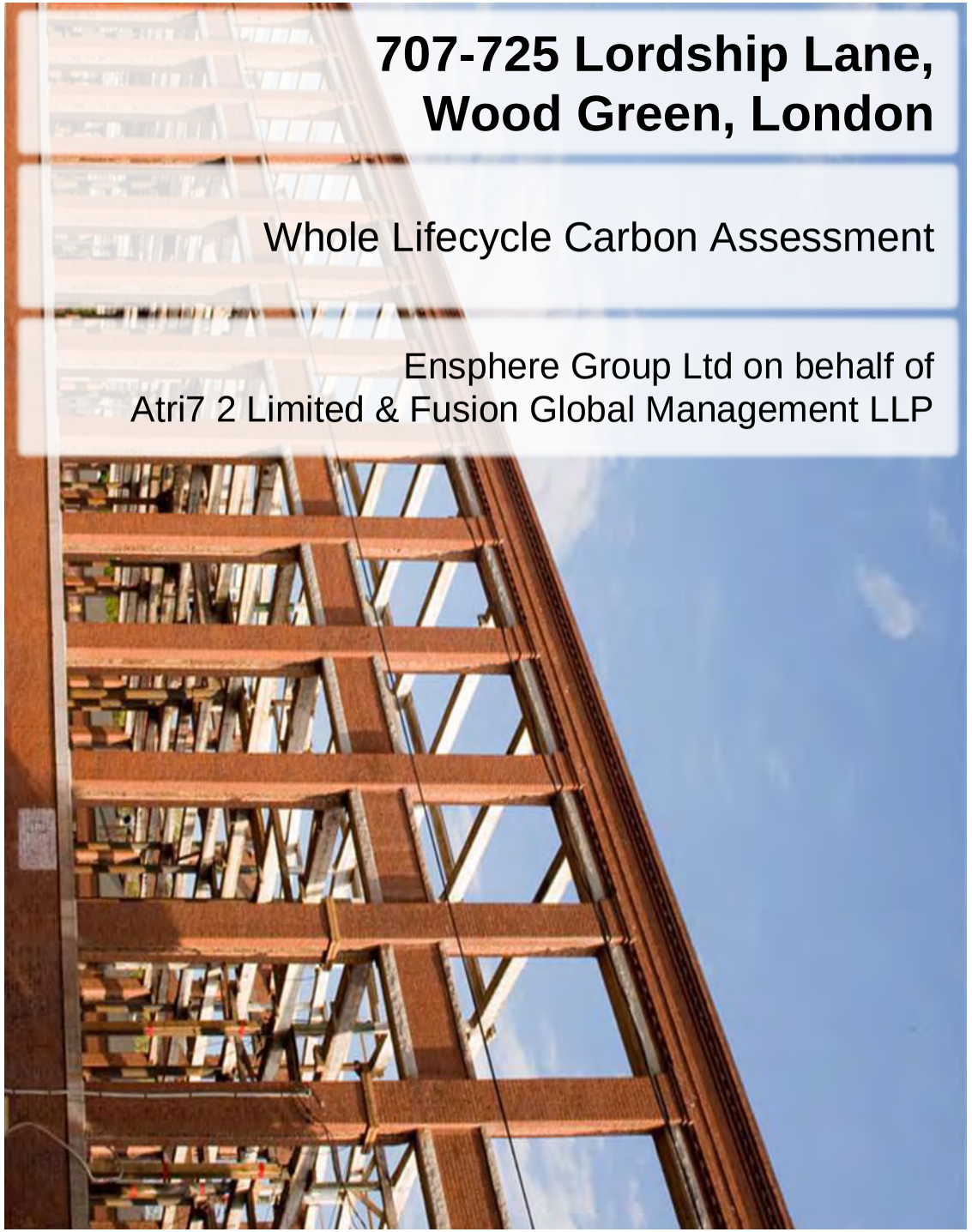
707-725 Lordship Lane, Wood Green, London

Whole Lifecycle Carbon Assessment

Ensphere Group Ltd on behalf of
Atri7 2 Limited & Fusion Global Management LLP



Ensphere Group Ltd
55a Catherine Place
London, SW1W 0AU
+44 (0) 20 7846 9040
www.enspheregroup.com

ensphere

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Whole Lifecycle Carbon Assessment

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1. Executive Summary

1.1 This Whole Lifecycle Carbon ("WLC") considers the carbon emissions resulting from the construction and use of the proposed development at 707-725 Lordship Lane, Wood Green, London.

1.2 The proposed development will comprise a mixed-use scheme consisting of affordable homes, purpose-built student accommodation, and flexible ground floor commercial (Class E) floorspace within buildings ranging between 3 – 9 storeys, public realm and landscaping works, cycle parking, and associated works.

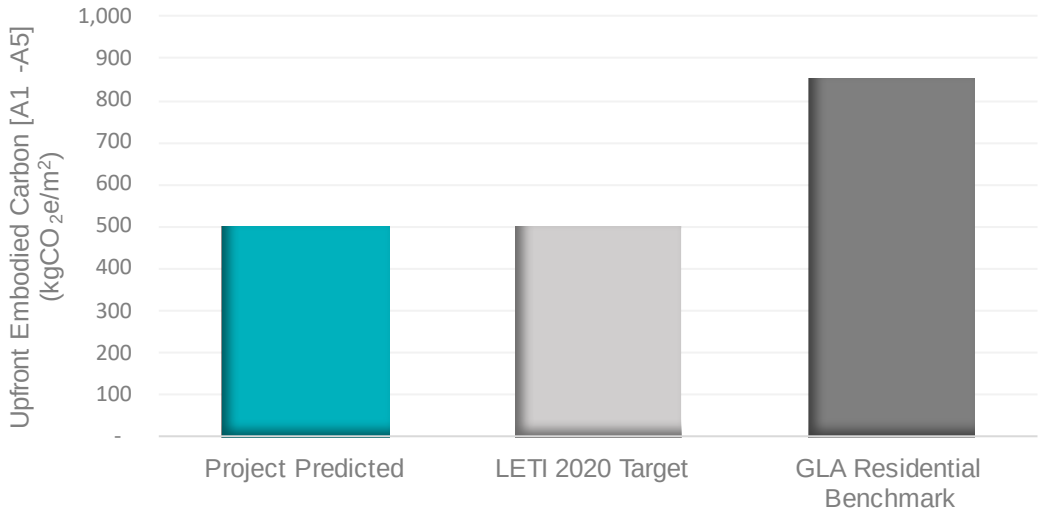
1.3 Consideration has primarily been given to the planning policy and other relevant standards and guidance prior to specifying the assessment object.

1.4 All stages of the project have then been considered, from raw material extraction, product manufacturing, transport, and installation on site through to the operation, maintenance, and eventual material disposal.

1.5 Best available data has been used, with the acknowledgement that this assessment has been undertaken at a relatively early stage of design.

1.6 Specialist software has been used with emissions calculated using the One Click LCA software, utilising both the GLA compliant & EN15804 +A2 data supported LCA calculation tools.

1.7 The assessment has reviewed WLC over a 60-year period, in line with the recommended RICS approach. This identified total WLC emission of 41,204,317 $kgCO_2e$, with embodied carbon emissions equivalent to ~501 $kgCO_2e/m^2$ (below the 850 $kgCO_2e/m^2$ threshold given by GLA for residential developments).



1.8 The key lifecycle stages responsible for these emissions are [A1-A3] Materials Emissions (11,786,620 kg CO_2e), [B4] Material replacement (4,508,615 kgCO_2e), and the [B6] Operational Energy Use (21,410,208 kg CO_2e).

2. Introduction

2.1 Ensphere Group Ltd was commissioned by Atri7 2 Limited & Fusion Global Management LLP to undertake a Whole Lifecycle Carbon Assessment for a proposed development at 707-725 Lordship Lane, Wood Green, London.

Site and Surroundings

2.2 The Site is located within the Wood Green Town Centre, approximately 150m east of Wood Green Station.

2.3 The Site is approximately 0.86 hectares (ha) in size and is currently occupied by a single storey building, in use by Mecca Bingo as a bingo hall. The remainder of the Site is occupied by surface level car parking. The site is bound by:

- Lordship Lane (A109) to the north of the site;
- Sultan Terrace and Vincent Square to the east of the site;
- Residential properties along Moselle Avenue to the south of the site; and
- Omnibus House and Redvers Road to the west of the site.

2.4 Within the surrounding context, Lordship Lane is characterised by a variety of two and three storey properties, to the east of the application site is bound by a housing estate with three storey blocks, the southern boundary is characterised by Wellesley Road with two and three storey town houses and the rear gardens of the properties along Moselle Avenue. The West of the application site is bound by Omnibus House, a seven to nine storey residential building.

2.5 The Site is not located within a Conservation Area, nor does it contain any listed buildings. The Noel Park Conservation Area is located immediately to the south of the site.

Proposed Development

2.6 Demolition of the existing building and redevelopment to provide affordable homes, purpose-built student accommodation, and flexible ground floor commercial (Class E) floorspace within buildings ranging between 3 – 9 storeys, public realm and landscaping works, cycle parking, and associated works.

Report Objectives

2.7 To assess the carbon emissions resulting from the construction and use of the building over its entire life, to improve understanding, consistent measurement and enable comparability of results, benchmarking and target setting to achieve carbon reductions.

3. Assessment Framework

3.1 Whole life-cycle carbon ("WLC") emissions are the carbon emissions resulting from materials, construction and use of a building over its entire life, including its demolition and disposal. A whole life carbon approach identifies the overall best combined opportunities for reducing lifetime emissions and helps to avoid unintended consequences of focusing on operational emissions alone.

Relevant Standards & Guidance

3.2 The framework for appraising the environmental impacts of the built environment is provided by BS EN 15978:2011, a European Standard now adopted at a national level. The Standard specifies the calculation method, based on Life Cycle Assessment (LCA) and other quantified environmental information, to assess the environmental performance of a building. It also gives the means for the reporting and communication of the outcome of the assessment.

3.3 The standard gives:

- The description of the object of the assessment;
- The system boundary that applies at the building level;
- The procedure to be used at the inventory analysis;
- The list of indicators and procedures for the calculations of these indicators;
- The requirements for presentation of the results in reporting and communication; and
- The requirements for the data necessary for the calculation.

3.4 In response to the challenge of ensuring consistency with the application of BS EN 15978, further work has been undertaken by organisations including the Royal Institute of Chartered Surveyors (RICS) and the Building Research Establishment (BRE), with the following references also being pertinent to this assessment:

- RICS Professional Statement – Whole Life Carbon Assessment for the Built Environment 1st Edition (RICS; ISBN 978 1 78321 208 8, November 2017); and
- BRE Global Methodology for the Environmental Assessment of Buildings Using EN 15978:2011 (Building Research Establishment; ref PN 326 Rev 0.0; January 2018)

4. Planning Context

4.1 Local planning policy relevant to the assessment is considered below:

National Context

National Planning Policy Framework (2023)



4.2 The National Planning Policy Framework (NPPF) was updated in December 2023. Paragraphs 7 of the revised NPPF include reference to the following:

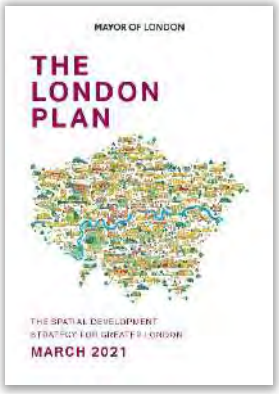
7. "The purpose of the planning system is to contribute to the achievement of sustainable development, including the provision of homes, commercial development, and supporting infrastructure in a sustainable manner. At a very high level, the objective of sustainable development can be summarised as meeting the needs of the present without compromising the ability of future generations to meet their own needs.

