

# **M60/M62/M66 Simister Island Interchange**

**TR010064**

## **6.5 FIRST ITERATION ENVIRONMENTAL MANAGEMENT PLAN**

### **APPENDIX N: OUTLINE CARBON MANAGEMENT PLAN**

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# Outline Carbon Management Plan

## O.1 Purpose and objectives

- O.1.1 This Outline Carbon Management Plan (Outline CMP) relates to an application made by National Highways (the “Applicant”) to the Secretary of State for Transport via the Planning Inspectorate (the “Inspectorate”) under the Planning Act 2008 (the “2008 Act”) for a Development Consent Order (DCO). If made, the DCO would grant consent for the M60 / M62 / M66 Simister Island Interchange (the “Scheme”). A detailed description of the Scheme can be found in Chapter 2 The Scheme of the Environmental Statement (TR010064/APP/6.1). This Outline CMP sets out how whole carbon emissions have been assessed to date and how they will be assessed during the detailed design to further reduce Greenhouse Gas (GHG) emissions during construction and operation of the Scheme. The Scheme’s carbon management approach is aligned with the Publicly Available Specification PAS 2080:2023 (The British Standards Institute , 2023) and the Carbon Management in Buildings and Infrastructure technical standard which ensures that carbon reduction is fully integrated into the project team’s culture.
- O.1.2 This Outline CMP is designed to inform all relevant parties of:
- How carbon reduction for the Scheme will be implemented; and
  - The requirements to support implementation of DMRB LA114 during the design, construction, and operation of the Scheme.
- O.1.3 This Outline CMP has been prepared to support the DCO application to detail the approach and methodology for carbon management for the Scheme at the detailed design and construction stages.
- O.1.4 This Outline CMP is a live document that will be updated to a Carbon Management Plan (CMP) upon consent of the DCO to set out how carbon will be managed during the construction of the Scheme.
- O.1.5 A preliminary design carbon assessment has been completed based on estimated construction data from the available design information. This forms the basis for this Outline CMP.

## O.2 Background to the plan

### Introduction

- O.2.1 The objective of the Scheme is to alleviate predicted congestion and journey time issues at the junction and between J17 and J18 of the M60, reducing negative air quality and noise impacts and delivering overall improvements to road safety. The Scheme will:

- Create a free-flow link from M60 eastbound to M60 southbound (clockwise), including a new bridge over the M66 and junction 18 slip roads.
- Realign the M66 motorway as it heads south under junction 18 and introduce additional capacity through the junction to accommodate the merging traffic from the new loop.
- Provide an improved two-lane free-flow link from the M60 northbound to the M60 westbound (anti-clockwise) to replace the existing single lane.
- Widen the carriageway between M60 J17 and J18, providing 5 lanes in both directions with a discontinuous hard shoulder.
- Provide new traffic signals, signs, and street lighting at J18 and its approaches.
- Provide new gantries on the M66 southbound and between the M60 J17 and J18.

O.2.2 The Applicant is seeking reductions in carbon emission by adhering to the principles of PAS 2080:2023. This will support the Scheme in reducing its carbon emissions during design, construction, and operation. It would also ensure that carbon is consistently and transparently quantified at the key stages of the design process.

O.2.3 This Outline CMP has been developed to establish clear roles and responsibilities, which are further discussed in Section 2 of the First Iteration EMP. This Outline CMP intends to place responsibility and accountability with key individuals involved in the development of the Scheme.

O.2.4 There are multiple technical requirements in the PAS 2080:2023 standard, which include:

- Implement a carbon management process to help an organisation meet PAS 2080 when delivering assets and/or programmes of work.
- Follow the carbon reduction hierarchy.
- Quantify, assess, and report a Scheme's carbon emissions to inform Scheme development and overall asset management.
- Engage with others as early as possible, in a collaborative way of working to identify whole life low carbon solutions, including the selection of relevant low carbon materials and products, innovative design solutions and construction methods.

O.2.5 The PAS 2080:2023 standard defines the specific carbon management actions to be undertaken, and defines the key strategies and approaches to implement the culture and behaviour changes necessary for delivering carbon reduction, specifically:

- Collaborative working from concept to operation.

- Implementation of the carbon reduction hierarchy when identifying potential opportunities to reduce carbon.
- Raising major carbon challenges to design development and construction planning, where key carbon risks are identified.

