SHEPPARD ROBSON

EDITION THREE
INTERACTIVE READING
2025

Unwavering focus
on the big picture

Sustainability

Preface

“As one of the largest architectural practices in the UK, we feel an intense responsibility to directly address the built environment’s contribution to the climate and biodiversity crisis. We must reduce resource consumption, greenhouse gas emissions and support restoration of natural habitats in an inclusive and measured way, in order to reach a balance with our natural world.

This publication showcases our work, approach and understanding across a range of key subjects within sustainable design and innovation. The content is not an exhaustive catalogue of our work in this field, as every day we are progressing solutions and engaging in new ways to help push our industry forward. Instead, here we provide our collaborators with a summary of how we critically apply our inventive, multi-layered approach and how this results in designs that fundamentally rethink how we live, learn, work and play. Put simply, the following pages document our unwavering focus on the big picture.”

Liam Kelly
Head of Sustainability
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Click to view Liam’s biography

Introduction

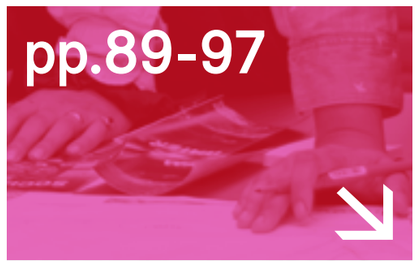
Design efficiency

Whole life carbon

Social value

Health + wellbeing

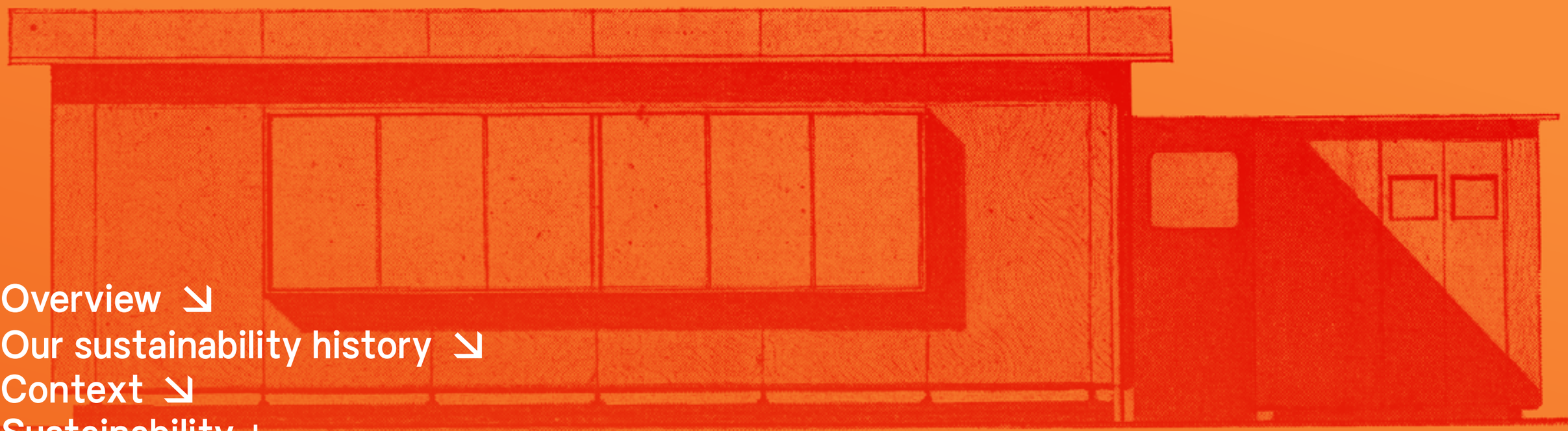
Practice



Research + innovation

Contents

Back to contents



Introduction

Next section:
Design efficiency ↘

“Our practice’s process is not limited to a single solution... instead, we are knowledgeable and confident in critically applying innovative, multifaceted approaches.”

Visit our website for more on our history, approach and culture.

Sustainability at Sheppard Robson

Sustainable innovation has been a founding principle of the practice and is fully integrated into our designs and business processes. From designing the first zero-carbon (in operation) home to delivering one of the first LEED Platinum office buildings in the Middle East, we have a proven track record of improving the sustainability of buildings and the communities in which they are located.

Our approach to design is driven by the fundamental belief that no building, space, or place can be considered well designed if it does not positively contribute to environmental, social, and economic sustainability.

Design should be informed by science and an ambition to reduce the built environment’s carbon footprint, and contribute toward holistic sustainable development, consequently promoting and enabling change in our industry and wider society.

Our practice’s process is not limited to a single solution or targeting specific green credentials, but instead we are knowledgeable and confident in critically applying innovative, multifaceted approaches to create deliverable and exemplar sustainable solutions.

Exemplary sustainable design requires an informed approach—one that cultivates through leadership in a collaborative environment.

Industry commitments + memberships

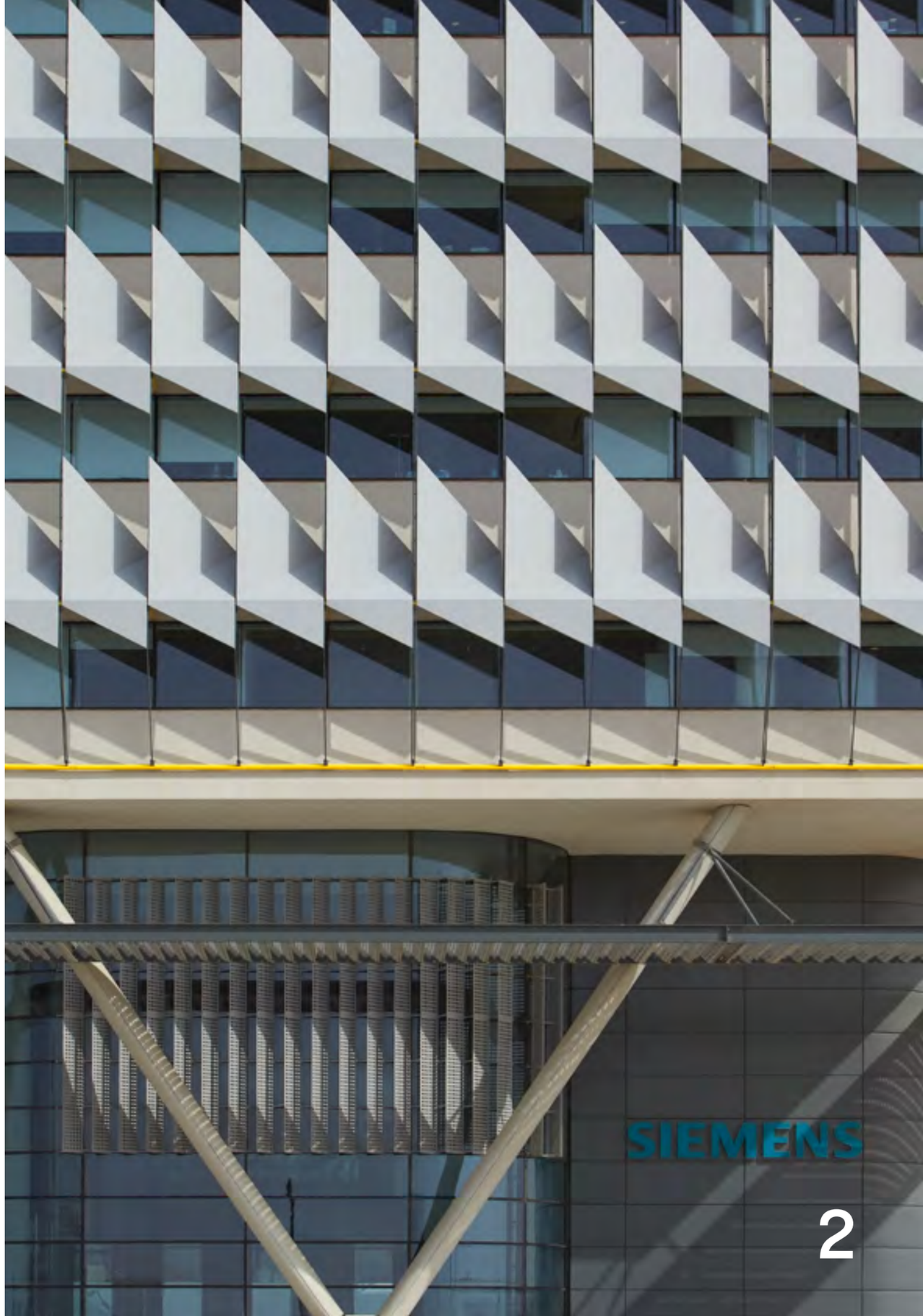
We are signatories of:

- The RIBA 2030 Climate Challenge
- The UK’s Architects Declare Climate and Biodiversity Emergency commitment
- The AJ RetroFirst campaign

We are also:

- ISO 9001 and 14001 certified
- A team that includes certified Passivhaus designers
- Former Sustainability Advisor to the RIBA
- On the UKGBC Advisory Group Board
- Members of UK Green Building Council (UKGBC)
- Members of Social Value Portal
- Members of Passivhaus Trust
- Members of Camden Climate Alliance
- Members of Timber Development UK
- SBTi-validated
- Silver sponsor of Article 25
- Bronze sponsor of UK Net Zero Carbon Buildings Standard

Overview



Our longstanding drive for sustainable and innovative design spans nine decades. With an emphasis on 21st century projects that address our current challenges, here are some of the projects that allowed us to accelerate change in our industry.

Urgency in Action: 10 years of Green Week and 25 years of our Sustainability Group

Click to read more and watch our 'Urgency in Action' video.

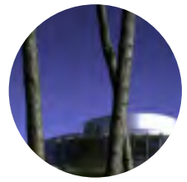
1944
Jicwood Bungalow
Prototype design for efficient post-war housing

1950
Swan Hunter HQ
Innovative concrete shell structure for light, open workspace

1996
Helicon
One of London's first sustainable developments combining retail and offices

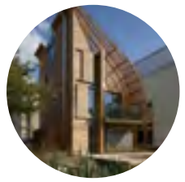
1998
Arup HQ
Active chilled beams and optimised glazing for daylight

2000
Launch of Sustainability Group
The practice forms in-house Sustainability Group



2002
Toyota
A headquarters which responds to its greenbelt environment

2006
Carabanchel 19
Exemplar in passive design



2007
The Lighthouse
UK's first zero-carbon house to meet Code Level 6

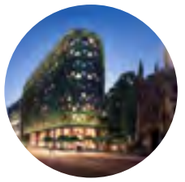
2011
Lancaster Institute for the Contemporary Arts
First BREEAM Outstanding higher education building

2014
Siemens HQ
A new model for sustainable office buildings in the Middle East

2016
citizenM Tower Hill
Exemplar of efficient prefabricated modular construction

2018
Deloitte HQ
First fit-out to achieve BREEAM Outstanding and WELL Gold

2018
Hardman Square Pavilion
Exemplar of timber frame construction



2020
Citicape House
Exemplar design for urban greening - featuring Europe's largest green wall

2020
BBC Cymru Wales
Setting new standards for workplace inclusivity in design and neurodiversity

2020
245 Hammersmith Road
Winner of 'Social Value Innovation Award' 2021

2020
Freshfields Bruckhaus Deringer
Exemplar in occupant wellness and highest possible SKA rating

2022
York Student Residences
Utilising innovative MMC to enhance quality while reducing construction time and waste

2022
Ev0 Building
Designing one of the UK's lowest carbon-emitting workspaces

2023
Mynydd Isa
Part of the net zero carbon Welsh schools programme

2023
Plot C3 MediaCity
Targeting BREEAM Outstanding, NABERS 5*, net zero carbon and WELL Gold

2024
Metro:Morphosis
Winning concept of Arup's Façade of the Future North design competition

2025
Fallowfield Campus
3,300-bed student campus and one of the world's largest Passivhaus schemes receives planning

Our sustainability history

The climate and biodiversity crisis is undeniable, and it is happening now.

As a practice, we are acutely aware of the threat climate change poses, and that the strides we make forward in championing a more positive future have to be done urgently. Our responsibility as an industry is amplified as we consider the already significant environmental changes we are observing globally, and closer to home.

We are seeing new records broken across the world, whether it is drought, wildfires, floods or heatwaves – the climate and biodiversity crisis is undeniable, and it is happening now.

While recent campaigning has been effective in putting the spotlight on the important guidance and research that is already being done by our industry, it has also highlighted the need for further government action to push climate change mitigation and resilience forward.

The requirement for more progressive, well-defined legislation regarding the construction industry's environmental impact is clear. We are vocal in our support of this, through our membership organisations and directly; for example, this was a key part of our response to the government net zero carbon call for evidence in October 2022. We listed our statement of support for Part Z, which calls for the regulation of embodied carbon, and our sponsorship of the UK Net Zero Carbon Buildings Standard as an aligned industry definition.

Until a clear and consistent approach is defined by legislation, we will continue to collaborate to drive forward and realise the opportunities available to make positive change, both locally and in the wider socio-economic context.

We must continue to support our clients - who are increasingly eager to push the boundaries of sustainable innovation - by optimising briefs, guiding understanding, and setting agendas at this critical moment in time.

"We need to think beyond the building footprint to wider socio-economic and environmental impacts."

Click here for our episode of the BCLP and Financial Times' sustainability podcast.

Redoubling our commitment.

Our first charter was published in the midst of the Covid-19 pandemic as a public pledge to prioritise sustainable recovery.

The charter includes a summary of our interpretation of our industry commitments and the sustainable development principles that we subscribe to.

Drawing on our exemplar projects, the document outlines seven key tenets, listed below, which shape our work and thinking.

In 2020, we committed to amplifying our long-standing engagement with sustainability and innovation and in 2022 we reflected on our actions in those eventful years and strengthened these commitments.

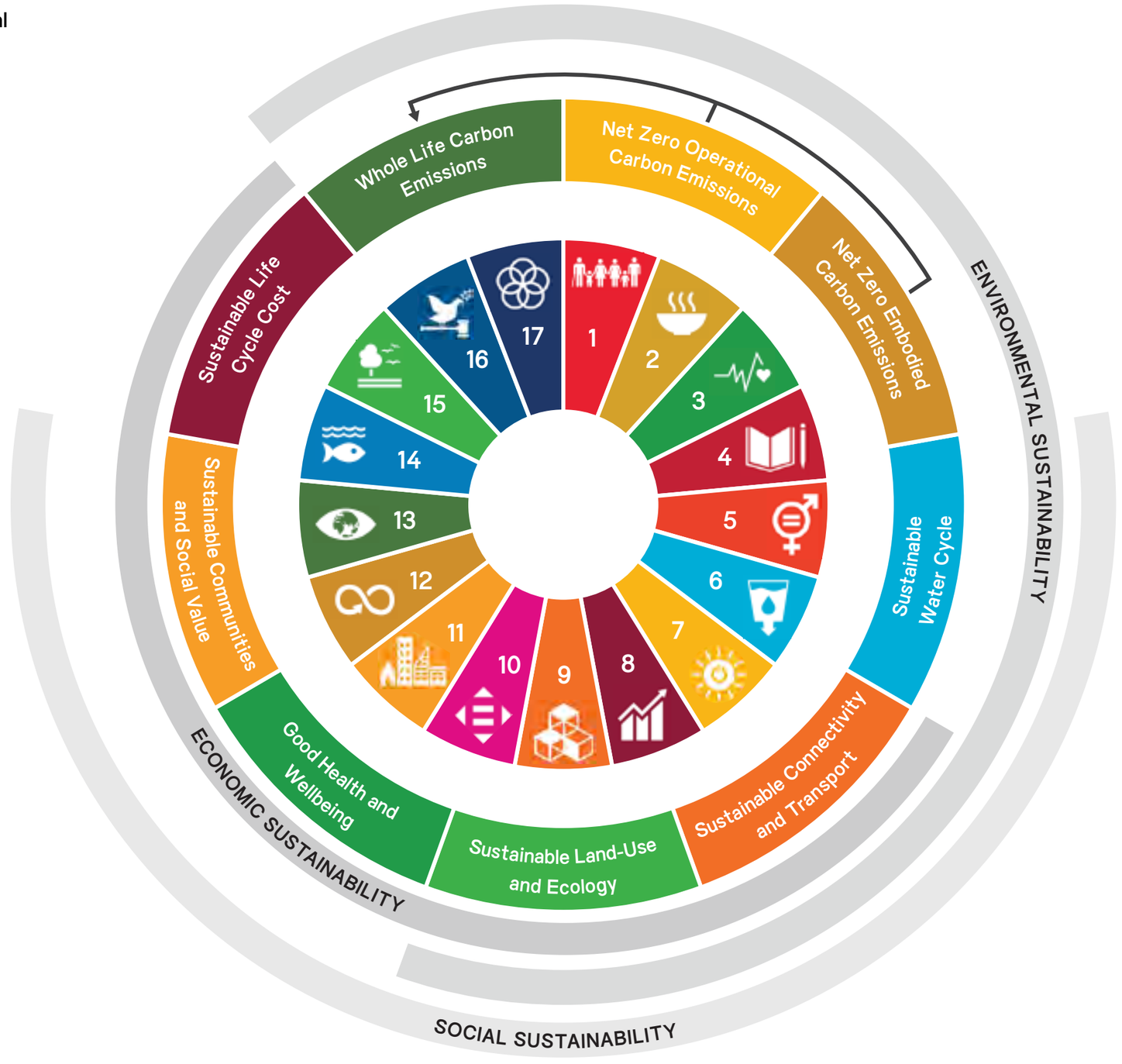
Now, the need for collective acceleration is clearer than ever. We have completed the second update of the charter to strengthen, refocus and reflect on how we've responded to these tenets since 2022, to keep ourselves accountable to the commitments we have made. We are committed to reviewing our charter every three years.

"Now more than ever, it is clear we need to act quickly and decisively. Our industry is pushing for change, and collaboration and engagement is critical."

Click here to read the charter.

1. Promote - environmentally and socially regenerative practices, innovation and action.
2. Employ - sustainable design principles aligned to the RIBA Sustainable Outcomes.
3. Establish - methodologies to meet ambitious and achievable limits, targets and indicators. Monitor and verify.
4. Evaluate - in-use project performance in order to inform and optimise.
5. Realise - a comprehensive toolkit for achieving net zero carbon.
6. Integrate - health, wellness, inclusivity and fairness considerations into practices and operations.
7. Share - knowledge, research and data in a collaborative and considered manner.

We structure our sustainability initiatives and design principles around the RIBA Sustainable Outcomes, to promote a holistic balance of social, environmental and economic design considerations.



Ref: RIBA Sustainable Outcomes Guide

UN SDGs + RIBA Sustainable Outcomes

To create a decarbonised world, we will have to work in harmony with nature, not against it.

We submitted to the Architects' Declare and AT's Regenerative Architecture Index, which benchmarks regenerative policies, actions and working practices.

Click here to learn more.

As architects and designers, we must work to facilitate a paradigm shift, to design with climate adaptation in mind, and consider that the buildings we create today will exist in a potentially very different world, with very different requirements, in the future.

This change in approach further highlights the need to build in flexibility and adaptability into our building stock, ensuring that what we build now can stand the test of time.

But it's not just new builds. Predictions are that 80% of the buildings that will exist in 2050 have already been built (UKGBC). We need to be thinking about how to retrofit our existing buildings and urban environment to adapt to climate change, and how to stitch new interventions into this that can offer a positive and regenerative future.

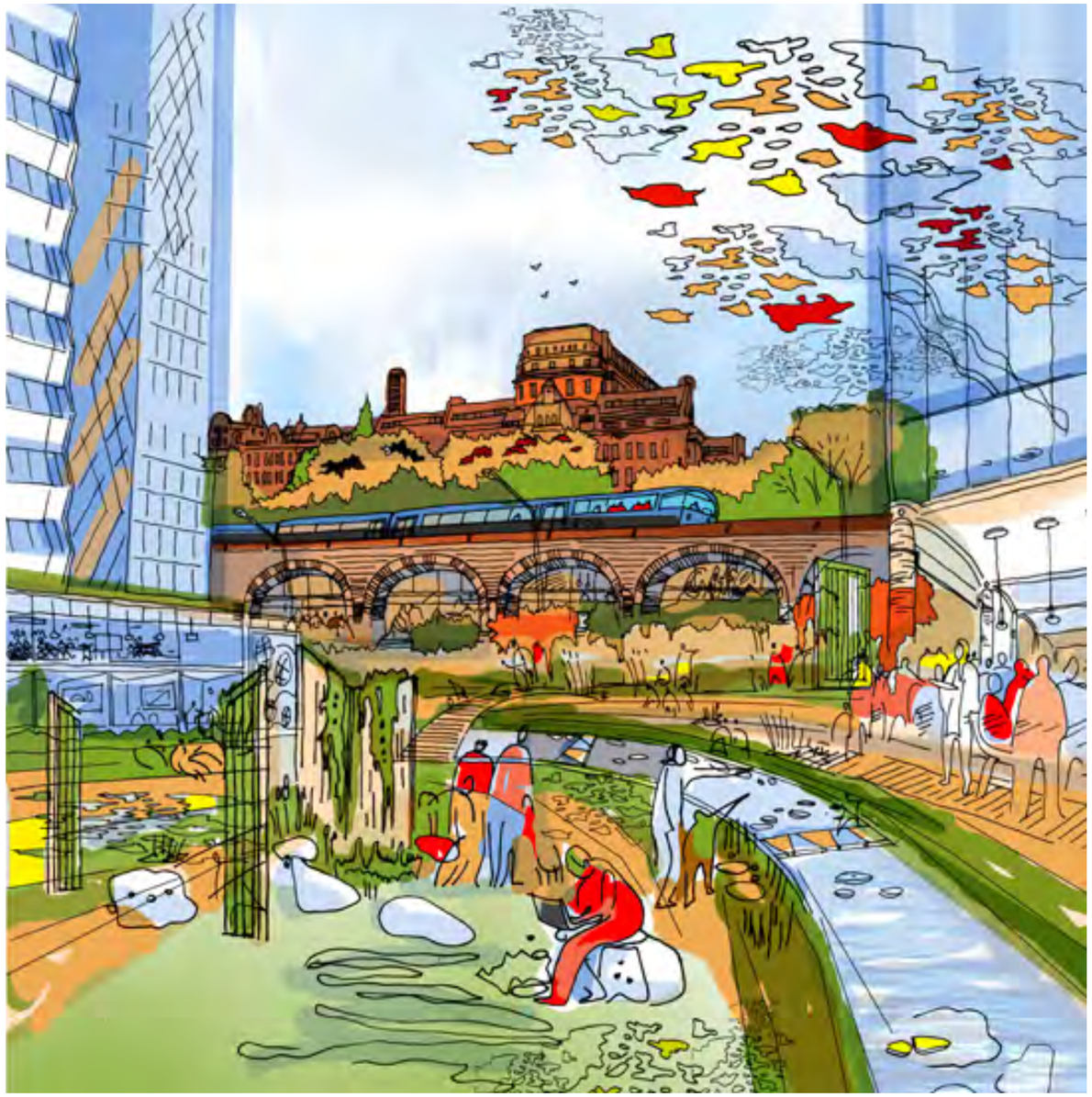
The scale of the issue is significant, but it also comes with compelling opportunities. Known solutions to incorporate climate resilience include increased urban greening, which can help mitigate the urban heat island effect, and in turn can have improvements for the health and wellbeing of residents, workers and the local area while also supporting increased biodiversity within urban environments.

Further to this, a shift in economic model could offer opportunities to address inequality, locally and further afield - everyone will be affected by climate change, but some will feel the consequences worse than others.

At Sheppard Robson, the core themes that underpin our work in relation to climate resilience and regenerative design are to:

- Prioritise creative retrofitting and reuse of existing buildings, often requiring our designs to be both sensitive and bold.
- Adopt a fabric first approach for all new builds to futureproof the long-term elements of the building and minimise reliance on active systems, where possible.
- Incorporate measures to reduce potable water usage and increase resilience to extreme weather events, such as rainwater harvesting and greywater recycling.
- Integrate circular design principles into all proposals to facilitate flexibility, adaptability and disassembly when required.
- Increase urban greening and incorporation of biophilic design.
- Optimise opportunities for social value to be incorporated into projects, to support and empower local communities.

We are focused on how our solutions today can set the foundations for wider regeneration. A better synergy between nature and the built environment is vital, and collaboration and engagement between consultants, with communities and with governing bodies will be key to unlocking this.



Back to contents

Design efficiency

Next section:
Whole life carbon ↘

A honed process.

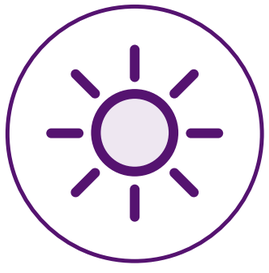
Our design process is structured to evaluate sustainable solutions from the commencement of a project; early involvement enables an informed, pragmatic approach, balanced with creativity and vision.

Starting at the macro scale, we aim to take the following steps on all projects, where possible:

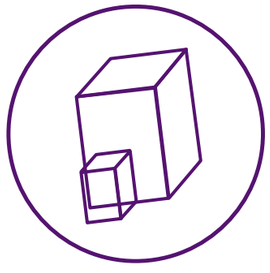
- Holistic design: consider reuse, energy, water, waste, ecology, social context and building efficiency from the outset.
- Passive design: reduce energy demand through passive design.
- Parametric design: utilise software to evaluate environmental conditions and inform passive design solutions.
- Active design: analyse low energy active solutions to complement passive design.
- Embodied impacts: prioritise specification of healthy, low carbon materials and products, and incorporate circular design principles where possible.
- Wellness: consider health and wellbeing metrics when designing and specifying materials.
- Measurement: where possible, measure performance in-use to close any performance gap and feed lessons learnt into future designs.

Holistic design

Passive design



Parametric design



Active design

Embodied impacts

Wellness

Measurement

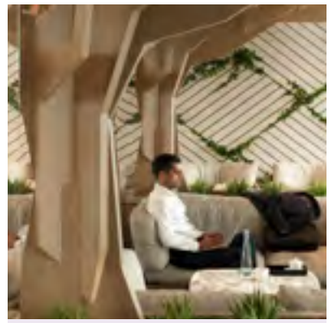
Nelson Mandela Children's Hospital

Mynydd Isa

Siemens Middle East HQ

Collaborative Teaching Laboratories

Hardman Square Pavilion



Deloitte HQ

Lancaster Institute for the Contemporary Arts

Sustainable design approach

Holistic design

It's important to take a holistic view of sustainability when establishing the brief, when it can have the greatest impact - social, environmental, and economic sustainability should all be considered.

We take a broad view of every aspect of sustainability when approaching design, including the site-specific opportunities and challenges, working collectively with the design team and clients to realise and balance sustainable design solutions.

By considering placemaking, mixed use, inclusive, flexible, and adaptable design, places will be loved and cherished. We have a strong portfolio of masterplanning work in which these principles are applied.

