Detailed Circular Economy Statement
Pope’s Road

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1.0 EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

On behalf of our Client 'Hondo Enterprises' HDR prepared this Circle Economy Statement for the proposed development at Pope's Road, Brixton.

Pope's Road development, is situated in Brixton in the London Borough of Lambeth. This Statement is based on the final proposals and details how the development proposes to demonstrate:

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

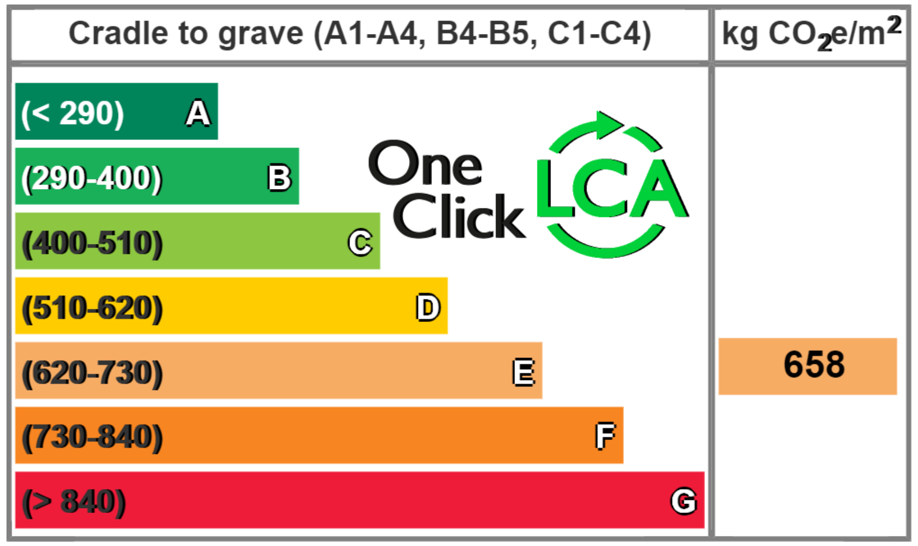
WLCA

The following opportunities were identified to reduce embodied carbon:

- Considering material type, its efficient use, and expected lifespan.
- Choose low carbon versions of materials.
- Minimise wastage on site, consider construction processes and design for adaptability, disassembly and reuse.

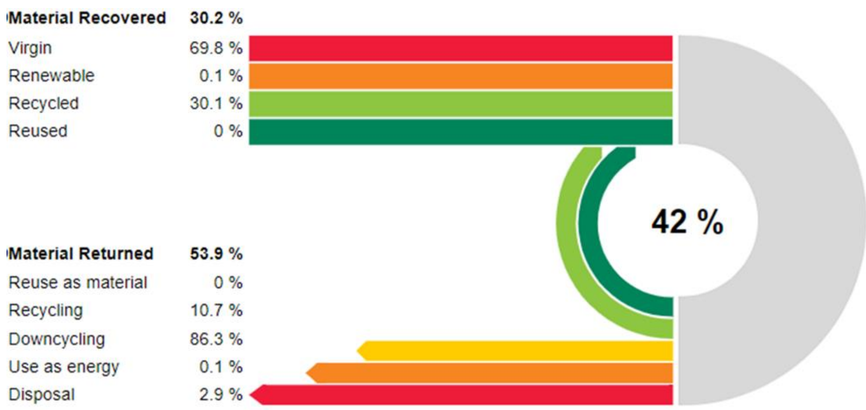
Conclusions can be drawn from the results summarized in the WLCA report:

- The proposed development achieved a One Click LCA 'Carbon Heroes Benchmark'[1] rating of E, demonstrating 658kgCO2e/m[2].



Building Circularity

The proposed development has a Building Circularity score of 42%.



The calculated Building Circularity score represents the total materials circularity both in use of materials for the project as well as end of life handling. It is calculated as the average of Materials Recovered (representing use of circular materials in the project) and Materials Returned (representing how effectively materials are returned, instead of disposed of or downgraded in value. The calculation is purely mass based without material weighing.

The Building circularity score will be tested and monitored throughout the design process.

Bill of Materials & Waste Metric Report

These documents in the Appendices include targets and commitments.

Appendix A, The Bill of Material, looks at the new materials and identifies the percentage of recycled content and the estimated recyclable materials in each element.

Appendix B, Recycling and Waste Report provides the estimate of the construction Waste.

Operational waste was not available at this stage.

[1] https://www.oneclicklca.com/construction/carbonheroes/

2.0 INTRODUCTION

INTRODUCTION

This document has been produced to identify a Strategic Approach to Circular Economy implemented in the design and construction of the proposed Pope's Road development. The document herein is structured following the 'Circular Economy Statement – Consultation Draft set out by the Greater London Authority (GLA) in October 2020.

2.1 Site and Proposed Development

Site Description:

The application site is located at 20-24a Pope's Road, Brixton. The site comprises a funnel shaped parcel of land situated between two railway viaducts. The site currently comprises a single storey retail building. The proposed development includes the demolition of the existing building and erection of a part G+19, part G+8 storey building comprising flexible A1/A3/B1/D1/D2 uses at basement, ground and first floor, with B1 accommodation on floors 2 to 19.

2.2 Policy Context

The Statement responds to the Publication London Plan March 2021 policy requirements:

- Policy D 3 'Optimizing site capacity through the design-led approach', and
- Policy SI 7 'Reducing waste and supporting the Circular Economy'

The above planning policies outlined by the Greater London Authority (GLA) in the London Plan have set out the following objectives:

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

It is considered essential that the proposed development meets planning policy guidelines and aims to adopt the latest industry sustainable design and construction methods to ensure it becomes one of London's most exemplary buildings.