### O.3 Roles and Responsibilities

O.3.1 The Applicant and its appointed supply chain have key responsibilities in leading the efforts to implement low-carbon solutions during design and delivery. These are set out below.

Role	Main Responsibilities
Applicant	<ul style="list-style-type: none"> <li>• The Applicant has the overall responsibility for setting Scheme specific carbon reduction targets and driving the carbon reduction.</li> <li>• Attend the carbon reduction workshops, and actively engage in the direction and decision making of the workshops.</li> <li>• Maintain an active relationship with the Principal Contractor, ensuring they are aware of the ongoing carbon decision making, carbon reduction progress.</li> </ul>
Principal Contractor (PC) Project Director	<ul style="list-style-type: none"> <li>• The PC Project Director has overall responsibility for carbon reduction throughout design and construction.</li> <li>• The PC Project Director is responsible for updating the CMP and the carbon reduction opportunities.</li> <li>• The PC Project Director will ensure early engagement with the supply chain, holding workshops and events to upskill, knowledge share and unlock innovation to whole life cost and carbon.</li> <li>• The PC Project Director will attend the carbon reduction workshops, provide opening and closing statements to set their expectations and priorities for carbon reduction, and actively engage in the direction and decision making of the workshops.</li> <li>• The PC Project Director will ensure the project team has the skills and resource to deliver on the carbon objectives of the CMP, and the expectations and priorities that are set.</li> <li>• The PC Project Director will participate in all review activities and/ or ensure through delegation that carbon is correctly considered, and decision-making</li> </ul>

	<p>progresses towards achieving the carbon reduction opportunities.</p> <ul style="list-style-type: none"> <li>• The PC Project Director will maintain an active relationship with the Applicant, ensuring they are aware of their responsibilities to support low carbon decision making, carbon reduction progress, and are prepared to discuss challenges that arise.</li> <li>• The PC Project Director will ensure an active relationship is maintained with stakeholders and that delegated responsibilities are conducted accordingly.</li> </ul>
<p>Principal Designer (PD) Project Director</p>	<ul style="list-style-type: none"> <li>• The PD Project Director will ensure the project team are clearly informed of the carbon objectives of this Outline CMP, and the expectations, priorities, and challenge of the PD Project Director, and are empowered to undertake their roles.</li> <li>• The PD Project Director will ensure the design team has the skills and resource to deliver on the carbon objectives of this plan, and the expectations and priorities that are set.</li> </ul>
<p>Principal Designer (PD) Design Manager</p>	<ul style="list-style-type: none"> <li>• The PD Design Manager through day-to-day running, ensure compliance with and directly support the design team with implementation of objectives of this Outline CMP, in particular the carbon reduction hierarchy, and the expectations, priorities and challenge that are set.</li> <li>• The PD Design Manager will ensure the carbon assessment of options is carried out to the required level of detail.</li> </ul>
<p>Principal Contractor (PC) Engineering Manager</p>	<ul style="list-style-type: none"> <li>• The PC Engineering Manager will provide strategic engineering and design management, strong leadership and control of a multi-disciplinary team comprising engineering resources at all levels.</li> <li>• The PC Engineering Manager will ensure full design integration between all design disciplines is achieved and assessed for all build ability aspects during both the development stage and construction stage of the Scheme.</li> <li>• The PC Engineering Manager will lead, support, and implement digital design and carbon integrated method-led construction.</li> <li>• The PC Engineering Manager will support and advise the PD Design Manager throughout the hotspot and carbon reduction opportunity review</li> </ul>



<p>Principal Contractor (PC) Construction Manager</p>	<ul style="list-style-type: none"> <li>• The PC Construction Manager will provide strategic operational management, strong leadership and control of a multi-disciplinary team comprising engineering and supervisory resources at all levels and facilitation of strong links with other teams within and external to the Scheme.</li> <li>• The PC Construction Manager will support and advise the PC Engineering Manager and PD Design Manager throughout the hotspot and carbon reduction opportunity review, to ensure carbon in construction is considered.</li> <li>• To implement the low carbon in construction plan in all works packages.</li> <li>• Ensure the on-site workforce complete the relevant carbon training.</li> </ul>
<p>Principal Contractor (PC) Supply Chain Manager</p>	<ul style="list-style-type: none"> <li>• The Principal Supply Chain Manager will provide strategic operational and supply chain management, strong leadership and control of our supply chain data and operational performance.</li> <li>• The Principal Supply Chain Manager will collaborate with vendors and suppliers to ensure all operations meet carbon, quality, and safety standards.</li> <li>• The Principal Supply Chain Manager will support and advise the PC Sustainable Procurement Manager throughout the carbon integrated procurement</li> </ul>
<p>Principal Contractor (PC) Sustainable Procurement Manager:</p>	<ul style="list-style-type: none"> <li>• The PC Sustainable Procurement Manager will provide strategic operational management, strong leadership and control of a multi-disciplinary team comprising engineering and supervisory resources at all levels and facilitation of strong links with other teams within and external to the Scheme.</li> <li>• The PC Sustainable Procurement Manager will lead, support and implement, carbon integrated procurement throughout the Scheme design and preconstruction.</li> </ul>
<p>Principal Contractor (PC) Programme Manager</p>	<ul style="list-style-type: none"> <li>• The PC Programme Manager will ensure carbon management actions are included in the programme to ensure that they are undertaken at the required time, to enable the required design decision making, and performance reporting.</li> </ul>



