Technical note: Port Street Post Construction Circular Economy Statement

Purpose of this note

WSP has been commissioned by Port Street Ltd. to produce this technical note. The purpose of this technical note is to summarise the results of the post construction Circular Economy Statement (CES) with consideration to the residential development at Port Street (hereafter referred as Development). The CES has been developed at RIBA Stage 06 and is to be submitted as per requirements of condition 4b attached to planning permission 132489/FO/2021. The CES has been prepared in line with best practice guidance set out in the London Plan (March 2022) Policy D3 'Optimising Site Capacity Through the Design-led Approach' and Policy SI 7 'Reducing Waste and Supporting the Circular Economy'[1].

This note accompanies the CES template spreadsheet (Port Street GLA Post Construction Template.xls) that reports on the actual performance and Circular Economy (CE) targets and commitments achieved that were identified for adoption across the evolution of the design within the previous detailed CES which was prepared for the Proposed Development in August 2023. The note contains the following sections:

- Section 1: Methodology
- Section 2: Results
- Section 3: Limitations and assumptions

1. Methodology

The CE statement consists of a written report and a spreadsheet, with the relevant tab(s) filled in at each stage. Each tab contains a number of tables where information should be recorded to reflect material usage, waste arisings and circular design decisions associated with the Development. The post construction stage tab has been filled out in the template. The spreadsheet includes the actual bill of materials (including calculations), end of the life strategies, recycling and waste reporting as well as the lessons learnt and key achievements at the post construction stage. The components of the template are listed below.

1.1. Bill of materials

The bill of materials in the CE statement has been filled out to demonstrate how material demands have been minimised and on-site reuse and recycling maximised. This has been filled out based on the post construction actual quantities of materials.

The quantities of materials were modelled in OneClick LCA software using the available Environmental Product Declarations (EPD) from the database. The results were exported from

[1] Greater London Authority (2022). *London Plan Guidance: Circular Economy Statements*. [https://www.london.gov.uk/programmes-strategies/planning/implementing-london-plan/london-plan-guidance/circular-economy-statement-guidance]

the software in the form of a material efficiency report which was used to input information into the CE excel template. The material quantity (module A), construction waste factor (module A and B), recycled content by mass, recycled content by value, expected lifespan, end of life scenario and percentage (%) of recycling (module C) were exported from the material efficiency report and added to the CE template.

The template has used this information to automatically calculate the material and waste quantities throughout the building's life cycle; and calculate the intensity of these indices, where relevant, using the Gross Internal Area (GIA).

It is required to identify opportunities for the use of reused or recycled materials; and aim for at least 20 % recycled or reused content, by value, for the whole building. This target requires both an estimate of the quantities of materials and the capital cost of that material.

In the bill of materials table, the recycled content for each building element or material type has been detailed based on the manufacturer's EPD available in the OneClick LCA tool or based on generic data for UK region. The cost of each component has also been assumed based on the information available in the tool. The OneClick LCA GLA tool calculates the recycled content by value (%) for each component which has been directly added to the GLA template.

The recycled content by value (%) for each component is calculated by the OneClickLCA tool as per the following formula[1].

$$\textbf{Recycled content by value for each component} = \frac{\textbf{Cost per unit x quantity x percentage of recycled content}}{\textbf{Total cost of all components}}$$

The end-of-life scenarios for the materials were modelled as specified in the end-of-life strategy document (Z0-SHP-A180-RP-XX-CES1) or per the manufacturer's EPD if available. The end-of-life plan for the elements of the building has been provided with a calculation of the percentages of waste that can be reused or recycled at end of life. The recycling percentage has been assumed based on current standard industry practices and may change in the future depending upon available technology.

1.2. Recycling and waste reporting

The recycling and waste reporting table contains the total amount of non-hazardous/contaminated waste material arising (tonnes) for excavation, demolition and construction. It also specifies the waste management strategy used for each type of waste. It indicates the amount of non-contaminated material reused on-site (%), recycled on-site (%), reused off site (%) and recycled off-site (%) landfill amount (%) and recovery amount (%).

The waste arising for key streams (t/m^2 GIA) is automatically calculated in the template along with the overall recycling rate.

1.3. Key achievements and lessons learnt

The key achievements and lessons learnt table highlights the actual performance against quantitative and qualitative targets/commitments.

2. Results

The template automatically calculates the material and waste quantities throughout the building's life cycle; and calculate the intensity of these indices, where relevant, using the GIA.