A holistic approach considers reuse of existing structures, components and materials, microclimate, energy, water, waste, ecology as well as social context and building efficiency, to set deliverable and integrated sustainability targets for the project. This includes looking at uses, zoning, and finding the balance between flexibility without over-engineering.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1 Nelson Mandela Children's Hospital: Designed as a mixed-mode building combining passive and active cooling, natural daylight and ventilation to all patient recovery rooms.

2 TTP Campus: Holistic sustainability approach in passive measures that optimise natural light and minimise energy demands, renewable energy, enhanced biodiversity, innovative materials and community benefits.

3+5 North Manchester General Hospital Masterplan: Designed to promote active, healthy lifestyles and the wellbeing of staff, patients, visitors and the community.

4 Barony Campus: Consolidates five schools into one shared campus, integrating community facilities to create a centre for education for local towns and the surrounding areas.

6 Barking Riverside: Low-carbon residential district.


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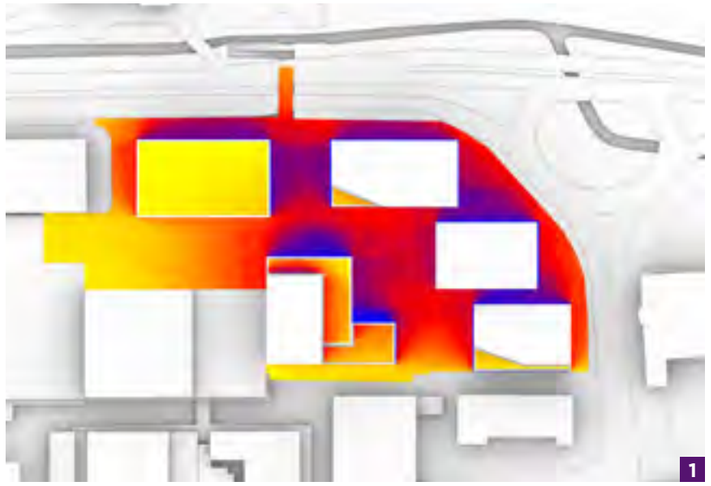
Passive design

We optimise passive design within the budget and design constraints. A fabric first approach helps to reduce energy demand from the outset, and future-proof the fabric efficiency and long-term elements of the building to adapt to climate change and new technologies.

We look for opportunities for passive design in early stages - examples can be found in the use of optimising orientation, natural ventilation, thermal mass, solar shading, evaporative cooling, and well-insulated and airtight construction.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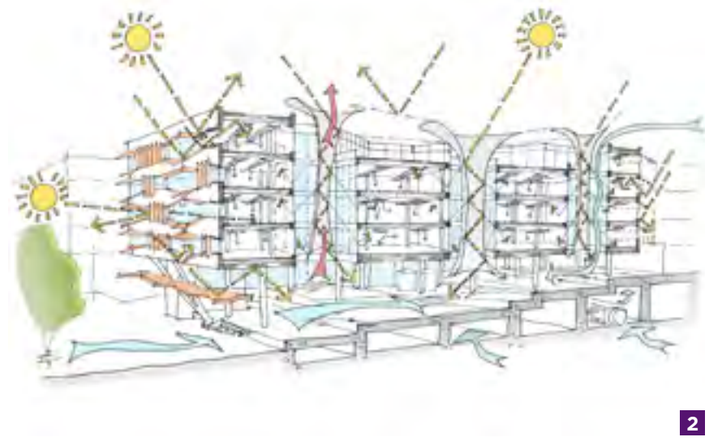
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1 Environmental analysis: Output from Ladybug.

2 Environmental analysis: Study sketch.

3 Carabanchel 19: Naturally ventilated homes that combine thermal mass, shading and evaporative cooling.

4 The Ev0 Building, Didsbury Technology Park: Façade arranged to minimise solar gain and overheating while optimising views out and daylight.

5 Mynydd Isa Campus: Thermally mapped to tune the building to its solar context, for natural light without overheating. Natural ventilation via chimneys on the roof.

Parametric design

Parametric design supports our passive design approach. We use computer software and plugins to conduct environmental analysis of concept designs including solar radiation and shading, outdoor comfort and daylighting, and to model geometry that responds to this analysis.

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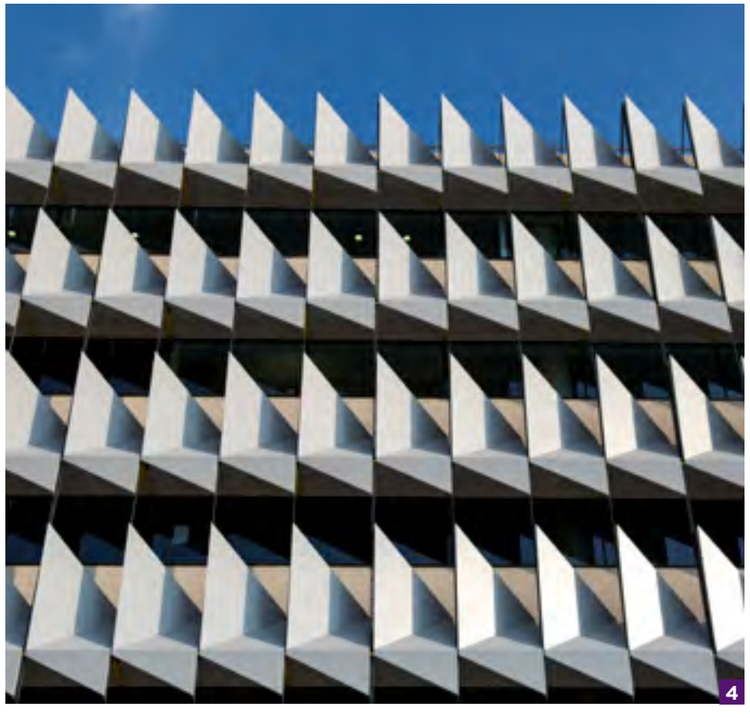

4

1 Siemens Middle East HQ: LEED Platinum certification, Estidama 3 Pearl. 63% saving in energy and 52% saving in water consumption, compared to typical office building in the region.

2 Project Estidama: The tower form was generated following parametric analysis. 42% carbon reduction compared to ASHRAE baseline model.

3 London Wall West: Building form and façade parametrically modelled.

4 Shading design: Component shading design using parametric tools to optimise daylight and views while controlling solar gain.

Active design

Where an active design approach is required, the architecture and services need to be integrated to provide a comfortable and simple-to-operate internal environment.

We work with the MEP engineer to understand how system solutions work closely and most efficiently with the fabric of the building, so we can consider how to accommodate these early in the design development.

Sheppard Robson's projects have utilised mixed mode ventilation systems, chilled beams, and airtight construction with efficient heat recovery.


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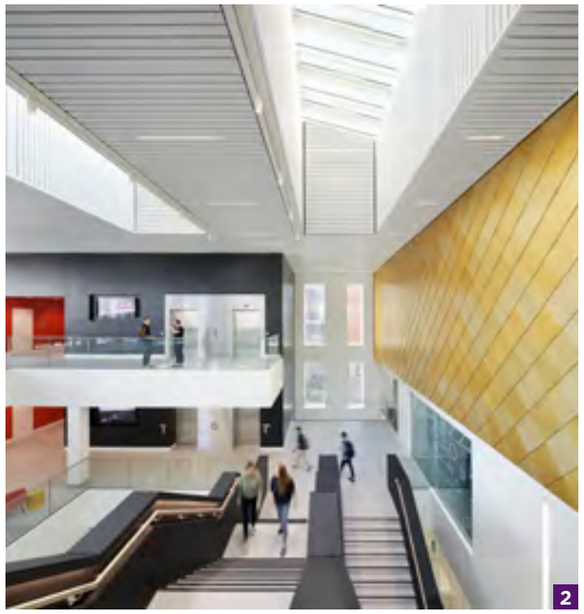
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1+**2** Collaborative Teaching Laboratories, University of Birmingham: BREEAM Excellent Laboratory. 207m^2 of photovoltaic panels (30 degree incline).

3 Arup Headquarters: Active chilled beams provide cooling to office space.

4 Hounslow House: Exposed concrete slab cooled by VAV active chilled beams for a radiant cooling effect. The VAV system monitors occupancy to decide how much and where to deliver fresh air and heating or cooling.

5 SCRM Research Laboratories: Rated BREEAM Excellent, renewable energy includes ground source heat pumps combined with chilled beams. Photovoltaics provide renewable electricity for pumps.

Embodied impacts

Through conscientious material specification, we can significantly improve the overall impact of the built environment and its supply chain.

Key criteria of sustainable material evaluation are: use and extraction of raw materials, energy and water consumption, GHG emissions, material performance (including durability and potential to reuse), waste and occupant health and wellbeing.

There are industry groups also working towards gaining a better understanding of the wider embodied ecological impacts of construction materials.

As we continue to drive down operational carbon and improve energy efficiency, understanding and limiting embodied carbon becomes increasingly important.

We aim to minimise upfront embodied carbon by promoting retrofit where possible and through our iterative design process, supported by use of our in-house upfront carbon design development tool.

Considerations for implications on life cycle embodied carbon in the use and end of life of a building are reviewed throughout the design process.


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1 + 2 Waingels College: Buildings constructed using a cross-laminated timber system as their structural base.

3 Hardman Square Pavilion: Timber elements of the building form the majority of its superstructure and envelope, which helped to drive reductions in the embodied carbon.

4 The Ev0 Building, Didsbury Technology Park: Low carbon design approach drives the building form and materials. Ultra-low carbon timber structure, currently exceeding LETI 2020 design targets for upfront carbon.

5 BBC London Broadcasting House: Fit-out incorporated reuse and repurposing of existing furniture, integrated with a creative approach to material specification to faciliate flexibility and low carbon impact.

Wellness

Quality designs that are well-considered can promote wellbeing and inclusivity. A subject that is gaining momentum as a key client requirement, wellness and inclusivity principles improve quality of life while answering business' bottom line through increased staff attraction, retention and productivity.

We have extensive experience delivering designs to high levels of certification in BREEAM, WELL Building Standard and SKA Rating.


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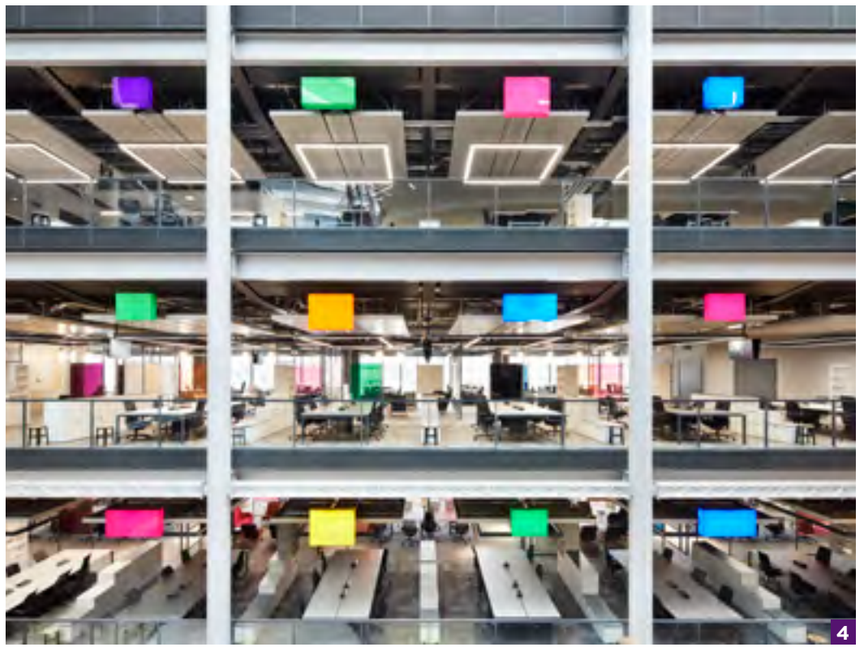
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1+2 Deloitte, 1 New Street Square: Approach included 50% of desks sit-stand and a biophilic design that had 6,300 plants in 700 displays, 140m^2 moss walls and images of nature to bring the building to life and create opportunities for mindfulness.

3+4 BBC Cymru Wales: Promotes new perspectives on wellness and inclusivity, incorporating considerations around neurodiversity into the design decisions.

5 Freshfields Bruckhaus Deringer: Includes key features of biophilic design from natural daylight flooding the offices spaces, to materiality and manifestations.

Measurement

Measuring environmental performance once a project is completed and in use is a crucial part of the approach to sustainable design.

This can be beneficial to our clients across a spectrum of areas, including improving occupant health and wellbeing, and identifying opportunities for improving energy efficiency which can then lead to energy cost and carbon emission reductions. It can also highlight lessons learnt so designers of subsequent projects can be better informed in their decisions.

We have conducted rigorous analysis on SR projects - the findings of some of these are included in the post-occupancy section ↗


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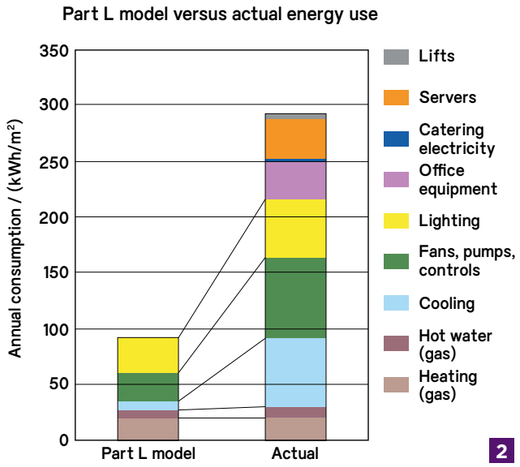

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1 Lancaster Institute for the Contemporary Arts: UK's first BREEAM Outstanding Higher Education building.

2+**5** One Kingdom Street: Part L Model vs actual energy use. Building performance evaluation highlighted performance gap, and used to understand energy in-use and help with commissioning.

3 MediaCity Salford: Façade optimised to reduce solar gain and maximise daylight.

4 KPMG Manchester: Achieved SKA Gold and BREEAM Excellent.

Client	London Borough of Hounslow, LinkCity
Location	London, UK
Size	16,050m^2
Cost	£64m
Completed	2019
Website	↗

The starting point of our design was to reflect the progressive culture of the borough, with the bold building acting as a sustainable beacon that demonstrates the council's commitment to environmental efficiency.

Defined by orientation

The façade defines the identity of the building and - through its adoption of passive design principles - is a vital element of the building's sustainable approach. The façades are informed by a singular design approach, creating a consistent architectural language to all elevations.

This vocabulary is derived from glazed bays separated by extruding geometric forms made from anodised aluminium, with the surface's iridescent quality changing throughout the day, and expressing the three-dimensionality of the building's form.

The shading changes in depth depending on the orientation of the façade. The façade maximises natural light by incorporating high levels of glazing, with the solid elements digitally modelled to minimise solar gain, cooling loads, and consequently the energy consumption of the building.

Co-location and convergence

The building has been shaped around the principles of transparency and integration, with the design efficiently bringing together numerous functions around a dramatic central atrium.

At ground floor and first floor level are the council's public-facing spaces, including library and community facilities as well as a café. Large openings at street level allow these amenities to animate the building for passers-by and give it a strong civic presence.

Above the first floor are four levels of workspace for the council's team, with the civic chamber positioned at the top of the building to benefit from views across London.

The building's public and private spaces are stitched together by a bold and sculptural staircase, which also works to create visual connections throughout the different types of spaces in the building.

Design efficiency: Hounslow House

Client	ADFEC (MASDAR)
Location	Abu Dhabi, UAE
Size	20,000m^2
Cost	£23m
Completed	2014
Website	↗

When completed in 2014, the project was one of the first office buildings in the region to achieve LEED Platinum status, following a simple ambition: to maximise efficiency and build more with less. An iterative process of traditional design and parametric analysis resulted in an efficient and compact form.

Parametric façade design

The building envelope was conceived as a box within a box: an inner highly insulated airtight façade designed to reduce thermal conductivity, and a lightweight aluminium external shading system which minimises solar gain while maximising daylighting and views from the building.

The variation in the form of the shading systems was designed to offer legibility to the architectural expression with each façade tailored to suit its solar orientation. Delicate, articulate modular components cast intricate shadows on the internal box.

As the sun circles the building, shadows animate the interior and give the façade depth. From a distance the building appears as a simple whole, but the individual components become visible and independent on approach.

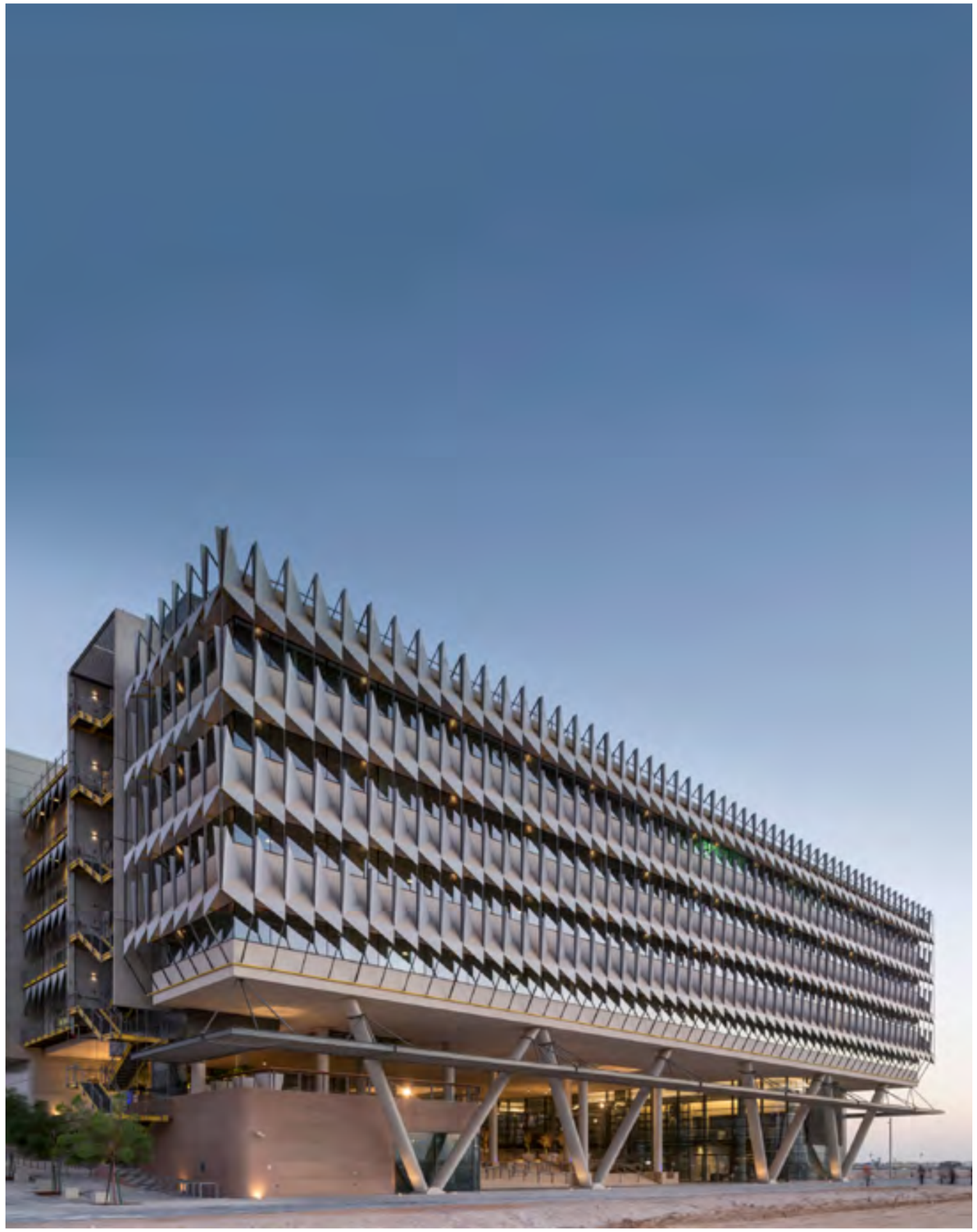
A small number of materials repeatedly appear in the façade, unifying the design without distracting from the striking geometric pattern. Internal window positions are carefully placed to provide consistent internal lighting, and atria are fully glazed, welcoming you with light and a feeling of space as you enter the building.

Ultra efficient floor plates

The office floor plates, each 4,500m^2, have been optimised for efficiency, daylight and flexibility using parametric modelling and achieve over 90% efficiency. They are punctuated by nine atria and served by six perimeter cores.

Completely column-free floor plates incorporate 15m spans by using an innovative post-tensioned flat slab with integrated void-forming technology. This reduces the material used by approximately 60% and provides maximum flexibility for the office space planning.

The arrangement enables each of the floors to be subdivided into a combination of various space sizes and therefore creates flexibility for the building to be remodelled over time to accommodate between one and 32 tenants.



Design efficiency: Siemens Middle East HQ

Client	Kingspan Metl-Con
Location	London, UK
Size	93m²
Cost	£240k
Completed	2007
Website	↗

Lighthouse was the UK's first zero-carbon house, meeting Level 6 (the highest level) of the Code for Sustainable Homes.

The Lighthouse is a prototype home where the innovative environmental systems and construction methods do not compromise the quality of the occupants' life, but add to it - creating adaptable, flexible spaces designed for sustainable modern living.

Valuing simplicity

The structure is a simple, barn-like form, derived from a 40° roof accommodating a PV array. The sweeping roof envelops the central space—a generous, open-plan, top-lit, double-height living area, with the sleeping accommodation at ground level. The living space uses a timber portal structure so floors can be slotted between frames or left open as required.

At ground level, a timber frame structural layout carries the vertical loads of the open-plan frames above and provides stability to the load-bearing shear walls. Stability is achieved through the moment connections at first floor and ceiling level. It is constructed using Kingspan Off-Site's TEK Building System - a high performance SIPs (structural insulated panel) based system.

Controlling heat loss

To achieve Level 6 there is a mandatory heat loss parameter which demands high U-values for the building fabric, thus the Lighthouse's ratio of glazing to wall is 18%, as opposed to 25-30% in traditional houses. This drove the decision to locate the living space on the first floor, to maximise daylight and volume.

Phase-changing material in the ceiling absorbs the room heat by changing from solid to liquid within microscopic capsules embedded in the board. This process is reversed when the room is cooled with the night air, working with the passive system of the wind-catcher.

Design efficiency: Lighthouse

Big leaps and iterative tweaks: the importance of continual feedback.

Post-occupancy evaluation (POE) is an appraisal of how a building supports the needs of those for whom a building is designed *(Friedman, 1978)*.

At Sheppard Robson, we have been documenting POE for approximately two decades - since the formation of our sustainability group - and we aim to conduct it on as many completed projects as possible.

Where appropriate, we encourage clients to undertake a thorough and detailed POE process using an established third-party methodology.

Where conducted with a third-party specialist consultant, POE can provide additional benefits to our clients, including information on improving occupant health and wellbeing, and identifying opportunities for improving energy efficiency which can then lead to energy cost and carbon emission reductions.

Sheppard Robson joined the BUS Methodology Partner Network in 2024 to promote the use of this industry standard occupier satisfaction evaluation, and to support our clients in identifying features that work well or could be improved. This service will support our clients to optimise building operation with occupant satisfaction at the centre.

Where a third-party methodology is not undertaken, we endeavour to undertake POE using our in-house process, which gathers information via occupant feedback surveys and building visits.

The feedback from these is disseminated through our thorough Design Review and Design Delivery Group reviews, and through knowledge sharing and practice presentations which are carried out centrally for all staff. The results and feedback from these studies are invaluable and help us become better designers by feeding these lessons learnt into future projects and procedures.

Our considered POE approach, together with our in-house Passivhaus expertise, enable us to better design for performance in use and work towards closing the performance gap in our projects.

10 years after its completion, James Jones returns to Notre Dame Catholic College to see how it has evolved as well as negotiated the challenges of the pandemic.

True flexibility can only be assessed over time, allowing buildings and spaces to be pulled in different directions by changing aspirations, shifting requirements, and – perhaps most testing of all – health emergencies. It is with this in mind that we returned to a building that had flexibility at its core to see how it has weathered changing contexts.

Completed in 2013, Notre Dame Catholic College (NDCC) in Liverpool is a bold school design, creating a flexible economic architectural 'shell' within which a bespoke mix of learning and social spaces could be developed. The project allowed the school to move from a Victorian building, which they likened to a "rabbit warren", to a school that promoted openness and could embrace change. NDCC was the first of three schools we developed with Liverpool City Council as part of the Liverpool Schools Investment Programme.

The interiors of the 950-pupil school are a blend of naturally lit traditional classroom spaces and more open and dynamic break-out and study spaces, located through the central concourse and galleries. Cellular teaching spaces occupy three sides of the building, encircling an open central zone or 'village' containing school-specific functions such as performance space, amphitheatre, chapel and dining spaces, all of which reflect the school's sense of community.

Adaptation over time

Since completion, we have maintained an ongoing relationship with the school (both informal conversations and advice as well as formal commissions), with the design becoming an important reference point for our work and a precursor to the government's MMC school programme.

We have done around a dozen tours of the building to learn how it has evolved since its completion and we were pleased to find that the building has been adapted incrementally over the last ten years as was the intention of the original design.

Changes include: the enclosure of two open-plan classrooms; the creation of new Special Educational Needs (SEN) facilities on the ground floor; a DT room has been converted into a lab; a small new classroom has been added into the central village; office pods changed to more teaching space; and the relocation of ground floor pods to create more dining space.

Many of these changes were because of increasing pupil numbers, with the school having to turn administrative spaces into more classrooms, especially for core subjects such as English, Mathematics and Science. This was done with relative ease, including adding specialist spaces, such as laboratory.

Responding to the pandemic

Additional significant changes were brought about by the Covid-19 pandemic. During the pandemic, the lunch break was split into two sessions. This extension of students' social time impacted the acoustic performance of the open learning spaces within the school, which led to a roof being added to the art department. This was an easy addition which took three days to complete with minimal disruption.

The teaching staff noticed a change in behaviour following the pandemic. Many students lacked a structure to their day when at home and the school believes this has impacted negatively on the students' behaviour, including more vandalism. The 'village' at the heart of the building had been designed to be open however, following the pandemic, the school took the decision to restrict some areas and create more defined routes through the school to stop anti-social behaviour and bullying. Again, changes that could be made quickly and at low cost.

In fact, the open nature of the school is still a great advantage, allowing easy supervision. This in turn has allowed staff to quickly identify problem areas and take a mixture of managerial and site measures in response.

Lessons learnt

Returning to a building and listening to how it has performed since completion is an invaluable exercise, especially with a project like this which was a testbed for new ideas and pedagogical thinking. Because of the close relationship we have with the school, we have had many open and honest discussions about tweaks that could be made and factored into our work in the future.

We have discussed at length the careful balance of creating an open school, which is adaptable and encourages passive supervision, and the need for controlled environments, especially around acoustics.

Changes – for example those connected to the pandemic – can be unpredictable so inherent flexibility needs to be incorporated into the design. The school is currently installing additional doors to close off the top part of perimeter access stairs leading to the plant rooms. The stair cores were designed to be efficient and take up minimal area on the plan – which aids future flexibility. In hindsight, however, separating plant level access from the main stairs, while causing a small compromise in efficiency and adaptability, would have prevented a school management headache where pupils can access and hide at the top level of the stairs.

