

Dyne House and the Island Site Tunnel Building

Circular Economy Statement

January 2022

Quality information

Prepared by	Checked by	Verified by	Approved by
JC SD	AP CMJ	DC GA	JE

Revision History

Revision	Revision date	Details	Authorized	Name	Position
1	04.11.22	For Planning Issue	JE	JE	Associate Director
2	20.12.22	QA after client and Bidwell's comments	JE	JE	Associate Director
3	06.01.22	Update of demolition plan	GA	GA	Associate Director

Prepared for:

Highgate School

Prepared by:

AECOM Limited
Aldgate Tower
2 Leman Street
London E1 8FA
United Kingdom
aecom.com

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Table of Contents

1.	Executive Summary	5
1.1	Introduction	5
1.2	Brief description of the development.....	5
1.3	Engaged organisations	5
1.4	Design Approaches.....	5
1.5	Specific commitments	6
2.	Introduction	7
2.1	Background	7
2.2	Policy	7
2.3	Greater London Authority.....	7
2.3.1.1	London Plan (2021)	7
2.3.1.2	Circular Economy Statement Guidance (2022)	8
2.4	London Borough of Haringey	8
2.4.1.1	Local Plan: Strategic Policies (2013, with alterations 2017)	8
2.4.1.2	Haringey Development Management DPD (2017)	9
2.4.1.3	Haringey Sustainable Design and Construction SPD (2013).....	9
2.4.1.4	North London Waste Plan (NLWP) (2022).....	9
2.4.1.5	Haringey New Local Plan: First Steps Engagement	9
2.5	Description of the development	9
2.6	Method statement.....	10
2.7	Circular economy aspirations	11
3.	Design Approaches.....	12
3.1	Overview.....	12
3.2	Circular Economy Design Approaches for Existing Structures / Buildings	12
3.2.1	The Site	12
3.2.2	Design Approaches.....	13
3.3	Circular Economy Design Approaches for New Buildings, Infrastructure and Layers Over the Lifetime of the Development.....	15
3.3.1	The Proposed Development.....	15
3.3.2	Design Approaches.....	17
3.4	Circular Economy Design Approaches Table.....	17
4.	Circular Economy Design Principles by Building Layer.....	19
4.1	Circular Economy Design Principles by Building Layer Table	19
4.2	Reporting Forms.....	21
4.2.1	Bill of Materials	21
4.2.2	Recycling and Waste	27
4.3	Circular Economy Narrative.....	28
4.3.1	Designing Out Waste	28
4.3.1.1	Module A – Product Sourcing and Construction Stage	28
4.3.1.2	Module B – In-Use Stage.....	29
4.3.1.3	Module C – End-of-Life Stage	29
4.3.1.4	Module D – Benefits and Loads Beyond the System Boundary	29
4.3.2	Designing for Longevity	29
4.3.3	Designing for Adaptability or Flexibility	29
4.3.4	Designing for Disassembly	29
4.3.5	Using Systems, Elements or Materials that can be Reused and Recycled.....	30
5.	Circular Economy Targets	31
5.1	Specific plans for short- and medium-term targets	32
5.2	Programme / method for longer-term targets.....	32
5.3	End-of-life strategy.....	32

6. Conclusion	33
Appendix A – GLA Circular Economy Template.....	34
Appendix B Pre-Redevelopment and Pre-Demolition Audit	35
Appendix C Operational Waste Management Strategy	36
Appendix D Cut / Fill Estimate.....	37

Figures

Figure 1. Dyne House and the Island Site Tunnel Building Site Boundary, showing ground floor use. Source: Hopkins Architects Partnership LLP).....	10
Figure 2. Proposed Development red line boundary (<i>Source: Hopkins Architects Partnership LLP</i>)	12
Figure 3. Circular economy decision tree for design approaches for existing structures/buildings (<i>Source: GLA</i>)	13
Figure 4. Dyne House Retention and Demolition Plan	14
Figure 5. Island Site Tunnel Building Retention and Demolition Plan.....	15
Figure 6. Appraisal of redevelopment for Dyne House (<i>Source: Hopkins Architects Partnership LLP</i>)	16

Tables

Table 1. Circular Economy Design Approaches	18
Table 2. Circular Economy Design Principles by Building Layer	19
Table 3. Bill of Materials	21
Table 4. Recycling and Waste Reporting.....	27

1. Executive Summary

1.1 Introduction

This Circular Economy Statement has been prepared by AECOM Ltd. on behalf of Highgate School ('the Applicant') in support of Dyne House and the Island Site Tunnel Building ('the Site') (hereafter referred to as 'the Proposed Development') located in the administrative area of London Borough of Haringey.

This document sets out the proposed Circular Economy Strategy which has been developed to meet the relevant planning policy within the context of the constraints applicable at the Site.

1.2 Brief description of the development

The Applicant intends to seek planning permission for the following:

"Redevelopment of Dyne House and the Island Site Tunnel Building, to include:

- 1) Retention, refurbishment and extension of the principal five storey (plus plant and lift over run) Dyne House structure;*
- 2) Demolition and redevelopment of the rear extension and associated buildings with a part one, part two storey structure;*
- 3) Retention of the Parade Ground open space, with new sports pitch surface;*
- 4) Associated improvements to the Island Site access and underground tunnel, including demolition and redevelopment of service block; and*
- 5) Associated landscaping and improved provision for emergency services, servicing, and disabled parking".*

1.3 Engaged organisations

Some of the key organisations that are involved in the development, design and delivery of the Proposed Development include:

- Highgate School (Applicant);
- Hopkins Architects (Architect);
- Expedition (Engineering); and
- AECOM (Sustainability / BREEAM Consultant).

1.4 Design Approaches

The Site is currently occupied by Highgate Senior School, including the Music Department, teaching rooms, supporting services and disused facilities such as the swimming pool. These buildings deliver approximately 3,019 m² GIA. It is proposed that the structural frame will be retained, with some structural alteration and full refurbishment, as well as extensions to create one larger building. The Proposed Development will deliver one building comprising a Sixth Form Centre, Music Department, Auditorium and Recital Room, as well as other supporting facilities.

The Circular Economy decision trees from the associated guidance document have been followed to determine the design approaches for both the existing buildings and new development. The strategic approaches for the Proposed Development have been set out as follows:

- The strategy is to deconstruct and reuse (either on- or offsite) where possible before considering recycling or other waste management routes. Through the development of a Pre-Redevelopment and Pre-Demolition Audit, the opportunity has been identified to retain, refurbish, and extend elements of the existing structure within the new development.
- The Proposed Development will be predominantly designed for longevity, there are no significant use changes expected. This will be achieved using robust and durable materials and creation of a scheme which is resilient to future scenarios. The Proposed Development will also support future adaptability within the educational use class.

1.5 Specific commitments

The key commitments of the Applicant are:

- To target diversion of a minimum of 95% of non-hazardous demolition waste from landfill for reuse, recycling, or recovery;
- To target diversion of a minimum of 95% of inert excavation waste generated from the Proposed Development from landfill for beneficial use;
- To target diversion of a minimum of 95% of construction waste generated by the Proposed Development from landfill for reuse, recycling, or recovery;
- To facilitate recycling levels in operation which will exceed the municipal waste recycling target of 65% by 2030; and
- To specify a minimum 20% of the total value of the selected products and materials to include recycled and reused content; and
- To provide a Post-Construction report to the Greater London Authority.

2. Introduction

2.1 Background

AECOM's Sustainable Development Group has been appointed by Highgate School to prepare a Circular Economy Statement, to accompany the detailed planning application for Dyne House and the Island Site Tunnel Building.

The document sets out the proposed Circular Economy Strategy which has been developed to meet the relevant planning policy within the context of the Proposed Development. As the document supports a detailed planning application, the 'Detailed Application Stage' tab of the Greater London Authority (GLA)'s Circular Economy template has been submitted alongside this report, in accordance with the GLA's London Plan Guidance: Circular Economy Statements.

2.2 Policy

The Circular Economy Statement is primarily required to respond to London Plan "Policy SI 7 Reducing waste and supporting the circular economy" however it also exhibits a significant overlap with waste policy areas which often have requirements set at a local level.

2.3 Greater London Authority

2.3.1.1 London Plan (2021)

The London Plan is the statutory Spatial Development Strategy for Greater London prepared by the Mayor of London ('the Mayor'). The London Plan 2021 was adopted as the current version in March 2021, introducing a range of new subject areas including the following in relation to circular economy.

Policy SI 7 Reducing waste and supporting the circular economy

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

- 1) *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;*
- 2) *Encourage waste minimisation and waste prevention through the reuse of materials and using fewer resources in the production and distribution of products;*
- 3) *Ensure that there is zero biodegradable or recyclable waste to landfill by 2026;*
- 4) *Meet or exceed the municipal waste recycling target of 65 per cent by 2030;*
- 5) *Meet or exceed the targets for each of the following waste and material streams:*
 - a) *Construction and demolition – 95 per cent reuse/recycling/recovery;*
 - b) *Excavation – 95 per cent beneficial use;*
- 6) *Design developments with adequate, flexible, and easily accessible storage space and collection systems that support, as a minimum, the separate collection of dry recyclables (at least card, paper, mixed plastics, metals, glass) and food.*

B. *Referable applications should promote circular economy outcomes and aim to be net zero-waste. A Circular Economy Statement should be submitted, 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 material demands and enable 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 support 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.*
- C. *Development Plans that apply circular economy principles and set local lower thresholds for the application of Circular Economy Statements for development proposals are supported."*

Policy D 3 Optimising site capacity through the design-led approach

The Circular Economy Design Principles are also referenced in the "Policy D 3 Optimising site capacity through the design-led approach".

2.3.1.2 Circular Economy Statement Guidance (2022)

The GLA has published a London Plan Guidance document to support the development of Circular Economy Statements to comply with the requirements of London Plan Policy SI 7, including estimating, monitoring, and reporting waste associated with the Proposed Development.

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

2.4 London Borough of Haringey

2.4.1.1 Local Plan: Strategic Policies (2013, with alterations 2017)

The Local Plan sets out a vision and key policies for the future development of the Borough up to 2026. It takes forward the priorities of Haringey's Sustainable Community Strategy and other plans and strategies, to identify a vision for Haringey as a place to live, work and visit, and contains key policies and an implementation framework to deliver the vision. There are several key policies and documents that planning applications in Haringey are determined by. Haringey's development plan is made up of the following documents: Strategic Policies, Development Management Policies, Site Allocations and Tottenham Area Action Plan.

The design of the Proposed Development will need to respond to the relevant policies in the Haringey Local Plan, including but not limited to the following:

Policy SP4: Working towards a low carbon Haringey

"1...all new developments to take measures to reduce energy use and carbon emissions during design, construction, and occupation, by incorporating the following measures:

- b. *From 2011 onwards all new non-residential development shall be built to at least BREEAM "very good" standard and should aim to achieve BREEAM "excellent" or the current nationally agreed standard. All new non-residential development shall be zero carbon from 2019.*

"2. The Council will promote low- and zero-carbon energy generation through the following measures:

- a. *Requiring all developments to assess, identify and implement, where viable, site-wide, and area-wide decentralised energy facilities including the potential to link into a wider network;*
- b. *Establishing local networks of decentralised heat and energy facilities by requiring developers to prioritise connection to existing or planned networks where feasible;*
- c. *Working with neighbouring boroughs and other partners to explore ways of implementing sub-regional decentralised energy networks including the potential in the Upper Lee Valley Opportunity Area; and*
- d. *All new developments are required, where viable, to achieve a reduction in predicted carbon dioxide emissions of 20% from onsite renewable energy regeneration, which can include connections to local sources of decentralised renewable energy".*

2.4.1.2 Haringey Development Management DPD (2017)

The Development Management Development Plan Document (DPD), adopted in 2017, aligns with Haringey's spatial strategy and the key objectives of the Strategic Policies Local Plan. It supports proposals that contribute to the delivery of sustainable development in accordance with the strategy and provides a clear framework for resisting development that would be at odds with the Local Plan. Development Management policies relevant to the Circular Economy Statement for Dyne House and the Island Site Tunnel Building include the following:

- Policy DM4: Provision and design of waste management facilities, states that, *"All proposals should consider how to sustainably manage waste arising from the development during the design, construction and occupation phases of new developments."*
- Policy DM21: Sustainable design, layout, and construction, requires that, *"All new development, including building and landscape works, will be expected to consider and implement sustainable design, layout, and construction techniques. Proposals should:*
 - (a) Apply the energy hierarchy to minimise energy use in order to meet, and if possible, exceed, minimum carbon dioxide reduction requirements;*
 - (b) Apply the cooling hierarchy to reduce the potential for overheating and limit reliance on mechanical air conditioning systems.*
 - (c) Maximise opportunities to enhance biodiversity on-site, including through appropriate landscaping, Sustainable Drainage Systems, living roofs and green walls*
 - (d) Wherever possible, use building materials with high environmental performance ratings; and*
 - (e) Seek opportunities for locally sourced labour."*

2.4.1.3 Haringey Sustainable Design and Construction SPD (2013)

The Haringey Sustainable Design and Construction Supplementary Planning Document (SPD) was adopted in February 2013. The document supports the Local Plan: Strategic Policies (adopted March 2013) and is a material consideration when determining applications.

The SPD notes that the Council expects three out of five elements (including roof, external walls, internal walls, upper and ground floors, and windows) to be specified using materials with an embodied energy rating between A+ and D, where A+ represents the best environmental performance / least environmental impact, and E the worst environmental performance / most environmental impact.

2.4.1.4 North London Waste Plan (NLWP) (2022)

The North London Waste Plan (NLWP) was adopted by Haringey Council in July 2022. The document which has been produced jointly between the seven North London Boroughs of Barnet, Camden, Enfield, Hackney, Haringey, Islington, and Waltham Forest. It sets out the planning framework for waste management in the Boroughs for the next 15 years. The NLWP identifies sites for waste management use and sets out policies for determining waste planning applications. The policies and commitments outlined in the NLWP are expected to impact the approach to waste and materials management for the Proposed Development in implementation.

2.4.1.5 Haringey New Local Plan: First Steps Engagement

Haringey has begun the process of preparing a New Local Plan which will replace the existing Local Plan documents adopted in July 2017. Formal consultation on the New Local Plan: First Steps ran from 16th November 2020 until 1st February 2021.

The engagement document sets out the key issues to be addressed by the New Local Plan, it asks about the issues and challenges facing the future planning of the borough and seeks views on options to address them.

2.5 Description of the development

The Applicant intends to seek planning permission for the following:

"Redevelopment of Dyne House and the Island Site Tunnel Building, to include:

- 1) *Retention, refurbishment, and extension of the principal five storey (plus plant and lift over run) Dyne House structure.*

- 2) *Demolition and redevelopment of the rear extension and associated buildings with a part one, part two storey structure.*
- 3) *Retention of the Parade Ground open space, with new sports pitch surface.*
- 4) *Associated improvements to the Island Site access and underground tunnel, including demolition and redevelopment of service block; and*
- 5) *Associated landscaping and improved provision for emergency services, servicing, and disabled parking”.*

This Circular Economy Statement supports the detailed planning application for Dyne House and the Island Site Tunnel Building. The Site is as illustrated in Figure 1. The Proposed Development seeks to deliver 6,216 m² GIA of use class F1.



Figure 1. Dyne House and the Island Site Tunnel Building Site Boundary, showing ground floor use.
Source: Hopkins Architects Partnership LLP)

2.6 Method statement

In order to ensure that circular economy measures are integrated into the design of the Proposed Development, a cross-disciplinary meeting was held on 08th June 2022. Attendees included representation across the parties and teams involved with the project; Applicant (Highgate School), Architect (Hopkins Architects), Sustainability / BREEAM Consultant (AECOM) and Engineers (Expedition).

The workshop structure provided all attendees with an overview of the circular economy principles, allowing them to agree on a strategic approach and identify opportunities and key actions. Information provided and agreed during the workshop has been used to populate Table 2 and Table 3 and the reporting forms presented in Section 3, as required by the GLA's Circular Economy Statement Guidance.

The results of the workshop were the following:

1. A Pre-Demolition Report (KaNect, 2022) [Appendix A] has been produced with respect to the existing site. The Report sets out recommendations for the management of waste arising from the demolition works proposed on the Site.

2. An Operational Waste Management Plan (KaNect, 2022) has been produced for the Proposed Development. The Plan will support the implementation of sustainable waste management measures in practice and sets out the waste storage allocations for the Proposed Development.

2.7 Circular economy aspirations

The design of the Proposed Development will respond to the circular economy principles, as defined in the GLA's London Plan Guidance: Circular Economy Statements. This Circular Economy Statement sets out the aspirations and intentions including specific targets and measures to be implemented within the Proposed Development.

3. Design Approaches

3.1 Overview

Initially, high-level strategic opportunities were identified, in order to maximise the residual value of the Proposed Development. The strategic approach for the implementation of the circular economy principles in the Proposed Development accounts for several key factors which are unique to the Site and its wider London context.

3.2 Circular Economy Design Approaches for Existing Structures / Buildings

3.2.1 The Site

The total Site measures approximately 0.565 ha onto which 6,216 m² GIA is intended to be delivered as part of the Proposed Development. Dyne House and the Island Site Tunnel Building is located on the east side of Southwood Lane, which adjoins Archway Road to the north and Highgate High Street to the south. The Site slopes steeply down from west to east and is adjacent to a number of residential properties, on both Southwood Lane and Kingsley Place.

Dyne House and the Island Site Tunnel Building forms an integral part of Highgate Senior School; the building currently houses the Music Department and Sixth Form Centre. The teaching rooms comprise 17 classrooms/seminar rooms and numerous practice rooms and support facilities. The remainder of the site comprises the Classroom Building (built in 1904), Gymnasium (built in 1950) and the redundant open air swimming pool (built in 1950). In addition, there are two pupil amenity areas; Gibbon Garden located between Dyne House and the Classroom Building; and the Parade Ground which occupies the whole of the east end of the site.

Figure 2 shows the red line boundary for the proposed development.

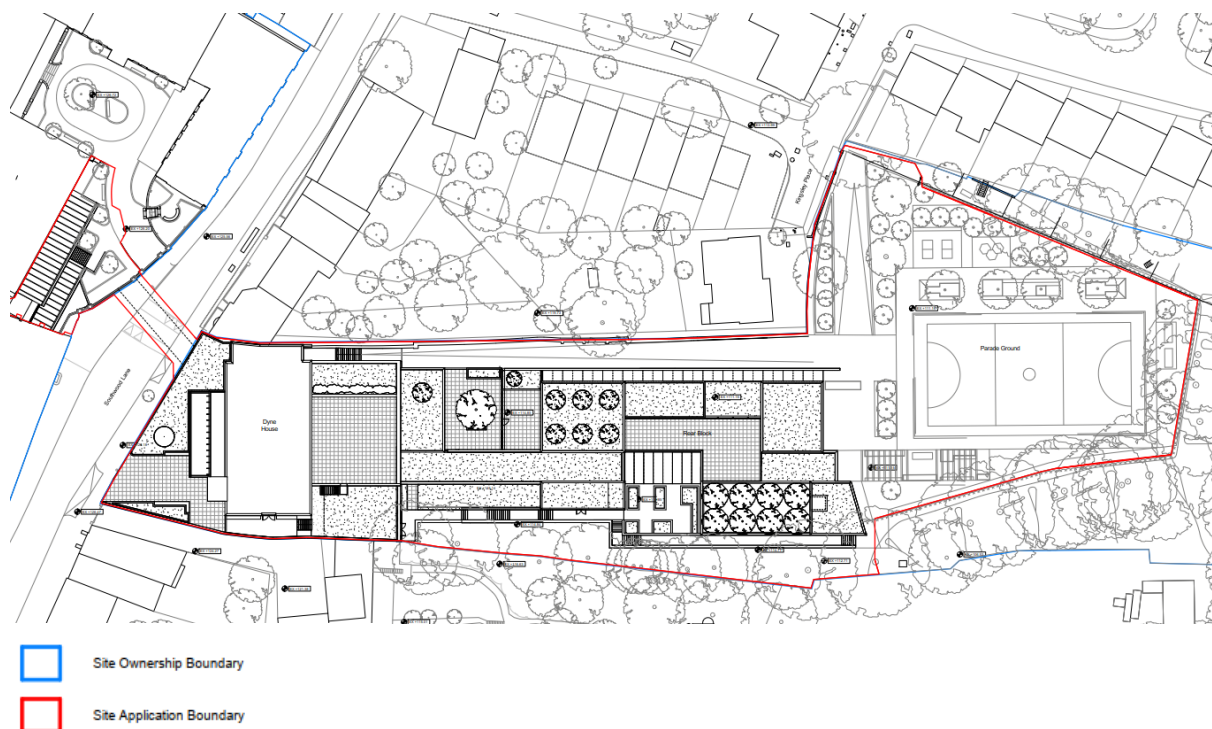


Figure 2. Proposed Development red line boundary (Source: Hopkins Architects Partnership LLP)

3.2.2 Design Approaches

The Circular Economy Decision Tree from the associated guidance document and as set out in Figure 3 has been followed to determine the design approaches for existing structures / buildings.

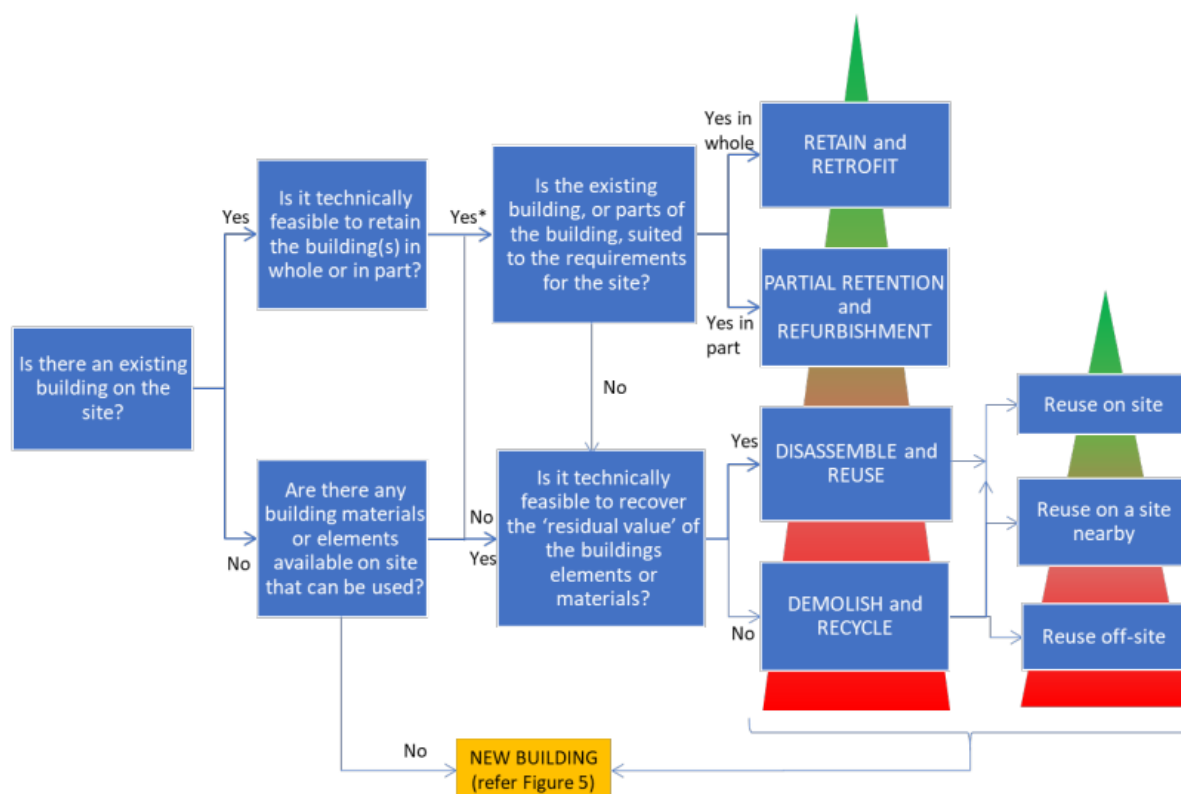


Figure 3. Circular economy decision tree for design approaches for existing structures/buildings
(Source: GLA)

The existing buildings deliver approximately 3,019 m² GIA, including the Music Department, teaching rooms, and supporting facilities.