3.0 METHOD STATEMENT

METHOD STATEMENT

A Circular Economy is defined in the London Plan Policy SI 7 'Reducing waste and supporting the Circular Economy' as one where materials are retained in use at their highest value for as long as possible and are then reused or recycled, leaving a minimum of residual waste.

For buildings, this means creating a regenerative built environment that prioritises retention and refurbishment over demolition and rebuilding. It means designing buildings that can be adapted, reconstructed and deconstructed to extend their life and that allow components and materials to be salvaged for reuse or recycling.

Designing buildings for a circular economy can increase their value by avoiding depreciation and can help to stave off obsolescence. It can even secure a positive residual value at end-of-life.

In a circular economy, built environment assets are designed so that whole buildings, and materials, components and parts can be continually and easily recycled.

3.1 Circular economy hierarchy

Redevelopment should be assessed against the following Circular Economy Hierarchy.

1. Refurbishment

Redeveloped for similar needs and uses but meeting or exceeding current regulations and standards through restoring, refinishing and future proofing while minimising changes and avoiding replacement of any parts. Parts of historical significance are incorporated in the design and carefully preserved. Designed for longevity, adaptability or flexibility to prolong the new life of the development.

2. Repurpose

Redeveloped to accommodate different needs and/or uses (e.g. from industrial use to mixed use) but exceeding current regulations and standards through with significant changes and replacement of shorter-life parts. Parts of historical significance are incorporated in the design and carefully preserved. Designed for longevity, adaptability or flexibility to prolong the new life of the development.

3. Deconstruct and reuse

Building/infrastructure disassembled, with the entire asset being reconstructed elsewhere, or individual components directly reused elsewhere.

4. Demolish and recycle

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

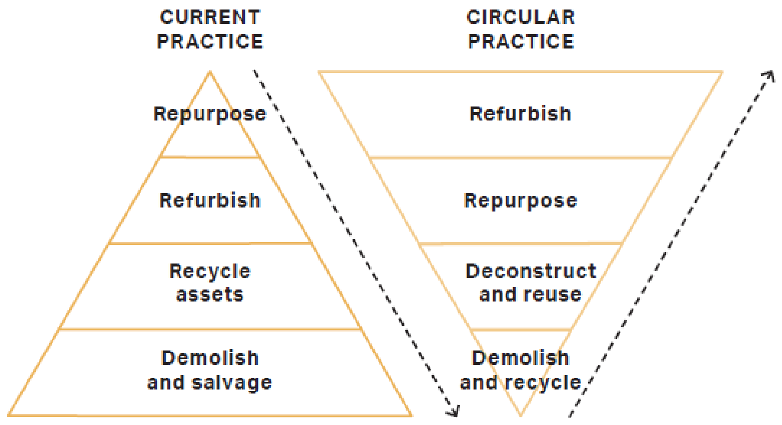


Figure 1 - Source: Design for a circular economy, GLA-

3.2 Circular Economy Workshop

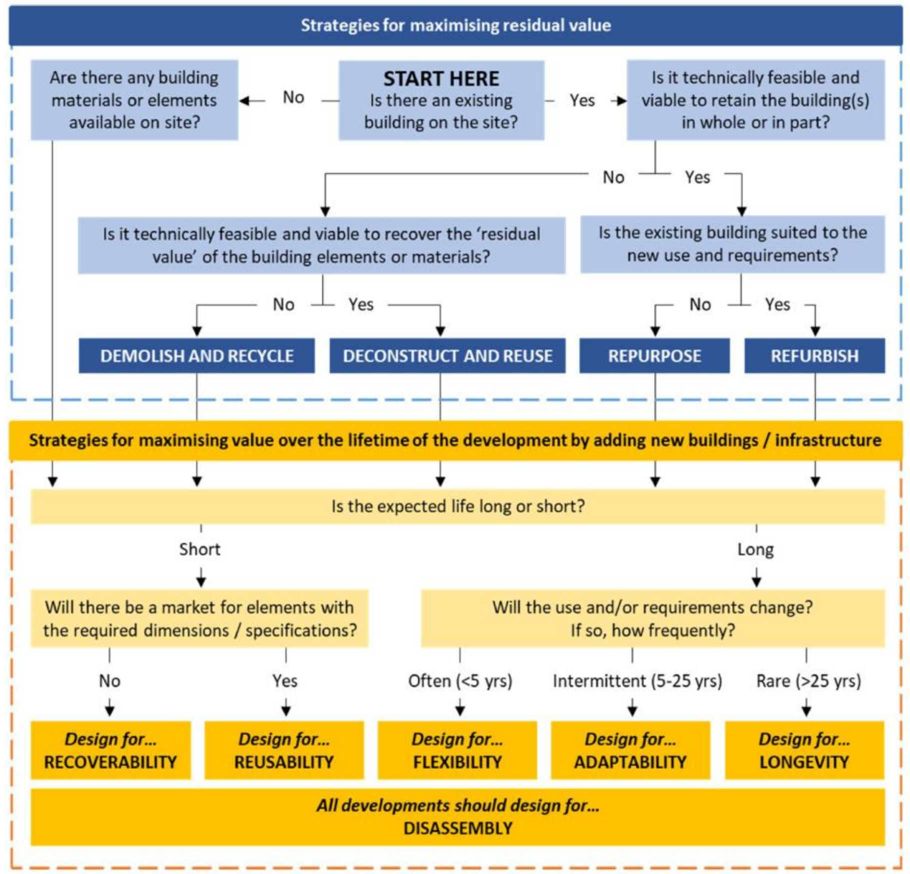
A series of workshops with key stakeholder have been undertaken during RIBA stages 0-3 to develop the sustainability strategy for the development. A specific 'Circular Economy Workshop' was held on the 14th December 2021 as well as other forms of communication including the following stakeholders;

- **HDR –** Sustainability;
- **AKT II –** Structures; and
- **Adjaye –** Architects.

