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Fox Court
Circular Economy Statement

Issue One - October 2023

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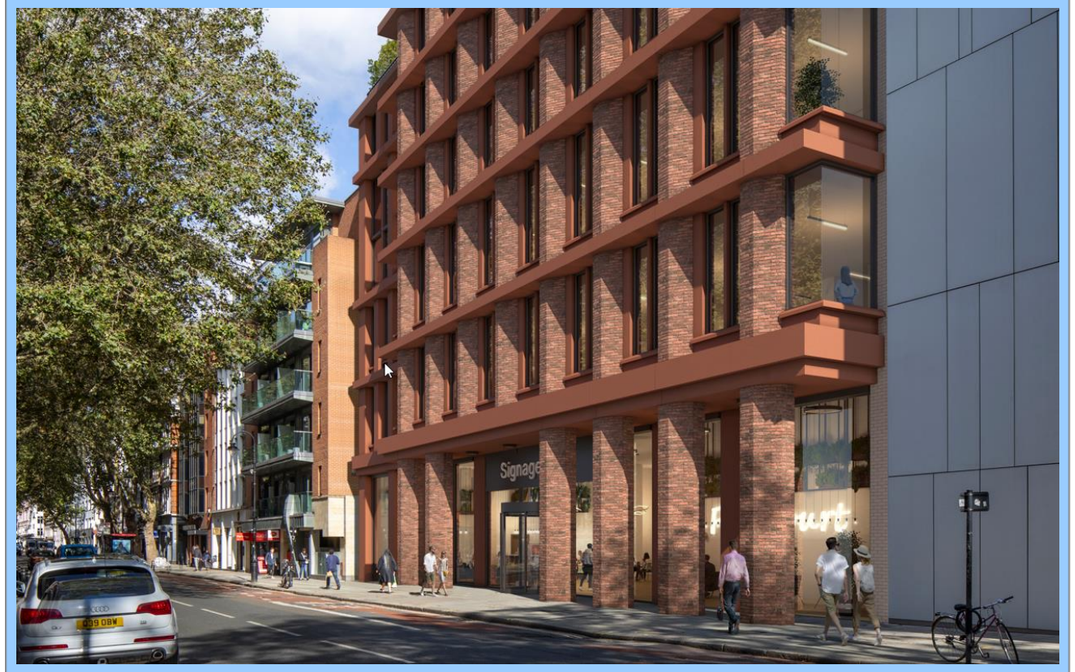
OVERVIEW

This Circular Economy Statement has been prepared by MTT Limited on behalf of Clare Real Estate (14 Gray's Inn Road) Ltd ('the Applicant') in support of an application for full planning permission for the redevelopment of the site ('the Site') at Fox Court, 14 Gray's Inn Road, London WC1X 8HN ('the Site'), within the London Borough of Camden ('the Proposed Development').

The description of development is as follows '*Demolition of existing facades, retaining existing reinforced concrete frame and basement structures; refurbishment and reconfiguration of the existing office (Use Class E) building for continued office use including extensions with new facades to the west elevation fronting Gray's Inn Road (9 storeys), to the northern courtyard elevation facing Brookes Court (8 storeys), to the existing 5 storey north-east wing fronting Brook Street (3 storeys) and to the south elevation (8 storeys); external alterations, provision of rooftop amenity terraces, landscaping and associated works.*'

This Circular Economy Statement (CES) documents strategies to be implemented during the design, construction and operation of Fox Court with respect to Circular Economy principles. This CES has been prepared in line with the GLA's Circular Economy Statement Guidance (March 2022) in accordance with the expectations of the London Borough of Camden.

This document comprises the written report part of the CES and is accompanied by a completed copy of the GLA Circular Economy Template Spreadsheet.



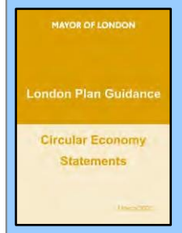
Architect's CGI Image of the Fox Court Redevelopment from Gray's Inn Road

OBJECTIVE

A Circular Economy is defined in London Plan Policy SI 7 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.' It is an economic model in which resources are kept in use at the highest level possible for as long as possible in order to maximise value and reduce waste, moving away from the traditional linear economic model of 'make, use, dispose'.

Using the framework of the GLA's Circular Economy Statement Guidance (March 2022) this Circular Economy Statement seeks to demonstrate how Circular Economy issues have been addressed in a structured and comprehensive manner by the proposals in the planning application, covering the whole lifecycle of the development and reflecting the collaborative review by the Project Team.

COMPLIANCE FRAMEWORK



The London Plan Policy SI 7 requires Circular Economy considerations to be addressed during the design process and a Circular Economy Statement to be submitted with referable planning applications demonstrating how this will be achieved.

This CES has been prepared in accordance with the GLA's Circular Economy Statement Guidance, March 2022 (hereafter referred to as the 'GLA CES Guidance') and is accompanied by a completed copy of the GLA Circular Economy Template Spreadsheet.

METHODOLOGY

Analysis Undertaken

The following Circular Economy 'core principles' were formally reviewed and addressed during the Fox Court design process to date:

- Conserve resources, increase efficiency and source ethically
- Design to eliminate waste (and for ease of maintenance)
- Manage waste sustainably and at its highest value.

Overall Process

The Project Team collaborated through a five-stage process to complete this Circular Economy Statement for Fox Court. Following briefing on Circular Economy Statement concepts, site-specific measures were identified and developed. Inputs for a life cycle assessment (LCA) model were collated and the modelling was undertaken, allowing quantitative impacts of Circular Economy issues and opportunities to be understood.

Circular Economy Statement Overall Process Diagram

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Workshops

The project's Circular Economy approaches were developed early in the design process, in a series of cross-disciplinary Circular Economy and Whole Life-Cycle Carbon workshops integrated into the wider design programme. These were led by the Sustainability Consultants (MTT/SUSTAIN) and attendees included representatives from the Architects (BGY), Structural Engineers (Elliott Wood), Project Manager and Quantity Surveyor (Third London Wall), Building Services Consultants (MTT Limited).

During the workshops, Circular Economy principles and targets were discussed, further discussions scheduled and studies (including the Pre-Redevelopment Audit and Pre-Demolition Audit) instructed. Workshop notes and presentation slides can be found in **appendix g**.

The workshops verified that a 'Partial Retention and Refurbishment' approach is the appropriate strategy to be applied at the Fox Court site.

Pre-Redevelopment Audit

The above approach was validated in a formal Pre-Redevelopment Audit report, containing a detailed condition review of the existing building's materials, its energy performance and

This concludes that under a 'retain and retrofit' approach, whilst all the existing building's embodied carbon would be retained and limited internal reconfiguration could occur, there are constraints and shortcomings with the existing built form and improvements to the public realm cannot be met under such a scenario. The existing building layout and fabric also impose limitations on the extent to which operational energy and carbon could be reduced.

Pre-Demolition Audit

The site-specific pre-demolition audit provides a detailed inventory of the materials in the building that will need to be managed upon demolition. It provides a schedule of the key materials present in the existing building, based on a site review and desktop study, a schedule of the Key Demolition Products (KDPs) arising, with an estimate of their quantities and a commentary on whether they are suitable for reclamation/reuse

Creation of Bill of Materials and Life Cycle Modelling

A Bill of Materials for the proposed development was created using the TLW Stage 2 Cost Plan., complemented with further information from the Project Team for the building components not included in the planning Cost Plan (e.g. internal doors).

This approach sought gather all relevant information (or the quantitative elements of the CES and ensure that 95% of the cost allocated to each building element category was accounted for.

A common LCA model was created for the WLCA and the Circular Economy review and Circular Economy Statement on the basis of the Bill of Materials. One Click LCA (OCL), a GLA-approved Life Cycle Assessment (LCA) software tool, was used to quantify key Circular Economy issues around recycled content and end-of-life recycling rates.

KEY FINDINGS

Recycled Content

The Bill of Materials identifies materials to be specified with high recycled content proportions. Key materials include concrete (with GGBS cement replacement), structural steelwork and reinforcement, plasterboard and mineral wool insulation.

The Cost Plan has been used to estimate that a total of 4.5% of the building materials/elements (by value) will be comprised of recycled or reused content. This is less than the GLA's aspiration target (for new-build projects) of 20% since high recycled content materials tend to comprise structural elements - a lower proportion of the new materials in this partial retention and refurbishment project.

End-of-Life Strategies

Design and construction strategies to enable building materials, components and products to be disassembled and reused at the end of their useful life have been reviewed, including retention of building information within project hand-over documentation.

The Bill of Materials schedules proposed end-of-life scenarios for each building element or material, which are also presented in **Section 5.0 circular economy design principles by building layer.**

Specific end-of-life approaches to be implemented vary by material type (including those retained from the current building) but key strategies include those for concrete (crushing to aggregate), Steel/Other Metals (recycling), glass (recycling to sheet glass or fibreglass insulation) and plasterboard (manufacturer take back and recycling schemes).

The specification of Cross Laminated Timber (CLT) and structural steelwork to the extension elements improves the proportion of materials which can be reused at the end of life.

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CONCLUSION AND COMMITMENTS

This Circular Economy Statement (CES) demonstrates how the proposed redevelopment of the Fox Court site will deliver Circular Economy principles according with the expectations of the London Borough of Camden, in line with the GLA's Circular Economy Policy SI 7 and in addressing all requirements of the GLA's Circular Economy Statement Guidance (March 2022).

It has been prepared through collaboration across a multi-disciplinary Project Team that includes suitably qualified architects, quantity surveyors, engineers and sustainability consultants. The initiatives evolved in the production of this Circular Economy Statement have been selected to convey the key principles of a Circular Economy into the scheme, balancing the benefits of 'designing with the past' with those of 'designing for the future', to minimise the waste generated from the scheme and the materials used throughout its life cycle, including the end-of-life stage.

Where existing site elements cannot meet the functional requirements of the proposed development, best practice measures will be adopted to maximise recovery of materials via reuse, reclamation or recycling. This will involve implementation of detailed demolition strategies, effective material segregation, appropriate storage and monitoring waste flows, as well as partnering with local organisations where feasible to direct elements for onward reuse.

The Applicant and their Project Team are committed to sustainable development and recognise the interconnectedness of sustainable design and the Circular Economy. They have demonstrated a robust approach to the Circular Economy for the proposed redevelopment of Fox Court and the design of the proposed development incorporates a number of initiatives to reduce materials required, increase recycling and limit the amount of waste sent to landfill.

The proposed development shall adopt the following targets from the London Plan Policy SI 7:

- Reusing/ recycling/ recovering 95% of demolition and construction waste, and putting 95% of excavation waste to beneficial use
- Targeting 75% of municipal waste to be diverted from landfill by 2030 and zero biodegradable or recyclable waste to landfill by 2026
- Maximising the total value of materials derived from recycled and reused content in the products and materials selected, and higher proportions are targeted in various cases

All 'Essential Elements for Circular Economy Statements' for Policy SI 7(B) (GLA CE Guidance Appendix 2) are included within this CES and the GLA Circular Economy Template Spreadsheet.

OTHER DOCUMENTATION

This CES should be read in conjunction with the completed GLA Circular Economy Template Spreadsheet, which has been submitted as part of this planning application. This details the Circular Economy design approaches and Circular Economy design principles by building layer and provides the Bill of Materials, a recycling and waste reporting table and a summary of the Circular Economy targets.

This CES should also be read in conjunction with other documents forming part of the planning application, in particular the Design and Access Statement and Whole Life-Cycle Carbon Report.

ESSENTIAL ELEMENTS OF CIRCULAR ECONOMY STATEMENTS

CE Statement Requirement from Policy SI 7(B)	**How This is to be Demonstrated** GLA CE Guidance Section — **CES Section**
How all materials arising from demolition and remediation works will be reused and/or recycled.	**Pre-Demolition Audit** — **Section 6.0 / app. d** (GLA CE Guidance Section 4.6) **Recycling and Waste Reporting** — **Section 10.0 / app. c** (GLA CE Guidance Section 4.9)
How the proposal's design and construction will reduce material demands and enable building materials, components and products to be disassembled and reused at the end of their useful life.	**CE Design Approaches** (GLA CE Guidance sections 2.3 - 2.5 and 4.3) **Bill of Materials** — **Section 7.0** (GLA CE Guidance Section 4.7) **End-of-Life Strategy** — **Section 8.0** (GLA CE Guidance Section 4.7) **CE Design Principles** — **Section 4.0** (GLA CE Guidance Section 2.1 and 4.4) **CE Design Principles by Layer** — **Section 5.0** (GLA CE Guidance Section 4.5) **CE Targets** — **Section 2.0** (GLA CE Guidance Section 4.2)
Opportunities for managing as much demolition, excavation, construction, and operation waste as possible on-site.	**Pre-Demolition Audit** — **Section 6.0/app. e** (GLA CE Guidance Section 4.6) **Bill of Materials Targeting Recycled and Reused Content** (GLA CE Guidance Section 4.7) — **Section 7.0 / app. b** **Recycling and Waste Reporting Maximizing On-Site Man.** (GLA CE Guidance Section 4.9) — **Section 10.0 / app. c**
Adequate and easily accessible storage space and collection systems to support recycling and reuse during operation.	**Oper. Waste Management Plan** — **Section 9.0 / app. f** (GLA CE Guidance Section 4.8)
How much waste the demolition, construction and operation phase of the proposal is expected to generate, and how and where the waste will be managed in accordance with the Waste Hierarchy.	**Recycling and Waste Reporting** — **Section 10.0** (GLA CE Guidance Section 4.9) **Operational Waste Management Plan** (GLA CE Guidance Section 4.8) — **Section 9.0 / app. f**
How performance will be monitored and reported, during the demolition, excavation, construction, and operation phases.	**CE Targets** — **Section 2.0** (GLA CE Guidance section 4.2) **Operational Waste Management Plan** (GLA CE Guidance Section 4.8) Section. **9.0 / app. f**

Essential Elements of Circular Economy Statements for Policy SI 7(B) (GLA CE Guidance Appendix 2)

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OBJECTIVE

The purpose of this section of the Circular Economy Statement is to provide an overview of Circular Economy considerations in the built environment and how these are to be implemented during the design, construction and operation of the proposed development.

It also provides background on the Fox Court site and the proposed development and sets out applicable planning policy requirements and best practice guidance for Circular Economy approaches which have been used to inform design decisions for the proposed works.

The reporting requirements are drawn from local (London Borough of Camden), regional (Greater London Authority) and national planning policies and associated guidance, which accord with the Applicant's sustainability aspirations.

SPECIFIC CIRCULAR ECONOMY CONSIDERATIONS FOR FOX COURT

Overview

This Circular Economy Statement (CES) has been prepared by MTT Limited on behalf of Clare Real Estate (14 Gray's Inn Road) Ltd ('the Applicant'). to document Circular Economy strategies to be implemented for the proposed development, addressing the Circular Economy requirements of the London Borough of Camden, which align with the requirements London Plan Policy SI 7(B).

Philosophy

Growing understanding of the impacts of current human activities calls for a fundamental cultural and economic shift in how we consume resources and embrace a sustainable mindset. A Circular Economy is defined in London Plan Policy SI 7 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.' These considerations have particular importance in the built environment.

Methodology

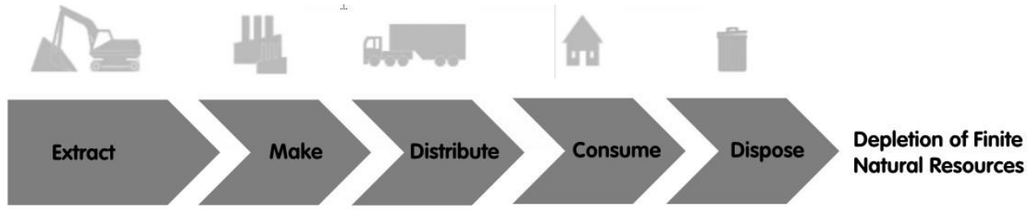
The London Plan Policy SI 7 requires Circular Economy considerations to be addressed during the design and construction processes, and a formal Circular Economy Statement to be submitted with referable planning applications demonstrating how outcomes from these considerations will be manifested in the design, construction and operation of developments.

This CES considers material and resource efficiency opportunities and the responsible management of waste for the proposed development. It follows the GLA's Circular Economy Statement Guidance, March 2022 - hereafter referred to as 'the GLA CES Guidance' - and contains all essential elements required within Circular Economy Statements for Policy SI 7(B), as listed in Appendix 2 of the GLA CES Guidance.

CIRCULAR ECONOMY PRINCIPLES

Background

In the Circular Economy economic model, resources are kept in use at the highest level possible, as long as possible in order to maximise value and reduce waste. This is a move away from the traditional 'take-make-dispose' linear model and its 'end-of-life' concept, being regenerative by design and aiming to gradually decouple growth from the consumption of finite resources. In a Circular Economy waste is no longer disposed of; but repurposed as a resource for future production processes, ceasing to exist as a by-product.



The Linear Economy: 'Take' - 'Make' - 'Dispose' Economic Model

The Circular Economy: 'Re-make' - 'Use Again ' Economic Model

The Ellen McArthur Foundation describes a Circular Economy as 'a system that is restorative or regenerative by intention and design'. As opposed to the 'business as usual' of the built environment (the linear economy) where materials are extracted, manufactured, used over a certain period of time and finally disposed of as waste.

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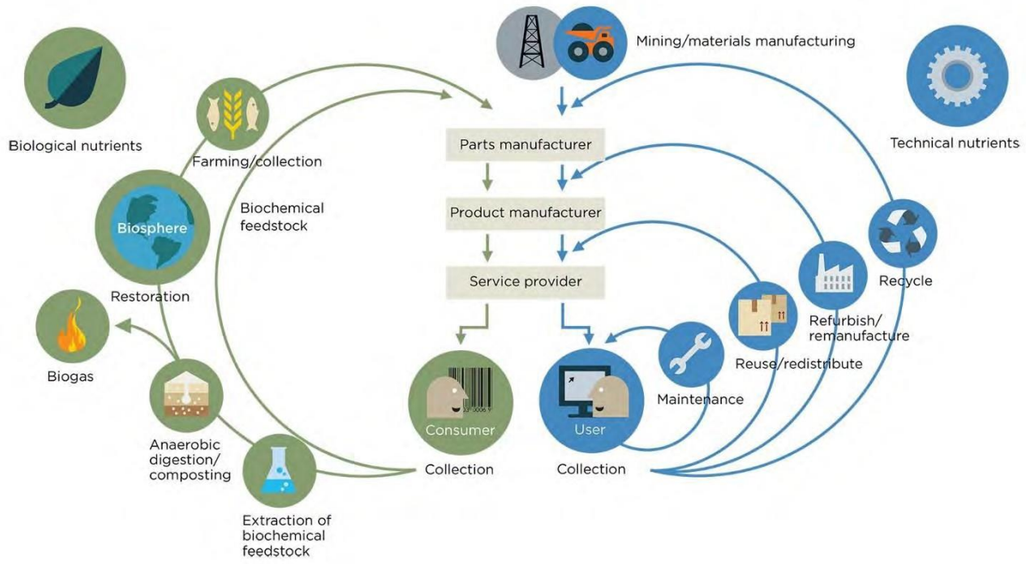
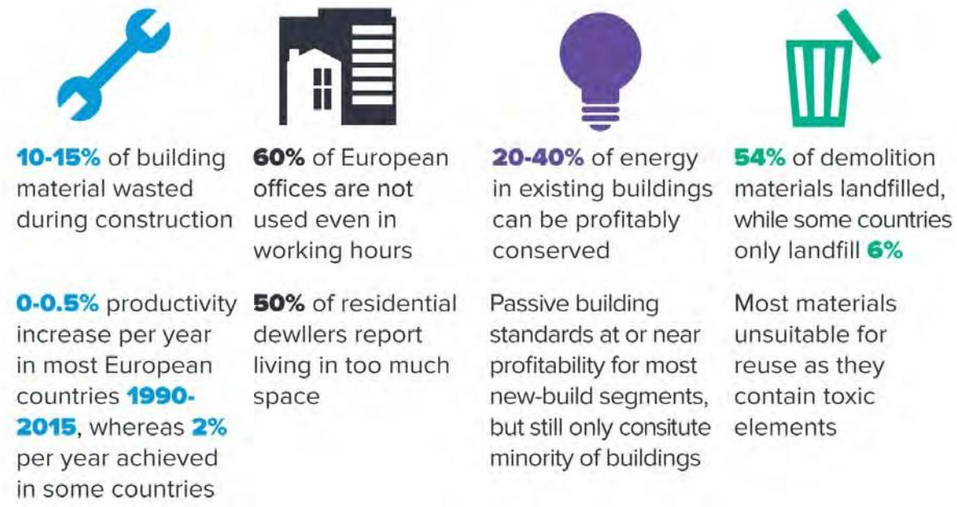
CIRCULAR ECONOMY CONSIDERATIONS FOR THE BUILT ENVIRONMENT

Current built environment design strategies almost always follow a 'take-make-dispose' model, where construction materials are sourced, used, and eventually discarded as waste. This approach leads to substantial systemic structural waste, making the built environment a significant global consumer of resources and raw materials, as well as a major contributor to waste generation and carbon emissions.



The Circular Economy System Diagram, Ellen McArthur Foundation

As one of the most resource-intense industries, moving to Circular Economy approaches within the built environment presents a tremendous opportunity for businesses, governments and cities to effectively reduce structural waste and unlock greater value from assets. Integrating these principles into the design of new buildings today is key to facilitating future re-use of construction materials.



Circular Economy Considerations for the Built Environment, Ellen McArthur Foundation

Within the built environment, the following Circular Economy principles for the built environment are key:

- Conservation of virgin resources
- Designing for adaptability, disassembly, re-use and recycling
- Designing for longevity
- Designing out waste
- Managing waste sustainably

The prevention approach is vital: i.e. a different way of designing, producing and managing materials, products and systems which will enable recovery through repairing, remanufacturing, recycling, etc. and enable the creation of continuous loops within the construction industry and across industries.

