MULTIMAX

MULTISTOREY, MAXIMUM TIMBER

AFFORDABLE HOMES WITHIN PLANETARY BOUNDARIES

PATTERN BOOK

JUNE 2025

PROJECT COLLABORATORS

PROJECT FUNDERS

DISCLAIMER

This publication (the Pattern Book) is provided for information purposes only. The views expressed are those of the authors. We do not accept any responsibility for any loss, damage or injury, or consequential loss/es arising from the information contained in the Pattern Book.

Any user of the Pattern Book must satisfy themselves regarding the application to their purpose, of statutory requirements, building (or other) regulations, codes, insurance certification or other obligations or requirements which may arise from time to time.

This guidance is given on an "as is" basis with experience and research carried out to identify relevant sources of information concluded in March 2025. To the full extent permitted by applicable law the authors disclaim all or any implied representations or warranties, including (but not limited to) implied warranties of fitness for purpose, accuracy or validity or completeness of information, merchantability, title, quality, and/or non-infringement.

The user assumes full responsibility for any loss resulting from use or inability to use the information, data, or advice presented in this Pattern Book.

Published 2025

Printed in the UK

CONTENTS

1. INTRODUCTION

The MultiMax System is a standardised, pre-approved timber 'kit of parts' for low-rise residential buildings under 11 metres. Designed to demonstrate how locally grown timber and biomaterials can replace high-carbon materials like concrete and steel, MultiMax offers an affordable, low carbon solution for new housing.

Tested on real sites and within the UK planning system, the system is adaptable to a range of neighbourhoods and housing types. It addresses urgent challenges in the UK housing sector - rising carbon emissions, poor-quality construction, and unmet housing needs - by providing a replicable model for sustainable, buildable homes.

This guide, the second of two booklets in the series, sets out the core design principles, technical guidance, and performance standards for using the MultiMax System. Aimed at architects, designers and others involved in delivering high quality, low carbon housing, it supports straightforward construction methods. The system is designed to be built by general tradespeople, avoiding reliance on specialist contractors.

The solutions represented in this document reflect a 'worked example' demonstrating the potential for compliance with statutory regulations. As part of this, the wall cassette system is currently being tested to confirm it meets REI 60 performance standards. This testing is subject to field of application constraints and advice should be sought as to whether additional testing is required when moving outside the defined system parameters.

While this is intended to signpost solutions in order reduce barriers to low carbon construction by non-specialist clients and contractors, any and all projects implementing the guidance herein will be required to satisfy all pertinent statutory guidance entirely independent of this guidance. As such, all projects implementing the guidance will benefit from the early involvement of a Registered Building Control Approver as well as a team of suitably competent professional designers.

MultiMax is a collaboration between WeCanMake, Waugh Thistleton Architects, Price & Myers, BlokBuild, E3 Consulting Engineers and Efectis, combining expertise in community-led housing, sustainable design, engineering and fire safety.

1.1 WHAT IS MULTIMAX?

MultiMax is a standardised, pre-approved and replicable timber 'Kit-of-Parts' for residential buildings below 11-meters, tested against three live sites and the UK planning process, and adaptable and replicable for other neighbourhoods.

'**Multi**-storey, **Max**imum-timber', the MultiMax system is designed to demonstrate how low-carbon homegrown timber and biomaterials can be safely and affordably used in place of high-carbon construction materials like concrete and steel.

The system is being tested on a set of real-world housing development sites to demonstrate how the Kit-of-Parts can be adapted to the needs of different sites, and meet wider housing sector requirements of affordability and buildability.

Key features of the MultiMax System:

- Meeting diverse housing needs - Flexible layouts for 1-3 bedroom apartments that can be adjoined or detached to suit changing needs over time.
- More than housing - Ground-level spaces for community and civic use enhance social infrastructure and neighbourhood quality.
- Pre-reviewed system - Includes a suite of details considering carbon impact, fire safety and durability, reducing costs and uncertainty.
- Place-specific material palette - Optimised for low-carbon materials, with opportunities for locally sourced biomaterials and non-extractive reuse to add local character.

How the MultiMax System can help you:

The MultiMax System is valuable for communities, developers, and designers who are looking to implement low-carbon, timber-based low-rise residential developments. It offers practical solutions for overcoming regulatory and technical challenges related to building with low-carbon materials and provides a comprehensive, compliance-driven approach to sustainable construction.

THE CHALLENGE

The UK's housing system prioritises profit over providing essential shelter, leaving 8.5 million people with unmet housing needs. The government's pledge to build 1.5 million homes risks reinforcing inequalities and worsening the climate crisis unless it rethinks how, where, and for whom homes are built.

Housing is a highly resource and carbon intensive industry, responsible for 17% of UK emissions (UK Green Building Council, 2021). Current practices waste materials on low quality, unsustainable housing that will require costly retrofitting (Committee on Climate Change, 2019). Without change, housing alone could exceed the UK's carbon budget for 1.5°C before 2050 (RIBA, 2021). To address these challenges, alternative housing models must be explored. WeCanMake demonstrates a new approach, using digital fabrication and local materials to create affordable, low carbon homes. The MultiMax System builds on this work, presenting research on unlocking urban infill sites with a sustainable timber system for low-rise housing.

This guide offers principles for designing better homes - recognising that good housing is about more than just buildings, but also about reconnecting with land, materials, and communities.

READING THIS REPORT

This report forms the second of two booklets detailing the MultiMax System:

1 - MULTIMAX PLAYBOOK

Booklet 1 presents the research behind MultiMax and its real-world demonstration site through the themes of land, materials, and people. It explores how the system unlocks infill sites for affordable housing, integrates homegrown timber to reconnect construction with local materials and culture, and addresses housing needs while fostering community value through local production and long-term stewardship. Aimed at community groups, cooperatives, councils, and not-just-for-profit developers, it provides insights for those interested in commissioning a building using the MultiMax System.

To view the MultiMax Playbook - click here

2 - MULTIMAX PATTERN BOOK

Booklet 2 outlines the design principles for MultiMax residential developments, providing a comprehensive methodology for creating sustainable and resilient low-rise timber housing. Primarily intended for designers, it offers technical guidance, a framework of design considerations, and best practice principles to support the effective application of the MultiMax System while addressing key aspects such as fire safety, moisture management, and structural strategies.

Key aims of the MultiMax Pattern Book:

- To provide a set of design principles for designers using the MultiMax System.
- To offer best practice guidance for designing with durability in mind.
- To outline the carbon benefits of using the MultiMax System.
- To establish a standard set of details for incorporating the MultiMax System.

THE INNOVATION TEAM

WeCanMake is a Community Land Trust and not-for-profit housing developer in Bristol who aim to build long-term social infrastructure, community wealth and promote a just transition through housing development. The organisation runs a community micro-factory, training local people to use digital fabrication tools and biomaterials to create components for new homes and retrofits.

Waugh Thistleton Architects is internationally recognised for their pioneering use of sustainable materials and for its innovative approach to environmentally responsible architecture. Their commitment to minimising environmental impact has earned them numerous accolades, including a shortlisting for the RIBA Stirling Prize in 2018 and the title of Architects' Journal 'Architect of the Year.'

Price & Myers is a structural and civil engineering practice known for an open, collaborative approach and for pushing technical boundaries, including in timber design. They have developed deep expertise in sustainable timber systems, including the innovative BlokBuild platform.

BlokBuild designs and manufactures off-site construction systems using advanced digital technology and UK-grown timber. Their BOPAS-accredited system delivers sustainable, high-performance buildings across residential, commercial, community and education sectors, giving architects, developers, and contractors greater control over cost, time, and environmental impact.

E3 is a building services consultancy specialising in energy-efficient mechanical and electrical design. The practice works across a range of sectors with a focus on low-energy solutions and minimising environmental impact.

Efectis is a leading expert in fire science, providing testing, engineering, inspection, consultancy and certification services. With a multinational presence and state-of-the-art facilities, Efectis ensures compliance with fire safety regulations across a range of industries. By combining research, technology, and experience, Efectis helps clients enhance fire protection and safety standards.

1.2 SYSTEM PARAMETERS

The MultiMax System offers an innovative approach to affordable, sustainable housing in the UK. Designed specifically for low-rise multistorey developments below 11m, the system uses locally grown timber in high-performance, insulated structural cassettes, ensuring a truly low-carbon construction method. Compliant with UK statutory guidance, the MultiMax System delivers high-quality, easily constructable homes, providing communities with a sustainable alternative to traditional building practices.

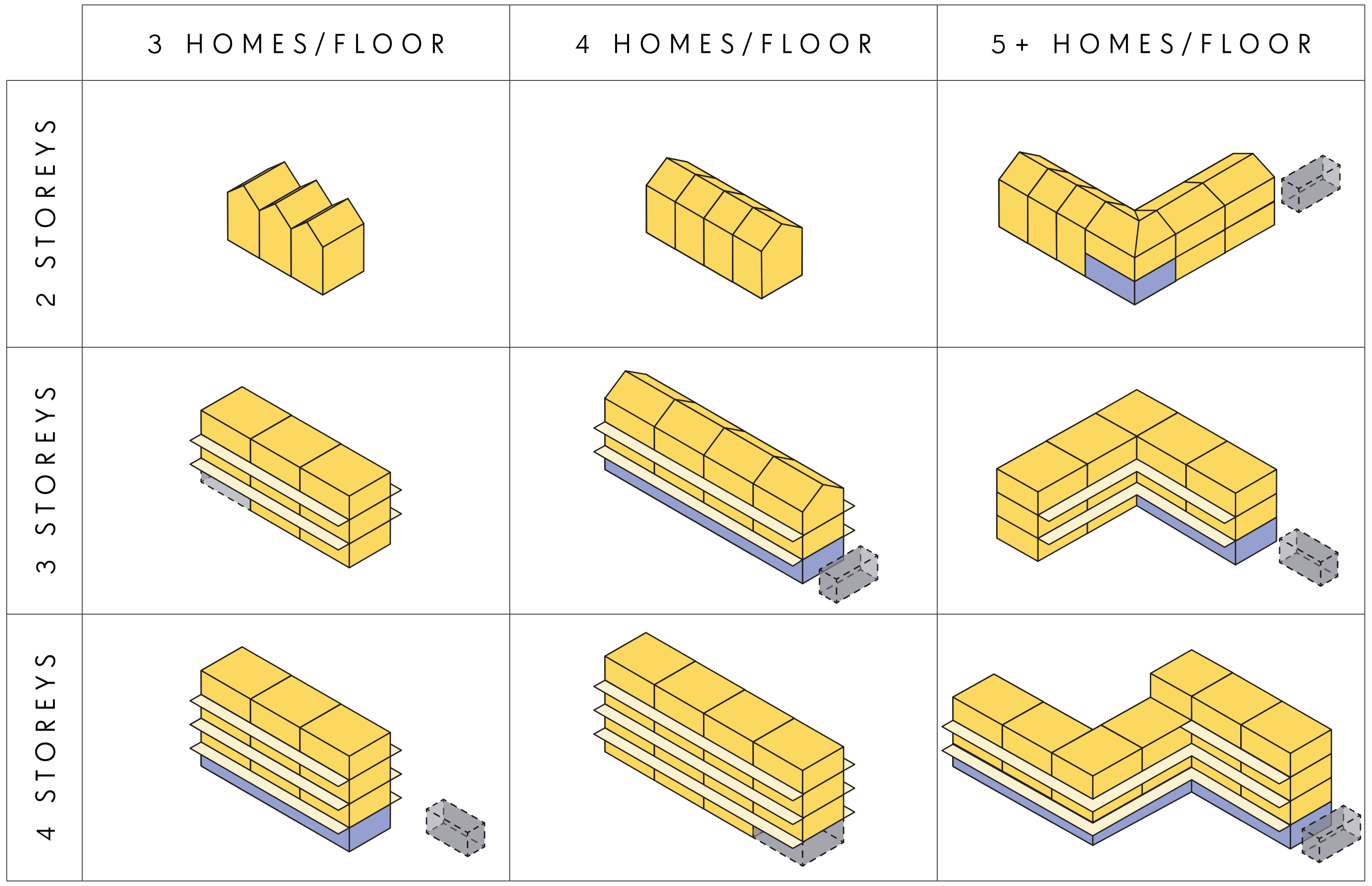
The MultiMax System is best suited to multistorey residential developments ranging from 2 to 4 storeys. Smaller projects typically include terraces of single-family homes, while larger ones may consist of low-rise apartment blocks. The building designs can vary, with some incorporating step-downs and setbacks to fit the site.

Ground floors might be used for alternative purposes, such as community spaces, retail spaces and the like. Plant spaces can either be provided within the main building massing or, where space allows, in a separate structure within the site.

To help identify suitable projects, the below matrix shows the range of expected building types, while a set of performance parameters describe the design principles of the MultiMax System.

KEY

- Home
- Community and civic space
- Plant space



Typology
Primarily residential, with potential for ground floor uses such as community spaces or workshops.

Height
Designed to suit buildings up to 11 metres in height, in line with Diagram D6 of Approved Document Part B.

Adaptability
Party wall locations are fixed, but internal layouts are designed to allow rooms to be combined in the future. Buildings are initially configured to maximise the number of homes per floor.

Carbon
Aims to meet LETI 2030 embodied carbon targets: <450 kgCO$_2$e/m^2 (A1–A5, B1–B5, C1–C4) and <300 kgCO$_2$e/m^2 (A1–A5).
Operational energy is designed to meet the Net Zero Carbon Building Standard: 40kWh/m^2/year.

Construction
Designed for assembly by local tradespeople, minimising the need for specialist skills.

Circulation
Vertical circulation is typically provided by a stair core spanning the width of the plan. Lifts are not included as standard but the system is designed to allow future lift installation. Deck access walkways provide horizontal circulation.

Fire Protection
Capable of compliance with either Approved Document B or BS 9991, subject to project specific requirements.

Acoustics
Aims for a 5dB improvement over the minimum standards set in Approved Document E.

Durability
Designed following best practice in moisture management, from design through construction and in use.

Thermal
Fabric u-values (W/m2 K) as follows:
- Walls 0.13-0.15;
- Floors 0.08-0.10;
- Roof 0.10 - 0.12;
- Exposed ceilings/floors 0.13 - 0.18;
- Windows 1.0;
- Doors 1.0.

Airtightness: <1m3/m2.hr @ 50Pa

Glazing
Glazing specifications to be defined per project, with the ability to incorporate local made timber windows.

MEP Strategy
Typical services include local direct electric heating, MVHR and a domestic hot water air source heat pump.

Superstructure
Timber structural system using structural insulated OSB cassettes. Based on the BlokBuild system, which meets fire and structural performance standards.

Ground Floor Structure
Continues the timber structural approach for residential schemes. Mixed-use schemes may require steel or timber transfer structures.

Roof Structure
Lightweight timber roof with a minimum 1:40 fall. BROOF(t4)-rated roof coverings, with the option for green roofs.

Façade
Lightweight cladding systems, with a preference for timber materials where suitable.

Energy Generation
Roof-mounted PVs can be incorporated, depending on project requirements.

Warranty Provision
The MultiMax system is undergoing type approval certification.

1.3 DESIGNED FOR MANUFACTURE

The MultiMax system is designed to be assembled from timber cassettes that can be manufactured off-site. These cassettes are digitally designed and locally manufactured ensuring accuracy whilst generating local wealth in the form of local jobs.

There are different types of MMC systems, ranging from the use of discrete component parts which have been digitally designed and fabricated (such as off-site structural trusses) to fully volumetric systems whereby complete homes made in a factory are craned onto site. The MultiMax system focusses on discrete components - smaller handleable elements. Discrete components typically require smaller, simpler factories that in turn enable the use of local labour and material sources.

The MultiMax system uses timber cassettes to form the structure of a building. There are a variety of timber cassette systems that could be applied to the MultiMax context. The research and development of the MultiMax project used the BlokBuild system. WeCanMake worked with BlokBuild to design and build their first two homes in Bristol. This followed a series of demonstration builds with community members in the neighbourhood to test out a range of different cassette-based systems. Community members liked the combination of ease of use and high performance.

BLOKBUILD

BlokBuild's cassette-based construction system is accredited by the Build Off-site Property Assurance Scheme (BOPAS) and has been applied successfully to a wide range of residential, education, community and commercial contexts.

A key innovation of the BlokBuild system is that all parts are digitally manufactured from readily available OSB, the only UK-grown and produced structural sheet material.

BlokBuild bring their expertise as construction system designers and specialist manufacturers, ensuring an innovative approach that meets high levels of quality control and building performance standards.

The following pattern book demonstrates how BlokBuild cassettes can form the structure of the MultiMax system.

Further details about the procurement process for a MultiMax project can be found at the end of Chapter 2.

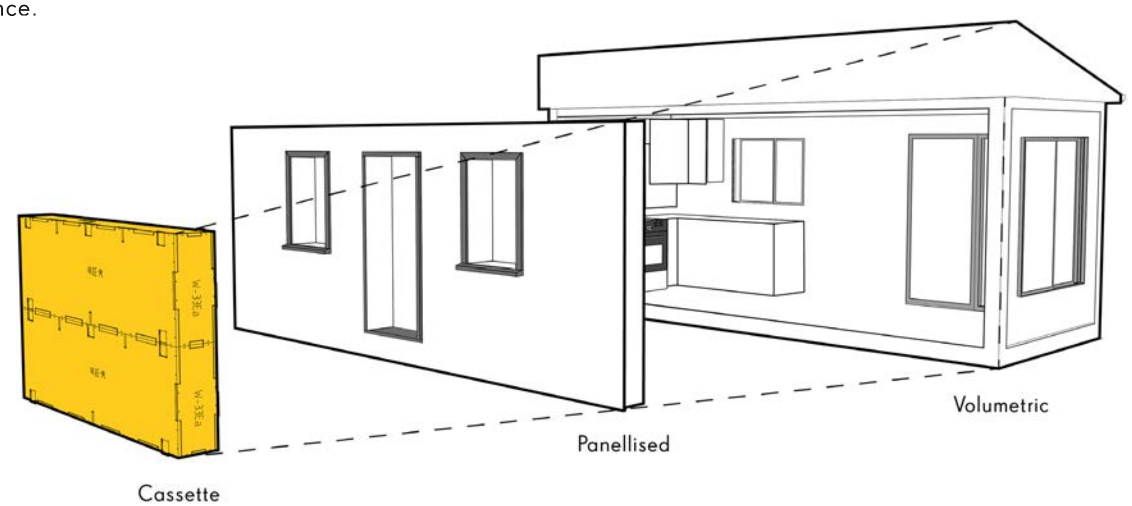


Figure: Cassette system

BlokBuild cassettes produce minimal waste through smart design ©BlokBuild

Community engagement at the BlokBuild factory ©BlokBuild

2. DESIGN PRINCIPLES

This chapter outlines the key design parameters and performance principles of the MultiMax System, providing practical guidance for delivering high quality, low rise timber housing. It brings together spatial layout, structural strategy, façade and roof design, fire safety, servicing, and environmental performance to support the successful application of the system across varied sites:

- The system is optimised for buildings up to 11 metres, using a modular structural grid based on prefabricated timber cassettes. Internal plans use standardised room types that can be reconfigured to create varied housing options, with service areas grouped for buildability and future flexibility.
- The structure follows platform-frame principles, with load-bearing cassette walls and joisted floors providing stability. A portal frame can be introduced at ground level where clear spans or mixed-use spaces are needed.
- Façades and roofs follow the structural grid to create a consistent yet flexible architectural language. Lightweight cladding is preferred for buildings over three storeys, with repeatable detailing to support efficient, low-impact construction.
- Fire safety is integrated from the outset, with flexibility to follow either Approved Document B or BS 9991. Deck-access walkways serve as both escape routes and shading devices, while construction materials meet relevant fire resistance standards. BlokBuild's wall cassette system is currently being tested to confirm it meets REI 60 performance standards.
- Mechanical and electrical systems are routed through central risers and ceiling voids, simplifying installation and improving performance. Each home includes MVHR, efficient heating, and access to solar PV where possible, supporting low operational carbon.
- The system is designed to minimise both embodied and operational carbon, using timber and natural insulation for carbon sequestration and prioritising efficient building fabric and MEP systems.
- Moisture management is addressed through best-practice detailing at critical junctions, supported by clear construction and maintenance strategies to ensure durability in timber construction.

Together, these principles ensure the MultiMax System delivers robust, adaptable, and sustainable homes suited to a wide range of urban infill and low-rise development contexts.

2.1 LAYOUT CONSIDERATIONS

The MultiMax System is a versatile construction solution designed for buildings up to 11 meters in height and tailored for efficiency and adaptability.

It features a cellular structural grid with a central spine, allowing for flexible internal layouts while adhering to local regulations and space standards. This system accommodates future layout adjustments and simplifies the design and construction process by minimising variations.

BUILDING HEIGHT

The MultiMax System is designed for buildings up to 11 meters in height, as defined by Diagram D6 in Approved Document Part B. This height is measured from the top floor's surface to the ground level on the lowest side of the building.

In practice, the MultiMax System is generally limited to buildings of four storeys or fewer. Special consideration is needed for buildings on sloping sites or those with increased ground floor ceiling heights, as these factors may impact the overall building height.

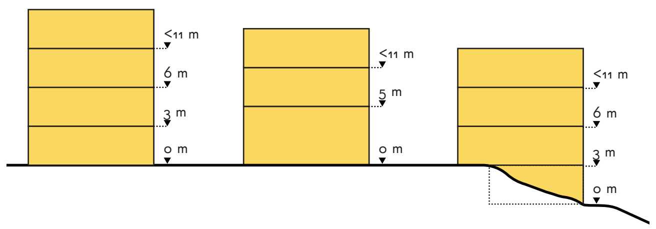


Figure: The MultiMax System is typically used for buildings up to 4 storeys tall

STRUCTURAL GRID

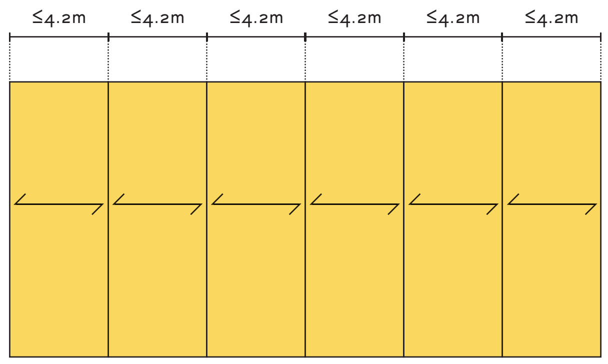


Figure: A maximum structural width of 4.2m is recommended

Lightweight timber frame technologies do not allow for large spans. To ensure material efficiency, the MultiMax System has a maximum span of 4.2m.

To offer greater flexibility in internal layouts, the system incorporates a central structural spine with fixed dimensions. The structural grid on either side of this spine can be adjusted, enabling the MultiMax System to adapt to various site conditions and respond to different design constraints.

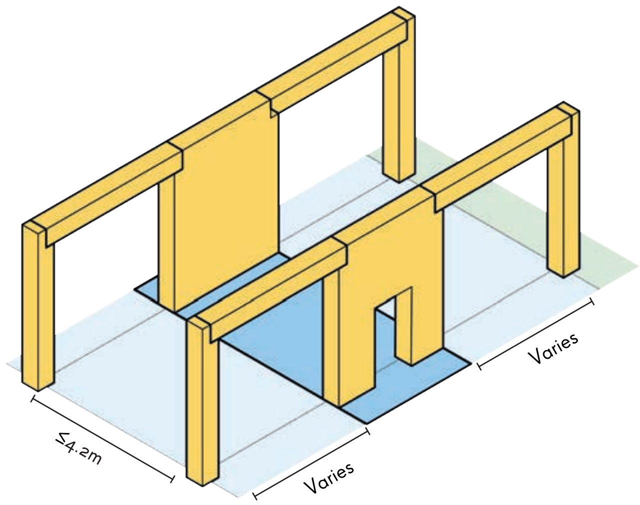


Figure: A central structural spine is combined with flexible bays either side

THE MULTIMAX STRUCTURAL BAY

In multistorey timber buildings, structural efficiency is achieved by keeping spans within optimal limits for the chosen timber products and transferring loads directly where possible. This reduces the need for complex components and fabrication. Digital fabrication further improves material efficiency, allowing for customisable designs that simplify construction and make building more accessible.

Guided by this approach, the MultiMax structural system employs stacked, cellular arrangements with flexible positioning of architectural openings, creating an adaptable structural grid. The walls are formed using OSB wall cassettes that are manufactured off-site and pre-insulated. Floor plates are constructed with spanning timber floors using proprietary metal-webbed joists, providing a service zone with high flexibility and avoiding the need for complex structural detailing. However, the system remains compatible with other comparable timber structural products, offering further adaptability.

At the heart of the MultiMax System is the structural bay - a repeatable unit with a maximum span of 4.2 metres. This bay forms the basis for a highly adaptable framework from which a wide variety of home types and layouts can be configured.

More detail on the structural performance of the system can be found in Chapter 2.2: Structural Considerations.

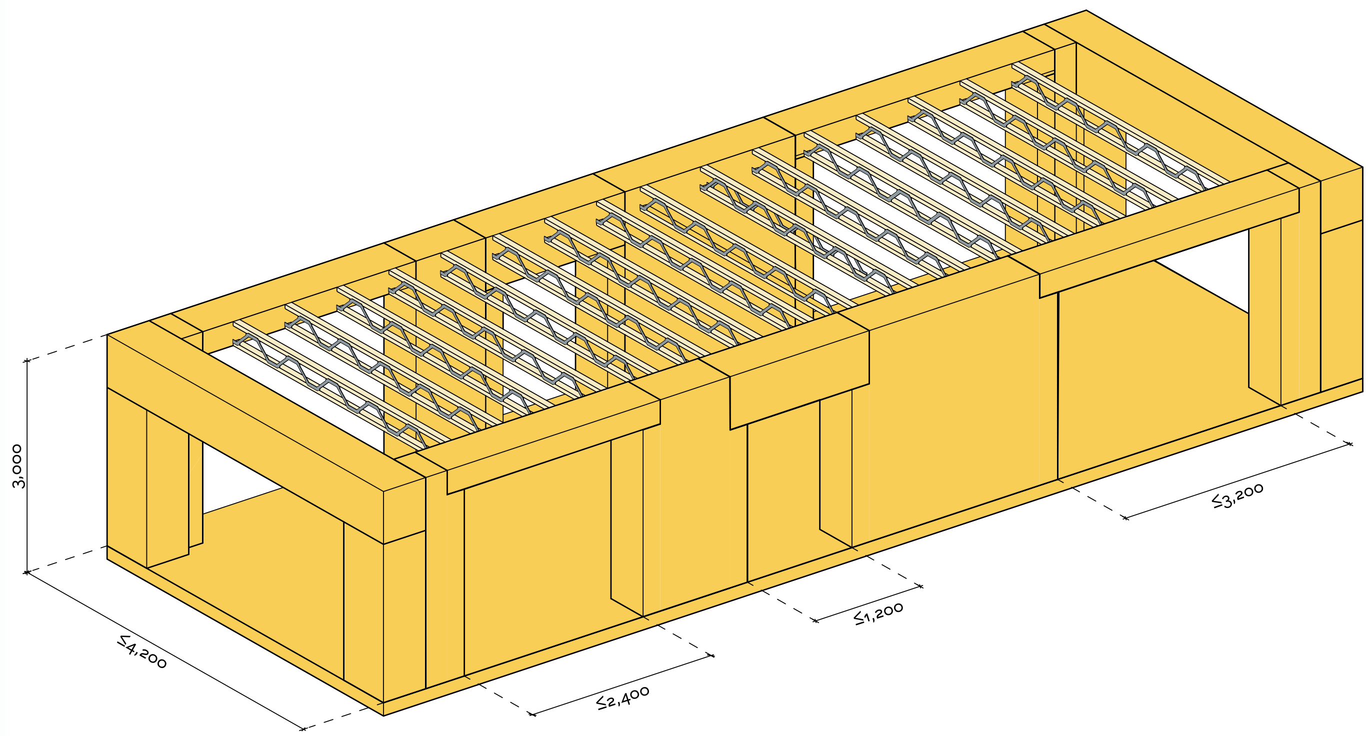


Figure: The MultiMax Structural Bay

SPINE WALL COMPONENTS

The structural elements of the spine wall can be efficiently standardised to minimise the number of component cassette types required, simplifying both design and construction. Each cassette type is defined by a set of parameters—such as height, width, and load-bearing capacity—which allow for consistent performance while accommodating a range of layout configurations.

These parameters are outlined below, and further detail can be found in Chapter 2.2: Structural Considerations.

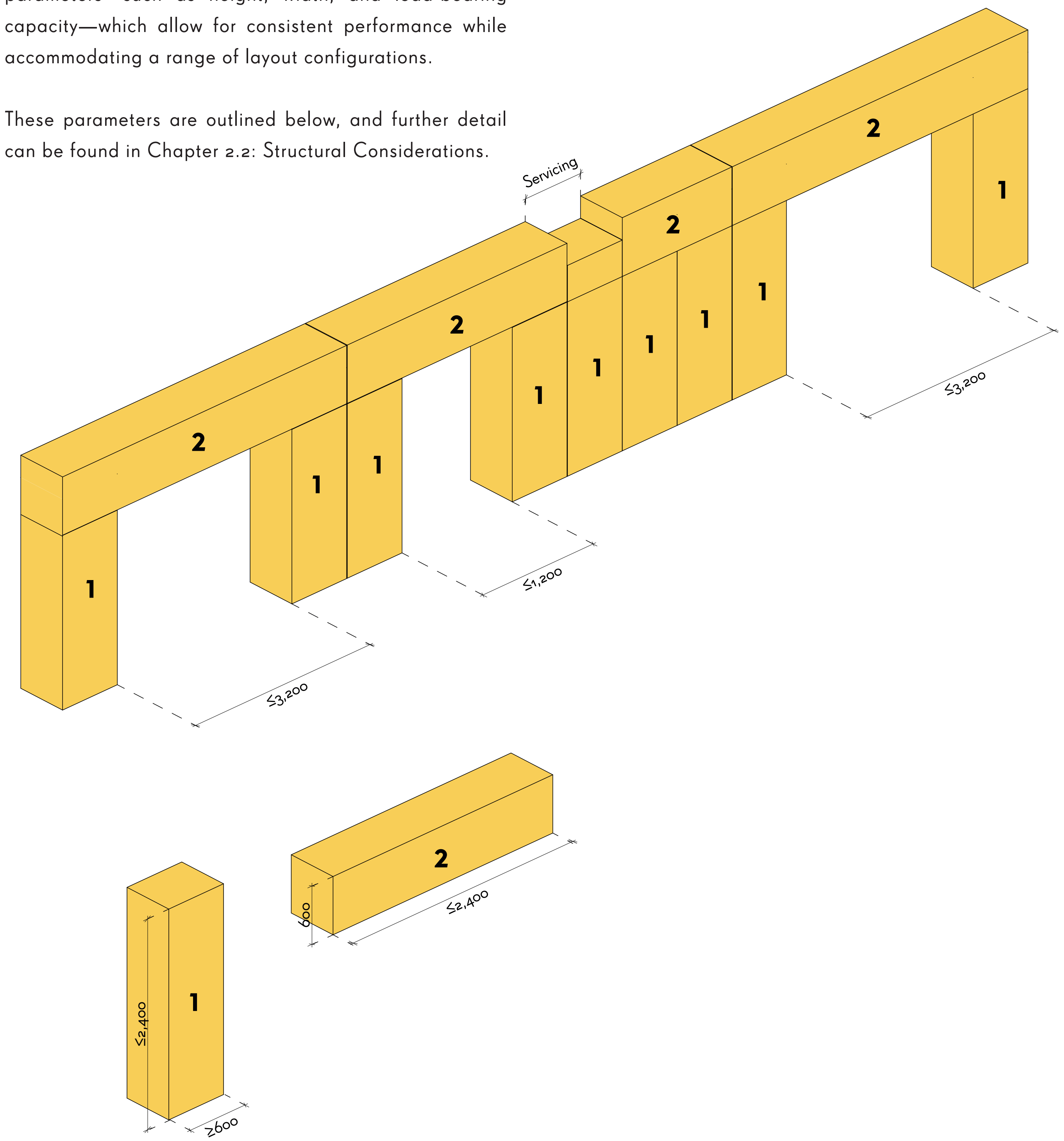


Figure: Spine wall parameters

INTERNAL LAYOUT

Internal layouts must comply with local and national regulations, statutory space standards, and any additional requirements set by the local community, client, or future residents.

Model layouts in this document are based on the minimum space standards set out in the statutory guidance 'Technical housing standards – nationally described space standard', published by the Department for Communities and Local Government in March 2015. Other or additional space standards may apply in different parts of England and across the wider UK.

The design and construction process can be made more efficient by minimising the number of home and room types, as fewer variations lead to a quicker and simpler build. This approach is especially beneficial for rooms with sanitary fittings or items that require precise planning, such as bathrooms, kitchens, and utility rooms.

Room sizes should align with the structural grid, allowing the creation of organisational modules that can be applied across different home types. Rooms with sanitary fittings, such bathrooms, kitchens and utility rooms should be located in the central spine.

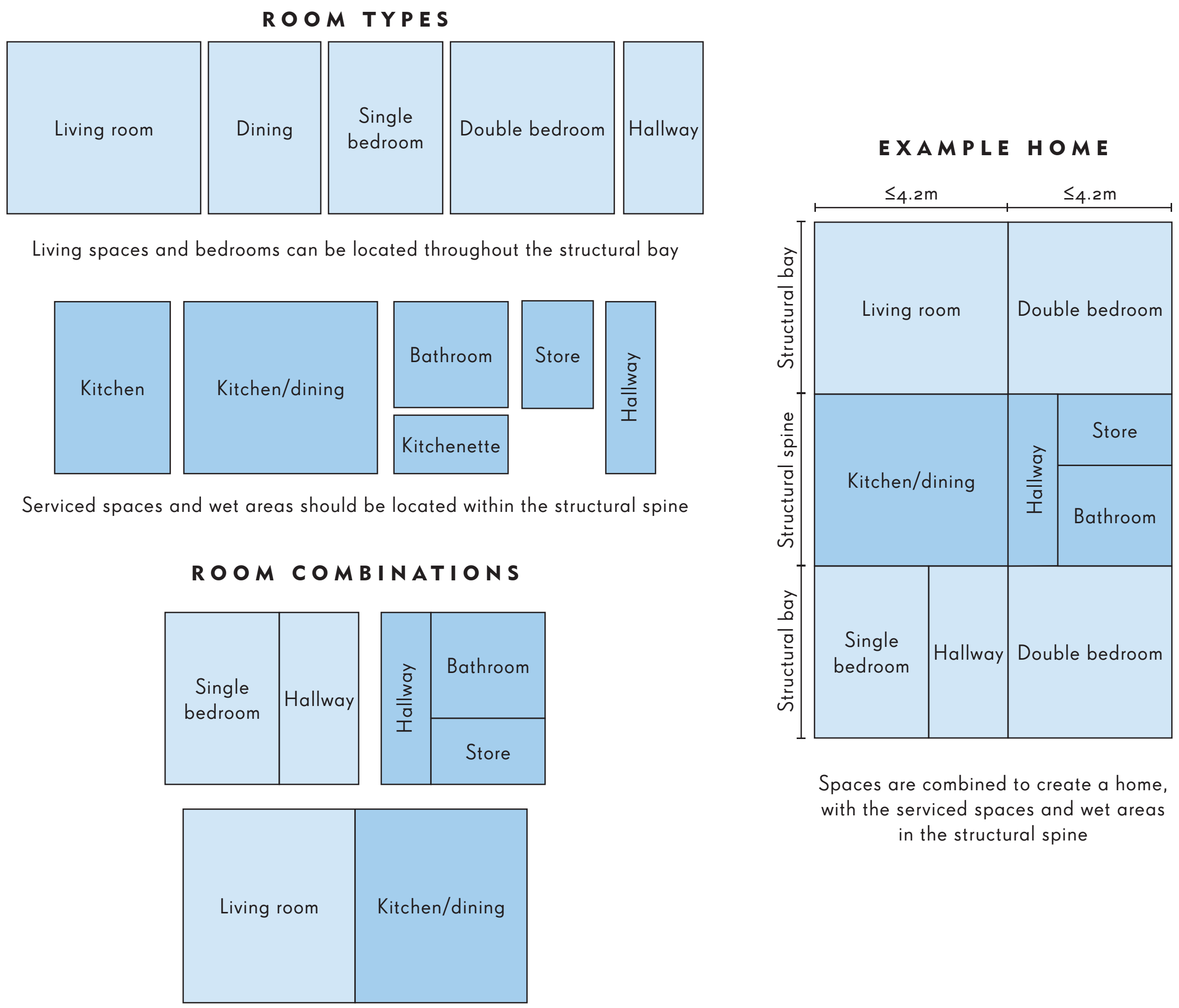


Figure: A central structural spine is combined with flexible bays either side

INTERNAL LAYOUT

Using a repeating layout with a small number of home types doesn't limit design flexibility. These standardised room types can be arranged in various ways to create a wide range of home layouts and plans, accommodating different resident needs and adapting to site-specific constraints such as orientation, views and solar gains.

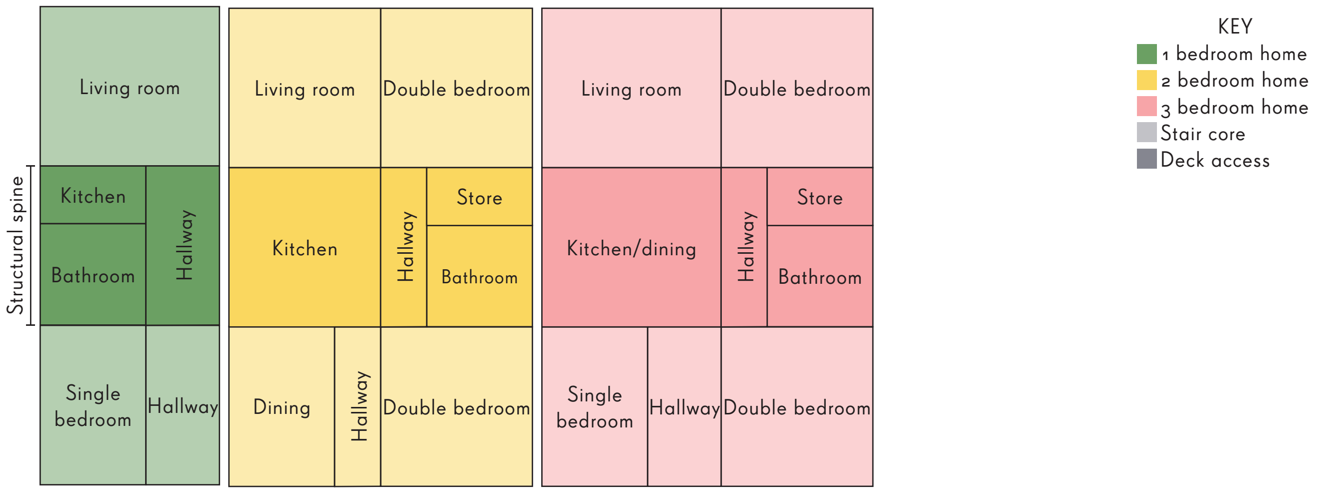
The structural spine can be positioned centrally or partially offset to one side, offering greater layout variety. This should be determined in consultation with the project's structural engineer.

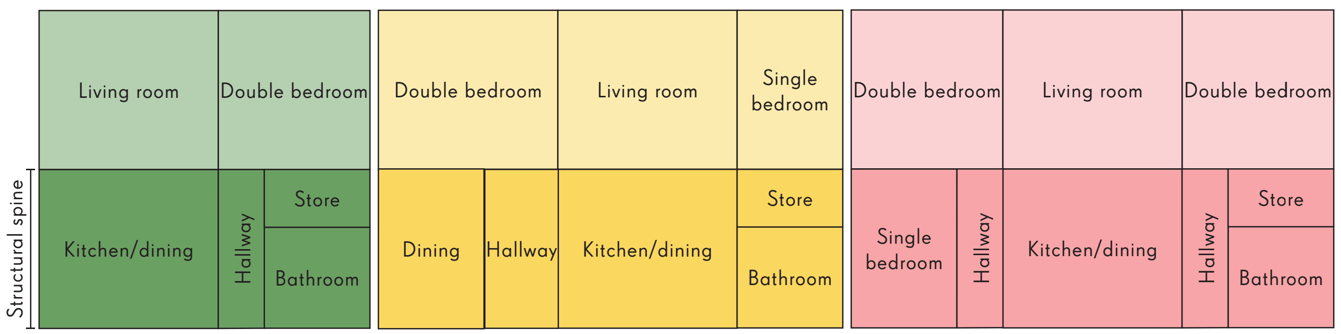
CIRCULATION

The MultiMax System uses horizontal circulation via deck access walkways, which also function as shared amenity spaces and provide shading to reduce overheating. These external walkways are a key feature of the system, promoting resident interaction and fostering a sense of community. They also offer a cost-effective access solution while supporting passive environmental strategies.

Vertical circulation is provided by stairs. While lifts are not included as standard, the system is designed to allow for their future installation.

For guidance on integrating walkways with the fire strategy, see Chapter 4.2: Fire Considerations. For design precedents, refer to The Deck Access Housing Design Guide: A Return to Streets in the Sky.



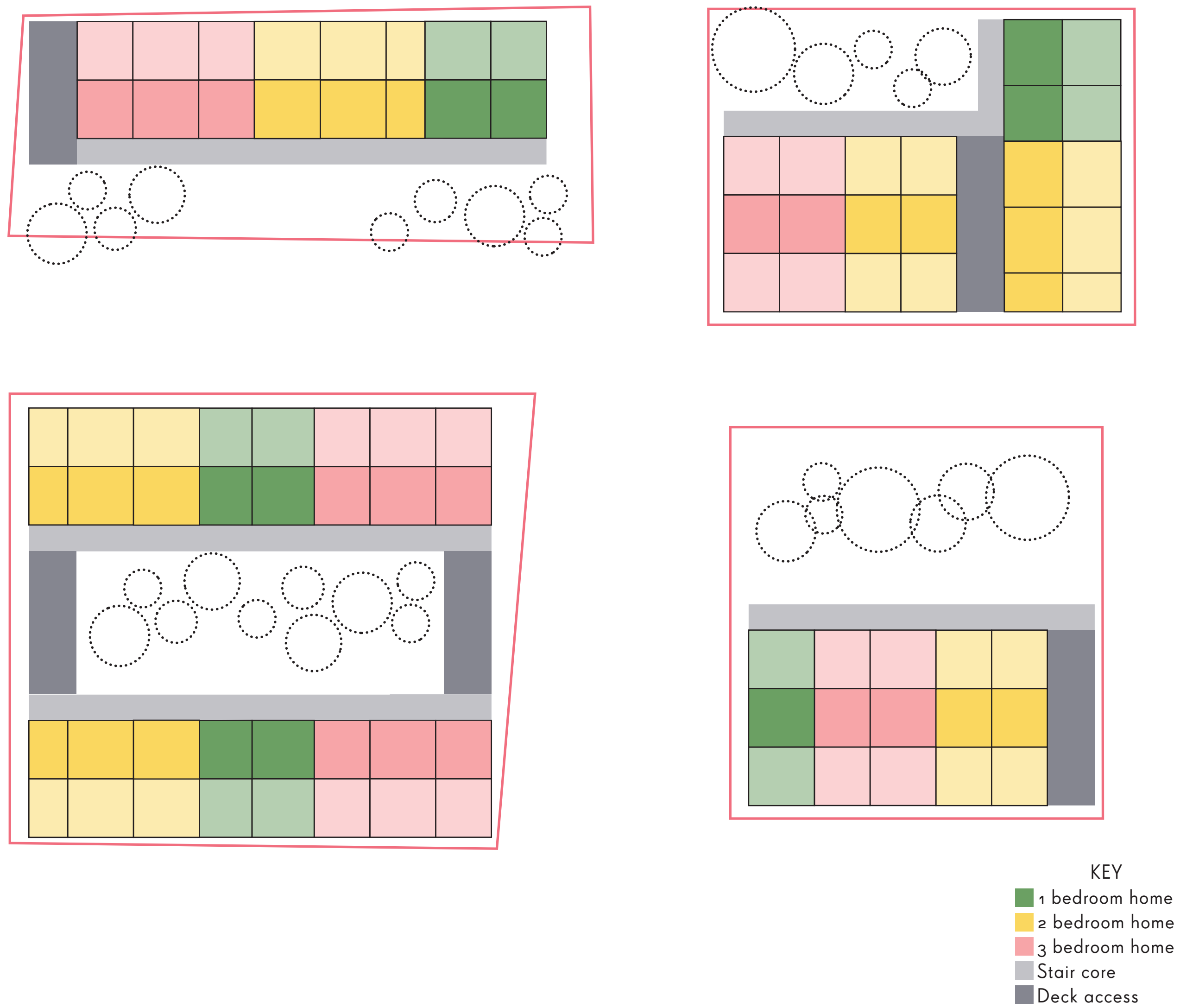


RESPONDING TO A SITE

The MultiMax System is a flexible solution designed to create various flat types that can be adapted to different site constraints.

By following the system's principles, these flat types can be configured into a range of building massing types, allowing for effective responses to diverse site conditions.

While the system may not be suitable for every site or its specific challenges, it is particularly well-suited for small to medium urban infill sites. The design approach ensures that the MultiMax System can effectively address the majority of these urban settings, providing a practical solution for common infill scenarios.



