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9710_17-37 WILLIAM ROAD_WLC ASSESSMENT_210903

9.710 – 17-37 WILLIAM ROAD

03/09/2021 *by EL, reviewed by BH*

EXECUTIVE SUMMARY

A whole life-cycle carbon (WLC) assessment has been undertaken for the proposed development at 17-37 William Road. The WLC has been carried out in accordance with the latest published *GLA Life-Cycle Carbon Assessments Guidance - Consultation Draft* (October 2020).

This assessment includes carbon emissions associated with the life-cycle modules shown in Figure 1; emissions associated with module D (benefits and loads beyond the system boundary) have been reported separately.

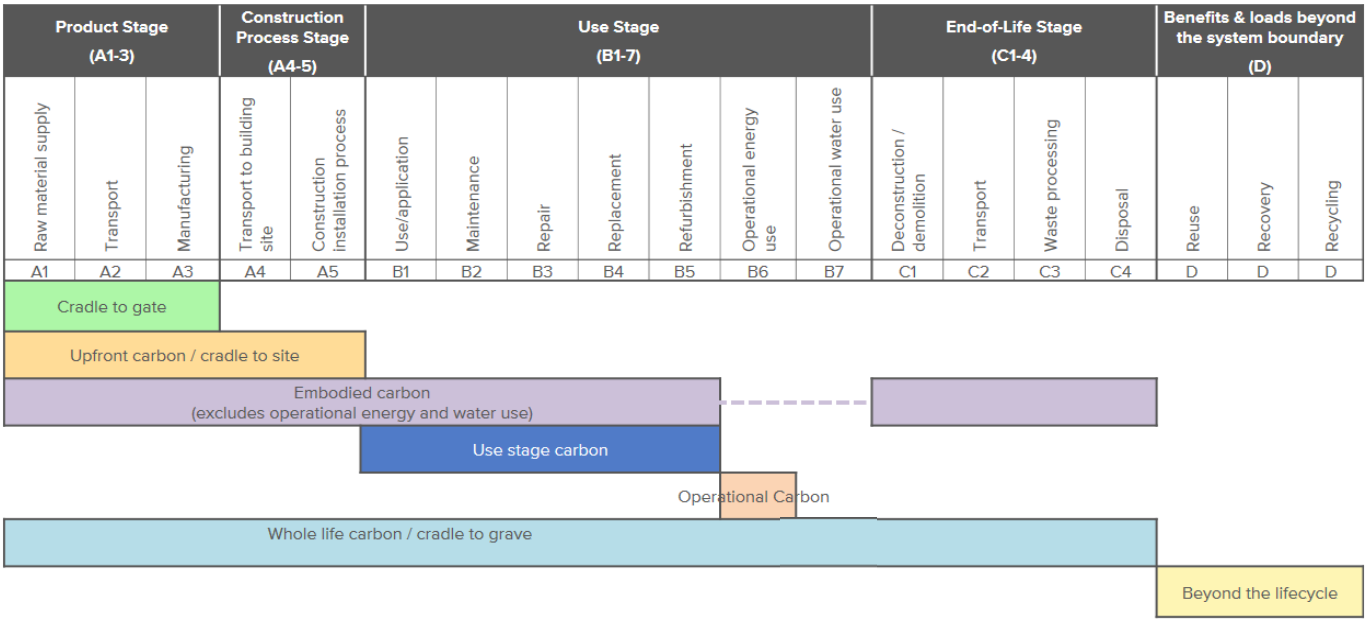

Figure 1: Lifecycle stages (modules) according to EN 15978 and terminology of carbon emissions scopes.

The estimated whole lifecycle carbon emissions of the proposed development are shown in the tables overleaf. Table 1 shows the results for Assessment 1 – current status of the electricity grid with SAP10 carbon factors, which is the scenario that was chosen to form the basis of design decisions.