4.3 Minimising emissions and waste are listed as part of the "environmental objective" in relation to achieving sustainable development.

London Context

London Plan (2021)

4.4 The London Plan is the overall strategic plan for London, it sets out an integrated economic, environmental, transport and social framework for the development of London over the next 20-25 years. The London Plan is part of the Development Plan and covers a range of planning issues. The presented policies provide a vision for how London should sustainably grow and develop in the future. Policies considered pertinent to this report are presented below:



- Policy SI 2 (*Minimising greenhouse gas emissions*) - Development proposals referable to the Mayor should calculate whole life-cycle carbon emissions through a nationally recognised Whole Life-Cycle Carbon Assessment and demonstrate actions taken to reduce life-cycle carbon emission.

London Plan Guidance – Whole Life-Cycle Carbon Assessments (March 2022)

4.5 The guidance document explains how to prepare a WLC assessment which should accompany all referable planning applications in line with the London Plan Policy SI 2. The guidance follows BS EN 15978 using the RICS Professional Statement as the methodology for assessment.

North London Waste Plan (Adopted 2022)

4.6 The seven North London Boroughs are working together to produce the North London Waste Plan (the 'NLWP'). The NLWP's purposes is to ensure there will be adequate provision of suitable land and to provide policies for waste development.

Local Context

Haringey's Local Plan Strategic Policies (2013; consolidated with alterations since 2017)



4.7 The Local Plan sets out the key planning policies for the future development of the borough up to 2026 and provide a consistent basis for deciding planning applications.

4.8 The following policies are considered pertinent to this report:

- Policy SP4 (*Working Towards a Low Carbon Haringey*) - requires a 25% improvement on Part L 2010 (equivalent to a 19% improvement on Part L 2013 and Code Level 4 energy performance). Non-residential to achieve BREEAM "Very Good" and aspire to "Excellent". Promotes low carbon technologies;

- Policy SP6 (*Waste and Recycling*) – requires integrated, well-designed recycling facilities to be incorporated into all new developments;

- Policy SP11 (*Design*) – encourages all new developments to be sustainable and impacts on biodiversity, natural resources, climate change, and health are minimised;

Haringey's development Management DPD – (July 2017)



4.9 This Development Plan Document (DPD) provides support to help contribute to the delivery of sustainable development in accordance with the Haringey strategy. It sets out criteria based policies against which planning applications will be assessed.

4.10 The following policies are highlighted:

- Policy DM4 (*Provision and Design of Waste Management Facilities*) - All proposals should consider how to sustainably manage waste arising from the development during the design, construction and occupation phases;

- Policy DM21 (*Sustainable Design, Layout and Construction*) – Promotes new developments to consider and implement sustainable design, layout and construction techniques;

- Policy DM23 (*Environmental Protection*) – requires new development proposals to consider air quality, noise and vibration, light pollution, contaminated land and hazardous substances;

5. Specification of the Object of Assessment

5.1 The following section outlines the parameters by which the Whole Life-Cycle Carbon Assessment has been undertaken. Specification of the boundaries is necessary to ensure consistency of approach and comparison.

Spatial Boundaries

5.2 A Whole Life-Cycle Carbon Assessment should consider all building components and works relating to the project, including any external works within the site boundary. The site boundary needs to be in line with the definition and intended use of the built asset, including all contiguous land that is associated with the project and that supports its operations.

5.3 For the WLC assessment, the spatial boundary is consistent with the red-line site boundary presented in support of the application.

Building Physical Characteristics

5.4 This section outlines the building parts, elements, and components to be included in a Whole Life-Cycle Carbon Assessment. The physical characteristics are as described in schedule of accommodation and architect drawings and include:

- The proposed development is for a purpose-built student accommodation building, shared ownership and social rent residential units as well as some flexible ground floor commercial floorspace. Buildings will range between three and nine storeys.
- Additional landscaping is also proposed, with associated cycle parking, waste/recycling storage, landscaping and other ancillary works.

5.5 In line with the GLA approach, any carbon emissions associated with pre-construction demolition have been accounted as part of the proposed development's lifetime carbon emissions. The assumption of 50kgCO_2e/m^2 for the existing areas being demolished has been assumed. With the footprint of the existing Mecca Bingo hall measuring approximately 3,700 m^2, emissions are estimated at 185,000 kgCO_2e.

Reference Study Period

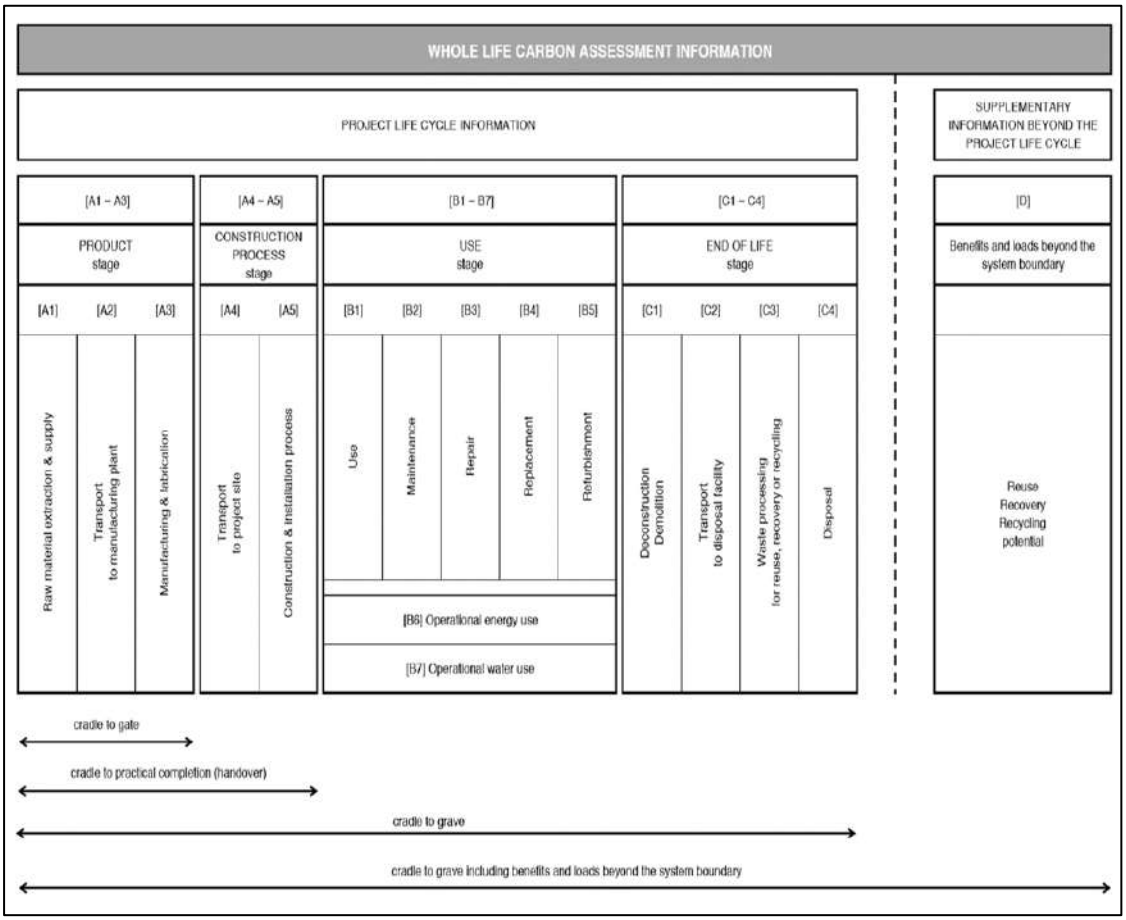
5.6 The Reference Study Period (RSP) to be used for the Whole Life-Cycle Carbon Assessment is defined by the RICS PS as being dependent on the nature of the development. RICS PS gives reference to the number of years referred to under non-domestic standards; including BREEAM 2014 New Construction – Mat01 Life Cycle impacts; and LEED v.4 standards whereby a 60-year study period is specified. The RICS PS references to both the BREEAM and LEED standards are purely to ensure compatibility with other similar approaches. Furthermore, the

acknowledgement of the 2014 version of BREEAM is due to the publishing date of the RICS PS; before the release of BREEAM New Construction 2018.

Life Cycle Stages - Overview

5.7 The stages are as presented in BS EN 15978:2011, the boundaries of which are all clearly defined to ensure consistency of approach and comparison between the whole life results for different projects.

Figure 5.1 Whole Life Cycle Stages (RICS PS adapt. of BS EN 15978:2011 stages)



5.8 Certain potential sources of carbon (e.g., transport emissions associated with the use stage) are outside the scope; and whilst these emissions might be picked up through other assessment (organisational carbon foot printing), they are not including within Whole Life-Cycle Carbon Assessment. This is because the WLC methodology is an assessment of the built environment only.

Units of Measurement

5.9 The units of measurement are reported in $kgCO_2$ equivalent ("$kgCO_2e$"). This is standard unit for measuring carbon footprints and expresses the impact of each different greenhouse gas in

terms of the amount of CO_2 that would be required to create the same amount of warming. It therefore allows for the simultaneous assessment of multiple greenhouse gases.

Future Energy Projections

5.10 The energy sector is a major carbon emitter and will need to continue to decarbonise over time to be consistent with national policy targets. To enable consistency in the calculation of life cycle carbon impacts, EN15978 suggests that current practices shall apply to any future projections and does not allow for decarbonisation in the calculations. This is in line with the GLA methodology as the data surrounding the decarbonisation of the electricity grid is not reliable to use for accurately estimating embodied carbon emissions. SAP10.2 carbon conversion factors have been used in this assessment.