Additional and improved space is needed to meet the academic requirements of the Senior School campus and the only way to achieve this is through the sensitive redevelopment of the Dyne House and the Island Site Tunnel Building site. The existing Dyne House site is spatially inefficient, inaccessible to wheelchair users (or those with ambulatory impairments) and has an unsatisfactory main pupil entrance via a congested tunnel from the Island Site. There is scope to ease this congestion with re-worked entry points to the tunnel, but significant relief will be provided by consolidating sixth form functions largely in one location. For additional detail of the redevelopment refer to Section 6 of The Design and Access Statement (Hopkins Architects Partnership LLP, 2019).

It has been determined that it is technically feasible to retain the current building in part. The structural frame of Dyne House is proposed to be retained, with some structural alteration, whilst the envelope and interior fittings of the existing Dyne House will all be removed. The outbuildings: the geography building, and gym building will be demolished in entirety, all of which are between 70 and 100 years old. The Proposed Development will deliver a new rear extension to Dyne House stepping down to the Parade Ground with a modest new extension at the front of Dyne House. Figure 4 and Figure 5 show what is proposed to be retained and demolished.

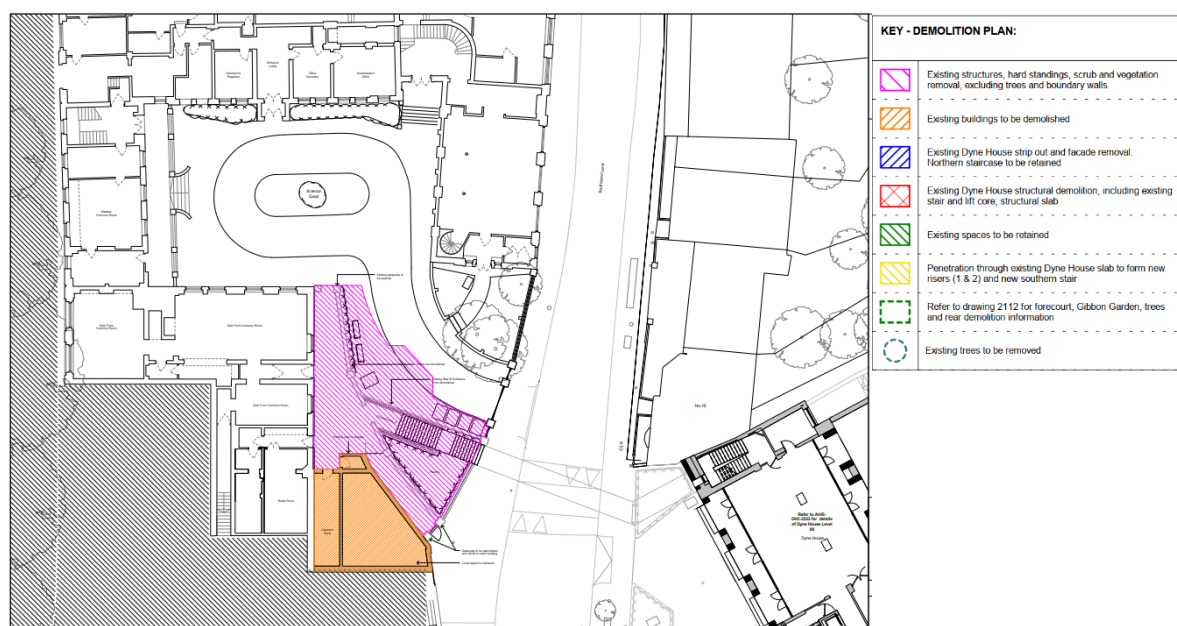


Figure 5. Island Site Tunnel Building Retention and Demolition Plan

A Pre-Redevelopment Audit and Pre-Demolition Audit (KaNect, 2022) has been prepared with respect to the existing Site as provided in Appendix A of this Circular Economy Statement. The audit report sets out recommendations for the management of waste arising from the demolition works proposed on the Site.

The onsite reuse of existing materials will be investigated to assist in further reducing the embodied carbon impact of the new build development. It is sought that opportunities for reuse will be explored in the first instance; however, it is expected that there will be some materials for which direct reuse is not possible. Where this is the case, the Waste Hierarchy will be applied to ensure these materials are recycled where possible.

A Whole Life-Cycle Carbon Assessment (AECOM, 2022) has been prepared which accompanies this Application, this document considers the embodied carbon impacts of the proposed new development, including demolition.

3.3 Circular Economy Design Approaches for New Buildings, Infrastructure and Layers Over the Lifetime of the Development

3.3.1 The Proposed Development

The Proposed Development involves the removal of the existing Classroom Building, the Drama Studio and redundant swimming pool. The existing five-storey Dyne House will be stripped back to its concrete frame for refurbishment and reconfiguration of a new rear extension, stepping down to the Parade Ground with a modest new extension at the front of Dyne House. of part-one and part-two storeys. The Proposed Development will also deliver new public realm and surrounding hard and soft landscaping works.

The Proposed Development will deliver the following: Sixth Form Centre, Music Department, and Auditorium & Recital Room. Other facilities will also be delivered including Informal Assembly Area, and support facilities including circulation, plant rooms and stores.

Figure 6 provides an indicative sketch of the Proposed Development.

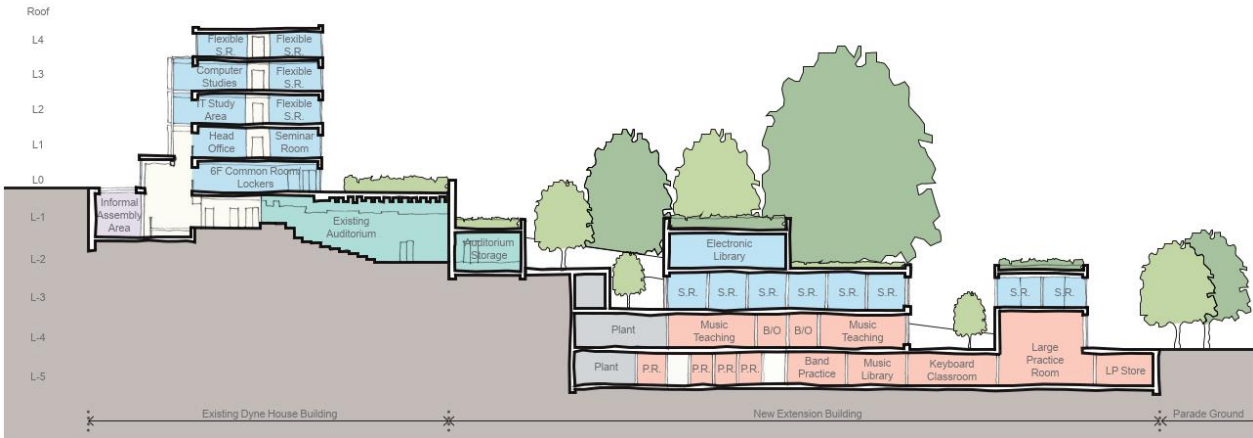


Figure 6. Appraisal of redevelopment for Dyne House (Source: Hopkins Architects Partnership LLP)

3.3.2 Design Approaches

After considering the existing structures / buildings on the Site, the Circular Economy decision tree from the associated guidance document and as set out in Figure has been followed to determine the design approaches for new buildings and infrastructure.

It is not expected that there will be a change in the use of the Proposed Development therefore, it will be designed for longevity. The Proposed Development will also support future adaptability within the educational use type by delivering a clear and flexible floorplate.

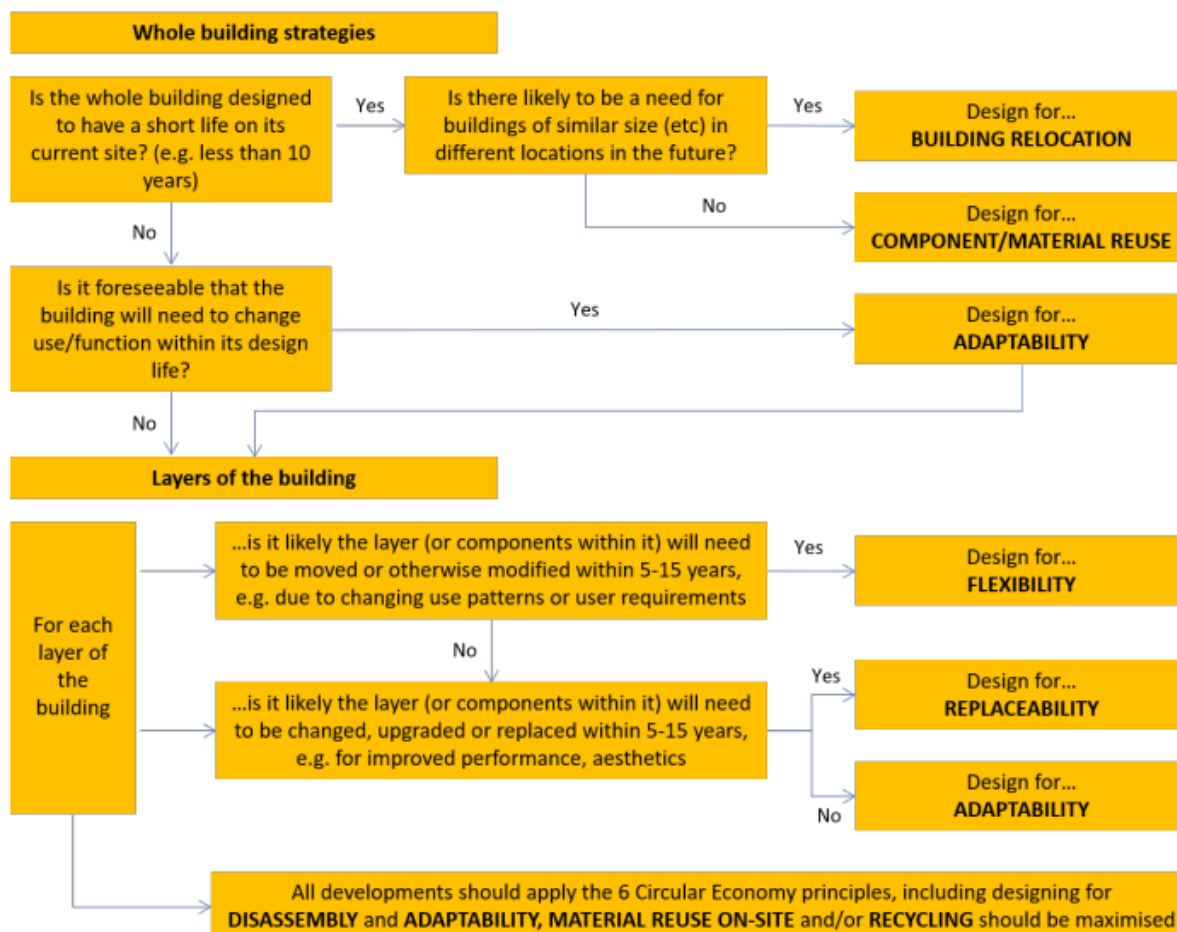


Figure 6. Circular Economy decision tree for design approaches for new buildings, infrastructure, and layers over the lifetime of the development (Source: GLA)

The Circular Economy decision tree for design approaches for layers over the lifetime of the development from the associated guidance document and as set out in Figure have been explored in line with the reporting in Table 2. Circular Economy Design Principles by Building Layer as set out by the Circular Economy template.

3.4 Circular Economy Design Approaches Table

Key strategic circular economy measures for the existing structures and buildings on the development Site which are explored throughout this document include the aspects set out in Table 1.

Table 1. 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?		Yes, in part
The preferred strategy is:		PARTIAL RETENTION and REFURBISHMENT
Circular Economy Design Approach	Phase/Building/Area/Layer	Strategic Response
Refurbish	Dyne House and the Island Site Tunnel Building (Substructure / Superstructure)	The potential to retain, refurbish and extend the existing buildings has been explored. The outcomes of this study illustrate that the New Build option has the least associated life-cycle carbon emissions per square metre of development.
Repurpose	N/A	As set out above, the opportunity to retain, refurbish and extend the existing structure has been explored. However, there are a number of constraints associated with the repurposing of the existing development including internal structural configuration and regulatory compliance.
Disassemble / Deconstruct and Reuse	Geography Building / Gym Building	It is proposed that that the buildings at the back of the site are demolished to allow for redevelopment of the Site. In line with the Waste Hierarchy, it is sought to maximise the residual value of materials including the reuse of existing materials either on or off-site. This is to be facilitated through deconstruction where feasible and separation of waste streams on Site.
Demolish / Deconstruct and Recycle	Geography Building / Gym Building	As set out above, it is sought that opportunities for reuse will be explored in the first instance. However, it is expected that there will be some materials for which direct reuse is not possible, for example existing bricks. Where this is the case, the Waste Hierarchy will be applied to ensure these materials are recycled where possible.
Circular Economy Design Approaches for New Buildings, Infrastructure and Layers Over the Lifetime of the Development		Applicant Response
All Proposed Buildings		
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 maximized
Circular Economy Design Approach	Phase/Building/Area/Layer	Strategic Response
Building relocation	N/A	The buildings are not foreseen to have a short life on the current Site, it is not therefore proposed to adopt a building relocation approach.
Component or material reuse	N/A	The Proposed Development is primarily designed for longevity however the use of materials which can support high rates of recycling will be explored.
Adaptability	Site	It is expected that the new build elements could support adaptability within the educational-use type and will be explored further through detailed design. The buildings are designed for a 100-year life.
Flexibility	Space	The space will be designed for flexibility in allowing these to be reconfigured to the school's changing needs over the lifetime of the Proposed Development.
Replaceability	N/A	For elements which may have a shorter lifetime than the design life of the Proposed Development and for those which are more likely to be reconfigured or replaced in use then disassembly has been considered to allow either reuse or effective separation of materials for recycling.
Disassembly	Space	The Proposed Development is primarily designed for longevity however the principles of disassembly have been considered and materials will be specified with consideration of the end-of-life scenarios.
Longevity	Substructure, Superstructure, Shell / Skin	Given that there are no significant changes anticipated within the lifetime of the Proposed Development, it is therefore sought that the scheme is built for longevity. This will be achieved through the use of robust and durable materials and creation of a scheme which is resilient to future scenarios.

4. Circular Economy Design Principles by Building Layer

4.1 Circular Economy Design Principles by Building Layer Table

Table 2 summarises the key commitments in response to the Circular Economy principles and as set out in detail in Section 4.3.

Table 2. Circular Economy Design Principles by Building Layer

	Site	Substructure	Super-structure	Shell/Skin	Services	Space	Stuff	Construction Stuff	Summary	Challenges	Actions & Counter-Actions, Who + When	Plan to Prove and Quantify
The preferred strategy is:	-	Design for ADAPTABILITY	Design for ADAPTABILITY	Design for ADAPTABILITY	Design for ADAPTABILITY	Design for FLEXIBILITY	-	-	-	-	-	-
	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.								-	-	-	-
Designing Out Waste – Module A - Product Sourcing and Construction Stage	Opportunities to reclaim existing materials to use in landscaping will be explored	- The existing basement to the front of the site is being retained - The amount of concrete used for the new basement will be rationalised - GGBS proposed to concrete elements	- Primary concrete columns and floor slabs are being retained - GGBS proposed to concrete elements - Precast columns proposed - Remanufactured raised access flooring will be considered	- Exposed brick and concrete finishing materials - Potential for the façade to use recycled stone		- Repeated cores, unit types and details - Materials that need frequent replacement will be kept to a minimum		- Materials with high recycled content will be considered - Lean design principles considered, including offsite manufacturing of gridded panel brick systems, brick slips glulam timber, decking, glazing	Explore the use of materials with high recycled content and embodied carbon savings	Complex trade-offs between material efficiencies, waste reduction and end-of-life scenarios More arduous requirements for materials and building services due to basement design	Investigate further through detailed design	Resolve through detailed design
Designing Out Waste – Module B – In-Use Stage		Use of concrete limits maintenance requirements in use	Use of concrete limits maintenance requirements in use	Use of traditional masonry limits maintenance requirements in use			Operational Waste Management Strategy developed to reduce waste to landfill		Designing for durability and longevity to limit need for maintenance in use	No challenges	Develop maintenance strategy	Implementation at construction stage
Designing Out Waste – Module C - End-of-Life Stage	As per Section 4.3.4 Designing for Disassembly and Section 4.3.5 Using systems, elements or materials that can be re-used and recycled below.								As per Section 4.9 Designing for Disassembly and Section 4.10 Using systems, elements or materials that can be re-used and recycled below.			
Designing Out Waste – Module D - Benefits and Loads Beyond the System Boundary	As per Section 4.3.5 Using systems, elements or materials that can be re-used and recycled.								As per Section 4.10 Using systems, elements or materials that can be re-used and recycled.			
Designing for longevity	The site will be in educational use in the long term.	Concrete proposed for durability and resilience	Concrete proposed for durability and resilience	- Brick proposed for durability and resilience - Opportunities to explore the use of hybrid windows		Designed to allow for refurbishment every 40 years		100-year design life	Use of robust and durable materials for key elements	The development envelope has been pushed to the limits of the Site allowing little scope for extensions to the buildings	To be explored with the contractor	Implementation at construction stage

	Site	Substructure	Super-structure	Shell/Skin	Services	Space	Stuff	Construction Stuff	Summary	Challenges	Actions & Counter-Actions, Who + When	Plan to Prove and Quantify
Designing for adaptability and flexibility		New build area including the basement areas will have generous heights	Increased floor-to-ceiling height in the new part of the building compared to the part being retained		Ventilation systems designed to work with different room partitions	Significant flexibility to alter the internal aspects of the buildings			Build for longevity, including adaptable and flexible educational spaces which can evolve with changes in education	No challenges	N/A	Architectural design
Designing for disassembly			Any pre-cast concrete floor and walls will be able to be removed	- Prefabricated system to be explored - Use of lime mortar to be explored - Areas of concrete with brickwork panels will be able to be removed and other facades will be removable					Explore the implications of using methods which facilitate disassembly upon longevity	Cost implications and subject to feasibility	To be explored with the contractor	To be resolved through detailed design
Using systems, elements or materials that can be re-used and recycled		A Product Procurement Policy could be prepared for the Proposed Development		- Explore specification of materials with EPDs to support end-of-life scenarios - Gaskets on glazing are likely to be the weakest element, refurb approach will be considered	Explore specification of materials with EPDs to support end-of-life scenarios	Explore specification of materials with EPDs to support end-of-life scenarios			Explore potential to use materials which support favourable end-of-life scenarios and with lower life-cycle impact	Cost implications and subject to feasibility and programme	Investigate further through detailed design	Product Procurement Policy

4.2 Reporting Forms

4.2.1 Bill of Materials

Table 3 shows the Bill of Materials based on the current stage of the design.

Table 3. Bill of Materials

Building Element Category		PRODUCT AND CONSTRUCTION STAGE (MODULE A)							USE STAGE (MODULE B)					END OF LIFE STAGE (MODULE C)				BENEFITS BEYOND THE SYSTEM BOUNDARY (MODULE D)					
		Material Type	Material quantity (kg)	Material intensity (kg/m2 GIA)	Performance Indicator (LPG Appendix 1)	Construction Waste Factor	Construction Waste (kg)	Recycled Content by mass (kg)	Recycled Content by value (%)	Expected Lifespan (years)	Number of Replacements (over assumed 60-year period)	Repair and Replacement quantities of materials (/kg)	Construction Waste Factor	Construction Waste (kg)	Design for Disassembly	Assumed End of Life Scenario (Description)	% Reusing	% Recycling	% Landfill	Estimated reusable materials (kg)	Estimated reusable materials intensity (kg/m2 GIA)	Estimated recyclable materials (kg)	Estimated recyclable materials intensity (kg/m2 GIA)
0.1	Demolition: Toxic/Hazardous/Contaminated Material Treatment	0	0	0	-	0%	0	0	0	0	0	0	0	0	0	0	0%	0%	100%	0	0	0	0
0.2	Major Demolition Works	0	0	0	-	0%	0	0	0	0	0	0	0	0	0	0	0%	0%	100%	0	0	0	0
0.3	Temporary Support to Adjacent Structures	0	0	0	-	0%	0	0	0	0	0	0	0	0	0	0	0%	0%	100%	0	0	0	0
0.4	Specialist Ground Works	0	0	0	-	0%	0	0	0	0	0	0	0	0	0	0	0%	0%	100%	0	0	0	0
1	Substructure	-	5,373,190	889	4 th	-	214,151	-	-	-	-	0	-	26	-	-	0%	100%	0%	0	0	5,352,718	886
1	Substructure	Carbon steel reinforcing bar	252,014	42	-	5%	12,223			60	1	0	5%	3	No	Steel recycling	0%	100%	0%	0	0	252,014	42
		Concrete admixture - water resisting admixtures	5,330	1	-	4%	213			60	1	0	4%	2	No		0%	0%	100%	0	0	0	0
		Ready mix concrete	4,391,238	727	-	4%	175,650			60	1	0	4%	2	No	Concrete crushed to aggregate (for sub-base layers), Portland Cement 300 kg / m3	0%	100%	0%	0	0	4,391,238	727
		Flooring screed	255,465	42	-	4%	10,219			60	1	0	4%	2	No	Cement/mortar use in a backfill	0%	100%	0%	0	0	255,465	42
		EPS insulation panels	10,826	2	-	4%	433			60	1	0	4%	2	No	Plastic-based material incineration	0%	0%	100%	0	0	0	0
		Synthetic membrane for waterproofing	255	0	-	10%	25			60	1	0	10%	6	No	Plastic-based material incineration	0%	0%	100%	0	0	0	0
		Structural steel profiles	454,000	75	-	3%	14,982			60	1	0	3%	2	No	Steel recycling	0%	100%	0%	0	0	454,000	75
		Polyurethane waterproofing membrane	4,063	1	-	10%	406			60	1	0	10%	6	No	Landfilling (for inert materials)	0%	0%	100%	0	0	0	0

