

Specifying low carbon, means considering sourcing, processing, manufacture, transportation, construction, operation, maintenance, repair, reuse and recycling to minimise carbon at every stage of the lifecycle.

Embodied Carbon and Lifecycle Assessment

Embodied Carbon is the total carbon impact associated with a material, from extraction, through processing, manufacture, transportation, construction, maintenance and repair, to demolition and disposal. Whole Lifecycle Carbon also includes Operational Carbon, which for landscape design, may include the consumption of energy, water or other resources during the operational stage. Embodied Carbon is used as the measure of carbon impacts associated with specific materials and a Lifecycle Assessment (LCA) can be used to calculate the carbon impact of a project.

0 Strategic Definition

1 Preparation and Briefing

Minimise the extents and volumes of hard landscapes, using reused, recycled, reusable, recyclable and durable materials, and favouring sourcing of local materials. Use carbon calculations to mitigate the potential impacts of the project.

2 Concept Design

3 Spatial Coordination 4 Technical Design

Utilise low carbon materials, specify low carbon detailing and construction processes, and minimise consumption of resources and production of waste. Use carbon calculations to guide and deliver a low carbon design.

5 Construction 6 Handover

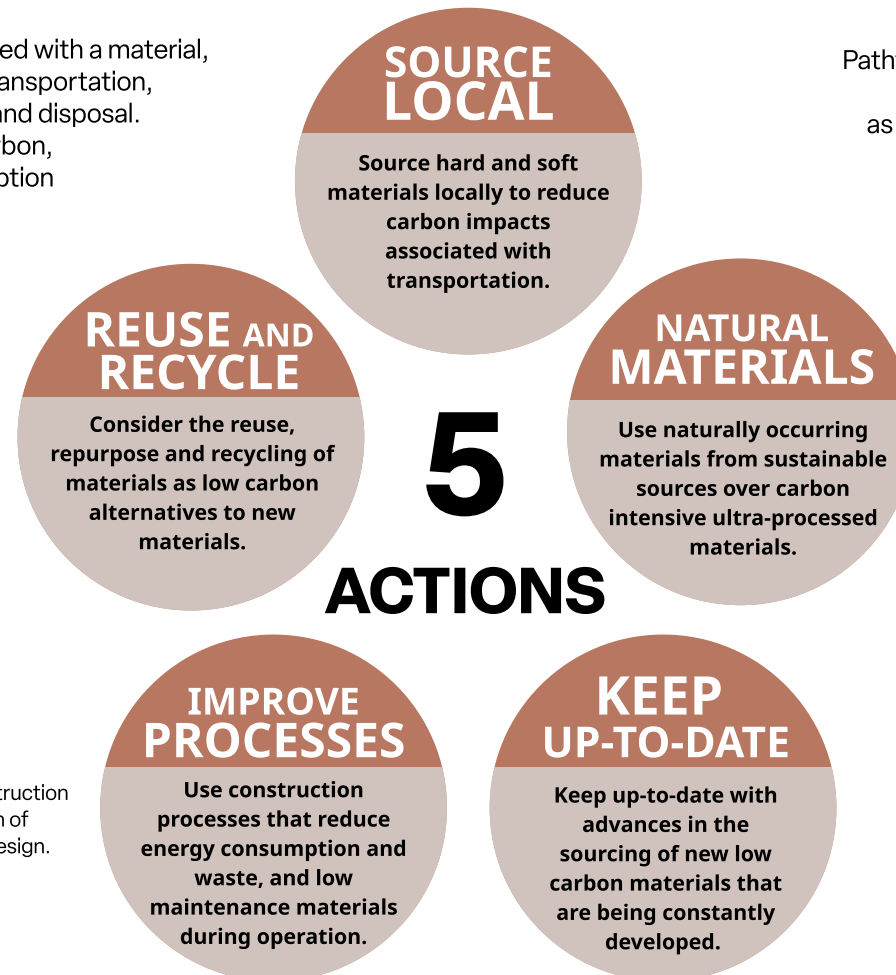
Minimise waste of materials, energy and water through efficient construction processes.

7 Use

Monitor and adapt the maintenance, reparability and replacement of hard and soft landscapes to reduce carbon impacts.

8 End-of-life

Low carbon disassembly, reuse and recycling need to be factored in from the start and adapted throughout the lifecycle of the project as the context, the climate and future use of the site potentially changes.



