

The University of Manchester
North Campus Energy Centre
Design and Access Statement

7228 Revision (02) October 2024

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0.2 | Revision History

Revision	Details	Prepared By	Checked By	Date
00	Initial issue	kc	KC	2024 07
01	Site plan amended to suit UoM ownership / RLB comments incorporated / MEP ASHP arrangement changed / SEng concrete change impacting brickwork	kc	KC	2024 10
02	Signage statement amended	kc	KC	2024 10

1.0 | Introduction

THIS DESIGN AND ACCESS STATEMENT HAS BEEN PREPARED IN SUPPORT OF THE DETAILED PLANNING APPLICATION FOR THE NEW 'ENERGY CENTRE' PROPOSED AS PART OF WORKS AT THE UNIVERSITY OF MANCHESTER , NORTH CAMPUS.

This Design and Access Statement is intended to allow the local Planning Authority, the local community and others interested in the proposals to understand the design principles behind the development. The statement explains how the proposal has been developed to deliver an energy centre to serve the retained buildings in the University of Manchester 'North Campus'.

The Design and Access Statement should be read in conjunction with the supporting information scheduled in Section 5.0 of this report.

Context

This project comprises of the construction of the new Energy Centre for site distribution of services and renewable technology upgrades to provide sustainable power, heating, and domestic hot water services to surrounding University buildings and to contribute towards the University Net Zero Carbon goals as well as improving site Infrastructure.

The Energy Centre project will provide a '5th generation' district heat network to serve John Garside and George Begg buildings with heating and domestic water, with district heating pipework initially extended to serve the Faraday tower site.

The proposal encompass' a phased expansion capability within the design to also include serving the Faraday Tower plot, Masdar and Ferranti buildings in the future.

A considered approach has been maintained for the development of the proposed building. The proposal presented within this document evidences a building design development which has been dealt with sensitively, acknowledging the site, adjacencies and the form and scale of location context.

The Energy Centre is a statement building with respect to its functional intent. The design team have sought to ensure that the quality of design, materials and construction is cognisant of this. .

The project will support the University to meet its Net Zero goals set out within the Net Zero Carbon 2038 initiative.

Brief

The following objectives and scope have been confirmed:

- Provide a fossil fuel free heat network which utilises electrically powered air source heat pumps to serve both John Garside and George Begg buildings with heating and domestic water.
- Provide the ability for phased expansion capability within the design to supply the Faraday Tower plot, Masdar and Ferranti buildings
- Support the UoM in meeting their Zero Carbon aspirations.
- Use Zero Carbon Technologies with zero ozone depletion refrigerants.
- Provide a new Mains Cold Water ring main to provide resilient water supplies and smart metering.
- Provide a Fire Fighting ring main to the current best-practice guidance for the flow capability compliance.
- Maintain business continuity throughout all the transitional phases of the project.
- Facilitate future energy recovery from the building and process cooling plant.

The construction of the energy centre provides the following benefits:

- The carbon footprint of the retained buildings will be substantially reduced.
- Additional disruption caused by the conversion of the retained buildings to Low Carbon Technologies will be avoided.
- The new infrastructure will be designed to meet the requirements of Low Carbon Technologies.
- The infrastructure design is expandable to more properties.
- The heat network design will be capable of recovering waste

energy from cooling plant.

- The heat network design will flexibly accommodate progressive modernisation of existing plant and equipment.
- As new plant is integrated the efficiency of the network will be enhanced.
- The network uses water as a heat transfer medium, so is environmentally sustainable.

Location

The position of the proposed building is driven by the need to utilise the Mancunian Way for its high background noise levels in relation to the air source heat pump acoustics, coupled with the avoidance of compromising any development opportunities of any adjacent University land.

The site currently has no existing building stock, however it houses service installations for the surrounding University Buildings.

2.0 | Assessment

2.1 | Site Location



The site is located within the University's North Campus, at the lower south west corner of that area.

The site is at the junction of Sackville Street to the south and Princess Street to the west. Mancunian Way is slightly further to the south but overlooks the proposed site from its elevated position. Drover Lane is part of the North Campus area. Works to Drover Street are proposed as part of this project.

The North Campus' retained building stock comprises John Garside Building, George Begg Building, Faraday Tower, Masdar Building and the Ferranti Building.

2.3 | Site Context

KEY

-  UoM ownership
-  Proposed Energy Centre Site
-  Proposed temporary Gas Storage
-  Proposed Generator (Refer to MEP Detail)
-  Applicants Underground Ownership

