

December 2024

The Aylesham Centre, Peckham



Whole Life Cycle Carbon Emmissions Assessment

Document reference: AC09A



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**Whole Life Cycle
Carbon Emissions
Assessment
AC09A**

Berkeley Homes (Capital) Plc

Aylesham Centre

Final

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December 2024

DOCUMENT CONTROL RECORD

REPORT STATUS: FINAL

Version	Date	Reason for issue	Author	Checked by	Approved for Issue by Project Manager
v.1	29.04.2024	Draft	L Bisson	Z Stebbings	Z Stebbings
v.2	21.05.2024	Second Draft	L Bisson	Z Stebbings	Z Stebbings
v.3	06.06.2024	Final Draft	Z Stebbings	L Bisson	Z Stebbings
v.4	11.06.2024	Final	L Bisson	-	pp. L Bisson
v.5	21.06.2024	Final	L Bisson	-	pp. L Bisson
v.6	29.11.2024	Update following scheme amendments	L Bisson	Z Stebbings	Z Stebbings

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Executive Summary

This updated Whole Life Cycle Carbon Emissions Assessment has been prepared for Berkeley Homes (Capital) Plc and is being submitted in support of the planning application (ref. 24/AP/2074) which seeks permission for the comprehensive redevelopment of the Aylesham Centre and associated car park and petrol filling station at Hanover Park, London SE15 5EW ('the Site'). This updated WLCCE supersedes the June 2024 assessment (document ref. AC09).

The updated WLCCE reflects the design changes as set out within the updated Design and Access Statement (document ref AC02A) and responds to comment received from the Greater London Authority and the London Borough of Southwark. The updates within this Report are minor and comprise the following:

- > Updates to the assessment to reflect the change in GIA.
- > Updates to the accompanying GLA Template to provide further justification on the proposed demolition.
- > Amendments in the accompanying GLA Template to the refrigerant charge and quantity.

The conclusions as set out within this updated WLCCE assessment are unchanged from those as set out within the June 2024 assessment (document ref. AC09).

The Proposed Development will comprise demolition of existing buildings and phased redevelopment to provide a replacement supermarket and associated basement car parking (Use Class E(a)); flexible retail, leisure (including drinking establishment), and commercial accommodation (Use Class E/Sui Generis); dwellings (Use Class C3); landscaping; and associated works.

National Building Regulations for new developments account for a building's operational carbon emissions. As methods and approaches for reducing operational emissions have become better understood, and as targets have become more stringent, these emissions are now beginning to make up a declining proportion of a development's carbon emissions. Attention now needs to turn to WLCCE to incorporate embodied carbon emissions, enabling a better understanding of the environmental impact of the proposed development.

WLCCE are the carbon emissions resulting from the construction and the use of a building over its entire life, through four stages described as life-cycle modules, as shown in Figure i;

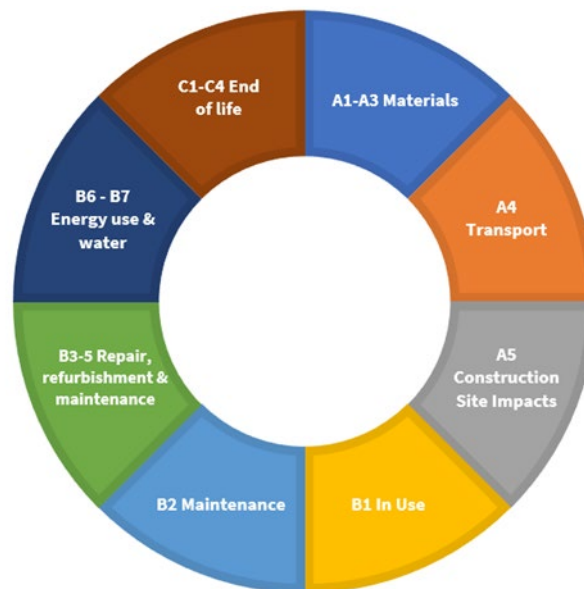


Figure i: Life cycle modules included within WLCCE assessment

They capture a building's operational carbon emissions from both regulated and unregulated energy use, as well as its embodied carbon emissions. Embodied emissions are those associated with raw material extraction, manufacture and transport of building materials, construction and the emissions associated with maintenance, repair, and replacement as well as dismantling, demolition, and eventual material disposal. The assessment provides a picture of a building's carbon impact on the environment.

This WLCCE assessment is being undertaken in compliance with London Plan 2021 Policy (SI 2), the methodology has followed the principles of BS EN 15978 and has used both the GLA guidance '*Whole Life-Cycle Carbon Assessments guidance – March 2022*' and the RICS Professional Statement '*Whole life carbon assessment: 2017 - Whole life carbon assessment for the built environment*' as the methodology for assessment. This has been facilitated through the use of GLA approved One Click LCA software.

The total emissions, based on the GLA guidance is **866 kgCO₂/m² GIA over 60 years excluding sequestered carbon or 853 kgCO₂/m² when sequestered carbon is included.**

- > 556 kgCO₂/m² for modules A1-A5 (excluding sequestered carbon).
- > 310 kgCO₂/m² for modules B-C.

When operational energy and water emissions are included in the calculation above the total emissions are expected to be **1,213 kgCO₂/m² GIA over 60 years**. The results are lower than the GLA WLC benchmarks for all modules, which means that the scheme is compliant with London Plan Policy SI 2.