Measuring Carbon

Pathfinder, Carbon Conscious App and Elemental are tools for carbon calculation that take into account soft as well as hard landscape design. OneClick LCA and EC3 only cover hard landscape design and not soft landscape design and while the other tools are free to access, OneClick LCA comes with a cost.

Pathfinder, Climate Conscious App and Elemental cover both hard and soft landscape design, with the former two taking into account the carbon sequestration of the soft landscaping over the lifetime of the project and all three including the carbon impact of installation.

Carbon Conscious App is especially recommended for the early stages of a project and with Pathfinder and Elemental providing a greater level of detail at the design stage. The accuracy and range of all these tools is determined by the EPD data available which is currently limited but constantly improving.

Carbon data and tools for low carbon specification:

[One Click LCA](#) (hard)
[EC3 Embodied Carbon Construction Calculator](#) (hard)
[Pathfinder](#) (hard and soft)
[Elemental](#) (hard and soft)
[Carbon Conscious App](#) (hard and soft)

Hard Landscape Design

In addition to minimising hard landscape and maximising reuse and recycling, specifying low carbon hard landscape design should consider the following.

- Concrete and steel are the most commonly used construction materials with carbon impacts up to 80% and 60% greater than those of timber. These materials should be avoided wherever possible.
- In projects where concrete and steel are unavoidable, quantities should be kept to a minimum, green concrete and green steel specified, and design should facilitate their reuse or recycling at end-of-life.
- Deforestation is responsible for approximately 20% of global carbon impacts, so it is important that timber products are sourced sustainably, locally harvested, manufactured following energy efficient practices, and selected for longevity, durability and reuse, to reduce carbon impacts and lock-in carbon.
- Generally, bound and loose aggregate surfaces have lower carbon impacts than concrete and asphalt. However considerations need to be balanced between low carbon options and longevity, with the need to replace less durable materials, potentially exceeding the carbon impacts of high carbon options with greater longevity.

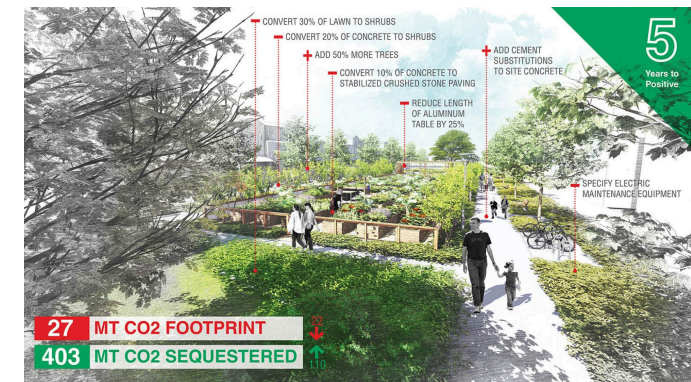
- Research the sustainability of materials and construction processes, compare EPDs and use carbon calculators to guide design decisions towards low carbon solutions.

Soft Landscape Design

Soft landscape design is often not as green as it seems, and early commitment to low carbon design and maintenance will considerably reduce carbon impacts.

- Natural regeneration offers the lowest carbon option, although this requires a suitable and proximate source of seeds, favourable conditions for establishment, patience for the plants to grow and tolerance around the uncertainty of what will grow.
- Planting of seeds and small stock will be low carbon owing to low volumes for transportation and less packaging. Although establishment will take longer growth rates beyond this.
- Planting of large stock with higher volumes for transportation and more packaging, will have higher carbon impacts, especially where supports, irrigation and tree guards are needed.

- It is important to source native and genetically local plants as these will support robust ecologies above and below ground. Planning ahead will enable the sourcing of endemic seeds and time for propagation.
- Selecting the right plants for the right place whilst factoring in the need for climate resilience will enable planting to thrive and in so doing will sequester higher rates of carbon from the atmosphere.



Links to information on low carbon specification:

[Design Toolkit — Tips And Tricks — Climate Positive Design](#)
[Material Matters: Specification in the age of climate emergency by Landscape, the journal of the Landscape Institute - Issuu](#)

[Guidance Document: PAS 2080 for Carbon Management | Institution of Civil Engineers \(ICE\)](#)