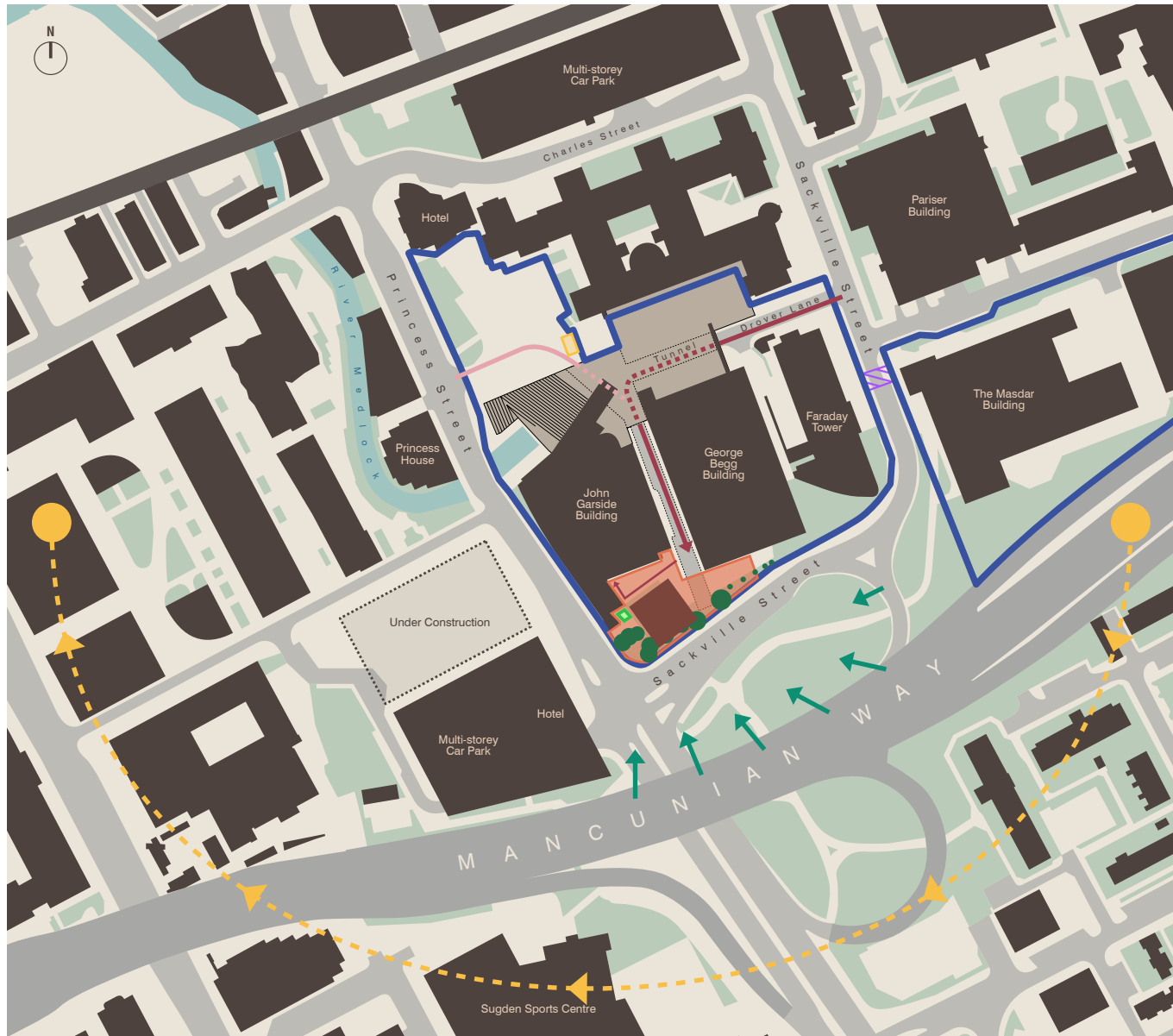
The site proposed for the new Energy Centre is to the south of the John Garside Building. The plot has no building on it and was formerly a meditation garden, but currently it houses services installations including gas storage, which will need to be relocated.

The Estate and buildings within the blue line on the adjacent image are within University of Manchester ownership.

The closest buildings outside of the University ownership to the construction site is the multi storey car park and hotel to the west across Sackville Street.



2.2 | Site Analysis



The site has a south facing aspect. The east and west elevations are also unmasked by adjacent buildings. As a result, the proposed building will be visible from the nearby Mancunian Way and road network.

The exposed corner site gives the proposed building some prominence, however it is intended to be smaller than existing adjacent buildings and so does not dominate or detrimentally impact upon the streetscape.

The site is accessed through an internal road network. There is a vehicular route between the John Garside and George Begg buildings.

As the site is contained by high fences to the south and west, it is effectively a dead end in-so-far as visitors and vehicles would only be expected on Energy Centre matters and for deliveries to George Begg and MIB.

Other existing site features to consider include;

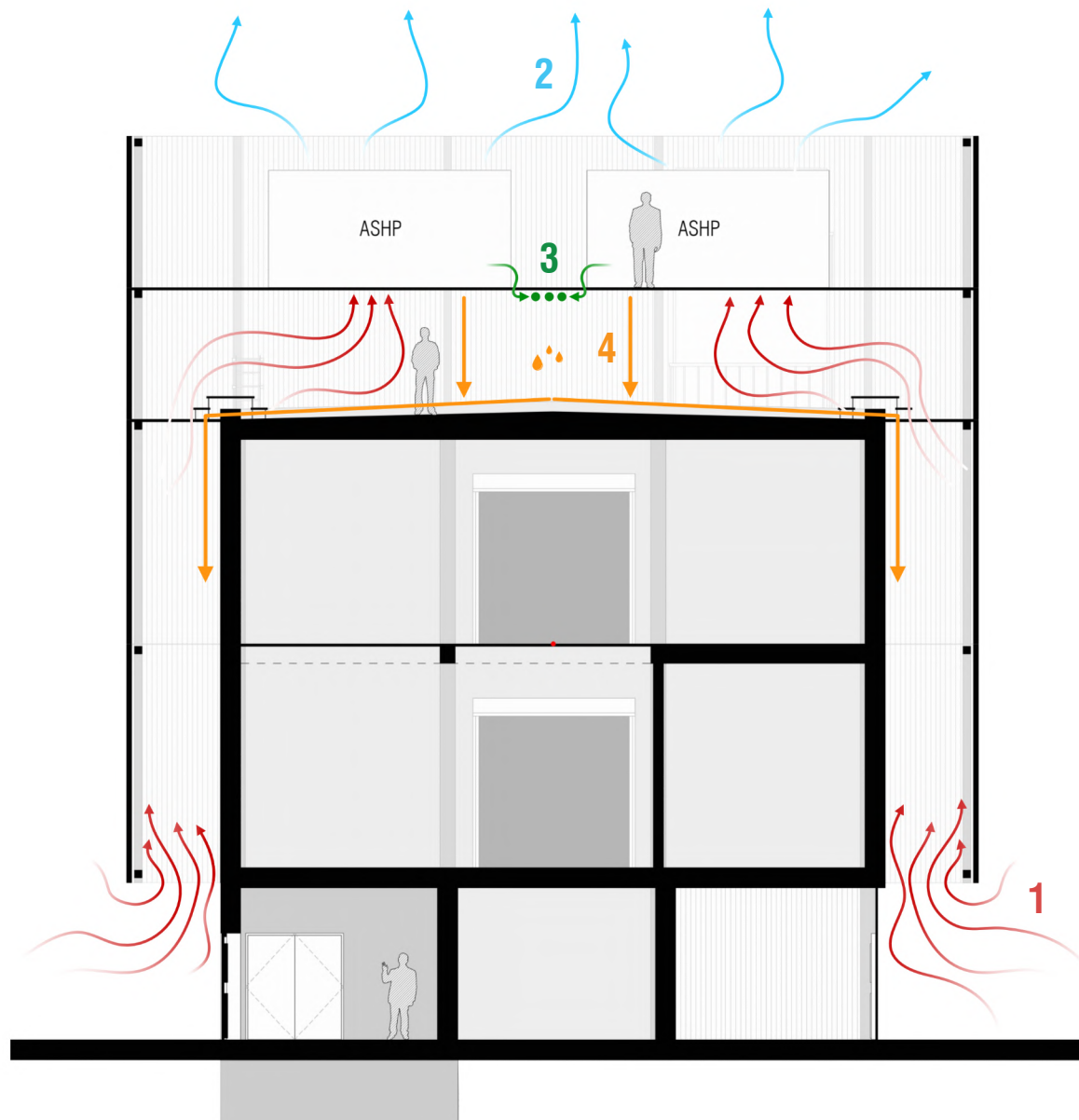
- the need to treat the building acoustically to avoid affecting nearby occupants
- consideration of existing trees.
- Relocation of the gas storage (noted elsewhere in this report)

