



Applicant Response to GLA (Energy)

Planning Application Reference 2382/APP/2023/2906
Broadwater Lake, Moorhall Road, Harefield, UB9 6PE

| Post Stage 1 Comment (04/02/2025) | Applicant Response |
|---|--|
| <p>The applicant should submit the GLA's Carbon Emission Reporting spreadsheet in excel format. The applicant should ensure that all tabs are completed as per methodology on Introduction tab.</p> | <p>The Carbon Emission Reporting Spreadsheet (in excel format) was issued to LBH on 12th January 2026. All tabs have been completed as per the methodology on the Introduction tab.</p> |
| <p>The applicant has not provided an updated estimate of the be lean savings.</p> <p>There is no need to have a baseline BRUKL unless there is a refurbished element. The applicant should provide the latest be lean BRUKLS (with a heating efficiency of 2.64 and hot water of 2.78). The be green TER should be used for the baseline.</p> <p>The applicant should note that the London Plan includes a target of a minimum 15% improvement on 2021 Building Regulations from energy efficiency which applicants should target. The applicant should</p> | <p>The Be Lean Savings are provided within the completed Carbon Emission Reporting Spreadsheet and Section 4 of the Energy Statement (ref. C2526351, dated 6th January 2025), both of which were issued to LBH on 12th January 2026.</p> <p>The submitted Energy Strategy demonstrates that the combined Lean, Clean and Green measures achieve greater than 35% regulated CO₂ emissions reduction compared to a Part L Volume 2 (2021) compliant target emission rate. This level of performance demonstrates compliance with Criterion 1 of Part L Volume 2 (2021) and London Plan Policy SI2 as it exceeds the minimum target of 15% improvement on energy efficiency in comparison to the 2021 Building Regulations target.</p> |



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| <p>therefore consider modelling additional energy efficiency measures to meet the EE target.</p> | <p>A baseline BRUKL has not been provided as refurbishment of the existing building is not proposed.</p> |
| <p>The area weighted average (MJ/m²) and total (MJ/year) cooling demand for the actual and notional building should be provided and the applicant should demonstrate that the actual building's cooling demand is lower than the notional.</p> <p>The applicant has shown compliance with Tm52 DSY 1 with the use of active cooling. Given the use-classes proposed this is accepted.</p> <p>Heat pumps are being proposed in the form of a (centralised) WSHP system. Further information on the heat pumps should be provided including:</p> <p>(a) An estimate of the heating and/or cooling energy (MWh/annum) the heat pumps would provide to the development and the percentage of contribution to the site's heat loads;</p> <p>Details of the Seasonal Coefficient of Performance (SCOP) and/or Seasonal Energy Efficiency ratio (SEER) and how these have been calculated for the specific proposed system's operation. This should</p> | <p>Detailed information relating to heat pump specification, space heating demand and cooling demand is not typically fixed at planning application stage, as these matters sit within the technical building design and Building Regulations process.</p> <p>The enclosed RUKL outputs confirm that the buildings are <u>not mechanically cooled</u>, and therefore the cooling demand is zero.</p> <p>Condition No. 50 as currently drafted requires the final overheating strategy to be submitted to the Local Planning Authority for approval. The following details will be submitted for approval:</p> <ul style="list-style-type: none">▪ Heat pumps and connections;▪ Space heat demand;▪ Cooling demand;▪ Estimate of the heating and / or cooling energy (MWh/annum);▪ Contribution to the Site's heat loads (%); and▪ Details of the Seasonal Coefficient of Performance (SCOP) and / or Seasonal Energy Efficiency Ratio (SEER) and associated calculations. |



