YI-AN HUANG City Manager

# **City of Cambridge** Executive Department

CMA 2023 #62 IN CITY COUNCIL February 27, 2023

Please find attached a CDD & Law Department report responding to Policy Orders 314, 315, and 316 from the meeting of 12/19/2022.



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# CITY OF CAMBRIDGE

Community Development Department

IRAM FAROOQ Assistant City Manager for Community Development F SANDRA CLARKE Deputy Director Chief of Administration

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To: Yi-An Huang, City Manager

From: Iram Farooq, Assistant City Manager for Community Development Nancy E. Glowa, City Solicitor

Date: February 23, 2023

Re: Council Order #O-1, O-2 and O-3 dated December 19, 2022, related to Emissions Accounting Zoning Petition and specifically embodied emissions

In response to the above Policy Orders, we submit the following:

### **Review and Amend Zoning Text**

In response to Council Order No. O-1 of 12/19/22, CDD and the Law Department have reviewed the zoning text and recommend amendments to the language. The attached zoning text suggests the following clarifying amendments: 1) that the Embodied Emissions section is based on a whole-building life cycle assessment (WBLCA), 2) that the Assistant City Manager for Community Development has the authority to promulgate regulations, and 3) that the requirement becomes effective when the final regulations are promulgated. It also amends the Embodied Emissions section to remove references to "Passive House" and "energy," which are not applicable to that topic.

The regulations would be informed by the scope of work described below. Because that work is expected to be completed in June, if the petition is adopted, then regulations would likely be promulgated by the end of 2023.

## **Cost and Time Estimates**

In response to Council Order No. O-2 of 12/19/22, CDD has procured services from a consultant to provide cost and time estimates. CDD already has procured services from a consultant for activities related to Task 2.2 Address Embodied Carbon Through Green Building Requirements in the Net Zero Action Plan. The tasks outlined in the scope of work for that consultant also will provide detailed information on the questions raised in the Policy Orders. The consultant will provide estimates for the time and cost of reporting embodied carbon emissions and further refine those estimates through a stakeholder engagement process. The contract will expire on June 30, 2023.

CDD has already received initial, high-level feedback from the consultant on the time and cost estimates for conducting a whole building life cycle analysis (WBLCA) for buildings over 50,000 square feet. Please note, these initial estimates vary widely among firms based on firm size, experience, project complexity, and other factors. Through the course of the project, these estimates will be further refined and provide more nuanced detail.

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There are several embodied carbon accounting tools that exist in the construction industry to conduct a WBLCA. Based on staff's early review, the Athena Impact Estimator, Tally, One Click LCA, and EC3 (Embodied Carbon in Construction Calculator) are the most popular. Some tools are provided as open source, others require subscriptions and are integrated as add-on within computer aided drafting tools such as Autodesk Revit or as stand-alone modeling software. Time estimates to conduct WLCA can vary widely, suggesting anywhere from 4 to 80 hours of billable time to perform the analysis depending on the project and firm experience. Firms do not freely share their billable hourly rates, but it is not inappropriate to assume a rate of \$100+ per hour

#### **Stakeholder Feedback**

assuming time, materials, and other costs.

In response to Council Order No. O-3 of 12/19/22, CDD will be utilizing its consultant to work with relevant stakeholders. Stakeholder engagement and feedback is a big component of the scope of work in the City's contract with CDD's consultant. The task specifically addressing this activity is included below.

#### Task 1.3 Stakeholder Engagement and Local Market Research

Lastly, the selected Consultant shall identify local stakeholders that would be responsible for reporting embodied carbon to the city for new construction. These stakeholders may include developers, architects, building owners, material suppliers and manufacturers, and others as recommended by the selected Consultant. Once these stakeholders have been identified, the Consultant should engage and recruit them for participation in a series of focus group sessions.