Table i below summaries the elements required for a GLA compliant assessment and, where appropriate, where the information can be found.

Table i: Summary of required elements for GLA WLCCA

Item	Detail	Further information
1	Project assessment details	Project description – Demolition of existing buildings and phased redevelopment to provide a replacement supermarket and associated service yard and car parking (Use Class E(a)); flexible retail, leisure (including drinking establishment), and commercial accommodation (Use Class E/Sui Generis); dwellings (Use Class C3); landscaping; and associated works.
		GIA – 105,639.2 m ²
		Operational modelling for Module B6 – Residential (SAP), Non-Residential (SBEM). Due to the size of the commercial space and their shell only scope TM54 modelling has not been undertaken. SBEM modelling has been used for the commercial space energy calculations.
		Reference study period – 60 years
		Software used - One Click LCA
1	Project assessment details	Type of EPDs and carbon database used – One Click defaults
2	Confirmation that the assessment accounts for a minimum of 95% of the capital cost allocated to each building elements category	The assessment was undertaken using the outputs from the BIM model, which accounts for all the required building elements.
3	Explanation of third-party mechanisms that have been adopted to quality assure the submission	All work has been completed by a competent individual, Leah Bisson (BA, MSc) who has undertaken numerous LCAs for GLA compliance and are considered experts. They are suitably competent to complete the work. All work independently QA'ed by Zeta Stebbings (BSc, MSc, CEnv, MIEMA).

Item	Detail	Further information
4	Estimated total WLC emissions for each life-cycle module	A full breakdown of results can be found in the accompanying GLA WLCCA Template
5	Confirmation that options for retaining existing building and structures have been fully explored.	The Morrisons store occupies a significant portion of the site, leaving minimal space for residential development. Consequently, the alternative design, though emitting fewer emissions, is solely commercially driven. Moreover, the structural constraints of the existing store prohibit the construction of residential units above it. Thus, despite its lower emissions, this alternative remains unfeasible for the Applicant due to its lack of residential dwellings
6	Carbon emissions associated with pre-construction demolition	617,000 kg CO ₂ e (based on estimates in Pre-demolition Audit – KaNect Consultancy)
7	Percentage of the new build development that will be made up of existing facades, structures, and buildings	20% of the scheme will be made up of existing materials, as stated in the Pre-demolition Audit (KaNect Consultancy)
8	Summary of actions to achieve the WLC emissions report and the emissions reductions they are expected to achieve	This information can be found in the accompanying GLA WLCCA Template
9	Opportunities to further reduce the developments WLC emissions	This information can be found in the accompanying GLA WLCCA Template
10	Complete of the ‘material quantities and end-of-life’ scenarios table covering all building element categories	This information can be found in the accompanying GLA WLCCA Template. This corresponds with the Bill of Materials in the Circular Economy Statement (Hodkinson Consultancy).
11	Completion of the ‘GWP of all life-cycle modules table.	This information can be found in the accompanying GLA WLCCA Template.

CONTENTS

Executive Summary	3
1. INTRODUCTION	8
2. DEVELOPMENT OVERVIEW	9
3. POLICY AND REGULATIONS	11
4. WHOLE LIFE CYCLE CARBON EMISSIONS ASSESSMENT	13
Methodology	13
Operational Carbon	14
Embodied Carbon	15
5. WHOLE LIFE CYCLE CARBON RESULTS	19
6. MEASURES IMPLEMENTED AND OPPORTUNITIES	23
Measures Implemented	23
Opportunities	23
7. CONCLUSION	25

1. INTRODUCTION

- 1.1 This updated Whole Life Cycle Carbon Emissions Assessment has been prepared for Berkeley Homes (Capital) Plc and is being submitted in support of the planning application (ref. 24/AP/2074) which seeks permission for the comprehensive redevelopment of the Aylesham Centre and associated car park and petrol filling station at Hanover Park, London SE15 5EW ('the Site'). This updated WLCCE supersedes the June 2024 assessment (document ref. AC09).
- 1.2 The updated WLCCE reflects the design changes as set out within the updated Design and Access Statement (document ref AC02A) and responds to comment received from the Greater London Authority and the London Borough of Southwark.
- 1.3 The Proposed Development will comprise demolition of existing buildings and phased redevelopment to provide a replacement supermarket and associated basement car parking (Use Class E(a)); flexible retail, leisure (including drinking establishment), and commercial accommodation (Use Class E/Sui Generis); dwellings (Use Class C3); landscaping; and associated works.
- 1.4 The purpose of this WLCCE assessment is to demonstrate that the Proposed Development has undertaken an initial assessment based on the information available to date which will need to be updated as the project progresses.
- 1.5 National Building Regulations for new development account for a building's operational carbon emissions. As methods and approaches for reducing operational emissions have become better understood, and as targets have become more stringent, these emissions are now beginning to make up a declining proportion of a development's carbon emissions. Attention now needs to turn to WLCCE to incorporate embodied carbon emissions, enabling a better understanding of the environmental impact of the proposed development.
- 1.6 The assessment of the Proposed Development endeavours to help the design team understand, at concept design stage, the lifetime consequences of their design decisions. This report should be read in conjunction with the updated '*GLA Whole Life Carbon Assessment Template*' which has been submitted alongside this application and updated following comments received.

