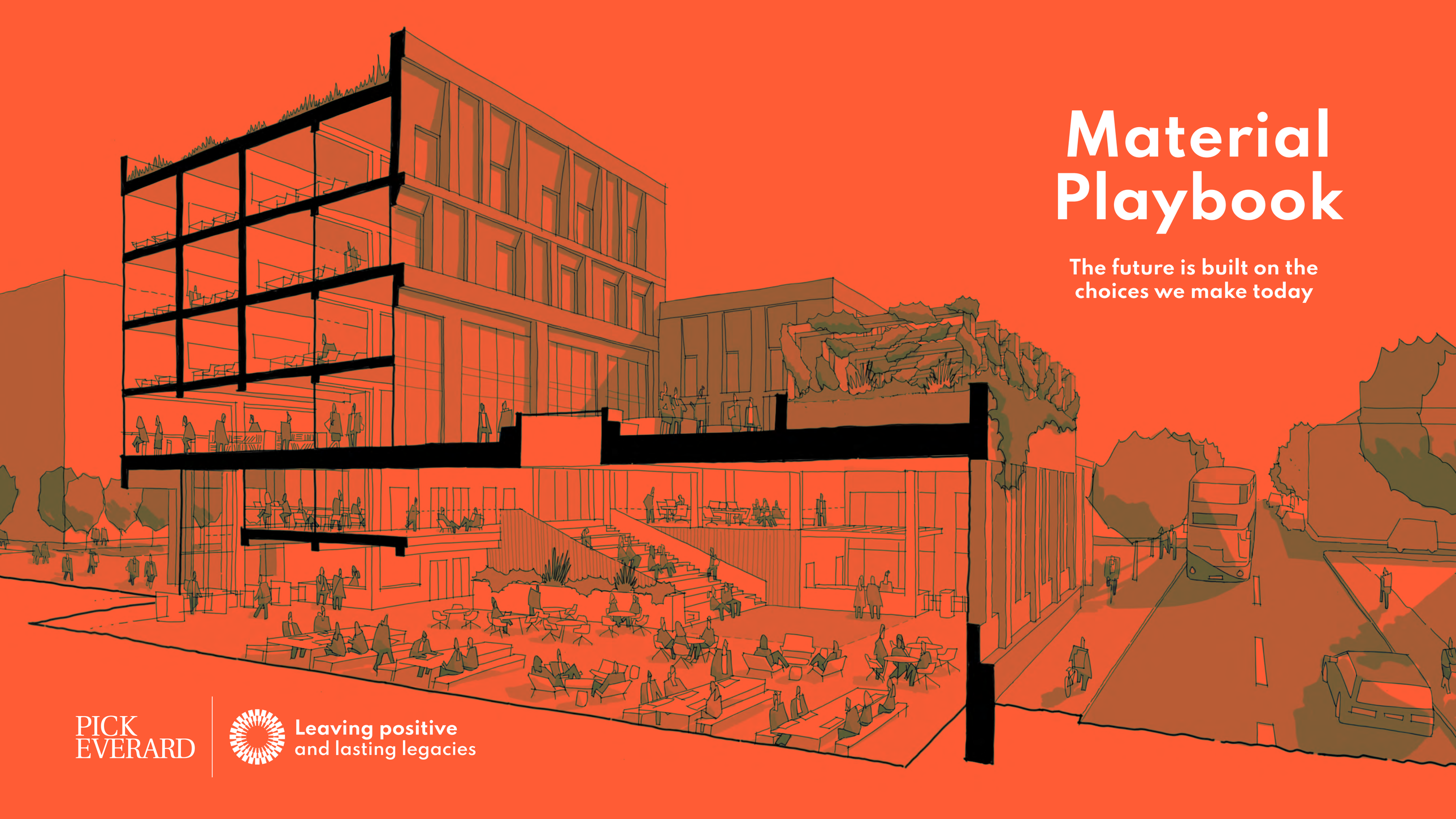


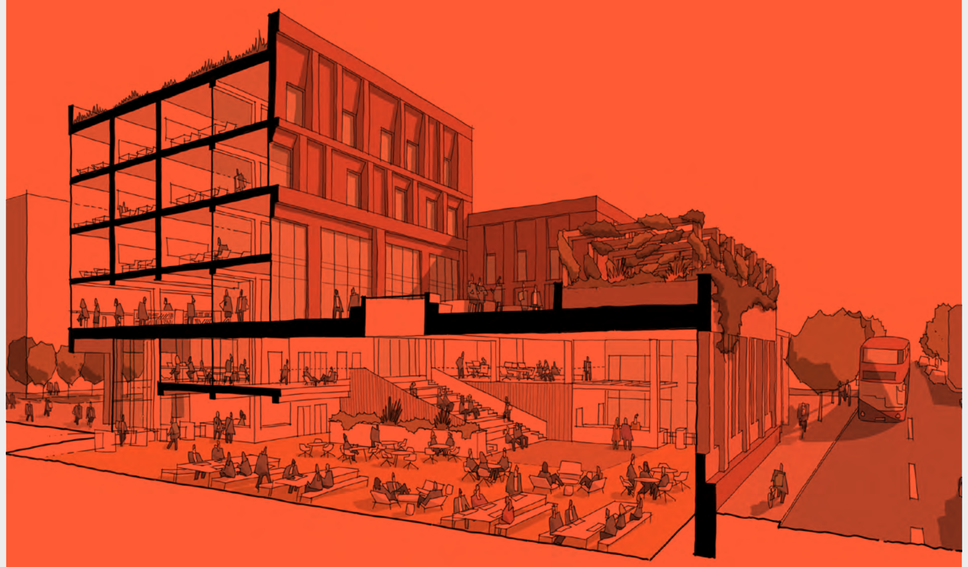
Material Playbook

The future is built on the choices we make today

PICK EVERARD

Leaving positive and lasting legacies

This playbook is a **practical guide** that will align our project teams through the **shared principles** of improved design efficiency and material choices that drive **long term value.**



Material Playbook

The future is built on the choices we make today.

