

5.0 Finalised Design Strategies

5.1 Movement

The number of parking spaces provided for the Fives Court development meets the Wiltshire Council policy requirements for this type of housing. However, during the consultation with neighbours and the Town Council, the issue of the amount of parking provided has been raised consistently.

To respond to these concerns, an analysis of parking spaces and requirements has been made in existing schemes, one in a rural town and another in a village. The results are consistent, with a ratio of 42% and 44% cars to homes.

Applying this metric to the Fives Court development enables an estimate of 9 spaces being needed by residents at any one time. This compares with the car parking capacity provided of 15 parking spaces, 2 of which are fully disability compliant. There is an additional drop off / emergency vehicle parking space located near the main entrance to the site. We are therefore confident that the car parking capacity, not only meets the policy requirements, but will also be sufficient for residents and their visitors.

Electric Vehicle (EV) charging points will also be provided to the parking spaces in line with the Approved Document Part S. For more details of the EV charging points and exact locations, please refer to the separate site plan ref WCMRFC-O50-00-00-DR-A.

Sheffield cycling stands have also been provided near the front entrance in line with Wiltshire Council guidance, and a mobility scooter store has been located in the centre of the plan to accommodate residents with mobility requirements.



5.2 Landscape Strategy

- Proposed mixed native hedgerow along the western, southern and eastern site edges will enhance the existing boundaries for ecology whilst providing additional visual screening, acting as a barrier and helping to reinforce the edge of development. Structurally, it will integrate with the proposed native mixed scrub and proposed trees to create an ecological hotspot throughout the site.
- A mix of native scrub species will be provided to support the ecological buffer around the southern, western and eastern boundaries.
- Ornamental planting will consist of three mixtures which will respond to aspect and be a combination of shrubs, grasses and herbaceous stock to give structure and interest throughout the year. Large legacy trees will be retained throughout the site and medium-sized trees will be selected where in closer proximity to the building. Tree species will be predominantly native.
- Swathes of species-rich grassland will offer ecological value through a bio-diverse mix of native wildflowers and grasses. This habitat type offers good amenity value visually and is relatively low maintenance once established.
- Species-rich grassland alongside paths will be maintained as close-mown grass for improved recreational use.
- For more details on the landscape proposals, please see the documents and drawings prepared by Greenhalgh Landscape Architecture. The text above is reproduced from the document ref 324_GLA_00_XX_RP_L_0001_P1 Landscape Strategy



Habitat Provision

Ethos Environmental Planning (Ethos) were commissioned to prepare the ecological appraisal and undertake a biodiversity net gain assessment of the area of land at Fives Court, Mere, Wiltshire. Please see summary below and metric calculation and ecological appraisal appended to this application 202403_Fives-Court-Mere-Ethos-Preliminary-Ecological_Appraisal-Report. Please refer to the proposed elevation drawings for the locations of the habitat features. The ecological appraisal and resulting surveys recommended the following habitat installations to be included on the buildings and within the site these will include;

- swift boxes to be incorporated at eaves level
- small bat boxes to accommodate Common Pipestrelle on buildings and in trees - Baumaris box type and Kent bat box
- other bird nesting boxing type Schwegler open front nest box to be provided

Please refer to the proposed elevation drawings for the locations of the habitat features.

Biodiversity Net Gain

Whilst the proposed development qualifies for the Statutory Small Sites Metric, the calculation has been undertaken using the Statutory Metric to account for the creation of habitats which are likely to be in a poor condition due to the limited space available and likely management measures.

The proposed plans currently project an overall biodiversity net gain for area habitats, with a proposed area unit value 0.68 units, resulting in an overall gain of 0.33 area habitat units (88.66%). Linear units project an overall net gain of 0.15 units (287.45%).



wall mounted swift box



wall and tree mounted bat boxes



Schwegler bird boxes



5.4 Waste Management Strategy Summary

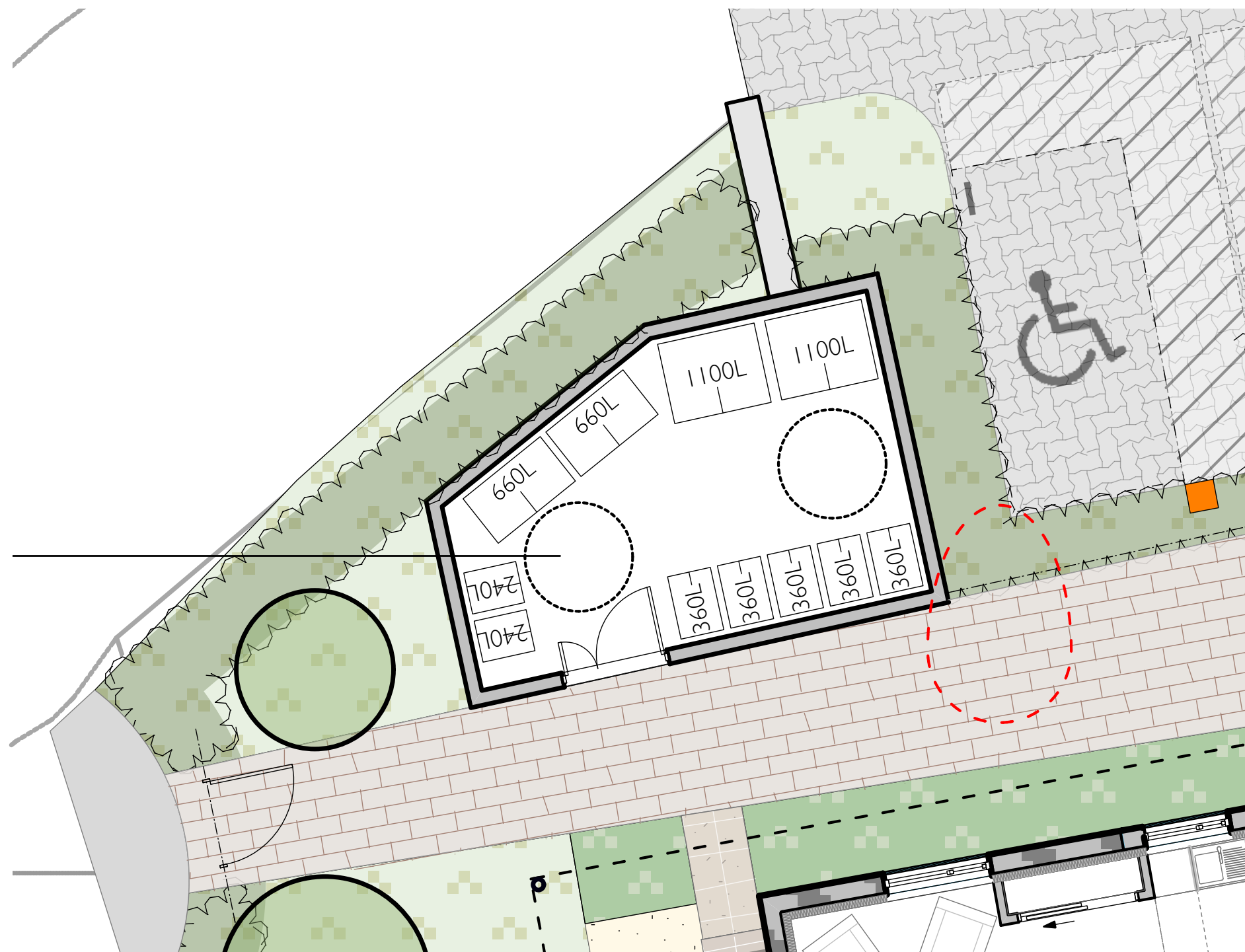
As part of the reuse strategy for the existing building, efforts have been made to reduce waste during the construction process.