2.1	Superstructure: Frame	-	545,318	90	2 nd	-	25,139	-	-	-	-	0	-	19	-	-	0%	95%	5%	0	0	517,905	86
2.1	Superstructure: Frame	Glue laminated timber (Glulam)	27,385	5	-	17%	4,573			60	1	0	17%	10	Yes	Wood incineration	0%	0%	100%	0	0	0	0
		Epoxy intumescent fireproofing coating	28	0	-	3%	1			60	1	0	3%	2	No	Landfilling (for inert materials)	0%	0%	100%	0	0	0	0
		Structural steel profiles, generic	56,865	9	-	3%	1,877			60	1	0	3%	2	No	Steel recycling	0%	100%	0%	0	0	56,865	9
		Ready-mix concrete	432,000	72	-	4%	17,280			60	1	0	4%	2	No	Concrete crushed to aggregate (for sub-base layers), Portland Cement 300 kg / m3	0%	100%	0%	0	0	432,000	72
		Carbon steel reinforcing bar	29,040	5	-	5%	1,408			60	1	0	5%	3	No	Steel recycling	0%	100%	0%	0	0	29,040	5
2.2	Superstructure: Upper Floors	-	3,900,957	646	3 rd	-	137,073	-	-	-	-	0	-	22	-	-	0%	99%	1%	0	0	3,878,282	642
2.2	Superstructure: Upper Floors	Carbon steel reinforcing bar	2,504	0	-	5%	121			60	1	0	5%	3	No	Steel recycling	0%	100%	0%	0	0	2,504	0
		Glued laminated timber (Glulam)	20,764	3	-	17%	3,468			60	1	0	17%	10	No	Wood incineration	0%	0%	100%	0	0	0	0
		Ready-mix concrete	2,944,800	487	-	4%	117,792			60	1	0	4%	2	No	Concrete crushed to aggregate (for sub-base layers), Portland Cement 300 kg / m3	0%	100%	0%	0	0	2,944,800	487
		Galvanized profiled steel decking	2,928	0	-	5%	142			60	1	0	5%	3	No	Steel recycling	0%	100%	0%	0	0	2,928	0
		Plywood	1,912	0	-	4%	76			30	2	0	4%	1	No	Wood incineration	0%	0%	100%	0	0	0	0
		Flooring screed	386,842	64	-	4%	15,474			60	1	0	4%	2	No	Cement/mortar use in a backfill	0%	100%	0%	0	0	386,842	64
		Bubbledeck	541,208	90	-	0%	0			60	1	0	0%	0	No	Rebar separated (2 %), concrete to aggregate	0%	100%	0%	0	0	541,208	90
2.3	Superstructure: Roof	-	411,033	68	3 rd	-	19,101	-	-	-	-	3	-	72	-	-	0%	81%	19%	0	0	332,466	55
2.3	Superstructure: Roof	Sawn timber	710	0	-	18%	127			60	1	0	18%	11	No	Wood incineration	0%	0%	100%	0	0	0	0
		Glue laminated timber (Glulam)	1,214	0	-	17%	203			60	1	0	17%	10	Yes	Wood incineration	0%	0%	100%	0	0	0	0
		EPS Insulation	355	0	-	4%	14			60	1	0	4%	2	No	Plastic-based material incineration	0%	0%	100%	0	0	0	0
		Mineral wool	38,829	6	-	8%	3,106			60	1	0	8%	5	No	Landfilling (for inert materials)	0%	0%	100%	0	0	0	0
		Glass wool insulation	2,901	0	-	8%	232			60	1	0	8%	5	No	Landfilling (for inert materials)	0%	0%	100%	0	0	0	0
		Plastic vapour control layer	1,006	0	-	10%	101			30	2	0	10%	3	No	Plastic-based material incineration	0%	0%	100%	0	0	0	0
		Solid Timber Panels (Cross-Laminated Timber, CLT)	23,285	4	-	17%	3,889			60	1	0	17%	10	Yes	Wood incineration	0%	0%	100%	0	0	0	0
		Precast concrete paving products	67,563	11	-	0%	0			60	1	0	0%	0	No	Rebar separated (2 %), concrete to aggregate	0%	100%	0%	0	0	67,563	11
		Plywood, generic	1,023	0	-	17%	171			30	2	0	17%	5	No	Wood incineration	0%	0%	100%	0	0	0	0
		Waterproofing membrane	218	0	-	10%	22			30	2	0	10%	3	No	Plastic-based material incineration	0%	0%	100%	0	0	0	0

	Ready-mix concrete	258,755	43	-	4%	10,350			60	1	0	4%	2	No	Concrete crushed to aggregate (for sub-base layers), Portland Cement 200 kg / m3	0%	100%	0%	0	0	258,755	43	
	Polypropylene vapour membrane	98	0	-	10%	10			30	2	0	10%	3	No	Plastic-based material incineration	0%	0%	100%	0	0	0	0	
	Bituminous waterproofing system	2,948	0	-	10%	295			30	2	0	10%	3	No	Landfilling (for inert materials)	0%	0%	100%	0	0	0	0	
	Polyethylene sealing film	73	0	-	10%	7			30	2	0	10%	3	No	Plastic-based material incineration	0%	0%	100%	0	0	0	0	
	Drainage floor underlay from EPS	266	0	-	4%	11			60	1	0	4%	2	No	Plastic-based material incineration	0%	0%	100%	0	0	0	0	
	Geotextile from polypropylene	163	0	-	10%	16			10	6	1	10%	1	No	Plastic-based material incineration	0%	0%	100%	0	0	0	0	
	Single-layer bitumen-polymer waterproofing membrane	5,478	1	-	10%	548			30	2	0	10%	3	No	Landfilling (for inert materials)	0%	0%	100%	0	0	0	0	
	Aluminium framed rooflight	6,149	1	-	0%	0			30	2	0	0%	0	Yes	Glass-containing product recycling (80 % glass)	0%	100%	0%	0	0	6,149	1	
2.4	Superstructure: Stairs and Ramps	-	147,534	24	-	-	687	-	-	-	-	0	-	8	-	-	0%	97%	3%	0	0	143,710	24
2.4	Superstructure: Stairs and Ramps	Reinforcement steel (rebar)	60	0	-	5%	3			60	1	0	5%	3	No	Steel recycling	0%	100%	0%	0	0	60	0
		Precast concrete staircase	143,650	24	-	0%	0			60	1	0	0%	0	No	Rebar separated (2 %), concrete to aggregate	0%	100%	0%	0	0	143,650	24
		Wooden handrails	3,824	1	-	18%	685			30	2	0	18%	5	Yes	Wood incineration	0%	0%	100%	0	0	0	0
2.5	Superstructure: External Walls	-	543,018	90	2 nd	-	35,845	-	-	-	-	1	-	46	-	-	0%	96%	4%	0	0	519,356	86
2.6	Superstructure: Windows and External Doors	Glued laminated timber (Glulam)	19,013	3	-	17%	3,175			60	1	0	17%	10	Yes	Wood incineration	0%	0%	100%	0	0	0	0
		Natural stone cladding	3,781	1	-	5%	170			60	1	0	5%	3	No	Brick/stone crushed to aggregate (for sub-base layers)	0%	100%	0%	0	0	3,781	1
		Sunshade from terracotta	3,268	1	-	5%	163			60	1	0	5%	3	No	Brick/stone crushed to aggregate (for sub-base layers)	0%	100%	0%	0	0	3,268	1
		Glass façade curtain wall system	22,350	4	-	0%	0			35	1	0	0%	0	Yes	Glass recycling	0%	100%	0%	0	0	22,350	4
		Red brick	279,767	46	-	5%	13,988			60	1	0	5%	3	No	Brick/stone crushed to aggregate (for sub-base layers)	0%	100%	0%	0	0	279,767	46
		Mineral wool	4,650	1	-	8%	372			60	1	0	8%	5	Yes	Landfilling (for inert materials)	0%	0%	100%	0	0	0	0
		Autoclaved aerated concrete blocks	110,280	18	-	8%	8,271			60	1	0	8%	5	No	Concrete crushed to aggregate (for sub-base layers), Portland Cement 300 kg / m3	0%	100%	0%	0	0	110,280	18
		Masonry mortar	24,100	4	-	13%	3,133			60	1	0	13%	8	No	Cement/mortar use in a backfill	0%	100%	0%	0	0	24,100	4
		Mortar	39,330	7	-	13%	5,113			60	1	0	13%	8	No	Cement/mortar use in a backfill	0%	100%	0%	0	0	39,330	7
		Ready-mix concrete	36,480	6	-	4%	1,459			60	1	0	4%	2	No	Concrete crushed to aggregate (for sub-base layers), Portland Cement 300 kg / m3	0%	100%	0%	0	0	36,480	6
2.6	Superstructure: Windows and External Doors	-	28,001	5	2 nd	-	69	-	-	-	-	0	-	5	-	-	0%	64%	36%	0	0	17,960	3
2.6	Superstructure: Internal Walls and Partitions	Extruded aluminium profiles for window and door frames	546	0	-	8%	41			60	1	0	8%	5	Yes	Aluminium recycling	0%	100%	0%	0	0	546	0

	Float glass	2,800	0	-	1%	28			35	1	0	1%	0	Yes	Glass recycling	0%	100%	0%	0	0	2,800	0	
	Aluminium framed glazed doors	4,200	1	-	0%	0			30	2	0	0%	0	Yes	Glass-containing product recycling (80 % glass)	0%	100%	0%	0	0	4,200	1	
	Wooden door with metal frame	10,041	2	-	0%	0			30	2	0	0%	0	Yes	Wood-containing product incineration (80% wood)	0%	0%	100%	0	0	0	0	
	Riser door system	1,387	0	-	0%	0			30	2	0	0%	0	Yes	Metal-containing product recycling (90 % metal)	0%	100%	0%	0	0	1,387	0	
	Aluminium framed windows	9,027	1	-	0%	0			30	2	0	0%	0	Yes	Glass-containing product recycling (80 % glass)	0%	100%	0%	0	0	9,027	1	
2.7	Superstructure: Internal Walls and Partitions	-	209,092	35	2 nd	-	7,847	-	-	-	-	1	-	18	-	-	0%	93%	7%	0	0	194,153	32
2.7	Ready-mix concrete	26,400	4	-	0%	0			60	1	0	0%	0	No	Concrete crushed to aggregate (for sub-base layers), Portland Cement 300 kg / m3	0%	100%	0%	0	0	26,400	4	
	Aluminium profiles glass railings	4,370	1	-	5%	218			30	2	0	5%	2	Yes	Landfilling (for inert materials)	0%	0%	100%	0	0	0	0	
	Mobile partition from particle board	1,882	0	-	4%	75			30	2	0	4%	1	Yes	Landfilling (for inert materials)	0%	0%	100%	0	0	0	0	
	Aluminium framed glazed partition systems	19,358	3	-	5%	939			30	2	0	5%	1	Yes	Glass-containing product recycling (80 % glass)	0%	100%	0%	0	0	19,358	3	
	Concrete block wall	50,706	8	-	13%	6,338			60	1	0	13%	8	No	Concrete crushed to aggregate (for sub-base layers), Portland Cement 200 kg / m3	0%	100%	0%	0	0	50,706	8	
	Water-borne interior paints	1,153	0	-	13%	144			15	4	1	13%	2	No	Landfilling (for inert materials)	0%	0%	100%	0	0	0	0	
	Carbon steel reinforcing bar	1,650	0	-	8%	132			60	1	0	8%	5	No	Steel recycling	0%	100%	0%	0	0	1,650	0	
	Gypsum plaster board	96,039	16	-	0%	0			30	2	0	0%	0	Yes	Gypsum recycling	0%	100%	0%	0	0	96,039	16	
	Glass wool insulation panels	7,534	1	-	0%	0			60	1	0	0%	0	Yes	Landfilling (for inert materials)	0%	0%	100%	0	0	0	0	
2.8	Superstructure: Internal Doors	-	10,930	2	2 nd	-	0	-	-	-	-	0	-	0	-	-	0%	0%	100%	0	0	0	0
2.8	Wooden door with wooden frame	870	0	-	0%	0			30	2	0	0%	0	Yes	Wood-containing product incineration (80% wood)	0%	0%	100%	0	0	0	0	
	Wooden door with metal frame	10,060	2	-	0%	0			30	2	0	0%	0	Yes	Wood-containing product incineration (80% wood)	0%	0%	100%	0	0	0	0	
3	Finishes	-	235,298	39	-	-	18,069	-	-	-	-	4	-	15	-	-	0%	48%	52%	0	0	112,632	19
3	Emulsion matt paint for all-round interior use	2,813	0	-	10%	281			10	6	1	10%	1	No	Landfilling (for inert materials)	0%	0%	100%	0	0	0	0	
	Ceramic tiles and plates	8,467	1	-	10%	847			10	6	1	10%	1	No	Brick/stone crushed to aggregate (for sub-base layers)	0%	100%	0%	0	0	8,468	1	
	Gypsum plaster board	38,418	6	-	13%	4,802			30	2	0	13%	4	Yes	Gypsum recycling	0%	100%	0%	0	0	38,418	6	
	Waterborne one-component floor paints	181	0	-	10%	18				0	0	10%	0	No		0%	0%	100%	0	0	0	0	
	Rubber floor covering with foam coating	1,662	0	-	10%	166			10	6	1	10%	1	Yes	Plastic-based material incineration	0%	0%	100%	0	0	0	0	
	Carpet tiles	9,845	2	-	10%	985			10	6	1	10%	1	Yes	Plastic-based material incineration	0%	0%	100%	0	0	0	0	
	Laminated skirting board	3,347	1	-	5%	167			10	6	0	5%	1	Yes	Plastic-based material incineration	0%	0%	100%	0	0	0	0	

	Rubber floor covering	200	0	-	10%	20			10	6	1	10%	1	Yes	Plastic-based material incineration	0%	0%	100%	0	0	0	0	
	Ready-mix concrete	55,990	9	-	4%	2,240				0	0	4%	0	No		0%	100%	0%	0	0	55,990	9	
	Raised access flooring panels	104,619	17	-	7%	7,323			30	2	0	7%	2	Yes	Landfilling (for inert materials)	0%	0%	100%	0	0	0	0	
	Gypsum plasterboard for suspended ceiling systems	9,756	2	-	13%	1,220			30	2	0	13%	4	Yes	Gypsum recycling	0%	100%	0%	0	0	9,756	2	
4	Fittings, furnishings & equipment (FFE)	-	1,711	0	-	-	0	-	-	-	-	0	-	0	-	-	0%	0%	100%	0	0	0	0
4	Fittings, furnishings & equipment (FFE)	Contribution for unknown elements	1,711	0	-	0	0			10	6	0	0	0	Yes	Landfilling (for inert materials)	0%	0%	100%	0	0	0	0
5	Services (MEP)	-	62,892	10	-	-	883	-	-	-	-	1	-	8	-	-	0%	63%	37%	0	0	39,819	7
5	Services (MEP)	Sewer pipe PE-HD	17,177	3	-	0%	0			20	3	0	0%	0	No	Landfilling (for inert materials)	0%	0%	100%	0	0	0	0
		Electric elevator elements	8,628	1	-	0%	0			20	3	0	0%	0	Yes	Metal-containing product recycling (90 % metal)	0%	100%	0%	0	0	8,628	1
		Pre-insulated round ductwork system for HVAC	6,807	1	-	6%	408			25	2	0	6%	2	Yes	Metal-containing product recycling (90 % metal)	0%	100%	0%	0	0	6,807	1
		Ventilation ducting	5,324	1	-	1%	53			60	1	0	1%	1	Yes	Metal-containing product recycling (90 % metal)	0%	100%	0%	0	0	5,324	1
		Air handling unit, with heat recovery through plate heat exchanger	4,860	1	-	1%	49			25	2	0	1%	0	Yes	Metal-containing product recycling (90 % metal)	0%	100%	0%	0	0	4,860	1
		Photovoltaic monocrystalline panel	2,900	0	-	0%	0			20	3	0	0%	0	Yes	Metal-containing product recycling (90 % metal)	0%	100%	0%	0	0	2,900	0
		Water circulation radiator	2,666	0	-	10%	267			30	2	0	10%	3	Yes	Metal-containing product recycling (90 % metal)	0%	100%	0%	0	0	2,666	0
		Electricity distribution system	2,031	0	-	1%	20			30	2	0	1%	0	Yes	Metal-containing product recycling (90 % metal)	0%	100%	0%	0	0	2,032	0
		LED office lighting	2,019	0	-	0%	0			15	4	0	0%	0	Yes	Landfilling (for inert materials)	0%	0%	100%	0	0	0	0
		Ventilation system	1,974	0	-	1%	20			20	3	0	1%	0	Yes	Metal-containing product recycling (90 % metal)	0%	100%	0%	0	0	1,974	0
		Porcelain WC kit	1,533	0	-	0%	0			20	3	0	0%	0	Yes	Landfilling (for inert materials)	0%	0%	100%	0	0	0	0
		Air exchanger+heat recovery	1,522	0	-	1%	15			20	3	0	1%	0	Yes	Metal-containing product recycling (90 % metal)	0%	100%	0%	0	0	1,522	0
		Porcelain sink	1,154	0	-	0%	0				0	0	0%	0	Yes		0%	0%	100%	0	0	0	0
		Drainage system, PVC	883	0	-	0%	0			25	2	0	0%	0	No	Landfilling (for inert materials)	0%	0%	100%	0	0	0	0
		Single and three phase distribution boards	750	0	-	1%	7			30	2	0	1%	0	Yes	Metal-containing product recycling (90 % metal)	0%	100%	0%	0	0	750	0
		Heat distribution piping network	716	0	-	0%	0			30	2	0	0%	0	No	Metal-containing product recycling (90 % metal)	0%	100%	0%	0	0	716	0
		Fan coil unit	600	0	-	1%	6			20	3	0	1%	0	Yes	Metal-containing product recycling (90 % metal)	0%	100%	0%	0	0	600	0
		Sewage water drainage piping network	531	0	-	6%	32			25	2	0	6%	2	No	Metal-containing product recycling (90 % metal)	0%	100%	0%	0	0	531	0
		Air handling unit, with heat recovery through indirect liquid circulation heat recovery	510	0	-	1%	5			20	3	0	1%	0	Yes	Metal-containing product recycling (90 % metal)	0%	100%	0%	0	0	510	0
		Indoor luminescent lighting	306	0	-	0%	0			15	4	0	0%	0	Yes	Landfilling (for inert materials)	0%	0%	100%	0	0	0	0

6	Prefabricated Buildings and Building Units	-	0	0	-	-	0	-	-	-	-	0	-	0	-	-	0%	0%	0%	0	0	0	0
7	Work to Existing Building	-	0	0	-	-	0	-	-	-	-	0	-	0	-	-	0%	0%	0%	0	0	0	0
8	External works	-	473,600	78	-	-	0	-	-	-	-	0	-	0	-	-	0%	20%	80%	0	0	96,000	16
8	External works	Concrete paving	96,000		-	0%	0			60	1	0	0%	0	Yes	Rebar separated (2 %), concrete to aggregate	0%	100%	0%	0	0	96,000	16
		Aggregate (crushed gravel)	377,600	63	-	0%	0			60	1	0	0%	0	Yes	Landfilling (for inert materials)	0%	0%	100%	0	0	0	0
Overall			11,942,575	1,977			458,864		20%			11		480			0%	94%	6%	0	0	22,410,004	3,710

4.2.2 Recycling and Waste

Table 4 shows the recycling and waste reporting estimates based on the current stage of the design.

Table 4. Recycling and Waste Reporting

TOTAL ESTIMATES OF WASTE					WASTE MANAGEMENT ROUTES						SUMMARY				
Type of Waste	Source of Information	Overall Waste (tonnes)	Overall Waste (tonnes/m² GIA)	Performance Indicator (LPG Appendix 1)	REUSE		RECYCLE		OTHER DISPOSAL		Total Reuse (%)	Total Recycle (%)	Total Reuse and Recycle (%)	Total Waste Reported (%)	
					Reuse Onsite (%)	Reuse Offsite (%)	Recycle Onsite (%)	Recycle Offsite (%)	To Landfill (%)	To Other Management (%)					
PRODUCT AND CONSTRUCTION STAGE (MODULE A)															
1	Demolition Waste	Pre-Redevelopment and Pre-Demolition Audit (KaNect, 2022) [Appendix B]	1413.46	0.234	2nd Quartile	12%	34%	0%	53%	1%	0%	46%	53%	99%	100%
2	Excavation Waste	Cut / Fill Estimate (Stantec, 2022) [Appendix D]	28,638	4.741	4th Quartile	0%	95%	0%	0%	5%	0%	95%	0%	95%	100%
3	Construction Waste	BRE Waste Benchmark Data for Construction Waste (Issued 26 June 2012)	2,229.70	0.369	4th Quartile	0%	0%	0%	95%	5%	0%	0%	95%	95%	100%
USE STAGE (MODULE B)															
4	Demolition / Strip-Out Waste	Whole Life-Cycle Carbon Assessment (AECOM, 2022) and Bill of Materials	-	-	-	-	-	-	-	-	-	-	-	-	-
5	Construction Waste	Whole Life-Cycle Carbon Assessment (AECOM, 2022) and Bill of Materials	-	-	-	-	-	-	-	-	-	-	-	-	-
		Overall Waste (tonnes/ annum)	Overall Waste (tonnes/ annum/ m²)	Performance Indicator (LPG Appendix 1)	Reuse Onsite (%)	Reuse Offsite (%)	Recycle Onsite (%)	Recycle Offsite (%)	To Landfill (%)	To Other Management (%)	Total Reuse (%)	Total Recycle (%)	Total Reuse and Recycle (%)	Total Waste Reported (%)	
6	Municipal Waste	Operational Waste Management Strategy (KaNect 2022) [Appendix C]	97	0.016	2nd Quartile	0%	0%	0%	75%	25%	0%	0%	75%	75%	100%
7	Industrial Waste (if applicable)	Not applicable	N/A	-	-	-	-	-	-	-	0	0	0	0	0
MODULE A – MODULE C															
		Overall Materials (tonnes)	Overall Materials (Module A-C) (tonnes/m²)	-	Reuse Onsite (%)	Reuse Offsite (%)	Recycle Onsite (%)	Recycle Offsite (%)	To Landfill (%)	To Other Management (%)	Total Reuse (%)	Total Recycle (%)	Total Reuse and Recycle (%)	Total Waste Reported (%)	
8	Total Materials	Whole Life-Cycle Carbon Assessment (AECOM, 2022) and Bill of Materials	11,889	1.91	-	-	-	-	6%	94%	0	6%	6%	100%	

* Excavation waste arising in tonnes has been calculated based on an assumed soil density of 1,850 kg/m³ and the volumes provided in the Cut / Fill Estimate (Stantec, 2022) [Appendix D].

4.3 Circular Economy Narrative

The following sections detail the circular economy opportunities identified for the Proposed Development as set out in Table 2 and as explored through the application of the following six circular economy principles:

- Building in layers;
- Designing out waste;
- Designing for longevity;
- Designing for adaptability or flexibility;
- Designing for disassembly; and
- Using systems, elements or materials that can be reused and recycled.

4.3.1 Designing Out Waste

4.3.1.1 Module A – Product Sourcing and Construction Stage

The Proposed Development will adopt lean design principles in order to minimise the quantities of materials associated with the development. At the level of the substructure, this will be minimised through the rational approach and type of concrete used for the new basement aspect.

The retention of Dyne House's existing primary concrete columns and floor slabs, as well as the lower-level theatre retaining walls will allow for significant material savings. On the new build elements, there is a repetition of structure/core to provide a rational grid, and no transfer deck.

While the rear buildings are being fully removed, these consist of Edwardian buildings with some later extensions in the 1930's and 1950's; therefore, the buildings are between 70 and 100 years old. They are no longer appropriate for the current use and are inaccessible. Where possible, materials will be recycled - such as larger concrete slabs, windowpanes and radiators. There are opportunities to explore reclaiming materials currently on the site to use in the landscaping of the scheme.

A Pre-Demolition Report (KaNect, 2022) [0] has been prepared with respect to the existing Site as provided in 0 of this Circular Economy Statement. The Report sets out recommendations for the management of waste arising from the demolition works proposed on the Site.

The use of pre-cast structural columns is proposed, assisting in reducing the quantities of construction waste generated on the Site. The standardisation within the design will also facilitate the use of precast or prefabricated risers, which will be considered through detailed design.

Standardisation within the design of the new build sections, including floor-to-ceiling heights has been targeted which also assists in reducing offcuts and other construction waste. Reduction of construction waste has been considered through design measures in the first instance before considering other measures.

In line with the lean design principles exposed brick, concrete and glulam timber will be used as finishing materials. Similarly, materials that require frequent replacement will be kept to a minimum, while materials with a high recycled content will be explored.

The use of Ground Granulated Blast-furnace Slag (GGBS) has been considered as a cement replacement and way to introduce recycled content into the specification. This typically has an embodied carbon saving of around 50%, if not higher. The baseline scenario for the purposes of investigating the embodied carbon of the Proposed Development as set out in the Whole Life-Cycle Carbon Assessment (WLCA) (AECOM, 2022) assumes a GGBS content of 50%. Where the use of pre-cast concrete structural columns is proposed, a higher GGBS content may be achieved compared to the slabs, where off-site manufacture will limit impact to the programme. The WLCA identifies key actions for further reducing the embodied carbon of the Proposed Development, including investigating the feasibility of increasing the GGBS content to 70% with the benefit of also increasing the recycled content.

Based on RICS industry standards as explored within the WLCA the proposed specification includes use of steel with high recycled content (97% for reinforcement bars, 20% for structural sections, 15% for studwork / support frames) and aluminium with 35% recycled content. It is expected that the Rockwool stone wool insulation in the external walls may contain up to 40% recycled content. These opportunities for the use of materials with high

recycled content are to be explored further through the detailed design stage to be reflected within the specification and subsequent post-construction reporting.