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| <p>incorporate the expected heat source and heat distribution temperatures (for space heat and hot water) and the distribution loss factor, which should be calculated based on the above information and used for calculation purposes.</p> <p>The applicant has provided a CIBSE TM54 report. This shows a ranged EUI with the 'likely scenario' of 39.55. The applicant should also provide the Space Heat Demand expected for this development.</p> | <p>The above details will be submitted to the Local Planning Authority for approval prior to the first occupation of the development.</p> |
| <p>The applicant is proposing a WSHP system. They should confirm that this is a site-wide approach connecting to all blocks from a centralised energy centre. A schematic has been provided.</p> <p>The applicant should provide a commitment that the development is designed to allow future connection to a district heating network. This should include a single point of connection to the district heating network. Drawings should be provided demonstrating space for heat exchangers in the energy centre/centres, and a safe-guarded pipe route to the site boundary, and sufficient space in cross section for primary district heating pipes where proposed routes are through utility</p> | <p>The GLA London Heat Map confirms there are no existing district heat networks within a reasonable distance of the site. The nearest network is located in West Drayton, approximately six miles away. There are no planned Heat Networks within a reasonable distance of the Site and the development will never be connected to a District Heat Network, given its rural location.</p> |



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| <p>corridors. This requirement is to be secured through a suitable condition or legal wording.</p> | |
| <p>The applicant is proposing to install 300 kWp of PV.</p> <p>A detailed roof layout should be provided demonstrating that the roof's potential for a PV installation has been maximised and clearly outlining any constraints to the provision of further PV, such as plant space or solar insolation levels. The applicant is expected to situate PV on any green/brown roof areas using biosolar arrangement and should indicate how PV can be integrated with any amenity areas.</p> <p>The on-site savings from renewable energy technologies should be maximised regardless of the London Plan targets having been met.</p> | <p>Approximately 500 square metres of PV panels are proposed on the roofs of the Safety Zone and Camp Zone buildings, as shown on drawings:</p> <ul style="list-style-type: none">▪ 1102 P01 – Proposed Safety Zone Ground Floor and Roof Plan▪ 1103 P01 – Proposed Camp Zone Ground Floor and Roof Plan <p>The Safety Building provides the largest suitable roof area and pitch for PV installation. Locating the PVs on these buildings also represents the safest option for access and maintenance. The PV provision has been maximised as far as practicable, to ensure that on-site savings are optimised.</p> <p>There are no brown or green roofs proposed on the Site.</p> <p>PV panels are not proposed on the Operational Building as the roof pitch is unsuitable. The roof design has been carefully considered in relation to operational requirements and landscape impacts. The roof pitch is a direct response to requests from the LBH Design Officer. Condition No. 31 as currently drafted requires the final PV design to be submitted to the Local Planning Authority for approval prior to its installation.</p> |
| <p>Once the planning stage CO2 emissions have been agreed with GLA, the applicant should confirm that the planning stage data has been submitted to GLA.</p> | <p>The completed GLA Be Seen spreadsheet is appended at <u>Document 1</u>. As requested by the GLA, these provide the planning stage CO₂ figures.</p> |



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| <p>The applicant should confirm the carbon shortfall in tonnes CO₂ and the associated carbon offset payment that will be made to the borough. This should be calculated based on a net-zero carbon target for domestic and non-domestic proposals using the GLA's recommended carbon offset price (£95/tonne) or, where a local price has been set, the borough's carbon offset price. The draft s106 agreement should be submitted when available to evidence the carbon offset agreement with the borough.</p> | <p>The Applicant has agreed a carbon offset contribution of <u>£42,821.25</u> which will be secured in the usual manner through a S106 Agreement.</p> <p>As set out in the submitted Energy Statement and the Be Seen spreadsheet, the calculation is based on the GLA's recommended carbon offset price of £95 per tonne. The annual emissions are as follows:</p> <ul style="list-style-type: none">▪ Operations Building: 13.82 tCO₂/year▪ Camp Zone Building: 1.205 tCO₂/year▪ Total: 15.025 tCO₂/year▪ 30-year emissions total: 450.75 tCO₂. <p>Condition No. 49 as currently drafted requires the submission of an Energy Monitoring, Recording and Reporting Plan prior to occupation. This will ensure compliance with London Plan Policy SI2 and GLA Energy Assessment Guidance.</p> |
| <p>The applicant should ensure the same fabric spec and air permeability is applied at all stages, notably the air permeability.</p> | <p>As requested by the GLA, the building has been designed to have a high fabric efficiency and air permeability target. This will be applied at all stages.</p> |
| <p>The applicant has submitted a WLC report which appears to cover much of the assessment requirements, however, an Excel version of the GLA WLC template must also be submitted to allow a full review to be completed against the guidance.</p> | <p>The completed GLA Whole Life Carbon spreadsheet (in excel format) is enclosed at <u>Document 2</u>. Condition No. 57 as currently drafted requires a post-construction Whole Life-Cycle Carbon Assessment to be submitted prior to the first occupation of the development.</p> |



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It would be beneficial to review the completed Whole Life Carbon assessment template spreadsheets as the report shows A1 - A5 emission figures as snippets from the spreadsheet. These emissions are also quite low and further explanation is needed to justify these.

