RIDGE

Circular Economy Statement

Octagon House Manchester

OCTAGON HOUSE MANCHESTER
CIRCULAR ECONOMY STATEMENT

Prepared for

Octagon Project Manchester

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Version Control

Project	5033325
Issue Date	24th August 2026
Originator	AG
Checked	SS
Version	04

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1. EXECUTIVE SUMMARY

Ridge & Partners LLP have been appointed to prepare a Circular Economy (CE) Statement for the Octagon development in support of the detailed planning application, to align with the National Planning Policy Framework (NPPF), Manchester County Council (MCC) Core Strategy and Places for Everyone Joint Development Plan. The purpose of the CE Statement is to demonstrate that the proposed development has considered, and will incorporate, CE principles into all aspects of the design, construction, and operation process.

Overall, the Circular Economy statement aims to ensure that the development:

- Considers strategies to facilitate the transition towards a circular built environment.
- Reports against numerical targets that will facilitate monitoring of waste and recycling.
- Recognises opportunities to benefit from greater efficiencies that can help to save resources, materials, and money.

The report is prepared to support the planning application for the Octagon development. The development comprises the *'Full planning application for the refurbishment and extension of Octagon House and the erection of buildings of up to 11 storeys in height to accommodate a mix of uses comprising Purpose Built Student Accommodation bedrooms (205 studios and 35 apartments accommodating 255 bedrooms) (Sui Generis Use Class); Key Worker accommodation (Sui Generis Use Class) (211 units); Residential units (16 no) (Use Class C3); 2,568 sq m of healthcare use (including the retention of an existing healthcare facility on site) (Use Class Ee); and 394 sq m of commercial or community uses (Use Classes Ea, Eb, Eciii, Ee, Ef, F1e, F2b, F2c) with associated site access, car and cycle parking and landscaping.'*



Figure 1 - Location of the Octagon House development (Source Hodder & Partners)

The project team undertook a CE workshop to discuss these and set out preliminary targets. This has helped define the strategy approach to the CE Statement and facilitate the implementation of CE principles most effectively. The following parties listed in Table 1 were part of these discussions and engaged in development, design, and delivery of the CE statement.

COMPANY	ASSOCIATED DISCIPLINE/ROLE(S)
Warrington Martin	Project Manager
Octagon Project	Client
Ridge & Partners LLP	Mechanical and Electrical Engineering, Sustainability, Civil & Structural Engineering
Hodder & Partners	Architecture

Table 1 - Contributing parties

In summary, this statement outlines how the Octagon development aims to meet the following principles:

- How materials arising from demolition and remediation works will be re-used and/or recycled;
- How the proposal's design and construction will reduce material demands and enable building materials, components and products to be disassembled and re-used at the end of their useful life;
- Opportunities for managing as much waste as possible on site;
- Adequate and easily accessible storage space and collection systems to support recycling and re-use;
- How much waste the proposal is expected to generate, and how and where the waste will be managed in accordance with the waste hierarchy;
- How performance will be monitored and reported.

To identify the appropriate design approach for the development, the principles outlined in the Greater London Authority (GLA) Circular Economy Statement has been used, which includes a 'Decision Tree' approach to prioritising design considerations.

Retaining existing built structures totally or partially was prioritised before considering substantial demolition, as this is typically the lowest-carbon option. Since the proposal seeks to refurbish and repurpose the existing Octagon House building, the approach that will be followed for this area of the development is 'partial retention & refurbishment'. The building layer approach has been used to ensure that each of the principles outlined below have been explored fully for the new building associated with the development.

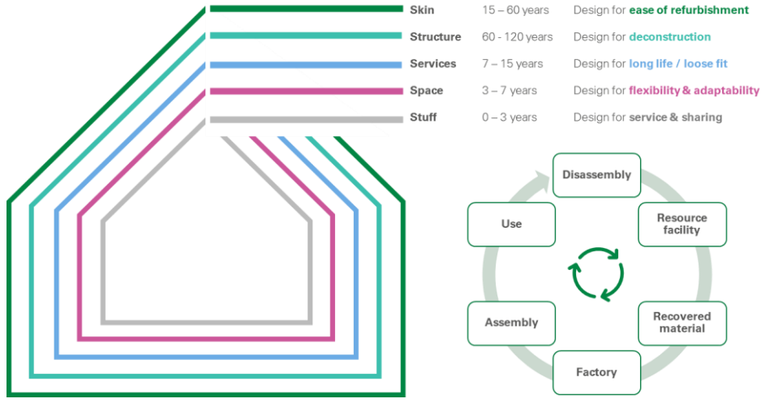


Figure 2 - Building in layers diagram, adapted from of Useful Projects & GLA, Circular Economy Statement Guidance

2. INTRODUCTION

2.1. Description of Development Site

The project is a proposed redevelopment of the existing Octagon House and new build on the corner of Carmoor Road and Hathersage Road, in Manchester.



Figure 3 – Location of the Octagon Development (Source: Hodder & Partners)

2.2. Project Description

The development comprises the *'Full planning application for the refurbishment and extension of Octagon House and the erection of buildings of up to 11 storeys in height to accommodate a mix of uses comprising Purpose Built Student Accommodation bedrooms (205 studios and 35 apartments accommodating 255 bedrooms) (Sui Generis Use Class); Key Worker accommodation (Sui Generis Use Class) (211 units); Residential units (16 no) (Use Class C3); 2,568 sq m of healthcare use (including the retention of an existing healthcare facility on site) (Use Class Ee); and 394 sq m of commercial or community uses (Use Classes Ea, Eb, Eciii, Ee, Ef, F1e, F2b, F2c) with associated site access, car and cycle parking and landscaping.'*

Key measurables:

- Number of student bedrooms – 455 (205 studios, 255 in cluster form)
- Key worker units – 141 studios, 86 one and two bedroom units
- Commercial or community unit at ground and first floor of Octagon House – 394 sq m
- Central Manchester Dialysis Unit (existing plus expansion to first floor of Octagon House) – 2,568 sq m
- Cycle parking spaces:
    - PBSA – 34
    - Key worker – 50
- Car parking
    - 19 spaces in south east part of the site currently used by staff and visitors of the Central Manchester Dialysis Unit to be retained for use by its visitors only
    - 32 new spaces to be provided for use by Central Manchester Dialysis Unit staff
    - 0 car parking across the rest of the site
    - All remaining existing car parking within the site will be removed

2.3. Policy Context

2.3.1. National Planning Policy Framework

A revised National Planning Policy Framework (NPPF) was published in August 2026 which sets out the government's planning policies for England and how they are expected to be applied. This framework confirms that:

'the purpose of the planning system is to contribute to the achievement of sustainable development.'

This highlights sustainability as a critical issue that runs throughout all of the planning policies. The National Planning Policy Framework (NPPF) defines sustainable development in agreement with the U.N. definition of "meeting the needs of the present without compromising the ability of future generations to meet their own needs". The NPPF outlines how three overarching objectives need to be pursued in mutually supportive ways in order to achieve sustainable development.



Figure 4 – Image of the Proposed Development (Source Hodder & Partners)

a. An **economic objective** – to help build a strong, responsive and competitive economy, by ensuring that sufficient land of the right types is available in the right places and at the right time to support growth, innovation and improved productivity; and by identifying and coordinating the provision of infrastructure.

b. A **social objective** – to support strong, vibrant and healthy communities, by ensuring that a sufficient number and range of homes can be provided to meet the needs of present and future generations; and by fostering a well-designed and safe built environment, with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being.

c. An **environmental objective** – to contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.

2.3.2. Manchester Local Plan

The Manchester Local Plan is the Adopted Development Plan for MCC. With respect to climate change and sustainability considerations, the following policies are included within the Manchester Local Plan Core Strategy (2012). Relevant extracts are provided below.