- In the removal of the existing first floor, it is intended that any masonry removed could be reused to rebuild sections of the ground floor
- It has also been included in the landscape strategy to develop gabion boxes with the roof tiles for use as retaining walls within the rear courtyards and along the southern boundary.
- Any materials from the demolition that are not reused on site will be recycled wherever possible

In regard to bins and on-site waste management during occupation, there will be accessible, convenient and practical waste storage areas for the residential units. The bin store has been designed to meet Wiltshire design guidance for recycling provision and additional non-recyclable waste, incorporating space for the future strategy anticipated to be implemented in 2027.

The design has been considered for both convenience for residents, including those with reduced mobility, and refuse collection operatives. Waste storage areas will also be sized to enable the development to adapt to future needs, should requirements change.

Please see the separate Waste Audit document submitted as part of this application ref WCMRFC-O50-RP-A-0005
In addition, please see the Stage 3 Remediation Plan prepared by TerraFirma, detailing how contamination is dealt with on site.



extract of binstore with site plan

Low Carbon Design

Wiltshire Council declared a climate emergency in 2019 and are committed to becoming carbon neutral as an organisation by 2030. Through their Climate Strategy they have identified the need for the Built Environment to help deliver this target, with the aspiration that all new council-led developments achieve, where possible, zero carbon in operation, or failing that EPC A rating for energy performance.

It is recognised that the best way to achieve energy efficiency in building operation is through a fabric first approach to construction, with new floor, wall, window and roof constructions limiting unwanted heat losses and gains through high thermal efficiency and airtightness.

In addition to building performance and emissions associated with operational energy, it is estimated that embodied carbon, emissions associated with the fabrication of building materials, delivery and construction / deconstruction processes accounts for 20% of the UK's built environment emissions (UK Green Building Council).

Whilst operational energy is legislated through the Building Regulations, embodied carbon and the energy associated with it, currently sits outside of a legislative framework at both a local and national level. It is acknowledged however that limiting emissions through construction and material choices will play an important role in the UK becoming Net Zero.

The following sections develop further detail on how both operational energy and embodied carbon have been considered in the design strategy and detailed proposals for the refurbishment of Fives Court.

Operational Energy + Building Services

The design proposals for Fives Court have been developed alongside mechanical and electrical services analysis, including building energy modelling, undertaken by Box20 Consulting Engineers. A separate Energy and Sustainability Statement has been produced by them which details the anticipated operational performance of the building, including the systems and strategies employed to achieve this; this is submitted separately as part of this application.

All heating, cooling and ventilation within the building is to be fully electric, limiting the carbon intensity of energy supply. Each apartment is to be provided with its own individual, independent system, comprising of direct electric heating and internally located Air Source Heat Pump (ASHP) for domestic hot water. In addition, each apartment will have its own Mechanical Ventilation Heat Recovery (MVHR) system ensuring a continuous supply of fresh air whilst limiting heat losses. Suitable storage, beyond the requirements of Nationally Described Space Standards, is provided in each flat to accommodate these systems and where possible facilitate maintenance access to the equipment without requiring access to private residences.

