Circular Economy – Best Practice in Construction

Terri Vogt

Circular North-east Project Manager

GRAMPIAN HOUSING ASSOCIATION LTD

TLC HOUSING MAINTENANCE PROVIDING YOUR HOME WITH TLC

JTC FURNITURE GROUP

CIRCULAR NORTH-EAST

ZERO WASTE SCOTLAND

European Union gov.scot

EUROPE & SCOTLAND
European Regional Development Fund
Investing in a Smart, Sustainable and Inclusive Future

Aberdeen & Grampian Chamber of Commerce

Introduction

Circular North-east

- Raise awareness
- Support businesses develop ideas
- Look at sector opportunities
- Support companies access funding and support available

Focus on Construction, launch event January 2020

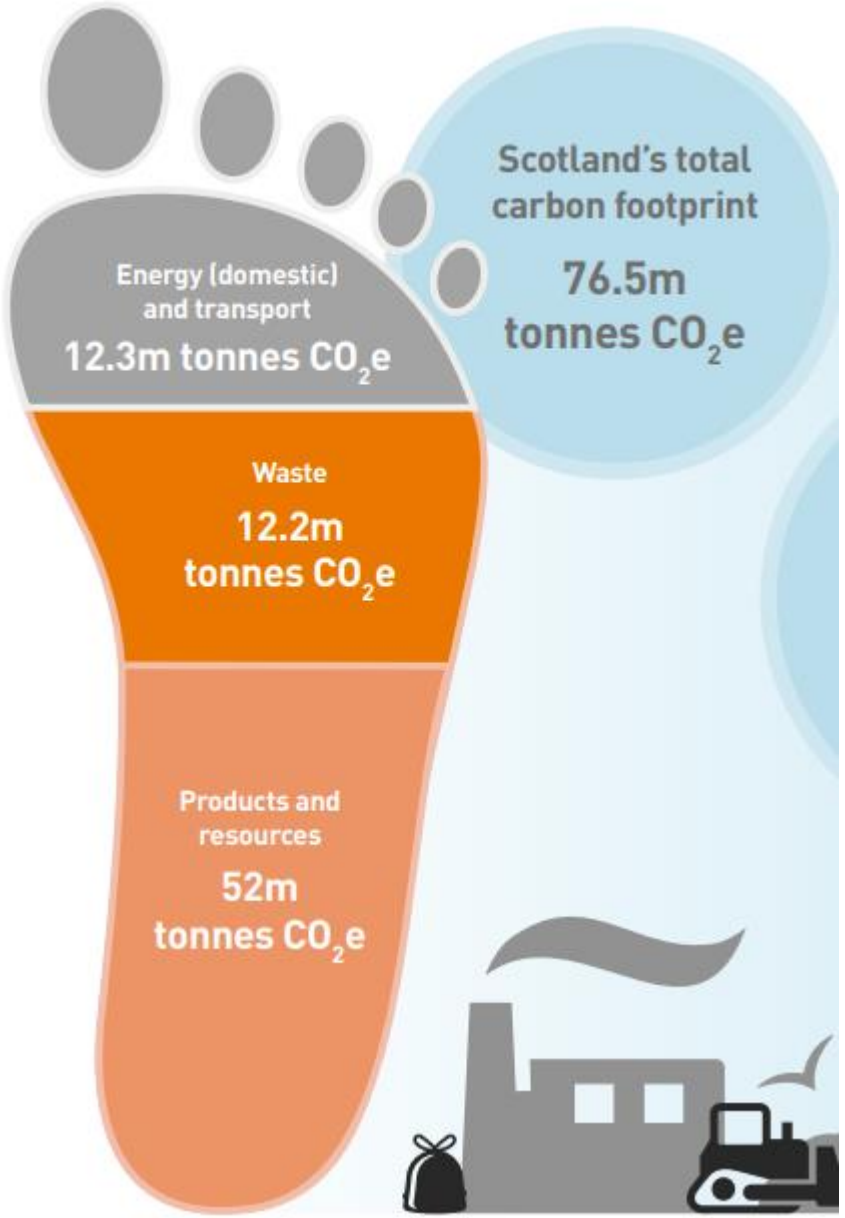
LINEAR ECONOMY

CIRCULAR NORTH-EAST

CIRCULAR ECONOMY

Four-fifths of Scotland's carbon footprint comes from products and materials

Zero Waste Scotland Corporate Plan 2019-2023



Circular Economy and Construction

Generates an estimated **50,000 tonnes** of plastic packaging waste every year –

3 X more packaging waste than all UK households combined.

Circular Economy Construction Principles

1. **Adapt, refurbish and reuse**
2. Design for **longevity, flexibility, adaptability**
3. Design for **easy assembly, disassembly & recoverability**
4. Design **out waste** and design for **resource efficiency**
5. Use **recycled content** and recycle any waste

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Adapt/Refurbish/Reuse

Look at what you already have.

Are there existing materials/buildings that can be integrated into the new development?

- Pre-demolition audits and planning with designers/clients
- Deconstruction methods to retain value
- Handling and storage of materials to retain value
- Adoption of repair/reuse approach across supply chains

Design for longevity/flexibility/adaptability

- Can the building be readily adapted if it were to be used for a variety of uses in its life time?
- Has the building been designed to minimise waste during maintenance, upgrade or replacement (are appropriate building layers easily accessed)
- Have the durability of layers been considered to maximise lifespan and minimise maintenance.
- What records and communication is necessary to ensure the impacts of future management are minimised (Building Information Management (BIM), materials passports).

Cairngorm national Park HQ-movable timber clad screens

Buildings as Material Banks

Design for assembly/disassembly and recoverability

- Can the elements be re-used / recovered in the future?
- Can the design promote ease of reuse and recovery (think about fixtures, ease of dismantling)?
- Can non reusable materials be replaced by alternatives?
- Can you develop a materials passport

Ethical bank Triodos' new headquarters is "the world's first totally demountable office building"

Design out waste

- Off site manufacturing can minimise waste produced on site
- Can design, form and layout be simplified without compromising the design concept?
- Consider space utilisation
- Have you designed for future repairability, remanufacture and deconstruction
- Can the range of materials required be standardised to minimise over-ordering and encourage reuse of offcuts?

On site

- Can packaging waste be eliminated?
- Accurate quantity and timely ordering
- Waste management cost forecasting and forward planning

Use recycled content and recycle waste

Queens Park London Olympic Stadium
Reuse of surplus gas pipeline for the compression truss structure
104,000 tonnes of recycled crushed concrete was reused replacing virgin aggregate

The Engine Shed Stirling

- The cladding made from reclaimed school gym flooring
- Parts of the walls had a previous life as the Seaforth Bridge
- Used zinc which is long-lasting and 100% recyclable.

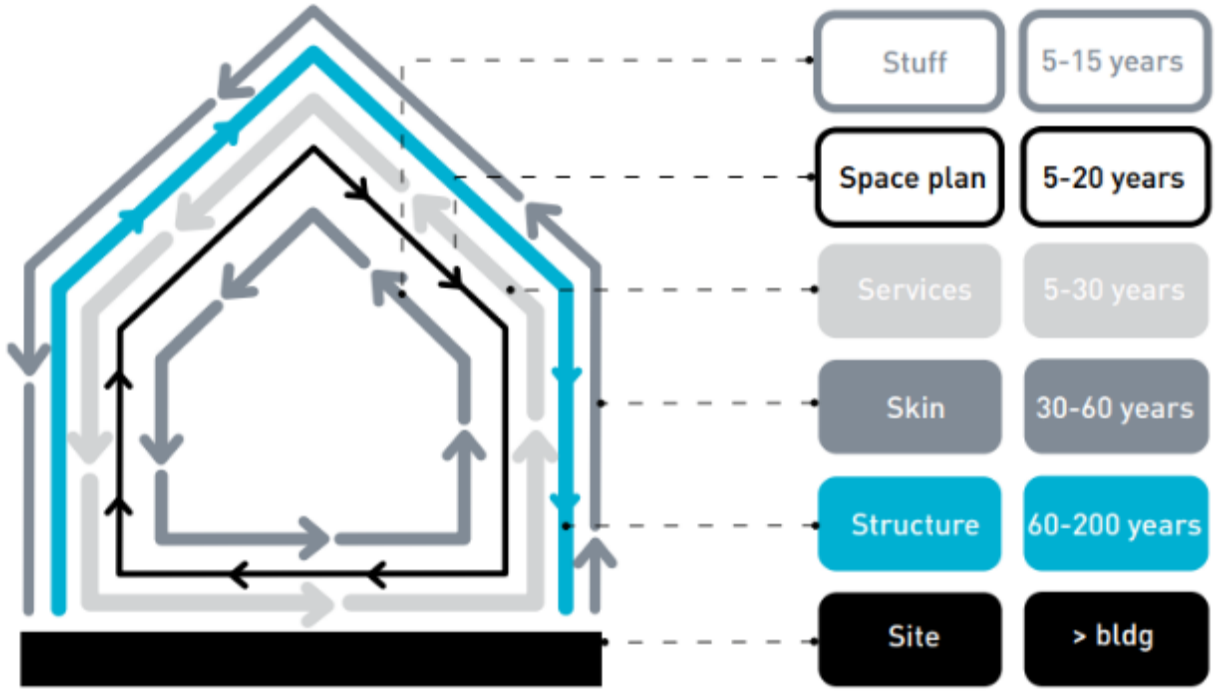
Bute recycling centre

- roof is 100% recycled aluminium
- timber cladding from a local sustainable source.
- Recycled glass screens used throughout the building

Circular construction enablers

1. Collaboration across the supply chain
2. Design in layers
3. Circular aspirations/performance target
4. Smart construction methods
5. Whole life assessments
6. Alternative business models
7. Digital technologies
8. Material management and reverse logistics

Thinking in layers



Sketch: John Gilbert Architects based on 'How Buildings Learn', Brand (Viking, London 1994)

Benefits of a circular approach

1. Lower carbon emissions (operational and embodied)
2. Cost savings (capital and lifetime)
3. Maximisation of assets and space
4. Increase business and supply chain resilience
5. Improve and develop customer relationships
6. Future proofing
7. Adaptability

Where to Start

- Engage the design team
- Set Sustainability aspirations for the project
- Engage the suppliers
- Monitor progress

Resources

https://www.agcc.co.uk/circular-north-east/circular-economy-resources

Thank you for listening

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European Union

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Working in Partnership

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HOUSING ASSOCIATION LTD

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HOUSING MAINTENANCE
PROVIDING YOUR HOME WITH TLC

JTC
FURNITURE GROUP

The Circular Economy

Improve the local economy

Improve the environment

Reduce waste

Provide a safe, secure, biodiverse, healthy, pollution free place to live in

Reduce carbon footprint

The Circular Economy

- Review of kitchen furniture options
- Reduce whole life costs by offering a more robust product
- Improvement in quality of product installed in Grampian Housing Association homes
- Work in partnership with JTC Furniture Group to develop and promote the aims of the Circular Economy
- Reduction in future maintenance visits, costs and carbon footprint using IT technology

Consult/Involve/Collaborate.

- As part of the commitment to delivering value for money and continuous improvement, Grampian Housing Association conducted a series of resident focus meetings where tenants were consulted and collaborated in the design specification of our kitchens and our Capital replacement programmes.

Specification Review.