Section 2.2 of the updated Whole Life Carbon Assessment Report (which is enclosed as Document 3) has been updated to include further detail on the A1 – A5 emission figures. The following factors contribute to the reduced embodied carbon:

- **The development comprises of three relatively small, low-rise buildings with relatively simple forms;**
- **No basement construction or significant groundworks are proposed;**
- **Lightweight steel frame construction has been adopted;**
- **Limited internal finishes and simple material palette;**
- **One of the buildings (Safety Zone) is largely unheated and predominantly storage space;**
- **No high-carbon structural systems such as reinforced concrete frames;**
- **Default transport distances and construction impacts in line with OneClick LCA assumptions; and**

Minimal building services complexity compared to typical benchmark buildings.

The benchmark targets used for comparison are based on an educational building whereas the proposed building is a leisure facility with some educational spaces. Therefore, the benchmark targets are not fully representative of the proposed building.



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| | <p>In summary, the scheme's A1-A5 emission figures are considered low but are reflective of the nature of the proposed development.</p> |
| <p>The Applicant should provide additional information about the existing building(s) on the site, including provision of a Pre-Redevelopment Audit and Pre-Demolition Audit.</p> | <p>The proposed development comprises the removal of relatively small-scale structures. Given the limited scale of demolition works, a detailed pre-redevelopment audit and pre-demolition audit at this stage would not provide meaningful additional information.</p> <p>Pre-redevelopment and pre-demolition audits are often secured via planning condition and undertaken following planning determination, once detailed contractor information and demolition methodologies are available. This ensures the audit reflects the most accurate material quantities, reuse opportunities and construction logistics.</p> <p>At this stage, no demolition contractor has been appointed. Therefore, any audit prepared now would be based on assumptions and may require revision post-consent.</p> <p>Furthermore, given the relatively small scale of demolition (approximately 150sqm), limited structural complexity, and absence of significant materials such as large concrete frames or basements, the opportunity for material reuse and recovery is expected to be limited.</p> |



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| | <p>It is therefore considered reasonable and proportionate for the pre-redevelopment audit and pre-demolition audit to be secured via planning condition and submitted prior to demolition works commencing.</p> |
| <p>The Applicant should ensure that the Recycling and Waste Reporting table is completed in full, demonstrating how much waste the proposal is expected to generate, and how and where the waste will be managed in accordance with the waste hierarchy in compliance with the targets set by GLA policy.</p> | <p>The completed GLA Recycling and Waste spreadsheet is enclosed at <u>Document 4</u>. As requested by the GLA, this demonstrates that the proposal is expected to generate 0.066 tonnes per square metres (Gross Internal Area) of waste at construction stage. The spreadsheet also provides details as to how and where the waste on Site will be managed and assesses measures for prevention / reduction, reuse and preparing for re-use, recycling and other waste recovery, in line with the GLA's Waste Hierarchy.</p> |



Appendix 1

GLA Be Seen Spreadsheet

Please see covering email.



Appendix 2

GLA Whole Life Carbon Assessment Spreadsheet

Please see covering email.



Appendix 3

Whole Life Carbon Assessment Report (Updated) (April 2026)



WHOLE LIFE CARBON ASSESSMENT

For

**Proposed Development of Hillingdon
Water Sports Facility and Activity Centre**

at

**Broadwater Lake, Off Moorhall Road,
Harefield, Uxbridge**

By

**John White
HIBEC Limited
106a High Street
Henley-In-Arden
B95 5BY**

1.0 INTRODUCTION

1.1 Development Overview

This Whole Life Carbon Assessment has been prepared for the proposed development comprising of the construction of 3No detached buildings as illustrated in Figure 1.1 below. The buildings consist of an Operational Building with offices, viewing area and changing rooms, A Safety Zone building which consists of mainly storage areas with a small tea point and WC and a Camping Zone building which consists of changing rooms.