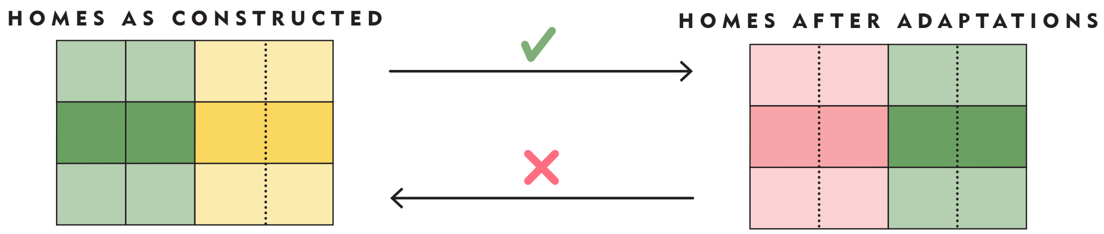
LAYOUT ADAPTABILITY

The MultiMax System is designed for adaptability, allowing internal layouts to change to meet to future residents' needs. Homes can be expanded or reconfigured by removing non-structural walls to create larger, open-plan spaces. This approach is particularly well suited to growing families living in managed apartment blocks, enabling them to remain within their communities throughout different stages of their 'living career'.

For efficiency, party wall locations are fixed - these walls can become internal, but not vice versa:

This is because building internal partitions to meet party wall standards would require extra materials to ensure fire and acoustic performance. Since not all homes are expected to be adapted during the building's lifespan, this would lead to unnecessary costs and increased embodied carbon.

As a result, the system allows for homes to be made larger, but not smaller. Each building is initially delivered with the maximum number of homes per floor. When needed, smaller openings in the structural spine can be made to combine homes or modify internal layouts, as shown in the diagram below. Any changes must consider the fire strategy, as this may be affected.



GROUND FLOOR DESIGN

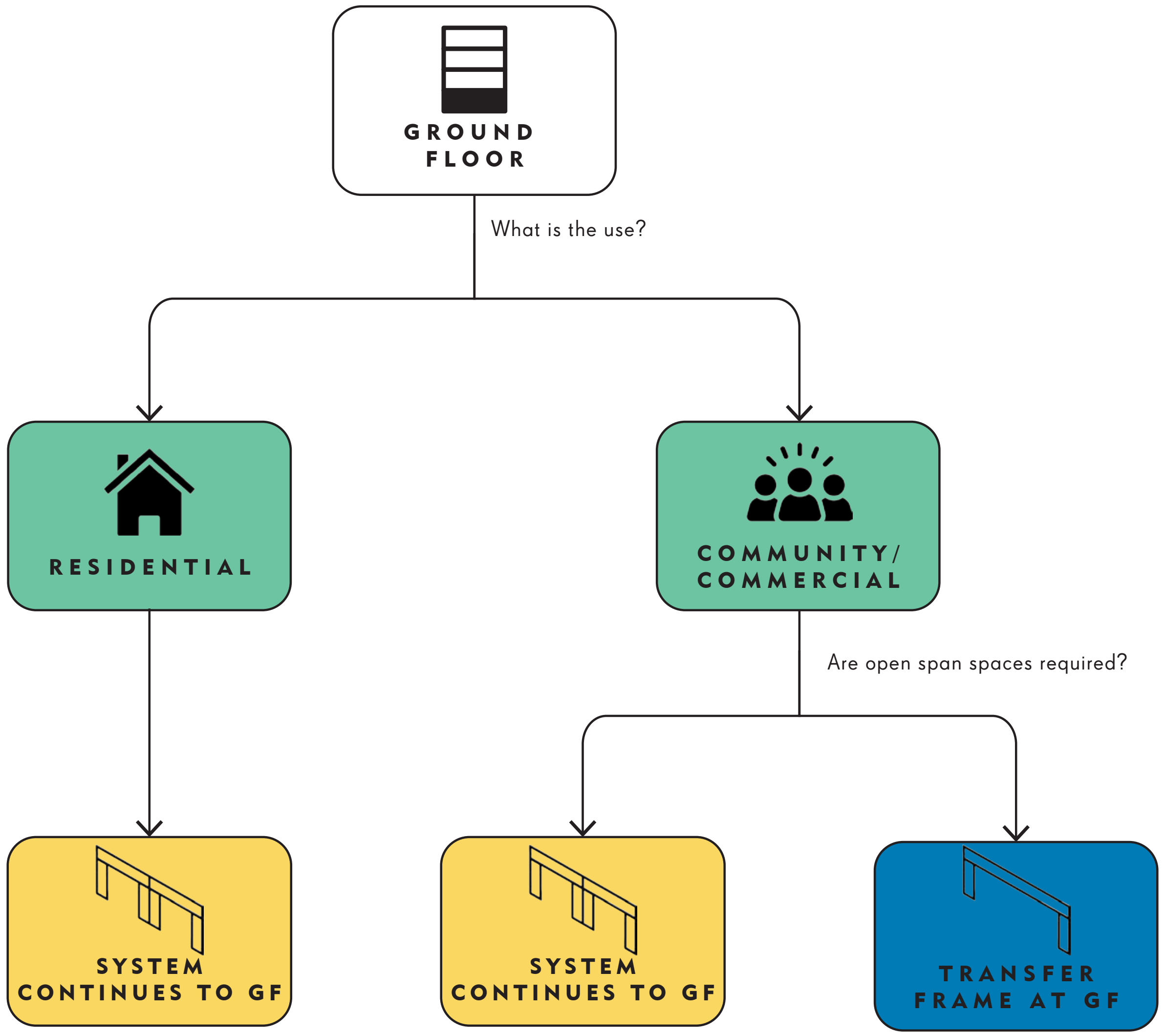
The MultiMax System provides flexibility at the ground floor level, accommodating a range of alternative uses. If required, it can include an open, clear span space suitable for community or commercial purposes.

Typically, a portion of the ground floor is reserved for servicing and plant equipment, although the exact layout varies depending on the specific project requirements.

Principles for the ground floor design are as follows:

- The stair always continues to the ground floor and is enclosed. This forms part of the structural stability arrangement.
- A transfer structure is needed when the ground floor use differs from residential and open plan layouts with larger spans are desired.
- The transfer structure will be provided through a portal frame which aligns with the structural grid that stacks above.
- No timber will be within 150mm of the ground. For sloped sites, a concrete or masonry retaining wall should be provided.

For guidance on structural parameters for ground floor, please refer to Chapter 2.2: Structural Considerations.



2.2 STRUCTURAL CONSIDERATIONS

Structural efficiency in multistorey timber buildings is achieved by keeping spans within optimal ranges for timber and avoiding complex load transfers. This minimises the need for intricate components and enables material efficiency, especially when paired with digital fabrication for mass customisable solutions. The MultiMax system follows this approach, using stacked, cellular layouts with flexible openings to create an adaptable structural grid. Load-bearing OSB wall cassettes form the walls, while timber composite joists provide the floor structure.

STRUCTURAL SYSTEM

The structural arrangement of a building using the MultiMax system works on the premise that the arrangement of wall units with any floor structure and trimming members for openings, forms a cellularly arranged multi-storey construction up to 11m in height.

The superstructure follows similar principles to traditional platform-frame timber construction and is envisaged to be built sequentially; wall units are erected off a stable platform and tied through with the joisted floor diaphragm, before the structural walls to the next level are constructed by using the last completed floor as a working platform.

Due to the applicability of the system for multiple occupations and/or mixed-use cases where the ground floor level can be used for non-residential requirements, the timber floors are horizontally tied to the wall constructions to provide disproportionate collapse resistance.

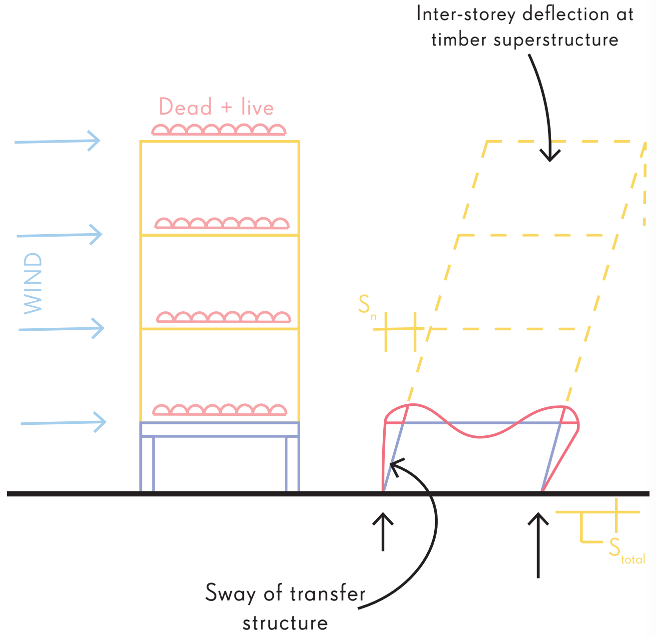


Figure: Global stability principles about building minor-axis with podium structure under

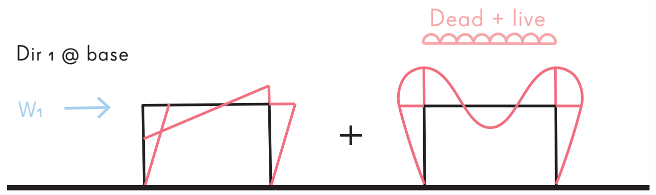


Figure: Timber frame behaviour

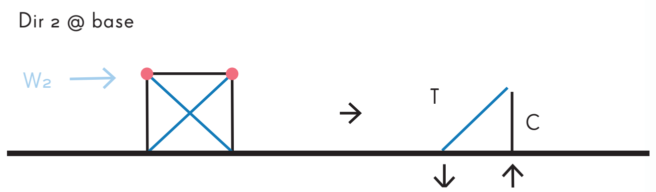


Figure: Braced bay behaviour in plane stabilisation of transfer frame

STABILITY CONSIDERATIONS

Stability to the structure is provided by the cellular arrangement of internal dividing party walls and the enclosing elevations. The OSB structurally insulated cassettes are arranged to work in a manner similar to timber racking panels, with mechanical fixings on the faces of wall cassettes coupling these to each other. This can be achieved through standard builder's metalwork for carpentry applications, not dissimilar from that used in studwork construction or engineered timber buildings such as CLT framing (ie nail-plates and angle brackets at regular centres). Detailed stability parameters are outlined in the structural engineering drawings appended to this report.

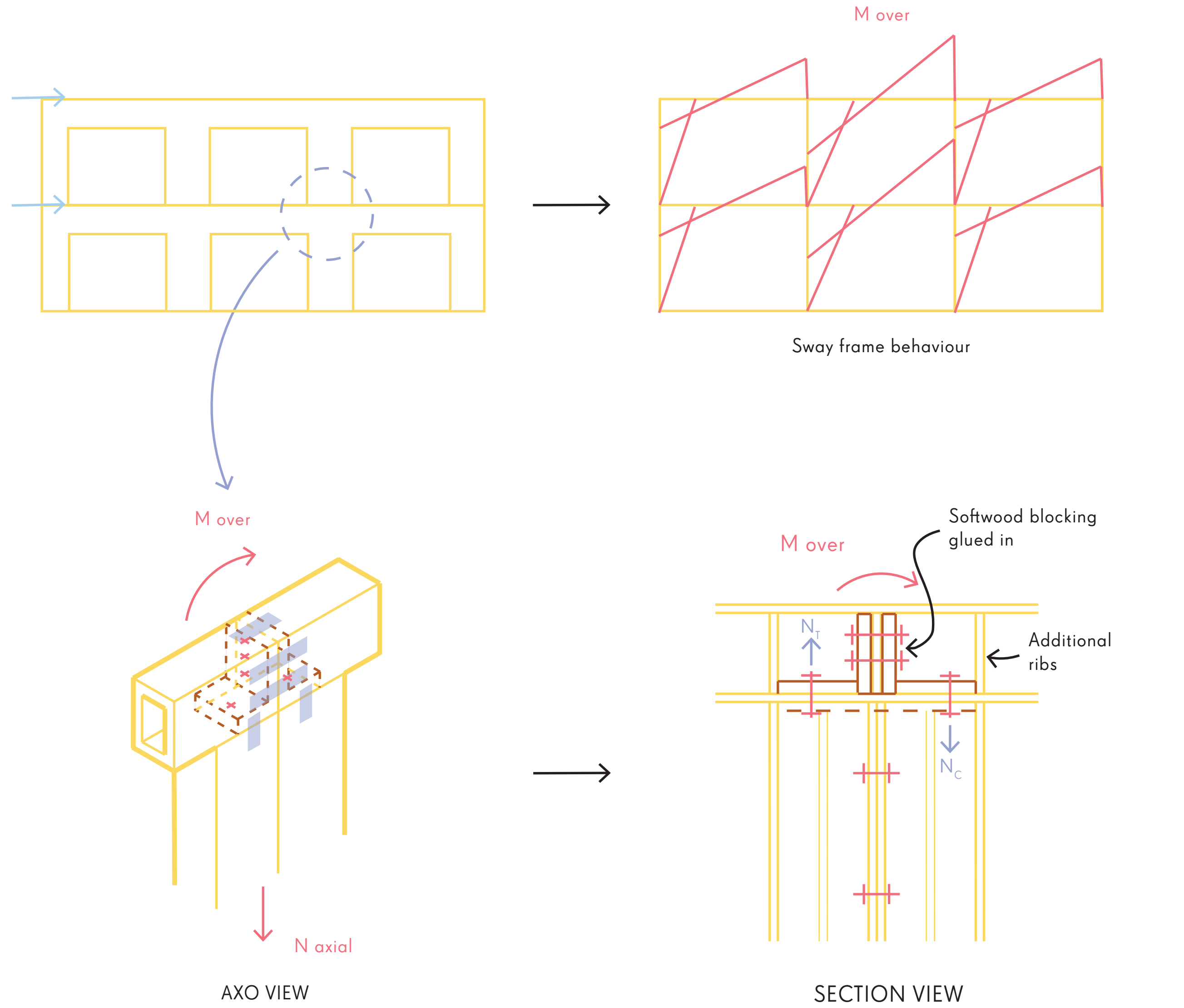


Figure: Moment connection typology for at box-beam to cassette junction

GROUND FLOOR STRUCTURE

In purely residential, single-use applications, the structural approach for the ground floor continues the cellular arrangement of the superstructure, with cassette walls bearing directly onto the foundations. Holding-down requirements for resisting horizontal loads (eg wind) are incorporated as needed to ensure stability.

Should the ground floor space be adapted for a mixed-use scenario, the provision of a transfer structure in bays aligning with the internal load-bearing wall lines should be provided. This portalises the global structural arrangement about its minor axis (front-back) with stability in the major direction (left-right) achieved by using either bracing between bays or infill wall panels on external and internal areas (subject to finalised architectural layouts). This is detailed in the appended structural drawings.

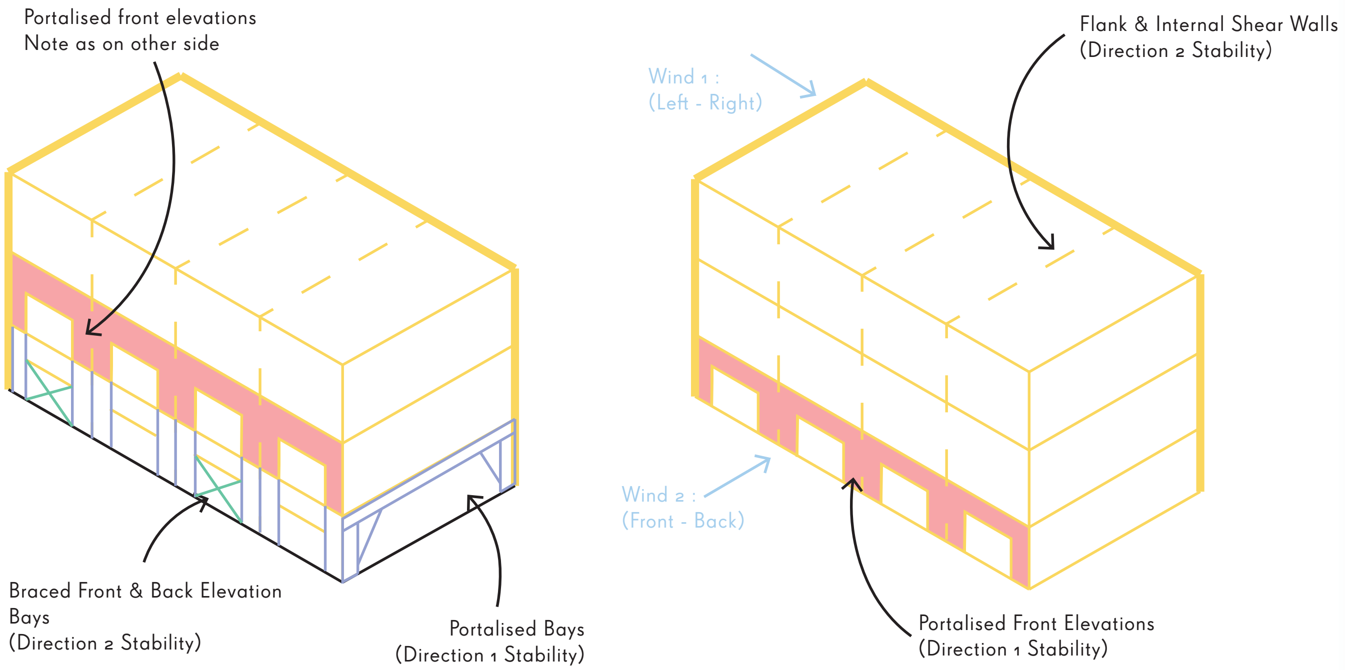


Figure: Global stability principles

SUBSTRUCTURE CONSIDERATIONS

For the purposes of the document, the superstructure is shown as being supported on traditional mass concrete foundations for sites with an allowable bearing pressure of 150kN/m2. This is to demonstrate its applicability to a ubiquitous substructure solution, familiar to most competent constructors. This is not to say that the system cannot be adapted for varying sites and differing foundation solutions such as;

- Galvanised steel beam or elevated timber beam grillages on concrete piles or helical screw piles
- Rubble filled trench footings of well compacted clean granular material. In each case of application, the top line of the rubble trench footings should have a capping beam layer designed to span over soft-spots in the ground make-up
- Reinforced concrete raft foundations where ground movement is a design issue; i.e. soil heave due to close proximity trees are of a particular concern and deep strip footings are not desirable

In all of the above instances a site-specific investigation is required to determine the nature of a suitable bearing strata and provide a detailed foundation design. The applicability of this should then be determined by the relevant and qualified project engineer.

EXTERNAL WALKWAY STRUCTURE

To provide a simplified framing approach, the walkway structures are designed as an isolated timber 'stick-and-post' framing system. This is stabilised by virtue of being coupled back to the main building envelope which is structurally stable and allows for varying materials to be expressed as part of the external elevation design.

In certain site specific cases, this may require its own stabilisation through expressed structural bracing or framing members.

For more details on the external walkway, please refer to Section 2.4.

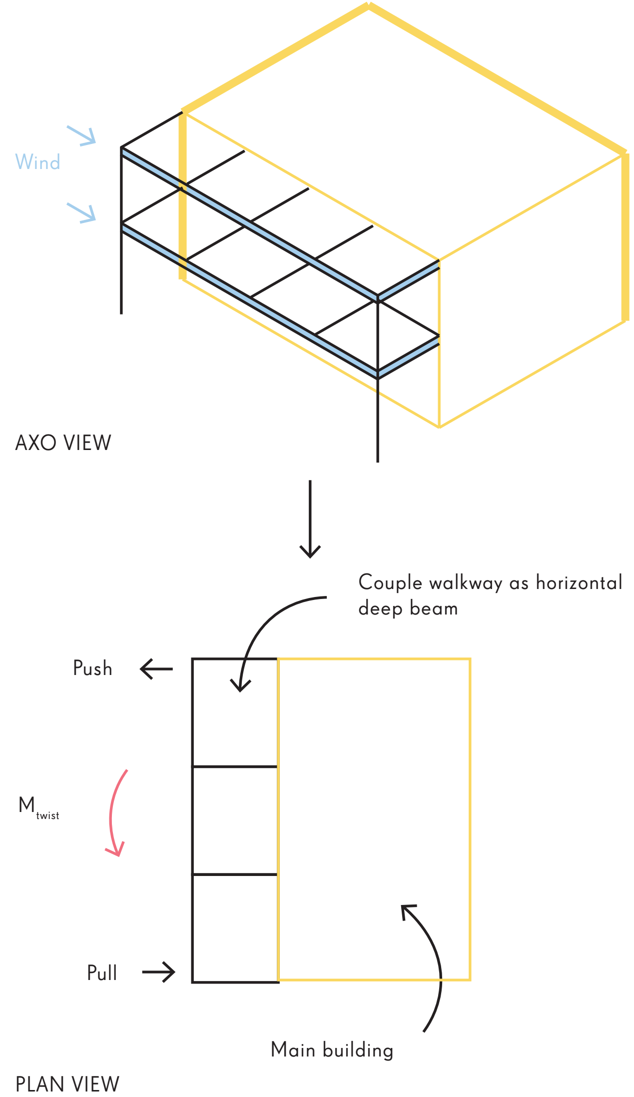


Figure: Walkway stability principles

2.3 FAÇADE CONSIDERATIONS

The MultiMax System typically uses a lightweight timber façade.

Design considerations for this include aligning façade grids with structural layouts, selecting suitable cladding materials, ensuring efficient construction through standardised details, and balancing shading with daylight in deck access walkways to prevent overheating while maintaining adequate natural light.

FAÇADE GRID

Designers should align the façade design with the overall structural grid to establish a consistent rhythm of repeating modules. By using variations of a basic module within this grid, a dynamic and diverse façade can be achieved.

For example, a 600mm façade module can create a cohesive elevation design with uniform opening dimensions across different home types.

FAÇADE COMPONENTS

The structural elements of the façade wall can be efficiently standardised to minimise the number of component cassette types required, simplifying both design and construction. Each cassette type is defined by a set of parameters—such as height, width, and load-bearing capacity—which allow for consistent performance while accommodating a range of layout configurations.

These parameters are outlined on the facing page, and further detail can be found in Chapter 2.2: Structural Considerations.

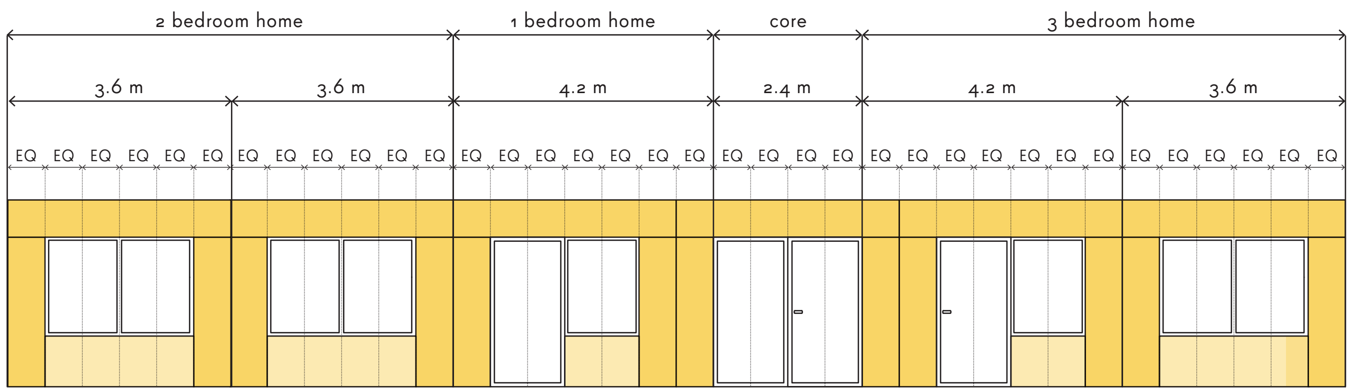


Figure: Example of how the façade grid can align with the structural grid

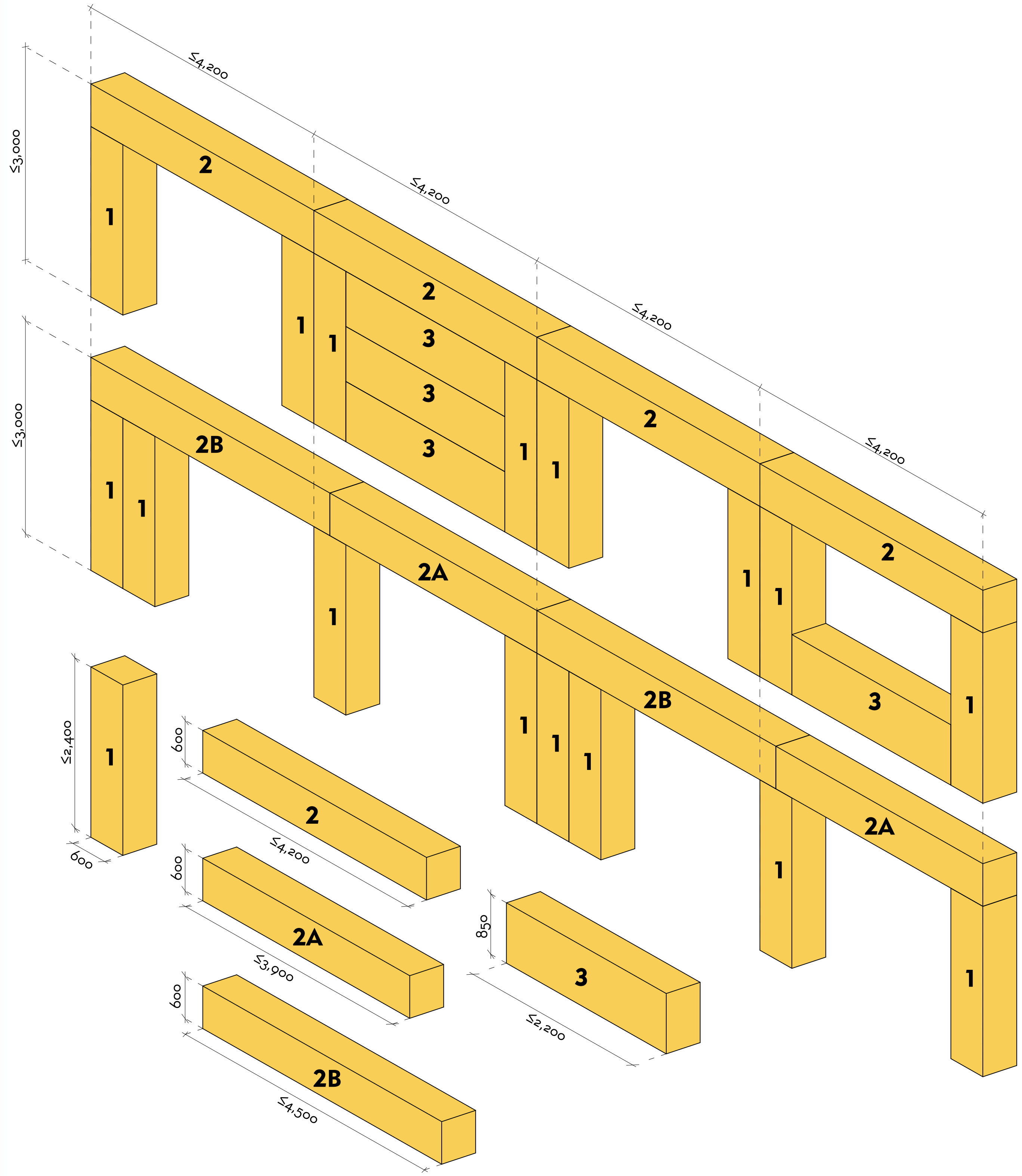


Figure: MultiMax System façade components

ARRANGEMENT OF OPENINGS

Where façade openings are required, the following guidance should be followed:

1. Maximum structural bay ≤4.2m
2. Each structural bay should use at least 2no. '1' components and 1no. '2' component.
3. The typical arrangement of this should be a simple goal post:
4. Where required, '3' components are used to infill the goalpost:
5. Where greater flexibility in the location of openings is required, '1' components can be rearranged. Variants of '2' - '2A' and '2B' - are used in this arrangement.

The structural considerations for this and the impact on global stability are detailed further in the appended structural section.

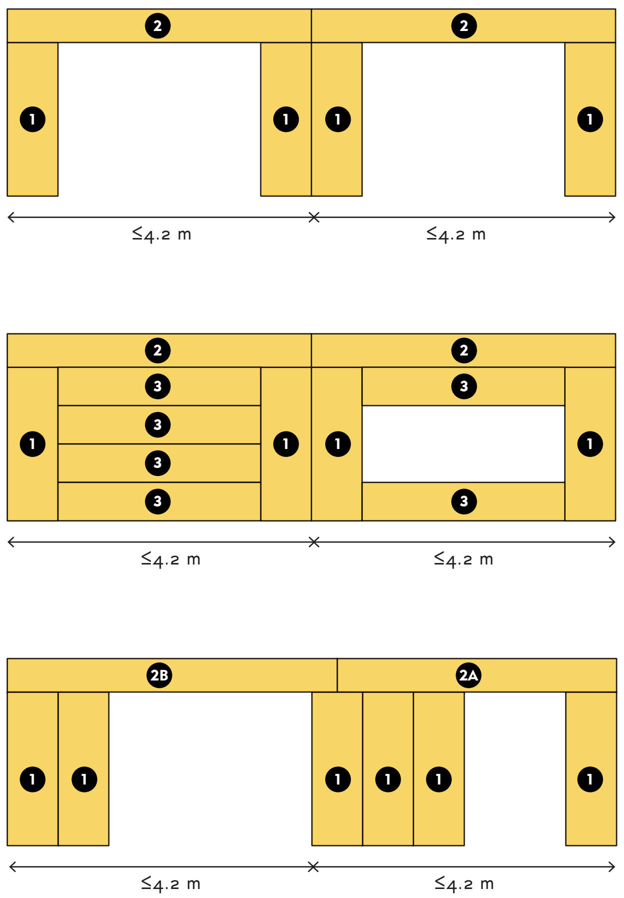


Figure: Guidance for the arrangement of openings within a façade

MATERIALITY

When selecting external facing materials, the designer should consider requirements such as local context, material efficiency, robustness and ease of construction.

Cladding materials can generally be categorised as either a lightweight system or a loadbearing system.

Lightweight systems include:

- Timber cladding, such as horizontal or vertical cladding or shingles
- Tiles, such as clay tiles or terracotta tiles.
- Sheet cladding such as cementitious boards or fibre cement.

For buildings over three storeys, a lightweight cladding system is generally the most materially efficient option, as it can be easily supported by the structure. Timber is expected to be the preferred choice for external cladding in most MultiMax System applications.

Loadbearing cladding systems are typically limited to masonry and are only anticipated where a particularly robust or impact-resistant finish is required. At this height, brickwork is usually supported under its own weight and borne by the ground floor structure, avoiding additional load on the primary timber frame and enhancing overall material efficiency.

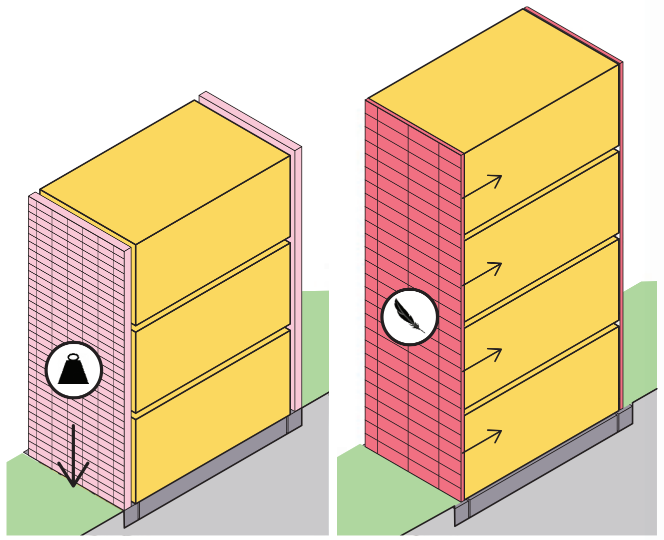


Figure: For buildings over three storeys, lightweight cladding is most efficient

BRICK	HEMPCRETE	TILES	CEMENTIOUS BOARD	LIME RENDER	TIMBER
Brick offers durability and robustness but is carbon intensive, so its use should be limited to essential areas like the ground floor.	Hempcrete is a low carbon alternative to brick but is typically more expensive, so its use should be balanced against the overall project budget.	Tiles offer a lightweight alternative to brick, providing a traditional clay finish without the weight or carbon impact of masonry.	Cementitious board is a lightweight, cost-effective cladding option that is well suited to projects with smaller budgets offering a durable finish.	Lime render has a low embodied carbon footprint. However, its installation is typically more complex, requiring specialist skills and consideration.	Low carbon, and cost effective, timber is a suitable cladding material for many projects. However, it is less suited to areas requiring a robust finish.


Figure: High level analysis of cladding materials, ranging for heavyweight to lightweight

BUILDABILITY

The cladding system should consider the building movement and settlement. Movement joints or tiles that move over one another can be employed.

It is preferable to use dry trades where possible, ensuring a clean, quiet and healthy site environment. Materials should be efficient to install while also maintaining the quality of the design.

Repeatable details and standardised processes allow for the same detail to be used over multiple locations. For example, if all windows have the same reveal detail, time spent on site installing the reveals will be reduced.

OVERHEATING/DAYLIGHT

Site orientation has a huge impact on both overheating and daylight. Prioritising north/south glazing is preferred with openings sized to meet minimum daylight levels. Shading on the south elevation will then help to avoid summertime overheating. The deck access walkway can be used to shade windows on this elevation. East/west glazing should be minimised where possible as these openings are often the cause of overheating during summer when the sun is low in the morning and evening.

Designers should adhere to the guidelines outlined in AD Part O to ensure that these shading requirements are met effectively.

STRUCTURAL CONSIDERATIONS

Key structural rules for detailing varying façade typologies are as follows:

- Where timber cladding is used, this should be lightweight, built off a system of cross battening at regular centres to provide a ventilated cavity and screwed back to the exterior skin of the cassette walls.
- Where a masonry weathering course is preferable, this should track down to foundation level; vertical load of the masonry skin is supported at foundations whilst the timber superstructure is for providing lateral restraint to the external skin. The typical centering of 450mm centres, with screwed connectors will suit for most UK applications of reasonable wind loads, with an increase of ties centres around apertures and sharp edges of the building. This is inline with recommendations of BS5628 : 6-1: 1996,

In all cases, façade fixing strategies are to be determined on a case-by-case basis considering the site specific wind loads, considering orientation and any exposure or sheltering of the building. In both cases examples of this are outlined in the appended structural drawings.

2.4 WALKWAY CONSIDERATIONS

The MultiMax System is based on using external walkways to provide horizontal deck access circulation, along with projecting balconies that offer private amenity space. When carefully designed, walkways deliver multiple benefits, including reduced construction costs, improved daylight and ventilation, and greater layout flexibility.

MATERIALITY

The MultiMax System does not prescribe materials for the walkways, allowing for a range of options for the walkway structure, decking, soffits, and façade cladding. Materiality and detailing are critical, including the deck finish, soffit treatment, balustrades and façade interfaces. A fully timber solution is achievable under Approved Document Part B, but must be assessed in relation to fire performance, durability and long-term maintenance.

While it is possible to design a walkway that maximises the use of timber - including structure, cladding, and decking - materiality should be considered holistically, taking into account factors such as site location, boundary conditions, climate, durability requirements, cost and embodied carbon. Hybrid or steel options may also be appropriate and should be evaluated alongside timber.

Material selection should be coordinated with the full design team early in the process to ensure a safe, coherent, and cost-effective solution. Designers and stakeholders alike should adopt a whole system perspective to materiality of the walkway, enabling flexibility to meet a variety of budgetary, regulatory, and architectural needs.

ACCESS AND AMENITY

Although constructed using the same materials, walkways for access and amenity must be considered separately. The access walkway forms part of the means of escape and must be designed to provide a safe and compliant route in the event of fire. The fire strategy should be developed in collaboration with the fire engineer, based on project-specific priorities.

Amenity spaces are typically less constrained in use, but it is important that residents and building managers understand the distinct roles of each walkway type.

BUILDING REGULATIONS COMPLIANCE

The walkway design must comply with all relevant Building Regulations. While this guide provides an overview of key considerations, designers should take a holistic approach to ensure full regulatory compliance across all aspects of the walkway design.

For further guidance on building operation and management in the MultiMax Playbook - click here

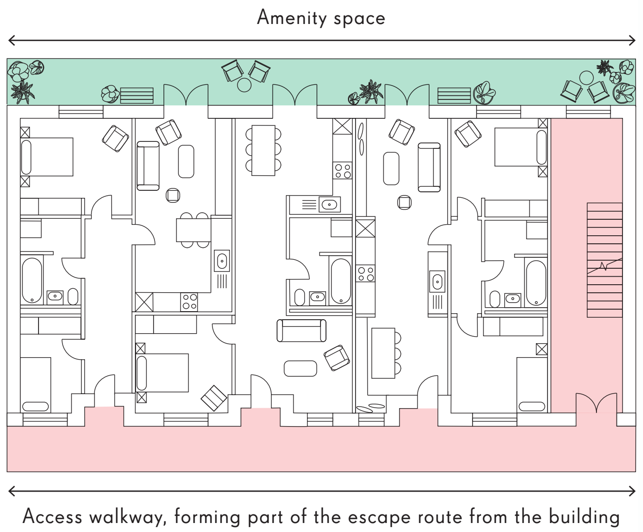


Figure: Access and amenity walkways should be treated differently

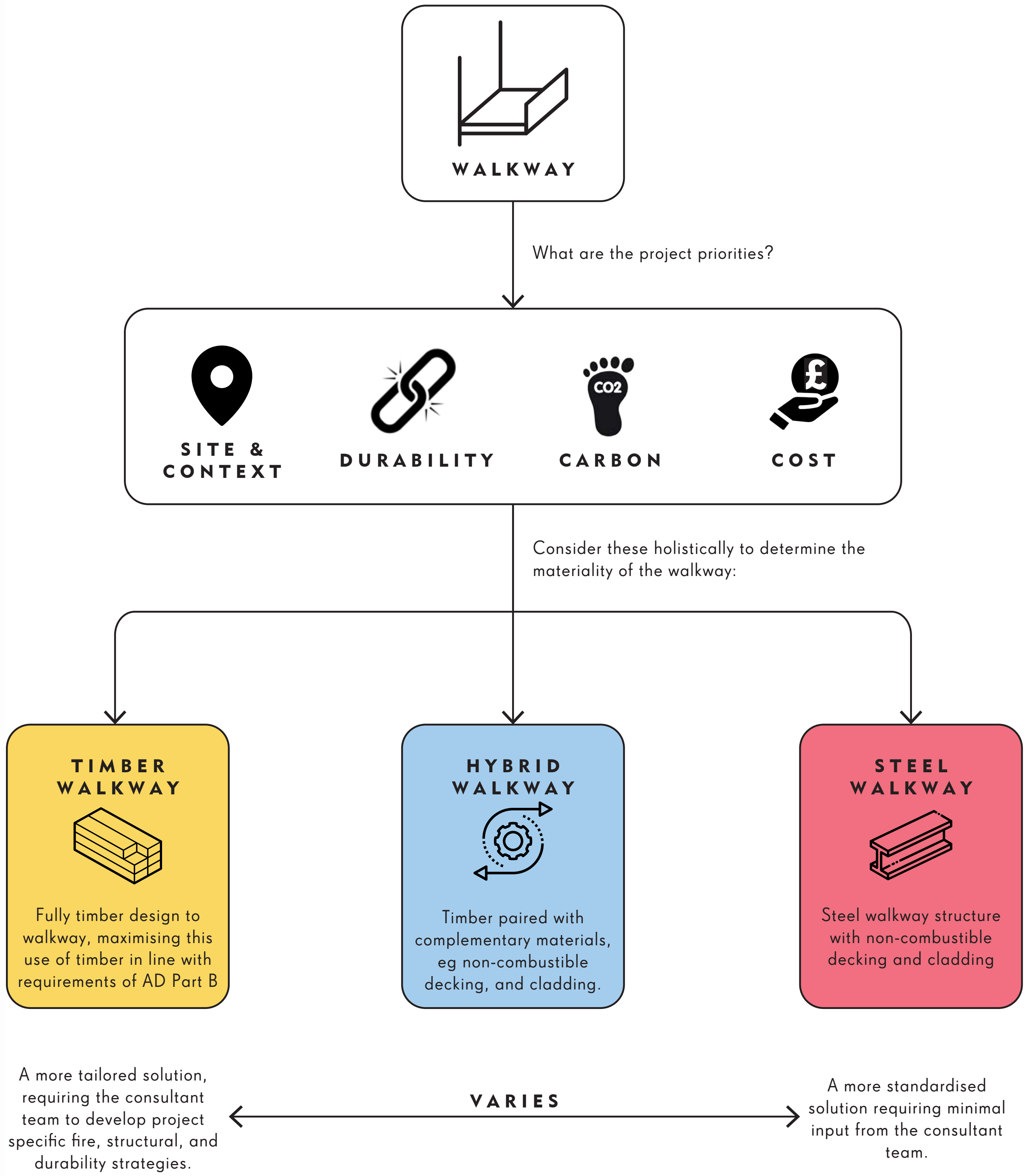


Figure: Walkways flowchart

2.5 ROOF CONSIDERATIONS

This section sets out guidance on key aspects of roof design, including pitch options, structural alignment, material selection, thermal and fire performance, and buildability. It highlights the importance of integrating the roof with the structural grid, using efficient and lightweight materials, and ensuring compliance with relevant regulations. Attention to detail in design and construction supports a robust, consistent, and cost-effective roofing solution across a range of building types.

ROOF PITCH

The MultiMax System supports both flat and pitched roofs, as shown in the diagram. Standard details are available for flat and inhabited pitched roofs. For uninhabited pitched roofs, designers should follow typical standard details and comply with all relevant building regulations and standards to ensure a robust design.

ROOF STRUCTURE

For efficient construction, designers should align the roof structure with the overall structural grid. Variations of a basic module can be used within the grid to accommodate different functional or spatial requirements while maintaining overall uniformity.

A timber composite joist system is expected to be used for roof structures, however other structural materials can be used when required.

MATERIALITY

When selecting external facing materials, designers should consider local context, material efficiency, robustness, and ease of construction. Lightweight roofing systems are generally the most efficient, as they place minimal load on the structure and are easier to install. Common lightweight options include clay or terracotta tiles and sheet roofing.

Where green roofs are required, lightweight systems should be prioritised, as an increase in dead load invariably leads to an increase in structural support and roof depth

BUILDABILITY

The roof system should consider the building movement and settlement. Movement joints or tiles that move over one another can be employed.

It is preferable to use dry trades where possible, ensuring a clean, quiet site environment. Materials should be efficient to install while also maintaining the quality of the design.

Repeatable details and standardised processes allow for the same detail to be used over multiple locations. For example, if all parapets have the same reveal detail, time spent on site installing the reveals will be reduced.

THERMAL PERFORMANCE

The roof design should meet the project's specific thermal performance requirements, with a target U-value between 0.10 and 0.12 W/m^2K to ensure high levels of insulation and energy efficiency. Achieving this standard will typically require a well-detailed build-up with continuous insulation, minimised thermal bridging, and careful coordination around junctions and penetrations. Designers should also ensure compatibility with ventilation, airtightness, and moisture control strategies to maintain overall fabric performance.

FIRE PERFORMANCE

The roof design must comply with all relevant statutory guidance and building regulations. The MultiMax System incorporates a BROOF (t4) rated roof covering.

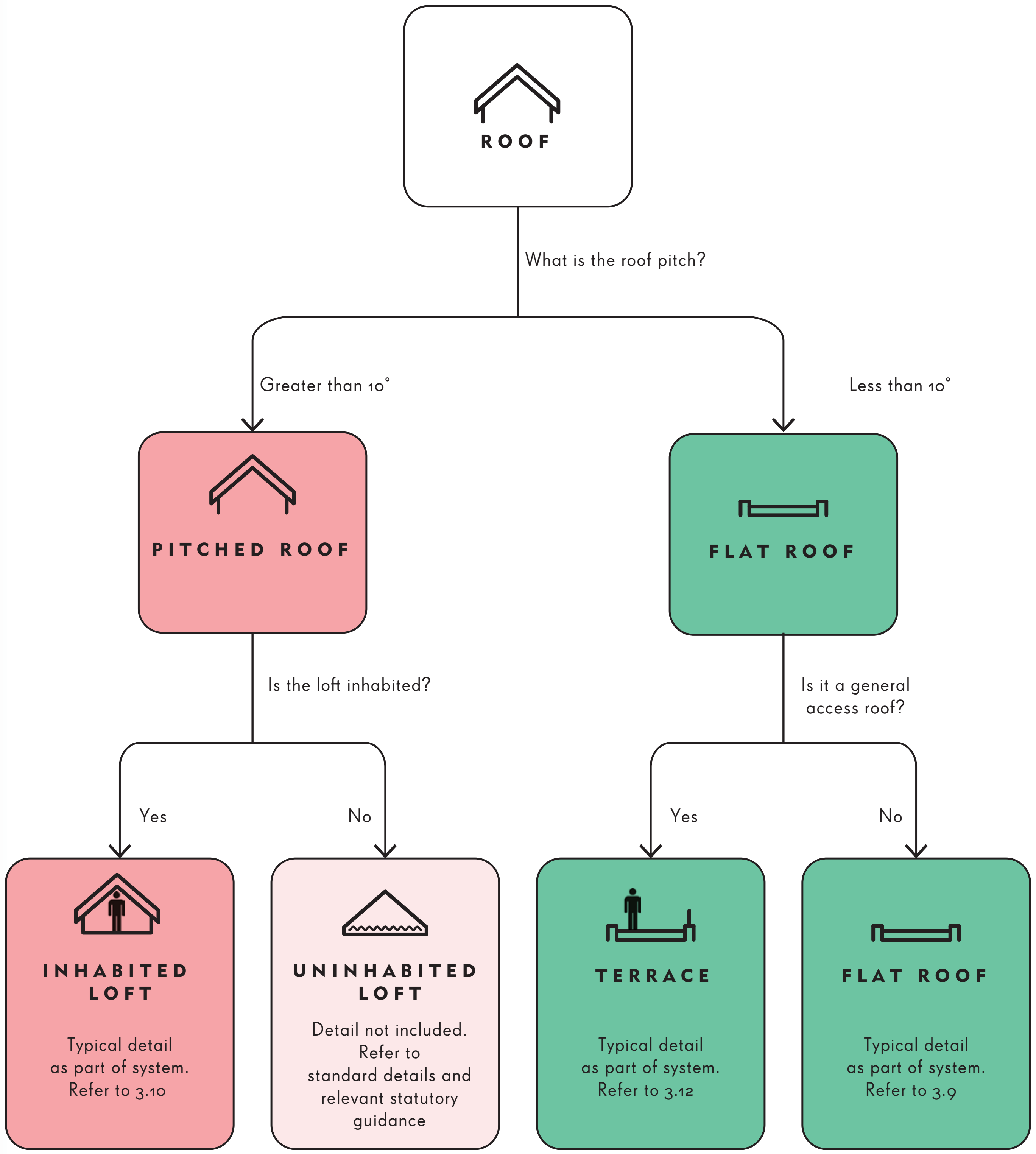


Figure: Roof types flowchart

2.6 FIRE CONSIDERATIONS

A well-designed fire strategy is essential for safeguarding lives and ensuring building resilience. By integrating fire safety measures throughout design, construction, operation, and maintenance, it helps prevent fires, limit their spread, support safe evacuation, and enable efficient firefighting intervention. The MultiMax System is developed in accordance with local regulations, providing a structured and effective approach to fire safety.