- A workshop facilitated by Zero Waste Scotland resulted in a review of potential kitchen weak points and solutions and products were developed in conjunction with JTC resulting in some market leading changes in specification including:
- The introduction of a solid surface compact laminate worktop, upstand and sink.
- An aluminium sink liner drip tray
- Aluminium or glass cooker splashback
- Soft close hinges on doors or drawer runners as standard.
- Waterproof seals at the floor on plinths.
- Marked electrical switches for appliances are fitted and fire detection and electrical condition reports are updated.
- Water resistant vinyl laminate flooring supplied and fitted.
- Full kitchen decoration including walls, ceilings and woodwork so the kitchen is fully finished for the occupier.
- Kitchens are designed with the tenant taking account of their white goods and choices while plans are electronically stored so plans and component details are available in the future.
- Feedback from customers on the install and product is collated independently as we aim to continue improving the service provided by GHA/TLC and JTC.

Kitchens – Product Review - Worktops

- Grampian Housing were one of the first Housing Associations to introduce a solid surface worktop as standard on their reinvestment programme.

- The compact laminate worktop is a 12mm thick top which is extremely robust and offers a 100% waterproof work surface – reducing any risk of worktops ‘blowing’ in the event of any moisture ingress.

- The product can be cut/machined on site quite easily.

Compact Laminate Worktops - Specification

Sink Tops

AMETHYST IGNEOUS GRANITE INSET SINK

AME860AS/

Size: 860 x 500 mm

Featuring large bowls with a soft edged profile and modern classic lines, the Amethyst kitchen sink collection looks equally at home in a contemporary or traditional styled kitchen.

- Igneous granite
- Compact size
- Reversible drainer
- Waste kit included
- 25 year warranty

The Benefits

- Extend the life span of the kitchen – worktops are 100% waterproof, heat resistant and impact resistant
- Easy to install – full training offered by JTC Furniture Group
- Compact laminates have antibacterial properties
- Helps reduce responsive maintenance and long- term reinvestment works costs
- Modern, aesthetically pleasing product in a range of finishes with matching upstand and splashbacks available

Whole Life Costs - IT

- Details relating to all kitchens surveyed and supplied are stored on JTC's web based Extranet facility
- The Extranet is secure, free and easy to use
- The facility stores order details/history, copies of signed kitchen plans and details of ranges/colours supplied
- A simple search by address facility offers quick access to details of what has been supplied to each address
- If a property becomes void there is no requirement to survey the kitchen, previous plans are readily available
- Any item requiring replacing (such as a door front) can be easily identified by accessing the plan – meaning a repair can be carried out on the first visit reducing repair times, costs and also your carbon footprint whilst increasing customer satisfaction

Grampian Housing Association, our tenants, TLC Housing Maintenance and JTC Furniture Group collaborated on your kitchen to improve the quality of our properties, reduce ongoing maintenance and associated travel costs by fitting higher quality kitchen components, decorating and laying flooring. We also hope to reduce waste by fitting components that either last longer or have an end of life use. It is important to us that we get everyone's feedback to ensure we are making progress to improve our tenants customer experience, so your assistance in completing this survey is most appreciated. This survey is specific to the changes we have introduced in your home and will be used to inform future planned maintenance works. Thank You.

Edit Intro Screer

Section 1

+ Add New Question

Question 1 Move Options Settings Delete

1. Your kitchen was supplied by JTC Furniture can you confirm how pleased you are with the overall quality and finish of the units and worktops. !Required!

[Unit quality]

Very Poor									Exceptional
1	2	3	4	5	6	7	8	9	10

Question 2 Move Options Settings Delete

2. Grampian are one of the first Housing Associations to offer a robust solid surface worktop and sink, how pleased are you with the new worktops and sinks?

!Required!

[Composite Worktop]

Very Poor									Exceptional
1	2	3	4	5	6	7	8	9	10

Finished examples.

Finished Example.

TLC on site.

TLC protecting the site.

From mountain to sea

Aberdeenshire COUNCIL

Circular Economy in Construction

Aberdeenshire Council, Office Strategy

17 June 2021

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Aberdeenshire COUNCIL

Council Priorities

The Council launched new strategic priorities to address the impacts on communities and businesses, from COVID-19, Brexit, the economic crises and climate change.

threads of sustainable throughout all of the strategic priorities

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Council Policies

Circular Economy becoming embedded in Council decision making:

- **Aberdeenshire Council Environmental and Climate Change Policy (2016)**

  " Reduce our use of energy, water and natural resources in support of circular economy principles and zero waste."

- **Resources and Circular Economy Commitment (2019)**

  " *Promote, effect and support circular economy principles and practice internally and in our external areas of influence such as events, contractors, partners, community and government."*

- **Climate Change Declaration Our sustainable future (2020)**

  "Work with others across the region to ensure that Aberdeenshire reaches Net Zero by 2045, by promoting energy transition and a circular economy;"

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Office Space Strategy

Inverurie

New build office
- 450 FTE staff
- 225 desks (5:10)
- Service point
- Registrar

Partner Space

Stonehaven

Refurb of Viewmount
- 287 FTE staff
- 183 desks (7:10)
- Service point

Ellon

New build office
- 163 FTE staff
- 82 desks (5:10)
- Family Resource Centre
- Library
- Service point
- Registrar

Aberdeen

Refurb of Woodhill
- 800 FTE staff
- 400 desks (5:10)

Partner Space

Peterhead

Refurb & Extension to Buchan House
- 183 FTE staff
- desks (7:10)

Partner Space

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Partner Space

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Ellon Focus

Leased
29-31 Neil Ross Square
45-53a Neil Ross Square

Owned
59 Station Road
25 Station Road
Existing Library

Owned
20 Schoolhill Road

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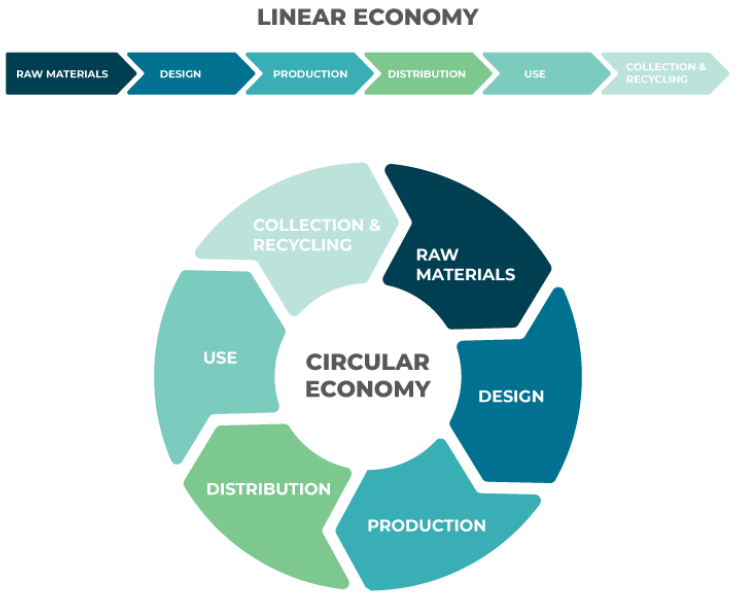
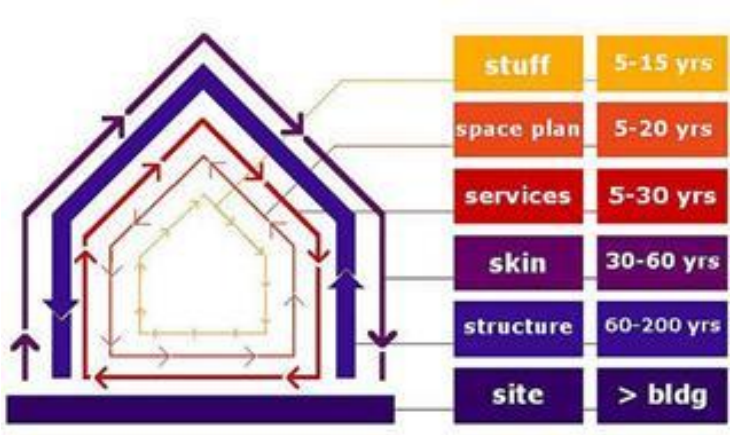
The Possibility of a Circular Approach

Workshops with Zero Waste Scotland coordinated by Circular North-East





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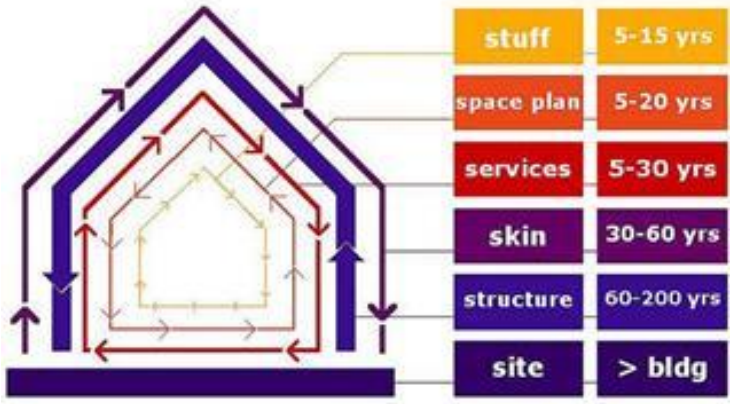
Considerations in Design

- **Designing to lifecycles**



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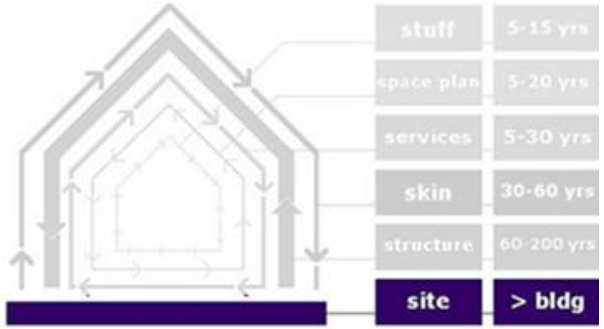
Site

- More thorough review of retention of existing structures could have been carried out (in hindsight)
- Making sure proposals work with existing site material so we ‘work with what we have’
- Can we work with what is there?