Policy EN4: Reducing CO2 Emissions by Enabling Low & Zero Carbon Development

This policy requires development to '*follow the principle of the Energy Hierarchy, being designed:*

- *to reduce the need for energy through design features that provide passive heating, natural lighting and cooling*
- *to reduce the need for energy through energy efficient features such as improved insulation and glazing*
- *to meet residual energy requirements through the use of low or zero carbon energy generating technologies'*
- *It also states that:*
- *'Wherever possible new development and retrofit projects, including energy generation plant, must be located and designed in a manner that allows advantage to be taken of opportunities for low and zero carbon energy supplies.*
- *Where possible new development and retrofit projects will be used as a mechanism to help improve energy efficiency and provide low and zero carbon energy supplies to existing buildings.*
- *Where appropriate new development and retrofit projects will be required to connect to and/or make contributions to low or zero carbon energy schemes and/or to incorporate provision to enable future connection to any existing / potential decentralised energy schemes.*
- *The use of building materials with low embodied carbon in new development and refurbishment schemes.'*

Policy EN 19 Waste

This policy states that the Council will:

- *'Require all developers, including those of new waste management facilities within the District, to demonstrate the proposal's consistency with the principles of the waste hierarchy (prevention, reduction, re-use, recycling/composting, energy recovery, final disposal)*
- *Require all developers to submit a waste management plan to demonstrate how both construction and demolition waste will be minimised and recycled on site wherever possible and how the sustainable waste management needs of the end user will be met.*
- *Promote the development of innovation and technological advancement within the sustainable waste management industry, aiming to achieve a closed-loop waste management system.*
- *Require waste management practices to have full regard to the environmental, social and economic impacts of such development and encourage long-term benefits in improving the environment, the regeneration of areas in need of investment and co-location with other employment uses where appropriate.*
- *Encourage communities to take responsibility for the waste they create through the provision of accessible facilities.'*

Policy DM1 Development Management

'All development should have regard to the following specific issues for which more detailed guidance may be given within a supplementary planning document:

- *Appropriate siting, layout, scale, form, massing, materials and detail.*
- *Impact on the surrounding areas in terms of the design, scale and appearance of the proposed development. Development should have regard to the character of the surrounding area.*
- *Effects on amenity, including privacy, light, noise, vibration, air quality, odours, litter, vermin, birds, road safety and traffic generation. This could also include proposals which would be sensitive to existing environmental conditions, such as noise.*
- *Accessibility: buildings and neighbourhoods fully accessible to disabled people, access to new development by sustainable transport modes. Community safety and crime prevention.*
- *Design for health.*
- *Adequacy of internal accommodation and external amenity space.*
- *Refuse storage and collection.'*

2.3.3. Guide to Development in Manchester Supplementary Planning Document

The Guide to Development in Manchester Supplementary Planning Document (SPD) was adopted in April 2017. The SPD is a material planning consideration for applications; however, it is not part of the development plan. While it references policies from the old Local Plan (UDP) which have been superseded it is still useful as a general guide to development. It includes a section on environmental standards, with sub sections on energy efficiency, renewable energy, environmental design, water management and weather resilience, waste management, construction management, biodiversity and waterways.

2.3.4. Net Zero Carbon and Climate Emergency

It is becoming increasingly recognised within the construction industry that successful incorporation of sustainability and CE principles into developments requires early consideration and ongoing review to ensure they can feed into the way buildings are designed, built, operated, and deconstructed. The GMCA acknowledges that tackling the climate and ecological emergency requires comprehensive action across of a range of issues including the circular economy, but the current challenge is the lack of knowledge surrounding the relationships between different environmental factors. Therefore, they have adopted a systemic, organisation-wide approach to begin to tackle such issues.

In June 2019, the UK Government committed the country to a legally binding target of net zero carbon emissions by 2050. Following this, a month later, MCC adopted a motion to declare a climate emergency which commits the Council to action to combat climate change. The Council have set out their aim of making Manchester a zero-carbon city by 2038 or before.

The Manchester Climate Change Framework 2020–25 is MCC's high-level strategy for meeting their commitment on climate change that builds on the Draft Manchester Zero Carbon Framework 2020-38 and the declaration of a climate emergency in July 2019. This was endorsed by MCC at the Executive meeting in March 2020 and will develop over the next five years, in line with changes in policy, climate science, rate of progress and other factors.

2.3.5. Greater Manchester Joint Waste Development Plan Document

In 2006, the Association of Greater Manchester Authorities (AGMA) produced a Joint Waste Development Plan AGMA consists of all ten Greater Manchester local authorities. The Waste Plan forms part of each Authority's statutory development plan and runs from 2012 to 2027.

The Greater Manchester Municipal Waste Management Strategy outlined within this document sets out a framework for managing Local Authority collected waste arisings up to 2030. The key target of the Strategy includes achieving levels of recycling and composting of household waste:

- 33% by 2010
- a minimum of 50% by 2020 and through to 2030

2.3.6. Places For Everyone Joint Development Plan Document

'The achievement of a circular economy and a zero-waste economy will play a key role in meeting Greater Manchester's ambition of becoming a leading green city region by 2038. The following measures will help achieve this:

1. Development and implementation of the Resource Strategy for Greater Manchester which promotes overall reduction in the level of waste produced and supports resource efficiency within the Plan area in order to gain the maximum value from the things we produce;
2. Ensuring the design of all new development incorporates storage space to facilitate efficient recycling and where appropriate, processing of waste on site;
3. Recognition of the role of existing infrastructure in managing our waste and protecting such facilities to ensure adequate waste management capacity is maintained; and
4. Using sustainable design and construction techniques to reduce carbon emissions, adapt and future proof to the impact of climate change, reduce and recycle waste and minimise water use.'

2.4. Method Statement

The sustainability and CE strategy for the development has been developed to support the Manchester Local Plan Core Strategy, specifically Policies EN19 and DM 1.

The core principles of CE are intrinsically linked to sustainability principles which are already important considerations for all development schemes amidst the climate change emergency. The Greater Manchester Combined Authority (GMCA) declared a climate emergency in July 2019 and launched a plan in March 2020 following 12 months collaboration and consultation with representatives from areas across the city region.

It is becoming increasingly recognised within the construction industry that successful incorporation of sustainability and CE principles into developments requires early consideration and ongoing review to ensure they can feed into the way buildings are designed, built, operated, and deconstructed. The GMCA acknowledges that tackling the climate and ecological emergency requires comprehensive action across of a range of issues including the circular economy, but the current challenge is the lack of knowledge surrounding the relationships between different environmental factors. Therefore, they have adopted a systemic, organisation-wide approach to begin to tackle such issues.

Figure 5 has been adapted from the UK Green Building Council (UKGBC) to highlight specific actions that design teams can take at each RIBA stage to incorporate the core CE principles into their developments.

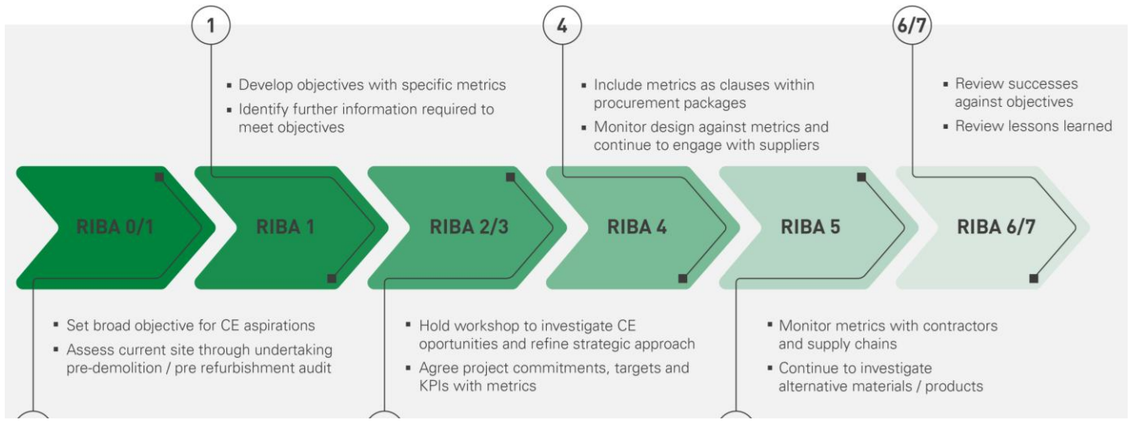


Figure 5 - Methods to incorporate CE principles into a development process using RIBA work stages (Source: adopted from UKGBC)

[1] *Circular Economy Statement Guidance | GLA (london.gov.uk)*
[2] *Built Environment - Circle Economy (circle-economy.com)*

A workshop has been held during RIBA Stage 2 which meets the methods as noted in Figure 5 and detailed in Section 3.4. Due to the nature of the scheme, assessment of the current site through undertaking a comprehensive Pre-Demolition Audit is expected to occur during Stage 3. It is anticipated that the scheme will then follow the further steps as set out in Figure 5.

3. CIRCULAR ECONOMY ASPIRATIONS

The is circular economy is defined by the GLA London Plan as one "where materials are retained in use at their highest value for as long as possible and are then reused or recycled, leaving a minimum of residual waste. The end goal is to retain the value of materials and resources indefinitely, with no residual waste at all. This is possible, requiring transformational change in the way that buildings are designed, built, operated and deconstructed". The approach to CE for the proposed development has also been based on core guiding principles as set out by the GLA's Circular Economy Statement Guidance and the Waste Hierarchy to ensure design measures to prioritise avoiding or reducing waste.

