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Circular Economy Statement

For

41 Sheldon Avenue

For

Mark Tognolini and Eva Stengaard

June 2024



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Appended to this document are:

- ☐ **Pre Redevelopment Audit**
- ☐ **Pre Demolition Audit**

Executive Summary

Carbon Plan Engineering have been appointed by Radcliffe to carry out a Circular Economy Statement to demonstrate how the 41 Sheldon Avenue, within the Bishop's Conservation Area of Haringey. This report has been developed to address the planning submission commentary received. The circular economy aspirations of the project, are to design out waste and pollution, keep products and materials in use, and regenerate natural systems.

This report is written with to reference *the NPPF (2023) does expressly encourage the reuse of existing resources, including the conversion of existing buildings (in para 157), with the need to reduce waste and the circular economy principle also referred to/ promoted within the London Plan.*

Carbon Plan Engineering has also been appointed to complete the following studies all of which are referenced to support of this Circular Economy Statement.

- ☐ **Whole Life Carbon Study**
- ☐ **Pre Redevelopment Audit**
- ☐ **Pre Demolition Audit**

Project Description

This Circular Economy Statement has been produced following ongoing design team involvement and specific workshops which have ensured that Circular Economy principles underpin the design proposals. This Circular Economy Statement responds to the commentary provided by Haringey on the 41 Sheldon Avenue planning application which proposed the demolition of an existing, tired house with a new four-storey dwelling consisting of basement, ground floor, first floor, and a loft floor with front rear garden and swimming pool.

Circular Economy Outcomes

The current building comprises of a poor quality three-storey dwelling and the key outcomes from the pre-redevelopment audit were that:

- ☐ the building fabric quality is poor and uninsulated
- ☐ timber window frames in poor condition with single glazed units.
- ☐ facades are brickwork with cracking and delamination, bricks on back façade are painted white.
- ☐ the clay roof tiles are at end of their life
- ☐ the conservatory is timber frame with double glazed and in poor repair
- ☐ all existing services are old, inefficient and at end of life
- ☐ The floor to ceiling height is lower than 2.5m and does not meet best practice spaces standards.
- ☐ The actual retained façade is not as much as expected due to the difficulty of the retained bay window and the non-original brick to be replaced.

The Pre-Redevelopment Audit shows that reuse of the existing fabric or structure has been considered in detail however, doing this would limit dwellings ability to adapt to climate change and become a high-quality energy efficient dwelling. Therefore, full demolition is proposed.

In following the GLA flowcharts in Section 5 results with a design approach of **Demolish and Recycle**.

The intent is to reuse as many bricks and roof tiles as is possible depending on the quality of what is recovered during deconstruction.

There will be a need for significant aggregates on site and so existing brickwork and rubble that is not reclaimed will be crushed on site for re-use as granular fill.

All materials will be sourced with medium to high recycled content (especially for substructure and superstructure) and where possible from suppliers with Environmental Management Systems such as ISO1401, BES6001 and CARES certified products in all layers.

All concrete will maximise the recycled and GGBS content.

Circular Economy Targets and Commitment

This project referred to the GLA Circular Economy Guidance and take the following CE targets into consideration while constructing and procuring.

- ☐ Minimum of **95% of demolition waste** (non-hazardous) to be diverted from landfill for reuse, recycling, or recovery.
- ☐ Minimum of **95% of excavation waste** (non-hazardous) to be diverted from landfill for beneficial reuse.
- ☐ Minimum of **95% of construction waste** (non-hazardous) diverted from landfill for reuse, recycling, or recovery.
- ☐ Minimum of a **65% recycling rate** for municipal waste by 2030.
- ☐ Minimum of **20% of the building material elements** to be comprised of recycled or reused content.

1. Introduction

1.1. Project Background

Carbon Plan Engineering have been appointed by Radcliffe to carry out a Circular Economy Statement to demonstrate how the 41 Sheldon Avenue development, in the London Borough of Haringey, design references the principles of the GLA circular economy requirements (GLA 2021). This development comprises of a four-storey dwelling (GIA: 870.8 m²) consisting of basement, ground floor, first floor, and a loft floor with front rear garden and swimming pool.

Figure 1 rendering image from MWA report



This Circular Economy Statement responds to the planning submission commentary to demonstrate the project has taken the CE principles into consideration and incorporated the outcomes within the design as far as possible.

1.2. Methodology

This Circular Economy Statement has been developed referred to the London Plan Policy SI 7, following the guidance outlined in 'Circular Economy Statement Guidance (March 2022) document. This Circular Economy Statement has been developed in collaboration with the Design Team to ensure that Circular Economy principles have underpinned design proposals from outset.

The aim of the Design Meetings was to review the potential to retain the existing structure and to otherwise identify opportunities and measures that would minimise waste throughout the life cycle of the project, including construction waste, in-use waste, and end of life waste, in accordance with the GLA Circular Economy Core Principles and waste hierarchy. This circularity approach has informed all elements of the design.

2. Policy Context

This section summarises the London Plan and relevant policy for Circular Economy.

