

3PM

Responding to the Retrofit Challenge

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Case Studies – Learning from KCL



KCL – The Quad

- Complex phased briefing & delivery
- Responsive-design following exposure of the structure
- Fire protection of existing structure
- Complex logistics & contractor interfaces
- Live environment
- Team Culture

Operational

Inspiring Trusted Leadership



KCL – Bush House SWW

- Rapid start & tight timescales
- BREEAM Outstanding, WELL Gold,
- Championed : EnerPHit

Currently in RIBA Stage 3

Case Studies – Learning from others



Church Commissioners – Lambeth Palace

- Grade 1* Listed
- Fabric enhancements prioritised but limited
- Decarbonised central energy centre with PV's
- Facilitated a Green audit at end RIBA S2 & S3

Currently On-site



London School of Economics - Firoz Lalji Building

- Championed : BREEAM Outstanding, WELL Gold, Passivhaus
- 60% retained, 40% new build
- Complex phasing to reduce embodied carbon impact of temp. works
- Selected as a LETI Retrofit in HE case study & an exemplar Scheme for WCC

Currently in RIBA Stage 4 / Planning

Case Studies – Exemplar Retrofit

3PM | PORTFOLIO,
PROGRAMME AND
PROJECT MANAGERS

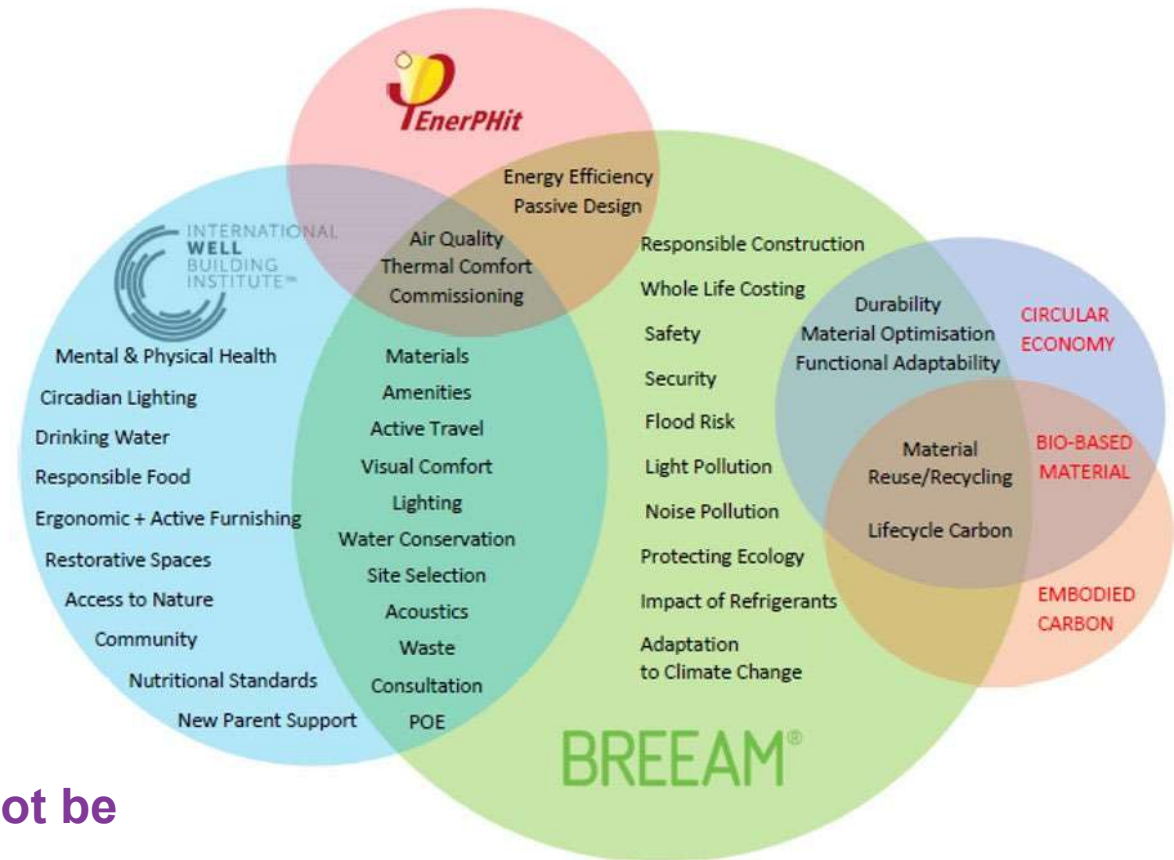


EVE WALDRON DESIGN



Validating the brief

- Explaining the accreditations
- What do they mean?
- What are the User's responsibilities?
- Are they feasible?