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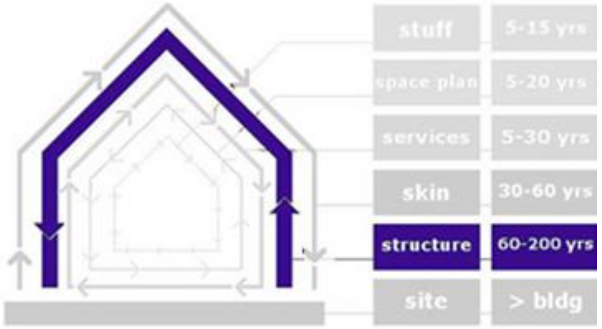
Structure (60 – 200yrs)

- Cross Laminated Timber
- Modular to increase flexibility with internal space planning
- Prefabrication of components
- Ease of adaptability
- Ease of disassembly & reuse



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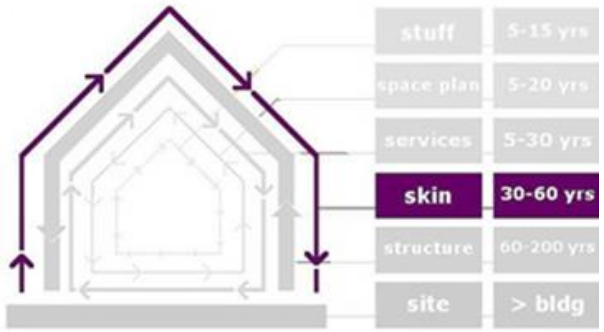
Skin (30 – 60yrs)

- Designed for longevity – ability to maintain, repair and replace
- Only applying finishes with functional benefit
- Modularisation & standardisation
- Specification with circularity in mind



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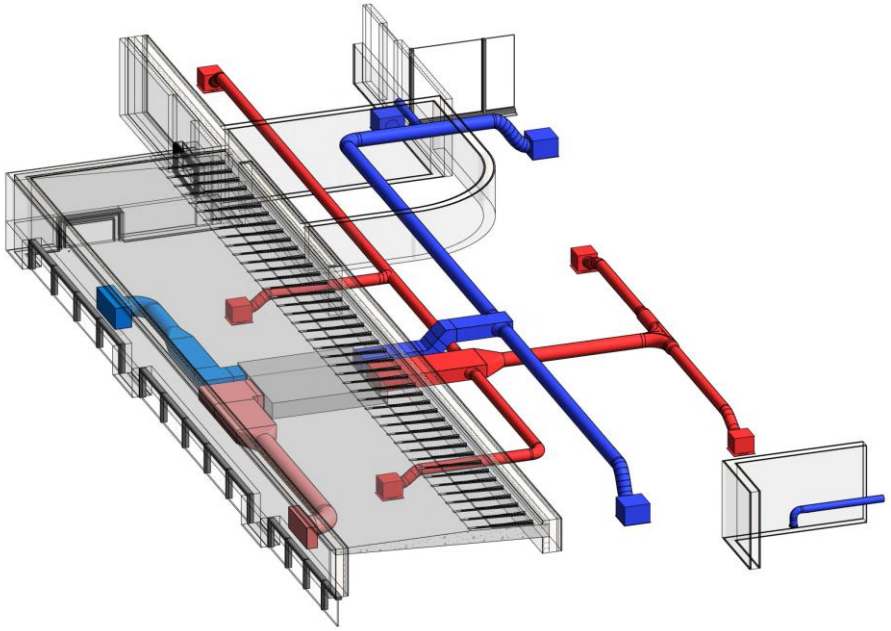
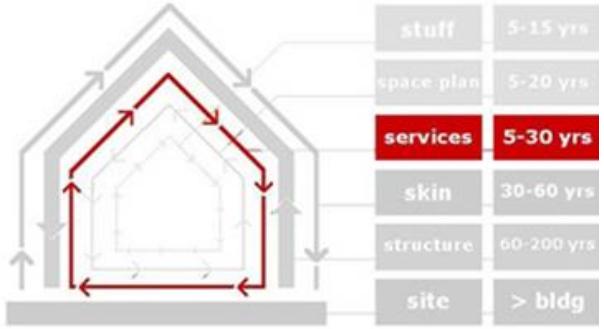
Services (5 – 30yrs)

- Designed for longevity – ability to maintain, repair and replace
- Potential for more building services on show and not covered up by linings
- Building Information Modelling (BIM) is allowing early interrogation of building coordination – designing out waste through abortive work during the construction phase





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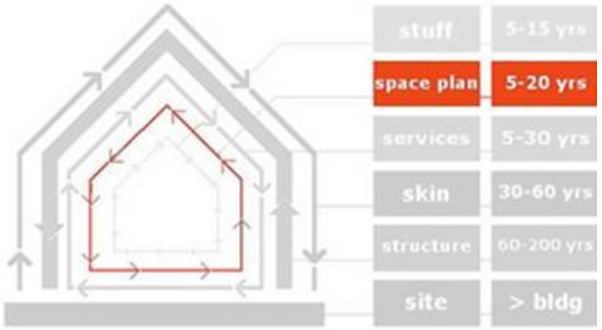
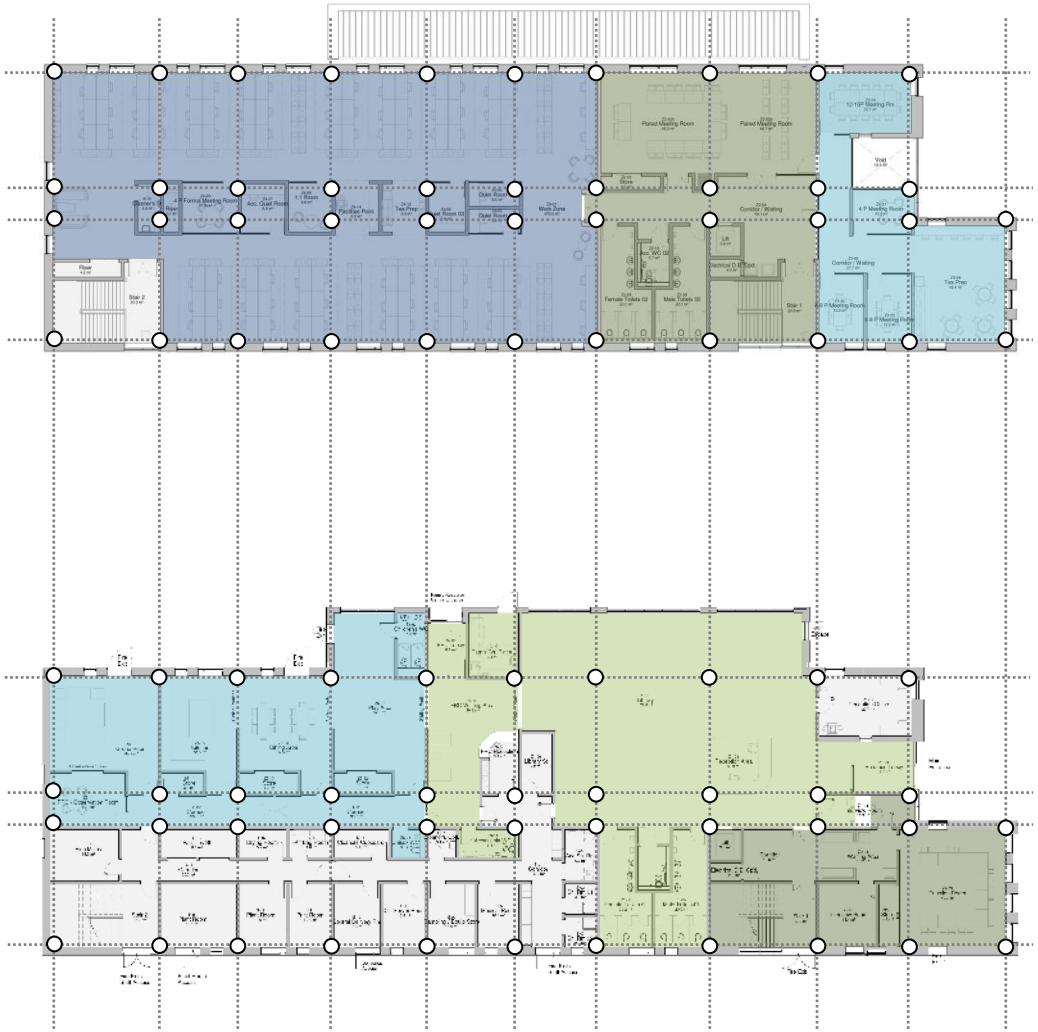
Space Plan (5 - 15yrs)

- Designing to grid
- Evolving requirements through Covid-19
- We anticipate change in the short-medium term as we come through the pandemic
- Flexibility with internal spaces can maximise the buildings use





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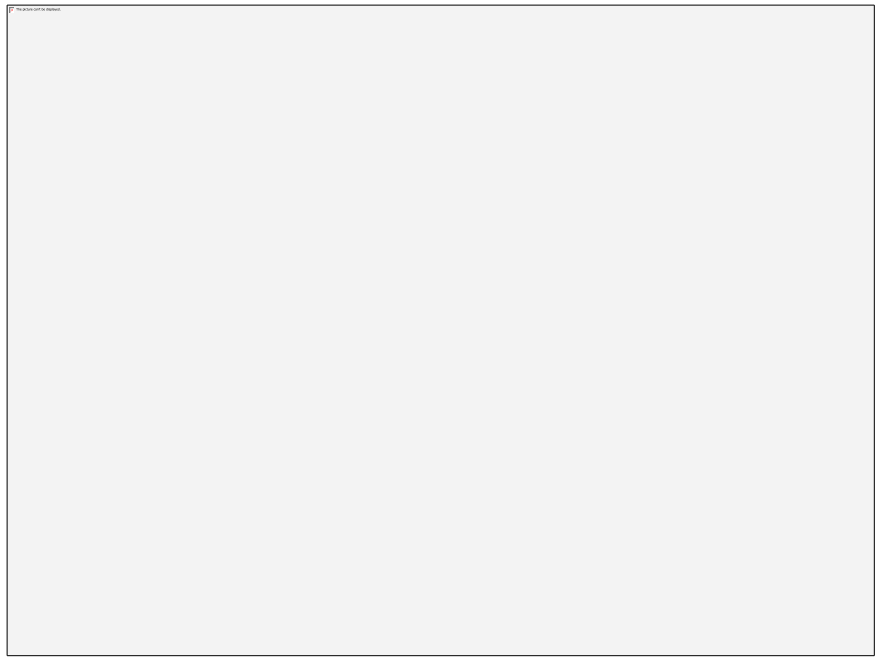
Stuff

- Assessment of what we already have
- Reuse, repair and / or repurpose where possible
- Engagement has already commenced with possible furniture re-purposing
- ‘Warp It’ for items not required
- Circular conscious specification of new items



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Considerations for Construction Phase

- Making sure contractors / suppliers have awareness of the Council's Circular ambitions
- Early dialogue with supply chains / industry particularly in relation to challenges in being able to achieve a circular specification
- Reviewing realistic measures to be introduced to the contract to reduce the impact of construction activity
- Ensuring circular specification cannot be challenged, eroded, through the commercial exercise
- Ease of demolition at the end of the building's life

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Building Performance & Carbon Impact

Embedded Carbon Lifecycle Analysis

Cradle to grave (A1-A4, B4-B5, C1-C4)	kg CO_2e/m^2
(< 300) A	
(300-430) B	
(430-560) C	
(560-690) D	
(690-820) E	761
(820-950) F	
(> 950) G	

One Click LCA

LCA Carbon Hereos Benchmark

Operational Carbon Assessment

Energy Performance Certificate — Scotland

Non-Domestic buildings and buildings other than dwellings

Address 3, Aberdeen

Date of assessment:	01 Apr 2008	**Reference number:**	0000-0040-0030-9000-0803
Date of certificate:	22 Mar 2021	**Building type:**	Office/Workshop
Total conditioned area:	2049.19 m^2	**Assessment software:**	EPCgen, v5.6.b.0
Primary energy indicator:	90 kWh/m^2.yr	**Approved organisation:**	CIBSE Certification Ltd

Building Energy Performance Rating

Excellent

Carbon Neutral

A (0 to 15)
B (16 to 30)
C (31 to 45)
D (46 to 60)
E (61 to 80)
F (81 to 100)
G (100+)

Very Poor

Current: -15 Carbon Neutral

Potential: 0 A+

Approximate Energy Use: 31 kWh per m^2 per year

Approximate Carbon Dioxide Emissions: -15.27 kgCO_2 per m^2 per year

The building energy performance rating is a measure of the effect of a building on the environment in terms of carbon dioxide (CO2) emissions. The better the rating, the less impact on the environment. The current rating is based upon an assessor's survery of the building. The potential rating shows the effect of undertaking all of the recommended measures listed below. The Recommendations Report which accompanies this certificate explains how this rating is calculated and gives further information on the performance of this building and how to improve it.