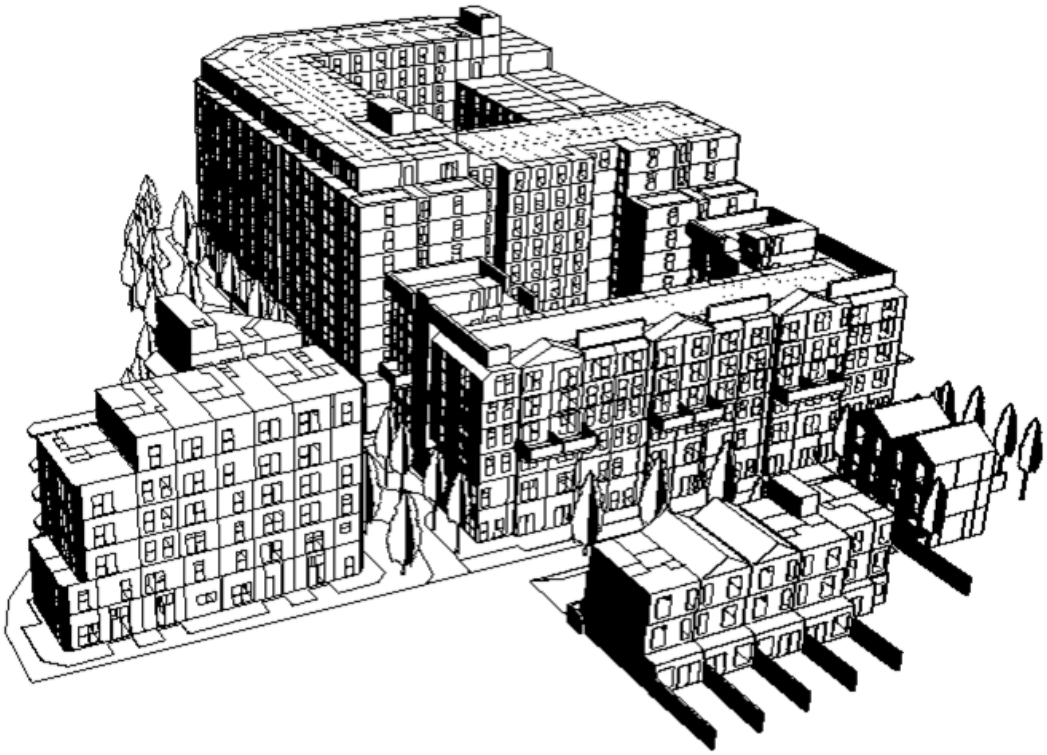
6. Methodology

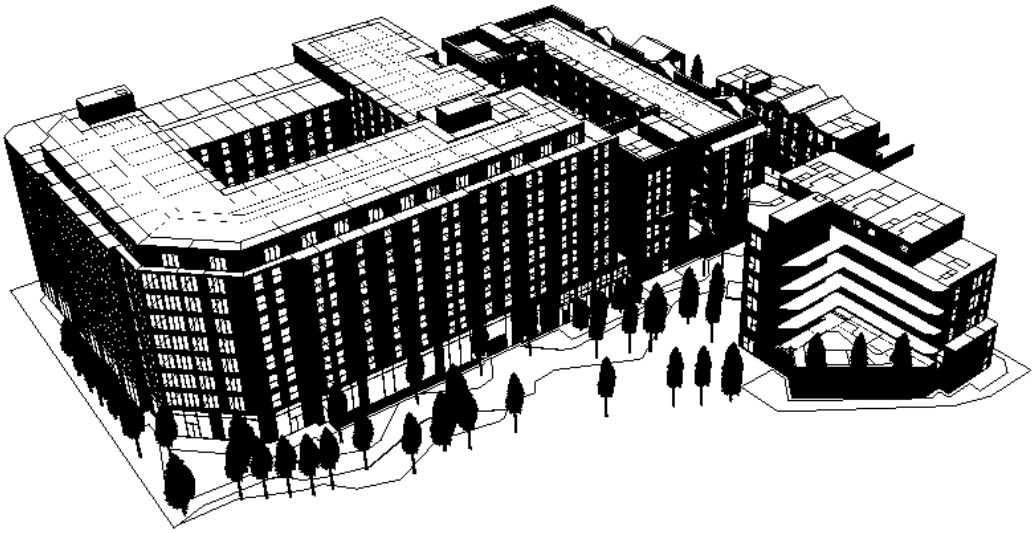
6.1 The Whole Life-Cycle Carbon Assessment was calculated using the One Click LCA software, utilising both the GLA compliant & EN15804 +A2 data supported LCA calculation tools.

6.2 The geometries of the building were modelled within IES VE 2023, based upon drawings provided by the architect. Once this was completed, data detailing the measurements of building elements were exported from IES VE 2022 and inserted into One Click LCA, providing the appropriate material quantities for the assessment. This process was assisted by the project cost plan, as well as detailed architectural and structural assumptions for the relevant materials.

6.3 Building materials were then attached to the appropriate building elements based on available information from the design team, including the cost plan.

Figure 6.1 IES Representation of the Site





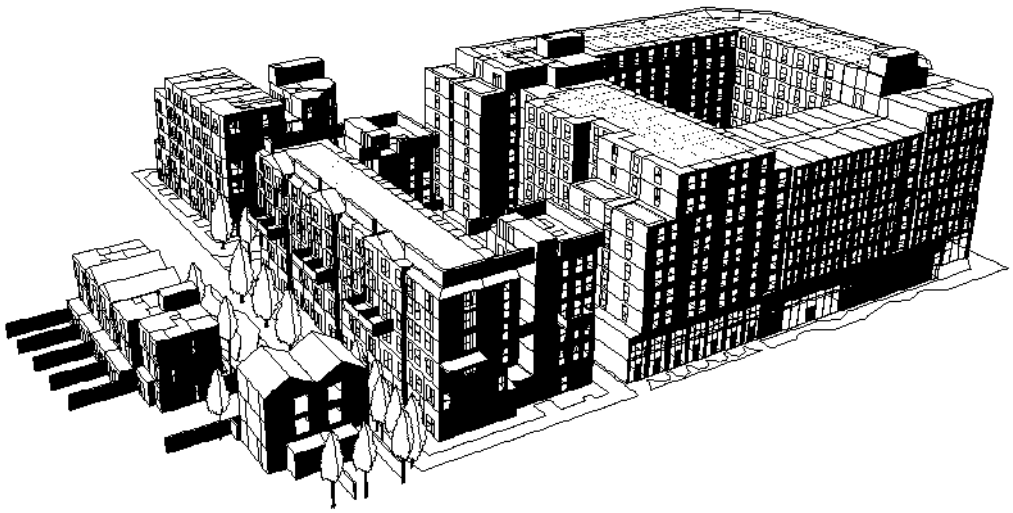


Table 6.1 WLC Primary Data Sources Summary

Lifecycle Stage		Data Source
Product Stage	A1: Raw Material Supply	IES-VE, Cost Plan, One Click LCA database and architect material details
	A2: Transport	One Click LCA database
	A3: Manufacturing	One Click LCA database
Construction Process Stage	A4: Transport to Building Site	One Click LCA database
	A5: Installation into Building	One Click LCA database
Use Stage	B1: Use / Application	One Click LCA database Submission Documents

	B2: Maintenance	One Click LCA database
	B3: Repair	One Click LCA database
	B4: Replacement	One Click LCA database
	B5: Refurbishment	One Click LCA database
	B6: Operational Energy Use	Building Regulations Part L Report
	B7: Operational Water Use	BSRIA BG9-2011 (Rules of thumb), London Plan Policy
End of Life Stage	C1: Deconstruction / Demolition	One Click LCA database
	C2: Transport	One Click LCA database
	C3: Waste Processing	One Click LCA database
	C4: Disposal	One Click LCA database
Benefits & Loads Beyond the System Boundary	D: Reuse / Recovery / Recycling	One Click LCA database

7. Product Stage [A1-A3]

7.1 The product stage deals with the carbon emissions attributable to the cradle to gate processes; raw materials supply, transport, and manufacturing; and comprise:

- Raw Material Extraction & Supply [A1]
- Transport to Manufacturing Plant [A2]
- Manufacturing & Fabrication [A3]

7.2 The processes covered by [A1–A3] frequently occur in several steps, where components are manufactured and then transported to a further fabrication plant for assembly into a system; and all of these interim steps need to be taken into account.

7.3 The calculation for the carbon emissions associated with the product stage [A1-A3] requires the assignment of suitable embodied carbon factors to the given elemental material quantities, as follows:

[A1-A3] = Material quantity (a) x Material embodied carbon factor (b)

7.4 Given the early stage of assessment, technical specification is still indicative, therefore generic data, representative of standard, market average specifications have been used where no specific material details are available.

7.5 Environmental information for the product stage is defined in the product Environmental Product Declaration (EPD). But where no EPD is available, scenarios for products have been defined from cradle to gate modules according to EN15804.

7.6 The following table summarises the building materials assumptions:

Table 7.1 Building Materials

Category	One Click LCA Resource	Quantity (kg)
	Substructure	
Foundations	Ready-mix concrete, normal strength, generic, C32/40 (4600/5800 PSI) with CEM II/B-V, 20% fly ash content in cement (300 kg/m3; 18.7 lbs/ft3 total cement) (One Click LCA 2022)	2,520,000
	Reinforcement steel (rebar), generic, 97% recycled content (typical), A615 (One Click LCA 2022)	158,000
	Ready-mix concrete, normal strength, generic, C32/40 (4600/5800 PSI) with CEM II/B-V, 20% fly ash content in cement (300 kg/m3; 18.7 lbs/ft3 total cement) (One Click LCA 2022)	16,800,000
	Reinforcement steel (rebar), generic, 97% recycled content (typical), A615 (One Click LCA 2022)	123,000
	Ready-mix concrete, normal strength, generic, C32/40 (4600/5800 PSI) with CEM II/B-V, 20% fly ash content in cement (300 kg/m3; 18.7 lbs/ft3 total cement) (One Click LCA 2022)	3,150,000

Lowest Floor Construction	Reinforcement steel (rebar), generic, 97% recycled content (typical), A615 (One Click LCA 2022)	189,000
	Damp insulation PA, 0.08 kg/m2	420
	Rock wool (mineral wool) insulation, unfaced, L = 0.0315 W/mK, R = 1 m2K/W, 31.5mm, 1.26 kg/m2, 40 kg/m3, (Range: 36-50kg/m3), 22% slag content (One Click LCA)	6,615
	Ready-mix concrete, normal strength, generic, C32/40 (4600/5800 PSI) with CEM II/B-V, 20% fly ash content in cement (300 kg/m3; 18.7 lbs/ft3 total cement) (One Click LCA 2022)	180,000
	Reinforcement steel (rebar), generic, 97% recycled content (typical), A615 (One Click LCA 2022)	8,000
Superstructure		
Frame	Ready-mix concrete, normal strength, generic, C32/40 (4600/5800 PSI) with CEM II/B-V, 20% fly ash content in cement (300 kg/m3; 18.7 lbs/ft3 total cement) (One Click LCA 2022)	552,000
	Reinforcement steel (rebar), generic, 97% recycled content (typical), A615 (One Click LCA 2022)	28,000
Upper Floors	Ready-mix concrete, normal strength, generic, C32/40 (4600/5800 PSI) with CEM II/B-V, 20% fly ash content in cement (300 kg/m3; 18.7 lbs/ft3 total cement) (One Click LCA 2022)	4,680,000
	Reinforcement steel (rebar), generic, 97% recycled content (typical), A615 (One Click LCA 2022)	210,000
	Ready-mix concrete, normal strength, generic, C32/40 (4600/5800 PSI) with CEM II/B-V, 20% fly ash content in cement (300 kg/m3; 18.7 lbs/ft3 total cement) (One Click LCA 2022)	7,041,600
	Light gauge steel for façade infill or load bearing systems, t: 1,2, 1.6, 2.0 mm, 7850kg/m3, EOS Steel Frame (EOS Framing Ltd.)	224,000
	Ready-mix concrete, normal strength, generic, C32/40 (4600/5800 PSI) with CEM II/B-V, 20% fly ash content in cement (300 kg/m3; 18.7 lbs/ft3 total cement) (One Click LCA 2022)	855,000
	Reinforcement steel (rebar), generic, 97% recycled content (typical), A615 (One Click LCA 2022)	53,000
	Ready-mix concrete, normal strength, generic, C32/40 (4600/5800 PSI) with CEM II/B-V, 20% fly ash content in cement (300 kg/m3; 18.7 lbs/ft3 total cement) (One Click LCA 2022)	1,760,400
	Reinforcement steel (rebar), generic, 97% recycled content (typical), A615 (One Click LCA 2022)	56,000
	Ready-mix concrete, normal strength, generic, C32/40 (4600/5800 PSI) with CEM II/B-V, 20% fly ash content in cement (300 kg/m3; 18.7 lbs/ft3 total cement) (One Click LCA 2022)	1,710,000
	Reinforcement steel (rebar), generic, 97% recycled content (typical), A615 (One Click LCA 2022)	106,000
	Ready-mix concrete, normal strength, generic, C32/40 (4600/5800 PSI) with CEM II/B-V, 20% fly ash content in cement (300 kg/m3; 18.7 lbs/ft3 total cement) (One Click LCA 2022)	3,499,200
	Reinforcement steel (rebar), generic, 97% recycled content (typical), A615 (One Click LCA 2022)	112,000
	Self-levelling mortar (SLM), 2024.3 kg/m3, 2.41 Mpa, additive: polyfunctional plasticizer, 50% recycled fine aggregate (One Click LCA)	75,384
	Glass fiber reinforcement mesh, 25 mm diam. glass fibre rods, 2200 kg/m3, Combar® (Schöck Bauteile)	126
	Rock wool (mineral wool) insulation, unfaced, L = 0.031 W/mK, R = 1 m2K/W, 31mm, 1.86 kg/m2, 60 kg/m3, (Range: 51-65kg/m3), 50% slag content (One Click LCA)	1,900