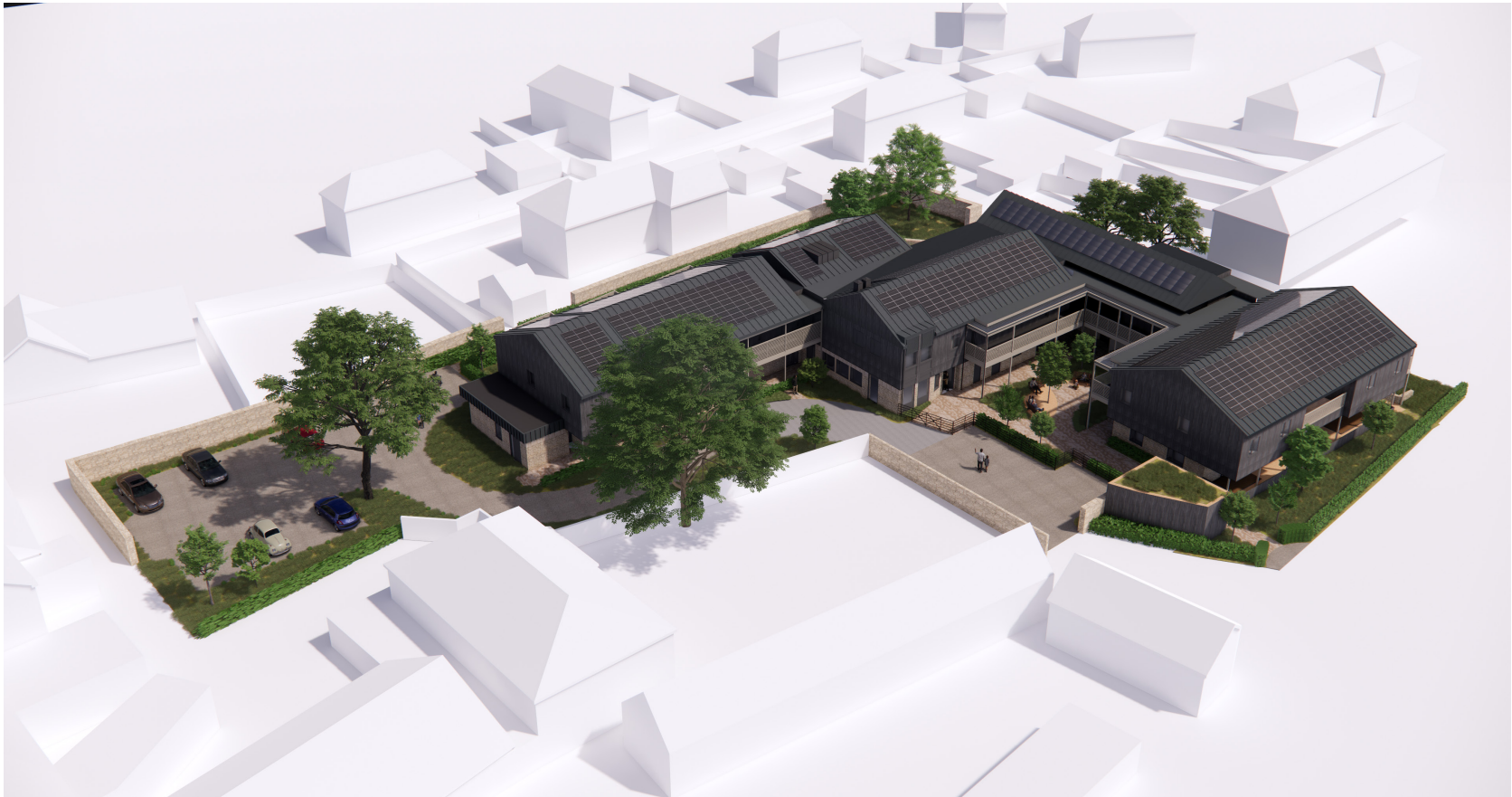
Photovoltaic panels (PV) are to be located on the roof of the building and provide a key part of the building's on-site generation strategy. The orientation of the roof form follows the footprint of the existing building, which is predominantly on an east-west alignment. Although this isn't the most efficient arrangement in terms of energy generation, it is anticipated that a sufficient number of PV's can be installed on the roof to enable all private residences and communal spaces to achieve an EPC A rating.

Buiding Fabric

As previously described, the building fabric is seen as the best way to optimising the energy performance of the building. This fabric first approach has sought to exceed the standards as defined by the UK Building Regulations, essential in creating high levels of occupant comfort and achieving desired energy performance.

The adjacent table highlights how both the upgraded and refurbished external fabric of the retained building as well as the new construction elements of the buildings envelope exceed the performance or limiting values defined by Part L of the Building Regulations.

	Building Element	Part L Limiting Values	Design Fabric Target
Refurbishment	External Wall U-value	0.30	0.22
	Ground / Exposed Floor U-value	0.25	0.15
	Roof U-Value	n/a	n/a
New Build	External Wall U-value	0.26	0.15
	Ground / Exposed Floor U-value	0.18	0.12
	Roof U-Value	0.16	0.10



Embodied Carbon

Introduction:

The following pages present a high-level analysis of the embodied carbon associated with the proposed refurbishment and extension of the existing Fives Court building. As operational emissions continue to decrease due to improvements in energy efficiency and the decarbonisation of the grid, the relative impact of embodied emissions has become increasingly important. Embodied carbon - the greenhouse gas emissions arising from the extraction, manufacture, transport and installation of construction materials - represents a significant proportion of a building's total carbon footprint and decisions at the early design stages can have a substantial impact on reducing a projects overall emissions.

This assessment has been undertaken to interrogate the carbon emissions associated with the material choices, constructions processes and life cycle stages of the building, in line with current best practice and relevant industry standards, including RICS Whole Life Carbon Assessment guidance, LETI (Low Energy Transformation Initiative) guidance, RIBA Benchmarking and the UK Green Building Council (UKGBC) framework.

Assessments are undertaken accounting for non-biogenic carbon - carbon emissions released from non-living sources such as fossil fuels and industrial processes and biogenic carbon - referring to carbon stored (sequestered) in bio-based building materials at the time of construction, such as timber. The latter can significantly offset a buildings initial upfront emissions by providing a temporary carbon store, however as their end of life condition can not always be guaranteed, best practice is to define this figure separately, rather than as part of the calculated total. Additionally assessments and calculated values are split into stages of a projects lifecycle; Production and Manufacture A1-A3, Transport A4, Construction A5, Maintenance and replacement B1-B5, End of life and disposal C1-C4.

Scope:

Given the stage of the project, with further detailed design and specification work to be undertaken during RIBA Stage 4, current analysis of the project's embodied carbon is based primarily on the general architectural and structural layouts, indicative materials specifications, and benchmark data, with the aim of informing design decisions as they evolve.

