

1 Ashby Farm – Circular Economy Design Approaches

This template has been adapted from the GLA Circular Economy Statement Template which identifies a number of principles to be considered in the building’s design.

Please can each team review and complete their sections.

McDonald Architects

- Section 1.1 Project details
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1.1 Project Details – McDonald Architects

Project Details	
Planning application reference number (if available)	
Number of use types (of the development)	Single use
Types of use	Industrial
Area, GIA (m ²) of each use type	1416 m ²

1.2 Circular Economy design approaches – Definitions

Circular Economy Design Approaches		Definition
Designing out waste	Product Sourcing and construction stage	Considering the choice of suppliers and contractors, and acquiring goods and services for a construction project with respects to the environment.
	In use	A method of minimising the amount of materials used and waste produced once the building is occupied.
	End of life	Strategies to ensure materials and components can be easily reused, recycled, or repurposed, minimizing waste sent to landfill and reducing environmental impact.
	Benefits and Loads beyond the system boundary	The long-term benefits and environmental impacts of using materials/a product that extend beyond its immediate system. E.g. the benefits of reusing, recycling, or exporting energy or water from a product.
Component or material reuse		The use of a product in its original form with minimal repossession at the end of its life. Materials can be reused as a whole, redeployed as modules, or reused as a kit of parts on one of more different sites. Preparation for reuse involves checking, cleaning or repairing materials so that they can be used again at the <u>end of life</u> for their original purpose.
Adaptability		A building that has been designed with thought of how it might be easily altered to prolong its life, e.g. by alteration, addition, or contraction. Relates more to building <u>structural</u> changes.
Flexibility		A building that has been <u>designed</u> to allow easy rearrangement of its internal fit-out and arrangement to suit the changing needs of occupants. Relates to <u>floorplate</u> rather than structural changes.
Replaceability		Designing to facilitate easy removal and upgrade, and ideally be reused, remanufactured, or recycled on a part-by-part basis.
Disassembly		Designing to allow the building and its components to be taken apart with minimal damage to facilitate reuse or recycling. If designed well, it should be possible to replace any component.
Longevity		Designing to avoid a premature end of life for all components through considering maintenance and durability.

1.2.1 Architectural design approaches – McDonald Architects

Design Approaches		Site e.g. geographical location, any external works or works to the ground, landscaping etc.	Shell/Skin e.g. façade	Internal space e.g internal layout, internal walls, partitions etc.	Stuff e.g furniture, appliances, art etc.	Construction Stuff e.g. temporary installations/works/ materials, packaging and equipment etc.	Challenges Potential challenges in achieving the design suggestions	Actions How will this be done and next steps?	Plan to Prove and Quantify e.g. SWMP, WLCA, Design stage reviews and implementation etc
Is it likely the layer (or components within it will need to be moved or modified within the 5-15yrs (e.g. change in use patterns)? (YES , NO)		No	No	No	No	No	No	N/A	N/A
Is it likely the layer (or components within it will need to be changed, upgraded or replaced within the 5-15yrs (e.g. for improved performance, aesthetics)? (YES , NO)		No	No	No	No	No	No	N/A	N/A
Designing out Waste	Product Sourcing and construction stage	Pre-demolition/refurbishment audit to determine any potential reuse opportunities	Hand laid bricks to some Façades.	Design to use full sheet size of materials where possible (plasterboard, plywood etc) to minimise offcuts.	Standardised room types with details designed to make efficient use of materials.	Contractor to Reuse site set up/furniture from another project Reuse area on site for offcuts.	Availability of sustainable materials and associated lead in times	Early engagement with reclaimed bricks suppliers.	Site Waste Management Plan which is periodically reviewed and updated to reflect