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Process

OVERALL PROCESS DIAGRAM

The Project Team collaborated through a five-stage process to complete the WCLA for Fox Court, starting with a briefing on WLC concepts and targets and, following identification of key reduction principles and targets for the site, providing information to allow the life cycle assessment (LCA) model for the proposed development to be created and WLC issues and opportunities to be understood.

Whole Life-Cycle Carbon Assessment Overall Process Diagram

These steps align well with the process steps in Figure 1 in the new RICS PS (2nd Edition) which is not presently effective, but which provides good general guidance. The diagram on the following page shows the process in detail, alongside the Figure 1 headings.

Many parts of the process were undertaken in parallel with the Whole Life-Cycle Carbon assessment.

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DETAILED PROCESS DIAGRAM

The diagram below details the steps taken in undertaking the proposed development's CES.

RICS PS (2nd Ed.) Figure 1 Steps	Step 1 Initiate Assesment	Step 2 Collate Project Information	Step 3 Components Inventory and Energy Sources	Step 4 Assess Emissions to Project Completion	Step 5 Assess Post-Completion Emissions over RSP	Step 6 Assess Benefits/Loads beyond System Boundary	Step 7 Compile Report of Steps 1-6
Fox Court WLCA Process Steps	**Hold Kick-off Workshop**	**Hold Follow-On Workshops** + Project Team Dialogue	**Compile Bill of Materials + Other LCA Model Inputs**	**Create LCA Model and Assess Key Circular Economy Issues**			**Analyse and Report**
Life Cycle Modules				**Modules A1 - A5**	**Modules. B1 – B7, C1 - C4**	**Modules D1 and D2**	
Fox Court WLCA Process Actions	Briefing with key Project Team members on Circular Economy concepts and targets Review of Circular Economy terms and frameworks Discussion of the assessment, scope and expectations for Fox Court, including GLA CES Guidance ■ Discussion of Requirements for LCA Model, including Bill of Materials and pre-redevelopment and pre-demolition audits and draft operational waste management plan Review of key Circular Economy principles for Fox Court – retention of building vs. new build replacement. Agreement of Circular Economy Design Targets	■ Review of preparation of Stage 2 project documents and Cost Plan Review of 'Circular Economy Design Approaches for Existing Structures'/ Circular Economy Design Approaches for New Buildings' and their implementation at Fox Court across structural, architectural and building services disciplines Review of 'Circular Economy Design Approaches by Building Layer' and their implementation at Fox Court across structural, architectural and building services disciplines Review of 'Circular Economy Design Approaches by Building Layer' and their implementation at Fox Court across structural, architectural and building services disciplines ■ Review of end-of life-strategies/scenarios Instruction of specialists to undertake pre-redevelopment audit, pre-redevelopment audit and draft operational waste management plan.	■ Translation of Stage 2 Cost Plan data into Bill of Materials suitable for LCA model - listing and quantifying all construction elements ■ Identification of quantity of demolition ■ Identification of construction costs ■ Identification of alternative design options	■ Creation of LCA model including different design options within the OneClick LCA tool. ■ Incorporation of all Bill of Materials items (materials, products and components) into LCA mode, assigning EPD's from LCA Tool database as appropriate (Modules A1 – A3)	■ Assignment of Maintenance, Repair and Replacement Emissions (Modules B2 – B4) based on material/component/product assumed services lives and quantities from Modules A1 – A3 ■ Assignment of Deconstruction and Demolition Emissions (Module C1) based on RICS PS standard rate and Transport, Waste Processing and Disposal Emissions (modules C2 – C4) based on RICS PS assumptions.	■ Assignment of benefits and loads beyond the system boundary (Module D) based on end-of-life scenarios and data within LCA tool.	Completion of analysis, reporting and commentary in Circular Economy Statement based on outputs from LCA tool Completion of GLA CE Template Spreadsheet Inclusion of assumptions and data sources in reporting

Whole Life-Cycle Carbon Assessment Detailed Process Diagram (■) with RICS PS (2nd Edition) Figure 1 Steps (■)
[■ indicates common activities with While Life Carbon Assessment]

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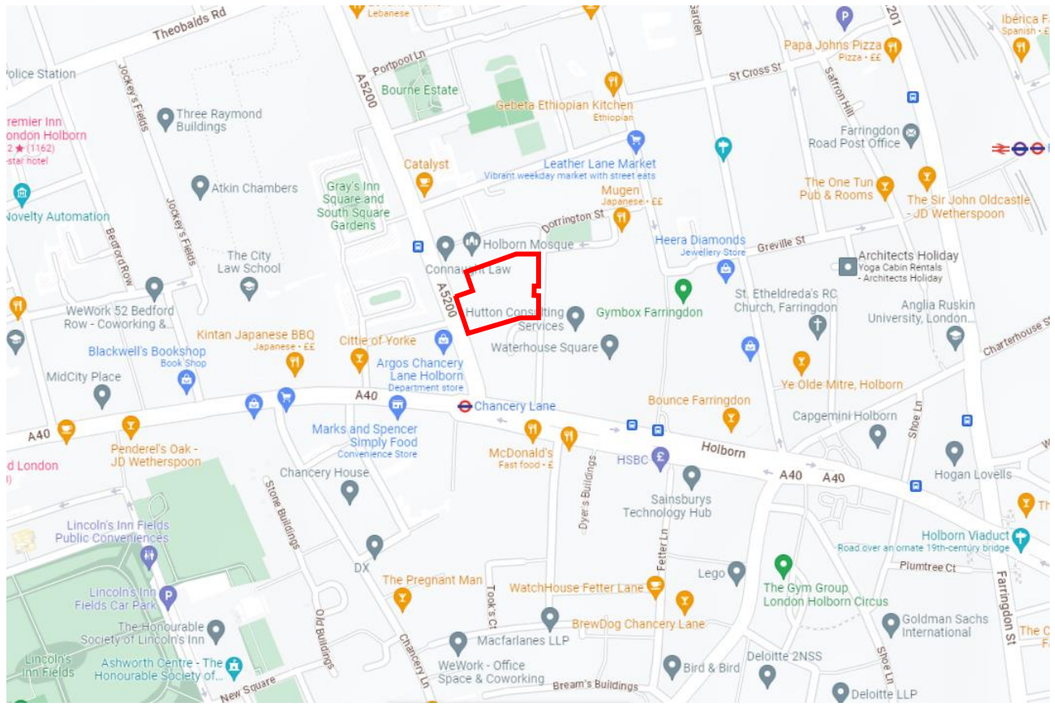
FOX COURT AND THE PROPOSED DEVELOPMENT

Site Background

The Fox Court site ('the Site') at 14 Gray's Inn Road, London, WC1X 8HN, is located within the London Borough of Camden and borders the City of London. It is situated in a core Midtown location, on the east side of Gray's Inn Road, close to its junction with Holborn.

In total, the site extends to 0.347 hectares, almost entirely occupied by the Fox Court office building, which has frontages on both Gray's Inn Road and Brooke Street. The frontage to Gray's Inn Road extends to 33.3m, and the frontage to Brooke Street is 49.2m.

The topography of the site is broadly flat, with a slight drop from west to east and from north to south. The immediate area is largely characterized by offices with ground floor retail units along High Holborn and continuing into both Gray's Inn Road and Brooke Street.



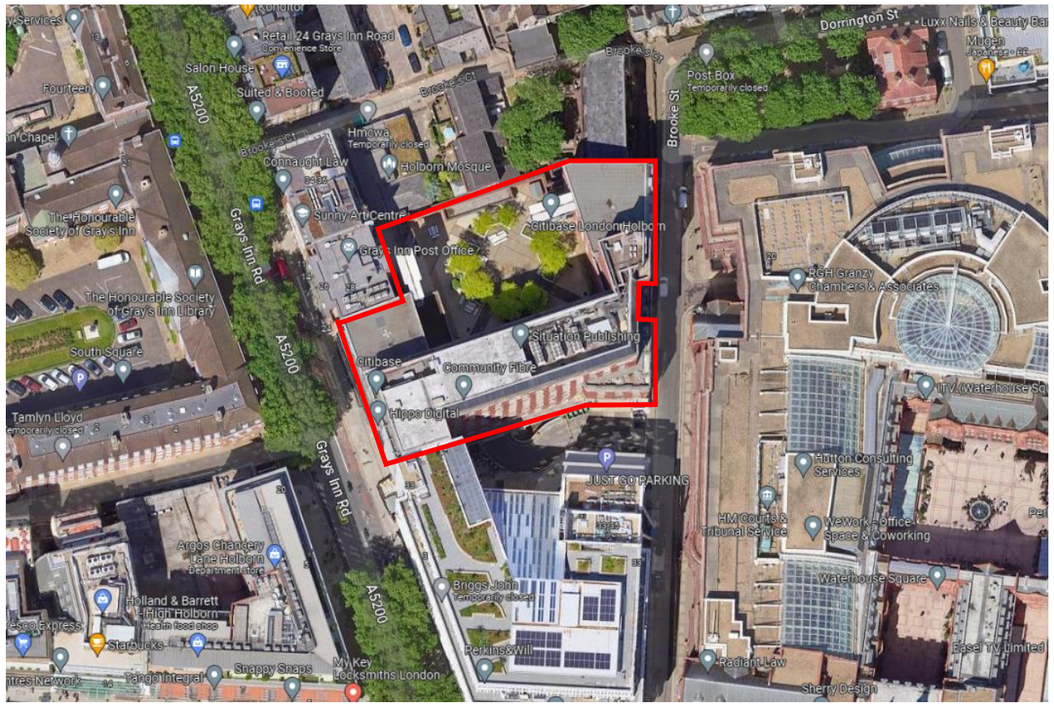
Site Location Map

EXISTING SITE

The site is in close proximity to Chancery Lane Underground Station (Central Line) and the new Elizabeth Line station at Farringdon, as well as major bus and cycle routes.

Fox Court is not listed and is not located in a conservation area, but it is bounded by Bloomsbury Conservation Area to the west and Hatton Garden Conservation Area to the east. The site is adjacent to the Grade II* listed Waterhouse Square, and opposite South Square and Gray's Inn Square, which are Grade II* registered historic gardens.

In terms of planning designations, the site lies within the Central Activities Zone (CAZ), the London View Management Framework (LVMF) protected vista from Primrose Hill to St Paul's Cathedral and the background areas of the views from Blackheath Point and Greenwich Park.



Site Location Aerial Photograph

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EXISTING BUILDING

Fox Court is located within the Holborn & Covent Garden Ward within the London Borough of Camden. It is a 9-storey purpose-built office building (14,287 sqm GIA of Class E office floorspace) in a U-shape with an external courtyard space to the north of the building. It was originally developed in the 1960s and generally has a relatively modern red brick façade. However, the Gray's Inn Road frontage was overclad in 1995/1996 to provide a new modern façade of glass and stone.

The existing building consists of 7 storeys above ground level, with a basement, sub-basement, and a roof plant area, originally developed in the 1960s, with the Gray's Inn Road frontage overclad in 1995 with a modern glass and stone façade.

The building is of no architectural merit. In its current state, it does not perform to its full potential and will struggle to attract desirable future occupiers. Shortcomings include an outdated design that fails to contribute positively to the local area, floorplates and columns that restrict space planning flexibility for office tenants, as well as poor sustainability and energy performance levels arising from inefficient facades, dated windows, and plant equipment nearing the end of its life.

The building stretches east-west, joining the two street frontages, primarily red brick with regular square windows on the south and north elevations, and a metal-clad upper storey and plant floor behind metal panels. There is a courtyard to the north with planting and two escape stairs lead from the east and west wings into the courtyard.

PROPOSED BUILDING

The proposed development falls within one red line area and specifically comprises the following components:

- Retrofit and extension of the existing office building to provide additional office accommodation, with an uplift of 8,426sqm GIA (9,338sqm GEA).
- Existing reinforced concrete frame to be retained, along with ground floor slab and basement structure.
- Extensions to the west, north and south sides of the building with new facades.
- Provision of a central atrium space between the existing structure and the northern extension for internal circulation and rooftop amenity spaces for tenants, including urban greening.
- Provision of cycle parking and servicing at basement level, provision of plant space at roof and basement levels.

The proposed development has evolved through pre-application and a wider stakeholder consultation process, which has included collaborative discussions with the Council and a number of other key stakeholders. The proposed development provides the opportunity to regenerate this important site through the sustainable retrofitting of the existing poor-quality office building to provide a highly sustainable and modern office building which reflects commercial demand in the area and seeks to support LBC's aspirations to provide a range of business premises within the Borough.

Fox Court Existing Building from Gray's Inn Road

Architect's CGI Image of the Fox Court Redevelopment from Gray's Inn Road

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REVIEW OF POLICY AND GOOD PRACTICE GUIDANCE

Statutory Development Plan

The statutory development plan for LBC, and in turn the proposed development consists of:

- The London Plan (2021)
- London Borough of Camden Local Plan (2017)

These, and related regional/national policy documents, are reviewed below and in **appendix a**.

Local Policy (LBC) Circular Economy Considerations

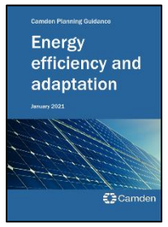
CAMDEN LOCAL PLAN 2017

The Camden Local Plan is the key strategic document forming the Development Plan for Camden. The Council adopted the Camden Local Plan document on the 3rd July 2017 and this forms the basis for planning decisions and future development in the Borough. The document sets out the vision for shaping the future of the Borough and contains policies for guiding decisions.

The Local Plan sets out a series of strategic objectives and policies including the following which support the subject area of Whole Life-Cycle Carbon:

- Policy CC1 - Climate Change Mitigation states 'we will e) require all proposals that involve substantial demolition to demonstrate that it is not possible to retain and improve the existing building; and f) expect all developments to optimise resource efficiency'.
- Policy CC 5 - Waste states 'We will aim to reduce the amount of waste produced in the borough and increase recycling and reuse of materials' and provides supporting text on facilities for storage and collection

CAMDEN PLANNING GUIDANCE (CPG) ENERGY EFFICIENCY AND ADAPTATION (JANUARY 2021)



The Council adopted their Camden Planning Guidance (CPG) on Energy and Adaptation on the 15th January 2021 to support the policies in the Camden Local Plan 2017, in particular Policies CC1 Climate Change Mitigation and CC2 Adapting to Climate Change. It forms a Supplementary Planning Document (SPD) which is an additional material consideration in planning decisions.

The CPG provides specific guidance supporting key Whole Life-Cycle Carbon principles. In particular Section 9 'Reuse and optimising resource efficiency' notes 'We will expect creative and innovative solutions to repurposing existing buildings, and avoiding demolition where feasible' and 'all development should seek to optimise resource efficiency and use Circular Economy principles'. Key extracts are shown on the right.

KEY TEXT FROM CPG ENERGY EFFICIENCY AND ADAPTATION SECTION 9

Resource Efficiency and Circular Economy Principles

9.9 As noted above the construction process and new materials employed in developing buildings are major consumers of resources and can produce large quantities of waste and carbon emissions. Policy CC1 expects all development whether for refurbishment or redevelopment to optimise resource efficiency by:

- reducing waste;
- reducing energy and water use during construction;
- minimising materials required;
- using materials with low embodied carbon content; and
- enabling low energy and water demands once the building is in use.

9.10 Reducing embodied carbon impacts can result in other additional benefits including: less waste to landfill from efficient construction methods, or improved air quality benefits from reduced

transportation and lower costs of development, operation, and maintenance.

9.11 Policy SI 7 of the New London Plan and GLA draft guidance provides a clear framework for integrating Circular Economy principles within a development but this has the most value when considered at the earliest stages of project design.

9.12 There are various stages of the development process where resource efficiencies can be made and we will expect these to be demonstrated in your Sustainability or Energy statement where relevant.

OTHER INITIATIVES AND GUIDANCE

The Council has declared a 'Climate Emergency' and an 'Ecological Emergency', with the aspiration to achieve a Net Zero Carbon borough by 2030, 20 years ahead of the national target. In June 2020, the Council approved a 5-year 'Climate Action Plan' which created an action framework to support this aim across all aspects of the borough.

The following guidance has also been referenced in compiling this CES.

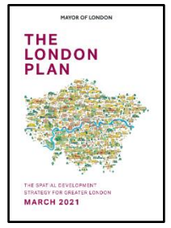
- Camden Planning Guidance - Design, 2021
- Camden's Environment Service technical guidance for recycling and waste
- North London Waste Plan (NLWP), currently in examination

1.0 introduction and strategic approach…

…sustainable building services solutions

Regional Policy - Greater London Authority

OVERVIEW - LONDON PLAN POLICY SI 7



The London Plan is the statutory Spatial Development Strategy for Greater London prepared by the Mayor of London. The New London Plan 2021 was adopted as the current version in March 2021.

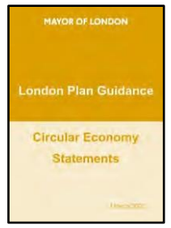
This introduced a number of topic areas including the following in relation to Circular Economy. In particular, Policy SI 7 Reducing Waste and Supporting the Circular Economy, which promotes widespread adoption of these principles by requiring GLA referrable developments to provide evidence that such principles are incorporated from the start of their conception, by means of a Circular Economy Statement.

Policy SI 7 (Reducing Waste and Supporting the Circular Economy) calls for applications to promote Circular Economy outcomes and aim to be net zero-waste and requires submission of a Circular Economy Statement with referable applications. Key aspects of Policy SI 7 are shown on the right.

Other policies pertinent to Circular Economy considerations include

- Policy GG5 (Growing a Good Economy) - Planning and development processes must recognise and promote the benefits of a transition to a low carbon Circular Economy to strengthen London's economic success.
- Policy GG6 (Increasing Efficiency and Resilience) - Planning and development processes must improve energy efficiency, supporting moves towards a low carbon Circular Economy.
- Policy D3 (Optimising Site Capacity Through the Design-led Approach) - Development proposals should aim for high sustainability standards and take into account Circular Economy principles.

CIRCULAR ECONOMY STATEMENT GUIDANCE, MARCH 2022



The GLA published their Circular Economy Statement Guidance in March 2022 to support the preparation of Circular Economy Statements in compliance with the requirements of London Plan Policy SI 7, including estimating, monitoring and reporting waste associated with proposed developments.

The Circular Economy Guidance requires a completed Circular Economy Statement reporting template and accompanying written report to be submitted to the GLA which demonstrates how waste arising will be reduced, managed and reused or recycled as necessary.

This report should also consider how the development will minimise material demands and facilitate disassembly and reuse. This Circular Economy Statement and associated strategy have been prepared in accordance with GLA's latest Circular Economy Guidance.

Although the Circular Economy guidance applies mainly to larger developments, boroughs are encouraged to apply similar policies to applications for smaller developments.

KEY TEXT FROM POLICY SI 7

The adopted London Plan policy SI 7 tackles waste reduction and supports the Circular Economy by requiring the following considerations to be addressed during the design process:

Policy SI 7 Reducing Waste and Supporting the Circular Economy

Resource conservation, waste reduction, increase in material re-use and recycling, and reduction in waste going for disposal will be achieved by the Mayor, waste planning authorities and industry working in collaboration to:

- promote a more Circular Economy that improves resource efficiency and innovation to keep products and materials at their highest use value for as long as possible;
- encourage waste minimisation and waste prevention through the reuse of materials and the use of fewer resources in the production and distribution of products;
- ensure that there is zero biodegradable or recyclable waste
- going to landfill by 2026;
- meet or exceed the municipal waste recycling target of 65 per cent by 2030;
- meet or exceed the targets for each of the following waste and material streams:
  - construction and demolition - 95 per cent reuse/ recycling/recovery
  - excavation - 95 per cent beneficial re-use
- design developments with adequate and easily accessible storage space and collection systems that facilitate the separate collection of dry recyclables (at least card, paper, mixed plastics, metals, glass) and food as a minimum.

Referable applications should promote Circular Economy outcomes and aim to be net zero- waste.

A Circular Economy Statement should be submitted (this section), to demonstrate:

1. how all materials arising from demolition and remediation works will be re-used and/or recycled;
2. how the proposal's design and construction will reduce future material demands by enabling building materials, components and products to be disassembled and re- used at the end of their useful life.
3. opportunities for managing as much waste as possible on site.
4. adequate and easily accessible storage space and collection systems to Secondary recycling and re-use.
5. how much waste the proposal is expected to generate, and how and where the waste will be managed in accordance with the Waste Hierarchy.
6. how performance will be monitored and reported.

1.0 introduction and strategic approach…

National Policy and Guidance

NATIONAL PLANNING POLICY FRAMEWORK

The National Planning Policy Framework (NPPF), September 2023, sets out the Government's planning policies on the delivery of sustainable development through the planning system in England and indicates how these are expected to be applied, informing local councils, and communities with regard to local plans and requirements.

The NPPF provides a revised and condensed approach to national planning and sustainability that includes economic, social, and environmental roles. Reference is made throughout the document to the minimisation of waste.

NATIONAL PLANNING POLICY GUIDANCE

The NPPF is supported by The National Planning Practice Guidance (NPPG), as a resource replacing almost all previously recognised planning guidance documents with a web-based resource.

NATIONAL PLANNING POLICY FOR WASTE

The National Planning Policy for Waste outlines the government's commitment to fostering a more sustainable and effective approach to resource use and management, setting out detailed waste planning policies.

The document states that the planning system should ensure the design and layout of new residential, commercial and infrastructure developments will enable sustainable waste management, including through the provision of appropriate storage and segregation facilities.

The policy document also defines the Waste Hierarchy applied in Circular Economy Design Principle 2 - Designing Out Waste and elsewhere in this statement.

Additional Guidance

Guidance on Circular Economy approaches for the built environment has improved over the years and has been developing alongside wider considerations of resource use and waste. Statutory guidance referred to includes:

- The Waste (England and Wales) (Amendment) Regulations 2014
- Our Waste, Our Resources: A Strategy for England (2018)
- Waste Management Plan for England (2021)

In addition to the above and the GLA CES guidance, reference has also been made to reports and documents from other built environment organisations, where they provide guidance on Circular Economy principles and implementation.