Introduction

The built environment has a critical role to play in addressing the climate emergency. It directly contributes to 40% of the UK's carbon emissions, with the materials used to construct, maintain and refurbish our buildings accounting for a significant proportion of their environmental impact.

This position needs to be resolved if we are to achieve a truly sustainable future. For too long, material selection has been driven by established specifications, familiar products and short-term commercial considerations. However, the market is changing rapidly. Lower-carbon, reused, recycled and responsibly sourced alternatives are becoming increasingly available, creating new opportunities to reduce embodied carbon, minimise waste and make better use of finite resources.

Making the right choices requires project teams to consider materials earlier, challenge conventional approaches and assess whole-life value rather than focusing solely on upfront cost. It also requires greater collaboration between clients, designers, contractors, suppliers and manufacturers.

Our Material Playbook has been created to provide a **standardised and systemic approach to sustainable material management** on our projects to help de-risk this new approach as well as focus on realising cost savings for projects. It brings together practical guidance, market insight and project experience to help teams make more informed material and commercial decisions. By considering cost, carbon, performance, availability and circularity together, we can reduce environmental impact, create more resilient places and leave a positive and lasting legacy for future generations.

Our current linear and short-term approach to building design, construction and operation means that the **carbon footprint of the global construction sector is projected to double by 2050.**

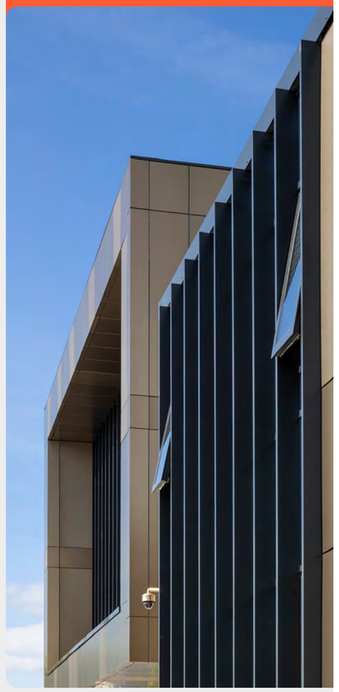
Globally, only 6.9% of materials benefit from some level of circular intervention to reduce their impact and maintain lifetime value.

By systematically changing how we select and use materials in our projects **we can help clients meet their objectives for whole life value, cost reduction and resilient design.**

The IPCC now forecasts a >50% chance of temperatures exceeding the Paris Agreement 1.5C limit.

This means that the way we select and use materials now will become increasingly important to the success of our projects in the *future*.

Remember
Its about 'planting trees we won't sit under.'



How must we respond?

Low carbon design is good design: it reduces lifetime cost, minimises waste, uses materials efficiently, and plans for the future. It is these core principles that define our role as designers, consultants and scientists, ensuring we maximise value for our clients and the communities in which we work.

This playbook outlines practical and proven design and material choices that reduce lifetime energy and carbon, whilst demonstrably delivering clients' budgetary and programme requirements.

The process for material management

To fully assess and reduce the impact of our decision on materials we should consider three timelines. The past: existing buildings and assets on site that hold value, the current- what options for materials do we have for new development, and the future, what design decision can we take today to promote the future value of materials and prevent waste.

Audit existing materials and assets to determine their most valuable next use.

Identify materials and assets that can be retained, refurbished or reused within the new development.

Reused **Biogenic** **Circular**

Take a building layer approach to considering design interventions to promote future value.

1 Valuing the present

Audit existing materials and assets to determine their most valuable next use.

How: Undertake a pre reconstruction audit to capture existing assets on site and identify key material pathways.

Collaborate as a design team to identify and validate opportunities for incorporation of existing assets into new design.

2 Choosing materials wisely

Prioritise new materials sourcing from reused, initially, then biogenic and then from circular manufacturers.

How: Enable a design team to review and evaluate material options against wider sustainability and lower impact criteria.

Provide contractor specific documentation and guidance to support material use.

3 Avoiding future waste

Maximise future asset value by embedding key design measures such as adaptability, longevity and deconstructability for individual building layers.

How: Run specific circular economy Stretch & Challenge sessions with the design team to identify, define, validate, and quantify design choices to minimise future waste.

Reduce and reuse

The guiding principle of sustainability is meeting the needs of the now without jeopardising the needs of the future.

The first, simple question, which should guide our thought processes is: **Do we need that material?**

Avoiding or reducing material consumption must be our starting point. This question is perhaps the most critical aspect of carbon reduction, and functions by reduced material consumption, that is all it is. The ONE critical aspect of carbon reduction processes and frameworks, functions by ensuring that we are designing efficiently and challenging, where necessary, elements of the design that are overengineered or unnecessary.