The analysis has been undertaken using the SmallCarbonTM calculator, which uses information from the Inventory of Carbon & Energy (ICE) database and product Environmental Performance Declarations (EPDS) to apply CO2equivalent weightings to square metre rates for different constructional build-ups within the design. These are then multiplied by the estimated areas / volumes present in the building to give an overall picture of the associated material emissions.

Design Strategy:

The aspiration to limit the embodied carbon associated with the construction of the scheme informed the early design decision to re-use and enhance elements of the existing building on the site. The adaptation of the existing ground floor foundations and external walls combined with the addition of a new lightweight first floor structure, forms a hybrid approach of retention and new construction.

As initial feasibility studies for the site also explored a new build approach to the site, this provides the opportunity for a comparative assessment to understand the impact the chosen design pathway.

Beyond the carbon savings associated with the retained elements of the existing building, strategies for limiting embodied carbon at this stage focus on key components of the building's superstructure and external fabric, primarily the external finishes and insulation, with the latter being key to also ensuring that the building's thermal performance meets the aspiration in terms of operational energy.

The following section analyses the quantities of upfront carbon (emissions associated with the manufacture and construction of a buildings materials) and lifecycle embodied carbon (emissions associated with a buildings lifetime, incorporating upfront, maintenance related emissions and end of life / deconstruction,) and focusses only on known material choices at this time.

Analysis:

The following elements of the refurbishment and extension have been analysed for their upfront and embodied carbon impact:

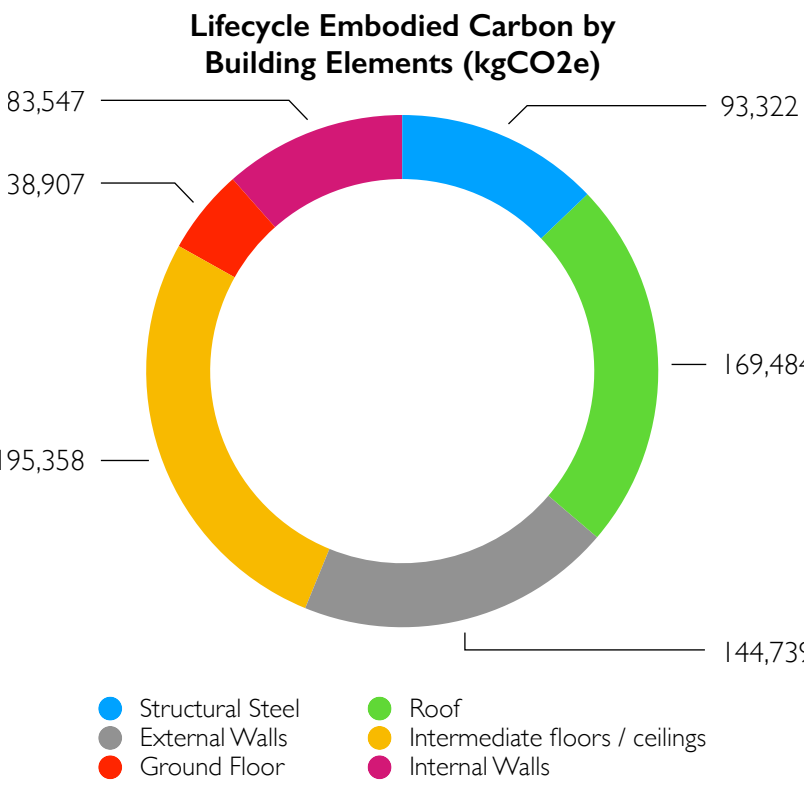
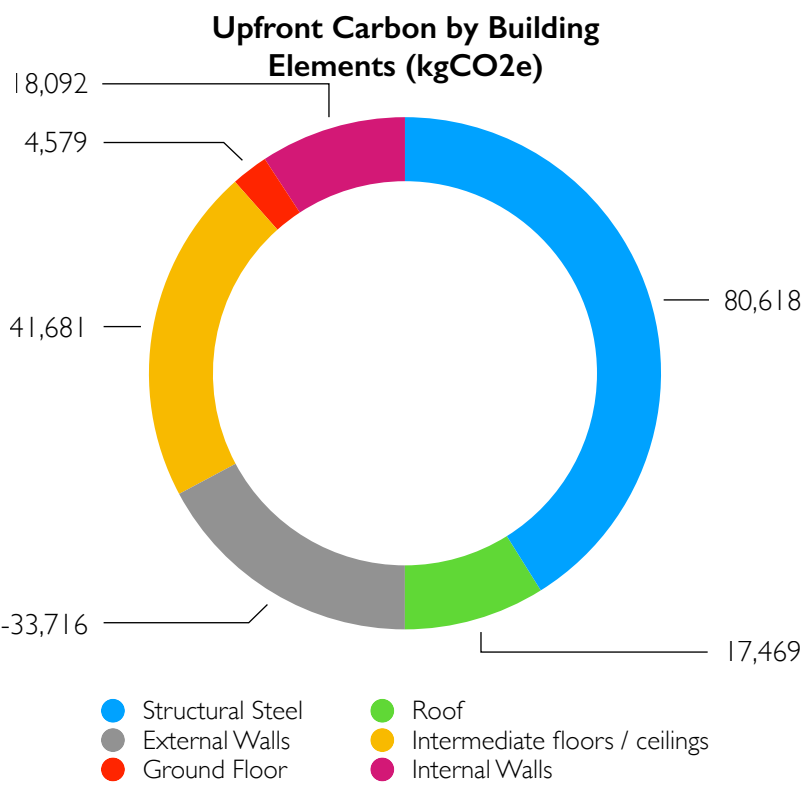
- Roof finishes and structures
- First Floor ceilings and insulation
- First Floor internal walls
- First Floor external walls
- Intermediate floor + ceilings
- Ground Floor internal walls - where new installations required
- Ground Floor external walls - thermal upgrades and finishes to retained walls
- Ground Floor - thermal upgrades and finishes to existing slab.
- Ground and First Floor structural members + balconies