This careful chorography between open and closed spaces is a key lesson learnt for us which we are applying to current projects.

Avante Linton, Kent

Housing scheme - building performance evaluation with government funded grant along with customer satisfaction survey.

Barking Riverside

Housing scheme - customer satisfaction survey.

One Kingdom Street, London

Speculative office building - building performance evaluation to understand energy in-use and help with commissioning.

University of Strathclyde

Ongoing projects for various departments - occupant and user lessons learnt meeting. Results from feedback have been subsequently applied to other projects for the university and beyond.

Greenbank Student Residences

New-build and refurbishment student residential scheme creating 1,370 en-suite bedrooms for the University of Liverpool - customer satisfaction survey.

Notre Dame Catholic College

An ongoing relationship with the school has enabled us to understand how the school has used and adapted the spaces, and feed lessons learnt back into practice.

Post-occupancy evaluation: project examples

1 Briefing

It is critical to set the sustainable outcomes at the outset of the project. Take time at the beginning of a project to establish a clear, ambitious and holistic brief. A holistic brief balances social, environmental and economic measures to ensure it is deliverable, that it contributes to climate and biodiversity restoration, and that it includes the wellbeing of end users and the local community.

2 Design approach

An iterative approach with consultants is key to test and refine options. Designs should be monitored throughout each RIBA work stage to ensure proposals remain aligned to the brief.

3 Prioritise

Sustainable design does not have to be boring or ugly. It can and should be impactful and engaging by prioritising architectural expression to special moments in the building design.

4 Keep it simple

Overly complex designs and details are difficult to construct and can lead to flaws in construction and consequent underperformance from day one. Our buildings need to be built to last, which means starting with high-quality, considered design and construction. Airtightness and thermal lines should be simple and robust - buildability must be considered.

5 Post-occupancy evaluation

Measurement in use is a crucial step to close any performance gap and obtain the modelled carbon reductions in reality. Lessons learnt and feedback are an important part of this, to take the real-life workings back into future designs and increase efficiency in proposing solutions.

6 Collaboration is key

Collective and consistent buy-in to the common goal from the whole project team is essential. Every person has a role to play.

Lessons learnt

Back to contents

Whole life carbon

Next section:
Social value ↘

Whole-life thinking is embedded in our practice culture.

What is whole life carbon?

Whole life carbon emissions are the sum total of all asset-related GHG emissions and removals, both operational and embodied, over the life cycle of an asset including its disposal (*modules A0–A5, B1–B7, B8 optional, C1–C4, all including biogenic carbon, with A0 assumed to be zero for buildings*).

Overall whole life carbon asset performance includes separately reporting the potential benefits or loads from future energy or material recovery, reuse, and recycling and from exported utilities (*modules D1, D2*).

(Ref: RICS Whole life carbon assessment for the built environment 2nd edition ↗).

Our approach

Whole-life thinking is embedded in our practice culture. Our approach aims to minimise operational energy use and upfront embodied carbon through our iterative design process, while considering the implications for life cycle embodied carbon throughout the use and end of life of a building, such as maintenance and replacement cycles and promoting design for flexibility, adaptability and disassembly.

We work diligently with project teams to embed operational energy and embodied carbon targets and limits into construction and delivery; recognising a building's actual carbon impact can only be realised once it is built, through efficient construction that has monitored and measured carbon impact throughout.

We advocate whole life carbon accounting on all projects, and consideration of future climate conditions and changes in use. Information related to efficient operation and maintenance of the building should be included in the building handover procedures and information.

Post-occupancy evaluation is encouraged to understand the as-built performance against the modelled design, to close any performance gap, and to enable lessons learnt to feed back into the project and all future developments.

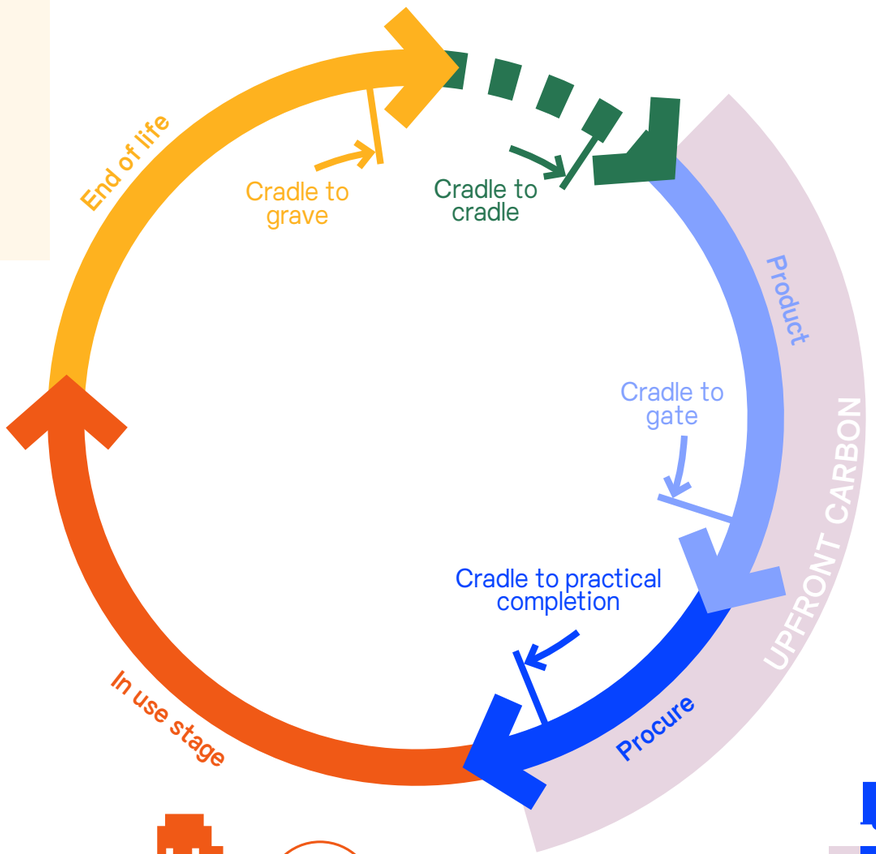
The next few sections of this publication will explore approaches that can offer efficiencies and reductions in operational and/or embodied carbon, and how we implement these at Sheppard Robson.

It is important to note that reduction strategies for operational and embodied carbon are not always complementary, and therefore it is important to design iteratively and holistically.

Overview

C1	Deconstruction
C2	Transport
C3	Waste processing
C4	Disposal

D	Reuse, recycle, recover



A0	Non-physical pre-construction activities
A1	Raw material
A2	Transport to manufacturing unit
A3	Manufacturing emissions

B6	Operational energy
B7	Operational water
B8	User activities not covered by B1-B7

B4	Replacement
B5	Refurbishment

B1	In use
B2	Maintenance
B3	Repair

A4	Transport to site
A5	Work on site

Whole life carbon modules - RICS 2nd edition

Start with a passive, fabric first approach to minimise energy use required from the outset.

What is operational carbon?

Operational carbon are those greenhouse gas emissions (direct and indirect) associated with energy used by a building in use over its life cycle *(module B6)*, or with the supply and wastewater treatment of water, used by a building in use over its life cycle *(module B7)*.

(Ref: UK Net Zero Carbon Buildings Standard ↗).

Operational carbon is directly related to how we occupy and interact with buildings. The energy efficiency of a building must be a core focus when considering operational carbon, to reduce peak demand to be compatible with the future decarbonised national grid.

Our approach

To achieve an ultra-low energy design, it is important to start with a passive, fabric first approach to minimise energy use required from the outset.

The buildings we design today will still be standing when we reach the government net zero target of 2050 (2045 in Scotland), therefore we should look to future proof the fabric efficiency and long-term elements to adapt to climate change and new technologies.

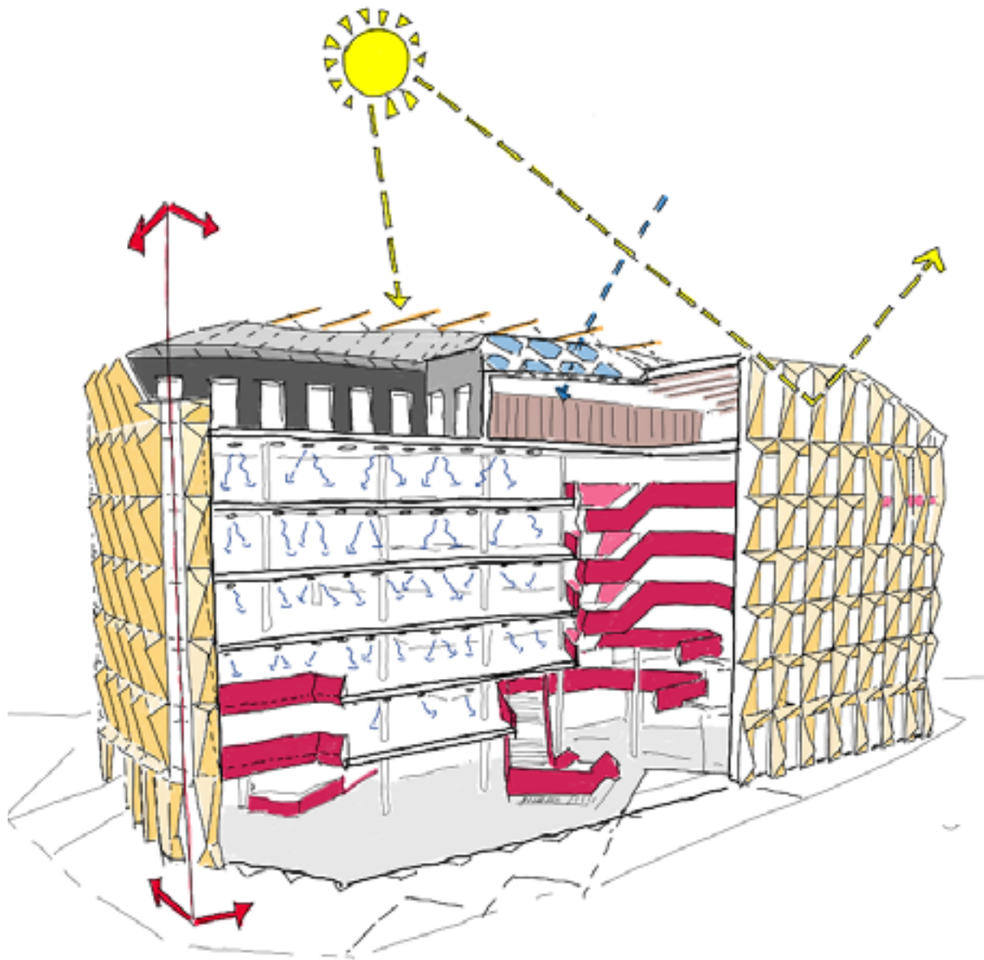
It is crucial that the active systems then complement the brief and the passive approach. Early engagement with the MEP engineer is beneficial to understand how system solutions work most efficiently with the fabric of the building, so these can be accommodated early in design development.

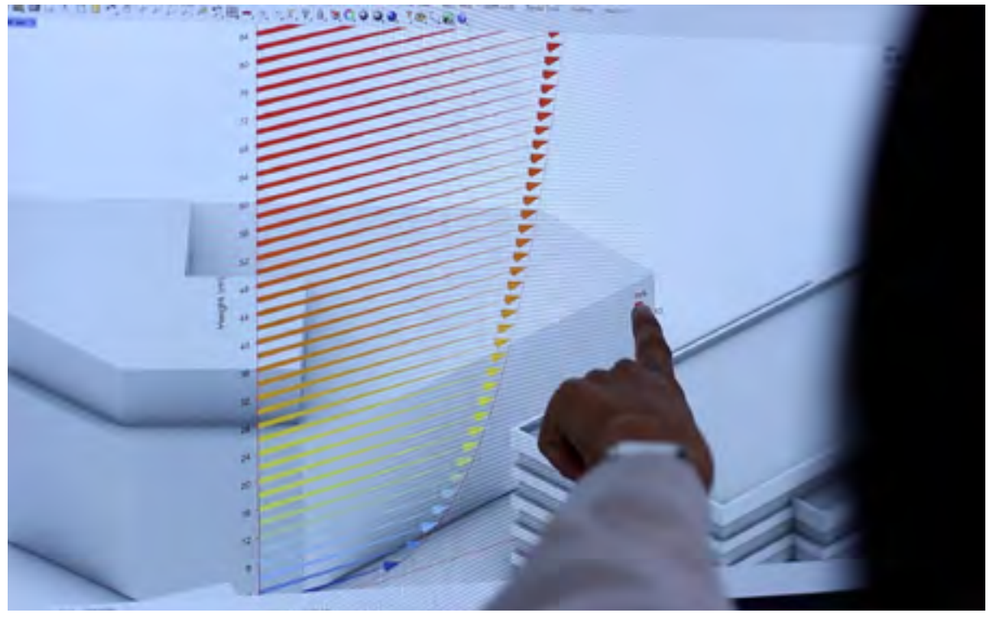
Passive, fabric first design considers:

1. Optimising design parameters: including form factor (efficiency of shape), glazing ratio and orientation. Refer to LETI Climate Emergency Guide ↗ indicative design measures for guidance.
2. Maximising airtightness: to minimise heat loss through air leakage.
3. Using high levels of insulation: where appropriate, to balance heating/cooling loads.
4. Optimising balance of solar gain with natural daylighting: through the careful orientation, shape and size of glazed openings and provision of solar shading relative to orientation.
5. Optimising natural ventilation: through passive ventilation where possible (noise and air quality need to be considered), utilising mixed mode or via mechanical ventilation with efficient heat recovery.
6. Optimising passive cooling: through pre-cooling of supply air, night-time purging and using the thermal mass of the building fabric to moderate internal temperatures and comfort levels.

Our aim is to minimise the energy demand such that buildings are simple, affordable to run and future-proofed against climate change.

Solutions to reduce potable water usage need to be integrated - these can also support resilience to extreme weather events such as storms and flooding. Efficient fixtures and fittings and leak detection should be incorporated, alongside rainwater harvesting and greywater recycling where possible.





Client	Welsh Education Partnership Company (WEPCo)
Location	Flintshire, Wales
Size	10,300m^2
Cost	£30m
Completed	Ongoing
Website	↗

Designed to be net zero carbon in operation (NZCiO), Mynydd Isa Campus consolidates a high school and primary school that were previously spread over three sites, into a single campus in the village of Mynydd Isa in North Wales.

Prioritising passive solutions...

The BREEAM Excellent project brings together the two schools as separate 'finger' blocks, joined by a shared entrance, secure reception, and kitchen. The form provides separation between primary and secondary teaching areas and inherently embraces passive design principles, to maximise natural light and ventilation and minimise overheating through solar shading strategies alongside considered orientation.

Design iterations were thermally mapped to tune the building to its solar context, resulting in classrooms that benefit from natural light whilst not overheating due to too much direct sunlight.

Natural ventilation is also fundamental to the NZCiO strategy: all learning spaces receive fresh air through chimneys located on the roof, which is combined with mechanical heat recovery units for winter.

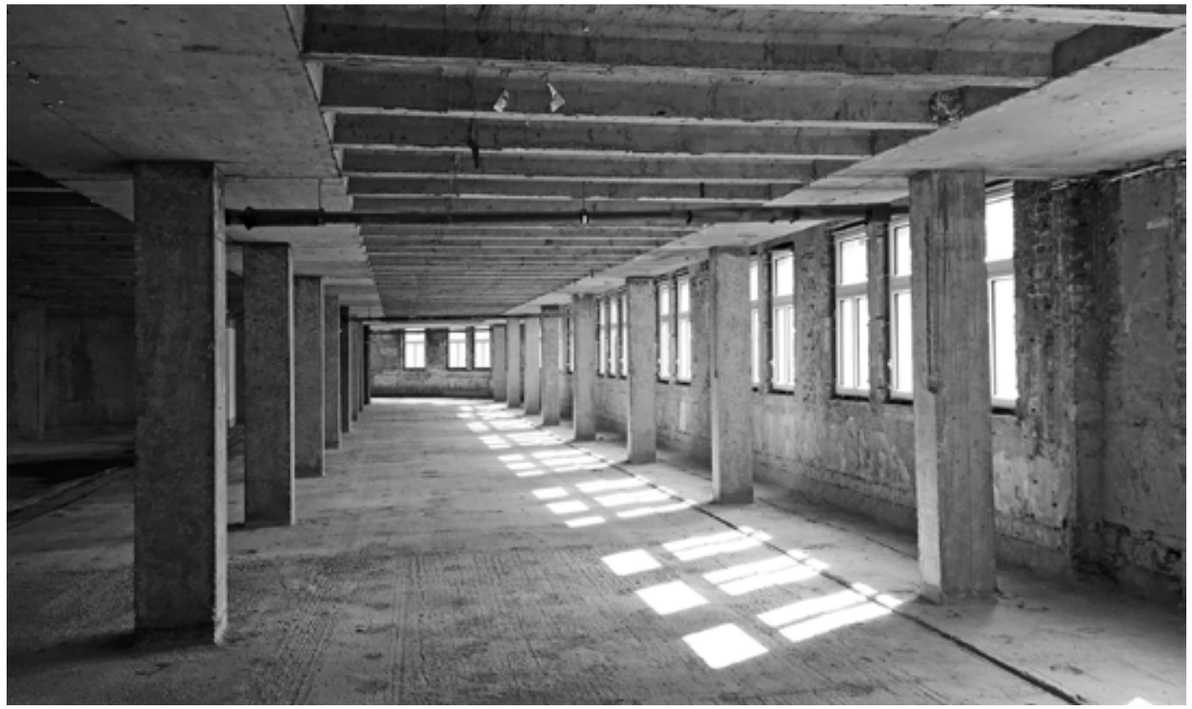
Further minimising energy use, the building's roof and walls are designed to achieve 0.1Wm^{2}K. This is achieved by enhanced specification of the building fabric and rigorous airtightness testing.

...alongside active systems

Passive design strategies have been paired with complementary active systems to achieve the NZCiO target. A building management system identifies inefficiencies in the running of the building, collecting data on the operational energy expenditure. This allows for better informed decisions on running the building. The all-electric buildings utilise heat pumps for heating and hot water and have approximately 2560m^2 of on-site PVs.

Operational carbon: Mynydd Isa

Substantially reducing the upfront carbon associated with creating or retrofitting a building is one of the most urgent challenges the construction industry faces.



What is embodied carbon?

Embodied carbon, or life cycle embodied carbon emissions of an asset are the total GHG emissions and removals associated with materials and construction processes throughout the whole life cycle of an asset *(Modules A0–A5, B1–B5, C1–C4, with A0 assumed to be zero for buildings).*

Upfront carbon emissions are the GHG emissions associated with materials and construction processes up to Practical Completion *(Modules A0-A5, with A0 generally assumed to be zero for buildings).*

Upfront carbon excludes the biogenic carbon sequestered in the installed products at Practical Completion.

(Ref: RICS Whole life carbon assessment for the built environment 2nd Edition ↗)

Embodied carbon is currently an unregulated issue. However, substantially reducing the upfront carbon associated with creating or retrofitting a building, from the point of sourcing the raw material to Practical Completion, is one of the most urgent challenges the construction industry faces.

The worldwide 'carbon budget', the maximum amount of carbon emissions that can be released while restricting global temperature rise to limits in the Paris agreement, will be consumed in under 6 years if emissions remain at their current level (Ref: ↗).

This makes the carbon emitted over the next decade critical to meeting the goals set out in the Paris Agreement. It requires buy-in from all stakeholders and close collaboration throughout the design team, contractor and supply chain.

Our approach

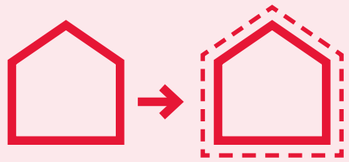
When it comes to material choices, there is no single solution to designing low embodied carbon buildings. Each material should be chosen only where it has the best performance for its function, with the lowest life cycle carbon impact.

Based on LETI embodied carbon primary actions ↗ key considerations include:

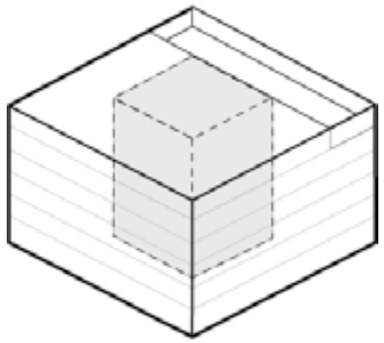
- Build less: prioritise retrofit and reuse of materials on site, where possible. Seek an efficient form, use of space and materials.
- Build light: reduce long spans and weight of dead loads where possible.
- Build wise: review material efficiency by considering modular sizes and repeating elements. Utilise locally sourced material options where viable.
- Build low carbon: consider natural and renewable materials. Minimise use of high embodied carbon materials.
- Build for the future: design for adaptability and disassembly. Consider flexibility in space planning and future-proof risers and plant rooms to adapt to possible uses and technologies. Explore options to increase longevity of materials.
- Build collaboratively: involve the whole design team and the client. Start reduction strategies early, utilising rules of thumb and add detail to calculations as design progresses.

The embodied carbon implications of our design decisions are methodically considered throughout design development, supported by our in-house upfront carbon design development tool.

Following widely accepted industry standards, this tool enables the design team to assess upfront embodied carbon implications of options at early project stages, when the most impactful savings strategies can be realised.

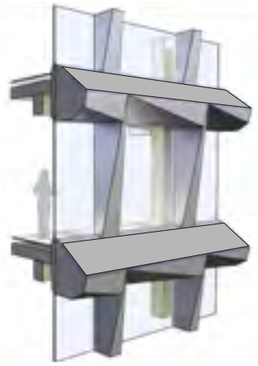


BUILD LESS



Ev0 has a very efficient form, and has avoided additional finishes where possible - for example, keeping soffits and overhead services exposed on floorplates.

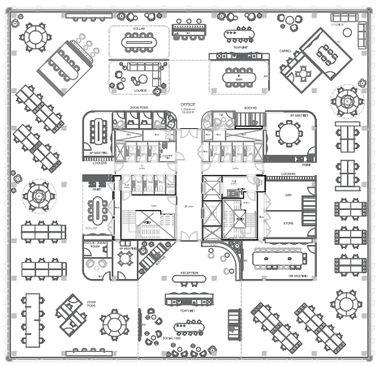
BUILD WISE



The solar shading to all façades has been sculpted to optimise material use while balancing daylight requirements and limiting solar gain.

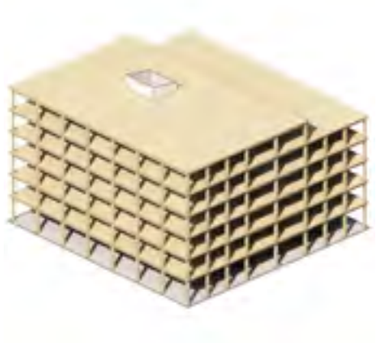
Each façade has a repeating window and cladding module that responds to its orientation. These modules have potential to be pre-fabricated off site which could offer benefits to waste reduction and construction programme.

BUILD FOR THE FUTURE



The timber structure is easily adapted to accommodate flexibility in the design and any future tenant requirements. It is also much more easily disassembled at its end of life than a traditional steel or concrete structure.

BUILD LIGHT



A lightweight timber frame allowed for concrete foundations to be minimised.

The column grid span was limited to 6m in one direction to minimise the span of the CLT slabs, in the other direction it was 4.5m adjacent to the central core to facilitate M+E services. This increases to 9m to the north and south edges, which supported efficient use of material in the timber slab and beams.

BUILD LOW CARBON

The structural design for Ev0 has maximised the use of mass timber, limiting use of concrete to the foundation and core only.

Timber flooring is specified in the lift lobby and staircase areas.

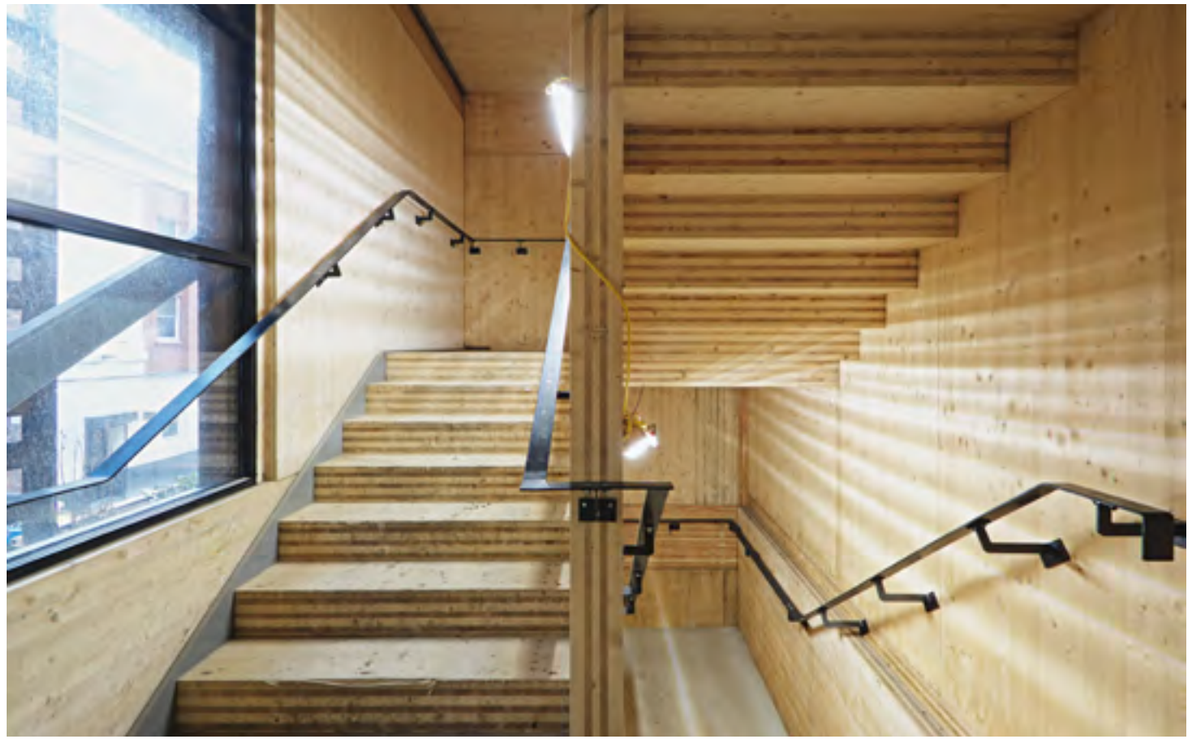
BUILD COLLABORATIVELY

The industry leading ambitions of the project required the design team and client to work very collaboratively, addressing both regulatory and sustainable performance criteria.

There were high levels of communication throughout the design process, buy-in from every party at senior level and far more iterations at every work stage to test and refine options to meet or exceed the targets set.