Applying this in practice requires us to view any existing buildings or assets on site as a source of materials for new developments. For example: increasingly, this is being mandated by planning, as well as through Retrofit First policies, in London.

The second most important question we need to ask ourselves is: **What opportunities are there, to reuse materials?**

Where additional materials are required, projects should be considering the viability of bringing in reused materials to meet these needs. Not only can this save carbon (between 80-90% typical savings from reused product compared to new) but it can also reduce costs by up to 60%.

Industry is now witnessing the emergence of markets for the identification, brokering and logistics required for material reuse. This includes physical resource exchange hubs as well as online platforms. It's never been easier to consider reuse on projects.

The carbon reductions that can be achieved by avoiding and reusing resources show that that the majority of a material's carbon is associated with its manufacture. Where we can avoid the need to manufacture new materials and products, the most significant carbon savings will be achieved.

Remember
Carbon reduction is achieved best by avoiding consumption in the first place, and then reusing materials from from a marketplace or reseller.

Remember
It no longer costs the Earth to save the Earth.

Our approach

Review the proposed cost plan and materials specifications to identify opportunities to substitute key building layers and components, with reused materials.

Review established material marketplaces to identify suitable reused items of sufficient quantity, quality, and avaiblility.

Determine cost and carbon savings.
Carbon savings have been extrapolated from average impacts from EPDs for the substituted materials.

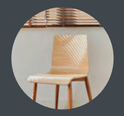
Note: reusing resources removes the carbon impacts from a material's original extraction, transport and manufacture (Lifecycle Modules A1-A3). Typically, reuse results in greater than 80% lifetime carbon savings. 90% savings are possible if materials are reused on-site (and thus avoiding emissions associated with transportation).

Potential carbon and cost savings from a retrospective assessment of a selection of public sector projects

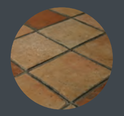
The low hanging fruit: easy to substitute materials

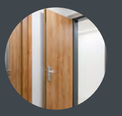
The following items are typically identified as being easy to substitute due in part to the low risk, relative standardisation, availability and cost. These items are readily available on the Circular Economy marketplaces available to us as designers and have a likelihood of being consistently available through the Lifecyle of a building.


Sanitaryware


Furniture


Ceiling tiles


Flooring

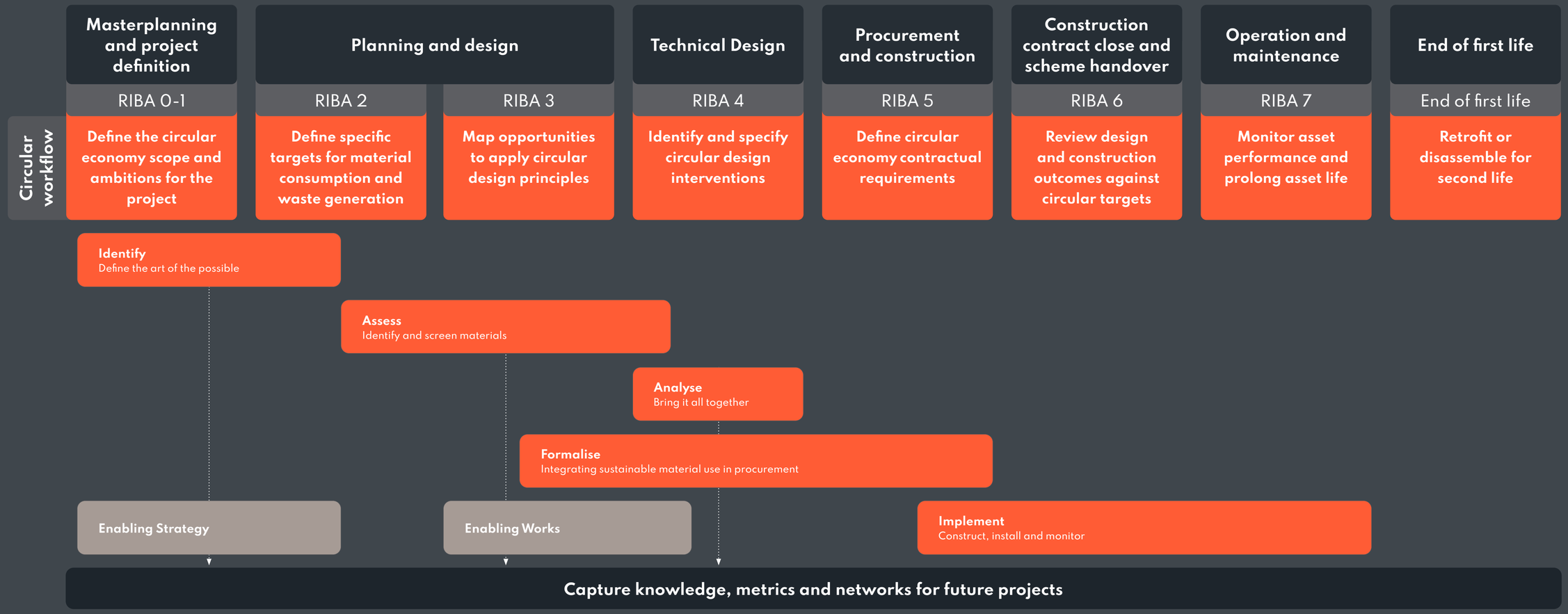

Doors


Glazing

PICK EVERARD

A framework for material mapping

Applying the principles of the circular economy to our work is essential in delivering low carbon, low impact outcomes.



