

ATTACHMENT 2: Redline version showing proposed changes to TGS v4 Performance Measures for Buildings Energy, Emissions and Resilience and Waste and the Circular Economy

TGS v4 for Low Rise Residential

TIER 2

~~GHG 3.1 Material Emissions Assessment~~ **Upfront Embodied Carbon Assessment**

Conduct a Materials Emissions Assessment using BEAM (Building Emissions Accounting for Materials tool), or an equivalent tool, to measure A1-A3, stage emissions for all structural, enclosure and major finishes (cladding, flooring, ceilings, interior wall sheathing). Identify low-carbon sustainable material alternatives to the proposed structure or envelope to use in the building project. The report must demonstrate an emissions intensity **of equal to or less than 250 kgCO₂e/m²**.

TIER 2

SW 2.1 Building and Material Reuse

Option 1

1) Maintain existing structural elements (walls, floors, roofs, and envelope):

Maintain the existing building structure (including floor and roof decking) and envelope (the exterior skin and framing, excluding window assemblies and non-structural roofing materials) for at least 30% of the project completed floor area.

AND/OR

2) Maintain interior non-structural elements

Use existing interior non-structural elements (e.g. interior walls, doors, floor coverings and ceiling systems) for at least 30% of the project completed floor area, including additions.

Option 2

~~Whole Building Life Cycle Assessment~~

~~Conduct a whole building lifecycle assessment (LCA) for the structure and envelope in accordance with GHG 3.1~~

Upfront Embodied Carbon Assessment

Conduct an Upfront Embodied Carbon Assessment for the structure and envelope in accordance with GHG 3.1.

TGS v4 Mid-High Rise & Non-Residential Development

TIER 2

GHG 2.1 ~~Materials Emissions Assessment~~ **Upfront Embodied Carbon Assessment**

Conduct an **Upfront Embodied Carbon Assessment** for the structure and envelope in accordance with the CAGBC Zero Carbon Building Standard methodology for the **Upfront Carbon** lifecycle stage (A1-5). Identify low-carbon sustainable material alternatives to the proposed structure or envelope for use in the building project. **The report must demonstrate an emissions intensity of equal to or less than 350 kgCO₂e/m².**

TIER 3

~~GHG 2.2 Whole Building Life Cycle Assessment~~

~~Conduct a whole building life cycle assessment (LCA) of the building's structure and envelope in accordance with the CaGBC Zero Carbon Building Standard methodology that demonstrates a minimum of 20% embodied carbon reduction, compared with a baseline building.~~

GHG 2.2 Upfront Embodied Carbon Assessment

Conduct an Upfront Embodied Carbon Assessment for the structure and envelope in accordance with the CAGBC Zero Carbon Building Standard methodology for the Upfront Carbon lifecycle stage (A1-5). Identify low-carbon sustainable material alternatives to the proposed structure or envelope for use in the building project. The report must demonstrate an emissions intensity of equal to or less than 250 kgCO₂e/m².

TIER 2

SW 2.1 Building and Material Reuse

Option 1

Path 1) Maintain Existing Structural Elements: Walls, Floors, Roofs, and Envelope

Maintain the existing building structure (including floor and roof decking) and envelope (the exterior skin and framing, excluding window assemblies and non-structural roofing materials) for at least 30% of the project completed floor area.

AND/OR

Path 2) Maintain Interior Non-structural Elements

Use existing interior non-structural elements (e.g. interior walls, doors, floor coverings and ceiling systems) for at least 30% of the project completed floor area, including additions.

OR

Option 2

~~Whole-Building Life-Cycle Assessment~~

~~Conduct a whole building lifecycle assessment (LCA) for the structure and envelope in accordance with GHG 3.1.~~

Upfront Embodied Carbon Assessment

Conduct an Upfront Embodied Carbon Assessment for the structure and envelope in accordance with GHG 2.2

TGS v4 for City Agency, Corporation & Division-Owned Facilities

GHG 1.1 Energy Use and Greenhouse Gas Emissions Limits

Using whole-building energy modelling, design the buildings to demonstrate an annual Greenhouse Gas Intensity (GHGI) of 0, and meeting one of the following minimum energy performance options:

1. Minimum TEUI of 100 eKWh/m²/yr and TEDI of 30 eKWh/m²/yr;
2. Energy efficiency at a minimum 50% better than Ontario Building Code compliant building (Ontario Building Code, SB-10 Division 3 2017);
3. Passive House levels of energy performance including registration and certification; OR
4. Follow the **current** CAGBC Zero Carbon Building **Design** Standard, including registration and certification.

Note: A net-zero emissions building is one that: (i) is highly energy-efficient; (ii) does not have on-site combustion of fossil fuels; (iii) produces on-site carbon-free energy wherever feasible; and (iv) offsets any residual emissions from building operations in 2040 or later in accordance with the Corporate Offset Credits Policy.

~~*Note: A net-zero emissions building is one that is highly energy-efficient and produces on-site, or procures, carbon-free renewable energy in an amount sufficient to offset the annual carbon emissions associated with its operations or simply eliminates carbon emissions altogether.*~~

GHG 2.1 Upfront Embodied Carbon Assessment

Conduct an **Upfront Embodied Carbon Assessment** for the structure and envelope in accordance with the CAGBC Zero Carbon Building Standard methodology for the Upfront Carbon lifecycle stage (A1-5). Identify low-carbon sustainable material alternatives to the proposed structure or envelope for use in the building project. **The report must demonstrate an emissions intensity of equal to or less than 350 kgCO₂e/m².**

OR

~~GHG 2.2 Whole Building Life Cycle Assessment~~

~~Conduct a whole building life cycle assessment (LCA) of the building's structure and envelope in accordance with the CaGBC Zero Carbon Building Standard methodology that demonstrates~~

GHG 2.2 Enhanced Upfront Embodied Carbon Assessment

Conduct an Upfront Embodied Carbon Assessment for the structure and envelope in accordance with the CAGBC Zero Carbon Building Standard methodology for the Upfront Carbon lifecycle stage (A1-5). Identify low-carbon sustainable material alternatives to the proposed structure or envelope for use in the building project. The report must demonstrate an emissions intensity of equal to or less than 250 kgCO₂e/m².

SW 2.1 Building and Material Reuse

Option 1

Path 1) Maintain Existing Structural Elements: Walls, Floors, Roofs, and Envelope

Maintain the existing building structure (including floor and roof decking) and envelope (the exterior skin and framing, excluding window assemblies and non-structural roofing materials) for at least 30% of the project completed floor area.

AND/OR

Path 2) Maintain Interior Non-structural Elements

Use existing interior non-structural elements (e.g. interior walls, doors, floor coverings and ceiling systems) for at least 30% of the project completed floor area, including additions.

Option 2

~~Whole-Building Life-Cycle Assessment~~

~~Conduct a whole building lifecycle assessment (LCA) for the structure and envelope in accordance with GHG 2.2.~~

Upfront Embodied Carbon Assessment

Conduct an Upfront Embodied Carbon Assessment for the structure and envelope in accordance with GHG 2.2