Key themes and objectives pertinent to this CE Statement is Key Theme 1 – Consumption, Resources and Waste and Key Theme 3 – Homes, Buildings, and the Built Environment. Manchester City Council have stated that the achievement of a circular economy and zero-waste economy will play a pivotal role in meeting Greater Manchester's ambition of becoming a leading green city by 2038 and therefore will support measures to help achieve a circular and zero-waste economy,

3.1. Introduction to CE principles

In contrast to our current linear system where users 'Take, Make, Dispose', the CE can be thought of as a 'living' system[1] whereby materials and products are optimally used and reused (Figure 6) which preserves the value of resources and operates within the boundaries of our planet. Ultimately, a shift to a CE is fundamental in delivering better outcomes for people and the environment.

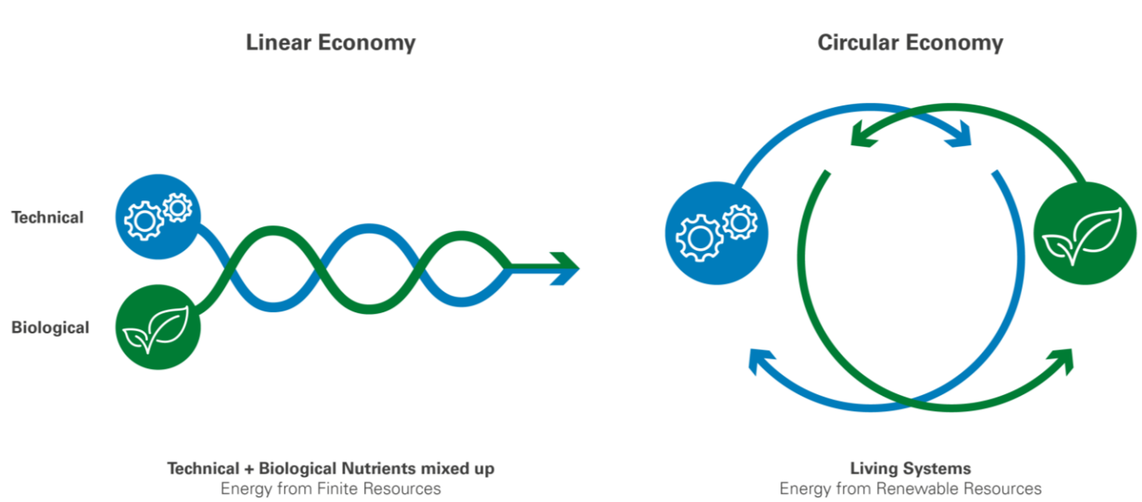


Figure 6 - Representation of Linear vs Circular Economy adapted from Ellen MacArthur Foundation, 2015 (Source: adapted from ARUP)

The UKGBC[2] identifies that the circular model revolves around three principles:

[3] *Circular-Economy-Report.pdf (ukgbc.s3.eu-west-2.amazonaws.com)*

- Design out waste and pollution
- Keep products and materials in use
- Regenerate natural systems

These principles facilitate sustainability through gradually decoupling economic activity from the consumption of finite resources. The further distinction between technical and biological cycles allows for the biologically based materials and building components to be fed back and regenerate living systems while the technical cycles encompass recovery, restoration, reuse or (at last resort) recycling.

3.2. Application to the built environment

Applying CE principles to the built environment is complex, the following nine core guiding principles (Table 2) are similar to those from the UKGBC above but are more specific to support the CE and underpin the structure and content requirements of CE Statements. Commitments to these principles will be detailed in Section 4 with supporting strategic approaches in Section 3.

Table 2 - GLA Six Circular Economy Principles

1. BUILDING IN LAYERS
Ensuring that different parts of the building are accessible and can be maintained and replaced where necessary
2. DESIGNING OUT WASTE
Ensuring that waste reduction is planned in from project inception to completion, including consideration of standardised components, modular build, and reuse of secondary products and materials
3. DESIGN FOR LONGEVITY
Designing to avoid a premature end of life for all components through considering maintenance and durability.
4. DESIGN FOR ADAPTABILITY OR FLEXIBILITY
Adaptability - A building that has been designed with thought of how it might be easily altered to prolong its life, for instance by alteration, addition, or contraction, to suit new uses or patterns of use. Often used interchangeably with flexibility; however, it relates more to building structural changes.
Flexibility - A building that has been designed to allow easy rearrangement of its internal fit-out and arrangement to suit the changing needs of occupants. Often relates to floorplates rather than structural changes.
5. DESIGN FOR DISASSEMBLY
Designed 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.
6. USING SYSTEMS, ELEMENTS OR MATERIALS THAT CAN REUSED AND RECYCLED
The use of a product in its original form with minimal reprocessing. Preparation for reuse involves checking, cleaning or repairing materials so that they can be used again for their original purpose. Materials can be reused as a whole; redeployed as modules; or reused as kit of parts on one or more different sites.

STRATEGIC APPROACH

3.3. Building in Layers

To accelerate the transition and embed CE principles within the proposed development, the 'building in layers' concept will form the foundations of the strategic approach. Each 'layer' has its own life cycle which requires a unique design approach to ensure material use and reuse is optimised and waste is designed out (Figure 7).

Looking at this approach in further detail, the structure of the building will be designed to have a long-life cycle (more than 25 years) so longevity, adaptability and flexibility will be prioritised. Furthermore, features that will need to be replaced over the lifetime of the building and elements with a shorter life expectancy (less than 25 years) will be designed for ease of maintenance, reuse, and recoverability.

Adopting this design approach that recognises these distinctions will ensure the structure and façade of a development will be built to be long lasting and adaptable, whilst individual components like the services, interior space and furnishings are designed in a way that supports reuse or recycling.

The specific 'layers' that are commonly referred to across industry are defined below in Table 3, with reference to the RICS New Rules of Measurement (NRM) classification system.

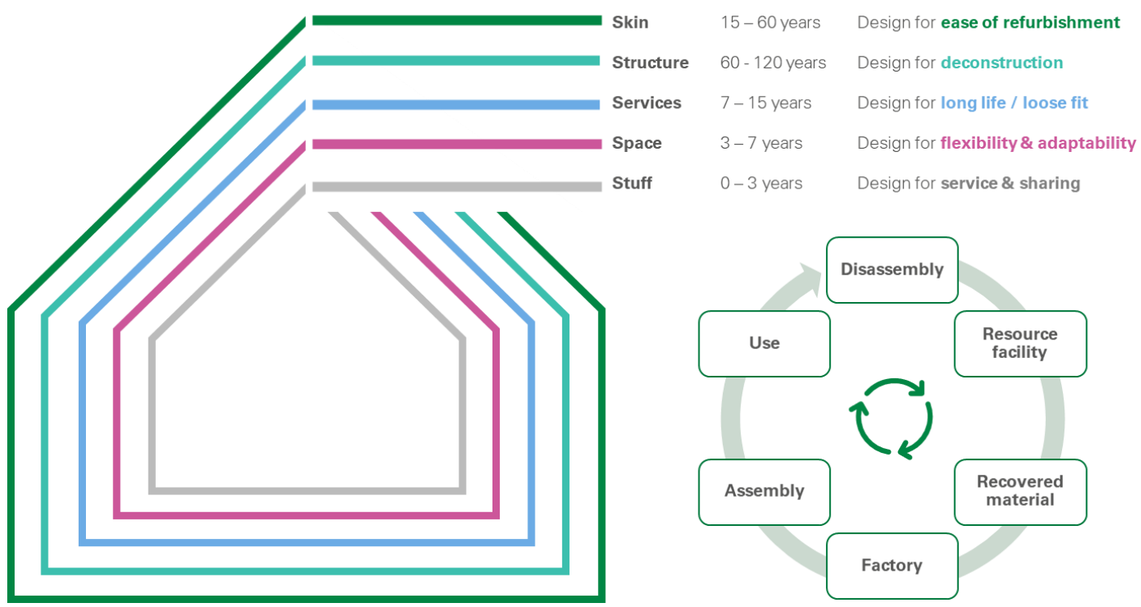


Figure 7 - Building in layers diagram, adapted from of Useful Projects & GLA, Circular Economy Statement Guidance