“Sustainable buildings should not be any more expensive.

As a principle, it's about design development, it's about the team thinking collaboratively and getting value for money.”

Design Brief - Aspirations

- Low Carbon Retrofit of an 1830's former Telephone Exchange
 - Single glazed sash windows with secondary glazing
 - Space heating: gas boilers feeding radiators, AHU heat coil & 4-pipe FCUs; plus some reversible DX units
 - Cooling: Chiller feeds 4-pipe FCUs & AHU cooling coil; plus some reversible DX units
- CISL currently spread over 3 sites in the city, needed a change of working culture
- Collaborative Space for SMEs, Corporate Partners and CISL
- Exhibition Space to Promote, Teach and Inspire
- A Circular Office Case Study
- Zero GhG emissions in operation
- PassivHaus / EnerPhit Standard
- BREEAM Outstanding
- Embodied Carbon - The team will target less than 300Kg CO_{2e}/m² over 100 yr life
- 50+ Innovations
- 70% Biobased Materials
- Soft Landings / POE
- Replicable / Risk Control

The Project Brief - constraints

- Fee budgets based on £5.95m 'Standard CAT-B Fit-Out' Cost Plan
- RIBA Stages 1-3 plus Tender: June 2018 – December 2018
- Construction Period: 10 months
- Single Stage Tender Using Framework Contractors
- Initial advice of a +25% Premium

And just to make it harder....

- Mis-aligned visions
- WELL (Gold)
- “World first” accreditations
- Do it through a Pandemic!

Team Alignment – The Charter

THE ENTOPOLIA PROJECT CHARTER

1. PURPOSE

It was agreed between the parties that the project would be created and entered into, setting out agreed core behaviours and values.

2. VISION

To stimulate the delivery of a low carbon retrofit for 1 Regent Street that is both practical and pragmatic in approach, represents good value for money whilst challenging conventional norms around building refurbishment. The project will in itself be an 'educator' and enable leadership and dissemination to others. The built environment represents a major contributor to GHG emissions in both construction and operation and the historic stock of energy inefficient buildings in the UK is a challenge of the first order. In developing this specification the challenge is to deliver locally in terms of functionality and performance but also at strategic level to provide much needed leadership at national and international level.

3. PROJECT CHALLENGES

The following are the agreed design challenges for the **Entopia Building**:

- Which will play a key role in facilitating culture change within CISL to enable the values
- The University of Cambridge.
- Environment
- Considered innovative solutions to provide habitats to support the roof terrace.
- Practices to promote effective delivery of low carbon
- Deliver a scheme within the normal cost profile and range predicted for a project of this type & scale
- High % of bio-based materials and traceability register
- Soft Landings with Post Occupancy Evaluation (to run over 3 years)

4. SUCCESS CRITERIA

The project's success will be monitored against:

- Low Carbon Retrofit
- Circular Office Case Study – suitable to be defined
- / KPIs set) – curate
- EnerPHit +
- BREEAM Outstanding
- WELL Gold (look to exceed)
- Embodied Carbon <300kg CO₂ /m² as a benchmark
- Technology Innovations

Clarity of Vision

Alignment on the challenge

Define Success



5.

PROJECT VALUES

A successful project requires collaboration from the entire project team including the contractor, sub-contractors, designers, End users, Estates functions, Envision (funder) and the CISL Department.

The following project values will be adopted to ensure the successful delivery of this project:

1. Achieving the highest design quality
2. Recognise the potential of the project as a retrofit exemplar
3. Collaborative decision making process that both empowers and respects work
4. Work ethically, honestly, fairly and transparently, valuing the contributions of all
5. Be open to challenging the design and having the design challenged with freedom to innovate
6. Celebrate success and the input of the whole team
7. Lead by example, strive for consistency of behaviour in upholding the project values

Behavioural Traits

Buy-in of key individuals

CISL	EM	3PM	Archtype			ISG
Polly Courtice	David Hills	Patrick Watson	Ben Humphries	Rob Webber	James Hepburn	Chris Chappell

Facts & Figures

https://www.cisl.cam.ac.uk/files/entopia_case_study_12_12_22.pdf



Windows:
triple glazed & inset

Walls:
Bio-based internal
insulation

Floors:
Retained cold
bridges resolved

Services:
Gas boiler & radiators replaced
Mixed mode, peak lopped via MVHRs

- Test the space budget, build less, maximise utilisation
- Retro first over new build, Circular Economy benefits
- Maximise extent of bio-based materials (insulation, finishes, timber)
- Allocate appropriate contingency (time & cost)
- Identify the “quick wins” & test the options
- Challenge the use – think lightweight construction
- Use the metrics (BREEAM / WELL / Passivhaus etc)
- Collaborate – engage both designers & users in the process and bring the stakeholders on the journey