2.1. Circular Economy

“A circular economy is one that is restorative and regenerative by design, and which aims to keep products, components and materials at their highest utility and value at all times, distinguishing between technical and biological cycles” - Ellen MacArthur Foundation.

2.2. The London Plan (March 2021)

The London Plan 2021 seeks to integrate economic, environmental, transport and social objectives and place them in a framework to progress London's development from 2021 onwards.

The London Plan 2021 is the Spatial Development Strategy for London and legislation requires that the Plan takes account of three cross cutting themes:

- ☐ economic development and wealth creation
- ☐ social development
- ☐ improvement of the environment

In all cases the London Plan policies supplement or augments the policies in all earlier versions of the Plan and the London Plan was adopted in March 2021.

The following outlines key policies which are relevant to the proposed development and this Statement.

Policy D3 Optimising site capacity through the design-led approach

This sets out the importance now placed upon undertaking *meaningful engagement and collaboration* to deliver appropriate and attractive developments that follow and address Sustainable Design principles including:

- ☐ design out exposure to poor air quality and noise
- ☐ **following the circular economy principles**
- ☐ maximising urban greening and creating green open spaces
- ☐ designing out crime
- ☐ creating inclusive places to meet the needs of all users
- ☐ provide permeability to support active travel
- ☐ provide easy accessibility for deliveries and waste storage
- ☐ sustainability in terms of servicing, maintenance and management
- ☐ protecting and enhancing historic and cultural sites
- ☐ improving social infrastructure
- ☐ creating economic opportunities for all

Policy SI 7 Reducing waste and supporting the circular economy

A circular economy is one where materials are retained in use at their highest value for as long as possible and are then re-used or recycled, leaving a minimum of residual waste. The successful implementation of circular economy principles will help to reduce the volume of waste that London produces and must manage.

Therefore, development proposals should show how waste will be managed and minimised, both during construction and operation, to help promote a more circular economy that improves resource efficiency and innovation to keep products and materials at their highest use for as long as possible.

This Policy also required the development to achieve:

- ☐ meet or exceed the municipal waste recycling target of 65% by 2030
- ☐ meet or exceed the targets for construction and demolition with 95% of the waste would be reused, recycled, or recovered.
- ☐ 95% of excavation waste should be reused where beneficial.

Policy SI 7(B) requirements point Local Authorities and Developers in the direction of the GLA published guidance on the development of Circular Economy Statements in 2022 where they set out the detailed requirements for inclusion in a Circular Economy Statement. The documents make it clear that Pre-Redevelopment and Pre-demolition audits are to be submitted along with Circular Economy Statement at Outline application and Full application stage.

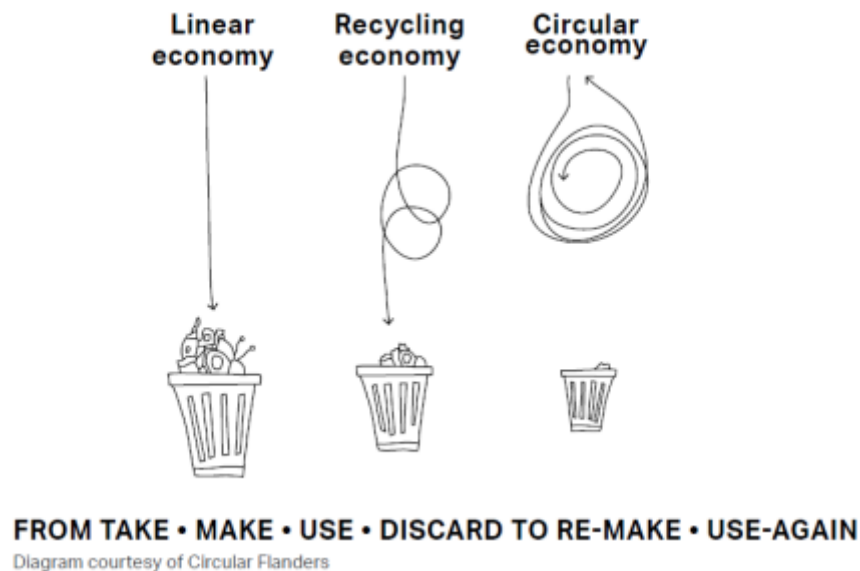
Policy SI 2 Minimising greenhouse gas emissions

This policy aims to minimize greenhouse gas emissions in major developments. Moreover, Development proposals referable to the Mayor should calculate whole life-cycle carbon emissions through a nationally recognised Whole Life-Cycle Carbon Assessment and demonstrate actions taken to reduce life-cycle carbon emissions.

3. Circular Economy

London Plan Policy SI 7 defines a circular economy (CE) 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 a move away from the current linear economic model, where materials are mined, manufactured, used and thrown away, as shown in Figure 1.

Figure 2 – What is the Circular Economy



This section set out what information should be submitted on each of the tables in the CE statement template spreadsheet.