Table 3 - Building in Layers approach (Source: GLA

LAYER (RICS REFERENCE)	CONSITUENTS	OVERARCHNG STRATEGY
Site (8)	The geographical setting, urban location, and external works	▪ Maximise residual value - strategy as defined by the GLA's 'Decision Tree'.
Substructure (1)	Excavations, foundations, basements, and ground floors	▪ Longevity- focus on long terms needs while being durable and resilient with little modification and no replacement. ▪ Adaptability- designed to meet present needs, but also future change with consideration of how those needs might evolve. Modifications are likely to involve planning, building control and 'wet trades'. ▪ Flexibility- designed for change through frequent reconfiguring including reconfiguration of non-structural parts. configurations are likely to be pre-agreed with planning and building control and not involve 'wet trades' or any waste.
Superstructure (2.1, 2.2, 2.4)	Load-bearing elements above plinth including roof supporting structure	
Shell / Skin (2.3, 2.5, 2.6)	The layer keeping out water, wind, heat, cold, direct sunlight, and noise	
Services (5)	Installations to ensure comfort, practicality, accessibility, and safety	▪ Reusability- Designed to be redeployed as modules or reused as a kit of parts on one or more different sites while minimising any servicing and maximising the size of the future market by using high-demand, standard dimensions and specifications. ▪ Recoverability- Designed to be deconstructed and reused or recycled on a part-by-part basis due to neither modules nor a kit of parts being desirable, feasible or viable and/or a limited future market as a result of unusual parts, dimensions or specifications.
Space (2.7, 2.8, 3)	The layout, internal walls, ceilings, floors, finishes, doors, fitted furniture	▪ Functional adaptability – Feasibility, Accessibility, Versatility, Convertibility, Expandability, Refurbishment potential.
Stuff	Anything that could fall if the building was turned upside down	▪ Service and sharing ▪ Resource optimisation
Construction stuff	Any temporary installations/works/materials, packaging and equipment	▪ Off-site construction ▪ Standardisation ▪ Reuse of materials

When selecting and designing the layers, the following hierarchy will also be applied as detailed in Figure 8 below.



	1. Design out	2. Reclamation, remanufacture	3. Product Selection
What ?	Design out the need for the component or material in the first intance	Use materials that have been previously used which could be altered, re-sized, refinished or adapted.	Actively selecting products and materials which can be easily remanufactured or reused at the end of their first life.
How?	Integrate passive design and/or freecooling measures to reduce the total heating, cooling, mechanical ventilation, and lighting loads.	Example include bricks, doors, window frames, glass panels, metal fixtures, and steel sections. Remanufactured components over new components ensures no loss in material quality, unlike recycling.	Use products which are Cradle to Cradle Certified® Product Standard and natureplus Eco-label. Materials with recycled content can also be considered and even leasing of short-lived components.

Figure 8 - Designing layers hierarchy

All of these layers above will be designed with consideration for disassembly, with inclusion of the following principles:

- Versatility
- Convertibility
- Expandability
- Ease of access
- Independence
- Simplicity
- Standardisation
- Safety of disassembly

3.4. Defining the approach

High level strategic opportunities were explored during a workshop with the project team on 21.5.2026 which has fed into the development of this CE statement. The following aims and objectives for the workshop had been achieved:

Aims:

1. Understand circular economy principles.
2. Explore how circular thinking can be incorporated into the scheme.
3. Develop the first draft of a circular economy statement.

Objectives:

- Recognise the difference between linear and circular economies.
- Understand the circular economy statement requirements.
- Apply the 'Decision Tree' guidance to maximise residual value

3.5. Decision tree for design approach

As there are existing buildings on site which will be demolished, the comprehensive pre-demolition audit that is to be conducted during Stage 3 will determine whether the 'demolish & recycle' approach is most appropriate for this area of the development. The current overarching approach has been outlined in Table 5 which accounts for the other areas of the development where retention and new construction are proposed.

Existing buildings for demolition

The existing data centre building proposed for demolition is coming to the end of its useful life and is therefore deemed unsuitable to refurbishment for a development of this scale. It is envisaged that most of the materials forming the existing structure will be recycled offsite, however opportunities to retain crush from the demolition of the foundations and slabs of the data centre for reuse in the hard landscaping strategy will be explored at a later stage of design.

Existing buildings for retention

Retaining existing built structures totally or partially should be prioritised before considering substantial demolition, as this is typically the lowest-carbon option. Since the proposal seeks to refurbish and repurpose the existing Octagon House building for the scheme, a significant amount of material forming the existing structure of Octagon House will be retained. The approach that will therefore be followed is 'partial retention & refurbishment' for this area of the development.

Minor modifications are proposed at ground floor to the existing Octagon House structure, shown in Figure 9. The remaining building, including the upper 1-4 floors will be remodelled internally, a rooftop extension is also proposed to create an additional storey and a lightwell spanning approximately three floors will be introduced. Most of the existing brick and block elements of the external walls are being retained with replacement of the overcladding and windows.

New developments

Alongside the Octagon House redevelopment three new buildings will be constructed, ranging from 4 to 11 storeys to provide a mixed-use space comprising key worker accommodation, purpose-built student accommodation, amenity areas and commercial units.

All developments should be designed so that buildings can be adapted to extend their life. They should also be designed so they can be deconstructed and reconstructed to allow components and materials to be salvaged for reuse or recycling, whilst maintaining their economic and environmental value. The appropriate design approach for the new buildings and the new additions to the existing Octagon House building, have been informed by the decision tree in Figure 10. In line with this approach the circular economy principles have been applied to each building layer, as detailed in Section 6 below.

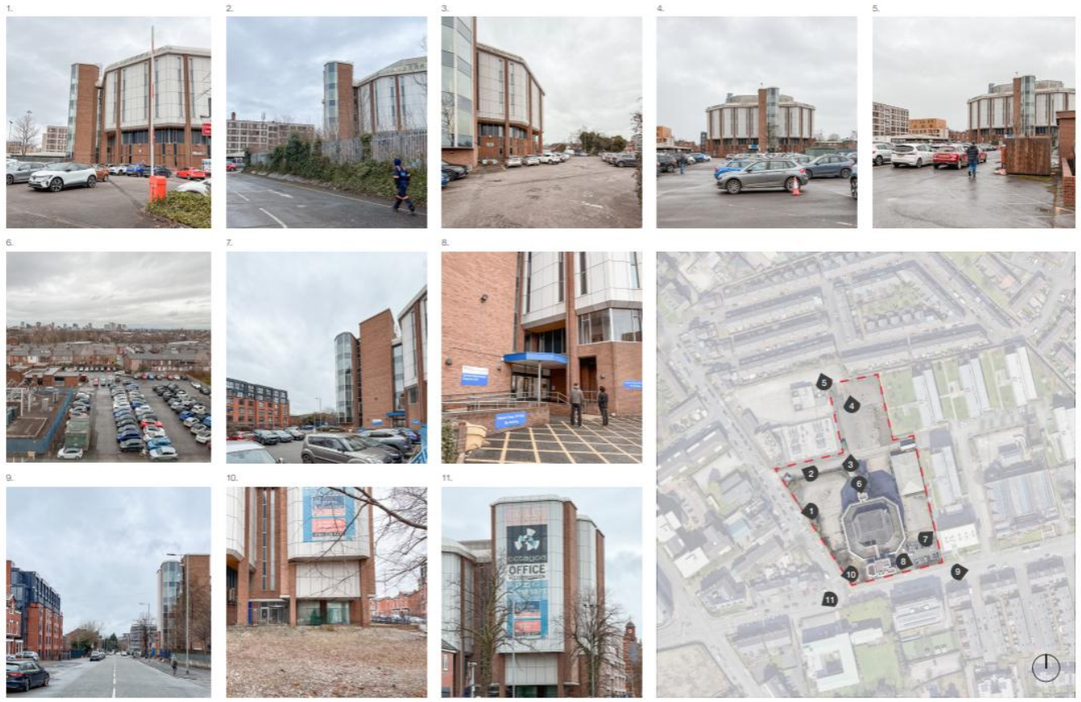


Figure 9 – Existing Octagon House development (Source: Hodder & Partners)