Table 1: Estimated WLC emissions (Assessment 1)

Assessment 1 (current status of the electricity grid)	Module A1-A5	Module B1-B5	Module B6-B7	Module C1-C4	Module D
TOTAL kg CO_2e	2,954,569	381,164	10,312,608	540,167	-33,639
TOTAL kg CO_2e/m^2 GIA	368	47	1,284	67	-4

Table 2 shows the results for Assessment 2 – expected decarbonisation of the grid (using the 'National Grid's Future Energy Scenario: Steady progression'). The results show that modules B6-B7 Operational Energy and Water Use have the largest impact on the total lifecycle carbon emissions.

Table 2: Estimated WLC emissions (Assessment 2)

Assessment 2 (expected decarbonisation of the grid)	Module A1-A5	Module B1-B5	Module B6-B7	Module C1-C4	Module D
TOTAL kg CO_2e	2,954,219	371,871	9,204,003	539,993	-33,608
TOTAL kg CO_2e/m^2 GIA	368	47	1,146	67	-4

INTRODUCTION

As buildings become more energy efficient, operational carbon emissions will make up a smaller proportion of a development's whole life-cycle carbon emissions. It is therefore becoming increasingly important to calculate and reduce carbon emissions associated with other aspects of a development's life cycle; namely, embodied carbon emissions and unregulated emissions (all operational energy uses not covered by Building Regulations, for example cooking and small power).

SITE DESCRIPTION

The proposed development is located on 17-37 William Road, within the London Borough of Camden. The proposal consists on the redevelopment of no. 35-37 to provide a 15 storey building with basement level for use as student accommodation, with affordable workspace at ground floor level of no. 17-37 and improvements to ground floor façade of no. 17-33, together with public realm improvements, servicing, cycle storage and facilities, refuse storage and other ancillary and associated works.

The total Gross Internal Area (GIA) is expected to be approximately 8,034 m^2 which was used to determine the estimated carbon emissions by floor area (kg CO_2e/m^2 GIA) for the assessment.

POLICY FRAMEWORK

The new London Plan (March 2021) has included under Policy SI2 Minimising greenhouse gas emissions, a requirement for a Whole Life-cycle Carbon Assessment for all referable development proposals.

> *F. 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.*

The GLA has also published a draft Whole Life-cycle Carbon Assessments Guidance (October 2020) which explains how to prepare a WLC assessment for planning application. As outlined in the WLC Assessments guidance applicants are required to take action at the following stages:

- Pre-application
- Stage 1 submission (i.e. RIBA Stage 2/3)
- Post-construction (i.e. upon commencement of RIBA Stage 6 and prior to the building being handed over, if applicable. Generally, it would be expected that the assessment would be received three months post-construction)

The GLA has also published a WLC assessment template which provides separate tabs outlining the information that should be submitted at each stage.

METHODOLOGY

The methodology followed in preparing this report is in line with the GLA Life-Cycle Carbon Assessments Guidance and the RICS professional statement (PS) for undertaking detailed carbon assessments. The RICS Whole life carbon assessment for the built environment (2017), follows the European standard EN 15978.

The GLA's WLC assessment template has been filled in for both Pre-app stage and Detailed Planning stage. The Pre-app tab describes the design principles adopted in the scheme to reduce the whole life-cycle carbon of the development. This report summarises the actions taken during stage 1 submission (detailed application stage). This report should be read in conjunction with the WLC Assessment Template, which has been submitted as part of this planning application. The applicant recognises that the WLC calculations presented in this report will need to be revisited and if appointed, amended at post-construction stage (upon commencement of RIBA Stage 6).

LIFE-CYCLE STAGES

The life-cycle stages covered by the RICS methodology refer to EN 15978, which includes a modular approach to a built asset's life cycle, breaking it down into different stages, as shown in Table 3. The four main modules are Product stage [A1 – A3], Construction Process stage [A4 – A5], Use stage [B1 – B7] and End of Life stage [C1 – C4]. Module D consists of the potential environmental benefits or burdens of materials beyond the life of the project, this is usually reported separately to the cradle to grave modules [A – C].

Table 3 shows the life-cycle stages that were considered for the assessment and the assumptions made for some stages due to limitations of the software used.

Table 3: Life cycle stages.