3.1. Circular Economy Principles

The Circular Economy Guidance has set out the six principles as the fundamental part of the building design process, which would help the development to reduce the materials quantity, waste and increase the opportunity to recycle and reuse during the whole life cycle of the building (from materials, in use stage, and end of life)

1. **Building in layers** – ensuring that different parts of the building are accessible and can be maintained and replaced where necessary.
2. **Designing out waste** – ensuring that waste reduction is planned in from project inception to completion, including consideration of standardised components, modular build, and reuse of secondary products and materials.
3. **Designing for longevity** - well-defined, long term needs while being durable and resilient or able to cope with change with little modification/no replacement of parts due to its ‘loose fit’, generous proportions and readiness for alternative technologies, different ways of living or working and a changing climate.

4. **Designing for adaptability or flexibility** - to meet the needs of the present, but with consideration of how those needs might change in the future and designed for change in the form of periodic remodelling including alterations or replacement of non-structural parts.
5. **Designing for disassembly** – Ensuring that all elements are easy removal and upgrade, and ideally to be reused, remanufactured, or recycled on a part-by-part basis.
6. **Using systems, elements or materials that can be reused and recycled** – All selected new materials should be low impact on the environment and human health throughout its lifecycle. Aim to use recycled contents/ secondary aggregates to reduce the use of virgin materials and optimising material efficiency, also with a high recycle or reclaimed rate at the end of life..

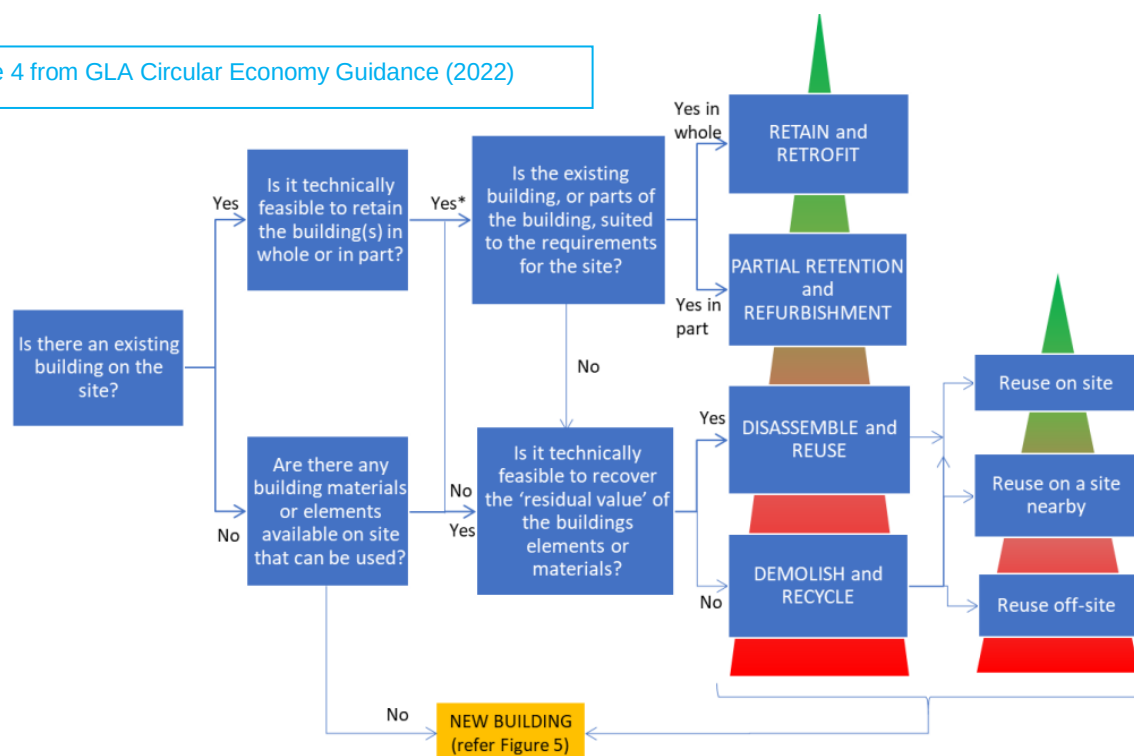
The following section shows the approaches support the implementation of the six circular economy principles. Multiple approaches are expected to be adopted for each project development aspect, layers or uses, particularly for larger developments.

3.2. Circular Economy design approaches for existing buildings

Sections 3.2 and 3.3 show the GLA Circular Economy Approaches Decision Tree for Existing building and New Development, respectively.

GLA Circular Economy Guidance stated in section 2.4.5 that “*When assessing whether existing buildings are suited to the requirements for the site, applicants should robustly explore the options for retaining existing buildings (either wholly or in part).*”