Project example: Ev0 Building ↘

Client	Allied London
Location	Manchester, UK
Size	1,280m²
Cost	£5.5m
Completed	2018
Website	↗



A hybrid building, constructed almost entirely from timber, designed to maximise ecological and social benefit while minimising embodied carbon.

Embracing CLT

In a drive to improve quality and reduce the carbon impact, the superstructure comprises a hybrid of glulam and cross-laminated timber (CLT). The timber structure provides relief from its metal and glass neighbours; the trussed structural framework is a deliberate expression of its function. Key benefits of prefabricated CLT and glulam include minimised material waste, reduced construction time, and lower embodied carbon.

Connecting building and landscape

The pavilion is designed to blur the boundary between building and public realm opposite, with soft landscaping wrapping around the building, incorporating over 22 different varieties of vegetation.

Embodied carbon: Hardman Square

Client	Wokingham Borough Council
Location	Berkshire, UK
Size	12,900m^2
Cost	£18m
Completed	2011
Website	↗

Waingels College is innovative in both form and construction, designed as a ‘village’ of learning spaces.

Embracing timber

The buildings use a cross-laminated timber (CLT) system as their structural base. External and internal materials and finishes have a low carbon footprint and their visual appearance and textural tactile experience create an environment that is light, inviting and reflective of the school’s ethos of a sustainable approach to teaching and learning.

Lowering operational energy use

While the use of timber lowers embodied carbon, the combination of a highly efficient envelope, intelligent passive design and incorporation of renewable energy technologies also lowers operational energy use. The design promotes the use of natural light and passive ventilation throughout the teaching and circulation spaces.

This strategy, combined with the CLT construction, has enabled an increase in floor to ceiling heights creating impressive internal spaces. High-level windows and clerestory lights bring daylight deep into the plan, minimising the need for artificial lighting.

Embodied carbon: Waingels College

Our in-house certified Passivhaus designers help drive our focus on highly energy-efficient designs.

What is Passivhaus?

Passivhaus is a design standard for the creation of extremely energy efficient buildings with a clear focus on operational energy performance and occupant comfort.

Specialist software, the Passivhaus Planning Package software (PHPP), is used to predict the energy use based on the building parameters (geometry, build ups, windows, ventilation etc.).

Our approach

We embrace Passivhaus as a clear and measurable route to net zero carbon in operation. Our project process workflow, together with our S|E|E|D (Social, Environmental, Economic, Design) tracker, prompt design teams to review passive design, analysing proposals at the key stages of a project and identifying opportunities for improvement.

Early use of the PHPP is encouraged on all of our projects, not just those pursuing Passivhaus certification. This is used before initial sketch designs have been prepared to create a target energy model based on general factors (site condition, glazing ratios, realistic u-values) to ensure each project begins with a focus on the energy efficiency targets. For our projects, the PHPP output is a live document used throughout the design process to track the expected operational energy of the completed building.

Low operational energy is not the only quantifiable benefit of the Passivhaus process. The Passivhaus standard limits the variation of internal surface temperatures to prevent cold spots and mould while the ventilation system provides constant fresh air for occupant comfort.

How the design is influenced by the Passivhaus standards

Key decisions at project inception can have a big impact on the operational energy performance of a building. It is important that, as designers, we have a full awareness of these implications.

To achieve the Passivhaus targets, our designs prioritise the orientation, allowing the buildings to benefit from carefully controlled solar gains, especially in the winter, which can reduce reliance on mechanical heating systems.

Simplifying the form and thermal envelope of our buildings can lead to efficiencies and reduced façade area, requiring less insulation to meet the performance targets which can mean less embodied carbon and reduced capital expenditure.

Sheppard Robson's Passivhaus designs take a fabric first approach with careful detailing to omit thermal bridges and include high-performance triple-glazed windows, which are accurately modelled to allow the required levels of daylight while minimising overheating risk.

How the construction quality is influenced by Passivhaus

The required construction quality in the completed building can only be achieved with effective teamworking and collective buy-in to the Passivhaus aspirations from the client, design team, contractor, and certifier, with each bringing expertise and experience to the process. This is critical to achieving the ambitious air permeability targets, where we need to ensure that the airtightness layer is designed with buildability and sequencing of works as the priority.

The Passivhaus standard includes a thorough inspection regime throughout the certification process, raising the quality of the delivered building. Each project benefits from the rigorous independent review and verification of the information supplied by the design and construction teams. Certification keeps the whole team engaged with the performance targets and keeps high quality construction as a primary focus.

Constraints

The Passivhaus standard does not include targets for daylighting which would need to be calculated separately, and data on window size/shading fed back into the PHPP to ensure energy performance and overheating targets are achieved.

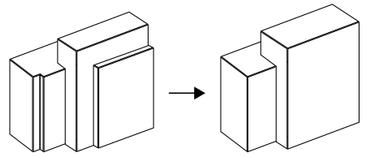
The Passivhaus standard also does not set targets for embodied carbon, which would need to be calculated separately for all materials.

WE UNDERSTAND THAT:

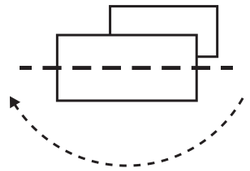
- Key early design decisions have a significant impact on the operational energy requirements
- Designing for the appropriate climate will limit overheating while achieving daylight standards
- Careful detailing will ensure heat loss through the building fabric is limited
- Understanding of construction will ensure the proposed details and airtightness envelope can be constructed simply and safely
- Collaboration with consultants, clients and contractors is key to achieving the standards

DESIGN CONSIDERATIONS/APPROACH

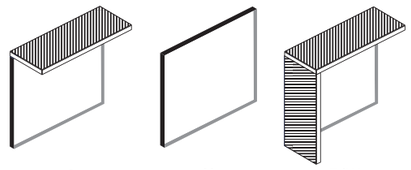
FORM FACTOR



SOLAR ORIENTATION

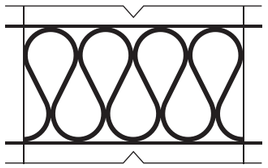


EXTERIOR SHADING

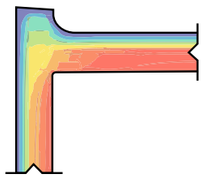


WINDOW DESIGN

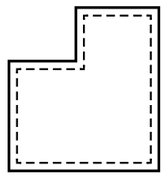
HIGHLY INSULATED



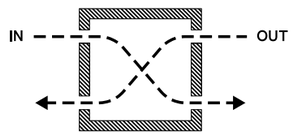
THERMAL BRIDGING



AIRTIGHTNESS



VENTILATION W/ HEAT RECOVERY



- MAXIMISE **comfort**
- CONSIDER **daylighting**
- MINIMISE **energy use**
- CONSIDER **embodied carbon**

Client	University of Manchester
Beds	3,300
Designed	2025
Website	↗

As well as providing high-quality accommodation, plans also include space for support staff and 1,200m² of associated amenity and study space as part of one of the world's largest Passivhaus developments.

The project will provide much-needed student rooms in a development that prioritises sustainability, biodiversity and a sense of community, with enhanced connectivity for pedestrians and cyclists both throughout campus and to the wider area.

The massing strategy places the tallest buildings at the centre of the scheme, stepping down in level towards the boundary to align with the height of neighbouring buildings.

The layout and orientation of the blocks aim to optimise space, sunlight and permeability of routes by the inclusion of underpasses and the utilisation of T-shaped blocks.

Blocks have been clustered to form "mini-communities", a key trait of Fallowfield Campus, with courtyards, entrance gardens and communal spaces incorporated to foster chances for interactivity. Layout was also carefully planned to maintain the lush, green character of the site, with perimeter trees preserved to create screening for neighbours and to provide connectivity with nature.

The history of the site will be reflected in the retention of key historic features, including the Mitzi Cunliffe-designed 1960s fibreglass relief artwork and the distinctive iron gates of Woolton Hall.

The new development has been designed to respond to the setting of listed buildings in the surrounding area. Materiality, especially brick, will reflect the surrounding context with either a complementary colour or one that allows the scheme its own character.

Passivhaus: Fallowfield Campus

An iterative strategy with forensic appraisal is important to inform what elements can be reused and existing embodied carbon retained.

What is retrofit?

LETI refers to retrofit as “the upgrading of a building to enable it to respond to the imperative of climate change”. The UKGBC sets out two types of retrofit in their guide Delivering Net Zero: Key Considerations for Commercial Retrofit:

- Light retrofit: focus on performance optimisation, basic remodelling, replacement, or adaptation of existing building elements which tend to focus on a single aspect or feature (lighting upgrades, optimisation of building controls and operation, etc.).
- Deep retrofit: focus on significant works of size or scale that result in a fundamental change to the building structure and/or services. This can be represented as a collection of light retrofit enhancements or individually disruptive measures, such as major plant replacement.

A forensic approach to retrofit

As signatories of the AJ’s RetroFirst Campaign, and in line with our commitment to reduce the impact of our work and industry, we actively promote retention and reuse of buildings and components.

While this always needs to be considered in context, and as part of the wider sustainability strategy, retrofit is a massive part of our ethos and, as such, our body of work. For example, around 85% of our current architecture projects in the office sector* involve a significant retrofit strategy, highlighting our commitment and expertise as well as the demand for retrofit in the marketplace.

As our industry increasingly champions a retrofit-first (distinct from retrofit-only) approach, we also must continue to mitigate the risks and keep pace with the quick-moving issues around reviving existing buildings.

Firstly, it is important to understand that each building, whether historic or modern, will have its own idiosyncrasies with its own business case; therefore, it will require a bespoke pathway to meeting Paris-proof net zero carbon (NZC) targets. This often takes the form of an iterative strategy, with an outline direction set at the start of the project that gets refined during the analytical stages.

Reuse projects are inherently complex: even when you have the vision for the project down on paper, they often have hidden issues that don’t reveal themselves until work has started on stripping back to the structure.

This can mean that parts of the project involve a voyage into the unknown, which is normal, and leads to project teams needing to balance big design visions with nimble problem-solving onsite. This involves a different way of working - a process of discovery where the project team must be experienced in working with the surprises that buildings of any age can present.

From the client’s perspective, it also means investing more time up front to de-risk the design and resisting the temptation to apply a new-build programme to a retrofit project, thereby not accommodating a proper investigatory period.

Scratching the surface

Managing the unknown places particular importance on the initial stages of the project where the building is scrutinised.

A thorough understanding of a building can be formed with specialists in their field to assess the condition of different elements of the building - for example, MEP services and components, stonework, cladding - so that a forensic appraisal informs what building elements can be reused and the existing embodied carbon retained.

This understanding of the existing fabric’s character and condition means that a plan that balances sustainability with commercial viability can be plotted.

Net zero carbon alignment

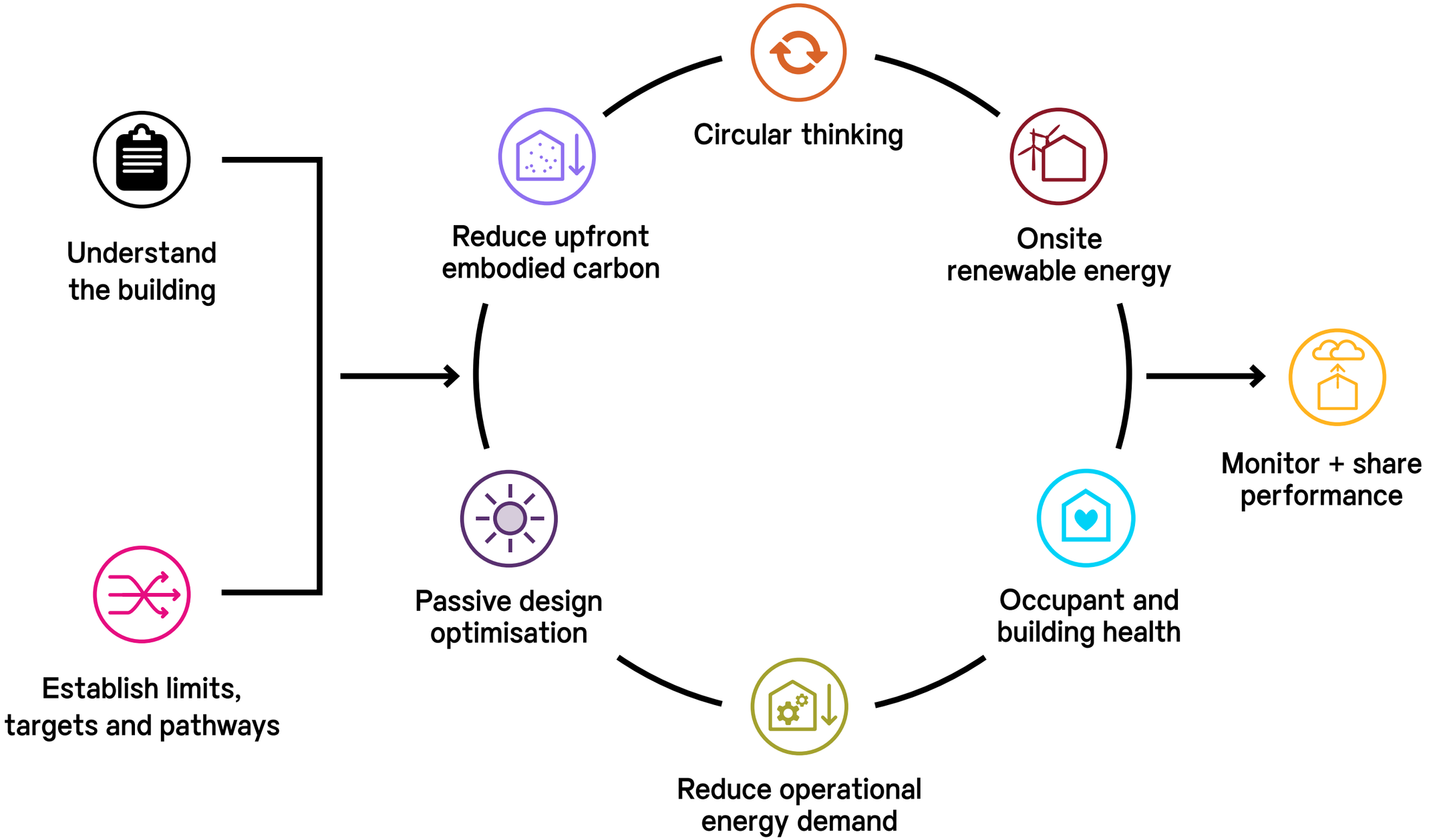
The UK Net Zero Carbon Buildings Standard (UK NZCBS) Pilot Version includes equations for calculating the limits and targets for retrofit projects for the sectors included in the Standard.

There are two approaches outlined in the UK NZCBS for operational energy - a ‘one-go retrofit’ that achieves an end point limit for the year the retrofit works commenced on site from first verification, or a ‘stepped retrofit’ approach, which does not achieve the end point limit from first verification but provides a retrofit plan and improvements over time to meet intermediate limits and the end point by 2040.

(Ref: UK Net Zero Carbon Buildings Standard Pilot Version ↗)

By keeping solutions simple and making the possibilities of future adaptions straightforward, you are helping the next chapter of the building’s life to be written.

*Calculation based on workload in Summer 2024


Understand the building
Establish limits, targets and pathways
Reduce upfront embodied carbon
Circular thinking
Onsite renewable energy
Monitor + share performance
Passive design optimisation
Occupant and building health
Reduce operational energy demand

Plot CD02A, Bristol

Radical retrofit that retains 89% of existing structure and takes a fabric-first approach to dramatically improve the building's environmental performance.

Pall Mall Court, Manchester

Faithful recreation of the building's cladding to boost energy efficiency and airtightness, bringing it up to modern standards. This included the painstaking recreation of the cladding joints, made and tested through 3D-printed models.

60 Queen Victoria Street, London

Design includes a careful retention strategy, reworking of the interior, and improvement of the building's operational performance through efficient glazing and a new all-electric MEP, targeting BREEAM Outstanding and NABERS 4.5*.

Melbourn Science Park, Cambridge

All developments within the masterplan are targeted to be net zero carbon in construction and operation following a transformation project that will retain as much of the existing fabric of the Park's buildings as possible.

Calton Square, Edinburgh

Retaining 88% of the existing structural frame, the major refurbishment seeks to create a new identity for the landmark office building, through reconfiguration and enhancements, that exemplifies sustainable and wellness-centred design.

150 St Vincent Street, Glasgow

Retention of the existing structure and stripping it back to the concrete frame, reusing where possible to reduce embodied carbon. The building envelope is at the end of its life and will be replaced with a high-performance façade which exceeds current technical standards and improves energy efficiency.

Our current retrofit work

Client	Brunel University
Location	London, UK
Size	4,710m^2
Completed	2016
Website	↗

This deep retrofit project demonstrates both our longstanding interest in reuse as well as our enduring relationship with Brunel University.

An enduring relationship

Our work with the University started with masterplanning the campus in the early 1960s. We then went on to design the Wilfred Brown Building in 1968 and add a rooftop extension to the structure in the 1990s. 25 years later we returned to transform the facility, creating a new gateway to the university.

New identity, improved performance

We stripped the building back to its concrete frame and re-clad it with a ‘saw tooth’ façade. On the first and second floors, the north-west elevation features clear glazing, while the west and south-west elevations use interstitial architectural mesh to provide solar shading. We added a perforated profiled metal screen to the third floor, echoing the structure of the façade and unifying the building’s front elevation.

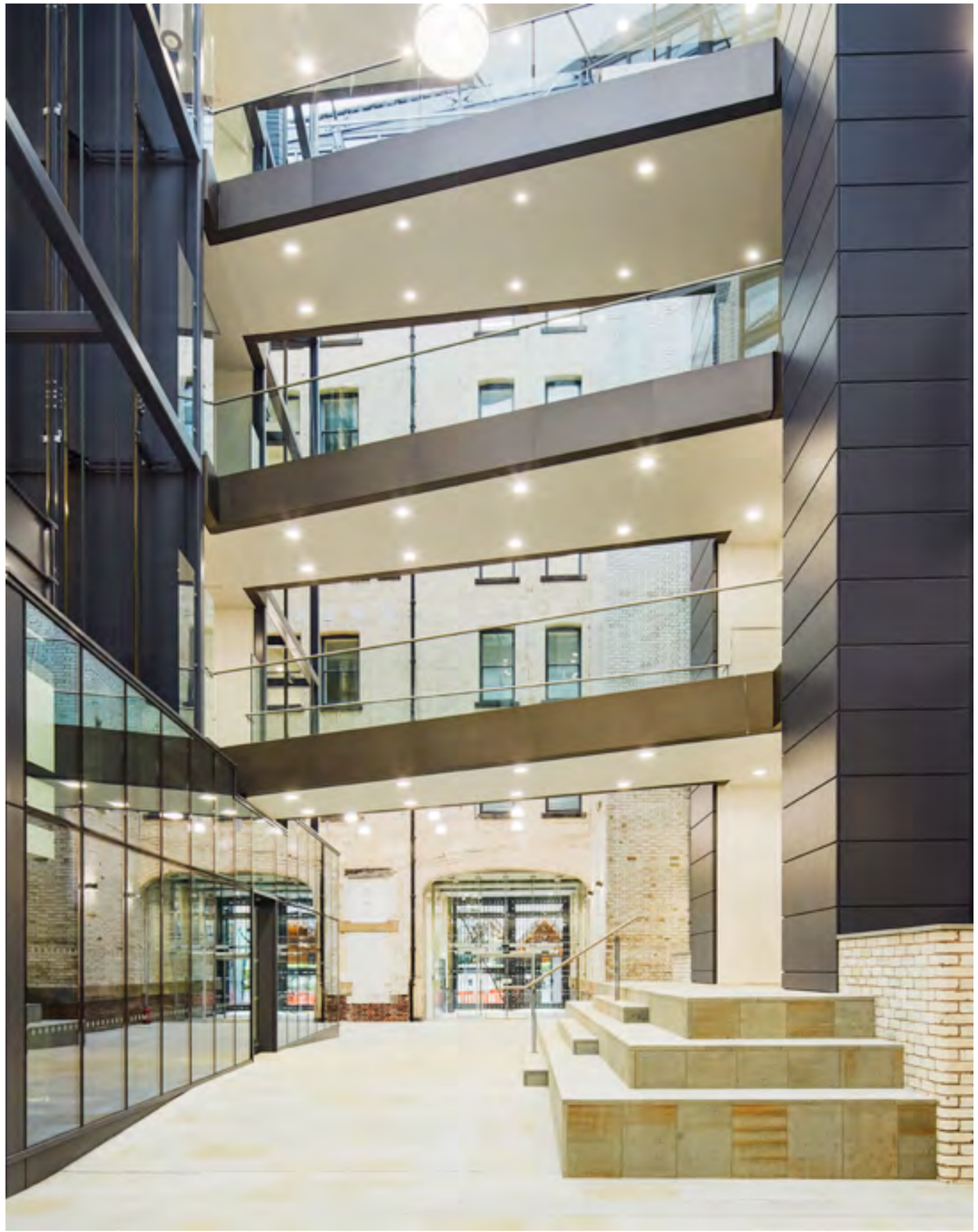
Bold transformation

The building’s new entrance sits inside a red portal frame made from anodised aluminium, a bold gesture that signals the level of transformation within the building.

On entering, there is a reception area that opens-up into an expansive atrium space, created by conjoining several smaller areas. This restructuring creates a vibrant heart for the building, providing social and exhibition spaces, as well as breakout areas that can be used by neighbouring departments.

Retrofit: Wilfred Brown Building

Client	Hermes Investment Management
Location	Manchester, UK
Size	16,742m²
Cost	£32m
Completed	2018
Website	↗



Hanover revives two Grade II listed former Co-operative buildings into a new Grade A office and retail destination. Through careful restoration of the existing structures, and the creation of highly adaptable space, Hanover will continue to serve the city for years to come.

Making a modern workplace

The scheme involved the deep retrofit of two different Edwardian Baroque buildings located over one city block. It now provides six floors of flexible floor plates delivering 8,284m² of Grade A office space as well as 2,905m² of retail and leisure space across the ground and two lower ground floors, with flexibility built in for the first floor to be converted for retail use.

The works included installation of internal double glazing, roof insulation, and upgraded heating and cooling systems, and achieved BREEAM Very Good and an EPC B rating (originally E rating).

The reuse strategy

A responsible approach was taken to the project's reuse, including more than 95% of construction and operational waste being recycled and diverted from landfill as well as, where possible, materials and labour being locally sourced, with 40% of the workforce employed living within 10 miles commute distance.

The challenges of a historic building

One of the main challenges of the development was uniting two distinct buildings with different floor and ceiling heights while respecting the historic fabric and unique character of each.

In order to create a coherent whole building plan, without compromising either buildings original features, a new full height glazed atrium was established to join the two existing elements. This housed core services and vertical circulation at the heart of the building maximising floorplate efficiency.

This project was featured in the UKGBC Delivering Net Zero: Key Considerations for Commercial Retrofit guidance.

Retrofit: Hanover House, NOMA

Client	Contact Theatre
Location	Manchester, UK
Size	300m²
Completed	2020
Website	↗

> “[Designing Contact] has brought home an important point: the renewal of modern buildings which have embedded, successful uses/ users, requires the same level of delicacy and compassion as used when working on historic structures.” ↗
>
> Read James Jones interview about Contact as part of the Architects’ Journal’s RetroFirst stories

The deep retrofit and extension of the pioneering youth-led theatre used co-creation to build on Contact’s sustainable heritage.

Spirit of co-creation

The changes to the theatre needed to reflect the identity of the organisation as well as to result in physical upgrades. For this, Contact created its consultant group, Con:Struct, a team of young people associated with the Theatre that played a pivotal role in ensuring that the developing design reflected not just the needs, but also the ‘attitude’ of its members, staff and audience.

Building on the original vision

Alan Short’s original design, developed with Max Fordham in the 90s, was innovative due to its natural ventilation. The building already had a remarkably low-carbon performance prior to refurbishment, but one of the commitments made to secure Arts Council England funding was to further improve on the building’s already highly sustainable performance.

The new extension includes two new chimneys, to complement those originally designed by Short, for natural ventilation of the new performance space and offices. The innovative variable flow natural ventilation system will minimise the heat loss caused by over-ventilation in the winter and provide night cooling of the thermal mass in summer to limit overheating and negate the need for any comfort cooling in the building.

Retrofit: Contact Theatre

Location North England, UK
Completed 2024
Website ↗

“The future city must be not just sustainable, but regenerative.”

Click here to watch the short video that expands on key design features, and to read our full proposal.

Metro:Morphosis Office to Urban Village is a research project which engages with the twin crisis of a climate and biodiversity emergency as well as the social issues around mental health and loneliness.

Our concept, winner of Arup’s Façades of the Future North design competition, offers a combined solution for upgrading existing buildings into new housing with increased communal amenities to encourage incidental social exchange, with the benefits of urban greening for microclimate, regenerating biodiversity and occupant wellbeing.

We have designed a modular kit-of-parts framework that maximises use of reclaimed materials and aims to increase urban greening, improve internal comfort, provide water capture and storage for irrigation of living walls, while increasing amenity space for residents.

Our proposed façade of the future integrates a new ‘gallery’ around the existing building creating a double-skin façade system.

The gallery is enclosed to provide protection from year-round weather conditions and mitigate the effects of noise, particularly in areas with heavy traffic.

The thermal line of the existing building is upgraded, and the new lightweight external skin is angled depending on the orientation of the façade to maximise daylight while limiting solar gain. The design includes openable windows in order to maintain the external living walls, and natural ventilation chimneys to encourage air circulation in warmer months.

The newly created space is designed as communal circulation with pockets of amenity per household, to encourage social exchange with neighbours. The integration of external greening offers multiple benefits, such as encouraging a sense of connection to nature by views out from internal spaces including greenery, supporting regeneration of biodiversity by creating new biodiverse corridors through a city, and contributing towards urban heat island effect mitigation.

We have a distinguished heritage for employing innovative design and Modern Methods of Construction (MMC) across a wide variety of building typologies. We champion Design for Manufacture and Assembly (DfMA) and have harnessed the benefits of off-site prefabrication methods to optimise the use of natural resources and increase efficiency while minimising waste.

We have found that this gives the opportunity for more considered construction sequencing, with resulting cost savings and programme reduction. Historically, our hotels, student housing and office projects have led the way, but we are seeing MMC benefits brought into our residential projects of all scales.

The key attractions for our clients include:

- Better quality control, including fire compartmentation and thermal efficiency.
- Reduced worker activity on site, with therefore less disruption to the neighbourhood and health and safety advantages under CDM.
- Significant programme and often capital cost savings.
- Possibility of off-site defect rectification and testing.
- Standardisation of components coupled with manufacture in factory environments can result in reduced material waste.

MMC is well known for its benefits in quality control and efficiency on-site, however benefits for embodied carbon are not necessarily inherent and need to be specifically considered.

As with any design project, material specification needs to be carefully considered to specify appropriate low carbon materials, as well as transport type and distance, to ensure any reductions in embodied carbon, wastage and material specification are not then lost to longer, more convoluted transportation routes needed between factories.

Utilising MMC can also increase robustness of early carbon data as the design is more resolved at an earlier stage.