							<i>(reclaimed bricks)</i>		<i>current construction works.</i>
	In use Stage	<i>N/A</i>	<i>Brick façade can be repaired locally with minimal waste</i>	<i>Accurate record of materials/products installed ensures correct maintenance through in-use phase.</i>	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>	<i>As Built WLCA</i>
	End-of-life stage	<i>N/A</i>	<i>Hand fixed timber cladding can be easily disassembled</i>	<i>Work benches and other items of furniture will be made of high-quality materials and will be able to be re-used in number of other workshop applications.</i>	<i>N/A</i>	<i>N/A</i>	<i>Will ensure correct disassembly/removal of materials to prevent damaging materials</i>	<i>N/A</i>	
	Benefits and Loads Beyond the system boundary								
Component or material reuse and recycle		<i>Retaining structural frame of 1no historic barn as part of proposals. Will be investigating possibility of recycling and re-using elsewhere/</i>	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>	<ul style="list-style-type: none"> <i>Ensure that recycled content and recyclability is considered and delivered during procurement</i> <i>Explore materials/pro</i> 	<i>Complexity of work involved to repair barn frame</i>	<i>Ensure competent specialist contractor is engaged to undertake repair works to barn</i>	<ul style="list-style-type: none"> <i>WLCA</i> <i>Site Waste Management Plan</i>

	<i>selling structural frames of barns which will not be retained as part of proposals.</i>				<i>ducts that offer an end-of-life takeback/recycling scheme</i>			
Designing for flexibility	<i>N/A</i>	<i>Brickwork façade can be added to or partially demolished easily</i>	<ul style="list-style-type: none"> <i>Structural frame allows for non-load bearing internal walls which allows for reconfiguration</i> <i>Open plan design</i> 	<i>Internal furniture not fixed to allow for reconfiguration</i>	<i>N/A</i>	<ul style="list-style-type: none"> <i>Cost constraints</i> <i>Availability of adaptable products</i> 		
Designing for replaceability	<ul style="list-style-type: none"> <i>Limited number of window types in scheme to simplify replacement</i> <i>Hand-laid brickwork replaceable</i> 	<ul style="list-style-type: none"> <i>Modular design of internal spaces (3m grid)</i> <i>Non-destructive access for replacement of services</i> 	<i>Modular design of internal spaces and furniture where possible</i>	<i>N/A</i>	<i>Availability of the product that needs replacing</i>			
Designing for disassembly	<i>N/A</i>	<i>Specify materials that are easy to be disassembled-hand fixed-timber cladding, metal cladding</i>	<i>Minimise the use of fixings/adhesives that cannot be disassembled</i>	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>	
Designing for longevity	<i>N/A</i>	<i>High durability masonry finish specified</i>	<i>Doors and wall finishes will appropriate for</i>	<i>Durable products to be specified</i>	<i>N/A</i>	<i>Cost constraints of</i>	<i>Early engagement with</i>	

			<i>environment specified (kick plates to doors in heavy use areas)</i>	<i>against spills /wear and tear</i>		<i>premium/durable product</i>	suppliers and extensive market research to ensure best quality products specified within available budget	
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1.2.2 Structural design approaches – MHA Structural Design

Design Approaches		Site e.g. geographical location, any external works or works to the ground, landscaping	Substructure e.g. Excavations, foundations, basements, and ground floors	Superstructure e.g. Any Load-bearing elements above ground	Construction Stuff e.g. temporary installations/works/materials, packaging and equipment etc.	Challenges Potential challenges in achieving the design suggestions	Actions How will this be done and next steps?	Plan to Prove and Quantify e.g. SWMP, WLCA, Design stage reviews and implementation etc
Is it likely the layer (or components within it will need to be moved or modified within the 5-15yrs (e.g. change in use patterns)? (YES , NO)		No.	No.	No.	No.	No.	N/A.	N/A.
Is it likely the layer (or components within it will need to be changed, upgraded or replaced within the 5-15yrs (e.g. for improved performance, aesthetics)? (YES , NO)		No.	No.	No.	No.	No.	N/A.	N/A.
Designing out Waste	Product Sourcing and construction stage	<i>Site specific ground investigations to be undertaken. Excavated soil is to be kept on site.</i>	<i>Site specific ground investigations to be undertaken. These will facilitate an economic but appropriate foundation</i>	<i>Steel reinforcement used in the reinforced concrete frame is to be UK manufactured (100% comes from recycled scrap metal).</i>	<i>Parts of the timber frame can be prefabricated, reducing site waste. Shuttering used for the reinforced concrete columns and first floor slab can be reused.</i>	<i>Supply chain challenges on the availability of GGBS to be used as cement replacement, along with limestone</i>	<i>Early engagement with the supply chain for the concrete specification and use of cement replacement.</i>	<i>Structural design to be efficient for the applied loadings. To be reviewed in-house by senior staff members</i>