The façade system is currently proposed as traditional masonry; however, the use of prefabrication, such as a unitised or panelised system with brick slips, will be explored through detailed design. The use of traditional masonry is the current preferred strategy, as this has the benefit of providing a robust and durable finish limiting maintenance and supporting longevity. Any alternative solutions will be required to provide an equally high-quality finish and competitive properties.

4.3.1.2 Module B – In-Use Stage

The Proposed Development will be designed for longevity. In defining this approach, the development is designed to limit maintenance required during the in-use stage through the use of robust and durable materials. This is a practical consideration both in terms of limiting the need for works to be undertaken, particularly beneficial at given the nature of the site being an operational school and reducing lifetime material requirements.

The Proposed Development will seek to deliver adequate operational waste storage provision in line with the prepared Operational Waste Management Plan (KaNect, 2022), to allow for the separation of waste streams and facilitate maximisation of recycling opportunities.

4.3.1.3 Module C – End-of-Life Stage

As per Section 4.3.4 Designing for Disassembly and 4.3.5 Using Systems, Elements or Materials that can be Reused and Recycled.

4.3.1.4 Module D – Benefits and Loads Beyond the System Boundary

As per Section 4.3.5 Using Systems, Elements or Materials that can be Reused and Recycled.

4.3.2 Designing for Longevity

The development will primarily be designed for longevity, through use of durable materials and configuration of quality educational spaces which can be easily reconfigured to allow for changes in learning priorities and methods. This is essential as it is envisaged that the site will remain in educational use in perpetuity; the Applicant is designing for 100-year life. To allow the space to be appropriately used for the lifetime, the design will allow for refurbishment every 40-years.

The Applicant has carried out a lesson learned approach to the design of the building, as such, there are other buildings on the wider school site from the Victorian era which have had the capacity to adapt and change to meet current requirements. Therefore, the same principles have been implemented into the new building designs; namely ensuring there is good lighting, lots of space and robust structure.

4.3.3 Designing for Adaptability or Flexibility

The development envelope has been pushed to the limits of the site, and therefore, there is unlikely to be scope to extend the buildings in the near future. However, there is significant flexibility to alter the internal aspects of the buildings. For example, rooms are designed with ventilation systems that would work when they are individual rooms or when they are combined as larger/reconfigured rooms.

In the existing building, the slab heights are particularly generous, however the new build sections will have achieved a floor-to-ceiling height to allow for future flexibility and adaptability. The design is also making use of the site's slope, meaning that the height of the building is not a constraint.

4.3.4 Designing for Disassembly

A prefabricated system is being considered for the façade and superstructure, with the potential to allow panels to be demounted from the structure if required. Currently, the preferred option is for the use of traditional masonry. The feasibility of using lime mortar within the façade is to be explored through detailed design and through contractor engagement. This would assist in allowing for disassembly at end-of-life, as it allows for bricks to be easily separated which can then be cleaned for reuse. In investigating the feasibility of the use of lime mortar, strategic compromises will also be considered, for example lime mortar has a shorter design life than cement mortar and will reduce the durability of finish, longevity of construction and increase the maintenance required throughout the life of the buildings.

4.3.5 Using Systems, Elements or Materials that can be Reused and Recycled

The use of alternative materials, such as waste-based products and bio-alternatives, has been identified as key opportunities for exploration during specification in detailed design. These types of materials are highly circular in being derived from either waste or from natural renewable sources.

The use of certified products or those with EPDs has been identified as a key opportunity to specify with certainty materials with high recycled content and allowing clear communication of the materials and products present within the buildings aiding higher reuse and recycling rates at end-of-life. The specification of such products and materials will be explored further through detailed design and through review of the procurement strategy.

5. Circular Economy Targets

The Circular Economy Strategy for the Proposed Development has been set out in line with circular economy principles, and in accordance with London Plan Policy SI 7 targets as set out below.

Circular Economy targets for existing and new development - Policy Requirement	Target Aiming For (%)	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	The recommendations set out within the Pre-Redevelopment and Pre-Demolition Audit should be reviewed with the design team and demolition contractor to implement targets for reuse, recycling, and recovery where feasible. All waste arising should be managed in line with best practice and construction management plans ensuring adequate separation, monitoring, and reporting of waste to support demonstration of performance against this target at post-construction.
Excavation Waste Materials - Minimum of 95% diverted from landfill for beneficial reuse.	95%	Yes	All waste arising should be managed in line with best practice and construction management plans ensuring adequate separation, monitoring, and reporting of waste to support demonstration of performance against this target at post-construction.
Construction Waste Materials - Minimum of 95% diverted from landfill for reuse, recycling, or recovery.	95%	Yes	All waste arising should be managed in line with best practice and construction management plans ensuring adequate separation, monitoring, and reporting of waste to support demonstration of performance against this target at post-construction.
Municipal Waste - Minimum 65% recycling rate by 2030.	65%	Yes	The prepared Operational Waste Management Strategy should be implemented including delivery of refuse storage containers. The Operational Waste Management Strategy should be communicated to the operators and tenants of the Proposed Development including passing on responsibility of monitoring and reporting as necessary.
Recycled Content - Minimum 20% of the building material elements to be comprised of recycled or reused content.	20%	Yes	This target should be reviewed throughout the detailed design stage to identify key materials and opportunities to specify high reused or recycled content. This should include review of the recommendations within the Pre-Demolition Audit to incorporate existing materials from the existing Site within the new development where suitable and feasible. Any changes to specification through construction should be made with reference to this target. The final specification of all elements should be recorded through construction, including evidence of data sheets and EPDs as necessary, to demonstrate performance against this target at post-construction.
Additional requirements - Policy Requirement	Please acknowledge acceptance for a planning condition	Please set out an indicative timescale and responsible party for the provision 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	The Applicant will be responsible for providing a Post-Construction Report to GLA three-months following practical completion of the Proposed Development.	

5.1 Specific plans for short- and medium-term targets

- Ensure that the Demolition Contractor and Lead Contractor are aware of all Circular Economy Statement targets and commitments, including a contractual requirement to meet the targets of at least 95% diversion of demolition, excavation, and construction waste from landfill for reuse, recycling, or recovery.
- Establish the final destination landfills and ensure that they have sufficient capacity.
- Ensure that a minimum of 20% of the total value of the selected products and materials will include recycled and/or reused content.
- Set up a tracker for all the targets and commitments made in the planning stage Circular Economy Statement and review the progress on a regular basis.

5.2 Programme / method for longer-term targets

- The Demolition Contractor and Lead Contractor to provide evidence that all commitments are addressed in the as-built development.
- The Demolition Contractor and Lead Contractor to report against all waste management targets.
- The Demolition Contractor and Lead Contractor to provide written confirmation that the final destination landfills had sufficient capacity.
- Provide evidence that a minimum of 20% of the total value of the selected products and materials will include recycled and/or reused content.
- The Lead Contractor to provide evidence that materials have been procured in line with requirements set out in the tender document.
- Ensure that the operators are aware of the overall waste management strategy and the targets for at least 65% diversion of municipal waste from landfill for reuse, recycling, or recovery by 2030.
- Provide a Post-Construction report to the GLA which includes lessons learned that can be fed into future projects.

5.3 End-of-life strategy

In line with Circular Economy principles, the main priority is to extend the lifetime of the buildings through careful design and specification through the measures listed above. The lifetime of different building elements and components will vary, so the end-of-life strategy will consider the process for maintenance, upgrade, and replacement of the demountable or modular elements of construction. The key opportunity areas which are expected to be considered through the design stages in order to support the developing end-of-life strategy include the communication of the end-of-life strategies of elements as envisioned by the original design team.

The Maintenance Manuals for the Proposed Development will include key information including manufacturer's warranties which will provide valuable information to the teams managing the development to reduce and manage waste demolition/strip-out waste in-use. The inclusion of any relevant EPDs will be further explored through detailed design to provide information about the components and materials within these elements and the recommended end-of-life scenario.

6. Conclusion

Circular economy commitments for the Proposed Development have been development through a collaborative, cross-disciplinary approach. The interventions proposed aim to embed sustainable practice, waste reduction and circular economy principles within the scheme and address new London Plan policy requirements.

This Circular Economy Statement covers a wide range of interventions in developing a design approach that prioritises circular economy principles and will help to reduce the material impact and waste generated by the built environment through the lifecycle of the Proposed Development.

The main principles have been implemented are summarised as follows:



Material Reuse: A Pre-Redevelopment and Pre-Demolition Audit has been undertaken for the Proposed Development which considers the existing materials and components and how these may be reused in the new development. The retention, refurbishment, and extension of the existing structure within the new development is proposed.



Off-Site Construction Methods: Construction waste arising from the Proposed Development will be reduced through adoption of offsite manufacturing methods where possible. The scheme will explore the use of pre-cast structural columns and prefabricated risers.



Waste Minimisation and Management: The scheme will seek to reduce construction, demolition, and excavation waste to landfill in line with the waste hierarchy and London Plan Policy SI 7 targets. The Proposed Development will provide adequate storage provision and separation of municipal waste streams to allow maximisation of recycling opportunities.

The document sets out the proposed Circular Economy Strategy which has been developed to meet the relevant planning requirements, of London Plan Policy SI 7 Reducing waste and supporting the circular economy,' and has been produced in line with published GLA London Plan Guidance: Circular Economy Statements (March 2022).

2022).

Appendix A – GLA Circular Economy Template

Please refer to the GLA Circular Economy template submitted with the report.

Appendix B Pre-Redevelopment and Pre-Demolition Audit

A Pre-Redevelopment and Pre-Demolition Audit (KaNect, 2022) has been produced to explore whether existing buildings, structures and materials can be retained, refurbished, or incorporated into the new development and how any demolition materials arising will be managed.



Pre-Demolition and Pre-Redevelopment Audit Report

Richard Music Centre

Client: Highgate School

Prepared: October 2022

Document Control

Version	Date	Comments	Author	Checked By
1	30 June 2022	Draft Report v1 for Issue	Nafey Afan Resources and Waste Management Consultant	Kat Lees Resources and Waste Management Consultant
2	10 October 2022	Final Issue	Nafey Afan Resources and Waste Management Consultant	Kat Lees Resources and Waste Management Consultant

Prepared for

Highgate School

Prepared By

KaNect Limited
49 Gordon Road
Whitstable
Kent CT5 4NG
United Kingdom

www.kanectconsultancy.com

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Table of Contents

1. Introduction.....	1
2. Site Information	2
Site Location	2
Existing Site	2
Existing Site Analysis.....	4
3. Proposed Works	5
4. Aims and Objectives	7
5. Key Principles.....	7
The Waste Hierarchy	7
The Circular Economy	8
6. Methodology	9
7. Key Waste/Materials Identified.....	10
Concrete	11
Bricks.....	12
Metals	13
Timber and Timber Products.....	14
Tiles and Ceramics	15
Plasterboard (Other Gypsum containing material).....	16
Glass	17
Textiles	18
Plastics (including Vinyl Sheets)	19
Bituminous material	20
Stone	21
Lighting	22
8. Identified Materials Type and Estimated Quantities	23
9. Waste Management Opportunities.....	27
10. General Guidance for Management of Demolition Materials and Waste	35
11. Recommendations and Next Steps.....	36
12. Further Information	37
13. References	38

Tables

Table 1 Circularity Rating	10
Table 2 Location and Quantities of Concrete	11
Table 3 Location and Quantities of Bricks	12
Table 4 Location and Quantities of Metals	13
Table 5 Location and Quantities of Timber and Timber Products	14
Table 6 Location and Quantities of Tiles and Ceramics	15
Table 7 Location and Quantities of Plasterboard.....	16
Table 8 Location and Quantities of Glass.....	17
Table 9 Location and Quantities of Textiles	18
Table 10 Location and Quantities of Plastics (including Vinyl Sheets).....	19
Table 11 Location and Quantities of Bituminous material.....	20
Table 12 Location and Quantities of Stone	21
Table 13 Location and Quantities of Lighting	22
Table 14 Estimated Quantities of Materials.....	24
Table 15 Opportunities Key	27
Table 16 Waste Reduction Opportunities.....	28
Table 17 Waste Companies in London, which collect multiple Construction, Demolition and Excavation (CD&E) Waste Streams	35

Figures

Figure 1 RMC Building - 1.....	2
Figure 2 RMC Building – 2	3
Figure 3 Existing Site Plan	5
Figure 4 Extent of Demolition	6
Figure 5 Waste Hierarchy	7
Figure 6 Applying Circular Economy Principles to Building Design	8
Figure 7 Approximate Quantities of Materials (%) by Volume	25
Figure 8 Approximate Quantities of Materials by Weight (tonnage)	26

1. Introduction

KaNect Limited ('KaNect') has been commissioned by Highgate School ('Client') to prepare this Pre-Demolition and Pre-Redevelopment Audit Report ('Report') in support of the redevelopment of the Richard Music Centre site ('Site') located in London Borough of Haringey (LBH).

As per the BREEAM New Construction 2018 (UK), a total of 5 credits can be obtained for the Wst 01 Construction Waste Management criteria. These credits are split into four parts (for Simple Buildings) including:

- **One Credit** – Pre-Demolition Audit:
 - Complete a pre-demolition audit of any existing buildings, structures or hard surfaces being considered for demolition. This audit will:
 - » Be carried out at Concept Design stage by a competent person prior to strip-out or demolition works
 - » Guide the design, consider materials for reuse and set targets for waste management
 - » Engage all contractors in the process of maximising high-grade reuse and recycling opportunities
 - Refer to the audit in the resource management plan (RMP)
 - Compare actual waste arisings and waste management routes used with those forecasts and investigate significant deviations from planned targets
- **One Credit** – Construction resource efficiency: preparing a compliant Resource Management Plan (RMP) with the aim of minimising and monitoring waste.
- **Two Credits** – Simple buildings – RMP measurements and Reporting
- **One Credit** – Simple buildings – Diversion from landfill

As per the London Plan Guidance: Circular Economy Statement (Ref. 1), to meet Policy SI7 (B) of the London Plan (Ref. 2) one of the requirements is to submit a Pre-Redevelopment audit. The Pre-Redevelopment audit is a tool for understanding whether existing buildings, structures and materials can be retained. The Pre-Redevelopment audit should outline an explanation of the existing buildings on the site and brief description of state of their repair. The details should include: the building's age, key materials, photos of typical internal spaces and facades, and site plans.

The extent or details required to complete the Pre-Redevelopment audit is not mentioned by the Greater London Authority (GLA), however, based on KaNect's experience of working on these Audit reports, we have included the information in Section 2, that would be useful in understanding the approach adopted for the redevelopment of the Proposed Development.

2. Site Information

Site Location

The Richards Music Centre (RMC) Site is situated at the southern edge of the Highgate Conservation Area, in the Bishops Area. The RMC is adjacent to Highgate School's 'Junior Field' to the north, which is Metropolitan Open Land. The Bishops Area lies between the west of the historic town centre and the boundary of the London Borough of Haringey to the London Borough of Camden, with Hampstead Lane to the South and Aylmer Road to the North.

Existing Site

The RMC is a single storey, red brick building with mansard roof, and UPVC windows. RMC was built between the World Wars for the School as a sports pavilion before largely being converted for use as a music centre for the Junior School. These music facilities have since been co-located within the new Junior School. The eastern extension, once a base for the School's Estates Department, was converted in 2010 to an IT Data Centre. The building is now predominantly occupied by the SPEX Department and IT team.

Figure 1 and Figure 2 provides the images of the façade.

Figure 1 RMC Building - 1



Figure 2 RMC Building – 2



Existing Site Analysis

To establish whether retrofitting would be a suitable option, in comparison to the demolition of the existing buildings (on-Site), several parameters were analysed. These parameters have been outlined in this section, however, for more details please refer to the Dyne House Options Study.

Footprint of the Existing Site

The existing Site is located on the boundary of the designated area of the Metropolitan Open Land (MOL). The existing building footprint is not large enough to accommodate the use of the Proposed Development that is a full-size drama studio.

Spatial Capacity – Proposed Building Uses

The Proposed Development will be used for a full-size drama studio, that will require a two-storey building and a basement, which the existing building on Site (in its original form) is unable to provide.

Circulation

The long and relatively thin shape of the existing building on Site will result in a higher percentage of circulation and inefficiencies in the layouts of the development/

Existing Site Condition

As an intrusive structural survey has not been carried out, however, based on professional judgement it is noted that the existing buildings are deteriorating, and retaining the existing structure might not be a viable option.

Based on the above analysis, it was concluded that the demolition of the existing buildings would be a more suitable option.

3. Proposed Works

As part of the redevelopment of the RMC Site, the existing RMC building will be demolished. Figure 3 shows the existing Site plan.

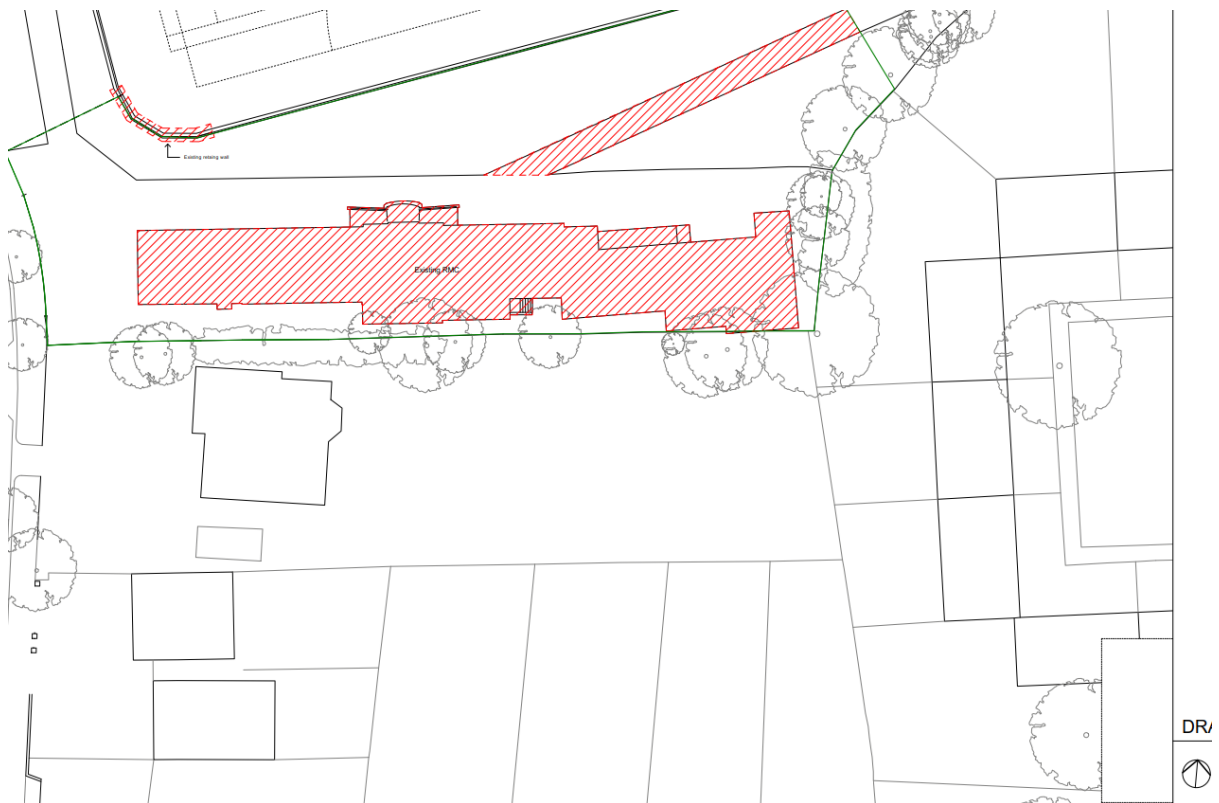
Figure 3 Existing Site Plan



Please note that this Figure is not drawn to scale.

Figure 4 provides the extent of demolition.

Figure 4 Extent of Demolition



Please note that this Figure is not drawn to scale

4. Aims and Objectives

The main aim of the Report is to understand whether the existing buildings, structures and materials can be retained, refurbished, or incorporated into the new development. This report will also help to identify and quantify the materials that might be generated on-Site (if the buildings undergo demolition) and to provide the Client with this information to assist the Client in maximising the recovery of material for subsequent high grade or value applications.

The objectives of this Report are to:

- Provide brief information on the existing buildings, structures on site and their condition,
- Identify the types and quantities of key materials present in the existing buildings, structures, and hard services,
- Identify potential applications and any related issues for the reuse and recycling of the key waste/materials in accordance with the waste hierarchy,
- Identify opportunities for reuse and recycling on-Site and off-Site,
- Identify local re-processors or recyclers for recycling of materials,
- Identify overall recycling targets where appropriate,
- Identify reuse targets where appropriate, and
- Identify overall landfill diversion rate for all key materials.

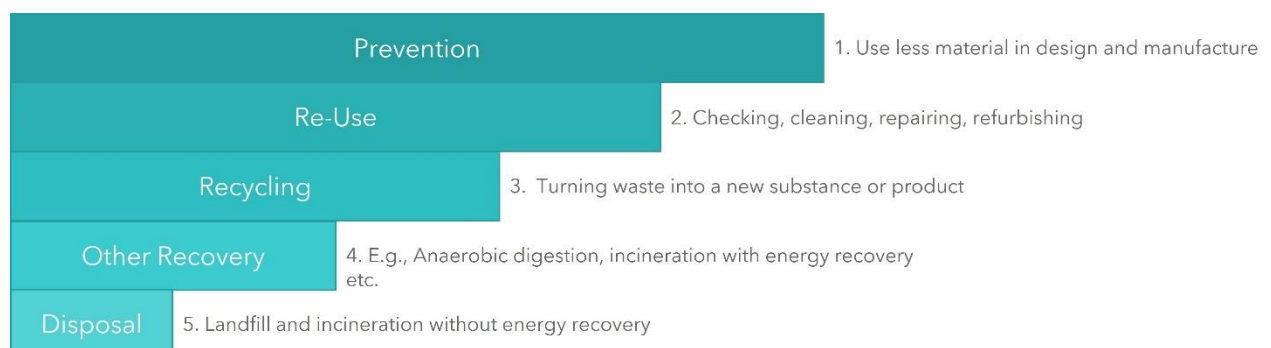
5. Key Principles

The Waste Hierarchy

Clause 12 of The Waste (England and Wales) Regulations 2011 requires that anyone involved in the import, generation, collection, transferring, recovery, or disposal of waste must take all such measures available to apply the waste hierarchy.

This Report considers the waste hierarchy and encourages materials identified on-Site to be reused before they are sent for recycling, recovery, or disposal. The main principles of the waste hierarchy are summarised in Figure 5.

Figure 5 Waste Hierarchy¹



¹ Department of Environment, Food & Rural Affairs (Defra), Waste Hierarchy Guidance (updated by KaNect Limited)

The Circular Economy

A Circular Economy (CE) is a systematic approach to economic development designed to benefit businesses, society, and the environment. In contrast to the 'take make waste' linear model, a Circular Economy is regenerative by design and aims to gradually decouple growth from the consumption of finite resources. The Circular Economy activity focuses on design that is regenerative and restorative. This is based on three principles:

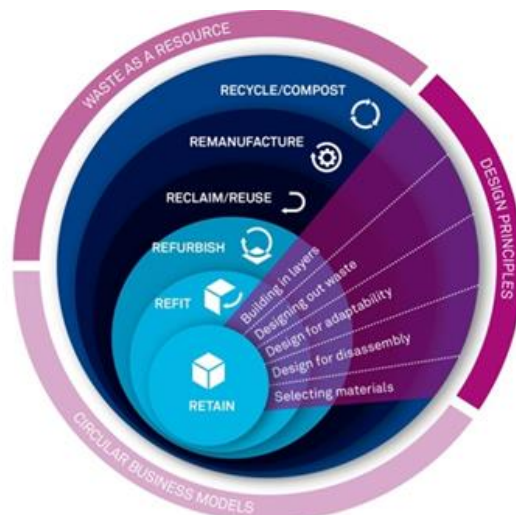
- Design out waste and pollution,
- Keep products and materials in use, and
- Regenerate natural systems.

