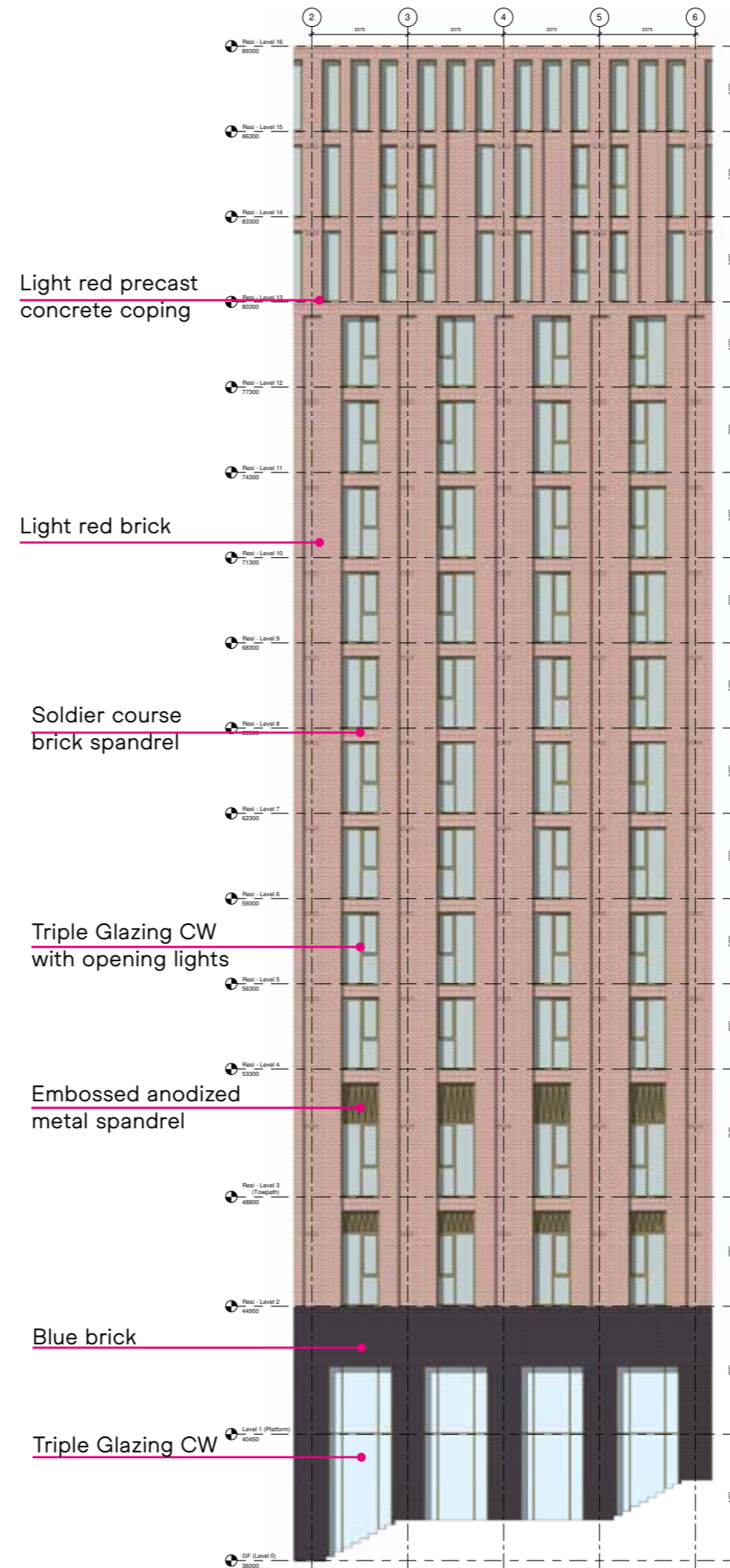


12.5 Facade articulation and materiality

The materiality and articulation of the typical body of the building is described in more detail in the adjacent detail elevation and axonometric.





View from the Canal

MEP

The new PBSA buildings will be designed to provide comfortable, energy efficient and enjoyable residences.