2. DEVELOPMENT OVERVIEW

Site Location

- 2.1 The Site is located within Peckham town centre within the administrative boundary of the London Borough of Southwark ('LBS') (the Local Planning Authority ('LPA')). Rye Lane bounds the Site to the west, Hanover Park to the south and Mckerrell Road to the east. Peckham Bus Station, fronting onto Peckham High Street, bounds the Site to the north.

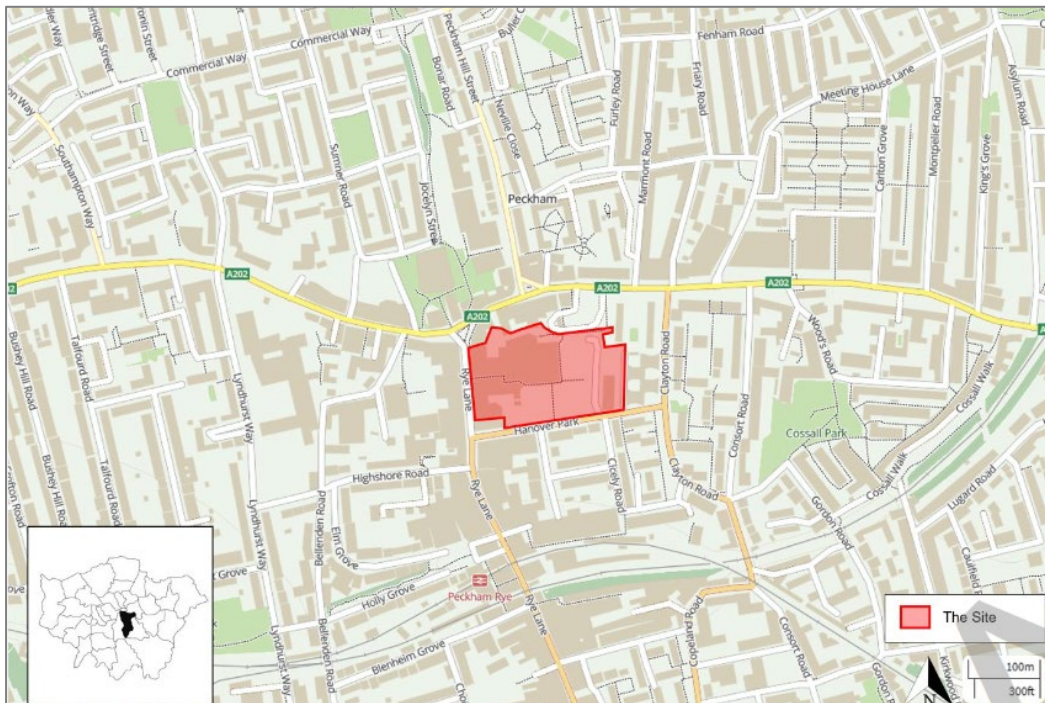


Figure 1: Site Location

Existing Development

- 2.2 The Site accommodates the Aylesham Centre alongside an associated surface car park (353 spaces), service yard, and petrol filling station. The Aylesham Centre comprises retail units fronting on to Rye Lane with additional retail units within a covered mall, including a Morrison supermarket.
- 2.3 The existing buildings (on the Site) are not listed at either Statutory or Local level. The closest listed buildings are located at 58 Peckham High Street and Baptist Chapel, Rye Lane. Immediately north of the Site, is the former Jones and Higgins building and immediately to the south of the Site is 47-79 Rye Lane, both of which are locally listed. The western part of the Site (fronting onto Rye Lane) falls within the Rye Lane Peckham Conservation Area.

Proposed Development

2.4 The Proposed Development is described as follows:

“Demolition of existing buildings and phased redevelopment to provide a replacement supermarket and associated service yard and car parking (Use Class E(a)); flexible retail, leisure (including drinking establishment), and commercial accommodation (Use Class E/Sui Generis); dwellings (Use Class C3); landscaping; and associated works”.

2.5 Figure 2 below illustrates the proposed Site layout.



Figure 2: Proposed Site Layout – DRMM Architects (November 2024)

Floor Area

2.6 The total floor area for the Proposed Development is 106,060 m², this is comprised of:

- > Retail, Leisure and Commercial Floorspace (Use Class E/Sui Generis) – 17,250 m².
- > Residential (Use Class C3) – 88,810 m².

2.7 The principles noted within this report apply to this GIA.

3. POLICY AND REGULATIONS

Regional Policy: The London Plan

London Plan (2021)

3.1 The London Plan sets out an integrated economic, environmental, transport and social framework for the development of London. The following policies are considered relevant to the proposed development and this Statement:

3.2 Policy **SI 2 Minimising Greenhouse Gas Emissions, states:**

‘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:

Operational carbon emissions will make up a declining proportion of a development’s whole life-cycle carbon emissions as operational carbon targets become more stringent. To fully capture a development’s carbon impact, a whole life-cycle approach is needed to capture its unregulated emissions (i.e., those associated with cooking and small appliances), its embodied emissions (i.e., those associated with raw material extraction, manufacture and transport of building materials and construction) and emissions associated with maintenance, repair and replacement as well as dismantling, demolition and eventual material disposal). Whole life-cycle carbon emission assessments are therefore required for development proposals referable to the Mayor. Major non-referable development should calculate unregulated emissions and are encouraged to undertake whole life-cycle carbon assessments. The approach to whole life-cycle carbon emissions assessments, including when they should take place, what they should contain and how information should be reported, will be set out in guidance’.