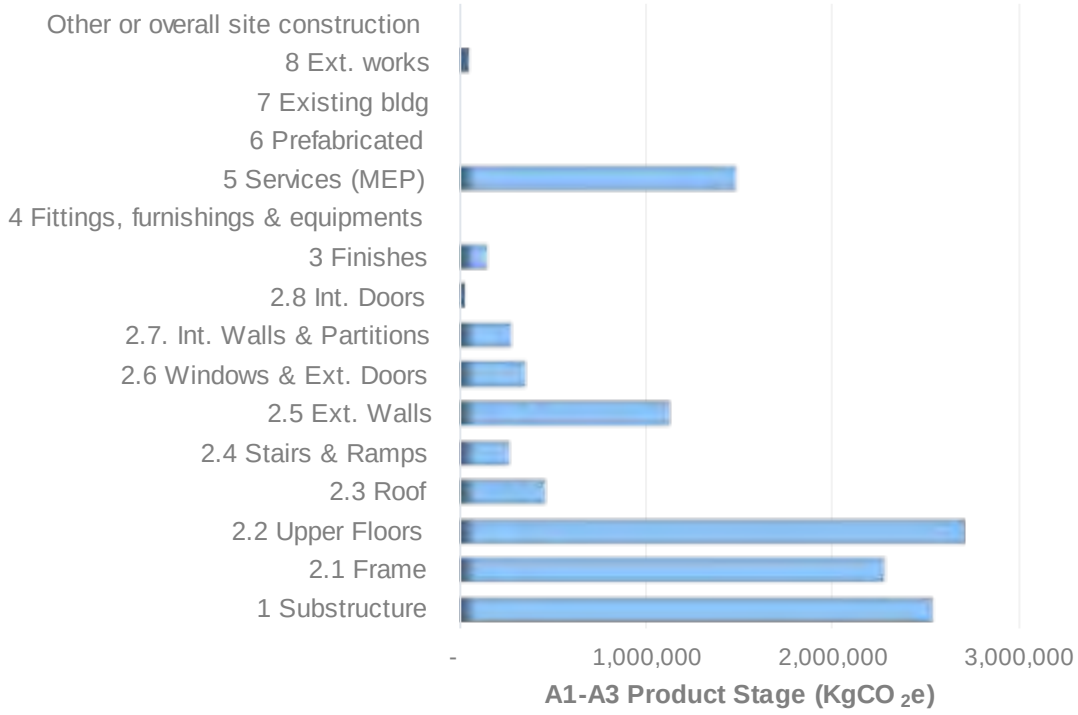
	Plywood board, 490.6 kg/m3, EN15804+A2	5,500
	Glue laminated timber (Glulam), 544 kg/m3, 12% (± 3%) moisture content (One Click LCA)	31,000
	Rock wool (mineral wool) insulation, unfaced, L = 0.031 W/mK, R = 1 m2K/W, 31mm, 1.86 kg/m2, 60 kg/m3, (Range: 51-65kg/m3), 50% slag content (One Click LCA)	2,800
	Glass fibre for concrete reinforcement (One Click LCA)	2,720
	Glue laminated timber (Glulam), 544 kg/m3, 12% (± 3%) moisture content (One Click LCA)	2,720
Roof	Ready-mix concrete, normal strength, generic, C32/40 (4600/5800 PSI) with CEM II/B-V, 20% fly ash content in cement (300 kg/m3; 18.7 lbs/ft3 total cement) (One Click LCA 2022)	2,268,000
	Light gauge steel for façade infill or load bearing systems, t: 1,2, 1.6, 2.0 mm, 7850kg/m3, EOS Steel Frame (EOS Framing Ltd.)	82,000
	Polypropylene vapour membrane, French average, 0.18 kg/m2 (MDEGD)	945
	Glass wool insulation, R=5.0 m2K/W, L=0.040 W/mK, ép. 200 mm, 2.295 kg/m2, Lambda=0.04 W/(m.K), ISOLANT TOITURE 200 (ISOVER)	12,000
	Bituminous waterproofing system - Single layer, 5.44 kg/m2, AXTER, DERBIGUM, MEPLE, SIPLAST-ICOPAL, SOPREMA (Chambre Syndicale Française de l'Etanchéité)	29,000
	Polyethylene sealing film for slabs, ép. 150 micron, Donnee par default (MDEGD)	710
	Drainage floor underlay from EPS, ép.25 mm, Couche drainante en polystyrène expansé (DONNEE ENVIRONNEMENTALE GENERIQUE PAR DEFAUT)	1,800
	Geotextile from polypropylene, 300 g/m2 (MDEGD)	1,575
	Soil substrates for green roofs (MDEGD)	-
	Glue laminated timber (Glulam), 544 kg/m3, 12% (± 3%) moisture content (One Click LCA)	710
	PVC waterproofing membrane, 2.93 kg/m, Bandeau de rive de toiture en PVC (DONNEE ENVIRONNEMENTALE GENERIQUE PAR DEFAUT)	440
	Glue laminated timber (Glulam), 544 kg/m3, 12% (± 3%) moisture content (One Click LCA)	14,000
	Glass wool insulation panels, unfaced, generic, L = 0.031 W/mK, R = 3.23 m2K/W (18 ft2°Fh/BTU), 25 kg/m3 (1.56 lbs/ft3), (applicable for densities: 0-25 kg/m3 (0-1.56 lbs/ft3)), Lambda=0.031 W/(m.K)	1,900
	Plastic vapour control layer, 0.2 mm (Tommen Gram)	58
	Roof slate, 30 kg/m2, EN15804+A2	9,300
Stairs and Ramps	Ready-mix concrete, normal-strength, generic, C30/37 (4400/5400 PSI), 10% (typical) recycled binders in cement (300 kg/m3 / 18.72 lbs/ft3)	420,000
	Reinforcement steel (rebar), generic, 90% recycled content, A615	17,407
	Ready-mix concrete, normal-strength, generic, C30/37 (4400/5400 PSI), 10% (typical) recycled binders in cement (300 kg/m3 / 18.72 lbs/ft3)	1,204,128
	Reinforcement steel (rebar), generic, 90% recycled content, A615	50,172
	Cross laminated timber (CLT), 481 kg/m3, 12% (± 3%) moisture content (One Click LCA)	160,000

External Walls	Red brick, average production, UK, 215 mm x 102.5 mm x 65 mm, 2.13 kg/unit, 1485 kg/m3 (Brick Development Association (BDA) Ltd (2019))	1,600,000
	Masonry mortar/facing wall mortar/mortar with special properties, 1500 kg/m3, EPD coverage: >1500 kg/m3 (IWM)	320,000
	Rock wool insulation panels, unfaced, generic, L = 0.039 W/mK, R = 2.56 m2K/W (15 ft2°Fh/BTU), 200 kg/m3 (12.49 lbs/ft3) (applicable for densities: 150-200 kg/m3 (9.36-12.49 lbs/ft3)), Lambda=0.039 W/(m.K)	450,000
	Masonry mortar/facing wall mortar/mortar with special properties, 1500 kg/m3, EPD coverage: >1500 kg/m3 (IWM)	220,000
	Gypsum plaster board, regular, generic, 6.5-25 mm (0.25-0.98 in), 10.725 kg/m2 (2.20 lbs/ft2) (for 12.5 mm/0.49 in), 858 kg/m3 (53.6 lbs/ft3)	140,000
	Gypsum plaster, 1100 kg/m3 (Bundesverband der Gipsindustrie)	42,000
	Water-borne interior paints, 1.36 kg/L, average coverage 8-10 m2/L, Biora, Ekora, Kolibri Sand, Paneelikattomaali, Ranch, Superlateksi, Tapettipohjamaali, Teknospro, Tela, Timantti, Trend (Teknos)	1,722
	Aluminium façade cladding panel, anodized, 7.5 kg/m2, 70% recycled content (One Click LCA)	3,500
Windows	Aluminium framed windows, double leaf, 26.55 kg/m2 (SNFA)	80,000
	Aluminium framed rooflight, U = 1.1 W/m2K, 51.67 kg/m2, Mardome Glass Trade (Brett Martin Daylight Systems)	3,600
External Doors	Aluminium framed double glazed doors, per m2, 79.5% glass, 15.7% aluminium, 2.2% steel, 44 kg/m2, width:1.23m, height:2.18m, 6mm toughened and 8.8mm laminated glass, Edge Symmetry (Optima)	7,040
	Entrance metal door with metal frame, 28.7 kg/m2	2,870
Internal Walls and Partitions	Gypsum plaster board, regular, generic, 6.5-25 mm (0.25-0.98 in), 10.725 kg/m2 (2.20 lbs/ft2) (for 12.5 mm/0.49 in), 858 kg/m3 (53.6 lbs/ft3)	350,000
	Light gauge steel for façade infill or load bearing systems, t: 1,2, 1.6, 2.0 mm, 7850kg/m3, EOS Steel Frame (EOS Framing Ltd.)	672,000
	Light gauge steel for façade infill or load bearing systems, t: 1,2, 1.6, 2.0 mm, 7850kg/m3, EOS Steel Frame (EOS Framing Ltd.)	168,000
	Light gauge steel for façade infill or load bearing systems, t: 1,2, 1.6, 2.0 mm, 7850kg/m3, EOS Steel Frame (EOS Framing Ltd.)	336,000
	Glass wool insulation panels, unfaced, generic, L = 0.031 W/mK, R = 3.23 m2K/W (18 ft2°Fh/BTU), 25 kg/m3 (1.56 lbs/ft3), (applicable for densities: 0-25 kg/m3 (0-1.56 lbs/ft3)), Lambda=0.031 W/(m.K)	78,000
	Gypsum plaster board, regular, generic, 6.5-25 mm (0.25-0.98 in), 10.725 kg/m2 (2.20 lbs/ft2) (for 12.5 mm/0.49 in), 858 kg/m3 (53.6 lbs/ft3)	350,000
Internal Doors	Doors with wooden frame, interior, Portes intérieures de communication avec huisserie bois (DONNEE ENVIRONNEMENTALE GENERIQUE PAR DEFAUT)	33,000
Other Structures and Materials		
Finishes	Emulsion matt paint for interior use, 0.174 kg/m2, 1.39 kg/l, Diamond Matt (Dulux Trade)	8,500
	Water-based epoxy floor paint, 1.44 kg/l, 6 m2/l, 0.48 kg/m2, Dulux Trade High Performance Floor Paint (AkzoNobel)	1,100
	Luxury vinyl flooring tile, 2.5 mm, 4.3 kg/m2, wear layer: 0.5 mm (One Click LCA)	65,000