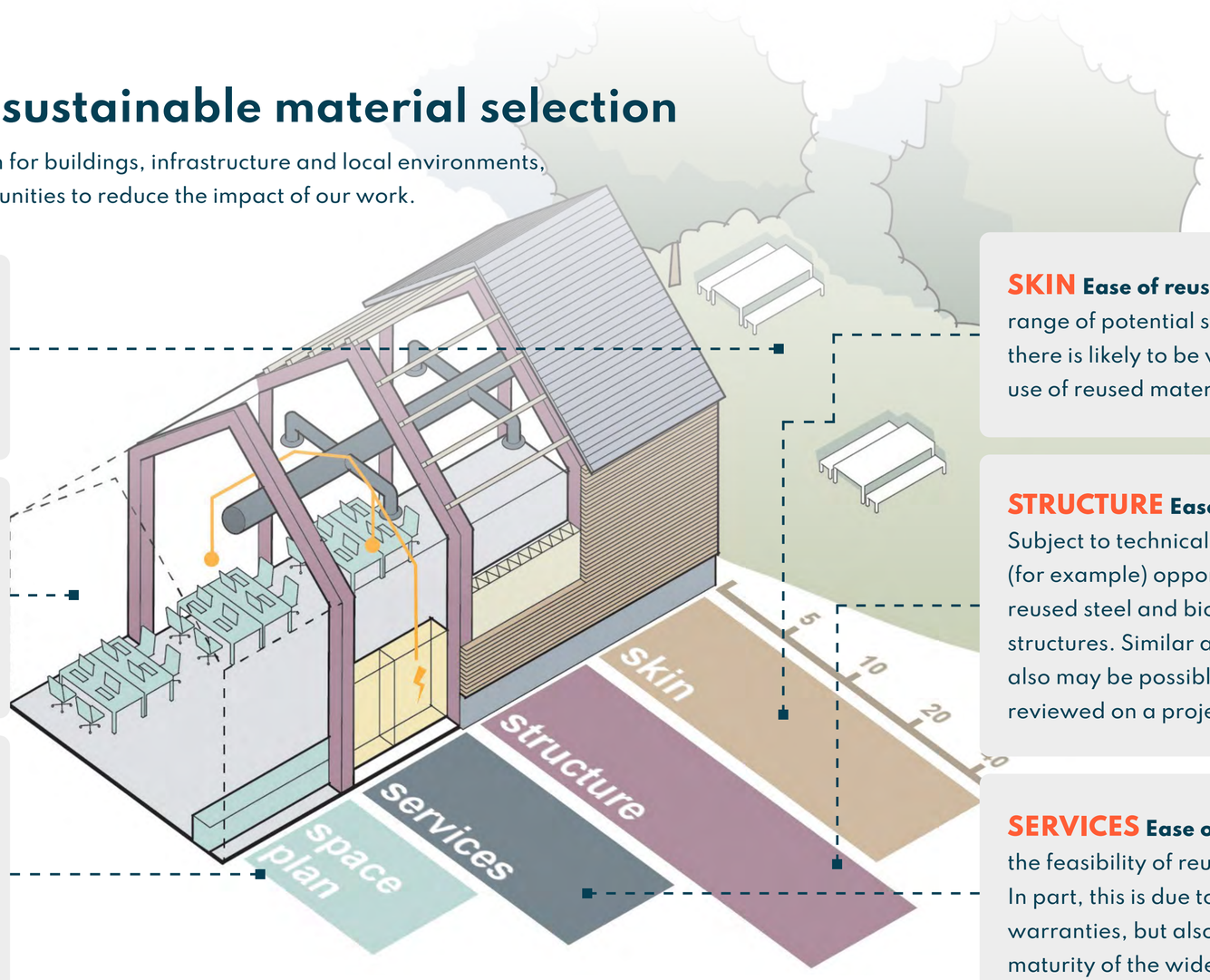
A layered approach to sustainable material selection

Thinking in layers is a well-established mechanism for buildings, infrastructure and local environments, that ensures we systematically consider all opportunities to reduce the impact of our work.

SITE Ease of reuse: Medium: The ability to reuse site materials (e.g. excavations/ foundations) will depend upon suitable on-site opportunities to reuse (e.g. as made ground or landscaping).

STUFF Ease of reuse: High: Due to the high volume of good quality and standardised FFE items on reuse marketplaces there are significant opportunities to source reused/ refurbished products.

SPACE Ease of reuse: Medium: Ability to reuse items to inform space planning will be dependent upon requirements for look and feel. Here, key design opportunities to reduce material consumption should be based on adaptable space planning.



SKIN Ease of reuse: Medium: Due to the range of potential skin systems and materials there is likely to be variability in how feasible use of reused materials are for this layer.

STRUCTURE Ease of reuse: Medium: Subject to technical requirements, there are (for example) opportunities to incorporate reused steel and biogenic materials within structures. Similar approaches for masonry also may be possible. This should be reviewed on a project basis.

SERVICES Ease of reuse: Low: Currently, the feasibility of reusing services is low. In part, this is due to requirements for warranties, but also the (currently) limited maturity of the wider marketplace.