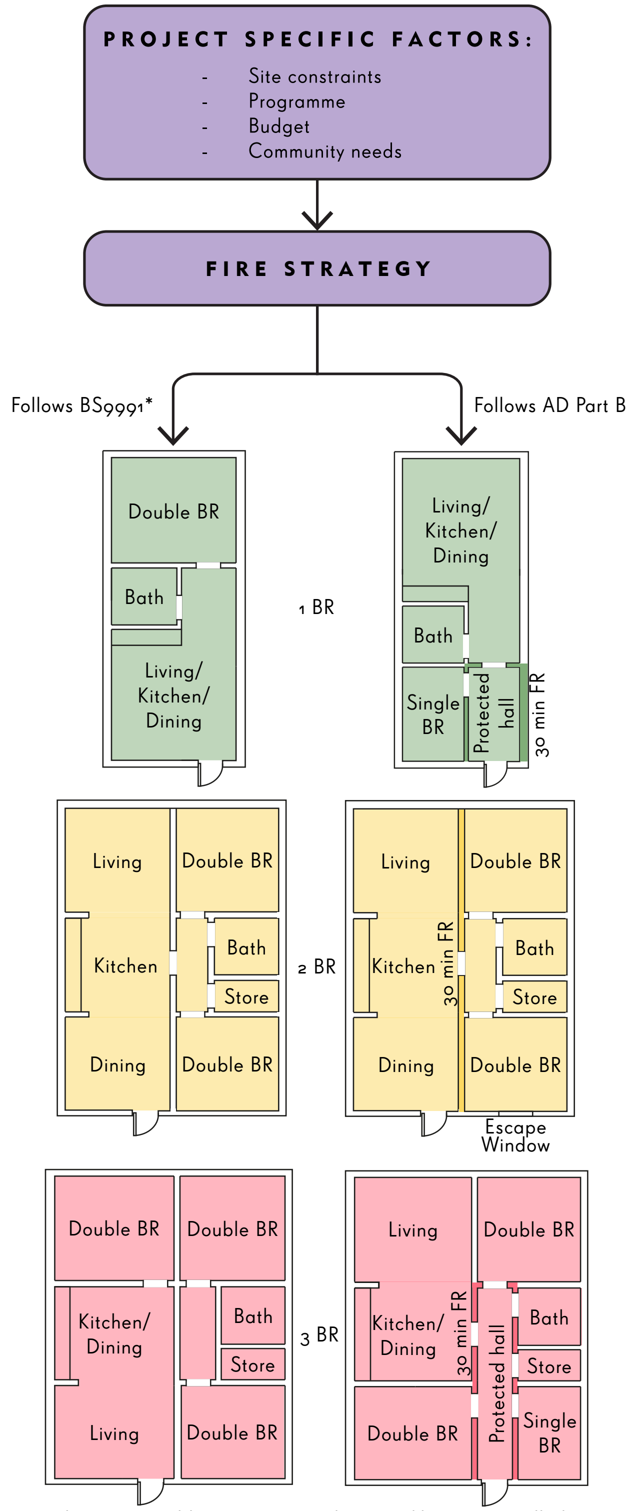
APPROACH TO COMPLIANCE

The MultiMax System provides model approaches to regulatory compliance while offering adaptable fire safety strategies, tailored to project-specific factors such as site constraints, programme, budget, and client/community needs.

Part B of the Building Regulations 2010 sets out functional requirements to ensure effective fire alarm systems, safe evacuation routes, prevention of fire spread within and between buildings, structural integrity to prevent collapse, adequate fire separation, provisions for automatic suppression, and proper access for firefighting services—all aimed at safeguarding lives and minimizing fire damage.

To meet these requirements, the MultiMax design can follow a prescriptive approach in line with:

- Approved Document B Vol.1, which provides clear and actionable steps for fire safety, including the use of protected hallways and limited open-plan layouts to enhance consistency and reliability.
- BS 9991, which offers greater flexibility, allowing for open-plan layouts through a performance-based approach that considers risk factors related to the building's design, occupants, and fire severity.



*The suggested layouts assume that sprinklers are installed in line with BS 9991:2024 and that open-plan kitchens meet the requirements outlined in section 5.6 of BS 9991:2024.

Figure: Examples of how layouts may differ depending on the fire strategy

FIRE ENGINEER APPOINTMENT

The appointment of a suitably competent fire engineer is recommended for all MultiMax projects, regardless of the chosen compliance route. However, pursuing the BS 9991 route is unlikely to be deliverable without such an appointment.

BUILDING HEIGHT

The MultiMax System is designed for buildings up to 11 meters and can accommodate both sprinklered and non-sprinklered configurations based on project requirements.

MEANS OF WARNING AND ESCAPE

The MultiMax System provides flexible design solutions for flats and common areas. Interior layouts can either feature open-plan configurations for compact living or protected entrance halls for enhanced safety. A stay-put policy can also be implemented depending on project needs.

Escape routes will vary based on building design. The system includes open-deck access to each flat, leading to a fire-protected staircore via a clean, sterilized walkway. The deck's walking surface and balustrades will be imperforate, while walls facing the deck will be fire-protected up to 1.1m to ensure a safe escape route.

A rear deck, serving as either a private or shared amenity space, is also incorporated into the design.

The system will include fire detection and alarm systems, designed to meet the specific requirements of each building.

INTERNAL FIRE SPREAD

The MultiMax System will be of fire-rated construction, tailored to the specific design of each building, incorporating fire-rated walls, floors and doors. Internal linings will be selected to meet the relevant reaction-to-fire classifications, ensuring full compliance with regulatory requirements.

EXTERNAL FIRE SPREAD

The external walls of the system will be designed to comply with regulations to prevent the spread of fire both within the building and to adjacent buildings. The external envelope will be constructed to avoid contributing to fire spread between different parts of the building or from fires in nearby buildings. The classification of the building's external surfaces will be based on the site layout and the relevant boundary conditions.

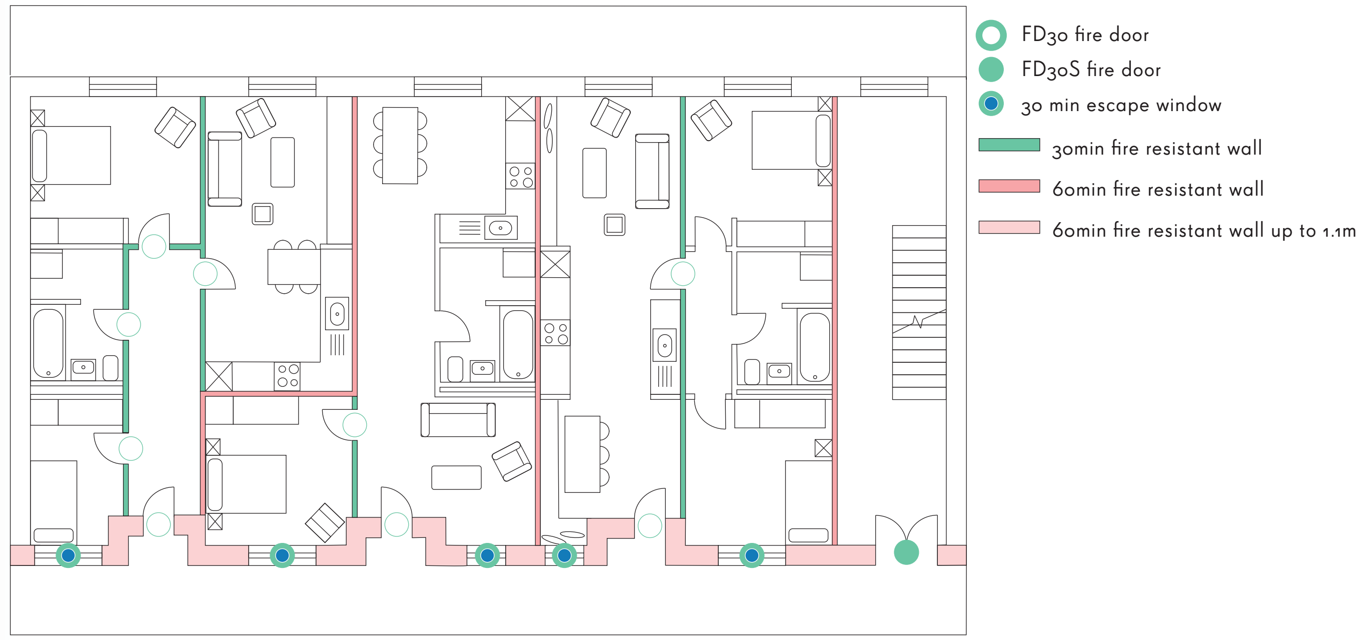


Figure: Example layout showing fire strategy and performance of walls and doors

EXTERNAL MATERIALS

External cladding materials should be assessed within the context of the overall fire strategy. In accordance with Approved Document B, Vol. 1, timber cladding is permissible except where the façade is situated within 1000mm of a relevant boundary, in which case the external wall surface must achieve a classification of at least Class B-s3, d2.

The System does not prescribe specific materials for the walkway; therefore, designers should consult Approved Document B, Vol. 1, to ensure compliance with relevant regulatory requirements.

Roof materials should be selected in accordance with Approved Document B, Vol. 1.

WALL CASSETTE MATERIALS

The MultiMax System is designed to use the BlokBuild structural insulated OSB cassette system. The cassette itself comprises a timber frame which is fully filled with 150 mm woodfibre insulation and encapsulated with 18 mm thick OSB boards 3/4 skins.

Extra layers of materials provide further protection to the frame for its structural fire performance. On the outer face (either on both or one side), a 15 mm void using timber battens and double layer of non-combustible sheathing board complete the wall types. This sheathing board should provide K2-60 encapsulation to the structural insulated OSB cassettes. All the materials used are separately tested and classified in accordance with Reaction to Fire standards.

A full wall build up using the BlokBuild structural insulated OSB cassette system and non-combustible sheathing board has been tested to demonstrate performance of REI 60mins. Details of the tested build up are shown opposite, with the technical drawings of the test wall included in the Appendix.

ELEMENT	SPECIFICATON FOR FIRE TEST
TEST TYPE	Single sided
BREATHER MEMBRANE	No breather membrane
OSB THICKNESS	18mm OSB 3 - by SmartPly
CASSETTE WIDTH	186mm
CASSETTE SIZE	600mm x 2400mm
CASSETTE JOINTS	Notched joints with P.U. glued seams to cassette skins
PANEL JOINTS	Strip joints, with horizontal cassette included
RIBS	Internal ribs to 'lintel' piece
INSULATION	150mm fullfill wood fibre insulation
OSB FIXINGS	Simpson NP80/140 nailplates with 4mm diameter pozi screws and ply pegs by Blokbuild
LOADING	See loading calculation sheet
WALL LINING BOARD	1 layer 15mm + 1 layer 18mm fermacell® fibre gypsum board (to provide K2-60 encapsulation)
SERVICE VOID	15mm sevice void on softwood timber battens

Figure: Specification of elements for fire test of wall cassettes to demonstrate REI 60 minutes performance

BLOKBUILD STRUCTURAL INSULATED OSB CASSETTE

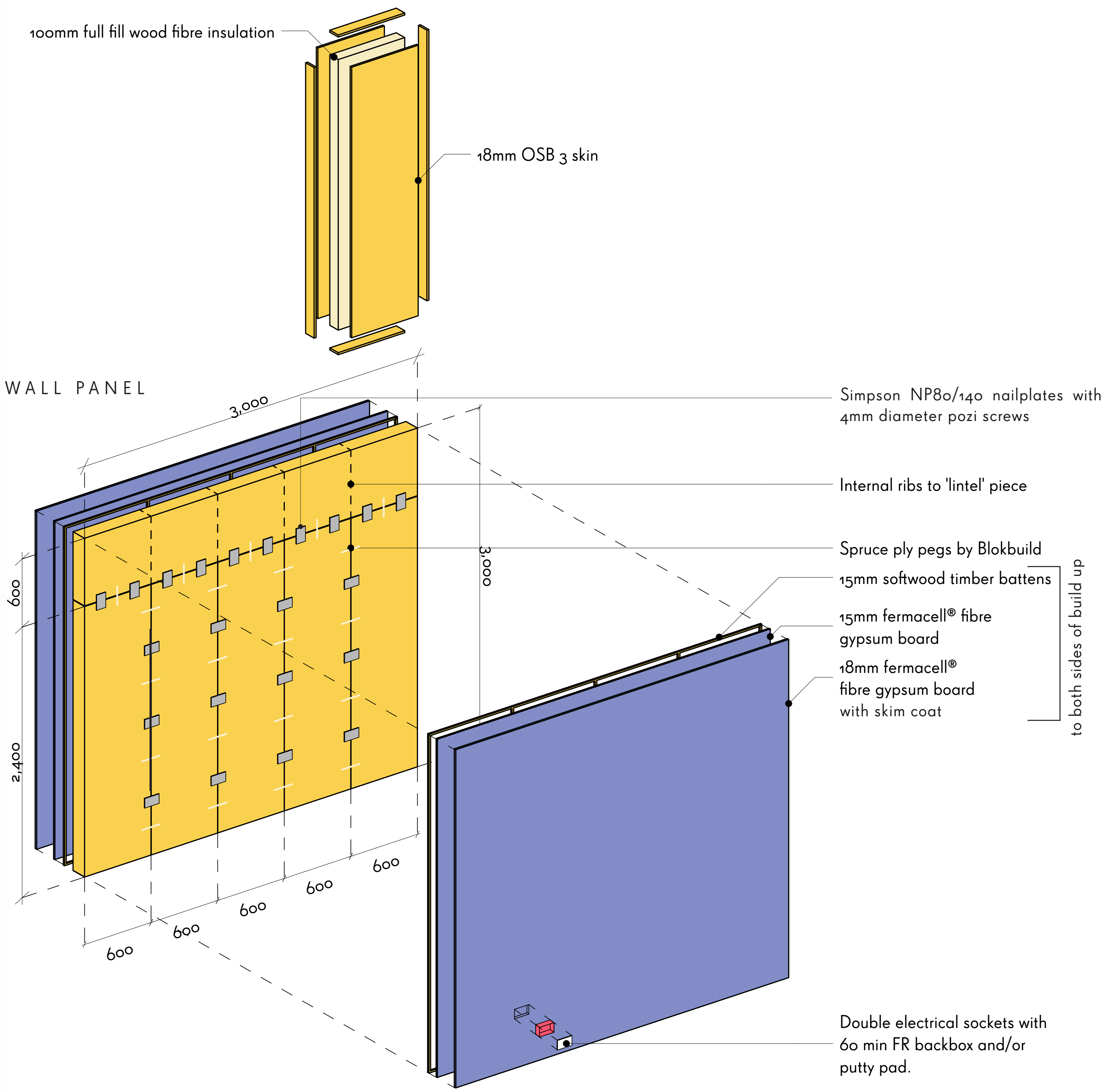


Figure: Detail showing the full wall build up that has been tested to demonstrate performance of REI 60mins

2.7 MEP CONSIDERATIONS

This chapter outlines the MultiMax System guidance for a coordinated approach to mechanical, electrical and plumbing services. A coordinated layout improves buildability, reduces clashes between trades, and streamlines installation. It also supports efficient maintenance, simplifies compliance with fire and acoustic requirements, and helps to maintain clear spatial planning. Key systems include MVHR, electric heating and domestic hot water heat pumps.

SERVICING PRINCIPLES

From the incoming services zone at ground floor a set of mechanical and electrical risers will distribute services vertically through the building.

At each floor services will branch out of the risers and run within the ceiling void out and along the access walkway to each home.

Services to each home will include cold water, LV and comms. Services to Building Management areas will include LV, fire alarm, security and cold water (if required).

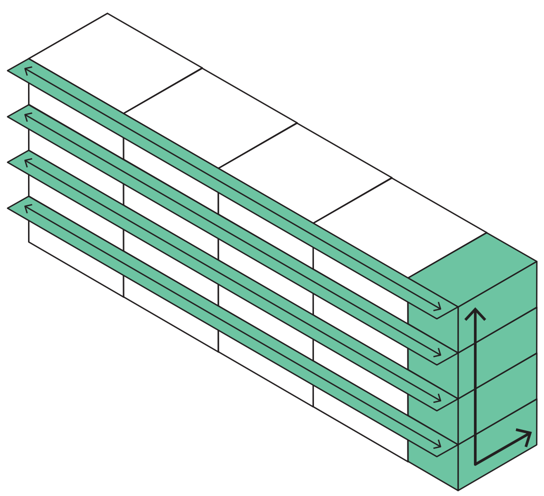


Figure: Services rise from the ground floor, branching through ceilings to each home

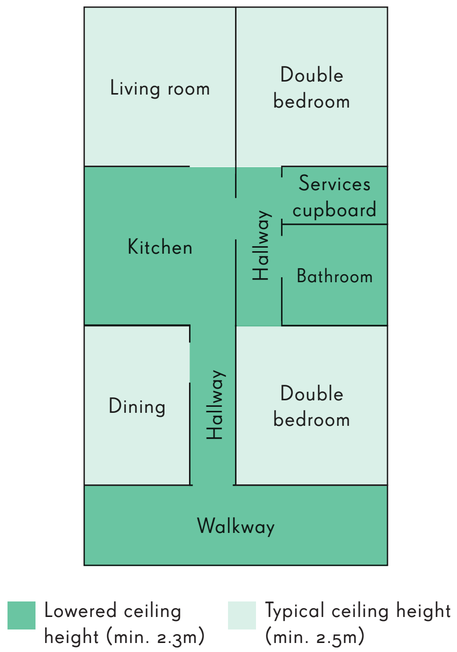


Figure: Grouped services reduce facade openings and ceiling void depth.

Penetrations through the facade should be minimised by grouping services where possible to reduce heat loss and infiltration. Within flats, kitchens, bathrooms and services cupboards should be grouped together to allow for distribution in ceiling void above.To minimise the depth of ceiling void, service crossovers and main distribution should be limited to the central zone above the kitchens, bathrooms and services cupboards.

If increased ceiling voids are required for service crossovers, lowered ceiling areas should be confined to the following:

1. Storage areas
2. Bathrooms
3. Hallways
4. Kitchens

Note: Any areas with reduced ceiling height must comply with the Technical Housing Standards – Nationally Described Space Standard and any applicable local legislation.

HEATING

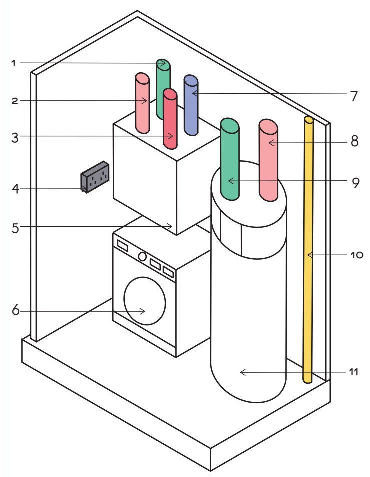
The high performing building fabric and air tightness means that the peak heat loss during winter is expected to be very low.

For small-scale buildings, with limited external plant space, direct electric panel heaters are viable with minimal impact on heating bills due to the low heat loss. These also offer additional benefits such as low-cost installation, minimal maintenance and individual room control. Local controls to each radiator will give residents full flexibility on output and scheduling. This should be reviewed with local planning requirements. For larger MultiMax schemes, a communal heating system may be viable but this depends on the context of the site and space available for centralised plant.

Internal stair cores should also be heated to keep these spaces at a minimum of 12°C during the winter months.

VENTILATION

Good ventilation is essential in homes to maintain indoor air quality, control moisture and ensure comfort. It helps remove pollutants, allergens and excess humidity, preventing issues like mould and condensation, which is particularly important in timber buildings.



1. Intake duct to external facade
2. Exhaust duct to external facade
3. Exhaust duct from kitchen, bathroom and services cupboard
4. Dado trunking with power supplies
5. MVHR with access to the front of the unit for filter replacement
6. Suitable location for washing machine if tight for space in kitchen
7. Supply duct to bedrooms and living space
8. Exhaust duct to external facade
9. Intake duct to external facade
10. Soil vent pipe from above to below picking up connections from MVHR, domestic hot water heat pump and washing machine
11. Domestic hot water storage tank

Figure: Example services cupboard arrangement

Mechanical ventilation with heat recovery (MVHR) is an energy efficient ventilation strategy which helps stabilise temperature and humidity. Each home should be fitted with an MVHR unit which will reduce the reliance on the heating system by exchanging heat between the extract air and the incoming fresh air – up to 90% of heat can be recovered. Summer bypass mode will allow for cool night ventilation to reduce overheating.

The unit will be located in the home's services cupboard and connect to the external façade via ductwork concealed in the ceiling void. Supply and extract ductwork will run within the dropped ceiling zone where possible supply air into habitable spaces and extracting from kitchens, bathrooms and any other wet rooms.

Developers or communities should provide clear guidance to help users understand and operate MVHR systems, which may otherwise be seen as costly, noisy, or confused with air conditioning.

The internal communal areas will be ventilated via operable windows throughout the year.

WATER

For buildings over two floors, centralised, boosted cold water storage will be required with metered supplies to each flat. Storage and pumps should be located at ground floor in a communal area. Domestic hot water will be produced by individual domestic hot water heat pumps. These willl be located in the flat's services cupboard. Heat rejection will be via ductwork concealed in the ceiling void and routed to the façade.

If required, a category 5 water supply will be provided for irrigation, bin store wash-down or other building management requirements. This will be supplied from the building's centralised boosted cold water supply.

DRAINAGE

Foul drainage is via a gravity system with soil vent pipes rising up to roof level. Where possible the connections through the roof will be minimised to reduce heat loss.

ELECTRICAL SUPPLY

Each flat will have its own metered electrical supply fed from a multiservice distribution board. There will be a separate supply to a Building Management distribution board for communal areas. The final strategy should be agreed and reviewed by the local utility provider.

PV SYSTEM

A photovoltaic array should be designed to maximised the available roof space. A solar PV sharing device shall be incorporated to prioritise the on-site consumption of renewable electricity over exporting to the national grid.

SERVICING PENETRATIONS

Penetrations are positioned within the front façade elements so that the spanning box-beam sections retain sufficient depth in their top and bottom chords. This allows for local strengthening around openings without compromising structural performance.

Where possible, all services should pass through a single penetration. These penetrations should be positioned above each home's front door, aligning with the internal lowered ceiling. Their placement should be consistent across the project, using a standardised detail. Each penetration must incorporate appropriate fire stopping in accordance with the project's fire strategy and Approved Document B Vol.1.

Penetrations should be coordinated with structural and MEP engineers. They should be vertically centred on 'type 2' structural insulated OSB cassettes, with a minimum clearance of 120mm from the bottom and a maximum size of 200mm.

Penetrations should be positioned centrally between two 'type 1' structural insulated OSB cassettes.

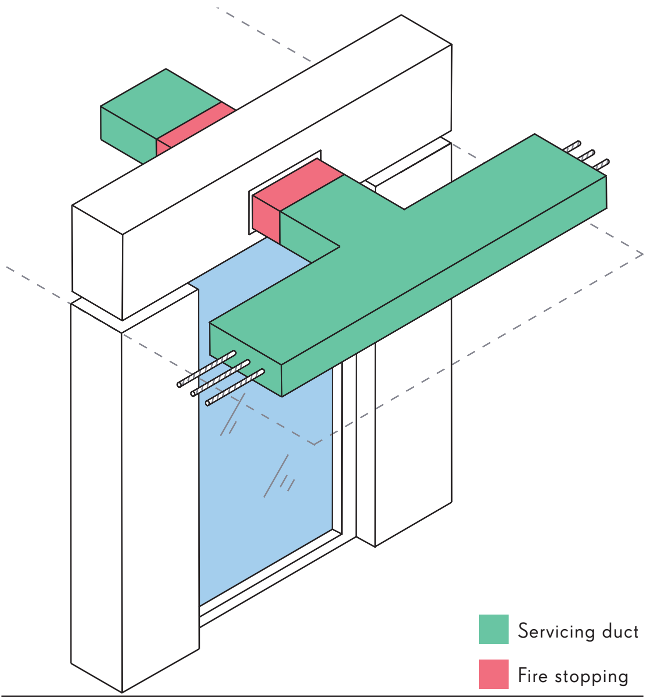
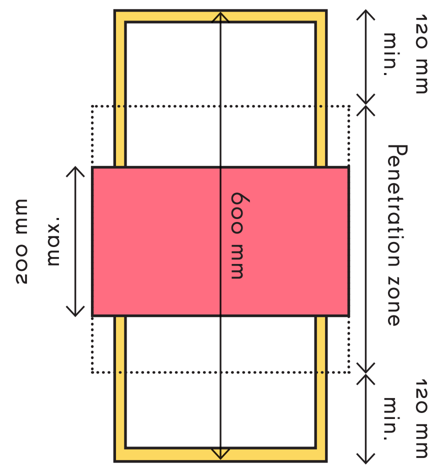


Figure: Service penetrations align above doors with fire-stopped, standardised detailing.

PENETRATION SETTING OUT
(SECTION)



PENETRATION SETTING OUT
(ELEVATION)

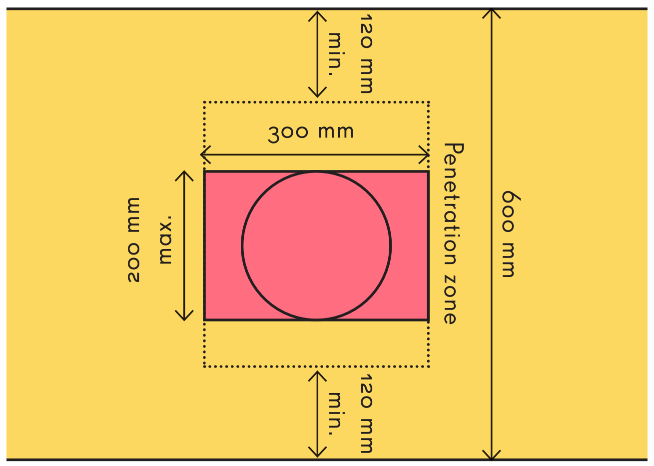
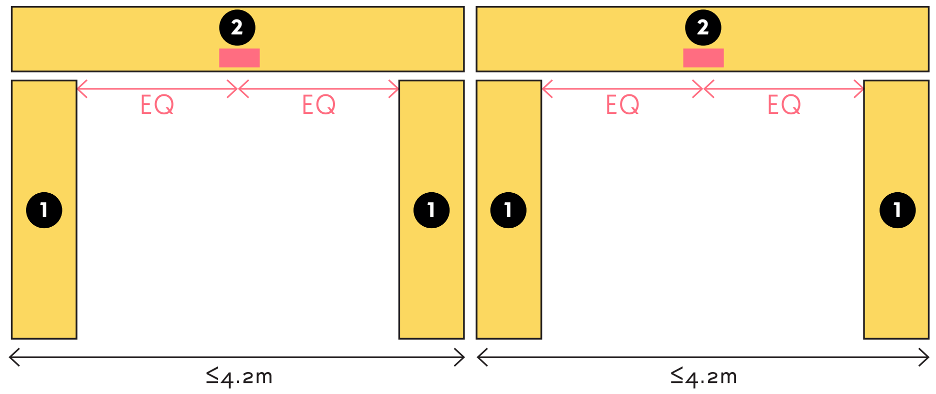


Figure: Penetrations to be centrally located on structural insulated OSB cassettes, coordinated with structural and MEP design.

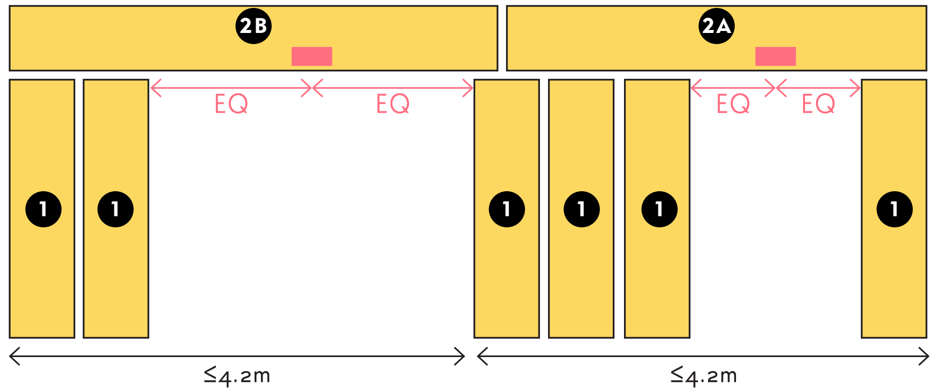
1. Penetration setting out (typical)

Penetrations are centred to the 'Type 2' structural insulated OSB cassettes.



2. Penetration setting out (variation 1)

Penetrations are centred between 2 no. 'Type 1' structural insulated OSB cassettes.



2. Penetration setting out (variation 2)

Where a penetration needs to be offset to one side of a 'Type 2' cassette, an additional 'Type 1' cassette must be provided.

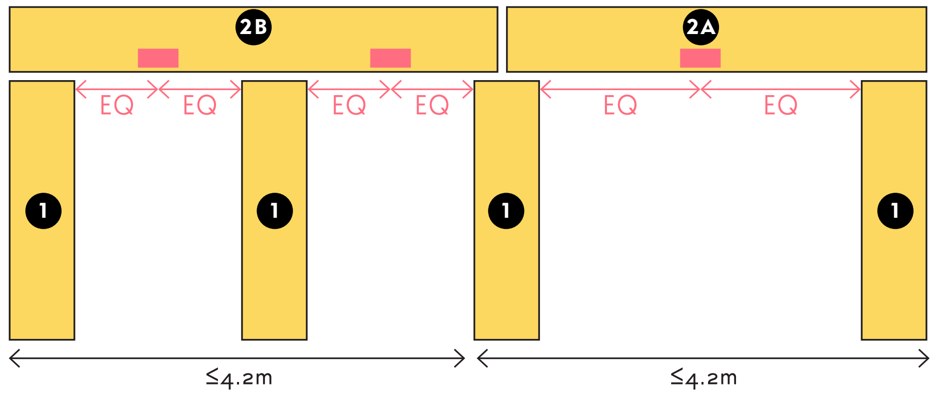


Figure: Rules of thumb for setting out penetrations to elevations

2.8 CARBON CONSIDERATIONS

A life cycle assessment (LCA) evaluates the environmental impact of a building across all stages of its life. It highlights carbon contributions from different components and helps identify opportunities for improvement. An LCA for the application of the MultiMax System to a typical site found that it outperforms industry standards for both operational and embodied carbon. This is achieved through a high-performing, airtight building fabric that reduces energy demand and an efficient, low embodied carbon structure.

OPERATIONAL CARBON

Operational carbon is the carbon dioxide emitted from the energy used to run a building over its lifetime. This includes energy used for heating, cooling, ventilation, hot water, lighting and powering appliances and systems within the building. Operational carbon is typically measured annually or over a standard building lifecycle and is influenced by factors such as building fabric, energy efficiency, occupant behaviour and the carbon intensity of the energy supply. Reducing operational carbon is key to improving a building's environmental performance and achieving net zero carbon targets.

Energy use intensity
39 kWh/m²/yr

Annual heating demand
6.2 kWh/m2/yr

Number PVs
110 m²

PVs annual generation
18,710 kWh

PVs contribution
67%

EMBODIED CARBON

Embodied or embedded carbon is the carbon dioxide emitted in producing materials and products. It is a total of the energy used to extract and transport raw materials in addition to emissions associated with the manufacturing process.

In construction embodied carbon is measured over the whole lifespan of a building, typically assumed to be 60 years. The carbon impact of the building's construction is calculated at each phase of the development chronologically from the extraction and processing of raw materials, to the manufacturing, packaging and marketing processes, to the use, re-use and maintenance of the product, and on to its eventual recycling or disposal as waste. The carbon emissions associated with each stage are reported as kgCO2e/m².

Substructure
33.4 kgCO2e/m²

Structure
73.4 kgCO2e/m²

Envelope
11 kgCO2e/m²

Internal fit out
203.3 kgCO2e/m²

MEP
250 kgCO2e/m²

Carbon sequestered
-106 kgCO2e/m²

A1-A5
268
kgC02e/m²

UPFRONT EMBODIED CARBON

LETI A rating ie has embodied carbon A1-A5 of <350 kgCO2e/m².

A-C
491
kgC02e/m²

WHOLE LIFE EMBODIED CARBON

LETI A rating, ie has embodied carbon A-C excluding sequestered of <750kgCO2e/m².

This is less than the 2030 RIBA A-C target for completed buildings of <750kgCO2e/m².

-106
kgC02e/m²

BIOGENIC SEQUESTERED CARBON

There is 76 TCO2e biogenic carbon sequestered within the fabric of a typical MultiMax System building, or 106 kgCO2e/m².

This is equivalent to 39% of the upfront embodied carbon.

DEMAND
39
kWh/m²/y

OPERATIONAL ENERGY

The annual operational energy demand for a typical MultiMax System building is 39 kWh/m²/y. This meets the Net Zero Carbon Building Standard of 40kWh/m²/year.

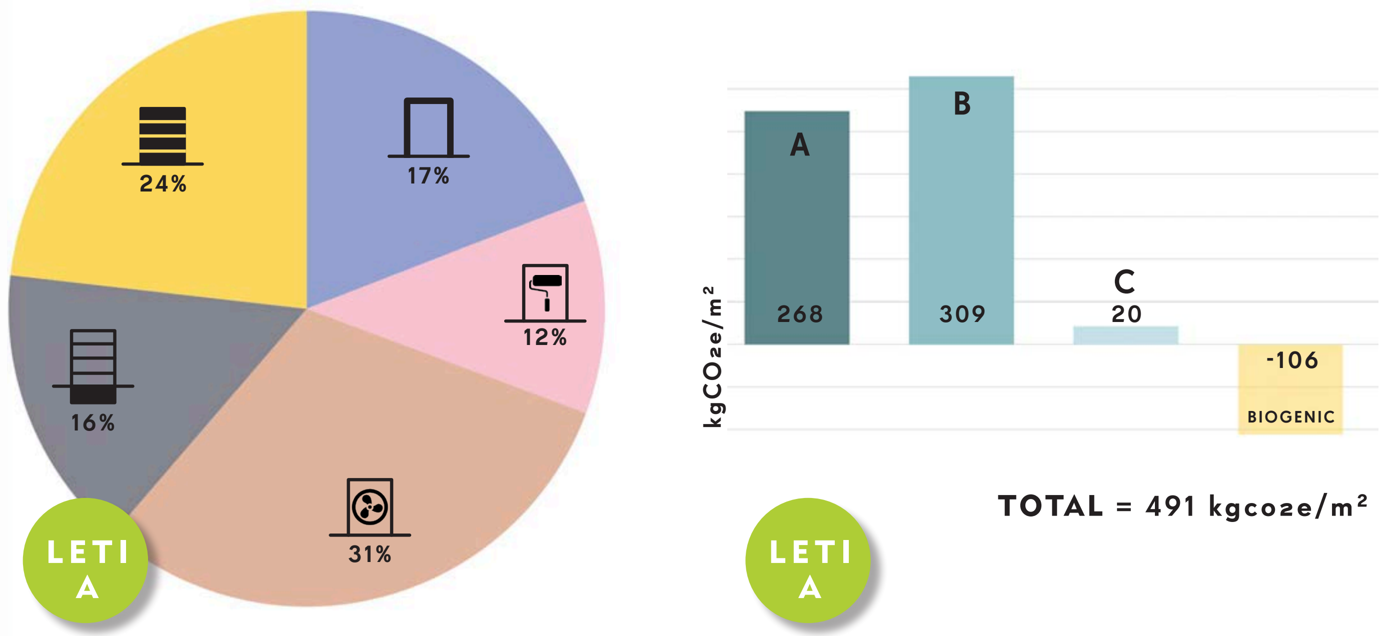


Figure: Breakdown of upfront carbon A1-A5 per building elements & Breakdown of whole life carbon A-C

2.9 MOISTURE MANAGEMENT

Effective moisture management is essential for the durability and performance of buildings. The MultiMax System highlights the importance of considering moisture risks at every stage - design, construction, and occupancy. By implementing robust design strategies, careful construction practices, and continuous monitoring, the risk of moisture damage can be minimised, ensuring a long lasting and resilient building.

Timber structures can become wet through four main mechanisms:

1. Infiltration: Water enters due to gravity, often from the roof, foundation, façade cladding, plumbing leaks, or sprinkler activation.
2. Capillary action: Water moves within the wood, particularly where it contacts the ground or is exposed to precipitation.
3. Condensation: Moist indoor air condenses on cold surfaces due to thermal bridging or poor airtightness.
4. Moisture Trapping: Water becomes trapped due to inadequate site moisture management or poor workmanship, such as installing impervious membranes over wet timber.

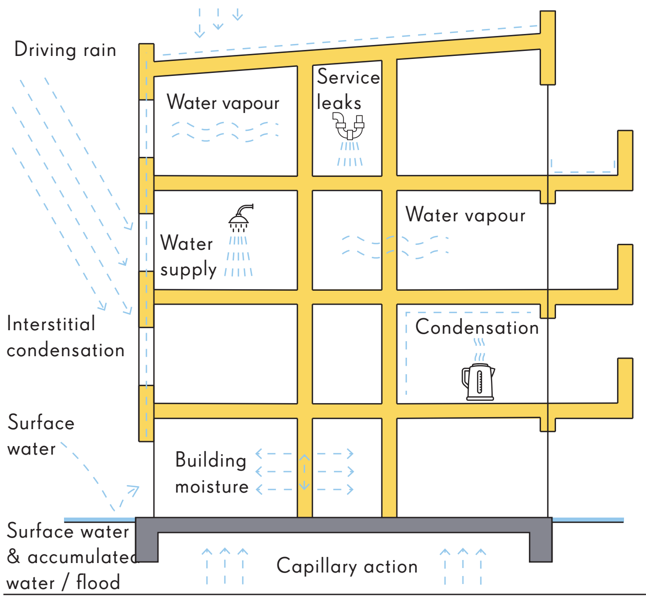


Figure: Sources of moisture while a building is in use

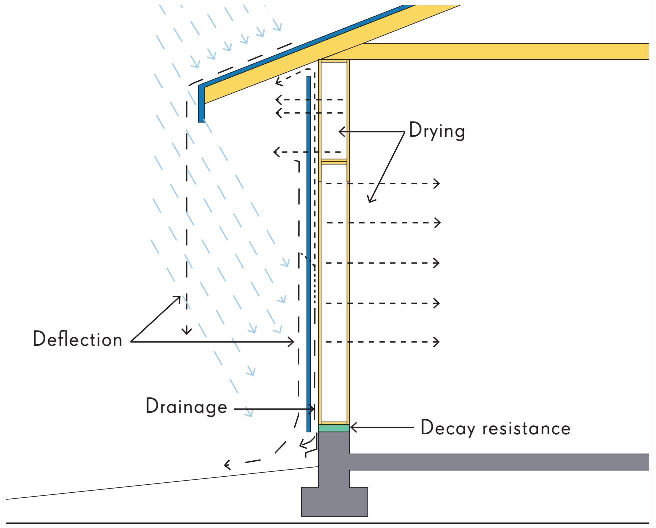


Figure: Moisture control in timber relies on the four D's

Effective moisture control in timber structures relies on Deflection, Drainage, Drying, and Decay Resistance. These principles should be integrated throughout a building's design, construction, and operation.

1. Deflection prevents water from reaching the structure. Key strategies include roof overhangs to direct rain away from walls, siding profiles and flashing to promote runoff, and pressure-equalised cavities to reduce water ingress forces.
2. Drainage ensures any water that penetrates the outer cladding is quickly removed. This can be achieved using drained cavity systems to allow moisture escape, drainage at ground level to prevent accumulation, and installing timber elements to falls to aid runoff.
3. Drying allows trapped moisture to evaporate. Walls should be designed to dry outward to ensure effective ventilation.
4. Decay Resistance ensures durability where moisture control cannot be fully maintained. Selecting appropriate materials reduces the risk of deterioration.

This chapter outlines best practices for moisture-resistant timber buildings at each stage. However, designers should consult industry guidance for comprehensive moisture management strategies.

MOISTURE MANAGEMENT THROUGH DESIGN

In all buildings, there are areas that may be more susceptible to moisture damage, in particular:

- Interfaces between ground floor slabs and walls/ columns bases where infiltration, capillarity rise or interstitial condensation could cause damage.
- Façades, where junctions around openings and penetrations may lead to water ingress.
- Wet areas (eg kitchens, bathrooms and areas around water pipes and wet service routes) where there is a risk of leakage and/or malfunction of equipment.
- Roofs, terraces and balconies which should be designed to prevent water sitting on the wood either during construction or in the event of a membrane failure.

In all these areas, careful attention must be given to the design of the timber structure to ensure it is well-detailed and allows for easy access, repair, and partial disassembly if moisture-related issues occur. While these problems can arise at any stage of a building's life, they can be anticipated and addressed effectively during the design and construction phases at various scales.

General qualitative guidance for these areas is provided below, but each project should have a moisture management plan that translates this guidance into specific, quantifiable measures. For example:

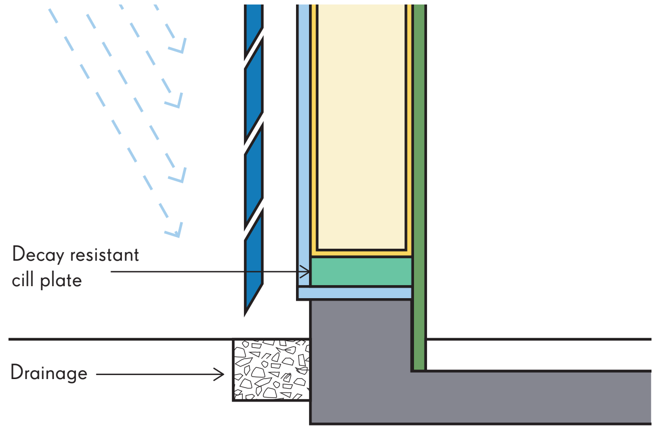
General design principle: Any timber load-bearing walls or columns in contact with the ground floor slab must be raised above the internal finished floor level on a brick, block, or concrete upstand.

Project-specific requirement: Timber load-bearing walls (EW-01 and IW-01, 02) are raised a minimum of 150mm above ground level on a concrete upstand.

This tailored approach ensures moisture risks are effectively mitigated based on the unique conditions of each project.

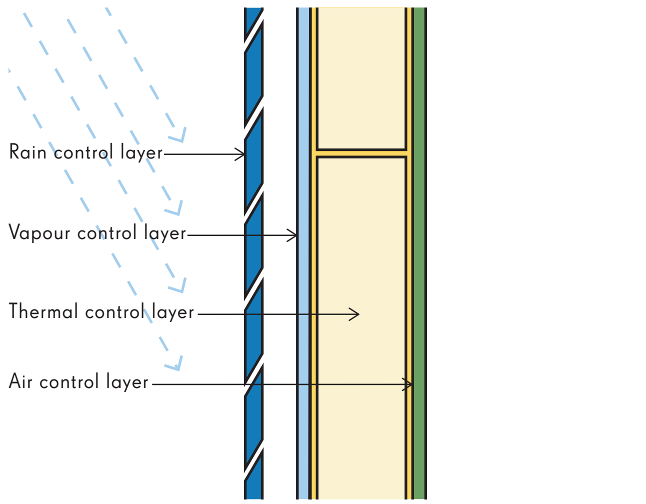
GROUND FLOORS

Where any timber, load-bearing walls or columns are in contact with the ground floor slab, the bottom of the timber must be above the internal finished floor level on a brick, block or concrete upstand. A DPC and a treated cill plate must also be installed to prevent moisture from wicking into the timber.



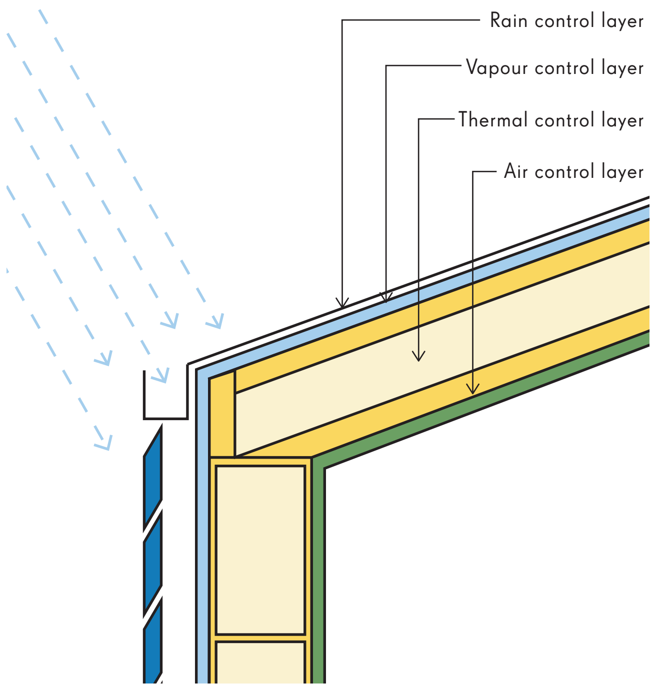
FACADES

Prevent moisture from reaching the structural insulated OSB cassette structure through overhangs, membranes and pressure-equalised cavities. If horizontal cladding is proposed, split battens should be profiled to prevent water accumulation. If water bypasses these defences a drained, ventilated cavity should be provided to ensure it is quickly removed and able to dry. Openings and penetrations must be carefully detailed, ensuring membranes are properly lapped and taped to prevent weak points for water ingress.