We are proactive in sharing our knowledge and experience working with MMC. For example, Sheppard Robson was part of the author team and advisory board for the Build Offsite and CIRIA collaborative research report ‘Offsite construction – concept design and delivery’ and the consultation group for the RIBA DfMA Plan of Work overlay.

With a range of experience from single homes to high-rise, Sheppard Robson has been helping bring MMC innovation to the industry with the mantra that it can improve quality in all respects.

1 Pre-manufacturing (3D primary structural systems)

2 Pre-manufacturing (2D primary structural systems)

3 Pre-manufacturing components (non-systemised primary structure)

4 Additive manufacturing (structural and non-structural)

SR example: citizenM modules
STRUCTURAL

SR example: CLT at Waingels
STRUCTURAL

SR example: Glulam beams at Notre Dame School
STRUCTURAL

Adobe Stock

Industry example: 3D printing
STRUCTURAL + NON-STRUCTURAL

KEY

Off-site and near site pre-manufacturing

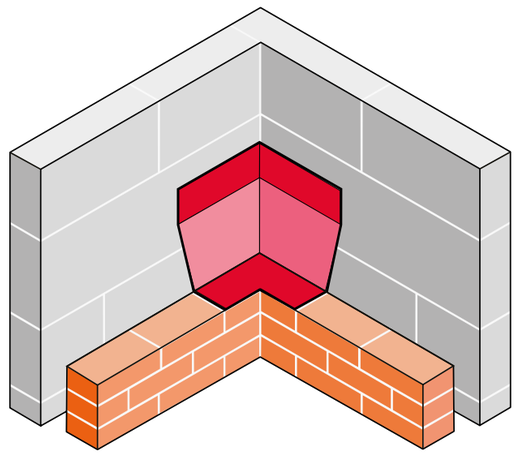
Site based process improvement

5 Pre-manufacturing (non-structural assemblies and sub-assemblies)

6 Traditional building product led site labour reduction/ productivity improvements

7 Site process led site labour reduction/productivity/ assurance improvements

SR example: Prefabricated façade panels, 245 Hammersmith
NON-STRUCTURAL



Industry example: Pre-formed system corners
NON-STRUCTURAL

Adobe Stock

Industry example: Survey drones
NON-STRUCTURAL

Ref: UK GOV MMC Definition Framework

MMC Definition Framework

Client	GRAHAM with Equitix
Location	York, UK
Size	40,000m²
Completed	2021
Website	↗

This major development provides 1,480 student dwellings in two waterside residential colleges, utilising innovative MMC solutions for efficiency onsite and in operation.

Prefabricated elements

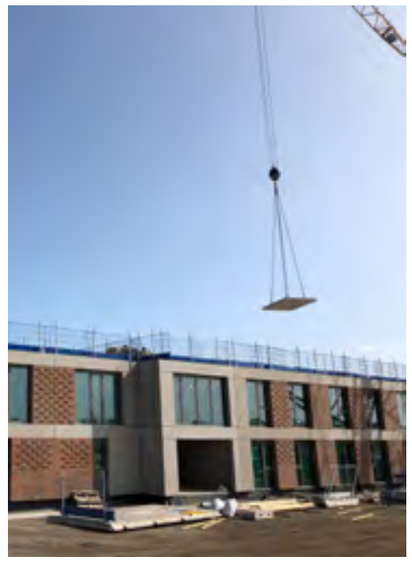
The project applied innovative MMC solutions, with cross-wall prefabrications, integrated brick finishes, windows, internal walls and slabs, and prefabricated bathroom pods all enhancing quality while reducing construction waste and time.

As a result of prefabrication, we achieved a level of airtightness close to Passivhaus standard, as well as reducing heat loss and enhancing acoustics, fire safety, and durability. Due to the use of prefabrication, parts of the scheme were delivered ahead of time.

Reduced waste

Prefabrication took place within a controlled manufacturing facility where waste streams can be better controlled.

Waste was also minimised on the construction site, with fewer single components being brought to site, saving waste produced from packaging, off-cuts and remedials. This led to a waste saving of 43% compared with a traditional build.



MMC/DfMA: University of York Student Residences

Client	citizenM
Location	London, UK
Size	12,800m^2
Cost	£26m
Completed	2016
Website	↗

The BREEAM Excellent building embraces MMC to drive efficiency on a historic and complex site.

A remarkable yet challenging site

As well as the Tower of London immediately to the south of the site, the project is in a conservation area with several listed buildings nearby, as well as being adjacent to the historic Roman London Wall.

In addition, the project negotiates the technical and logistical challenges of being located above a London Underground Station (Tower Hill).

Negotiating complexity through innovation

A lightweight structure was required, however, the modular construction techniques do not define the architectural character of the building.

The design moves away from a repetitive grid, helping the hotel sit comfortably within its historic setting. The challenge was to accommodate an innovative modular approach above a busy transport hub, with anti-vibration technology insulating guests from any disturbance.

Lightweight, modular cladding created an appropriate external form, with the specified materials 200 tonnes lighter than alternative systems.

The vertical array of fins on the façade have been carefully placed to provide shading and contribute to the building's sustainability credentials.

Uplifting experiences

With high levels of insulation, maximised daylighting, PVs and a sophisticated Building Management System (BMS), the project was driven by efficiency and creating uplifting experiences. The use of MMC fed into this strategy, with a high proportion of off-site construction under controlled conditions, allowing for waste to be minimised and a consistent high quality of finish.

Client	Kingspan Metl-Con
Location	London, UK
Size	76.5m^2
Cost	£60,000
Completed	2006

The SixtyK House is an architectural design based on sustainability concepts and integrative services to respond to climate change, with inherent flexibility to suit changing demographics and lifestyle choices.

Cost-effectiveness

SixtyK embraces the benefits and efficiencies of MMC, enabling a cost-effective solution to providing varied façade detail. The design utilises the TEK building system from Kingspan, where key structural elements are designed and manufactured off-site.

The accuracy achieved in the off-site manufactured products provides a high degree of airtightness, minimising energy consumption and reducing carbon emissions.

Passive design features

Central to the passive environmental design, and providing a strong architectural definition to the design, is the ‘roof lantern’. The lantern provides generous daylighting allowing south-facing windows to be reduced in size, minimising heat gain without detriment to the internal spaces.

These inherent qualities of the roof lantern mean that housing types can be used at any orientation across a site with no negative effect on the internal daylighting and passive environmental system.

MMC/DfMA: SixtyK

We exist in a system dominated by a linear economy. It is resource-intensive, wasteful, and short-sighted.

Image credit: AKT II

Sustainable material selection: “how can we do more?”

Noa Barak talks to Architecture Today about her role at the practice helping to research and scrutinise the design decisions we make.

What is the circular economy?

A circular economy is an alternative to the traditional linear economy, and is ‘restorative and regenerative by design’ *(Ellen Macarthur Foundation)*. It is based on three principles:

- Eliminate waste and pollution.
- Circulate materials and products (at their highest value).
- Regenerate nature.

Our approach

Circular thinking is central to our responsible design approach, as part of whole life carbon considerations. Not only does embedding this thinking in projects help to minimise waste through design and construction, but it helps projects better address emerging resource security and scarcity issues now and in the future. It is critical to consider the full life cycle of the buildings we design and products they encapsulate in order to holistically strive toward sustainable development.

For the built environment, key design principles are part of this:

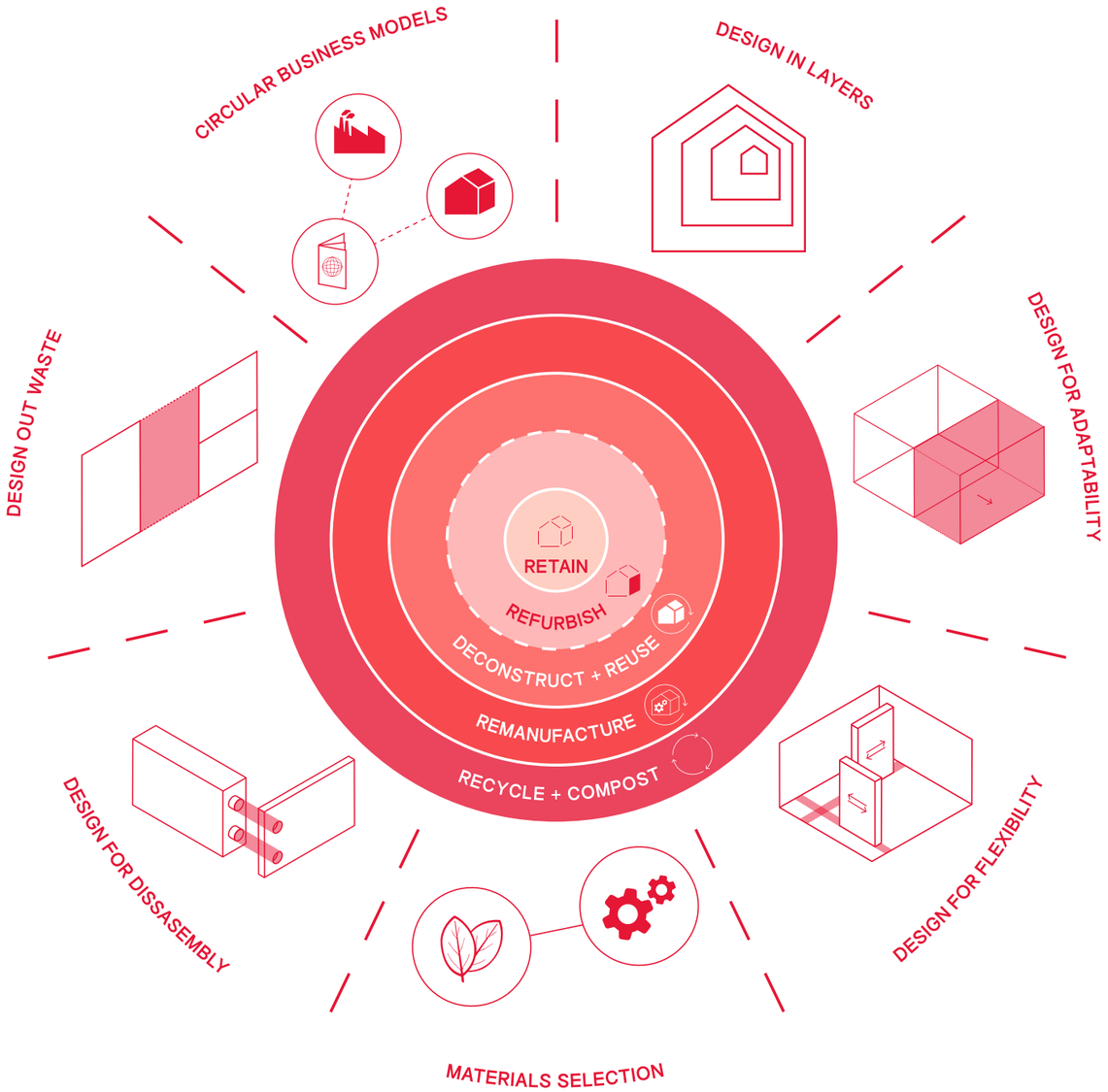
- Design in layers: elements of a building have different lifespans. Designing in layers allows elements to be removed/upgraded when required without damaging adjacent longer life elements. This facilitates simpler maintenance cycles, flexibility and adaptability, and ultimately reclamation at end of life.
- Designing out waste: prioritise retrofit and refurbishment of existing buildings. Use reclaimed or re-manufactured products where possible and consider MMC and modular sizing to reduce wastage. Lean design also supports a reduction in demand for raw materials.
- Design for flexibility and adaptability: to prolong the useful life of a space or building. Consider how plan form, layout and structural design can allow for future changes of use.
- Designing for disassembly: to allow components and materials to be recovered and recirculated at their highest value.
- Careful selection of material and specification: simplify compositions wherever possible, to allow separation of materials at end of life. Understand inherent qualities of materials and facilitate separation of biological and technical materials, to allow their return into respective ‘loops’.

(Ref: *Building revolutions: Applying the circular economy to the built environment*, David Cheshire)

These principles, alongside the use of innovative business models that enable better circularity throughout the building’s life cycle, help facilitate re-use, remanufacture and recycling, and eventually deconstruction - as opposed to demolition - to retain product and material value and keep resources in use for as long as possible. The ultimate aim is to close the loop and to help what is usually waste from one fit-out, building or site to become a future resource, either on the same site or on another, or returned to nature as nutrients.

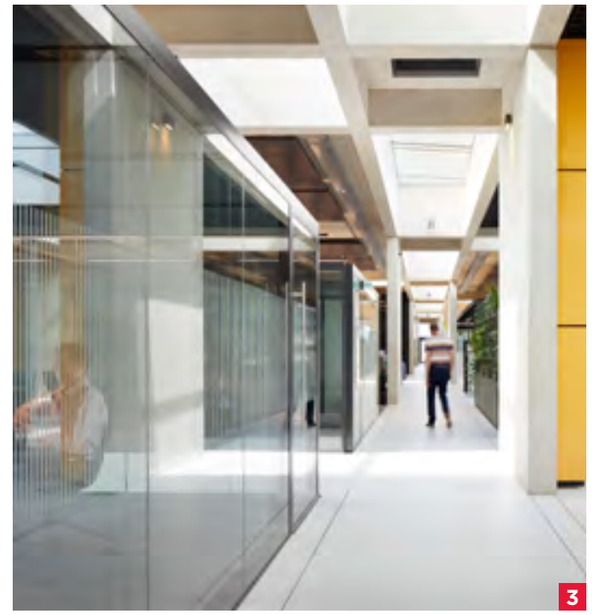
Circular economy thinking starts when deciding to refurbish an existing development or rebuild. As signatories of AJ’s RetroFirst Campaign, and in line with our commitment to reduce the impact of our work and industry, we actively promote retention and reuse of buildings and components when appropriate to the client brief.

While this always needs to be considered in context, and as part of the wider development sustainability strategy, retrofit and reuse is a large part of our ethos and, as such, our body of work.



1 150 St Vincent Street: Reclaiming the raised access floor tiles.

2 BBC W1: Table repurposed and reused from a touchdown to canteen, as opposed to buying new.



3 TTP Campus: Use of Optima AMR to maximise flexibility.

Upcycling: the creativity of resourcefulness ↗

Helen Berresford writes for Property Week on the growing upcycling movement in workplace projects.

Circular economy

Client	BBC
Location	London, UK
Size	85,000m^2
Completed	2019

The result of a 12-year redevelopment project, off Oxford Circus, which has provided the BBC with a suitable home for the world's most famous broadcasting corporation.

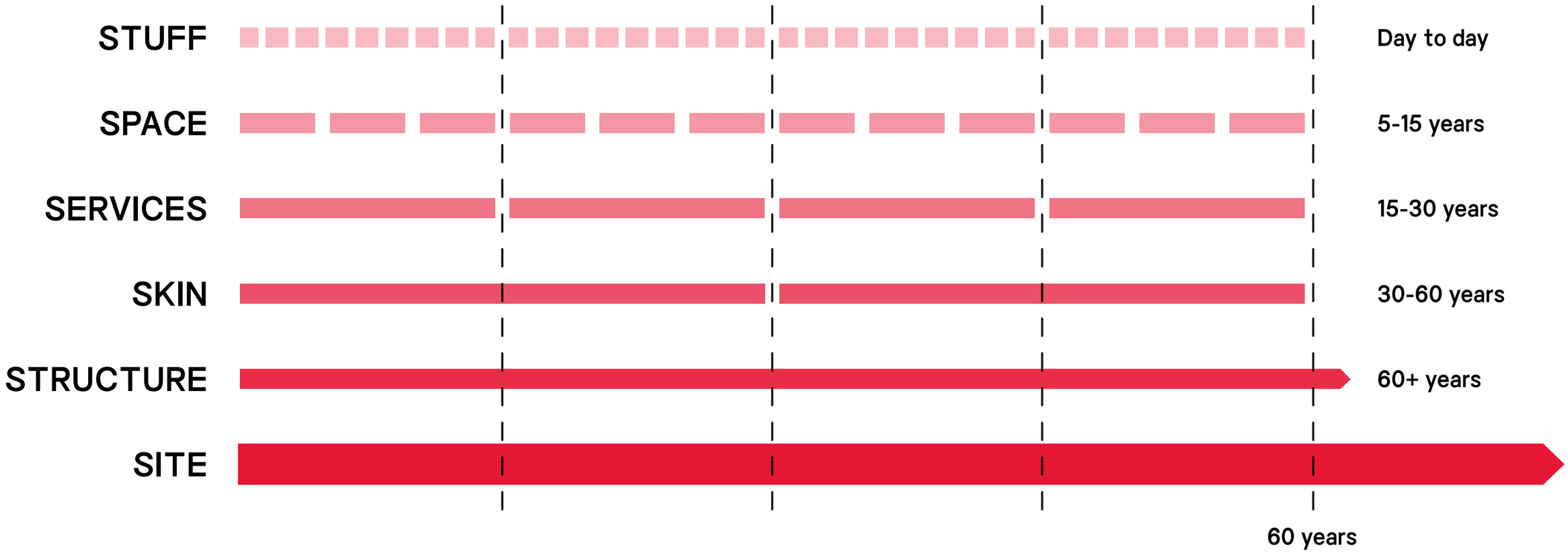
Through a light yet transformational touch guided by circular economic principles, discarded materials were rescued, redistributed and refurbished. Supplementary furnishings adhere to ethical sourcing and end-of-life recyclability.

As a refurbishment focused on workplace upgrades rather than structural changes, this project enacted sustainability through its restorative ethos targeting office furniture, finishes and equipment. Care was taken to reuse rather than discard assets in good condition. The significant positive impact comes from revitalising how the building functions without generating construction waste or emissions.

A key aspect was the emphasis on wellness, sustainability and inclusivity. ID:SR prioritised the use of sustainable materials throughout the building to create a nurturing environment for the staff.

Additionally, the majority of products specified for the project where possible were sourced from the UK, showcasing a commitment to supporting local businesses.

Circular economy: BBC Broadcasting House



Building layers ref: Stewart Brand and Frank Duffy

Building layers and indicative lifespans

A systematic approach to pursuing net zero carbon.

What is net zero carbon?

The UK Net Zero Carbon Building Standard (UKNZCBS) Pilot Version sets out the limits, targets and reporting requirements that a building needs to adhere to in order to claim 'net zero carbon aligned' after completion.

The UKNZCBS Pilot Version, released September 2024, does not include the verification requirements for the Standard, which are going to be included in Version 1 of the Standard due end 2025. Therefore, for this interim period between UKNZCBS Pilot and full V1, the UKGBC have confirmed that the limits/ targets in the Pilot Standard should be met, and the UKGBC Net Zero Framework Definition should still be followed to verify a net zero carbon building.

Once Version 1 of the UKNZCBS is published, the V1 verification requirements set out will supersede the UKGBC Framework Definition.

Our approach

A key driver for any project is to establish performance-based metrics, limits and targets at the outset.

For a building pursuing net zero carbon alignment after completion, this will include referring to the UK Net Zero Carbon Buildings Standard and including the relevant limits, targets and reporting requirements into the brief and consultant scopes.

Our key net zero carbon design considerations for whole life carbon include:

- Establish relevant targets and limits at the outset.
- Prioritise retrofit by retaining as much as possible. This includes reusing buildings, structures, components and materials. Sheppard Robson is a signatory to AJ Retrofirst, a campaign to promote retrofit as a means to reduce the environmental footprint of the architecture and construction industries.
- Optimise passive design. A fabric-first approach should be adopted to reduce operational energy demands, and future-proof long-term elements of the building against climate change. Consider measures including:
  - Form factor
  - Airtightness
  - Sunlight for heat
  - Orientation
  - Glazing position and specification
  - Cross-ventilation
  - Passive cooling
- Eliminate all fossil fuel use on site. If not possible or feasible at that time, futureproof design to have capability to be all-electric in future without major renovation required.
- Maximise efficiency of mechanical systems: through close collaboration with M+E engineers, ensure active strategies complement passive design solutions and balance requirements with embodied carbon considerations, including refrigerants and the life cycle of the system components.
- Integrate renewables: Explore options to integrate renewable energy generation into the architecture of buildings.
- Reduce construction impacts: An efficient form factor not only offers benefits for operational energy efficiency through reducing the surface area of external walls where heat is lost, but also reduces the amount of material in structure and façade. Refer to LETI Primary Actions ↖ for reducing embodied carbon.
- Consider modular sizing and components: Sheppard Robson has a distinguished heritage for innovation and Modern Methods of Construction (MMC) used in all our building typologies, which can harness off-site prefabrication methods to optimise the use of natural resources, both increasing efficiency while minimising waste.
- Understand the impact of operation and maintenance: incorporate circularity principles into design and material selection to enable flexibility, adaptability and disassembly to allow for recovery and reuse of materials, throughout the lifespan of the building. The building's lifetime cost needs to be carefully considered during design.

Under the UKNZCBS, offsetting is optional. Any offsetting procured should meet the requirements set out in the Standard.

The UKNZCBS is assessed on performance and measured quantities, and therefore conformity can only be assessed and verified once construction is completed and the building is fully in-use. Conformity with the Standard will be assessed and verified annually, and therefore buildings cannot claim to be a 'Net Zero Carbon Aligned Building' if it has not been verified for that reporting year.

Once verified, the performance data will need to be uploaded to the Built Environment Carbon Database (BECD).

We use the following tools and techniques to support these net zero carbon design considerations:

- Passivhaus PHPP software: we have several certified Passivhaus designers in-house, who are trained in PHPP software. PHPP calculates the heating and cooling load, the frequency of overheating and the demand for renewable primary energy of all energy services.
- Environmental analysis software: we use Ladybug and Honeybee in-house to evaluate environmental conditions and inform passive design solutions.
- In-house upfront carbon design development tool: Following widely accepted industry standards, this tool enables the design team to assess the upfront embodied carbon implications of design and material options at the early stages of the project, when the most impactful savings strategies can be realised.

  We work closely with the project team to ensure full life cycle analysis (LCA) and carbon cost analysis (CCA) can be accurately conducted, providing a comprehensive assessment of whole life carbon emissions and the economic costs and benefits to the low carbon solutions under consideration.
- Comprehensive design review process: our Design Delivery Group includes experienced architects and sustainability experts who review projects to promote the efficient and competent delivery of projects through to completion.

Our systematic design approach means that progress is reviewed at every stage to ensure the proposals are aligning with the project's operational energy and embodied carbon limits.

Note:
Steps aligned with UKGBC Net Zero Carbon Buildings Framework ↗
Refer to UK Net Zero Carbon Buildings Standard for limits, targets and reporting requirements.

Establish brief

Consider the reuse strategy.

Establish net zero carbon aligned scope, limits, targets, reporting requirements and environmental certification aspirations.

Passive design optimisation

Use a fabric first approach.
Future-proof building envelope design by considering orientation, solar shading, airtightness, thermal bridging, etc.

Reduce operational energy demand

Total regulated and unregulated energy consumption to meet industry typology EUI limits.

Eliminate gas

Proposals to be all-electric.

Embodied carbon

Limit upfront carbon to meet industry typology limits.
Calculate and disclose life cycle embodied carbon.

Integrate onsite renewables

Explore opportunities to integrate renewable energy generation into the architecture of buildings to meet UKNZCBS targets and embodied carbon limits.

Optional: Offset remaining carbon

Any remaining carbon can be offset using schemes that align to requirements set out in the UK Net Zero Carbon Buildings Standard.

Publicly disclose energy + carbon data

One year post-competion and at minimum occupancy, and then energy and carbon data annually when the building is in-use.

Net zero carbon roadmap

Client	Bruntwood Works
Location	Didsbury, Manchester, UK
Cost	£50m
Size	7,710m²
Completion	Ongoing
Website	↗

The Ev0 Building is designed to be one of the UK's lowest carbon new build workspaces. Situated at Didsbury Technology Park in South Manchester, the £31m development will provide 82,000ft² of sustainable office space, leading Manchester's workspace offering towards a net zero future.

Setting a new benchmark

The project is targeting the LETI 2020 design target for upfront carbon, the RIBA 2025 performance targets for whole life carbon, and the UKGBC Paris Proof target for operational energy use.

It will follow the UK Green Building Council's (UKGBC) net-zero carbon framework and is targeting net-zero carbon in upfront carbon and in operation.

Ev0 is targeting NABERS 5.5* and BREEAM Excellent.

A holistic response

The façade will minimise solar gain and overheating on the south and westerly elevations and maximise solar gain on the north and east elevations. Energy will be generated on-site, including the building façades, roof, and car park, all acting as a series of mini power plants.

The development will use restricted carbon materials such as low-carbon concrete and mass timber. In addition, an intelligent building management system will ensure space management is effective, reducing running costs.

Low carbon design: The Ev0 Building

Client	Peel L&P/Landsec
Location	Salford, UK
Size	32,500m^2
Completion	Ongoing
Website	↗

The project pushes forward the sustainable aspirations of the wider development, targeting BREEAM Outstanding, NABERS 5* and WELL Gold.

The net zero carbon target is based on latest guidance from the UKGBC for the performance of office buildings, and is pursuing net zero carbon in operation and in construction. The construction embodied carbon will be no more than 600 kgCO_2e per m^2, which will be offset by recognised accredited schemes.

A marker for sustainable innovation

The architectural language of the building was purposely designed to stand out from the existing buildings at MediaCity, using a different palette of materials to help the 11-storey become a marker for sustainable innovation.

The building's appearance is tied closely with its environmental ambitions.

The design's shading strategy, façade design and placement of balconies have all been modelled to help minimise heat loss as well as offering the floor plates passive solar shading.

Thoughtful use of materials

As part of the façade design, a variety of materials were investigated in terms of suitability for context and their whole life carbon.

Aluminium cladding was selected because of its durability, ability to be reused, and can be sourced partially from recycled materials. The aluminium is Polyester Powder coated with an aquatic green/blue which is a nod to the building's environmental credentials and its proximity to the Manchester Shipping Canal.

Low carbon design: Plot C3 MediaCity

1 Retrofit

Start each project with an openness and an interrogative approach which looks to build on what already exists. Examine existing information where available – if a soft strip is a viable option at early stages, this can help the design team to understand the building fabric. Front-load information to mitigate risk, especially for heritage assets.

2 Passivhaus

Don't rely on business-as-usual knowledge of detailing when working on a Passivhaus building – thermal bridging and airtightness requirements are onerous and need to be taken into account from the outset, to maximise buildability and minimise additional associated costs.

3 Mass timber

Engage insurers, mass timber suppliers, fire and structural engineers early in the design process. Ensure all parties understand the implications of using mass timber, for example maintenance, column size and spacing, sprinkler requirements etc., and information is coordinated if timber is to remain exposed, particularly MEP. Design should be one RIBA stage ahead for the CLT package coordination given the volume of work required for compliance.

4 Circular economy

Client buy-in to the realities of the process is essential, and so is a clear communication of the benefits. Workshop with the wider design team on options for material reuse – be creative but realistic about what the barriers might be – think about storage, warranties, transport, etc. Engaging the supply chain in early discussions can also enable possible solutions. For structural steel reuse, make efficient use of lengths and structural specification to avoid wastage.