These include:

- 'Design for a Circular Economy Primer', GLA (March 2022)
- 'Towards a Circular Economy: Business rationale for an accelerated transition', Ellen
- Macarthur Foundation, (December 2015)
- 'London Environment Strategy', Greater London Authority, (May 2018)
- 'Circular Economy in Cities: Project Guide', Ellen Macarthur Foundation, (March 2019)
- 'Circular economy guidance for construction clients', UKGBC, (April 2019)

2.0 circular economy targets…

OBJECTIVE

This section of the CES sets out key quantitative targets for the proposed development in accordance with London Plan Policy SI 7.

SUMMARY TABLE

Key Requirements

Circular Economy Targets for Existing and New Development	Policy Requirement	Target Aiming For %	GLA Policy Met?	Explanation How will performance against this metric be secured through design, implementation and monitoring?
Demolition Waste Materials (Non-Hazardous)	Minimum of 95% diverted from landfill for reuse, recycling or recovery.	95%	**YES**	A Pre-Redevelopment Audit has been undertaken by ADW Developments and identified that a minimum of 95% of demolition waste can be diverted from landfill. A detailed review of the Pre-Redevelopment Audit Report's recommendations, alongside consultation with demolition contractors, shall be undertaken post-planning as part of the procurement process. Some elements will require careful disassembly to be salvaged in a usable condition. The Demolition Contractor shall be made responsible (through Contract Preliminaries) for the compilation of a Site Waste Management Plan (SWMP)/Resource Management Plan (RMP) for the demolition works.
Excavation Waste Materials	Minimum of 95% diverted from landfill for beneficial reuse.	95%	**YES**	The majority of the building, including the basement and sub-basement is being retained in situ. However there will be a limited amount of excavation work associated with the Gray's Inn Road façade. Review with the Structural Engineer has identified that the excavation waste arising is likely to either be reused on site for a piling mat or transported away for use on another construction site. In either case, all this waste will be diverted from landfill. The Main Contractor shall be made responsible (through Contract Preliminaries) for the compilation of a Site Waste Management Plan (SWMP)/Resource Management Plan (RMP) for the main works, including this excavation waste arising.
Construction Waste Materials	Minimum of 95% diverted from landfill for reuse, recycling or recovery.	95%	**YES**	The Main Contractor shall be made responsible (through Contract Preliminaries) for the compilation of a Site Waste Management Plan (SWMP)/Resource Management Plan (RMP) for the main works.
Municipal Waste	Minimum 65% recycling rate by 2030.	65%	**YES**	A draft Operational Waste Management Plan has been developed identifying the likely waste arisings and waste streams for the development - please refer to **appendix f.**
Recycled Content	Minimum 20% of the building material elements to be comprised of recycled or reused content.	4.5%	-	The existing structure will largely be retained and the Structural Engineer has advised that around 87% of the existing structure will be retained and reused in situ. Opportunities to reuse items such as the oak flooring, plant screen, glass partitions and doors, existing doors, lift doors and surrounds, stairs, terrazzo floors and stainless steel balustrades, 7th floor kitchen and timber screens, 6th floor kitchen, metal suspended ceiling, steelwork supporting roof-mounted plant, slate floor tiles shall be pursued during the subsequent design stages. The use of recycled and/or secondary content shall be maximised where feasible, including appropriate levels of GGBS and recycled steel. Recycled content targets shall be explicitly stated within material specifications.

2.0 circular economy targets…

…sustainable building services solutions

Additional Requirements

Additional Requirement	Policy Requirement	Please Acknowledge Acceptance for a Planning Condition	Please Acknowledge Acceptance for a Planning Condition of this Information
Post-Construction Report	A CE Statement is Required at post-Construction (i.e. upon commencement of RIBA Stage 6 and prior to the building being handed over, if applicable. Generally, it would be Expected that the assessment would be received no more than three months post-construction).	It is accepted that the Post Construction Reporting will be conditioned.	It is accepted that the Post Construction Reporting may be conditioned. The Main Contractor Contract Preliminaries documentation will include a requirement to produce a Post Completion CES Report and submit this to the London Borough of Camden within three months of practical completion of the works. The Report will set out the predicted and actual performance against numerical targets and provide updated versions of the Recycling and Waste Reporting form and Bill of Materials, reflecting the works as completed.

3.0 circular economy design approaches…

…sustainable building services solutions

OBJECTIVE

This section of the CES is intended to present approaches to the existing building (establishing whether it is appropriate to retain it) and for the future building (establishing which Circular Economy design principles are most appropriate for the proposed building use and lifespan).

APPROACH FOR THE EXISTING BUILDING

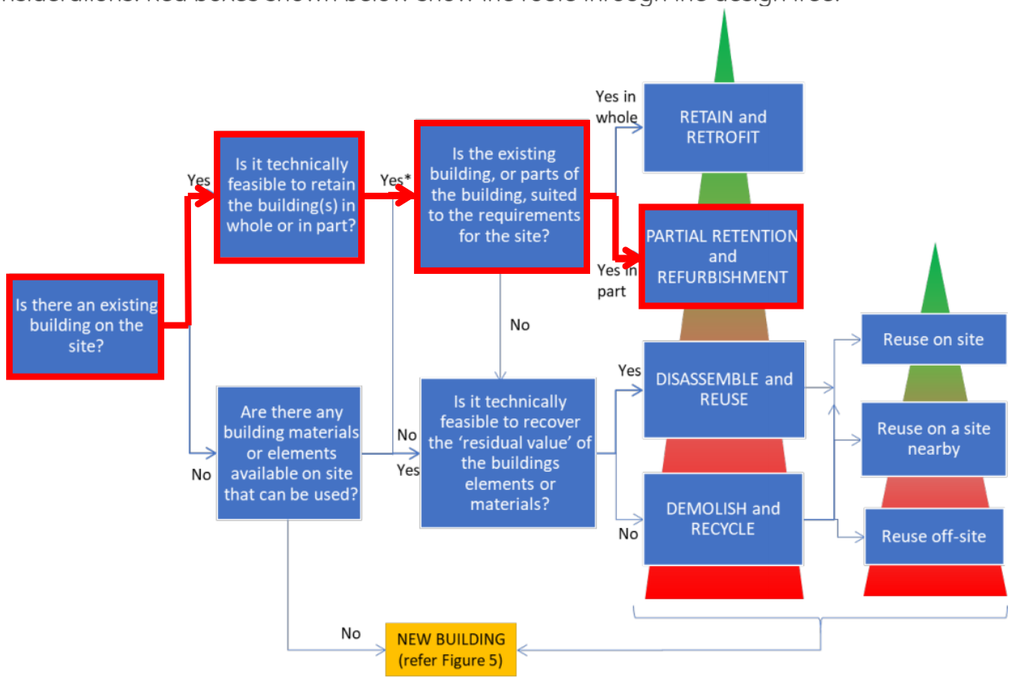
Overview

Initial design studies considered a range of approaches for the site, including complete demolition and new build. Approaches were examined in line with the Energy Efficiency and Adaptation CPG Section 9, taking into account existing building uses, servicing, technical audit and site capacity.

In light of these considerations, the applicant and their project team have chosen to pursue a 'substantial refurbishment and extension' approach, retaining essential existing building and structural elements that have long-term value and modifying and extending these to create office spaces that meet current technical and commercial standards.

Decision Tree

The decision tree given in Figure 4 of the GLA CES Guidance was also followed in these design considerations. Red boxes shown below show the route through the design tree:



GLA CES Guidance Figure 4 - Decision Tree for Design Approaches for Existing Building

Most Appropriate Strategies for the Fox Court Site

Accordingly, 'PARTIAL RETENTION AND REFURBISHMENT' shall be the strategy applied at the Fox Court site - a significant proportion of the existing structure will be retained and reused in situ with localised demolition and strip-out to allow for the extension of the building.

Summary Table

Circular Economy Design Approach (Key 'Layers')	**Strategic Response**
Refurbish Superstructure and Sub-Structure	The project team have determined that it is technically feasible to retain much of the existing building. The RC structure will be retained and reconfigured to accommodate the proposed layouts, with the existing building extended on Gray's Inn Road at the junction with 150 Holborn.
Repurpose Superstructure and Sub-Structure	The Structural Engineer has advised that around 87% of the existing structure will be retained and reused in situ, with retention of existing basements and piling, where possible. The roof plant enclosure screen shall be removed to accommodate the vertical extension of the building, allowing this attractive bronze/aluminium component to be repurposed for use with the refurbished buildings as panel finishes.
Disassemble / Deconstruct and Reuse Skin (Façade), Services, Stuff	A pre-demolition audit has been undertaken for the building, with a number of materials and components identified. The proposed increase in the building's floor area means that most of the facades will need to be removed (as the building line moves outwards) with the exception of portions of the brick elevation to the north, wrapping around to the east which may be retained, The Gray's Inn Road elevation is suitable for dismantling/disassembly, but the majority of the façade will need demolition.
Demolish / Deconstruct and Recycle Skin (Façade)	In accordance with the pre-demolition audit, where feasible, demolished materials will be reused on-site. Where this is not feasible, opportunities to maximise off-site re-use and/or recycling set out in the pre-demolition audit will be followed. The pre-demolition audit has identified potential reuse, recycling and recovery routes for existing materials and components, with an estimated 96% of waste by mass forecast to be diverted from landfill disposal. Key existing materials, including concrete, steel, glass and timber, will be recycled. There may be the opportunity to use crushed masonry as fill on site.

Summary of Circular Economy Design Approaches for the Existing Building

3.0 circular economy design approaches…

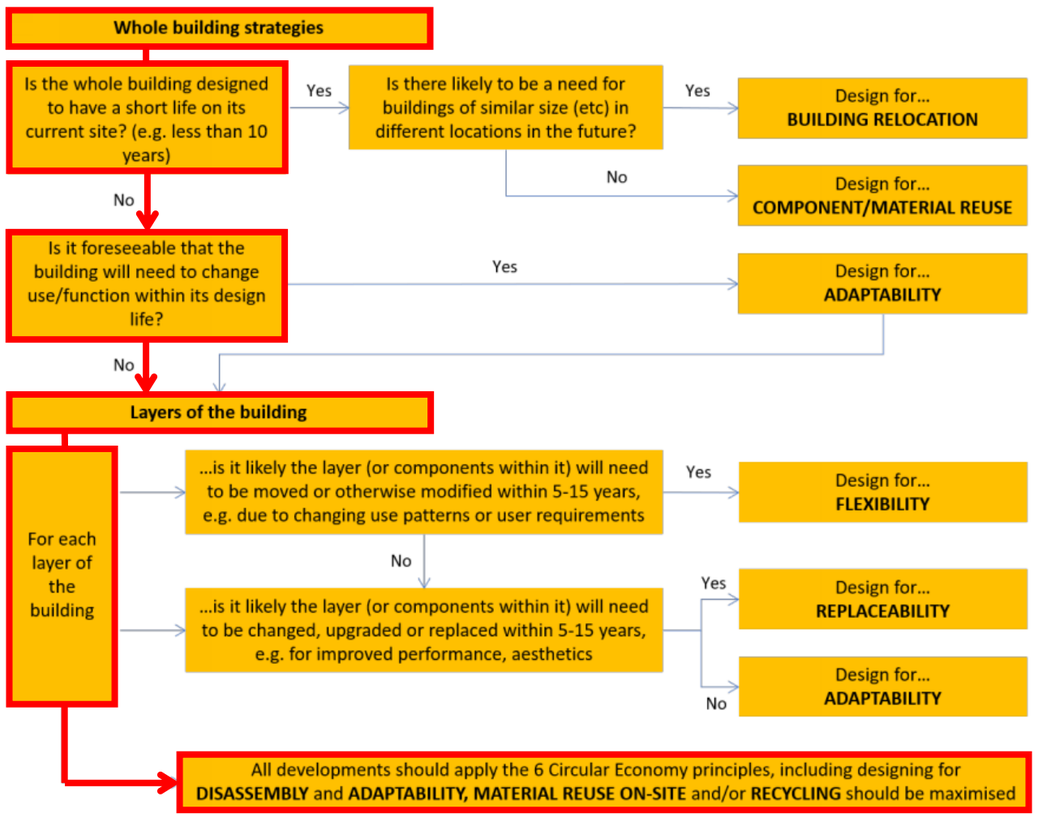
…sustainable building services solutions

CIRCULAR ECONOMY DESIGN APPROACHES

Decision Tree

The decision tree given in Figure 5 of the GLA CES Guidance has been followed in the design process to identify the most appropriate design approach for the new/extended building.

Red boxes shown below show the route through the design tree:



GLA CES Figure 5 - Decision Tree for Design Approaches for New Buildings and Layers

Most Appropriate Strategies for the Fox Court Site

Accordingly, Designing for DISASSEMBLY and ADAPTABILITY, MATERIAL REUSE ON-SITE and/or RECYCLING should be maximised

Summary Table

Circular Economy Design Approach (Phase/Building/Area/Layer)	**Strategic Response**
Building Relocation Whole Building	Building relocation is not a feasible approach, as buildings of this type cannot be designed to be moved.
Component or Material Reuse Whole Building, Structure Layer	Reuse of the majority of the existing structure in situ, including floors, is proposed. Recovered materials and components will be offered to the reuse market (e.g. Globechain) if no on-site reuse route can be identified.
Adaptability Whole Building, Services Layer	To avoid unnecessary material use, cost and disruption arising from the need for future adaptation works, the building design seeks to facilitate adaptability. This approach has been considered throughout the early design period and has been implemented through several measures. The building's reasonable floor-to-floor heights and structural floor loads enable a range of potential changes of uses in the future. A formal functional adaptability strategy study will be undertaken as part of the BREEAM assessment (Credit Wst 06). The building services shall be designed to be easily accessible from inside the building, enabling replaceability for varying loads if the building's use is changed.

3.0 circular economy design approaches…

Circular Economy Design Approach (Phase/Building/Area/Layer)	Strategic Response
Flexibility Whole Building, Skin, Space and Services Layers	To respond to changing functional demands or local environmental impacts of climate change, the building design seeks to facilitate flexibility for future changes. In the 'Skin' layer, the building design will incorporate measures such as a modular façade design, using a regular grid which enables the use of standardised panel sizes. This approach also provides the opportunity for prefabrication and for the modules to be independently disassembled from the envelope and replaced. In the 'Space' layer, a flexible open-plan internal layout is proposed, which can accommodate a variety of end uses and internal configurations. The open-plan floors shall allow for non-structural partitions to be installed as part of tenant fit-outs if required. In the 'Services' layer, the building services design will seek to ensure that the mechanical and electrical central systems (including data/telecoms) and distribution allow for future layout changes and are adaptable/extendible for reconfiguration and future changes in needs. The design shall accommodate maximum flexibility, both in terms of loads and areas served, allowing for each floor plate to accommodate one or more tenants, with provision for separate sub-metering for each potential tenancy area.

Circular Economy Design Approach (Phase/Building/Area/Layer)	Strategic Response
Replaceability Whole Building, Skin, Space and Services Layers	There is no intention to replace the building and therefore adaptability/flexibility and longevity will be the focus of the Circular Economy design approach for the 'Skin' and 'Structure' layers of the building. However, materials, components and products in the 'Services', 'Space' and 'Stuff' layers will be subject to periodic replacement and the building design takes this into account. In the 'Services' layer, mechanical, electrical and public health services for WC cores shall be 'stacked', to minimise the amount of services distribution required and to ease maintenance and replacement of these elements. Additionally, in all elements, building services shall be located so they are easily accessible, not requiring the removal of ceilings/walls during maintenance and replacement processes. In all layers, the building design will consider design and construction methods incorporating, where feasible, standardised elements for components and products to lower waste arising from redundant specialist items with limited reuse potential in their next life. Maintenance and replacement strategies shall be included in a building handover pack.

3.0 circular economy design approaches…

Circular Economy Design Approach (Phase/Building/Area/Layer)	Strategic Response
Disassembly Whole Building, Skin and Services Layer	To maximise opportunities to reclaim and reuse materials at the end of the building's life, the building design will incorporate measures to enable effective disassembly. In the 'Structure' layer, the substructure and superstructure materials (reinforced concrete) will be amenable to recovery and recycling at end-of-life, with the CLT slabs and panels and the new structural steelwork being simple to disassemble by unbolting. These structural systems have been maximised (and reinforced concrete minimised) to reduce whole life-cycle carbon and ease disassembly. Where present, concrete and reinforcement can be separated by crushing. The recovered concrete can be crushed for use as aggregate and the recovered reinforcement steel can be recycled back into other uses. In the 'Skin' layer, the use of modular facade elements within the design, as well as facilitating adaptation, may allow these to be removed as a unit and therefore have some potential to be reused elsewhere on a different development. In the other layers, at the subsequent design stages, consideration will be given to the selection and specification of assemblies (e.g. mechanical connections with facade systems) and finishes which facilitate easy disassembly at the end-of-life stage. Consideration will also be given to the specification of materials with lower potential health issues, to avoid health impacts to those deconstructing the building.

Circular Economy Design Approach (Phase/Building/Area/Layer)	Strategic Response
Longevity Whole Building, Skin and Services Layer	The building design has prioritised measures to ensure longevity of materials, products and components to avoid premature end-of-life for these through considerations of maintenance and durability. The need for significant change to the overall structure and form is unlikely within the buildings' lifespan (at least 60 years) so the selection of durable and resilient materials in the 'Skin' has been pursued, with the exterior fabric being selected with resilience to degradation due to environmental effects (freeze/thaw action, UV radiation, rain ingress etc.). Similarly, in the 'Space' layer, appropriate durability performance will be specified for vulnerable or heavily trafficked parts of the internal building, to minimise the frequency of their replacement. The office spaces will be designed to meet long-term tenant needs and be robust, durable, and resilient to climate change through their fabric and services design and specification. During the subsequent design stages, formal strategies will continue to be developed and documented for the repair and replacement of fabric elements and plant throughout the building and these will be documented in O&M manuals and cleaning strategies. Highly efficient building fabric and building services shall be specified in order to reduce operational energy use, and open-plan floors provide flexibility for future change of use. Both measures reduce the need for future major refurbishment and therefore maximise longevity. An end-of-life strategy will be developed and include details on the expected service life of the materials used.

4.0 circular economy design principles …

OBJECTIVE

This section of the CES is intended to present the response of the scheme to designing out waste (in terms of how waste materials will be reduced, treated as a resource, and managed) at each module stage, in accordance with the six Circular Economy principles, as set out in Section 2.1 of the GLA CES guidance.

These are:

- building in layers - ensuring that different parts of the building are accessible and can be maintained and replaced where necessary
- 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
- designing for longevity
- designing for adaptability or flexibility
- designing for disassembly
- using systems, elements or materials that can be reused and recycled.

PRINCIPLE 1 - BUILDING IN LAYERS (SUPPORTING FUTURE REFURBISHMENT)

Overview

Please refer to **Section 5.0 Circular Economy Design Principles by Building Layer** of this CES for a detailed review of designing out waste through 'building in layers' principles.

Application at the Fox Court Site

Consideration of the lifetimes of different elements and their 'layers' of the building has been undertaken to evolve the appropriate strategies and tactics that can be applied at the Fox Court Site. This will enable future adaptation and disassembly works (to avoid unnecessary materials use, cost and disruption and maximise the potential to reclaim and reuse materials at final demolition) in line with the principles of a Circular Economy.

Further review shall be undertaken throughout the subsequent design stages.

4.0 circular economy design principles …

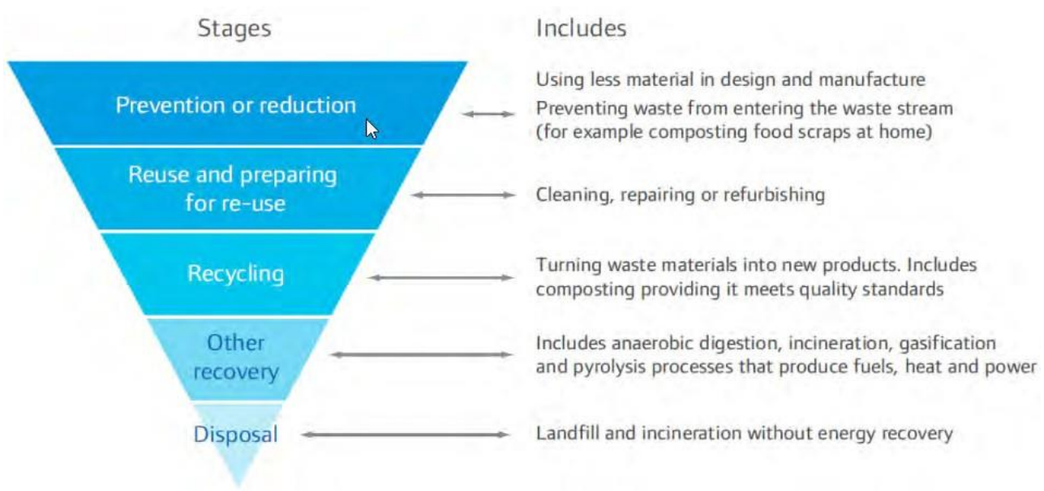
PRINCIPLE 2 - DESIGNING OUT WASTE

Definition

Circular Economy Principle 2 Designing Out Waste is concerned with 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.

Overview

Designing out waste relates to establishing the principle of using resources efficiently in the design stage of the works. The aim is to plan, as far as possible, to use available materials as efficiently as possible in order to minimise the amount used for construction and to ensure sufficient durability in the materials and components specified so they do not require replacement at an excessive rate.



The Waste Hierarchy from the National Planning Policy for Waste

Principle 2 is concerned with the need to ensure waste production is planned for, from project inception to completion. Of importance is the consideration of measures such as standardised components, modular build and reuse of secondary products and materials. In addition to the principle of building in layers itself, a range of measures have been proposed to minimise the quantities of materials used within each layer.

