A46 Coventry Junctions (Walsgrave)
Scheme number: TR010066

7.4 Scheme Design Report

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SCHEME DESIGN REPORT

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1. Introduction

1.1. Purpose of report

1.1.1. This Scheme Design Report is submitted by National Highways (the Applicant) under section 37 of the Planning Act 2008 to the Secretary of State for Transport via the Planning Inspectorate (the Inspectorate) for a Development Consent Order (DCO) for the A46 Coventry Junctions (Walsgrave) Scheme, hereafter referred to as the Scheme.

1.1.2. A detailed description of the Scheme can be found in Chapter 2 (The Scheme) of the Environmental Statement (ES) (**TR010066/APP/6.1**). The purpose of this Report is to:

- Provide a guide to the design decisions that have informed the development of the design for the Scheme.
- Assist those reviewing the application documentation by providing a reference document that details the design of the Scheme.
- Ensure that the Scheme continues to adhere to the good design policies, both locally and nationally, and that the Design Principles are central to the Scheme's delivery.

1.1.3. This Report also provides evidence of compliance with the design requirements of the National Networks National Policy Statement (NPS NN) (2024), such as: paragraphs 4.27 to 4.32 that outline criteria for good design for national network Infrastructure. For further details refer to the NPS NN Accordance Tables (**TR010066/APP/7.2**).

1.2. National Highways Licence

1.2.1. National Highways' Licence[1] includes both statutory directions and statutory guidance issued by the Secretary of State for Transport, as provided for in section 6 of the Infrastructure Act 2015 (which states that the Secretary of State may from time to time give a strategic highways company directions or guidance as to the manner in which it is to exercise its functions).

1.2.2. In relation to design, paragraph 5.26 of the Licence states *'In exercising its functions, the Licence holder must have due regard to relevant principles and guidance on good design, to ensure that the development of the network takes account of geographical, environmental and socio-economic context'.*

[1] Department for Transport (2015) highways England Licence. Available ate https://assets.publishing.service.gov.uk/media/5a80c317ed915d74e33fc43c/strategic-highways-licence.pdf (last accessed August 2024)

1.2.3. Paragraph 5.27 of the Licence states *'The Licence holder must establish a Design Panel to provide advice to the Licence holder on design issues, and in doing so must ensure that:*

- *The membership of the Design Panel includes a representation from credible experts and relevant stakeholders, as appropriate;*
- *The Licence holder seeks, and has due regard to, the views of the Secretary of State concerning the purpose, remit and membership of the Design Panel;*
- *The Licence holder seeks advice from the Design Panel:*
  - *On the design of road improvement Schemes, where these are in sensitive locations or expected to have a substantial impact on the surrounding landscape;*
  - *On the development of relevant design standards concerning the visual impact of schemes; and*
  - *At any other time where required by the Secretary of State.*
- *The Licence holder has due regard to the advice and general recommendations of the Design Panel, and the particular observations of the Panel on specific schemes.'*

1.2.4 Further information on the Design Panel can be found in section 5 of this Report.

1.3. Design Manual for Roads and Bridges (DMRB)

1.3.1. National Highways' principles of good design are set out in 'The road to good design'[2] and compliance with these principles is a requirement of the Design Manual for Roads and Bridges (DMRB) standard GG 103 Introduction and general requirements for sustainable development and design.

1.3.2. GG 103 describes how sustainable development and good road design can be applied to the design of motorway and all-purpose trunk roads, and aligns with a range of global, European and National commitments on sustainable development.

1.3.3. GG 103 states that *'Good road design aims to put people at its heart by designing an inclusive, resilient and sustainable road network; appreciated for its usefulness but also its elegance, reflecting in its design the beauty of the natural, built and historic environment through which it passes, and enhancing it where possible'*.

[2] Highways England The road to good design (2018), available at: https://nationalhighways.co.uk/media/gqspcx0c/strategic-design-panel-the-road-to-good-design.pdf

1.3.4. DMRB is a suite of documents which contains requirements and advice relating to works on motorways and all-purpose trunk roads for which National Highways is the overseeing organisation.