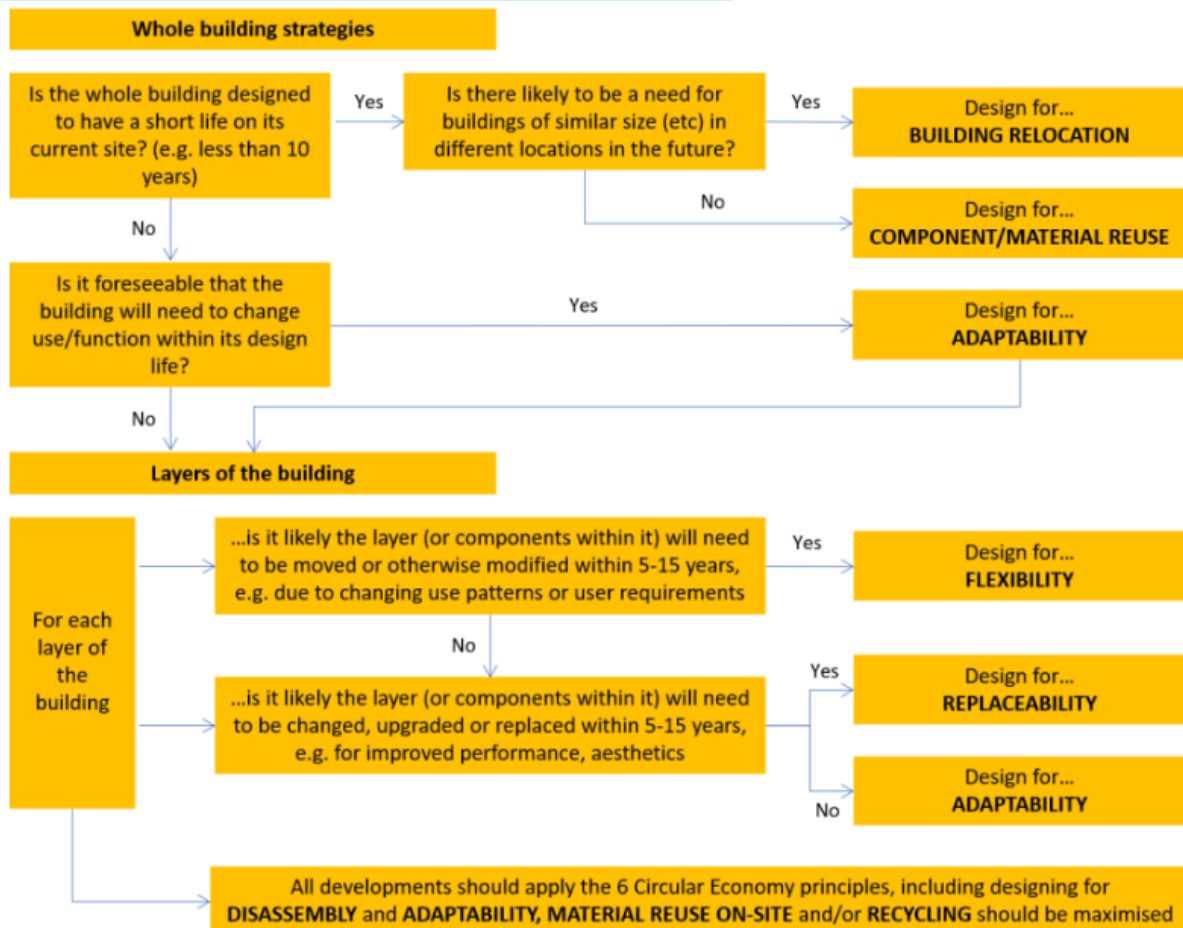
Figure 4 from GLA Circular Economy Guidance (2022)



3.3. Circular Economy design approaches for new developments

GLA Circular Economy Guidance stated in section 2.5.1 that “All developments should be designed so that buildings can be adapted to extend their life. They should also be designed so they can be deconstructed and reconstructed to allow components and materials to be salvaged for reuse or recycling, whilst maintaining their economic and environmental value.”

Figure 5 from GLA Circular Economy Guidance (2022)



4. Circular Economy Target

This section shows the circular economy targets for existing and new development.

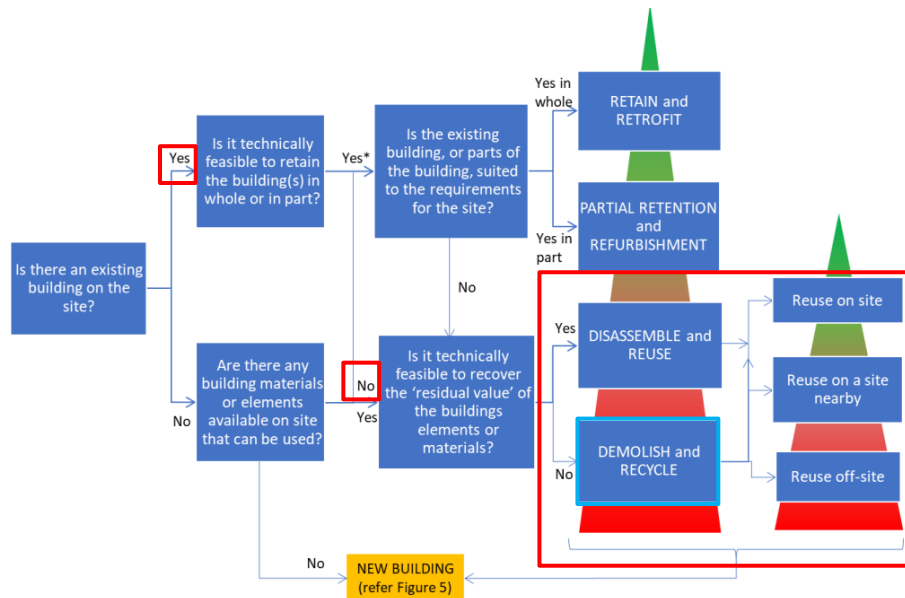
	Policy Requirement	Target Aiming For (%)	Policy Met?
Demolition waste materials (non-hazardous)	Minimum of 95% diverted from landfill for reuse, recycling or recovery.	95%	✓
Excavation waste materials	Minimum of 95% diverted from landfill for beneficial reuse.	95%	✓
Construction waste materials	Minimum of 95% diverted from landfill for reuse, recycling or recovery.	95%	✓
Municipal waste	Minimum 65% recycling rate by 2030.	65% TBC	✓
Recycled content	Minimum 20% of the building material elements to be comprised of recycled or reused content.	20%	✓