APPLICATION AT THE FOX COURT SITE

MATERIAL EFFICIENCY

A key principle in ensuring waste on site is minimised is the minimisation of the total amount of materials themselves.

BS 8895 Designing for Material Efficiency in Building Projects outlines specific material efficiency processes, key tasks, team members and their responsibilities, and outputs specific to each work stage, along with supporting guidance and tools to assist the Project Team in developing and implementing material efficiency strategies for their developments.

CONSTRUCTION WASTE MINIMISATION AND MANAGEMENT

Overview

In support of the targets defined for Construction Waste in the Recycling and Waste Metrics section above and the Recycling and Waste Reporting Form presented in **appendix c**, the following strategies will be employed.

Principles

Suppliers and Subcontractors shall be required to take all reasonable steps to minimise waste, reduce packaging, give preference to materials and products with the greatest reused or recycled content and provide documented evidence to the Contractor and Project Team.

Where possible, Suppliers and Subcontractors should employ closed-loop waste systems which utilise the waste product from one process or product in another product or process. This can be part of the same construction project or can be through collaboration with other projects/organisations which use the waste as their raw material.

Working With Subcontractors

Subcontractors shall be required to contribute to the SWMP and identify potential waste streams that could arise during their works, along with estimated total quantities of each waste type that will be produced and their planned disposal route. They shall be required to comply with the site waste segregation strategy, including the avoidance of cross-contamination of segregated (non-mixed) skips.

4.0 circular economy design principles …

Training and communication methods are key to ensuring successful implementation of Circular Economy and waste reduction measures. The Contractor shall lead the following processes:

- Briefing all operatives in site inductions, including sub-contractor operatives, on project aims for Circular Economy measures and waste reduction, defining individual responsibilities on site
- Using toolbox talks, posters and other information across site to promote waste reduction
- Incorporating waste management issues into regular progress meetings with sub-contractors to discuss the waste management on site and areas for improvement and monitoring and publishing waste performance figures on site notice boards.

Working With Strategic Suppliers

A significant proportion of the materials on the project will be supplied by relatively few strategic supply chain partners. The Contractor will be expected to work with these suppliers to reduce waste production both during their manufacturing processes and during their installation on site.

Prior to any agreement being made with a supplier, the Contractor will be expected to undertake a detailed analysis of the supplier's ability to work in accordance with this Circular Economy Statement's Steering Approaches and waste targets (for example, whether they can offer a take-back scheme, whether they are increasing the recycled content of their materials).

PACKAGING AND MATERIALS TAKE-BACK AND COLLECTION SERVICES

Suppliers and Subcontractors should minimise the use of packaging and, wherever feasible, it should be made from materials that can be reused, recycled, or recovered.

The Contractor will be expected (through their suppliers and subcontractors) to pursue the use of take back and collection services for their materials and associated packaging for subsequent reuse, recycling or recovery, wherever feasible. Key waste materials expected to be purchased or hired that are re-useable and which should be targeted for re-use on this project are:

- Packaging
- Pallets
- Temporary fencing
- Site accommodation

OTHER SITE PRACTICES

Implementing a 'just-in-time' material delivery system to avoid materials being stockpiled on site for long periods of time, therefore reducing the risk of their damage and disposal as waste

All absorbent materials (e.g. carpets, upholstery, furnishings, fabric wall coverings, acoustic ceiling panels) will be transported, stored and protected in original packaging or sealed polyethylene sheeting until the time of installation to reduce waste caused by damage.

NEXT STEPS

At the subsequent design stage, the Project Team will pursue:

- A Modularisation Review Workshop to identify elements of the design that could benefit from off-site fabrication shall be undertaken.
- A requirement for designers to consider modularity and identify 'specials' on design drawings will be imposed.

4.0 circular economy design principles …

PRINCIPLE 3 - DESIGNING FOR LONGEVITY

Definition

Circular Economy Principle 3, 'Designing for Longevity' is focused on design 'to avoid a premature end-of-life for all components through consideration of maintenance and durability'.

Application at The Fox Court Site

OVERVIEW

The building design has prioritised measures to ensure the longevity of materials, products and components to avoid a premature end-of-life for these, through considerations of durability and resilience.

The offices and jewellery workshop units will be designed to meet long-term tenant needs, and be robust, durable, and resilient to climate change through their fabric and services design and specification. The uses of these areas may potentially evolve during the building lifespan so their longevity focus should be on the 'Skin' and 'Space'.

RESILIENCE

As the primary use of the building shall be as commercial offices, the need for significant change to the overall structure and form is not anticipated within the building's lifespan (at least 60 years) and so the selection of resilient materials in the 'Skin' layer has been prioritised, with the exterior fabric being selected with resilience to degradation due to environmental effects (freeze/thaw action, UV radiation, rain ingress etc.).

Exposed elements of a building or landscaping are at risk of damage through impact or wear and tear which can result in significant and unnecessary materials use and waste generation across the life of a building.

As climate change can significantly accelerate the deterioration of materials used in a building, it is important to consider the impact of climate change and its associated environmental changes on the vulnerable elements within the built environment.

DURABILITY

Similarly, in the 'Space' layer, appropriate durability performance will be specified for vulnerable or heavily trafficked parts of the internal building, to minimise the frequency of their replacement.

Alongside designing out the risk, durability measures to be considered for the building are expected to include:

- Bollards, barriers or raised kerbs to delivery and vehicle drop-off areas
- Robust external wall construction, up to 2m high
- Corridor walls specified to Severe Duty (SD) as per BS 5234-22
- Protection rails to walls of corridors
- Kick plates or impact protection (e.g. trolleys) on doors
- Hard-wearing and easily washable floor finishes in heavily used circulation areas
- Door stoppers to prevent door handles from damaging walls

A formal assessment of durability measures to reduce the need to repair and replace materials resulting from damage to exposed elements of the building and landscape (based on BS 7543:2015: Guide to durability of buildings and building elements, products and components) shall be undertaken.

COMPONENTS REPLACEMENT

There is no intention to replace the building and therefore adaptability/flexibility and longevity will be the focus of the Circular Economy design approach for the 'Skin' and 'Structure' layers of the building. However, materials, components and products in the 'Services', 'Space' and 'Stuff' layers will be subject to more frequent replacement and the building design takes this into account.

In the 'Services' layer, where appropriate, mechanical, electrical and public health services WCs to be 'stacked', to minimise the amount of services distribution required and to ease maintenance and replacement of these elements.

Additionally, in all elements, building services shall be located so they are easily accessible, not requiring the removal of ceilings/walls during maintenance and replacement processes.

In all layers, the building design will consider design and construction methods incorporating, where feasible, standardised elements for components and products to lower waste arising from redundant specialist items with limited reuse potential in their next life.

A review of regular component replacement patterns has been undertaken within MTT Limited from their experience in similar office schemes. This indicates that the components that are likely to require regular replacement are filters and fans within air handling units and fan coil units, electrical elements (especially lighting systems) and parts of the control systems such as sensors, pressure switches, drives etc.

Detailed consideration of the specification and selection of these items (and their access through the building fabric for replacement) will be undertaken at the subsequent design stage.

NEXT STEPS

During the subsequent design stages, the Project Team will continue to develop and document formal strategies for the repair and replacement of fabric elements and plant throughout the building and these will be documented in O&M manuals and cleaning strategies.

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PRINCIPLE 4 - DESIGNING FOR ADAPTABILITY OR FLEXIBILITY

Definition

Circular Economy Principle 4, 'Designing for Adaptability or Flexibility' has two related areas of focus:

- Designing for Adaptability - defined as '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 or use.'
- Designing for Flexibility - defined as 'a building that has been designed to allow easy rearrangement of its internal fit-out and arrangement to suit the changing needs of occupant'.

As noted in the GLA CES guidance, the terms are often used interchangeably however, adaptability refers more to structural changes, whilst flexibility often relates to floor plates.

Application at The Fox Court Site

DESIGNING FOR ADAPTABILITY

To avoid unnecessary material use, cost and disruption arising from the need for future adaptation works, the building design seeks to facilitate adaptability. This approach has been considered throughout the early design period and has been implemented through several measures.

These measures will allow the building to be adapted to respond to changing functional demands, or local environmental impacts of climate change.

The tenanted elements of the site, particularly the office areas, will have changing needs and uses over time, therefore a flexible internal space is required. The optimised structural grid/column spacing facilitates the changes and adaptation of the space for new users and/or patterns of use.

DESIGNING FOR FLEXIBILITY

To respond to changing functional demands or local environmental impacts of climate change, the building design seeks to facilitate flexibility for future changes.

In the 'Skin' layer, the building design will incorporate measures such as a modular façade design, using a regular grid which enables the use of standardised panel sizes. This approach also provides the opportunity for prefabrication.

In the 'Space' layer, elements will be designed with an open-plan layout to enable easy future adaptability for different use types.

In the 'Services' layer, the building design will seek to ensure that the mechanical and electrical central systems (including data/telecoms) and distribution allow for future changes in layout and are adaptable/extendible for reconfiguration and future changes in needs.

PRINCIPLE 5 - DESIGNING FOR DISASSEMBLY

Definition

Circular Economy Principle 5, 'Designing for Disassembly' calls for designers to seek to "[design a building] to allow the building and its components to be taken apart with minimal damage to facilitate reuse or recycling".

The GLA CES guidance notes that 'if designed well, it should be possible to replace any component of a building'.

Ease of disassembly is facilitated by principles allowing 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.

Application at The Fox Court Site

To maximise opportunities to reclaim and reuse materials at the end of the building's life, the building design will incorporate measures to enable effective disassembly.

In the 'Structure' layer, the CLT slabs/panels and new bolted structural steelwork have been maximised as (alongside their whole-life carbon benefits) these are inherently easier to disassemble relative to RC or other concrete-based solutions.

Where present other substructure and superstructure materials (reinforced concrete) will be amenable to recovery and recycling at end-of-life, with the concrete and reinforcement separated by crushing. The recovered concrete can be crushed for use as aggregate and the recovered reinforcement steel can be recycled back into other uses.

In the 'Skin' layer, the use of modular facade elements within the design, as well as facilitating adaptation, may allow these to be removed as a unit and therefore have some potential to be reused elsewhere on a different development.

In the other layers, at the subsequent design stages, consideration will be given to the selection and specification of assemblies (e.g. mechanical connections with facade systems) and finishes which facilitate easy disassembly at the end-of-life stage. Consideration will also be given to the specification of materials with lower potential health issues, to avoid health impacts to those deconstructing the building.

During the subsequent design stages, the Project Team will pursue:

- Provision of a Building Adaptability and Disassembly Guide, either as a hard copy document or an Asset Information Model from the Building Information Model (BIM) created in accordance with PAS 1192 Part 2-20131 and PAS 1192 Part 3-20142. There is also the potential to use the development's BIM model to facilitate real-time maintenance tasks which can reduce waste generated on-site during the building's 'in use' phase.

- Provision of a fit-out manual, detailing how the floorplates can be efficiently repurposed into various types of other space uses (e.g. open-plan offices, cellular offices, meeting rooms and breakout spaces.

PRINCIPLE 6 - USING SYSTEMS, ELEMENTS OR MATERIALS THAT CAN BE RE-USED AND RECYCLED

Definition

Circular Economy Principle 6, 'Using systems, elements or materials that can be reused and recycled' supports the application of the Waste Hierarchy at the end of the building's lifetime.

Application at The Fox Court Site

Using systems, elements or materials that can be reused and recycled will ultimately help in ensuring that waste is avoided, or at least reduced.

Several approaches implementing this principle are planned for the proposed development:

- In the 'Structure' layer CLT and structural steel can be reused,
- In the 'Skin' layer façade panels (if mechanically fixed) could be removed and reused,
- In the 'Services' layer lighting modules (and perhaps MVHRs & CAM units) could be stripped out and reused or returned to manufacturers for reuse/recycling,
- In the 'Space' layer,' sanitaryware fittings could be reused or returned to manufacturers and plasterboard returned to manufacturers for reuse/recycling,

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SUMMARY TABLE - PLEASE REFER TO GLA CE TEMPLATE SPREADSHEET FOR FULL LAYER BY LAYER COMMENTARY ON THESE PRINCIPLES

Circular Economy Design Approach	**Phase/ Building/ Area** Layer (Sect. 5.0)	**Strategic Response for the Proposed Development**
Longevity	**Whole Building** Layers: Skin to Stuff	The building design has prioritised measures to ensure the longevity of materials, products and components to avoid premature end-of-life for these through considerations of maintenance and durability. Key responses for Fox Court are: • **Building materials, components and products shall be selected to avoid a premature end-of-life.** • **Use of durable elements, consideration of design for disassembly and the use of mechanical fixings shall be implemented across all building layers.** • **Information to support the future re-use of materials shall be required for optimising end-of-life cycles.** During the subsequent design stages, formal strategies will continue to be developed and documented for the repair and replacement of fabric elements and plant throughout the building and these will be documented in O&M manuals and cleaning strategies.
Adaptability and Flexibility	**Whole Building** Layers: Primarily Structure	To avoid unnecessary material use, cost and disruption arising from the need for future adaptation works, the building design seeks to facilitate adaptability. This approach has been considered throughout the early design period and has been implemented through several measures. Key responses for Fox Court are: • **All Layers of the building (in particular the services) will be designed to be flexible and adaptable to multiple uses.** • **The building as a whole shall be designed to be adaptable where possible, in line with the decision tree provided in the GLA CES Guidance Figure 4.** • **The building has been designed for optimal flexibility through the use of open-plan layouts to accommodate a variety of end uses and configurations. The design allows for non-structural partitions to be installed by occupiers as required, for example, to create meeting rooms.** • **The use of non-structural partitions shall provide ease of deconstruction for future re-arrangement or change of use.** • **The building services have also been designed to accommodate maximum flexibility, allowing for each floor plate to accommodate one or multiple tenants. Each tenancy area shall be separately sub-metered and zoning of HVAC allows for the sub-division of floors into function areas or tenancies.** • **Due to site constraints, there is no scope for adaptability through further addition or contraction of the building.** These measures will allow the building to be adapted to respond to changing functional demands, or local environmental impacts of climate change. In the 'Skin' layer, the building design will incorporate measures such as a modular façade design, which also provides the opportunity for prefabrication. In the 'Space' layer, the office spaces will have changing needs and uses over time, therefore a flexible internal space is required. The optimised structural grid/column spacing facilitates the changes and adaptation of the space for new users and/or patterns of use. In the 'Services' layer, the building design will seek to ensure that the mechanical and electrical central systems (including data/telecoms) and distribution allow for future layout changes and are adaptable/extendible for reconfiguration and future changes in needs.

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Circular Economy Design Approach	Phase/ Building/ Area Layer (Sect. 5.0)	Strategic Response for the Proposed Development
Disassembly	**Whole Building** Layers: Structure to Stuff	To maximise opportunities to reclaim and reuse materials at the end of the building's life, the building design will incorporate measures to enable effective disassembly, selecting products, systems and components that can be disassembled where possible. Key responses for Fox Court are: • **The building shall be designed using systems and components that can be disassembled, in particular, the CLT slabs and panels and structural steelwork have been a key Circular Economy consideration, yielding products which can be directly reused in other buildings.** • **Recycling and reuse of the structural concrete and steel reinforcement, where present, is also expected, with good recycling (and reuse) potential of the component materials present.** In the 'Structure' layer, the CLT slabs/panels and new bolted structural steelwork are inherently easier to disassemble relative to reinforced concrete. However, other substructure and superstructure materials containing reinforced concrete will be amenable to recovery and recycling at end-of-life, with the concrete and reinforcement separated by crushing. The recovered concrete can be crushed for use as aggregate and the recovered reinforcement steel can be recycled back into other uses. In the 'Skin' layer, the use of modular facade elements within the design, as well as facilitating adaptation, may allow these to be removed as a unit and therefore have some potential to be reused elsewhere on a different development. In the other layers, during the subsequent design stages, consideration will be given to the selection and specification of assemblies (e.g. mechanical connections with facade systems) and finishes which facilitate easy disassembly at the end-of-life stage. Consideration will also be given to the specification of materials with lower potential health issues, to avoid health impacts to those deconstructing the building.
Using systems, elements or materials that can be re-used and recycled	**Whole Building** Layers: Services to Stuff	There is no intention to replace the building and therefore adaptability/flexibility and longevity will be the focus of the Circular Economy design approach for the 'Skin' and 'Structure' layers of the building. However, materials, components and products in the 'Services', 'Space' and 'Stuff' layers will be subject to frequent replacement and the building design takes this into account. Key responses for Fox Court are: • **The building shall be designed using materials, products and components that can be reused or recycled where possible.** • **Recycling and reuse of the structure is expected to be the most significant consideration here, with good reuse potential for the CLT and structural steelwork and good recycling potential for the limited new reinforced concrete** In the 'Services' layer, where appropriate (e.g. for WC cores), mechanical, electrical and public health services shall be 'stacked', to minimise the amount of services distribution required and to ease maintenance and replacement of these elements. Additionally, in all elements, building services shall be located so they are easily accessible, not requiring the removal of ceilings/walls during maintenance and replacement processes. In all layers, the building design will consider design and construction methods incorporating, where feasible, standardised elements for components and products to lower waste arising from redundant specialist items with limited reuse potential in their next life.

5.0 circular economy design principles by building layer…

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OBJECTIVE

This section of the Circular Economy Statement reviews the application of Circular Economy principles to the proposed development in relation to the different 'layers' identifiable in the scheme.

OVERVIEW

As noted in the GLA CES Guidance, a useful way to consider Circular Economy strategies for a building or development is in terms of 'shearing layers', where each layer has its own life cycle, life span, and relevant Circular Economy design approaches. A typical 'building in layers' framework is shown on the right, with indicative lifespans given for materials, components and products in different layers.

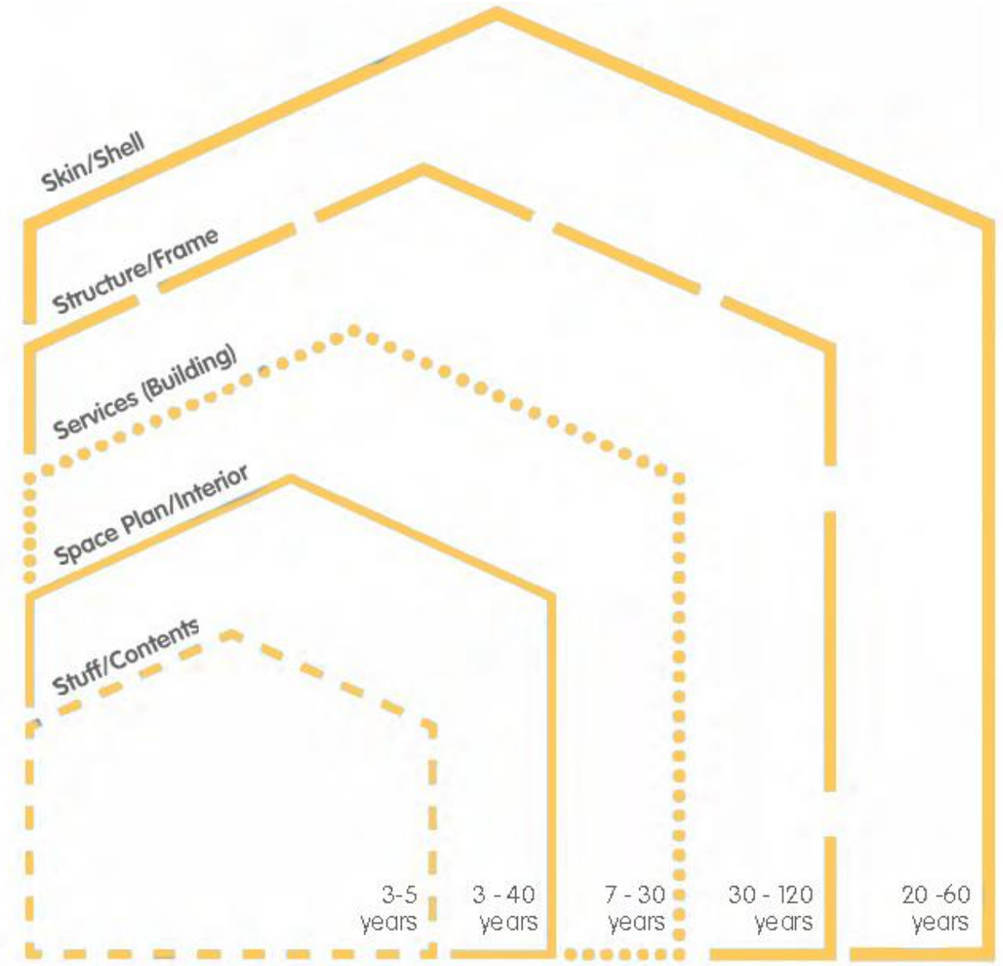
This encompasses the following principal layers:

- Site
- Skin/Shell (e.g. façade, roof)
- Structure (structural frame/ superstructure)
- Substructure
- Services (building services)
- Space (space plan/interior/ interior space)
- Stuff (contents)
- Construction Materials

It is often beneficial, where possible subject to the complexity and scale of a project, to ensure building elements and components with different lifespans form independent layers. This will enable material and components in layers with shorter lifespans to be replaced without damage to layers which have longer lifespans.

Each building layer can therefore be subject to its own dedicated approach, according to its purpose, function and lifespan.

Specific considerations for the different layers at the Fox Court site are summarised on the following pages.



Building in Layers Framework - Building Layers and their Indicative Lifespans, after GLA Guidance Figure 2

Note - The layer lifespans shown are typical and will be specific to each development.

5.0 circular economy design principles by building layer…

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SITE

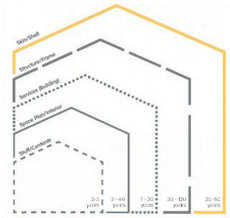
Constituent Elements

The geographical location, context, external works, earth works and landscaping.