	Emulsion matt paint for interior use, 0.174 kg/m2, 1.39 kg/l, Diamond Matt (Dulux Trade)	2,800
	Gypsum plasterboard for suspended ceiling systems, 12.5 mm, 9 kg/m2, 720 kg/m3	130,000
Fittings, Furnishings and Equipment	Ceramic toilet with flush tank (cistern), 34.8 kg/unit, 980 × 360 × 430 mm (One Click LCA)	20,880
	Ceramic shower tray, 33.3 kg/unit, 900 × 900 × 80 mm (One Click LCA)	19,980
	Sink from polyester resin reinforced with fiberglass, 5.77 kg/unit, Evier en matériau de synthèse [Long. 860 mm Larg. 500 mm Haut. 185 mm] (DONNEE ENVIRONNEMENTALE GENERIQUE PAR DEFAUT)	3,500
	Basin faucet (single lever mixer), 3.68 kg/unit (Dornbracht AG & Co. KG)	2,208
	Mirror, 4 mm, 10 kg/m2, 2500 kg/m3, Mirox MNGE Mirox MNGE SAFE+ Mirox 4Green Mirox 4Green SAFE+ (AGC France SAS)	2,700
Building Technology		
Services (MEP)	Electricity distribution system, cabling and central, for all building types, per m2 GFA	110,000
	Drinking water supply piping network, per m2 GIFA (residential buildings)	7,000
	Air/water heat pumps for the production of domestic hot water, without a tank, 476.5 kg/unit, P=35.1 kW, Q-TON ESA30EH Hydragreen ZéPAC70 QAHV-N560YA-HPB - Atlantic - Mitsubishi Electric- Auer - Mitsubishi Heavy Industries (Uniclima)	4,300
	District heat distribution center, per 1kW	8,100
	Heat distribution piping network, per m2 heated area, all building types	5,000
	Air handling unit, with heat recovery through plate heat exchanger, 10 000 m3/h (5885.8 ft3/min), 1256 kg/unit (2769 lbs/unit)	8,900
	Ventilation ducting, per m linear, D: 63 mm (2.48 in)	7,500
	Sewage water drainage piping network, per m2 GIFA (residential buildings)	5,000
	Concrete and concrete products, unreinforced, 2403 kg/m3 (VOB BETON)	14,413
	Battery Lithium ion, French average, capacité=200Ah, Batterie Lithium ion (DONNEE ENVIRONNEMENTALE GENERIQUE PAR DEFAUT)	9,383
	Motion detector, 0.147 kg/unit, 6412286 - DMB TYXAL+, Autres références visées: 6412311 (Delta Dore)	57
	LED office lighting, 5.95 kg/unit	15,763
	Cable 1-wire, 0.02 kg/m	7,344
	Power cable, 0.02 kg/m, H07V-U PASSEO 1G1.5 GREEN/YELLOW C100m (Nexans)	18,296
	Electronic access control mortise lock, 3.146 kg/unit, Corbin Russwin IN120 (Assa Abloy)	2,976
	Electric operated passenger elevator, 320-1350 kg load capacity, elevator weight 2556.5 kg, 814.9 tkm life cycle, Schindler 1000, 3000 (Schindler)	15,339
	Galvanized steel water supply plumbing, French average, DN=110mm, Réseau d'adduction d'eau en acier galvanisé (DONNEE ENVIRONNEMENTALE GENERIQUE PAR DEFAUT)	5,600
	Butterfly valve, fire suppressing, Diam.=100mm, Cartouche coupe feu ou pare-flamme (DONNEE ENVIRONNEMENTALE GENERIQUE PAR DEFAUT)	4

	Fire sprinkler, 0.072 kg/unit, Sprinkler pendant (DONNEE ENVIRONNEMENTALE GENERIQUE PAR DEFAUT)	12
	Flow meter with bendable plate, 0.93kg, Contrôleur de débit à palette (DONNEE ENVIRONNEMENTALE GENERIQUE PAR DEFAUT)	5
	Communication cable, 0.231 kg/m, Câble PTT 288 [14 paires] - DONNEE ENVIRONNEMENTALE PAR DEFAUT (MINISTERE DE L'ENVIRONNEMENT, DE L'ENERGIE ET DE LA MER - MINISTERE DU LOGEMENT ET DE L´HABITAT DURABLE)	160
	Photovoltaic monocrystalline panel, per m2, 14.5 kg/m2, 224 Wp (One Click LCA)	7,250
External Areas and Site Elements		
External Works	Precast concrete pavers/blocks, Danish average, 10 cm, 225 kg/m2 (Belægningsgruppen)	436,500
	Sand, compacted dry density, 1682 kg/m3	97,892
	Aggregate (crushed gravel), generic, dry bulk density, 1600 kg/m3	310,400
	Gravel, dry bulk density, 1680 kg/m3	33,600

Figure 7.1 Product Stage [A1-A3] Emissions ($kgCO_2e$)



8. Construction Process Stage [A4-A5]

8.1 Modules [A4] and [A5] respectively capture the emissions associated with the transportation of the materials and components from the factory gate to the project site and their assembly into a building.

Transport Emissions [A4]

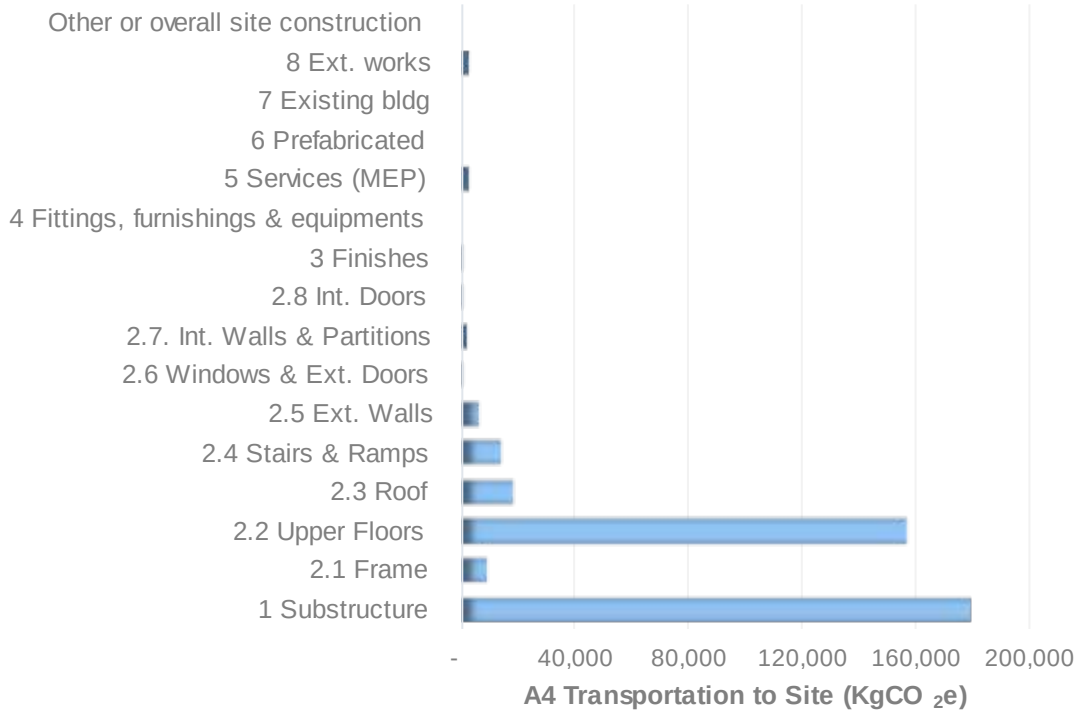
8.2 Transport emissions must include all stages of the journey of the products following their departure from the final manufacturing plant to the project site, taking into account any interim stops at storage depots / and / or distribution centres.

8.3 Transport emissions are calculated as follows:

[A4] = Material or system mass (a) x Transport distance (b) x Carbon conversion factor (c)

8.4 For the purposes of this WLC assessment, the One Click LCA library dataset has been used and the following emissions have been calculated in relation to the selected materials.

Figure 8.1 Transport to Site [A4] Emissions ($kgCO_2e$)



Construction – Installation Process Emissions [A5]

8.5 The carbon emissions arising from any on- or off-site construction-related activities must be considered in [A5]. This includes any energy consumption for site accommodation, plant use

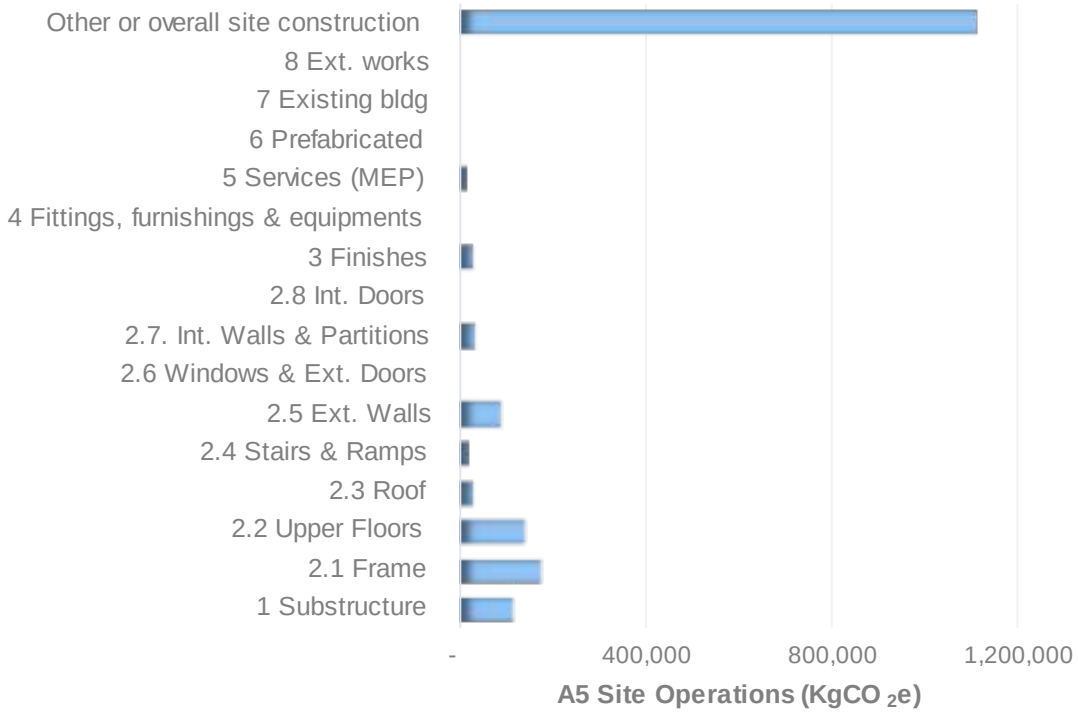
and the impacts associated with any waste generated through the construction process, its treatment and disposal.

8.6 The RICS PS permits the use of an average figure of 1,400kgCO_2e/£100K of project value for building construction site emissions, in the absence of more specific information. This figure is taken from the BRE SMARTWaste KPIs and is based on the date of the publication, March 2015; and should therefore be adjusted to current value in accordance with CPI.

8.7 This approach is presented within One Click LCA whereby the cost figure is based on the date of the publication of the above RICS Guidance, March 2015, and is adjusted to current value in accordance with CPI (Dec 2022). Using the One Click LCA calculation, emissions are therefore assumed to be 10,973 kgCO_2e per £1 million.

8.8 For the purposes of this WLC assessment, the 'Stage 2 Cost Plan' (4th December 2023) produced by Gardiner & Theobald had been used for the construction cost estimates.