Material Management

Responsible material management

This section details the key principles, actions, and outputs to be considered to enable responsible material management in our projects to minimise waste, demand for new materials and reduce carbon emissions.

Remember **80%** of carbon is locked in at RIBA Stage 2.

Three key considerations to minimise waste, material demand and carbon emissions:

Success for sustainable material management on a project depends on three key factors:

1. **Early engagement:** 80% of carbon is locked in by RIBA 2. The earlier design teams can be stretched and challenged in design the greater the opportunity to minimise impacts of materials.
2. **Use data to provide transparency on value:** whether that's the value of existing buildings and materials or the whole life value from sustainable design.
3. **Align with project success criteria:** sustainable design approaches and materials need to be aligned with a project's budgetary, programme and risk success factors.

What	Valuing the present	Choosing materials wisely	Avoiding future waste
Why	Typically, only 5% of the original value of building materials is recovered. Maximise the value of existing assets through identifying opportunities to retain, refurbish, reuse and recycle.	Consideration of wider criteria for material selection to include waste minimisation, future value and environmental impacts can lead to future proofed and low impact designs whilst respecting original project ambitions.	Maximise future asset value by embedding key design measures that: • Promote longevity • Enable adaptation • Support maintenance and repair • Allow ease of deconstruction and reuse
How	Undertake a pre reconstruction audit to capture existing assets on site and identify key material pathways. Collaborate as a design team to identify and validate opportunities for incorporation of existing assets into new design.	Apply a framework to assess material choices against wider sustainability and lower impact criteria. Create a project-specific material library that enables the design team to review and evaluate material options. Provide contractor-specific documentation and guidance to support material reuse.	Run specific circular economy Stretch & Challenge sessions with the design team to identify, define, validate, and quantify design choices to minimise future waste.

Identify: Define the art of the possible

Every project will have its own unqiue drivers, opportunities and boundaries for implementing sustainable materials. Early identification of the 'art of the possible' with a design team, is essential to achieve our goals. Different building layers will have their own technical requirements that will influence the extent to which reused materials can be incorporated.

Key tasks

- Review planning requirements
- Set ambition early
- Review client targets
- Understand clients' intentions and restrictions
- Assess a project's potential
- Set targets and objectives for materials and waste

Layer	Ease of reuse
Skin	M
Structure	M
Services	L
Space Plan	H
Stuff	H
Site	M

Key questions

- Has a pre deconstruction audit been undertaken?
- Are there any end use requirements that may influence material use on site?
- Are there any planning or client drivers to reduce embodied carbon/waste and or specify more sustainable materials?

Identify value of existing buildings, materials and assets

Without an understanding of the condition, value and feasible material pathways for existing materials and assets on site, projects risk losing an opportunity to reduce costs and material impacts.

Identify key project sustainability opportunities

Any sustainable material use should compliment or enhance key project criteria such as new use requirements, budget, programme and risk. Identify targets and criteria to ensure sustainable design aligns with these.

Identify planning and strategic drivers

Identify factors external to the project that may drive the need for sustainable design including planning, waste legislation and and clients' corporate sustainability commitments to net zero.

Identify opportunities to realise value for the client

Consider how sustainable design and material use aligns with wider client ambitions. For instance, reduced whole life cost, or to enable reuse of materials across a multi asset estate.

Assess: Identify and screen materials

Materials on site

A key enabler to minimising waste and material consumption is to map the condition of existing assets and materials on site.

From this an assessment can be made on the optimal onward pathway for materials following the reuse hierarchy.

Key tasks

- Determine pathways for existing asset(s).
- Audit and create inventories for existing materials and components.
- Identify and agree next life pathways for existing materials.

Key questions

- What value is already on site?
- Is reuse viable?
- What are the project enablers required to unlock this value?

Audit Materials

Undertake a pre reconstruction audit to enable assessment of pathways. Log materials:

- Description
- Category
- Location
- Condition
- Accessibility
- Demountability / deconstructability
- Make up / componentry
- Quantity
- Opening up / intrusive works findings
- Next steps

Determine pathways

For all materials identify pathways based on material/asset type

Retain

Reuse on or off site

Design opportunites

Consider the degree of intervention required to enable pathways

Use material as it is → Modify/ refurbish material → Process material (e.g. downcycling)

Assess: Identify and screen materials

Additional materials

At this stage consider how best to identify potential materials that are low impact and future proofed by using the following hierarchy:

1. Reuse off site
2. Source from biogenic materials
3. Source other low carbon and low impact materials

Reuse Hierarchy ↓

Reduce
Reuse
Closed loop recycling

Linear recycling
Disposal

Key tasks

- Determine pathway for existing asset(s).
- Audit and inventories existing materials and components.
- Identify and agree next life pathways for existing materials.

Key questions

- What value is already on site?
- Is reuse viable?
- What are the project enablers required to unlock this value?

Assessing additional sustainable materials

Collaborate with your design team to agree the need for new materials and assets, to meet a project's requirements and ambitions.

Undertake desk based research to identify sources/ suppliers of materials. This could include reuse marketplaces e.g steel, or sustainable materials repositories. Research individual manufactures to collate data (e.g EPDs , Sustainability strategies).

Collate materials into a project specific materials library including key data to support further analysis such as sustainable certifications, end of life processes, carbon data and design metrics.