KEY

- UoM ownership
- Applicants Ownership Underground
- Proposed Energy Centre Site
- Proposed temporary Gas Storage
- Primary Access
- Secondary Access
- Views of proposed building
- Proposed Generator (Refer to MEP Detail)

3.0 | Design

3.1 | Use



Building Section

Functional envelope

The adjacent illustration shows a section of the proposed Energy Centre building. It identifies the locations of the principle services installations. It also illustrates their connectivity both internally and routing externally to the other University of Manchester campus buildings.

The air source heat pumps need to be a high level and exposed to the external environment. The lightweight cladding ('shroud') is used to form a vertical channel between itself and the composite cladding of the building envelope to direct air flow. The height of the 'shroud' enables visual masking of rooftop services.

- 1 Hot Air:**
Hot air rises between the shroud and the cladding to be utilised by the Air source heat pump
- 2 Cool Air:**
Cool Air is discharged to atmosphere from the Air source heat pump
- 3 Air Source Heat Pump Services:**
ASHP services routed below open mesh deck, avoids trip hazard above and is easily accessed from below
- 4 Precipitation and Moisture:**
Rain and water generated by services function which falls on the roof is directed to the building perimeter then into drainage pipework, to avoid penetrating the roof membrane

3.0 | Design

3.1 | Benefits

Key system benefits of the Energy Centre proposal include;

- The proposed heat network solution can be developed and expanded to support **buildings of varying type, size, and operational characteristics.**
- The principle of distributing low grade energy using water as a transfer medium then locally boosting temperatures facilitates **direct interface with legacy systems**
- A rapid transition from existing heating systems to the heat network presents **minimal impact on business continuity**
- Each subsequent addition to the network to embrace improvements in plant technology will yield a **greater energy efficiency.**
- The North Campus proposal can also serve to finesse a solution that **could be deployed to the wider UoM estate.**
- Transporting low-grade heat through the network facilitates the recovery of waste heat from process and building cooling. Heat rich buildings such as computer labs waste energy transferred to **offset the energy cost of heat poor buildings.**



- Using low grade heat, the network can be built using lower cost plastic pipework (in lieu of steel) with **a design life exceeding 100 years**
- The heat network concept facilitates a progressive rollout **when capital funds are available,**
- **Substantial carbon footprint reduction** of the retained buildings.
- **Avoid disruption caused by conversion** of the retained buildings to Low Carbon Technologies.
- The new infrastructure will be designed to **meet the requirements of Low Carbon Technologies.**
- The infrastructure design is **expandable to more properties.**
- The heat network design will be capable of **recovering waste energy from cooling plant.**
- The heat network design will **flexibly accommodate progressive modernisation** of existing plant and equipment.
- As new plant is integrated the **efficiency of the network will be enhanced.**
- The network uses water as a heat transfer medium, so is **environmentally sustainable.**

3.0 | Design

3.2 | Amount and scale

The Energy Centre will need to accommodate:

Subterranean:

Interface for pipework and electrical cables.
Drainage.

Ground Floor:

BOC gas bottle storage.
HV Transformers (4 hour fire compartment).

First Floor:

LV Electrical Switchgear.
Mechanical Plant WSHP / Buffer Tanks.
Maintenance Storage.
WC / Shower facilities.
Lockers / breakout space.

Second Floor:

Mechanical Plant WSHP / Buffer Tanks.

Roof deck:

Air Source Heat Pumps.

The roof deck will have unique requirements:

- Air passage from external floating cladding.
- Open metal deck construction
- Support posts to support anti vibration resilient mounts

The accommodation provision has been developed in conjunction with Tetra Tech through design team workshops.

There has been some design development and changes to accommodation requirements since the previous accommodation schedule was developed.

- Wall thicknesses have been adjusted,
- the building footprint has undergone minor amendments to incorporate revised structural grids and align with cladding and shroud modules

Accommodation Schedule (Proposed)					
Name	Number	Area	Department	Level	
Mechanical Trench	B1-001	8.54 m ²	Mechanical	B1 - Basement -01	
Acc WC	GF-001	4.40 m ²	Sanitary	GF - Ground Floor	
Acc Shower	GF-002	4.40 m ²	Sanitary	GF - Ground Floor	
Office / Breakout / Store	GF-003	33.28 m ²	Admin	GF - Ground Floor	
Mech Riser	GF-005	8.32 m ²	Riser	GF - Ground Floor	
Server Room	GF-006	27.64 m ²	Electrical	GF - Ground Floor	
Gas Bottle Store	GF-007	29.53 m ²	Store	GF - Ground Floor	
HV Substation 01	GF-008	27.47 m ²	Electrical	GF - Ground Floor	
HV Substation 02	GF-009	27.04 m ²	Electrical	GF - Ground Floor	
Electrical Riser	R01	3.20 m ²	Riser	GF - Ground Floor	
Mech Riser zone	FF-002	12.12 m ²	Riser	01 - First Floor	
Mechanical Plant	FF-003	112.78 m ²	Mechanical	01 - First Floor	
LV Switch Room	FF-004	66.29 m ²	Electrical	01 - First Floor	
Mechanical Plant	SF-003	191.56 m ²	Mechanical	02 - Second Floor	
Roof Plant Deck	PD-001	354.53 m ²	Mechanical	PD - Plant Deck	
Grand total: 15		911.11 m ²			

- internal rearrangement eg omission of riser
- incorporation of internal walls to 1st floor to create switch room

The ground floor level houses the substations, sever room and gas bottle store and office / breakout accommodation. The ground floor accommodation is accessed externally. There is no direct access from this level to the levels above, assisting security.

Access to the upper levels is via the existing ramp which provides access to the first floor, from here the other levels are accessed via an

external staircase. Other than the switch room area, first and second floor level have been designed as a single compartment with a mesh floor. This provides flexibility in the layout and allows for future changes in equipment and layout.