A fabric first approach will be followed to minimise energy demand, with the building designed to have a highly insulated and air tight envelope. Fossil fuels will not be used for the buildings, with high efficiency electric air source heat pumps meeting the hot water demand of the dwellings, which will be the dominant energy demand of the PBSA blocks. Heating will be provided by a combination of air source heat pumps or direct electric heaters throughout. Although there is no opportunity at present to connect into a local district heating network, the heating and hot water systems will be designed to allow transition to a district heating network at the end of the heat pumps design life should this be available.

All dwellings will be provided with mechanical ventilation with heat recovery to maintain excellent air quality while reducing energy demand. These units will be provided with demand control so that air flow rates track occupancy and further reduce energy demand. Each of the residential spaces will also have openable windows to provide fresh air and cooling in summertime months.

New dedicated electrical substations will be installed to service each of the blocks and allow these to operate independently. It is proposed that a new Photovoltaic array will be installed on the roof of each PBSA building to offset the electrical demand of the building and reduce CO2 emissions. Water and drainage systems will both be designed to reduce demand, for example utilising low flow appliances throughout to bring down incoming water flow rates and connecting into new SUDS to manage rainwater outflow to local sewage systems, as set out in the drainage strategies.

New telecommunications systems will be provided to the new PBSA buildings to provide modern connectivity. In addition, new modern security, CCTV, access control and life safety systems will be provided to ensure the building operates effectively and maintains a safe environment for residents. MEP systems that are provided to the amenity spaces will be designed to be as flexible as possible, to minimise the embodied carbon associated with any future adaptations to the building.

Acoustics

A survey of representative existing ambient noise levels on-site was undertaken and found to be:

- 52 dBA – Daytime (07:00 to 23:00)
- 46 dBA – Night-time (23:00 to 07:00)

The representative existing background noise levels on-site were found to be:

- 44 dBA – Daytime (07:00 to 23:00)
- 38 dBA – Night-time (23:00 to 07:00)

Noise emissions from the new buildings have been designed such that the combined noise from all new primary items of plant equipment result in a "low impact" at a nearby noise sensitive receptor when assessed in accordance with BS 4142:2014+A1:2019. Similarly, daytime plant noise emissions are expected to comply with the proposed noise rating level limit and therefore represent a low impact at the nearest noise sensitive receptor. Night-time plant noise emissions and daytime emergency plant noise emissions were found in assessment to exceed the proposed noise rating level limit and therefore acoustic interventions have been incorporated to meet the required noise levels such as screening or siting in acoustic enclosures.

To control internal ambient noise from the external noise sources, façades will provide a minimum sound insulation under background ventilation conditions capable of meeting the internal ambient noise levels as given in the BS 8233:2014 standard:

- 35 dBA daytime (living room)
- 40 dBA daytime (dining room)
- 30 dBA night-time (bedroom)

Whole dwelling ventilation will be provided by a mechanical ventilation with heat recovery (MVHR) systems. As such, mechanical ventilation systems, including both continuous and intermittent mechanical ventilation, will be designed and installed to meet the internal ambient noise levels as given in the BS 8233:2014 standard.

Minimum façade glazing acoustic requirements to achieve 35 dBA and 30 dBA ambient noise levels during daytime and night-time hours, respectively, have been defined and will be incorporated into the specification of the glazing. Solid façade elements will achieve at least 40 dB Rw+Ctr.

All items of plant (including emergency plant equipment) will be acoustically treated as necessary to achieve the noise level limits at the

nearest noise sensitive receptor. This assumes all items of plant running at 100% duty (i.e. worst-case scenario). Based on this it is expected that noise from plant equipment associated with the development should result in a "low impact" as per the guidance in BS 4142:2014+A1:2019.

Examples of acoustic treatments for key items of plant include:

Residential Tower Smoke Fans

The smoke fans proposed to be located on the roof of the residential towers require 5 dB of attenuation per unit. This amount of attenuation can be achieved by providing a suitable acoustic barrier around the smoke fans with a height of no less than 2 m along with an in-duct acoustic attenuator on the atmosphere side duct outlet.

A parapet wall is to be constructed around the edge of the residential towers which could effectively act as that acoustic barrier and in turn provide the 5 dB of attenuation required, so long as the parapet has a minimum height of 2 m (i.e. 1 m above the height of the smoke fan).