5 MMC

Client confidence in, and sign-off of, the design of the modular components is essential to enable module manufacture to commence. Coordination between modular manufacturers, contractor and subcontractors is essential due to the various differing construction tolerances between work packages.

6 Low carbon design

Achieving high levels of energy efficiency and low embodied carbon design requires a highly collaborative and iterative approach – one that models, tests, refines, repeats. It is fundamental that enough time is allowed in the design programme, and specialist consultants engaged early enough with scope of services to allow for multiple and realistic modelling scenarios.

Back to contents

Social value

Next section:
Health + wellbeing ↘

A structured approach to prioritising wider societal gains.

Click here to read our Impact Report.

What is social value?

There are many definitions for social value available, but when reviewing them there are often three core themes - wider benefits or additionality, wellbeing or quality of life, and that it considers social, environmental and economic factors.

The RIBA Social Value Toolkit for Architecture highlights that *'the social value of architecture is in fostering positive emotions, whether through connections with nature or offering opportunities for an active lifestyle, connecting people and the environment in appropriate ways and in providing freedom and flexibility to pursue different lifestyles (autonomy). There is also social value in participation, supporting communities to help design and build their homes and neighbourhoods.'*

The Public Services (Social Value) Act 2012 requires public organisations and their suppliers to consider how their procured services contribute towards the social, environmental and economic wellbeing of an area.

Though we are not bound by the legislation, we are committed to putting value creation for our stakeholders at the core of our decision-making across our practice.

Social value and corporate social responsibility (CSR) are often confused and used interchangeably, but there are some key differences. CSR is not regulated and tends to refer to activities separate from core business activities: conversely, social value is proactive, structured, in legislation and embedded in core activity.

Social value is focused on creating long-term and measurable social, economic, and environmental benefits within communities.

We welcome the increase in prominence in social value in recent years, as it gives us the opportunity to showcase how we set, monitor and feed back on our contributions.

We understand the huge benefits that embedding a considered approach to social value can bring, not only to local individuals, groups, and companies, but also to our clients and our practice who benefit from the skills, input, and local knowledge from those involved.

Our approach

At Sheppard Robson, people are at the core of everything we do. Community is intrinsic to our collective purpose and the work we deliver, which is defined as being co-created and people-centred. We actively promote practice, project, and staff-led initiatives, by providing time, space and patronage to bring these ideas to fruition.

In 2022, Sheppard Robson further committed to social sustainability, working with Social Value Portal on strategy development to inform and formalise our Social Value Policy. Alongside the recruitment of our dedicated Social Value Champion, these key investments into our resource, policies and processes will help us further integrate social value into our design approach and practice principles.

The strategy development with Social Value Portal included workshops with a diverse working group of colleagues across our offices, who were engaged and consulted to identify the social, economic and environmental outcomes that we have the resource and capability to contribute to as an architecture and design practice.

Our Social Value Policy identifies three priority areas for creating social value and impact as a practice:

- Improving access and social mobility
- Building communities
- Creating sustainable places

We are committed to promoting social value initiatives, with these core themes as a focus - meeting the balance between the opportunities presented by economic growth and progress, and the responsibility of businesses to protect the natural environment and promote social equality.

It is not just in the finished project that social value can be created, for designers, our projects are an opportunity to engage communities in the design process through educational initiatives, co-creation strategies and employment opportunities.

We work to embed our people-centred approach throughout the design process, and to systematically record and report on social value initiatives that are carried out. At the inception of a project, we can work with the client to undertake local needs analysis and suggest local charities and organisations to get involved with.

Societal value is also generated by the inherent qualities of high-quality design and development. We seek to better understand these less tangible, but valuable outcomes through enhanced processes of engagement and post-occupancy activities, helping incentivise truly beneficial and sustainable placemaking.

We place particular emphasis on engaging young minds in design.

The first of our core themes, improving access and social mobility, is centred around promoting local skills and employment. Examples of how we showcase social mobility within our business operations and project work include investing time at local schools and colleges, guest lectures, and providing meaningful work experience across the practice.

We are actively involved with a wide range of community initiatives that engage young minds and champion diversity within architecture, design and the arts more broadly. For example, we work with organisations and charities such as Open City Accelerate and Positive Steps, which aim to provide mentoring opportunities for students from disadvantaged backgrounds across our communities.

Through those partnerships, we have been able to facilitate meaningful work experiences and office visits which provide students an interactive experience working directly with our staff members.

Ultimately, we believe these steps will help to improve diversity and inclusivity within the built environment industries, by engaging with the potential designers of the future.

Access + social mobility

Client Earls Court Development Company
Location London, UK
Website ↗

We are working on the first phase of the redevelopment of the Earls Court Exhibition Centres site, leading the Hammersmith & Fulham part of phase 1 that will create a strong relationship with the neighbouring West Kensington and Gibbs Green Estates.

Our work involves close collaboration with Serie Architects and dRMM as well as the masterplanners for the wider development. Our site includes a series of residential buildings, creating homes for sale, for rent and for students. These new homes will sit above a podium which will house a mix of workspaces, retail, amenities and community centre.

As part of our social value commitment, we participated in an interactive workshop with Normand Croft Primary School as part of Open City's Architecture in Schools programme.

This partnership with our client, Earls Court Development Corporation, encouraged children to engage in a design project and create a vision for the redevelopment of the Earls Court Exhibition Centres site through workshops and visits, as well as explore the role of architects in shaping the city.

During the final workshop, our staff members visited Normand Croft Primary School and students were introduced to their final task, which involved creating models of their proposed ideas.

A few of the models were displayed at the local community centre, which provided the students with a sense of ownership for their projects.

Access + social mobility: Earls Court

“We believe every child should start life with as many open doors in front of them as possible.”

There is an essential need for greater diversity in the architecture industry, as well as the wider built environment and creative industries.

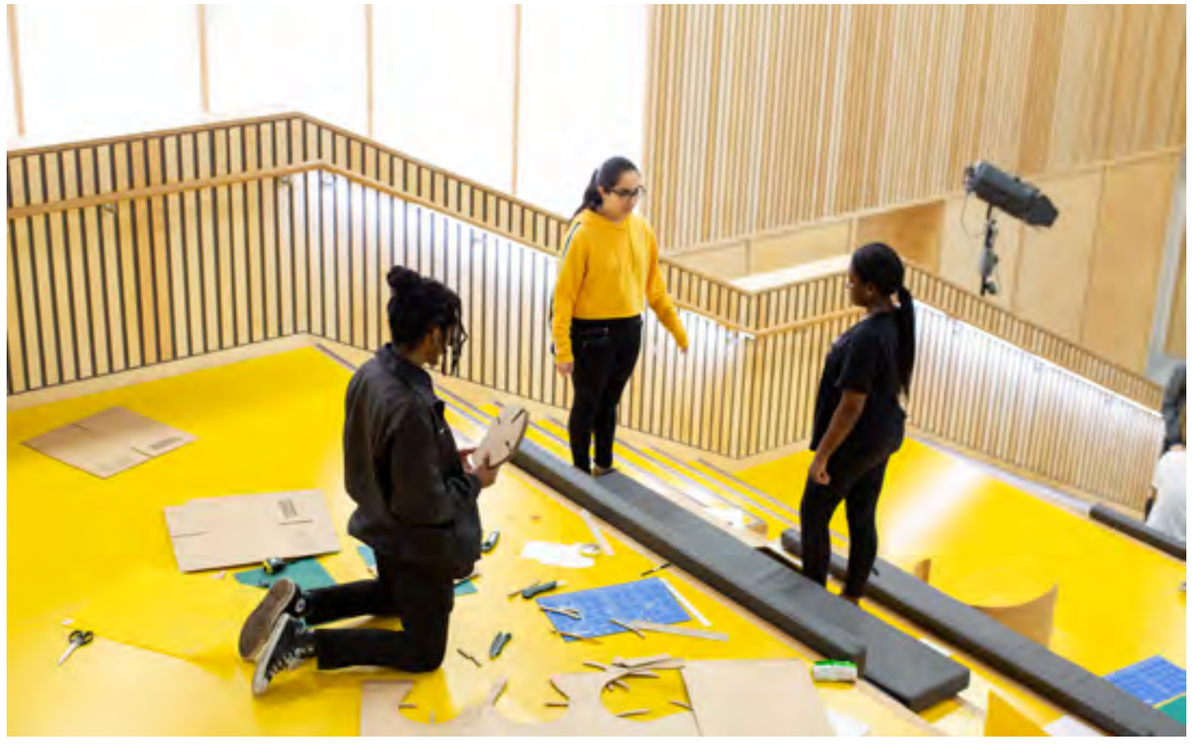
The challenge of addressing this issue is made even more acute considering the cost of design education - architectural thinking should not be done in an ivory tower and design education should not be a luxury item.

If we do not address issues of diversity and inclusivity then our industry, cities and communities will be worse off. This reality is the basis for Sheppard Robson’s focus on community engagement initiatives that engage young people in architecture, design, and the arts more broadly.

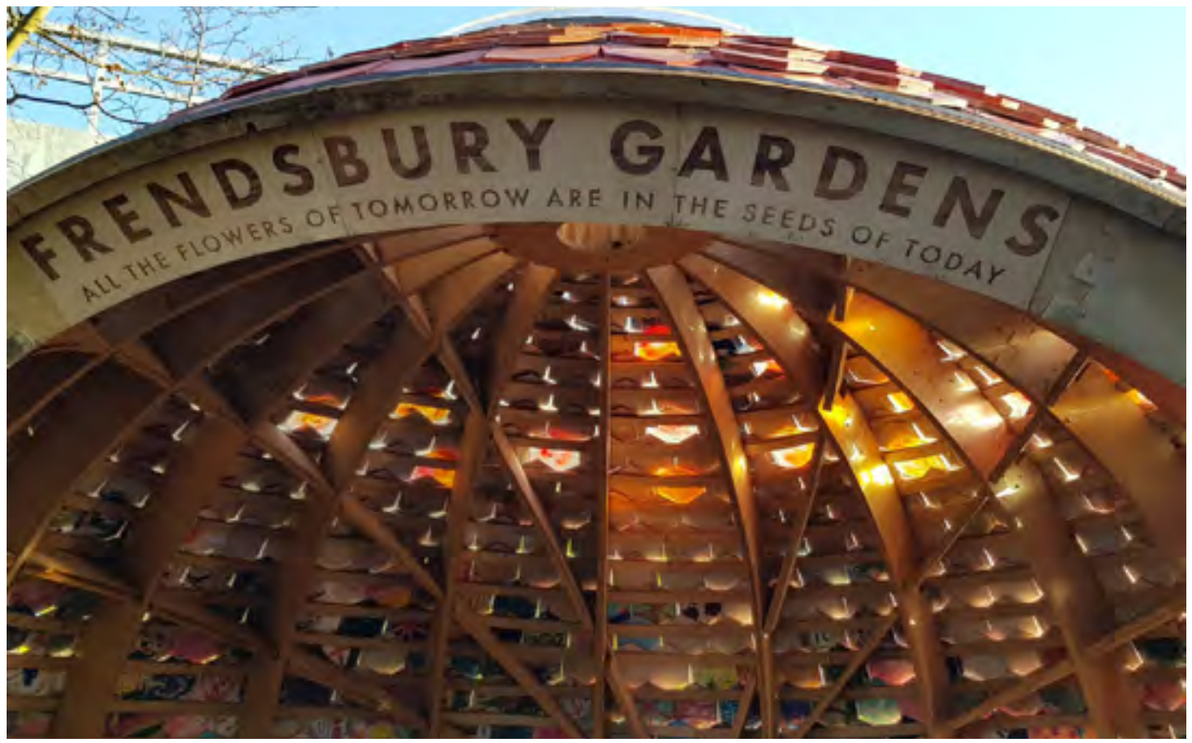
As a practice, we are well placed to connect a wide range of people to the power of creativity, and we believe every child should start life with as many open doors in front of them as possible.

To support this, we encourage each of our employees to seek out initiatives that they are passionate about - from co-designing a classroom, to mentoring architecture and design students.

Several of these initiatives are outlined in our publication, Opening Doors, Opening Minds, which are both practice-led and self-initiated by our dedicated staff, and supported by Sheppard Robson by providing the time, space and patronage necessary to bring these ideas to fruition.



Our projects have two key drivers: to deliver for the client and to serve the community in which our work is rooted.



The second of our core themes, building communities, involves supporting the growth of responsible and local businesses, and contributing to healthier, safer and more resilient communities. Examples of how we approach this include volunteering for local community projects, supporting local architecture schools, and providing equality, diversity and inclusion (EDI) training to our staff.

We see social value creation not as a hurdle to overcome but as an opportunity to build trust and understanding with communities.

We contribute to the social value of communities through our designs and business operations, continually putting the needs of people and the environment at the forefront of our practice.

Our staff are encouraged to use their expertise to enhance and support our communities. We are involved in organisations, such as Camden Town Unlimited, to support community improvement projects.

Building communities

Client	East Ayrshire Council
Location	Cumnock, Scotland
Size	23,000m^2
Cost	£64m
Completed	2020
Website	↗

The project has been designed as a community focal point, consolidating five schools into one campus, creating a centre for education for the towns of Cumnock and Auchinleck.

Working with the community

The Barony Campus has set the standard for enhancing community opportunities locally, due to its scale and combined aspirations, through a comprehensive community benefit and engagement programme. Working with East Ayrshire Council, we used a strategic brief to work with all stakeholders through a series of workshops, ensuring their vision was appropriately captured.

Workshops and open days supported communication and harnessed local input. A programme of education and involvement maximised the impact of education initiatives delivered, including design competitions and learning outreach. With the Council, secondary education provision, Skills Development Scotland and training providers, we met targeted local training and employment needs, providing work experience placements, mentoring and apprenticeships to the merging secondary schools.

Open to the community

The design was deliberately open to the community, providing shared spaces with public realm and community facilities arranged around the heart of the school. Sending a message of positivity and openness, the school has become a hub for the community, a meeting place, a place of safety, exchange, discussion and calm, by providing a venue for events and shared experiences that build cohesion.

Building communities: Barony Campus

Client	Legal & General + Mitsubishi Estate London
Location	London, UK
Size	32,600m^2
Cost	£107m
Completed	2020
Website	↗

245 Hammersmith Road wins Social Value Innovation Award ↗

245 Hammersmith Road is a destination for working and connecting, with flexible office, retail, and public spaces combining to redefine the Business Improvement District.

The project is a leading example of moving beyond risk mitigation, towards realising net-positive gains for the environment, society and the economy by adopting regenerative design principles and redefining value, with long-term environmental and social sustainability at the heart of its design.

Valuing public space

We treated the building and site as an ecosystem to be enhanced, to improve both the human experience and the biodiversity of the area through much-needed green space, including a landscaped piazza, podium park and roof terraces. Green features weave throughout the building and site, increasing site biodiversity through indigenous planting and creating habitat opportunities for London's animal, bird and insect populations.

Setting a standard for social value

At 245 Hammersmith Road, the project team engaged with the local community to positively impact the surrounding area, delivering over £28 million of social value, during and following construction.

The project was awarded the 'Social Innovation Award' in 2021 by the Social Value Portal, demonstrating a novel and creative approach to radically improve how social value is delivered or managed.

A civic-minded ground floor

The interior concepts developed by ID:SR keep the development's civic setting in mind. The ground floor functions as an extension of the public piazza, evoking a generous civic hall, while featuring a variety of more intimate settings to promote collaborative working. The interior draws on the English tradition of Arts and Crafts fused with industrial heritage, reflecting the history of the Hammersmith neighbourhood.

It is essential to consider the current and future impact of our design decisions.

The third of our core themes, creating sustainable places, involves initiatives that support the decarbonisation and safeguarding of our planet. Examples of actions that can be undertaken include reducing waste through reuse of products and materials, creating green spaces to improve biodiversity and help ecosystems, and committing to report and disclose our scopes 1, 2 and 3.

We model our social value approach on our collective purpose, which is to design for life, for the common good. Our work is given continuity by this wider frame of environmental and social responsibility, and every design decision made is driven by a consideration of its current and future impact.

Creating sustainable places

Client	Sheppard Robson
Location	London, UK
Completed	2018
Website	↗

Nestled off a busy street in Camden Town, the former industrial building has been home to Sheppard Robson for over 40 years.

The refurbishment involved a series of additions that has given the practice the opportunity to add a greater range of amenity and social spaces as well as diversity in work settings.

The expansion of the triangular shaped building has been done alongside sensitive repairs to create a significantly improved office environment that retains the distinct character of the original building.

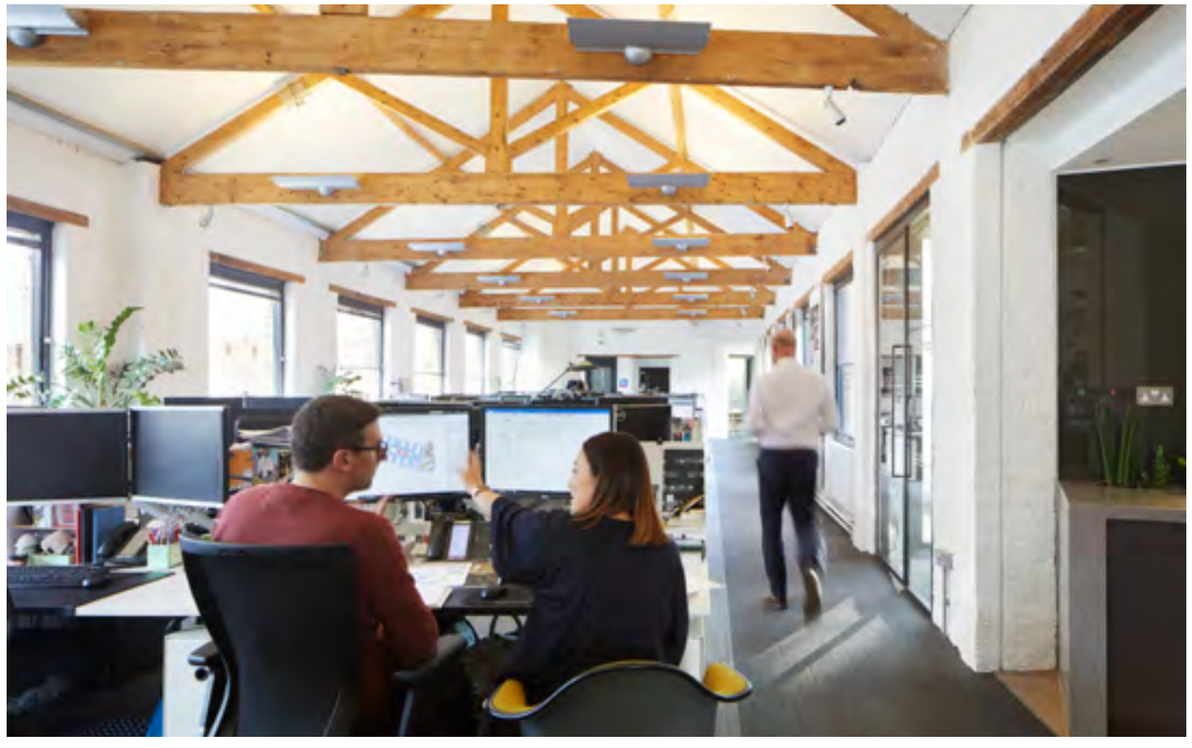
On approach to the office, the building's original water tower - now restored - signals the entrance into the intimate courtyard just off the bustling Parkway. The work included a new entrance and meeting rooms above that project out into the courtyard.

Also included in the work was an extension to the rear of the building, with the extra space allowing for all the Sheppard Robson team - previously spread over three sites in Camden - to be co-located, while also expanding the range of amenities for staff and visitors.

This balance of rawness and refined surfaces is found throughout the building, such as the bespoke concrete reception desk, the bronze-coloured, stainless steel hardware and the cast concrete surfaces in the toilets. All of these are a modern interpretation of the heritage of the building, with this narrative also subtly woven into the signage and manifestation design throughout the building, which refers to the history of the building in Morse code.

In addition, we took the opportunity to incorporate green spaces throughout the office to support staff wellbeing and local biodiversity. The additions included multiple green roofs, one of which is full of wildflowers, a green wall outside the ground floor meeting rooms, and a honey locust tree in the main courtyard space.

Part of the reason for this refurbishment was a continual drive to reduce energy use as a business - to find out more about this, go to our page on environmental management ↗.



Our process is underpinned by listening, and then using this insight to lead.

Social sustainability requires direct and sustained engagement with end-users. This people-centric approach has led to our activity-driven design principles, where spaces support the specific requirements of the people who rely on them.

Our approach to engagement is tailored to each project, taking into account the ladder of participation and where true opportunities for co-creation lie.

At the earliest stages of design we explore the history, unique characteristics and communities of every site. As designers we are acutely aware that our designs will impact communities for generations to come, so this research and exploration is core to every brief.

In the application of architecture, we define co-creation as a process that fosters engagement from the inception of a project to help establish its overall direction.

Co-creation positions end-users as experts, to enable meaningful contributions towards design processes and outcomes, in which architects become conductors of the design process, responsible for shaping strategic visions and championing empathetic, human-centric design.

Our 2020 publication Ideas on Co-creation ↗ was followed up by a roundtable event in 2023 that assembled a cross-section of built environment professionals – architects, developers, a planner, a psychologist, a councillor, and a public art consultant – to address: what is co-creation and how is it different from engagement?

How do you reach the right people in creative and effective ways; and, once the right strategy is defined, how do you sustain it? The views of our panel members can be found at the event's write-up here ↗ and video documenting key takeaways can be found here ↗.

Unpacking what it means to co-create.

Edited by Sheppard Robson, Ideas on Co-creation: Listening, Trusting, Communicating, Empowering, Advocating, is a study into co-creation and how heightened engagement can lead to positive changes in the built environment.

The publication offers a contribution to the wider industry, unpacking what it means to co-create, while presenting stories, lessons and principles for putting people and communities at the heart of the design process.

“What separates co-creation from co-design, consultation, collaboration? How can architects be conductors of a structured and insightful engagement process?”

Our publication Ideas on co-creation looks to answers some key questions around the topic.

Open City Accelerate

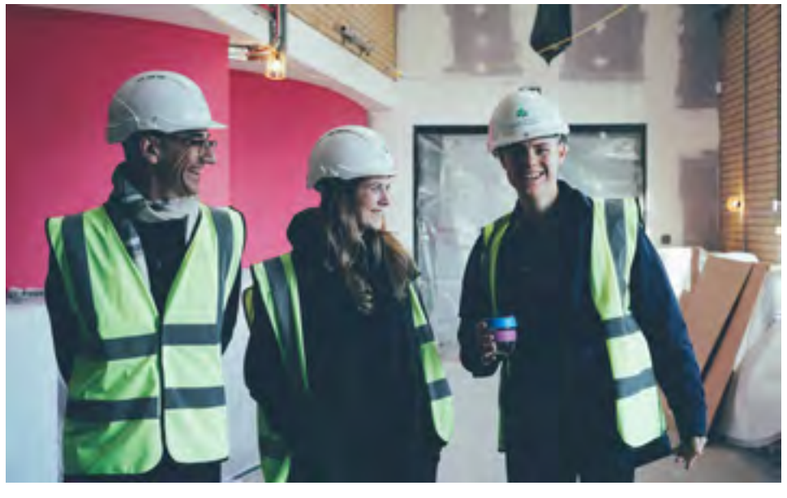
Mentoring sessions for students from disadvantaged backgrounds over a six-month curriculum, covering manual and computer aided design skills, critical analysis of the built environment and enabled students to discuss and share ideas with confidence.

Positive Steps

Our Manchester office works with Positive Steps, a charity that aims to deliver meaningful mentorships to young people and adults. Through our partnership, we have delivered several career talks and mock interviews at local schools to encourage and support students interested in pursuing a career in design.

Power Up North London

We have partnered with Power Up North London, a group of committed volunteers who work with local communities to fund, install, own and manage their own low-carbon energy solutions. We provide pro-bono drawing work to support planning applications.



Contact Theatre, Manchester

Consultant group Con:Struct, a team of young people associated with the Theatre, played a pivotal role in ensuring that the developing design reflected not just the needs but also the ‘attitude’ of its members, staff and audience. Learn more about this in our Ideas on Co-creation publication ↗

East Wick + Sweetwater

Providing mentoring and careers guidance to schools around the Olympic Park as part of the Legacy Careers Project on behalf of the LLDC through our long-term involvement in East Wick + Sweetwater.

BBC Learning

We developed a 21st Century Classroom concept where the BBC could collaborate with local schools to develop new learning pedagogies. Our design for the space included inviting children to design graphics, which are now displayed across the full height of the atrium at the BBC’s Manchester base.

Social value: further examples

1 Social impact

Meaningful social value must be more than just a tick box exercise, and aim for long-term, positive social impact. It should be a symbiotic relationship between the community, the client and project team. Consider the community as the expert of location on the team.

A successful social value strategy involves tailoring it to the needs of our local communities. It is important to aim to engage with key stakeholders early on to achieve a deeper understanding of their wants and needs.

2 Diversity

Ensure the social value and engagement strategy is inclusive and be creative in the approach. A cookie-cutter approach won't work and risks alienating or frustrating those that you're trying to reach.

3 Listen

Our buildings and interventions have lasting impacts on the communities they serve. It is important to build trust from the outset, and actively listen to residents to understand their needs and concerns. Giving residents a say in the design process can help embed a sense of belonging and further improve community wellbeing.

4 Empower

We have a responsibility to empower people to engage with their built environment. Whether this is with their community on projects, or with young minds and those considering entering the profession. We have a collective responsibility to break down barriers and give confidence to people to get involved.

5 Measurement

It is difficult to define a single approach that captures the full picture of social value that can be created. Therefore, a multifaceted approach that captures both the qualitative and quantitative benefits should be adopted as a minimum.

6 New perspectives

It's not just the community that benefits; these activities can make us better designers by offering different perspectives and interesting insights, opening our eyes to new ideas, and can be fun. Involve different people from across the project team to create a range of experiences which can feed back into our work.

Back to contents

Health + wellbeing

Next section:
Practice ↘

Our definition of wellness is purposefully broad, incorporating biophilic design, encouraging physical movement, furniture selection, lighting, acoustics, food and drinks offer.

Sheppard Robson partner Mark Kowal discusses the increasing importance of wellness in the Guardian, focusing on the office market and a need to push for a bolder approach to creating healthy spaces.

Click here to read the full article

The health and wellbeing of people and our planet is at the heart of our design process, and these principles are integrated into each of our projects, across varied client briefs and typologies. We have a history of delivering projects that set the standard for wellness in design while balancing environmental sustainability considerations.

At Deloitte we created the largest WELL Gold, New and Existing Interiors project worldwide at completion, and the first to achieve both BREEAM Outstanding and WELL Gold. Through our ten-year relationship with the BBC, we have developed pioneering designs for neurodiversity inclusion at both BBC North and BBC Cymru Wales Central Square.