Due to the scope of this analysis and the level of specification developed at this stage in the project, the following items were not included in the analysis. This also allows a more accurate comparison to the new build option for the site, however would be expected to be further assessed during latter design stages:

- Internal and external windows
- Internal and external doors
- Fixtures and fittings
- Mechanical and Electrical equipment, i.e ASHP / MVHR / PV / lighting

Fives Court Refurbishment and Extension Summary Results-I

Total Carbon (kgCO2e)		
Scenario	Upfront Carbon (A1-A3 + A4 + A5.1 + A5.2 + A5.3)	Embodied Carbon over Lifetime (Upfront + B1.2 + B2 + B3 + B4 + C1 + C2 + C3 + C4)
Non-biogenic	381,060	760,461
Biogenic (sequestered)	-252,336	-252,336



Comparison to a notional New Build scheme:

The figures established above for the refurbishment and extension of the existing Fives Court building also provide the opportunity to compare to a notional design for a New Build option for the site.

Although there are limitations in this comparison due to the extent to which a new build option has been developed, there is still merit in exploring the relative impacts of the form and scale of the building, the impact of forming new foundations, a full external envelope and internal divisions and floors. The specifications developed for the refurbishment options have been applied where applicable and new constructions for elements not present in the refurbishment have been applied using industry standards and noted below.

The following buildings elements have had a specification applied and measured for the New Build embodied carbon comparison analysis:

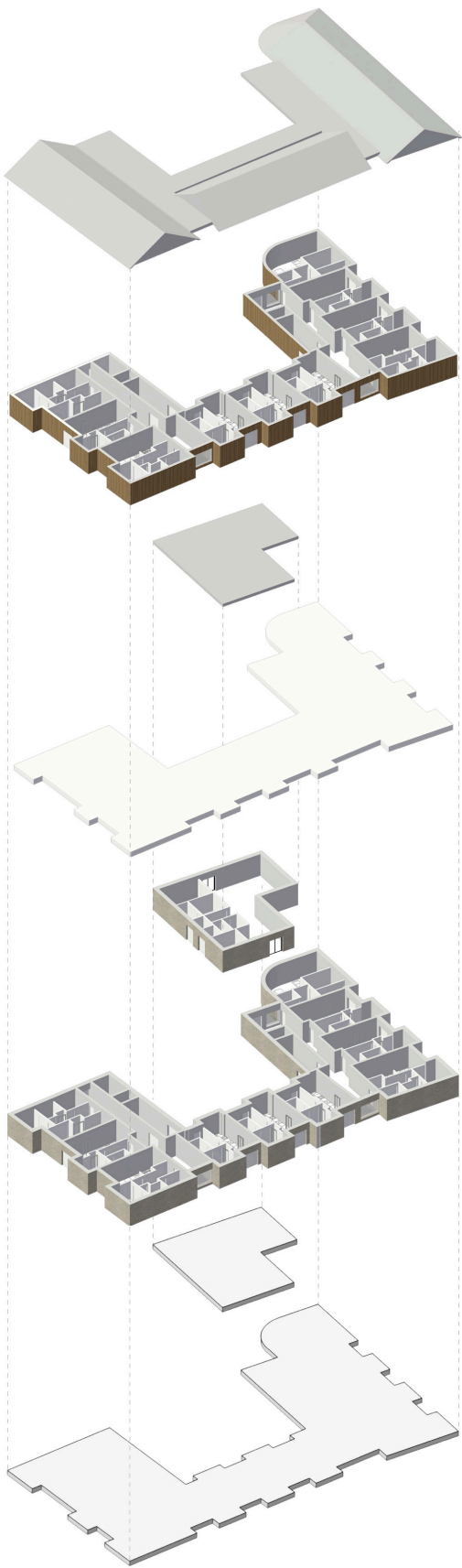
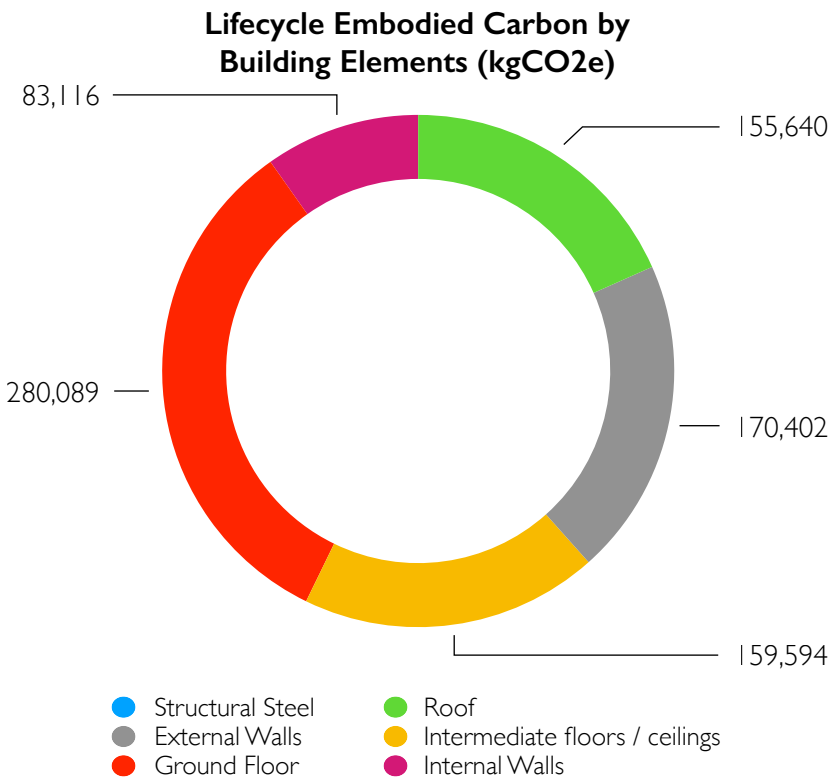
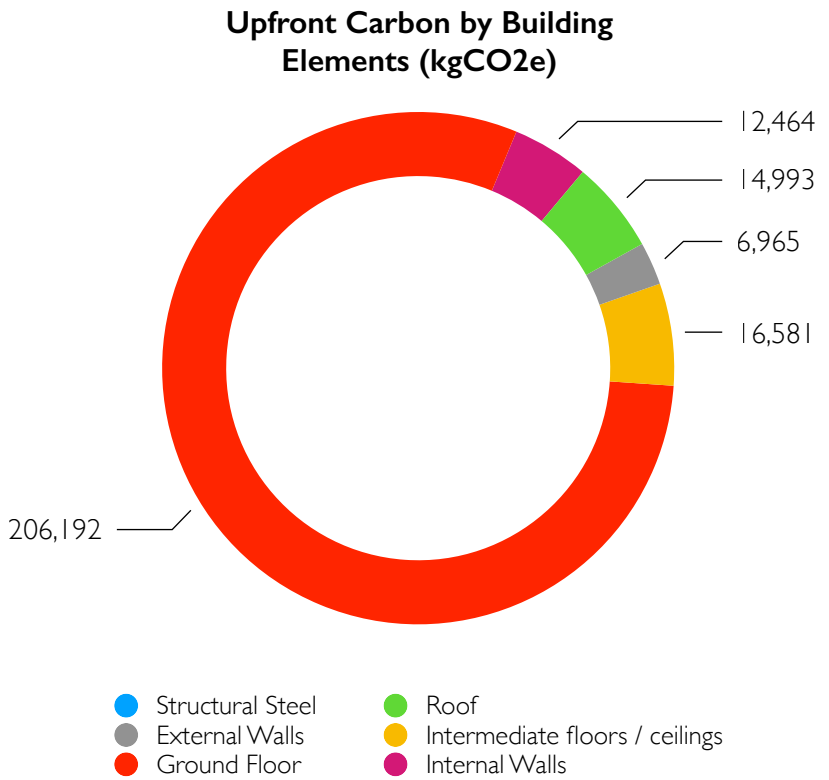
- Roof finishes and structures (pitched + flat roofs)
- First Floor External Walls
- First Floor Partitions + Party Walls
- Intermediate Floor
- Ground Floor External Walls (specification developed assuming reconstituted stone facing and timber frame construction behind)
- Ground Bearing Slab (specification developed assuming reinforced concrete with edge thickenings, insulation above and screed finish)