This Report can help encourage a Circular Economy by:

- Influencing the wider design team to consider reclamation and reuse of waste/materials found on-Site to be incorporated in the proposed RMC development, avoiding disposal of valuable materials, and
- Identifying reuse and re-processors companies for materials found on-Site, extending the products useful life before being remanufactured.

Figure 6 demonstrates the key stages and principles used when applying the Circular Economy to the built environment.

Figure 6 Applying Circular Economy Principles to Building Design²



² Building Revolutions, David Cheshire, RIBA Publications 2016

6. Methodology

A Site visit was carried out by competent persons: ‘... who has appropriate knowledge of buildings, waste and options for reuse and recycling of different waste streams’

A Site visit was undertaken by Chartered Building Surveyor Tom Lawrence and Chartered Waste and Resource Manager Kat Lees on 20 May 2022.

The Site visit consisted of a non-intrusive visual audit of building fabric to the external and internal parts of the buildings to be demolished.

Subsequently, a workshop was held on 14 June 2022 with the Design Team to discuss the existing conditions of the buildings and the potential to reuse materials on-Site.

Exclusions and Assumptions

The following assumptions, exclusions and caveats apply to this Report:

- This Report is based purely on the findings of a non-intrusive visual survey.
- Where clear line of sight/access was not available to attain measurements e.g., thicknesses, best judgement and assumptions have been made.
- All facing bricks elevations are assumed to be brick/cavity installations.
- Where areas of build frame were not visible, the size and lengths of the columns were assumed.
- An allowance of 300 mm concrete slabs has been considered for all floors.
- 5% of the volume of concrete reinforcement is assumed to be steel.
- Information on the pile foundations were assumed, whereas no allowance was made for the removal of foundations or any excavation.
- It is assumed that the demolition would be to the ground floor level.
- Small power, data, and large specialist plants or any other mechanical, electrical, and plumbing (MEP) equipment are not considered within this Report.
- It is assumed that all furniture, equipment, and miscellaneous non-fixed items installed by the tenants will be removed by the tenants, therefore, these are not considered within this Report.
- It is assumed that there will be no insulation in the stud walls.
- Apart from the paving via the central atrium, no other hardstanding has been considered as part of this Report.

The information provided within this Report is based on visual inspection (non-intrusive) of the existing Site. Where elements of the Site were inaccessible, assumptions are made based on professional judgement. It is understood that the quantities provided within this Report might vary, therefore, the principal contractor will be responsible for monitoring and reporting these changes (if any).

7. Key Waste/Materials Identified

The following section describes the key waste/materials identified, their location, and images taken during the Site visit. Based on the condition of the waste/materials and their market demand, a circularity rating (i.e., how likely is the material reused on/off-Site) for the waste/materials has been provided (based on professional judgement) to determine whether they can be reused, recycled, or sent for recovery or disposed to landfill as a last resort.

The circularity rating is based on the following key shown in Table 1. The ratings and related descriptions are recommendations for the waste management route of the materials identified; the exact routes for the materials will be determined by the appointed demolition contractor (when appointed).

Table 1 Circularity Rating

Indicator	Description
	Good condition and reuse of this material is possible.
	Wear and tear – this material is likely to be recycled. Alternatively, this indicator may be used if the material is in a good condition but there is no market for reuse and therefore must be recycled.
	Poor condition/not reusable or non-recyclable material, this may be due to several reasons such as there being no end market for the material to be recycled (e.g., composite materials) or due to the small quantity of the material present, which therefore makes it unviable to recycle separately. This material is likely to be sent to landfill or energy recovery.

Concrete

Please see Table 2 for the location and the quantities of the Concrete found on-Site. Image 1 - Image 2 shows the concrete elements found on-Site.

Table 2 Location and Quantities of Concrete

Building	Approximate Quantity (m ³)	Approximate Quantity (tonnes)
RMC	131.57	368.40
Total	131.57	368.40

Recommendation

★ For all the concrete elements, it is recommended that the concrete is sent to a local re-processor and crushed off-Site and used as a recycled aggregate. The recycled aggregate can be further used as a construction material for the proposed redevelopment of the Site.



Image 1 Concrete Pathway



Image 2 Concrete Slab

Bricks

Please see Table 3 for the location and the quantities of Bricks (including external walls) found on-Site. Image 3 - Image 5 shows the bricks found on-Site.

Table 3 Location and Quantities of Bricks

Building	Approximate Quantity (m ³)	Approximate Quantity (tonnes)
RMC	142.08	383.62
Total	142.08	383.62

Recommendation

★ ★ Overall, the bricks are in good condition for reuse. However, these bricks need to be matched with the requirements of the Proposed Development (including colour) prior to reuse. Considering, these do not meet the requirements of the Proposed Development, then these bricks need to be sent off-Site for recycling or reuse (depending the needs of the development).



Image 3 External Brick Wall



Image 4 External Brick Wall



Image 5 External Brick Pavement

Metals

Please see Table 4 for the location and the quantities of Metals (including aluminium frame) found on-Site. Image 6 - Image 8 shows the metals found on-Site.

Table 4 Location and Quantities of Metals

Building	Approximate Quantity (m ³)	Approximate Quantity (tonnes)
RMC	22.22	59.98
Total	22.22	59.98

Recommendation

★ For all metal found on-Site, it is recommended that it is recycled off-Site.



Image 6 Aluminium Metal Window Frame



Image 7 Aluminium Metal Window Frame



Image 8 Metal Window Bar

Timber and Timber Products

Please see Table 5 for the location and the quantities of Timber and timber products (including structural timber and doors) found on-Site. Image 9 - Image 12 shows the timber and timber products found on-Site.

Table 5 Location and Quantities of Timber and Timber Products

Building	Approximate Quantity (m ³)	Approximate Quantity (tonnes)
RMC	25.76	18.03
Total	25.76	18.03

Recommendation

★ Where high quality solid timber cannot be reclaimed, it is recommended that it is sent for recycling.



Image 9 Timber Floorboard

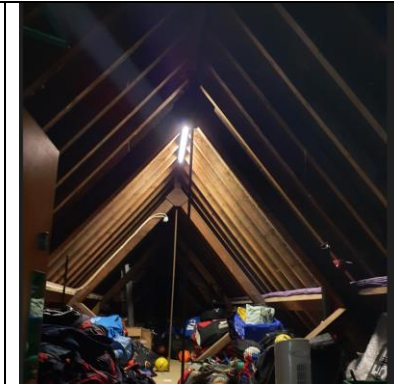


Image 10 Structural Timber

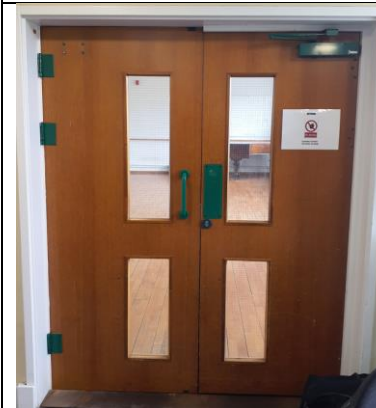


Image 11 Timber Internal Doors

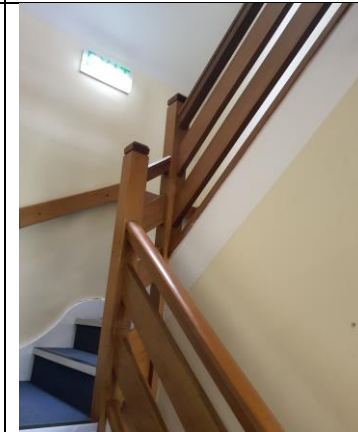


Image 12 Timber Staircase Railing

Tiles and Ceramics

Please see Table 6 for the location and the quantities of Tiles and Ceramics (also including Slated Roof Tiles, Water Closets (WC) and Basins) found on-Site. Image 13 - Image 16 shows the tiles and ceramics found on-Site.

Table 6 Location and Quantities of Tiles and Ceramics

Building	Approximate Quantity (m ³)	Approximate Quantity of WC's (Number)	Approximate Quantity of Basins (Number)	Approximate Quantity (tonnes)
RMC	6.08	8	8	16.76
Total	6.08	8	8	16.76

Recommendation

★ Due to the adhesive binding of the tiles, the time required to carefully remove them without breakage, it is recommended that these materials are segregated, so that they can be crushed and recycled off-Site.



Image 13 Washroom Ceramic Tiles



Image 14 Washroom Tiles and WC's



Image 15 Washroom Bathroom Basins



Image 16 Floor Tiles

Plasterboard (Other Gypsum containing material)

Please see Table 7 for the location and the quantities of Plasterboard (other gypsum containing material) found on-Site. Image 17 - Image 18 shows the plasterboard (other gypsum containing material) found on-Site.

Table 7 Location and Quantities of Plasterboard

Building	Approximate Quantity (m ³)	Approximate Quantity (tonnes)
RMC	11.63	6.98
Total	11.63	6.98

Recommendation

★ Reuse of plaster (gypsum materials) is not yet possible, assuming a best case, this material would be recycled.

★ It is currently not possible to separate and recycle plaster from walls. It is therefore envisioned this material would be disposed off.



Image 17 Plasterboard Internal Walls



Image 18 Plasterboard Washroom Walls

Glass

Please see Table 8 for the location and the quantities of Glass found on-Site. Image 19 - Image 20 shows the glass found on-Site.

Table 8 Location and Quantities of Glass

Building	Approximate Quantity (m ³)	Approximate Quantity (tonnes)
RMC	0.27	0.70
Total	0.27	0.70

Recommendation

★ It is recommended that it be sent off-Site to be crushed and recycled into new products.

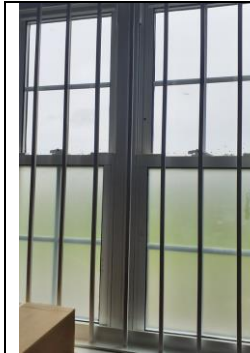


Image 19 Window Glass



Image 20 Window Glass

Textiles

Please see Table 9 for the location and the quantities of Textiles (i.e., carpet tiles) found on-Site. Image 21 - Image 23 shows the carpet tiles found on-Site.

Table 9 Location and Quantities of Textiles

Building	Approximate Quantity (m ³)	Approximate Quantity (tonnes)
RMC	1.75	2.63
Total	1.75	2.63

Recommendation

★ ★ Majority of the carpet found on-Site is of good quality and in good condition, therefore, it can be reused off-Site. However, where the condition of carpet is poor, then recycling is recommended.



Image 21 Carpet Tiles

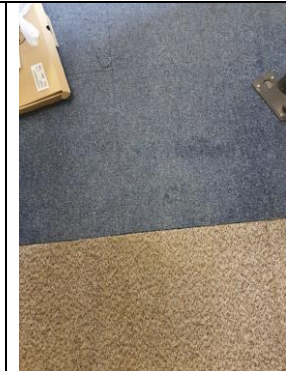


Image 22 Carpet Tiles

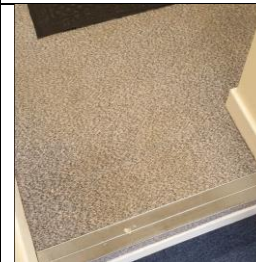


Image 23 Carpet Tiles

Plastics (including Vinyl Sheets)

Plastics (including vinyl sheets) Please see Table 10 for the location and the quantities of Plastics (including vinyl sheets) found on-Site. Image 24 shows the Plastics (including vinyl sheets) found on-Site.

Table 10 Location and Quantities of Plastics (including Vinyl Sheets)

Building	Approximate Quantity (m ³)	Approximate Quantity (tonnes)
RMC	0.20	0.21
Total	0.20	0.21

Recommendation

★ It is recommended that the plastics are recycled off-Site (subject to contaminants and the quality).



Image 24 Laminate Flooring

Bituminous material

Please see Table 11 for the location and the quantities of bituminous material found on-Site. Image 25 - Image 26 shows the bituminous material found on-Site.

Table 11 Location and Quantities of Bituminous material

Building	Approximate Quantity (m ³)	Approximate Quantity (tonnes)
RMC	0.66	0.71
Total	0.66	0.71

Recommendation

★ This material should be sent for disposal off-Site.



Image 25 Bituminous Material



Image 26 Bituminous Material

Stone

Please see Table 12 for the location and the quantities of Stone found on-Site. Image 27 shows the stone found on-Site.

Table 12 Location and Quantities of Stone

Building	Approximate Quantity (m ³)	Approximate Quantity (tonnes)
RMC	1.18	3.32
Total	1.18	3.32

Recommendation

★ ★ Overall, the front elevation stonework is in good condition for reuse. However, if this stonework does not meet the requirements of the Proposed Development, then this stonework need to be sent off-Site for recycling or reuse (depending on the needs of the development).



Lighting

The number of lightbulbs (fluorescent tubes) identified totalled 90. Please see Table 13 for the location and quantities. Image 28 - Image 30 shows the lighting found on-Site.

Table 13 Location and Quantities of Lighting

Building	Approximate Quantity No of Units
RMC	90
Total	90

Recommendation

★ ★ The reuse of lightbulbs and their fixtures is likely impractical; it is therefore likely that LED lighting would be recycled, whereas older incandescent lightbulbs would be sent for energy recovery.



Image 28 Fluorescent Tubes

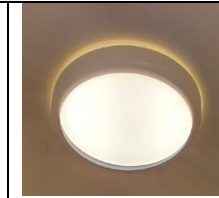


Image 29 Fluorescent Tubes



Image 30 Fluorescent Tubes

8. Identified Materials Type and Estimated Quantities

Estimated quantities of the materials anticipated to be generated during the demolition process are provided in Table 14. The estimated volumes are based on the Site visit and do not consider the actual skip volumes that may result from the Site (i.e., does not account for bulking and the inevitable voids within the skip during disposal). Figure 7 and Figure 8 shows the percentage breakdown of waste identified during the Site visit.

It should be noted that the recovery potential provided within Table 14 is based on the best practices as suggested by Waste and Resource Action Programme (WRAP). Therefore, this should be used as a reference only. Whereas the % of materials to be reused or recycled in Table 16 provides the quantities the design team intend to use onsite.

Table 14 Estimated Quantities of Materials

Material	European Waste Catalogue Code (EWC)	Volume (m³)	% of Total Volume (m³)	Tonnes (t)	% of Total Tonnage (t)	Recovery Potential (%) (Best Practice) i.e. % diverted from landfill	Recovery Potential (i.e., m³ diverted from landfill)	Disposal to Landfill/ Energy from Waste (m³)	Recovery Potential (i.e., Tonnes diverted from landfill)	Disposal to Landfill/ Energy from Waste (Tonnes)
Concrete	17-01-01	131.57	38%	368.40	43%	100%	131.57	-	368.40	-
Bricks	17-01-02	142.08	41%	383.62	45%	100%	142.08	-	383.62	-
Suspended Grid Mineral Ceiling Tile	17-09-04	1.24	0.4%	3.71	0.4%	75%	0.93	0.31	2.78	0.93
Metals	17-04-05	22.22	6%	59.98	7%	100%	22.22	-	59.98	-
Timber and Timber Products	17-02-01	25.76	7%	18.03	2%	95%	24.47	1.29	17.13	0.90
Tiles and Ceramics	17-01-03	6.08	2%	16.76	2%	100%	6.08	-	16.76	-
Plasterboard (other gypsum containing materials)	17-08-02	11.63	3%	6.98	1%	95%	11.04	0.58	6.63	0.35
Glass	17-02-02	0.27	0.1%	0.70	0.1%	100%	0.27	-	0.70	-
Textiles	20-01-11	1.75	1%	2.63	0.3%	100%	1.75	-	2.63	-
Plastics (including vinyl sheets)	17-02-03	0.20	0.1%	0.21	0.02%	100%	0.20	-	0.21	-
Bituminous material	17-03-03*	0.66	0.2%	0.71	0.1%	0%	-	0.66	-	0.71
Stone	17-05-04	1.18	0.3%	3.32	0.4%	100%	1.18	-	3.32	-
Total		344.63	100%	865.04	100%		341.79	2.84	862.15	2.88

The % might not add up to 100% due to rounding

The numbers may not add up due to rounding

Figure 7 Approximate Quantities of Materials (%) by Volume

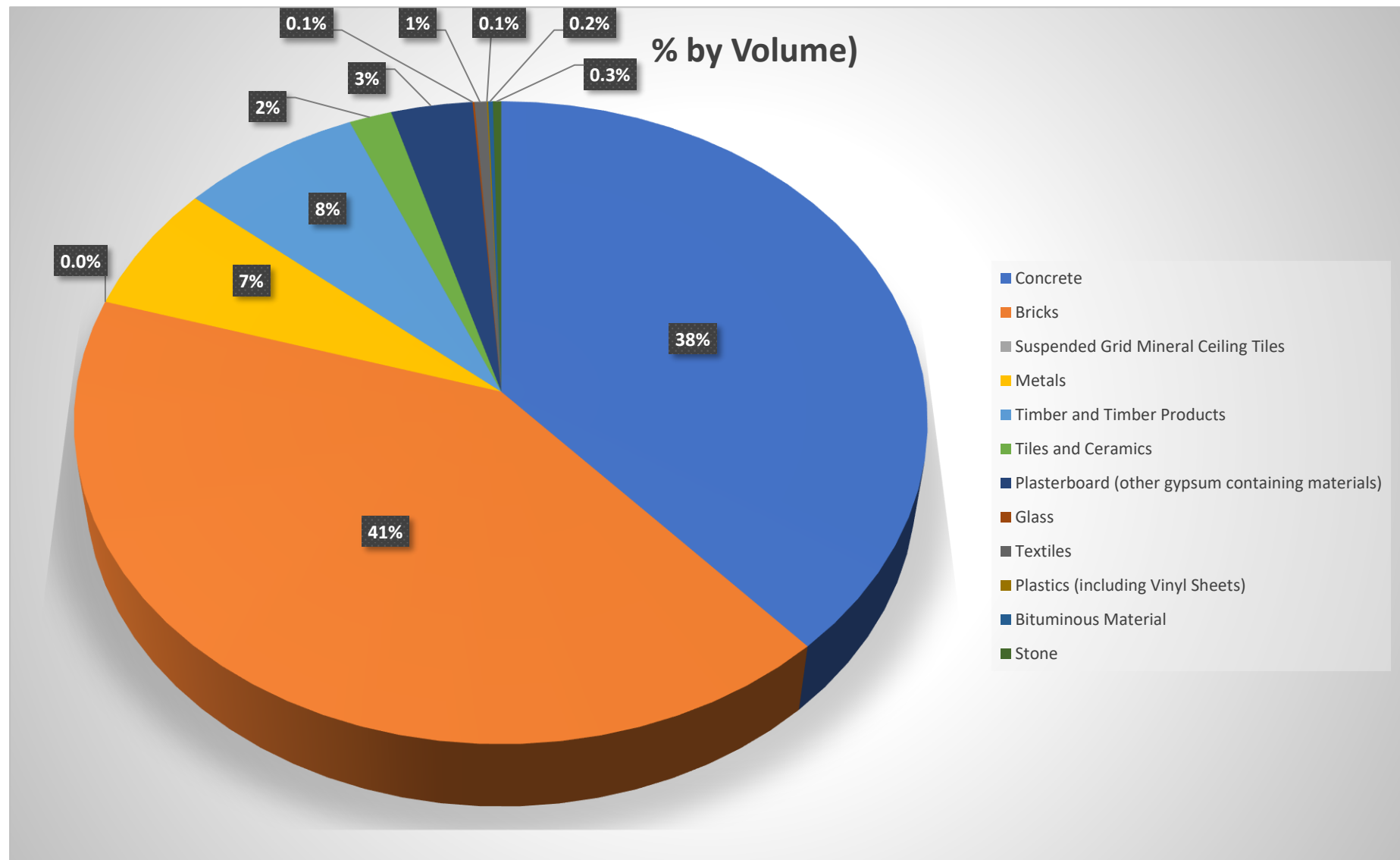
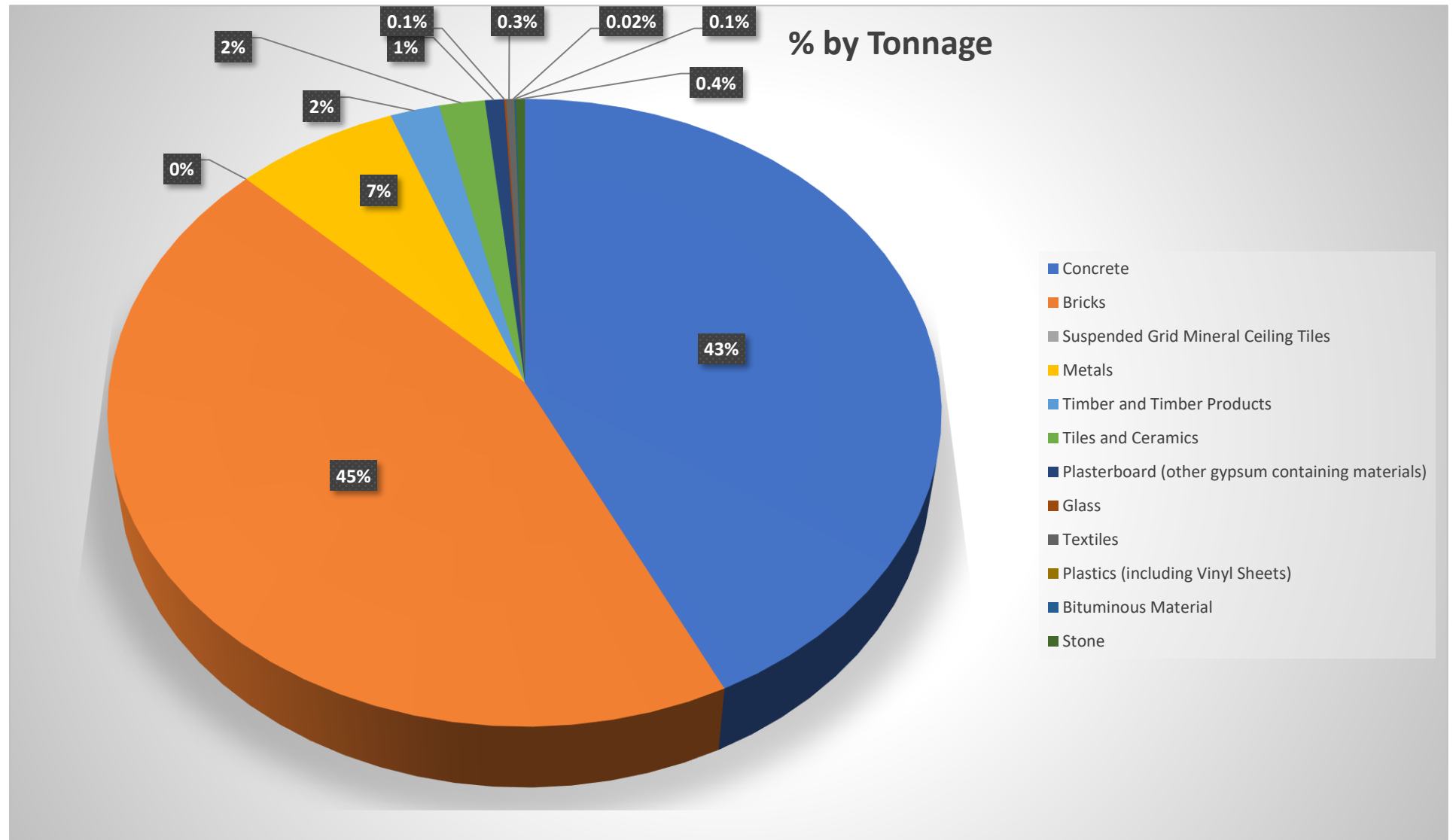


Figure 8 Approximate Quantities of Materials by Weight (tonnage)



It can be noted from Table 14, that approximately 99% of the demolition waste can be recovered.

