



## March Area Transport Study

### Carbon Assessment

## Document Control

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## 1. Carbon Assessment

### 1.1 Introduction

- 1.1.1 This report sets out the approach for calculating the embodied greenhouse gas (GHG) emissions associated with the March Area Transport Study schemes (hereafter referred to as the Proposed Scheme) and culminates in a total embodied carbon value which can be used as a baseline to drive carbon reductions and assess the benefits of value engineering, using alternative materials, and implementing more efficient construction methods.
- 1.1.2 Embodied carbon is the term used for the GHG emissions associated with the creation of a highway's asset, including the production and transportation of materials to site. It is referred to within this report as 'carbon' and is measured in tonnes of carbon dioxide equivalent (tCO<sub>2</sub>e). The quantification and assessment of embodied carbon is a key stage in the carbon management process in accordance with PAS2080 principles.
- 1.1.3 Materials, fuel and energy use, waste arisings and transportation during construction all produce carbon emissions either directly, as in the case of transportation, or indirectly as embodied carbon which relates to the emissions from production/manufacturing processes for the materials being used.
- 1.1.4 Cambridgeshire County Council (CCC) declared a climate emergency in May 2019 and aims to be a carbon neutral organisation by 2030. There is also an objective for net-zero carbon emissions across the entire county by 2045. In line with the Cambridgeshire & Peterborough Combined Authority (CPCA) and CCC's commitment to combating climate change and achieving 'Net Zero' carbon emissions by 2030, the proposed scheme will undergo carbon assessment prior to gaining formal approval for the final design and construction.
- 1.1.5 Carbon emissions associated with the Proposed Scheme will be quantified using a combination of the Milestone Infrastructure Carbon Tool and manual calculations. The carbon data will be presented in a dashboard to facilitate identification of carbon 'hotspots' and help designers/delivery teams to

focus their carbon reduction efforts accordingly. This assessment will be undertaken based on the information available at preliminary and detailed design development with assumptions and interpretation where necessary.

## 1.2 Methodology

- 1.2.1 The following methodology is proposed for calculating carbon emissions associated with preliminary and detailed design phases of the proposed scheme. It would also be possible to update the carbon assessment post-construction using an as-built Bill of Quantities to assess the benefits of any carbon reduction initiatives implemented during the construction phase.
- 1.2.2 The calculation of carbon emissions associated with the proposed scheme will be undertaken using a combination of the Milestone Infrastructure Carbon Tool and manual calculations. This tool uses carbon conversion factors from the UK Government GHG Conversion Factors and Inventory of Carbon and Energy (ICE) databases.
- 1.2.3 The data used within the Carbon Tool will comprise estimates of Proposed Scheme construction material types and quantities, based on information provided by the Design Team in the form of a Bill of Quantities (BoQ). This data is used as inputs to the Carbon Tool to generate an initial estimate of the carbon footprint of the proposed scheme. The tool is based on the standard Method of Measurement for Highways Works from the Specification for Highways Works to align with the typical BoQ format. In addition to fuel and energy usage, it captures Scope 1, 2 and 3 emissions for the follow 'Bill' elements:
- Site Preliminaries
  - Traffic Management
  - Site Clearance
  - Fencing
  - Vehicle Restraint Systems
  - Drainage
  - Earthworks
  - Pavements
  - Kerbs & Footways
  - Signs and Road Markings
  - Street Lighting
  - Ducting & Electrical

- Structural Concrete
- Piling
- Waterproofing
- Bridge Joints
- Brickwork & Blockwork

1.2.4 Each category within the Carbon Tool is further divided into item /material types e.g. fill and aggregate (within the bulk materials category). For each item type the Carbon Tool provides a unit and CO2e value for that item.

1.2.5 It is noted that elements of the design would continue to be refined throughout the design process resulting in changes in material quantities.

### 1.3 Data and Key Assumptions

1.3.1 Estimated quantities of proposed material use and waste arisings will be based on the latest design information available (October 2021).

1.3.2 Attempts will be made to calculate the carbon emissions for every item. However, in some scenarios, either carbon factors do not currently exist (and therefore carbon cannot be estimated with a suitable degree of accuracy) or suitable information does not exist on which to base carbon assumptions.

1.3.3 In scenarios where an appropriate carbon factor in the carbon tool is not available; a suitable alternative will be used (i.e. manual calculation to estimate carbon emissions based on spend data or other available information).

1.3.4 It is expected that the highway construction will require maintenance and replacement during its design life. The carbon emissions associated with these future activities have will be excluded from the assessment due to the inherent uncertainty in their frequency and extent.

1.3.5 The information provided will be based on the carbon footprint following any carbon reduction initiatives delivered during the preliminary and detailed design phases. Further carbon reductions could be driven by the contractor going forwards and should be a point of discussion where construction methods may contribute to a reduction or increase in emissions.

## 1.4 Approach to Carbon Reduction

- 1.4.1 Reporting and guidance, such as PAS 2080:2016 (BSI, 2016) indicate that the potential to influence carbon emissions decreases as a project progresses. The largest savings can be achieved during the planning stage, with more modest reductions achievable during design and construction.
- 1.4.2 Carbon quantification is necessary on the proposed scheme to better understand the carbon footprint of the scheme and to enable opportunities for carbon savings to be identified.
- 1.4.3 The facilitation of workshops will help to identify how design decisions and construction activities can influence the proposed schemes carbon footprint. The most significant carbon reductions are likely to be attributed to the fact that opportunities have been sought to enhance the sustainability of the design early in the process. Workshops will help to highlight 'carbon hotspots' and allow designers to focus carbon reduction efforts in the right areas whilst highlighting the carbon implications of certain decisions throughout the design development.
- 1.4.4 As a starting point, the ongoing design specification should aim to reduce or avoid where practicable, the use of significant high impact materials, (e.g. steel and concrete), or processes (e.g. significant earthwork excavations). Where this is not possible, material volumes or processes should be substituted with lower intensity replacements if achievable within the bounds of the design standards for safety and quality.
- 1.4.5 It is hoped that this approach leads to tangible changes in the design which improve the overall sustainability of the scheme in line with the CPCA and Cambridgeshire County Councils climate objectives.