The plant deck sits approximately 2.5m above roof level, allowing for maintenance access to the roof and access to the the containment running below the plant deck. The plant deck is of mesh construction allowing for good air flow to the ASHP's. The plant deck can accommodate 8no. ASHP's, allowing for future expansion.

3.0 | Design

3.3 | Layout

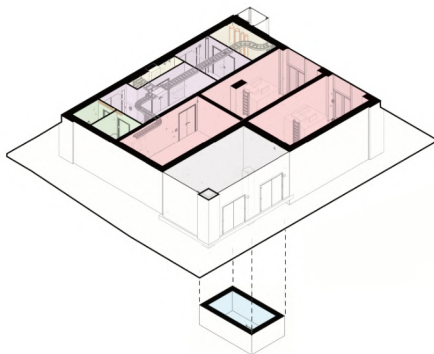
Ground floor

The ground floor accommodates the transformers, server room, gas bottle storage and staff ancillary space.

The walls are concrete construction due to the required fire rating and loading performance.

The floor level is cranked to address existing site levels. The southern half is at a lower level with low gradient access, to facilitate safe installation and maintenance of the large transformers. The norther half is at a higher level, above the levels noted in the flood risk assessment document as the potential height of flood water.

A hoist zone at the south east corner is aligned with hatches/apertures in the perimeter access walkway above. The installed hoist enables planned and easier replacement and maintenance of the plant and equipment within the building.



KEY

Circulation	Sanitary
Electrical	Store
Riser	Mechanical

3.0 | Design

3.3 | Layout

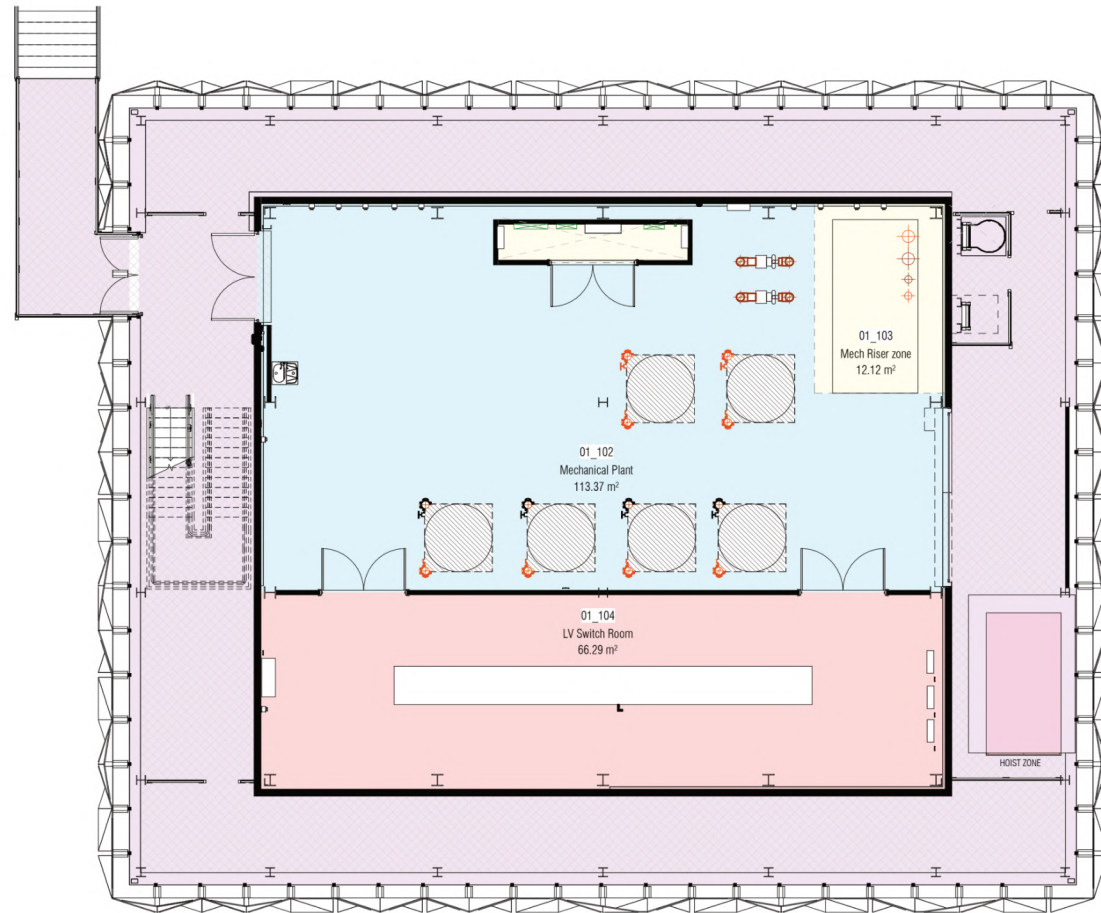
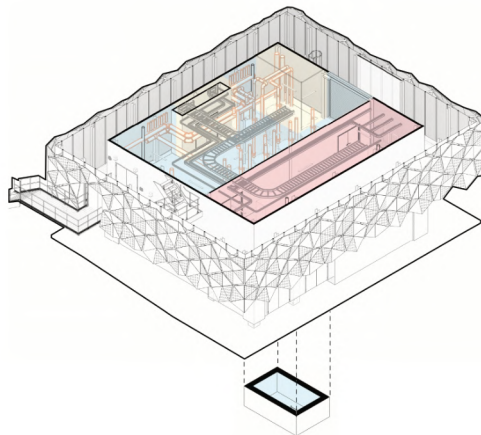
First floor

The first floor accommodates the large buffer vessels and LV switch room, with associated plant and risers.

The external walls are composite cladding. The space between this cladding and the shroud cladding defines a vertical air flow channel which serves the air source heat pumps on the roof.

There is an open mesh maintenance walkway in this zone, and the two means of vertical access; a stair to the west and escape ladder to the east.

The maintenance walkway connects to the existing ramp and platform which serves the adjacent John Garside building.