Product Stage			Construction Process Stage		Use Stage								End-of-Life Stage				Benefits and loads beyond the system boundary	
Raw material supply	Transport	Manufacturing	Transport to building site	Installation into building	Use/application	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction/demolition	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling
A1	A2	A3	A4	A5	B1	B2	B3*	B4	B5	B6	B7	C1	C2	C3	C4	D	D	D
✓	✓	✓	✓	✓	✓	✓	✓	✓	×	✓	✓	✓	✓	✓	✓	✓	✓	✓

* B3 results have been combined with B2 – as per guidance received from the LCA software provider (eTool).

BUILDING ELEMENTS

The WLC assessment covers all building elements listed in Table 4 (where applicable). Material quantities have been provided by the Quantity Surveyor (Iesis Consult). A minimum of at least 95% of the cost allocated to each building element category has been accounted for where information has been given in line with GLA policy.

Table 4: Building elements as per RICS NRM.

Group	Building Element	Applicable	Included
0. Demolition & facilitating works	0.1. Toxic / hazardous / contaminated material treatment	No	No
	0.2. Major demolition works	No	No
	0.3. & 0.5. Temporary / enabling works	No	No
	0.4. Specialist groundworks	No	No
1. Substructure	1.1. Substructure	Yes	Yes
2. Superstructure	2.1. Frame	Yes	Yes
	2.2. Upper floors incl. balconies	Yes	Yes
	2.3. Roof	Yes	Yes
	2.4. Stairs & ramps	Yes	Yes
	2.5. External walls	Yes	Yes
	2.6. Windows & external doors	Yes	Yes
	2.7. Internal walls & partitions	Yes	Yes
	2.8 Internal doors	Yes	Yes
3 Finishes	3.1 Wall finishes	Yes	Yes
	3.2 Floor finishes	Yes	Yes
	3.3 Ceiling finishes	Yes	Yes
4 Fittings, furnishings & equipment	4.1 Fittings, furnishings & equipment	Yes	Yes
5 Building services / MEP	5.1–5.14 Services	Yes	Yes
6 Prefabricated Buildings and Building Units	6.1 Prefabricated buildings and building unit	No	No
7 Work to existing building	7.1 Minor demolition and alteration works	No	No
8 External works	8.1 Site preparation works	No	No
	8.2 Roads, paths, pavings and surfacings	Yes	Yes
	8.3 Soft landscaping, planting and irrigation systems	No	No
	8.4 Fencing, railings and walls	No	No
	8.5 External fixtures	No	No
	8.6 External drainage	No	No
	8.7 External services	No	No
	8.8 Minor building works and ancillary buildings	No	No

SOFTWARE TOOLS

eToolLCD software was used to model life cycle impacts of the project. eToolLCD uses third party background processes aggregated as mid-point indicators and stored in a number of libraries within the software which are coupled with algorithms and user inputs to output the environmental impact assessment. A map of user inputs, data sources and algorithms (outputs) is given in Figure 2.

eToolLCD is compliant with International Standards 14040 and 14044, and European Standard EN 15978; it is listed in the GLA Draft Whole Life-Cycle Carbon Assessments Guidance, Appendix 1 as an acceptable/approved tool for whole life carbon calculations.