9. Waste Management Opportunities

A workshop was held with the design team (including but not limited to the structural engineers, landscaping architects and the design team) on 14 June 2022. The purpose of the workshop was to discuss the condition of the existing buildings to understand whether these buildings or any components can be retained. Within this workshop information on the materials identified was also discussed along with the potential of reusing and recycling these materials during the redevelopment of the Proposed Development.

The key provided in Table 15 has been adopted to show the opportunity of each waste/material identified.

Table 15 Opportunities Key

Key	Description
	Reduction in landfill costs
	Reduced environmental impact
	Less carbon/energy intensive
	Preserve natural resources
	Corporate social responsibility

Based on the discussions undertaken during the workshop, the potential opportunities for reusing and recycling the waste/material generated on-Site as well as the benefits of such initiatives have been identified in Table 16.

There are several opportunities to apply the waste hierarchy and Circular Economy to the buildings being demolished and examples of local reprocessing and recycling facilities have been identified, where appropriate, in this Report. However, these facilities suggested in Table 16 are not an exhaustive list. The final choices of the recommendations made within this Report will need to be determined by the demolition contractor, based on the costs and benefits of the options presented. There are clear benefits to implementing waste reduction initiatives, these include:

- Reducing costs associated with disposal,
- Realising financial benefits by diverting waste from landfill, and
- Environmental and social benefits of implementing the waste hierarchy and Circular Economy.

Table 16 Waste Reduction Opportunities

Material Type	Circularity Rating	Suggestion					Opportunity	Constraints	Example Reprocessors
		on-Site reuse	on-Site recycling	off-Site reuse	off-Site recycling	off-Site Disposal			
Concrete	★	At this stage it is assumed that approximately 21 m3 of concrete subbase will be crushed and reused on-Site. This forms about 16% (by volume) of the overall concrete. However, it is proposed that a specialised contractor is taken on board during the demolition and construction phase, who will re-evaluate the quality of the material and incorporate measures that will allow some % of this material to be reused on-Site.	At this stage it is assumed that 0% (by volume) of concrete will be recycled on-Site. However, it is proposed that a specialised contractor is taken on board during the demolition and construction phase, who will re-evaluate the quality of the material and incorporate measures that will allow some % of this material to be recycled for use on-Site. if on-Site crushing is allowed (considering the noise and dust constraints), then the crushed material can be used as bulk fill in areas, where the levels are built up.	Based on the condition and quality (subject to testing) approximate 50% (by volume) of the remaining material would be – Reuse off-Site.	Based on the condition and quality (subject to testing) – approximate 50% (by volume) of the remaining material would be recycled off-Site.	At this stage it is assumed that 100% of this material would either be re-used or recycled and therefore not be subject to disposal to landfill.		Additional space to keep materials segregated.	A list of recycling companies that collect crushed aggregate are provided in Table 17.

Bricks	 	At this stage it is assumed that 0% (by volume) of bricks will be reused on-Site. However, it is proposed that a specialised contractor is taken on board during the demolition and construction phase, who will re-evaluate the quality of the material and incorporate measures that will allow some % of this material to be reused on-Site.	At this stage it is assumed that 0% (by volume) of bricks will be recycled on-Site. However, it is proposed that a specialised contractor is taken on board during the demolition and construction phase, who will re-evaluate the quality of the material and incorporate measures that will allow some % of this material to be recycled for use on-Site. if on-Site crushing is allowed (considering the noise and dust constraints), then the crushed material can be used as bulk fill in areas, where the levels are built up.	Based on the condition and quality (subject to testing) approximate 50% (by volume) would be – Reuse off-Site.	Based on the condition and quality (subject to testing) – approximate 50% (by volume) would be recycled off-Site.	At this stage it is assumed that 100% of this material would either be re-used or recycled and therefore not be subject to disposal to landfill.	   	Additional space to keep materials segregated to then transport off-Site for crushing. Additional time in the demolition programme will have to be allowed and it is likely to incur increased demolition costs, however, there will be a resale value for the bricks, and it would considerable reduce the amount of material that is downcycled for secondary aggregates.	Globe Chain is a reuse marketplace that connects companies with charities, Small and Medium size Enterprises (SME) and individuals to redistribute unneeded construction material while collating social, environmental and economic data GlobeChain https://www.globechain.co.uk Salvage opportunities for bricks: https://www.salvoweb.com
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Suspended Grid Mineral Ceiling Tiles	 	At this stage it is assumed that 0% (by volume) of this material will be reused on-Site. However, it is proposed that a specialised contractor is taken on board during the demolition and construction phase, who will re-evaluate the quality of the material and incorporate measures that will allow some % of this material to be reused on-Site.	At this stage it is assumed that 0% (by volume) of this material will be recycled on-Site. However, it is proposed that a specialised contractor is taken on board during the demolition and construction phase, who will re-evaluate the quality of the material and incorporate measures that will allow some % of this material to be recycled for use on-Site.	Based on the condition and quality (subject to testing) approximate 50% (by volume) would be – Reuse off-Site.	Based on the condition and quality (subject to testing) – approximate 50% (by volume) would be recycled off-Site.	At this stage it is assumed that 100% of this material would either be re-used or recycled and therefore not be subject to disposal to landfill.	   	Additional space required to keep material segregated.	Armstrong Ceiling Solutions have a recycling service for acoustic ceiling tiles https://www.armstrongceilingsolutions.co.uk/en-gb/performance/sustainable-building-design/recycling-programmes
Metals		At this stage it is assumed that 0% (by volume) of metal will be reused on-Site.	At this stage it is assumed that 0% (by volume) of this material will be recycled on-Site. However, it is proposed that a specialised contractor is taken on board during the demolition and construction phase, who will re-evaluate the quality of the material and incorporate measures that will allow some % of this material to be recycled for use on site.	0% (by volume) will be reused off-Site	Based on the condition and quality (subject to testing) - 100% (by volume) would be recycled off-Site	At this stage it is assumed that 100% of this material would be recycled and therefore not be subject to disposal to landfill.	   	Additional space to keep materials segregated.	EMR Scrap Metal http://www.emrgroup.com/

Timber and Timber Products		At this stage it is assumed that 0% (by volume) of timber will be reused on-Site.	At this stage it is assumed that 0% (by volume) of this material will be recycled on-Site. However, it is proposed that a specialised contractor is taken on board during the demolition and construction phase, who will re-evaluate the quality of the material and incorporate measures that will allow some % of this material to be recycled for use on-Site.	Based on the condition and quality (subject to testing) approximate 50% (by volume) would be – Reuse off-Site.	Based on the condition and quality (subject to testing) – approximate 50% would be recycled off-Site.	At this stage it is assumed that 100% of this material would either be re-used or recycled and therefore not be subject to disposal to landfill.		Additional space to keep materials segregated. .	Globechain https://www.globechain.co.uk Community Wood Recycling can reclaim wood and reuse it: https://www.communitywoodrecycling.org.uk/
Tiles and Ceramics		At this stage it is assumed that 0% (by volume) of tiles and ceramics will be reused on-Site.	At this stage it is assumed that 0% (by volume) of this material will be recycled on-Site. However, it is proposed that a specialised contractor is taken on board during the demolition and construction phase, who will re-evaluate the quality of the material and incorporate measures that will allow some % of this material to be recycled for use on-Site.	0% (by volume) will be reused off-Site	Based on the condition and quality (subject to testing) - 100% (by volume) would be recycled off-Site	At this stage it is assumed that 100% of this material would be recycled and therefore not be subject to disposal to landfill.		Additional space to keep materials segregated.	https://www.globechain.co.uk

Plasterboard (other gypsum containing materials)	 	At this stage it is assumed that 0% (by volume) of plasterboard and other gypsum containing materials will be reused on-Site.	At this stage it is assumed that 0% (by volume) of this material will be recycled on-Site. However, it is proposed that a specialised contractor is taken on board during the demolition and construction phase, who will re-evaluate the quality of the material and incorporate measures that will allow some % of this material to be recycled for use on-Site.	0% (by volume) will be reused off-Site	Based on the condition and quality (subject to testing) - 100% (by volume) would be recycled off-Site	Based on the condition and quality (subject to testing) – some material may be disposed off-Site	   	Additional space to keep materials segregated. .	British – Gypsum https://www.britisht石膏.com/about-us/csr/environmental-challenges/plasterboard-recycling Junk Removal London provides collection services for plasterboard: http://junkremovalsolutions.com/plasterboard-collection/
Glass		At this stage it is assumed that 0% (by volume) of glass will be reused on-Site.	At this stage it is assumed that 0% (by volume) of this material will be recycled on-Site. However, it is proposed that a specialised contractor is taken on board during the demolition and construction phase, who will re-evaluate the quality of the material and incorporate measures that will allow some % of this material to be recycled for use on-Site.	0% (by volume) will be reused off-Site	Based on the condition and quality (subject to testing) - 100% (by volume) would be recycled off-Site	At this stage it is assumed that 100% of this material would be recycled and therefore not be subject to disposal to landfill.	   	Additional space to keep materials segregated. .	May Glass Recycling: https://www.mayglassrecycling.co.uk/services Nationwide Waste Services: https://www.nationwidewasteservices.co.uk/recycling/ Guardian Glass https://www.guardianglass.com/gb/en Pilkington Glass Manufacturing https://www.pilkington.com/

Textiles	 	At this stage it is assumed that 0% (by volume) of this material will be reused on-Site. However, it is proposed that a specialised contractor is taken on board during the demolition and construction phase, who will re-evaluate the quality of the material and incorporate measures that will allow some % of this material to be reused on-Site.	At this stage it is assumed that 0% (by volume) of this material will be recycled on-Site. However, it is proposed that a specialised contractor is taken on board during the demolition and construction phase, who will re-evaluate the quality of the material and incorporate measures that will allow some % of this material to be recycled for use on-Site.	0% (by volume) will be reused off-Site	Based on the condition and quality (subject to testing) - 100% (by volume) would be recycled off-Site	At this stage it is assumed that 100% of this material would be recycled and therefore not be subject to disposal to landfill.	   	Additional space to keep materials segregated. .	Carpet Recycling UK: https://carpetrecyclinguk.com/ Envirocycle London: a carpet tile reuse programme https://envirocyclelondon.com/recycle-office-carpet-tiles/ Interface - carpet supplier offering a take back scheme for carpet reuse https://www.interface.com/EU/en-GB/campaign/reentry/reentry-en_GB
Plastics (including Vinyl Sheets)		At this stage it is assumed that 0% (by volume) of plastic (including vinyl sheets) will be reused on-Site.	At this stage it is assumed that 0% (by volume) of this material will be recycled on-Site. However, it is proposed that a specialised contractor is taken on board during the demolition and construction phase, who will re-evaluate the quality of the material and incorporate measures that will allow some % of this material to be recycled for use on-Site.	0% (by volume) will be reused off-Site	Based on the condition and quality (subject to testing) - 100% (by volume) would be recycled off-Site	At this stage it is assumed that 100% of this material would be recycled and therefore not be subject to disposal to landfill.	   	Additional space to keep materials segregated.	Recovinyl offers a takeback scheme for vinyl flooring via Axion Group: https://axiongroup.co.uk/services/specialist-collection-schemes/recovinyl/
Bituminous material		Hazardous material not expected to be re-used on-Site	Hazardous material not expected to be recycled on-Site	Hazardous material not expected to be re-used off-Site	Hazardous material not expected to be recycled off-Site	At this stage it is assumed that 100% of this material would be subject to disposal to landfill.	   	Additional space to keep materials segregated.	A list of recycling companies that collect crushed aggregate are provided in Table 17

Stone	 	At this stage it is assumed that 0% (by volume) of this material will be reused on-Site. However, it is proposed that a specialised contractor is taken on board during the demolition and construction phase, who will re-evaluate the quality of the material and incorporate measures that will allow some % of this material to be reused on-Site.	At this stage it is assumed that 0% (by volume) of this material will be recycled on-Site. However, it is proposed that a specialised contractor is taken on board during the demolition and construction phase, who will re-evaluate the quality of the material and incorporate measures that will allow some % of this material to be recycled for use on-Site.	Based on the condition and quality (subject to testing) approximate 50% (by volume) would be – Reuse off-Site.	Based on the condition and quality (subject to testing) – approximate 50% (by volume) would be recycled off-Site.	At this stage it is assumed that 100% of this material would either be re-used or recycled and therefore not be subject to disposal to landfill.	   	Additional space to keep materials segregated.	A list of recycling companies that collect crushed aggregate are provided in Table 17.
Lighting	 	At this stage it is assumed that 0% (by weight) of lighting will be reused on-Site.	At this stage it is assumed that 0% (by weight) of concrete will be recycled on-Site. However, it is proposed that a specialised contractor is taken on board during the demolition and construction phase, who will re-evaluate the quality of the material and incorporate measures that will allow some % of this material to be recycled for use on-Site.	At this stage it is assumed that 0% (by weight) of metal will be recycled on-Site.	Only low energy light bulbs and fluorescent light tubes are recyclable. Incandescent (old-fashioned) light bulbs cannot be recycled. Therefore, 100% (by weight) would be recycled off-Site	Based on the condition and quality (subject to testing) – some material may be disposed off-Site	  	Additional disposal costs.	Recolight: https://www.recolight.co.uk/ BPR Group http://www.bprgroup.co.uk/ Globechain https://www.globechain.co.uk Salvo https://www.salvoweb.com/

Waste contractors in the area that collect multiple construction streams (segregated) are shown in Table 17. This list is not intended to be comprehensive, and waste generators will need to meet their legal duty of care by making sure that any waste produced is managed responsibly and only given to businesses authorised to take it. The presence of a company on the list below does not remove the requirement for waste generators to carry out their own duty of care checks.

Table 17 Waste Companies in London, which collect multiple Construction, Demolition and Excavation (CD&E) Waste Streams

Waste Company
Capital Waste www.Capwaste.co.uk
London Waste Removal Service www.Londonwasteremovalservic.co.uk/demolition
O'Donovan Waste Disposal https://www.odonovan.co.uk/
Junk Bunk Limited https://junkbunk.co.uk/
Swift Waste Management https://swiftwaste.co.uk/
Powerday https://powerday.co.uk/
Bywaters https://www.bywaters.co.uk/

10. General Guidance for Management of Demolition Materials and Waste

This pre-demolition and pre-redevelopment audit have been conducted to allow material and waste management to be considered in the early stage of the project. The Client, Architect and Demolition Contractor should be involved in the material and waste management process from the offset. This will allow for effective planning to realise the value of materials on-Site and their subsequent management (i.e., consideration of the waste hierarchy).

The reuse of material on-Site or on a nearby similar project is the ideal option from an environmental and economic perspective. The Client and Architect are best positioned to consider these options and enable these initiatives. Doing so also often results in reduced transportation, reducing embodied CO₂ emissions and costs associated with material management on the project. To maximise this opportunity, it is advised that the following are considered:

- Opportunities for reuse on-Site,
- Safe storage of these items on-Site, in a separate storage area if feasible,
- Opportunities for reuse by the Client on other projects,
- Opportunities for reuse on local/similar projects,
- Advertisement of specific items on websites (e.g., www.salvo.co.uk),
- Contacting local architectural salvage merchants about specific items, and
- Selling or gifting items locally.

Waste arisings during demolition works should be continually monitored to provide a thorough understanding of the types and amounts of waste coming from the Site. This data collection will help with the continual improvement of material and waste management on-Site. Data collection can also be used to help set more demanding waste segregation targets for future demolition and refurbishment projects.

11. Recommendations and Next Steps

The type and quantities of material present on-Site have been identified, and opportunities to apply the principles of waste hierarchy and Circular Economy applied to different material types, with local reprocessing and recycling facilities identified. Ahead of construction works taking place, the following recommendations and next steps are suggested:

- Lifecycle analysis of new construction materials for the Proposed Development, in conjunction with the reuse/recycling of materials as identified in this Report.
- Embed the recommendations within this Report in the design process at pre-tender stage so the measures in relation to reuse and recycling targets are included in the awarded construction contract.
- Engagement with construction material suppliers to explore opportunities for takeback schemes.
- Where takeback schemes with suppliers are not possible, it is recommended that early engagement with reprocessing and recycling companies take place, to best capture recyclable materials and avoid downcycling.
- It is recommended that the materials identified within this Report are incorporated into a Site Waste Management Plan (SWMP)/Construction Resource Management Plan (CRMP) for effective management of waste. This is considered good practice on all construction projects and is a key step in facilitating diversion from landfill.
- Identify storage areas on-Site as appropriate for the types and quantities of waste anticipated to be produced during construction works. These areas should allow for the successful segregation of waste, as appropriate to avoid contamination of the different waste and material streams.
- All staff should have appropriate levels of training to enable the segregation of waste is achieved. Waste management information should be included within the Site induction for all personnel. It is recommended that a Reporting procedure SWMP/CRMP is put in place to catalogue the materials/waste produced, which is regularly updated. This will allow for the appropriate organisation of the transport for materials/waste on-Site and prevent stock piling.
- Further to this, it is recommended that a Waste Champion is nominated by the principal contractor to facilitate management of the SWMP/CRMP. This role would also aim to allow that the waste hierarchy is always considered, with the emphasis being on reducing, reusing, and recycling before landfill disposal is considered.

Once the principal contractor is commissioned to undertake the construction works, the following should be considered:

- The principal contractor should engage all contractors in the process of maximising high-grade reuse and recycling opportunities, and
- The principal contractor should refer to the Pre-Demolition and Pre-Redevelopment Audit Report in the SWMP/CRMP.

12. Further Information

In addition to the resources detailed in Table 16, further information pertaining to the sustainable waste management for construction projects can be found through the following sources:

- Bioregional, Reclaimed Buildings Product Guide:
<https://www.bioregional.com/resources/reclaimed-building-products-guide>

13. References

- Ref. 1 Greater London Authority (GLA), (2022); London Plan Guidance – Circular Economy Statements
- Ref. 2 GLA, (2021); The London Plan – The Spatial Development Strategy for Greater London

Appendix C Operational Waste Management Strategy

An Operational Waste Management Strategy (KaNect, 2022) has been produced to demonstrate how the Proposed Development will deliver shared, adequate, flexible, and easily accessible storage space and collection systems and meet the requirements of relevant London Plan policy.



Operational Waste Management Note

Project: Highgate School

Client: Highgate School

Prepared: September 2022

Document Control

Version	Date	Comments	Author	Checked By
01	21/09/2022	Draft Issue for Comments	Nafey Afan Resource and Waste Management Consultant	Kat Lees Resources and Waste Management Consultant
02	08/11/2022	Issue with comments for CE	Nafey Afan Resource and Waste Management Consultant	Kat Lees Resources and Waste Management Consultant

Prepared for

Highgate School

Prepared By

KaNect Limited
49 Gordon Road
Whitstable
Kent CT5 4NG
United Kingdom

www.kanectconsultancy.com

This document has been prepared by KaNect Limited ("KaNect") for sole use of Highgate School (the "Client") in accordance with generally accepted consultancy principles, the budget for fees and the terms of reference agreed between KaNect and the Client. Any information provided by third parties and referred to herein has not been checked or verified by KaNect, unless otherwise expressly stated in the document. No third party may rely upon this document without the prior and express written agreement of KaNect.

Table of Contents

Executive Summary.....	1
1. Introduction.....	3
Strategy Overview.....	3
2. Waste Hierarchy and Circular Economy.....	4
3. Legislation/Planning Policy	6
National Waste Legislation.....	6
Waste and Planning Policy	6
4. The Proposed Development	9
5. Methodology	9
School.....	9
6. Management Strategy.....	10
Waste and Recycling Arisings.....	10
Storage Containers	10
Waste and Recycling Storage Requirements and Management Strategy	11
Unique Waste	14
7. Monitoring.....	15
8. Waste and Recycling Storage and Collection Provision	15
Location	15
Convenience.....	15
Screening or covering	16
Signage	16
Accessibility	16
Access paths and roads.....	17
Vehicle Access	17
Materials and finishing	17
Safety and anti-social behaviour	17
Fire safety.....	17
Ventilation and Lighting.....	18
Maintenance	18
Landscaping Waste	18
Sanitary Waste	18
9. Summary	19
10. References	20

Figures

Figure 1 Waste Hierarchy	4
Figure 2 Circular Economy Model.....	4
Figure 3 Location of Central Bin Stores	12
Figure 4 Proposed Bin Store b/w Mills Lane and Pre-Preparatory School.....	12
Figure 5 Pre-Preparatory, Junior School and Cafeteria - Point of Collections	13
Figure 6 Senior School - Point of Collection.....	14
Figure 7 Example Wheelchair Turning Circle	16

Tables

Table 1 Waste and Recycling Management Policies.....	7
Table 2 Pupil Breakdown Per School.....	9
Table 3 Methodology for School	9
Table 4 Weekly Waste and Recycling Arisings	10
Table 5 Waste Arisings (Weekly for MDR and Twice per Week for Food and Residual)	10
Table 6 Standard Bin Dimensions.....	11
Table 7 Waste and Recycling Storage Requirements based on Weekly Collection for MDR and Twice per Week Collection for Food and Residual Waste	11

Executive Summary

- i. KaNect Limited ('KaNect') has been commissioned by Highgate School ('Client') to prepare an Operational Waste Management Note ('Note') for the proposed Highgate School Development ('Proposed Development') located in the administrative boundary of London Borough of Haringey (LBH).
- ii. The principal aim of this Note is to demonstrate how sustainable methods for waste and recycling management have been considered for the operational phase of the Proposed Development. Furthermore, with regards to waste and recycling management within the Proposed Development, this Strategy has the following aims:
 - To contribute towards achieving current and long-term government, Greater London Authority (GLA), North London Waste Authority (NLWA) and LBH targets for waste minimisation, recycling and re-use;
 - To comply with all applicable legal requirements for handling operational waste;
 - To achieve high standards of waste management performance, through giving due consideration to the waste generated during operation of the Proposed Development; and
 - To provide a convenient, clean, and efficient waste management strategy that enhances the operation of the Proposed Development and promotes recycling.
- iii. Once operational, the Proposed Development is anticipated to produce 94,279 (L) of waste from all buildings per week, equating to approximately 422 tonne per year (i.e., based on the following approximate densities: Mixed dry recyclables (MDR) – 41 kg/m³, Food – 563 kg/m³ and Residual waste – 73 kg/m³).
- iv. The Proposed Development will comprise of three schools including the Pre-Preparatory School for pupils aged 4-7 years, Junior School for pupils aged 7-11 years and Senior School for pupils aged 11-18 years.
- v. A total of three central bin stores have been provided to cater the Proposed Development. With one combined bin store providing space to hold waste and recycling bins for the Pre-Preparatory School and the Junior School, one bin store for the Senior School and one bin store for storing Food waste bins for the cafeteria area. It should be noted that the bin stores provided for the Pre-Preparatory School, Junior School and the Senior School will only provide space to hold bins for Mixed Dry Recycling (MDR) and Residual/General waste and all Food waste bins will be located behind the cafeteria area.
- vi. For the Pre-Preparatory School and Junior School, small bins/transparent liners will be provided within and outside the buildings, that will allow the students and the staff to deposit their waste and recycling material into. Every day (or as required), the facilities management team will collect these bins/liners and empty them into the larger bins provided within the central bin store. On the day of collection (or as agreed), the facilities management team will move the bins (to be collected) from the central bin store to Bishopswood Road, from where it will be collected.
- vii. Similar to the Pre-Preparatory School and Junior School, small bins/transparent liners will be provided within and outside the buildings of the Senior School. Every day (or as required), the facilities management team will collect these and empty them into the larger bins located within the central bin store. On the day of collection (or as required), the facilities management team will move the bins (to be collected) from the central bin store to Southwood Lane, from where it will be collected. For the Senior School The council's refuse collection vehicle (RCV) will park within 10 m distance to the bin presentation area, from where, the council's collection operatives will wheel the bins to the RCV and empty these. The collection operatives will return the empty

- viii. The Food waste bins that are provided for the cafeteria will be taken to Bishopswood Road for collection by the facilities management team.
- ix. It is understood that the MDR/recycling waste from all the school buildings will be collected by LBH, whereas the other waste streams will be collected by private waste collection contractor.
- x. Once collected and emptied, the facilities management team will return the bins into their respective central bin stores.
- xi. These provisions will result in waste produced during the operation of the Proposed Development being managed in accordance with the Waste (England and Wales) Regulations, 2011 (as amended). Additionally, all waste infrastructure introduced to the Proposed Development will comply with guidelines published by the GLA and LBH, British Standard (BS) 5906:2005 Waste Management in Buildings Code of Practice and Part H6 of the Building Regulations (2010).