The material intensity of the project was found to be 1,162 kg/m^2. The template also calculates the material intensity for each building element category (based on the RICS New Rules Measurement (NRM) classification system level 2 sub-elements[2]). The table below summarises the calculated material intensity.

Building Element Category (RICS)		**Material Intensity (Module A) (kg/m^2 GIA)**	**Performance Indicator (calculated by template)**
1	Substructure	29	Building Element Category 1, 1st Quartile
2.1	Superstructure: Frame	1,056	Building Element Category 2.1, 4th Quartile
2.2	Superstructure: Upper floors	4	Building Element Category 2.2, 1st Quartile
2.5	Superstructure: External walls	4	Building Element Category 2.5 & 2.6, 1st Quartile
2.6	Superstructure: Windows and external doors	4	Building Element Category 2.5 & 2.6, 1st Quartile
2.7	Superstructure: Internal walls and partitions	46	Building Element Category 2.7 & 2.8, 2nd Quartile
3	Finishes	18	-

All the building element categories apart from the superstructure: frame and internal walls and partitions fall under the 1st quartile which demonstrates good resource efficiency. The superstructure: frame falls under the 4th quartile as it has a high material intensity due to structural components. In order to offset this, Port Street reduced primary material demand by using recycled content such as GGBS in concrete where available and aimed for high levels of recycled content within reinforced steel (ranging from 90-95% to 100% of recycled content).

The London Plan Policy SI 7 sets out circular economy targets for both existing and new developments.

- 95% of demolition, excavation, and construction waste be diverted from landfill through reuse, recycling, or recovery. It also establishes a target to achieve a minimum

[2] RICS (2021). *NRM 1: Order of cost estimating and cost planning for capital building works.* [https://www.rics.org/content/dam/ricsglobal/documents/standards/NRM-1_Oct2022_Update.pdf]

municipal waste recycling rate of 65% by 2030. Furthermore, the policy mandates that no less than 20% of building material elements comprise recycled or reused content. The project's performance against these targets is outlined below.

a) Demolition waste

Demolition waste calculation has been scoped out due to limited availability of data. As the Proposed Development was situated on an existing car park, there was limited opportunity to recover and reuse existing materials. Crushed and graded material from the limited demolition or site preparation works were re-used in the temporary piling mat during construction. All efforts were taken to reuse the limited existing materials on the cleared site. Soil was reused on landscaping and the developer ensured suitable treatment of hazardous soil where applicable by an authorised contractor.

b) Excavation waste

The Development achieved 95% beneficial reuse of excavation waste materials. Excavation was extremely limited due to the existing levels on the site. Excavated material was reused as fill on site to create landscaping. The waste intensity was calculated to be 0.738 tonnes/$m^{2.}$

c) Construction waste materials

95.3% of construction waste materials were diverted from the landfill for reuse, recycling or recovery. The waste intensity was calculated to be 0.062 tonnes /m^2.

d) Municipal waste

The Development is forecast to generate 120,000L and 133,000L of waste for residential and commercial uses, respectively; the main waste streams are expected to be general, dry mixed, glass, and organic recycling. Suitable waste containers will include 1,100L Eurobin and 240L wheeled bins, with 50% of these vessels designated for recycling. Council and private contractor collections will be used, and the building management company, Affinity Living, will monitor and promote high recycling rates by educating residents and placing recycling bins closer to access gates.

a) **Recycled content**

The recycled content by value was calculated to be 30.49% which exceeds the GLA target of 20%.

3. Limitations and assumptions

a) Please note that due to an error in the GLA CE statement template spreadsheet (post construction stage sheet) available on the GLA website[1], the content has been replicated into a new excel file. The new excel sheet has been attached with this note which includes the correct formulas and has been populated with the project information and results.

b) Material and waste quantities are modelled based on the latest available data.

c) Materials were modelled on OneClick LCA with the EPD published by the actual manufacturer mentioned in the bill of materials. Wherever manufacturer's data was not available, generic data for the region has been considered.

d) Recycled content and cost of the material have been considered as per the material specifications and wherever not available, has been assumed with generic data for the region.

e) Recycling percentages at the end of life have been assumed based on current industry practices and may change in the future depending upon technological advancements.

f) Demolition waste calculations have been excluded due to limited availability of data.

g) Standard densities and thickness of materials have been assumed wherever not available to calculate weight from the volume/surface area.