Benchmark

A building of this type built to current building regulations at the date of issue of this certificate would have a building energy performance rating of: 20 B+

Recommendations for the cost-effective improvement of energy performance

1. Add time control to heating system.
2. Add optimum start/stop to the heating system.
3. Add local temperature control to the heating system.
4. Add weather compensation controls to heating system.

There are additional improvement measures applicable to this building. Refer to the Recommendations Report.

THIS PAGE IS THE ENERGY PERFORMANCE CERTIFICATE WHICH MUST BE AFFIXED TO THE BUILDING AND NOT BE REMOVED UNLESS REPLACED WITH AN UPDATED CERTIFICATE.

Energy Performance Certificate

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Assessing where we are…targets?

Sustainable Value Management Framework		
Carbon Engineering	Carbon	Embodied Carbon
		Operational Carbon
Circular Economy	Resources	Retain in Use
		Source Responsibly
		Design out waste
	Components	Standardise Manufacture
		Extend Producer Responsibility
	Future Value	Design to Preserve Value
Co-Benefits	Natural	Avoid Pollution
		Enhance Biodiversity
	Social	Support Community Enterprise
		Promote Equality
		Source Responsibly
	Human	Design for Health and Wellbeing
		Design for Safety and Security
		Provide Skills and Employment
Financial	Cost	Capex
		Opex
		Revenue
		Whole Life Cost

Example appraisal from ZeroWasteScotland

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Assessing where we are…targets?

A. Resources

		Site	Structure	Skin	Services	Space	Stuff	Commentary
Retain in Use	Retrofit existing asset (Retain building or other infrastructure largely intact)							*The proposals allow for significant reuse of the existing building with only a small portion to be demolished and rebuilt (site, structure), and the exterior will be overclad (skin).* *The exceptions are services where a new MEP installation has been planned (services) and interiors (space).* *Unclear whether existing furniture and equipment will be repurposed or new items purchased (stuff).*
	Salvage materials for reuse (based on demolition appraisal, going to material bank)							
Source Responsibly	Use salvaged materials (whether on-site or from material bank)							*Assumed that insulation (skin) and interior finishes (space) will mostly use natural/low impact materials as detailed in other sections of this review, this score would be downgraded with more standard material choices (e.g. plastic insulation).* *There will be less opportunity for this with other parts of the new fabric (structure, services).* *Procurement requirements can be embedded in specification.*
	Use materials with recycled/secondary content (meaningful part of new item)							
	Use other low impact materials (such as natural materials or renewable energy input)							
Design out Waste	Manage wastage of materials (use of full width panels, cutting patterns to use full sheets etc.)							*Contractor not yet appointed so assume base level compliance but could be included with tender (e.g. in accordance with WRAP targets)* *Highlights where design choices will have impact e.g. temporary wall bracing (skin).*
	Manage construction site waste (construction debris, packaging, temp. works, excavation)							

Example appraisal from ZeroWasteScotland

From mountain to sea

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Aberdeenshire
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Thank you

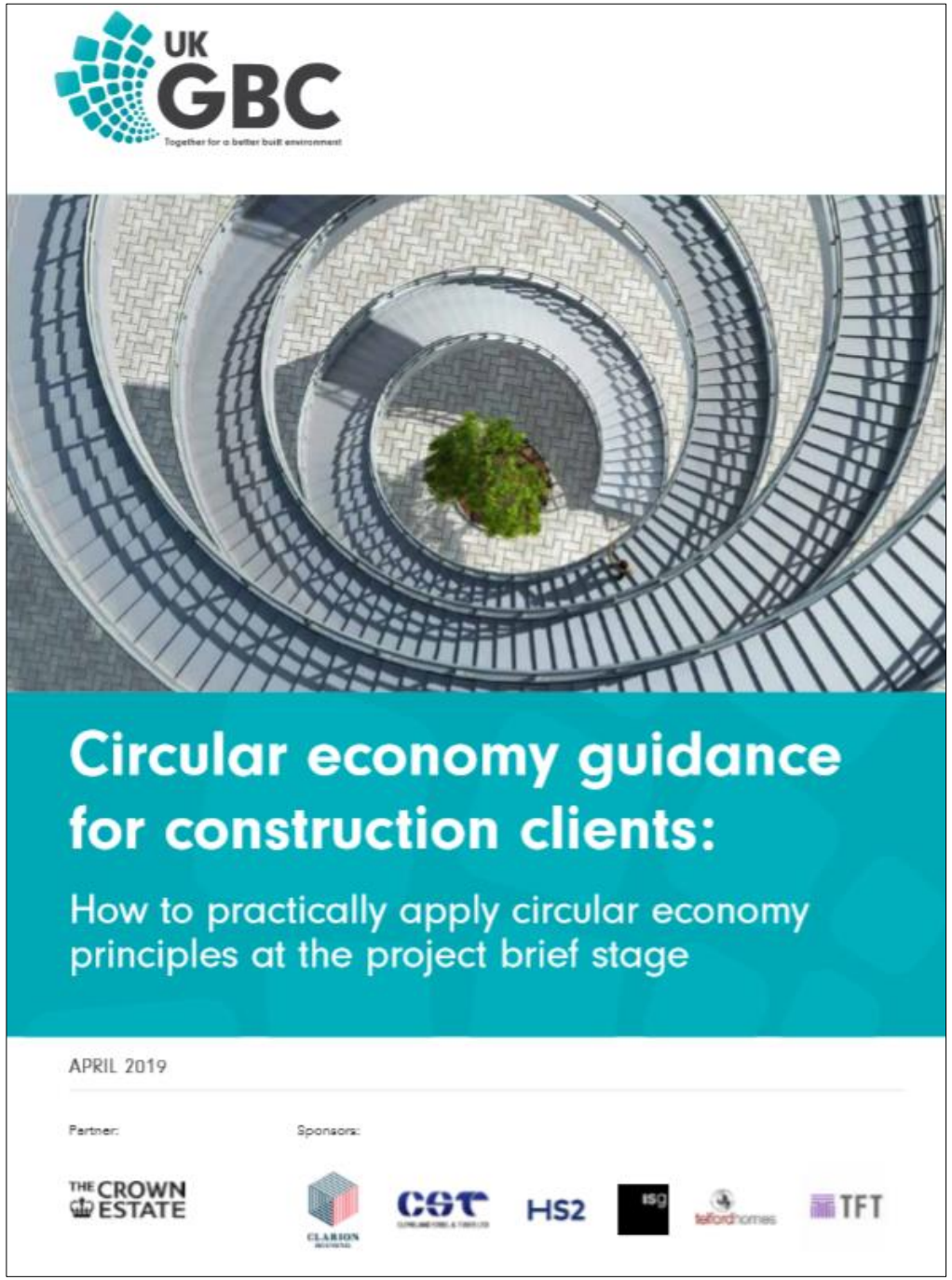
CLARION
HOUSING GROUP

Integrating the circular economy into housing developments.

Paul Quinn

Why should we be interested in this?

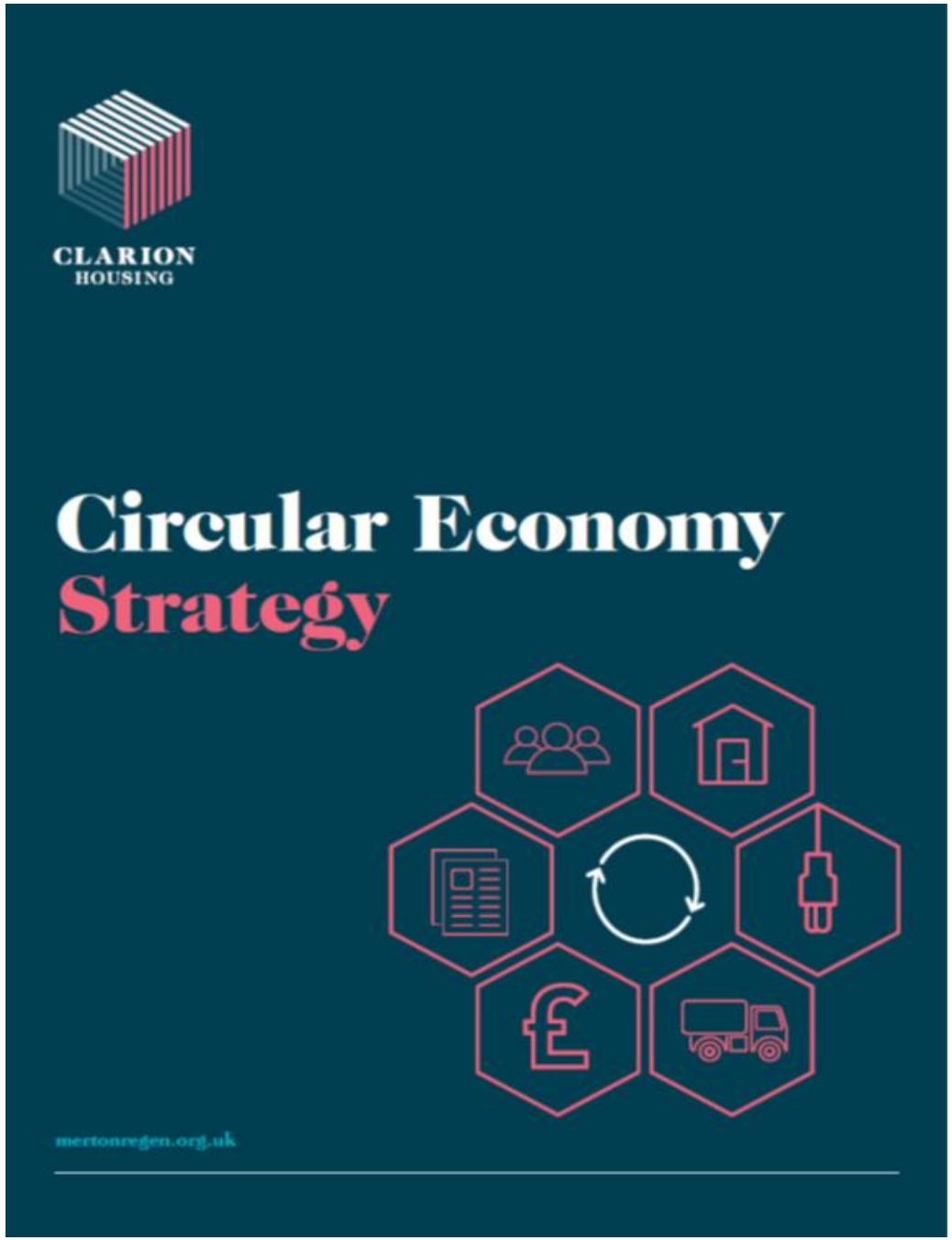
- 35% of the total EU waste stream created by construction and demolition industries
- World's largest consumer of raw materials 3 billion tonnes annually
- But recovery rate is high….