			<i>design to meet design guidance (such as NHBC 4-2 Building Near Trees). Excavated soil is to be kept on site.</i>			<i>finer. Percentage used of GGBS can be increased, with good availability. Look for local aggregates.</i>	<i>Early engagement with contractor to reduce site waste, maximise prefabrication of timber panels.</i>	<i>remote from the project.</i>
In use Stage	<i>Site specific ground investigations to be undertaken, including contamination testing.</i> <i>Appropriate remedial works to be undertaken if required.</i>	<i>Concrete designed and specified to suit the environmental conditions (based on the ground investigations), ensuring longevity of the substructure, in excess of the design life. Cement content to not be over-specified.</i>	<i>Concrete designed and specified to meet the above ground environmental conditions, ensuring longevity of the superstructure.</i> <i>Timber structure is used in an internal environment and if kept dry will last in excess of the design life.</i> <i>Partitions are mostly non-structural, therefore providing flexibility for adapting layouts.</i>	<i>N/A</i>	<i>-</i>	<i>Good investigations and appropriate lean design. Monitoring of the contractor's works during construction.</i>	<i>Regular maintenance during use, to ensure that the timber structure remains dry.</i>	
End-of-life stage	<i>External works can be regraded, keeping the</i>	<i>All concrete and reinforcement can be recycled at the end of</i>	<i>All concrete and reinforcement can be recycled at the end of the life of the building. Re-</i>	<i>N/A</i>	<i>Concrete recycling will be dependent on this being</i>	<i>Keeping good records in the Health & Safety File will help future</i>	<i>-</i>	

		<i>material on site.</i>	<i>the life of the building. Re-use of parts of the concrete structure is feasible. Timber structure is demountable and parts can be reused.</i>	<i>use of parts of the concrete structure is feasible. Timber structure is demountable and parts can be reused.</i>		<i>initiated by the future contractor.</i> <i>Future use requirements cannot be predicted, which may constrain the amount of recycling of the structure.</i>	<i>teams looking at building adaption and recycling.</i>	
	Benefits and Loads Beyond the system boundary	<i>N/A</i>	<i>Substructure for the Machine Room Area designed for a minimum ground floor live load of 6kN/m², which is high and will allow many appropriate future re-use possibilities. Other areas designed for live load of 2.5kN/m², which still has many other uses.</i>	<i>Reinforced concrete frame is regular and provides flexibility for future change of use.</i> <i>Timber structure will be relatively transparent and can be adapted.</i>	<i>N/A</i>	<i>-</i>	<i>-</i>	<i>-</i>
Component or material reuse and recycle		<i>External works can be regraded, keeping the material on site.</i>	<i>Substructure can use cement replacement recycled products such as GGBS and limestone fines.</i>	<i>Superstructure concrete frame can use cement replacement recycled products such as GGBS and limestone fines.</i>	<i>N/A</i>	<i>Supply chain challenges on the availability of GGBS to be used as cement</i>	<i>Early engagement with the supply chain for the concrete specification</i>	<i>Review at each design stage.</i>

			<i>Timber can be used, if appropriate sizes are found, strength graded and treated.</i>		<i>replacement, along with limestone fines. Recycled timber sizes may not be available.</i>	<i>and use of cement replacement. Early engagement with timber frame contractor on timber procurement.</i>	
Designing for adaptability	<i>External works can be regraded, keeping the material on site.</i>	<i>Substructure for the Machine Room Area designed for a minimum ground floor live load of 6kN/m², which is high and will allow many appropriate future re-use possibilities. Other areas designed for live load of 2.5kN/m², which still has many other uses.</i>	<i>The first floor of the superstructure has been designed for a minimum live load of 2.5kN/m², which still has many other uses (e.g. residential or office). Partitions are mostly non-structural, therefore providing flexibility for adapting layouts.</i>	<i>N/A</i>	<i>Designing a lean structure for current use, but also allows for future adaption.</i>	<i>Minimise structure on the floor plates (columns and shear walls) to maximise future potential adaption.</i>	
Designing for flexibility		<i>Regular foundations, and loadings, allow for flexible future uses.</i>	<i>Internal floorplates are relatively clear and allow for future flexibility. Timber structure is relatively transparent and can be flexible for new small openings.</i>	<i>N/A</i>	<i>For the clients to make sure that the as-built information in the Health & Safety file is readily available, which will help future</i>	<i>Adopt the Golden Thread principles, as used for High Risk Buildings.</i>	