Risk Realisation

Sustainable Refurbishment Projects

Risk Theme	Cost Risk	Time Risk	Mitigation
Existing building perimeter / wall	H	M/L	Early intrusive surveys required
Basement waterproof	M	M/L	Early intrusive surveys required
Asbestos in existing estate	M	M/H	Early intrusive surveys required
EnerPHit / Passivhaus experience	M	H	Proven expertise recommend or cover off learning curve
Thermal comfort rang due to mixed mode approach	L	L	End user acceptance & understanding
Design continuity	L	M	Continuity of EnerPHit treatment is fundamental. Non-novation requires extensive due diligence of the design strategy. This introduces a delay in the design process
EnerPHit certification	L	M	Limited availability of independent certification bodies, early awareness & securing resource is important
Design life of retained elements	M	M	No checks undertaken on residual base build life span
Quantities of combustible materials	H	M	Design guide seeks avoidance which conflicts with desire for enhances bio-based material to improve carbon metrics
Marketing availability of materials and supply chain maturity of use	M	M	Specific materials not off the shelf and limited market availability
The supply of triple glazed windows	H	M/L	Early supply chain engagement and procurement of windows

Risk Realisation

Behavioural aspects

- Team Culture
- Leadership & Management
- Stakeholder Identification & Engagement
- Experience (Carbon awareness...)
- Personal motivations
- Aspirations vs affordability
- Perceptions vs reality
- Transparency over impact & delay
- Dispute avoidance & resolution
- Open honest approach
- Difficult conversations

Behavioural risks also require
contingency

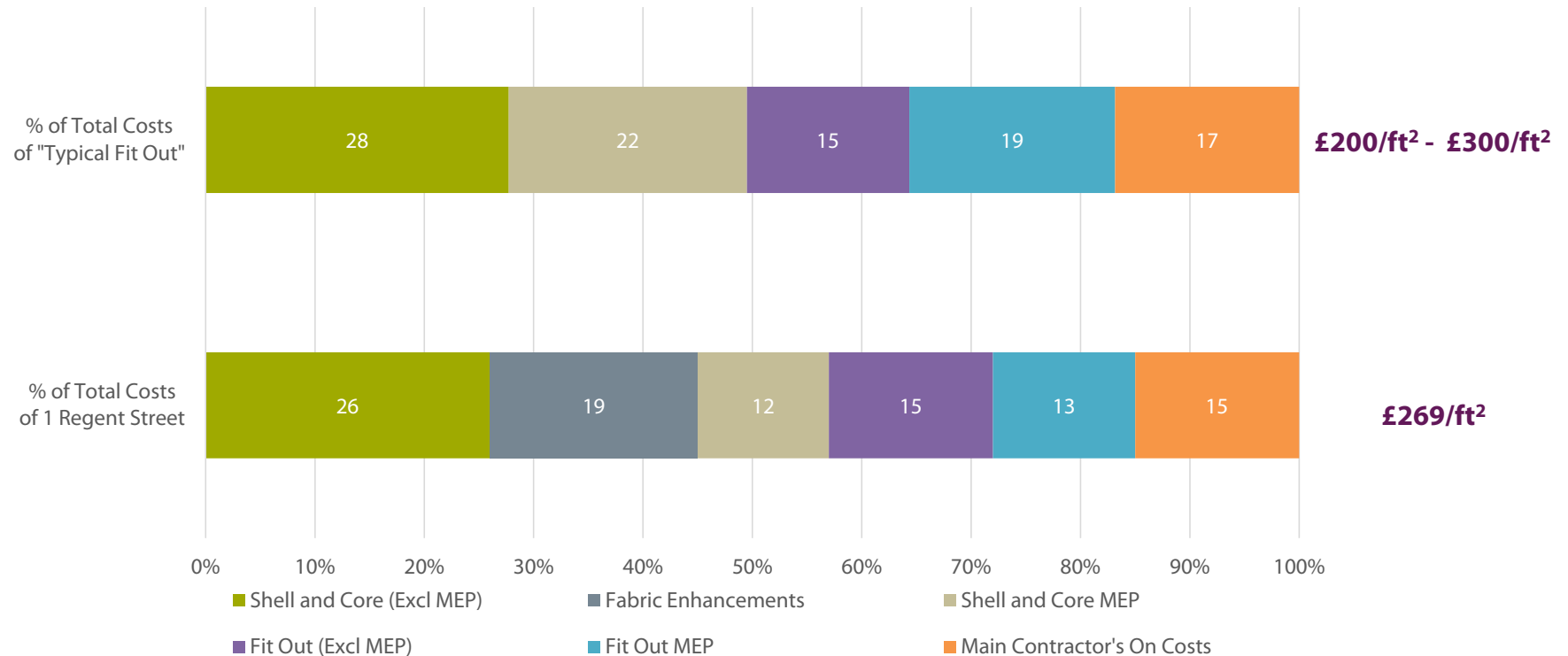
(Calm under fire, focus & patience)