Commentary

The site layer is in effect 'eternal' in the context of the built environment and is the element/layer which is least easily changed following the initial construction works. Accordingly, decisions for this layer are likely to drive the longest ongoing impacts (positive or negative) for the project.

The site is located in the London Borough of Camden with good public transport connections, so its geographical location lends it to sustainable transportation.



SKIN/SHELL

Constituent Elements

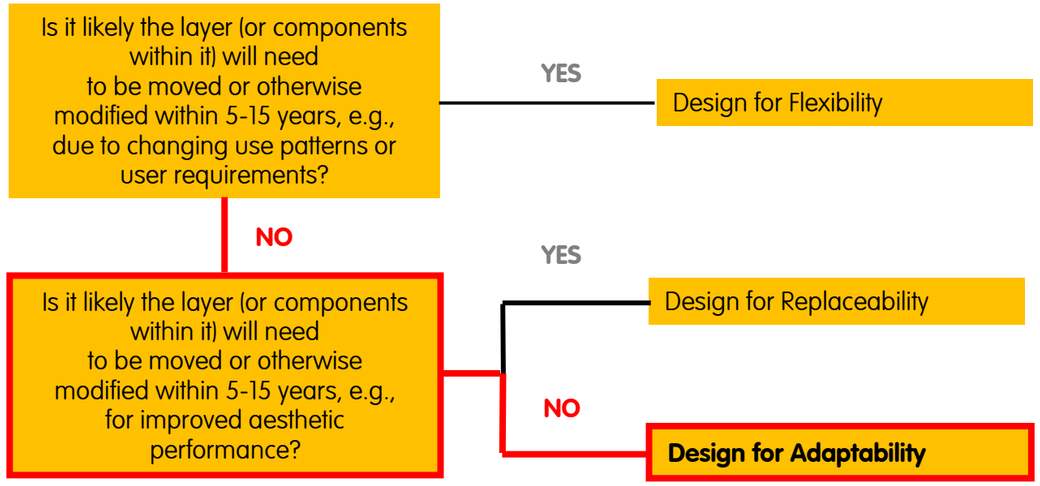
The layer keeping out water, wind, heat, cold, direct sunlight and noise. Includes exterior surfaces such as the roof, siding, sheathing and windows. This layer includes the façade (front or face of a building).

This layer often has the biggest impact on long term durability, occupant comfort and building-energy performance.

Commentary

The current proposals have been subject to energy and thermal comfort modelling to determine the optimum glass specification and thermal and air tightness performance to reduce CO_2 emissions and deliver occupant comfort, particularly in the context of overheating risk.

For Fox Court, the primary design approach for the skin/shell layer is 'design for adaptability':



Decision Tree for Design Approaches to Fox Court Skin/Shell Layer, after GLA Guidance Figure 5

5.0 circular economy design principles by building layer…

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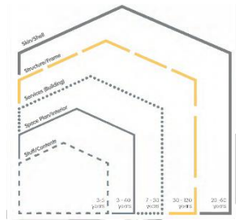


STRUCTURE (STRUCTURE/STRUCTURAL FRAME/ SUPERSTRUCTURE)

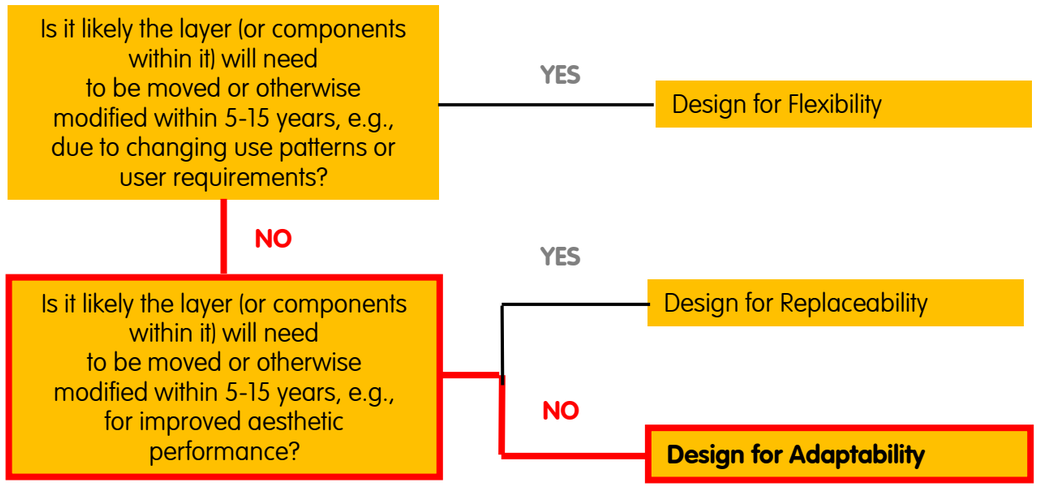
Constituent Elements

Load-bearing elements above plinth including roof-supporting structure.

Commentary

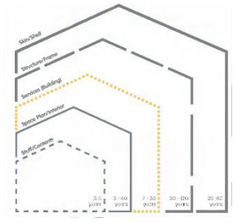
Generally, the structure it is the longest-lasting of all the building element. Insulation and services may be embedded here.

For Fox Court, the primary design approach for the structure layer shall be 'design for adaptability':



Decision Tree for Design Approaches to Fox Court Structure Layer, after GLA Guidance Figure 5

SERVICES (BUILDING SERVICES)



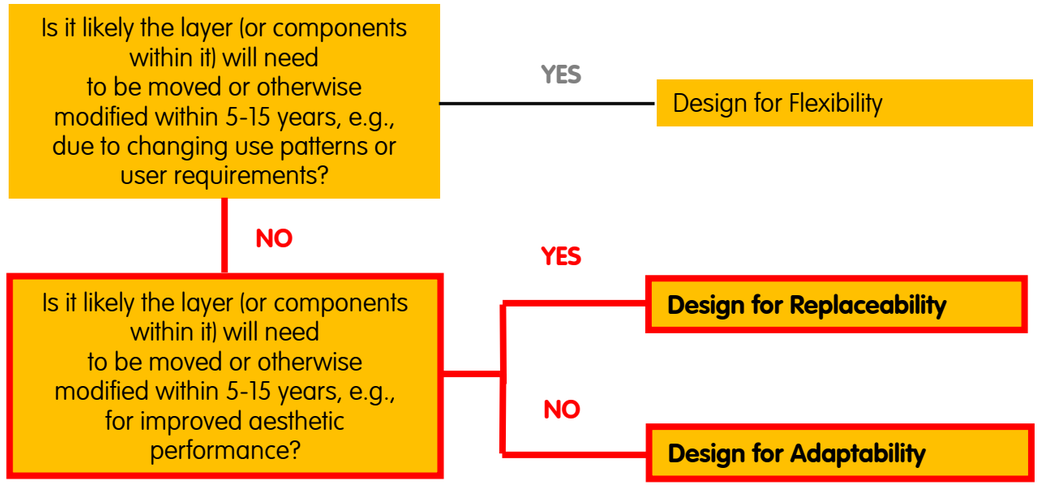
Constituent Elements

Installations to ensure comfort, practicality, accessibility and safety, including plumbing, heating, cooling, ventilation and electrics. Distribution systems can be hard to change

Commentary

As noted in the Energy and Sustainability Statement, through the specification of an Air Source Heat Pump-led system, the building will be fully electric (fossil fuel free) and therefore have the potential to reduce its CO_2 emissions year on year as the electricity grid decarbonises. This omission of gas pipework, flues etc. from the site will reduce material inputs into the building and hence improve the circularity of the scheme.

For Fox Court, the primary design approaches for the services layer shall be 'design for replaceability' and 'design for adaptability':



Decision Tree for Design Approaches to Fox Court Services Layer, after GLA Guidance Figure 5

5.0 circular economy design principles by building layer…

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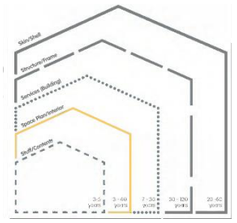
SPACE (SPACE/SPACE PLAN/INTERIOR/INTERIOR SPACE)



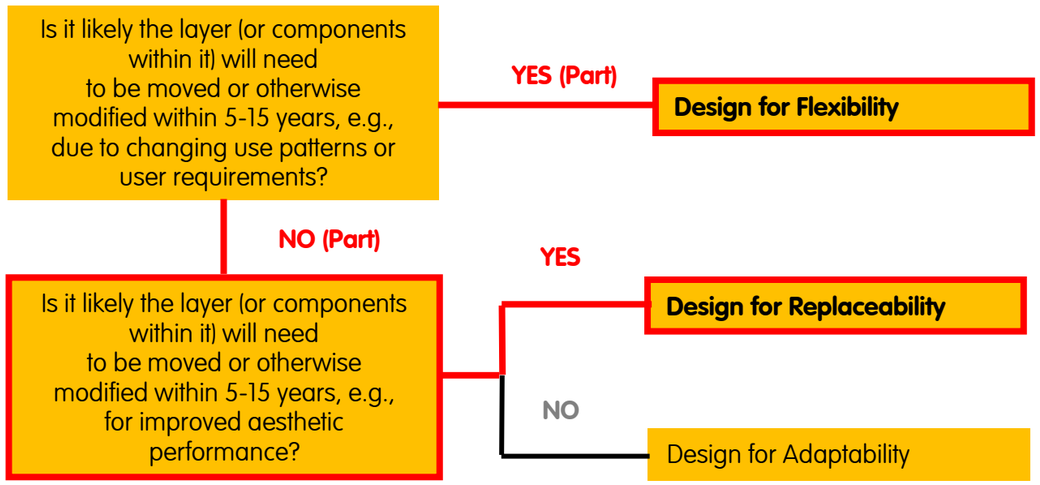
Constituent Elements

The layout, internal walls and partitions, ceilings, floors, surface finishes, fixtures, doors, fitted furniture. Changeable without changing structure, services or skin.

Commentary

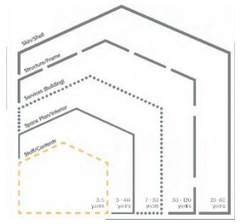
Interior finishes often comprise a big investment and are subject to relatively frequent updates and replacement.

For Fox Court, the primary design approaches for the space layer shall be 'design for flexibility and 'design for adaptability':



Decision Tree for Design Approaches to Fox Court Space Layer, after GLA Guidance Figure 5

STUFF/CONTENT



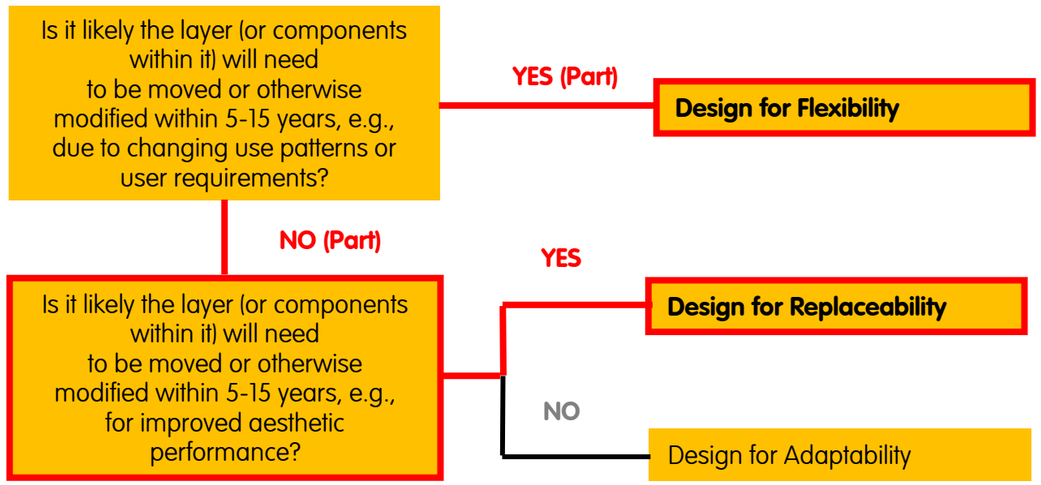
Constituent Elements

Anything that could fall if the building was turned upside down. Not permanent, easily movable, most frequently changed by the occupant, e.g., appliances, lamps, electronics, furniture, art.

Commentary

Items considered as 'stuff'; appliances, lamps, electronics, furniture, art etc. are easily movable and are most frequently changed by the occupants, whether in the office or jewellery workshop elements.

For Fox Court, the primary design approaches for the stuff/contents layer shall be shall be 'design for flexibility and 'design for adaptability':



Decision Tree for Design Approaches to Fox Court Stuff/Contents Layer, after GLA Guidance Figure 5

5.0 circular economy design principles by building layer…

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DESIGNING OUT WASTE

Design Principles	Module	Site	Substructure	Superstructure	Shell/Skin	Services	Space	Stuff	Construction Stuff
Designing Out Waste	**Module A** Product Sourcing and Construction Stage	The site is bounded by adjacent buildings and public footpaths and there is limited landscaping to be provided at the ground floor level with the exception of: - to the new cycle/pedestrian access. - to the Gray's Inn Road elevation, where a new landscaping scheme with planters is to be provided. - to the north side of the site, landscaping shall be provided to the terraces and around the retained fire escape stair. - Green and blue roofs, where terraces, these will have planters and drains to an attenuation tank.	Existing structures and substructures are to be retained on site, where deemed possible. Detailed investigations have been undertaken to establish the required loadings and additional piling required to accommodate the modified and extended structure, whilst also maximising the retention of existing piles. By identifying the proposed locations for new piles, the demolition of the existing structure has been minimised as much as reasonably possible to accommodate full-size piling rigs. The existing basement is being retained. Cement replacement (e.g. GGBS) shall be incorporated in the concrete mix (subject to supply chain availability). A 10% GGBS proportion is currently proposed, as a higher content is not sustainable (due to lack of domestic and global availability). In the long-term London Councils may prohibit the use of GGBS altogether.	Existing superstructure elements (primary concrete columns and floor slabs) shall be retained where possible. CLT slabs are proposed for the new floors, minimising the slab weight and reducing the loading on columns, to reduce the need for additional existing structure strengthening. Metal decks/ lightweight concrete slabs are proposed for the new roofs due to concerns over the performance of CLT roofs when rainwater penetrates the waterproofing layer. The proposed steel frame and CLT floor slabs (comprising around 80% of the new slabs) in the vertical extension shall be procured as pre-fabricated components, typically as 6m x 1.2m modules, reducing the potential for on-site waste. The structural grid for the new superstructure follows that of the existing building, and reduces the need for transfer structures between the proposed building vertical extension and the existing structure. - Reduction in concrete and steel mass has been prioritised before cement replacement.	The proposed façade shall be designed to be of a lightweight construction, consisting of modularised precast concrete panels, reducing the loading required on the superstructure. The modular façade panels will be manufactured offsite, minimising site waste. The new building envelope shall be specified to meet best practice U-values, which shall minimise heat losses/gains and reduce operational energy consumption. Windows shall be of standard sizes and manufactured off-site, reducing on-site waste and the potential for damage	Central Plant: - The capacity and size of building services plant has been limited as far as possible by implementing a low energy 'fabric first' approach in the 'Be Lean' stage of the Energy Hierarchy and further efficiency measures in the 'Be Clean' and 'Be Green' stages. Where possible, packaged plant is proposed for the central cervices, direct from suppliers/manufacturers to reduce site waste. Distribution: - The building services vertical and horizontal distribution shall be designed to follow the shortest viable routes, reducing the extent of pipework and ductwork. Plant sizes and distribution shall be optimised throughout the subsequent design stages.	The office floor plates shall be delivered as open-plan spaces - partitions will not be installed by the Developer, allowing flexibility for tenants to install partitions as required within their own fit-out, reducing base-build construction waste. Reuse of existing floor tiles, or the specification of remanufactured raised access flooring, shall be considered at the detailed design stage. The Jewellery Workshop to be provided in the basement shall be provided as fitted-out spaces, where possible in conjunction with occupants to reduce waste. Generally, materials needing frequent replacement shall be kept to a minimum.	The extent of Office and Landlords/Core area fit-out handed over by the Developer is to be determined in the detailed design stage. However, it is anticipated that the level of FF&E installed by the Developer shall be minimal. The existing building has extensive glazed partitioning from the previous occupant, opportunities for the reuse of which will be considered in the detailed design stage. The Jewellery Workshop to be provided to the basement and ground floors shall be provided as fitted-out spaces.	- The Main Contractor shall be required to develop a strategy for temporary works that minimises waste. Temporary works are required to enable the piling rigs to install the additional piling required whilst also retaining the maximum amount of structure possible from the existing building.

5.0 circular economy design principles by building layer…

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Design Principles	Module	Site	Substructure	Superstructure	Shell/Skin	Services	Space	Stuff	Construction Stuff
	Module B In-Use Stage	The external works on the site have been designed primarily for longevity, with the green roof planting strategy and all landscaping materiality selected to maximise long-term use of the external space, with minimal maintenance. Durable and resilient materials shall be specified, the cycle/pedestrian access and to the green and blue roofs proposed for the roof terraces, to reduce maintenance and replacement frequency. The green roofs will incorporate low-maintenance planting and shall be accessible for maintenance (located on the 9th floor). A formal maintenance plan shall be developed for the hard and soft landscaping.	Not Applicable - The new and retained substructure shall have a service life matching the whole building's required life span. The use of concrete in the existing substructure limits its maintenance requirements in use.	Not Applicable - The new and retained superstructure shall have a service life matching the whole building's required life span. The new and retained superstructure will incorporate materials that are durable and of high quality, require a very low frequency of maintenance and replacement	Durable and resilient materials facade and roof material (to resist environmental degradation) shall be specified, to reduce maintenance and replacement frequency.	Central Plant: - Appropriate planned preventative maintenance agreements and warranties shall be put in place to ensure plant is kept in good working order at operating at maximum efficiency - Sufficiently sized openings and access strategy shall be provided to allow dismantling and removal of the basement plant for replacement without damage or intervention to the plant itself or to the building fabric/structure. Distribution: - The building services vertical and horizontal distribution shall be designed and located to allow for easy access for maintenance, cleaning and repair, reducing their replacement frequency and damage to finishes when accessing them. - Ceiling/Floor void distributed services will allow for reconfiguration of space and function without additional services strip-out/diversion works	Finishes to door and lift cars, and walls and floors in vulnerable parts of the building (i.e. those subject to high pedestrian traffic or on route to cycle store) shall be designed to minimise risk of damage from impact and shall be low maintenance. Finishes to all areas shall be specified of high quality and with the ability to be cleaned/deep cleaned, to minimise the frequency of replacement.	Where FF&E is installed by the Developer, appropriate servicing agreements and warranties shall be put in place. The Building Management/Owner shall ensure that tenant Fit-Out Guides are revised after each fit-out, to encourage responsible and circular fit-outs based on knowledge of what is present in the building.	The offices shall be provided as a shell, ready for fit-out by others, without internal partitions.
	Module C End-of-Life Stage	Appropriate end-of-life routes for hard landscape materials shall be put in place, preferring reuse where possible. The proposed hard landscaping materials - metal, concrete and stone - have established reuse and recycling routes. The proposed green roof substrate could be recovered for reuse or recycling.	Appropriate end-of-life routes for materials in the 'Substructure' layer shall be put in place, preferring reuse where possible. Just as the current proposed works will reuse the existing substructure, a future scheme could reuse this also. Key materials include: - The concrete substructure could be demolished and crushed for re-use on-site or off-site for future developments, reducing waste sent to landfill. - The piles will preferably be re-used once again at the end of the project, e.g. if the building is removed and a new building is constructed above.	Appropriate end-of-life routes for materials in the 'Superstructure' layer shall be put in place, preferring reuse where possible. Components within the new superstructure such as the steel beams and columns and CLT floor slabs can easily disassembled at the end-of-life, allowing for these elements to be reused or recycled. Concrete from the existing/retained superstructure can be demolished and crushed for reuse on or off-site, reducing waste sent to landfill. The metal sheets forming the metal deck could be processed as scrap for recycling.	The proposed façade shall be designed to be of a lightweight construction, consisting of modularised precast concrete panels, reducing the loading required on the superstructure. Just as the current proposed works will reuse the existing superstructure, a future scheme could reuse this also. The potential for whole façade panels (as opposed to individual components of the modular panel) to be reused shall be explored in later design stages to understand how panels can be made demountable to allow for disassembly.	Central Plant: - Appropriate planned preventative maintenance agreements and warranties shall be put in place to ensure plant is kept in good working order at operating at maximum efficiency - Sufficiently sized openings and access strategy shall be provided to allow dismantling and removal of plant prior to building demolition/deconstruction. General: - The building services installation shall use mechanical fixings where possible for ease of disassembly - Standardised components shall be specified across the building	Partitions shall not be load-bearing and therefore allow for ease of disassembly and reconfiguration. Mechanical fixings shall be preferred to permanent fixings and adhesives to enable removal and replacement of elements individually. Fit-out guides shall be provided for tenants/occupants. The Building Management/Owner will ensure that tenant fit-out guides are revised after each fit-out, to encourage responsible and circular fit outs based on knowledge of what is present in the building. Replacements/updates/modifications to materials and components shall be recorded in the End-of-life Information Set.	Where FF&E and/or finishes are installed by the Developer, chemical fixings and adhesives shall be minimised, where feasible.	Temporary works structures shall be designed for ease of disassembly.