Guidance Documents

3.3 Guidance has been released by the Greater London Authority “*Whole Life-Cycle Carbon Assessments guidance – March 2022*”. It outlines how to prepare a WLCCE assessment which should accompany all referable Planning Applications in line with London Plan Policy SI 2 ‘*Minimising Greenhouse Gas Emissions*’.

3.4 The guidance is accompanied by an assessment template, which provides separate tabs outlining the information that should be submitted at each stage. This template has been provided as a standalone document which should be read in addition to this assessment report.

3.5 In addition, the following guidance is available to conduct assessments:

- > **BS EN 15978:2011** - *Sustainability of construction works. Assessment of environmental performance of buildings. Calculation method.*
- > **ISO 14040:2006** - *Environmental management — Life cycle assessment — Principles and framework.*
- > **RICS Professional Statement Whole life carbon assessment: 2017** - *Whole life carbon assessment for the built environment.*

3.6 The above documents are used to complete the WLCCE assessment, further planning reports submitted alongside this report will also be used and/or referenced within this assessment, including:

- > Energy Statement- ME Engineers
- > Design and Access Statement- DRMM Architects

4. WHOLE LIFE CYCLE CARBON EMISSIONS ASSESSMENT

- 4.1** Undertaking WLCCE assessments is a way to fully understand and minimise the carbon emissions associated with building designs over the entire life cycle of the building. This will be done at the Proposed Development to quantify the WLCCE that will be released, considering not only operational and embodied emissions but also demolition, construction, and refurbishment and replacement cycles.
- 4.2** The London Plan has introduced a requirement (Policy SI 2 ‘*Minimising Greenhouse Gas Emissions*’) for all new referable developments to calculate and reduce WLCCE, this is both embodied and operational carbon:
- > **Operational carbon** is the energy required to heat and power a building;
 - > **Embodied carbon** is the emissions associated with raw material extraction, the manufacture and transport of building materials, and construction; and the emissions associated with maintenance, repair and replacement, as well as the dismantling, demolition and eventual material disposal.
- 4.3** In addition to the two metrics above there are additional life cycle stages that are considered during WLCCE assessments, these include demolition, end of life and refurbishment/replacement cycles.
- 4.4** The two metrics (operational and embodied) and the additional life cycle stages, as noted above, have been included in this WLCCE assessment as per GLA guidance.
- 4.5** Undertaking a WLCCE assessment provides a full overview of the material and construction of a building using science-based metrics whilst also identifying the overall best combined opportunities for reducing lifetime emissions, and also helps to avoid any unintended consequences of focusing on operational emissions alone.

Methodology

- 4.6** WLCCE assessments are sensitive to changes in design and specification and therefore detailed design will impact the results as the scheme progress. As noted in the GLA guidance, WLCCE assessments should be conducted at the following stages in order to maximise design efficiencies:
- > Pre application;
 - > Stage 1 submission (RIBA 2/3);

- > Post construction (RIBA 6).

- 4.7** This assessment is considered to be the Stage 1 submission and has been completed for the proposed development using the drawings provided by DRMM Architects (November 2024) and energy calculations from the Energy Statement submitted for planning (ME Engineers).
- 4.8** A set of WLCCE benchmarks have been developed by the GLA in which applicants are required to compare against their own results as part of the assessment and which the GLA will refer to in its review of these assessments. An 'aspirational' set of benchmarks have also been devised for applicants that wish to go further. Both sets of benchmarks are included in this assessment and are being reported on.

Study Period

- 4.9** The reference study period (RSP) is 60 years, this is based on the principles outlined in BS EN 15978: 2011, section 7.3 and the RICS guidance. RSPs are fixed to enable comparability between whole life carbon results for different projects. It ensures that the assessment is representative of typical service life of different building elements.

Operational Carbon

- 4.10** Operational energy is the inputted energy required for all heating and power needs. It can be split into two variants:
- > **Regulated emissions** are assessed using the Government's approved methodology for Building Regulations Part L compliance; the Standard Assessment Procedure (SAP) for residential units; and Simplified Building Energy Model (SBEM) for non-residential units.
 - > **Unregulated emissions** are energy use as a direct result of user behaviour. This includes cooking, white goods (fridges, washing machines, etc), and plug-in electrical loads (televisions, laptops, lamps, etc).
- 4.11** Both of the above elements have been accounted for in this WLCCE assessment, these were provided by the calculations completed for the Energy Statement submitted for planning (ME Engineers). For clarity, as unregulated energy demands are largely reliant on the behaviour of occupants, they have been considered a fixed entity in the calculations in accordance with the guidance.

Non-Residential

- 4.12** The estimated energy demand for the commercial units have been calculated using Simplified Building Energy Model (SBEM) software. SBEM calculates the Regulated energy demands associated with hot water, space heating and fixed electrical items, as well as unregulated energy demands.

Operational unregulated energy demands associated with non-residential items outside of the commercial space (i.e. electric vehicle charging, external lighting, corridors, and lifts) are accounted for separately. They are presented as the landlord's energy demands at the Be Seen stage, in line with the London Plan Energy Hierarchy.