<p>Principal Designer (PD) Carbon Manager</p>	<ul style="list-style-type: none"> <li>• The PD Carbon Manager will develop and document the CMP for the Scheme.</li> <li>• The PD Carbon Manager will support the supply chain and the Applicant with implementation of this Outline CMP, through day-to-day working to assist them with understanding the actions required and pragmatic, but effective levels of options assessment.</li> <li>• The PD Carbon Manager will lead modelling the carbon performance of the completed designs. The Scheme will undertake regularly report construction related GHG emissions throughout the development and construction phase.</li> </ul>
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## O.4 National Policy

O.4.1 The National Policy Statement for National Networks (NPS NN) (Department For Transport , 2014) sets out the Government’s policies to deliver the development of Nationally Significant Infrastructure Projects (NSIPs) on the national road and rail networks in England. The Secretary of State must consider the NPS NN as the primary basis for making decisions on development consent applications.

O.4.2 Regarding carbon reduction, paragraph 5.19 of the NPS NN states (Department For Transport , 2014):

*“Evidence of appropriate mitigation measures (incorporating engineering plans on configuration and layout, and use of materials) in both design and construction should be presented. The Secretary of State will consider the effectiveness of such mitigation measures to ensure that, in relation to design and construction, the carbon footprint is not unnecessarily high.”*

O.4.3 The NPS NN (Department For Transport , 2014) was, however, written in 2014, before the Government’s legal commitment to achieving net zero by 2050, and the publication of the Decarbonising Transport Plan (Department for Transport , 2021). While the 2014 NPS NN continues to be the designated policy under which applications for development consent are decided Department for Transport (DfT) has committed to review it in the light of these developments, and update modelling assumptions, including the introduction of new tighter CO2 emissions standards for cars, vans and HGVs to be implemented between 2025 and 2035, new sales figures showing a further decline in sales of diesel cars compared to 2018, and updated consumer choice modelling of the take-up for ultra-low emissions vehicles, which collectively have resulted in updated electric vehicle and fuel efficiency forecasts which reflect more recent, post-pandemic conditions.

- O.4.4 The Government published a draft NPS NN for consultation in March 2023 which ended in June 2023. The draft NPS NN is not currently designated, however the draft NPS NN is potentially capable of being an important and relevant consideration in the decision-making process by the Secretary of State for development consent applications.
- O.4.5 Regarding carbon reduction, the draft NPS NN paragraph 5.36 states (Department for Transport, 2023):
- “The Secretary of State should be content that the applicant has taken all reasonable steps to reduce the total greenhouse gas emissions from a whole life carbon perspective.”*
- O.4.6 An assessment of how the Scheme complies with the NPS NN can be found in the NPS NN Accordance Tables (TR010064/APP.7.2). An assessment has also been undertaken to demonstrate the Scheme’s compliance with the draft NPS NN which can be found in the Draft NPS NN Accordance Tables (TR010064/APP/7.3).