ROOFS AND TERRACES

The MultiMax System supports both flat and pitched roofs, constructed using lightweight roof systems. To prevent water accumulation during construction or in the event of membrane failure, the structure should be sloped, as steeper slopes reduce the risk of standing water. Flat roofs must have a minimum fall of 1:40 to ensure proper drainage, with provisions for early moisture detection and impact assessment.



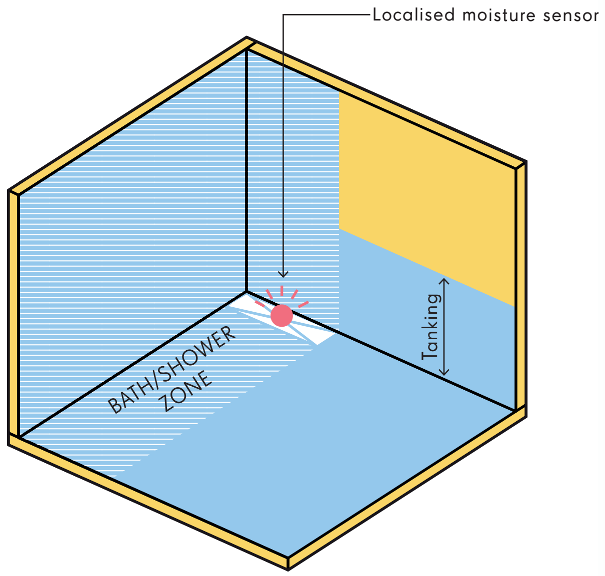
WALKWAYS AND BALCONIES

The System accommodates timber walkways and balconies, but their suitability should be assessed within the broader project context, with alternative materials considered where necessary. If a timber walkway is proposed, the appropriate service class for structural components must be identified to inform material specification, ensuring selected materials meet durability requirements. Walkways should be designed with a minimum fall of 1:40 to direct water away from the building and prevent standing water. Designers should also integrate moisture detection measures and allow for movement between elements to prevent tearing of waterproof membrane connections.

WET AREAS

The design team should identify all areas in the building with active plumbing fixtures or appliances. Typically, these include bathrooms and kitchens. Protection and risk reduction strategies must be used in all identified wet areas. These could include:

- Tanking membrane
- System leak detection monitor
- Local leak detection system
- Ventilation Zones
- Preservative treatments
- This risk that can be mitigated using moisture sensors above protective membranes



MOISTURE MANAGEMENT IN CONSTRUCTION

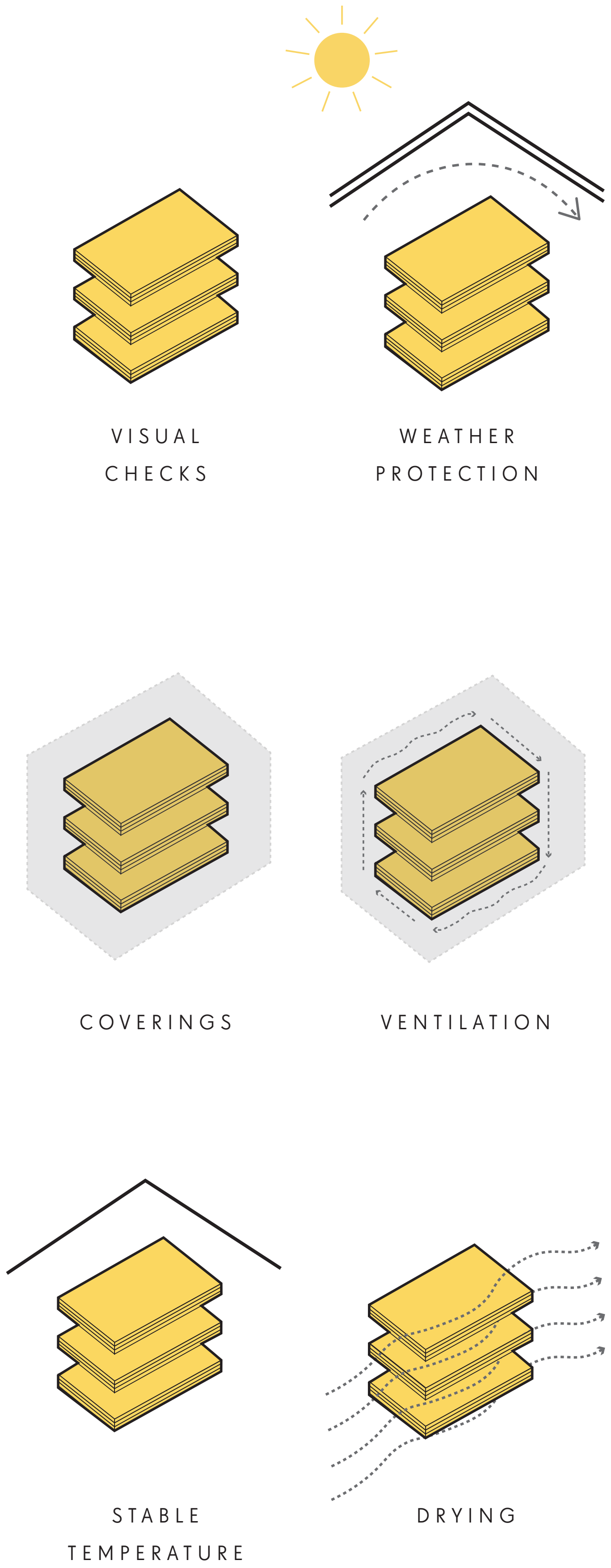
Project teams should carry out Risk Assessment and Method Statement (RAMS) as part of an on-site moisture management control plan (MMCP). The RAMS must outline the design, methods, and requirements for protecting the system from weather exposure and mechanical damage during storage, transportation and installation. The MMCP should be provided by the contractor before construction for use during fabrication, delivery to site, erection and delivery phases. MMCPs must be project specific, and form part of the construction management plan submitted as part of any tender return. MMCPs must be developed in conjunction with the timber supplier and project engineer and reviewed by all relevant subcontractors. The MMCP must include practices such as:

- how to protect timber elements stored on site
- drainage during construction
- end grain and joint taping protection
- how to dry timber elements
- how to remove surface water
- moisture content testing strategy prior to encapsulation

If timber is found to have been exposed to moisture the affected area should be assessed to determine the extent of any damage and a suitable remediation strategy defined. The assessment should consider factors that affect the level of damage to the timber, such as:

- total area of timber exposed to moisture
- how long the timber has been exposed to moisture
- presence of mould or decay to the timber
- ability to dry the affected area, including factors such as site access, exposure, reliance on secondary contractors etc.

In many cases, allowing the timber to dry to a moisture content of <20% will be sufficient and the timber will not need to be replaced. However, if the assessment recommends repair or replacement, this work should be carried out by a contractor familiar with the material.



MOISTURE MANAGEMENT IN USE

An often-overlooked part of moisture management is while the building is in use. Plumbing and appliance leaks can be hard to detect, but risks can be reduced with good design. Key strategies include placing services in accessible locations, waterproofing wet areas to protect timber, and installing leak detection and moisture monitoring systems.

A comprehensive maintenance plan is essential for ensuring the long-term durability of a building. In timber structures, the Operation and Maintenance Manual should provide detailed guidance on moisture risks, a post-occupancy inspection checklist, clear repair instructions, and key areas to monitor. It should also include practical advice on managing condensation within homes, ensuring residents understand how to operate ventilation systems effectively and reduce condensation buildup from daily activities such as drying clothes and cooking.

Building managers should carry out regular inspections, checking roofs, drains, cladding, balconies, windows, and sealants. If needed, moisture monitors and leak detection systems can improve monitoring by sending leak alerts to the building management system.

Additionally, residents should be aware of the risks of moisture damage and report any leaks or signs of dampness to building management. The Residents' Manual should outline common areas prone to moisture issues and include contact details for reporting problems. This manual should be provided to all residents.

REMEDIATION AND REPAIR

When trapped water is suspected, a moisture content survey should be conducted by a qualified professional to identify affected areas and assess the extent of damage. Readings should focus on high-risk areas. The survey should be supported by BIM data, calculations, construction documentation, O&M manuals, and H&S files, all compiled into a digital manual.

Once high moisture levels are detected, surface finishes must be removed locally to expose the structural insulated OSB cassettes. This includes internal and external finishes, cladding, membranes, insulation, floor finishes and acoustic build-ups. The affected area should then be allowed to dry.

Drying strategies depend on the level of exposure:

- Passive drying: Exposing affected timber to air is a cost-effective but slow method that does not require specialised equipment.
- Active drying: Heated, desiccated air is blown onto surfaces for faster drying, but must be carefully controlled to avoid issues like cupping or gaps forming due to rapid shrinkage.
- Drying may take several months, as outlined in BMTRADA drying tables. After drying, shear tests should be performed on small samples to ensure structural integrity. If cracks have formed due to swelling or shrinkage, repairs may be necessary.

Long-term moisture exposure can lead to fungal decay and require more extensive remediation and replacement of structural insulated OSB cassettes. Should this have happened, a structural engineer must assess the impact on structural performance, connection design requirements, and the need for temporary works or propping. The repair strategy must also address structural, fire, and acoustic performance.

If replacements are required, the MultiMax System has been designed so that structural insulated OSB cassettes can be locally replaced. Structurally, the System resembles platform-frame timber construction, where walls and spanning floor structures primarily transfer load through bearing, designed to Eurocode 5 serviceability classes. Repairs follow similar principles to traditional timber-based systems, where damaged cassettes or elements can be locally removed and replaced after structural inspection.

FURTHER GUIDANCE

The following is a non-exhaustive list of standards, technical documents, and industry guidance on moisture management and durability in timber construction. These resources provide best practices, regulatory frameworks, and research-based insights to help mitigate moisture-related risks but should be supplemented with project-specific assessments and expert consultation.

STANDARDS AND REGULATIONS

1. BS 5250:2021. Management of Moisture in Buildings – Best practices for moisture control in buildings.
2. BSI. Moisture in Buildings: An Integrated Approach to Risk Assessment and Guidance – Comprehensive guidance on moisture risk assessment.
3. ISO 20887:2020(E). Sustainability in Buildings and Civil Engineering Works – Focuses on design for disassembly and adaptability.
4. NHBC Standards 2025 – Guidance on the design and construction of new homes, including moisture management considerations.
5. Premier Guarantee (2025). Technical Manual – Industry standards for moisture control and durability in construction.
6. SIPA (Structural Insulated Panel Association). Technical Bulletin No. 09 – Durability of SIPs Exposed to Moisture – Guidance on moisture management for Structural Insulated Panels (SIPs).
7. STA (Structural Timber Association) (2022). Moisture Management Strategy (V.1) – Industry guidance on managing moisture in timber construction.
8. STA (Structural Timber Association). Technical Note 23 – Durability by Design – Guidance on ensuring the long-term durability of timber structures.
9. STA (Structural Timber Association). Technical Note 24 – Moisture Protection During Construction – Best practices for moisture control during the construction phase.
10. TDUK (Timber Development UK). Moisture Management During Construction – Strategies for minimising moisture risks in timber buildings.
11. TDUK (Timber Development UK). The Commercial Timber Guidebook – Guidance on timber applications in commercial construction.
12. TDUK (Timber Development UK). Timber Cladding – Best practices for moisture-resistant timber cladding.

ACADEMIC AND TECHNICAL PUBLICATIONS

1. Hazleden, D.G. Designing for Durable Wood Construction: The 4 Ds – Framework for ensuring durability in wood construction.
2. Straube, J. (2002). Moisture in Buildings, ASHRAE Journal, no. 44 – Analysis of moisture behaviour in buildings and its impact.
3. Winter, S., Gamper, A., Dietsch, P., & Merk, M. (2014). Building Climate – Long-term Measurements to Determine the Effect on the Moisture Gradient in Timber Structures, Forschunginitiative Zukunft Bau Report – Research on long-term moisture effects in timber structures.

2.10 PROCUREMENT PROCESS

For more info on implementing the MultiMax system in a community context visit the procurement page in the MultiMax Playbook - [click here]

The MultiMax system is intended to signpost solutions in order reduce barriers to low carbon construction by non-specialist clients and contractors to streamline the process - it isn't a replacement for a competent design team. What follows is modified RIBA Plan of Works that details the key ways the system can be applied

0 STRATEGIC DEFINITION

Identifying and acquiring land

High level feasibility study to enable the production of a business case for acquiring land through processes such as land disposal

1 PREPARATION AND BRIEFING

Appoint design team

A suitably qualified design team that is interested in designing using the MultiMax system

2 CONCEPT DESIGN

Assess suitability of MultiMax for the site

For further details, refer to page 20-21

3 SPATIAL COORDINATION

Develop design based on MultiMax principles

Appointing a specialist structural contractor who meets the structural and fire requirements of the MultiMax system

BLOKBUILD

During 2021 WeCanMake undertook a research project to test various structural cassette systems. Though this process WeCanMake found that BlokBuild were the best suited to distributed manufacturing in a community context. The MultiMax project was developed using the BlokBuild OSB cassette system. The BlokBuild system has undergone loaded fire testing to prove its compliance for 60 minutes in the MultiMax context. Blokbuild's team includes architects, manufacturing experts and structural engineers - Price and Myers that can help ensure the design is not only efficient to manufacture but also install and maintain. As such BlokBuild provides a complete package for approval.

4 TECHNICAL DESIGN

Integrate MultiMax details into the technical design

MultiMax details can be used as a base for developing project specific details that respond to the site context

5 MANUFACTURING & CONSTRUCTION

Work with contractor to manufacture cassettes

Following the key considerations for each detail. Cassettes can be manufactured locally using a cascading license for distributed manufacture

6 HANDOVER

Ensure long term maintenance is managed

Commence monitoring the building to see if UK Net Zero Carbon Building Standard has been achieved

7 USE

Use

The MultiMax system provides a strong basis for a project specific Building Manual and Health and Safety file

BLOKBUILD PROCESS

BlokBuild cassettes are manufactured with pinpoint accuracy using CNC technology in a controlled factory environment. With minimal equipment needs - a CNC machine, OSB supply and assembly space - and a focus on standardised processes and industry accreditations, the BlokBuild process is replicable, transferable, and scalable. By prioritising easy adoption and accessibility, their system is ideal for distributed manufacture with a diverse range of partners.

To find out more, contact info@blokbuild.com

3. SYSTEM DETAILS

A set of twelve key details is provided to support the design and delivery of buildings using the MultiMax System. These cover essential interfaces such as floors, walls, roofs, terraces, and service penetrations. Each detail is specific to the system and includes an accompanying checklist highlighting critical design considerations:

1. Ground Floor Junction
2. Ground/First Floor Junction
3. Walkway Junction
4. Loadbearing Party Wall
5. Loadbearing Internal Partition
6. Non Loadbearing Party Wall
7. Non loadbearing Internal Partition
8. Parapet
9. Pitched roof
10. Service Penetrations
11. Terrace
12. Internal wall junction

These standard details are intended to guide and inform design development, helping ensure consistency and buildability. However, they do not replace statutory requirements or established industry standards.

It remains the responsibility of architects, structural and fire engineers, and other design team members to develop a fully detailed, project-specific design. This must include all required drawings, specifications, and a fire strategy in accordance with relevant regulations and best practice.

The MultiMax System details should be used as a supplement to—not a substitute for—comprehensive design and compliance.

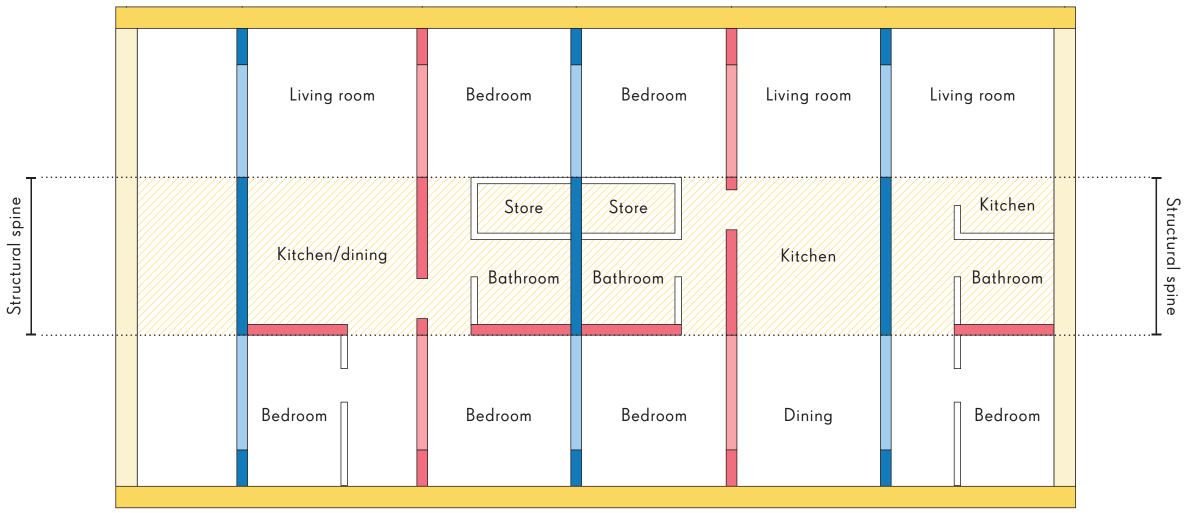
3.1 WALL TYPES

The following wall types form part of the MultiMax System and define the standard fabric build-ups for key internal and external wall conditions.

For wall types not defined as part of the MultiMax System, designers should follow standard guidelines to ensure appropriate performance. The performance of studwork components must also be specified to suit their intended location.

The details in this guide are based on the BlokBuild system, whose structural insulated OSB cassettes meet fire and structural performance criteria. For procurement details using BlokBuild, see p.50. Designers using alternative systems must ensure they meet the same performance standards.

- **External Walls** - Comprise OSB timber cassettes with a lightweight cladding system. Suitable for all external locations. A variant is used adjacent to walkways, where the wall must achieve REI 60 fire performance up to 1.1 metres above finished floor level.
- **Loadbearing Party Walls** - Located at the boundary between two homes, these walls comprise OSB timber cassettes, fully encapsulated to achieve K2 60 classification in accordance with BS EN 13501-2, with surface temperatures not exceeding 200°C under fire exposure.
- **Non-Loadbearing Party Wall** - Also located at party wall boundaries, this construction comprises a removable timber stud partition beneath a loadbearing lintel formed from structural OSB cassettes. The lintel is encapsulated to achieve K2 60 classification in line with BS EN 13501-2, maintaining surface temperatures below 200°C. While the stud partition is designed to be demountable to support future adaptability, it initially functions as a party wall and must therefore meet the required fire and acoustic performance standards.
- **Loadbearing Internal Partition** - Used within fire compartments, these walls comprise OSB timber cassettes, encapsulated to meet K2 60 classification under BS EN 13501-2, with surface temperatures not exceeding 200°C.
- **Non-Loadbearing Internal Partition** - Also used within fire compartments, these walls consist of a timber stud partition located beneath a loadbearing structural OSB cassette lintel. The lintel is encapsulated to achieve K2 60 classification under BS EN 13501-2, with surface temperatures limited to 200°C. Like the party wall counterpart, this partition is designed to be removable to accommodate changing resident needs.



WALL TYPE: EXTERNAL WALL (GENERAL)

Location: External / Apartment

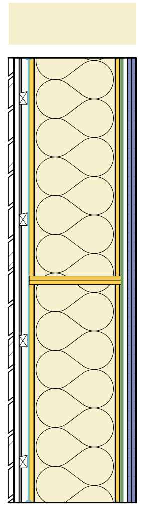
Fire performance: To meet project requirements, AD Part B OR BS 9991 as minimum

Thermal location: External / Internal (heated)
Thermal performance: 0.13-0.15 W/m2K
Airtightness: To meet project requirements, AD Part L as minimum

Minimum sound reduction: To meet project requirements, 5dB improvement on AD Part E as minimum

Notes: Fire performance varies depending on site boundaries and should be considered on a project by project basis

Varies Lightweight cladding material
Varies Cross battened timber cladding support system
25 mm Cross battened timber cladding support system
5 mm Breather membrane
Varies OSB
Varies Full fill wood fibre insulation
Varies OSB
(BlokBuild structural insulated OSB cassette (or equivalent))
2 mm Vapour barrier
25 mm Timber battens with servicing
15 mm Gypsum-fibreboard, providing 60 mins K2 class in accordance with BS EN 13501-2
15 mm Gypsum-fibreboard, providing 60 mins K2 class in accordance with BS EN 13501-2
2 mm Skim and paint



WALL TYPE: EXTERNAL WALL (WALKWAYS)

Location: External / Apartment

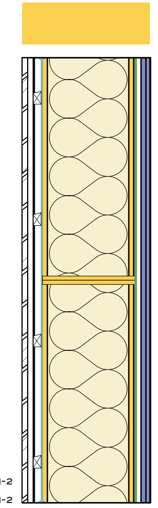
Fire performance: 60 Minutes REI to 1.2m AFFL

Thermal location: External / Internal (heated)
Thermal performance: 0.13-0.15 W/m2K
Airtightness: To meet project requirements, AD Part L as minimum

Minimum sound reduction: To meet project requirements, 5dB improvement on AD Part E as minimum

Notes: Fire performance required when adjacent to walkways used as primary means of escape only

20 mm Lightweight cladding material
25 mm Cross battened timber cladding support system
25 mm Cross battened timber cladding support system
5 mm Breather membrane
Varies OSB
Varies Full fill wood fibre insulation
Varies OSB
(BlokBuild structural insulated OSB cassette (or equivalent))
2 mm Vapour barrier
25 mm Timber battens with servicing
18 mm Gypsum-fibreboard, providing 60 mins K2 class in accordance with BS EN 13501-2
15 mm Gypsum-fibreboard, providing 60 mins K2 class in accordance with BS EN 13501-2
2 mm Skim and paint



WALL TYPE: LOAD-BEARING PARTY WALL

Location: Apartment / Apartment (Internal)

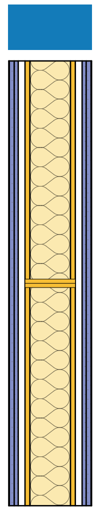
Fire performance: 60 minutes REI. The BlokBuild system has been tested to meet this requirement.

Thermal location: Internal (heated) / Internal (heated)
Thermal performance: N/A
Airtightness: N/A

Minimum sound reduction: To meet project requirements, 5dB improvement on AD Part E as minimum

Notes: For use at party walls in the structural 'spine' of the building

2 mm Skim and paint
18 mm Gypsum-fibreboard, providing 60 mins K2 class in accordance with BS EN 13501-2
15 mm Gypsum-fibreboard, providing 60 mins K2 class in accordance with BS EN 13501-2
25 mm Timber battens with servicing
Varies OSB
Varies Full fill insulation to cavity
Varies OSB
(BlokBuild structural insulated OSB cassette (or equivalent))
25 mm Timber battens with servicing
15 mm Gypsum-fibreboard, providing 60 mins K2 class in accordance with BS EN 13501-2
18 mm Gypsum-fibreboard, providing 60 mins K2 class in accordance with BS EN 13501-2
2 mm Skim and paint



WALL TYPE: LOAD-BEARING INTERNAL PARTITION

Location: Apartment / Apartment (Internal)

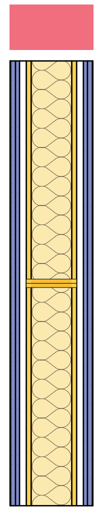
Fire performance: 60 Minutes (Resistance only)

Thermal location: Internal (heated) / Internal (heated)
Thermal performance: N/A
Airtightness: N/A

Minimum sound reduction: To meet project requirements, 5dB improvement on AD Part E as minimum

Notes: For use at internal partitions in the structural 'spine' of the building

2 mm Skim and paint
18 mm Gypsum-fibreboard, providing 60 mins K2 class in accordance with BS EN 13501-2
15 mm Gypsum-fibreboard, providing 60 mins K2 class in accordance with BS EN 13501-2
25 mm Timber battens with servicing
Varies OSB
Varies Full fill insulation to cavity
Varies OSB
(BlokBuild structural insulated OSB cassette (or equivalent))
25 mm Timber battens with servicing
15 mm Gypsum-fibreboard, providing 60 mins K2 class in accordance with BS EN 13501-2
18 mm Gypsum-fibreboard, providing 60 mins K2 class in accordance with BS EN 13501-2
2 mm Skim and paint



WALL TYPE: NON LOAD-BEARING PARTY WALL

Location: Apartment / Apartment (Internal)

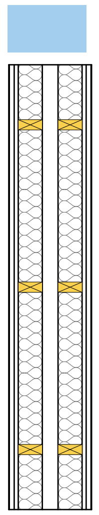
Fire performance: 60 Minutes (EI only)

Thermal location: Internal (heated) / Internal (heated)
Thermal performance: N/A
Airtightness: N/A

Minimum sound reduction: To meet project requirements, 5dB improvement on AD Part E as minimum

Notes: For use at party walls where future adaptability allows for wall removal. Based on Fermacell non-load-bearing timber stud wall (Type 1H24)

2 mm Skim and paint
18 mm Gypsum Wall Board
15 mm Gypsum Wall Board
89 mm Timber stud partition system with acoustic insulation
58 mm Void
89 mm Timber stud partition system with acoustic insulation
15 mm Gypsum Wall Board
18 mm Gypsum Wall Board
2 mm Skim and paint



WALL TYPE: NON LOAD-BEARING INTERNAL PARTITION

Location: Apartment / Apartment (Internal)

Fire performance: To meet project requirements, AD Part B OR BS 9991 as minimum

Thermal location: Internal (heated) / Internal (heated)
Thermal performance: N/A
Airtightness: N/A

Minimum sound reduction: To meet project requirements, 5dB improvement on AD Part E as minimum

Notes: For use at internal partitions where future adaptability allows for wall removal. Based on Fermacell non-load-bearing timber stud wall (Type 1H13)

2 mm Skim and paint
13 mm Gypsum Wall Board
89 mm Timber stud partition system
13 mm Gypsum Wall Board
2 mm Skim and paint

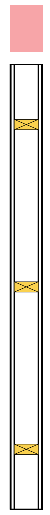
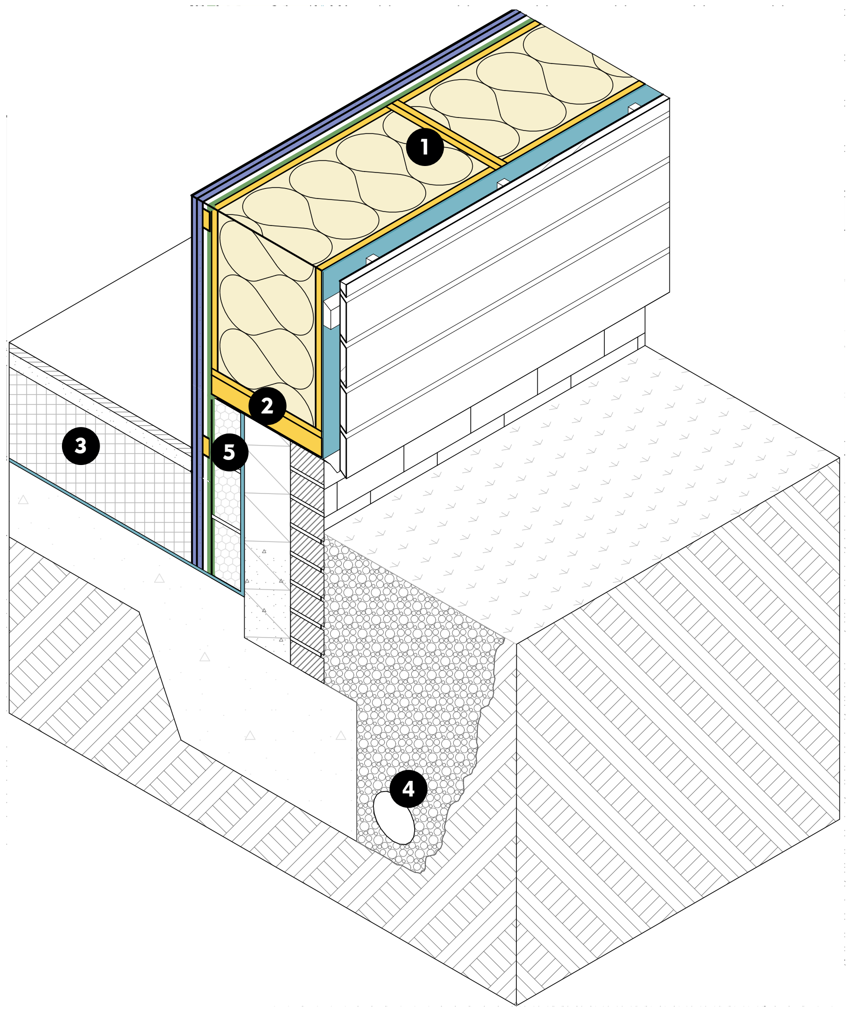


Figure: Fabric build ups for key wall types defined by the MultiMax System

3.2 GROUND FLOOR JUNCTION

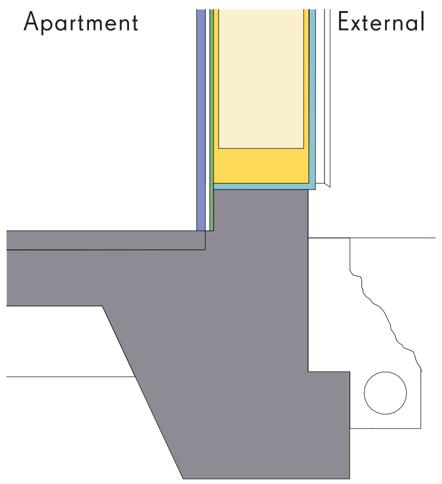


DETAIL COMPONENTS:

1. BlokBuild structural insulated OSB cassette (or equivalent)
2. Treated timber sole plate
3. Ground floor slab
4. Drainage
5. Concrete/masonry upstand

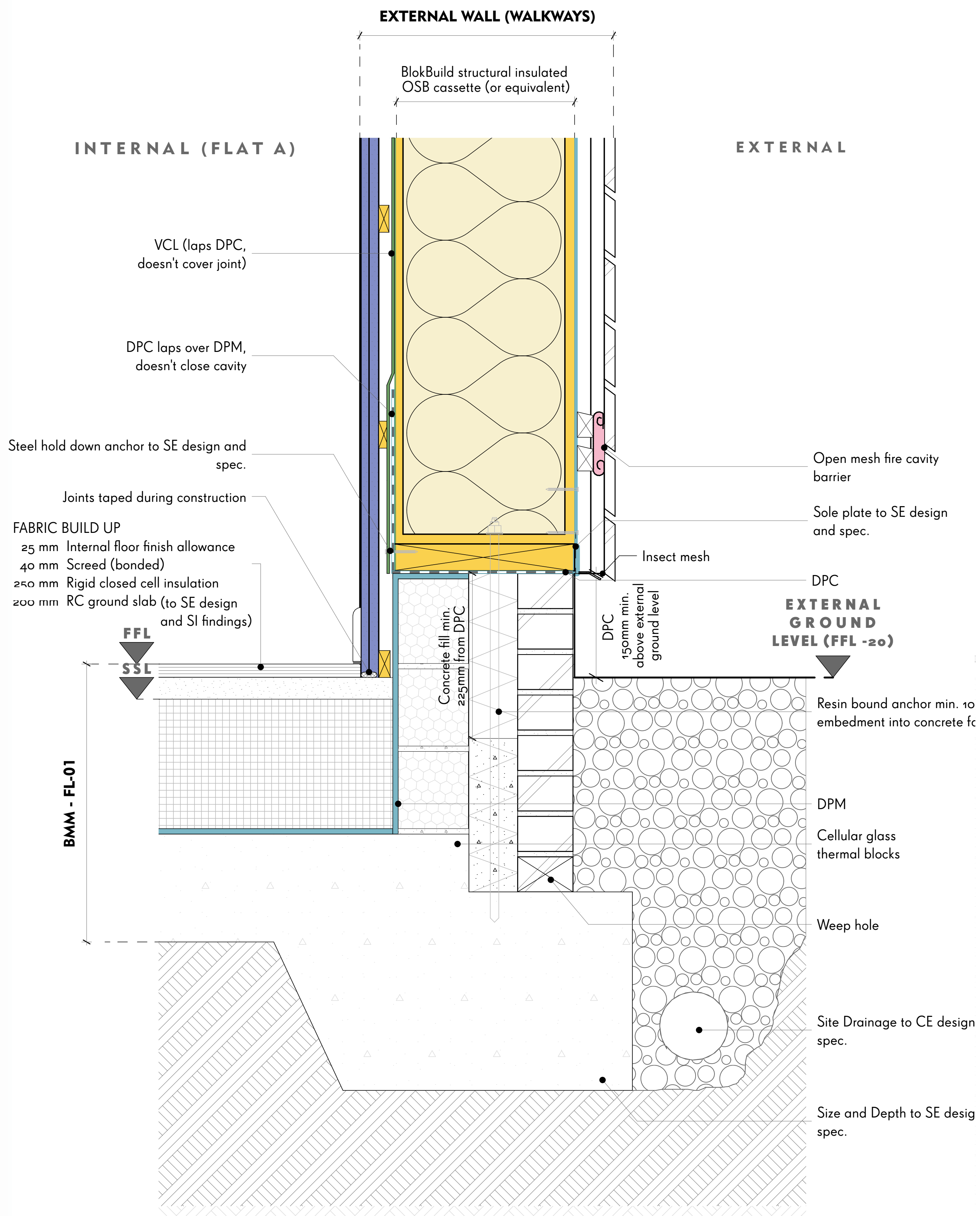
DETAIL PRINCIPLES:

- Timber structural elements
- 60 minute K Class encapsulation
- Cavity barrier
- Fire stopping materials
- Airtightness
- Waterproofing

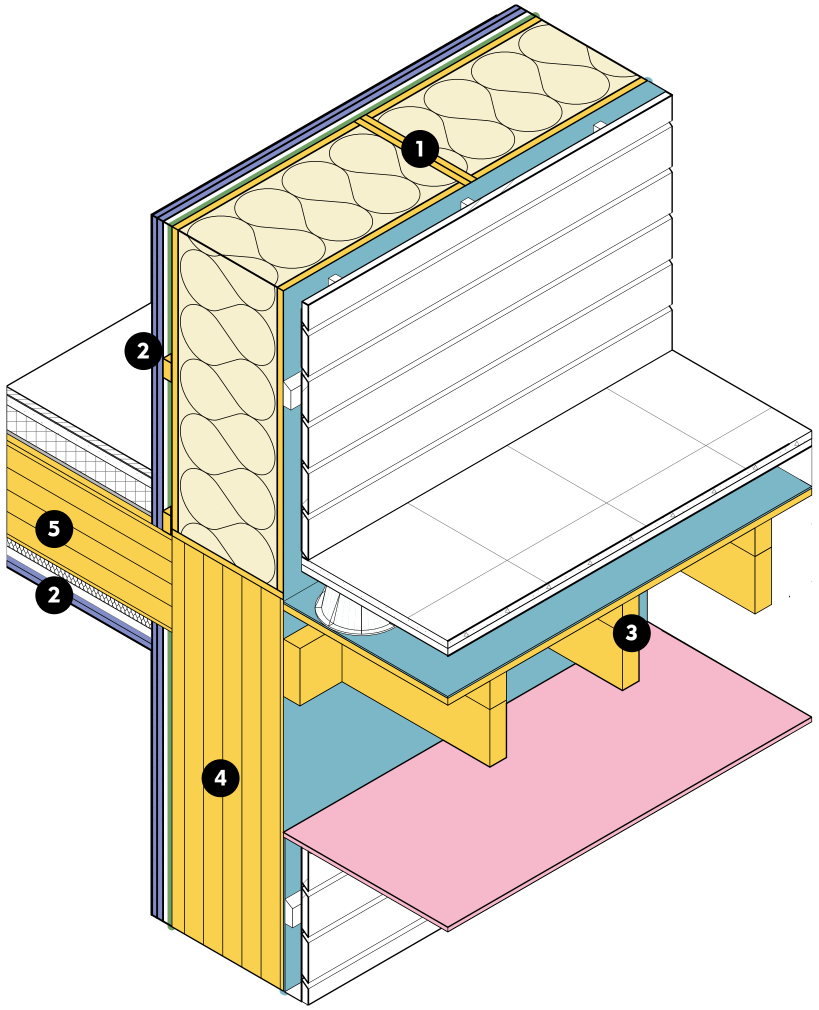


KEY CONSIDERATIONS

- ☐ Timber cassettes to be fixed to a preservative-treated sole plate, supported on a brick, block, or concrete upstand, with the bottom of the sole plate set a minimum of 150 mm above the internal finished floor level.
- ☐ DPC to be installed between upstand and sole plate, projecting at least 100 mm beyond the external face of the timber frame.
- ☐ End grain sealant to be applied to all cut and exposed ends of timber components.
- ☐ Detail to avoid moisture traps at stepped foundations or ledges; provide weathering or protective measures where required.
- ☐ Ensure cavity drainage and ventilation paths are maintained and unobstructed.
- ☐ Consider durability and fire strategy when selecting façade materials.



3.3 GROUND/FIRST FLOOR JUNCTION

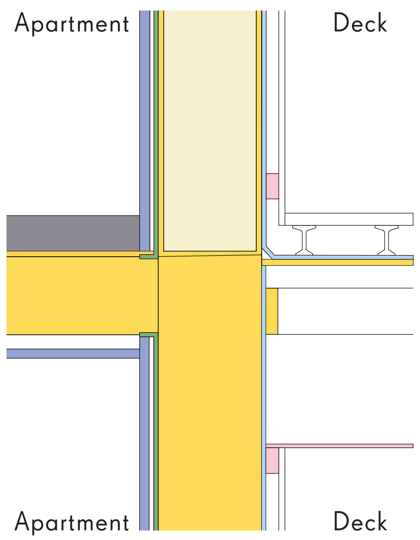


DETAIL COMPONENTS:

1. BlokBuild structural insulated OSB cassette (or equivalent)
2. Wall/ceiling lining board
3. Timber joists
4. Glulam column
5. Glulam beam

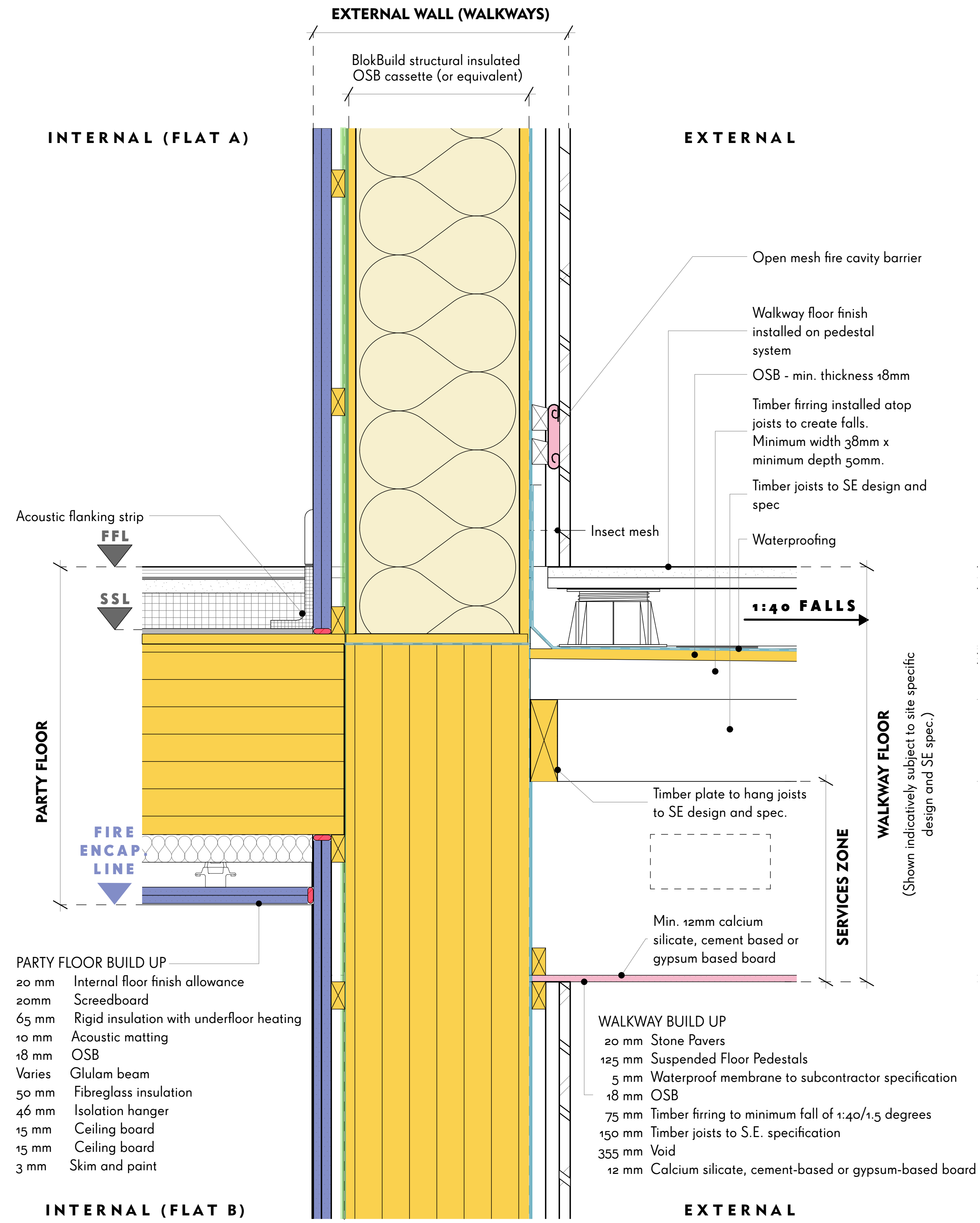
DETAIL PRINCIPLES:

- Timber structural elements
- 60 minute K Class encapsulation
- Cavity barrier
- Fire stopping materials
- Airtightness
- Waterproofing

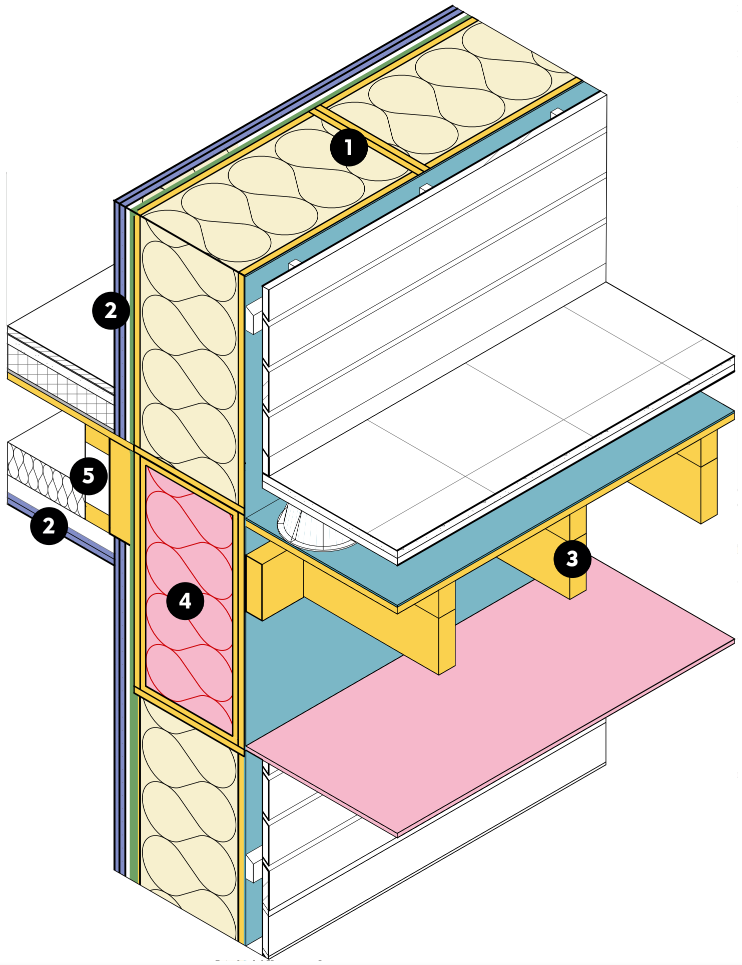


KEY CONSIDERATIONS

- ☐ Detail junction around glulam column to minimise thermal bridging. Allow for additional insulation, ensuring dew point remains outside the structural zone to prevent interstitial condensation.
- ☐ Locate drainage at the external edge of the walkway to direct water away from the façade. Provide a clear fall and ensure drainage outlets or gaps are not obstructed.
- ☐ Apply liquid-applied waterproofing sealant to all structural fixings and penetrations to prevent water tracking into the timber frame.
- ☐ Provide adequate ventilation behind and beneath the balcony to allow components to dry out between wetting cycles. Avoid trapping moisture against timber elements.
- ☐ Ensure access is available for periodic inspection and maintenance of waterproofing, drainage and fixings.
- ☐ When used for escape, the walkway construction must achieve REI 60 fire resistance up to 1.1 m above finished floor level.
- ☐ Materiality of walkway to be considered as part of the fire strategy.