During the workshop the design team investigated how materials can be optimised and waste eliminated not just during construction but over the life of the project and how materials can be reused beyond the life of the development. It was recommended that through engagement with the appointed main contractor and product supply chain opportunities to create a circular development would continue to be investigated.

3.3 Decision flow charts

The 'decision tree' flow chart can be considered to identify the most appropriate strategic approach. The chart aims to maximise residual value in any existing buildings and to add value over the lifetime of the development.



Source: Design for a circular economy, GLA

The design team have sought to ensure that the new build elements are designed to be long lasting, adaptable and flexible, and be easy to disassemble.

3.4 Sustainable Third-Party Certification

The design team are targeting a BREEAM NC 2018 'Excellent' rating for Offices. As part of the BREEAM assessments the following credits relevant to the principle of a circular economy are being pursued:

- Man 01 Commissioning and Handover
    - Commissioning and testing schedule and responsibilities
    - Commissioning building services
- Man 03 Responsibly Construction Practices
    - Environmental management
    - Sustainability champion
    - Considerate construction
    - Monitoring of construction site impacts - Utility consumption
    - Monitoring of construction site impacts - Transport of construction materials & waste
- Mat 01 Environmental impacts from construction products
    - Building Life Cycle Assessment (LCA)
- Mat 03 Responsible Sourcing of Materials
    - Responsible sourcing of materials (RSM)
- Mat 05 Designing for durability and resilience
- Mat 06 Material efficiency
- Wst 01 Construction waste management
    - Pre-demolition/refurbishment audit
    - Construction resource efficiency
    - Diversion of resources from landfill
- Wst 03 Operational Waste
- Wst 06 Design for disassembly and adaptability

4.0 CIRCULAR ECONOMY GOALS

GOALS AND CIRCULAR ECONOMY PRINCIPLES

The three core principles of a circular economy as recommended in the Guidance by the Major of London, promote a regenerative and restorative approach. This sets out how the development responses to these principles.

4.1 Principle 1 - Conserve resources, increase efficiency and source sustainably

This Principle addresses the following main points:

- Minimising the quantities of materials used
- Minimising the quantities of other resources used
- Specifying and sourcing materials and other resources responsibly and sustainably

4.1.1 Development response

The proposed development is for the demolition of a single storey building on site, and the development of a part G+19, part G+8 storey building.

Review of the location of plant equipment has minimised the size of the basement required. Careful design of the basement layer optimises space available while reducing the volume of concrete required.
Concrete bracing on the east and west elevations allows a minimisation of concrete in the central core.

The building design uses passive design measures to minimise cooling within the building. Deep set windows on the south elevation provide shading, while flush windows on the northern elevation maximise light gains.

PV panels will be used and low water consuming sanitary fittings will be used where possible.

Materials will be prioritised where responsible sourcing can be demonstrated (BES6001, ISO 14001 etc). Materials which can also demonstrate an Environmental Product Declaration should also be prioritised. All timber both within the development, and temporary site timber will be sustainably sourced.

4.2 Principle 2 - Design to eliminate waste (and for ease of maintenance)

This Principle addresses the following main points:

- Designing for longevity, adaptability or flexibility and reusability or recoverability
- Designing out construction, demolition, excavation and municipal waste arising

4.2.1 Development response

The development is targeting a waste efficiency target of ≤6.5 tonnes or ≤ 7.5m3 per 100m2 of GIA.

Demolition waste will be reused where possible in the piling mat for the new development. Careful design of the basement has optimised the space available and reduced the amount of excavation required.

The open structure of the building is designed to optimise the working space and allow a good degree of flexibility and adaptability.
Durable materials of brick and concrete will be used for the façade which will maximise the longevity of the building.

The development is targeting BREEAM credits Wst06 (Designing for disassembly and adaptability) and Mat05 (Designing for durability and resilience).

4.3 Principle 3 - Manage waste sustainably and at the highest value

In the third principle the following points are addressed:

- Managing construction waste
- Managing municipal waste (and industrial waste, if applicable)

4.3.1 Development response

A Site Waste Management Plan (SWMP) will be produced and include the following targets:
A minimum of 85% (by volume) of construction waste and 90% of demolition waste will be diverted from landfill.
A target of 95% all waste generated from the proposed development will be diverted from landfill.

The contractor will be required to consider actions such as ‘just in time’ deliveries to minimise damage through storage, avoid over-ordering of materials, and to consider suppliers who reduce the amount of packaging or participate in packaging take-back schemes.

A sufficiently sized bin store will be provided on the ground floor of the building with easy access for waste collection.

5.0 STRATEGIC APPROACH

STRATEGIC APPROACH

5.1 GLA Circular Economy Statement Guidance table 1.

This section includes a completed GLA Circular Economy Statement Guidance table 1.