The report details the approach taken by the applicant and Design Team to address the Whole Life Cycle Carbon principles and to incorporate these within the development design to reduce the overall Whole Life Cycle Carbon Emissions.



Figure 1.1 Proposed Site Plan

1.2 Policy Requirements

The GLA London Plan 2021 Policy SI2 Minimising Greenhouse Gas Emissions states:

“Development proposals referable to the Mayor should calculate whole lifecycle 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 proportions 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, manufacturer 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.’

This policy sets out the requirement for Whole Life Carbon Assessments in referable schemes and recommends them for non-referable schemes. The guidance document for completing a Whole Life Carbon Assessment was first published in October 2020 and updated in March 2022. This includes requirements for assessment at the pre-application, planning application and post-construction stage.

Additional guidance documents are also referred to in the policy and these are to be used to inform Whole Life Carbon Assessments, these documents are;

- I. RICS Professional Statement. Whole Life Carbon Assessments for the Built Environment 1st Edition November 2017.
- II. BS EN15978:2011- Sustainability of construction works. Assessment of environmental performance of buildings. Calculation method.

1.3 Life Cycle Modules

The GLA guidance refers to the RICS Professional Statement and BS EN15978 which note that WLC assessments should be undertaken against the four stages of the typical building life cycle listed below.

- Module A1-A5- Product sourcing and construction stages
- Module B1-B7- Use stages
- Module C1-C4- End of life stages
- Module D- Benefits and loads beyond the system boundary

These are split down into their constituent parts in figure 1.3 below

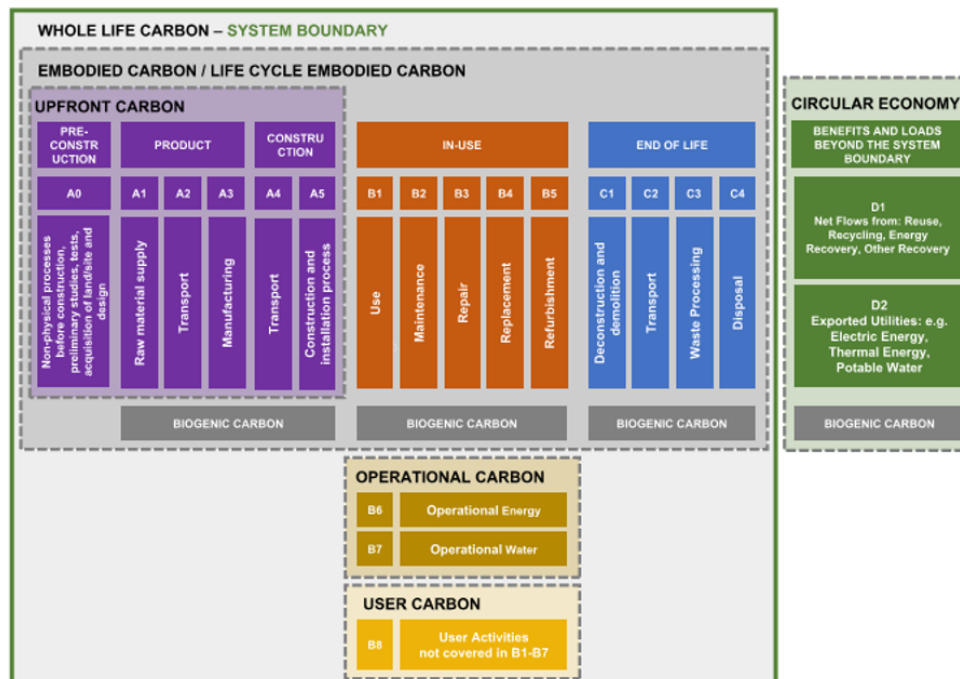


Figure 1.3 Life Cycle Modules

1.4 Methodology

This Whole Life Carbon Assessment has been carried out using the RICS nationally recognized assessment methodology. The report demonstrates the actions taken to reduce Whole Life Cycle Carbon Emissions and recommendations. The assessment covers the development's carbon emissions across all life cycle modules over its lifetime. This accounts for:

- Operational Carbon Emissions (regulated and unregulated)
- Embodied Carbon Emissions
- Any future potential carbon emission benefits post end of life including benefits from reuse and recycling of building structures and materials.