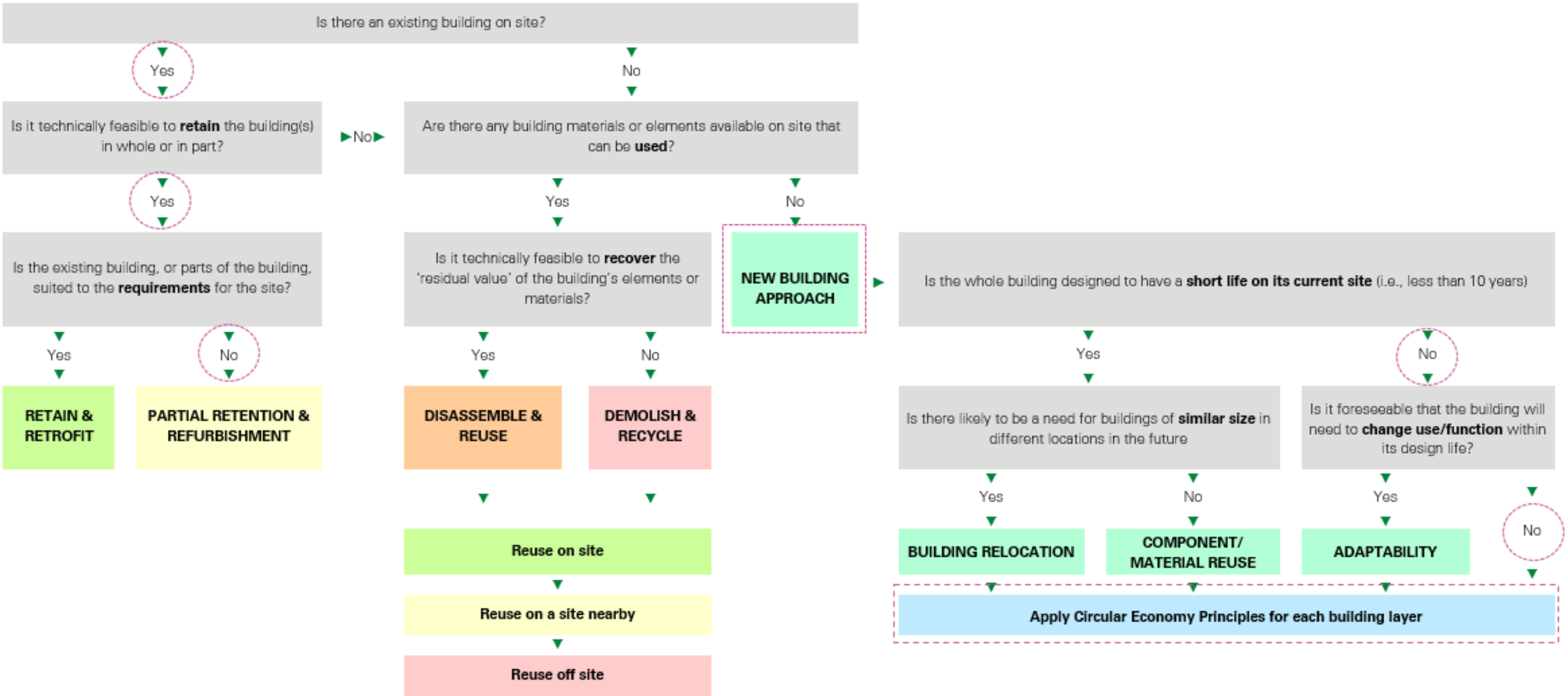


Figure 10 - Decision Tree (Figure 3.1: Illustration 3 of the GLA's Circular Economy Statement Guidance, from GLA's CE Guidance online)

4. KEY CIRCULAR ECONOMY COMMITMENT

The national principles and guidance and Policy EN19 and DM1 of the adopted Manchester Core Strategy, along with the development of the Greater Manchester Spatial Framework, demonstrates the ambition to move to a circular economy. The proposed development demonstrates a clear commitment to designing and building a development which considers the impacts of circularity in relation to materials and waste.

The key commitments to CE are summarised in Tables 4 and 5, which consider how the Octagon development can apply the nine circular economy principles (see Table 3) to each building 'layer' (See Section 3.3) considering all life-cycle stages. The contents of Tables 4 and 5 will evolve and be refined and updated as the design progresses.

Table 4 - Strategic approach in line with Appendix A of the GLA's Circular Economy Statement Guidance

ASPECT	PHASE / BUILDING / AREA	STEERING APPROACH	EXPLANATION	TARGET	SUPPORTING EVIDENCE
Circular economy approach for the new development	New buildings	Ensuring construction waste is managed sustainably at the highest value with reuse and recovery prioritised to ensure diversion from landfill.	A comprehensive resource management will detail procedures to estimate, monitor, measure and report on site waste. Procedures to sort, reuse and recycle construction waste into waste groups will be appropriately reviewed.	90% construction waste diverted from landfill.	Resource Management Plan
		Designing out waste and materials optimisation.	A comprehensive resource management plan will be developed to promote resource efficiency through minimising waste at source. A waste-minimisation target and details of waste minimisation actions to be undertaken will be detailed.	Wate generated during construction to be no more than ≤ 11.1 tonnes / 100m^2	Resource Management Plan
		Ensuring sustainable and responsible procurement of materials.	A sustainable procurement plan will set a clear framework for the responsible sourcing of construction products to guide procurement throughout the project.	In line with Sustainable Procurement Plan targets	Sustainable Procurement Plan
		Design for disassembly and recoverability.	Conduct a functional adaptability and disassembly study to ensure the avoidance of unnecessary materials use, cost and disruption arising from the need for future adaptation works as a result of changing functional demands. This will maximise the ability to reclaim and reuse materials at final demolition and increase the lifetime value of materials and products.	Report recommendations to be implemented within design approach for both Octagon House and the new build blocks	Functional Adaptability and Disassembly Study
		Designing for the future	The project team will aim to reduce the overall site's environmental life cycle impacts through conducting a BREEAM LCA and using this to inform the design decision-making process.	Meeting the BREEAM v7 LCA benchmarks	LCA report
Circular economy approach for the existing site	Octagon House	Designing for reuse, recovery, and designing out waste to conserve virgin resources.	A pre-demolition audit will be completed for any existing buildings, structures or hard surfaces which will be demolished. This will investigate the potential for refurbishment or reuse and ensure that material recovery is maximised. The findings from this audit will guide the design and ensure that overall recycling targets, reuse targets and demolition landfill diversion rates have been set.	90% demolition waste diverted from landfill. 90% excavation waste diverted from landfill.	Pre-demolition audit BREEAM Wst 01 evidence
Circular economy approach for municipal waste during operation	All buildings	Designing out waste and ensuring municipal waste is managed sustainably at the highest value.	An operational waste strategy will outline how the development has been designed to be sustainable and forward- thinking in its approach to waste and recycling, whilst remaining workable during operation. This will be enabled by the provision of adequate labelled and segregated bin storage facilities for all building users.	50% of bin provision dedicated for recycling, including organic waste, to align with GM waste strategy	Operational Waste Management Strategy

Table 5 - Summary of key CE commitments in line with Appendix B of the GLA's Circular Economy Statement Guidance

	SITE	SUBSTRUCTURE	SUPERSTRUCTURE	SHELL/SKIN	SERVICES	SPACE & ASPECTS	CONSTRUCTION aspects	SUMMARY	CHALLENGES	COUNTERACTIONS + WHO + WHEN
SECTION A: CONSERVE RESOURCES - guides designers to focus on conserving materials and resources, and to source materials responsibly.										
1. Minimising the quantities of materials used	Accurate measurements of the quantities required is being undertaken. Methods of construction to be employed to use materials in the most efficient way. Operatives to be suitably qualified for the proposed methods of work.	Materials will be selected which maximise span-to-weight ratio and therefore minimise the quantity of structural material used. Piled foundations have been prioritised over pad foundations as they typically use less material. The size and number of piles optimised to reduce material usage. The structural design is resource efficient through the use of cement replacement products and water reducing admixture. These will conserve virgin material use in the concrete.	A consistent architectural layout aids in the uniformity of the column grid creating an efficient overall structure. Materials which maximise span-to-weight ratio will be selected, minimising the quantity of structural material used. The use of pre-fabrication where possible will be investigated. Columns sizes and reinforcement will be standardised for ease of construction.	Design of the structural frame is to be undertaken independently of the façade allowing for the façade to be easily replaced with any reuse of existing material also enabled. The pre-cast façade for the new build elements will be manufactured offsite which will reduce onsite construction waste.	Individual systems should be designed and rationalised to minimise distribution, incorporating the most efficient route where possible. Efficient and early design of the plant has been undertaken to inform structural design. Where possible items will be assembled offsite. The number of apartment types have been considered to maximise as much repetition as possible.	Materials will be utilised to their intended tolerances with research provided into suitability of selection and application. Minimise internal columns and use light weight partitions where practical including demountable suspended ceilings. Any internal walls will provide options for adaptability and refurbishment beyond the design life of the development. Repetitive layouts are used across the different floors which will provide standardization across the development blocks. All units are likely to have the same finishes. The installation of finishes to the areas to be leased out will be limited to avoid the unnecessary specification of materials.	Resource efficiency targets to be set, controlling material use per 100 m^2 Practices are to be reviewed with contractor during pre-construction supply chain engagement. A 'just-in-time' delivery system will be considered onsite to minimise stockpiling and reduce the risk of damage to materials. Protective coverings will be left on products for as long as possible to reduce the risk of damage during the construction process.	Overall, the design is to be optimised at every opportunity to reduce material consumption. This also means designing out waste at source.	Potential for unforeseen challenges as the design progresses, for instance, prioritising different requirements and needs of the design itself. Supply chain disruption could cause procurement problems. This can be difficult to monitor. Other factors may take precedence through Value Engineering.	Ensure all aspects of the design are considered optimised, particularly structurally and architecturally. Pre-construction supply chain engagement from the contractor when appointed. Opportunities for MMC and offsite fabrication will be considered where possible such as bathroom pods, steel fabrication, door sets, windows, staircases. Site Waste Management Plan Functional Adaptability & Disassembly Study