Circular Economy: *Strategy*

- It's not the same as a sustainability strategy!
- We are right at the start
- Proof of concept required
- Policy will help….
- ….but delivery the real test

Clarion's approach to Circular Economy



Circular Economy as DNA

- Principles
- Procurement
- Delivery
- Operation
- End of Life

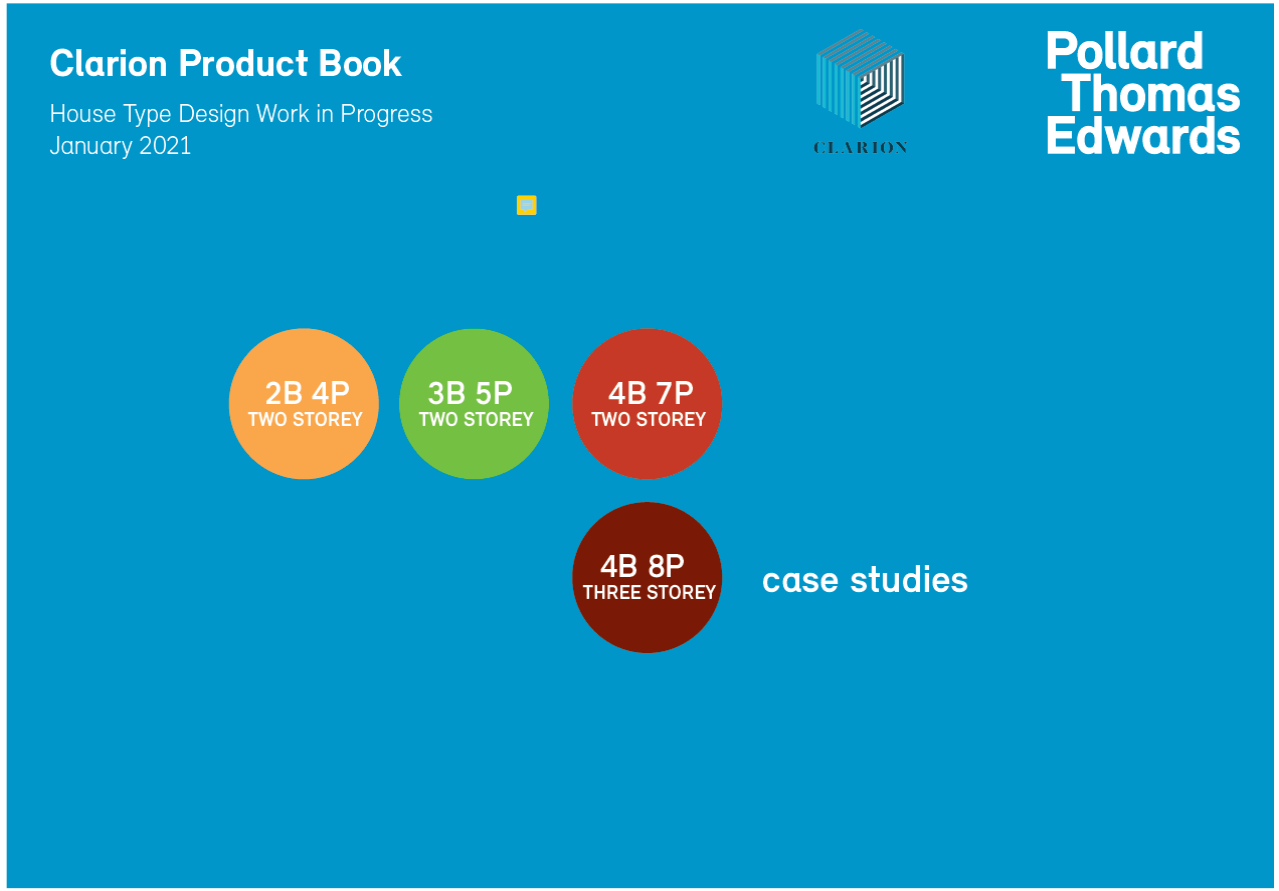
Practical delivery of CE: *a series of stages*

1. End of Life – existing buildings
2. Product and component stage
3. Construction Process
4. Use stage – as a place to live
5. Use stage – maintenance, repair, adaption, replacement
6. End of Life – new buildings

Based on three principles

1. Building in Layers

- Designing out waste
- Standardisation including off site and modular manufacturing
- Buildings that are adaptable and easy to maintain



Based on three principles

2. Social Value

- Community led design
- Community re-use networks
- Meanwhile strategies
- Promote the sharing economy
- Supporting household and community recycling

Based on three principles

3. Waste Hierarchy

- Demolition for maximum recovery value
- Specify high recycle content/reused materials
- Supply chain integration
- Excellence in construction waste management

Principles into Practice: *Procurement*

4. Circular Economy

Clarion's Regeneration team are particularly interested in ensuring that Circular Economy principles are embedded in all aspects of projects from the outset. This includes design. Areas to be addressed would include, but not be limited to, designing out waste; reusing and upscaling materials; community led design; standardisation; and materials. Clarion's Circular Economy Strategy can be found at: Circular Economy
The design team will need to demonstrate a comprehensive understanding of and commitment to a circular economy-based approach and the challenges and opportunities that come with that.

A good response would include, but not be limited to, the following:

- Proposals for the practical application of circular economy principles in this particular project
- Confirmation of who will lead on this aspect of the commission

Responses should be limited to 2 sides of A4

CIRCULAR ECONOMY

HTA has worked extensively with Clarion on the development of the Circular Economy Strategy for the Merton Regeneration projects. Elisabetta Li Destri, an Associate and Sustainability Consultant has been involved throughout and will lead on this aspect of the work.

We set out here our position on the circular economy, standardisation and prefabrication, energy efficiency and climate change which is central to our ambitions to create a sustainable set of residential buildings for Clarion and their tenants to occupy for decades to come. We feel strongly that this is a once-in-a lifetime opportunity to give these beautiful buildings a new lease of life and to make them fit for purpose, which means, sustainable, comfortable, energy efficient and easy to manage.

We will aim for all materials used in the project to be selected, designed, installed and used in such a way as to encourage their replacement and reuse at all stages of their life. We will carry out workshops at an early stage to evaluate with the client how to manage the circular economy principles throughout the project. We will actively seek to upcycle materials in the refurbishment in all areas, kitchens, flooring, for example or for internal wall insulation or other insulants, as well as reusing as many of the existing internal elements such as doors, linings and ironmongery as possible.

We aim to reduce the CO2 emissions of buildings to zero or as close to zero as possible and we have signed the Architects Declare Climate and Biodiversity Emergency which among other intentions commits us to seeking to:

- Evaluate all new projects against the aspiration to contribute positively to mitigating climate breakdown and encouraging our clients to adopt this approach.
- Upgrade existing buildings for extended use as a more CO2 efficient alternative to demolition and new build whenever there is a viable choice.
- Include life cycle costing, whole life CO2 modelling and post occupancy evaluation as part of our basic scope of work to reduce both embodied and operational resource use.

Planning Requirements: The London Plan requires an energy assessment highlighting how individual elements of the energy hierarchy have been achieved compared to the existing building baseline. These are: Be Lean (fabric improvements), Be Clean (energy efficient water and energy supply) and Be Green, (use of renewable energy). We will aim to deliver improvements in all these categories which respect the heritage character of the building and to achieve them invisible where possible. Providing the buildings' hot water demands using a high efficiency, low temperature heat network would help to achieve the Be Clean requirement, or using a heat pump system for each individual building located in a small basement and using internal wall insulation will help to deliver the 'Be Lean' requirement. The 'Be Green' requirement is more difficult as the use of renewable energy may involve unacceptable changes to the building's appearance but the use of novel technologies which mimic the appearance of roofing materials may prove acceptable.

Ideally, to reduce waste we would design a set of prefabricated material interventions in a standardised way, which could be quickly and easily installed into the building to minimise waste, reduce the impact on the environment, the length of time taken to carry out the work and which could be carried out quietly to minimise disruption, and which created sustainable new homes within the existing envelope. We will work closely with the client and resident groups to ensure that the interventions are purposeful and appropriate to the future residents and in line with Clarions management strategy.

We are internationally recognised for our work on prefabrication of buildings including designing the tallest modular building in the world, the 44 storey 101 George Street which is currently being constructed in East Croydon. Many of our projects are prefabricated and we would look to bring this knowledge and experience to this unique heritage environment to implement circular economy principles.

We use the DfMA (Design for Manufacture and Assembly) overlay for the RIBA plan of Work to guide our design work.

The character and nature of the project means that it will be challenging to use a pre-determined set of regular designs to sit within a building whose dimensions are unlikely to be regular. For example, walls are unlikely to be plumb and floors unlikely to be level, so allowances will need to be made in the design to take these tolerances into account. It will also be important to make it clear where the new interventions are different to the existing building so that future changes can be made a clear understanding of which part of the building was built at what point.

We would expect to engage with specific manufacturers at an early stage of the project, as the elements we use will be quite specific to the building, so we would propose an early tendering process to identify manufacturers capable of engaging with the project with experience of manufacturing elements for heritage buildings. This could include doorset, kitchen, bathroom, wall lining and partition manufacturers, as well as services and renewable energy system manufacturers.

Finally, the access into the building will be restricted to the sizes of existing openings, so any attempts at standardisation and prefabrication will need to take these sizes into account when designing components.

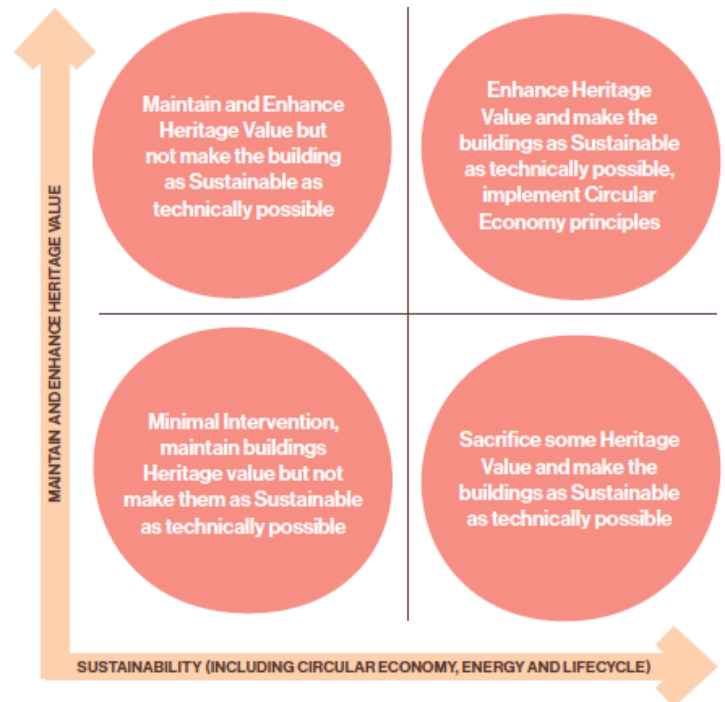
Methodology

The scope of our work on this project can cover a wide range of options and we would aim to evaluate the breadth of options at an early stage to ensure that the appropriate steps are taken to mitigate the effects of climate change on the one hand and maintain the heritage assets for future generations on the other.