1. Introduction

- 1.1 This Operational Waste Management Note (hereafter referred to as the 'Note') has been prepared by KaNect Limited ('KaNect') for Highgate School (hereafter referred to as the 'Client') for the proposed Highgate School Development (hereafter referred to as the 'Proposed Development') located within the administrative boundary of London Borough of Haringey (LBH).

Strategy Overview

- 1.2 Through the lens of the Circular Economy Model, the Strategy aims to promote a circular approach by exploring opportunities for reusing and recycling during the operation of the Proposed Development in accordance with the Waste Hierarchy.
- 1.3 Following on from the prevention and reduction of waste, this Strategy will encourage the separation and sorting of waste and recycling in-line with the Waste Hierarchy. Measures will be implemented to maximise the amount of material arising from the Proposed Development that is recycled/composed and minimise the amount of waste that is sent to landfill.
- 1.4 This Strategy provides a review of the requirements placed upon the Proposed Development under legislation and implemented policy at all levels of government (i.e., national (England), regional (Greater London Authority (GLA) and North London Waste Authority (NLWA)) and local (LBH). Consideration has also been given to the requirements included in local standards, local planning policy and guidance documents to comply with relevant objectives and targets.
- 1.5 The methodology used to identify and estimate volumes of waste generated during operation of the Proposed Development is provided in the Section 5. Following this, the approach taken towards waste management within the Proposed Development is discussed. This includes a breakdown of the waste management process, including waste handling, storage area provision, and collection arrangements. All waste reduction measures are compliant with British Standards 5906:2005 (Ref. 1), the Waste (England and Wales) Regulations, 2011 (as amended) (Ref. 2) and Part H6 of the Building Regulations (2010) (incorporating all amendments) (Ref. 3) Document (hereafter referred to as 'Part H6').
- 1.6 This Strategy has been written by KaNect, using information provided by the Client.

2. Waste Hierarchy and Circular Economy

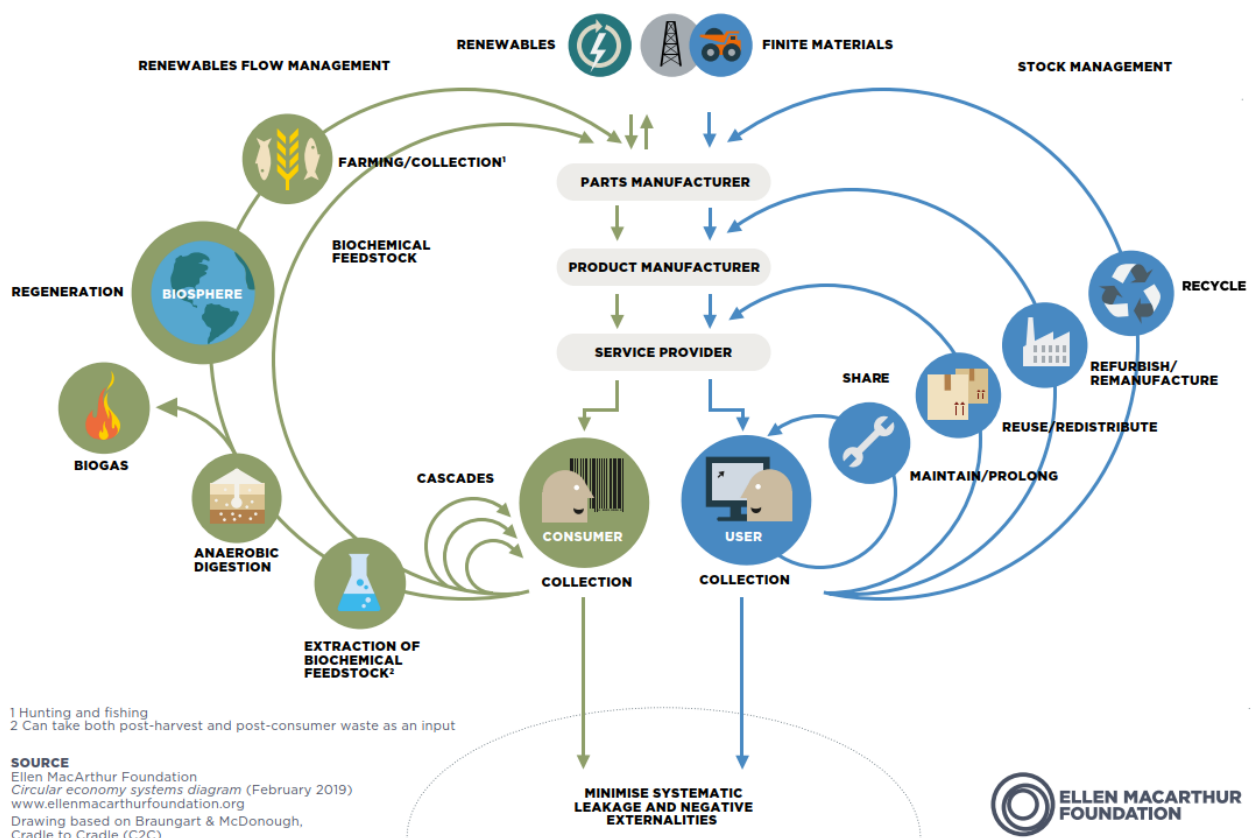
- 2.1 The Waste Hierarchy encourages the management and reduction of waste material. It is representative of a complex process influenced by the optimal management of any given product/waste material. A basic representation of the Waste Hierarchy is provided in Figure 1.

Figure 1 Waste Hierarchy



- 2.2 The prevention of waste sits at the top of the Waste Hierarchy. Prevention involves trying to reduce the amount of waste generated in the first place, for example by redesigning a product to use less, and fewer materials during manufacture.
- 2.3 The generation of waste in the UK has historically been linked with economic growth, as demonstrated by a marked decline in waste generation timed with the onset of the recession in 2008. The Circular Economy Model (see Figure 2) aims to decouple economic growth from resource consumption, by keeping resources in use for as long as possible and trying to regenerate them at the end of their life.

Figure 2 Circular Economy Model



- 2.4 It is likely that the future of waste prevention will look to adopt leasing/rental business models on a range of items (i.e., white goods, tools, phones, and clothes) which in doing so will promote an economy of repair and refurbishment. Reduction of waste will also occur by reducing the amount of packaging per item through innovation. Several initiatives will be explored to reduce waste arising from the Proposed Development including:
- Furniture Share between the School buildings;
 - Use of Recycled Paper; and
 - Collaboration with Charities for Food waste.
- 2.5 Reuse is the next tier of the Waste Hierarchy; it can involve the cleaning or repairing of products so they can be reused and redistributed as the same product. This helps to prevent products being disposed of once they become broken or dirty. Innovative exchange platforms to enable the reuse of materials include Globechain.
- 2.6 The third tier of the Waste Hierarchy and outermost loop of the Circular Economy Model is recycling – the act of turning waste materials into new products. Recycling benefits the environment as it reduces the consumption of raw materials and diverts waste materials from final disposal routes (i.e., landfill and incineration).
- 2.7 The fourth tier of the Waste Hierarchy is other recovery. This means that the waste material that cannot be recycled, it may be possible to recover energy in the form of ‘waste to energy’. This process can help to reduce carbon emissions.
- 2.8 Disposal is the final tier of the Waste Hierarchy. This would imply that the waste material collected are of no value (‘economic and environment’) and as a last resort are sent to the landfill (or incineration without energy recovery) for disposal. Due to the negative effects towards the environment (that may include impacts to air quality, climate change etc.), this is the least sustainable option.

3. Legislation/Planning Policy

- 3.1 A summary list of the legislation relevant to the management of operational waste is provided in this section:

National Waste Legislation

- The Animal By-Products (England) Regulations 2009 (as amended) (Ref. 4),
- Clean Neighbourhoods and Environment Act 2005 (as amended) (Ref. 5),
- Control of Pollution Act (COPA) 1974 (as amended) (Ref. 6),
- The Controlled Waste (England and Wales) Regulations 2012 (as amended) (Ref. 7),
- The Environment Act 1995 (Ref. 8),
- Environmental Protection Act 1990 (EPA) (Ref. 9),
- The Landfill Tax Regulations 1996 (as amended) (Ref. 10),
- The List of Wastes (England) Regulations (as amended) (Ref. 11),
- The Pollution Prevention and Control (Fees) (Miscellaneous Amendments) Regulations 2017 (Ref. 12),
- The Producer Responsibility Obligations (Packaging Waste) Regulations 2007 (as amended) (Ref. 13),
- The Hazardous Waste Regulations 2005 (as amended) (Ref. 14),
- The Waste (England and Wales) Regulations, 2011 (as amended),
- The Waste Batteries and Accumulators Regulations 2009 (as amended) (Ref. 15), and
- The Waste Electrical and Electronic Equipment (WEEE) Regulations 2015 (Ref. 16).
- The Environmental Act 2021 (Ref. 17).

Waste and Planning Policy

- 3.2 The national, regional, and local waste and recycling management planning policies in Table 1 contain information applicable to the Proposed Development.

Table 1 Waste and Recycling Management Policies

Waste Planning Policy Document	Date	Policy	Detail
A Green Future: Our 25 Year Strategy to Improve the Environment (Ref. 18)	2018	Chapter 4: Increasing resource efficiency and reducing pollution and waste	• Make sure that resources are used more efficiently and kept in use for longer to minimise waste and reduce its environmental impacts by promoting reuse, remanufacturing, and recycling. • Work towards eliminating all avoidable waste by 2050 and all avoidable plastic waste by end of 2025.
Our Waste, Our Resources: A Strategy for England (Ref. 19)	2018	1.1.1 1.1.4 1.3.2 2.3.1 3.1.1	• Extended Producer Responsibility - The Extended Producer Responsibility (EPR) is “a policy approach through which a producer’s responsibility for a product is extended to the post-use stage. This incentivises producers to design their products to make it easier for them to be reused, dismantled and/or recycled at end of life”, this also applies to certain materials within the construction and demolition section. • Deposit Return Scheme - In a Deposit Return Scheme (DRS), a small deposit will be added to the price of a drink container brought to a store. Once the container has been used, the consumer will dispose of it in a reverse vending machine and the deposit will be returned to the consumer. • Consistent Collections - Subject to consultation, legislation enforcing the government to “specify a core set of materials to be collected by all local authorities and waste operators” will be introduced. It is envisioned that specifying a consistent set of dry recyclable materials to be collected from all households and businesses will improve England's recycling rate, (subject to consultation) it will include mandatory separate food waste collections. At the current time these policy instruments are out for consultation and (subject to proposals) will be rolled out from 2023.
Regional			
The London Plan (Ref. 20)	2021	The London Plan Policy SI 7 Reducing Waste and Supporting the Circular Economy	This policy states that waste reduction and reduction in the quantity of waste going for disposal from London can be achieved by promoting circular economy i.e. • By encouraging the reuse of material and by using fewer resources in the production and distribution of products, • By ensuring that zero biodegradable or recyclable waste is sent to landfill by 2026, • By meeting the set recycling targets (i.e. 65% for municipal waste by 2030), • By designing developments that would provide adequate, flexible, and easily accessible storage space to support collection of dry recyclables (at least card, paper, mixed plastics, metals, glass) and food.

		The London Strategy Policy T7 Deliveries, Servicing and Construction	• This policy states that development proposals must consider the use of rail/water for the transportation of material with increased levels of direct vision on waste. • Development plans and development proposals should facilitate sustainable freight movement by rail, waterways and road. • At large developments, facilities to enable micro-consolidation should be provided, with management arrangements set out in Delivery and Servicing Plans.
London Environment Strategy (Ref. 21)	2018	Policy 7.2.2	• Targets a 65% recycling rate for municipal waste (this is broken down into a 50% recycling target for household waste and a 75% target for business waste by 2030) and specifies that no biodegradable or recyclable waste will be sent to landfill by 2026.
District and Local			
North London Joint Waste Strategy (Ref. 22)	2009	Objectives	• To minimise the amount of municipal wastes arising, • To maximise recycling and composting rates, • To reduce greenhouse gases by disposing of less organic waste in landfill sites, • To co-ordinate and continuously improve municipal wastes minimisation and management policies in North London, • To manage municipal wastes in the most environmentally benign and economically efficient ways possible through the provision and co-ordination of appropriate wastes management facilities and services, • To ensure that services and information are fully accessible to all members of the Community, • To maximise all opportunities for local regeneration, • To ensure an equitable distribution of costs, so that those who produce or manage the waste pay for it.
North London Waste Plan Proposed Submission (Ref. 23)	2019	S01	• States “to support the movement of North London’s waste as far up the waste hierarchy as practicable, to ensure environmental and economic benefits are maximised by utilising waste as a resource”.
		S02	• States “to support the use of sustainable forms of transport and minimise the impacts of waste movements including on climate change”.
Haringey Local Plan, Development Management Policies (DMP) (Ref. 24)	2017	Policy DM4	• All proposals should consider how to sustainably manage waste arising from the development during the design, construction and occupation phases of new developments. • All proposals will be required to make on-site provision for general waste, the separation of recyclable materials and organic material for composting. The on-site provision must: ○ Ensure adequate dedicated internal and external storage space to manage the volume of waste arising from the site

4. The Proposed Development

- 4.1 The Proposed Development will comprise of three schools including Pre-Preparatory School, Junior School and Senior School. Table 2 provides information on the number of pupils in each school.

Table 2 Pupil Breakdown Per School

School	Number of Pupils
Pre-Preparatory School	140
Junior School	400
Senior School	1,220
Total Students	1,760
Staff Members	650
Total Pupils	2,410

For estimating the waste and recycling arising from the Proposed Development, the staff members have been divided into three schools.

5. Methodology

School

- 5.1 A bespoke methodology has been developed by using the existing waste storage and collection data. The total quantities of waste collected from the existing school buildings was divided by the number of pupils to get the quantities of waste and recycling material arising per pupil. Table 3 provides the methodology used for estimating the waste and recycling material arising from the Proposed Development.

Table 3 Methodology for School

Methodology	Storage Requirements
Bespoke	12.17 L of MDR per person (including staff) per Week 25.10 L of Residual Waste per (including staff) per Week 1.84 L of Food Waste per (including staff) per Week

- 5.2 It should be noted that the MDR will constitute of all recycling streams (including):

- Paper and Cardboard;
- Mixed Plastics;
- Glass; and
- Metals (which is believed to be in small quantities).

6. Management Strategy

Waste and Recycling Arisings

6.1 Based on the methodology provided in Table 3 , the estimated weekly waste and recycling material arising from the Proposed Development are provided in Table 4.

Table 4 Weekly Waste and Recycling Arisings

School	Number of Students	Staff Members	Total Occupants	MDR (Litre/Week)	Food (Litre/Week)	Residual (Litre/Week)	Total
Pre-Preparatory	140	216	356	4,333		8,937	13,270
Junior School	400	216	616	7,498		15,464	22,962
Senior School	1,220	218	1,438	17,503		36,099	53,602
Cafeteria					4,445		4,445
Total	1,760	650	2,410	29,334	4,445	60,500	94,279

For estimating the waste and recycling arising from the Proposed Development, the staff members have been divided into three schools.

For cafeteria, it is assumed that all pupils will be using this facility, therefore, this will be the only place where Food waste is generated.

6.2 However, it is anticipated that the MDR will be collected weekly by LBH, whereas the Food waste and Residual waste will be collected twice every week. Considering this, the waste and recycling arisings are provided in Table 5.

Table 5 Waste Arisings (Weekly for MDR and Twice per Week for Food and Residual)

School	Number of Students	Staff Members	Total Pupil	MDR (Litre/Week)	Food (Litre/Week)	Residual (Litre/Week)	Total
Pre-Preparatory	140	216	356	4,333		5,362	9,695
Junior School	400	216	616	7,498		9,278	16,776
Senior School	1,220	218	1,438	17,503		21,659	39,162
Cafeteria					2,667		2,667
Total	1,760	650	2,410	29,334	2,667	36,299	68,300

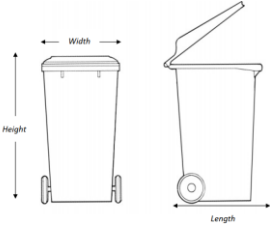
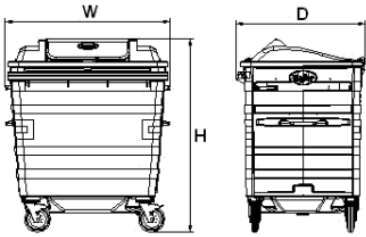
For estimating the waste and recycling arising from the Proposed Development, the staff members have been divided into three schools.

The Proposed Development is assumed to be operational for 5 days every week.

Storage Containers

6.3 Table 6 provides the example dimensions of storage containers ('bins') that are proposed to be used. Please note that bin dimensions may vary between different manufacturers, therefore, these dimensions provided should be used as reference only.

Table 6 Standard Bin Dimensions

Bin	Dimensions	Land Uses and Type of Waste the Bins are Used for
	Capacity (L): 240	For Food Waste
	Height (mm): 1,100*	
	Length (mm): 740*	
	Width (mm): 580*	
	Height (mm): 1,360*	
	Length (mm): 764*	
	Width (mm): 1,371*	
	Capacity (L): 1,100	For MDR & Residual Waste
	Height (mm): 1,410*	
	Length (mm): 1,000*	
	Width (mm): 1,265*	

*Bin dimensions might vary between manufacturers

Waste and Recycling Storage Requirements and Management Strategy

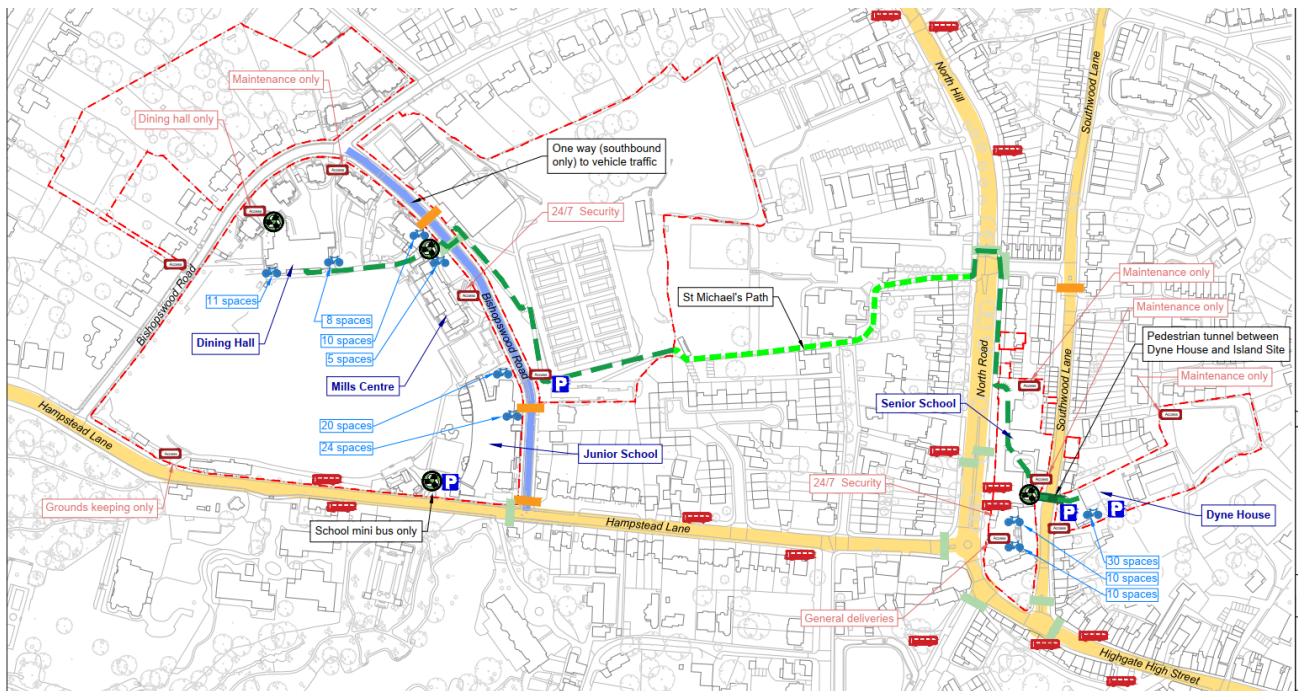
6.4 Based on the waste and recycling arisings as provided in Table 5, the subsequent storage requirements are provided in Table 7.

Table 7 Waste and Recycling Storage Requirements based on Weekly Collection for MDR and Twice per Week Collection for Food and Residual Waste

School	MDR	Food	Residual	Total
Pre-Preparatory and Junior School	11 × 1,100 L		14 × 1,100 L	25 × 1,100 L
Senior School	16 × 1,100 L		20 × 1,100 L	36 × 1,100 L
Cafeteria		12 × 240L		12 × 240L
Total	27 × 1,100 L	12 × 240L	34 × 1,100 L	61 × 1,100 L 12 × 240 L

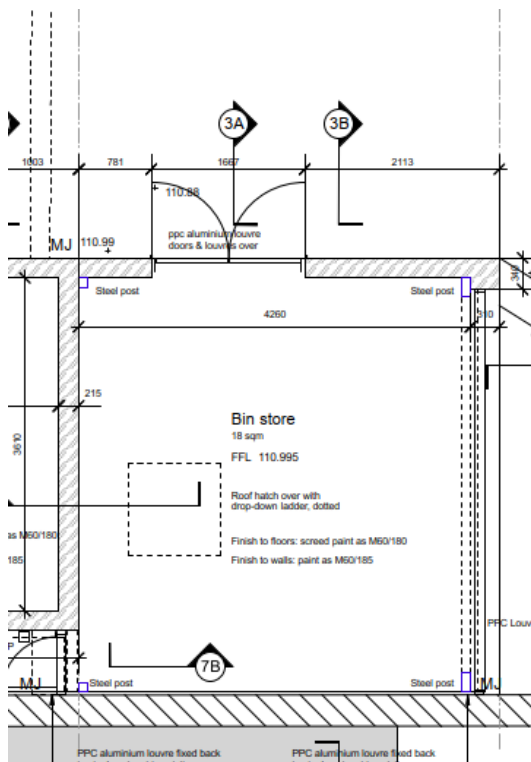
6.5 Figure 3 provides the locations of these central bin stores (marked by blue star). Whereas Figure 4 provides the proposed bin store between the Mill Centre and the pre-preparatory building.

Figure 3 Location of Central Bin Stores



Please note that this Figure is not drawn to scale. The green circles represent the bin stores.