Analyse: Bring it all together

The identify and assess stages highlight highlight the potential to use sustainable materials. In the analyse stage, the list of potential materials is then refined to select feasible options that deliver sustainability outcomes and align with key project success criteria.

Key tasks

- Engage with your design team/client to conduct a materials screening and viability exercise
- List out screened (viable) sustainable material choices, validate the associated lifetime carbon and cost benefits, and integrate them within our specifications
- Develop storage and logistics strategy

Key questions

- What are the risks associated with using reused or alternative materials?
- What are the lifetime cost benefits?
- What enabling work or design changes are required to enable sustainable material use?
- Have the legal and logistical requirements for the reuse of materials been established and agreed?
- How would sustainable material reuse benefit or otherwise impact a delivery programme?

Screening process

Is it technically feasible to achieve sustainable material use within the project?

Does the proposed use of sustainable materials align with a project's fundamental demands (programme, cost and risk)?

Integrate viable sustainable materials into a project specification list.

Formalise: Integrating sustainable material use in procurement

Fundamental to the success of reuse, and the incorporation of sustainable materials into a project, is embedding relevant requirements into construction tenders and contractual documentation.

Key tasks

- Identify owners and responsibilities
- Develop programme
- Prepare contractual requirements/confirm risk ownership
- Develop storage and logistics strategy
- Prepare tender questions, scoring and 'model answers' to test the contracting value chain, and to help select the 'best athlete' for sustainable material use

Key questions

- Who will be responsible?
- Who will own the risk of using alternative materials?
- What needs to be included in key project documentation?

Once a value chain has been established enabling sustainable consutrction

Documents

Include sustainability clauses as required within key documentation such as employers' requirements, contracts and material specifications.

Roles and responsibilites

Identify who will be responsible for key tasks such as deconstruction, refurbishment storage, logistics, installation and construction.

Strategies

Support sustainable construction through targeted strategies as required. These could include, end of life deconstruction and logistics strategies.

Timelines and programme

Ensure sufficient time is built within a programme to allow for deconstruction and reconstruction activities.

Implement: construct, install and monitor

This stage focuses on ensuring that design intent for sustainable material management is realised during construction and operation.

Key tasks

- Ensure we capture data on the installation and operational performance of reused and sustainable materials
- Capture key learnings for future projects

Key questions

- What monitoring data is required, at what frequency, and using which reporting mechanisms?

Enabling sustainable construction

Data capture

Ensure data capture, collation and exchange at key milestones during construction and implementation e.g. carbon savings achieved, materials reused, waste avoided.

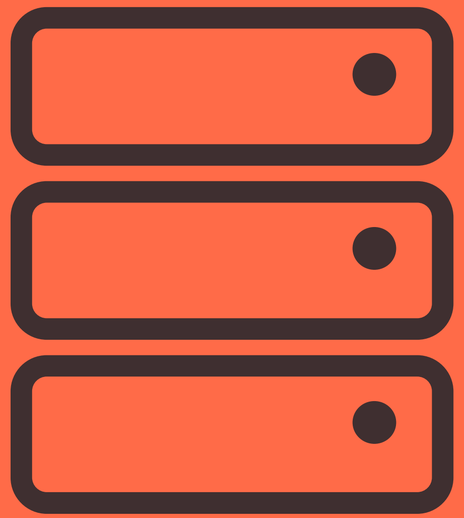
Assess post occupancy performance

Undertake a formal post-occupancy evaluation of the performance of low impact materials used. Ensure they are installed and performing correctly?

Celebrate and share learnings

Capture key learnings for future projects (particularly relevant for multi asset owner/operators).

Material Catalogue



Pick Everard Material Catalogue

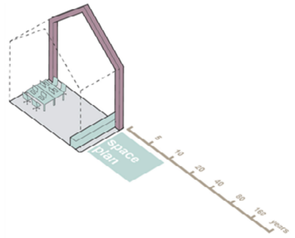
Our in house Material Catalogue provides a centralised and accessible inventory of sustainable materials.

This can be used to support the Identify and Assess stages of a project to highlight relevant alternative sustainable materials that align with specific project's needs.

Our Materials Catalogue is pre-populated with a host of performance information. Using this data, we then host optioneering workshops with our design teams to establish which products are likely to be most viable for a specific project's needs.

The Materials Catalogue then allows us to easily screen which low impact materials could be sourced for the project alongside the key cost and carbon impacts associated with this.