Some choices will need to be made which will require a balanced view. For example, insulating the building to reduce loss of heat and to provide comfort for residents will be an important step but doing so will have an impact on the character of the building.

Similarly, replacing the windows with versions which enhance the character of the building will also involve reaching a balance between heritage value and the performance of the windows. Secondary glazing may be required.

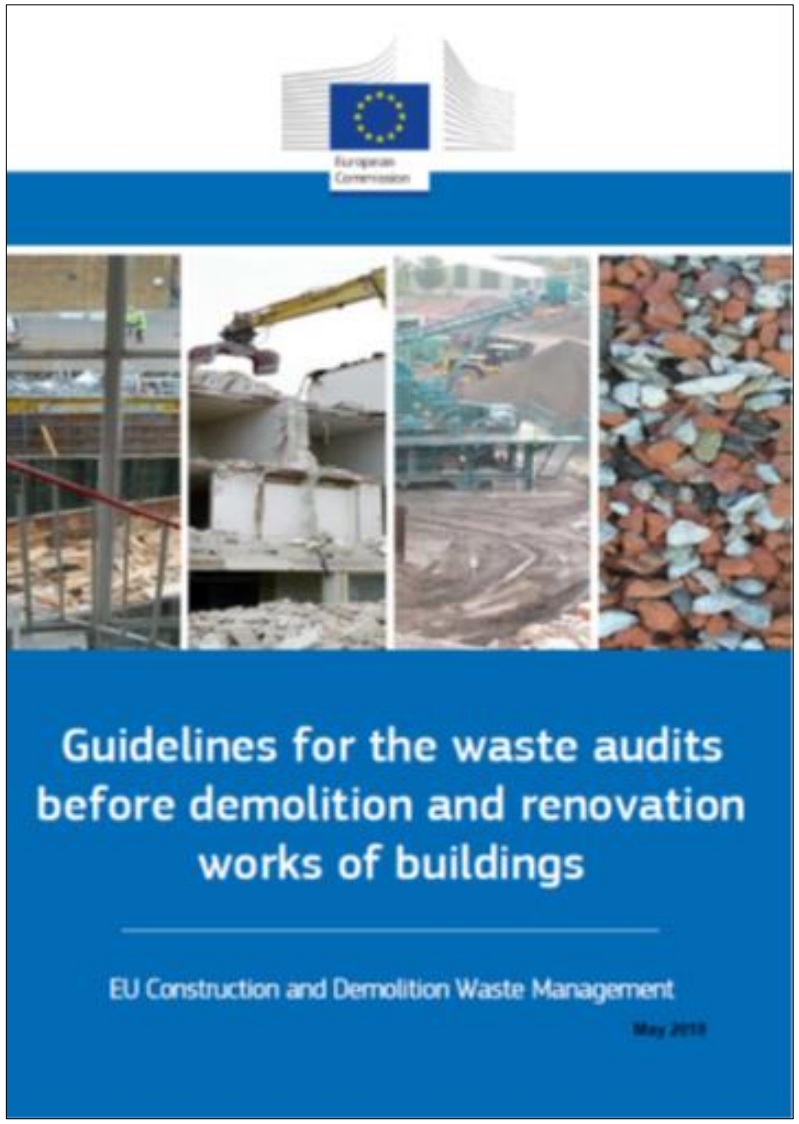
The recent tragic events at Grenfell Tower have also had a major impact on residents perception of fire risk and the markets attitude to risk and materials and non-combustibility will be a factor in deciding materials such as insulating materials as well as internal finishes which will need to be considered in light of the buildings age and character.

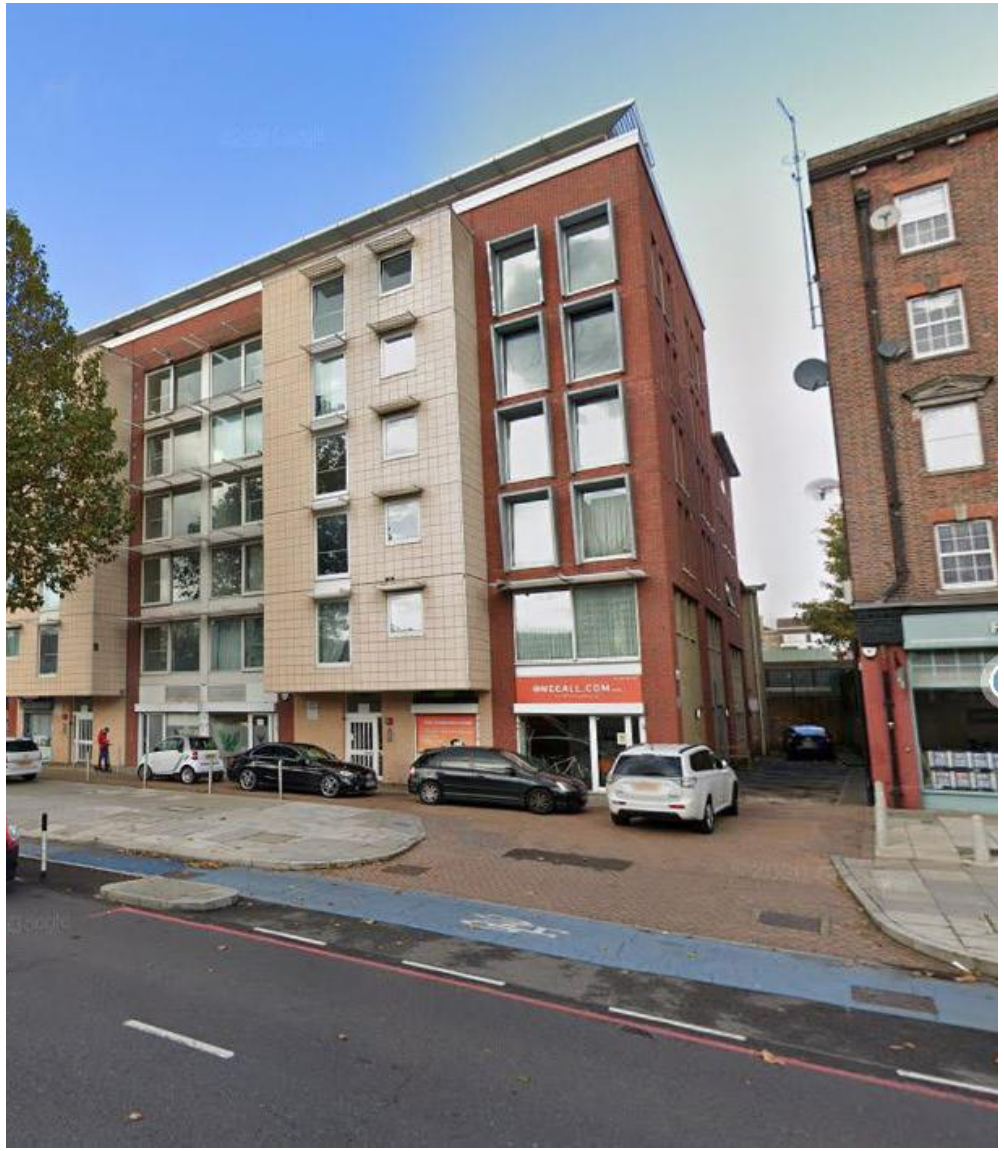


Balancing Sustainability and Heritage

All the interventions will need to be evaluated against many criteria including Heritage, Sustainability and Circular Economy to ensure that a balance is reached which achieves a comfortable and easily managed set of homes for Clarion and their residents to use.

Principles into Practice: *pre demo audits*





Principles into Practice: *delivery*

- Still early days…
- UPVC window upscaling
- Glass recycling
- Wood reuse via local networks
- White goods rehomed via local charities
- furniture recycled
- Paint recycling with Paint360

Principles into Practice: *delivery*

Sutton Buildings, Chelsea

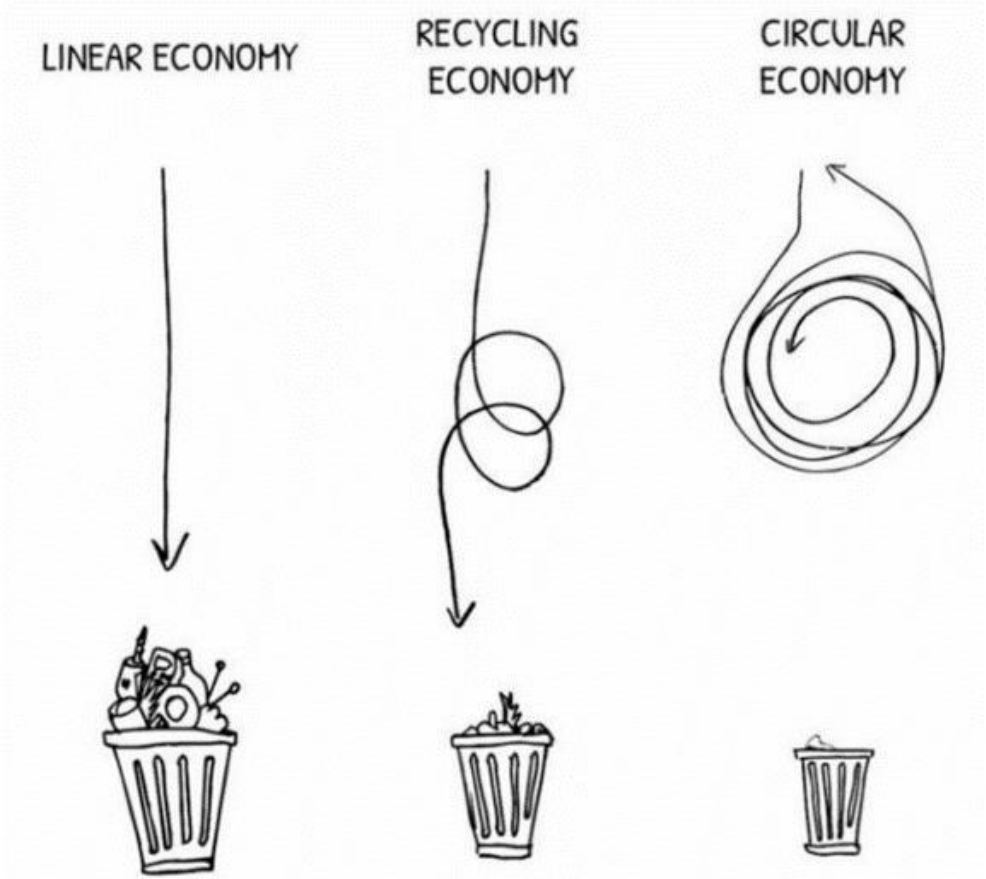
Circular Economy at scale:

Merton Regeneration Project

Ravensbury

Eastfields

High Path



Leaving the Linear Economy (make, use, dispose) behind…

Circular Economy – Sharing Best Practice, Construction and Renovation

JUNE 2021

#CEweekLDN

SPACE SOLUTIONS

INTRODUCTION

Space Solutions are experts in workplace consultancy, design and fit out. For more than 24 years we have worked with Clients to transform spaces and how those spaces work for the businesses and people that inhabit them. We strive to innovate through design, to find new ways of creating value both within projects and throughout the lifecycle of the inspiring spaces we help to create.

Modern workplaces increasingly demand flexible, adaptable working environments which has been a direction of travel for over 20 years but accelerated by the events of the last 18 months with the impact of the pandemic.