Aspect	Building area	Steering Approach	Explanation	Target	Supporting analysis / studies/ surveys / audits
Circular economy approach for the existing site	All areas	Reduction of construction waste. Diversion of waste from landfill in line with GLA target. Responsible construction practices.	A BREEAM complaint SWMP will be produced and incorporate the results from any pre-demolition / refurbishment audit. Waste on site will be segregated where possible to aid recycling. Where space on site is too limited to allow materials to be segregated, a waste contractor may be used to separate and process recyclable materials off site. Similarly, manufacturers take-back schemes could also be used. Monitoring water and energy use on site. Site energy and water used will be carefully recorded and monitored throughout the project.	95% diversion from landfill (The higher value out of the GLA target and BREEAM target). Waste targets for non-hazardous construction waste generated from the building (excluding demolition and excavation waste) need to be set at no more than $7.5m^3$ or 6.5 tonnes per $100m^2$ of gross internal floor area.	SWMP Site monitoring records. BREEAM Credit Wst01
	Existing buildings	Opportunities for re-using and recycling construction and demolition waste will be explored and implemented.	Minimise amount of virgin material used.	Any suitable material from the existing site will be used as a piling mat.	SWMP WLCA
	Site	Use of Brownfield site	Minimise the amount of undeveloped land needed for development .	75% of the development to be on land previously developed.	Site Plans BREEAM credit LE01
Circular economy approach for the new development	All areas	Create flexible and adaptable spaces	Maximise building life cycle and asset value through flexible and adaptable spaces	Design for ease of change of use. Open plan structure designed to optimise working space.	WLCA BREEAM Wst06 'design for disassembly and adaptability'
	All areas	Encourage durable construction for longevity	Specify materials which are durable and resilient	Incorporate appropriate durability measures for vulnerable parts of the building. Use of durable materials in construction to minimise maintenance and replacement. Design for adaptation to climate change.	WLCA BREEAM credit Mat05
	All areas	Maximise material reuse and minimise waste	Minimisation of waste on site. Reduction in virgin materials used. Design for end of life reuse and recycling throughout the project.	95% diversion from landfill at end of life (GLA target) Use of recycled aggregate from re-use of demolition material / use of secondary aggregate in concrete.	Proposed SWMP BREEAM credit Wst01 Construction management plan Design & Access statement

Aspect	Building area	Steering Approach	Explanation	Target	Supporting analysis / studies/ surveys / audits
				Design of basement reduced excavation waste.	
Circular economy approach for municipal waste during operation	All areas	Minimise operational waste to landfill through the provision of adequately sized waste and recycling areas.	Waste will be collected from each area throughout the day and taken down and stored in the bin storage room on the ground floor. Waste will then be collected from the service yard throughout the day.	A minimum recycling storage area of $10m^2$ for buildings ≥5000 m^2 An additional recycling storage area of $2m^2$ per $1000m^2$ of net floor area where catering is provided (with an additional minimum of $10m^2$ for buildings ≥$5000m^2$). A minimum of 65% of municipal waste to be reused, recycled or composted.	BREEAM Credit Wst03 Waste and Recycling Strategy Floor / Site plans Design & Access statement

6.0 CIRCULAR ECONOMY COMMITMENTS

COMMITMENTS

6.1 Key commitments for Popes Road – GLA Circular Economy Statement Guidance table 2.

This section includes a completed GLA Circular Economy Statement Guidance table 2.

Building "Layer"	Site	Substructure	Superstructure	Shell/Skin	Services	Space	Stuff	Construction stuff	Summary	Challenges	Counter actions + Who + When	Plan to prove and quantify
	Section A: Conserve Resources											
Minimising the quantities of materials used	Pre-refurbishment / demolition audit to be undertaken.	The basement footprint in this development has been reduced which minimises the volume of concrete required. Demolition materials form the existing single storey building will be crushed on site and re-used where suitable. Specifying concrete materials and reinforcements with recycled contents if feasible. Use of secondary aggregates (e.g. GBBS) to be used	Concrete bracing on the east and west elevations minimises the volume of concrete required for the central core. Concave floor slabs on the second floor minimises the volume of concrete and the overall weight of the building compared to flat slabs. Consideration should be given to the use of pre-cast concrete. Specification of concrete with recycled content where feasible. Lean design principles targeted.	Materials chosen for longevity, adaptability, flexibility and reusability or recoverability and to minimise operational energy consumption. Consider using reclaimed / recycled bricks. Use of pre-cast and pre-fabricated elements to be considered.	The location of plant equipment has been reviewed and results in a minimisation of the size of basement. Avoid over-specifying the required loads for the services.	Avoid additional finishes where not required.	Client to be involved in the specification throughout the process.	Manufacturers' packaging take-back schemes could be used to reduce the packaging. Best practice material procurement to minimise stockpiling and reduce risks of damages and waste; accurate material quantity to avoid overordering; reuse of existing materials where feasible.	Opportunities will be taken to re-use demolition materials where possible. Consideration has been given to the design to maximise useful space while optimising material use.	Challenges using recycled aggregate in structural frame. Site size, layout & location presents challenges for pre-cast material use.	Structural Engineer to investigate use of secondary aggregates (e.g. GBBS) within structural concrete.	Material efficiency review exercise at next stage of design. Bill of quantities analysis

Building "Layer"	Site	Substructure	Superstructure	Shell/Skin	Services	Space	Stuff	Construction stuff	Summary	Challenges	Counter actions + Who + When	Plan to prove and quantify
		within concrete.										
Minimising the quantities of other resources used (energy, water, land)	Brownfield site chosen for development.	The basement design has resulted in a small footprint, therefore requiring less excavation and land use.	Designing for disassembly and adaptability to avoid unnecessary materials use, cost and disruption arising from the need for future adaptation works as a result of changing functional demands and to maximise the ability to reclaim and reuse materials at final demolition in line with the principles of a circular economy. A Whole Life Carbon Assessment has been undertaken and accompanies the planning application (and is summarised in Appendix A) aiming to reduce the embodied and operational carbon emissions	A Whole Life Carbon Assessment has been undertaken and accompanies the planning application aiming to reduce the embodied and operational carbon emissions. South elevation has deep inset windows to provide shade and minimise overheating risks. Windows on the North Elevation are flush with the facade to maximise light gains.	The development will minimise cooling requirements through passive design measures. The consumption of potable water should be minimised in sanitary applications by encouraging the use of low water use and water efficient fittings, technologies and processes. PV panels are currently proposed.	n/a	n/a	The contractor will be required to monitor, and report energy and water use during construction works on-site. (BREEAM Man 03). Water use on site for demolition works will be minimised.	The development is on a brownfield site. Passive design measures and LZC technologies will be implemented. The Contractor will be required to monitor energy and water use on site.	Site size and shape influences building design.	Ensure further development of the energy strategy.	Review exercise at next stage of design.
Specifying and sourcing materials responsibly and sustainably	Sustainable procurement plan to be in place at an early Stage of the design in line with BREEAM Mat 3.	Materials to be certified in line with BREEAM Mat 3, i.e. - BES6001	Prioritise products certified with high tier such as BES6001 Specifying concrete materials and	Prioritise materials with EPDs and compare material manufacturers	Source materials for services with a high percentage of recycled content, and	Whenever possible source local materials to reduce transportation impacts.	Whenever possible source local materials to reduce transportation impacts.	All timber and timber-based products used during the construction process of	Materials to be responsibly sourced, and locally sourced where possible.	Potential cost premium especially for high recycled content materials due	Ensure structural design is optimised Preconstruction supply chain engagement	Certificates to be submitted