## **O.5 National Highways Net Zero Highways Plan**

- O.5.1 National Highways published its ‘Net Zero Highways Plan’ (‘the Plan’) 3 in July 2021 (National Highways, 2021). The Plan, which is aligned with Decarbonising Transport: A Better, Greener Britain (Department for Transport, 2021), sets out new aspirational greenhouse gas reduction targets for National Highways. The Plan sets out a roadmap with targets to cut corporate emissions (100% of corporate emissions to be net zero without purchased offsetting by 2030), maintenance and construction emissions (40-50% reduction in emissions compared to 2020 by 2030, and 100% of schemes net zero by 2040), and road users (100% of the network will be net zero by 2050).
- O.5.2 Plan sets out a wide range of objectives covering all its activities. For construction the key objectives are:
- A 0-10% reduction in emissions by 2025 compared to 2020, and 40-50% by 2030 compared to 2020.
  - Tier 1 and Tier 2 contractors have certified carbon management systems by 2025. Main Contractors with a direct commercial relationship with a client are termed Tier 1. Sub-contractors and suppliers with a direct contract with the Tier 1 main contractor are termed Tier 2.
  - By 2025 the specifications Design Manual for Roads and Bridges (DMRB) integrate net zero thinking.
  - By 2025 commission a long-term delivery partner to design a major net zero road scheme.

## **O.6 Design Manual for Roads and Bridges (DMRB) LA 114**

- O.6.1 The DMRB sets out the design and safety standards for managing the motorways and all-purpose trunk roads across England, Wales, Scotland, and Northern Island.
- O.6.2 DMRB LA 114 sets out the requirements for assessing and reporting the effects of climate on highways (climate change resilience and adaptation), and the effect on climate of greenhouse gas from construction, operation, and maintenance projects. The document is to be implemented forthwith on all schemes requiring an assessment of climate according to the implementation requirements of DMRB GG 101 (Highways England, 2021a).
- O.6.3 DMRB GG 101 states that all works on land owned, leased, or managed by the Overseeing Organisation shall be undertaken in accordance with DMRB requirements appropriate to the intended use of the asset or road unless approved by the Overseeing Organisation (Highways England, 2021a).
- O.6.4 An assessment of changes in GHG emissions during the construction and operational phases of the Scheme has been undertaken in accordance with DMRB LA 114 (Highways England, 2021b), the results of which are reported within Chapter 14 Climate of the Environmental Statement (TR10064/APP/6.1).
- O.6.5 DMRB LA 114 (Highways England, 2021b) states that; “Projects shall seek to minimise carbon emissions in all cases to contribute to the UK’s target for net reduction in carbon emissions”.
- O.6.6 The Scheme will undertake regularly report construction related GHG emissions throughout the development and construction phase as per paragraph 4.1 of DMRB LA 114.
- O.6.7 Emissions are mitigated by applying the carbon reduction hierarchy set out in DMRB LA 114 (Highways England, 2021b): The carbon reduction hierarchy is to Avoid. Switch, Improve. Items at the top of the hierarchy have a greater potential to reduce emissions and are prioritised. The hierarchy is detailed in section O.8 of this Outline CMP.

## **O.7 Carbon Management Objectives**

- O.7.1 The requirements of PAS 2080:2023 set out a consistent requirement of carbon reduction for highways schemes.
- O.7.2 In response to and aligned with these, the objectives of this Outline CMP are to:
- Reduce the whole life carbon footprint of the Scheme as low as reasonably practicable by applying the carbon reduction hierarchy to promote innovation and carbon reductions, through development of clever and collaborative design develop and construction planning proposals, with direct value chain engagement.

- The appointed PD and PC will actively identify and pursue carbon reduction opportunities and risks.
- A baseline has been produced, and the model has been used to:
  - identify carbon hotspots to inform design development and construction planning.
  - As the basis for determining performance improvements achieved during the detailed design stage.

O.7.3 Carbon management objectives are be aligned with DMRB LA 114. These include:

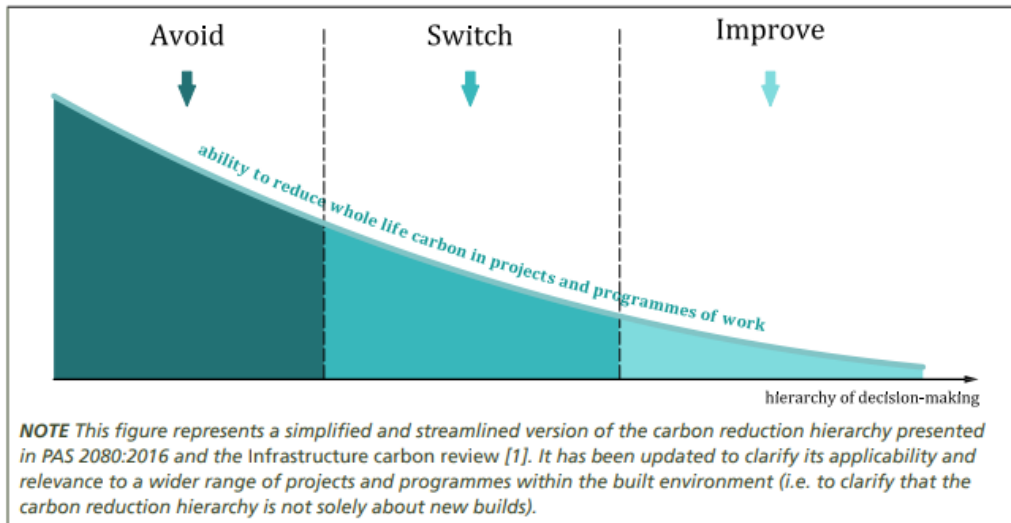
- Assessing and reporting the effects of climate on highways.
- An assessment of changes in GHG emissions at each life cycle stage of the project, in comparison with current and future baseline GHG emissions.
- An intention to minimise carbon emissions in all cases, to contribute to the UK's target for net reduction in carbon emissions.
- Regularly report construction related GHG emissions throughout the development and construction phase.
- Mitigate emissions by applying carbon reduction hierarchy.

## O.8 Carbon Reduction Hierarchy

O.8.1 As per PAS 2080, the carbon reduction hierarchy principles will be applied during design, which specifies:

- Avoid: align the outcomes of the Scheme and/or programme of work with the net zero transition at the system level and evaluate the basic need at the asset and/or network level.
- Switch: assess alternative solutions and then adopt one that reduces whole life emissions through alternative scope, design approach, materials, technologies for operational carbon reduction, among others, while satisfying the whole life performance requirements.
- Improve: identify and adopt solutions and techniques that improve the use of resources and design life of an asset/network, including applying circular economy principles to assess materials/products in terms of their potential for reuse or recycling after end of life.

**Figure 1 – Carbon Reduction Hierarchy (The British Standards Institute , 2023)**



## O.9 Preliminary Design

- O.9.1 A preliminary design carbon assessment has been completed based on estimated construction data from the available design information and detailed in Chapter 14 Climate of the Environmental Statement (TR010064/APP/6.1).
- O.9.2 In the carbon assessment, construction processes are estimated based on previous scheme data of a similar scope of work and therefore are based on conventional materials and methods, as data on alternative low carbon methods are not currently available.
- O.9.3 Design development has been undertaken during the preliminary design phase, with the carbon contribution considered. Several changes have resulted in mitigation being embedded into the current design. Mitigation measures are further detailed in Chapter 14 Climate of the Environmental Statement (TR010064/APP/6.1). A summary of the mitigation measures is as follows:
- The redesign of the Northern Loop and M66 Southbound slip road pairing from an over/over to an over/under configuration, resulting in substantial reductions to earthworks cut and fill and the removal of a concrete retaining wall from the design.
  - Retention of a section of slip road between the M60 Northbound and the M60 Westbound, resulting in reuse of the existing merge paved area, resulting in reductions to required earthwork volumes and reductions in GHG emissions associated with land use change.
  - Modifying the vertical alignment of the Northern Loop of the Scheme to allow a better tangential vertical tie-in to the M66 southbound and to remove the requirement for a 100m concrete retaining wall.

- Existing drainage infrastructure will be utilised where feasible, thus reducing the embodied carbon and transport emissions associated with the use of new drainage materials.
- Pavements have been designed to utilise existing pavement as much as possible, based on the pavement assessments, to eliminate as far as possible full reconstruction of existing pavements.

## O.10 Opportunities

- O.10.1 Further opportunities to mitigate carbon will be considered throughout the detailed design and construction phase of the Scheme. A carbon reduction opportunity register will be created and managed throughout the Scheme lifecycle to ensure that carbon management is tracked throughout.
- O.10.2 A carbon workshop was held on 6 February 2023. The workshop involved an overview of the Scheme along with a discussion relating to carbon hot spots and reduction opportunities that could be applicable to the Scheme.
- O.10.3 Monthly meetings at the preliminary design stage have been held. These meetings are used for the design, construction, and environmental disciplines to discuss the carbon reduction opportunities and the routes for integration into the Scheme design.
- O.10.4 Focus on the opportunities for enhancement is based on the largest carbon contributing factors that are highlighted by the carbon assessment during each stage of the Scheme.
- O.10.5 Opportunities for enhancement which have been identified that are relevant to this matter, but which have not been considered within the current carbon assessment (as discussions with suppliers and statutory undertakers on the availability are ongoing, they are unable to be confirmed for integration into the assessment at this stage), include but are not limited to:
- Using electric (or alternative lower-carbon fuel) construction equipment instead of conventional diesel-powered construction plant
  - Using vehicles fitted with telematics and start/stop technology.
  - Using onsite renewable energy generation and storage to reduce diesel generator use and power taken from the grid.
  - Using low resource and low energy solutions for the site compound, offices, and welfare facilities
  - Ensuring availability off grid connections for compounds (maximising access to lower carbon-intensity energy from grid electricity)
  - Adoption of special, low carbon, materials (such as geocomposite materials, asphalt preservatives and graphene additives)
  - Reprocessing and grading locally available previously used aggregates to meet construction needs through recycling.