3.4 WALKWAY JUNCTION

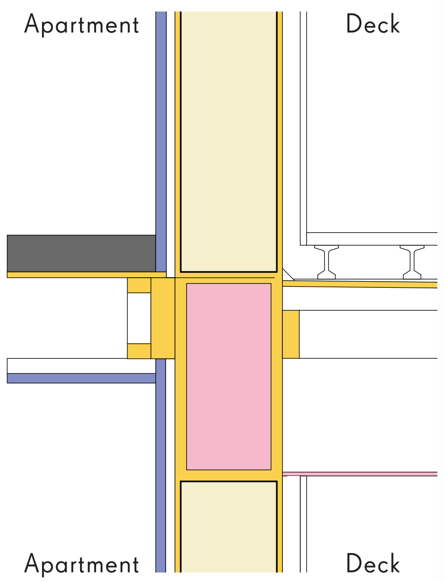


DETAIL COMPONENTS:

1. BlokBuild structural insulated OSB cassette (or equivalent)
2. Wall/ceiling lining board
3. Timber joists
4. Full fill insulation to compartment line
5. Composite timber/steel joist

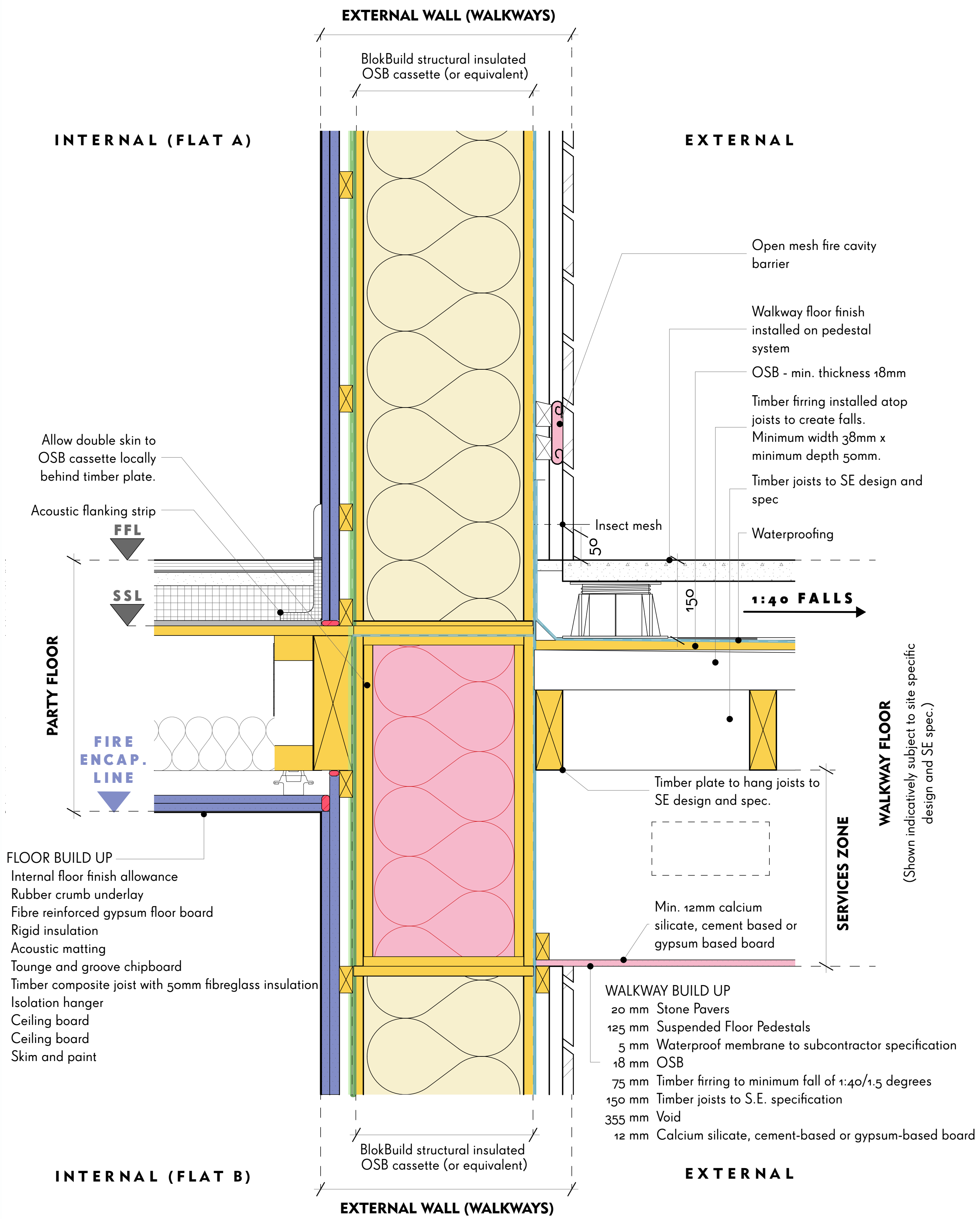
DETAIL PRINCIPLES:

- Timber structural elements
- 60 minute K Class encapsulation
- Cavity barrier
- Fire stopping materials
- Airtightness
- Waterproofing

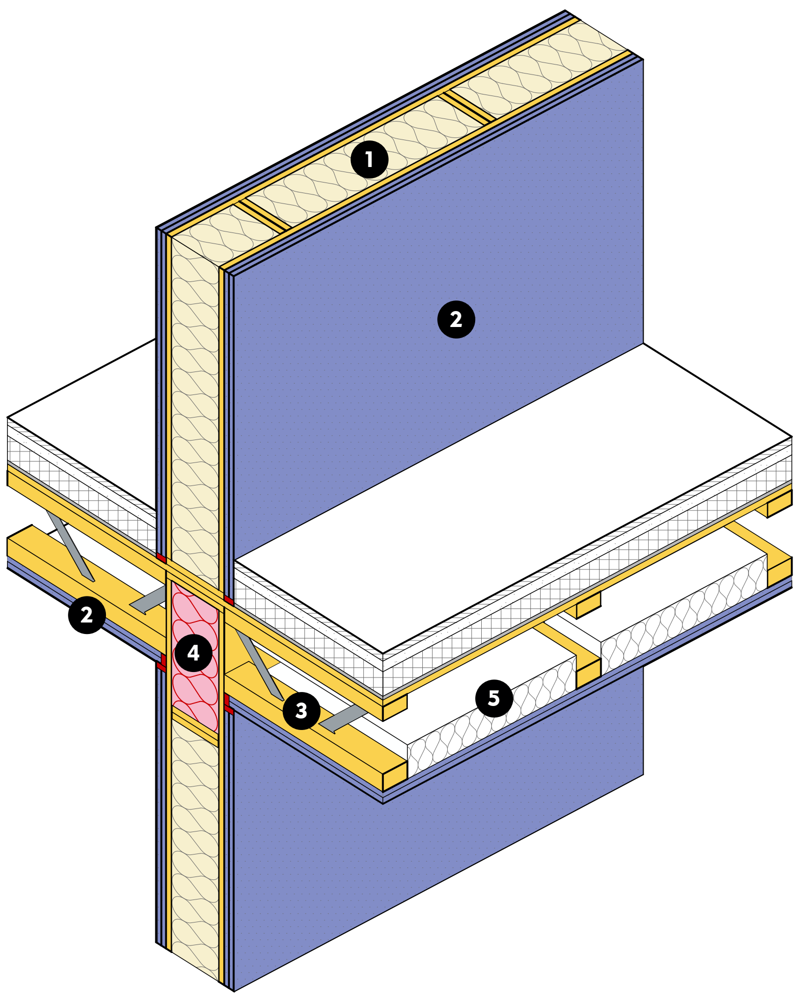


KEY CONSIDERATIONS

- ☐ Locate drainage at the external edge of the walkway to direct water away from the façade. Provide a clear fall and ensure drainage outlets or gaps are not obstructed.
- ☐ Apply liquid-applied waterproofing sealant to all structural fixings and penetrations to prevent water tracking into the primary timber frame.
- ☐ Provide adequate ventilation behind and beneath the balcony to allow components to dry out between wetting cycles. Avoid trapping moisture against timber elements.
- ☐ Ensure access is available for periodic inspection and maintenance of waterproofing, drainage and fixings.
- ☐ When used for escape, the walkway construction must achieve REI 60 fire resistance up to 1.1 m above finished floor level.
- ☐ Materiality of walkway to be considered as part of the fire strategy.



3.5 LOADBEARING PARTY WALL

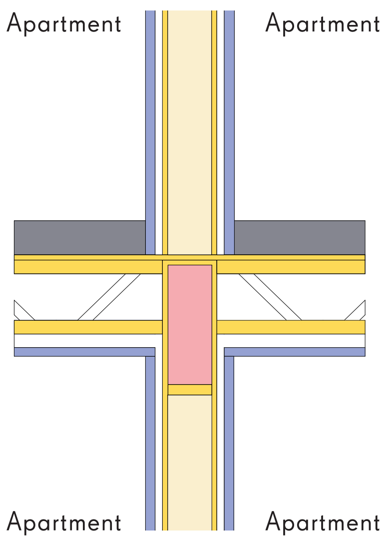


DETAIL COMPONENTS:

1. BlokBuild structural insulated OSB cassette (or equivalent)
2. Wall/ceiling lining board
3. Composite timber/steel joist
4. Full fill insulation to compartment line
5. Acoustic insulation as required

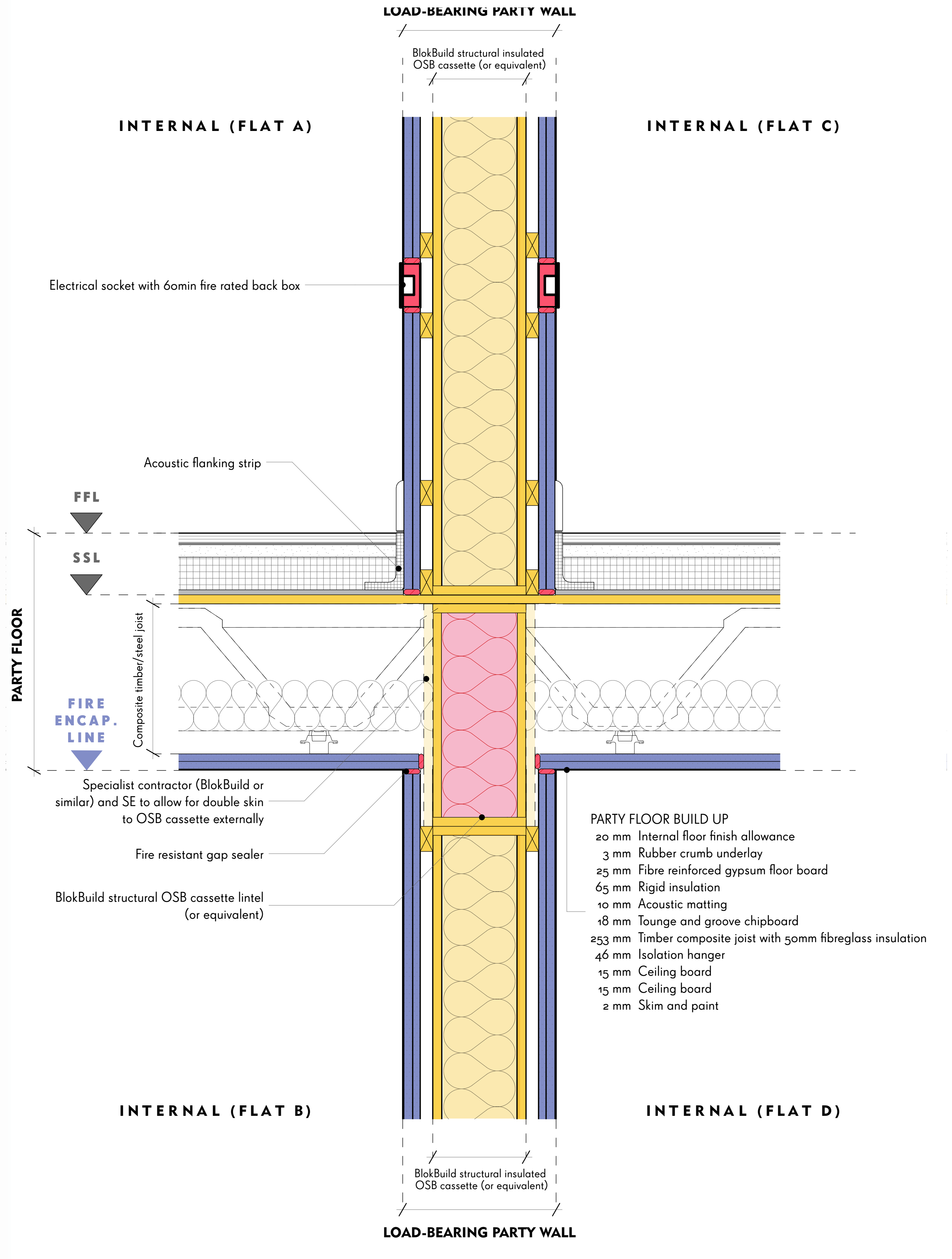
DETAIL PRINCIPLES:

- Timber structural elements
- 60 minute K Class encapsulation
- Cavity barrier
- Fire stopping materials
- Airtightness
- Waterproofing

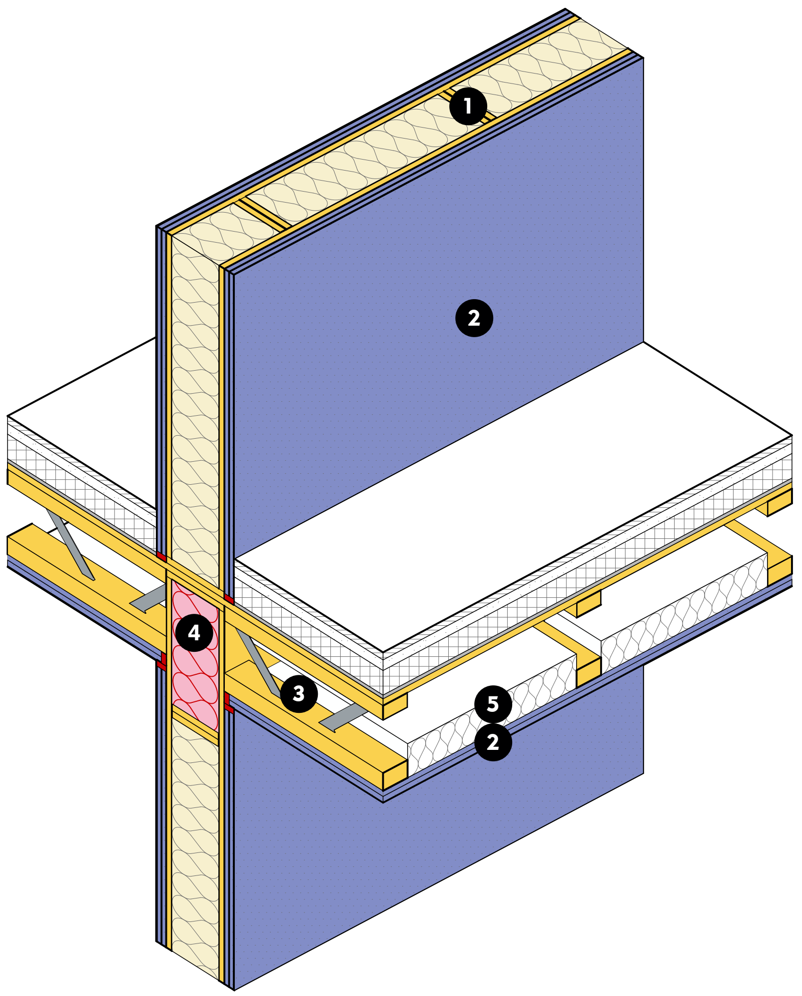


KEY CONSIDERATIONS

- ☐ Encapsulate loadbearing timber cassettes to achieve K2 60 classification per BS EN 13501-2, with surface temperature not exceeding 200°C.
- ☐ Provide test data confirming REI 60 fire performance of the wall system. NB, BlokBuild structural insulated OSB cassettes achieve compliance.
- ☐ Apply end grain sealant to all penetrations and exposed timber edges.
- ☐ Acoustic performance is project specific. Designers should aim to or exceed Approved Document E standards by at least 5 dB where required. Address flanking noise, impact sound, and party junctions.



3.6 LOADBEARING INTERNAL PARTITION

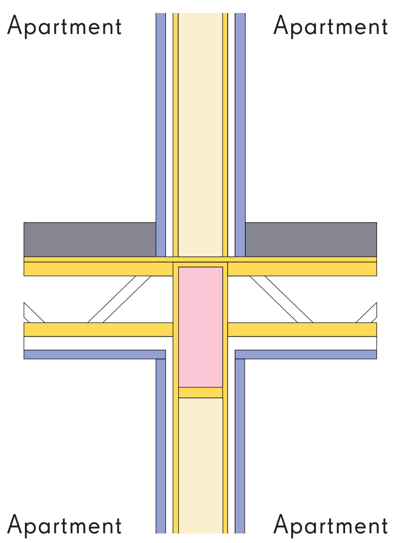


DETAIL COMPONENTS:

1. BlokBuild structural insulated OSB cassette (or equivalent)
2. Wall/ceiling lining board
3. Composite timber/steel joist
4. Full fill insulation to compartment line
5. Acoustic insulation as required

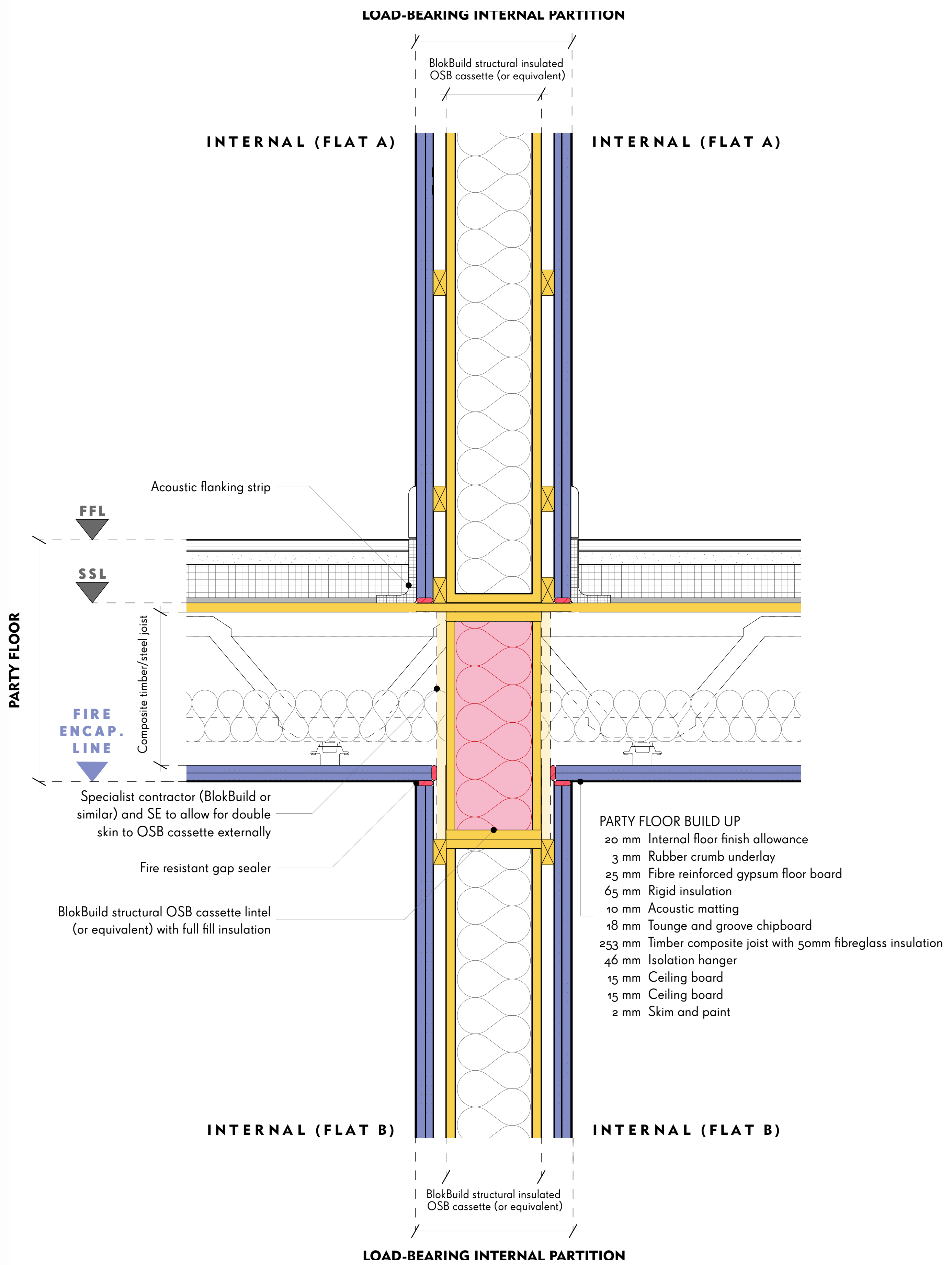
DETAIL PRINCIPLES:

- Timber structural elements
- 60 minute K Class encapsulation
- Cavity barrier
- Fire stopping materials
- Airtightness
- Waterproofing

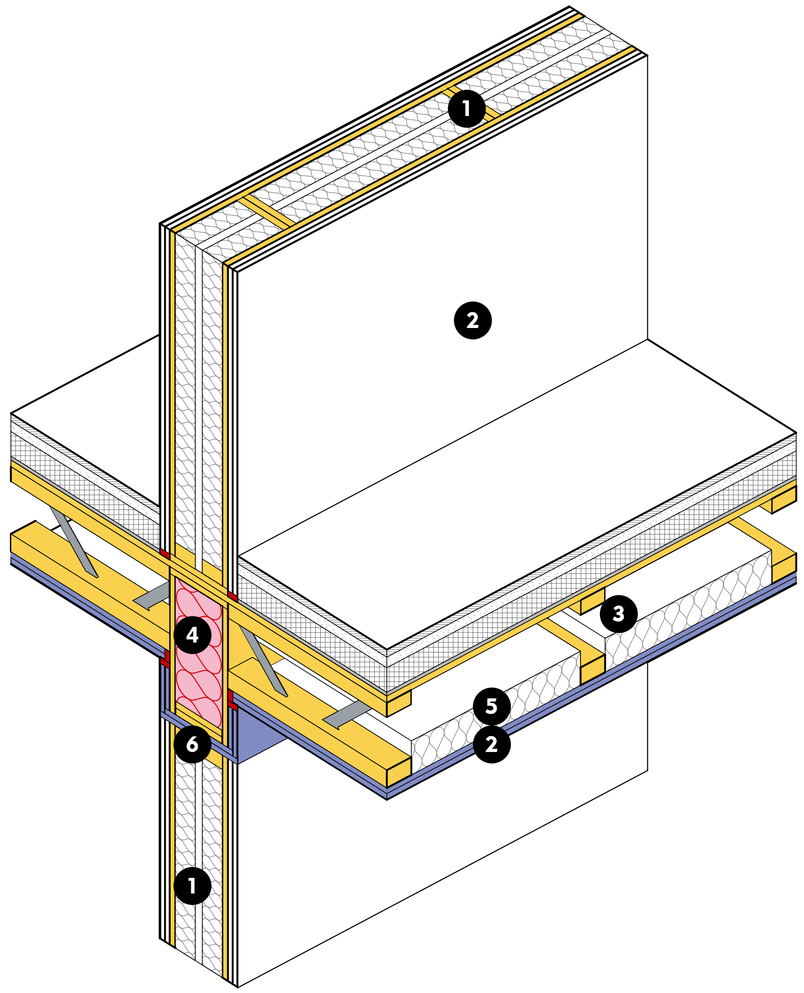


KEY CONSIDERATIONS

- ☐ Encapsulate all loadbearing timber cassettes to achieve K2 60 classification in accordance with BS EN 13501-2, limiting surface temperature to ≤ 200°C.
- ☐ Provide fire test evidence confirming 60-minute structural fire performance of the wall system. NB, BlokBuild structural insulated OSB cassettes achieve compliance.
- ☐ Apply end grain sealant to all penetrations and exposed timber edges to prevent moisture ingress.



3.7 NON LOADBEARING PARTY WALL

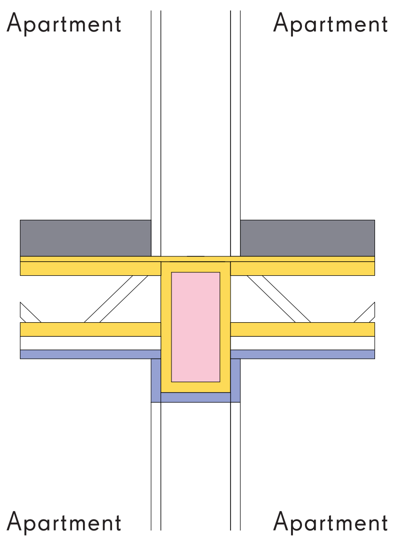


DETAIL COMPONENTS:

1. Timber stud partition with insulation
2. Wall/ceiling lining board
3. Composite timber/steel joist
4. Full fill insulation to compartment line
5. Acoustic insulation as required
6. BlokBuild structural OSB lintel (or equivalent)

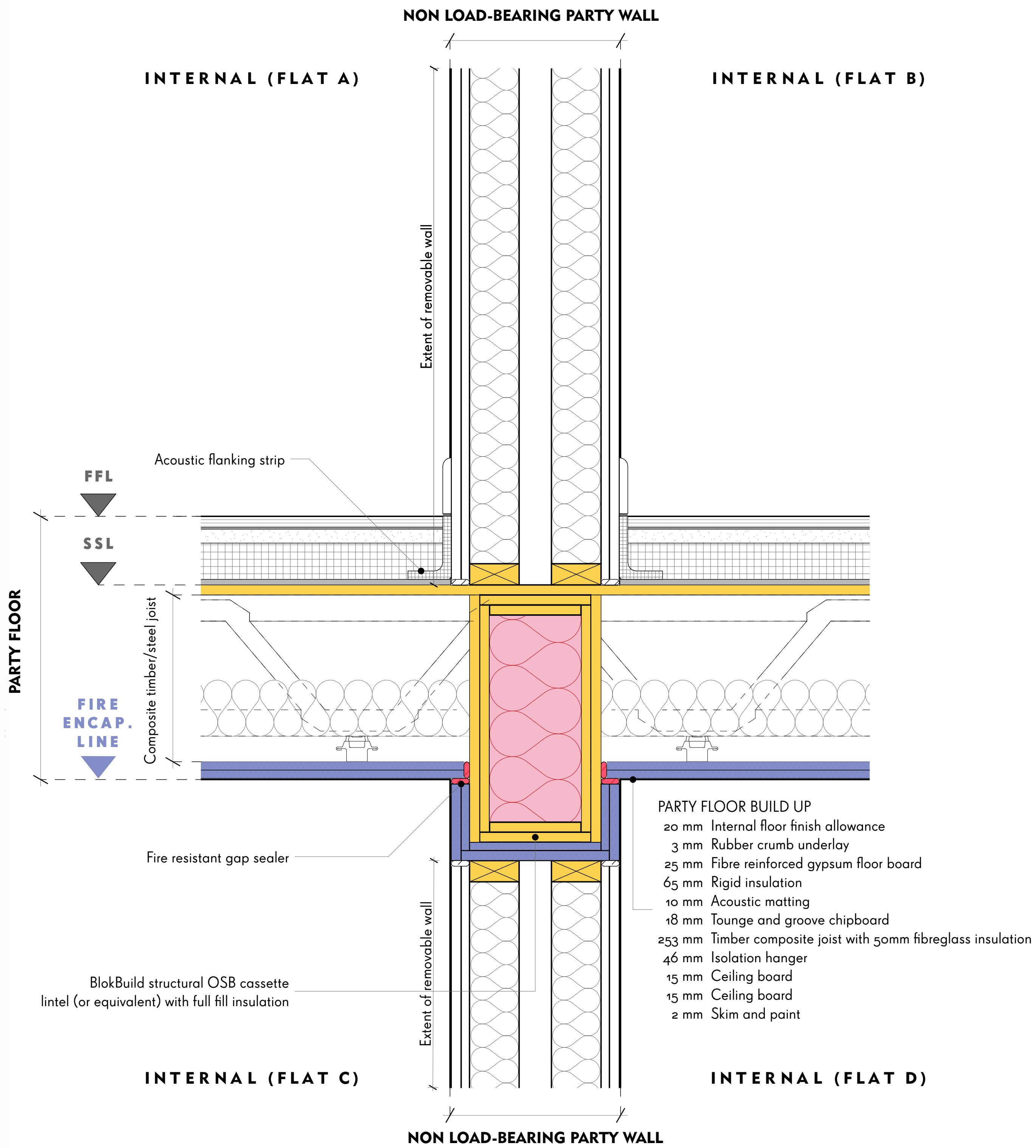
DETAIL PRINCIPLES:

- Timber structural elements
- 60 minute K Class encapsulation
- Cavity barrier
- Fire stopping materials
- Airtightness
- Waterproofing

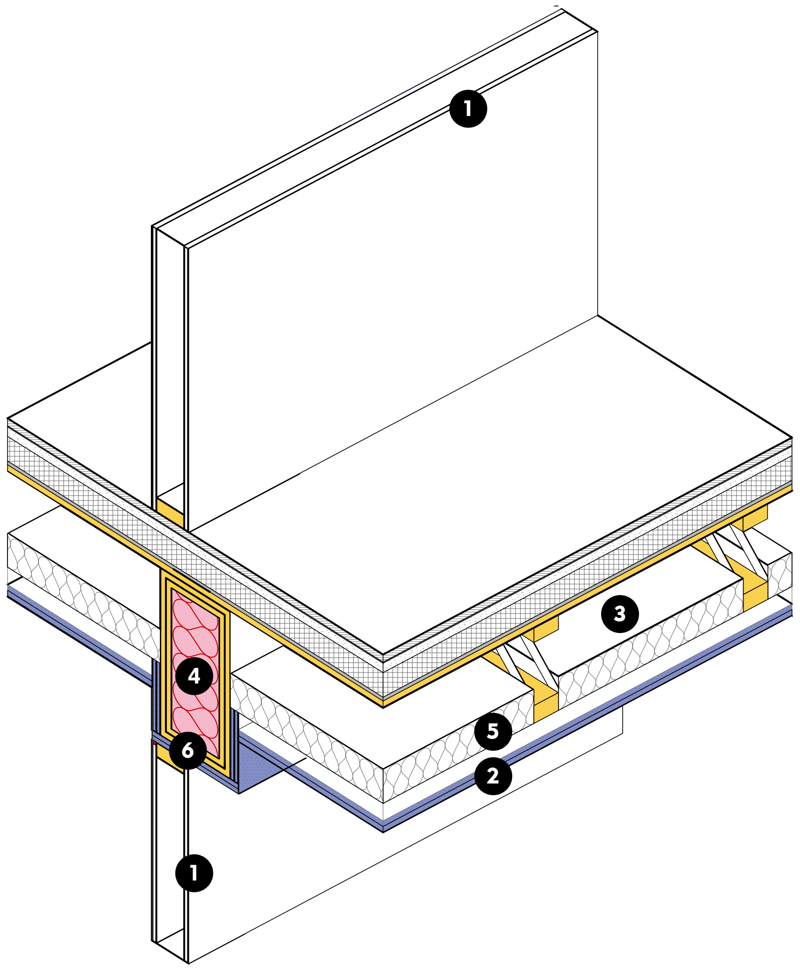


KEY CONSIDERATIONS

- ☐ Acoustic performance is project specific. Designers should aim to or exceed Approved Document E standards by at least 5 dB where required. Address flanking noise, impact sound, and party junctions.
- ☐ Encapsulate loadbearing timber cassette lintel to achieve K2 60 classification in line with BS EN 13501-2, with surface temperature limited to ≤ 200°C.
- ☐ Extend encapsulation beneath lintel to maintain fire resistance if the partition below is removed.
- ☐ Follow manufacturer's guidance to ensure the removable partition meets required performance criteria.
- ☐ Apply end grain sealant to all penetrations and exposed timber edges to prevent moisture ingress.



3.8 NON LOADBEARING INTERNAL PARTITION

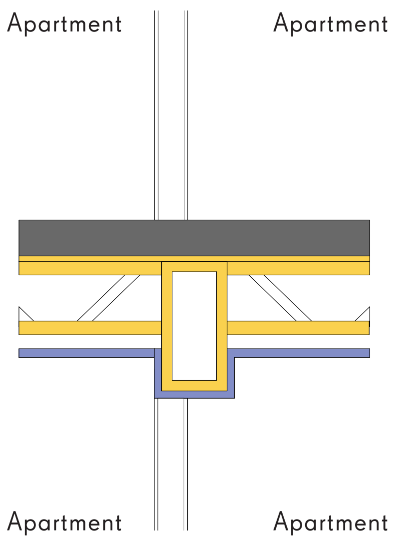


DETAIL COMPONENTS:

1. Timber stud partition
2. Wall/ceiling lining board
3. Composite timber/steel joist
4. Full fill insulation to compartment line
5. Acoustic insulation as required
6. BlokBuild structural OSB lintel (or equivalent)

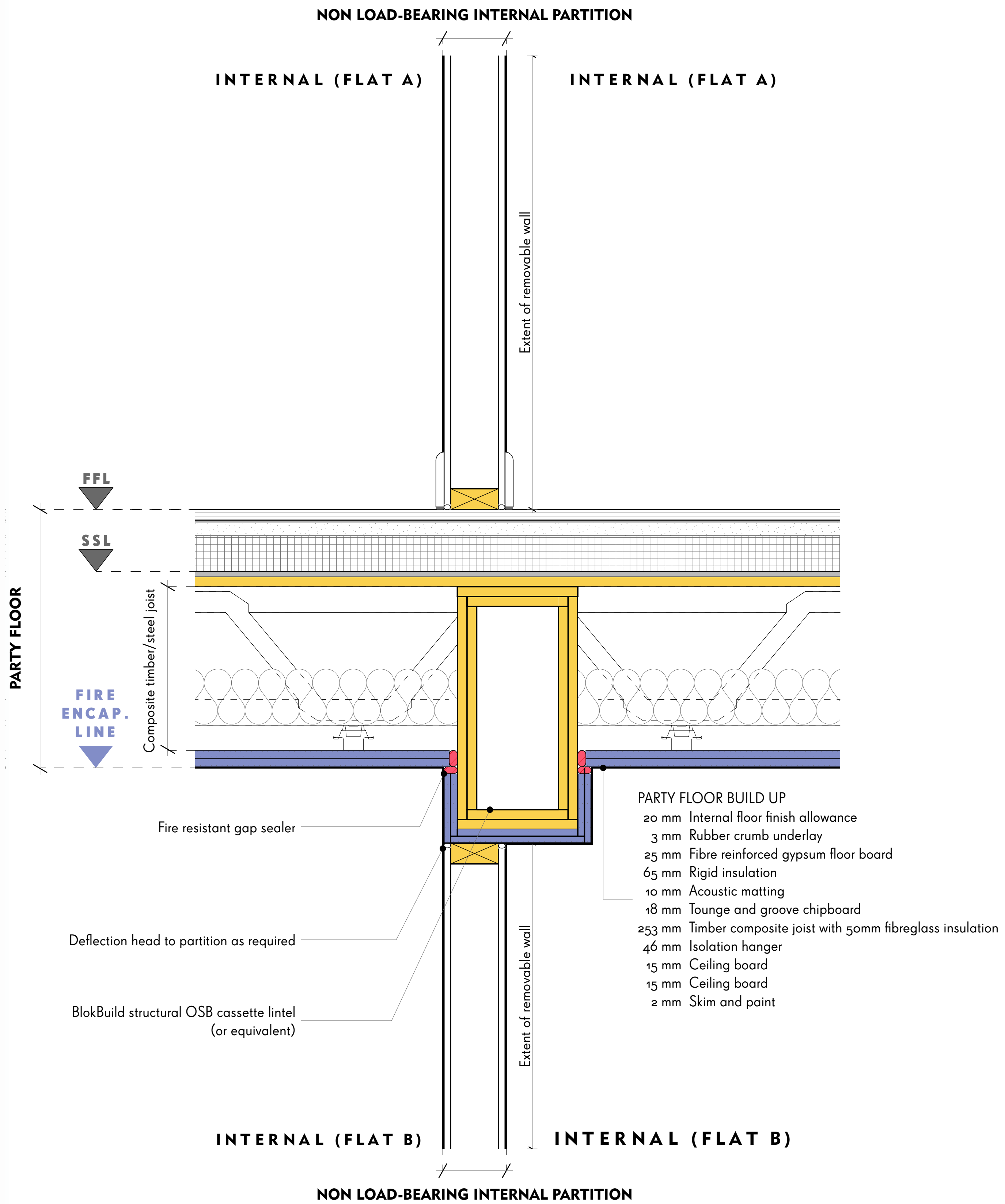
DETAIL PRINCIPLES:

- Timber structural elements
- 60 minute K Class encapsulation
- Cavity barrier
- Fire stopping materials
- Airtightness
- Waterproofing

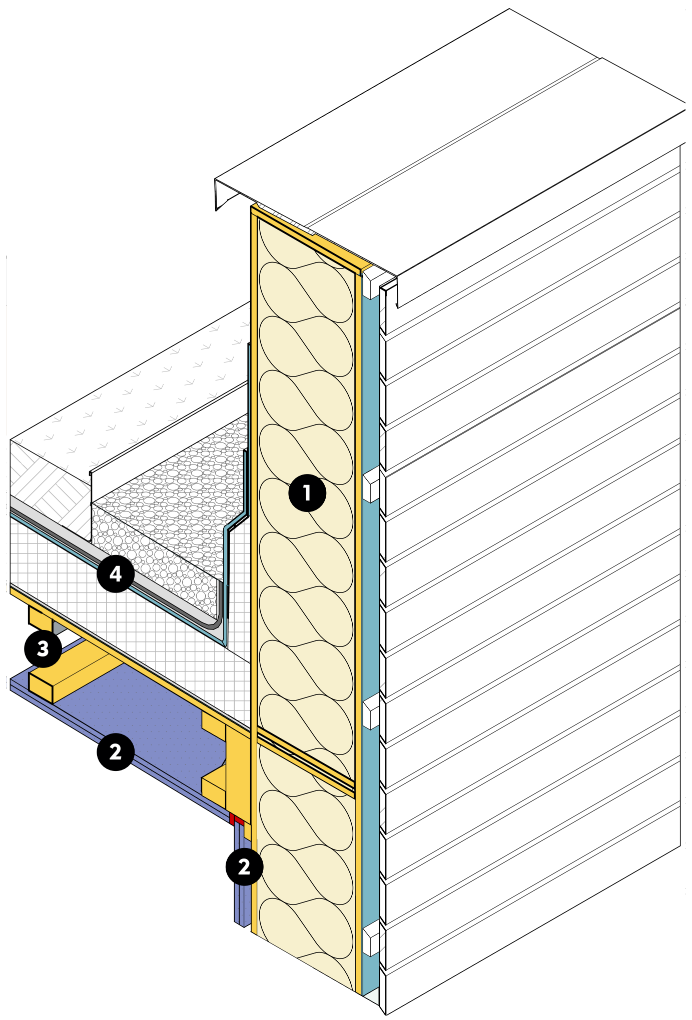


KEY CONSIDERATIONS

- ☐ Encapsulate loadbearing timber cassette lintel to achieve K2 60 classification in line with BS EN 13501-2, with surface temperature limited to ≤ 200°C.
- ☐ Extend encapsulation beneath lintel to maintain fire resistance if the partition below is removed.
- ☐ Follow manufacturer's guidance to ensure the removable partition meets required performance criteria.
- ☐ Apply end grain sealant to all penetrations and exposed timber edges to prevent moisture ingress.



3.9 PARAPET

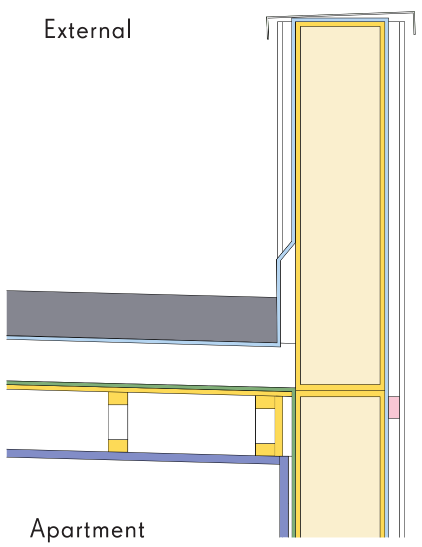


DETAIL COMPONENTS:

1. BlokBuild structural insulated OSB cassette (or equivalent)
2. Wall/ceiling lining board
3. Composite timber/steel joist
4. BRoof T4 roof build up

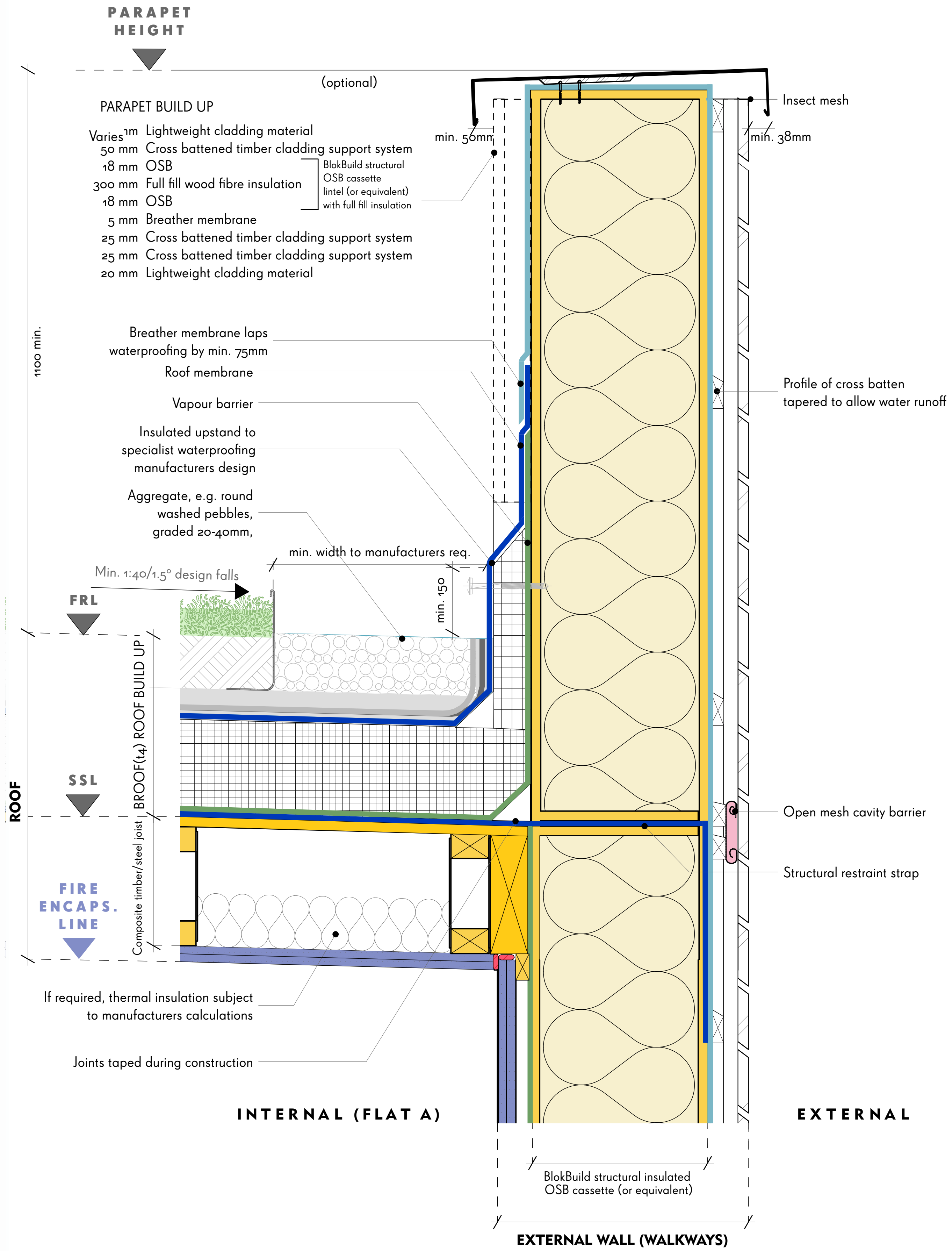
DETAIL PRINCIPLES:

- Timber structural elements
- 60 minute K Class encapsulation
- Cavity barrier
- Fire stopping materials
- Airtightness
- Waterproofing

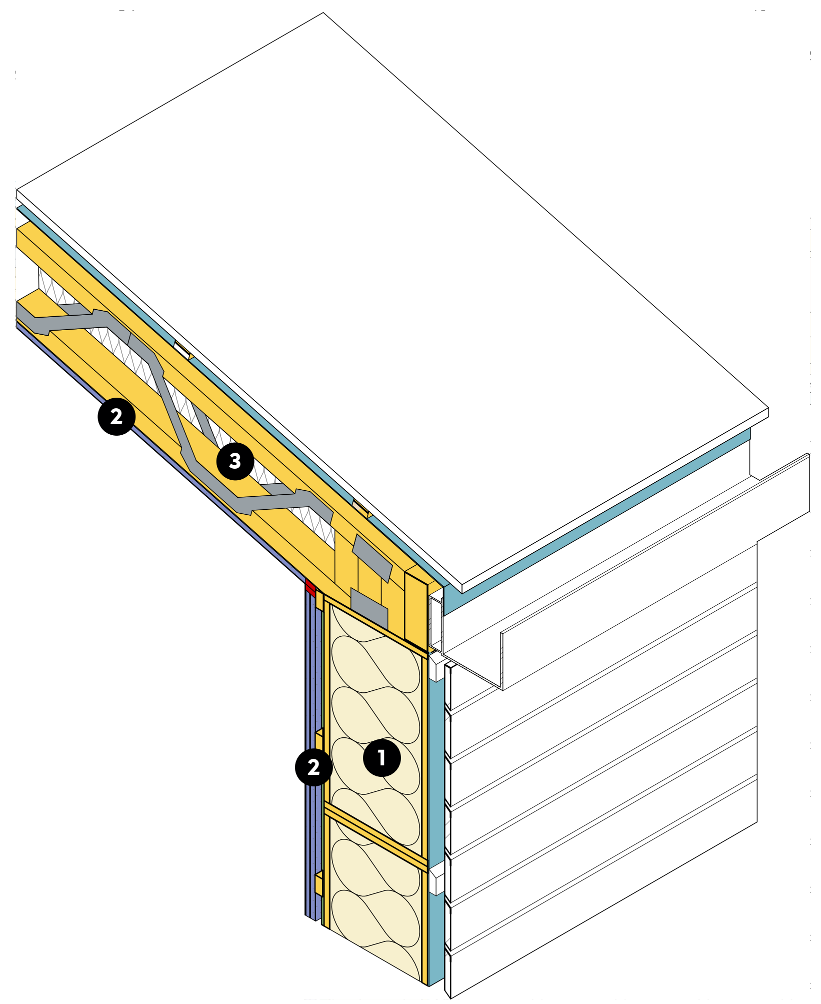


KEY CONSIDERATIONS

- ☐ Roof and terrace areas must be protected from moisture ingress during construction and throughout the building's life.
- ☐ All timber elements to be moisture tested in accordance with relevant standards prior to installation of any coverings.
- ☐ Design roofs and terraces with a minimum fall of 1:40 (1.5°) to ensure effective drainage and prevent standing water.
- ☐ Carry out a condensation risk analysis for all timber roof and terrace build-ups, assessing the type, thickness and location of insulation to control interstitial condensation.
- ☐ Recognise that proprietary waterproofing systems may degrade over time. Design must include provision for early moisture detection and reduce the risk of undetected water ingress.
- ☐ Consider durability and fire strategy when selecting façade materials.