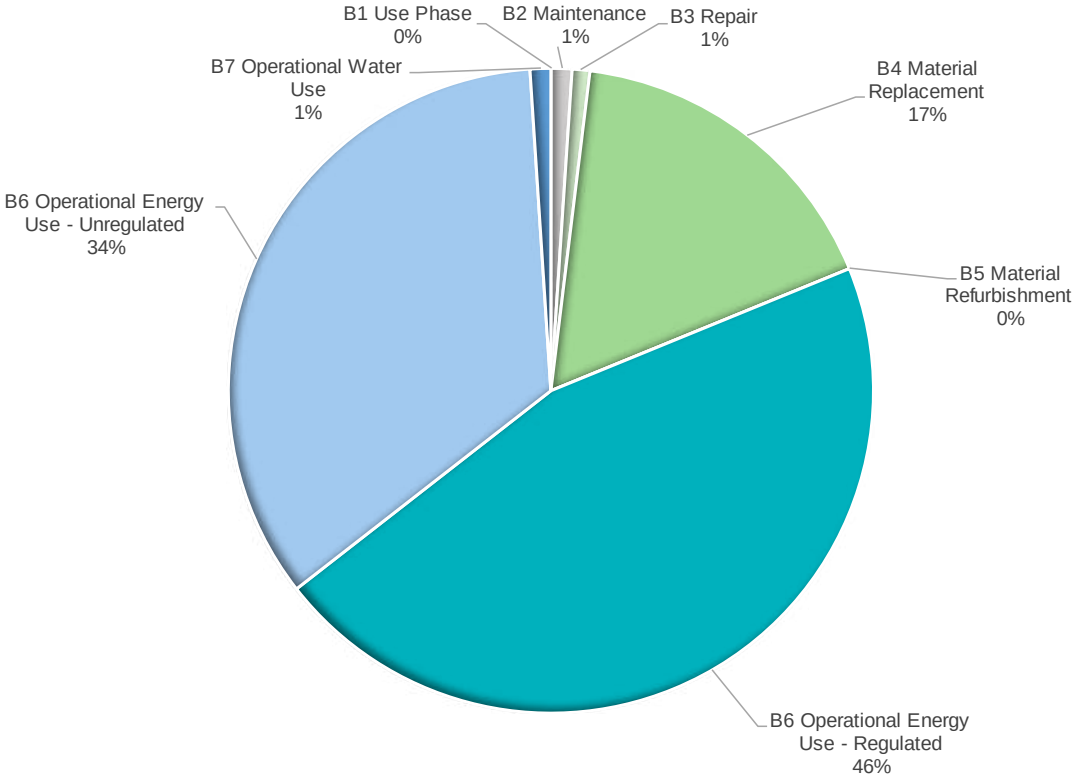
Figure 8.2 Site Operations [A5] Emissions (kgCO_2e)



9. Use Stage [B1-B7]

9.1 The use stage captures the carbon emissions associated with the operation of the built asset over its entire life cycle, from practical completion to the end of its service life. This includes any emissions relating to operational energy and water use as well as any embodied carbon impacts associated with maintenance, repair, replacement, and refurbishment of building components.

Figure 9.1 B1-B7 Use Stage Emissions



Use [B1]

9.2 The in-use module [B1] captures the emissions arising during the life of a building from its components; including any emissions arising from refrigerants, insulation blowing agents and paints; as well as accounting for the carbonation process in items containing exposed concrete and / or lime.

9.3 Carbon absorption potential by green roofs and facades should also be considered, although the absorption potential for areas <1,000m^2 is generally considered negligible.

Refrigerants

9.4 For the refrigerants, leakage from the ASHPs were estimated using TM65 methodology as part of the emissions arising during the operation of the building. Assumptions regarding the type

and number of ASHPs being installed as part of the development were applied. These were then used within the model to estimate the refrigerant charge.

Carbonation

9.5 Cementitious materials, such as concrete, cement and mortar, absorb carbon dioxide when exposed to air. This process is the chemical reversal of the cement production process calcination phase. The amount of carbon dioxide absorbed depends on exposure of the material, duration of the exposure as well as the initial amount of cement.

9.6 The figures associated with the carbonisation have not been generated through the OneClick LCA software.

Vegetation Carbon Withdrawals

9.7 It should be noted that removals associated with vegetation are not persistent and will be lost unless the project is set up in such a way to preserve vegetation at its eventual demolition. Vegetation carbon withdrawals have therefore not been modelled.

Maintenance [B2]

9.8 The [B2] module accounts for the carbon emissions arising from any activities relating to the maintenance processes, including cleaning, and any products used. It also includes any emissions from the energy and water use associated with these activities.

9.9 Emissions associated with maintenance are not calculated by the One Click LCA software on the basis that there are no meaningful data sources. Alternatively, the GLA suggests that for module B2 emissions, a total figure of 10 $kgCO_2e/m^2$ gross internal area (GIA) may be used to cover all building element categories, or 1 per cent of modules A1-A5, whichever is greater. This approach has been adopted to estimate emissions from maintenance in this assessment.

Repair [B3]

9.10 Module [B3] is intended to take account of the carbon emissions arising from all activities that relate to repair processes and any products used. Typically, this would require data from facilities management / maintenance strategy reports, façade access and maintenance strategy, life cycle cost reports, O&M manuals, and professional guidance.

9.11 Repair data have been entered into the software for some of the materials selected. As no details are available yet for repair, the data inputted into the tool are based on assumptions of annual rates of repair. For example, it has been assumed that 1 in 50 windows at street level may be broken every 2 years.

9.12 The default information associated with other applicable materials, based on their Environmental Product Declaration (EPD), mean that their service life is a lot shorter and thus

any emissions from repair works are likely already captured by other [B] modules. Examples include the finishes and coverings, such as paint and carpet tiles, which have a service life of ~10 years. Regardless, emissions associated with repair are not expected to be significant.

Material replacement and refurbishment [B4-B5]

9.13 Carbon emissions associated with the anticipated replacement of building components, including any emissions from the replacement process are captured under module [B4]. All emissions arising from the production, transportation to site and installation of the replacement items must be included. This extends to cover any losses during these processes as well as the carbon associated with component removal and end of life treatment.

9.14 Emissions from the replacement of items from the following building element groups should be reported: roof, external walls, windows and doors, finishes, fittings, furnishings & equipment, services.

9.15 Module [B5] must take into account any carbon emissions associated with any building components used in a refurbishment, including any emissions from refurbishment activities. All emissions arising from the production, transport to site and installation of the components used must be included. This includes any losses during these processes, as well as the carbon associated with their removal and end of life treatment.

9.16 The calculation of refurbishment should account for any material additions and variations, instead of like-for-like as in replacement.

9.17 It is assumed that items are being replaced on a like-for-like basis and full replacement (100%) of the items is assumed once the specified lifespan is reached.

9.18 Details for service life are automatically entered into the One Click LCA software for each of the selected building materials since it is typically quantified in the product's EPD. These emissions are accounted for in the B4 part of the lifecycle. As no refurbishment is planned for the building, it has been assumed that no change of use will occur during the service life of the project.

Operational Energy Use [B6]

9.19 The operational carbon emissions arising from the energy use of building-integrated systems as projected and/or measured throughout the life cycle of the project must be reported under module [B6].

9.20 The operational emissions include the following:

- All emissions regulated under Part L of the Building Regulations - including space heating, hot water supply, cooling, lighting and auxiliary.

- Emissions from non-regulated building-integrated systems – including lifts, safety, securing and communications systems.
- Emissions from non-building-related systems – including ICT equipment, cooking appliances, specialist equipment – can represent a significant part of the total operational emissions and should be including where possible.
- Any impact from waste produced by operational energy use should also be considered including any treatment and transportation these might require.
- Where building operation requires fuel to be transported to the site (e.g., gas bottles, oil suppliers etc.) the transport emissions associated with the fuel delivered should be included.
- Any benefit from energy produced onsite and exported to the grid is covered within module [D].

9.21 A CIBSE Technical Memorandum 54 (TM54) assessment has been undertaken to provide an estimate of operational energy consumption. The aim of this assessment was to identify and quantify the factors associated with operational energy use within the building, helping to bridge the performance gap between the regulated energy use from Part L compliance and actual operational energy use. As CIBSE TM54 accounts for unregulated energy uses which are usually discounted by Part L energy modelling, one total figure for energy demand has been calculated. This has been split into regulated and unregulated for the purposes or this WLC report and given comfort cooling has been proposed, is based on the comfort cooling test result.

9.22 The results of the analysis conducted by Ensphere Group Ltd have estimated an overall energy demand for development to be 2,623.8 MWh/yr, using the SAP 10.2 carbon conversion factors. This is broken down into ~1,494.3 MWh/yr from regulated sources, ~2,084.5 MWh/yr from unregulated energy and -955 MWh/yr displaced energy from renewables. This equates to ~21,410.2 tonnes over a 60-year time period.

Operational Water Use [B7]

9.23 All carbon emissions related to water supply and wastewater treatment, over the life cycle of the building (excluding water use during maintenance, repair, replacement, and refurbishment that are reported elsewhere), must be reported under module [B7].

9.24 For the student accommodation and residential units, the maximum daily total water demand was assumed to equal 105 litres / person / day in line with policy requirements for residential development. This should be understood as upper limits (i.e., worst case scenario) as the proposed reduced flow / flush systems should limit daily usage. Proposed occupancy numbers have been taken from the Accommodation Schedule (*Document Ref: 8001 Rev 16*) which

indicates 509 units for Block A, totalling an estimated ~621 students. For Blocks B, C and D (the shared ownership and social rent units), the total number of residents are estimated at 285.

9.25 Estimates on anticipated water consumption in the UK have been made based on the values provided in Table 22 of the BSRIA Rules of thumb – Guidelines for the building services, 5th edition for the respective building type, in the absence of project specific information at early design stages. For the non-residential space, occupants were calculated based on Table 3 of the BSRIA Rules of thumb document, assuming the most similar building type of retail establishments. This estimated around 160 occupants in the non-residential area. The BSRIA maximum daily total water demand for 'places of assembly' was then used which equates to 6 litres / person / day.

9.26 Thames Water Utilities Ltd specific emissions relating to clean tap water and wastewater were selected in the One Click LCA tool, with values taken from the Thames Water Combined Report 2019/20. Based on a daily water consumption of ~96,090 litres for the proposed development, emissions associated with operational water usage are estimated to be 277 tonnes CO_{2e} over the 60-year period.

10. End of Life Stage [C1 to C4]

10.1 The EoL stage commences when the built asset has reached the end of its life and will no longer be used. For the purposes of the whole life carbon assessment this is assumed to occur at the end of the reference study period of the building. The reference study period is used for consistency and comparability of results, irrespective of other factors which might determine the lifespan of the building (e.g., lease period).

10.2 Any emissions arising from decommissioning, stripping out, disassembly, deconstruction and demolition operations as well as from transport, processing and disposal of materials at the end of life of the project must be accounted for in module [C], which is subdivided as follows:

- deconstruction and demolition emissions [C1]
- transport emissions [C2]
- waste processing for reuse, recovery or recycling emissions [C3]
- disposal emissions [C4]

10.3 The carbon emissions arising from any on or off-site deconstruction and demolition activities, including any energy consumption for site accommodation and plant use, must be considered in [C1].

10.4 According to the RICS PS, an average rate of 3.4 $kgCO_{2e}/m^2$ GIA (rate from monitored demolition case studies in central London) based on aggregated data should be used in the absence of more specific information.

10.5 Any carbon emissions associated with the transportation of deconstruction and demolition arisings to the appropriate disposal site, including any interim stations, must be captured within module [C2].