As the use type for the development is Leisure the GLA benchmark for a Sports Building has been used for comparison.

1.4.1 Operational

The calculated operational carbon emissions from energy and water consumption are calculated separately using the TM54 Evaluating operational energy use at design stage methodology are considered to represent current grid emissions, and these have been used in line with GLA requirements.

1.4.2 Embodied Carbon

OneClick LCA life cycle software has been used to model the proposed development based on estimated bills of quantities provided by the design team. OneClick LCA is an approved software tool recognized by the GLA and is a dedicated Life Cycle Assessment tool containing generic and average life cycle indicators representative of the typical UK supply chain. The tool allows the embodied impacts for all the specified materials to be modelled using OneClick's dedicated database which is integrated into the software.

All building elements have been included in the study in line with Table 6 of the RICS Professional Statement 2017. At this stage, exact data and specific material suppliers are not known in most instances. Therefore, the Whole Life Carbon Assessment is based on project estimates and default figures with the OneClick template library to give as accurate a baseline as possible. As a result, high level observations are given for reductions in embodied emissions.

1.5 Key Assumptions

The materials information and quantities have been assumed and estimated from the design drawings provided in addition to email information from the design team which details any changes to the information shown on the drawings. The general base build is steel frame construction with concrete block cavity wall and internal wall comprising of exposed lightweight concrete blocks with cavity insulation (for noise attenuation).

Building services comprise of water source heat pumps serving all 3 building with underfloor heating in the Operations building and Camp Zone. The Safety Zone is unheated.

Table 1.5 below sets out the key assumptions used within the study to determine the Whole Life Carbon Cycle of the proposed development.

| Environmental Indicator | Embodied Carbon CO _{2eq} |
|--|--|
| Study Period | 60 years in line with GLA guidance |
| Functional Units | kgCO _{2e} /m ² GIA in line with GLA guidance |
| Assessment Scope | All materials used within the proposed developments boundary in line with RICS Professional Statement |
| Material Specification | All materials information included within the study is taken from the construction drawings and email information from the design team. Recycled content in materials has been included in line with RICS Professional Statement Table 6. |
| Modules B2-B3 | Emissions for modules B2-B3 were calculated in line with paragraph 2.5.12 of the Whole Life Carbon Assessment Guidance. |
| Default Values | Where produce-specific data is not available, default values from the OneClick database were used unless specified. |
| Material Lifespans and Transport Distances | OneClick default material lifespans and transport distance are in line with RICS Professional Statement Table 7 and have been used unless specifically stated. |
| Operational Energy and Water | The estimated annual energy consumption has been taken from the Planning TM54 Assessment and multiplied for a 60-year building life. |
| Construction Site | OneClick default construction site impacts were used which are in line with RICS Professional Statement methodology. |

Table 1.5 Key Assumptions

1.6 Limitations

Whole Life Cycle Carbon Assessments can be difficult to accurately apply and are only as good as the information available. This assessment has been completed in line with current industry best practice standards (RICS PS 2017 and BS EN 15978) however, the following limitations should be noted:

- This study has been made using the estimates provided at this stage of the project.
- The One-Click database includes standard assumptions for waste factors, life expectancy, recycled content and transport distances for each material type. These might not be reflective of the as-built data for this project. The Circular Economy Statement end of life scenarios have been used where possible.
- There is a degree of imprecision at this early stage, therefore the major impacts should be focused on for improvement.
- The embodied carbon of building services is still a new area within the industry and available data is limited. Approximations have therefore been used to represent the proposed systems using existing datasets within the software.