FIRST FLOOR PLAN

KEY

Circulation	Sanitary
Electrical	Store
Riser	Mechanical

3.0 | Design

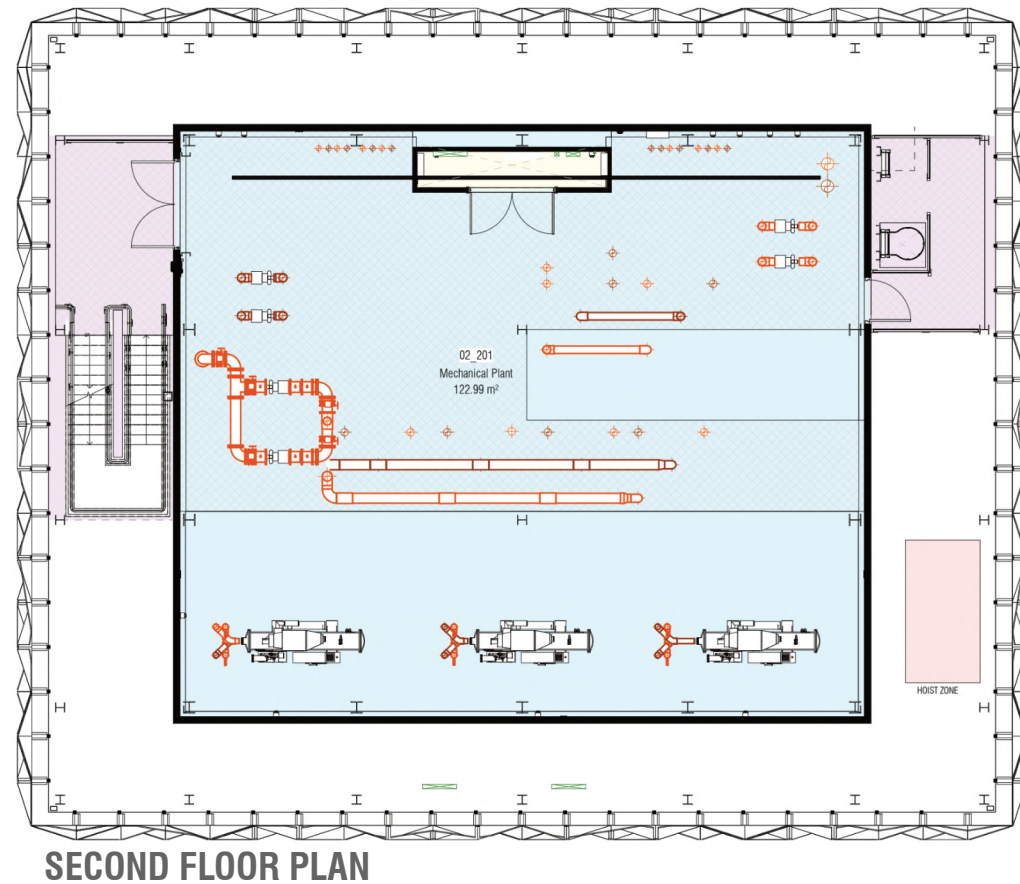
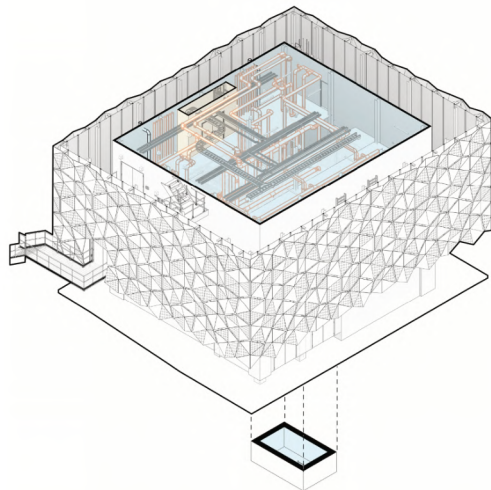
3.3 | Layout

Second floor

The second floor accommodates the water source heat pumps and other associated plant and risers. The floor is open mesh construction, enabling sections to be removed and apertures created to address potential future needs.

The external walls are composite cladding. The space between this cladding and the shroud cladding defines a vertical air flow channel which serves the air source heat pumps on the roof.

There is an open mesh maintenance walkway in this zone, and the two means of vertical access; a stair to the west and escape ladder to the east.



KEY

Circulation	Sanitary
Electrical	Store
Riser	Mechanical

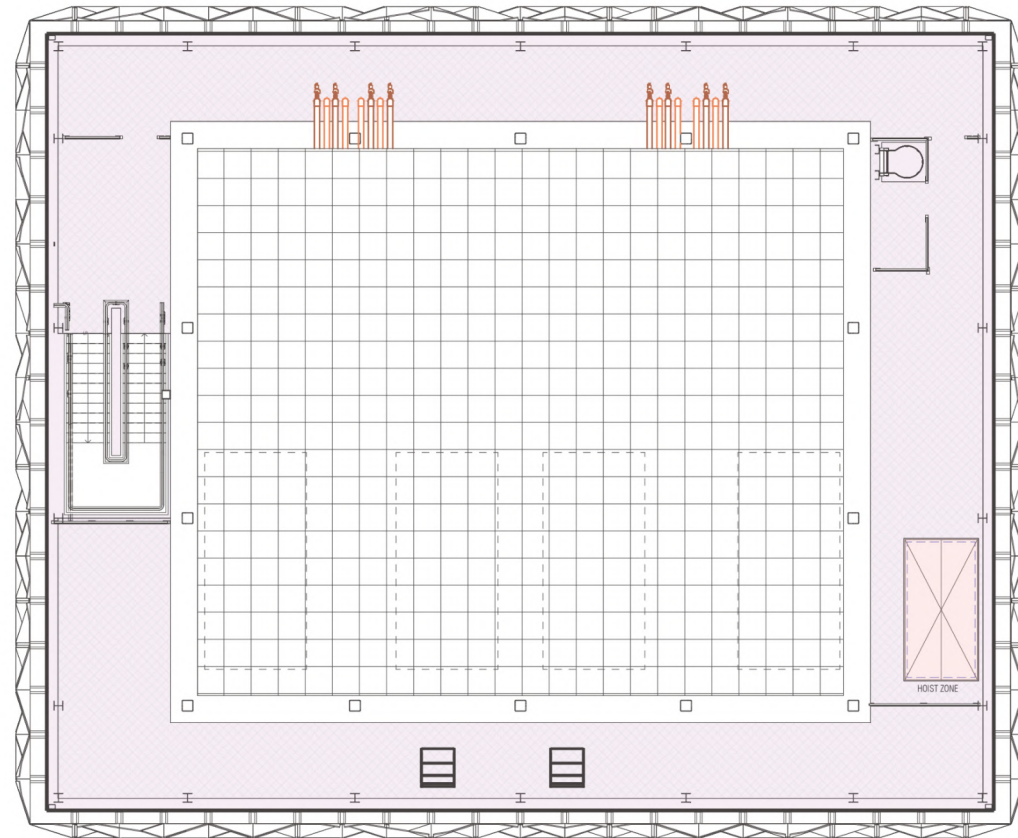
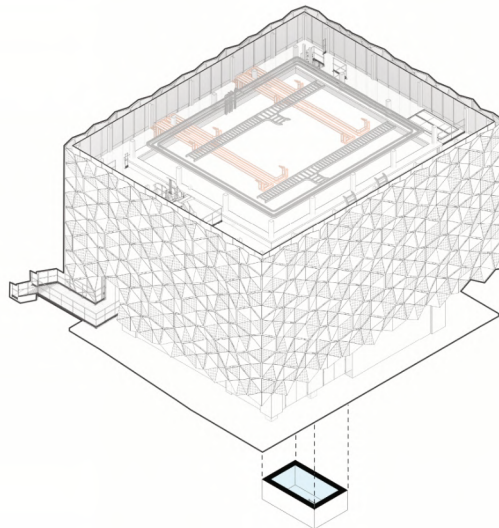
3.0 | Design