- Asphalt preservation treatments such as spray applied, bituminous-based products, used to hold and/or extend the life of asphalt surface courses.
- Full adoption of circular economy for products which looks to ensure equipment can be maintained, repaired, upgraded, repurposed at end of life etc. In a circular economy, products are kept in circulation through processes like maintenance, reuse, refurbishment, remanufacture and recycling.
- Road wagons and HGV deliveries with alternative fuels used as opposed to diesel/petrol.

O.10.6 Opportunities for enhancement which are realised will be updated on the carbon reduction opportunity register ahead of construction.

## **O.11 Whole Life Assessment**

O.11.1 In accordance with paragraphs 3.11 to 3.20 of DMRB LA 114 (Highways England, 2021b), changes in GHG emissions associated with the construction, maintenance and operation of the Scheme have been estimated and compared to relevant UK carbon budgets to assess their significance.

O.11.2 The only statutory carbon targets are the carbon budget targets and the Net Zero 2050 target that are set at a national level i.e., they are targets for the UK as a whole. The Applicant is not aware of any relevant non-statutory targets. There are no sectoral targets (e.g., for transport), nor any targets set at a sub-national geographic scale. The Net Zero 2050 and the carbon budget targets are themselves cumulative as they are a sum of carbon emissions for a range of sectors. In addition to the absence of sectoral or sub-national scale targets for carbon emissions, it is not possible for the Applicant to produce a baseline at such scales. Accordingly, there is no reasonable basis upon which the Applicant can assess the potential likely significant effect of the Scheme's carbon emissions at anything other than at the national level.

O.11.3 A whole life carbon assessment was undertaken and is detailed in the Chapter 14 Climate of the Environmental Statement (TR010064/APP/6.1).

O.11.4 A construction phase carbon assessment will be used to measure GHG emissions during construction of the Scheme to ensure that emissions are minimised as far as possible as the UK transitions to net zero.

## **O.12 Carbon Modelling**

O.12.1 The carbon modelling methodology used is set out in detail in Appendix 14.1 Estimation of greenhouse gas emissions of the Environmental Statement Appendices (TR010064/APP/6.3). In summary:

- Construction and operational maintenance GHG emissions were estimated.



- Road user GHG emissions were estimated using Defra's Emission Factors Toolkit (version 11.0)
- Emissions associated with changes in forestry were estimated using the Woodland Carbon Code Calculation Spreadsheet (version 2.4)
- Emissions associated with vegetation removal and soil disturbance were estimated using carbon factors derived by Natural England

## **O.13 Reporting**

- O.13.1 The output from the initial assessment quantifies the whole life carbon of the Scheme. Construction phase regular carbon assessments will document carbon reduction.
- O.13.2 PAS 2080 has three tiers of conformity covering: independent third-party certification; other-party certification; and self-validation. The current proposal is for self-validation.
- O.13.3 To achieve self-validation conformity, the appointed PC shall be able to demonstrate that their carbon management process has been established in accordance with PAS 2080 and publish supporting documentation upon request. The supporting documentation will detail:
- The scope of the claim
  - Summary evidence which demonstrates the relevant requirements are met.
  - Limitations of the claim due to data quality or data gaps
  - The key stakeholders/roles involved in carbon management process.
- O.13.4 Summary of actions for further improvement of the carbon management process. In addition, the appointed PC has a contractual requirement to report on cost and carbon performance to the Applicant, which includes reporting on carbon emissions. This will be completed on a quarterly return basis through the construction process and during maintenance activities through the life of the Scheme, as part of National Highways' existing reporting processes.

## O.14 References

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