Building elements not calculated:

- Internal and external windows
- Internal and external doors
- Fixtures and fittings
- Mechanical and Electrical equipment

Notional New Build Summary Results-I

Total Carbon (kgCO2e)		
Scenario	Upfront Carbon (A1-A3 + A4 + A5.1 + A5.2 + A5.3)	Embodied Carbon over Lifetime (Upfront + B1.2 + B2 + B3 + B4 + C1 + C2 + C3 + C4)
Non-biogenic	486,246	889,704
Biogenic (sequestered)	-229,049	-229,049



Summary

The analysis undertaken and presented over the previous pages is able to demonstrate that there is a relatively significant difference in the amount of embodied carbon between the refurbishment and extension of the existing building and a notional new build on the site., see adjacent table. Based on these calculations we are able to infer that a new build option for the site would be more carbon intensive, however would potentially provide the opportunity for a more compact form for the building with a higher performing building fabric.

When compared against the key industry standards for reducing embodied carbon, LETI and RIBA benchmarks, we can see that the currently both the refurbishment and new build schemes sit within RIBA 2025 and 2030 targets and meet the less onerous LETI A+ target. It should be noted however that as not all elements of the building construction have been analysed and calculated, it would be excepted that these figures to significantly increase and likely exceed some of these targets. Further analysis work would help define the extent of this.

The refurbishment and extension of the existing building, including the retention of the ground floor walls and existing concrete slab, also provides a number of additional savings which have not been able to be calculated as part of this exercise, but are assumed to have a net positive impact on both embodied carbon and the financial viability of the scheme:

- avoids the emissions associated with the demolition, removal and disposal / recycling of these materials
- reduces the amount of groundworks needing to be undertaken
- limits unnecessary exposure of potentially contaminated soil that would need to be removed from the site and require remediation
- avoids the need for additional archaeological exploration
- reduces potential disturbances to existing tree root protection zones