3.10 PITCHED ROOF

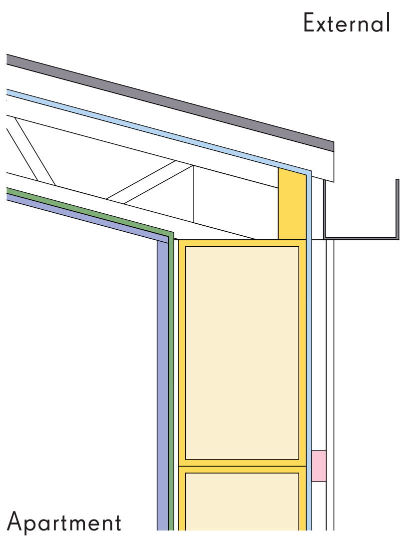


DETAIL COMPONENTS:

1. BlokBuild structural insulated OSB cassette (or equivalent)
2. Wall/ceiling lining board
3. Composite timber/steel joist

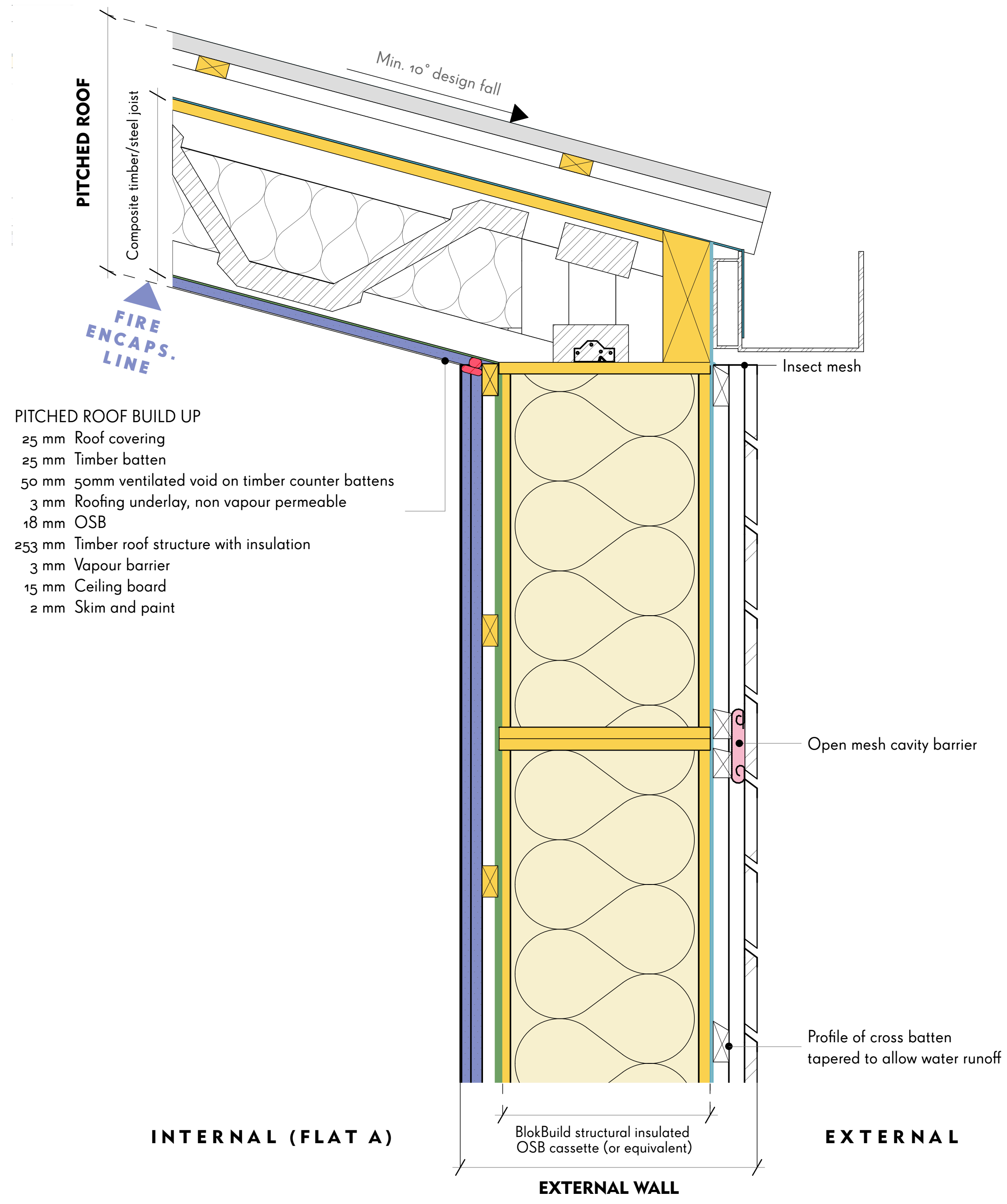
DETAIL PRINCIPLES:

- Timber structural elements
- 60 minute K Class encapsulation
- Cavity barrier
- Fire stopping materials
- Airtightness
- Waterproofing

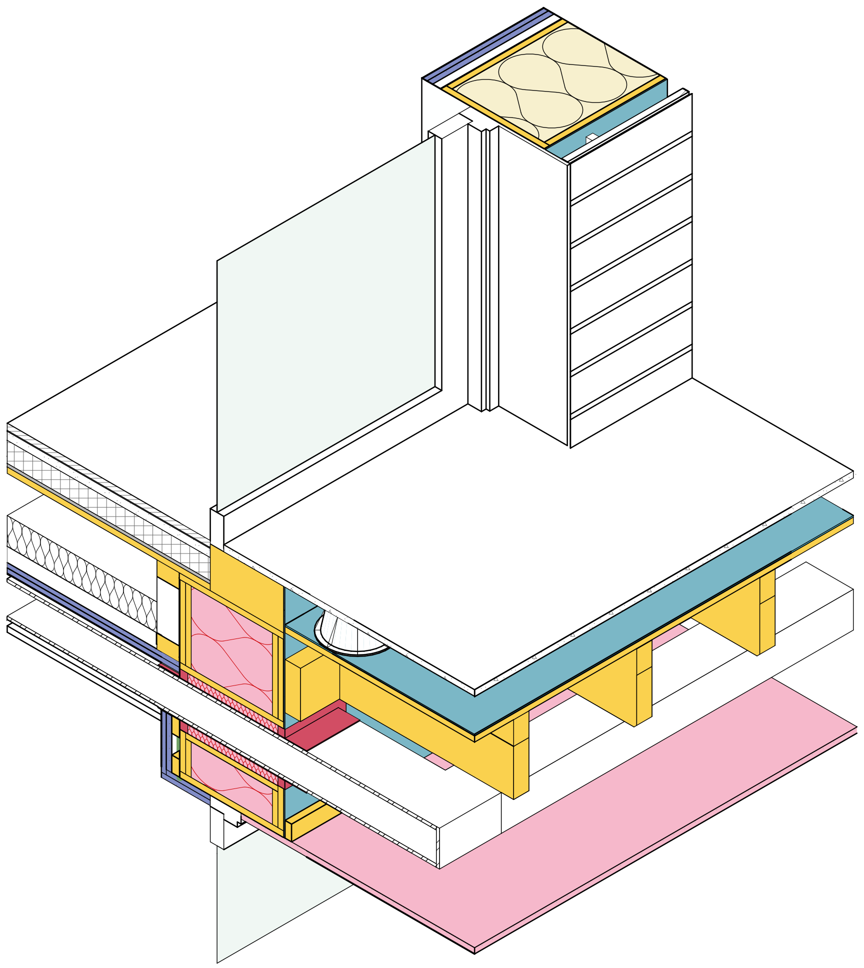


KEY CONSIDERATIONS

- ☐ Roof and terrace areas must be protected from moisture ingress during construction and throughout the building's life.
- ☐ All timber elements to be moisture tested in accordance with relevant standards prior to installation of any coverings.
- ☐ Design pitched roofs a minimum fall of 10°.
- ☐ Carry out a condensation risk analysis for all timber roof and terrace build-ups, assessing the type, thickness and location of insulation to control interstitial condensation.
- ☐ When selecting façade materials, consider durability, fire strategy, and their interaction with the roof detail. Depending on building size and context, a roof overhang may help deflect water away from the façade.



3.11 SERVICE PENETRATIONS



DETAIL COMPONENTS:

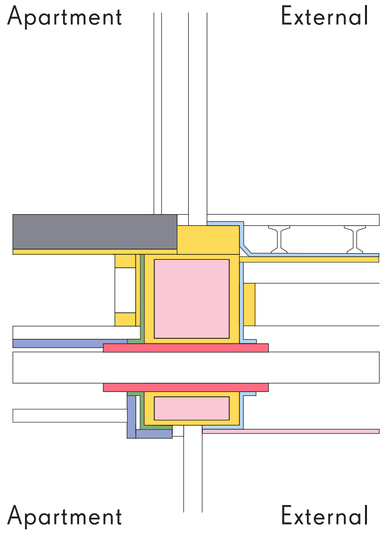
1. BlokBuild structural insulated OSB cassette (or equivalent)
2. Wall/ceiling lining board
3. Composite timber/steel joist
4. Full fill insulation cavity barrier
5. Acoustic insulation as required

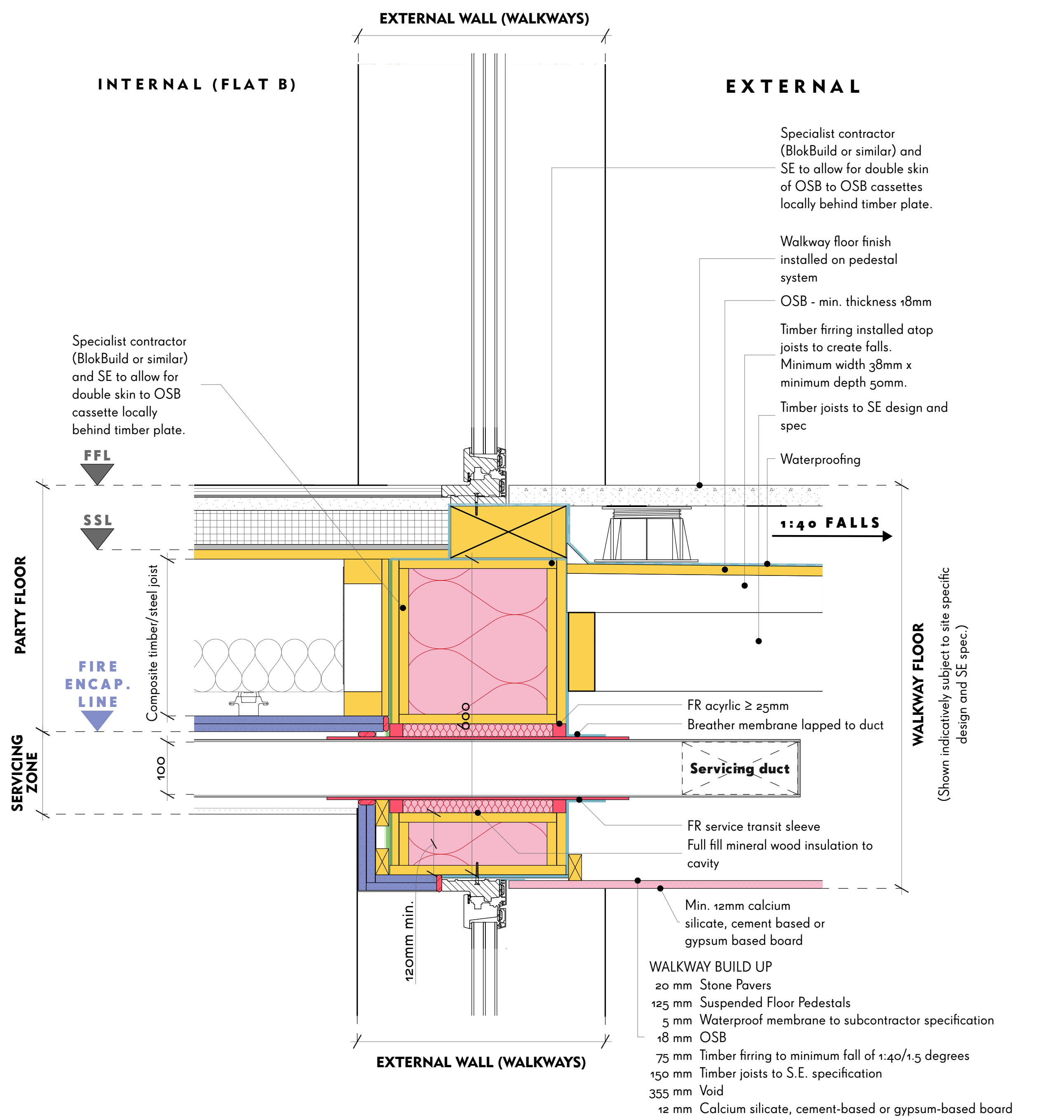
DETAIL PRINCIPLES:

- Timber structural elements
- 60 minute K Class encapsulation
- Cavity barrier
- Fire stopping materials
- Airtightness
- Waterproofing

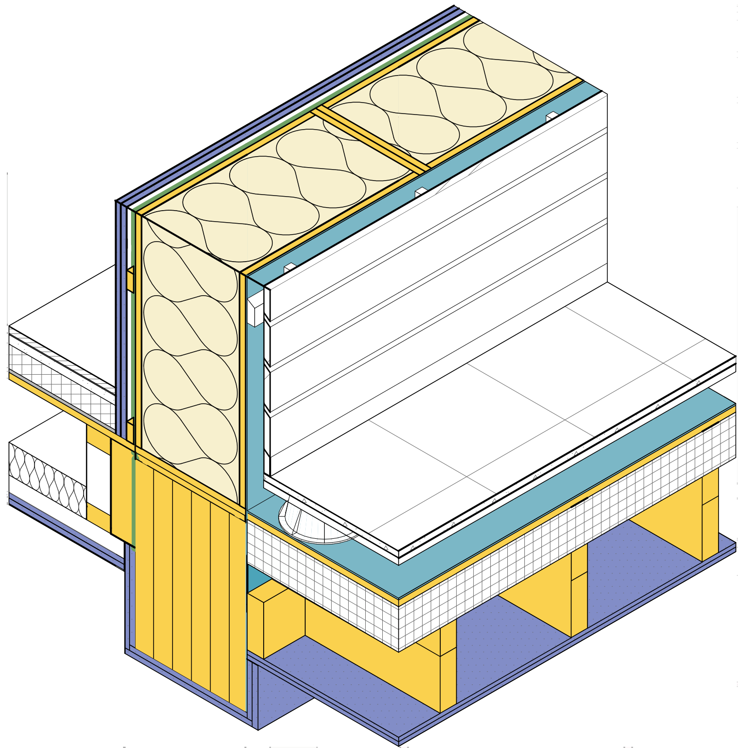
KEY CONSIDERATIONS

- ☐ Clearly identify the material and type of service at each penetration.
- ☐ Use fire-stopping products suitable for the service material and penetration size. Products must achieve REI 60 fire performance and be installed in accordance with the manufacturer's guidance, tested detail, or project-specific engineering judgement.
- ☐ Apply end grain sealant to all exposed timber edges at penetrations to prevent moisture ingress.
- ☐ Install full-fill mineral wool insulation around penetrations.
- ☐ Provide REI 60-rated cavity barriers around service penetrations where fire-rated collars or ducts are not used. NB, BlokBuild structural insulated OSB cassettes achieve compliance.
- ☐ Seal the AVCL to all service penetrations to maintain airtightness.
- ☐ Seal any voids between internal linings and services using intumescent gap sealant to prevent smoke and fire spread.





3.12 TERRACE



KEY CONSIDERATIONS

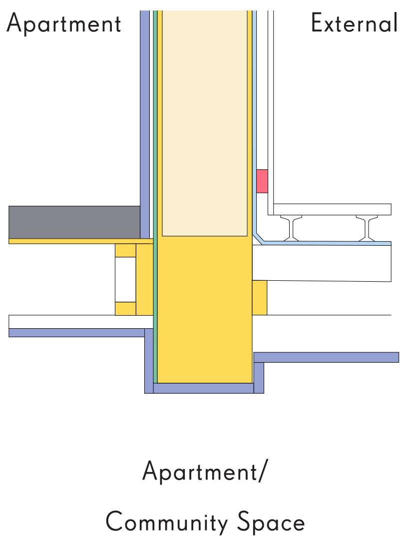
- ☐ Detail junction around glulam column to minimise thermal bridging. Allow for additional insulation, ensuring dew point remains outside the structural zone to prevent interstitial condensation.
- ☐ Locate drainage at the external edge of the walkway to direct water away from the façade. Provide a clear fall and ensure drainage outlets or gaps are not obstructed.
- ☐ Apply liquid-applied waterproofing sealant to all structural fixings and penetrations to prevent water tracking into the timber frame.
- ☐ Provide adequate ventilation behind and beneath the balcony to allow components to dry out between wetting cycles. Avoid trapping moisture against timber elements.
- ☐ Ensure access is available for periodic inspection and maintenance of waterproofing, drainage and fixings.
- ☐ When used for escape, the walkway construction must achieve REI 60 fire resistance up to 1.1 m above finished floor level.
- ☐ Carry out a condensation risk analysis for all timber roof and terrace build-ups, assessing the type, thickness and location of insulation to control interstitial condensation.

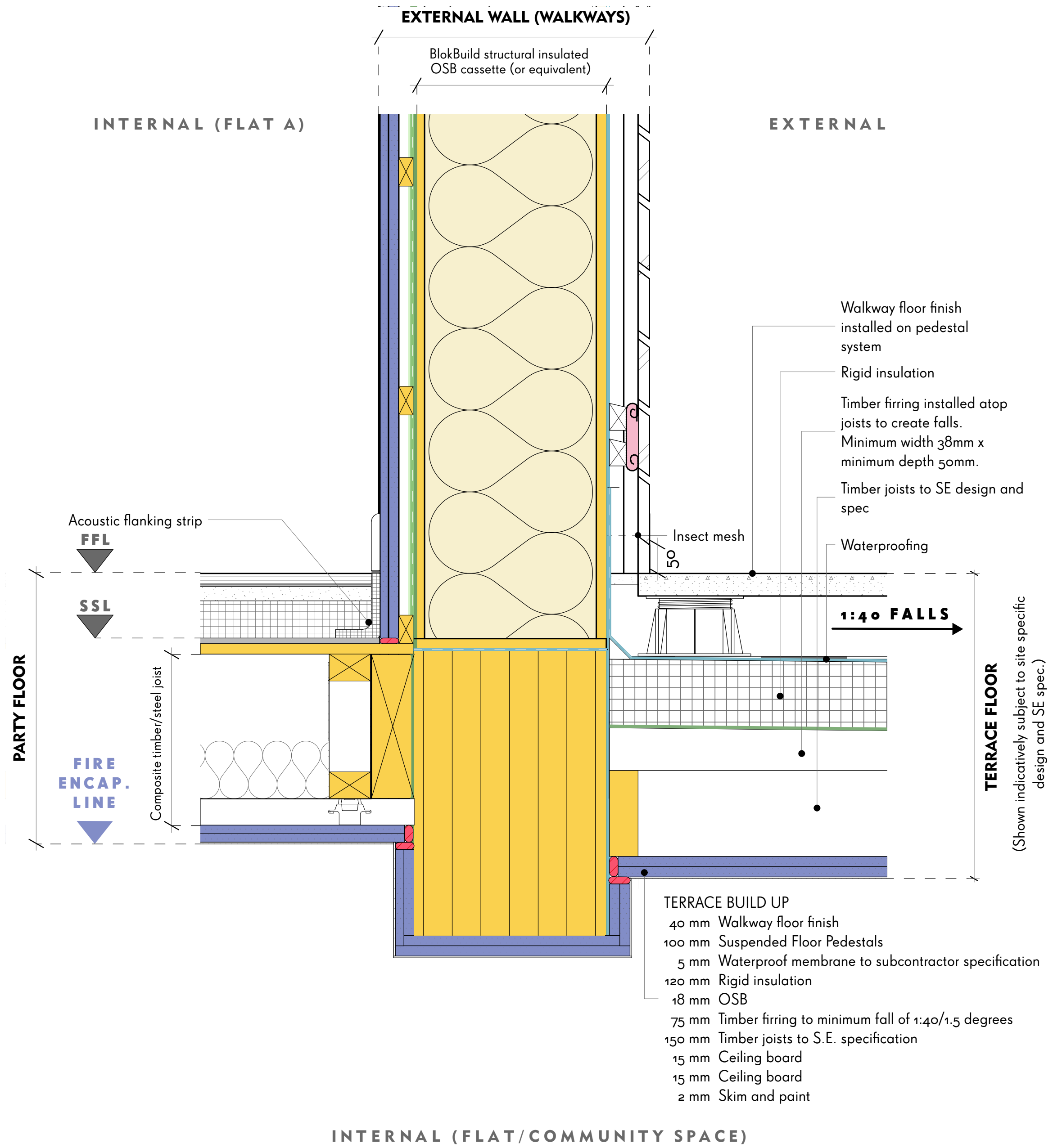
DETAIL COMPONENTS:

1. BlokBuild structural insulated OSB cassette (or equivalent)
2. Wall/ceiling lining board
3. Composite timber/steel joist
4. Full fill insulation cavity barrier
5. Acoustic insulation as required

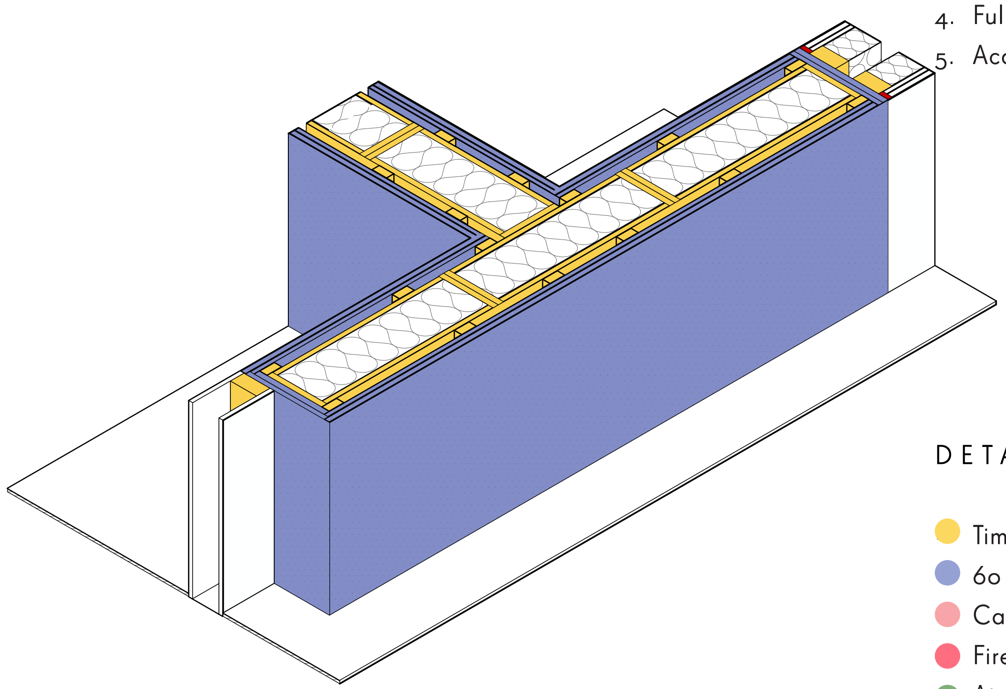
DETAIL PRINCIPLES:

- Timber structural elements
- 60 minute K Class encapsulation
- Cavity barrier
- Fire stopping materials
- Airtightness
- Waterproofing





3.13 INTERNAL WALL JUNCTION



DETAIL COMPONENTS:

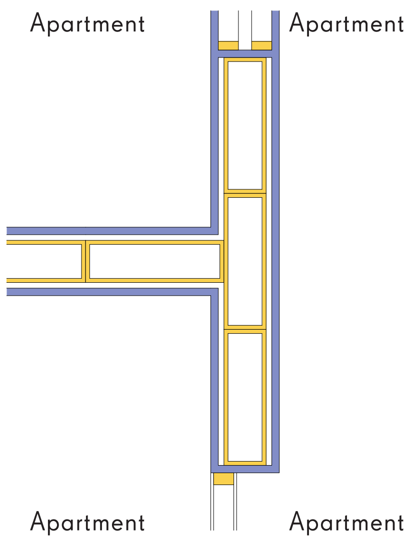
1. BlokBuild structural insulated OSB cassette (or equivalent)
2. Wall/ceiling lining board
3. Composite timber/steel joist
4. Full fill insulation cavity barrier
5. Acoustic insulation as required

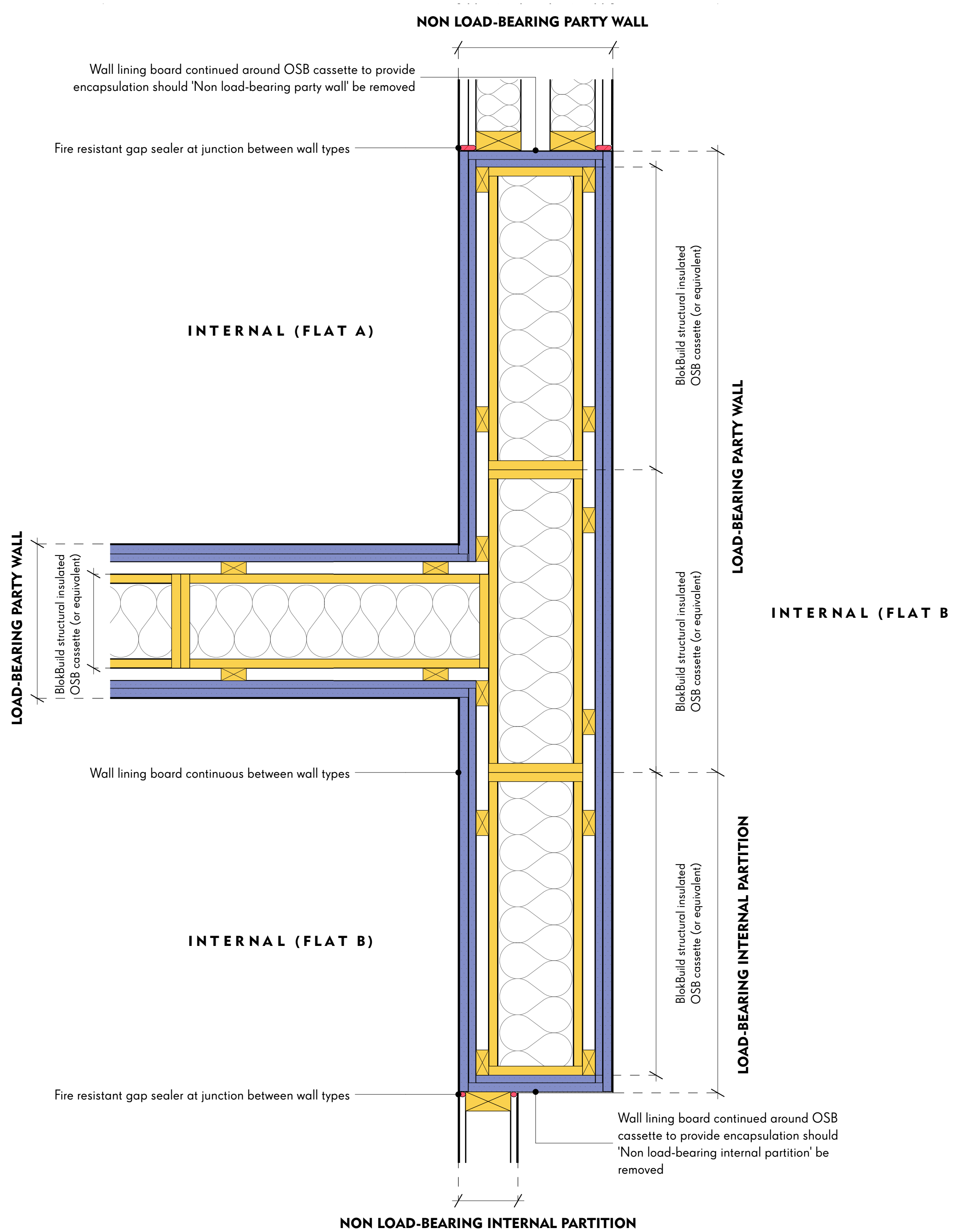
DETAIL PRINCIPLES:

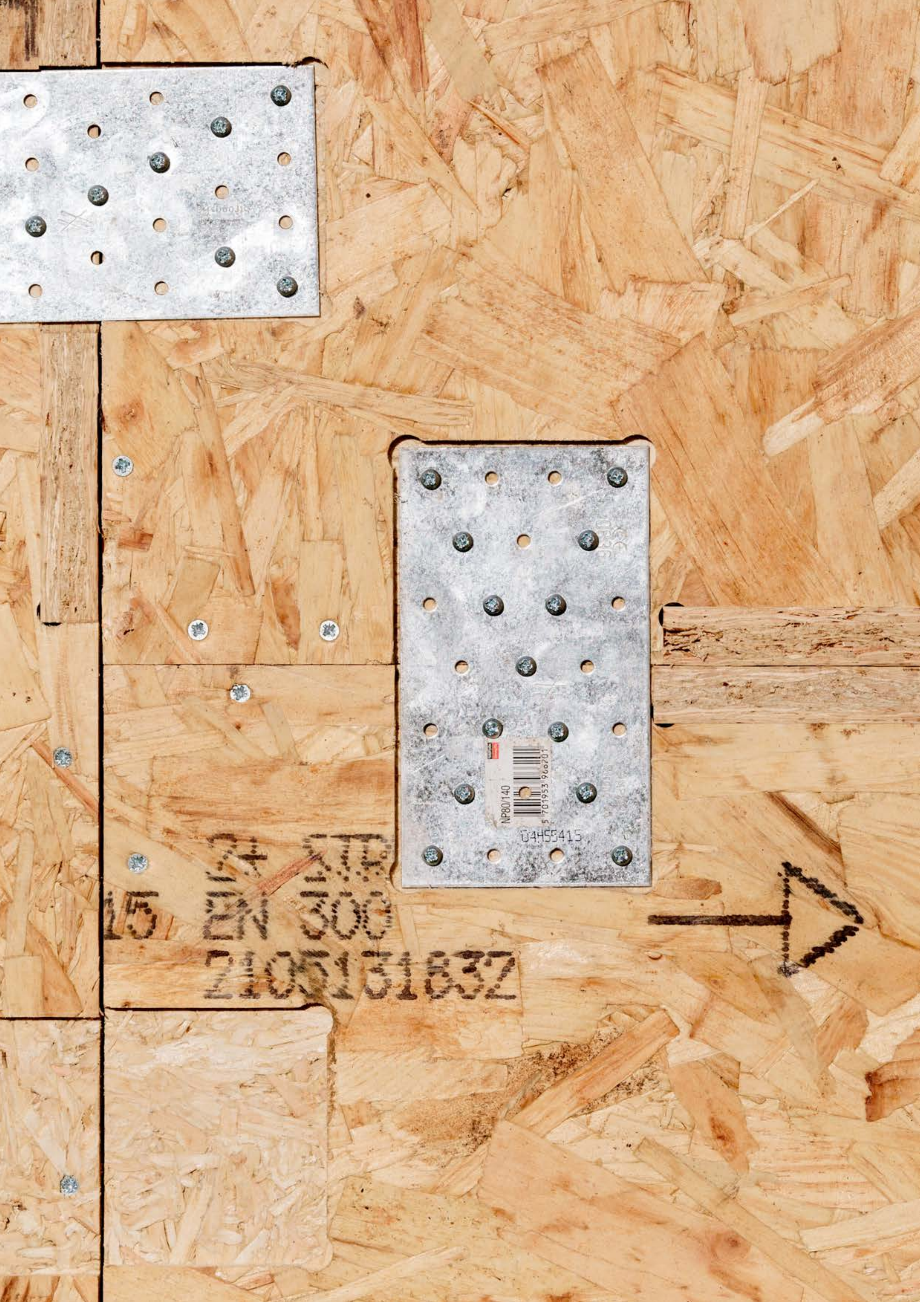
- Timber structural elements
- 60 minute K Class encapsulation
- Cavity barrier
- Fire stopping materials
- Airtightness
- Waterproofing

KEY CONSIDERATIONS

- ☐ Encapsulate all loadbearing timber cassettes to achieve K2 60 classification in line with BS EN 13501-2, with surface temperature limited to ≤ 200°C.
- ☐ Extend encapsulation beyond loadbearing partitions to maintain fire resistance if the partition is removed.
- ☐ Follow manufacturer's guidance to ensure the removable partition meets required performance criteria.
- ☐ Apply end grain sealant to all penetrations and exposed timber edges to prevent moisture ingress.
- ☐ Where relevant, Provide test data confirming REI 60 fire performance of the wall system. NB, BlokBuild structural insulated OSB cassettes achieve compliance.
- ☐ Acoustic performance is project specific. Designers should aim to or exceed Approved Document E standards by at least 5 dB where required. Address flanking noise, impact sound, and party junctions.







4. APPENDIX

4.1 GLOSSARY

AVCL: Air and vapour control layer. Continuous layer of impermeable material to prevent the movement of air and water vapour.

BIOBASED MATERIALS Materials derived from renewable biological sources, such as plants, animals, or microorganisms

BIOGENIC CARBON: The carbon absorbed and stored by plants as a natural consequence of their life cycle. In the context of timber-based products, this is the carbon sequestered by the tree as it grows, the carbon that continues to be stored in timber products over their lifetime.

CARBON: A collective term for greenhouse gases, often measured in carbon dioxide equivalent (CO^2e).

CARBON SEQUESTRATION: A natural or artificial process by which carbon dioxide is removed from the atmosphere and held in solid or liquid form, e.g. reforestation or, in the built environment through using timber.

CLIENT: The entity, individual, or organisation commissioning and funding a construction project, directly or indirectly.

DESIGN TEAM: Consultants appointed by the client to design a project. This may include architects, structural engineers, mechanical engineers, fire engineers, and other specialists.

DURABILITY: Ability of a constructed asset or any of its components to perform its required functions over a specified period of time without unforeseen maintenance or repairs.

DISASSEMBLY: Non-destructive taking apart of a construction work or constructed asset into constituent materials and components.

EMBODIED CARBON: The total carbon emissions associated with the production, transportation, and installation of building materials over a project's lifecycle.

EXTERNAL WALL: As defined in Building Regulations Approved Documents B.

FLAT ROOF: A roof with a maximum slope of less than 10 degrees from the horizontal.

GLULAM: Glued laminated timber (Glulam/GLT) is made from gluing layers of timber planks to create beams and columns of various sizes.

LIGHTWEIGHT TIMBER: A system of panellised structural walls and floors constructed from small-section timber studs clad with board products, in which the timber frame transmits vertical and horizontal loads to the foundations.

LIFE CYCLE ASSESSMENT A method for evaluating the environmental impact of a product, process, or building throughout its entire lifecycle - from raw material extraction and production to use, disposal, or recycling.

LIFE CYCLE COSTING A financial analysis method that assesses the total cost of a product, building, or system over its entire lifespan, including initial costs, operation, maintenance, and disposal.

LVL: A high-strength engineered wood product made by bonding multiple thin layers of wood veneers with adhesives.

MOISTURE: The humidity which, as a result of unforeseen events, leads to an increase in humidity in wooden components. Causes can be weathering during the construction phase, increased building moisture or convective moisture entry through leaks in the building envelope.

MOISTURE MANAGEMENT: All activities that are undertaken both to prevent moisture from entering a structure where it may cause damage as well as designing a structure to withstand unwanted moisture. Since moisture originates from various sources, such as built-in moisture from manufacturing, transport and storage of building materials; moisture loads from occupants and the surrounding air; outdoor climate, rain, snow, etc, it consequently affects all stages of building and maintenance.

NET ZERO: Net zero means cutting greenhouse gas emissions to as close to zero as possible, with any remaining emissions re-absorbed from the atmosphere, by oceans and forests for instance

OPERATIONAL CARBON: Refers to the emissions associated with energy used to operate the building or in the operation of infrastructure, including heating, hot water, cooling, ventilation, lighting systems, equipment and lifts.

PASSIVHAUS: A voluntary standard for achieving high energy efficiency in a building.

PITCHED ROOF: A roof with a slope of greater than 10 degrees from the horizontal.

GLULAM: Glued laminated timber (Glulam/GLT) is made from gluing layers of timber planks to create beams and columns of various sizes.

LIGHTWEIGHT TIMBER: A system of panellised structural walls and floors constructed from small-section timber studs clad with board products, in which the timber frame transmits vertical and horizontal loads to the foundations.

LIFE CYCLE ASSESSMENT A method for evaluating the environmental impact of a product, process, or building throughout its entire lifecycle - from raw material extraction and production to use, disposal, or recycling.

LIFE CYCLE COSTING A financial analysis method that assesses the total cost of a product, building, or system over its entire lifespan, including initial costs, operation, maintenance, and disposal.

LVL: A high-strength engineered wood product made by bonding multiple thin layers of wood veneers with adhesives.

MOISTURE: The humidity which, as a result of unforeseen events, leads to an increase in humidity in wooden components. Causes can be weathering during the construction phase, increased building moisture or convective moisture entry through leaks in the building envelope.

MOISTURE MANAGEMENT: All activities that are undertaken both to prevent moisture from entering a structure where it may cause damage as well as designing a structure to withstand unwanted moisture. Since moisture originates from various sources, such as built-in moisture from manufacturing, transport and storage of building materials; moisture loads from occupants and the surrounding air; outdoor climate, rain, snow, etc, it consequently affects all stages of building and maintenance.

NET ZERO: Net zero means cutting greenhouse gas emissions to as close to zero as possible, with any remaining emissions re-absorbed from the atmosphere, by oceans and forests for instance

OPERATIONAL CARBON: Refers to the emissions associated with energy used to operate the building or in the operation of infrastructure, including heating, hot water, cooling, ventilation, lighting systems, equipment and lifts.

PASSIVHAUS: A voluntary standard for achieving high energy efficiency in a building.

PITCHED ROOF: A roof with a slope of greater than 10 degrees from the horizontal.

PREFABRICATION: Prefabrication describes assemblies and/or components that are manufactured under factory conditions and then transported to construction sites for incorporation into a building.

PROGRAMME: Intersectoral programmes based on contents specified by the national government to achieve objectives defined by the government. Programmes usually involve collaboration between various ministries.

RENEWABLE MATERIAL: A natural resource or substance that regenerates naturally within a short period through ecological cycles or sustainable management, such as wood, wool or bamboo.

SEQUESTERED CARBON: Trees absorb CO_2 from the atmosphere while they grow. This CO_2 remains locked in timber until the end of its life and is referred to as 'sequestered carbon'.

TERRACE: External surface for amenity use, above an internal space, above ground level and with direct access from a building.

WALKWAY: Accessible deck walkway platform over an open space above ground level, with direct access from a building.

WELLBEING: A state of overall health, happiness, and prosperity, encompassing physical, mental, and social aspects.

WHOLE LIFE-CYCLE CARBON: The carbon emissions resulting from the materials, construction and the use of a building over its entire life, including its demolition and disposal. A WLC assessment provides a true picture of a building's carbon impact on the environment.

4.2 EXAMPLE LAYOUTS

The following pages present a worked example of the MultiMax System, developed by WeCanMake for a site in Bristol. This example demonstrates how the system's design principles can be applied flexibly to respond directly to site-specific constraints, while delivering well-proportioned, liveable homes.

WE CAN MAKE

All levels and dimensions are to be checked on site prior to construction or fabrication and any discrepancies reported to Architect immediately. Work to written dimension only, Do not scale from this drawings. The drawings and information contained are the intellectual property of WeCanMake and not to be re-distributed without explicit consent.

Legend

Indicates site boundary

Revisions

Revisions				
Rev	Description	Date	By	Chk
A	Pre-App Submission	30/10/24	CO	PT
B	DRAFT Planning	24/01/25	CO	PT

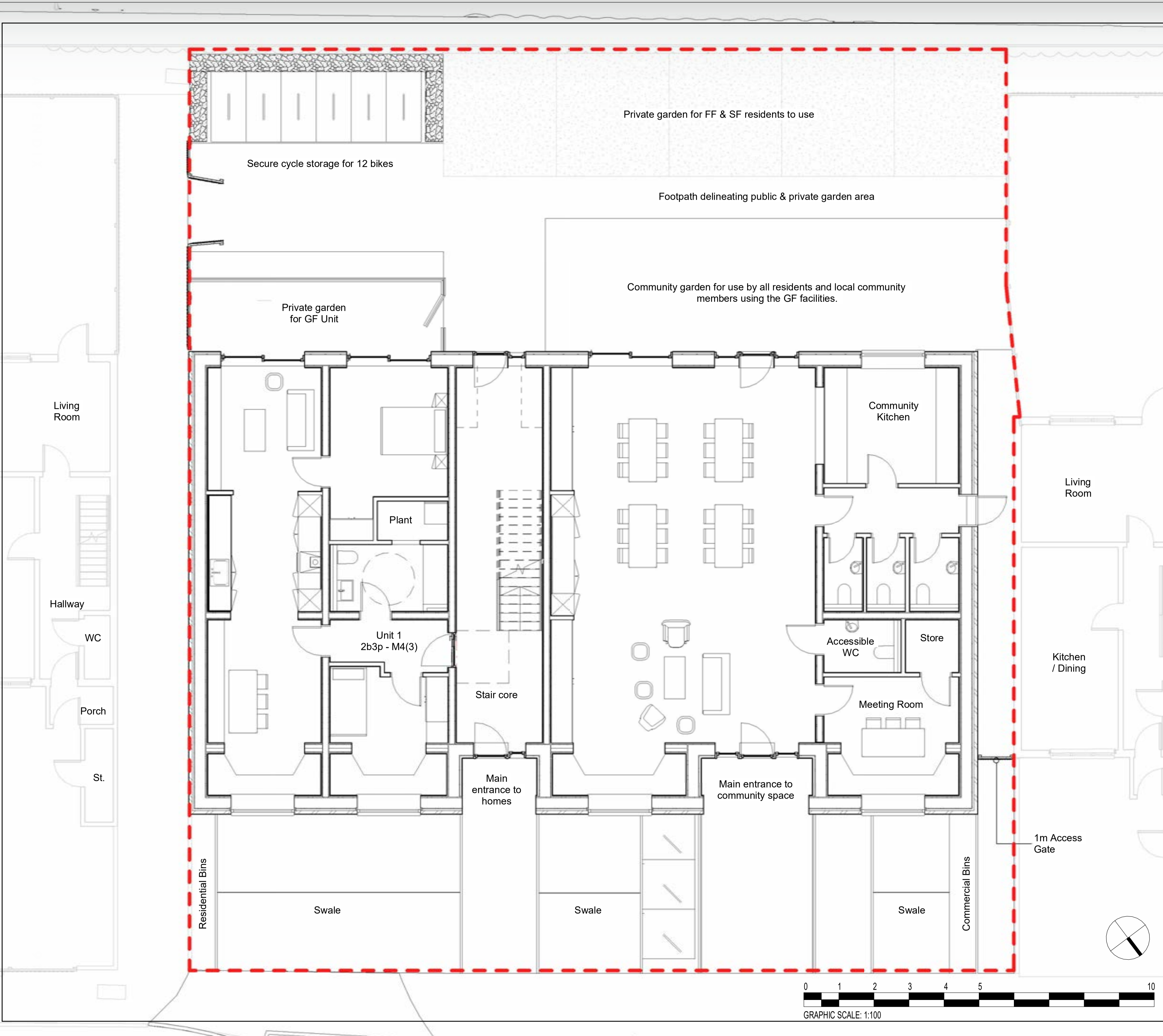
Project Rodfords Mead
Date 24/01/25
Drawn by CO

Sheet information

Site Plan as Proposed

24101-PL(2-)002

1 : 200



WE CAN MAKE

All levels and dimensions are to be checked on site prior to construction or fabrication and any discrepancies reported to Architect immediately. Work to written dimension only, Do not scale from this drawings. The drawings and information contained are the intellectual property of WeCanMake and not to be re-distributed without explicit consent.

