

03.4 Carbon Reductions Opportunities

Superstructure studies

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Lightweight Steel Gauge Frame

A lightweight gauge steel frame uses a 150mm LGSF deck on light steel studwork spanning up to 3.5m, achieving a significantly lower embodied carbon of 84 kgCO₂e/m².

Advantages: low embodied carbon from minimal concrete use, quick, single-subcontractor erection on site, and light construction that minimises loads on the foundations.

Disadvantages: restriction to a panelised wall system with limited flexibility for repositioning partitions, a requirement for all steel to be fire-rated with acoustically-treated decking, higher relative cost due to the specialist nature of the system, shorter 3.5m spans dictated by unit dimensions, and the need for a concrete transfer slab at Level 01 to convert down to the podium structure below.

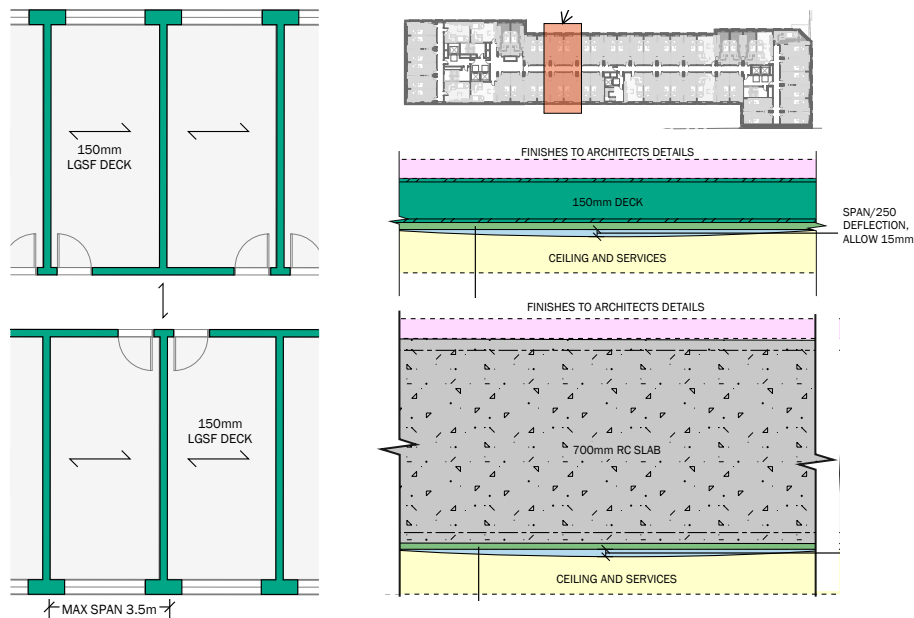


Figure 13: Information, plans and sections provided by Whitby Wood.

Modular Steel Frame

A modular steel frame uses prefabricated volumetric units with a 150mm module deck spanning up to 3.5m, offering the second lowest embodied carbon of the options studied at 89 kgCO₂e/m².

Advantages: low embodied carbon and reduced operational carbon on site, and very fast construction as units can arrive largely complete.

Disadvantages: suitability being limited to co-living units on a regular grid, a specialist system that can carry a cost premium compared to traditional methods, 3.5m spans dictated by unit dimensions, an allowance required for a double wall system at unit junctions, and, as with the LGSF option, the need for a concrete transfer slab at Level 01.

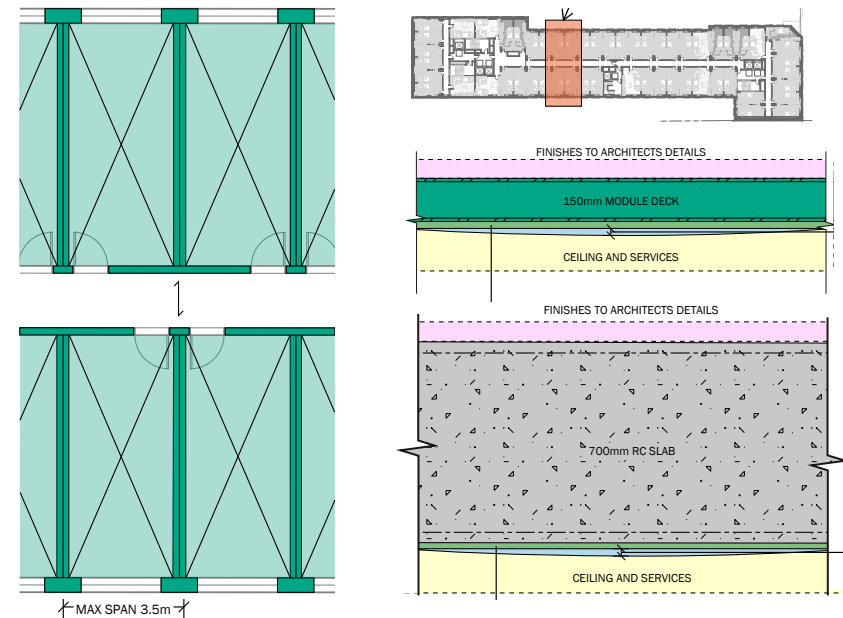


Figure 14: Information, plans and sections provided by Whitby Wood.