- 4.13** A sample SBEM calculation has been carried out on the commercial spaces. The sample calculation has been extrapolated to gain energy demand estimates representative of the total area to be provided.

Residential

- 4.14** The estimated annual energy demand for the residential portion of the development has been calculated using Standard Assessment Procedure (SAP) methodology. SAP calculates the Regulated energy demands associated with hot water, space heating and fixed electrical items.
- 4.15** SAP calculations have been carried out for representative home types. These encompass houses and exposed floor, mid floor, top floor and corner flats, at different orientations, and therefore represent a fair aggregation of the unit mix of the site.
- 4.16** To provide energy demands across the entirety of the Proposed Development, the accommodation schedule has been used to extrapolate the energy performance across the whole application area.
- 4.17** The unregulated energy demands, discussed further in Be Seen, for the residential units have been calculated using the methodology outlined in the SAP 10.2 document. This calculates the CO₂ emissions associated with appliances and cooking and are calculated using the BRE methodology.

TM54 Modelling

- 4.18** Due to the shell-only specification of the commercial spaces, TM54 modelling has not been undertaken. SBEM modelling has been used for the commercial space energy calculations, as outlined above in the non-residential methodology, this is deemed to be appropriate.

Embodied Carbon

One Click LCA

- 4.19** OneClick LCA is the software that has been used to conduct the WLCCE assessment. This is a web-based piece of design software for buildings and infrastructure approved for use by the GLA.
- 4.20** OneClick LCA consists of a large database of generic and average Life Cycle Indicator (LCI) data, and global Environmental Product Declaration (EPDs). The most suitable option for each material (where available) was chosen from the database in OneClick. The material LCI data has been chosen to be representative of the typical UK supply chain.

- 4.21 The life cycle stages (or modules) included within the WLCCE assessment as standard are shown in Figure 3 below.



Figure 3: Life cycle modules

- 4.22 At this stage it is not expected that all the information will be available. Where this is the case, One Click has been used to calculate the required values for the assessment. As the design develops, we will update and refine the tool to reflect the quantity and types of materials being used.

Construction Impacts

- 4.23 In addition to embodied carbon in the materials used for construction, greenhouse gas (GHG) emissions will be created by transportation of materials to site and operation of onsite plant and machinery. Guidance from RICs indicates 1.4 tonnes of CO₂e per £100,000 of project value, this is further referenced and approved by the BRE. The project value has been provided by the Applicant, which has allowed the construction transport GHG emissions to be included.

Potable Water Use

- 4.24 The carbon impact associated with water use during the operation of the proposed development is also required to be reported, in accordance with the RICS guidance. Water consumption is based on Building Regulations Part G 'enhanced consumption' of 110 litres/per person/per day (including external water use) and multiplied by the intended full occupancy of the development annually.
- 4.25 3,121 occupants have been assumed based upon the expected number of residents on site as per the Accommodation Schedule and calculations made using *BREEAM New Construction 2018 Occupant Density Guide*. This gives an estimated **annual water consumption of 120,731 m³** for the

entire development for 60 years. An additional allowance has been added to the calculations for the ongoing water required for maintenance.

End of Life Scenarios

- 4.26** At this stage in the design development, specific materials have not yet been selected. As such, the default end of life scenarios used in the One Click LCA software has been used.
- 4.27** Reuse and recycling of materials will be prioritised, where possible.

Carbon Sequestration

- 4.28** Sequestered carbon in timber has been included in the WLCCE assessment as all timber is assumed to be sustainably sourced.

Data Sources

- 4.29** The assessment has utilised multiple data sources described above and is based on the level of detail available at the current stage of design. The following data sources have been used:

Table 1: Data Sources

Data	Data source
Material types and volumes (A1-A3)	Material types were provided in the form of a BIM model output that was used to determine material quantities for the One Click model.
Transport data (A4)	Default values provided by One Click.
Construction site impacts (A5)	Construction value provided by applicant and baseline target provided by BRE.
Refrigerants (B1)	Refrigerant quantity of 355 kg has been estimated based on the use of R32 (ME Engineers) with annual leakage of 2% and 1% end of life leakage rate with a 99% end of life recovery (as per TM65).
Maintenance (B2)	B2 emissions have been calculated at 10kgCO ₂ /m ² , as per GLA guidance.
Repair and Replacement data (B3-B4)	An assumption has been made based on GLA guidance that assumes B3 emissions are 25% of the total B2 emissions for the site. Default values provided by RICS and One Click EPD database for products inputted into software for B4 emissions.

Data	Data source
Refurbishment (B5)	At present One Click does not have ways to consider B5 emissions. However, based on the information provided for B3 and B4 it is likely that these have emissions have been accounted for.
Operational energy (B6)	Energy consumption based on Energy calculations by ME Engineers.
Operational water (B7)	Water consumption based on Building Regulations Part G 'Enhanced Consumption' of 110 l/pp/d and multiplied by the intended full occupancy of the development.
End of life (C1-C4)	Default values provided by One Click based on the information within the EPD database.
Building areas	Total floor area: 106,060 m² - Retail, Leisure and Commercial Floorspace (Use Class E/Sui Generis) – 17,250 m² - Residential (Use Class C3) – 88,810 m²
Number of occupants	Commercial area- approximately 290 based on the <i>BREEAM New Construction 2018 Occupant Density Guide (Transport 02)</i> Residential- 2,831 based on the Accommodation schedule. Total- 3,121
Assessment period	60 years

4.30 For clarity, all assumptions made within the WLCCE assessment have been noted within this report. The assessment and comments made throughout should be taken within the context of carbon and energy use only.