Residential Tower Diesel Pump Sets

The sprinkler and wet riser pump sets associated with the residential towers are proposed to be located within internal plant rooms at level 0. Similar to the diesel pump for the Scottish Opera building, these pumps require a sound power level of no more than 90 dBA to meet the proposed emergency plant level limit during daytime hours so will have appropriate acoustic treatment provided by acoustic enclosures.

Residential Tower Air Source Heat Pumps

The DHW and LTHW ASHPs associated with the residential towers are proposed to be located within internal plant rooms at level 2. Due to the air flow required for these units, it is necessary for the façade of these plant rooms to be louvered with a high free area.

The noise impact assessment made in the previous section assumed that simple weather louvres with no sound reduction would be used on the façade of the plant rooms and as such, that all the sound power from the ASHPs would emit from the façade louvres.

12 dB of acoustic attenuation is required for these ASHPs and as such, acoustic louvres to the façades of the ASHP plant rooms with an insertion loss of at least 12 dB will be included to provide sufficient acoustic attenuation for these items of plant.

Civil and Structural Engineer

Substructure

Given the ground conditions encountered during the site investigations and taking into account the loadings imposed by the various building structures, piled foundations are considered to be the only viable foundation solution for the new building structures on this site.

Large diameter rotary bored piles will be employed below the North and South PBSA Buildings. Given the scale of the two blocks (18 to 22 storey's in height), 900-1200mm diameter piles are currently envisaged to support the building loads. An arrangement of pile caps and larger RC piled core bases will be tied together by a network of ground beams, and the ground floor slab will be suspended to create a diaphragm to distribute and transfer the buildings' lateral loadings to all the piles.

Superstructure

An option appraisal study was undertaken at an early stage of the project and a reinforced concrete flat slab with concrete cores and concrete blade columns was selected as the most efficient and suitable framing method for the PBSA blocks given the vertical scale of the structures and also in terms of overall performance requirements (namely fire and dynamic related), and programme.

The flat slab soffits also provide full flexibility for the distribution of building services and partition layouts.

Design Criteria

All structures will be designed to support all dead, snow and wind loads in accordance with the relevant BSI Eurocode Standards Eurocode Nos 1 to 7 and the Building Standards (Scotland) The PBSA building structures will be designed for a minimum fire resistance period of 2 hours.

All foundations and main structural frame elements will be designed for a minimum lifespan of 50 years, other secondary elements and components will require periodic inspections and ongoing maintenance.

Drainage

The developed site will have new, separate foul and surface water systems. Both Scottish Water and Scottish Canals have been consulted and agree, in principle, with strategy to route all foul to the public sewers around the frontage of the site.

For **surface water**, the only areas that can feasibly connect to the canal are the PBSA roofs. All other areas are below canal water level and will therefore drain to the combined sewers via attenuation. Scottish Water will consider a surface water connection to the combined sewers provided a volume "betterment" is offered from that of the predeveloped site.

Scottish Canals will consider connection of all new roof areas to the canal provided design is in accordance with the "MGSDP Sustainably Drain Glasgow" Document compiled by four-storey NGIWMS Project Group. The principle of above ground storage i.e. Green/Blue Roofs in this case, is also in accordance with Glasgow City Council's Water Environment Guide SG8.

The roof area of the new the multi-story PBSA blocks will drain to the canal via a "Blue roof" or "Blue roof/Green roof" systems in accordance with the "MGSDP Sustainably Drain Glasgow" Guide.

Roof water from the PBSA blocks will be suspended beneath the Level 3 slabs at a level of approx. 48.8m aod which is compatible with the canal tow path level. Once external, pipework will be suspended beneath a new link bridge then buried beneath the tow path and penetrate through the canal side wall. The detail of the canal outfall will be discussed in more detail with Scottish Canals but will likely be submerged with a non return valve fitted. There will be 2no. new outfalls in total (1no. for each PBSA block roof).

Foul water

The new wastewater generated by the development will be from toilets, sinks and the proposed laundry. The new foul drainage will be routed north and south, at the upper platform level, and connect to the public combined sewers in Corn Street and Sawmillfield Street.