Refurbishment vs New Build Comparison with Industry benchmarks noted-1

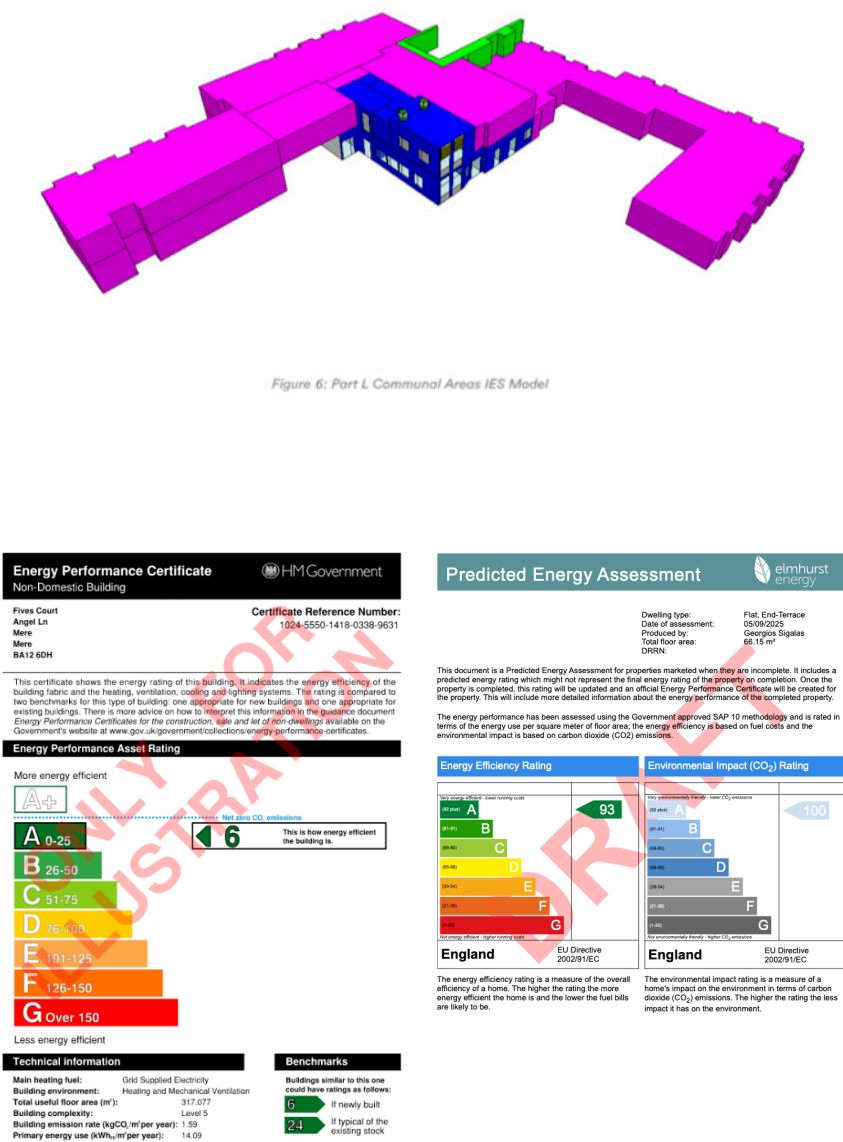
	Scenario	Total Carbon (kgCO2e)		Carbon per m² (kgCO2e)	
		Upfront Carbon (A1-A3 + A4 + A5.1 + A5.2 + A5.3)	Embodied Carbon over Lifetime (Upfront + B1.2 + B2 + B3 + B4 + C1 + C2 + C3 + C4)	Upfront Carbon (A1-A3 + A4 + A5.1 + A5.2 + A5.3)	Embodied Carbon over Lifetime (Upfront + B1.2 + B2 + B3 + B4 + C1 + C2 + C3 + C4)
Refurbishment	Non-biogenic	381,060	760,461	217	433
	Biogenic (sequestered)	-252,336	-252,336	-144	-144
New Build	Non-biogenic	486,246	889,704	238	435
	Biogenic (sequestered)	-229,049	-229,049	-112	-112
Benchmark Standards	LETI A++	-	-	150	150
	LETI A+	-	-	300	300
	RIBA 2025	-	-	500	800
	RIBA 2030	-	-	400	625

5.6 Energy and Sustainability Statement

This section should be read in conjunction with the Energy and Sustainability statement issued by Box Twenty document 2563-B20-XX-XX-RP-Y-000I

In summary;

- the fabric of the building has been designed to minimise heat loss through high thermal efficiency and air tightness, reducing energy demands and facilitating low energy heating systems and affordability for residents. This includes the addition of insulation to all existing and retained structures to ensure all properties achieve EPC A.
- This is supported by an extensive roof mounted PV array.
- The design of the building avoids using large areas of glazing to mitigate overheating risks.
- Low energy LED light fittings combined with electric panel radiators and ASHP hot water strategy and rooftop PVs.
- Cycle and mobility scooter storage combined with accessible pedestrian routes to the town centre encourage low carbon travel options.
- The majority of parking spaces are EV ready except those that sit within the root protection zone (RPZ) of the existing tree.
- The proposals aim to make a significant reduction in embodied carbon through the remodelling and retention of the ground floor structure and slab
- Alongside this the new first floor has been designed as a timber frame structure to minimise the embodied carbon and use lightweight roofing material to facilitate this.
- The proposal also retains the majority of the existing hard landscape to minimise excavation and new hard surfacing. It has also been included in the landscape strategy to develop gabion boxes with the roof tiles for use as retaining walls within the rear courtyards and along the southern boundary.



Through an analysis of the built context surrounding Fives Court, a number of complimentary materials have been proposed for the scheme. The materials chosen are also required to work within the parameters of the retained structure, in particular to the existing ground floor external walls and concrete slab.

To ensure that excess load capacity is not exerted on the retained structural elements, a light weight timber frame is proposed for the first floor construction, which is then to be finished externally with lightweight materials. The proposed timber cladding would be treated to prevent surface spread of flame and installed to meet Building Regulations.

Examples in nearby context



Little Shotley and adjacent barnyard



Buildings on Salisbury Street, Mere



Rear of buildings north of the site

Materials board for the proposed scheme



Angel Lane
Context example
- view from site entrance down Angel Lane towards Mere village centre



Coated Aluminium standing seam
RAL 7015 Slate Grey
- to all pitched roofs



Coated Aluminium standing seam
RAL 7015 Slate Grey
- to facias of single storey flat roofs



Coloured metal work
RAL 7015 Slate Grey
- ground + first floor external doors, windows and rainwater goods



Existing Stonework
Reconstituted / light sandstone mortar
- retained stonework on the ground floor



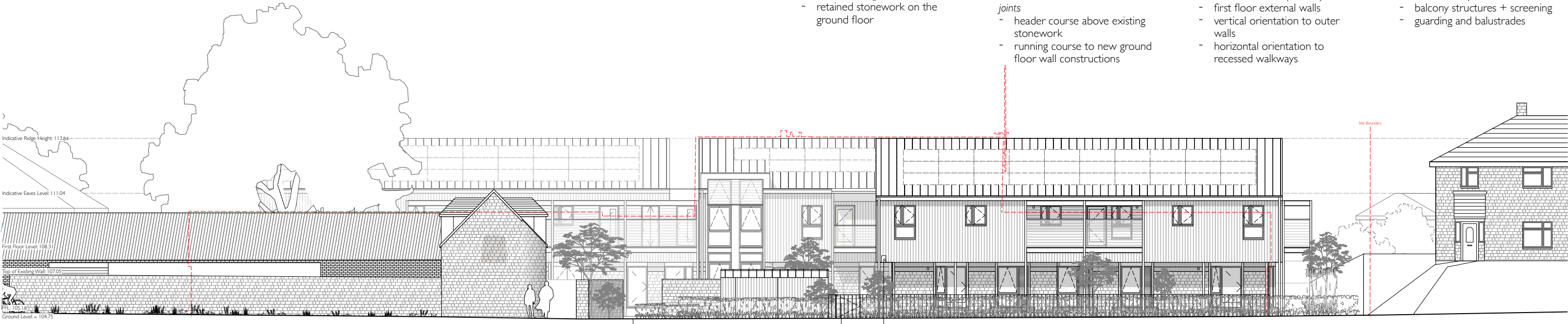
Light brickwork
St Ives Cream Rustica / white cream joints
- header course above existing stonework
- running course to new ground floor wall constructions