5.0 circular economy design principles by building layer…

…sustainable building services solutions

Design Principles	Module	Site	Substructure	Superstructure	Shell/Skin	Services	Space	Stuff	Construction Stuff
	Module D Benefits and Loads Beyond the System Boundary	Benefits beyond the system boundary for materials in the 'Site' layer have been identified for reuse, recycling and energy recovery within the Bill of Materials.	Benefits beyond the system boundary for materials in the 'Substructure' layer have been identified for reuse, recycling and energy recovery within the Bill of Materials. **Specific Materials / Components / Products**: - Concrete substructure could be crushed and re-used as recycled aggregate at end-of-life. - Steel substructure materials (i.e. rebar) could be recovered in the crushing process and reprocessed as scrap for recycling.	Benefits beyond the system boundary for materials in the 'Superstructure' layer have been identified for reuse, recycling and energy recovery within the Bill of Materials. **Specific Materials / Components / Products** - Concrete superstructure could be crushed and re-used as recycled aggregate at end-of-life. - Steel superstructure materials (i.e. stell frames and rebar) could be recovered in the crushing process and reprocessed as scrap for recycling - There are/will be emerging markets for the recovery and reuse of CLT in future, when the operational lifespan of this building is reached.	Benefits beyond the system boundary for materials in the 'Shell/Skin' layer have been identified for reuse, recycling and energy recovery within the Bill of Materials. Mechanical connections shall be specified where possible to facilitate disassembly and ensure facade materials can be recovered in a high-value state. A number of end-of-life uses for glass exist and these will be explored at the detailed design stage. Aluminium can be processed as scrap for recycling.	Benefits beyond the system boundary for materials in the 'Services' layer have been identified for reuse, recycling and energy recovery within the Bill of Materials. Mechanical connections shall be specified where possible to facilitate disassembly and ensure services plant/distribution systems can be recovered in a high-value state. **Specific Materials / Components / Products** - Major plant items shall be designed for deconstruction and removal, however re-use of equipment is subject to condition and age. - Steel from pipework and ductwork systems etc.) could be processed as scrap for recycling. - A number of lighting manufacturers operate take-back schemes for their products and similar schemes will be explored for packaged plant manufacturers at the detailed design stage. There is no scope for exporting energy from the site.	Benefits beyond the system boundary for materials in the 'Space' layer have been identified for reuse, recycling and energy recovery within the Bill of Materials. Standardised components shall be selected across the building. Mechanical fixings shall be used as these can be separated and reused more easily. **Specific Materials / Components / Products** - Plasterboard partitions could be disassembled for reuse or recycling. - Steel studs to partition walls could be processed as scrap for recycling.	Benefits beyond the system boundary for materials in the 'Stuff' layer have been identified for reuse, recycling and energy recovery within the Bill of Materials. **Specific Materials / Components / Products** - Furniture, Fixtures, and Equipment (FF&E) such as reception desks could be donated to charity or resold	Benefits beyond the system boundary for materials in the 'Construction Stuff' layer have been identified for reuse, recycling and energy recovery within the Bill of Materials. **Specific Materials / Components / Products** - Temporary steel could be deconstructed and re-used off-site.

5.0 circular economy design principles by building layer…

…sustainable building services solutions

Design Principles	Site	Substructure	Superstructure	Shell/Skin	Services	Space	Stuff	Construction Stuff
Designing for Longevity	The proposed development is located on a previously developed site and has no impact on virgin land. The Contractor will provide a Materials Durability Assessment, for storage with the End-of-life Pack, which will schedule the life expectancy of components within the 'Site' layer. A systematic, site-specific climate change impact assessment shall be carried out to identify and evaluate the impact of climate change on structural, fabric and building services resilience, including the ability of the building facade and plant as specified to avoid overheating under predicted future weather data. This shall be conducted in accordance with the methodology for BREEAM Credit Wst 05 Adaptation to Climate Change. A formal Flood Risk Assessment shall be undertaken to determine current and future flood risk (including an allowance for climate change).	The new substructure elements shall be designed to remain for the whole building life cycle. It shall be designed in accordance with the Eurocodes to have a minimum service life of 50 years, including the piles and pile caps. The existing retained substructure shall also have a minimum service life of 50 years Continued serviceability of the substructure shall be verified during the building's life through regular inspections and maintenance. Consideration shall be given to cement replacements and admixtures to extend the life and durability of concrete in the new substructure, with good detailing being a key approach to promoting longevity in the substructure.	The new superstructure shall be designed to remain for the whole building life cycle. It shall be designed in accordance with the Eurocodes to have a minimum service life of 50 years, including the piles and pile caps. The existing/retained superstructure shall also have a minimum service life of 50 years Continued serviceability of the superstructure shall be verified during the building's life through regular inspections and maintenance.	The shell/skin shall be designed to have a minimum service life of 60 years, including the external walls with brick façade and wall insulation. Materials and components shall be specified with long life expectancies, and be designed for long-term durability with minimal intervention during the building's life cycle. Secondary components such as windows, curtain walls, external doors and louvres shall be specified to be of high quality and capable of retaining their value. Gaskets on glazing are likely to be the element most susceptible to environmental degradation/the effect of weathering - design initiatives to reduce solar gain may alleviate some of these issues, but the refurbishment approach for these components shall be considered at the detailed design stage.	Building services plant and distribution shall be sized to be adequate for future weather conditions, with appropriate allowances for climate change effects.	Internal floors and walls in core areas shall be durable and designed to minimise risk of damage, for example through hard wearing floor finishes and kick plates to doors.	The offices shall be delivered as a 'Shell' space and internal furnishings will not be specified for this space. FF&E integrated into other layers shall be avoided.	No specific approaches have been identified Circular Economy measures shall be reviewed during construction to ensure that recommendations are implemented.

5.0 circular economy design principles by building layer…

…sustainable building services solutions

Design Principles	Site	Substructure	Superstructure	Shell/Skin	Services	Space	Stuff	Construction Stuff
Designing for Adaptability or Flexibility	The building as a whole shall be designed to be adaptable where possible, in line with the decision tree provided in the GLA CES Guidance Figure 4. 'The extent of horizontal extension within the proposed development is primarily limited by the site being bounded by adjacent buildings and public footpaths. 'The extent of vertical extension within the proposed development has been maximised within planning massing constraints, whilst maximising retention of the existing structure, without the need for additional substructure reinforcement.	The assessment undertaken of the existing substructure for the proposed works has included a review of the structural loadings, ensuring it will be suitable for a variety of uses should the building be adapted for these. For example - subject to the Structural Engineer's formal review - a change of use for the building from commercial to domestic use is likely to be feasible by the existing substructure but a retail use may only be accommodated if the new building had fewer floors. A retail use might require larger bays (currently 6m x 6m), so new framing and transfer structures will be needed.	The proposed new superstructure provides an opportunity for flexible open-plan layouts, accommodating a variety of occupiers, end uses, and internal configurations.	Pre-fabrication, modularity and specification of reversible connections shall be pursued on facade materials to facilitate disassembly and reuse of materials elsewhere. Standardised window sizing shall be pursued with limited different window types proposed across the facades.	The building services have been designed to accommodate maximum flexibility, e.g. floor-by-floor ventilation systems designed to work with different room partitions, allowing for each floor plate to accommodate one or more tenants. Smaller items of plant, shall be sited within accessible locations so they can be maintained easily and removed for replacement if necessary. For major plant items, a Plant Replacement Strategy setting out routes to and from the plant areas, lifting requirements and shutdown periods should be created to ensure it is possible to remove and replace major items of plants without needing to demolish sections of wall or floor. Each potential tenancy area shall be separately sub-metered. A plant replacement strategy shall be developed to ensure that building services equipment can be replaced when required (at end-of-life) without damage to building fabric or structure. Plant shall be located either externally (e.g. condenser units) or within the basement plant room. The plant room shall be accessible. It shall be possible to disassemble larger items of plant - for example the water tank, which shall be installed in sections.	If the office tenant becomes known during the construction process, the 'Space' design shall be reviewed in line with their proposed fit-out. Systems allowing the relocation of partitions across floorplates to reconfigure spaces/functions without resource-intensive works shall be investigated, alongside the specification of internal ceiling finishes designed to be demountable Partitions will not be load-bearing and therefore allow for ease of disassembly and reconfiguration	The integration of FF&E into the building fabric shall be avoided; Loose FF&E could be reused (donated to charity or resold) when reconfiguration is required.	Not Applicable

5.0 circular economy design principles by building layer…

…sustainable building services solutions

Design Principles	Site	Substructure	Superstructure	Shell/Skin	Services	Space	Stuff	Construction Stuff
Designing for Disassembly	Not applicable - No specific approaches for the 'Site' Layer have been identified.	Concrete substructure could be demolished and crushed for re-use on or off-site, reducing waste sent to landfill.	Most of the structural components within the new superstructure (CLT and steel) shall be easily disassembled due to the specification of mechanical, reversible fixings. This shall allow for the elements to be reused or recycled at the end-of-life. Concrete within the existing/retained superstructure could be demolished and crushed for reuse on or off-site, reducing waste sent to landfill. Accurate structural record drawings and specification details will be kept and conveyed into the End-of-Life Pack.	Pre-fabrication, modularity and specification of reversible connections shall be pursued on facade materials to facilitate disassembly.	All building services plant shall be documented with O&M Manuals (commercial and back-of-house areas) and tenants' packs. For major plant items, a Plant Replacement Strategy setting out routes to and from the plant areas, lifting requirements and shutdown periods should be created to ensure it is possible to remove and replace major items of plants without needing to demolish sections of wall or floor. Local services shall be adaptable to a range of use/occupancy rates.	Partitions shall not be specified as load bearing and will therefore allow for ease of disassembly and reconfiguration.	Chemical fixings and adhesives shall be minimised for wall and floor finishes, where feasible.	No applicable.
Using systems, elements or materials that can be re-used and recycled	**Specific Materials / Components / Products**: - External hard landscaping materials such as paving slabs can be reused if removed carefully or crushed for aggregate.	The key substructure material (reinforced concrete) is suitable for recovery and recycling at end-of-life, with the concrete and reinforcement separated by crushing. The recovered concrete can be crushed for use as aggregate and the recovered reinforcement steel can be recycled back into other uses. **Specific Materials / Components / Products**: - Concrete substructure could be crushed and re-used as recycled aggregate at end-of-life. - Steel could be processed as scrap for recycling.	The key existing/retained superstructure material (reinforced concrete) shall be suitable for recovery and recycling at end-of-life, with the concrete and reinforcement separated by crushing. The key new superstructure materials (steel structure and CLT floor components) shall be readily reusable or recyclable. **Specific Materials / Components / Products**: - Concrete substructure could be crushed and re-used as recycled aggregate at end-of-life. - Reinforcement steel could be recovered and reprocessed/recycled for other uses.	Pre-fabrication, modularity and specification of reversible connections pursued on facade materials to facilitate the reuse of materials elsewhere. Explore specification of materials with EPDs to support end-of-life scenarios **Specific Materials / Components / Products**: - Aluminium can be processed as scrap for recycling.	**Specific Materials / Components / Products**: - Plant designed for deconstruction and removal, however re-use of equipment subject to condition and age. - Steel could be processed as scrap for recycling.	Components and products shall be selected and specified to allow for disassembly and reuse at the end of their useful life. **Specific Materials / Components / Products**: - Plasterboard partitions could be disassembled for reuse or recycling. - Steel studs to partition walls could be processed as scrap for recycling.	**Specific Materials / Components / Products**: - Furniture, Fixtures, and Equipment (FF&E) such as reception desks could be donated to charity or resold.	Circular Economy initiatives shall be reviewed throughout the construction process to ensure that all recommendations are implemented and other opportunities identified. **Specific Materials / Components / Products**: - Temporary steel and timber could be deconstructed and re-used off-site.

6.0 pre-redevelopment audit and pre-demolition audit…

…sustainable building services solutions

OBJECTIVE

This part of the Circular Economy Statement summarises the approaches to the re-redevelopment audit and pre-demolition audit activities applied at the Fox Court site.

Section 4.6 of the GLA CE Guidance notes that pre-redevelopment and pre-demolition audits are important tools for establishing whether buildings and/or components can be reclaimed and how any demolition materials will be managed.

Typical Demolition Waste in a Skip - Mixing of Such Products Diminishes Their Recovered Value

PRE-REDEVELOPMENT AUDIT

Overview

As discussed in **Section 3.0 Circular Economy Design Approaches**, the decision tree given in Figure 4 of the CES Guidance has been followed in the design process to identify the most appropriate design approach for the existing building.

A detailed Pre-Redevelopment Audit Report has been prepared as supporting evidence to this Circular Economy Statement by a specialist consultant, Toby Balson of ADW Developments. Their report is presented in **appendix d**.

This has shown that a 'partial retention and refurbishment' approach is the appropriate strategy to be applied at the Fox Court site.

Key Findings

The report notes that under the 'retain and retrofit' approach, whilst all the embodied carbon within the existing building would be retained and internal reconfiguration could allow a limited number of new workshops to be created, there are limitations and shortcomings with the existing built form and improvements to the public realm cannot be met under such a scenario. In addition, the existing building layout and fabric impose limitations on the extent to which operational energy and carbon can be reduced.

It identifies existing building materials and within which components they are present in the building. These are set out in greater detail in the pre-demolition audit report (**appendix e** of this document), which schedules our forecast quantities and potential options for materials reuse and diversion from landfill.

The report also identifies that Fox Court has an Energy Performance Certificate (EPC) in Band C - Asset Rating 75 - which is reasonable for the building's age and type.

6.0 pre-redevelopment audit and pre-demolition audit…

Key Materials and Condition Review

The report contains a table summarising the key materials and their condition,

Layer	Description of Key Materials/Products	Condition (Note Based on Visual Assessment)	Recommendations for Retention/Reuse and Recycling
Site	Hardstanding, paving, tarmac, dwarf brick walls.	Typically good condition.	Paving could potentially be reused. Other materials are suitable for recycling.
Substructure	Foundations (concrete)	Not known	Not likely to undergo alteration.
Structure	Concrete frame structure with concrete floors.	Typically fair condition, commensurate with age.	Only minor alterations with most areas retained; demolition concrete could be crushed for fill material and steel rebar recycled.
Façade	Mixture of masonry and stone clad façades. Aluminium framed windows.	Stone and brickwork are typically in good condition, glazing is in fair condition.	Stone cladding should be targeted for potential reuse. Glass should be sent for closed-loop recycling; brickwork and metal frames should also be recycled.
Services	Mainly LED lighting. Centralised plant equipment - boilers, chillers, etc.	Lighting in excellent condition. All plant equipment seen estimated to be approaching end-of-life.	Any LED light fixtures may be suitable for reuse. Most other items recyclable via dedicated WEEE contractor.
Space	Spaces typically feature glazed partitioning, timber flooring and exposed ceilings. Smaller quantities of suspended ceiling tiles, carpet tiles and plasterboard partition also present.	Glazed partitions in excellent condition, timber flooring very good. Other components relatively worn.	The glazed partitions and timber flooring are potentially reusable, with very large quantities present. Carpet tiles and ceiling tiles also potentially reusable. Other components are recyclable.
Contents/ 'Stuff'	Office furniture, kitchen and WC fit-out.	Typically good condition, commensurate with use.	Good quality items should be reused/sold or offered to community groups; higher value fixtures e.g. granite work surfaces could be sold or reused.

Key Materials and Condition Review from Pre-Redevelopment Audit Report

Specific Opportunities Identified by Architect

As detailed in their Design and Access Statement, the Architect, BGY, has also undertaken site inspections to identify opportunities to reuse specific existing materials, with the following opportunities being identified for the envelope and structure:

- Reuse of façade brickwork within communal areas terrazzo floor
- Repurposing of metal plant screen within the atrium as spandrel panels
- Reus of concrete slab materials for aggregate in the new lift pits/foundations
- Reuse of stone façade cladding within countertops and floor tiling
- Return of window glass and aluminium frames to manufacturers for recycling
- Repurposing of mansard slate within changing rooms and showers as floor and wall tiles

For the internal materials, the following opportunities have been identified:

- Reuse of the raised access floor
- Use of takeback schemes for glass partitions
- Reuse of cable trays within the back of house areas
- Reuse of the oak flooring within common areas
- Listing of doors on reuse websites such as Enviromate
- Repurposing of kitchen worktops as reception desks

The specific embodied carbon savings from the reuse of the raised access floor are assessed within the Whole Life Carbon Report.

Conclusion

The Pre-Redevelopment Audit Report concludes that the proposed redevelopment scheme, characterised as 'partial retention and refurbishment', appears to present the best approach for the building, enabling greater utilisation whilst improving integration into the public realm and allowing for urban greening. It also notes that the energy performance of the building will be significantly improved.

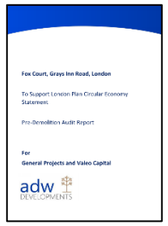
Whilst the building could be retained and retrofitted in its existing form, this would only result in a marginal improvement to building function and energy usage, whilst public realm aspirations would not be met.

The associated Pre-Demolition Audit Report (**appendix e** of this document), provides further details on the demolition approach proposed for the existing structure, and how materials that cannot be reused, can target closed-loop recycling (e.g. glass) in accordance with the Circular Economy principles and the Waste Hierarchy. The primary focus for materials arising as a result of the scheme should be material reuse, either within the new scheme or elsewhere.

6.0 pre-redevelopment audit and pre-demolition audit…

…sustainable building services solutions

PRE-DEMOLITION AUDIT


Fox Court, Grays Inn Road, London

To Support London Plan Circular Economy Statement

Pre-Demolition Audit Report

For
General Projects and Valeo Capital

adw DEVELOPMENTS

A pre-demolition audit is a detailed inventory of the materials in the building that will need to be managed upon demolition.

A draft pre-demolition audit report has been prepared as supporting evidence to this Circular Economy Statement by Toby Balson of ADW Developments, a specialist consultant with expertise in the reclamation of components and materials

The report is presented in **appendix e** and covers the following key information:

- An explanation as to why it is proposed that the buildings are to be demolished (as pre-redevelopment audit above)
- Reference to drawings showing the extent of the proposed demolition works
- A schedule of the key materials present in the existing building, based on a site review and desktop study
- A schedule of the Key Demolition Products (KDPs) arising, with an estimate of their quantities and a commentary on whether they are suitable for reclamation/reuse
- A review of the KDPs, highlighting opportunities for reuse and recycling either within the proposed development or off-site nearby/locally or further afield
- The amount of demolition waste identified in this analysis has been cross-referenced to the Recycling and Waste reporting table - please refer to **section 10.0 Recycling and Waste Reporting** of this CES.

It is recommended that the pre-demolition audit report is verified and updated by an independent specialist when the Strip-Out Contractor is appointed and prior to the commencement of any strip-out or demolition works.

6.0 pre-redevelopment audit and pre-demolition audit…

…sustainable building services solutions

STRIP-OUT/DEMOLITION WASTE SUMMARY

Excavation Waste Quantities

The pre-redevelopment audit report presented in **appendix de** notes that the Key Demolition Products (KDPs) by weight are concrete, brick, timber, metals and gypsum with smaller amounts of glass, stone, insulation, ceramics and other items. Of these, inert materials (concrete and bricks) represent approximately 78% of all waste occurring on-site.

Each KDP is described in more detail in the pre-redevelopment audit report including:

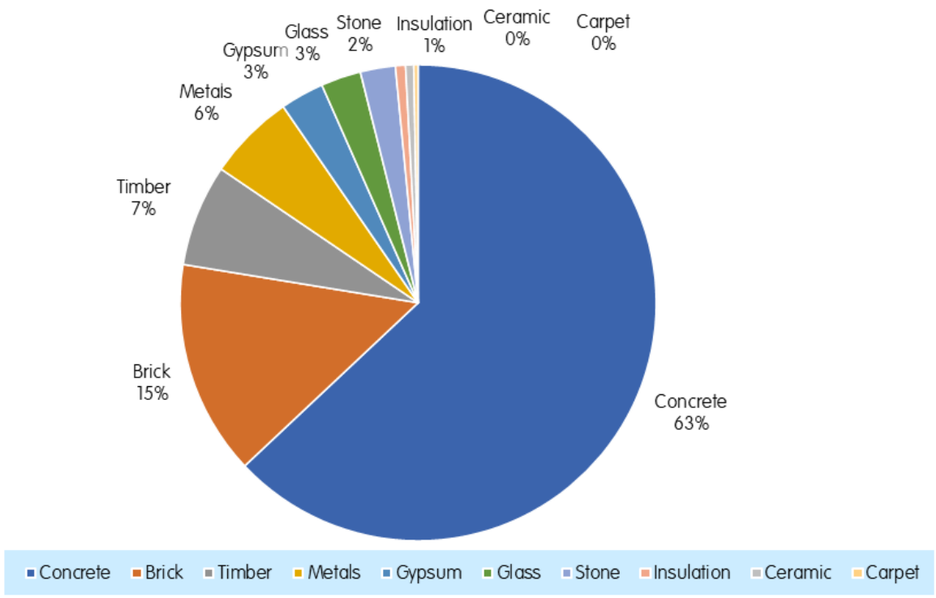
- Product description and tonnage/volume rates
- Opportunities to divert waste from landfill for reuse and/or recycling, in accordance with the Waste Hierarchy.

Demolition Waste Reuse/Recycling Rate

The audit has found that over 370 tonnes of material could potentially be reused, representing around 7.9% of the total strip-out/demolition waste by weight. It is estimated that 96.8% of the total demolition waste is suitable for diversion from landfill, via reuse, recycling or other management.

It is proposed that a demolition waste recycling rate of 95% shall be achieved for the project.

Summary Graph



Estimated Quantities and Types of Key Demolition Products, sorted by Weight

EXCAVATION WASTE

Excavation Waste Quantities

The Quantity Surveyor, Third London Wall (TLW), have provided an estimate of likely quantities of material associated with the limited amount of excavation work associated with the Greys Inn Road façade.

The quantity of excavation waste has been identified within the TLW Stage 2 Cost Plan as 'Allowance for local excavation and disposal of material for pile caps and proposed piles' with a total of 91 m^3 forecast.

This yields an estimate of 132.86 Tonnes of piling excavation waste arising.

Excavation Waste Reuse/Recycling Rate

Review with the Structural Engineer has identified that the excavation waste arising is likely to either be reused on-site for a piling mat or transported away for use on another construction site. In either case, all this waste will be diverted from landfill.