Building "Layer"	Site	Substructure	Superstructure	Shell/Skin	Services	Space	Stuff	Construction stuff	Summary	Challenges	Counter actions + Who + When	Plan to prove and quantify
	Prioritise locally sourced materials where possible	- FSC - PEFC - CARES - ISO14001 Whenever possible, use of materials that can be reused at end of life cycle. Use of site won demolition materials for piling mat where suitable.	reinforcements with recycled contents if feasible Whenever possible, use of materials that can be reused at end of life cycle.	and their carbon emissions. Move from concrete façade to brick façade. Consider reused / recycled materials if feasible.	recyclable content.			the project to be sustainable timber. Sustainable Procurement Plan to be developed and implemented. Plan to be reviewed with subcontractor s.	Preference should be given to materials with EPD's. All timber should be sustainably sourced.	to limited supply. Structural constraints for higher GGBS content.		
	Section B: Design to Eliminate Waste (and for ease of maintenance)											
Designing for reusability / recoverabili ty / longevity / adaptability / flexibility	N/A	Reduction of basement height with a mezzanine level optimises space. Basement uses the west side of the building as this is more space efficient.	Where possible designing for disassembly and adaptability to reduce waste and cost associated with future refurbishment or fit-out works and ultimately in demolition. Where possible improve the ability to cost-effectively reuse and recycle materials and increase the lifetime value of materials and products. Where possible use standardised components	Disassembly strategy Standardised components where possible Consideration of the lifespan of materials. Use of durable and resilient materials– brick and concrete. Move from concrete façade to brick façade.	Consider: - ease of replacement of components - adaptability of services for future reconfiguration	The building will have a open plan structure designed to optimise working space. The open plan structure is flexible and easily adaptable. Consider internal partition systems which easily allow to reconfiguration of internal spaces.	To be further considered during the fitout.	Sustainable Procurement Plan to be developed and implemented. Plan to be reviewed with subcontractor s. Consider the re-use and recycling of materials off-site where re-use on site is not practical. Consideratio n of agreements with material suppliers to reduce the amount of packaging, or to participate	The open plan structure optimises the working space within the building providing flexibility for use. The façade uses durable materials to aid longevity.	Site size, shape and accessibility present a challenge for the use of pre-cast material.	Review of Disassembly /Adaptability / recoverability during detailed design. Input is required from structural engineer, architect, contractor. Building services performance to be reviewed to ensure ease of maintenance.	Undertake lessons learnt at review at decommissioning

Building "Layer"	Site	Substructure	Superstructure	Shell/Skin	Services	Space	Stuff	Construction stuff	Summary	Challenges	Counter actions + Who + When	Plan to prove and quantify
								in a packaging take-back scheme. Implement a 'just in time' material delivery system to reduce the risk of damage.				
Designing out construction, demolition, excavation, industrial and municipal waste arising	Through the Site Waste Management Plan (SWMP) design out waste (Wst 1)	Optimisation of basement structure reduces excavation.	Where possible use - Reclaimed / reused materials. - DfMA approaches - Supplier take-back schemes - Using for a lean construction, an inventory management strategy	Where possible use - DfMA approaches - Supplier take-back schemes - Using for a lean construction, an inventory management strategy		Where possible use: - Supplier takeback schemes - Minimising Packaging - Using for a lean construction, an inventory management strategy	To be further considered during the fitout.	Procedures and commitments for minimising waste must be in place. Procedures for monitoring, measuring and reporting waste should also be implemented. Materials to be delivered 'just in time' and securely stored to minimise damage.	- Excavation waste reduced through basement design. - Us a lean construction, - Where possible reducing packaging and using supplier takeback schemes	Take back schemes are still challenging	Review at Detailed Design	SWMP
	Section C: Manage Waste											
Demolition waste (how waste from demolition of the layers will be managed)		Material to be crushed on site, with suitable material retained on site for re-use	Materials will be broken down and separated for recycling.	Materials will be broken down and separated for recycling.	Materials will be broken down and separated for recycling.	n/a	n/a	n/a	Materials will be re-used where possible.	Suitability of materials for -re-use. Location and accessibility of the site.	Pre-demolition audit and SWMP to be updated.	Pre-demolition audit and SWMP
Excavation waste (how waste from	Quantity of excavation waste	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Site constraints due to elevated plot.	N/A	SWMP