Revisions

Revisions				
Rev	Description	Date	By	Chk
A	Pre-App Submission	30/10/24	CO	PT
B	DRAFT Planning	24/01/25	CO	PT

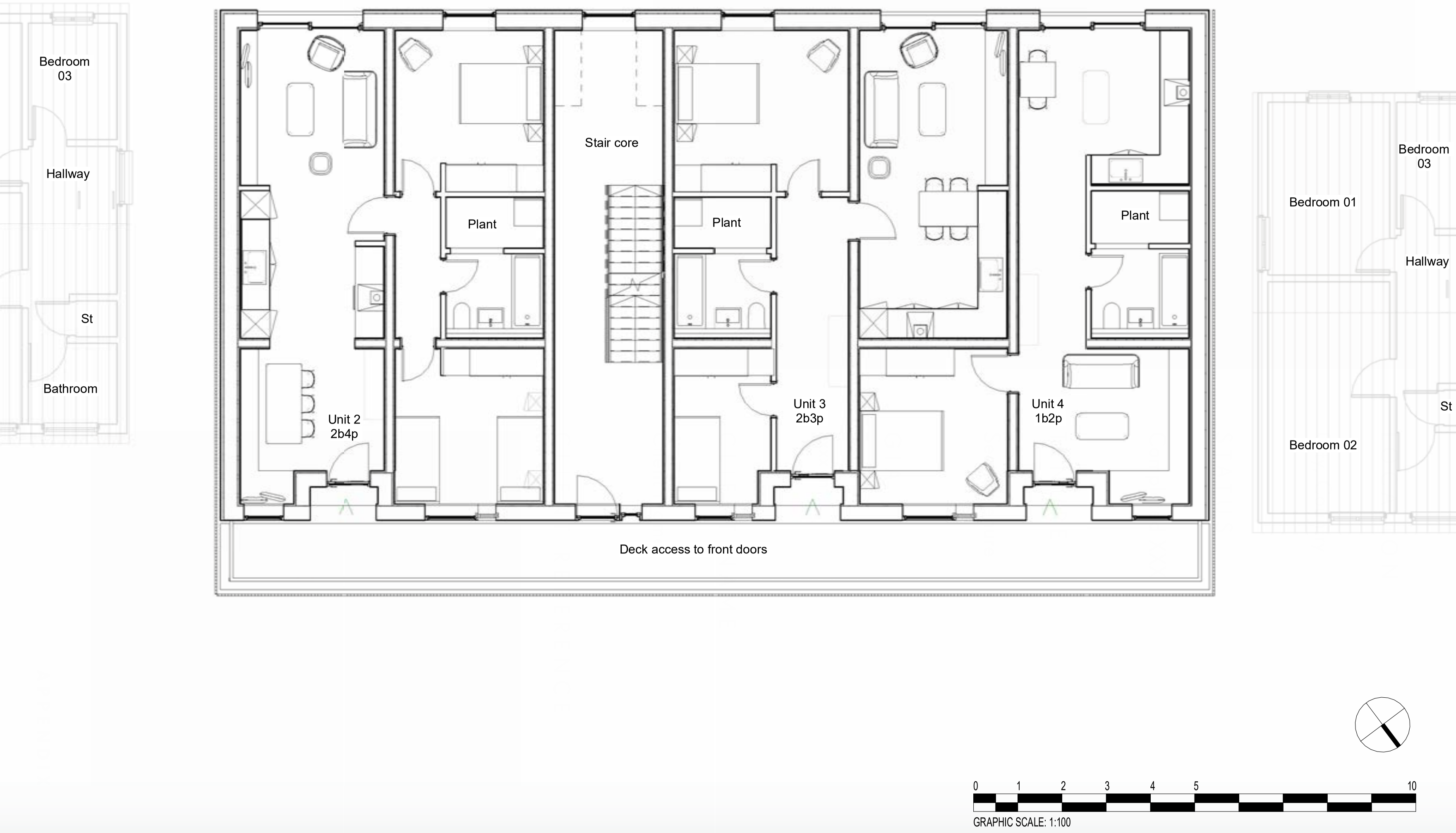
Project Rodfords Mead
Date 24/01/25
Drawn by CO

Sheet information

Ground Floor Plan as Proposed

24101-PL(2-)100

1 : 100



All levels and dimensions are to be checked on site prior to construction or fabrication and any discrepancies reported to Architect immediately. Work to written dimension only, Do not scale from this drawings. The drawings and information contained are the intellectual property of WeCanMake and not to be re-distributed without explicit consent.

Revisions

Revisions				
Rev	Description	Date	By	Chk
A	Pre-App Submission	30/10/24	CO	PT
B	DRAFT Planning	24/01/25	CO	PT

Project Rodfords Mead
Date 24/01/25
Drawn by CO

Sheet information

First Floor as Proposed

24101-PL(2-)101

1 : 100

All levels and dimensions are to be checked on site prior to construction or fabrication and any discrepancies reported to Architect immediately. Work to written dimension only, Do not scale from this drawings. The drawings and information contained are the intellectual property of WeCanMake and not to be re-distributed without explicit consent.

Revisions

Revisions				
Rev	Description	Date	By	Chk
A	Pre-App Submission	30/10/24	CO	PT
B	DRAFT Planning	24/01/25	CO	PT

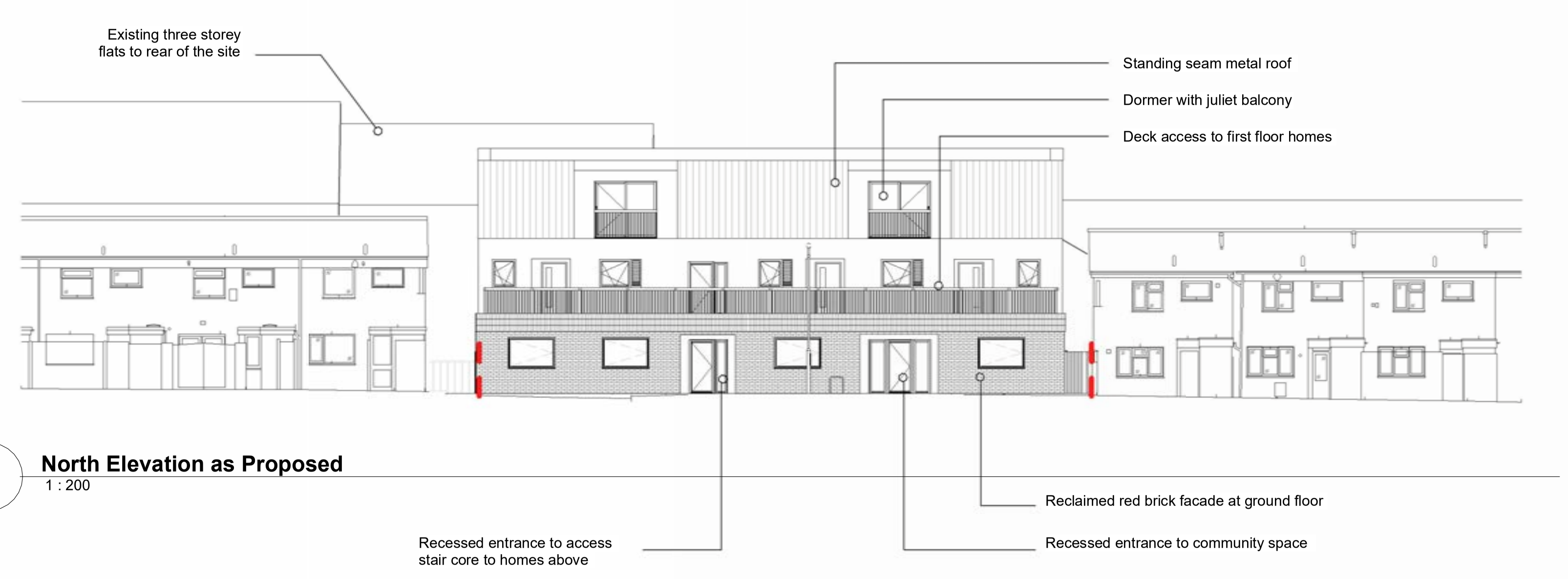
Project Rodfords Mead
Date 24/01/25
Drawn by CO

Sheet information

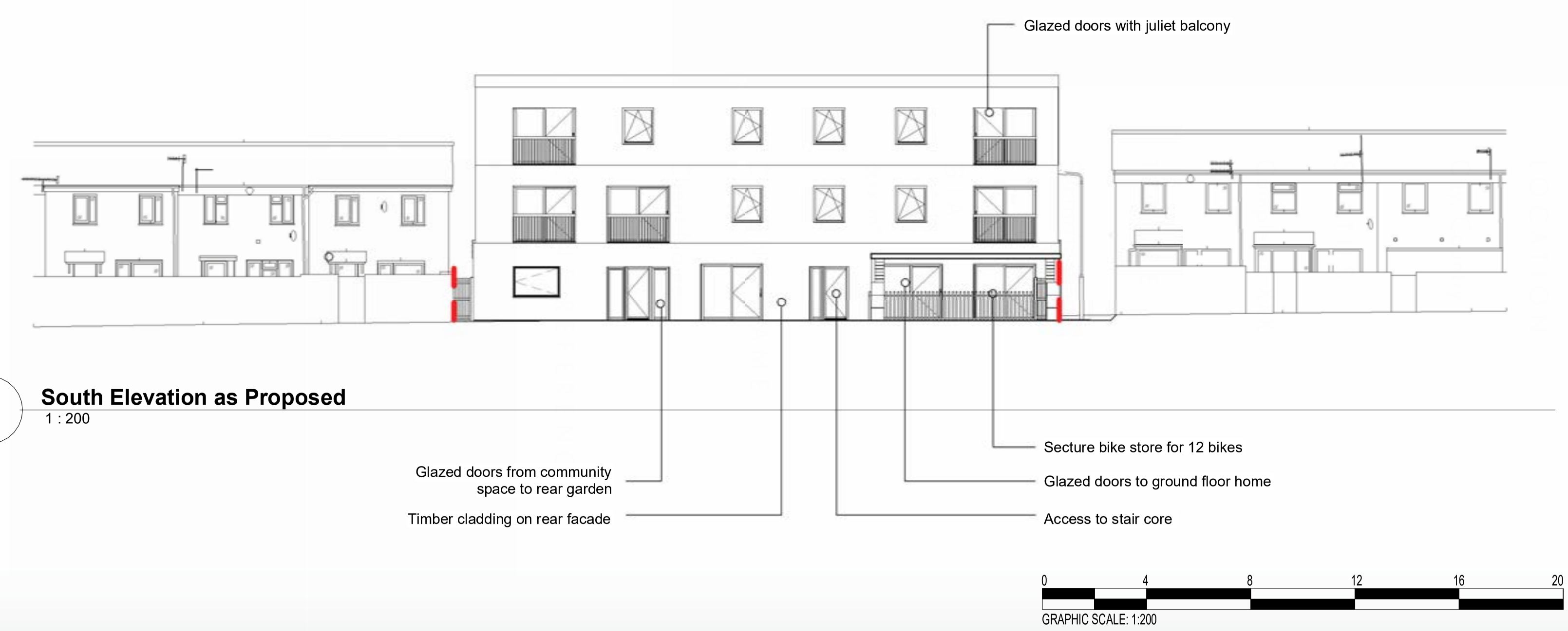
Second Floor as Proposed

24101-PL(2-)102

1 : 100



1 **North Elevation as Proposed**
1 : 200



2 **South Elevation as Proposed**
1 : 200

All levels and dimensions are to be checked on site prior to construction or fabrication and any discrepancies reported to Architect immediately. Work to written dimension only, Do not scale from this drawings. The drawings and information contained are the intellectual property of WeCanMake and not to be re-distributed without explicit consent.

Legend
Indicates site boundary

Revisions

Revisions				
Rev	Description	Date	By	Chk
A	Pre-App Submission	30/10/24	CO	PT
B	DRAFT Planning	24/01/25	CO	PT

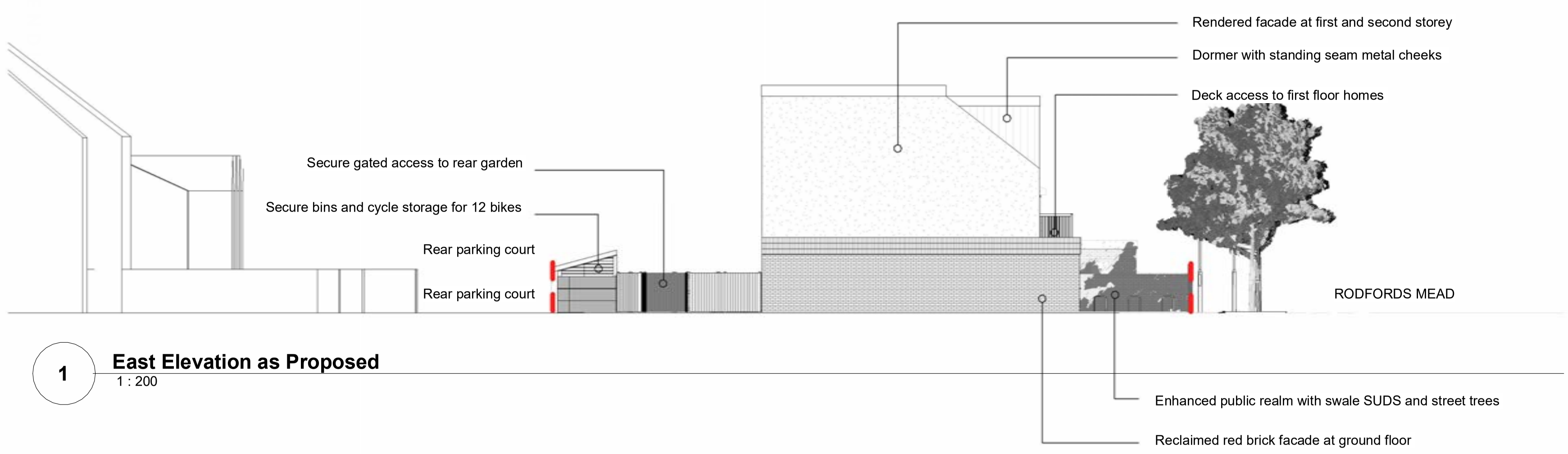
Project Rodfords Mead
Date 24/01/25
Drawn by CO

Sheet information

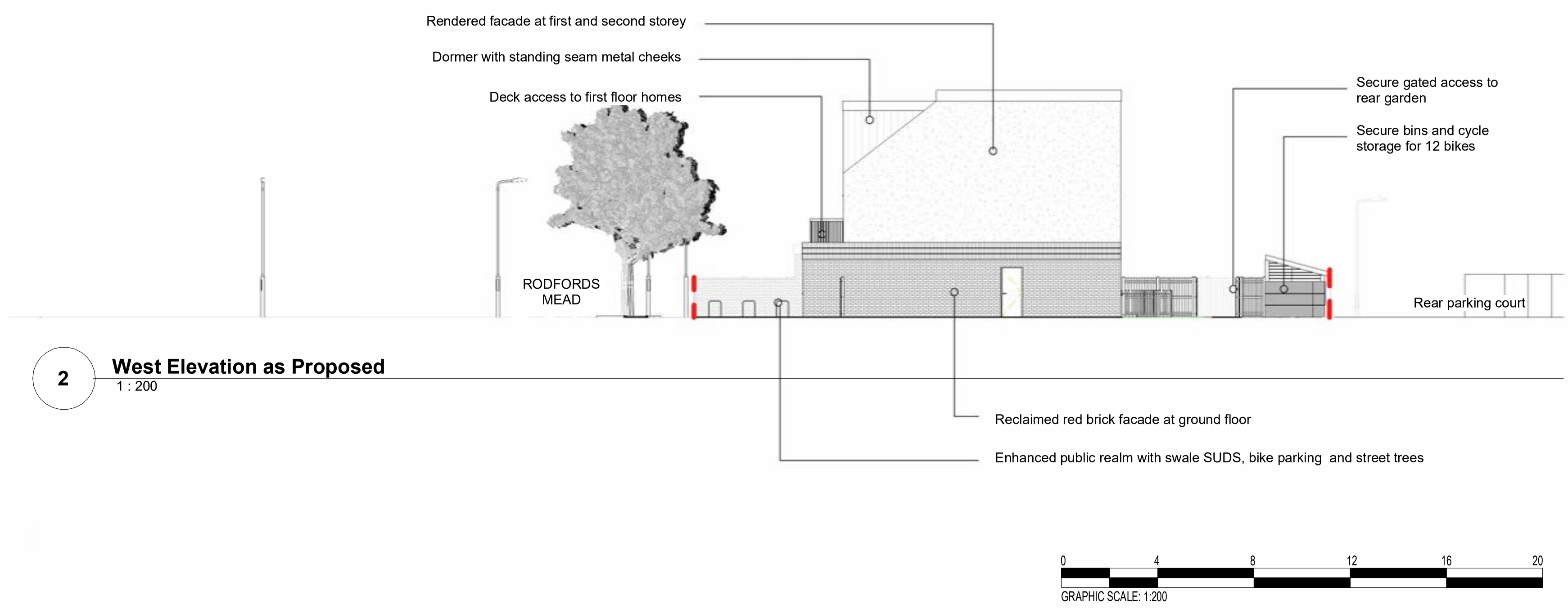
North & South Site Elevations as Proposed

24101-PL(2-)203

1 : 200



1 **East Elevation as Proposed**
1 : 200



2 **West Elevation as Proposed**
1 : 200

All levels and dimensions are to be checked on site prior to construction or fabrication and any discrepancies reported to Architect immediately. Work to written dimension only, Do not scale from this drawings. The drawings and information contained are the intellectual property of WeCanMake and not to be re-distributed without explicit consent.

Legend
Indicates site boundary

Revisions

Revisions				
Rev	Description	Date	By	Chk
A	Pre-App Submission	30/10/24	CO	PT
B	DRAFT Planning	24/01/25	CO	PT

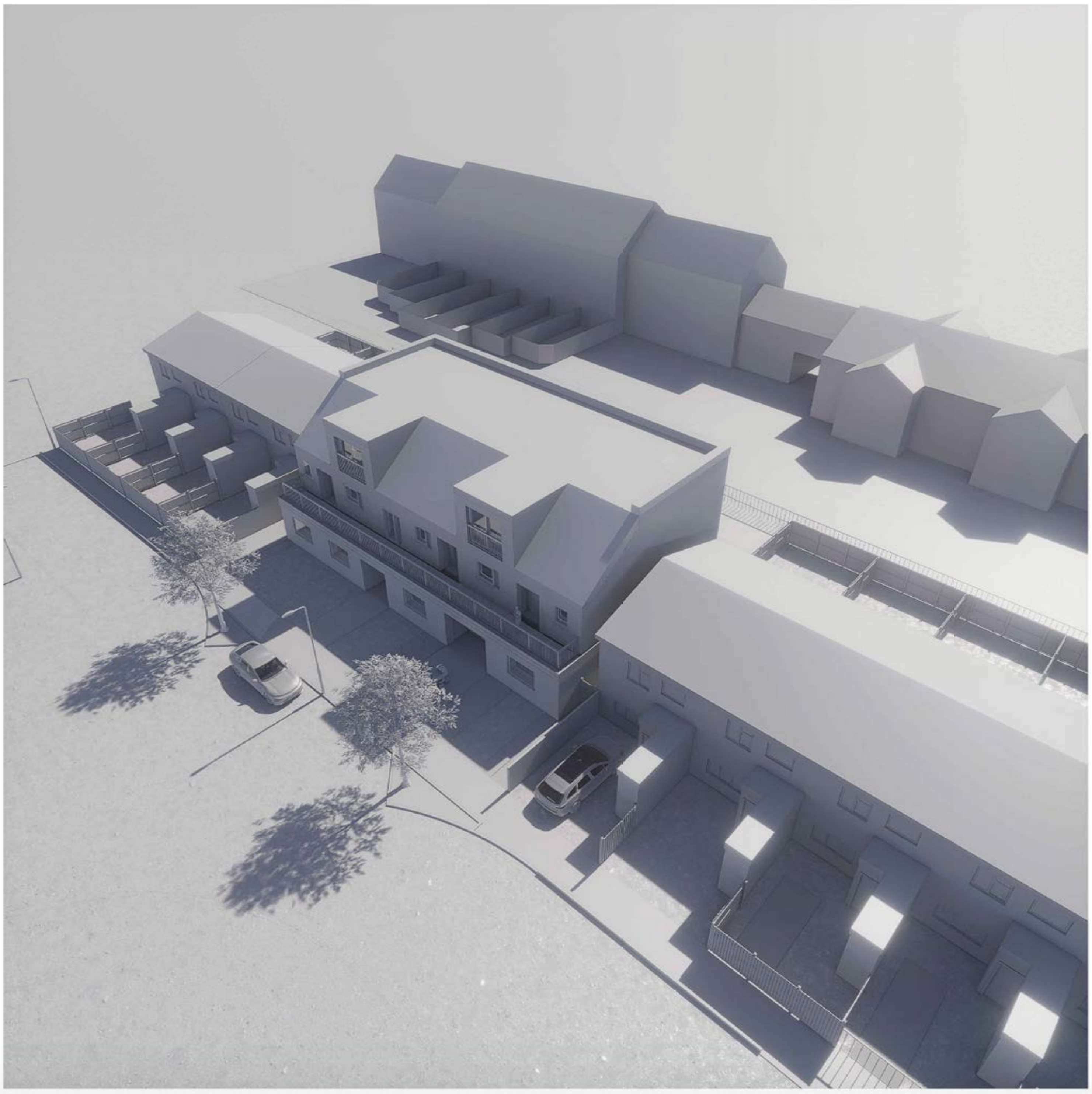
Project Rodfords Mead
Date 24/01/25
Drawn by CO

Sheet information

East & West Site Elevations as Proposed

24101-PL(2-)204

1 : 200



All levels and dimensions are to be checked on site prior to construction or fabrication and any discrepancies reported to Architect immediately. Work to written dimension only, Do not scale from this drawings. The drawings and information contained are the intellectual property of WeCanMake and not to be re-distributed without explicit consent.

Revisions

Revisions				
Rev	Description	Date	By	Chk
A	DRAFT Planning	24/01/25	CO	PT

Project Rodfords Mead
Date 27/01/25
Drawn by CO

Sheet information

3D Massing - Aerial View

24101-PL(2-)400

All levels and dimensions are to be checked on site prior to construction or fabrication and any discrepancies reported to Architect immediately. Work to written dimension only, Do not scale from this drawings. The drawings and information contained are the intellectual property of WeCanMake and not to be re-distributed without explicit consent.

Revisions

Revisions				
Rev	Description	Date	By	Chk
A	DRAFT Planning	24/01/25	CO	PT

Project Rodfords Mead
Date 27/01/25
Drawn by CO

Sheet information

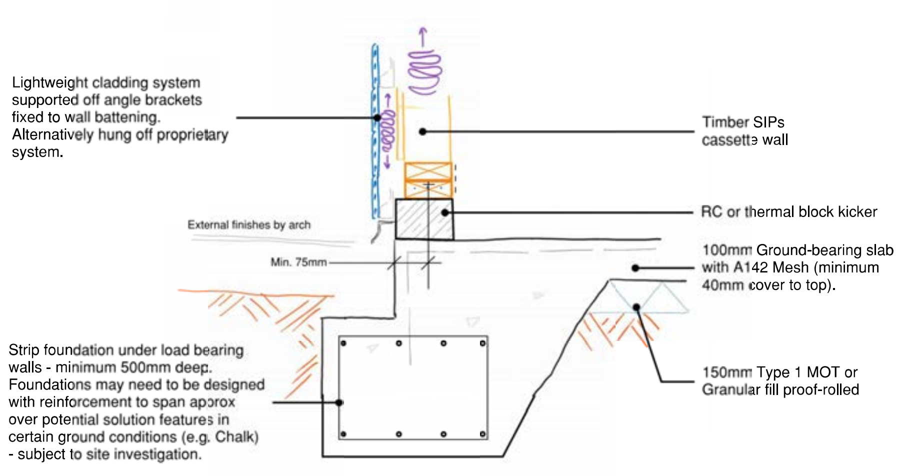
3D Massing - Street View

24101-PL(2-)403

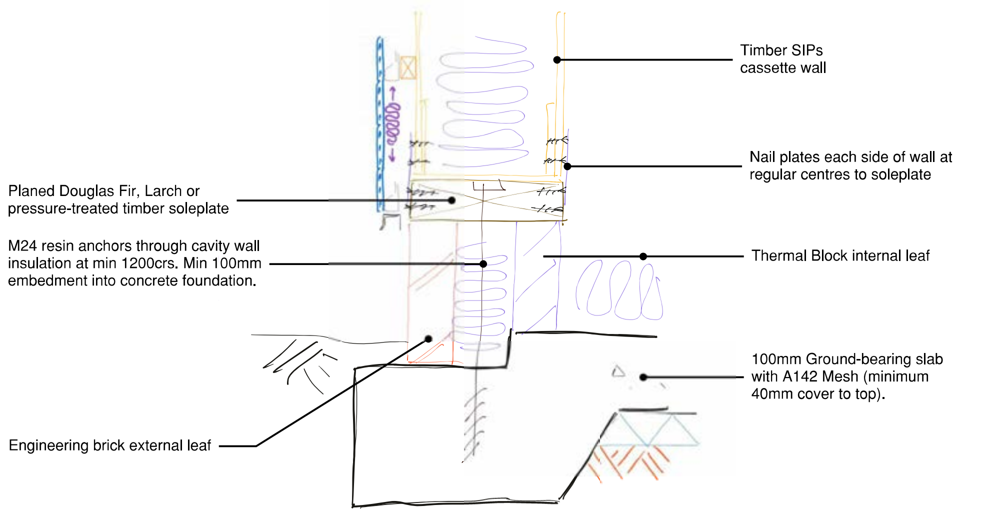
4.3 STRUCTURAL ENGINEER'S REPORT

The following pages feature drawings by Price & Myers, illustrating the structural design principles underpinning the MultiMax System.

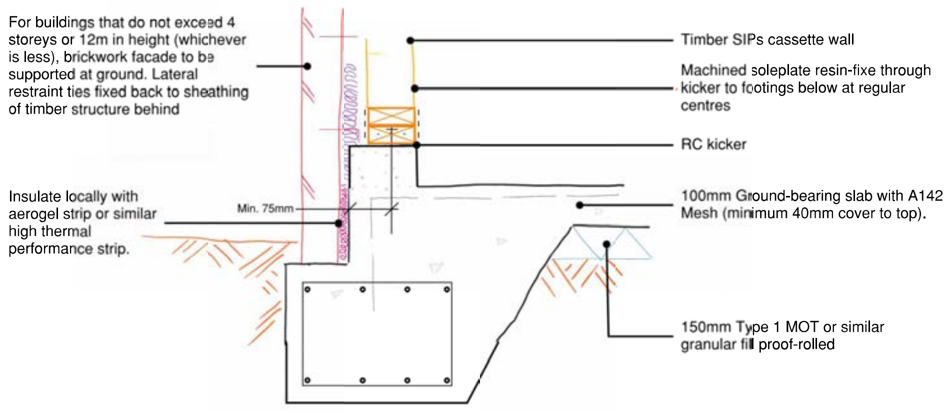
TYPICAL EXTERNAL FOUNDATION:
With hung facade / propietary cladding system



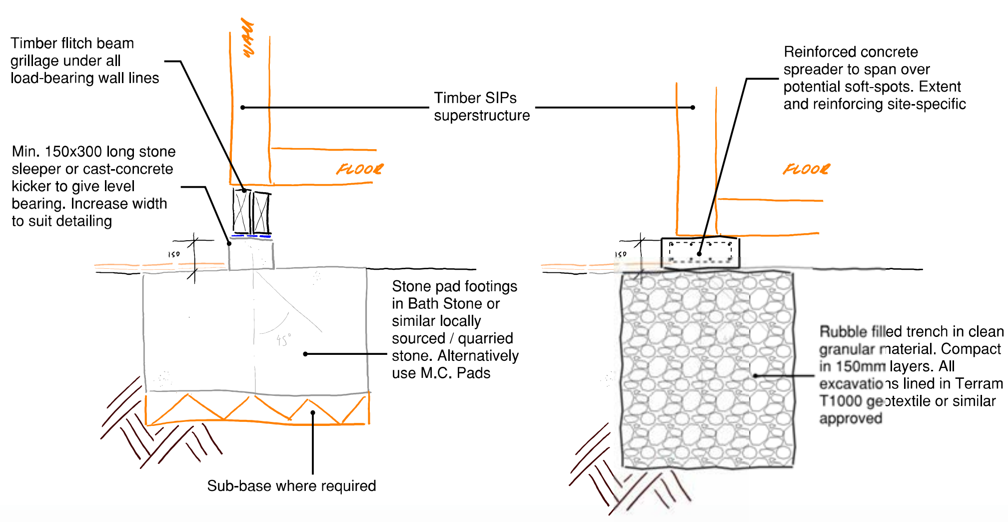
TYPICAL EXTERNAL FOUNDATION:
Where wall thickness is greater than minimum required size for higher thermal performance



TYPICAL EXTERNAL FOUNDATION:
With brick or similar masonry cladding



RENEGERATIVE FOUDNATION OPTIONS
S.I. findings permitting



NOTES:

- All items shown indicatively and subject to detailed structural analysis of each building type architectural layout, fire protection periods, finishing requirements and S.I information

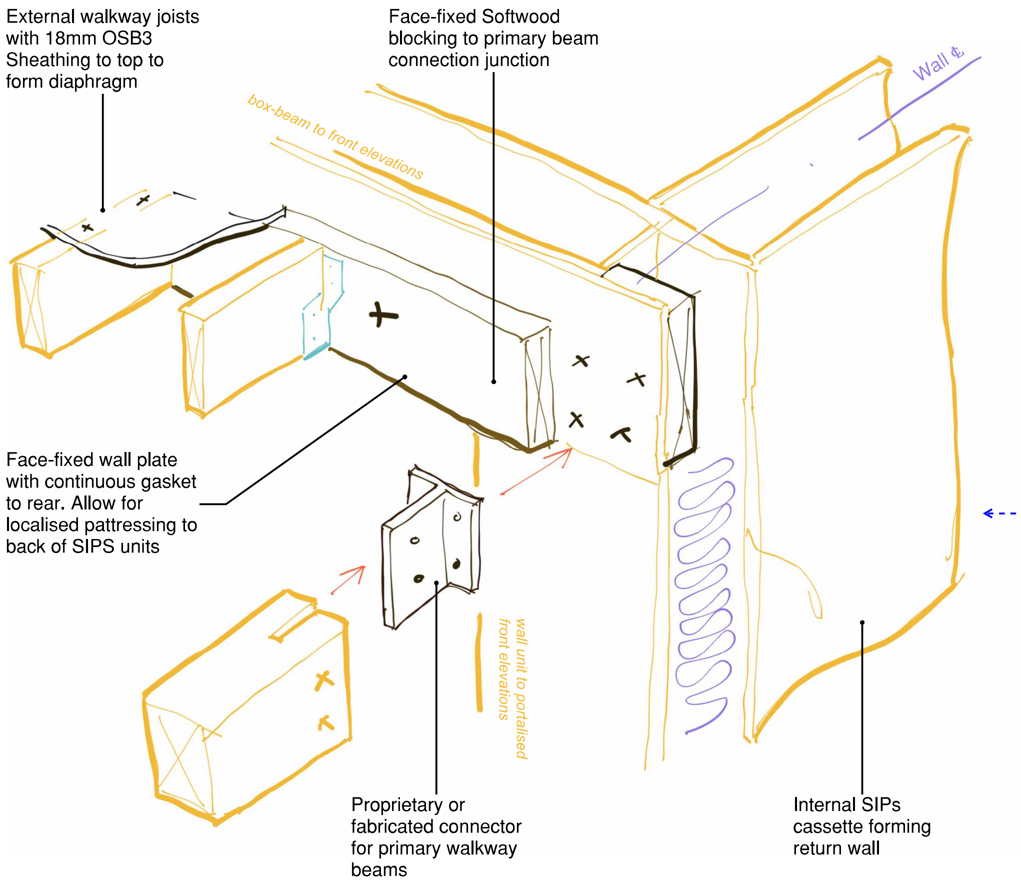
- The above is to be read in conjunction with relevant architectural information.

- Do not scale

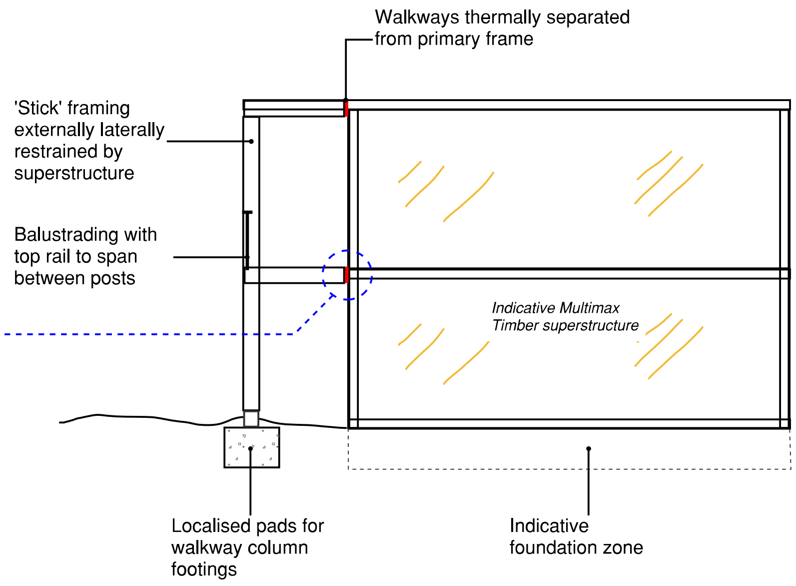
NOTES:

- All items shown indicatively and to be read in conjunction with the relevant system design guide and Architect's specification

- Final arrangements for connection detailing, stability considerations and foundation information subject to site-specific derivation of ground and environmental conditions.



ISOMETRIC WALKWAY CONNECTION DETAIL
Not to scale

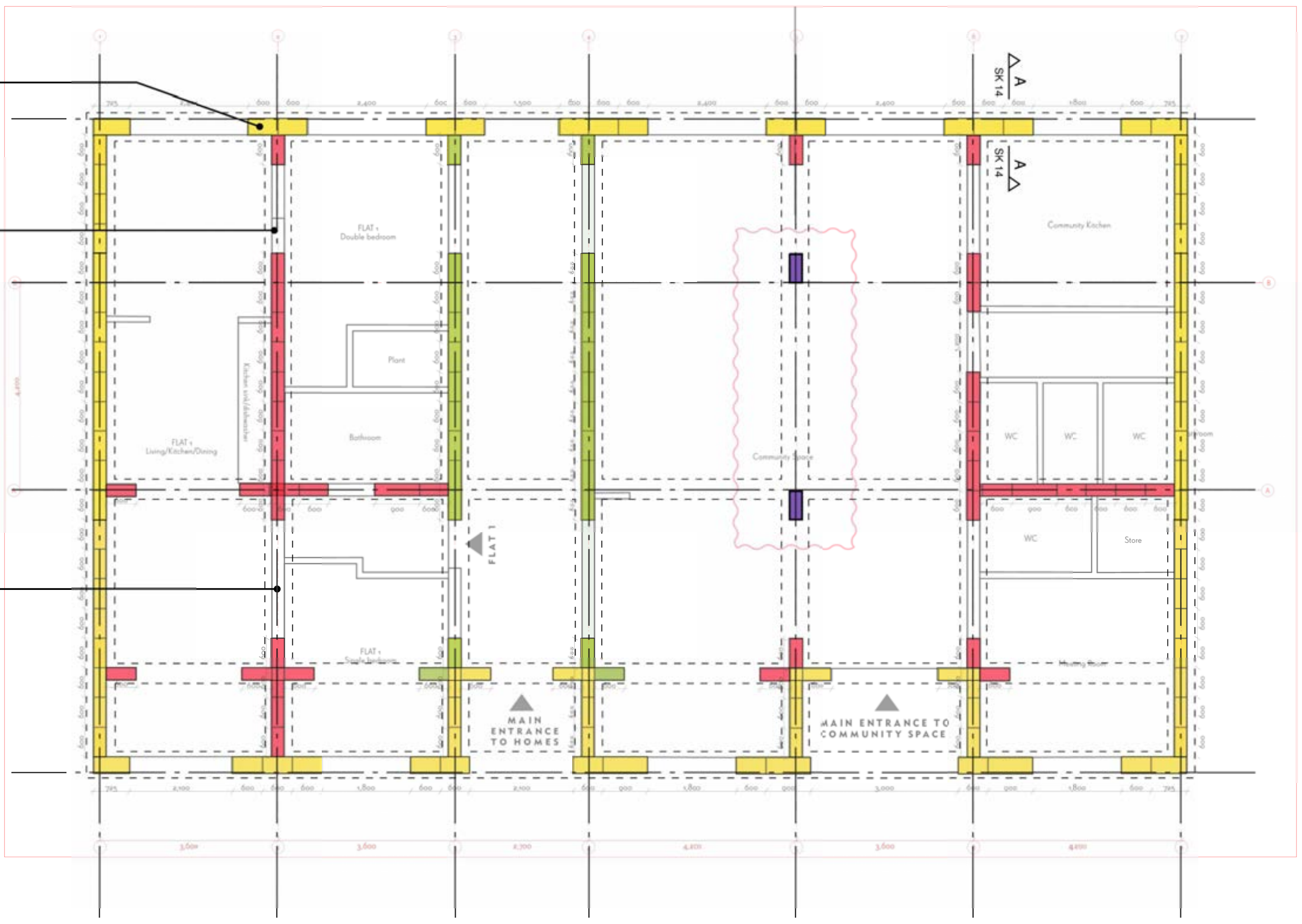


INDICATIVE WALKWAY SECTION
Not to scale

PRICE& MYERS

Job No.	29113	Page	SK 03b	Rev	6
Date	21/03/25	Eng	HS	Chd	BBe
Job	MultiMax System				

RODSFORD MEAD: Ground floor plan



Key:

- Structural external wall
- Structural Party Wall
- Structural Internal Partition
- Structural cassette column (double skin and ribs)

Notes:

- All items shown indicatively and subject to detailed design with input regarding site specific ground conditions, fire protection periods and finishing requirements to be agreed with building control

- The above is to be read in conjunction with relevant architectural information.

- Do not scale

PRICE& MYERS

Job No.	29113	Page	SK 04b	Rev	5
Date	21/03/24	Eng	HS	Chd	BB
Job	MultiMax system				

RODSFORD MEAD: First floor plan

KEY:

- B1 Blokbuild OSB box beam with addn'l ribs
- B2 Blokbuild OSB box beam
- B3 Blokbuild HD OSB box beam
- Internal Floors: 225dpx72 MiTek posi joists at 400 crs with 18mm OSB3 to top.
- Structural external wall
- Structural Party Wall
- Structural Internal Partition
- Structural cassette column (double skin and ribs)

NOTES:

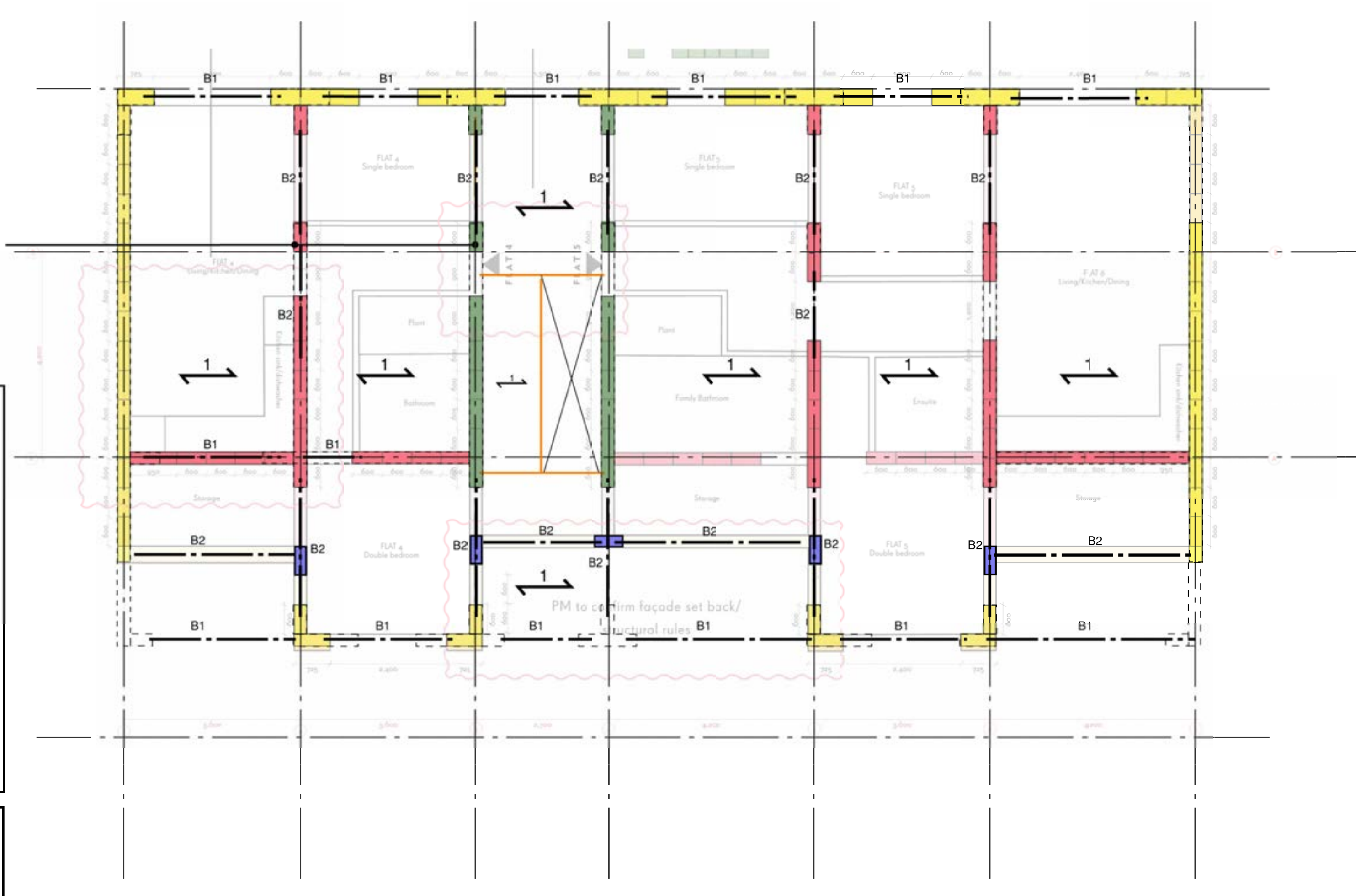
- All items shown indicatively and subject to detailed design with input regarding site specific ground conditions, fire protection periods and finishing requirements to be agreed with building control

- The above is to be read in conjunction with relevant architectural information.