5. Project Specific CE Design Approach

5.1. Circular Economy design approaches for existing buildings

There is a building existing on the site, and it is not feasible to retain any of the building above ground Superstructure. This will result in the design approaches of **Demolish and Recycle**.



1. Is there an existing building on the site?

YES, currently there is a 3-story dwelling with garage located on the site.

2. Is it technically feasible to retain the building(s) on whole or in part?

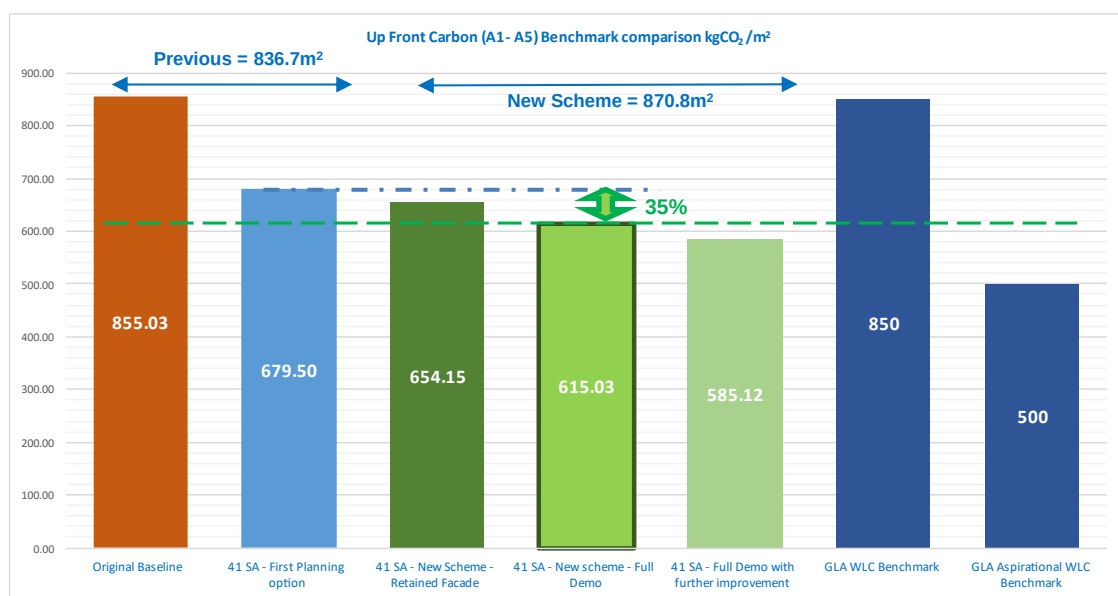
NO, from an **Architectural** perspective, the proposal is to build a high-quality future proofing dwelling with well insulated fabric (wall, roof, floor, and window etc.), future flexibility and adaptability, with high efficiency services system. Therefore, it would be inefficient to refurbish and expand the existing dwelling due to the poor fabric quality and performance as well as the lack of flexibility to re-arrange the layout (load bearing brick walls and bay window limited the room sizes), the existing dwelling is not designed for contemporary living as the floor to ceiling height is lower than 2.5m.



All the service systems are old, are not energy efficient and are at the end of their service life. Moreover, the existing dwelling has been adapted and extended several times previously which makes further alteration increasingly inefficient.

From a **Technical** perspective the existing dwellings external structure is difficult to adapt because it is a brick load bearing external structure which is fixed and not easily altered. This would limit the ability to expand the dwelling both downwards and horizontally. In addition, the building fabric would not be compliant with the current Part L requirements and will not lend itself to an energy efficient building.

As shown in the following chart the WLC Assessment demonstrates that a partially retained façade will result in higher impact of **654.15 kg/CO₂/m²** in up front carbon emissions when compared to the fully new building which has an impact of 6.5% less at **615.03 kg/CO₂/m²**.



3. Is it technically feasible to recover the residual value?

No. As described in the Pre-Redevelopment Audit the existing structure is primarily brickwork with timber floor slabs and timber roof structure.

All the bricks on site are being considered for re-use on site if they are in a good enough condition, to lower the materials impact, cost and maintain the same architecture style as existing dwelling.