We are seeing a steady increase in awareness and interest in circular economy (CE) initiatives for a combination of reasons:

Economic pressure from rising costs and scarcity of materials
Environmental necessity in the face of a climate emergency
Corporate Social Responsibility
Legislation
Media publicity

It is our experience that many businesses are well intentioned but on occasion lack the conviction to adopt CE practices, perceiving this to be expensive / problematic. For many, CE has about sustainability rather than value.

ABERDEEN
EDINBURGH
DUNDEE
GLASGOW
LIVINGSTON
MANCHESTER
LONDON

Recycle Scotland is a division of Space Solutions with circular economy principles at its heart.

Recycle Scotland is a Revolve accredited business, supporting the business community by uplifting unwanted office furniture with the focus being to re-use, re-engineer and resell as much of the product as is possible, extending its useable life whilst reducing consumption of energy and materials in the manufacturing process.

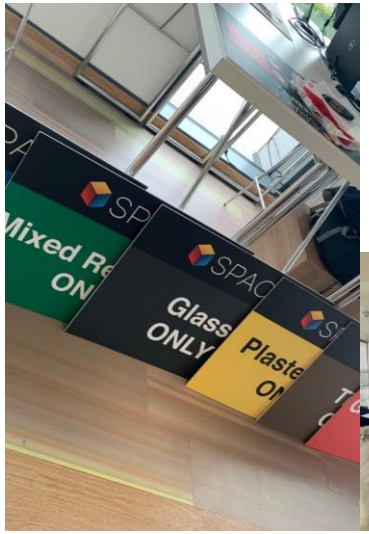
Since 2010, Recycle Scotland has recycled/reused over **6,000 tonnes** of office furniture, delivering sustainable solutions through:

- Supplying reused furniture products
- Reengineering existing furniture
- Acting as a product exchange for FF&E
- Recycling unwanted office furniture
- Avoiding landfill

DESIGN & BUILD PROJECTS OUR APPROACH

SPACE SOLUTIONS

- Establish Client's aspirations and undertake a feasibility assessment
- Conduct a destructive survey to assess quantity, suitability and scope for re-use of products and materials such as raised access flooring, floor finishes, partitions, glazed screens, ceilings, light fittings, floor boxes, door sets, architraves, ironmongery, furniture etc – report findings and commercial opportunities / implications
- Engage designers early in the process – explore design opportunities and the implications for re-use of products identified in the survey – cross referenced with potential products / materials from other sites or projects
- Ensure design and construction teams are aware of project objectives and that materials are dismantled carefully and set aside for re-use
- Set aside existing products for re-use at existing site or store for future re-use as opposed to demolished / discarded
- Ensure products that have a re-use value are made available / promoted for re-use (currently through Recycle Scotland). We also engage with various charities who can re-use redundant products, particularly furniture
- If re-use is not an option - segregate waste to minimize landfill. The survey will identify re-useable assets versus waste so site teams can be informed at an early stage and plan accordingly
- Landfill is a last resort



PROJECT EXAMPLE

Recently completed refurbishment of 3-Storey Office Building

- Re-used existing doors and frames, saving costs and reducing landfill materials
- Hardwood skirtings were carefully removed and re-installed
- Glass partitions and framing were deconstructed and re-installed according to a new design
- Partition insulation was removed, set aside and re-used in new solid partitions to enhance sound proofing
- Existing carpets were uplifted, cleaned and relayed with cut and worn tiles replaced. Old tiles were returned to manufacturer for recycling
- Recycle Scotland re-engineered existing office furniture. Frames and desktops were modified to a different footprint and assembled with existing tops cut to new size and shape and re-edged. Screens were altered, reupholstered and reused
- Remaining materials were stripped out ,segregated and disposed of in specific skips

CHALLENGES

SPACE SOLUTIONS

- Change of habit / mindset and avoiding complacency
- Collaboration is essential
- Verification of condition and specification of materials for re-use
- Time & Cost (actual or perceived)
- Availability and suitability for re-use (e.g. sound or fire performance)
- Ease of access and removal
- Storage and logistics
- Damage or breakages
- Warranties and liability
- Performance
- Availability of additional or replacement components

OPPORTUNITIES

SPACE SOLUTIONS

- Aside from the environmental benefits, rising commodity prices are justification for taking CE initiatives seriously
- Availability of some products / materials is further justification
- Think early in the process and conduct a destructive survey to ascertain re-use options and potential value aspects. If re-use is not an option can a product be re-engineered for use here or elsewhere
- Allow time to plan and fully consider re-use potential and any future implications (e.g. availability of spare components)
- Encourage collaboration amongst the design and construction team and the supply chain – give people their place
- Design with re-use and future flexibility in mind
- Avoid bonding and riveting – dismantle instead of demolish
- Standardise design elements where possible to maximise re-use potential
- Consider incentives such as take back initiatives (furniture and flooring contractors have been doing this for some time)
- Segregate waste to maximise recycling potential by others
- Learn and develop through shared experience and project debriefs
- Product exchange and brokerage – satisfy someone else's need (Currently Recycle Scotland)
- Measurement and continuous improvement – track progress

CONTACT US

Thank you for listening

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~~WASTE~~

CIRCULAR

Developing New Business Models

- Introduction
- Exploring opportunities
- Our offering
- Challenges and enablers

Jennifer Griffith
Lighting Designer

Tom Ruddell
Product Engineer

Brian O'Reilly
Director

Tsanko Dimov
CE Manager

Kostas Englezopoulos
Software & Controls

The Herald GLOBAL GAME CHANGERS 2018 — in partnership with Industries transforming our world INNOVATORS MAGAZINE — WINNER

SRC 2019 — Scottish Resources AWARDS — WINNER — Best Circular Economy Initiative

GLASGOW GUARANTEE — INVESTORS IN YOUNG PEOPLE — Business Award 2018

The Herald PIONEER AWARDS — Driving change for a sustainable Scotland

GBA — Glasgow Business Awards '19 — WINNER — INNOVATION in BUSINESS

VIBES — SCOTTISH ENVIRONMENT BUSINESS AWARDS

Exploring Opportunities

What can we learn from others?

Potential business models, enablers, barriers

What might work in our context?

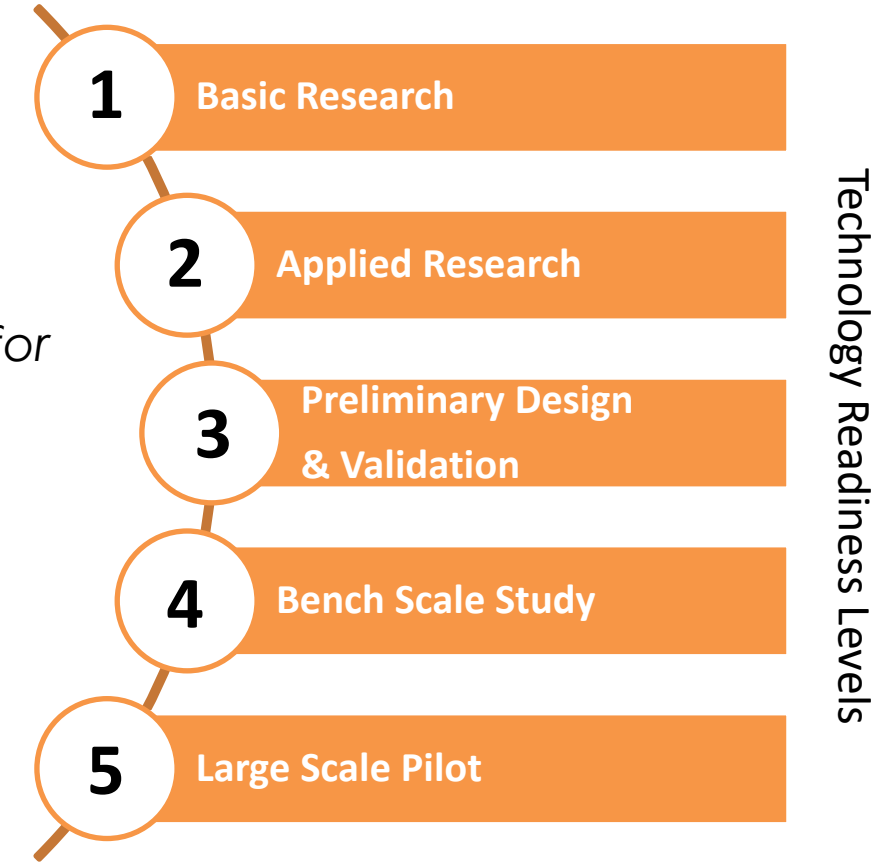
What our strengths, what opportunities exist for us?

Desk-based concept testing

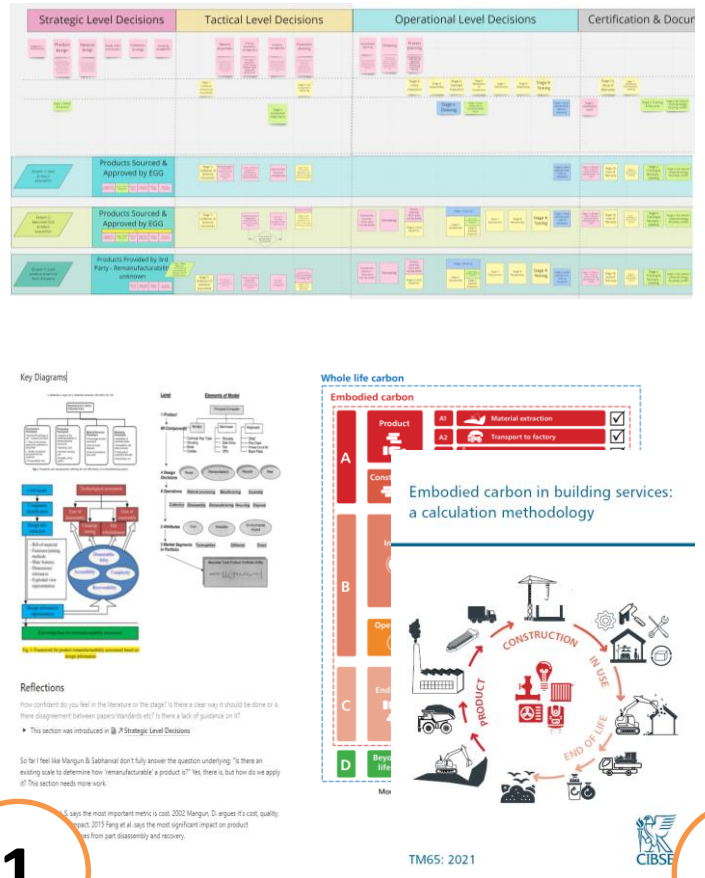
Does this make sense on paper? Fail fast.