Figure 4 Proposed Bin Store b/w Mills Lane and Pre-Preparatory School

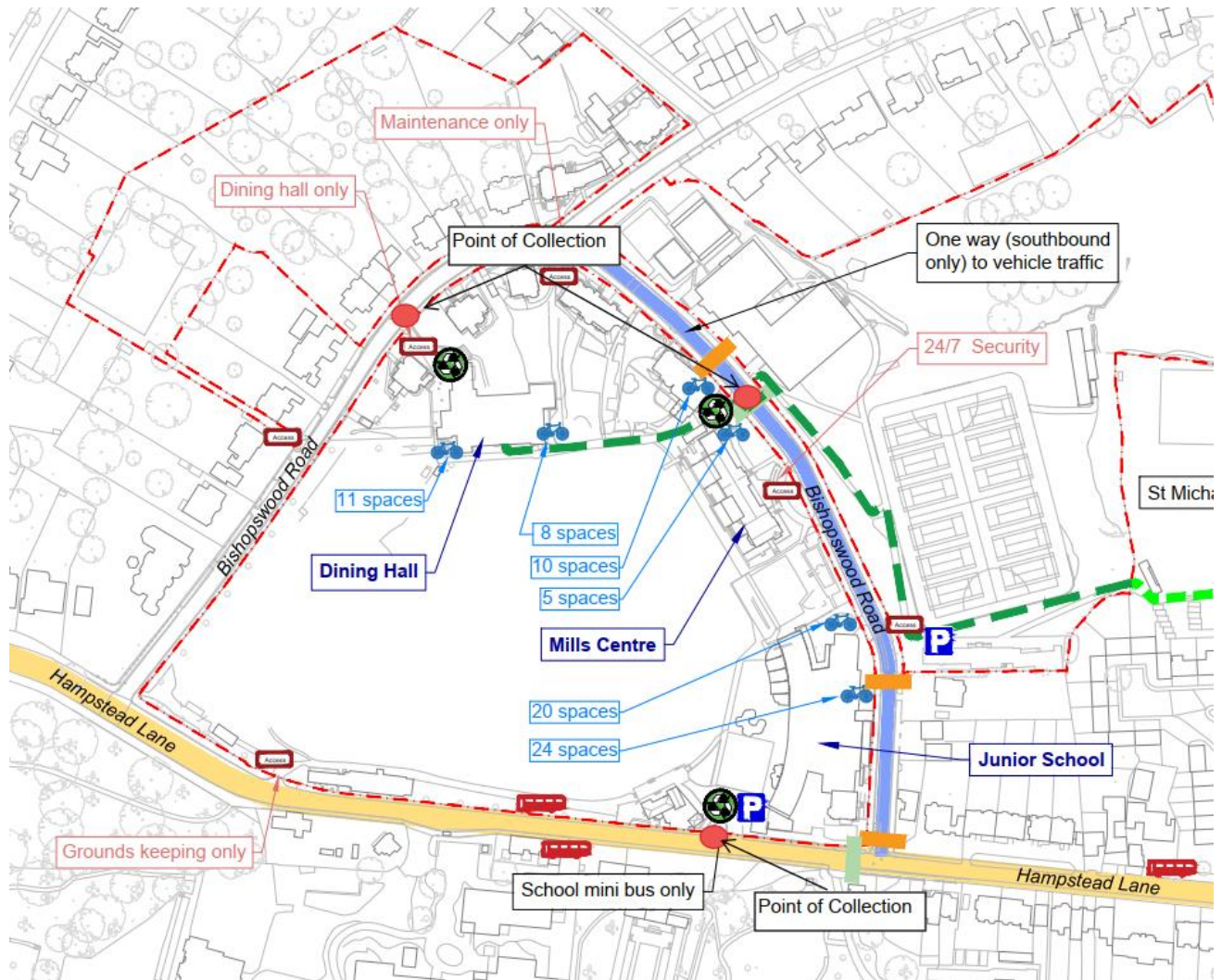


Please note that this Figure is not drawn to scale

- 6.6 Small bins or transparent liners will be provided inside and across each school, which will allow the pupils and staff to deposit their waste and recycling into. Daily (or as required), the facilities management team will take these bins/liners to the central bin stores and empty

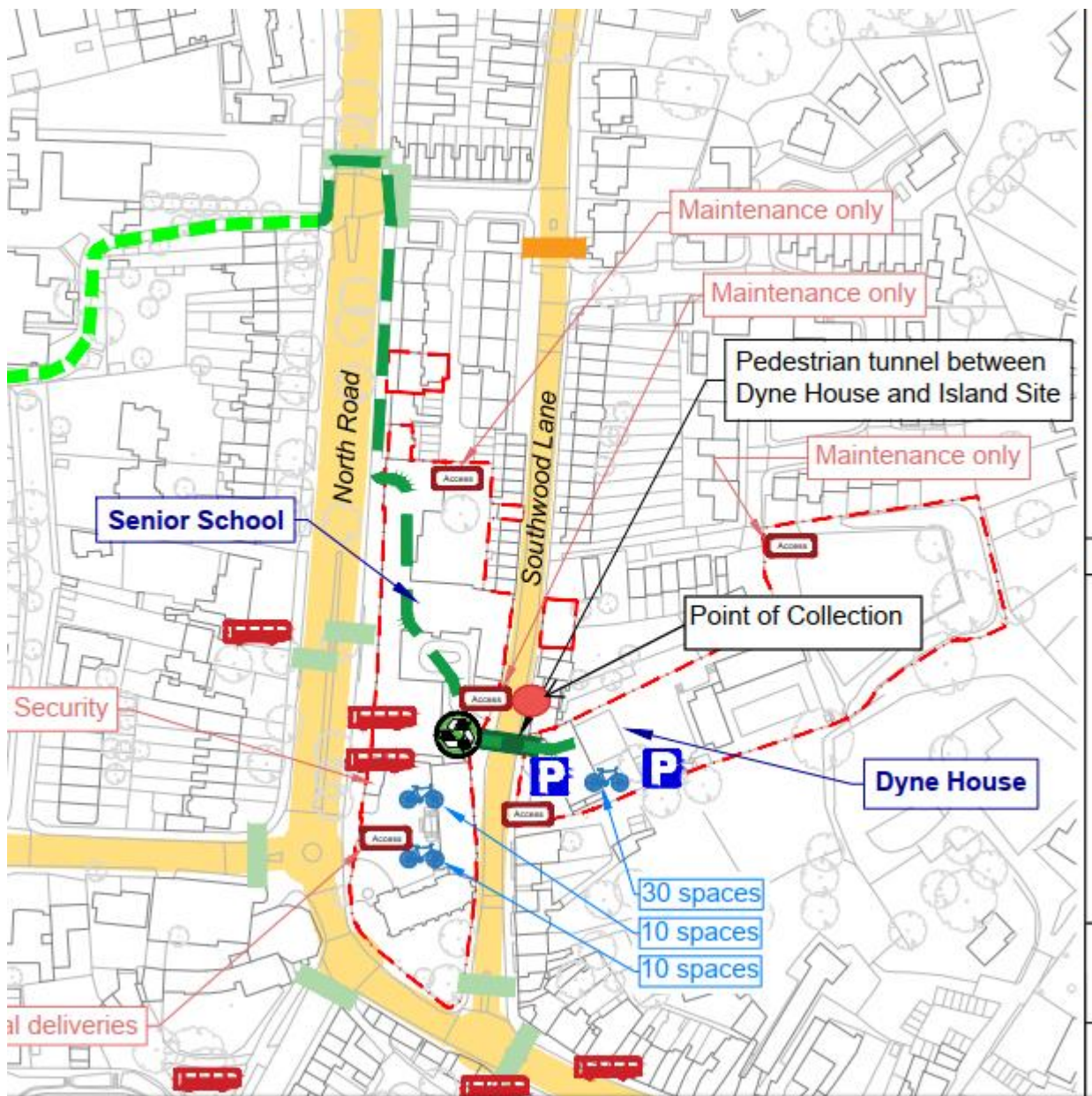
them. On the day of collection (or as agreed), for the Pre-Preparatory School, Junior School and the cafeteria, the facilities management team will wheel the bins (required for collection) to Bishopswood Road, from where these will be collected. Once emptied, the facilities management team will return these bins back to the central bin store. Please see Figure 5 for the location of collection.

Figure 5 Pre-Preparatory, Junior School and Cafeteria - Point of Collections



Please note that this Figure is not drawn to scale. Red circles represent collection points.

- 6.7 For Senior School, prior to the day of collection (or as agreed), the facilities management team will wheel the full bins (required for collection) to Southwood Lane, from where it will be collected. Once emptied, the facilities management team will transfer these empty bins back to the central bin store. Please see Figure 6 for the location of collection.

Figure 6 Senior School - Point of Collection

Please note that this Figure is not drawn to scale, Red circle represent the point of collection.

- 6.8 At this stage it is envisioned that the MDR/recycling will be collected by LBH, whereas all other wastes will be collected by private waste collection contractors.

Unique Waste

- 6.9 There is likely to be a small component of the overall waste arising from the Proposed Development that will comprise other waste streams, such as waste electrical and electronic equipment (WEEE), printer and toner cartridges and fluorescent light tubes. Building maintenance will also give rise to materials such as paints and waste lubricating oils that will require separate storage in dedicated sealed containers.
- 6.10 This type of waste is termed “unique” as it will not be produced on a regular basis and therefore its management will be on special arrangement with a registered waste handler for

the specific waste that is produced. Hazardous waste is required to be kept separate from general and bulky waste. There is space for this within the bin store for these types of waste. In addition, battery bins will be provided in different location of the schools. Separate arrangements will be made by the building management team for the safe disposal of these waste streams, as covered by the Hazardous Waste (Amendment) Regulations 2016 and WEEE Regulations 2015. All waste management will have to comply with Environmental Protection Act 1990 and The Waste (England and Wales) (Amendment) Regulations 2014.

7. Monitoring

- 7.1 The facilities management team will be responsible for monitoring the small bins and liners that are placed around the schools, to check for any contamination. If contamination is noted, then the facilities management will remove the contamination and deposit it into the correct bin or liner.
- 7.2 The facilities management team will also keep a record of the quantities of waste of waste being generated. Similarly, the collection contractor will also be responsible to do so. All this data will be kept in records with the facilities management team.

8. Waste and Recycling Storage and Collection Provision

- 8.1 In accordance with BS EN 840, as set out in BS 5906:2005, all waste containers within the Proposed Development will be stored under cover in a specially designed waste storage room, which will be built to the same general standard for commercial premises. The walls and roofs of this store will be formed of non-combustible, robust, secure and impervious material, and have a fire resistance of one hour when tested in accordance with BS 476-21 - Fire tests on building materials and structures: Part 21 (Ref. 25), whilst the door of the store will be made of steel, and will have a fire resistance of 30 minutes when tested in accordance with BS 476-22 - Fire tests on building materials and structure: Part 22 (Ref. 26).
- 8.2 Further to these requirements, the Proposed Development will also comply with the guidance set out in BS 5906:2005 and Part H6 as provided below:

Location

- Bin stores will be located at vehicle access level.
- Bin stores will be away from the main entrance to the building.
- Waste and recycling containers will be sited so that the containers can be taken to the collection point without being taken through a building unless it is a porch, garage, car port or other open space.
- External storage areas for waste and recycling containers will be away from windows and ventilators and preferably be in shade or under shelter.

Convenience

- Wheelie bins will be located no further than 15 m from the point of collection.

- Bulk waste containers will be located no further than 10 m from the point of collection.

Screening or covering

- The waste and recycling containers housed will be big enough to fit as many containers as are necessary to facilitate collection and will be high enough for lids to open and close where lidded containers are installed. Internal housing layouts will allow all containers to be accessed by users.
- Bins will be fitted with close fitting lids to prevent vermin access.
- Internal built storage areas will conform to BS 5906:2005.

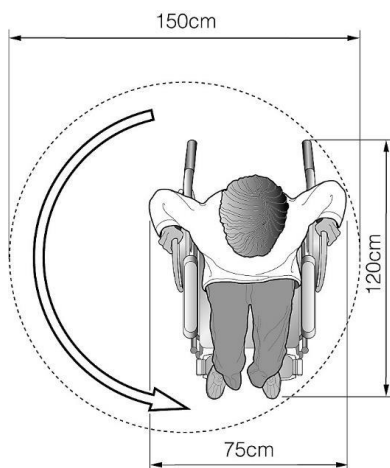
Signage

- Waste and recycling storage areas will be marked, and signs should be provided in the bin stores.
- There are a number of industry standard colours that are accepted for different categories of waste and recycling. These will not to be used when the bin doesn't hold the specific waste and recycling category.
- Users will be made aware of the fire risk from waste and recycling storage. This will be done using signage and displaying the danger when waste and recycling materials are stored carelessly.
- All roads will be clearly marked and controlled to prevent unauthorised parking

Accessibility

- Waste and recycling storage areas will be located in a position that provides easy and safe access for both waste and recycling producers and collectors. In addition, this will also provide an ease of use for older persons, persons short of stature and people with disabilities.
- Internal and external facilities for buildings will be designed for older persons and persons with disabilities as set out by the Disability and Discrimination Act (DDA), as specified in BS 8300:2001 (Ref. 27).
- Waste and recycling storage areas will provide a clear turning circle with a minimum diameter of 1,500 mm for wheelchair users, as specified in Part M of the Building Regulations (Ref. 28) and shown in Figure 7.

Figure 7 Example Wheelchair Turning Circle



Access paths and roads

- All doors and pathways will be 200 mm wider than any bins that are required to pass through or over them.
- Routes from bin storage areas to collection points will be as straight as possible with no kerbs or steps. Gradients will be no greater than 1:12 and surfaces should be smooth and sound, concrete rather than flexible. Dropped kerbs will be installed as necessary.
- There will be no steps and projections at the entrance of a bin store.
- The bin store will be external to the building or capable of being isolated from the main building. This will ensure access to the main building will not be used through the bin store.
- Roads will have a minimum width of 5 m.

Vehicle Access

- Adequate waste and recycling storage arrangements will be made so that waste and recycling does not need to be placed on the public highway other than immediately before it is due to be collected.
- Roads will be arranged so that collecting vehicles can continue mainly in a forward direction.
- Vehicles will not be reversing.
- Vehicles operating in service areas will enter and leave in a forward-facing direction.

Materials and finishing

- The walls and roofs of the bin store will be formed of non-combustible robust and secure materials with a smooth finish suitable of washing down. The door of the bin store will be made of steel.

Safety and anti-social behaviour

- Location of the bin store will be considered to minimise environmental impacts and nuisance from anti-social behaviour.
- The door of the bin store will be capable of being opened from the inside as well as the outside for reasons of safety.
- Unsightly bins can damage the visual amenity and contribute to increased level of anti-social nuisance such as odour and litter. Therefore, bins are planned carefully and will not be stored in a publicly accessible area.

Fire safety

- Stored waste and recycling material will be identified as a potential hazard in any fire risk assessment.
- Internal bin stores will be constructed within a fire compartment structure which is designed to contain a fire.
- Suitably sized manual fire extinguishers will be deployed. For larger risks, a dedicated automatic fire sprinkler or water mist system will be considered.

- The walls and roofs of the bin store will have a fire resistance of one hour when tested in accordance with BS 476-21. The door of the bin store will be made of steel or have a fire resistance of 30 minutes when tested in accordance with BS 476-22.

Ventilation and Lighting

- Bin stores will be lit to be safe for facilities management team and collection operatives to use and service during darkness hours.
- Permanent ventilators will be provided giving a total ventilation area of not less than 0.2 m². Passive ventilators will be fly and vermin proof and will be located near to the ceiling and floor of the bin store as possible but away from windows and dwellings.
- Electrical lighting will consist of sealed bulkhead fittings with houses related to IP65 in BS EN 60529:1992 (Ref. 29) for the purpose of cleaning down with hoses and inevitable splashing.
- Luminaires will be low energy light fittings or low energy lamp bulbs, controlled by a proximity detection or time delay button to prevent lights being left on.

Maintenance

- Arrangements will be made for the cleaning of the bin store with water. A hose union tap should be provided in agreement with the local water authority and the Environment Agency.
- The floor of the bin store will have a suitable fall towards the drainage point. Gullies will be positioned not to be in the track of container wheels and should incorporate a trap which maintains a seal, even during prolonged periods of disuse

Landscaping Waste

- 8.3 The landscaping contractor will be responsible for removing the landscaping waste from the Proposed Development where and when generated.

Sanitary Waste

- 8.4 The sanitary waste arising from the Proposed Development will be collected in-situ i.e., a specialist waste contractor will be commissioned to collect this type of waste directly from the generation points.

9. Summary

- 9.1 In keeping with national, regional (London) and local (NLWA and LBH) policy, this Note demonstrates how the Proposed Development will continue to promote sustainable waste and recycling management methods.
- 9.2 In following the Waste Hierarchy, the Proposed Development will promote resource efficiency to help reduce potential environmental impacts as a result. This Strategy has firstly looked to prevent waste, reuse resources where possible and recycle materials, minimising the generation of waste.
- 9.3 The Proposed Development includes sufficient space to enable best practice recycling methods and flexibility in the future. This Strategy shows how the Proposed Development has segregated and provided space for Recycling, Food and Residual streams.
- 7.4 Alongside striving towards local policy objectives, this Strategy can help achieve wider district goals such as reaching recycling targets (65% of municipal waste) alongside providing adequate, flexible, and easily accessible bin store to support recyclables and food waste as set by the London Strategy – 2021.

10. References

- Ref. 1 British Standards Institute (BSI), (2005); BS 5906:2005, Waste Management in Buildings – Code of Practice
- Ref. 2 Her Majesty Statutory Office (HMSO), (2011); The Waste (England and Wales) Regulations (as amended)
- Ref. 3 Department for Communities and Local Governments (DCLG), (2013); Building Regulations – Approved Document H: Drainage and Waste Disposal (Incorporating 2010, 2013, and 2015 amendments)
- Ref. 4 HMSO, (2011); The Animal By-Products (Enforcement) Regulations 2011.
- Ref. 5 HMSO, (2015); Clean Neighbourhoods and Environment Act 2015.
- Ref. 6 HMSO, (1989); Control of Pollution Act 1989.
- Ref. 7 HMSO, (2012); The Controlled Waste (England and Wales) Regulations 2012.
- Ref. 8 HMSO, (1995); Environment Act 1995.
- Ref. 9 HMSO, (1990); Environmental Protection Act 1990.
- Ref. 10 HMSO, (1996); The Landfill Tax Regulations 1996.
- Ref. 11 HMSO, (2005); The List of Wastes (England) Regulations 2005.
- Ref. 12 HMSO, (2017); The Pollution Prevention and Control (Fees) (Miscellaneous Amendments) Regulations.
- Ref. 13 HMSO, (2007); The Producer Responsibility Obligations (Packaging Waste) Regulations 2007.
- Ref. 14 HMSO, (2005); The Hazardous Waste Regulations 2005 (as amended)
- Ref. 15 HMSO, (2009); The Waste Batteries and Accumulators Regulations 2009.
- Ref. 16 HMSO, (2013); The Waste Electrical and Electronic Equipment (WEEE) (as amended)
- Ref. 17 HMSO, (2021); The Environmental Act
- Ref. 18 HMSO, (2018); A Green Future: Our 25 Year Strategy to Improve the Environment.
- Ref. 19 HMSO, (2018); Our Waste, Our Resources: A Strategy for England.
- Ref. 20 Greater London Authority (GLA) (2021); London Strategy, Spatial Development Strategy for Greater London.
- Ref. 21 GLA (2018); London Environment Strategy.
- Ref. 22 North London Waste Authority (NLWA), (2009); Joint Waste Strategy
- Ref. 23 NLWA, (2019); Waste Plan Proposed Submission
- Ref. 24 London Borough of Haringey (LBH), (2017); Local Plan, Development Management Policies
- Ref. 25 BSI, (1987); BS 476-21, Fire tests on building materials and structures: Part 21.
- Ref. 26 BSI, (1987); BS 476-22, Fire tests on building materials and structures: Part 22.
- Ref. 27 BSI, (2009); BS 8300:2001 – Design of buildings and their approaches to meet the needs of disabled people.
- Ref. 28 DCLG, (2010); Building Regulations – Approved Document M – Access to and use of buildings (2015) (Amendment 2016).
- Ref. 29 BSI, (1992); BS EN 60529:1992, Specification for degrees of protection provided by enclosures (IP code)

Appendix D Cut / Fill Estimate

A Cut / Fill Estimate (Expedition, 2022) has been undertaken to demonstrate the expected waste arising from excavation including both cut and fill and earthworks, to support the completion of Table 4. Recycling and Waste Reporting.

Cut and Fill Study for Richards Music Centre

Assumptions:

Basement is of uniform depth

Depth of heave mat = 225mm

Ground level is uniform across site

Existing building has no basement and the foundations are shallow

Demolition waste from the existing building is not included in the calculation

The volume calculated is that removed from the ground and no bulking factor has been applied

Cut Calculation

Floor area of basement = 1160m²

Approx existing ground level = 113.13 - see topo survey

Depth of basement from ground floor level = 4.76m

Difference from ground floor level to existing ground level = 113.13 - 12.890 = 100.24mm

Total excavation depth = 4.76 + 0.225 + 0.1 = 5m

Volume of attenuation tank = 48m³

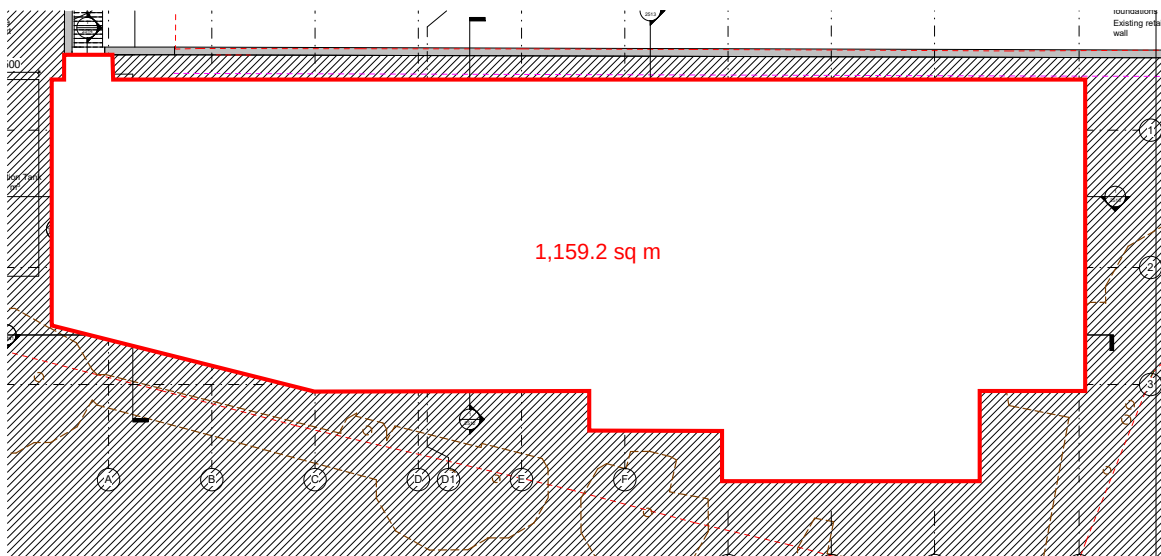
Total volume of material excavated = 1160 x 5 + 48 = 5848m³ of material

Fill Calculation

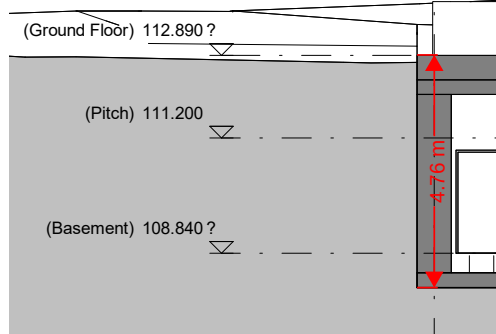
No fill required

Total cut/fill

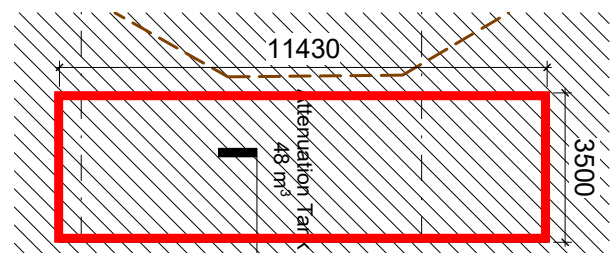
5850m³ of material to be cut



Basement Area



Depth of Basement



Size of Attenuation Tank

Title: Cut and Fill Assessment

Job: Richards Music Centre

Job No.: 427

Sketch No.: SK-22-01

Date: 23/05/22

By: HN