Moreover, the clay roof tiles will also be re-used on site if they are in good condition.

Therefore, although many elements will be reclaimed there are few suitable elements which can be re-used within the proposed new building. However, there will be a need for significant quantities of granular fill and so concrete and brick rubble will be crushed on site for re-use.

In following the above flowchart, we have ended up with a design approach of **Demolish and Recycle**.

Demolish and Recycle

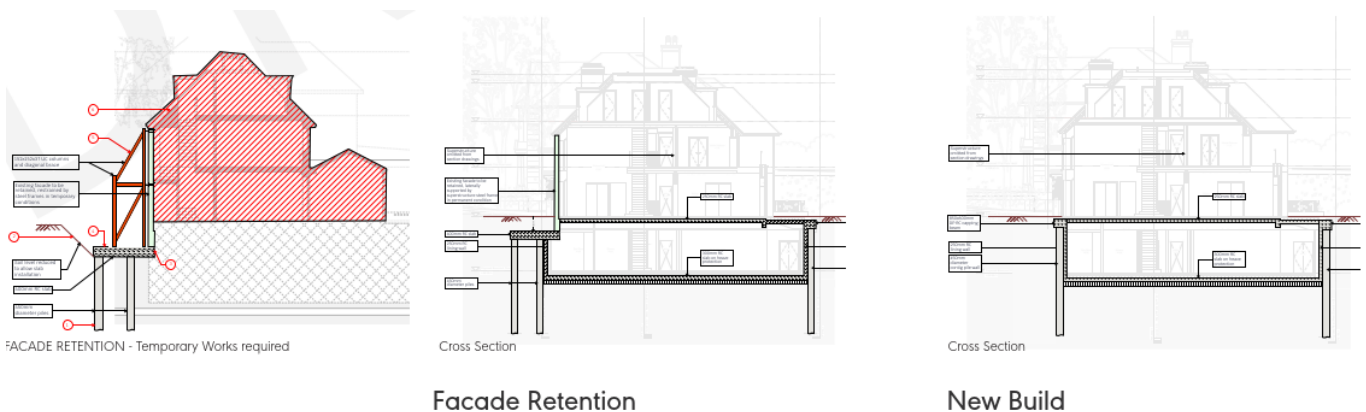
Traditional demolition, with elements and materials processed into new elements, materials and objects for use on the site or on another site.

- ❑ **Structure(frame), superstructure:** The load bearing brick walls of the existing building are thick and difficult to alter which reduces the potential flexibility in internal arrangements for different layout to suite different requirements for future occupants.

Additionally, the existing bay window structure restricts room sizes because the bay window needs to be the centre of the room.

Construction wise, retained front and side facades will limit the flexibility of design and will extend the costs and programme for the demolition as well as limiting the potential for construction of the new basement. In addition the retention of the facades requires significant volumes of additional steel and concrete to be used to support the existing structure during construction.

It has therefore been concluded that the full extent of the above ground structure would all require to be demolished and recycled or reused.



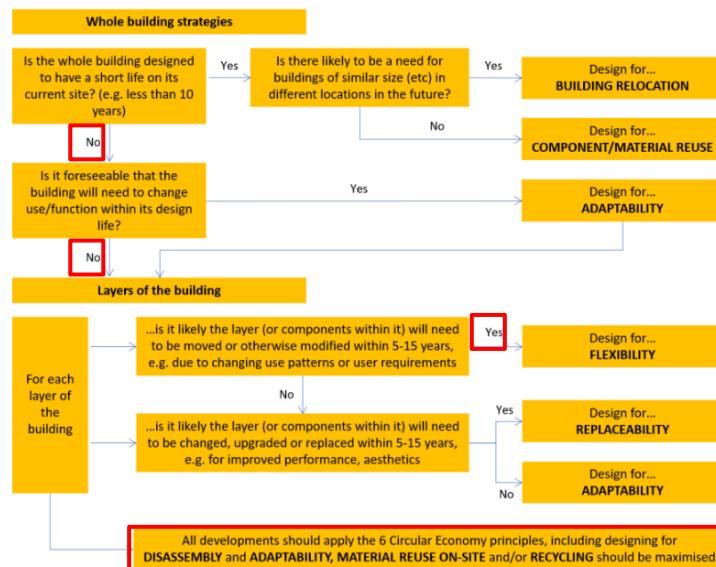
- ❑ **Skin /shell e.g. façade:** The quality of the existing façade is in poor condition and existing U values are inefficient and risk overheating. The retained front facade will improve its u value but will not achieve the new build standards. The dwelling would struggle to comply with current Part L 2021 of the Building Regulations with the facades retained as has been demonstrated in the updated Energy Assessment work by GMS Engineering.

Therefore it has been concluded that the brick wall facade will all be demolished and recycled or reused while the windows and doors will be demolished and recycled.

- ❑ **Space / plan / interior / interior space:** All the internal wall and finishes would need to be demolished and recycled to suit the new dwelling arrangement.
- ❑ **Services (building):** Current plant provision results in an inefficient building in terms of energy use meaning high operational carbon per m² per year continues to be emitted.
- ❑ **Stuff / content:** The existing fitting and furnishings to the dwelling are mostly at the end of their life and are not suited to a new, high-quality dwelling.