Real world development

Testing ideas at a growing scale



Exploring Opportunities



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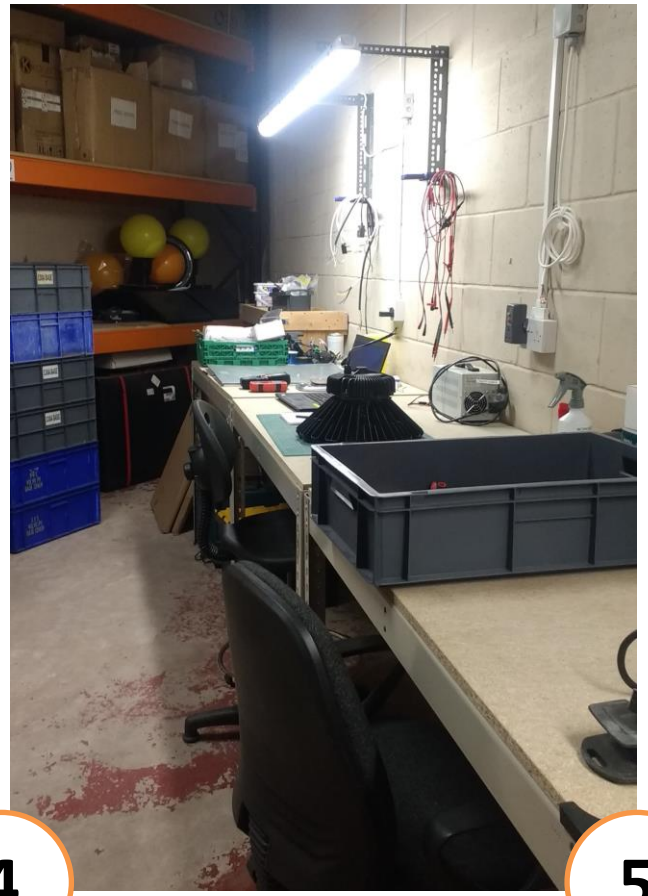
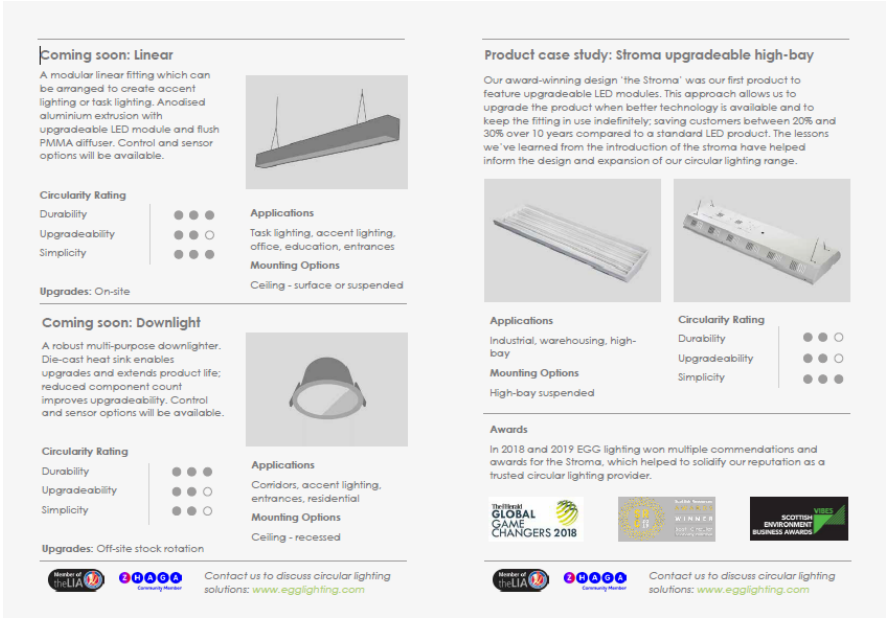


5

“By taking a lifecycle approach, we can use quality to compete against the race to the bottom”



Coming soon: Linear

A modular linear fitting which can be arranged to create accent lighting or task lighting. Anodised aluminium extrusion with upgradeable LED module and flush PMMA diffuser. Control and sensor options will be available.

Circularity Rating

Durability ●●●
Upgradeability ●●○
Simplicity ●●●

Upgrades: On-site

Applications

Task lighting, accent lighting, office, education, entrances

Mounting Options

Ceiling - surface or suspended

Coming soon: Downlight

A robust multi-purpose downlighter. Die-cast heat sink enables upgrades and extends product life; reduced component count improves upgradeability. Control and sensor options will be available.

Circularity Rating

Durability ●●●
Upgradeability ●●○
Simplicity ●●○

Upgrades: Off-site stock rotation

Applications

Corridors, accent lighting, entrances, residential

Mounting Options

Ceiling - recessed

Contact us to discuss circular lighting solutions: www.egglighting.com

Product case study: Stroma upgradeable high-bay

Our award-winning design 'the Stroma' was our first product to feature upgradeable LED modules. This approach allows us to upgrade the product when better technology is available and to keep the fitting in use indefinitely; saving customers between 20% and 30% over 10 years compared to a standard LED product. The lessons we've learned from the introduction of the stroma have helped inform the design and expansion of our circular lighting range.

Applications

Industrial, warehousing, high-bay

Mounting Options

High-bay suspended

Circularity Rating

Durability ●●○
Upgradeability ●●○
Simplicity ●●●

Awards

In 2018 and 2019 EGG lighting won multiple commendations and awards for the Stroma, which helped to solidify our reputation as a trusted circular lighting provider.

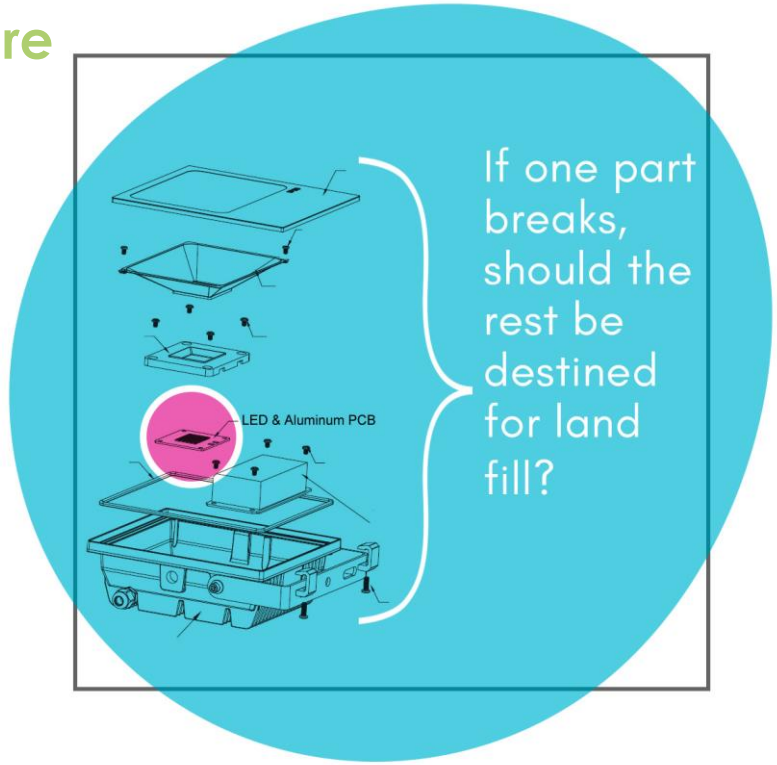
Contact us to discuss circular lighting solutions: www.egglighting.com

To ensure extended and multiple lifecycles, remanufactured **and new** products must have:

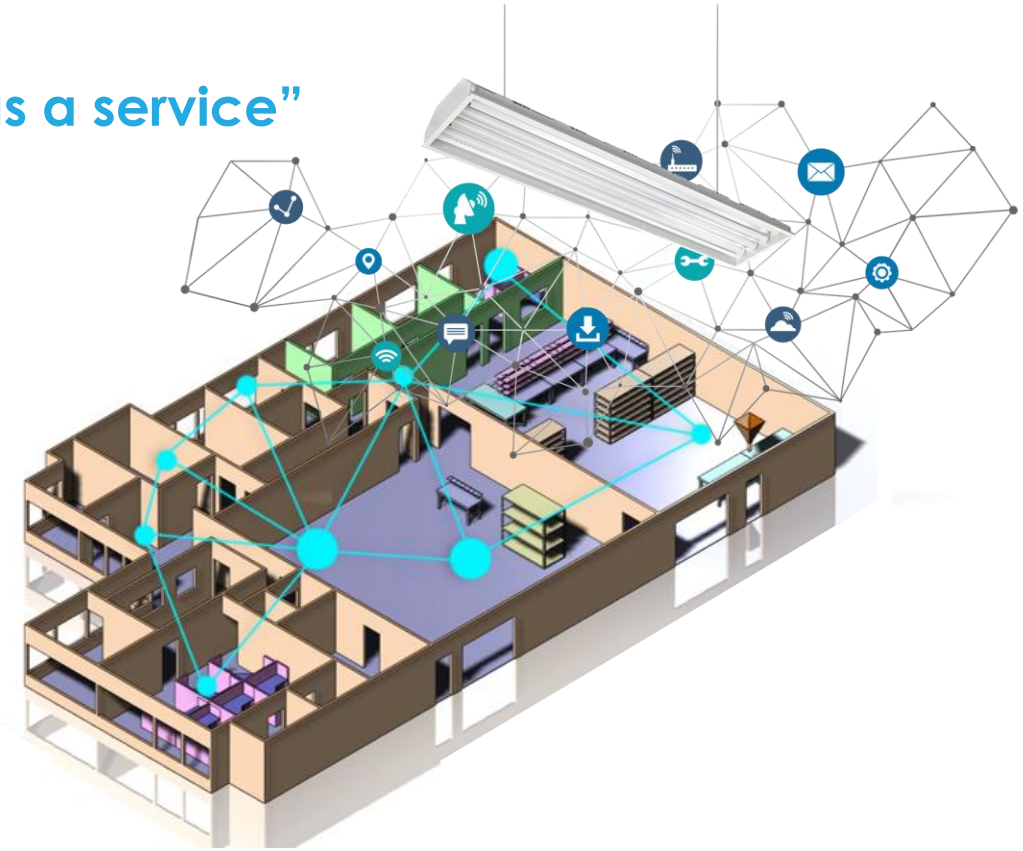
1. **Durable design** – must last multiple 5-10 year lifecycles
2. **Quality components** – minimise failure rate
3. **Upgradeability** – change only the component that needs changing instead of replacing the entire product
4. **Easy disassembly** – components don't need to be changed by trained electricians
5. **Simplicity –** reduce the number and variety of parts and fixtures

Initially we found 2 routes for procuring circular lighting:

Remanufacture



Light “as a service”



This led to 2 distinct offerings:

Remanufacture

Improve the performance of your existing lights

+ Option for cost-efficient upgrades when new technology becomes available
+ Product lifetime can be extended by 10-20 years
+ As-new warranty on all remanufactured products

Light “as a service”

EGG retain ownership of the lights and manage the system using sensors & AI.

+ Off-balance sheet solution
+ Enhanced controls and efficiency
+ Preventative maintenance for life extension and best-practice waste management

What did we learn?

- Co-design, **building trust**, and understanding our stakeholders needs and decision making processes is essential

- **Our offering shouldn't be binary!** We need to be flexible and provide a spectrum of services.

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SNOOK

What were our challenges?

- New business models introduce **new risks** to our operations and forecasting
- Procuring services, and taking **a lifecycle approach is much more complex** than business as usual for our customers

- Providing **case studies!** (the chicken or the egg?)

What have been our key enablers?

- **Digital** Technology and data
- **Stakeholder engagement** Co-design
- **Collaboration** A circular economy can only be built together

- **And of course, funding.**

Thank you

Download our 2021 White Paper - ‘Justification for remanufacture in the lighting industry’

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