		SITE	SUBSTRUCTURE	SUPERSTRUCTURE	SHELL/SKIN	SERVICES	SPACE & ASPECTS	CONSTRUCTION aspects	SUMMARY	CHALLENGES	COUNTERACTIONS + WHO + WHEN
2.	**Minimising the quantities of other resources used (energy, water, land)**	The development will be built on the building footprint of an existing commercial site which minimises the use of virgin land resources. The site utilises a previously occupied site, therefore no virgin land resources are consumed. Landscaping strategy to be designed to not require additional irrigation	A Life Cycle Assessment Study is being undertaken for the Proposal. Identification of carbon hotspots across the proposed development will facilitate design optimisation. This information will prompt consideration of alternative materials to reduce embodied emissions. The building fabric has been optimised to reduce energy demand through reduced thermal losses and efficient daylighting design. The constituent parts of concrete (water, cement and aggregate) are all readily and locally available to any construction site, keeping any impact of transporting raw materials low. Sourcing local products to reduce transport distances will be prioritised where possible and will be explored at a later stage in design		Highly efficient building fabric (in accordance with latest building regulations) and a low heat loss form factor where possible across the design to minimise the peak heating and cooling loads of the building. The size and number of windows ensure that the building does not overheat while daylight/sunlight is maximised Shading elements to be utilised and solar shading measures can be adapted for future climatic scenarios	Low water consuming outlets should be specified on WCs, urinals, taps, showers, baths, dishwashers, and washing machines. Leak detection systems are to be installed to identify water leaks quicker and avoid wasted resources. Electric based central plant strategies such as 'air source heat pumps' will be implemented in addition to PV. All blocks will be individually metered, in addition to submetering for the commercial unit.	The layouts ensure optimisation of drainage runs and other service requirements are cost effectively achieved minimising resource consumption. Simple clear programmable user controls to avoid wasting resources unnecessarily will be integrated. Latest systems and technologies are to be used to maximise system efficiencies.	Energy, water, and transportation movements on site will be monitored by the contractor	Efficient building design ensures energy and water consumption has been driven down where possible. Particular attention to services has been given which presents the most opportunities.		Energy Strategy to be developed to reflect energy efficiency considerations. Mechanical and Electrical Engineers to also reflect low water consuming sanitaryware, and other strategies. Embodied Carbon Assessment to be undertaken by Sustainability Consultant.
3.	**Specifying and sourcing materials responsibly and sustainably**	Priority will be given to major building elements which will result in the greatest impact. Where possible, these will	Opportunities to use recycled aggregates and GGBS in concrete at detailed design stage will be considered. Reinforcing Steel with a high recycled content will be specified.			Opportunities to specify ducting/pipework with a high recycled content will be reviewed at	All timber will be FSC certified.	N/A	Material suppliers are to provide valid responsible sourcing certification	Supply chain limitations and restrictions could cause difficulties when providing responsible	Endeavour to reduce the reliance on raw virgin materials and procure from sustainable sources.

	SITE	SUBSTRUCTURE	SUPERSTRUCTURE	SHELL/SKIN	SERVICES	SPACE & ASPECTS	CONSTRUCTION aspects	SUMMARY	CHALLENGES	COUNTERACTIONS + WHO + WHEN
	be covered by responsible sourcing certifications (e.g. BES 6001, ISO14001). Other schemes for specific materials should also be considered, including CARES Sustainable Constructional Steel Scheme, Aluminium Stewardship Initiative (ASI), and Concrete Sustainability Council (CSC). Material suppliers themselves are also to be approached for accreditation to sustainability standards and company sustainability policies. Consideration of Environmental Product Declarations (EPDs) will allow specifiers to compare products' sustainability performance and make more informed choices.	Use of local concrete plants to be investigated.			detailed design stage.			and/or EPDs with local suppliers to be prioritised.	sourcing certification and/or EPDs	The client will aim to ensure a construction specification that maximises energy and resource efficiency. To reduce the reliance on virgin materials in the construction material, the Contractor will specify the use of recycled materials wherever viable including steel content, aggregates, blockwork and building finishes and furnishes. The appointed Contractor may also possess a company-wide Sustainable Procurement Policy which will also be followed. The procurement team will ensure use of products from certified sustainable sources and ensure the availability of supply for the needs of the development.
SECTION B: DESIGN TO ELIMINATE WASTE (AND FOR EASE OF MAINTENANCE) - encourages designers to design out waste through measures such as designing to facilitate maintenance (therefore retaining materials and products in service for as long as possible), and through careful selection of construction techniques or procurement strategies.										
4.	**Designing for reusability / recoverability / longevity / adaptability / flexibility**	The Civils design can be modified to accommodate any impact imposed upon the external works in terms of	Given that a concrete structure is proposed there are limitations for designing for disassembly, but	Providing an architectural layout with structural grid regularity and optimisation of column-free spaces	Should the internal space be reconfigured, there should be potential to change the	Concrete/masonry stair and lift construction will be capable of providing fire	Submetering, will be provided throughout the building(s) for electricity, water and heating to facilitate successful monitoring	N/A	The design has been developed with longevity and durability in mind, including	Practical restrictions due to the residential build use.	All design team disciplines to ensure factors are considered to eliminate waste and promote ease of

	SITE	SUBSTRUCTURE	SUPERSTRUCTURE	SHELL/SKIN	SERVICES	SPACE & ASPECTS	CONSTRUCTION aspects	SUMMARY	CHALLENGES	COUNTERACTIONS + WHO + WHEN
	adaptability & flexibility. External (Civils) works designed to current climate specification/building regulations, which includes climate change factor.	prefabricated components will be investigated along with GGBS and recycled aggregates if feasible to compensate. The concrete foundations have capacity for reuse at the end of the building's life, minimising future demand for materials, as the crushed products from demolition can be processed into hardcore and feed into other structures or turned into aggregate. To maximise reuse of structural material at demolition, reversible connections will be prioritised where possible, while minimising cast-in concrete design where possible. To all steel reinforcement, larger dimension of cover concrete could be chosen to minimise degradation of reinforcing steel; stainless steel reinforcement could also be considered.	could allow convertibility in building use. The use of internal structural walls has been minimised where possible to facilitate any future redesigns of the internal spaces. The construction approach for the facade will allow for refurbishment if ever needed. Either through modular / precast or more traditional measures. If the use of the building remains the same, refurbishment is possible. The consideration of removable partitions within the design will allow for ease of refurbishment. The durability of the brick and stone materials specified, in addition to the low maintenance requirements associated, means these materials can be reused at the end of building's lifetime.	external shell, i.e., the solid (external cladding) and glazed elements (curtain walling) to suit any new internal arrangement. Use standard units and sizes where possible for cladding panels. External walls to are to be brick. Bricks are solid, durable and have minimal maintenance requirements.	rated stair lift enclosures. All strategies have been considered for end user safety, maintenance and functionality, including flexible service access. Accessibility has also been considered when designing the mechanical and natural ventilation systems. The services are centred on the ground floor to allow for ease of maintenance and replacement and to facilitate recommissioning/ balancing of building system(s). Duct and M&E risers are provided to all floors. The building services systems would have to be modified to accommodate any changes. In theory, the systems could be redesigned/ adapted to capture potential changes, however, this would be subject to the extent and	and billing of the key spaces throughout the buildings. This will ensure that energy and water consumption can be accurately monitored and billed. The internal flat layouts across the site are designed to be also suitable for general use. All internal finishes are suitable for the conversion to general needs. Across the site, consideration will be given to minimise internal columns and use light weight partitions where practical with demountable suspended ceilings.		how it could be adapted in the future.	Potential for unforeseen challenges as the design progresses, for instance, prioritising different requirements and needs of the design itself. Other factors may take precedence through Value Engineering.	maintenance at each RIBA stage.