It can be expected that there will be at least two to three focus group sessions, either in person or virtual, to address the key questions outlined below. Each session should have a variety of stakeholder representation to get different perspectives and understand the challenges each industry group may face while reporting on embodied carbon. Each session would last for about one to two hours; the Consultant should be prepared to field questions, propose new ideas, facilitate discussion, and develop any presentation materials as needed. To guide these focus groups the consultant should build off the findings of the background research and certification program options to develop an understanding of how local stakeholders feel about such work and to identify what tools, materials, and templates that would be needed for successfully reporting embodied carbon to the City.

#### Suggested clarifying text changes:

That section 22.25.1(c) of Article 22, entitled Sustainable Design and Development, be amended to read as follows (NOTE: markup formatting is shown in relation to current Zoning Ordinance text and the redlined additional text and strikethroughs are CDD's and the Law Department's suggested clarifying amendments):

(c) Net Zero Narrative: A written description of how the Green Building Project is being designed in response to the City's Net Zero Action Plan, which seeks to neutralize greenhouse gas emissions resulting from buildings by reducing their energy use intensity and promoting renewable sources of energy. This information is provided for advisory review by CDD staff, and CDD may provide a questionnaire template to the developer for completing this narrative. At a minimum, this narrative shall include the following information:

1. Anticipated building envelope performance, including roof, foundation, walls and window assemblies, and window-to-wall ratio;

2. Anticipated energy loads, baseline energy simulation tool assumptions, and proposed energy targets, expressed in terms of site energy use intensity ("EUI"), source EUI (expressed as British Thermal Unit (BTU) per square foot per year), and totalannual greenhouse gas emissions projected until 2050, expressed as Metric Tons of Carbon Dioxide Equivalents (MTCO2e), and calculated in accordance with the standards and requirements established in Chapter 8.67 of the Municipal Code ("Building Energy Use") and associated regulations. If anticipated tenant plug loads (EUI and emissions) are provided, they shall be separately broken out and clearly identified as such;

3. A description of ways in which building energy performance has been integrated into aspects of the Green Building Project's planning, design, and engineering, including building use(s), orientation, massing, envelope systems, building mechanical systems, on-site and off-site renewable energy systems, and district-wide energy systems;

4. A description of the technical framework by which the Green Building Project can be transitioned to net zero emissions prior to 2050 in the future (acknowledging that such a transition might not be economically feasible at first), including future net zero emissions options for building envelope, HVAC systems, domestic hot water, interior lighting, and on- and off-site renewable energy sources;

5. A description of programs provided by local utility companies, government agencies, and other organizations that provide technical assistance, rebates, grants, and incentives that can assist in achieving higher levels of building performance, summarizing which entities have been contacted and which programs could be utilized in the Green Building Project; and 6. An assessment of the technical and financial feasibility to meet the projected HVAC and domestic hot water demands of the building (as set forth in Paragraph (2) above) using energy systems that do not consume carbon-based fuels on-site (to include solar photovoltaics and hot water, ground source, water source or air source heat pumps, district energy, geothermal systems, and/or similar systems) compared to code-compliant energy systems that consume carbon-based fuels on-site (including, where applicable, the construction or expansion of energy plants controlled by the developer that may be necessary to produce energy for that specific building), which shall include the cost of installation, maintenance and upkeep of the energy system and its components (incorporating programs and incentives as set forth in Paragraph (5) above). This paragraph will become effective on February 23, 2021.

7. Embodied Emissions: A full-whole building lifecycle analysis of the estimated emissions generated by the construction of the Green Building Project. The Assistant City Manager for Community Development Department shall promulgate regulations for how these estimated emissions are to be reported. Such regulations shall include at minimum the required reporting of estimated lifecycle emissions generated by the use of major building materials, including but not limited to wood, concrete, steel, aluminum and glass, using Passive House or other acceptable energy and embodied emissions modeling software and industry standards acceptable to CDD staff. This paragraph will become effective on July 1, 2023 the date of final promulgation of the regulations for Green Building Projects that have not yet completed the initial stage of administrative review by such date, and shall not impose a requirement on any Green Building Project that is a project of the Affordable Housing Trust or otherwise for the construction of low and moderate-income housing meeting the standards established pursuant to any City, State or Federal housing program designed to assist low and moderate-income households.