3.3 | Layout

Roof

The roof accommodates no plant or installations. It is an intended barren zone beneath the gantry above which carries the air source heat pumps. The area is high enough for maintenance operatives to access pipework and services connected to the heat pumps above

The roof is an inverted insulated roof, with concrete flag ballast.



ROOF PLAN

KEY

 Circulation	 Sanitary
 Electrical	 Store
 Riser	 Mechanical

3.0 | Design

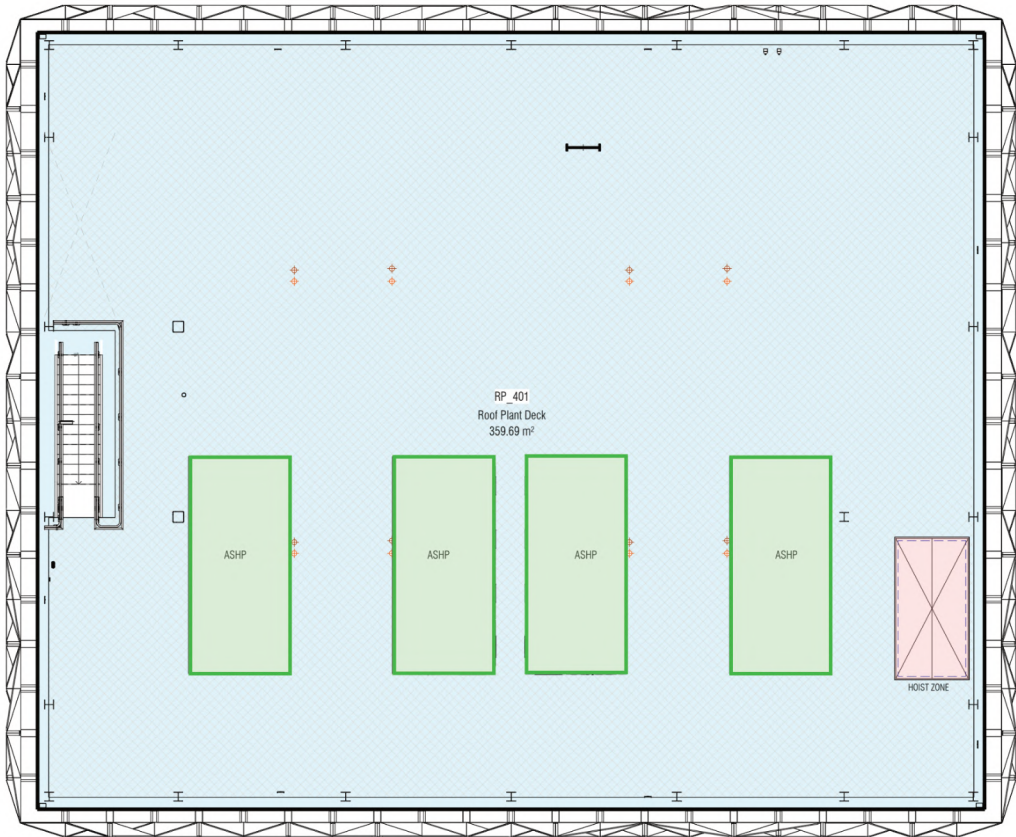
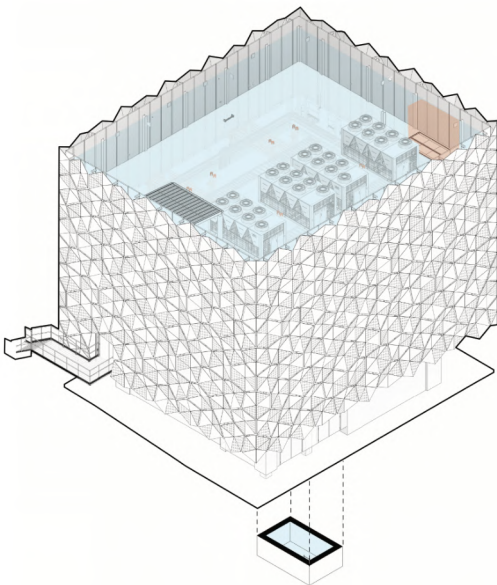
3.3 | Layout

Roof deck

The roof deck accommodates the air source heat pumps. The floor is open mesh construction.

The shroud extends above the roof deck to hide the services behind.

The area is accessed via the stair to the west elevation.