2.0 RESULTS

2.1 Baseline Results

The design information has been input into the OneClick LCA Software and the results have been extracted to the GLA Whole Life Carbon Assessment spreadsheet. The Results are shown in Table 2.1 below

| Life Cycle Module | Description | kgCO _{2e} over 60 years | kgCO _{2e} /m ² GIA |
|--|--|----------------------------------|--|
| Materials Embodied Carbon Module A1-A5 (excluding sequestration) | Construction Materials Transport Construction Site | 1,195,800 | 344 |
| In Use and End of Life Module B-C (Excluding B6 & B7) | Use Maintenance Repair Replace Refurbishment | 1,089,720 | 313 |
| A-C (excluding B6 & B7, including sequestration) | Construction Materials Transport Construction Site Re-use, recycling and disposal | 2,275,558 | 655 |

Table 2.1 Whole Life Carbon Assessment Results

The Whole Life Carbon Assessment baseline results demonstrate that for the proposed development the highest contributors to overall emissions are the A1-A5 modules as expected.

2.2 Comparison with the GLA Benchmark

The Whole Life Carbon Assessment has been compared to the GLA Benchmarks for Educational buildings as this is the closest available benchmark.

| | GLA Benchmark for Educational Buildings kgCO_{2e}/m² GIA over 60 years | Aspirational GLA Benchmark for Educational Buildings kgCO_{2e}/m² GIA over 60 years |
|--|--|---|
| Materials Embodied Carbon Module A1-A5 (excluding sequestration) | <750 | <500 |
| In Use and End of Life Module B-C (Excluding B6 & B7) | <250 | <175 |
| A-C (excluding B6 & B7, including sequestration) | <1000 | <675 |

Table 2.2 Whole Life Carbon Assessment Benchmark

The results show that the building's design compares favourably to the GLA Benchmark and aspirational GLA benchmarks with modules A1-A5 achieving aspirational benchmarks and modules A-C slightly exceeding the aspirational benchmarks. Modules B-C are significantly above the aspirational benchmark of 175kgCO₂/m².

The A1–A5 emissions of 344 kgCO_{2e}/m² are considered low but are reflective of the nature of the proposed development. The following factors contribute to the reduced embodied carbon:

- The development comprises of three relatively small, low-rise buildings with relatively simple forms
- No basement construction or significant groundworks are proposed
- Lightweight steel frame construction has been adopted
- Limited internal finishes and simple material palette
- One of the buildings (Safety Zone) is largely unheated and predominantly storage space
- No high-carbon structural systems such as reinforced concrete frames
- Default transport distances and construction impacts in line with OneClick LCA assumptions
- Minimal building services complexity compared to typical benchmark buildings

In addition the benchmark targets used for comparison are based on an educational building, whereas the proposed building is a leisure facility with some educational spaces. Therefore the benchmark targets are not fully representative of the proposed building.

3.0 DESIGN

3.1 Proposed Design

The highest contributors to the WLC carbon emissions are broken down by life-cycle stage in figure 3.1 below.