Building "Layer"	Site	Substructure	Superstructure	Shell/Skin	Services	Space	Stuff	Construction stuff	Summary	Challenges	Counter actions + Who + When	Plan to prove and quantify
excavation will be managed)	reduced through basement design.											
Construction waste (how waste arising from construction of the layers will be reused or recycled)	95% of the waste will be diverted from landfill. (Wst 01) The project target of total waste is ≤ 7.5 m3 per 100sqm of gross internal floor area. (Wst 01). The Contractor will use working methods which will minimise waste. A site waste management plan should be developed outlining expected waste materials, quantities and the waste hierarchy.					To be further considered during the fitout.	To be further considered during the fitout.	Segregation of waste on site to aid recycling. Where space on site is too limited to allow waste materials to be segregated, a waste contractor may be used to separate and process recyclable materials off site. Consider actions such as 'just in time' deliveries to minimise damage through storage. Avoid over-ordering of materials.	The contractor will provide a SWMP which will outline procedures for monitoring and reducing construction waste. 95% of the waste will be diverted from landfill. (Wst 01) The project target of total waste is ≤ 7.5 m3 per 100sqm of gross internal	To reduce the total waste to the targets	Preconstruction review with contractor	The SWMP should be provided Custody/application/destination of reused/recycled materials. BREEAM Wst 01 credit
Municipal and industrial waste (how the design will support operational waste management)	The recycling strategy for the building is based on a zonal structure with everything on site being brought down to the bin storage room via good lifts within each respective area. Collections will be made from	N/A	N/A	N/A	N/A	N/A	General waste and recyclable waste will be segregated.	N/A	Waste will be collected from each area and stored in the bin storage room on the ground floor. Waste will be collected from the service yard throughout the day.	Bins and containers are sealed to the external environment to ensure that they do not become a nuisance in terms of environmental health, noise and odour. The	Ensure adequate size of bin store for expected waste streams.	Waste Strategy

Building "Layer"	Site	Substructure	Superstructure	Shell/Skin	Services	Space	Stuff	Construction stuff	Summary	Challenges	Counter actions + Who + When	Plan to prove and quantify
	the service yard on the eastern side of the ground floor.									area will be screened from external visual receptors to reduce the visual impact on the surrounding areas.		

6.2 Plans for implementation

It is proposed the following actions are taken to implement and monitor the actions included in this circular economy statement;

RIBA stage 4/5 Design and construction stage

- BREEAM interim certificate including credits included in this statement
- Updated Building Circularity score
- Updated SWMP waste targets
- Updated Recycling and Waste Metrics Form
- Updated Bill of materials

As Built stage

- BREEAM certificate including credits included in this statement
- Updated Building Circularity score
- Updated SWMP demonstrating compliance to waste targets
- Updated Recycling and Waste Metrics Form
- Updated Bill of materials

6.3 End of life strategy

Design documents along with material specification and manufactures data sheets used in the development will be stored and updated as and when additional works are undertaken. This information can be used towards the end of life to inform the end of life strategy, disassembly, future reuse, waste avoidance, waste reduction.

The project envisaged end of life is not for 60 years at which point material reuse and recycling technologies are expected to be more advanced than today.

7.0 CONCLUSION

CONCLUSION

This Circular Economy statement sets out a course to maximise materials and resources circulating in the economy and so reduce reliance on virgin materials.

The calculated Building Circularity score (**Figure 2**) represents the total materials circularity both in use of materials for the project as well as end of life handling. It is calculated as the average of Materials Recovered (representing use of circular materials in the project) and Materials Returned (representing how effectively materials are returned, instead of disposed of or downgraded in value. The calculation is purely mass based without material weighing.

Figure 3 shows the quantities of Materials Recovered and Returned for the various categories with the information we have at this stage. In the proposed Pope's Road development the quantity of recycled materials is 10,655t, which corresponds to 30.1% of materials recovered. **Figure 3** also shows the quantities of materials returned which corresponds to a total of 53.9%.

Figure 4 shows the carbon emissions of the Transport in the categories A & B of RICS. The total Global warming produced for Pope's Road development is 150,076 KgCO_2e. **Figure 5** shows that 32.48% of it is coming from the horizontal structures.

Carbon emissions associated with transportation of construction can be managed and reduced by consolidating trips, reducing distances and shifting freight movements to cleaner modes.

Figure 6 shows the key material groups and their percentages of recovery, recycled and returned, therefore giving the percentage of circularity for each category. The percentage of circularity can be increased through specification of products with high levels of recycled materials and which are readily recyclable. The recyclability and overall environmental impact of a chosen material is most accurately assessed using product level EPD's. The percentage of circularity can be tested through the procurement process as more detail surrounding the final products includes EPD's are known.

This circular economy statement summarises the proposed approach and actions taken up to RIBA stage 3 for the proposed development as well as the proposed measures and monitoring and reporting mechanisms that will be implemented through its life cycle.

The statement demonstrates the project adheres to the GLA's circular economy principles and policy requirements and has a calculated building circular economy score of 42%.