	SITE	SUBSTRUCTURE	SUPERSTRUCTURE	SHELL/SKIN	SERVICES	SPACE & ASPECTS	CONSTRUCTION aspects	SUMMARY	CHALLENGES	COUNTERACTIONS + WHO + WHEN
					specific nature of the changes.					
5. Designing out construction, demolition, excavation, industrial and municipal waste arising	A Pre-Demolition Audit will be undertaken on the current site to review existing materials on site which will ensure demolition waste has been designed out accordingly. Aim for a target of 90% demolition waste diverted from landfill and 90% excavation waste diverted from landfill	Effort to minimise quantities as noted in Section 1 and 2 to design out construction waste. Success of this will be reviewed through the completion the construction management plan. Lean design adopted minimising material usage. Standardised element sizes designed so reduced formwork can be used in construction. Consideration for just-in-time delivery, reducing packaging, and supplier take-back schemes should also be demonstrated across building elements.				Appropriateness of detailing and maintenance will be considered through the RIBA stages and therefore elements as described would need to meet and exceed building control, fire, waterproofing, acoustics, and air quality requirements. These could result in waste during operation so design should reflect this appropriately.	Resource efficiency targets to be set, controlling material use per 100m^2 Practices are to be reviewed with contractor during pre-construction supply chain engagement.	Minimal excavation to site and maximising Design efficiency to effectively design to waste through careful coordination of services.	Availability of supplier take-back schemes are limited. Just-in-time delivery may not also be practically feasible when on site due to strict programme and timings.	Demolition contractor to undertake compliant audit. Contractor to follow Construction Management Plan, ensuring diversion from landfill has been achieved.
SECTION C: MANAGE WASTE - where designers should consider measures that can be taken to manage any waste that is generated, by increase reuse and recycling rates.										
6. Demolition waste (how waste from demolition of the layers will be managed)	Drainage systems utilise standardised components (industry wide standard). Proposed roads utilise standard components, i.e., kerbs, block/flag paving, material specifications.	To maximise reuse of structural material, at demolition reversible connections can be prioritised, while minimising cast-in concrete design where possible. Utilising prefabricated components will be investigated along with GGBS and recycled aggregates if feasible to compensate. The design of the structural frame is to be undertaken independently of the façade allowing for the façade layer to be dismantled without affecting the structural integrity of the frame.	Mechanical fixings to be used where possible and curtain walling prefabricated units which can be dismantled as whole units. Use of standard units and sizes where possible for elements such as the window systems.	The majority of plant will be small enough or be able to be dismantled to a size that can utilise 'standard' access routes through the building.	Review of building methodology can be undertaken to review options. Opportunities for minor and major refurbishment opportunities are to be considered of the selection of materials at stage 3 which will ensure demolition waste is minimised. The design currently seeks to implement robust and longevity via material selection, detailing and appropriate workmanship insulation.	When demolition is to be undertaken, a comprehensive Pre-Demolition audit is to be undertaken to ensure waste from demolition of layers is optimised.	Demolition should be the worst-case scenario for the building, with replacement strategies and layer independence prioritised as noted in the approach.	Practical restrictions due to the purpose of the build. Other factors may take precedence through Value Engineering.	The contractor will continue review the reuse and recovery of materials & components. During RIBA Stage 4 the team will aim to review the existing site to identify potential materials that may be salvaged and incorporated into the design and identify potential sites for safe storage and on-site reprocessing.

		SITE	SUBSTRUCTURE	SUPERSTRUCTURE	SHELL/SKIN	SERVICES	SPACE & ASPECTS		CONSTRUCTION aspects	SUMMARY	CHALLENGES	COUNTERACTIONS + WHO + WHEN
7.	**Excavation waste (how waste from excavation will be managed)**	Opportunities to maximise re-use of excavation waste are to be investigated fully.	Recycled crushed concrete could be considered as more sustainable option than conventional fill.	N/A	N/A	N/A	N/A	N/A	N/A	Excavated waste requires further investigation with a strategy confirmed.	Site constraints could mean applicable uses for excavated waste is limited.	Contractor to evaluate and confirm.
8.	**Construction waste (how waste arising from construction of the layers will be reused or recycled)**	Resource efficiency targets to be set, controlling material use per 100m^2 Aim to divert 90% of waste from landfill.	Effort to minimise quantities as noted in Section 1 and 2 to design out construction waste. Success of this will be reviewed through the construction management plan. Material quantities to be well planned to minimise over-ordering. Consideration for just-in-time delivery, reducing packaging, and supplier take-back schemes should also be demonstrated across building elements. Local waste processors are to be identified that send minimum quantities of material to landfill, with emphasis on reuse and recycling of construction waste.						Contractor to review possibilities. Contractor will segregate and monitor waste generated during construction.	Waste arising is to be reduced as far as possible with practices detailed in the construction management plan to ensure benchmarks are met.	Site constraints could cause logistics of waste segregation and storage issues. Availability of supplier take-back schemes are limited.	Contractor to follow Construction Management Plan and ensure that diversion from landfill has been achieved and waste management actions implemented.
9.	**Municipal and industrial waste (how the design will support operational waste management)**	A dedicated segregated and labelled bin store provided as an accessible refuse area at Ground Floor. At least 50% of the bins within the waste storage are dedicated for recycling, including organic waste. This meets the Greater Manchester Municipal Waste Management Strategy, which aims to achieve 50% recycling and composting of households rates by 2030.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	An initial municipal waste management strategy has been developed and will be reviewed and updated as the design progresses. Appropriately sized, labelled and segregated communal waste storage are to be provided.	Waste forecasts have informed appropriately sized waste storage. Recycling rates will be reviewed upon occupation.	Design Team to ensure incorporated into the design. Facilities management to ensure appropriate collections and logistics.

Table 7 - Recycling and Waste Reporting Form in line with Appendix D of the GLA's Circular Economy Statement Guidance

CATEGORY	TOTAL TONNAGE	T/ANNUM	% REUSED ON OR OFF SITE	% RECYCLED OR COMPOSTED, ON OR OFF SITE	% NOT REUSED OR RECYCLED	% TO LANDFILL	% TO OTHER (E.G. INCINERATION)	SOURCE OF INFORMATION
	0.1m^3 per week per unit (2 people)[1] 695No. Units total, 561 Units x 1 person, 36 Units x 2 person, 8 Units x 4 person. Therefore assume 0.05m^3, 0.1m^3 & 0.2m^3 per week per flat type. (0.05 x 561) + (0.1 x 36) + (0.2 x 8) = 38.05m^3 per week.	1,979 m^3 per year 0.27 conversion factor (Tonnes per cubic metre)[2] = **534 tonnes**	0%	England's average recycling rate for households is circa 45%[3]	Max 50% and no recyclable or compostable waste in line with Manchester Municipal Waste targets	50%	0%	[1]CIBSE Guide G (2014) & BS 5906:2005 Waste management in buildings. Code of practice [2]Draft 16 UK Waste Classification Scheme DETR (DEFRA) [3]UK statistics on waste - GOV.UK (www.gov.uk)

5. CIRCULAR ECONOMY NARRATIVE

5.1. Conserve resources, increase efficiency and source sustainably

5.1.1. Minimise the quantities of materials used

During the circular economy workshop a detailed analysis of the design was undertaken to identify opportunities to increase materials' efficiency and develop an efficient, lean design. The efficiency of the structural frame will be scrutinised to avoid over specification. Building weight will be minimised through the application of the following:

- Piled foundations have been prioritised over pad foundations as they typically use less material.
- The size and number of piles have been optimised to reduce material usage.
- Lightweight internal partitions.
- Lightweight finishes and limited screed use.

Virgin materials will be conserved, and materials will be selected with lower carbon intensities through the use of cement replacement products and sustainably sourced timber on site.

Materials selected will be reused or will contain a high recycled content. Reinforced steel (rebar) with a high recycled content will be sourced, where possible.

5.1.2. Minimise the quantities of other materials used

The proposed development will be built upon a previously developed brownfield site which will minimise disruption to the existing landscape and optimise use of the Manchester's limited resources.

The Energy Statement issued for planning identifies the most suitable passive and energy efficient design approach for the scheme. Specification of a highly efficient building fabric, efficient heating and ventilation systems and the use of renewable technology on the site (ASHPs and PV) have reduced operational energy consumption. The proposed system of heat pumps works at a greater efficiency than gas boilers and can take advantage of the projected decarbonisation of the grid.

5.1.3. Specify / source materials and other resources responsibly and sustainably

A sustainable procurement plan will be produced for the Octagon development. This plan will set a clear framework for the responsible sourcing of construction products to guide procurement throughout the project and will be developed in line with the range of issues identified within ISO 20400:2017. These issues have been used to form policy guidelines for the procurement of sustainable construction materials and products as well as potential options to monitor and report against these policies.