5. WHOLE LIFE CYCLE CARBON RESULTS

5.1 As noted above, this is an initial assessment based on the best available information which will need to be updated as the project progresses in line with GLA requirements.

Benchmark Comparison

5.2 The results when compared to the GLA benchmark values, as noted in the GLA guidance note “*Whole Life-Cycle Carbon Assessments guidance – March 2022*” are shown in Table 2 below:

Table 2: Whole Life Carbon Baseline (GLA Guidance)

Modules	Aylesham Centre	WLC Benchmark	Aspirational Benchmark
Modules A1 – A5 (excluding sequestered carbon)	556 kgCO₂/m² GIA	<850 kgCO ₂ /m ² GIA	<500 kgCO ₂ /m ² GIA
Modules B – C (excluding B6 and B7)	310 kgCO₂/m² GIA	<350 kgCO ₂ /m ² GIA	<300 kgCO ₂ /m ² GIA
Carbon sequestering	-13 kgCO₂/m² GIA	n/a	n/a
Total for A1-A5 & B-C (including sequestered carbon)	853 kgCO₂/m² GIA	<1,200 kgCO ₂ /m ² GIA	<800 kgCO ₂ /m ² GIA
Total for A-C (including B6 and B7, and sequestered carbon)	1,213 kgCO₂/m² GIA	n/a	n/a

5.3 It must be noted that no benchmark has been set by the GLA for operational and energy use (life cycle stages B6-B7) due to insufficient data at present. The results for these have therefore been omitted from the totals in the graph above.

5.4 The total emissions, based on the GLA guidance is **866 kgCO₂/m² GIA** over 60 years excluding sequestered carbon or **853kgCO₂/m²** when sequestered carbon is included.

- > 556 kgCO₂/m² for modules A1-A5 (excluding sequestered carbon).
- > 310 kgCO₂/m² for modules B-C.

- 5.5** When operational energy and water emissions are included in the calculation above the total emissions are expected to be **1,213 kgCO₂/m² GIA over 60 years.**
- 5.6** A set of WLCCE benchmarks have been developed by the GLA in which applicants are required to compare against their own results as part of the assessment and which the GLA will refer to in its review of these assessments. An ‘aspirational’ set of benchmarks have also been devised for applicants that wish to go further. Both sets of benchmarks are included in this assessment and are being reported on.
- 5.7** The results are lower than the GLA WLC benchmarks for all modules, which means that the scheme is compliant with London Plan Policy SI 2, an overview of the results when compared to the GLA benchmarks are outlined in Figure 4 below.

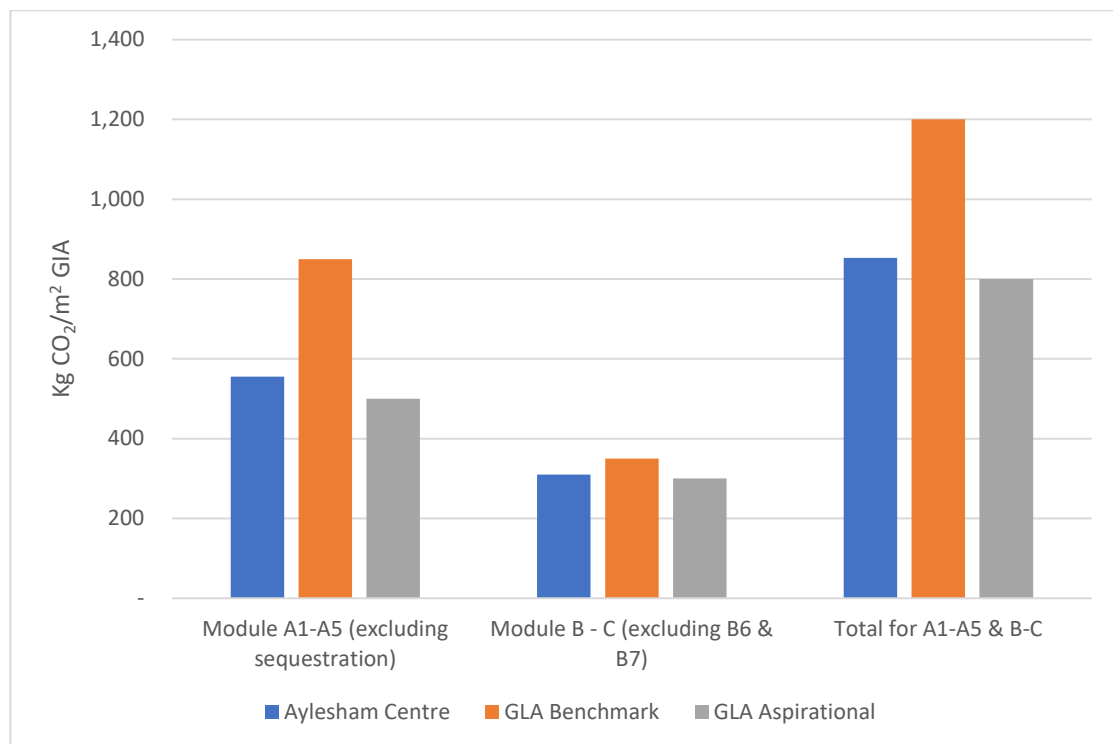


Figure 4: Total kgCO₂/m² GIA performance compared to GLA Benchmarks

- 5.8** The above results are subject to change as the WLCCE assessment gets updated in future. The full results are as follows:

Table 3: Full WLCCE Results

Category	Global warming potential	Total kgCO ₂ e over 60 years	Total kgCO ₂ e/m ² GIA over 60 years
A1-A3	Construction Materials	52,224,085	492.40
A4	Transport	1,455,981	13.73
A5	Site operations	5,260,820	49.60
B1	In Use	305,659	2.88
B2	Maintenance	1,060,800	10.00
B3	Repair	265,200	2.50
B4	Replacement/Refurbishment	27,139,630	255.89
B6	Operational energy use	38,175,371	359.94
B7	Operational water use	142,262	1.34
C1-C4	End of life	4,104,074	38.70
Total		130,143,532	1,227.07
Carbon Sequestering		-1,385,067	-13.06
TOTAL		128,758,465	1,2113.92

- 5.9 The above results demonstrate that **128,758 tonnes** are expected to be emitted over a 60-year period.
- 5.10 The operational energy (B6) makes up 30% of the overall emissions for the proposed development; 14% for regulated energy use and 16% for unregulated use.
- 5.11 Materials (A1 – A3) make up 40% of the overall emissions. There has already been a big focus on material selection and a leaner design in which waste is designed out which is why this percentage share is not bigger. Further focus will be given to reduce embodied carbon in the next stage of design.
- 5.12 5% of emissions are a result from the transport of materials to site and construction stages (A4 and A5), whilst this is small in comparison to elements it is still important to reduce transport emissions through the local sourcing of materials and to reduce consumption of energy and water during consumption, where possible.

5.13 There are also impacts, with the in-use life-cycle module B1-B5 making up approximately 22% of all embodied carbon emissions. This is primarily due to materials that will need replacing over the 60-year study period.