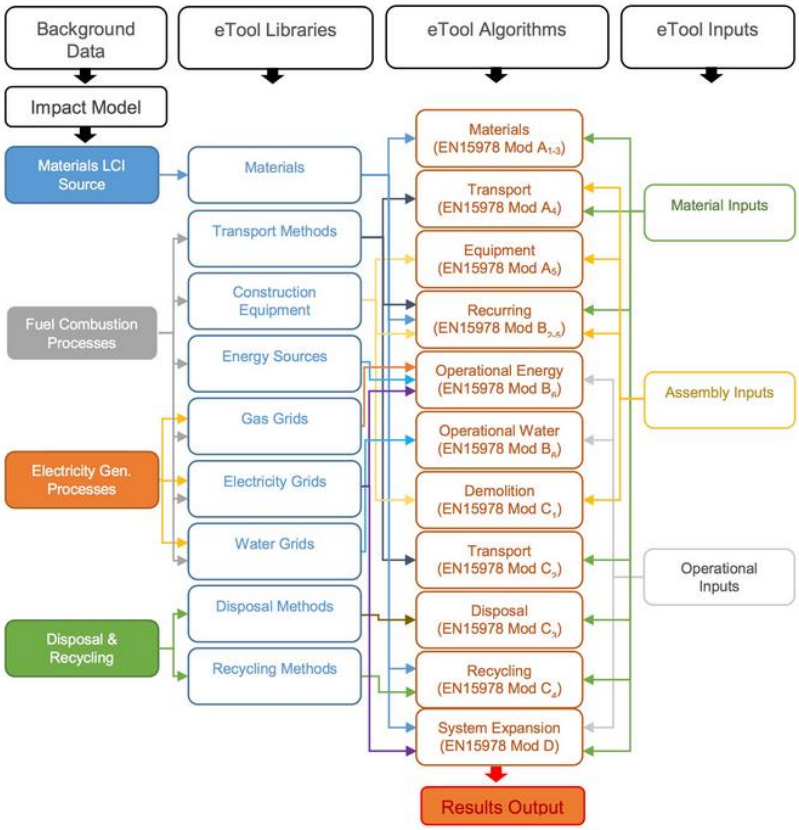

Figure 2: Map of eTool user inputs, data sources and algorithms

MATERIALS & PRODUCTS

WLC calculations have been carried out using:

- Type III environmental declarations (EPDs and equivalent) and datasets in accordance with BS EN 15804; and,
- EPDs and datasets in accordance with ISO 14025 and ISO 14040/44.

Sequestered (biogenic) carbon, in particular from the use of timber products, has been reported separately for A1-A3 stages.

Embodied carbon is difficult to calculate for many MEP systems due to a lack of available data. Where manufacturer specific data is not available figures for embodied carbon have been taken from the closest matching system within the eTool LCD database. In cases where there are no comparable systems embodied carbon has been calculated based on the key materials used to manufacture the equipment, by weight.

GRID DECARBONISATION

As required by the GLA two sets of WLC emissions figures have been presented: one based on the current status of the electricity grid (SAP 10 carbon factors); and the other based on the expected decarbonisation of the electricity grid over the lifetime of the development (National Grid's Figure Energy Scenario: slow progression). The UK National Grid 2020 Steady Progression Scenario electricity profile has been used for the Assessment 2 scenario.

RESULTS

ASSESSMENT 1 – CURRENT STATUS OF THE ELECTRICITY GRID

Figure 3 shows the results of *Assessment 1 – current status of the electricity grid*, which is the scenario that was chosen to form the basis of design decisions. The results show that as expected the highest contribution to the whole life carbon of the project is produced at stage B6 – Operational Energy Use, and accounts for about 74% of the total carbon emissions of the building during its lifetime (reported under the Services (MEP) category).

The second largest contributor is the *Superstructure: Upper Floors*, which accounts for approximately 9% (1,213 tCO_2e) of the total carbon emissions of the building over its lifetime, and the third building element category is the *Superstructure: External Walls*, with estimated carbon emissions of 634 tCO_2 over the lifetime of the building. This is mostly due to the high use of concrete in the construction. If hybrid aluminium/timber frame windows were used instead of fully aluminium frames, it would represent and overall reduction of 106 tCO_2e. In addition, if 60% recycled modular carpet were considered it would account for a further reduction of 143 tCO_2e.