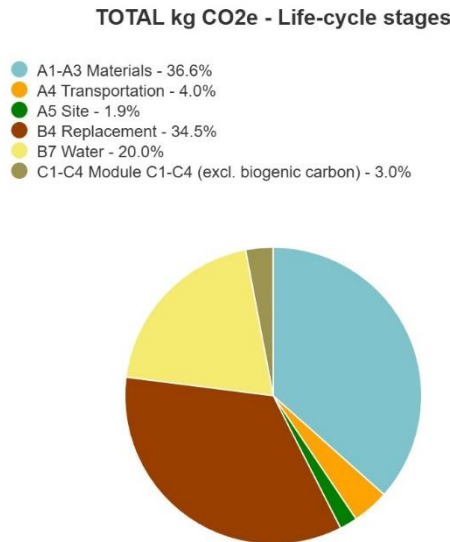


Figure 3.1 Life-cycle stages kgCO_{2e}

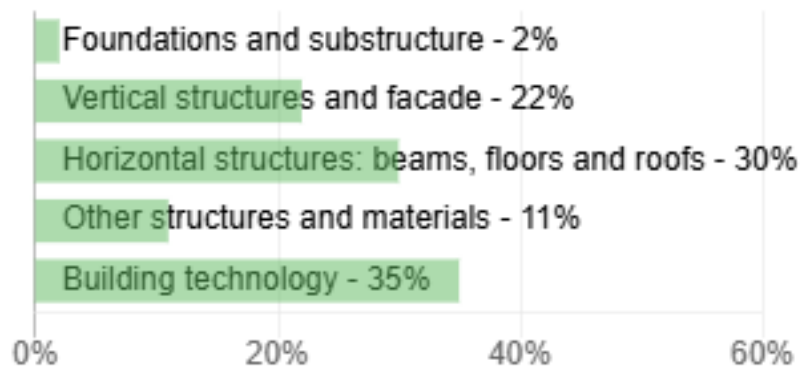


Figure 3.2 Embodied Carbon by Structure

The top 4 materials with the highest lifetime emissions to modules A1-A5 are;

- Lightweight Precast Concrete Block (17.9%)
- Photovoltaic Panels (12.9%)
- Precast Hollow Core Flooring (11.4%)
- Zinc Roofing with Standing Seam. (6.6%)

The results from the highest contributors show that the Lightweight Precast Concrete Blocks used in the external and internal walls account for nearly 18% of the lifetime emissions of the buildings, with the first floor slab of the Operations building contributing another 11%. Additionally, the Photovoltaic panels account for nearly 13% of the lifetime emissions. Therefore, the external wall and first floor slab be the elements with the highest focus for improvements as they will generate the largest reductions. It may also possible to achieve reductions by focusing on the solar photovoltaic panels.

The assessment has shown that these materials are the highest contributors to the overall Whole Life Cycle emissions of the proposed development. Priority should be given to reducing the emissions of these products.

4.0 CONCLUSIONS

This Whole Life Carbon Assessment has been produced in support of the planning application for the proposed development. The purpose of this assessment is to demonstrate that the proposed development is in line with GLA benchmarks and that a sustainable design has been considered and implemented.

The assessment has been prepared in line with the GLA's London Plan Policy SI2 and using the methodology detailed in GLA Whole Life Cycle Carbon Assessment Guide (March 2022), the RICS Professional Statement 2017 and BS EN15978:2011, The carbon emissions for the A1-A5 and B-C life cycle stages have been compared to the GLA benchmarks and are within the typical benchmark levels. This indicates that the proposed development incorporates the most feasible sustainable design options.