We are experienced in environmental rating systems, such as WELL, SKA and BREEAM, to evaluate the level of sustainability, health and wellbeing of our designs and ensure that these criteria can be robustly embedded, monitored and measured.

Comfort + flexibility

- Options for workplace space types
- Thermal comfort solutions to suit individual preferences
- Acoustic requirements + controls for optimal comfort

Clean air + water

- Minimise exposure to harmful contaminants and pollution
- Ensure access to clean air and water
- Thoughtful space planning to isolate key sources of pollution + odours

Materials

- Consider health and internal environment
- Material transparency
- Use of healthy materials

Nourishment

- Support healthy food choices through design
- Offer a variety of options to refuel

Light

- Prioritise access to daylight for occupied spaces
- Lighting zones, varied sources and user controls to allow personalisation
- Solar shading strategies
- Circadian lighting strategies

Community

- Promote best practice inclusive design principles
- Facilitate a collaborative project process
- Encourage engagement and feedback from occupants

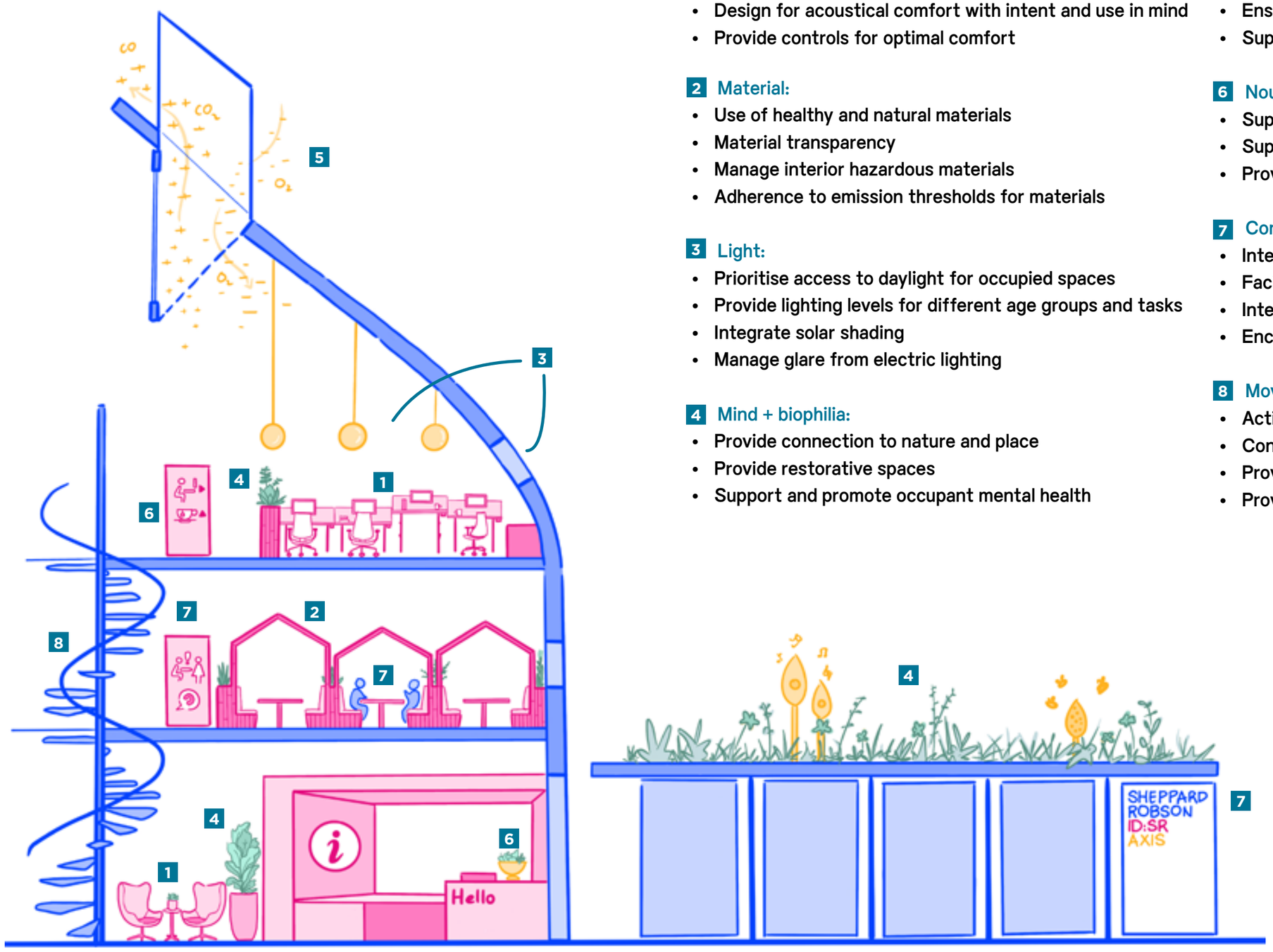
Mind + biophilia

- Increase presence of nature internally
- Use of natural materials, including patterns, textures and tones
- Integration of local identity
- Provide restorative spaces to support individual needs
- Strong links to outdoor space

Fitness

- Promote movement through dynamic design solutions and considered space planning
- Provide user adjustment at workstations
- Consider facilities for fitness + concierge services

Wellness



1 Comfort + flexibility:
- Provide ergonomic workstation designs
- Provide acceptable thermal environment
- Design for acoustical comfort with intent and use in mind
- Provide controls for optimal comfort

2 Material:
- Use of healthy and natural materials
- Material transparency
- Manage interior hazardous materials
- Adherence to emission thresholds for materials

3 Light:
- Prioritise access to daylight for occupied spaces
- Provide lighting levels for different age groups and tasks
- Integrate solar shading
- Manage glare from electric lighting

4 Mind + biophilia:
- Provide connection to nature and place
- Provide restorative spaces
- Support and promote occupant mental health

5 Air + water:
- Monitor air and water quality
- Prohibit smoking and ensure adequate ventilation
- Ensure drinking water access
- Support effective handwashing

6 Nourishment:
- Support healthy food choices through design
- Support mindful eating in dedicated spaces
- Provide meal support (ie microwave, toaster)

7 Community:
- Integrate inclusive design principles
- Facilitate a collaborative project process
- Integration of local identity
- Encourage occupant engagement and feedback

8 Movement:
- Active buildings promoting visible stairs
- Consider facilities for active occupants
- Provide physical activity opportunities
- Provide clear and appropriate wayfinding strategies

Illustration by Jing Zhi Tan

Client	Deloitte
Location	London, UK
Size	25,080m²
Cost	£60m
Completed	2018
Website	↗

Sensing what matters

The new headquarters project's sustainability vision was factored around two ideas: achieving the highest level of sustainable design to meet Deloitte's stretching environmental targets, while delivering a campus which puts wellbeing at the forefront.

The design prioritises light on all working floors with sensors ensuring optimal levels. Temperature, air quality, humidity and ambient noise are also monitored. Ergonomic design is inherent throughout, with 50% sit-stand desks to cater for individual needs.

Biophilic design

Natural materials, calming colours and warm textures have been incorporated throughout. Living plants, moss walls and images of nature bring the building to life, and the planted terraces provide a breath of fresh air.

Facilities across campus

Across campus, a suite of re-sited and refreshed facilities supports wellbeing, with a larger multi-faith room, a nursing mothers' room, mental health and occupational health suite, cycle facilities, shower facilities and a new gym.

Spacious breakout areas allow for meals away from desks, with healthier restaurant food choices and comprehensive food labelling. The Retreat provides a small, calming, tech-free haven for some quiet time.

Benefitting people and the planet

Deloitte has attained BREEAM Outstanding - the highest certification level awarded to only 1% of building projects prioritising sustainable environmental design. The design also achieved WELL Gold and was the first office in the UK to attain both certifications.

Wellness: Deloitte HQ

Client	Nelson Mandela Children’s Fund
Location	Johannesburg, South Africa
Size	29,900m^2
Completed	2016
Website	↗

The project negotiated the technical challenges of providing a range of speciality care areas, such as cardiology, neuroscience, nephrology, endocrinology, and reconstructive and general paediatric surgery, while instilling a feeling of calm in the internal and external spaces.

Rethinking the hospital plan

The competition-winning design broke away from housing all departments within a single ‘box’ building, which often leads to deep floor plates where the patients and staff have little contact with the outside world.

The concept revolved around creating six wings, each with its own specialism. By breaking down the mass of the building into six elements, the design has a domestic, human scale that is reassuring and familiar to children.

The design increased the length of the perimeter of the building and created shallow floor plates. This meant more natural light could flood into the building, placing many treatment spaces next to windows with views over the surrounding landscape.

Embracing nature

Spaces that invite contemplation, five internal therapeutic courtyards, and three gardens were designed for occupational therapy and children’s play. The landscape is predominantly indigenous, using plant species found in the nearby Melville Koppies Nature Reserve. The external spaces were created with healing in mind, and the design encourages patients to use the outdoors as part of their recovery.

Wellness: Nelson Mandela Children’s Hospital

Broadening the definition of inclusivity.

Our client at the BBC, Alan Bainbridge, Director of Workplace and Corporate Real Estate, writes for the Architects' Journal about our journey together to learn how to design for neurodiversity.

Click here to read the full article

Our designs strive to make buildings, spaces and places that are legible and achieve high levels of accessibility. This is particularly pertinent when adapting and repurposing existing buildings, with recent projects such as Contact Theatre and Pall Mall Court presenting opportunities to radically rethink the arrival experience and circulation of the existing building.

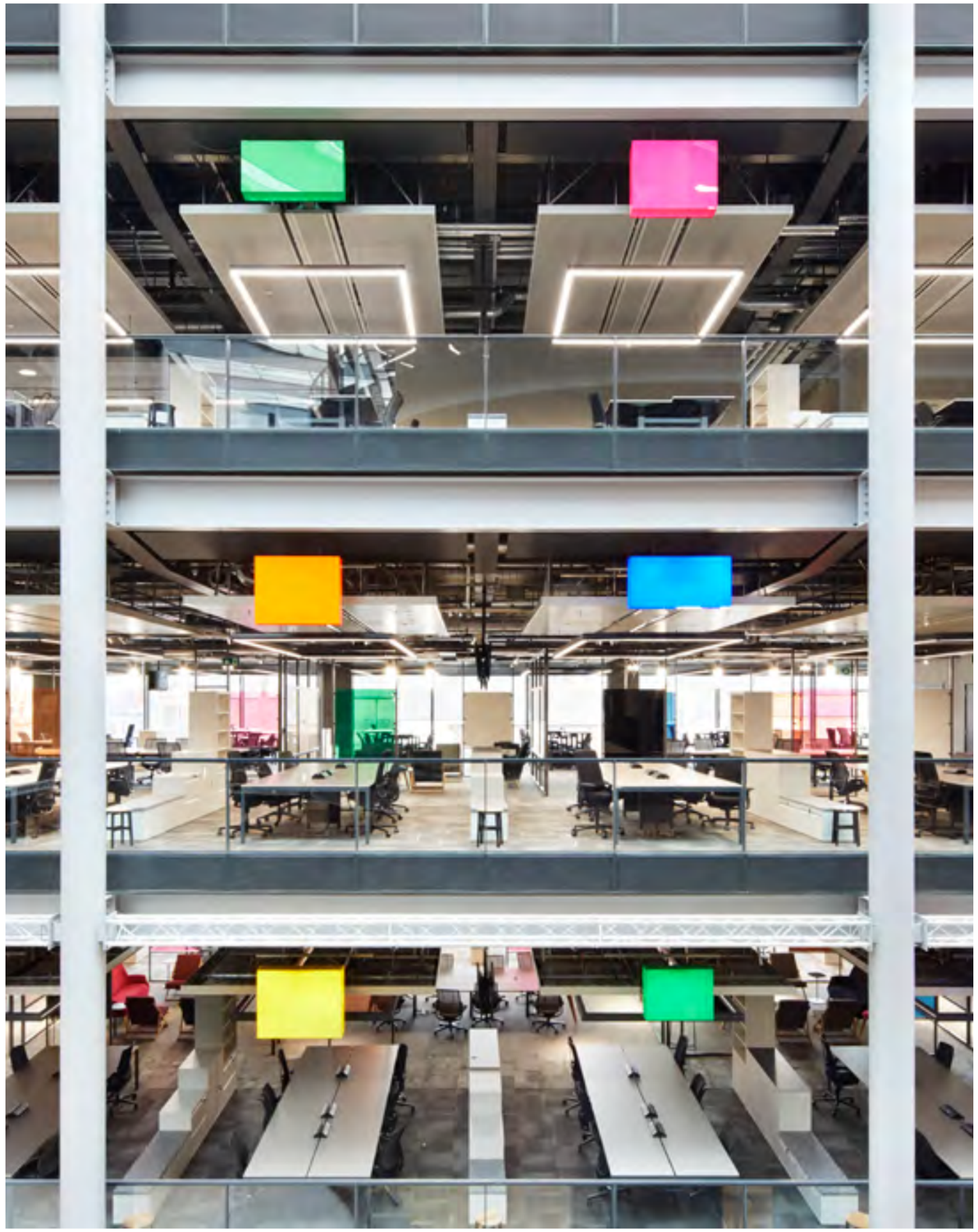
However, we aren't just interested in optimising physical access and have also pioneered designs that are sensitive to neurodiversity. We need to ensure that our buildings are sensitive to mental health and neurodiversity issues as well as other hidden disabilities. This appreciation of how people can perceive spaces in very different ways was developed during our work on BBC Cymru Wales; an account of our journey with the client can be read in the link above.

Workplace design has already acknowledged that one size does not fit all, with an increasing range of spaces that allow people to choose where and how they work, creating a genuine choice between the bustle of open-plan working and calmer spaces that people need to focus and decompress.

With choice and variety now high on the agenda, it is an opportune moment to drive social change through thoughtful, high-quality design, enabling a higher number of people with disabilities to thrive in an office environment.

Inclusivity

Client	BBC
Location	Cardiff, Wales
Size	26,000m²
Website	↗



BBC Cymru Wales Central Square's BREEAM Outstanding broadcast centre in the heart of Cardiff relocates around 1,000 production and support staff from its former facility in Llandaff, which was in need of modernisation.

Redefining inclusivity

The project mandated high-quality experiences for as many people as possible, pushing the design team to reach new levels of inclusivity. We considered how neurological differences - or neurodiversity - can lead to decidedly different experiences of space.

Our approach was supported by the BBC's own neurodiversity initiative BBC Cape, whose cognitive accessibility toolkit helped us examine many different elements of the design, including how landmarks, colour and texture can assist wayfinding; using the right colours and contrasts in the manifestations, fabrics and flooring; and training the reception staff to help all people use the building.

Including the community

The project engaged with the local community, including a design competition in which local students contributed to the project and championing local suppliers and craftspeople.

The team made a concerted effort to promote a locally sourced agenda throughout this major project, with a drive to find the best Welsh materials, furniture and talent.

Inclusivity: BBC Wales

New levels of greening the city.

> “Urban greening and biophilic design has the advantage of being eye-catching... but without the necessary expertise in the design stage and a robust maintenance plan, their full potential will not be delivered.”
>
> Chairman and partner Alan Shingler discusses the importance of biophilic design and urban greening.

Urban greening and biophilic design offer a myriad of physical and mental benefits, while making cities more resilient by mitigating urban environmental problems, such as the urban heat island effect and flood risks.

Urban greening helps to improve health and wellbeing in cities, enhancing air quality and offering outdoor nature respite - which we are now more acutely aware of than ever, due to the Covid-19 pandemic.

Humans’ innate connection to nature and the positive effects it can have on our wellbeing are well documented. Therefore, it is no surprise that biophilic design is referenced in both the WELL Building Standard and the PAS6463 Design for the Mind.

It is not just organic life that can have an important impact. Alongside planting, our interior design group introduces biophilia-inspired manifestations and natural materials - a client even tasked us with creating a space in their central London office, so inspired by nature, that it felt like a woodland stroll.

As urban populations grow and cities become denser to accommodate more populous communities, it is imperative that we promote urban greening as a means to improve the health and wellbeing of city dwellers.

Sheppard Robson continuously pushes the boundaries of urban greening, seeking new ways to provide green space in city environments through innovative interpretations of green roofs, vertical greening, pocket parks, and green corridors to provide biologically diverse and improved urban landscapes.

Through our own office greening ↗ our commitment to urban greening was further recognised through the BeeLine Initiative by Camden Clean Air, which is a community project that links and recognises green spaces across Camden through an interactive map. We became the first business to be documented on the map.

The combination of direct and indirect references to nature can create an impactful relationship with the natural world even in our city centres.

What is biophilic design?

Biophilia describes the human connection to nature in evolutionary terms, providing us with scientific reasoning to understand the human longing for natural systems in our built environment. It can act as an antidote to the often isolating and dehumanising cities that have emerged around us.

While many measures we may take to move towards a sustainable planet may feel like essential sacrifices to protect the natural world from human influence, biophilic design places human wellbeing as a central tenet of its ambitions, with symbiotic benefits with nature.

"We will never be truly healthy, satisfied, or fulfilled if we live apart and alienated from the environment from which we evolved." Kellert (2008)

Biophilia argues that as a necessity to survival, we have evolved to seek out natural environments, densely populated with fresh water, lush vegetation, animal life and far reaching views that alert us to incoming threats and provide intrigue for discovery.

In removing these from our lived experience, we have become more stressed, anxious, depressed, with poorer cognitive performance.

"Biophilic design is the designing for people as a biological organism, respecting the mind-body systems as indicators of health and wellbeing in the context of what is locally appropriate and responsive" Browning et al, (2014)

Biophilic design therefore seeks to reintroduce natural systems into our built environment, calming the primal voice within our subconscious mind. Biophilic design can have a profound impact on the ways we experience our environment.

Extensive studies have been undertaken since biophilia's inception in the 1980s, which have shown that biophilic design can positively improve human wellbeing in a variety of ways.

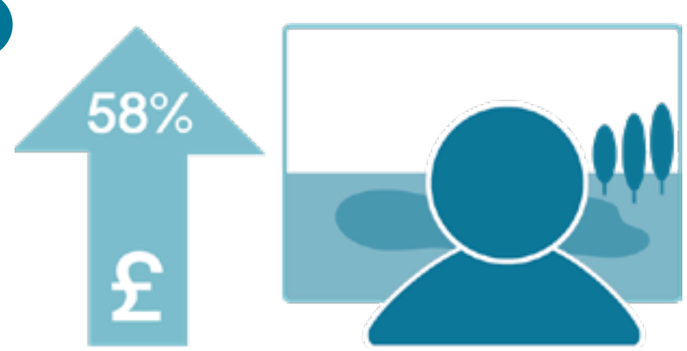
While it is a relatively new field of study, biophilic design has already been shown to:

1

Speed up recovery from surgery

Ulrich, R. S. "View through a window may influence recovery from surgery" Science, Vol. 224. 1984

2



Provide an increase in house prices with a view of water

Benson, Earl, Julia Hansen, Arthur L. Schwartz Jr., Greg T Smersh. "Pricing Residential Amenities: The Value of a View." Journal of Real Estate Finance and Economics. 16: 1, 55-73. 1998

3

Reduce absenteeism

Elzeyadi, I. "Daylighting-Bias and Biophilia: Quantifying the Impacts of Daylight on Occupants Health." In: Thought and Leadership in Green Buildings Research. Greenbuild 2011 Proceedings. Washington, DC: USGBC Press. 2011

4

Provide faster learning in daylit classrooms

Heschong Mahone Group. "Daylighting in Schools: An Investigation into the Relationship Between Daylighting and Human Performance". Pacific Gas and Electric Company: California Board for Energy Efficiency Third Party Program. 1999

Our approach

Defining biophilic design can seem so common sense and essential, it can become vague to grasp in a tangible way. It may be therefore helpful to isolate and differentiate some key design principles as a guide:

1 Views of nature

Provide expansive vistas of water, greenery and living things, including their smells and sounds where possible.

2 Natural materials

Construct using materials with as little refinement (as close to their raw state) as possible and include a variety of natural textures and calming colours.

3 Natural light

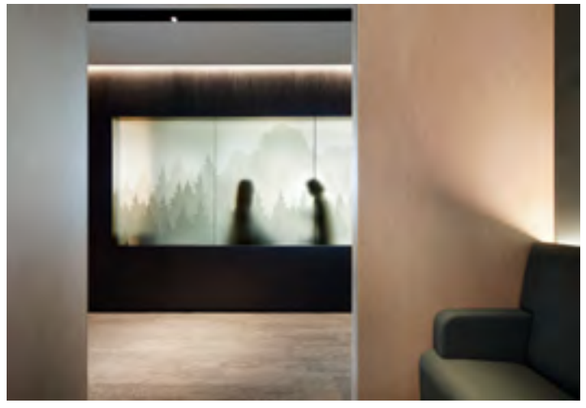
Fill spaces with sunlight, both direct and ambient, with different spaces orientated to their appropriate times of day.

4 Urban ‘blueing’ and greening

Introduce water, planting and animal life where appropriate with physical human contact where possible.

5 Natural forms

Use natural environments as the precursor to form and layout, with complexity and a spatial hierarchy.



6 Natural motifs

Use natural imagery, forms and symbols in signage, manifestation and ironmongery.

Client	TTP plc
Location	Melbourn, Cambridgeshire, UK
Size	10,300m²
Completed	2023
Website	↗

At the intersection of science, engineering and business, the campus includes three buildings that have been moulded to the ethos of TTP and its passion for invention. Set within the rural landscape of Melbourn, the campus has been shaped around the company's values of non-hierarchical, collaborative working.

Promoting biodiversity was a key part of the project's sustainability strategy. As well as creating the wildflower meadows, the landscape incorporates 773 new trees sustained by water from the site, a new 984m² wildlife pond, and 950m of native hedgerow.

The large expanses of glass of the Hive and Exchange frame views out over the landscape. Green banks rise up next to the Hive, allowing the wildflowers to grow next to the windows and helping to create the feeling that the building is embedded within the landscape.

Further instilling the feeling of being immersed by nature, when looking out over the landscape from the buildings, the car park is hidden behind trees and dense planting.

The landscape features spaces to work and rest and is key when transitioning between the different buildings and spaces on the campus; the car park is positioned a couple of minutes' walk south of the Hive and the Exchange.

This invites the TTP team and visitors to walk through the wild planted landscape, instilling a moment of calm, before entering or exiting. People can also enjoy nature by using the fitness trail around the site, a route for exercising, contemplation, and active meetings.

Biophilia: TTP Campus

Client	Dominvs Group
Location	London, UK
Size	24,500m^2
Designed	2019
Website	↗

Citicape House was designed to leave a gateway urban site in better ecological condition than it was before development.

This hospitality-led, mixed-use proposal is characterised by its extensive green wall, creating a distinctive architectural addition to the City of London, while setting a new standard for urban greening in London.

Citicape House is a critical case study, showing how imaginative architectural solutions can transform urban environments and have a measurable impact on local climatic conditions.

The building would annually capture over eight tonnes of carbon, produce six tonnes of oxygen, and lower the local temperature by three to five degrees Celsius.

The new green wall would have also significantly contributed towards improving local air quality, by trapping approximately 500kg of particulate matter (PM2.5 and PM10) per year.

The project engages with the Urban Greening Policy set out in the GLA's then-draft New London Plan, incorporating strategies to encourage more and better urban greening, while adopting measures for an 'Urban Greening Factor' (UGF). With an UGF of 1.37, the design for Citicape House far exceeded the mandated 0.3.

Urban greening: Citicape House

An analytical approach to material selection.

A critical analysis of the human and environmental impact of materials is integrated into each of our projects. We prioritise healthy, low carbon materials specifications wherever possible. We also consider these materials in balance with the building's life cycle and maintenance requirements, detailing assemblies in ways that facilitate disassembly and reuse at end of life.

We have extensive experience in environmental rating systems, such as WELL, SKA and BREEAM, to evaluate the level of sustainability and health of our material choices and ensure that these criteria can be robustly embedded, monitored and measured. Compliance with these standards is then monitored through our Design Delivery Group reviews. Find out more about our review process here ↗

We also consider social value impacts regarding materials. Our team spends time researching locally made products and materials with an aim to reduce waste and minimise the project's carbon footprint.

As well as sourcing local materials and products with sustainable criteria, such as reusability or recyclability, this approach helps support the local economy and smaller independent makers.

We ensure that materials chosen work harder for our clients; durability, multiple uses and flexibility are inherent to our designs, enabling spaces to flex and shift to meet required uses and support our clients' needs today and in the future.

With built-in flexibility to adapt to change and prevent future major works, our "kit of parts" approach results in adaptable spaces that are easily reconfigurable based on changing needs and priorities.

Every brief is unique, and therefore we conduct extensive research when exploring options for material and product specification, balancing low carbon, health and circular economy principles.

This is supported by our dedicated Sustainable Materials Specialist, who researches sustainability innovations in materials, products and systems and advises our teams on options and considerations from a sustainability perspective when specifying.

This research is collated into our 'S|E|E|D (Social, Environmental, Economic, Design) Library' which captures information based on the following categories:

- Low carbon
- Circular Economy
- Health and wellbeing
- Social responsibility

We have corresponding material displays in each office to champion new products for our teams to explore. These resources support our teams to prioritise sustainable, healthy choices from the outset of a project.

Engaging with suppliers on this journey is also key to our approach and ethos. Our Sustainable Materials Specialist regularly speakers to suppliers and manufacturers to understand their processes, and has joined the UKGBC Supply Chain Decarbonisation Task Group which helps research and implement best practices on this topic.

Finally, we work closely with contractors to ensure that these principles of using local, natural and ethically sourced materials are prioritised and zero waste is targeted throughout construction.

Our client at the BBC, Alan Bainbridge, wrote about how local sourcing can benefit the procurement of workplace interiors. ↗

Click here to read the full article.

Client	Freshfields Bruckhaus Deringer
Location	London, UK
Cost	£50m
Completed	2020
Website	↗

The BREEAM Excellent and SKA Gold project created a new agile HQ for a leading law firm.

The project carefully considered materials and their impact on embodied carbon, as well as energy and water use, transportation of material and waste. Finishes and fittings are also made with recycled products and were selected and installed with resilience and flexibility of future use in mind.

A stroll through woodland

A sense of wellness is apparent throughout, with ample planting and natural manifestations on glass capturing daylight and enlivening internal spaces, with the overall effect creating a calming atmosphere with natural warmth and a sense of intention. The manifestations bring a sense of nature into this urban, central London office, reminiscent of taking a stroll through a woodland, with each floor featuring different flora and fauna, including cow's parsley, blackberry, ferns and birds.

A future-proofed solution

Classic, luxurious furniture lends a sense of timeless elegance and longevity, ensuring that the designs will last beyond current trends, helping to future-proof the office while minimising potential future refurbishment and its environmental impact.

Material specification: Freshfields

1 An essential ingredient

The last few years has put health, wellbeing, and the impact our built environment can have on them, at the forefront of peoples' minds. It is not a 'nice to have' but an essential ingredient. Simple considerations should be integrated on every project regardless of pursuing certifications, such as reviewing light exposure, type and quality, and differences in LRV ratings between surfaces. Discussing these early on with the client can allow for the required modelling and any cost implications to be identified from the outset.