10.6 The transport emissions for the discarded items should be calculated based on the following formula:

[C2] = Mass of waste to be transported (a) × Transport carbon factor (b) × Distance to disposal site (c)

10.7 The RICS PS outlines acceptable assumptions to be used in the absence of more specific data.

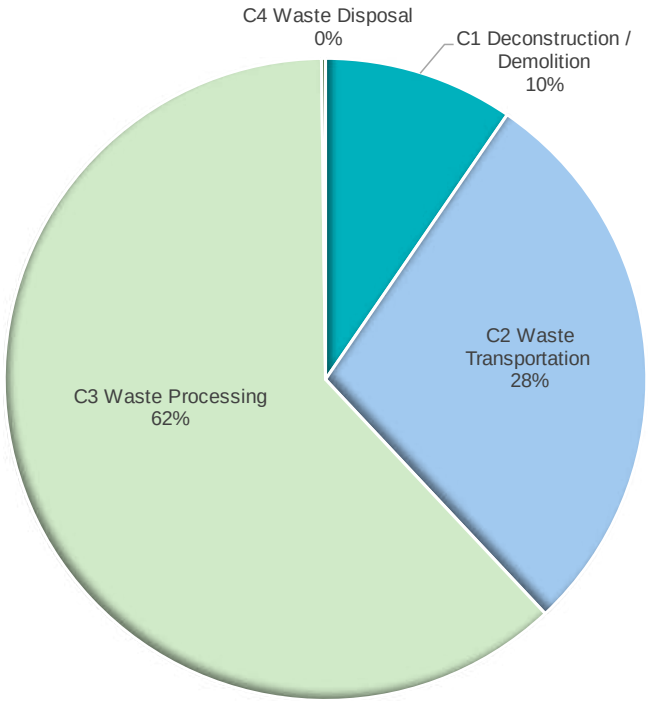
10.8 When materials and/or components are intended to be recovered and reused or recycled after the end of the life of the built asset, any carbon emissions associated with their treatment and processing prior to reaching the end-of-waste state must be included in module [C3].

10.9 For elements not expected to be recovered and repurposed but intended for final disposal either in landfill or incineration, an allowance for the emissions arising from their disposal must be included in [C4].

10.10 The RICS PS outlines acceptable assumptions to be used in the absence of more specific data.

10.11 Library data associated with the One Click LCA generates figures for the total C1-C4 emissions on the basis of the materials selected. The following has been calculated:

Figure 10.1 End of Life Stages [C1-C4]



11. Benefits & Loads Beyond the System Boundary [D]

11.1 Module [D] covers any benefits or burdens accruing from the repurposing of elements discarded from the built asset, or any energy recovered from them beyond the project's life cycle. Module [D] is intended to provide a broader picture of the environmental impacts of a project by accounting for the future potential of its components when these are repurposed i.e., recovered and reused and/ or recycled. Module [D] captures the avoided emissions (or potential loads) from utilising repurposed items to substitute primary materials. Module [D] can be used as a metric for quantifying circularity and assessing future resource efficiency.

11.2 It is communicated separately as it occurs beyond the life cycle of the project under study and also bears high inherent uncertainty regarding the future treatment of building components. In the absence of more specific data, reliance is given to the data within the One Click LCA tool.

Table 11.1 Benefits and Loads Beyond the System Boundary [D] ($kgCO_2e$)

	D Benefits and Loads Beyond the System Boundary
1 Substructure	-555358
2.1 Frame	-154007
2.2 Upper floors	-543190
2.3 Roof	-86229
2.4 Stairs and Ramps	-169707
2.5 External walls	-49658
2.6 Windows and External Doors	-17153
2.7 Internal doors and Partitions	-3272
2.8 Internal doors	0
3 Finishes	-177221
4 Fittings, furnishings & equipment's	
5 Services (MEP)	-963886
6 Prefabricated buildings and building units	
7 Work to existing building	
8 External works	-19247
Other materials – TOTAL	
TOTAL kg CO_{2e}	**-2738927**

12. Whole Lifecycle Carbon Assessment Results

12.1 The following presents the project Whole Life-Cycle Carbon Assessment according to RICS methodology and EN 15978.

Table 12.1 Whole Life Carbon Assessment ($kgCO_2e$)

	Biogenic Carbon	A1-A3	A4	A5	B1	B2	B3	B4-B5	B6	B7	C1-C4	D (*)	TOTAL
0.1 Toxic Mat.													0
0.2 Demolition											94,567		94,567
0.3 Supports											-		-
0.4 Groundworks											-		-
0.5 Diversion											-		-
1 Substructure	-	2,538,831	178,700	115,313			-				94,362	-555358	2,927,205
2.1 Frame	-	2,280,613	9,377	172,970			-				50,530	-154007	2,513,490
2.2 Upper Floors	-58,545	2,710,287	156,052	140,289			-				154,500	-543190	3,102,582
2.3 Roof	-25,540	469,645	18,286	29,574			-	73,526			48,371	-86229	613,862
2.4 Stairs & Ramps	-290,894	278,396	13,749	19,492			-				301,613	-169707	322,357
2.5 Ext. Walls	0	1,132,807	6,404	90,385			-	1,163,544			13,044	-49658	2,406,184
2.6 Windows & Ext. Doors	0	357,491	448	-			216,873	361,456			3,517	-17153	939,785
2.7. Int. Walls & Partitions	0	285,494	1,788	34,095			-	303,570			16,289	-3272	641,236
2.8 Int. Doors	-60,500	32,764	164	-			20,047	33,411			60,983	0	86,869
3 Finishes	0	158,279	772	30,389			-	433,014			137,511	-177221	759,966
4 Fittings, furnishings & equipment's											-		-
5 Services (MEP)	0	1,485,878	2,650	14,885	2,879	278,139	-	2,140,095	21,410,208	276,725	9,146	-963886	25,620,604
6 Prefabricated											-		-

7 Existing bldg											-		-
8 Ext. works	0	56,136	2,942	-			-				3,870	-19247	62,948
Unclassified / Other				1,112,662							-		1,112,662
TOTAL kg CO2e	**-435,479**	**11,786,620**	**391,332**	**1,760,055**	**2,879**	**278,139**	**236,920**	**4,508,615**	**21,410,208**	**276,725**	**988,302**	**-2738927**	**41,204,317**

(*) Module D is not included in totals.

13. Summary

13.1 A Whole Life-Cycle Carbon Assessment has been undertaken for a proposed development at Lordship Lane, Haringey.

13.2 The assessment has been undertaken on the basis of information available at RIBA Stage 2 of the design.

13.3 Consideration has been given to the planning policy requirements, in particular Policy SI2 (*Minimising Greenhouse Gas Emissions*) of the London Plan; as well as the GLA's Whole Life-Cycle Carbon Assessments Guidance.

13.4 The RICS Professional Statement - Whole Life Carbon Assessment for the Built Environment 1st Edition (RICS; ISBN 978 1 78321 208 8; November 2017); and BRE Global Methodology for the Environmental Assessment of Buildings Using EN 15978:2011 (Building Research Establishment; ref: PN 326 Rev 0.0; January 2018) have also been considered.

13.5 The assessment has reviewed WLC over a 60-year period, in line with the recommended RICS approach. This identified total WLC emission of 41,204,317 $kgCO_2e$, with embodied carbon emissions equivalent to ~501 $kgCO_2e/m^2$ (below the 850 $kgCO_2e/m^2$ threshold given by GLA for residential developments).



13.6 The key lifecycle stages responsible for these emissions are [A1-A3] Materials Emissions (11,786,620 kg CO_2e), [B4] Material replacement (4,508,615 $kgCO_2e$), and the [B6] Operational Energy Use (21,410,208 kg CO_2e).

14. Recommendations

14.1 The following comprises a series of recommendations to assist with further reducing the carbon emissions associated with the proposed development.

14.2 The Whole Life-Cycle Carbon Assessment has identified the following key areas as being the most significant contributors to emissions:

[A1-A3] Product Stage

14.3 These were assessed to represent 11,786,620 kgCO_2e, equating to roughly 29% of the total. These emissions are largely associated with the material choices associated with the substructure, superstructure, and external works; where decisions are also influenced by factors such as structural performance, cost and aesthetics.

14.4 There may be scope to investigate alternatives with a lower carbon footprint; however, given the nature of the proposed development, the potential for significant reductions may be limited. Nevertheless, it is recommended that material options be revisited as the detail of the design development to review the potential extent of savings.

[B4-5] Material replacement and refurbishment

14.5 Material replacement and refurbishment emissions were assessed at 4,508,615 kgCO_2e, roughly 11% of the total. These emissions are associated with the estimated lifespans associated with the selected materials and it may be feasible to identify more resilient materials products with longer lifespans.

[B6] Operational Energy Use

14.6 Operational energy use emissions were assessed at 21,410,208 kgCO_2e (regulated and unregulated); representing 52% of the total.

14.7 Operational energy use is expected to contribute significantly to emissions over the buildings predicted lifetime, this figure may not however fully account for future grid decarbonisation in the UK over the next 60 years as it is based on current (SAP10.2) carbon conversion factors and will likely steadily reduce over time.

Offsetting

14.8 Acknowledging that it is not always feasible to completely eradicate WLC emissions through design decisions, consideration could be given to the potential for offsetting the impacts through abatement measures elsewhere and / or contributions to facilitate such abatements (e.g., green tariff electricity).

Appendices

A. Site Plans – Building A, B, C & D Ground Floors


HARDY PASSAGE
BEDDERS ROAD
LORDSHIP LANE
Building A
Building C
Building D
Building B
WELLESLEY ROAD
MOLLEN ROAD
MOWELL AVENUE
Key
TBI 7 (8 Fusion)
Lordship Lane, Wood Green, London
Proposed Site Plan Ground Floor
PLANNING
Corstorphine & Wright
21820-0140
P-00
DS
AB
A1
1 : 500
Sep 2023

B. Key Local Planning Policy Requirements

London Planning Policy Framework

London Plan (2021)

Policy SI 2 Minimising greenhouse gas emissions

A. Major development should be net zero-carbon. This means reducing greenhouse gas emissions in operation and minimising both annual and peak energy demand in accordance with the following energy hierarchy:

   1) be lean: use less energy and manage demand during operation

   2) be clean: exploit local energy resources (such as secondary heat) and supply energy efficiently and cleanly

   3) be green: maximise opportunities for renewable energy by producing, storing and using renewable energy on-site

   4) be seen: monitor, verify and report on energy performance.

B. Major development proposals should include a detailed energy strategy to demonstrate how the zero-carbon target will be met within the framework of the energy hierarchy.

C. A minimum on-site reduction of at least 35 per cent beyond Building Regulations is required for major development. Residential development should achieve 10 per cent, and non-residential development should achieve 15 per cent through energy efficiency measures. Where it is clearly demonstrated that the zero-carbon target cannot be fully achieved on-site, any shortfall should be provided, in agreement with the borough, either:

D. through a cash in lieu contribution to the borough's carbon offset fund, or

E. off-site provided that an alternative proposal is identified and delivery is certain.

F. Boroughs must establish and administer a carbon offset fund. Offset fund payments must be ring-fenced to implement projects that deliver carbon reductions. The operation of offset funds should be monitored and reported on annually.

G. Major development proposals should calculate and minimise carbon emissions from any other part of the development, including plant or equipment, that are not covered by Building Regulations, i.e. unregulated emissions.

H. Development proposals referable to the Mayor should calculate whole life-cycle carbon emissions through a nationally recognised Whole Life-Cycle Carbon Assessment and demonstrate actions taken to reduce life-cycle carbon emissions.