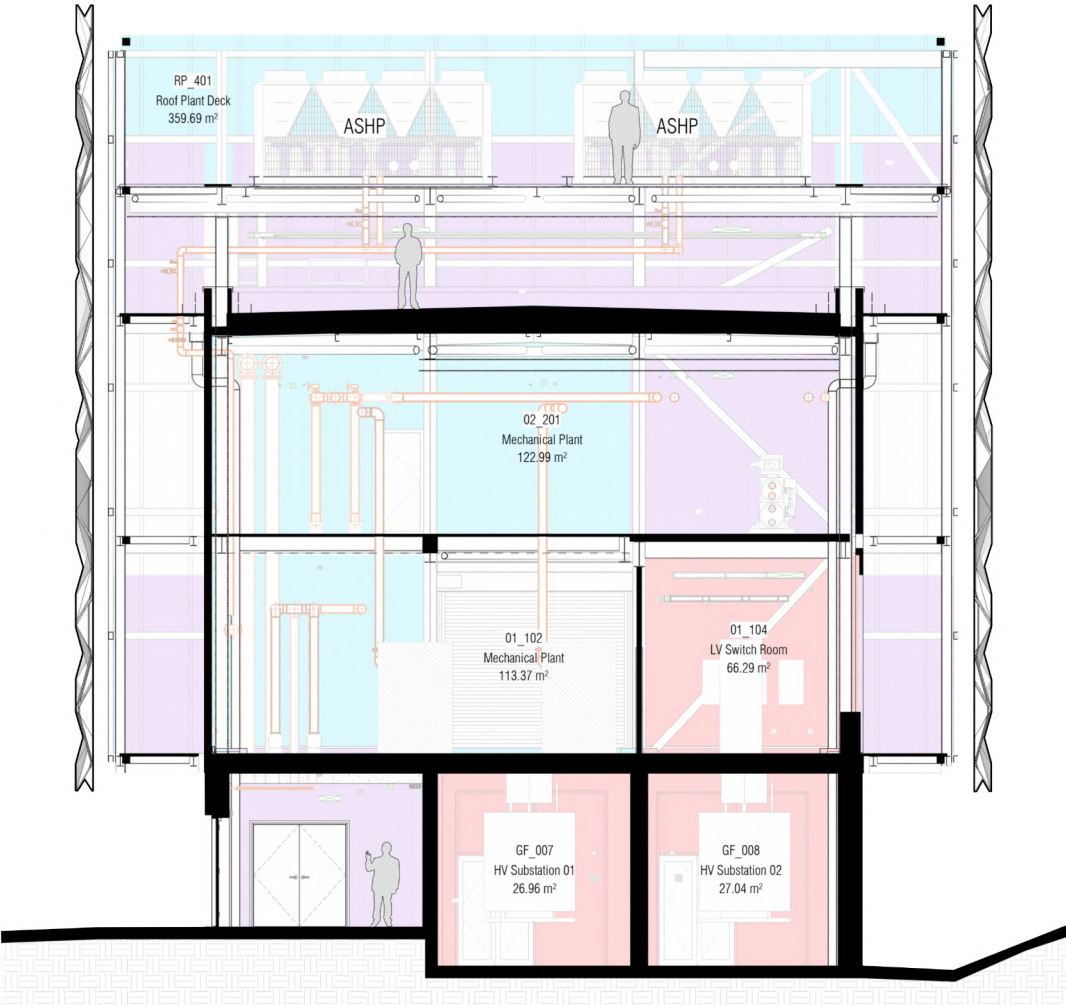
ROOF DECK PLAN

KEY

Circulation	Store
Electrical	Mechanical
Riser	

3.0 | Design

3.3 | Layout

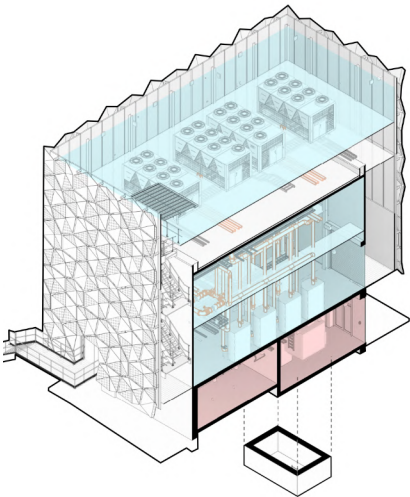
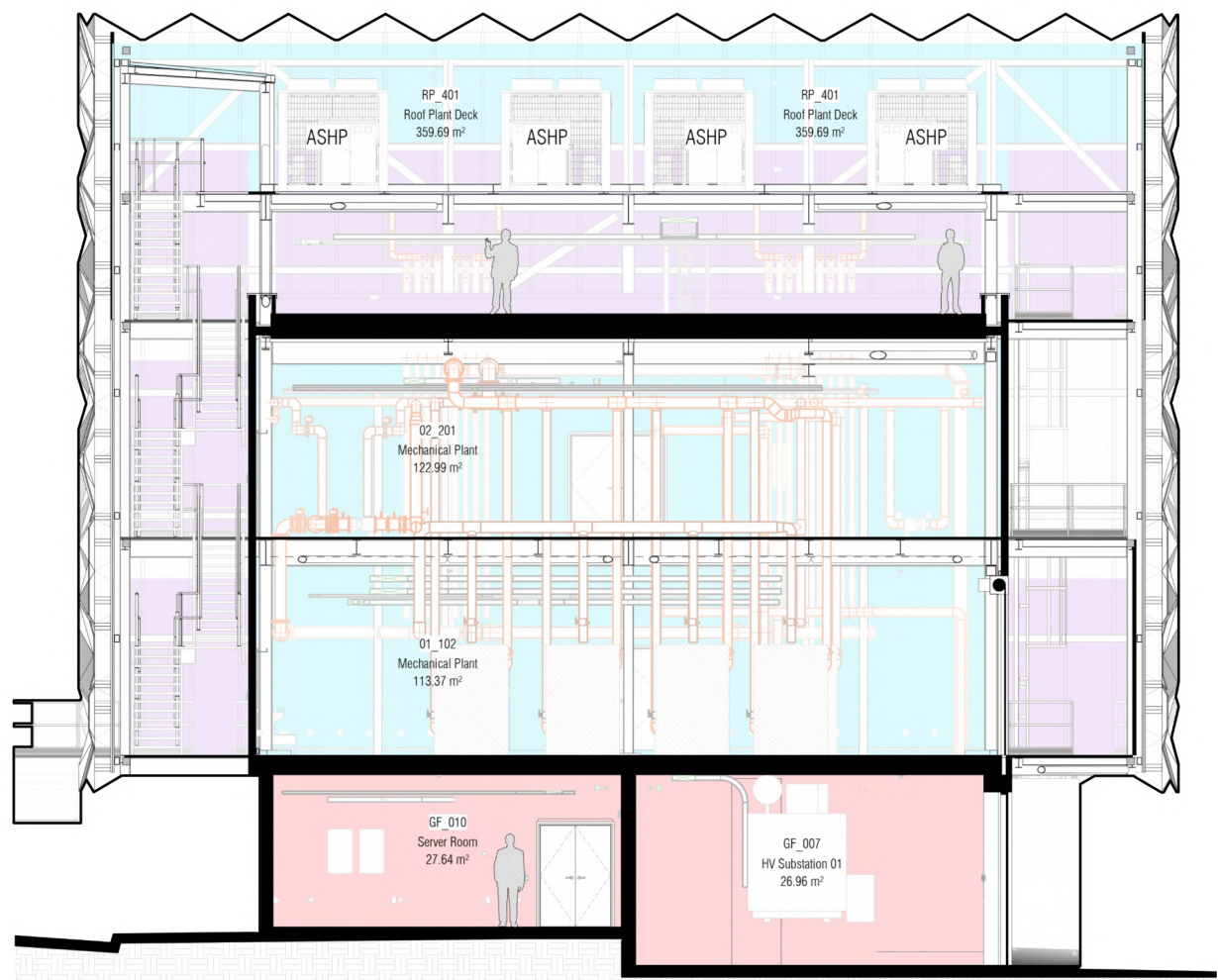