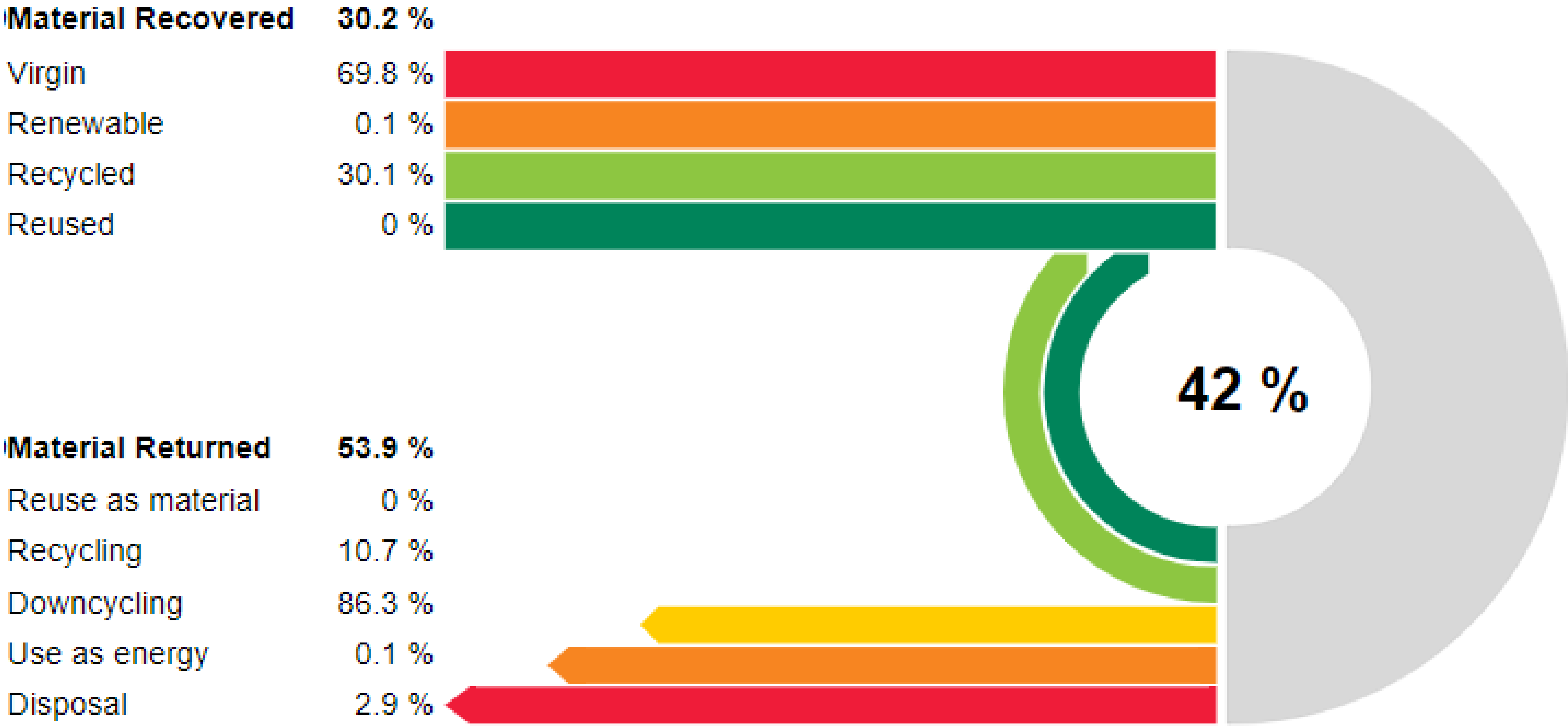


Figure 2 - Diagram showing Building Circularity score as calculated using Bionova One Click

Building Circularity - Materials Recovered

Result category	Total tons	Virgin tons	Renewable tons	Recycled tons	Reused tons	
Construction Materials	33 848	23 380	11	10 456	0	Details
Earth masses, asphalt and stones	0	0	0	0	0	Details
Construction site - material wastage	667	471	0	196	0	Details
Material replacement and refurbishment	854	839	11	3	0	Details
Total	35 368	24 690	23	10 655	0	Details

Building Circularity - Materials Returned

Result category	Reuse as material tons	Recycling tons	Downcycling tons	Use as energy tons	Disposal tons	
Construction Materials		3 237	30 102	26	484	Details
Earth masses, asphalt and stones			0			Details
Construction site - material wastage		235	404	1	26	Details
Material replacement and refurbishment		325		20	508	Details
Total		3 798	30 506	46	1 018	Details

Figure 3 - Tables showing quantities of Materials Recovered and Returned

Transport carbon intensity

Transport carbon intensity values are based on the transport figures from associated LCA tool. They are not rendered in the input forms of the circular economy tool to maintain the tool readable. Use these data for HQE Performance Economie Circulaire for example.

Result category	Global warming kg CO_2e	Payload distance tkm	
Transport	150 076	2 258 003	Details

Figure 4 - Transport Carbon Emissions associated with RICS modules A + B

Construction	Resource	User input	Global warming kg CO_2e	Payload distance tkm	Comments
Building materials > Foundations and substructure > Foundation, sub-surface, basement and retaining walls					
		Section share	16,01 %	16,18 %	
Building materials > Vertical structures and facade > External walls and facade					
		Section share	7,78 %	13,51 %	
Building materials > Vertical structures and facade > Columns and load-bearing vertical structures					
		Section share	7,69 %	13,35 %	
Building materials > Vertical structures and facade > Internal walls and non-bearing structures					
		Section share	2,72 %	4,48 %	
Building materials > Horizontal structures: beams, floors and roofs > Floor slabs, ceilings, roofing decks, beams and roof					
		Section share	32,48 %	39,6 %	
Building materials > Other structures and materials > Other structures and materials					
		Section share	0,96 %	1,67 %	
Building materials > Other structures and materials > Windows and doors					
		Section share	0,8 %	1,4 %	
Building materials > External areas and site elements > Materials and constructions for external areas					
		Section share	2,36 %	4,09 %	
Building materials > Building technology > Building systems and installations					
		Section share	29,19 %	5,73 %	

Figure 5 - Breakdown of emissions from transport in modules A+B

Building Circularity - Key Material Groups

Result category	Total tons	Virgin %	Materials Recovered %	Disposal %	Downcycling and use as energy %	Recycling and reuse as material %	Materials Returned %	Circularity %	
Concrete	28 337	68	32		100		50	41	Details
Metals	1 377	40	60			100	100	80	Details
Bricks and ceramics	1 585	96	4		100		50	27	Details
Gypsum-based	1 520	78	22	0	12	88	94	58	Details
Insulation	323	80	20	98	2		1	10	Details
Glass									Hide empty
Wood and biogenic									Hide empty
Earth masses and asphalt	0	0	0		0		0	0	Details
Other materials	706	89	11	24	3	74	75	43	Details