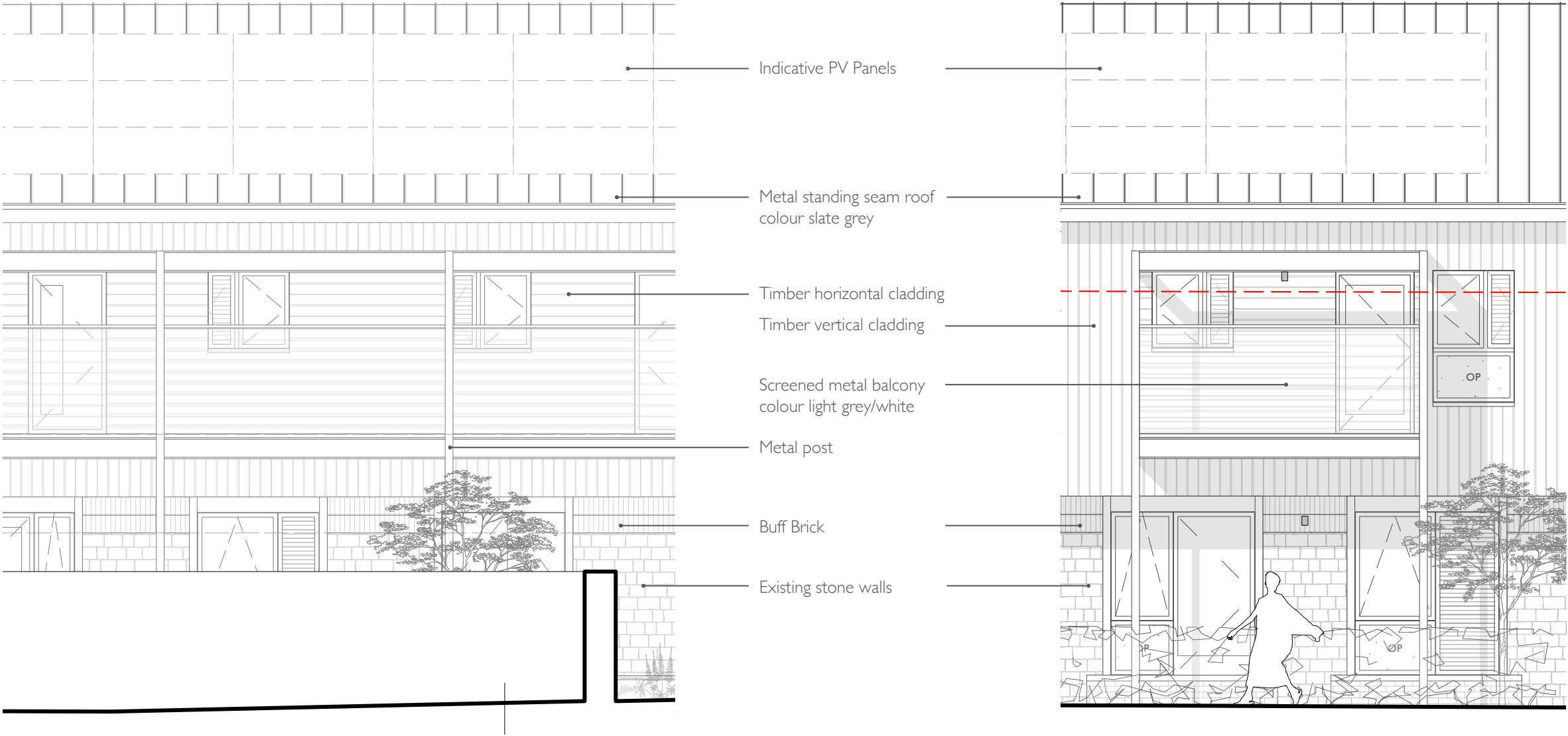


Timber Cladding
Western Red Cedar (silvered)
- first floor external walls
- vertical orientation to outer walls
- horizontal orientation to recessed walkways



Coloured metal work
RAL 9002 - Grey White
- balcony structures + screening
- guarding and balustrades





Precedents



Cotswold stone ground floor and timber first floor - South Cemey



1.5m high louver screened powder coated balcony to direct views away from sensitive boundaries



Steepleton Tetbury - homes for later living

6.0 Conclusion

The iterative design process has developed a sustainable development that:

- Creates 20no. independent living housing apartments for people aged 60 and over, including 10 no. 1-bed apartments and 10no. 2-bed apartments, all meeting 100% Nationally Described Space Standards.
- Provides 100% affordable apartments, with all being provided as social rent to meet local needs.
- Responds to the opportunities provided by the site.
- Includes an extensive reuse of the existing building and materials found on site
- Is of a scale and massing that has tried to be as respectful to it's surrounding as possible acknowledging boundary proximities and a form and grain that is relevant to the surrounding conservation area context.
- Responds sensitively to the materiality of the local context through the careful selection of finishes.
- Maximises the use of PVs alongside low carbon technologies including air source heat pumps and mechanical ventilation to minimise energy use and ensure the apartments achieve the highest possible EPC rating.