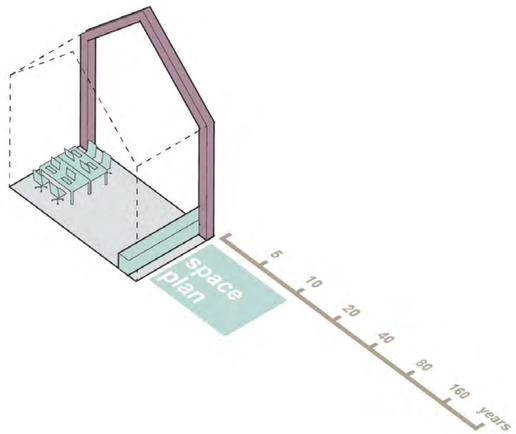
Sustainable material library



						Sustainability Credentials									Calculations		Design Metrics				
						Certification		End-of-Life processes				Sustainable data			Data comparisons		User safety	Client requirements			
Reference	Manufacturer	Location	Product Name	Product Type	Building Element	EPD	Responsibly Sourced Certificate	Direct reuse scheme	Take/buy back scheme	Closed recycle scheme	Refurbishment scheme	Recycled Content (%)	Carbon Sequestration	Lifespan (years)	Reference Size	Carbon (kgCO2e)	VOCs	Durability (5 = high durability)	Acoustic (5 = high noise reduction)	Slip resistance	Look and feel
I.1	Tarkett	Europe	DESSO Tactile Craft	Carpet	3.2 - Floor finishes	☑	☐	☐	☑	☑	☐	Medium	None	10	1m²	19					
I.2	Havwoods	Austria	Multi-layered engineered wood flooring	Oak Flooring	2.2 - Upper floors	☑	☐	☑	☐	☐	☐	None	High	50	1m²	10					
I.3	Caesar Stone	Isreal	Quartz range	Kitchen Top	4.2 - Kitchen Equipment	☑	☐	☐	☐	☐	☐	Low	None	75	1kg	1.6					
I.4	Aggio Baghin	Italy	Terrazzo Ecostone	Terrazzo Tile	3.2 - Floor finishes	☑	☐	☐	☐	☐	☐	High	None	60	1kg	0.32					
I.5	Gigacer	Italy	Touchstone & Inclusion Soave	Ceramic Tile	3.1 - Wall finishes	☑	☐	☐	☐	☐	☐	Medium	None	10	1kg	0.62					
I.6	Wow Ceramica	Spain	Bits	Ceramic Tile	3.1 - Wall finishes	☑	☐	☐	☐	☐	☐	Medium	None	10	1kg	0.66					
I.7	Junckers	Denmark	Hardwood parquet flooring	Oak Flooring	3.2 - Floor finishes	☑	☑	☑	☑	☐	☐	None	High	60	1m²	3.1					
I.8	Radii Planet Group	United Kingdom	Aluminium framed partition	Glass door	2.7 - Internal walls	☑	☐	☐	☐	☐	☐	Medium	None	20	1m²	150					
I.9	Sustonable	Turkey	Stone Countertop	Stone Countertop	4.2 - Kitchen Equipment	☑	☐	☑	☑	☑	☐	High	None	10	1m²	9.4					
I.10	Johnson Tiles	United Kingdom	Ceramic Wall Tiles	Wall tiles	3.1 - Wall finishes	☑	☐	☑	☑	☑	☐	High	None	10	1m²	9.4					

RIBA Stage Checklist

Internal



Key design principles

- Durability
- Adaptability
- Recyclability
- Low-toxicity
- Repairability
- Modularity

What elements does this cover?

Elements internal to the building walls that aren't MEP services:

- Sanitaryware
- FF&E
- Flooring and ceiling

Key takeaways

- Long life span materials
- Efficient material use
- Reuse materials where possible
- Refurbished elements in place of new
- Only use new when mandatory

RIBA 1

- [ ] Determine if the client already has an existing furniture stock available from other buildings and/or sites.
- [ ] Ensure the client has been made aware of the cost and carbon savings associated with reused and refurbished elements.

RIBA 2

- [ ] Produce an early-stage furniture & equipment log unique to the building(s).
- [ ] Review potential layouts include Efficient and Ultra-Efficient versions.
- [ ] Engage with S&E to source discussions and manufacturer information, regardless of appointment.

RIBA 3

- [ ] Engage with client and design team to assess cope to specify low impact materials and assets.
- [ ] Consider opportunities for furniture to contain as much organic material as possible for its type.
- [ ] Ensure any Look & Feel presentations include S&E's 'Top Choice' from the Material Library.

Internal
Loose items and finishes

Service
MEP Equipment

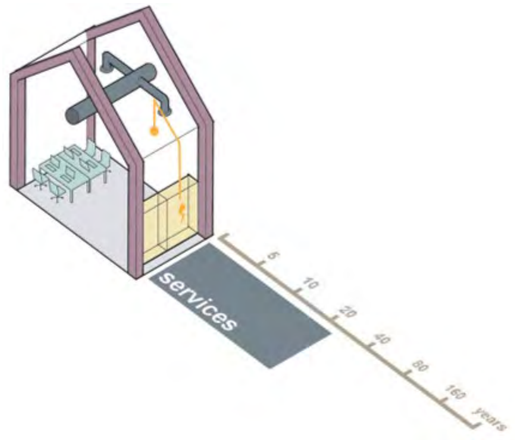
Structure
Building supports

Skin
Façade and fabric

External
Outside the building

Services

Key design principles



- Efficiency
- Maintainability
- Longevity
- Demountability
- Upgradeability
- Monitoring

What elements does this cover?

- Services
- MEP equipment

Key takeaways

- Long life span equipment
- Efficient layouts to minimise material consumption and enable future adaptability
- Reuse equipment where possible
- Refurbished and reinstall equipment where possible
- Ensure documentation supporting sustainable material use (EPDs, TM65, TM66 - for example) is prepared and shared with the delivery team

RIBA 1

- [ ] Ensure the Project Team are aware of impacts of inefficient layouts from an MEP POV.
- [ ] Investigate refurbished lighting and ducting products for the project.

