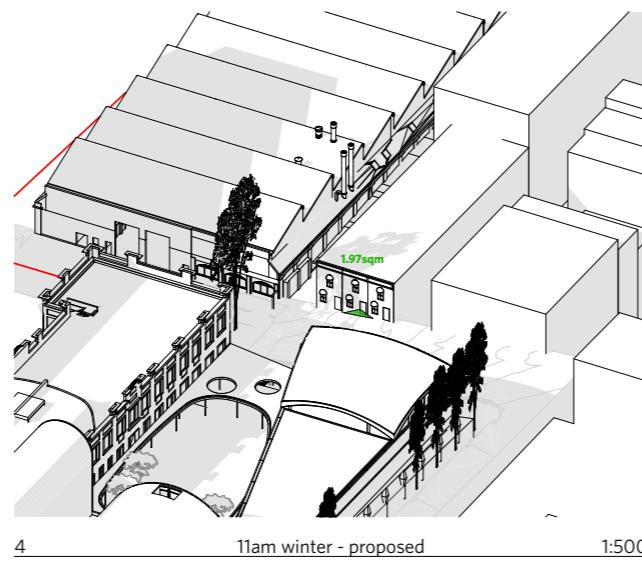
	m <sup>2</sup>	%
GATHERING TERRACE COURTYARD	1003	34
CLOISTER GARDEN COURTYARD	323	31