Utilise mediation techniques

Develop mitigation strategies for both;
Design & Construction phases

Entopia – Out-turn Cost & Programme

The additional investment in fabric enhancements (i.e. air tightness and U values) was largely offset by the simplification of the MEP systems within the building.



Client Risk & Prolongation (c. 24wks)

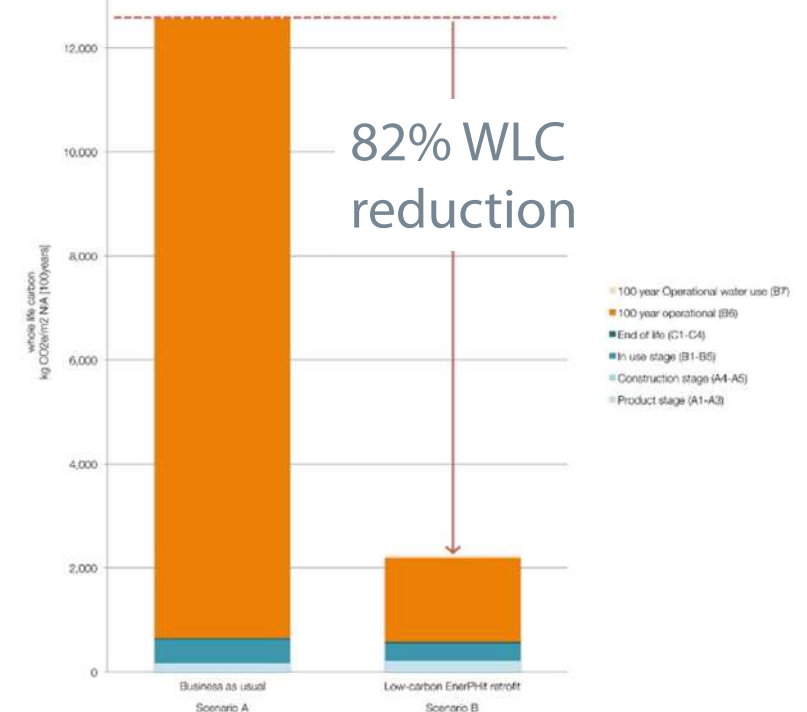
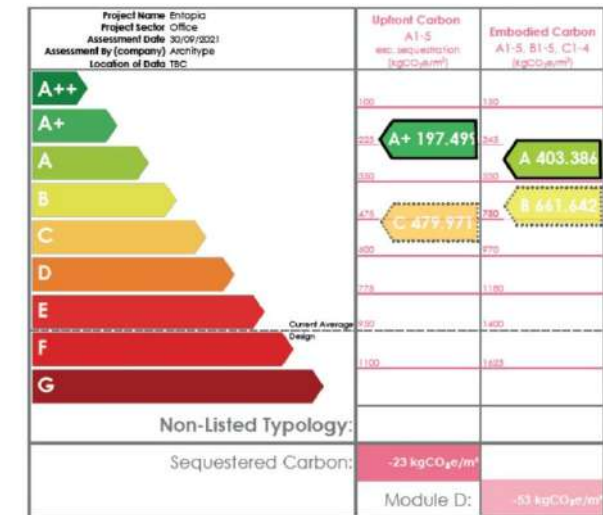
- Covid Allowance
- Additional Asbestos
- Existing Building Defects
- Client Changes

Contractor Risk & Prolongation (c. 14wks)

- Covid Extension
- Material Delays
- Sub-contractor Insolvency

Lessons Learnt

- Ensure Vision is shared (Projects, FM team & Users aligned)
- Survey as much as early as possible (BIM)
- Team continuity to maintain vision & creative challenge
- Collaboration workshops (one per stage)
- Continuous & regular FM engagement
- Highlight Risks early – no surprises
- Use Passivhaus “Fabric first” to drive down MEP / Carbon
- Embodied Carbon savings c. 174 tCO_{2e} secured in material selection.
- Retained access floors, recycled steel, recycled paint, reduced floor finishes



Inspiring Trusted Leadership