03.5 Carbon Reductions Opportunities
Insulation Optioneering

Insulation Optioneering

The external wall insulation specification at Ashley House presents an opportunity to assess the embodied carbon of different stone wool rainscreen insulation products. The insulation forms part of the external wall build up. Two options have been assessed using verified Environmental Product Declarations (EPDs) compliant with EN 15804+A2:2019, both published under the International EPD System (Environdec) and independently third-party verified. Both products are manufactured in Wales, UK and are specifically designed for use in ventilated rainscreen façade systems on buildings of any height.

Option 1 NyRock Rainscreen 032

Rockwool NyRock Rainscreen 032 (EPD-IES-0007330:002, Environdec). Stone wool insulation, dual-density construction which provides a firmer outer face for cladding fixing support and a softer inner layer that adapts to the substrate. Non-combustible Euroclass A1.

Option 2 Knauf Insulation Rocksilk RainScreen Slab

Knauf Insulation Rocksilk RainScreen Slab EE (EPD-IES-0009197:003, Environdec). Rock mineral wool with ECOSE Technology bio-based binder (which uses a plant-based binder with no added formaldehyde, derived from rapidly renewable plant starch), glass veil tissue facing, Non-combustible A2-s1,d0.



Implementation to be explored within next RIBA Stage.



Figure 15: Option 01, NyRock Rainscreen 032



Figure 16: Option 02, Knauf Insulation Rocksilk RainScreen Slab

	NyRock Rainscreen 032	Knauf Rocksilk RainScreen Slab EE
Density	100 kg/m ³	55 kg/m ³
Wool Type	Stone wool	Rock Mineral Wool
Origin	Bridgend, Wales, UK	Queensferry, Wales, UK
Mass per m ² at 150mm	15 kg/m ²	8.5 kg/m ²
Lambda	0.032 W/(m.K)	0.034 W/(m.K)
Fire Classification	Euroclass A1	A2-s1,d0
Lifecycle Stages included	A1-A3, C1-C4, D	A1-A3, A4-A5, C1-C4, D
Binder	Phenol-formaldehyde resin	ECOSE bio-based binder (no formaldehyde)
GWP-total A1-A3 (declared unit)	41.4 kgCO ₂ e/t	21.5 kgCO ₂ e/t
Mass over 100m ² at 150mm	1.5 tonnes	0.85 tonnes
Total upfront carbon over 100m ² at 150mm (A1-A3)	62.1 kgCO ₂ e	18.3 kgCO ₂ e
Total carbon saved in building A		5.28 tCO ₂ e

Table 2: Summary of results from insulation optioneering comparison.

Key findings

Despite both products being rock mineral wool rainscreen slabs manufactured in Wales, their embodied carbon profiles differ significantly. The NyRock Rainscreen 032 registers approximately 0.62 kgCO₂e/m² at A1-A3 for 150mm, compared to approximately 0.18 kgCO₂e/m² for the Knauf Rocksilk. This results in a saving of approximately 0.44 kgCO₂e/m², or around 70% per m² of wall area. The carbon difference is primarily driven by density, as the NyRock product is significantly denser at 100 kg/m³ than the Knauf at 55 kg/m³. More mass per m² means more raw material extraction, more melting energy and more product per unit area. The NyRock's patented fibre structure achieves better thermal performance per unit thickness (0.032 vs 0.034 W/mK), which partially offsets the density difference, but the density effect dominates the carbon calculation. The Knauf ECOSE binder also contributes a small carbon benefit by replacing petrochemical phenol-formaldehyde resin with a bio-based alternative.



03.6 Carbon Reductions Opportunities

Re:shape Responsible Materials & Procurement Strategy

Re:shape Responsible Materials & Procurement Strategy

Coliving Units

As part of a wider Responsible Materials & Procurement Strategy, re:shape are working directly with manufacturers to develop internal wooden furniture, such as the seating, joinery and storage solutions, as seen in the images, which prioritises durability and easily replaceable components, avoiding the use of adhesives wherever possible. This design-for-disassembly approach is a core application of circular economy principles: individual components can be repaired or replaced without damaging or discarding the wider connecting pieces, keeping materials in active use for longer and displacing the need for new, carbon-intensive furniture over the building's lifetime. Avoiding adhesives where possible keeps materials uncontaminated at end of life, meaning timber can be cleanly separated, reused, or recycled back into the supply chain rather than treated as mixed waste destined for landfill or incineration. This directly reduces embodied carbon associated with raw material extraction and manufacture. For residents, this means furniture that can be adapted and repaired in parts, rather than large areas being replaced outright. For the overall lifecycle of the scheme, it lowers whole-life embodied carbon, reduces long-term maintenance and replacement costs, and closes the material loop in line with circular economy best practice.

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Figure 17: Images produced by Holloway Li of indicative co-living unit layouts.

Wider Re:shape Strategy

Beyond FF&E, this strategy extends to the procurement of materials across the re:shape schemes more broadly. We are collecting carbon, air-emissions, and social value data on procured materials to establish a re:shape brand standard, enabling streamlined, consistent data collection on sustainability credentials across future projects and supply chain partners. Building this evidence base allows the project team to identify and prioritise lower-carbon, circular materials, including those with recycled content, take-back schemes or verified end-of-life recovery routes. This allows comparison between suppliers on a like-for-like basis. Over time, embedding this as a brand standard means every future re:shape project draws on a growing, verified dataset, driving continuous reduction in embodied carbon across the supply chain, accelerating the shift toward circular material flows project-wide, and creating a stronger, evidence-backed narrative for the environmental and social value the project delivers.