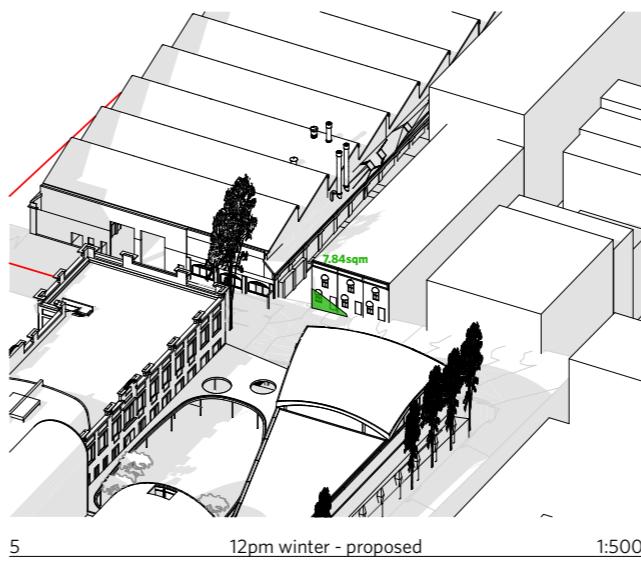
## Amenity



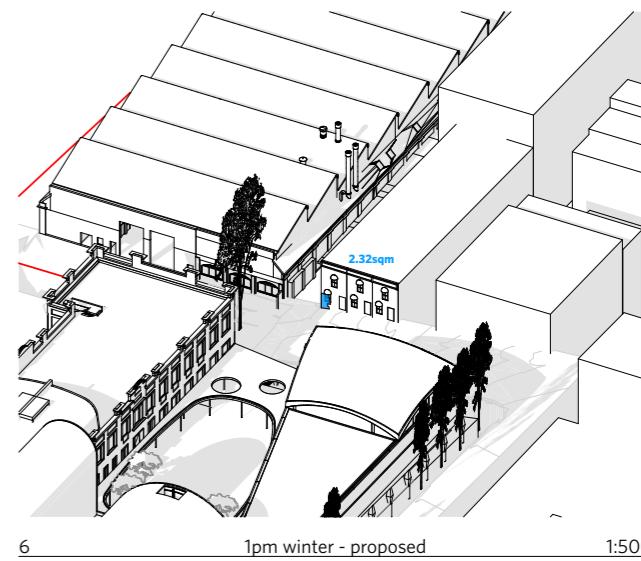
3 10 am winter - proposed 1:500



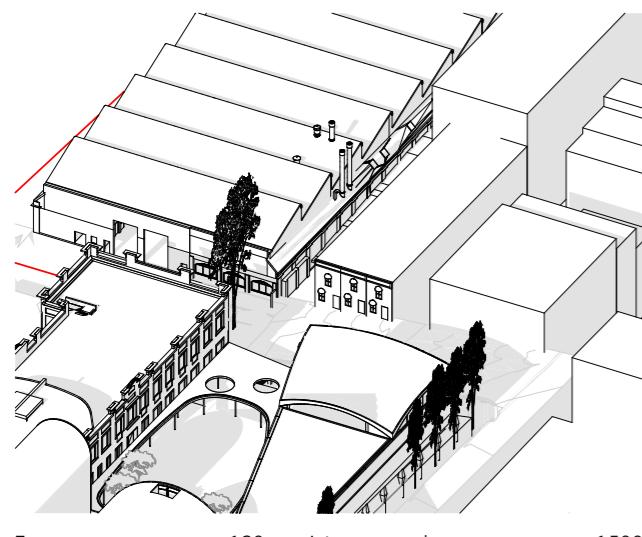
4 11am winter - proposed 1:500



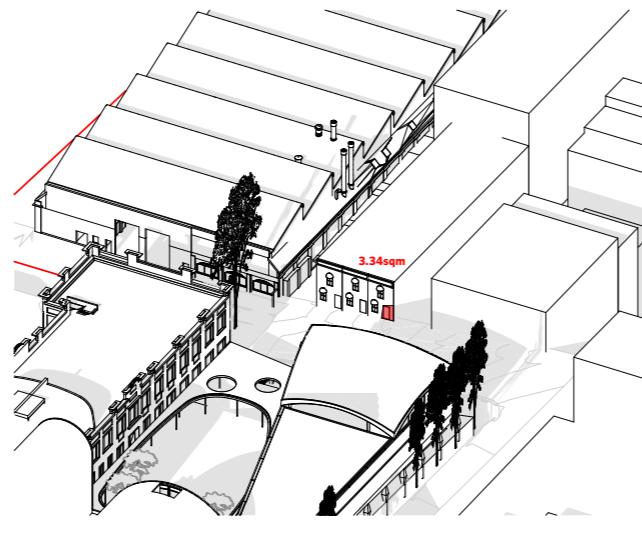
5 12pm winter - proposed 1:500



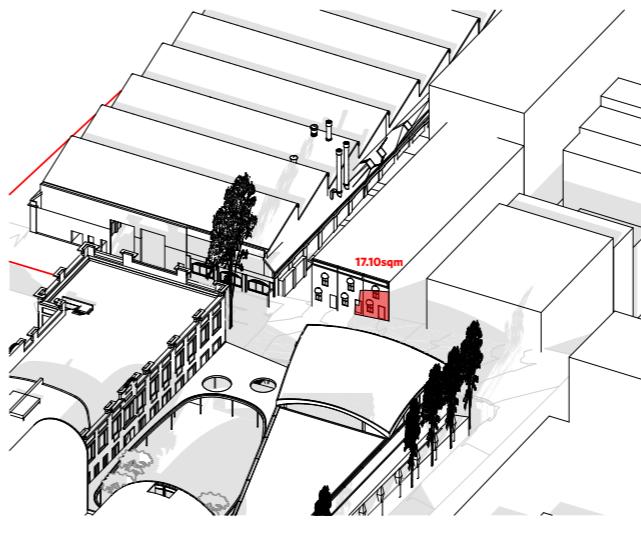
6 1pm winter - proposed 1:500



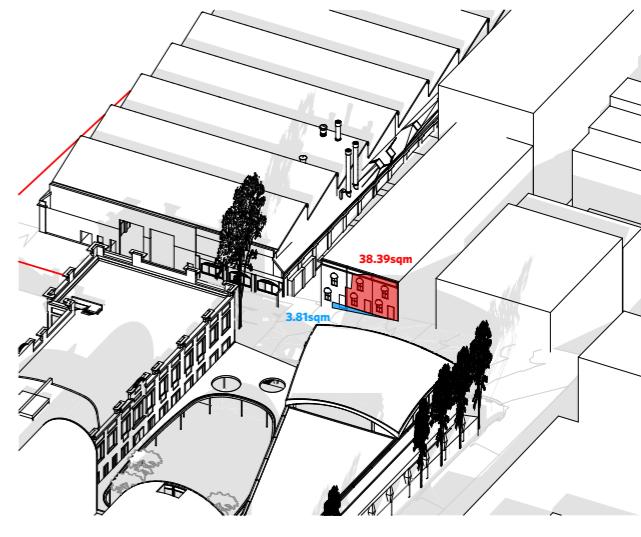
7 1:30pm winter proposed 1:500



8 2pm winter - Proposed 1:500



9 2:30pm winter - proposed 1:500



10 3pm winter - proposed 1:500

## Shadow Studies for 81-85 Macarthur Street

### SHADOW STUDY - WINTER SOLSTICE 21 JUNE

█ ADDITIONAL OVERSHADING

█ EXISTING OVER SHADING

█ LESS OVERSHADING - DUE TO REMOVING STEEL ROOF  
OFF SWITCH HOUSE