5.0 APPENDIX
WLCA Output

| Result category | Biogenic carbon (kg CO2e) | A1-A3 Product Stage | A4 Transportation to site | A5 Site operations | B1 Use Phase | B2 Maintenance | B3 Repair | B4 Material replacement - materials | B5 Material refurbishment | B6 Operational Energy use - Regulated | B6 Operational Energy use - Unregulated | B7 Operational Water use | C1 Deconstruction / demolition | C2 Waste transportation | C3 Waste processing | C4 Waste disposal | TOTAL kg CO2e | D External impacts (not included in totals) |
|--------------------------------------|---------------------------|---------------------|---------------------------|--------------------|--------------|----------------|-----------|-------------------------------------|---------------------------|---------------------------------------|---|--------------------------|--------------------------------|-------------------------|---------------------|-------------------|---------------|---|
| 0.1 Toxic Mat. | | | | | | | | | | | | | | | | | | |
| 0.2 Demolition | | | | | | | | | | | | | | | | | | |
| 0.3 Supports | | | | | | | | | | | | | | | | | | |
| 0.4 Groundworks | | | | | | | | | | | | | | | | | | |
| 0.5 Diversion | | | | | | | | | | | | | | | | | | |
| 1 Substructure | | 4778.28 | 3362.09 | 413.23 | | | | | | | | | | 115.61 | 16.85 | 0.02 | 8677.77 | -1487 |
| 2.1 Frame | | | | | | | | | | | | | | 3032.1 | 419.31 | | 3451.41 | -348843 |
| 2.2 Upper Floors | 0 | 265920.7 | 51734.23 | 12322.05 | | 3299.77 | 824.94 | 370222.8 | | | | | | 14795.11 | 38109.09 | 28.8 | 753132.7 | -30210.5 |
| 2.3 Roof | 0 | 67951.42 | 1040.96 | 697.24 | | 696.90 | 174.22 | | | | | | | 693.97 | 37.88 | | 70421.47 | -76822.2 |
| 2.4 Stairs & Ramps | 0 | 5277.25 | 671.14 | 118.33 | | 60.67 | 15.17 | | | | | | | 40.26 | 5.72 | 0.0069 | 6112.7 | -2575.47 |
| 2.5 Ext. Walls | 0 | 148804.2 | 5093.34 | 8234.15 | | 1621.32 | 405.33 | 13226.85 | | | | | | 7503.08 | 190.57 | 31.17 | 183083.4 | -10321.3 |
| 2.6 Windows & Ext. Doors | -4250.6 | 46816.1 | 1831.65 | 0 | | 486.48 | 121.62 | 55890 | | | | | | 328.44 | 4279.5 | 66.82 | 104961.9 | -33168 |
| 2.7. Int. Walls & Partitions | 0 | 102490.6 | 3977.45 | 5746.57 | | 1122.15 | 280.54 | 1581.5 | | | | | | 4839.08 | 113.43 | 14.27 | 118762.9 | -4556.59 |
| 2.8 Int. Doors | -5711.66 | 4814.37 | 237.98 | 0 | | 50.52 | 12.63 | 8625 | | | | | | 60.62 | 5760.04 | 38.33 | 13824.67 | -2091.03 |
| 3 Finishes | 0 | 24304.62 | 3006.28 | 1682.09 | | 289.93 | 72.48 | 215110.3 | | | | | | 286.36 | 812.22 | 0.39 | 245202.2 | -242.06 |
| 4 Fittings, furnishings & equipments | | | | | | | | | | | | | | | | | | |
| 5 Services (MEP) | 0 | 358501 | 40975.97 | 3050.41 | | 4025.27 | 1006.32 | 317615.7 | | 115579.98 | 40590.22 | 328900 | | 745.3 | 11118.25 | 3.12 | 732009.7 | -73995.3 |
| 6 Prefabricated | | | | | | | | | | | | | | | | | | |
| 7 Existing bldg | | | | | | | | | | | | | | | | | | |
| 8 Ext. works | | | | | | | | | | | | | | | | | | |
| Other or overall site construction | | | | 21946 | | | | | | | | | | | | | 21946 | |
| Unclassified / Other | | | | | | | | | | | | | | | | | | |
| TOTAL kg CO2e | -9962.26 | 1029659 | 111931.1 | 54210.49 | | 11653.00 | 2913.25 | 982272.1 | | 115579.98 | 40590.22 | 328900 | | 32439.92 | 60862.85 | 182.93 | 2823081 | -584313 |

WLCA Output Continued

| Estimated WLC emissions N.B. This forms the WLC baseline for the development. The green cells will automatically populate from the tables below | | | | | | | |
|---|---|--------------------------------|---|------------------------------|------------------------------|-----------------------------|-------------------------------|
| | Module A1-A5 (excluding sequestered carbon) | Modules B-C (excl B6 & B7) | Modules A-C (excluding B6-B7; including sequestered carbon) | Module B1-B5 | Module B6-B7 | Module C1-C4 | Module D |
| TOTAL kg CO ₂ e | 1,195,800 kg CO ₂ e | 1,089,720 kg CO ₂ e | 2,275,558 kg CO ₂ e | 996,235 kg CO ₂ e | 485,070 kg CO ₂ e | 93,486 kg CO ₂ e | -584,312 kg CO ₂ e |
| TOTAL kg CO ₂ e/m ² GIA | 344.214194 | 313.679 | 655.025 | 286.7687421 | 139.6287277 | 26.91010849 | -168.1958693 |
| Please select most appropriate benchmark from drop-down menu | Schools, Universities etc. | | | | | | |
| WLC Benchmark | <750 | <250 | <1000 | | | | |
| Aspirational WLC Benchmark | <500 | <175 | <675 | | | | |



Appendix 4

GLA Circular Economy Spreadsheet (Recycling and Waste Reporting)

Please see covering email.