12.7 PBSA Amenity

Glasgow City Council set a combined internal and external amenity requirement of circa 5 sqm per bed for PBSA. The scheme achieves this figure with additional public realm provision at street and canal levels.

The following pages demonstrates the quality and quantity of proposed amenity spaces, both internal and external, being provided by the development including the extensive public realm improvements.

The positive landscaped attitude to the enhanced public realm at all street and canal levels will extend the city's green network, [in line with Glasgow City Development Plan Policy CDP 6 \(Green Belt and Green Network.\)](#)

The high proportion of shared amenity spaces within each building will ensure that the ground floors help activate the newly enhanced streetscape around the building, providing a vibrant and activated building edge and playing a positive role in the regeneration of this part of the city.

Total number of student homes

700

Total proposed amenity space:

3,952 sqm

of which total internal amenity space:

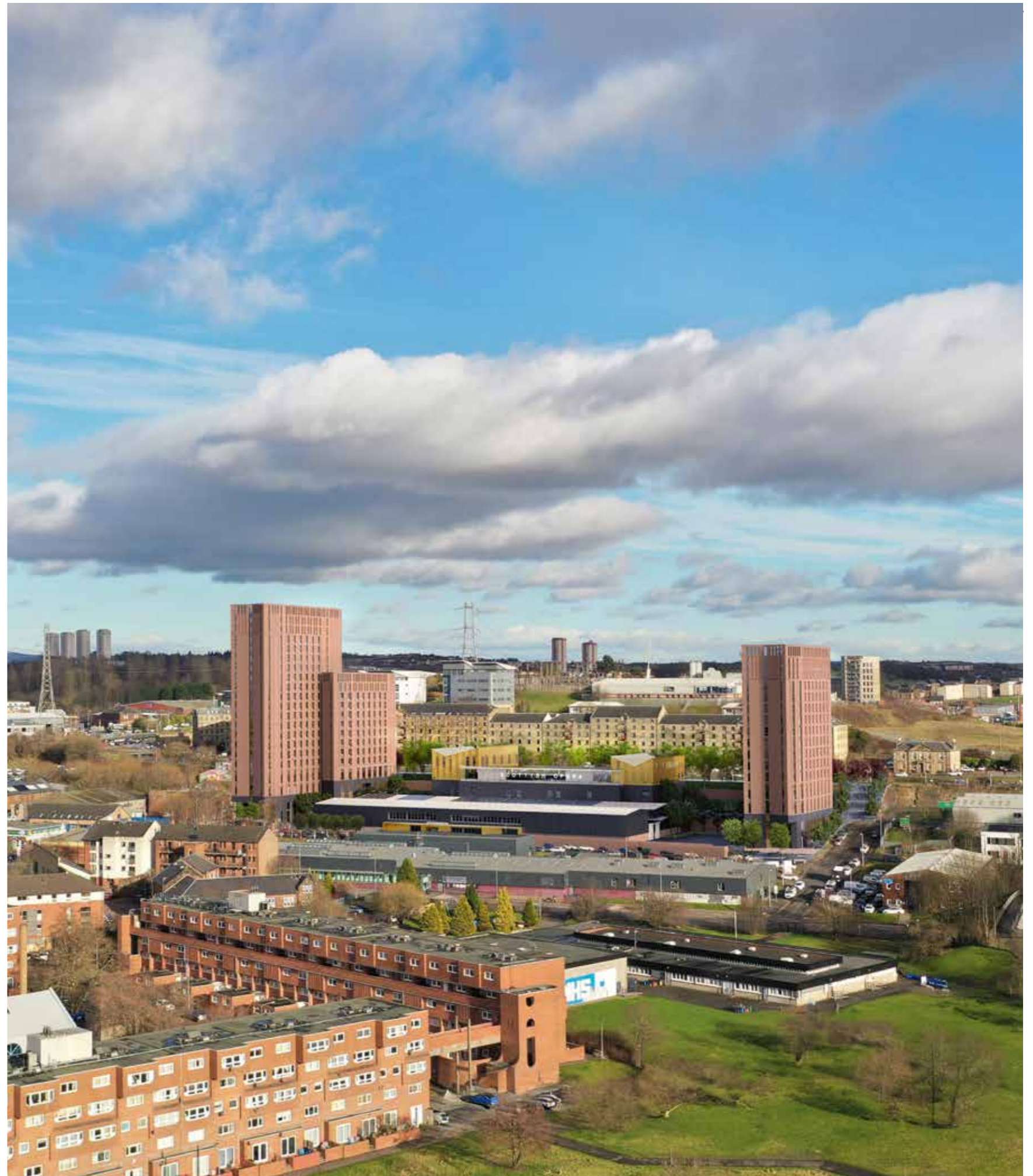
1,670 sqm

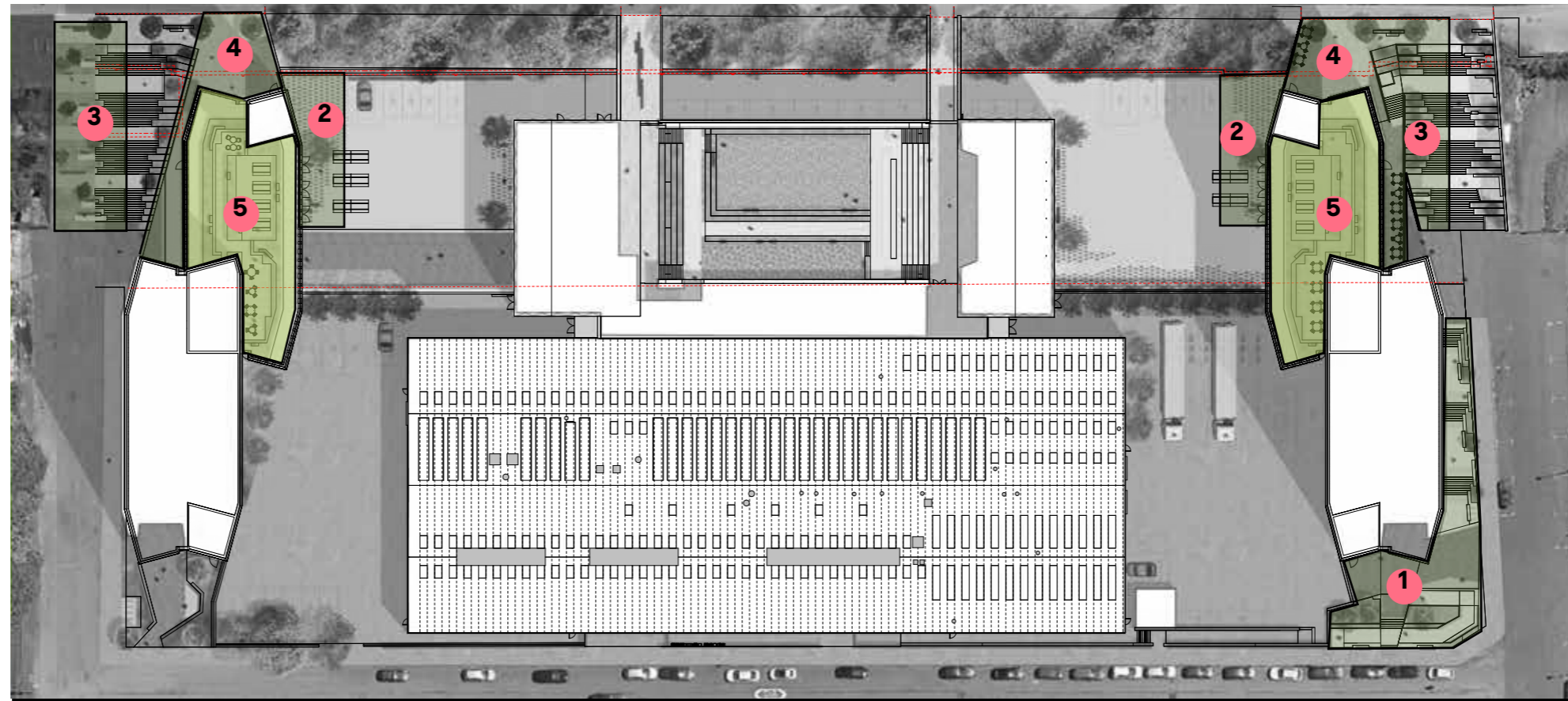
of which total external amenity space:

2,283 sqm

Total combined amenity per home:

5.65 sqm





This page:
Aerial view of the development
highlighting external amenity
spaces

External Amenity

The landscape proposal has been considered as an overarching strategy for the entire site. This approach provides an improved outlook and visual amenity whilst establishing a biodiversity net gain on the site. The landscape proposals seek to maximise the area of open space within the development while providing a safe and attractive amenity for the residents.