RIBA 2

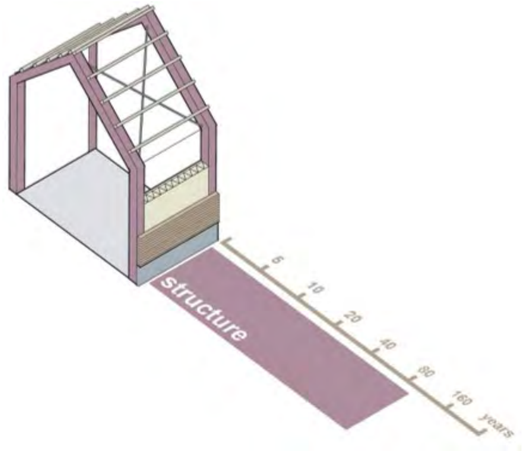
- [ ] Engage with S&E to source discussions and manufacturer information, regardless of appointment.
- [ ] Ensure pipework, connections and equipment can easily be accessed.
- [ ] Ensure equipment lifespan is as far above 20 years as possible.
- [ ] Plant room(s) are located in an efficient and suitable manner.

RIBA 3

- [ ] Determine if manufacturer take back schemes exist for the proposed system.
- [ ] Ensure sizing calculations have been conducted inline with the Efficient and Ultra-Efficient options.
- [ ] Determine if MEP equipment have EPDs, TM65s, and/or TM66s, where relevant in that order.

Structure

Key design principles



- Durability
- Adaptability
- Reuse
- Demountability
- Efficiency
- Repairability

What elements does this cover?

- Structural elements
  - Super structure
  - Sub structure
  - Foundations and piling

Key takeaways

- Long life span materials
- Efficient layouts to promote efficiency in layouts
- Ease of maintenance and replacement
- Adopt more reused materials
- Maximise recycled content where possible
- Investigate reuse marketplaces for your steel/timber requirements

RIBA 1

- [ ] Ensure the client is aware of the pros and cons of different framing and structural materials on their design/building (timber, steel, concrete, hybrid).
- [ ] Undertake discussions with the wider team to ensure typical building layouts require minimal excess materials.

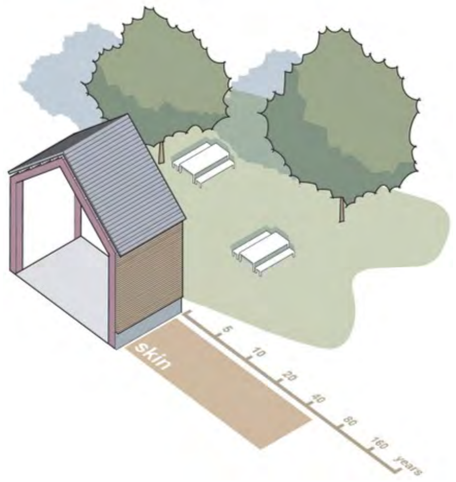
RIBA 2

- [ ] Assess the loading allowance for areas of potential over engineering and over specification.
- [ ] Coordinate with the design team to ensure efficient layouts across the building footprint.
- [ ] Investigate viability of direct material reuse has been investigated with reuse suppliers.
- [ ] Investigate structural design and allowance of adoption of reused steel types – e.g. circular hollow sections.

RIBA 3

- [ ] Review potential to use products with high recycled content.
- [ ] Identify opportunites to use non permanent connection methods.
- [ ] Provide necessary steel quantities/types to a reused marketplace such as Cleveland steel.

Skin



Key design principles

- Demountability
- Longevity
- Recoverability
- Reuse
- Maintainability
- Efficiency

What elements does this cover?

- Façade
- Roof
- External walls

Key takeaways

- Long life span materials
- Ease of maintenance and replacement
- Sustainable material choices
- Improve u-values

RIBA 1

- [ ] Ensure that orientation studies for wind and solar have been provided to the S&E Team for alignment with Climate Risk Mitigation Strategies.
- [ ] Ensure that façade design options are aligned with S&E Thermal Modelling Team's recommendations to improve energy efficiency.

RIBA 2

- [ ] Ensure that façade options have been discussed with the Thermal Modelling team for appropriate U-values.
- [ ] Consider design options to enable easy repair/replacement of facade components in future.
- [ ] Consider options to extend facade life.
- [ ] Coordinate with the design team to ensure efficient layouts across the building footprint.

RIBA 3

- [ ] Discussions occur to maximise efficiency once occupancy elements have been completed.
- [ ] Identity carbon hotspots in the structure and determine design interventions to minimize these.

Internal Loose items and finishes | **Service** MEP Equipment | **Structure** Building supports | **Skin** Façade and fabric | **External** Outside the building

External

Key design principles

- Reusability
- Durability
- Organic
- Efficient
- Adaptability
- Modular

What elements does this cover?

- Everything out of the building

Key takeaways

- Long life span materials
- Ease of maintenance and replacement
- Sustainable material choices
- Increase access to physical shading

RIBA 1

- [ ] Maximise opportunities for shading, especially around hard surfacing.

RIBA 2

- [ ] Ensure that landscape options have been assessed against their carbon impacts and impact upon climate risks such as overheating.

RIBA 3

- [ ] Consider use of organic binders are used for any surfacing areas requiring stability.
- [ ] Identify potential maintenance processes of the landscape are as efficient as possible.
- [ ] Consider opportunities to maximise organic component of design where feasible products are reused from various reuse sources.

Keen to know more?

Have a project where you think we could help?

Get in touch.

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