SECTION B-B

KEY			
	Circulation		Sanitary
	Electrical		Store
	Riser		Mechanical

3.0 | Design

3.3 | Layout



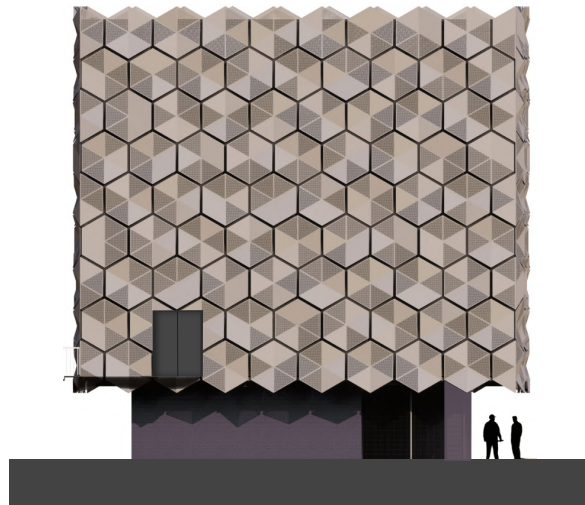
SECTION D-D

KEY

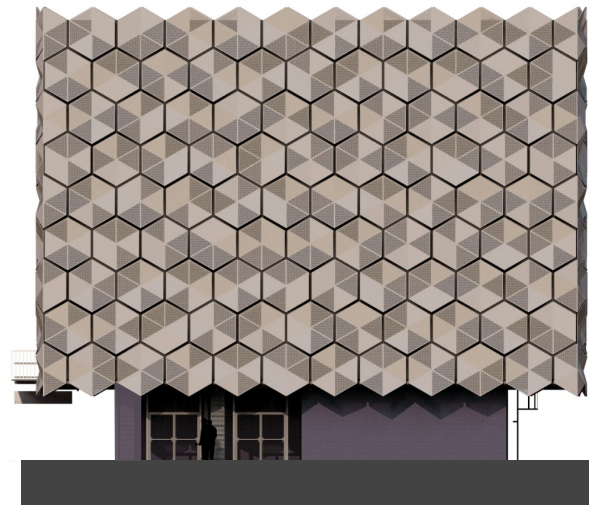
Circulation	Sanitary
Electrical	Store
Riser	Mechanical

3.0 | Design

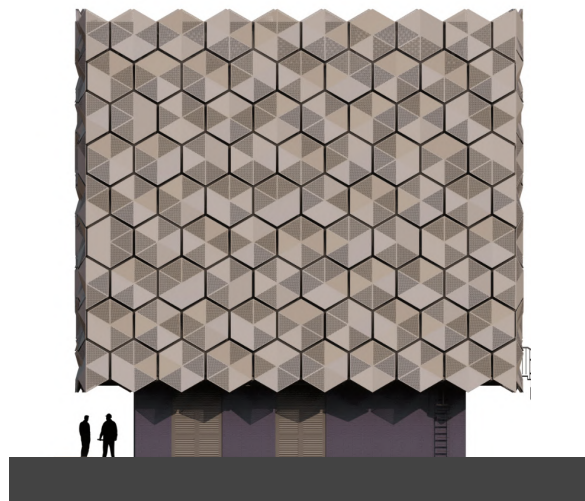
3.4 | Appearance



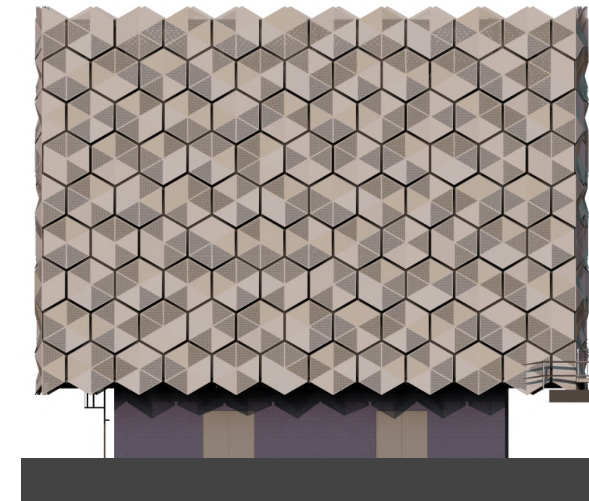
WEST ELEVATION



SOUTH ELEVATION



EAST ELEVATION



NORTH ELEVATION

3.0 | Design

3.4 | Appearance



01

Facade materials

The main installations utilised for the external envelope are shown here. They include

- A lightweight aluminium cladding system, composed of individual anodised hexagonal panels fixed to an aluminium sub-frame. We have named this installation the `shroud`, to differentiate it from the thermal envelope which is a separate cladding system, image **01**, and as it `floats` around the envelope beginning at first floor level.
- The ground floor is clad in brickwork, image **02**. The proposed product is a robust engineering brick. The brick is rated F2

durability to resist the temperature variations of the local micro-climate created by the building function. The dark brick and mortar adds visual weight and gravitas to the base, assisting the concept of the shroud `floating` above the ground.

- The cladding which forms the thermal envelope is a composite insulated panel, installed horizontally. See image **03**. This cladding is not visible from public areas. It can be seen by building users who will access behind the shroud. The cladding begins at first floor level, when the brickwork stops.

Refer to outline specification for further information.



02



03