The definition of public and private space is important in providing privacy to the new residences while offering accessible space to all. The landscape design is carefully considered to create a planted buffer zone to any parts of the buildings where privacy is required. Parking is mainly accommodated within functional areas of the site with an aim to maximise external areas outside PBSA and Scottish Opera amenity spaces.

The site consists of several amenity spaces with private and public outlooks, creating opportunities for locals and visitors to the area.

Areas of amenity directly linked with the residents are:

- 1 South Corner Plaza at Edington Street (Level 0)
- 2 Internal Courtyards set between new Scottish Opera Rehearsal Building and new PBSA blocks (Level 1)
- 3 Stepped landscape areas, connecting top of Corn St and top of Sawmillfield Street to the towpath level
- 4 PBSA plazas connecting to towpath (Level 3)

As well as these spaces at street levels, the middle roof of the each of the blocks will be developed into exclusive resident's amenity. 5

These external terraces will then be managed active social spaces that will animate the roofscape of the buildings.

Total proposed area of external amenity space:

2,283 sqm

of which total proposed area of private external amenity space:

540 sqm

of which total proposed area of other external amenity space:

1,743 sqm

Internal Amenity

The managed PBSA scheme will provide a range of high-quality communal amenity spaces for residents extending their living space throughout the building. Internal amenity space shall range from café, social learning space, gym, resident's lounges and games rooms to dining and party rooms generating a vibrant sense of community within the building.

The topography of the site presents the opportunity of maximising access to the PBSA buildings, with access to Level 0 from Edington St to Level 1 from the courtyard and to Level 3 from the towpath of the canal. The amenity spaces are distributed throughout these levels to maximise ground floor activation and take advantage of the new public realm.

Specifically the distribution is as follows:

- 1 Welcome lounge, South block L0
- 2 Student Lounges, South and North blocks L1
- 3 Dinner Party Room, South and North blocks L1
- 4 Learning Cafe, South block L3
- 5 Gym, North block, L3

Total number of student homes:

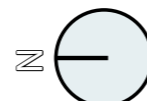
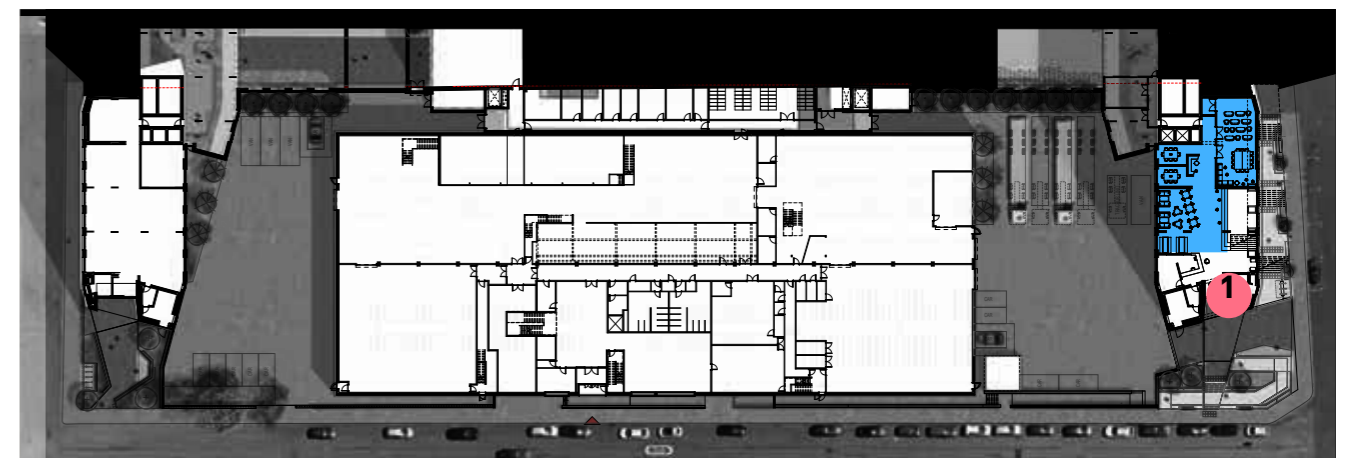
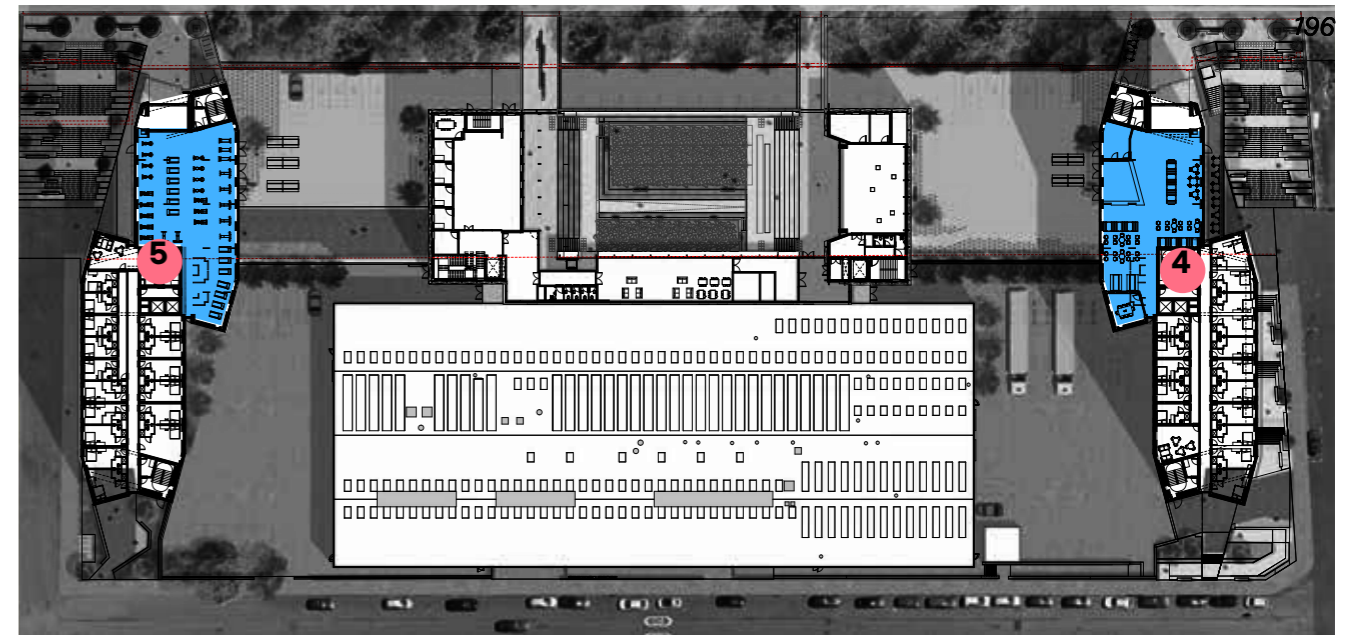
700

Total proposed internal amenity space:

1,670 sqm

Proposed internal amenity per home:

2.48 sqm



Amenity. Ground floor

The South block will be treated as the main entrance to the PBSA blocks, with the South-West plaza (1) providing level access from the public routes.

The plaza will also present seating areas and a managed unobstructed vehicle route to the adjacent Scottish Opera service yard. The plaza will feature planting that will assist with site drainage. By creating a terraced landscape with steps and ramps, the design will provide an accessible route from Eddington Street and public space whilst accommodating the existing levels.

The welcome point (2) to the residences is visibly located near the entrance. Around this point a number of social and working spaces are distributed such as a games zone (3), digital rooms (4), cinema (5), and project room (6).

From the entrance, a generous accommodation stair takes advantage of the change in level of the external street and creates a raked seating area for the residents (7).

The internal steps are mirrored outside by a terraced landscape (8) that runs along the south facade of the building. This is organised with planters that provide seating, rain gardens and tree planting.



South Plaza visualisation