- Do not scale

Job No.	29113	Page	SK 05b	Rev	5
Date	12/08/24	Eng	HS	Chd	BB
Job	Microhouse Project - Multimax				

RODSFORD MEAD: Second floor plan



KEY:

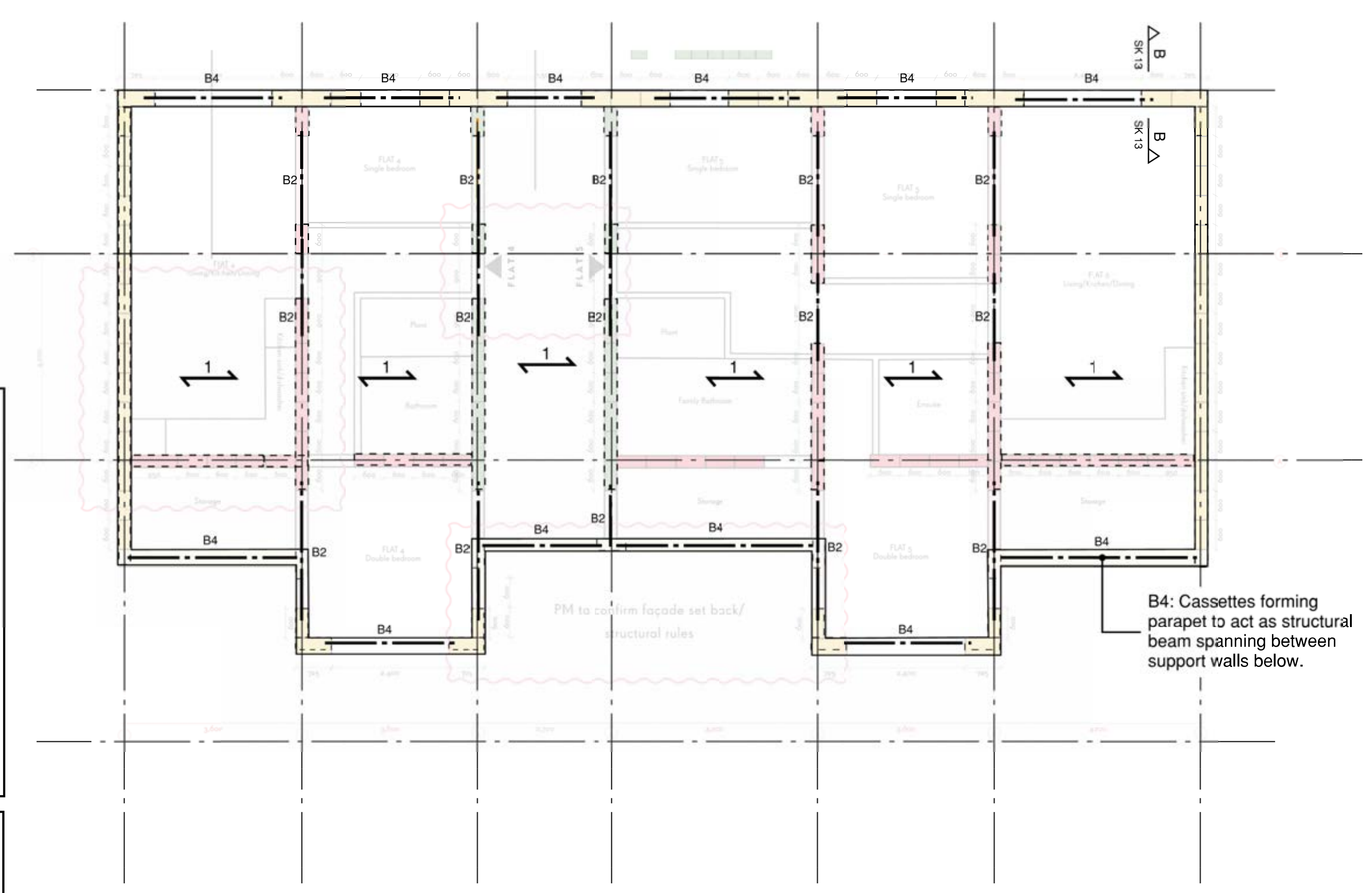
- B1 Blokbuild OSB box beam with addn'l ribs
- B2 Blokbuild OSB box beam
- B3 Blokbuild HD OSB box beam
- Internal Floors: 225dpx72 MiTek posi joists at 400 crs with 18mm OSB3 to top.
- Structural external wall
- Structural Party Wall
- Structural Internal Partition
- Structural cassette column (double skin and ribs)

NOTES:

- All items shown indicatively and subject to detailed design with input regarding site specific ground conditions, fire protection periods and finishing requirements to be agreed with building control
- The above is to be read in conjunction with relevant architectural information.
- Do not scale

Job No.	29113	Page	SK 06b	Rev	5
Date	12/08/24	Eng	HS	Chd	BB
Job	Microhouse Project - Multimax				

RODSFORD MEAD: Second floor plan



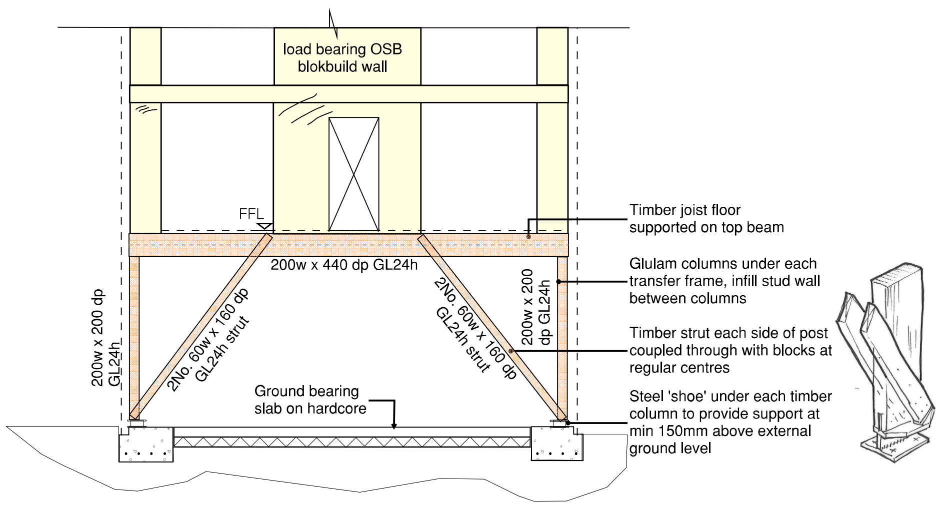
KEY:

- B1 Blokbuild OSB box beam with addn'l ribs
- B2 Blokbuild OSB box beam
- B3 Blokbuild HD OSB box beam
- Internal Floors: 225dpx72 MiTek posi joists at 400 crs with 18mm OSB3 to top.
- Structural external wall
- Structural Party Wall
- Structural Internal Partition
- Structural cassette column (double skin and ribs)

NOTES:

- All items shown indicatively and subject to detailed design with input regarding site specific ground conditions, fire protection periods and finishing requirements to be agreed with building control
- The above is to be read in conjunction with relevant architectural information.
- Do not scale

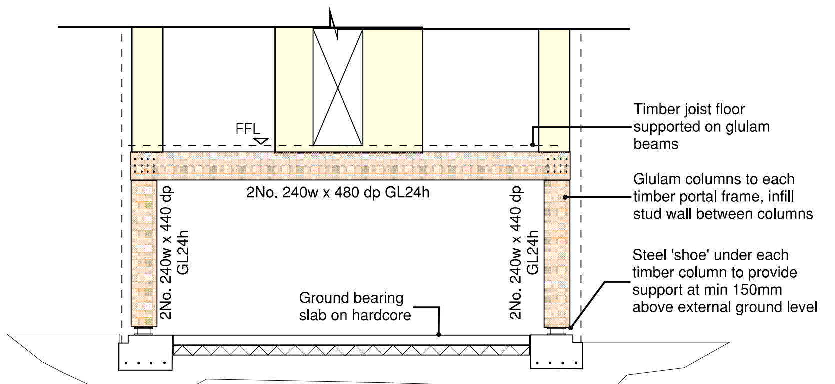
FRAME OPTION 1 - STRUT BRACING



Advantages
+ Efficient design results in smaller timber sections
+ Simpler connection detailing
+ Exposed timber may add to the character of the space

Disadvantages
- Encroaches into internal space at ground floor
- More exposed timber which may be difficult to fire proof for some commercial building uses.
- Fire treatment/charring to timber required

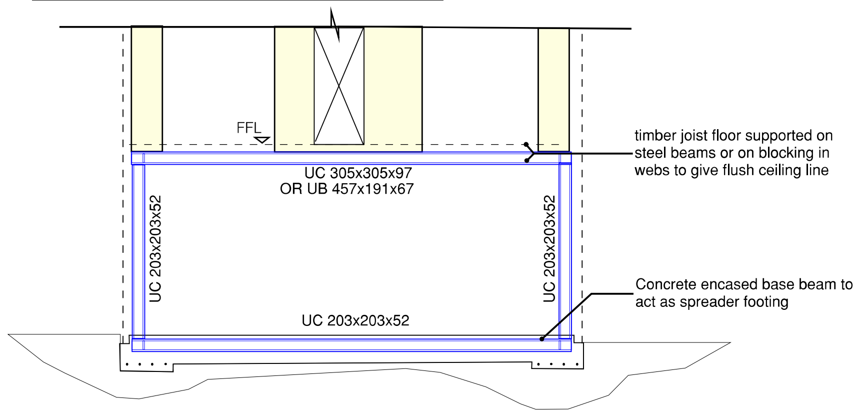
FRAME OPTION 2 - GLULAM PORTAL FRAME



Advantages
+ All timber - consider visual grading?

Disadvantages
- Fire treatment/charring to timber required
- Deeper structure at ground

FRAME OPTION 3 - STEEL PORTAL FRAME



Advantages
+ Simple delineation between trades
+ Well established sequencing
+ Easier to justify a higher fire resistance

Disadvantages
- Higher embodied energy
- Heavier structural sections for installation

SYSTEM APPROACH:

1. A transfer structure is required where the ground floor use differs from residential and an open plan space is required under stacking wall lines.

2. The framing typologies shown above must align with the structural grid to floor above for consistent transfer of vertical load.

3: Frame spans can be 8m from column centre-centre and at maximum grid spacings of 3.9m apart

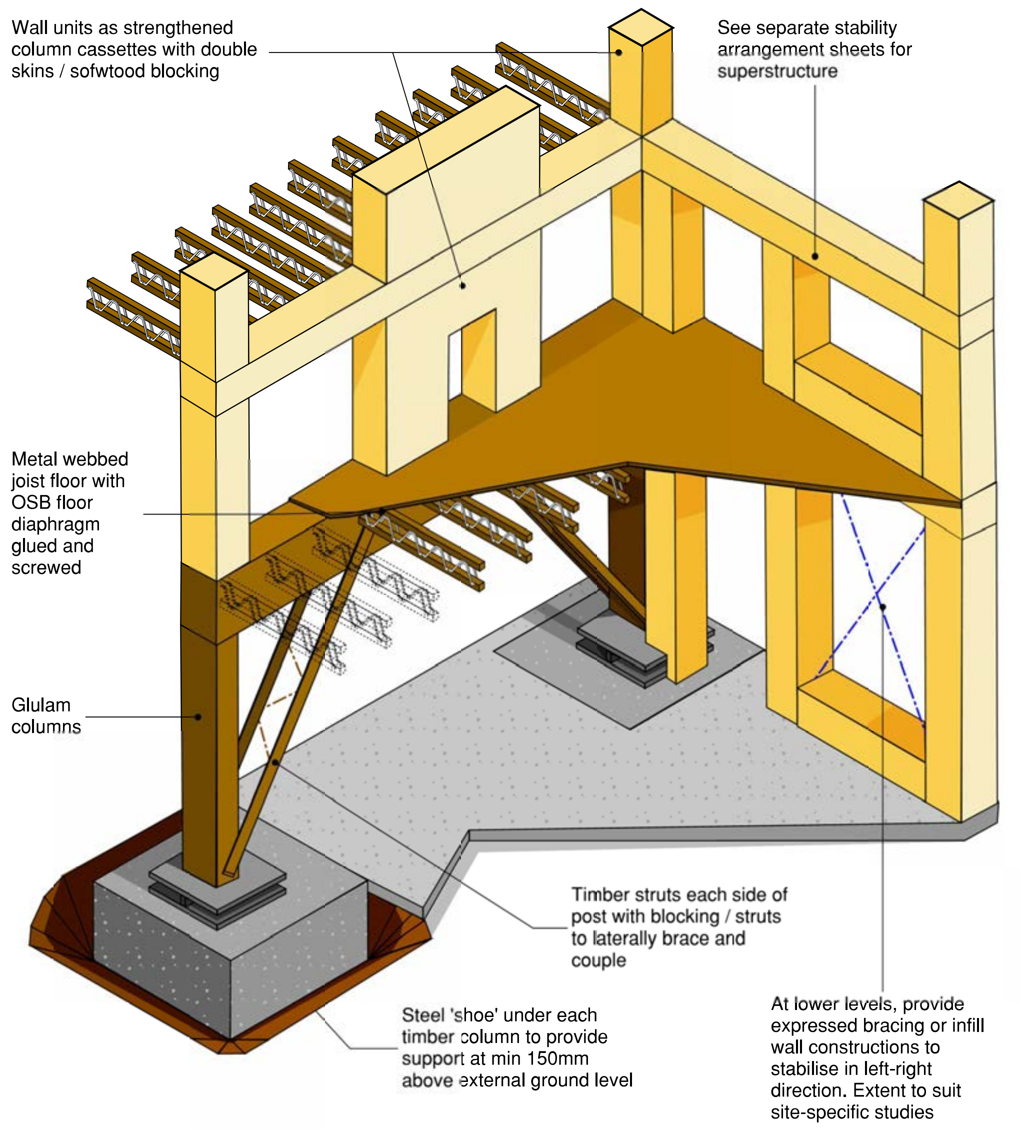
NOTES:

- All items shown indicatively and subject to detailed structural analysis of each building type architectural layout, fire protection periods, finishing requirements and S.I information

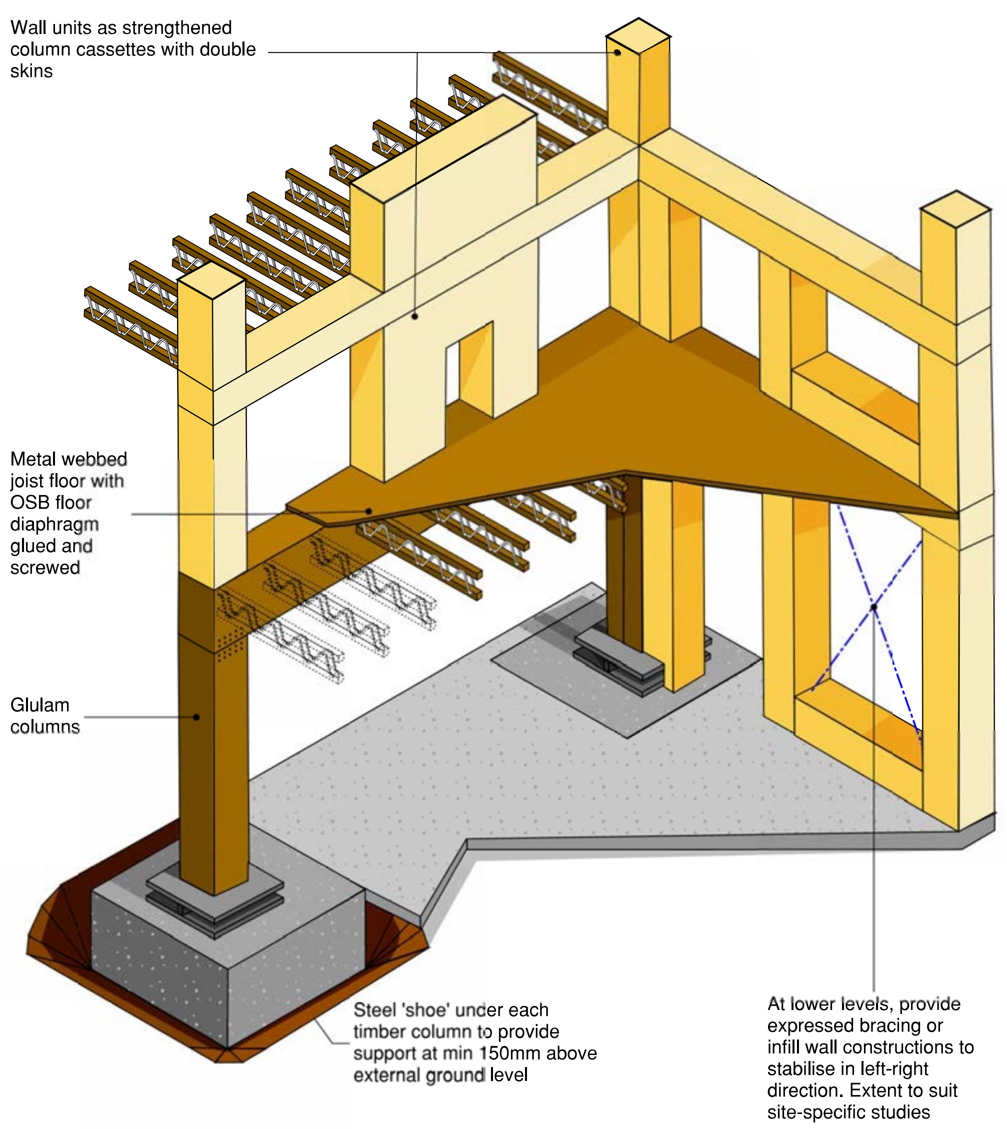
- The above is to be read in conjunction with relevant architectural information.

- Do not scale

TIMBER SUPERSTRUCTURE STABILITY PARAMETERS:
GROUND FLOOR MIXED-USES WITH TRANSFER STRUCTURE ARRANGEMENTS



FRAME OPTION 1: TIMBER TRANSFER FRAME WITH STRUT BRACING



FRAME OPTION 2: GLULAM PORTAL FRAME

NOTES:

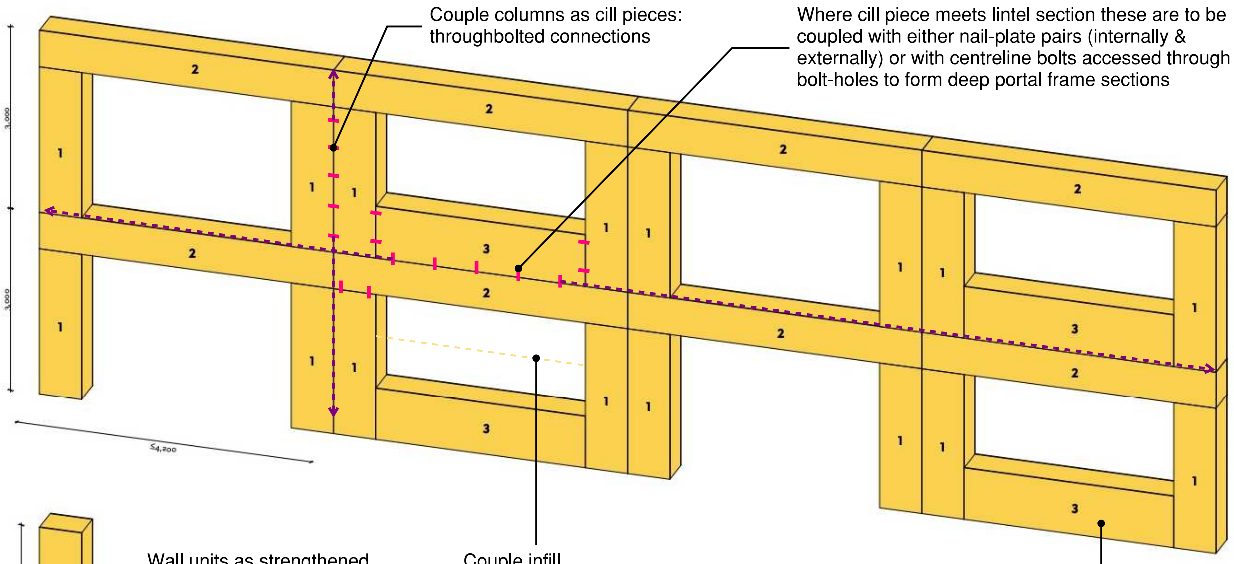
- All items shown indicatively and to be read in conjunction with the relevant system design guide and Architect's specification

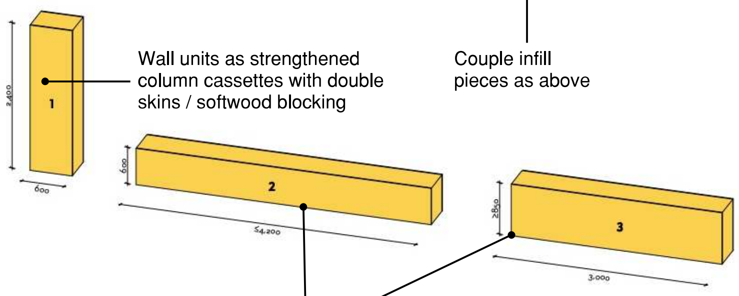
- Final arrangements for connection detailing, stability considerations and foundation information subject to site-specific derivation of ground and environmental conditions.

PRICE&
MYERS

Job No.	29113	Page	SK 09	Rev	2
Date	24/03/25	Eng	HS	Chd	BB
Job	MultiMax system				

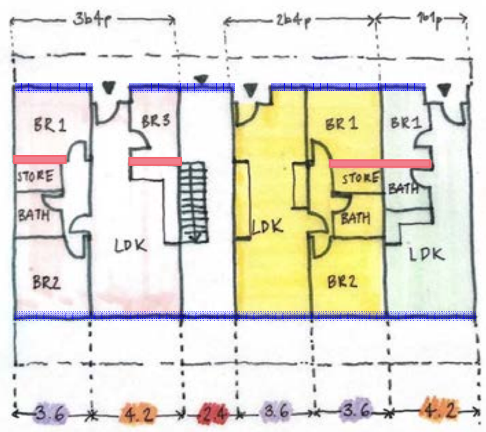
TIMBER SUPERSTRUCTURE STABILITY PARAMETERS:
FRONT AND REAR ELEVATION STABILITY



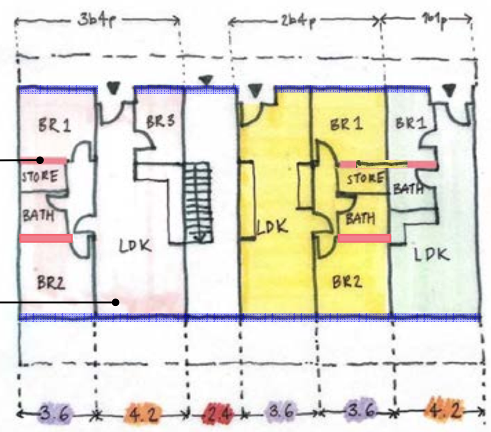


Refer to SK10 for Front-back wall flexibility.

Left-Right stability parameters for internal walls



OPT 1



OPT 2

Internal left-right stabilising walls

External elevation stabilising walls - see left side of page for portalising parameters

ISOMETRIC WALKWAY CONNECTION DETAIL
Not to scale

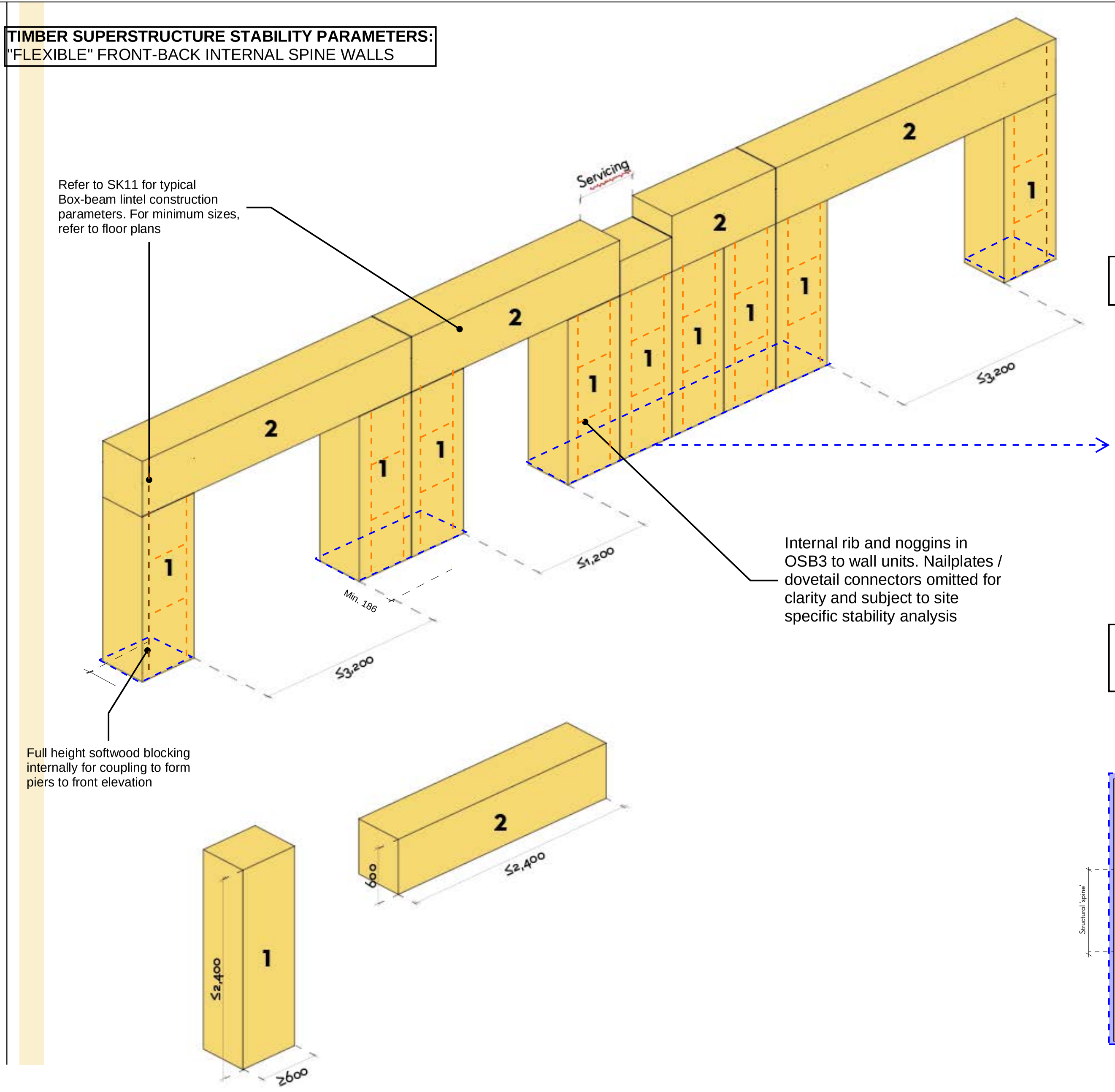
NOTES:

- All items shown indicatively and to be read in conjunction with the relevant system design guide and Architect's specification
- Final arrangements for connection detailing, stability considerations and foundation information subject to site-specific derivation of ground and environmental conditions.
- All skins are assumed to be 18mm OSB3/4 by SmartPly or similar approved
- All skins are to be glued and screwed using a polyurethane construction grade glue

PRICE&
MYERS

Job No.	29113	Page	SK 10	Rev	2
Date	24/03/25	Eng	HS	Chd	BB
Job	MultiMax system				

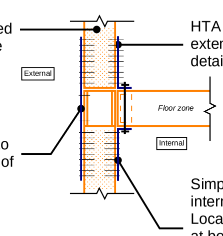
TIMBER SUPERSTRUCTURE STABILITY PARAMETERS:
"FLEXIBLE" FRONT-BACK INTERNAL SPINE WALLS



NOTES:

- All items shown indicatively and to be read in conjunction with the relevant system design guide and Architect's specification
- Final arrangements for connection detailing, stability considerations and foundation information subject to site-specific derivation of ground and environmental conditions.
- All skins are assumed to be 18mm OSB3/4 by SmartPly or similar approved
- All skins are to be glued and screwed using a polyurethane construction grade glue

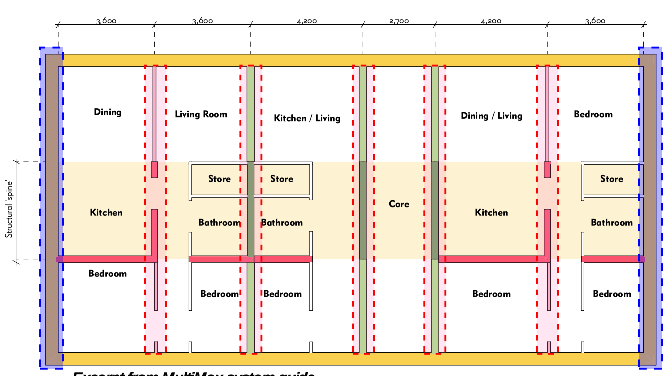
At floor junctions couple through to form vertically cantilevering spine walls:



Front-back stability parameters for internal walls

Internal front-back stabilising walls

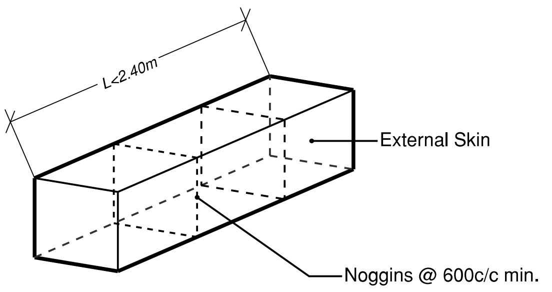
Fully blocked end-bays with nominal window openings

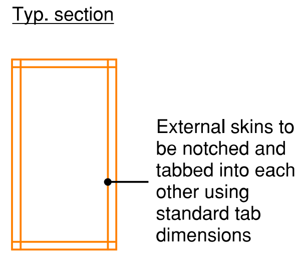


Excerpt from MultiMax system guide

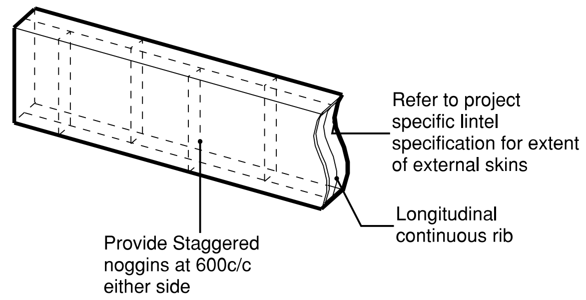
BOX BEAM & INTERNAL LINTEL CONSTRUCTION GUIDELINES

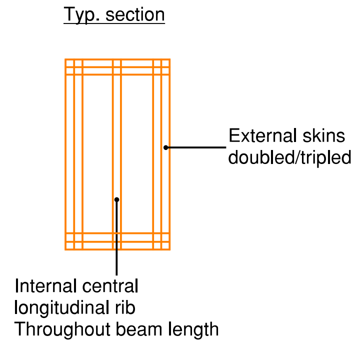
NORMAL DUTY BOX-BEAMS less than 2400mm long:
Construct out of single 18mm OSB3/4sheets to form un-lapped external skin lengths



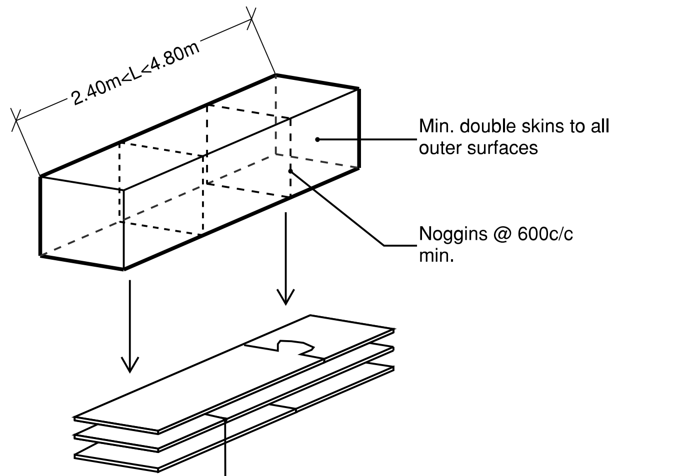


HEAVY-DUTY BOX-BEAMS for high loads and maximum 4400mm long spans
Construct out of minimum double-skins sheets to lap larger spans





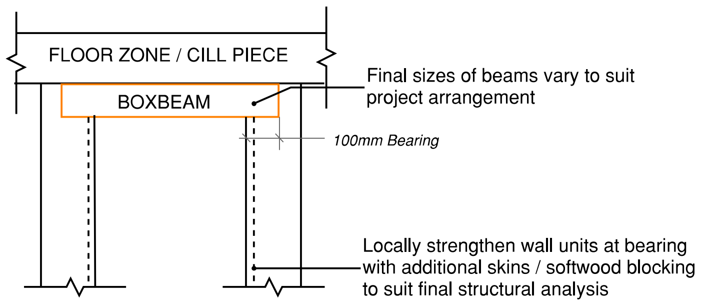
NORMAL DUTY BOX-BEAMS 2400-3600mm long:
Construct out of minimum double-skins sheets to lap larger spans



For double/triple external skins:

Top and bottom skins: laps staggered @ 1/3 points of span
Side skins: @ 1/2 and 1/4 points of span
Alternate laps to adjoining sheets to give continuous surface
CNC'd Dovetail detail at seams

WALL BEARINGS



NOTES:

- All items shown are indicative parameters for the general construction of boxbeam / lintel elements. Refer to project specific information for the particular construction of each element size and relevant loading criterias
- All skins are assumed to be 18mm OSB3/4 by SmartPly or similar approved
- All skins are to be glued and screwed using a polyurethane construction grade glue

DISPROPORTIONATE COLLAPSE REQUIREMENTS SUMMARY

The proposed use of the Multimax system falls into the Consequence Class 2A for disproportionate collapse detailing, this typically covers:

- Flats, apartments and other residential buildings not exceeding 4 storeys.
- Offices not exceeding 4 storeys.
- Industrial buildings not exceeding 3 storeys.
- Retail premises not exceeding 3 storeys of less than 1000 m² floor area in each storey.

Provided that no part of the building has a use that exceeds the above, the buildings can be designed for class 2A. Uses for the ground floor commercial space that would require higher classification include:

- Educational buildings
- Buildings of medical use

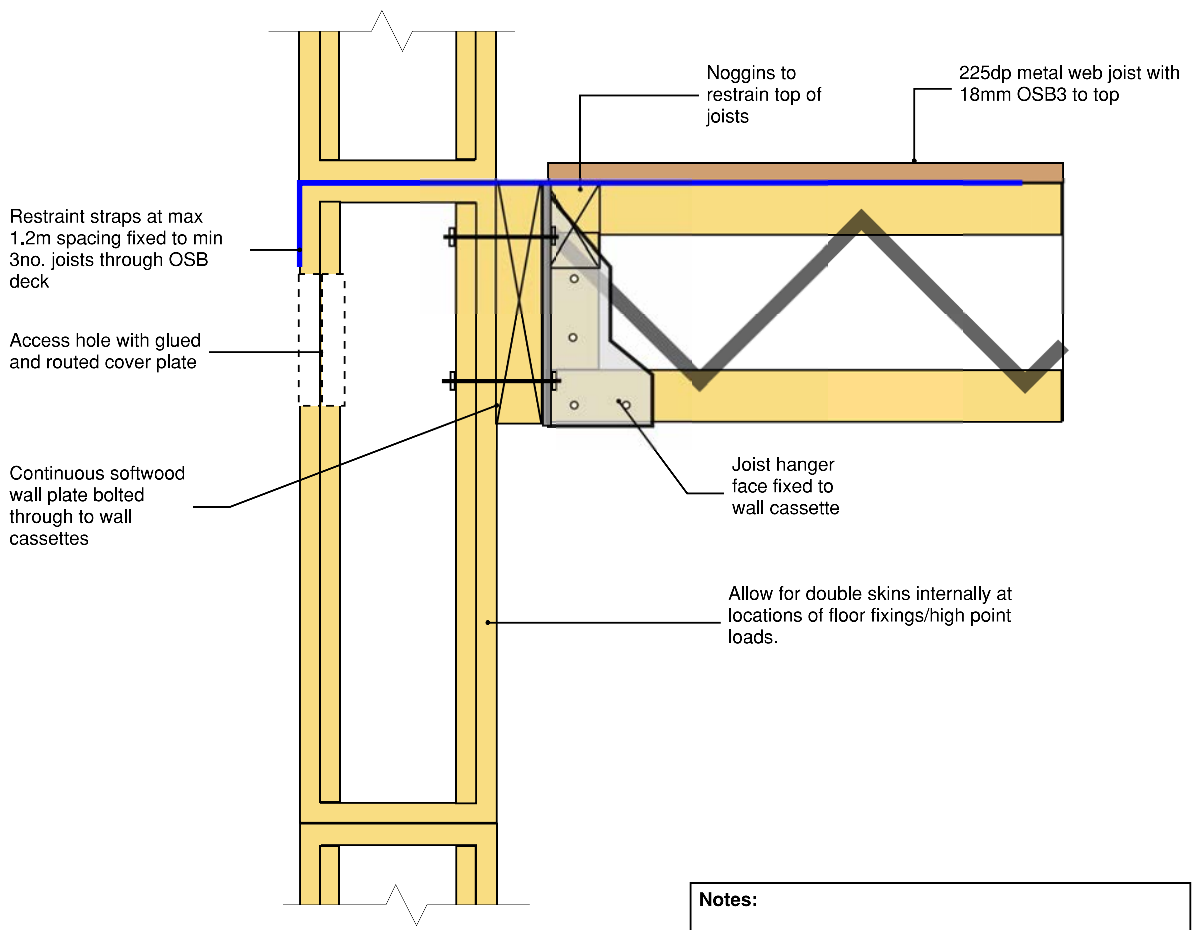
Design Requirements:
Class 2A design requires effective horizontal ties or anchorage of suspended floors to walls. This will be achieved through:

- Creating a floor diaphragm through sufficient density of fixings between floor joists and boards
- Restraint straps at max 1.2m spacing to perimeter of floors and roofs tying to supporting cassette walls
- Restraint straps at max 1.2m spacing to horizontally tie floors together across internal load bearing walls and beams.
- Floor and roof joists to be mechanically fixed to supporting beams and walls
- All floors and roofs to have min 90mm bearing on supporting walls/beams

Additional robustness provided (above that required of 2A):

- Design to have redundancy in number of stability systems/shear wall
- Vertical tying to also be provided through density of fixings between timber wall cassettes.

TYPICAL FLOOR TO WALL CONNECTION

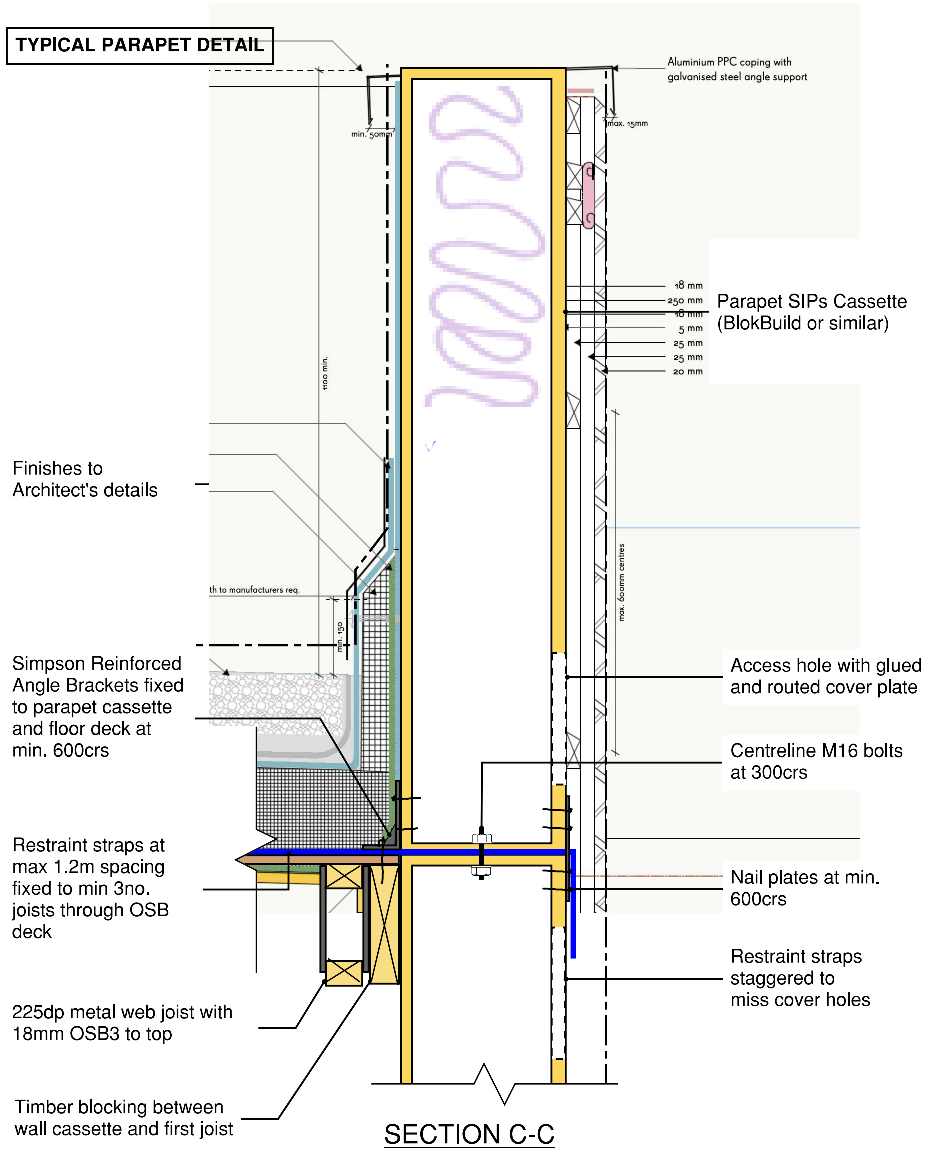


Notes:

- All items shown indicatively and subject to detailed structural analysis of each building type architectural layout, fire protection periods and finishing requirements
- The above is to be read in conjunction with relevant architectural information.
- Do not scale

PRICE& MYERS

Job No.	29133	Page	SK 13	Rev	2
Date	21/03/25	Eng	HS	Chd	BB
Job	MultiMax system				



SECTION C-C

SCALE: 1:10

Notes:

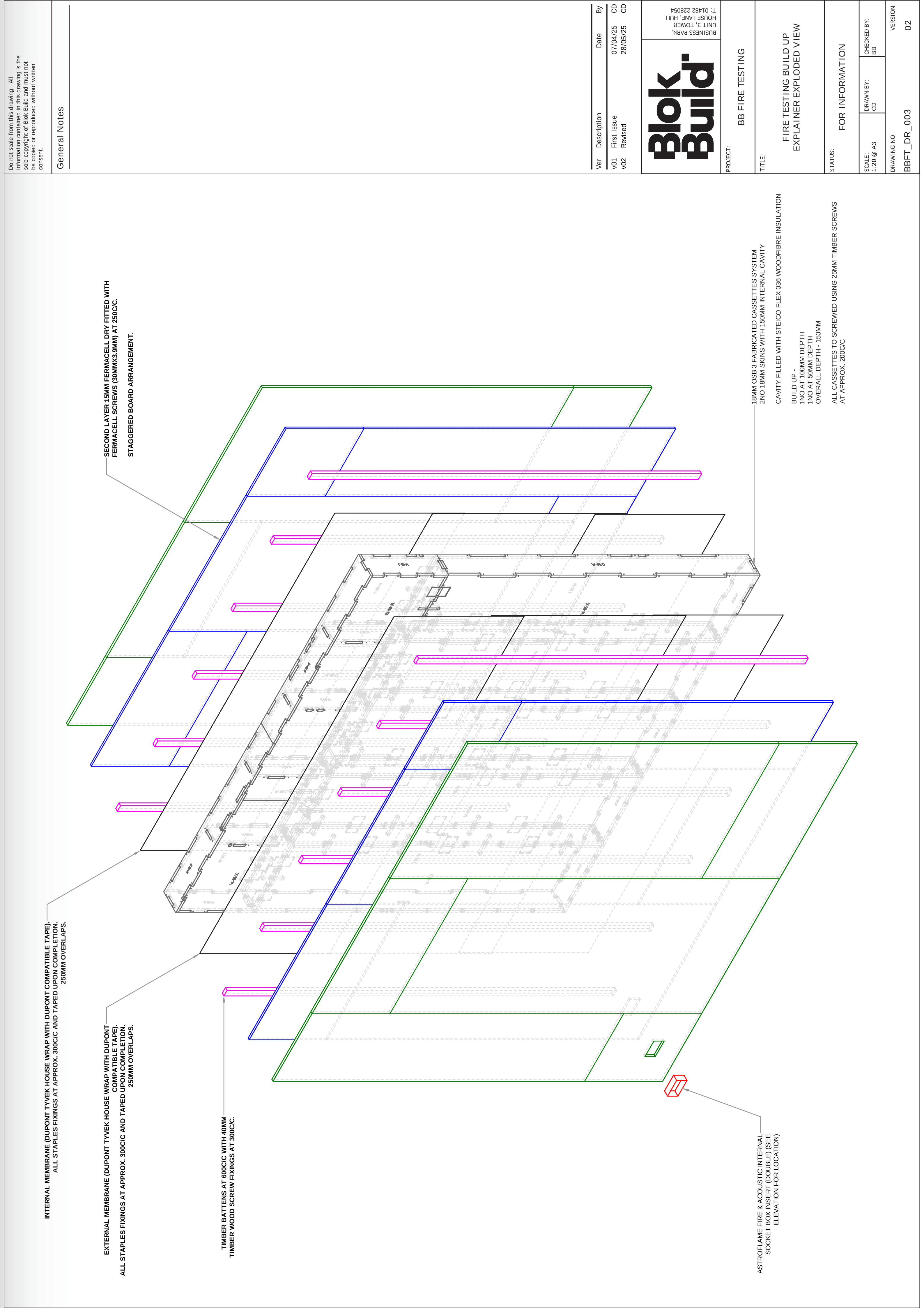
- All items shown indicatively and subject to detailed structural analysis of each building type architectural layout, fire protection periods and finishing requirements

- The above is to be read in conjunction with relevant architectural information.

- Do not scale

4.4 FIRE TEST TECHNICAL DRAWINGS

A full wall build up using the BlokBuild structural insulated OSB cassette system and non-combustible sheathing board has been tested to demonstrate performance of REI 60mins. Details of the test are shown opposite.



4.5 ABOUT BLOKBUILD

BlokBuild is a pioneering off-site construction company with a mission to create a more innovative and sustainable built environment through digital manufacturing technologies.

Our digitally-driven construction system addresses the need for a sustainable, affordable timber system that is mass customisable, empowers creative imagination, and can deliver projects across a wide range of commercial, residential, and community build scenarios.

High-performance, insulated timber cassettes are the modular components that make up the structural framework of our buildings. Our fully integrated system of floor, wall, and roof typologies can build up to 3-storeys without the need for additional structure, and as part of a full timber kit-of-parts for taller structures.

Our process is grounded in an advanced approach to digital Design for Manufacture and Assembly (DfMA), where a high level of detail is embedded into an algorithmic script that generates parts ready to be cut on a CNC machine to micro tolerances in a controlled factory environment. These parts are then assembled into cassettes and connected on-site to form the superstructure of the building. A digital clone serves as a central core of every project, making for a completely controlled and optimised process across design, manufacture, and site installation.

A key innovation of the BlokBuild system is that all parts are digitally manufactured from FSC-certified 18mm OSB. By pioneering the use of OSB to create a 100% digitally manufactured, multi-story building system capable of complex geometries and large spans, we hope to increase the uptake of the only UK-grown and produced structural timber sheet material.

Cassette depth can be customised to suit performance standards, including passive house, with insulation options including wood fiber, mineral wool, hemp, and cellulose. The digital precision of the cassette system optimises as-built thermal performance in comparison to other forms of construction, where variability in the site installation method often presents the potential for heat loss.

Our vision for off-site construction is to harness the benefits of mass production in the service of customisation and design innovation. Led by the needs of our clients, the BlokBuild system and technology are constantly evolving, creating a flexible and scalable approach adaptable to both ambitious one-off structures and mass-scale housing projects.

We pair industry-leading innovation with robust accreditations; the BlokBuild system and process are accredited by the Built Offsite Property Assurance Scheme (BOPAS). This means that the buildings you create with us are backed by a 60-year+ assurance recognised by funders, lenders, valuers and purchasers. Our accreditation covers all stages of design, off-site manufacturing and on-construction, showcasing the holistic skillset we bring to every project.

To find out more about the BlokBuild system, book a CPD, or discuss a project, contact info@blokbuild.com.

To see our recent projects visit blokbuild.com