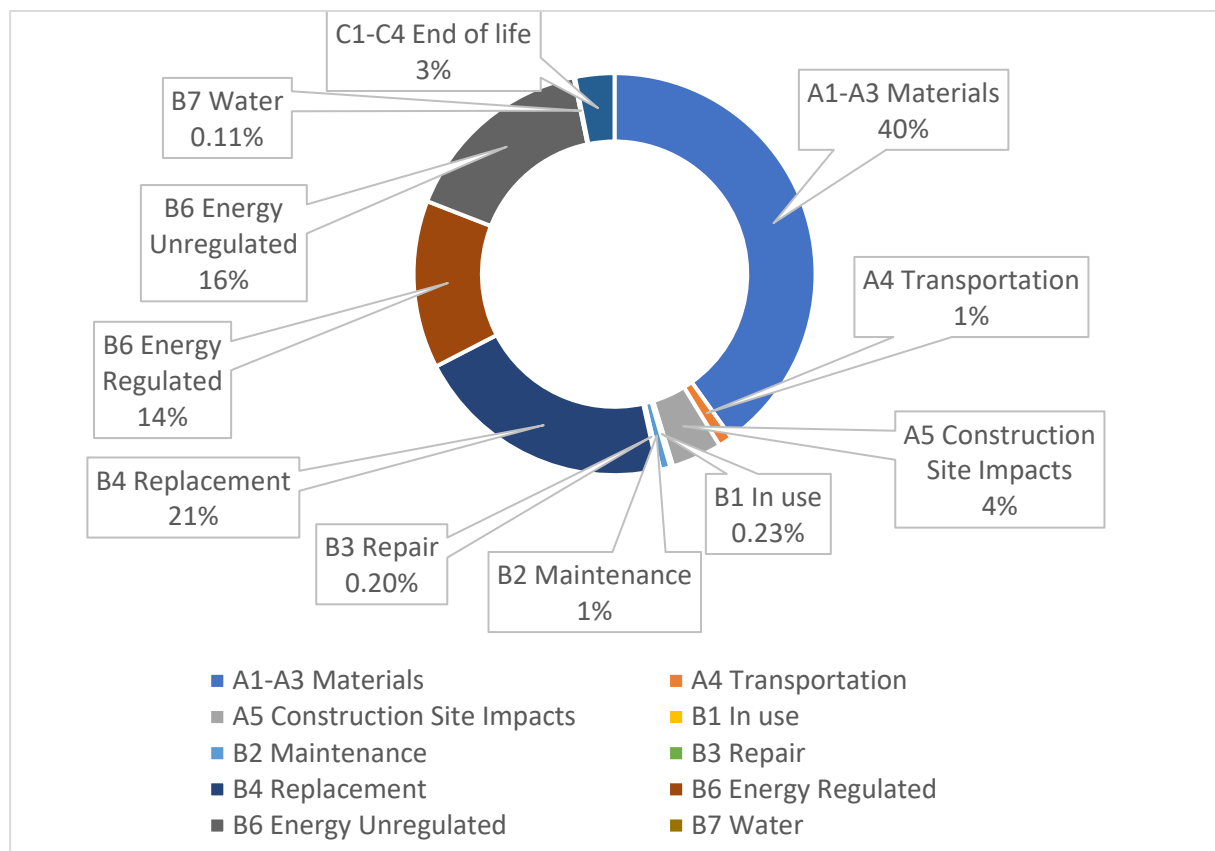


Figure 5: Total kgCO₂e - Life-cycle stages

6. MEASURES IMPLEMENTED AND OPPORTUNITIES

Measures Implemented

- 6.1** In February 2024, key members of the design team met for a Designing out Waste (DoW) Workshop, hosted by Berkeley Homes (Capital) Plc. From the earliest stage of the design process Berkeley Homes aim to design out waste and work with their supply chain to develop material efficient processes. This has allowed for a series of reductions in embodied carbon to take place, including but not limited to:
- > Specifying a high recycled content for steel is a good driver for products where the aim is to encourage and establish a market for recycled materials that are otherwise limited. Steel with 97% recycled content has been proposed for all floor constructions and has been included in all rebar. **This has allowed for 19 kgCO₂/m² saving in A1-A3 emissions.**
 - > The use of recycled materials (concrete, bricks and bituminous materials) in the substructure, as identified in the pre-demolition audit (KaNect) have allowed for a saving of **5 kgCO₂/m² in A1-A3 emissions** whilst also supporting a circular economy.
 - > The use of cement replacement (50% in foundations, columns and frames and 40% in floors) has allowed for a saving of **55 kgCO₂/m² in A1-A3 emissions.**

Opportunities

Reduce material use

- 6.2** The **future demolition and deconstruction** of the development could be considered at the design stage. Consideration to be given to ways to facilitate dismantling, where possible.
- 6.3** Non-load bearing internal walls contribute material to the building that could otherwise be avoided. By **reducing the volume of non-load bearing walls** where possible, associated embodied carbon is also reduced.
- 6.4** The façade is under constant wear from the environment which can lead to frequent repairs and maintenance. By using **durable materials** for exposed elements, this not only reduces the cost and frequency of refurbishment but also reduces the use of material replacement and its associated carbon footprint.
- 6.5** Similarly, **an extensive maintenance and repair schedule** could also be produced during the design life of the development to ensure that specific materials and pieces of equipment are able to

remain in situ during their expected lifespan. This will minimise the need to replace and refurbish and reduce emissions under life cycle stages C1-C4.

Alternative materials

- 6.6** During the next stages of design, the following materials could be reviewed, and alternative suppliers explored to ensure a better environmental performance:
- > LED lighting is notoriously carbon intensive, suppliers who are able to provide EPDs will be prioritised providing the energy performance is sufficient.
 - > Glazing is a carbon intensive process and a supplier with environmental credentials (EPD or responsible sourcing certification) should be selected, but only where this does not compromise performance (g-value, u-value etc).
 - > Insulation is difficult to make using recycled content and also difficult to re-use end of life but alternatives in the industry will be explored to see if a lower carbon option is available.

Recycled materials

- 6.7** Areas of hardstanding could make use of **recycled crushed concrete/gravel** to remove the associated carbon emissions from the assessment. These materials could similarly be recycled at the end-of-life scenario.
- 6.8** Innovative cement mixes are now increasingly available, increasing the % share of GGBS across the sub and structure could facilitate a **10 – 15 CO₂/m² in A1 – A3 emissions**. This cement mixture could be investigated further for use at the appropriate stage, and if available at the time of construction, be specified.
- 6.9** At end-of-life, **concrete can be completely recycled**. After demolition, concrete can be processed and used as recycled aggregate in fresh concrete. If the site is intended for new construction the demolished concrete can be crushed on-site and used onsite as hard core, fill, or in landscaping.
- 6.10** Products with an increased **% of recycled content** should be prioritised over 100% virgin materials.
- > Use of plasterboard with recycled content would offer circa **3 -5 kgCO₂/m² saving in A1-A3 emissions** whilst also increasing the recycled content (by value) figure in the Circular Economy assessment.

Re use of materials

- 6.11** The Circular Economy statement produced by Hodkinson Consultancy details the strategy for **recovery and reuse of materials**. Please refer to the report for further detail.

7. CONCLUSION

- 7.1** This updated Whole Life Cycle Carbon Emissions Assessment has been prepared for Berkeley Homes (Capital) Plc and is being submitted in support of the planning application (ref. 24/AP/2074) which seeks permission for the comprehensive redevelopment of the Aylesham Centre and associated car park and petrol filling station at Hanover Park, London SE15 5EW ('the Site'). This updated WLCCE supersedes the June 2024 assessment (document ref. AC09).
- 7.2** The updated WLCCE reflects the design changes as set out within the updated Design and Access Statement (document ref AC02A) and responds to comment received from the Greater London Authority and the London Borough of Southwark.
- 7.3** The total emissions, based on the GLA guidance is **866 kgCO₂/m² GIA** over 60 years excluding sequestered carbon or **853kgCO₂/m²** when sequestered carbon is included.
- > 556 kgCO₂/m² for modules A1-A5 (excluding sequestered carbon).
 - > 310 kgCO₂/m² for modules B-C.
- 7.4** When operational energy and water emissions are included in the calculation above the total emissions are expected to be **1,213 kgCO₂/m² GIA over 60 years.**