					<i>designers looking at other potential uses.</i>		
Designing for replaceability		<i>Reinforced Concrete substructure designed for a life of 50+ years.</i>	<i>Superstructure designed for a life of 50+ years. Elements of the timber frame can be replaced if needed, due to say long-term water ingress onto a rafter causing rot.</i>	<i>N/A</i>	<i>Ensuring good maintenance to keep the timber structure dry.</i>		
Designing for disassembly		<i>Reinforced concrete construction is inherently robust and so difficult to dismantle. Can be crushed and recycled.</i>	<i>Reinforced concrete construction is inherently robust and so difficult to dismantle. Can be crushed and recycled. Timber frame can be disassembled, but with some cutting at connections.</i>	<i>N/A</i>			
Designing for longevity		<i>Using cement GGBS cement replacement with appropriate reinforcement cover will allow the concrete structure to be durable beyond</i>	<i>Using cement GGBS cement replacement with appropriate reinforcement cover will allow the concrete structure to be durable beyond</i>	<i>N/A</i>		<i>Site specific ground investigations to be undertaken, including contamination testing.</i>	

		<i>the design life of 50 years.</i>	<i>the design life of 50 years.</i> <i>Timber structure is used in an internal environment and if kept dry will last in excess of the design life.</i>			<i>Regular building maintenance to ensure that the timber structure remains dry.</i>	
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1.2.3 MEP design approaches – Environmental Engineering Partnership (EEP)

Design Approaches		Services e.g. MEP plant, pipework, ductwork, cables, renewable technology	Construction Stuff e.g. temporary installations/works/materials, packaging and equipment etc.	Challenges Potential challenges in achieving the design suggestions	Actions How will this be done and next steps?	Plan to Prove and Quantify e.g. SWMP, WLCA, Design stage reviews and implementation etc
Is it likely the layer (or components within it will need to be moved or modified within the 5-15yrs (e.g. change in use patterns)? (YES , NO)		No				
Is it likely the layer (or components within it will need to be changed, upgraded or replaced within the 5-15yrs (e.g. for improved performance, aesthetics)? (YES , NO)		No				
Designing out Waste	Product Sourcing and construction stage	The MEP design is being developed to allow for air handling units, condensing units, fan coil units etc will be pre-fabricated offsite and delivered as complete units.		Access to site is via a narrow farm track.	Work with contractors to ensure they are aware of any delivery restrictions	Work alongside contractors to minimise and review wastage.
	In use Stage	Provide facilities management O&M guides are to ensure all systems are operated and maintained correctly, thereby extending their potential life span.		Final system users are often non-technical.	Work with contractors and client to ensure user guides are written in the appropriate way to make them useful and applicable.	Ensure the review and commenting process is started well ahead of handover.

	<p>End-of-life stage</p>	<p>Replace plant with like-for-like to minimise upstream or downstream alterations.</p>		<p>Technology progresses and can frequently result in discontinued equipment and/or changing size, shape or connection types.</p>	<p>Avoid bespoke elements and use of technology, e.g refrigerants, that are likely to be phased out in the near future.</p>	<p>Review and monitor the design as it progresses towards procurement.</p>
	<p>Benefits and Loads Beyond the system boundary</p>	<p>Design to tight and tested loads, to avoid over-engineering.</p>		<p>There is often contradictory guidance. Limited information available on the ventilation and cooling requirements for the project specific machines</p>	<p>Work with contractors to ensure loads and system parameters are fully understood and agreed upon.</p> <p>Work with contractors to ensure the early engagement with specialist filtration manufacturers to ensure requirements can be accommodated.</p>	<p>Review and monitor throughout.</p>
<p>Component or material reuse and recycle</p>	<p>Air handling units and fan coil unit filters will be specified to be reusable allowing for hoovering and cleaning multiple times before replacement.</p> <p>Plant will be specified from manufacturers that make space parts/components available for a reasonable time even after the item has been discontinued allowing for component change rather than a system replacement.</p>		<p>Inherently, not all aspects of the MEP will be recyclable.</p> <p>Manufacturers can only hold stock of replacement items for so long after they have been discontinued.</p>	<p>Contractors will provide guidance within the O&Ms such that plant can be largely repaired rather than replaced as well as guidance on end-of-life disposal/recycling.</p>	<p>Ensure reuse and recycling policy is included within the O&M's and advised to the operators.</p>	