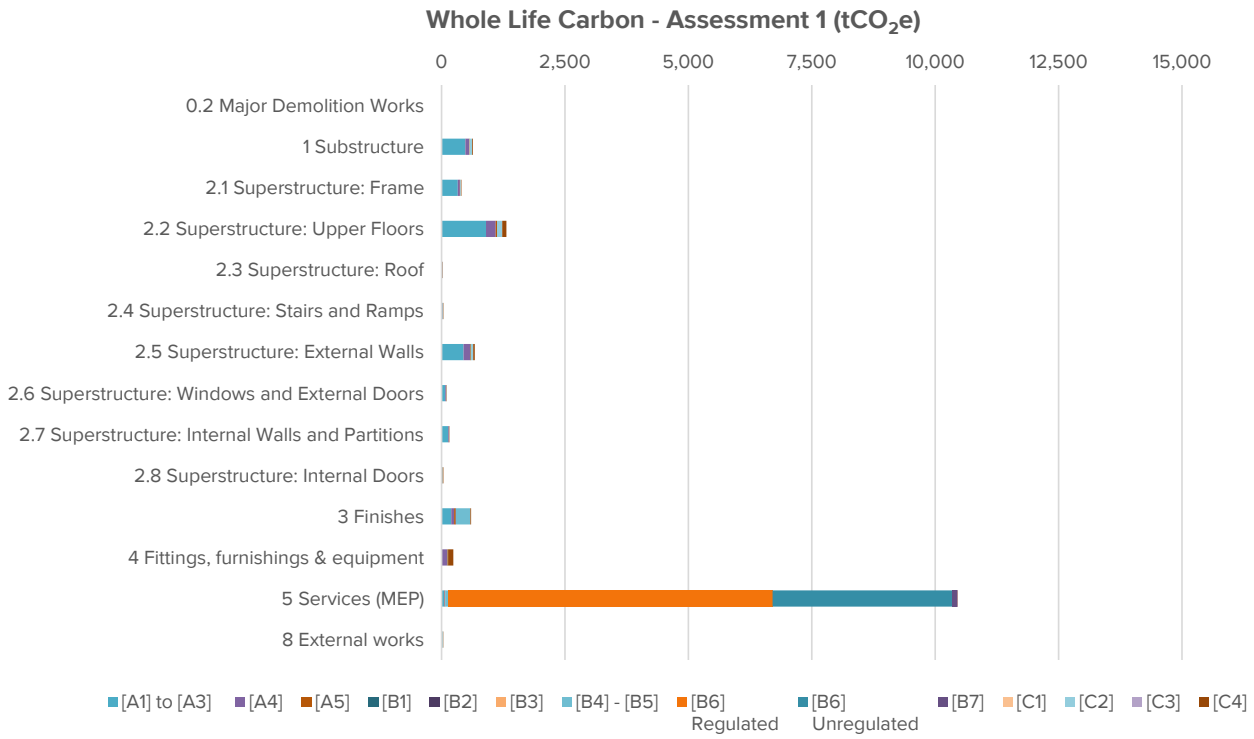

Figure 3: WLC results for Assessment 1.

ASSESSMENT 2 – EXPECTED DECARBONISATION OF THE GRID

The results of *Assessment 2 – expected decarbonisation of the grid* are shown in Figure 4 below. The results show that the whole life-cycle carbon emissions will be lower as the grid decarbonises, having a major impact in the reductions of B6 – Operational Energy Use emissions. The embodied carbon emissions of the other life-cycle stages were also reduced, albeit not as drastically. At present eTool is unable to accurately calculate the impact of grid decarbonisation on other life-cycle modules (B1-B5 and C1-C4). However, the expected impact of grid decarbonisation on these modules is minimal.