2 Don't assume

Diversity of voices and experiences informing the design team is key to embedding successful inclusive design. Our individual lived experiences can be too singular – listening to the experiences of others, or even using technology to build empathy first-hand, is the only way to truly deliver people-centred design. Be willing to go beyond the baseline requirements of Building Regulations.

3 Design for all the senses

We know that open plan spaces do not work for everyone. A kit of parts approach can offer the benefit of creating a variety of user experiences, giving individuals choice depending on their task, mood or need. Approach the user experience holistically – consider sounds, scents, visual stimuli, texture, etc. – to take into account a broader sensory experience and potential hyper or hypo sensitivities.

4 Balance

Balance health and wellbeing alongside other environmental strategies from the beginning to mitigate potential conflicts. For example, implications that M+E plant requirements for filtration and ventilation might have for whole life carbon limits, or the use of natural ventilation alongside considerations of external air quality and noise levels. Collective buy-in and education of how to efficiently use the building or space is paramount – everything needs to be designed with the user in mind, and the user better informed of these design decisions.

5 Urban greening

A realistic maintenance plan is essential when designing and delivering natural greening in or outside buildings. Consider health and safety for access and maintenance when designing. Work with experts to get plant specifications right for solar orientation, daylight and sunlight availability as well as other considerations such as microclimate, if external, or avoiding strong smells and allergens. Incorporate sustainable water use strategies for irrigation.

Go beyond ornamental. Effective urban greening can unlock a vast array of benefits for cities, but it needs to be done in a meaningful and informed way.

6 Look for transparency

The global material supply chain is complex with many potentially harmful ingredients and processes. Design teams need to understand these in order to avoid them, not just for occupants and contractors, but also the wider socio-economic and environmental ramifications across the full supply-chain. The appointment of human rights specialists on the consultant team to advise on material selection is a welcome advancement.

Ask for third party certifications, such as HPD or Declare, but acknowledge that this might not be feasible (or relevant) for small scale, local manufacturers, whose supply chain may be simple and well known to them.

Back to contents

Practice

Next section:
Research + innovation ↘

Our team of around 370 people design buildings, spaces and places that are people-centred and precision-made. The bedrock of our work in sustainable innovation is creating a culture that encourages creative, technical and intellectual exchange.

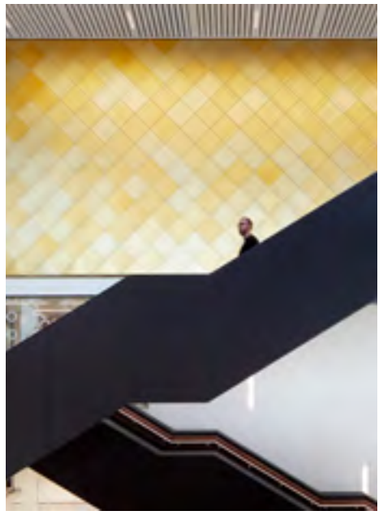
We are shaped by the legacy of our founders, Sir Richard Sheppard and Jean Shufflebottom, who established the practice in 1938 and were joined by Geoffrey Robson as a partner in the 1950s. Together they set out to engage with the most pressing societal issues of the time - a characteristic evidenced by our long-standing commitment to sustainability - and to instil a spirit of partnership, creating a practice that is still driven by the power of exchange.

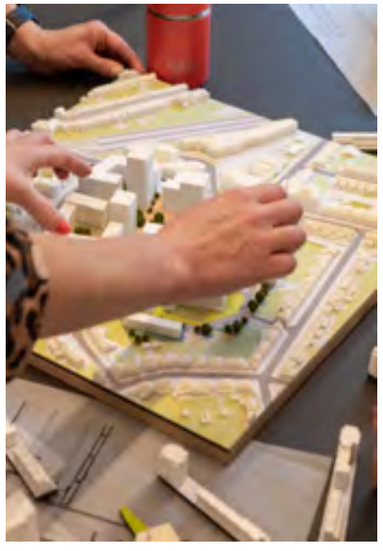
A culture focused on responsible design has been an enduring characteristic of the practice. Today, the practice is a diverse, rich and fertile space where around 370 inventive design minds and innovative architecture are cultivated. We make room for new talents and lasting partnerships to grow and flourish. This culture is manifested in our pioneering projects as well as the life of the practice, from design reviews and processes to Green Week and S|E|E|D Days.

By combining an open, friendly environment and a robust methodology for testing ideas, we are able to share and fine-tune design solutions without losing their pioneering spirit. Every project we make presents the opportunity to push our learning a little further, but we never forget that innovation should always be in the service of a clear purpose – to design for life.








Co-created
Interconnected actions can achieve more than individual gestures, and the best architecture grows out of meaningful, constructive engagement in which end users, clients and design team are partners. Our process is shaped by conversation and exchange within the practice, enabling all to benefit from our collective experience and perspective. We're not just one designer; we're many.

People-centred
We believe that buildings should be more than skin deep, so all of our work is guided by the activity of those that use them and bespoke to their collective identity. Through collaboration with our interior design specialists ID:SR, we design fitting spaces where people feel valued, healthy and emotionally connected.

Precision-made
We have a drive to work with clients on every stage of a project, applying the same diligence to the final detail of the building as we do to the first concept sketch. This is supported by our review process where every project is scrutinised at keys stages. Whether plotting a path to net zero carbon, planning the perfect floorplate or deliberating a technical detail, this structured collaboration allows designs to benefit from the exchange of ideas and experience.

We are known for our ability to deliver our designs, believing that the careful making of a building brings it to life. We also lend our detailed design expertise to major projects by other architects through our specialists, AXIS.

Approach

Established in 2000 by Sheppard Robson chairman and partner Alan Shingler (former chair of RIBA Sustainable Futures), the sustainability group is now led by Head of Sustainability Liam Kelly.

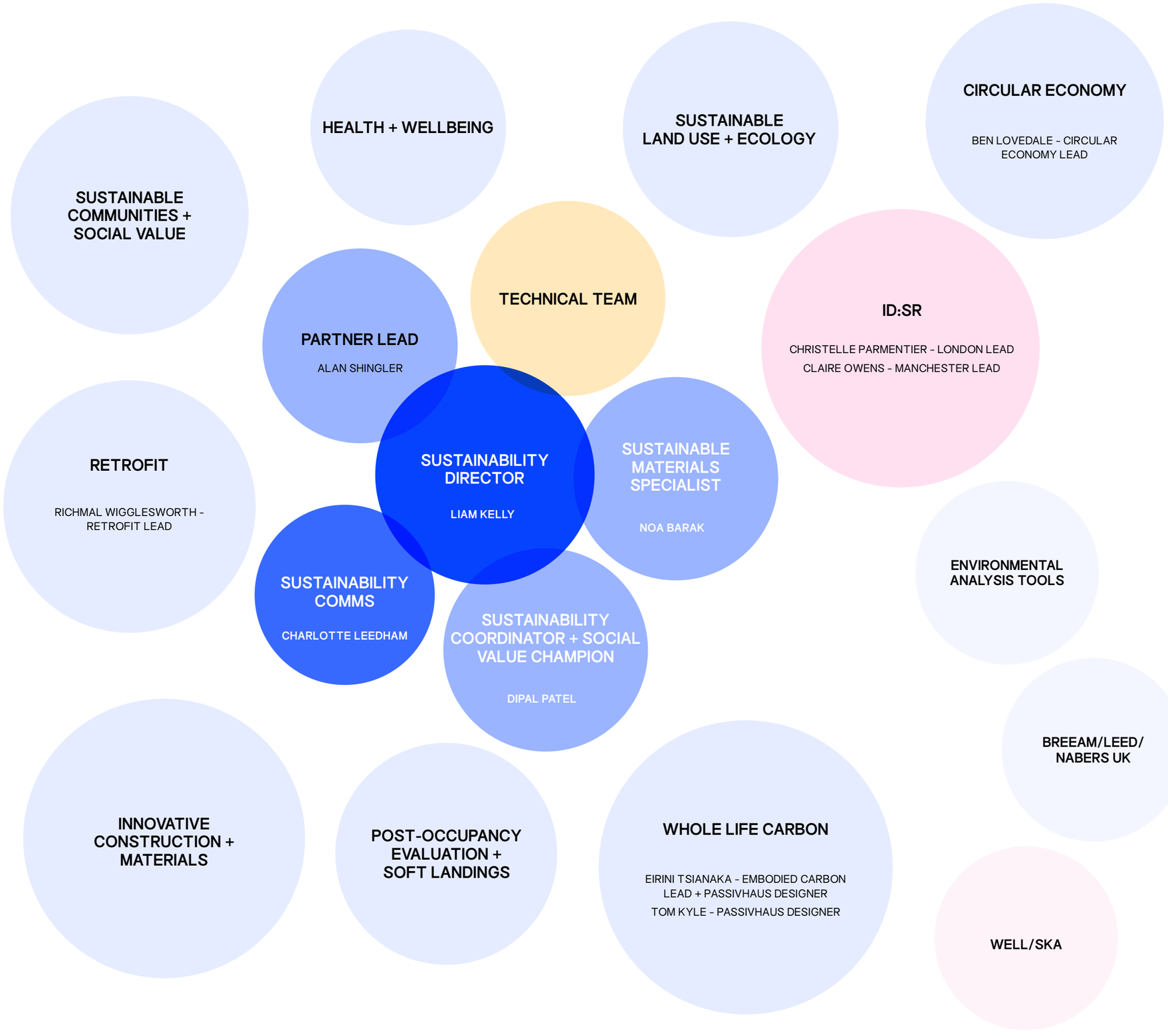
At around 60 members, our team has extensive experience in leading sustainability and wellbeing rating systems, including industry recognised BREEAM, LEED, WELL Building Standard and SKA Rating. We also have certified Passivhaus designers in-house.

The group is structured into core themes based on the RIBA Sustainable Outcomes, with additional specific industry areas for research and development.

This structure and increased resource in our central sustainability team reflects the complexity of the subject and our commitment to fully integrate sustainability into everything we do, ensuring our project teams are supported throughout the practice.

The group organises training and CPD seminars from the wider industry for all staff on a regular basis, through our monthly S|E|E|D Days and our annual Green Week, to ensure that staff are fully briefed on the latest standards and inspired to tackle emerging sustainability issues.

The group also acts as a business steering group, representing the wider practice across all our office locations, ensuring the entire Sheppard Robson family is heard and empowered in our journey towards a more responsible future.



Sustainability group structure

Our Green Week is a week-long programme of sustainability events for our teams to take the time to consider the impact our work has on the environment and how design can more effectively engage with the increasingly pertinent issue of climate change.

Started in 2015, Green Week is an annual inter-office initiative that brings together a week of events to help our teams to continually expand our thinking and ensure that staff are inspired to engage with the pertinent issues of today. In 2019, our Green Week was recognised as Best Employee Engagement programme by the Camden and Islington Sustainability Awards.

In 2023, our Sustainability Group launched our monthly S|E|E|D (Social, Environmental, Economic, Design) Day training series, covering 11 core topics to ensure all staff understand and support the implementation, measurement and monitoring of our strategy and commitments, in both our operations and our design work.

Green Week will remain a key date in our calendar, as a culmination and celebration of our culture of learning throughout the year, and a key milestone for action and reflection.

Accelerating Action: A panel discussion addressing the design of our cities and immediate actions to ensure a more resilient and equitable future.

Read the write-up here.

Harnessing an open culture of conversation and collaboration.

Our approach to responsible design is embedded in our comprehensive review process, through which every project is analysed at each RIBA work stage. The rigours of this process are part of our ISO 9001 Quality Management System and create the opportunity to establish sustainability targets and track progress against key criteria throughout the development of the design and its delivery.

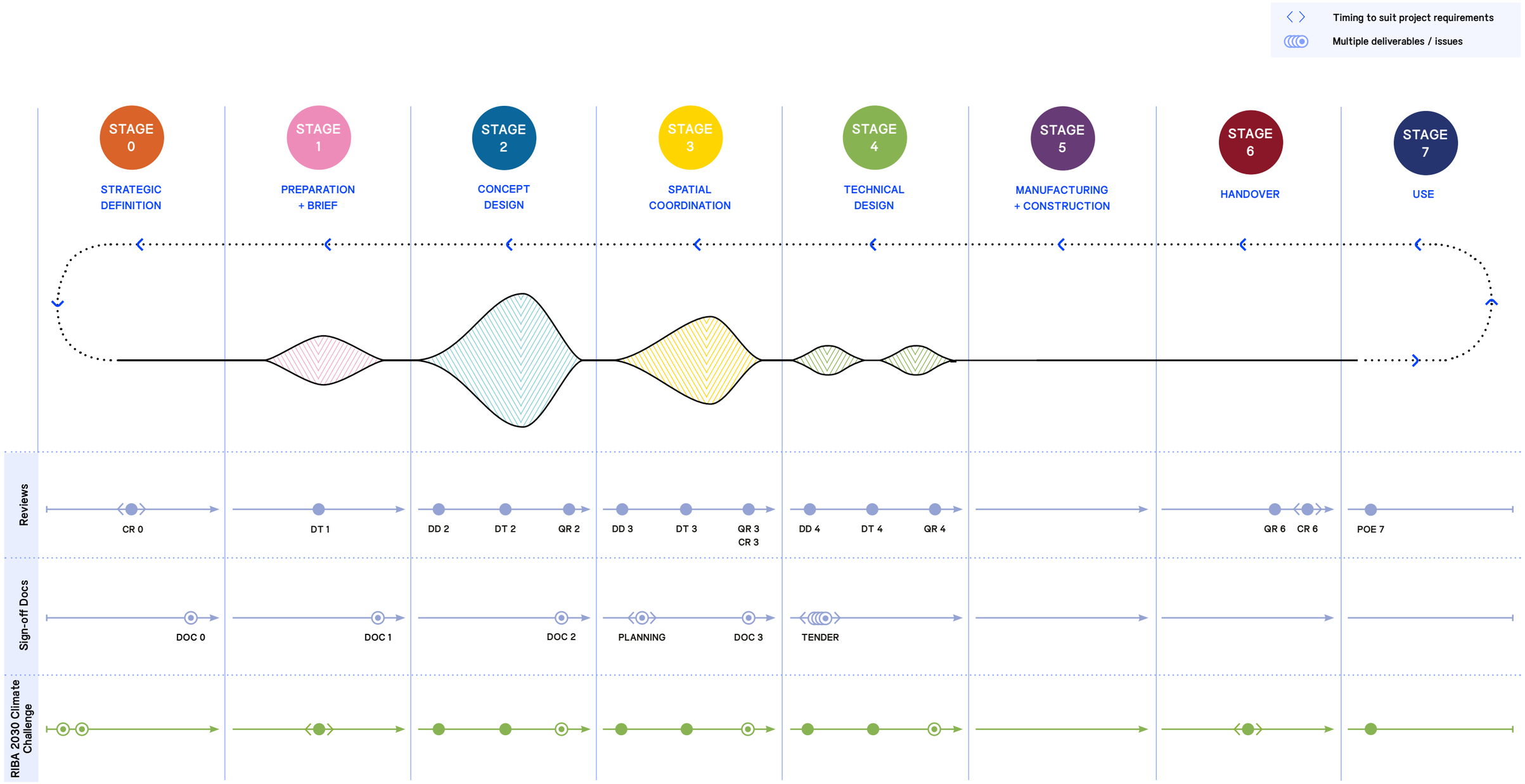
This systematic method of reviewing and refining is led by our Design Review and Design Delivery Groups, which lend consistency, expertise and experience to the iterative development of a project, with wider team members also contributing to this collegiate and open forum of discussion and debate.

Sustainability experts are an integral part of the review groups, promoting the practice's key themes and also highlighting opportunities to share knowledge between projects and research across the practice.

We also carry out post-completion activities such as presentations to occupiers regarding sustainability initiatives on the development, including how they inhabit and use the spaces we have designed. These post-occupancy evaluations support design decisions for future projects, underpinning our philosophy that every project presents the opportunity to push our learning a little further.

Review process

Our project process diagram, which integrates review checkpoints for the RIBA 2030 Climate Challenge.



The practice is a ‘university’ of continual learning.

We are focused on investing in our workforce to enable our knowledge base to develop continually and to motivate and empower our employees.

Our appraisal system is operated annually to identify areas for targeting development activities to support individuals in their professional/personal development and to keep our staff up to date with training in systems and project management skills.

All new joiners to the practice complete a comprehensive induction programme, which includes a training module on sustainability at Sheppard Robson.

To support ongoing staff development, the company provides a programme of live and virtual CPD forums that ensures compliance with professional institute obligations and enhances career development and personal satisfaction.

These presentations are hosted by expert practitioners and suppliers and cover a variety of disciplines, including sustainability. The content of this curriculum is reviewed annually.

Our S|E|E|D days and Green Week events ↗ are designed to sit alongside and contribute to the wider training programme.

Training

Building a sustainable practice.

We maintain an Environmental Management System (EMS) to meet the requirements of ISO 14001:2015 and achieve our environmental goals through consistent review, evaluation, and improvement of our environmental performance.

Our EMS provides a framework for minimising our impact on the environment, including avoidance of pollution, prioritising sustainable resource use, climate change mitigation and adaptation, the protection of biodiversity and ecosystems and any other specific commitments relevant to the context of the organisation's activities.

Our carbon journey

Our EMS sets goals to provide a clear route to reducing greenhouse gas emissions and all other impactful aspects of the business, including environmental and social considerations.

Through continued efforts to reduce the environmental impact of our business, we reduced our location-based carbon footprint from gas and electricity (including electricity transmission and distribution and gas well-to-tank) by 65.57% from a baseline year 2008/09 to 2023/24.

However, compared to 2022/23, this is a 6.53% increase in location-based emissions from these types in reporting year 2023/24. This is partially due to a long, cold winter in the reporting year resulting in a gas usage increase for heating, and we are investigating electricity usage increase to identify the issue.

In 2022, we significantly increased the Scope 3 data included in our carbon footprinting. It now includes a broader scope of well-to-tank emissions, project as well as non-project business travel by rail, flight, taxi, bus, car hire and mileage expenses, and employee commuting including home-working and working from abroad.

We also now include a supply chain screening of our Scope 3 Purchased Goods and Services in our data capture and will use this to understand which sectors of our purchasing have the biggest impact. We have therefore re-baselined our reporting to 2021-22 to reflect this improvement in data quality and scope.

Including the broader range of Scope 3 categories, our 2023/24 report shows an increase in the total location based tCO2e compared to 2021/22, despite the long term reduction in energy related emissions noted before. This is primarily due to an increase in transport related emissions since 2021-22, following the increasing return of in-person meetings and events since COVID-19.

We have updated our Sustainable Travel Policy to anticipate this and strengthen wording with regard to business related travel. We feel it is important that we are as transparent as possible with this reporting, so although increasing the data capture makes our carbon footprint look higher than previous years in the full reports, it puts us in a much better position to understand the impact different areas of our business operations have in order to target and reduce them.

We procure renewable electricity for all our offices, therefore, our market based emissions are lower than our location based emissions.

We update our business operations carbon reduction plan annually, which commits us to achieving net zero carbon emissions for reported scopes 1, 2 and 3 by 2050 at the latest and includes a 16% reduction target for our location-based carbon emissions from a 2021/22 baseline by 2027. This can be found on our website and we are committed to reviewing and publishing our progress towards these targets every year.

The environmental system is regularly reviewed by senior management to ensure it remains appropriate for our business. Our EMS is subject to internal and external annual audits in line with our ISO 14001 certification.

We aim to increase scope where possible and continuously seek opportunities and solutions to reduce consumption and/or increase sustainable sourcing of resources.

Back to contents

Research + innovation

Every research initiative, like the projects we work on, presents the opportunity to push our learning further.

In a constantly and rapidly evolving field such as sustainability, continuous research and fostering a spirit of innovation to embrace new methods of construction and cutting-edge systems are fundamental to ensuring we can offer the best solutions for our clients, communities and the natural world.

The principles of innovation, design and sustainability underpin Sheppard Robson's wide-ranging architectural output and are continuously being developed and refined within our practice. The case studies on the following pages outline some of the speculative research projects that we have undertaken.

Overview

Client	Kingspan Metl-Con
Location	London, UK
Size	93m²
Cost	£240k
Completed	2007
Website	↗

Lighthouse was the UK's first zero-carbon house, meeting Level 6 (the highest level) of the Code for Sustainable Homes.

The Lighthouse is a prototype home where the innovative environmental systems and construction methods do not compromise the quality of the occupants' life, but add to it - creating adaptable, flexible spaces designed for sustainable modern living.

Valuing simplicity

The structure is a simple, barn-like form, derived from a 40° roof accommodating a PV array. The sweeping roof envelops the central space - a generous, open-plan, top-lit, double-height living area, with the sleeping accommodation at ground level. The living space uses a timber portal structure so floors can be slotted between frames or left open as required.

At ground level, a timber frame structural layout carries the vertical loads of the open-plan frames above and provides stability to the load-bearing shear walls. Stability is achieved through the moment connections at first floor and ceiling level. It is constructed using Kingspan Off-Site's TEK Building System - a high performance SIPs (structural insulated panel) based system.

Controlling heat loss

To achieve Level 6 there is a mandatory heat loss parameter which demands high U-values for the building fabric, thus the Lighthouse's ratio of glazing to wall is 18%, as opposed to 25-30% in traditional houses. This drove the decision to locate the living space on the first floor, to maximise daylight and volume.

Phase-changing material in the ceiling absorbs the room heat by changing from solid to liquid within microscopic capsules embedded in the board. This process is reversed when the room is cooled with the night air, working with the passive system of the wind-catcher.

Zero carbon in operation: Lighthouse

Location North England, UK
Completed 2024
Website ↗

“The future city must be not just sustainable, but regenerative.”

Click here to watch the short video that expands on key design features, and to read our full proposal.

Metro:Morphosis Office to Urban Village is a research project which engages with the twin crisis of a climate and biodiversity emergency as well as the social issues around mental health and loneliness.

Our concept, winner of Arup’s Façades of the Future North design competition, offers a combined solution for upgrading existing buildings into new housing with increased communal amenities to encourage incidental social exchange, with the benefits of urban greening for microclimate, regenerating biodiversity and occupant wellbeing.

We have designed a modular kit-of-parts framework that maximises use of reclaimed materials and aims to increase urban greening, improve internal comfort, provide water capture and storage for irrigation of living walls, while increasing amenity space for residents.

Our proposed façade of the future integrates a new ‘gallery’ around the existing building creating a double-skin façade system.

The gallery is enclosed to provide protection from year-round weather conditions and mitigate the effects of noise, particularly in areas with heavy traffic.

The thermal line of the existing building is upgraded, and the new lightweight external skin is angled depending on the orientation of the façade to maximise daylight while limiting solar gain. The design includes openable windows in order to maintain the external living walls, and natural ventilation chimneys to encourage air circulation in warmer months.

The newly created space is designed as communal circulation with pockets of amenity per household, to encourage social exchange with neighbours. The integration of external greening offers multiple benefits, such as encouraging a sense of connection to nature by views out from internal spaces including greenery, supporting regeneration of biodiversity by creating new biodiverse corridors through a city, and contributing towards urban heat island effect mitigation.

Façade of the future: Metro:Morphosis concept

Client	Confidential
Location	The Middle East
Size	33,800m^2
Designed	2009

Project Estidama is a highly sustainable 30-storey tower design. Initial design analysis showed a 40% reduction in carbon emissions compared to standard office/ mixed-use towers in the region.

Parametric design

To achieve a regulated energy consumption of 90KWhr/m^2/yr, the building form was designed using complex parametric algorithms, combining climate analysis with Grasshopper modelling. A double helix spirals asymmetrically around the central core and creates a self-shading building form with equal floorplate areas, suited to office, hotel or residential use.

The upper surfaces of the spiral are further optimised for intense solar impact and are laced with photovoltaics. Incorporating an active double-skin façade, a delicate geometric filigree forms a structural diagrid and provides additional shading to the internal spaces, while reflecting daylight onto the office floor.

Project Estidama demonstrates the potential in using measurable sustainability criteria to define the building form for the Middle East climate without compromising building and floorplate efficiencies.

Efficiencies in extreme climates: Project Estidama 102

Client	Church commissioners / Hammersmith and Fulham Council
Size	60 homes (incl. 45% affordable)
Designed	2021
Website	↗

Our certified Passivhaus designers undertook a review of a residential scheme, applying Passivhaus design standards to the project and illustrating how efficiency can be boosted.

The reviewed scheme was composed of two buildings of four and five storeys, each with interlocking forms and public realm in between. On the site, a new church would occupy the ground floor.

Finding efficiencies

The Passivhaus case study maintained the concept and overall massing but simplified the form factor by relocating flats from ground to typical floor. The review process made balconies bolt-on instead of recessed as well as making the floorplate squarer in shape which also improved the efficiency.

The block layout was replanned to ensure there were no north facing apartments and more south facing ones with generous full width balconies, which also provided the required passive shading. There was no net loss of residential units through this replanning.

Windows were redesigned to minimise glazing to the north and maximise to the south. Daylight and thermal comfort were optimised by placing the window higher and wider than the initial design.

The improvements to the envelope and glazing allowed the Passivhaus standards to be achieved in design without having to reduce U-values in the walls, thus avoiding thickening the walls. Additionally, the embodied carbon was assessed, and façade and structural materials were proposed to minimise whole life carbon.

Location London, UK
Website ↗

Project Stack is a modular housing concept that incorporates cantilevered elements to create efficient, tall buildings with distinctive forms.

Dynamic yet efficient

Apartments are constructed in 3m-wide by 9m-long modules, with the plan consisting of four 1-bed and four 2-bed apartments, with the latter located at the corners.

While the typical floor repeats, the balcony position has three variants, creating a dynamic, spiralling appearance to the façade and giving the balconies privacy and protection from the elements.

The variant floor contains larger three-bedroom apartments with double-width balconies.

As the whole building is set out to a 3m grid, the façade can also be prefabricated and/or unitised. The modules are delivered as weather-tight units and then onsite the joints are firestopped and a rain screen framework provided to protect the joints and support the material façade expression.

The façade materials explored range from lightweight metal cladding to masonry cladding.

The chassis fits on a flat-bed lorry with a wide load, so it can be easily transported to site. There is a high degree of repetition within the flat types and modules, which is ideal for mass production.

The modules containing bathrooms and kitchens would be volumetric, but the modules for bedrooms and living rooms could also be built as a flatpack.

Exploring high-rise modular homes: Project Stack

Back to contents

Unwavering focus on the big picture.

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REFERENCED CLIENTS

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Dominvs Group
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Equitix
Freshfields Bruckhaus Deringer
GRAHAM
Hammersmith and Fulham Council
Hermes Investment Management
Kingspan Metl-Con
Landsec
Legal & General
London Borough of Hounslow
LinkCity
Mitsubishi Estate London
Nelson Mandela Children's Fund
Peel L&P
Welsh Education Partnership Company (WEPCo)
Wokingham Borough Council

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Back to start

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