Figure 6 - Key materials groups and the predicted percentages of recovery, recycling and returned at decommissioning

8.0 APPENDICES

APPENDIX A. BILL OF MATERIALS

Layer	Element	Material quantity (kg)	Material intensity (kg/m2 Gross Internal Area	Recycled content / secondary aggregates (% by value)	Reused content (% by value)	Estimated reusable materials (kg/m2)	Estimated recyclable materials (kg/m2)	Source of information [Examples are given below]
Structure	*Substructure*	*38 477 736*	*1 405*	*45*	*0*		*223*	*Oneclick Building Circularity, GLA*
	Upper Floors	*12 040 878*	*440*	*35*	*0*		*438*	*Oneclick Building Circularity, GLA*
	Frame	*7 310 787*	*267*	*44*	*0*		*267*	*Oneclick Building Circularity, GLA*
	Stairs	*625 863*	*23*	*0*	*0*		*23*	*Oneclick Building Circularity, GLA*
Shell/Skin	*Roof*	*191 656*	*7*	*2*	*0*		*7*	*Oneclick Building Circularity, GLA*
	External Walls	*3 432 373*	*125*	*26*	*0*		*115*	*Oneclick Building Circularity, GLA*
	Windows and External doors	*236 470*	*9*	*0*	*0*		*9*	*Oneclick Building Circularity, GLA*
Space	*Internal Walls and Partitions*	*1 399 621*	*51*	*9*	*0*		*51*	*Oneclick Building Circularity, GLA*

	Internal doors	*17 697*	*1*	*0*	*0*			*Oneclick Building Circularity, GLA*
	Finishes	*23 898*	*1*	*0*	*0*			*Oneclick Building Circularity, GLA*

APPENDIX B. RECYCLING AND WASTE REPORT

CATEGORY	TOTAL ESTIMATE	OF WHICH…		% not reused or recycled max 5%		SOURCE OF INFORMATION
	t/m2 Gross Internal Area (GIA)	*% reused or recycled onsite*	*% reused or recycled offsite*	*% to landfill*	*% to other management (e.g. incineration)*	
Excavation waste		Not applicable	Not applicable	*Not applicable*		*Estimate based on stage 3 drawings, scope of works & assumed methodology. To be updated by the appointed contractor prior to works commencing on site based on stage 4 information.* *Main considerations – foundations and earthworks to GV1/2 link, Barkentine plantroom foundations & trench, minor external works*
				Not applicable	*Not applicable*	
Demolition waste		*10%*	*85%*	*Not applicable*		*Estimate based on stage 3 drawings, scope of works & assumed methodology. To be updated by the appointed contractor prior to works commencing on site based on stage 4 information.* *Main considerations – cladding removal, GV 1/2/4 louvre removal, GV 1/2/4 roof steelwork & ballast, GV 1/2/4 structural openings.*
				5%		
Construction waste	*6.5*	*10%*	*85%*			*BREEAM Pre-Assessment document*
				5%		
	t/annum	*% reused on or off site*	*% recycled or composted, on or off site*	*% not reused or recycled*		
				% to landfill	*% to other management (e.g. incineration)*	
Municipal waste	*N/A*	*N/A*	*65%*	*Max. 35% and no recyclable or compostable waste*		*No waste strategy as no additional waste generated as result of new data hall floor*
Industrial waste (if applicable)	*N/A*	*N/A*	*N/A*	*Max. 35% and no recyclable or compostable waste*		*N/A*

APPENDIX C. WLCA – SUMMARY

A Whole Life Cycle Assessment (WLCA) in accordance with the GLA requirements has been undertaken for the proposed Pope's Road development. This has been done with the aim of recognising and encouraging measures to optimise construction product consumption efficiency, and the selection of products with a low environmental impact (including embodied carbon) over the life cycle of the building.

The WLCA has been run for the new building in line with the GLA requirements. This has been based on materials data provided by the project design team for applicable building elements required by the GLA methodology where gaps where found, the Oneclick database was used.

An options appraisal has been undertaken for the superstructure and the sub-structure. This has exemplified differing design scenarios potentially available to the project team to reduce the environmental impact of the proposed development.

The following conclusions can be drawn from the results summarised in the WLCA report:

The proposed development achieved a One Click WLCA 'Embodied Carbon Benchmark' rating of E, demonstrating 658kgCO2e/m2.

The Embodied Carbon emissions, associated with the Cradle to grave (A1-A4, B4-B5, C1-C4) are in line with the RICS methodology, EN 15978 and Greater London Authority guidance for whole life-cycle carbon assessments.

The material contributing the most to kgCO2e emissions was found to be Hollow core concrete slab (20.4%), followed by Reinforcement steel (rebar) (11.8%), then Reinforced or prestressed concrete plate for cast-in-situ concrete (11.5%).

The following recommendations are suggested:

- Reinforcement steel to be reduced whenever possible, avoiding overspecification.
- A larger percent of recycled steel, to be considered in the steel sections.
- The proposed ready-mix concrete to include Cement replacement with blast furnace slag (GGBS)

The results presented in the WLCA report summarise the WLCA undertaken at the Concept Design Stage in support of the GLA requirements and supporting documents.

The calculated operational energy WLC emissions for the development using current grid electricity carbon factors (SAP 10) are 1089 kgCO2e/m2(GIA) and 285 kgCO2e/m2(GIA) for future decarbonised grid electricity.

The GLA WLC appendix A Module A-D, total emissions for the proposed development (option 1) using current grid electricity carbon factors (SAP 10) are 1696 kgCO2e/m2(GIA) and 890 kgCO2e/m2(GIA) for future decarbonised grid electricity.

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