Local Planning Policy Framework

Haringey's Local Plan Strategic Policies (2013; consolidated with alterations since 2017)

Policy SP4: Working Towards a Low Carbon Haringey

Over the life time of the Local Plan, reducing energy use in buildings and working towards a low carbon borough will be one of the key challenges facing Haringey. The Council will promote the measures outlined below to reduce carbon emissions from new and existing buildings.

1. In line with London Plan policy, the Council will promote and require all new developments to take measures to reduce energy use and carbon emissions during design, construction and occupation, by incorporating the following measures:

   a. From 2011 onwards, all new residential development will achieve a minimum 25% reduction in total (regulated) CO2 emissions in line with Code for Sustainable Homes Level 4 energy standards, and should aim to achieve Level 6. All new residential development shall be zero carbon from 2016 onwards; and

   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 decentralized 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 on site renewable energy regeneration, which can include connections to local sources of decentralised renewable energy.

Policy SP6: Waste and Recycling

The Council supports the objectives of sustainable waste management set out by the Government in PPS10 Planning for Sustainable Waste Management and the Mayor's London Plan. To achieve these, the Council shall:

- Safeguard existing waste sites unless compensatory provision is made;
- Maximise self-sufficiency in waste management capacity;
- Seek to minimise waste creation, increase recycling rates in relation to commercial, industrial and municipal waste in order to achieve the Mayor's recycling targets;
- Address waste as a resource and look to disposal as the last option, in line with the Mayor's waste hierarchy;
- Require integrated, well-designed recycling facilities to be incorporated into all new developments;
- Monitor changes in the stock of waste management facilities, waste arisings, and the amount of waste recycled, recovered and going for disposal; and
- Continue working with its partners in the North London Waste Authority to adopt the North London Waste Plan (NLWP) which has identified locations suitable for waste management facilities to meet the London Plan apportionment of 1.9 2.1m tonnes and the Haringey apportionment of 237,000 182,000 tonnes.

Haringey will require Site Waste Management Plans for all major applications to identify volume and types of demolition and construction waste and to demonstrate how waste will be minimised and managed during construction and occupation. New waste management facilities will be required to take into account and minimise pollution and nuisance issues. This is addressed in more detail in the Development Management Policies document.

Policy SP11: Design

All new development should enhance and enrich Haringey's built environment and create places and buildings that are high quality, attractive, sustainable, safe and easy to use. To achieve this all development shall:

Be of the highest standard of design that respects its local context and character and historic significance, to contribute to the creation and enhancement of Haringey's sense of place and identity;

- Ensure impacts on health, climate change, natural resources and biodiversity are minimised by adopting and improving sustainable design and construction techniques;
- Incorporate solutions to reduce crime and the fear of crime, such as promoting social inclusion; creating well-connected and high quality public realm that is easy and safe to use; and by applying the principles set out in 'Secured by Design' and Safer Places;
- Promote high quality landscaping on and off site, including improvements to existing streets and public spaces;
- Seek the highest standards of access in all buildings and places; and
- Ensure buildings are designed to be flexible and adaptable – and able to integrate services and functions.

Applications for tall buildings will be assessed against the following criteria:

- an adopted Area Action Plan or existing adopted masterplan framework for the site and surrounding area;

- assessment supporting tall buildings in a Characterisation Study which should be prepared as supporting evidence for all AAP areas;
- compliance with the Development Management Policies criteria for Tall and Large Buildings siting and design; and
- compliance with all the relevant recommendations as set out in CABE / English Heritage "Guidance on Tall Buildings", 2007.

Haringey's Development Management DPD – (July 2017)

Policy DM4: Provision and Design of Waste Management Facilities

A) All proposals should consider how to sustainably manage waste arising from the development during the design, construction and occupation phases of new developments.

B) 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:

a. Ensure adequate dedicated internal and external storage space to manage the volume of waste arising from the site;

b. Provide accessible and safe access to onsite storage facilities, both for occupiers and collection operatives, including vehicles, having regard to the Council's Refuse Collection Strategy;

c. Be located and screened to avoid nuisance and adverse impact on visual and other amenity to occupiers and neighbouring uses, and are within the maximum permitted carrying and reversing distances; and

d. For mixed-use development, suitably separate household and commercial waste.

C) In addition, proposals for new multi-storey flatted residential development will be required to make provision for:

a. Adequate temporary storage space within each flat, allowing for separate storage of recyclable materials;

b. Adequate communal storage for waste, including separate storage for recyclables, pending its collection; and

c. Storage and collection systems at each floor (such as dedicated rooms, storage areas and chutes or underground waste collection systems) which are sensitively integrated into the development, with the Council giving preference to basement servicing over the use of forecourts or ground floor internal storage.

Policy DM21: Sustainable Design, layout and Construction

A) 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 minimize 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.

B) The Council will support appropriate measures to sustainably retrofit existing homes and nonresidential buildings.

C) Proposals that fail to demonstrate adequate consideration for sustainable design, layout and construction techniques will be resisted.

D) Consideration will be given to the use of carbon offset payments, to be secured by planning obligations, where it can be demonstrated that proposals are unable to meet carbon dioxide emission reduction targets on-site.

Policy DM23: Environmental Protection

Air Quality

A) All development proposals should consider air quality and be designed to:

B) Improve or mitigate the impact on air quality in the Borough; and

C) Improve or mitigate the impact on air quality for the occupiers of the building or users of the development.

D) Air quality assessments will be required for all major development and other development proposals, where appropriate.

E) Where necessary, adequate mitigation must be provided.

Noise and Vibration

F) The Council will seek to ensure that new noise sensitive development is located away from existing or planned sources of noise pollution. Proposals for potentially noisy development must suitably demonstrate that measures will be implemented to mitigate its impact.

G) A noise assessment will be required to be submitted if the proposed development is a noise sensitive development, or an activity with the potential to generate noise.

Light Pollution

H) Development proposals that include external lighting must mitigate potential adverse impacts from such lighting. Where appropriate, proposals will be required to submit details demonstrating that external lighting is:

I) Appropriate for its purpose in its setting;

J) Designed to minimise and provide protection from glare and light spillage, particularly to sensitive receptors such as residential properties and natural habitats, including watercourses; and

K) Energy efficient.

Contaminated Land

L) Proposals for new development will only be permitted where it is demonstrated that any risks associated with land contamination, including to human health and the environment, can be adequately addressed in order to make the development safe.

M) All proposals for new development on land which is known to be contaminated, or potentially contaminated, will be required to submit a preliminary assessment to identify the level and risk of contamination and, where appropriate, a risk management and remediation strategy.

Hazardous Substances

N) Proposals for development of new hazardous installations, or development of sites located within the vicinity of existing installations, will only be permitted where it is demonstrated that necessary safeguards are incorporated to ensure the development is safe.

C. LCA Details

One Click LCA

One Click LCA is specialised software developed by Bionova Ltd, that provides the means to generate quick and accurate building level Lifecycle Assessments using designs imported from tools such as Revit, IFC (BIM), Excel, IESVE, energy models (gbXML).

Further, it provides access to one of the largest LCA database's currently available with Environmental Product Declarations (EPD) from manufacturers as well as generic materials.

IMPACT

IMPACT is a specification and database for use by software developers to incorporate into their tool, enabling a consistent Life Cycle Assessment. IMPACT compliant calculation tools work by allowing the user to attribute environmental information to drawn or scheduled items in the BIM (For the purposes of this LCA the imported IESVE data model). The quantity information imported within the BIM is multiplied by the environmental impact and/or costs 'rates' to produce an overall impact and cost for the whole (or selected part) of the design.

For the purposes of this LCA an IMPACT compliant calculation tool available through One Click LCA has been used to generate an environmental benchmark for comparison with the BREEAM LCA benchmarks.

Environmental Product Declarations (EPD)

An environmental product declaration or EPD is a document which is used to quantifiably demonstrate the environmental performance of a product. The European Standard for the generation of environmental product declarations for construction products is EN 15804 and was published by the CEN Technical Committee for the sustainability of construction works (CEN TC350 in 2012.)

EPD are generated based on data obtained through Life Cycle Assessment (LCA), with the LCA being performed using a peer-reviewed Product Category Rules (PCR) document in line with EN 15804, ISO 14025, and other related intranational standard.

EN15804:2012 & Life cycle assessment scope and system boundaries

EN 15804:2012 + A1:2013 'Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products' is a European standard that provides core product category rules (PCR) for Type III environmental declarations for any construction product and construction service. The core PCR defines the parameters to be declared and the way in which they are collated and reported, describing which stages of a product's life cycle are considered in the

PED and which processes are to be included in the life cycle stages. Further information can be found on the European Committee for Standardisation's website.

Further detailed explanation of the life cycle stage and analysis score of the EN 15804 standard are as follows:

Product Stage	Description
A1-A3 Construction Materials	Raw material supply (A1) includes emissions generated when raw materials are taken from nature, transported to industrial units for processing and processed. Loss of raw material and energy are also considered. Transport impacts (A2) include exhaust emissions resulting from the transport of all raw materials from suppliers to the manufacturer's production plant as well as impacts of production of fuels. Production impacts (A3) cover the manufacturing of the production materials and fuels used by machines, as well as handling of waste formed in the production processes at the manufacturer's production plants until end-of-waste state.
A4 Transportation to site	A4 includes exhaust emissions resulting from the transport of building products from manufacturer's production plant to building site as well as the environmental impacts of production of the used fuel.
A5 Construction/installation process	A5 covers the exhaust emissions resulting from using energy during the site operations, the environmental impacts of production processes of fuel and energy and water as well as handling of waste until the end-of-waste state.
B1-B5 Maintenance and material replacement	The environmental impacts of maintenance and material replacements (B1-B5) include environmental impacts from replacing building products after they reach the end of their service life. The emissions cover impacts from raw material supply, transportation and production of the replacing new material as well as the impacts from manufacturing the replacing material as well as handling of waste until the end-of-waste state.
B6 Energy use	The considered use phase energy consumption (B6) impacts include exhaust emissions from any building level energy production as well as the environmental impacts of production processes of fuel and externally produced energy. Energy transmission losses are also considered.
B7 Water use	The considered use phase water consumption (B7) impacts include the environmental impacts of production processes of fresh water and the impacts from wastewater treatment.
C1-C4 Deconstruction	The impacts of deconstruction include impacts for processing recyclable construction waste flows for recycling (C3) until the end-of-waste stage or the impacts of pre-processing and landfilling for waste streams that cannot be recycled (C4) based on type of material. Additionally, deconstruction impacts include emissions caused by waste energy recovery.
D External impacts/end-of-life benefits	The external benefits include emission benefits from recycling recyclable building waste. Benefits for re-used or recycled material types include positive impact of replacing virgin-based material with recycled material and benefits for materials that

	can be recovered for energy cover positive impact for replacing other energy streams based on average impacts of energy production.

D. General Notes

The report is based on information available at the time of the writing and discussions with the client during any project meetings. Where any data supplied by the client or from other sources have been used it has been assumed that the information is correct. No responsibility can be accepted by Ensphere Group Ltd for inaccuracies in the data supplied by any other party.

The review of planning policy and other requirements does not constitute a detailed review. Its purpose is as a guide to provide the context for the development and to determine the likely requirements of the Local Authority.

No site visits have been carried out, unless otherwise specified.

This report is prepared and written in the context of an agreed scope of work and should not be used in a different context. Furthermore, new information, improved practices and changes in guidance may necessitate a re-interpretation of the report in whole or in part after its original submission.

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Ensphere Group Ltd
55a Catherine Place
London, SW1W 0AU
+44 (0) 20 7846 9040
www.enspheregroup.com