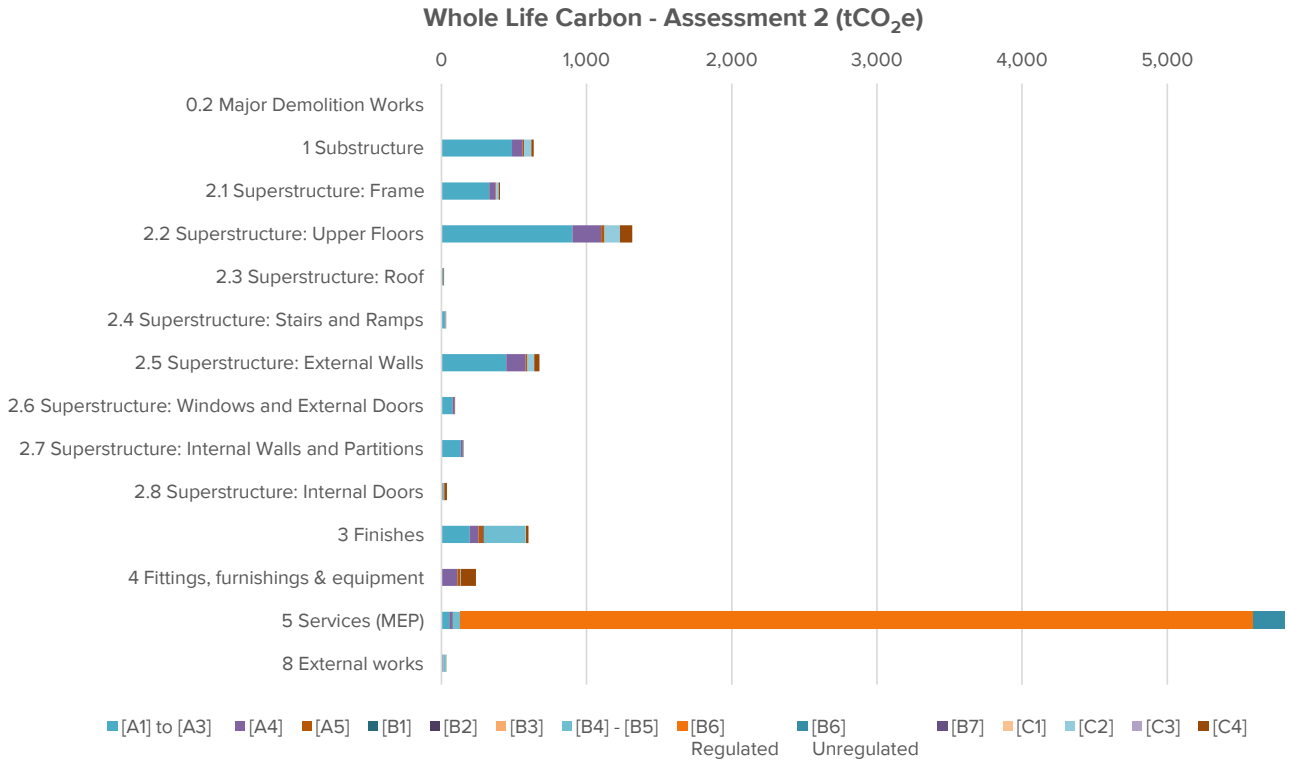

Figure 4: WLC results for Assessment 2.

BENCHMARKING

Following the GLA Whole Lifecycle Carbon assessments guidance, the estimated emissions have been compared against the benchmark provided by the GLA in the WLC assessments guidance, Appendix 2. The results of Modules A1-A5 and B & C, have been compared against the WLC benchmark for apartments, and the Aspirational WLC benchmark which is based on the World Green Building Council's target to achieve a 40% reduction in WLC emissions by 2030.

The results in Table 5 show the WLC Benchmark figures for a Residential building, and estimated carbon emissions of the proposed development for Assessment 1 and Assessment 2. The anticipated whole carbon emissions of the proposed development are slightly below the WLC benchmark for Modules A1-A5 and below for Modules B-C. The results show the estimated emissions calculated based on the information available to date and provided by the design team. At the current design stage there is a high level of uncertainty with the finishes section and the mechanical services specifications in terms of specified materials as well as maintenance considerations. These will be reviewed at the next stage when specifications are detailed.

Table 5: WLC Benchmark for apartments

Modules	WLC benchmark	Aspirational WLC benchmark	William Road Assessment 1	William Road Assessment 2
	Kg CO_2e per m^2 (GIA)			
A1-A5	750 to 850	450 to 500	368	368

Modules	WLC benchmark	Aspirational WLC benchmark	William Road Assessment 1	William Road Assessment 2
	Kg CO_2e per m^2 (GIA)			
B-C (excluding B6 & B7)	300 to 400	180 to 240	114	114