Outcome:- The intent is to reuse as many bricks and roof tiles as is possible depending on the quality of what is recovered during deconstruction. There will be a need for significant aggregates on site and so brickwork and rubble that is not reclaimed will be crushed on site for re-use as granular fill.

5.2. Circular Economy design approaches for new developments



- 1. Is the whole building designed to have a short life on its current site (less than 10 years)?**
No, the new dwelling is planning to have around 60-year design life on site.
- 2. Is it foreseeable that the building will need to change use/function within its design life?**
No, currently there is no plan to change the building from dwelling to other functions building.
- 3. Is it likely the layer will need to be moved or otherwise modified within 5-15 years?**
Yes, some of the internal component will change as a result of changing owner demands for new lay

As the decision tree shown above, the project would assess by layer of building and primarily falling into the design for flexibility, design for replacement and design for adaptability.

6. Circular Economy Strategy – design principles

6.1. Building in layers

Ensuring that different parts of the building are accessible and can be maintained and replaced where necessary. RICS NRM forms the basis of the CE process which utilises the layers.

6.2. Designing out waste

6.2.1. Module A - Product Sourcing and Construction Stage

All materials are targeting to source with medium to high recycled content (especially for substructure and superstructure) and where possible ISO1401, BES6001 and CARES certified products will be used in all layers. The Concrete is targeted to contain 50% GGBS with 20% recycled aggregate as minimum while the steel frame should contain 30% of recycled content as minimum. The reinforcement is proposed to use the product with 97% recycled content as minimum. Moreover, the steel frames are proposed to use the universal column and beam section which are standardised.

The client will develop a detailed specification and a Sustainable Procurement Plan to be included in the tender for contractors to ensure that the above is achieved.

6.2.2. Module B – In-Use stage

Using materials with longer life span and less maintenance requirements. The proposed façade is insulated brick wall, and the pitched roof is covering with clay tile which both have a very long lifespan. The same time the timber framed windows also have a long lifespan with regular repair rather than replacement. The design enables access to all elevations for maintenance of facades and to undertake any needed repairs.

6.2.3. Module C – End-of-Life Stage

Recycle, reclaim, and reuse most of the waste, and target minimum of 95% waste diverted from landfill for recycling, reuse, or recovery.

The substructure will be flexible to allow for alternative steel framed designs to be developed at the point in time where a full redevelopment was required. There is a significant metal structure which can be fully reused in its original form, and the brick and roof tile could be reuse at end of life if they are in a good condition.

The CLT slabs can be re-used in their original form for an alternative building using a similar methodology of construction.

6.2.4. Benefits and Loads Beyond the System Boundary

The proposed steel frame and floor slabs can be re-used in their existing form once the building has been deconstructed in the future. A full inventory of these elements should be included within the O&M.

6.3. Designing for longevity

Skin / shell - The proposal takes climate change into account and design to tackle overheating, glare and lower energy consumption with low U values and reduce overheating with low G values and adequate ventilation. Addressing high durability materials throughout the building, brick wall, clay roof tile and timber framed window all have a long lifespan.

Structure / structural frame / superstructure – steel structure and foundations are designed with long life span, flexibility and durability in mind. The steel frame structure has been designed to accommodate flexibility in space planning so that the internal arrangement can be altered without requiring the frame, or shell, to be reconstructed.

The design is such that, if the building is ever deconstructed the foundations and retaining walls can be retained and re-used and a new steel frame erected for a new building on the same footprint. In the same way the steel frame could be adapted to accommodate flexible space, additional vertical space or deconstructed and re-used to create a new building.

Services – The building will be served by an ASHP system located in the gardens and only this would need to be replaced at the end of the plant lifecycle as all other elements of the system can be retained. The garden location facilitates access for replacement at the end of its life without requiring damage / alteration to the building.

Alternatively, a future connection to a heat network can be used to provide heating and / or cooling.

The Lighting systems are all LED and have long lifespans.

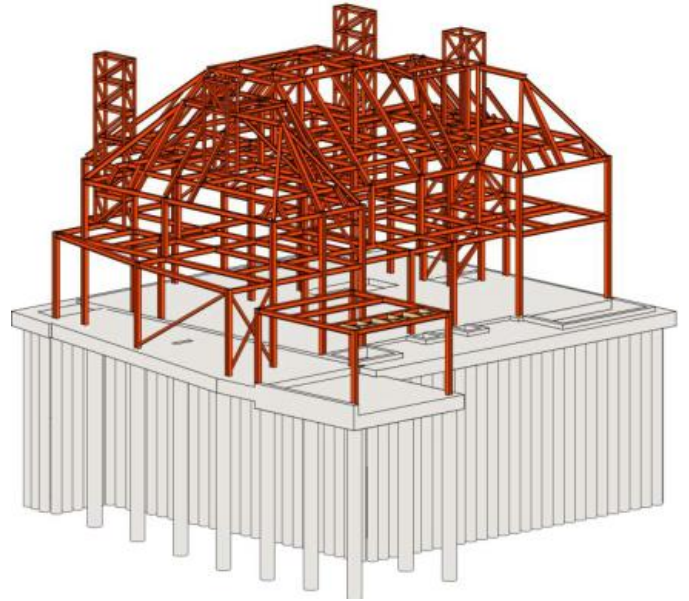
6.4. Designing for adaptability or flexibility

The foundation and steel frame have been designed with the allowance for any possible future extension and / or reshaping.