The Main Contractor shall be made responsible (through Contract Preliminaries) for the compilation of a Site Waste Management Plan (SWMP)/Resource Management Plan (RMP) for the main works, including this excavation waste arising.

It is proposed that an excavation waste recycling rate of 95% shall be achieved for the project.

Cut and Fill Calculations

'Cut and Fill' calculations have not been undertaken for the site as there will be no fill within the scope of the proposed development.

7.0 bill of materials…

…sustainable building services solutions

OBJECTIVE

This section of the CES sets out how the Bill of Materials for the proposed development was stablished from information provided by the Project Team.

London Plan Policy SI 7 (B)(2) requires Circular Economy Statements to demonstrate how a proposed development's material demands have been reduced and how building materials, components and products will be disassembled and reused at the end of their life.

Applicants are required to complete the Bill of Materials table within the GLA CES Template Spreadsheet o demonstrate how material demands have been minimised and on-site reuse and recycling maximised. The Guidance requires that the Bill of Materials is presented to demonstrate consideration of resource conservation opportunities across the themes of material intensity, recycled content and reused content.

OVERVIEW

The Bill of Materials data for the Fox Court site is summarised in **appendix b** and presented in full in the GLA CE Template Spreadsheet.

This provides an understanding of the key material types proposed for the development and the relative quantities. The spreadsheet automatically calculates the material and waste quantities throughout the building's life cycle; and the materials and waste intensities based on the entered gross internal area (GIA).

A common Bill of Materials approach and data set was used for the Circular Economy Statement and the Whole Life-Cycle Carbon Report – the Bill of Materials summary in **appendix b** of this document specifically identifies the recycled content of materials, their construction waste factor and their service life, where are relevant to Circular Economy considerations.

Estimates of key construction quantities, from the Bill of Materials are broken down in accordance with the RICS NRM classification system level 2 sub-elements in the table on the right.

SUMMARY TABLE - KEY CONSTRUCTION QUANTITIES FROM BILL OF MATERIALS

Section Result Category Material	Section Result Category Material	Section Result Category Material kg	Section Result Category Material kg/m² GIA	Layer
1	**Substructure**	2,106,893	92.52	Structure
2.1	**Superstructure: Frame**	2,112,960	92.79	Structure
2.2	**Superstructure: Upper Floors**	1,195,295	52.49	Structure
2.3	**Superstructure: Roof**	1,324,674	58.17	Structure
2.4	**Superstructure: Stairs and Ramps**	8,072	0.35	Structure
2.5	**Superstructure: External Walls**	174,435	7.66	Structure
2.6	**Superstructure: Windows and Ext. Doors**	5,385	0.24	Skin
2.7	**Superstructure: Int. Walls and Partitions**	312,488	13.72	Space
2.8	**Superstructure: Internal Doors**	17,625	0.77	Space
3	**Finishes**	406,164	17.84	Space
4	**Fittings, Furnishings & Equipment**	45,573	2.00	Stuff
5	**Services (MEP)**	391,265	17.18	Services
6	**Prefab. Buildings and Building Units**	-	-	-
7	**Work to Existing Building**	-	-	-
8	**External Works**	672,240	29.52	Site
0	**Unclassified/Other**			
Total		**8,773,069**	**740.99**	

Estimates of Key Construction Quantities, from Bill of Materials as per RICS NRM Classification System Level 2 Sub - Elements

7.0 bill of materials…

…sustainable building services solutions

BILL OF MATERIALS INPUTS

Overview

The key quantitative input for the Bill of Materials was the Fox Court Stage 2 Interim Order of Cost 2Q 23 (the 'Cost Plan') produced by the Quantity Surveyor, TLW. This Cost Plan was in turn based on information and drawings provided by the Architect, Structural Engineer, Building Services Engineer, Landscape Consultant and others in the Project Team.

Accordingly, the Bill of Materials was produced using data extracted from the following sources:

- TLW - Fox Court Stage 2 Interim Order of Cost 2Q 23 (the 'Cost Plan')
- BGY (Architect): Cost Plan input to TLW (Stage 2 drawings and reports), workshop responses and email correspondence
- Elliot Wood (Structural Engineer); Cost Plan input to TLW (Stage 2 drawings and reports), workshop responses and email correspondence
- MTT Limited (Building Services Engineer); Cost Plan input to TLW (Stage 2 drawings and reports), workshop responses and email correspondence with respect to lifts, major plant items and refrigerant type and quantity

Additional Information/Completeness of Assessment [c.f. GLA WLC Guidance Section 3.2.2]

The quantities provided by the Quantity Surveyor were complemented with further information from the Project Team for the building components not included in the planning Cost Plan (e.g. internal doors) and aligned with the Cost Plan format.

This approach aimed to gather all relevant information (necessary to perform the WLC study and ensure that 95% of the cost allocated to each building element category was accounted for in the assessment, in accordance with the GLA WLC Guidance section 3.2.2).

A breakdown of the materials and their quantities has been provided in the Bill of Materials in the GLA CES template spreadsheet.

Structural Engineer's Input

From the outset, the structural design process included optimisation efforts to minimise the structural concrete and steel within the context of alternative materials selection, efficient grids and reduced slab thicknesses. Accordingly, Elliot Wood, the Structural Engineer, provided key structural specification assumptions (which inform the recycled content calculations) as follows:

- 20% GGBS in Substructure Concrete (Piles, Pile Caps, Recasting of Lower Ground Floor, RC Ground Beams, RC Frame to Existing Basement Levels and others)
- 20% GGBS in Superstructure Concrete (RC Concrete Wall, RC frame to existing above-ground levels, RC in Metal Deck Composite Slabs and others)
- 97% Recycled Content in All Reinforcement Steel (Substructure and Superstructure)
- 20% Recycled Content in Structural Steel Frame (from GF and above to new CLT areas)

Building Services Engineer's Input [GLA WLC GUIDANCE SECTION 3.2.12]

Building services systems are a challenging area for accuracy in the Bill of Materials (on a product and a system level) representative data is often lacking. MTT Limited, the Building Services Engineer, provided a list of key plant items as follows:

- Allowance for air handling plant and equipment
  - 3 no. 4 pipe air source heat pumps
  - Approx 51 no. on-floor, floor-standing MVHR units
  - 1 no. Basement AHU
  - 1 no. MVHR unit (Cycle store)
  - 2 no. Basement Smoke extract fans,
  - 4 no. Stair core smoke extract shaft fans
  - 1 no. Toilet core AHU
  - 1 no. AWS AHU
- Fan Coil Units to S&C areas - reception, amenities, BoH areas etc
  - 10 no. GF FCUs
  - Typical floors landlord areas - 2 FCUs
  - Typical floor tenant zones; 1 downflow unit per ~300m^2, 1 fan tile unit per ~15m^2
- Local Colling Systems
  - 3no DX cooling systems to Comms room/Intake room
  - 2no DX cooling systems to Management suite and fire command centre - DX type
  - 2no DX cooling systems to electrical equipment rooms
- PV quantity and kWp Output
  - Site - wide minimum active area 192m^2, equiv. to 120 panels, each panel 1.6mL x 1.0mW, inclined 30°, facing 170° S, 21% high efficiency.
  - Total Installed Power 32 kWp, Total Annual Yield 26,700 kWhe.

The Bill of Materials includes an allowance for pipework, ductwork and cabling distribution horizontally and vertically within the building, sanitary fittings etc.

In accordance with the GLA WLC Guidance section 3.2.12, where detailed manufacturer's data was not available for specific systems or installations (for example using CIBSE TM65) default values in the software tool's figures for building services embodied carbon were adopted for the closest matching system within the OCL database (generally on a square metre area basis).

Where no comparable systems data was available, embodied carbon was calculated based on the mass of key materials used to manufacture the equipment (steel, aluminium, copper etc).

7.0 bill of materials…

BILL OF MATERIALS OUTPUTS

Recycled Content

TARGET/REQUIREMENT

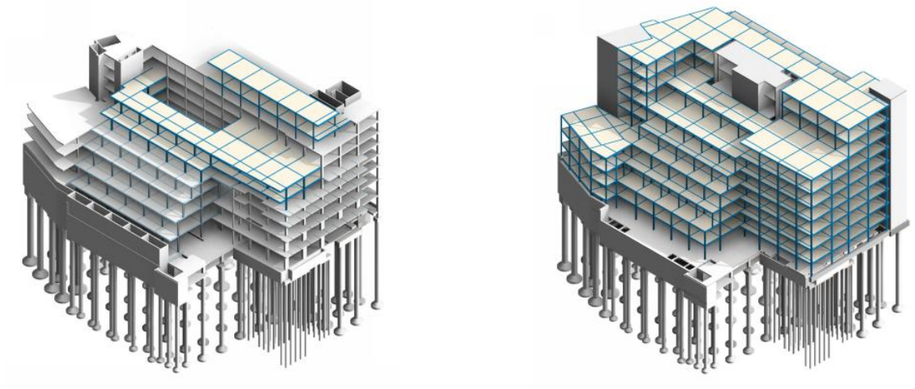
The GLA CES Guidance states that 'Applicants should identify opportunities for the use of reused or recycled materials; and aim for at least 20% recycled or reused content, by value, for the whole building'.

APPROACH AT THE FOX COURT SITE

Overview

The Bill of Materials schedules materials to be specified with high recycled content proportions, as identified in the CES/WLC Workshops and subsequent Project Team discussions. Key materials include concrete (with GGBS cement replacement), structural steelwork and reinforcement, plasterboard and mineral wool insulation.

At the initial design stage, the structural engineer undertook comparison studies to understand the relative embodied carbon impact of potential redevelopment schemes, focussed on the structural materials which are the predominant component of the embodied carbon of the building. These showed that implementing refurbishment and extension proposals would allow the delivery of high-quality office accommodation (and public realm improvements) whilst retaining the majority of the existing structure retained in-situ, with an embodied carbon impact per square meter similar to that of a less ambitious 'Base' scheme.



Initial Design Studies - Refurbishment Scheme vs. New Build Scheme (Blue Indicates New Structural Materials)

For the Stage 2 scheme, the Structural Engineer has advised that around 86.65% of the existing structure will be retained and re-used in situ.

This represents the large majority of embodied carbon within the building, but is not recognised in the Recycled Content analysis here as this is concerned with the recycled content of new materials being incorporated into the building.

Specific Materials

Through the CES workshops, the following key materials were identified as having high recycled content levels:

Materials Type	Recycled Content %	Applications
Steel (Reinforcement bar)	97%	All Reinforcement Steel (Substructure and Superstructure) (Foundations, Lowest Floor, Construction, some Upper Floors structures)
Insulation (EPS insulation panels)	45%	Thermal and acoustic insulation (Walls and Partitions)
Insulation (Mineral Wool)	45%	Thermal and acoustic insulation (Walls and Partitions)
Ready-Mix Concrete normal strength, 300 kg/m^3	20% GGBS	Substructure Concrete (Piles, Pile Caps, Recasting of Lower Ground Floor, RC Ground Beams, RC Frame to Existing Basement Levels and others) Superstructure Concrete (RC Concrete Wall, RC frame to existing above-ground levels, RC in Metal Deck Composite Slabs and others)
Ready-Mix Concrete high strength, 400 kg/m^3	20% GGBS	Substructure Concrete (Piles, Pile Caps, Recasting of Lower Ground Floor, RC Ground Beams, RC Frame to Existing Basement Levels and others) Superstructure Concrete (RC Concrete Wall, RC frame to existing above-ground levels, RC in Metal Deck Composite Slabs and others)
Steel (Structural steel profiles)	20%	Structural Steel Frame (from GF and above to new CLT areas)

From the Bill of Materials, the materials with the greatest potential to contribute to the recycled content target are the concrete and reinforcement steel, used in the building's structure, upper floor slabs, core etc., followed by steel employed elsewhere:

The quantities of these materials are limited relative to conventional office buildings due to the decision to use a CLT floor slab and structural steel solution rather than conventional composite slab floors. The whole life-cycle carbon benefits of this approach are consider to outweigh the recycled content benefit.

7.0 bill of materials…

…sustainable building services solutions

MATERIAL QUANTITY/INTENSITY AND RECYCLED CONTENT BY VALUE (MODULE A)

Values from the Cost Plan and outputs from the LCA model have been used to estimate that a total of **4.5%** of the building materials/elements (by value) will be comprised of recycled or reused content.

This is less than the GLA's aspiration target (for new-build projects) of 20% since high recycled content materials tend to comprise structural elements - a lower proportion of the new materials in this partial retention and refurbishment project.

Result Category	**Material Quantity** kg	**Material Intensity** kg/m² GIA	**Recycled Content by Value** %
1 Substructure	2,106,893	92.52	8.5%
2.1 Superstructure: Frame	2,112,960	92.79	12.6%
2.2 Superstructure: Upper Floors	1,195,295	52.49	0.4%
2.3 Superstructure: Roof	1,324,674	58.17	13.4%
2.4 Superstructure: Stairs and Ramps	8,072	0.35	0.0%
2.5 Superstructure: External Walls	174,435	7.66	0.0%
2.6 Superstructure: Windows and Ext. Doors	5,385	0.24	0.0%
2.7 Superstructure: Int. Walls and Partitions	312,488	3.72	68.1%
2.8 Superstructure: Int. Doors	17,625	0.77	0.0%
3 Finishes	406,164	17.84	9.2%
4 Fittings, Furnishings & Equipment	45,573	2.00	0.0%
5 Services (MEP)	391,265	17.18	0.0%
8 External Works	672,240	29.52	8.5%
Total	**8,773,069**	**385.26**	**4.5%**

Recycled Content Value Calculation - Value Estimate from Cost Plan

The GLA CES Template Spreadsheet misreports this item as 'Exceeds Policy'.

FURTHER OPPORTUNITIES

During the subsequent design stages the Project Team will investigate further opportunities to increase the recycled content of materials, focusing on materials with large quantities to achieve the project target. Key opportunities - reviewed in detail in the Whole Life-Cycle Carbon Report - may include increasing the recycled content of the concrete (i.e. an uplift in the GGBS content over 20%), and specification of recycled/reprocessed raised access flooring,

Recyclable Materials Estimate

TARGET/REQUIREMENT

The GLA CES Guidance does not state an end-of-life recyclable materials target for Module D, but this is assessed in the GLA GES Template Spreadsheet.

RECYCLABLE MATERIALS ESTIMATE (MODULE D)

The GLA GES Template Spreadsheet has been used to estimate the whole-life total recyclable materials as **17,285,435 kg** and recyclable materials intensity as **761 kg/m²** GIA. This is broken down as follows:

Result Category	**Estimated Recyclable Materials** kg/m²	**Estimated Recyclable Materials Intensity** kg/m²
1 Substructure	1,526,639	67.04
2.1 Superstructure: Frame	2,208,867	96.99
2.2 Superstructure: Upper Floors	1,374,075	60.34
2.3 Superstructure: Roof	1,265,795	55.59
2.4 Superstructure: Stairs and Ramps	165,632	7.27
2.5 Superstructure: External Walls	423,595	18.60
2.6 Superstructure: Windows and Ext. Doors	5,385	0.24
2.7 Superstructure: Int. Walls and Partitions	696,798	30.59
2.8 Superstructure: Int. Doors	17,625	0.77
3 Finishes	58,416	2.561
4 Fittings, Furnishings & Equipment	39,829	1.75
5 Services (MEP)	349,477	15.35
8 External Works	510,584	22.42
Total	**17,285,435**	**761.43**

Recycled Materials Estimate - from GLA CES Spreadsheet

The GLA WLC Template Spreadsheet also reports these items, but does not provide sufficient rows for all materials identified in the Bill of Materials to be separately accounted for., so the totals differ.

FURTHER OPPORTUNITIES

Over the lifetime of the building, as Circular Economy issues grow in importance, it is anticipated that emerging markets for recovered/reused of building materials will emerge and technologies developed to serve these, meaning the quantities of materials reuse/recycled may increase from the current estimate.

7.0 bill of materials…

END-OF-LIFE SCENARIOS

Overview

The GLA CES Guidance states that 'The Bill of Materials should include assumptions on the end-of-life scenarios for each building element or material', and accordingly, the Bill of Materials presented in the GLA CE Template Spreadsheet includes assumptions on the end-of-life scenarios for each building element or material.

End-of-Life Stage (Module C)

Please also refer to **Section 8.0 End-of-Life Strategy** of this statement for full commentary of the end-of-life considerations for these materials. For each item in the Bill of Materials, a summary description of the assumed end-of-life scenario is given. For example, for the plasterboard, 'gypsum recycling' is stated as it is known that well-established manufacturer take-back schemes are in place for plasterboard recycling. Further examples are shown below:

Material	Typical End-of-Life Strategy
Ready-Mix Concrete	Concrete crushed to aggregate (for sub-base layers),
Concrete Reinforcement (Rebar)	Steel recycling
Sand, Soil and Gravel	Do nothing
Expanded Polystyrene Insulation	Plastic-based material incineration
Regular Gypsum Board	Gypsum recycling
CLT, Glulam And LVL	Wood incineration
Bitumen And Other Roofing	Landfilling (for inert materials)
Glass Facades and Glazing	Glass recycling
Pipes (Water, Heating, Sewage)	Metal-containing product recycling (90% metal)
Other Precast Concrete Products	Rebar separated (2%), concrete to aggregate
Wall And Floor Tiles	Brick/stone crushed to aggregate (for sub-base layers)
Mortar (Masonry/Bricklaying)	Cement/mortar use in a backfill
Sandwich Panels, Metal	Recycling sandwich panel metals (20% metal)
Aluminium-Framed Glass Doors	Glass-containing product recycling (80 % glass)
Aluminium	Aluminium recycling
Wood And Wood Board Doors	Wood-containing product incineration (80% wood)
Stainless Steel	Stainless steel recycling

Typical End-of-Life Strategies for Material Types proposed for Fox Court

This is shown in the 'End-of-life Stage (Module C)' section of the GLA CE Template Spreadsheet, with the % reusing, % recycling and % landfill corresponding to the statement. Where incineration is the proposed end-of-life strategy, the proportion of the material proceeding to this scenario is shown under the % recycling.

Benefits Beyond the System Boundary (Module D)

Where appropriate, the GLA CE Template Spreadsheet shows the mass of estimates reusable `1

The total mass of reusable materials is forecast to be **17,285 kg** , whilst the total mass of recyclable materials is forecast to be **958,213 kgs**

No benefits beyond the system boundary are shown for Energy from Waste end-of-life scenarios

8.0 end of life strategy…

…sustainable building services solutions

OBJECTIVE

This section of the CES addresses Circular Economy issues as related to the end of the life of the building. It describes design and construction strategies to reduce material demands and enable building materials, components and products to be disassembled and reused at the end of their useful life.

Section 4.7 of the GLA CES Guidance provides guidance on end-of-life scenarios and notes how a CES should set out the strategy for these, including how this will be communicated to future building owners, managers and occupiers; and how the building information will be stored, to support the eventual recovery of components and materials.

The Bill of Materials presented in **Section 7.0** includes further information that is relevant to the End-of-life Strategy (e.g. design for disassembly and end-of-life scenarios by material type). The end-of-life stage of a building's lifecycle corresponds with Modules C1 to C4 within BS EN 15978 and the RICS Professional Statement for life cycle analysis.

Typical Recovered Building Products

END-OF-LIFE SCENARIOS IN THE BILL OF MATERIALS

As noted above, the Bill of Materials presented in the GLA CE Template Spreadsheet includes assumptions on the end-of- life scenarios for each building element or material.

KEY APPROACHES

Design

The building design process to date has considered both longevity and end-of-life, including assessing opportunities for deconstruction at end of (first) life for key materials, components and products.

As the design is progressed and specific materials and construction processes are specified, the end-of-life scenarios for the building can become more detailed. Where individual elements have shorter design life periods - particularly MEP items - the design should allow for the independent replacement of these individual elements.

The scheme's Whole Life-Cycle Carbon and Circular Economy approaches assume a 60-year design life and material reuse and recycling technologies are likely to advance in this period. Future revaluation of options is encouraged as and when better options are created.

Retention of Information

As noted in the GLA CE Template Spreadsheet, record keeping is a key action at the current and subsequent design stages, and construction stage, to enable Circular Economy opportunities to be recognised and implemented at the end-of-life stage.

Detailed building information shall be gathered and retained across the building's lifetime to facilitate the end-of-life approaches to disassembly, future reuse, waste avoidance, and waste reduction. This shall include 'as built' drawings, material specification and manufacturers data sheets for materials, components and products.

All documents should be indexed and referenced to deconstruction/strip-out strategies and the O&M/Building User manual to facilitate the future use of the element. These should be supplemented with material quantities information, certificates of responsible sourcing, strength/tolerance information, predicted lifespan, links to EPDs and carbon/LCA information.

This information must be stored in a secure but accessible manner and updated when upgrade and refurbishment works are undertaken - where possible a formal Building Information Model (BIM) approach should be adopted. The BIM model should be created in accordance with PAS 1192 Part 2-20131 and PAS 1192 Part 3-20142).

Material passports are (generally digital) sets of data describing characteristics of materials and components that give their value of present use, recovery, and reuse. The possibility of implementing Material Passports will be investigated during the subsequent design stages,

As part of this building information database, the Contractor shall be required to provide a Building Adaptability and Disassembly Guide (either (as a hard copy document or an Asset Information Model on a BIM model) providing detailed guidance on how materials, elements or components can be reused, reprocessed or recycled and/or disposed. This will provide instructions for the disassembly of building components that have been designed to be disassembled at the end of their life within the building.

8.0 end of life strategy…

STRATEGIES FOR END-OF-LIFE PROCESSES - ANTICIPATED DEMOLITION/RECOVERY METHODS

Soft Strip

The initial demolition process is likely to be a 'soft strip' process - i.e. the removal of doors, light-fittings, cabling, pipes, fans etc. by hand. It is widely acknowledged that the more thorough the soft strip process, the less damage to and contamination of materials will occur during the structural demolition.