	Plant will be specified that can be largely recycled at the end-of-life				
Designing for flexibility	<p>All systems are designed to be modular to allow for localised changes should they be required without having an impact on the whole building.</p> <p>Strategic points of isolation will allow for future shut-down and minimal abortive install, should the requirement arise.</p>		Cost-led changes to the design can often hinder the future flexibility.	Ensure these requirements are built-in to the contractor's design and carried through to delivery.	Review and monitor throughout.
Designing for replaceability	Plant will be specified from manufacturers that make space parts/components available for a reasonable time even after the item has been discontinued allowing for component change rather than a system replacement.		Maximising of usable floor space can causes special constraints.	Work with contractors, maintenance team and building users to ensure the maintenance and replacement strategies are fully understood.	Contractor to demonstrate the maintenance and replacement strategy of all plant to the client FM teams in a series of MEP training sessions at handover.
Designing for disassembly	<p>Design all systems to use standardised components, allowing for easy replacement when required.</p> <p>Provide accessible risers and clear labelling to allow tracing and removal of cables, pipes and ducts.</p> <p>Design all systems to be fully accessible and maintainable, thereby allowing for disassembly and removal of parts</p>		<p>Supply chain availability can cause for alternative systems/manufacturers to be considered.</p> <p>Access is sometime hindered due to architectural and structural site constraints.</p>	Work with architects, structural engineers and contractors to ensure access for maintenance is provided throughout; and that any specific concerns are dealt with collaboratively.	On site monitoring of installation to be regularly carried out to ensure design is adhered to.

	without any knock-on effect to other systems.				
Designing for longevity	<p>Plantrooms, risers, access panels etc to be design to enable easy access to carry out maintenance, prolong the life expectancy and premature replacements.</p> <p>Design BEMS system to allow for the systems to operate only when the building is in use and to indicate faults.</p> <p>Specify systems with long life expectancy to prolong the operation of active components</p>		Longevity of plant is partly due to installation quality but mainly relies on ensuring the correct, regular and proper maintenance is carried out.	<p>Ensure final selection of plant is such that units are not selected to operate at their peak output for prolong periods of time.</p> <p>Provide effective controls to turn plant off when not needed.</p> <p>Ensure building maintenance staff are aware of the correct maintenance schedules.</p>	<p>Ensure maintenance requirements for all plant is clearly detailed within the handover pack and O&M's.</p> <p>Ensure maintenance contracts are in place after handover</p>

1.2.4 Circular Economy targets – McDonald Architects

Circular Economy targets for new development	Policy Requirement	Target Aiming For (%)	Will this target be met? (Y/N)	Explanation (How will performance against this be secured through design, implementation and monitoring?)
Waste materials: - Construction	Minimum of 95% diverted from landfill for reuse	95%	Y	<i>Site Waste Management Plan produced by Velocity will identify the predicted waste streams and quantities of waste that can be recycled / reused.</i>
Waste materials: - Demolition (non-hazardous)	Minimum of 95% diverted from landfill for reuse	95%	Y	<i>Pre-demolition audit produced by Velocity will identify the predicted waste streams and quantities of waste that can be recycled / reused.</i>
Waste materials: - Excavation	Minimum of 95% diverted from landfill for reuse	95%	Y	<i>Pre-demolition audit produced by Velocity will identify the predicted waste streams and quantities of waste that can be recycled / reused.</i>
Municipal waste	Minimum 65% recycling rate by 2030	65%	Y	<i>The operational waste management plan produced by Velocity will provide calculations and proposed bin sizes to ensure the 65% recycling rate target is met by 2030.</i>
Recycled content	Minimum 20% of the building material elements to be comprised of recycled or reused content	20%	Y	<i>Upfront and Embodied Carbon assessments undertaken by Scotch Partners will identify the initial recycled content present within the proposed materials.</i>