The timber deck is inherently flexible to allow for ease of internal remodelling.

Most of the partition are drylining wall which is easy to adjust or rearrange without damage the structure and timber deck floors.

Note: Please see the section 3.1 of WLC report which have demonstrated that the design team have optimised the steel frame design and targeted to procure reclaimed steel frame as much as possible. (section 3.1.3) The proposal also specified high recycled content steel frame.



6.5. Designing for disassembly

Existing Building

There are no real opportunities for disassembly of the main structure however the conservatory elements should be able to disassembly, removed, and recycled.

The existing, unpainted brickwork and roof tiles should be deconstructed as part of the demolition process and set aside for re-use in the future construction.

Proposed Building

The proposed building will have a flexible steel frame with a timber decks construction for upper floors and roofs. This type of system approach allows better flexibility for potential future alterations or disassembly and also better reuse at end of life.

The internal partitions are plasterboard with metal stud – drylining system which would be able to disassembly while needed.

Fit out elements

Fit out elements, such as joinery and fittings are designed to be modular and also to enable disassembly. This will facilitate cleaning, and repairs but also allows adaptability for relocation or recycling.

6.6. Using systems, elements or materials that can be reused and recycled.

All layers - Recycle, reclaim, and reuse most of the waste, and target minimum of 95 % waste diverted from landfill for recycling, reuse or recovery.

Materials have been carefully considered and will be selected to meet circular economy, embodied carbon, and regulatory building requirements. This project would try to meet the 20% recycled content of total building materials CE target (Section 4) also target to achieve the GLA Whole Life Carbon aspirational Embodied Carbon thresholds (please see the Whole Life Carbon report submitted with this document).

The design utilises mechanical connection wherever possible, and these have been favoured over adhesives, where viable, in the proposal to aid separation of materials and facilitate reuse and recycling.

Appendix A - Circular Economy Design Approaches

Circular Economy Design Approaches for Existing Structures / Buildings		Applicant Response
Is there an existing building on the site?		Yes
Is it technically feasible to retain the building(s) in whole or in part?		No
Is it technically feasible to recover the 'residual value' of the buildings elements or materials?		No
The preferred strategy is:		NEW BUILDING
The preferred strategy is:		DEMOLISH/DECONSTRUCT AND RECYCLE
Circular Economy Design Approach	Phase/Building/Area/Layer	Strategic Response
Refurbish	N/A	
Repurpose	N/A	
Disassemble / Deconstruct and Reuse	1: Skin/shell - Façade	There are no real opportunities for disassembly of the main structure however the brick and roof tile can be cleaned, and reuse on site if in good condition.
Demolish / Deconstruct and Recycle	All layers	The main structure are brick wall and roof tile which can be reused on site if in good condition or should be fully recycle, while all the other materials and layer to be remove and recycled.
Circular Economy Design Approaches for New Buildings, Infrastructure and Layers Over the Lifetime of the Development		Applicant Response
Is the whole building designed to have a short life on its current site? (e.g. less than 10 yrs)		No
Is it foreseeable that the building will need to change use/function within its design life?		No
All developments should apply the 6 Circular Economy principles, including:		Designing for DISASSEMBLY and ADAPTABILITY, MATERIAL REUSE ON-SITE and/or RECYCLING should be maximised
Circular Economy Design Approach	Phase/Building/Area/Layer	Strategic Response
Building relocation	N/A	N/A
Component or material reuse	N/A	N/A
Adaptability	1: Substructure - Foundation	1: Minimal new pile foundation will be provided to form a robust base for the building and future extension.
	2: Structure - Frame	2: Optimized structural grid has been designed to maximum the potential of the different floor plate layout design.
Flexibility	1: Interior space - Partition	1: There is no proposed solid walls apart from basement, this will be beneficial for rearrange the layout in the future. Most of the internal wall are drylining partition.
Replaceability	1: Skin/shell - Roof 2: Service	1. The roof clay tile would be easy to replace if needed. 2: Services are accessible throughout the building to allow for replacement over lifecycles with access being designed in to facilitate this. - Horizontally most services are under the raised access floor - Vertically services run within the cores and access is gained through generous panels
Disassembly	1: Service 2: Structure - Frame 3: Interior space - Partition	1: Rooftop and basement plant location allows for ease of access, disassembly and removal. 2: Frame is steel and bolted together 3: The
Longevity	1: Substructure - Foundation 2: Structure - Frame 3: Skin/shell - Façade	1: The concrete foundation has a long-life span more than 60 year 2: The steel frame has a long-life span more than 60 years 3: The brick wall and timber framed window have a long-life span more than 60 years