Subject to the phasing of the building demolition and site access, the materials may be separated on-site or off-site. Stripped-out materials should be separated and placed into different material-specific skips, to be routed to appropriate recyclers. Contractors should aim to do as much sorting as possible.

Higher-value stripped-out components - for example, intact doors - can be sold as a whole. Similarly, plastic-covered power cables can be removed and sold to specialists for plastic stripping and metals recovery.

Façade Components

Whereas the majority of facade components (with the exception of the double-glazed glass units) could theoretically be reused in a new identical façade, due to evolving aesthetic, regulatory and performance requirements, reuse of such components may be challenging. Components would also need to be strength tested before reuse.

Other façade materials, with the exception of glass, silicone adhesive, polyisobutylene adhesive, EPDM seals and EPDM water management membranes, could be recycled.

STRATEGIES FOR KEY MATERIALS, COMPONENTS AND PRODUCTS

Overview

Designing for adaptability and disassembly (ensuring materials can be retained in a high-value state across the whole project lifecycle) - a key principle of the Circular Economy - has been a focus of the design to date, with a number of design principles pursued.

In addition, the Project Team have assessed key materials, components and products and reviewed 'pre-demolition audit statements' from past projects of similar construction types to identify potential end-of-life scenarios for the materials expected to be used in the building.

The key materials have been identified as:

- Concrete
- Metals
- Glass
- Plasterboard
- MEP Components and Products

Design Principles

A formal 'design for disassembly and adaptability' review was undertaken in accordance with the methodology set out for BREEAM Credit Wst 06, to explore the ease of disassembly and functional adaptation potential of the building and the principles to be adopted to optimise this potential.

Accordingly, the design includes (but is not limited to) the following measures to facilitate strip out and demolition and therefore reduce waste arisings at the end-of-life stages:

- The non-structural façade system (independent of the building frame) allows for complete removal of the envelope at end-of-life. Rooftop structural connections shall be considered during the subsequent design stage for facade maintenance and removal processes. At the lower levels of the building, facade removal could also be carried out via a mobile crane.
- Allowance shall be made for all plant to be dismantled and removed. Penetrations in slabs with access hatches/covers and lifting beams are to be provided to facilitate the replacement of basement plant and all plantrooms will be provided with appropriately sized doors for ease of access and replacement. Local access panels within ceilings and walls will be provided to provide access to smaller plant items.
- All services infrastructure throughout the building has been located within designated accessible risers.
- Shell and core fit-out principles are proposed for the offices, allowing flexibility for the tenant fit-out.

8.0 end of life strategy…

Concrete

Concrete recycling contractors typically use their own transport to collect building materials from demolition sites to take for crushing into aggregates. Given the narrow profit margins in the industry, the transportation cost constitutes a significant proportion of the overall cost, so selected recycling centres should be close to the site.

The recycling process typically begins by feeding the concrete into a jaw-type crusher, followed by the removal of ferrous metals using an electromagnet. The resulting pieces are then sorted by size using a screen deck, while non-concrete items such as plastic, wood, bricks, and other contaminants are carefully removed by hand. Further hammer crushing results in angular pieces of less than 40-50mm, at which stage any further ferrous material is removed by a second electromagnet. A final air separation stage removes any small pieces of wood before another screen deck sorts the material to less than 40mm.

Strict quality control is needed to ensure minimal contamination of the final product. EU legislation dictates that there must be < 1% of contaminant in Type 1 aggregate for use in concrete.

Metals

Metals (from the façade and other parts of the building) presently have well-established closed-loop recycling processes. For instance, steel reinforcing bars (rebar) are typically extracted from concrete beams using small impact jackhammers, enabling the rebar to be sold separately. In the case of larger steel elements, they are either cut to skip size directly on-site using a propane flame cutter or at an offsite processing plant with shears. This cutting process helps reduce the size of steel bars extracted from reinforced concrete beams or steel girders, making them more manageable for further processing.

Lighter material can be densified or baled to minimise the volume, as transport costs are a significant concern for cost-effective recycling.

Glass

Due to health and safety considerations, glass panes are typically not recovered as complete panes, with glazed units usually smashed and included in building rubble. Reuse of flat glass and double-glazed units is currently limited due to issues involving quality standards, low demand and the limited processing capacity for glass recycling.

Accredited plate glass, with a known history and composition, could relatively easily be processed for reuse. It can be sold to glass manufacturers, who incorporate it into the glass melt. However, to meet remelt standards, the material contamination level must be kept below 5 grams per 1,000 kilograms (less than 5 parts per million - ppm).

Where the history and exact material composition is not reliably known and glass may be contaminated with other materials, the key recycling route is to the fibreglass insulation market. Material is sorted on a finger screen and any metallic caps, paper labels, foil wrapping or other material contamination is progressively removed using a variety of techniques. The resulting glass is dried and further screened to obtain a uniformly sized, mixed-colour material.

Glass sand is produced by crushing glass waste in a special process that does not result in any sharp edges. The coarse nature of the glass sand gives excellent drainage and can be used for bedding block paving and concrete slabs.

Plasterboard

Well-established recycling processes now exist for plasterboard as an alternative to waste going to landfill. Plasterboard is made from an inner layer of gypsum sandwiched between two outer layers of lining paper. Until 2009, the Environment Agency previously allowed construction waste that contained small amounts of gypsum to be sent to landfill but this waste can no longer be mixed with biodegradable waste at a standard landfill site.

Processes to take back and recycle plasterboard waste are now operated by the plasterboard manufacturers. Waste plasterboard is transported from transfer stations, construction and demolition sites and waste contractors to reprocessing plants for the production of new plasterboard, as an ingredient in the production of cement, blocks or bricks and to improve agricultural soil quality.

Reprocessed gypsum powder is made up of around 92% original plasterboard material where the waste can be sent back to a manufacturer to make new plasterboard. The paper and related contaminants (equating to around 8% of the recycled plasterboard waste) can be reused for composting, heat generation and building materials.

MEP Components and Products

MEP Components and Products should be reclaimed or recycled where possible. A design review during the subsequent design stages should identify means to ensure these components are easily accessible and recoverable, both at the end-of-life stage and when they individually need maintenance, replacement, filter changes etc.

9.0 operational waste management plan…

…sustainable building services solutions

OBJECTIVE

This section of the CES is intended to address Circular Economy issues as related to operational (municipal) waste at the redeveloped Fox Court, i.e. appropriate management and reduction of the waste expected to arise from the offices, jewellery workshops and other uses when the site is in use.

Opportunities to reduce waste during the operational phase have been considered following the GLA CES Guidance and the WRAP Waste Hierarchy to ensure that operational waste) is reduced as far as possible.

Section 4.8 of the GLA CES Guidance notes that an Operational Waste Management Plan (OWMP) should be submitted in the written report/appendix to CE statements. The OWMP is required to demonstrate that the proposed development will:

- achieve the relevant targets (depending on the operational activity) set out in London Plan Policy SI 7
- include shared, adequate, flexible, and easily accessible storage space and collection systems, as required by London Plan policies D3, SI 7 and D6.

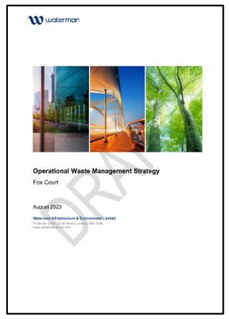
The GLA CES Guidance notes that at the planning application stage, a draft OWMP may be submitted.

APPLICABLE TARGETS

The GLA CES Guidance notes that one or more operation waste targets may apply, depending on the nature of the operations of the building. These are:

- the 65% municipal waste recycling target by 2030 (London Plan Policy SI 7 and London Environment Strategy Policy 7.2.2) and
- the 75% minimum target for business waste recycling by 2030 (London Environment Strategy Policy 7.2.2)

APPROACH



A draft OWMP has been prepared by Waterman Infrastructure and Environment Limited ('Waterman'), covering all elements of the redeveloped Fox Court site as proposed.

It sets out the anticipated municipal waste types, quantities, storage requirements and disposal routes for each element of the development (offices, and jewellery workshops) and demonstrates, in accordance with Section 4.8 of the GLA CES Guidance, the following for the proposed redevelopment:

- how much operational and municipal waste the proposed development (resulting from occupants) is expected to generate
- how and where (on-site versus offsite) operational waste will be managed in accordance with the Waste Hierarchy
- that the proposed development has adequate, flexible, easily accessible and shared storage space and collection systems
- that the proposed development supports the separate collection of dry recyclables (at least card, paper, mixed plastics, metals and glass), food waste and other waste.
- how operational performance will be monitored and reported
- that measures such as consolidated, smart logistics and community-led waste minimisation schemes have been explored.

Please refer to **appendix f** for a copy of the draft Operational Waste Management Plan.

ESTIMATED WASTE QUANTITIES

The draft OWMP includes a detailed calculation (in its Appendix B) for the total waste arising for key streams for each element of the site. Based on these sources, it is estimated that the proposed development could generate approximately 424 tonnes of waste per annum.

The forecast for the identified waste streams for each element of the building is as follows:

Element	Total tonnes/annum	Residual litres/week	Mixed Dry Recycling (MDR) litres/week	Food Waste litres/week
Offices	416.89	7,241	21,722	240
Jewellery Workshops	6.76	458	1,373	276
Total		7,698	23,094	516

Waste Generation forecast from draft Operational Waste Management Strategy Appendix B

9.0 operational waste management plan…

SEGREGATION, STORAGE AND COLLECTIONS

Overview

The draft OWMP describes the provision of storage for the segregation and storage into three waste streams (residual waste, mixed dry recycling (MDR) and food) for the site, within both individual units and communal bin stores, along with the management procedures for these.

Quantities are calculated in the draft OWMP's Appendix B and summarised in its Table 2.

	NIA m^2	Assumed food waste*	Daily Waste Storage Capacity Requirements (With Compaction)		
			Residual Waste No. of 1,280 litre bins	MDR No. of 1,280 litre bins	Food Waste No. of 240 litre bins
Office	14,467	Yes	2	9	2
Jewellery	923	No	1	1	-
Total	**15,390**	**-**	**3**	**10**	**2**

Waste Generation forecast from draft Operational Waste Management Strategy Table 2

MDR may be further segregated into card, paper, plastics and metal (depending on the nature of the waste produced by the tenants) for separate collection.

Office Use (Class E)

Appropriate storage will be allocated for the following:

- recyclables paper & card and plastics, glass, cans and cartons
- residual general waste (non-recyclable).
- food waste;

Separate bins shall be provided for refuse (and organic (food) waste) and recyclables within a dedicated commercial waste storage area.

The bin store will be provided with space for 9 x 1,280L Eurobin storage for recyclable waste, 2 x 1,280L Eurobin storage for residual waste and 2 x 240L food waste bins.

Operational Waste Storage Space - Bin Store Layout

The design includes an appropriately sized and easily accessible waste storage space on the ground floor. Waste will be collected from office floors and the jewellery workshop and retail by the building's facilities management staff and taken here, where the staff will use a wheeled bin press to compact residual and MDR waste.

Ground Floor Bin Store Layout

OPERATIONAL WASTE COLLECTIONS

Waste will be collected by private waste collection contractor(s) at appropriate frequencies, or LBC as a commercial service. Their Refuse Collection Vehicles (RCVs) will be able to stop on Brooke Street within 10m of the bin store.

OTHER DRAFT OWMP ISSUES

Implementation of the Waste Hierarchy

OVERVIEW

Regulation 12 in the Waste (England and Wales) Regulations 2011 requires waste producers or handlers to adhere to the Waste Hierarchy (i.e. prevention, preparing for reuse, recycling, recovery, disposal) unless there are valid environmental or technical justifications for not doing so.

MIXED DRY RECYCLABLE WASTE

In the first instance, commercial tenants should undertake on-site segregation of recyclables, separating paper and cardboard from plastics, metal, and glass. The sorted recyclables can then be sent for additional sorting or grading, after which they can be dispatched for recycling, specifically for the production of packaging materials or paper products, rather than being utilised as fuel.

It is important that tenants inquire about the disposal process for the residual waste resulting from the sorting of mixed recyclables, ensuring that it doesn't end up in landfill.

FOOD WASTE

Commercial tenants are encouraged to send food waste for anaerobic digestion instead of composting, this approach is acknowledged in the GLA CES Guidelines as a departure from the Waste Hierarchy, backed by substantiated evidence.

RESIDUAL WASTE

This waste stream requires most detailed discussion with the waste management contractor to understand the fate of the waste and the energy efficiency of the solution. Ideally, tenants should despatch such waste for processing to produce refuse-derived fuel (this fuel can be used to substitute coal or other fossil fuels).

As a minimum, tenants should refrain from sending the waste for disposal in landfill.

Performance Monitoring and Reporting

The building's Facilities Management team will be responsible for supervising waste storage arrangements, ensuring proper placement of bins within bin stores, and maintaining overall cleanliness. Additionally, they will oversee monitoring and reporting operational performance.

Office and workshop tenants will be expected to monitor and report waste management performance as required. It is likely the Facilities Management Team will be responsible for making arrangements for waste collections and so compliance with the waste duty of care.

CONSIDERATION OF CONSOLIDATED SMART LOGISTICS

Commercial waste collections will be conducted by commercial waste management contractors or LBC as part of a commercial service at appropriate intervals. It is reasonable to assume commercial waste collection operators will seek to optimise their routings.

As the proposed development is entirely commercial, other measures such as community-led waste minimisation schemes have not been considered.

9.0 operational waste management plan…

CONCLUSION AND TARGET

Commentary

The strategies and facilities being implemented will allow progress towards the Mayor's 2030 recycling target. The proposed redevelopment will seek to achieve the 75% recycling target by 2030.

Operational waste will be monitored and reported upon by the appointed facilities management team, who will be responsible for the waste duty of care. Office and workshop tenants will also be expected to monitor and report on their waste management performance.

The design of the proposed development will support effective management and reduction of operational waste. Clear signage will be provided to encourage correct use in line with the commercial recycling requirements of the London Borough of Camden.

SPECIFIC COMMITMENT AND TARGET

The above approach allows the targets of a 65% recycling rate for municipal waste and a 75% target for business waste by 2030 and for enabling no biodegradable or recyclable waste to be sent to landfill by 2026.

On a pro-rata basis of the commercial waste streams, the overall recycling rate shall be 75% across the proposed development. This represents a waste management strategy for the Proposed Development that helps achieve the wider regional goals, alongside providing adequate, flexible and easily accessible bin stores to support recyclables and food waste as set by the London Plan.

The proposed development is committed to meeting the Mayor's 65% target for municipal waste recycling by 2030. Operational waste will be monitored by the appointed Building Management organisation and the waste control requirements will be incorporated into their contract.

Accordingly, it is proposed that a target of 75% of municipal waste arising shall be reused, recycled or composted either on- or off-site shall be pursued for the project.

It is proposed that a target of zero organic waste to landfill shall be implemented.

Draft Operational Waste Management Plan

Please refer to **appendix f** for the full draft operational waste management plan.

As reported within the accompanying GLA CE Template Spreadsheet, expected operational waste generation of the proposed development is approximately **424** tonnes per annum (or 0.019/m^2 GIA p.a).

10.0 recycling and waste metrics …

…sustainable building services solutions

RECYCLING AND WASTE METRICS

Overview

The GLA CES Guidance requires a 'Recycling and Waste Metrics reporting form' documenting estimates of the total amount of waste or excavation material expected to arise, how much will be reused or recycled on-site and/or off-site, and how much residual waste will be sent to landfill.

A Recycling and Waste Reporting Form is provided within the GLA CE Template Spreadsheet for this purpose. This is automatically populated from entries within the spreadsheet, but there appear to be errors in the (locked) spreadsheet meaning some intended entries are not collated and some totals are miscalculated. These have therefore been extracted separately and summarised in this section of the report – they are shown with an asterisk in the table on the right. Full tables are also presented in **appendix c.**

Underlying Source of Information/Assumptions

PRODUCT AND CONSTRUCTION STAGE (MODULE A)

Demolition Waste and Excavation Waste

Waste quantities and reuse/recycling (95%)/landfill rates are taken from the Pre-Demolition Audit Report and Excavation waste quantities are taken from the Cost Plan. The Structural Engineer has advised that all such arisings are likely to either be reused on-site for a piling mat or transported away for use on another construction site. In either case, all this waste will be diverted from landfill.

Construction Waste

Wastage rates for each Bill of Materials entry have been assumed based on previous project experience or the OCL database. It is noted that within the BREEAM assessment for the proposed development, BREEAM Wst 01 targeting 2. Credits. A 95% recycling rate (in accordance with the London Plan) is assumed here.

USE STAGE (MODULE B)

Demolition / Strip-out Waste and Construction Waste

This relates to materials which undergo cycles of replacement within the 60-year period. Like-for-like replacement is assumed, with a 95% recycling rate (as in the London Plan) target applied.. The GLA CES spreadsheet appears to take the totals for this Module A item from the Module B columns. 'Construction Waste' here relates to wastage occurring during replacement of these elements. The wastage rate is based on that for the Module A construction waste for the relevant material.

Municipal and Industrial Waste

Waste quantities and reuse/recycling/landfill rates have been adopted from the Draft Operational Waste Management Plan. There are no large-scale industrial processes proposed for the site, so no industrial waste is identified.

SUMMARY TABLES

Product and Construction Stage (Module A)

	Type of Waste	Source of Information	Overall Waste	SUMMARY: Total Reuse	Total Recycle	Total Reuse and Recycle	Total Waste Reported
			Tonnes	%	%	%	%
1	**Demolition Waste**	Pre-Demo Audit	4,725	8%	89%	**96%**	100%
2	**Excavation Waste**	Cost Plan/ Struct. Eng	380	100%	0%	**100%**	100%
3	**Construction Waste***	LCA Waste Rates	160	-%	95%	**95%**	100%

Recycling and Waste Reporting Table -Excavation and Construction Waste (Product and Construction Stage)

Use Stage (Module B)

3	**Demolition/Strip-Out Waste***	As Module. A	487	-%	95%	**95%**	100%
4	**Construction Waste***	As Module. A	47	5%	87%	**95%**	100%

Recycling and Waste Reporting Table - Demolition/Strip-Out Waste and Construction Waste (Use Stage)

5	**Municipal Waste**	Draft OWMP	423 (p.a.)	0%	75%	75%	100%
6	**Industrial Waste**	n/a		n/a	n/a	n/a	n/a

Recycling and Waste Reporting Table - Municipal and Industrial Waste (Use Stage)

10.0 recycling and waste metrics …

…sustainable building services solutions

TOTALS (MODULES A - C)

			MODULES A - C		
			Overall Matls.	Overall Matls.	Total Reuse and Recycle
			Tonnes	Tonnes/m²	%
7	**Total Materials**		5,799	0.255	**95.32%**

Total Materials Table (All Stages A - C)

Other Commitments

It is not intended to send excavation or construction waste to landfill so confirmation that destination landfill(s) have the capacity to receive waste arising is not appropriate.

Section 4.9.7 of the GLA CES Guidance requires the reporting of the final destination of all waste streams (beyond the Materials Recycling Facility) is to be provided as soon as possible once a Contractor has been appointed, along with confirmation that the ultimate receiver of material (for example another site) has capacity to deal with the waste. The Recycling and Waste Reporting Table should be updated with the relevant information once the contractors have been appointed.

As this information is not available at the application stage, the local planning authority (LPA) may consider securing this by condition.

Formal written confirmation shall be sought by the Contractor from all waste handling facilities of the likely destination of all waste streams (beyond the Materials Recycling Facility.

Circular Economy Statement Post-Completion Report

In accordance with the GLA CES Guidance, as part of the Circular Economy Statement Post-Completion Report, the applicant shall provide an updated 'Recycling and Waste Metrics reporting form' with actual monitored recycling and waste figures.

11.0 conclusion…

…sustainable building services solutions

STATEMENT CONCLUSION

This detailed Circular Economy Statement (CES) demonstrates how the proposed redevelopment of the Fox Court site will deliver Circular Economy principles according with the expectations of the London Borough of Camden, in line with the GLA's Circular Economy Policy SI 7 and addressing all requirements of the GLA's Circular Economy Statement Guidance (March 2022).

It has been prepared through collaboration across a multi-disciplinary Project Team that includes suitably qualified architects, quantity surveyors, engineers and sustainability consultants. The initiatives evolved in the production of this Circular Economy Statement have been selected to convey the key principles of a Circular Economy into the scheme, to minimise the waste generated from the scheme and the materials used throughout its life cycle, including the end-of-life stage.

The Applicant and their Project Team are committed to sustainable development and recognise the interconnectedness of sustainable design and the Circular Economy. They have demonstrated a robust approach to the Circular Economy for the proposed redevelopment of Fox Court and the design of the proposed development incorporates a number of initiatives to reduce materials required, increase recycling and limit the amount of waste sent to landfill.

The proposed development shall adopt the following targets in accordance with London Plan Policy SI 7:

- Deriving at least 20% of the total value of materials from recycled and reused content in the products and materials selected, and higher proportions are targeted in various cases
- Reusing/ recycling/ recovering 95% of demolition waste and 100% of construction waste, and putting 100% of excavation waste to beneficial use
- Targeting 75% of municipal waste to be diverted from landfill by 2030
- Targeting zero biodegradable or recyclable waste to landfill by 2026

All 'Essential Elements for Circular Economy Statements' for Policy SI 7(B) (as set out in GLA CE Guidance Appendix 2) are included within this CES and the accompanying GLA Circular Economy Template Spreadsheet.

OTHER DOCUMENTATION

This CES should be read in conjunction with the completed GLA Circular Economy Template Spreadsheet, which has been submitted as part of this planning application.

The spreadsheet includes the following information:

- Circular Economy Design Approaches
- Circular Economy Design Principles by Building Layer
- Bill of Materials
- Recycling and Waste Reporting Table
- A Summary of Circular Economy Targets

This CES should also be read in conjunction with other documents forming part of the planning application, in particular the Design and Access Statement and Whole Life-Cycle Carbon Report.