To ensure effective implementation of sustainable procurement plan, targets will be outlined and will be expected to be met by construction partners and the entire supply chain regarding sustainable development and best practice. The plan will provide guidance across three key parts which encompass CE principles:

- Responsible sourcing of construction products
- Environmental impacts from construction products
- Minimising construction waste on site

5.2. Design to eliminate waste (and for ease of maintenance)

5.2.1. Design for longevity, adaptability or flexibility and reusability or recoverability

A Functional Adaptability and Disassembly Study has been developed to ensure that any work to the development can respond to a required change of use or requirements and goes beyond maintenance and repairs whilst solving functional problems. It will also allow the building or parts of the building to be disassembled at the end of its life, or to be renovated rather than demolished, with individual components being used for other purposes.

In line with BREEAM's v7 Wst 06 requirements, the Design for Disassembly and Adaptability Study will cover as a minimum:

- Versatility: the ability of spaces to accommodate changes in use with minimal changes to maximise space utilisation.
- Convertibility: related to versatility, the potential of internal spaces to accommodate more significant changes in use without affecting building structure.
- Expandability: the ability of a design to accommodate a substantial change that supports or facilitates the addition of new space, features, capabilities, and capacities. It involves designing to allow for either vertical or horizontal additions in floor space.
- Ease of access to components and services: it allows for a material, component, or connector of an assembly, especially those with the shortest anticipated life cycle, to be easily approached, with minimal damage to and impact on it and adjacent assemblies.
- Independence: it allows for parts, components, modules, and systems to be removed or upgraded without affecting the performance of connected or adjacent systems.
- Avoidance of unnecessary treatments and finishes: choice of finishes can limit the options for reusing or recycling, particularly if potentially hazardous substances are included. To support disassembly, finishes that can prevent components from being re-used or recycled should be avoided.
- Supporting re-use (circular economy) business models: this principle is concerned with supporting the market for re-used, refurbished, remanufactured, and recycled materials and products now and in the future, in support of circular economy business models.
- Simplicity: it refers to the quality of an assembly or system that is designed to be straightforward, easy to understand, and meet performance requirements with the least amount of customization.
- Standardization: it is concerned with the use of common components, products, or processes to satisfy a multitude of requirements.
- Safety of disassembly: it is concerned with easy access to accurate information on the original materials and assembly methods used for an asset, together with details of any subsequent major renovation.

Through undertaking this study, recommendations or solutions will be proposed which will be considered and factored into the design. A building adaptability and disassembly guide will then be produced to communicate the characteristics allowing functional adaptability and disassembly to future occupiers of the development.

5.2.2. Design out construction, demolition, excavation and municipal waste arising

Excavation on site will be minimised as far as possible. There are existing buildings on site which are unsuitable for re-use and, therefore, will have to be demolished. Prior to site clearance, a Pre-Demolition Audit will be undertaken to identify material re-use and recycling opportunities at a more detailed stage of design. For all aspects of the development the waste hierarchy will be followed.

A Construction Resource Management Plan is being developed prior to the start of construction works on site. It will outline the strategy to reduce construction waste and monthly monitoring will ensure that subcontractors are engaged in the process.

The operational waste management strategy for the proposed development will be further developed at detailed design to further outline how waste arising within the development will be managed and disposed of in a manner which ensures optimum levels of waste recycling.

5.2.3. Manage demolition, excavation and construction waste

The Pre-Demolition Audit will outline opportunities for material disassembly and diversion from landfill at a later stage of design. The proposed site will aim for a demolition waste 90% diversion from landfill target.

There is excavation on site mainly due to foundation construction and landscape related activities. Where possible this waste will be reused on site. The site will aim for 90% diversion of excavation waste from landfill, estimate quantities of excavation waste for the proposed development will be provided at a later design stage by a Pre-Demolition Audit.

As previously referenced, once the construction stage starts the contractor will be required to have a comprehensive Construction Management Plan in place. This will summarise the benefits of waste minimisation and management and will forecast the types and amounts of waste that might arise for the scheme, providing methodologies for managing and minimisation. Construction waste generation will be monitored by the contractor and reported to the design team periodically. Final demolition and construction waste figures will be recorded and monitored throughout the construction process and reported to the design team and contractor for evaluation.

A waste hierarchy approach will be followed with the intention first to minimise waste generation, followed by reuse, and then recycling on-site. Where materials cannot be reused or recycled on-site, the contractor will identify opportunities for potential reuse off-site. Materials and other arisings will be stored safely and efficiently, prior either for reuse on site or removal, and onsite waste storage areas will be segregated and clearly labelled to assist with recycling. Closed loop recycling will be utilised where possible for materials such as unused plasterboard, carpet tiles and insulation.

Resource efficiency targets are to be developed and set for the waste generated during construction, using a benchmark based on tonnes per 100m^2.

5.2.4. Manage municipal waste

As well as construction waste, the waste management strategy for the development when it is operational is also critical as this is where the majority of waste will be generated over the lifetime of the scheme. Therefore, the Octagon Building design team will further develop the operational waste management plan as the design progresses. This will demonstrate the opportunities for managing waste and the implementation of adequate and easily accessible storage space, and collection systems to support recycling and re-use, aligning with Policy JP-S7 'Resource Efficiency' of the Joint Development Management Plan (JDMP). The development will have its own dedicated refuse and recyclable storage zone on the ground floor which will be clearly labelled and accessible to allow for the segregation of various waste streams.

Sufficient space has been provided to accommodate one weeks' worth of residual waste and recyclable waste. Dedicated waste storage areas will be accessible to all building users and will allow for the segregation of at least three waste streams. The waste storage areas are present on the ground floor and have sufficient space for residents' waste, and a separate bulky waste disposal area will be provided. These measures will support the proposed development in achieving the target recycling rate for the municipal waste, which is 50% in accordance with the Greater Manchester Municipal Waste Management Strategy.

Measures to minimise operational waste such as consolidated, smart logistics and community-led waste minimisation schemes will be explored at a later stage. This shall also extend to investigating the adoption of schemes which specifically target the recycling of unwanted clothing and furniture and collection schemes to encourage the re-use of these items, available for future occupants of the proposed development. A non-technical building user guide will be provided to residents which will outline the waste strategy for the development and promote recycling.

Monitoring and evaluation of the operational waste strategy will be an ongoing process. Options for monitoring waste could include a regular visual assessment of the fill levels by the building manager or waste audits to provide a snapshot of waste and recycling streams. To promote residents' participation, the outcomes of the monitoring could be communicated to the residents via a newsletter or on a noticeboard.

6. PLANS FOR IMPLEMENTATION

Table 8 confirms how short- and medium-term targets in relation to the CE commitments will be implemented, monitored, and reported to ensure their delivery.

Table 8 - Plan for implementation

COMMITMENT	TARGET(S)	TIMEFRAME	RESPONSIBILITY	MONITORING
Sustainable Procurement Plan	Sustainable Procurement Plan targets	RIBA Stage 2	Contractor	Review and update as necessary at each RIBA Stage.
Functional Adaptability and Disassembly Study	Report recommendations to be implemented within design approach for both the	RIBA Stage 2	Design Team	Review and update at RIBA Stage 4. Implementation review post construction.
Pre-demolition audit	90% demolition waste diverted from landfill. 90% excavation waste diverted from landfill.	RIBA Stage 3	Demolition contractor	Confirmation of implementation from final waste report.
Resource Management Plan	90% construction waste diverted from landfill. Waste during construction to be no more than ≤ 11.1 tonnes / 100m^2	RIBA Stage 3/4	Contractor	Initial review once contractor appointed. Implementation review post construction.
Operational Waste Management Plan	50% recycling and composting provision to be provided	RIBA Stage 6	Client / Facilities Management	Effectiveness to be monitored by client during frequent reviews.

7. END-OF-LIFE STRATEGY

In line with CE principles, the main priority is to extend the lifetime of the building through careful design and specification and to ensure that if the building is to be deconstructed at a later date that there is a clear process to follow. The functional adaptability study reviewed the whole of the proposed development in detail following the BREEAM New Construction v7 methodology outlined in Section 6 of this report.

An implementation plan will be compiled which outlines the recommendations that the scheme will keep under review as the design progresses at the next stages. These have been brought into the strategic targets outlined in Table 4.

It is important that relevant building information is made available to the end users so that they can understand the end-of-life strategy where relevant to facilitate disassembly, future reuse, waste avoidance and waste reduction. It is proposed that an Adaptability and Disassembly Guide be produced for the overall development to communicate characteristics allowing functional adaptability and disassembly to future building users and facilities management teams.