1.3.5. DMRB embodies the collective experience of the overseeing organisation, their agents, supply chain members and industry bodies. It provides requirements and advice resulting from research, practical experience of constructing and operating motorways and all-purpose trunk roads, and from delivering compliance with legislative requirements. Where a specific requirement within a particular DMRB standard cannot be met, the Applicant has applied for a Departure from Standard from the overseeing organisation.

1.4. Structure of this Report

1.4.1. This Report is made up of 11 sections as described below:

- Section 1 – Introduction
- Section 2 – Provides a high level description of the Scheme
- Section 3 – Sets out the policy context
- Section 4 – Details the application of National Highways principles of good road design
- Section 5 to 11 – Reviews specific design considerations

2. The Scheme

2.1. Scheme context

2.1.1. The Government's second Road Investment Strategy (RIS2): 2020 to 2025[3] sets a long-term strategic vision for the network by:

- Specifying the performance standards National Highways must meet
- Listing planned enhancement Schemes expected to be built

2.1.2. Stating the funding made available during the second Road Period (RP2), covering the financial years 2020/21 to 2024/25.

2.1.3. The Scheme's objectives are derived from the aims of the RIS2, and the feasibility studies described in the Case for the Scheme (**TR010066/APP/7.1**), are:

- A Strategic Road Network (SRN) that supports and facilitates economic growth, supporting employment and residential development opportunities
- An SRN that is maintained to safe and serviceable condition
- Improve the operation and efficiency of the existing transport network, delivering capacity enhancements to the SRN
- An SRN that minimises its negative impacts on users, local communities and the environment
- An SRN that balances the need of individuals and businesses that use and rely upon it
- Reducing/minimising the impact on the wider environment, whilst seeking to bring enhancement
- Operational maintenance to be considered holistically

2.1.4. It should be noted that the 'A46 Coventry junction upgrade' (as referenced in Road Investment Strategy 1: 2015 – 2020), was originally intended to consist of works to both Binley and Walsgrave junction as one scheme. However, the decision was taken in 2016 to take a phased approach to delivery, and these became two separate schemes. The first, Binley junction upgrade, was consented by Highways Act Order on 8 August 2019 and opened for traffic in November 2022. Following the completion of the Binley junction improvement scheme in 2023 the Walsgrave Junction is the only remaining roundabout east of Coventry and north of Tollbar End junction that is at grade, and as such is a pinch point for traffic. The Tollbar End junction and M6 Smart Motorway

[3] Department for Transport (2020) Road Investment Strategy 2: for the 2020 - 2025 [online] available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/872252/road-investment-strategy-2-2020-2025.pdf (accessed March 2024)

improvements have increased the pressure on Binley and Walsgrave Junctions. The Binley junction is approximately 1.7km to the south of Walsgrave Junction.

2.1.5. There are concerns that without further investment to reduce congestion on the A46, the benefits derived from the improvement works at Tollbar End junction would be limited. In particular, the current delays at the Walsgrave Junction could undermine the existing investment which has been made on A46 improvements.

2.1.6. The Scheme comprises of an upgrade to the junction of the A46 Coventry Eastern bypass and the B4082, east of Walsgrave. The Scheme is being progressed by the Applicant to ease congestion and reduce queuing along the A46 corridor, east of Coventry.

2.2. Preferred route development

2.2.1. Four options were considered during the options selection stage, with three options discounted due the results of initial environmental assessment and traffic modelling deeming them non-viable. Option 11 was consulted on in 2022.

- Option 11 - a grade separated junction approximately 800m to the north of the existing roundabout location. The A46 mainline is realigned through the existing junction, with geometry to allow a 50mph speed limit on the mainline dual carriageway.

2.2.2. From the options assessed and consulted upon as described in the Case for the Scheme (**TR010066/APP/7.1**) and ES Chapter 3 (Assessment of Alternatives) (**TR010066/APP/6.1**), a preferred route was selected which meets with the principles and objectives set out above.

2.2.3. The Preferred Route, 'Option 11' was announced on the Scheme website in June 2022.

2.3. Programme

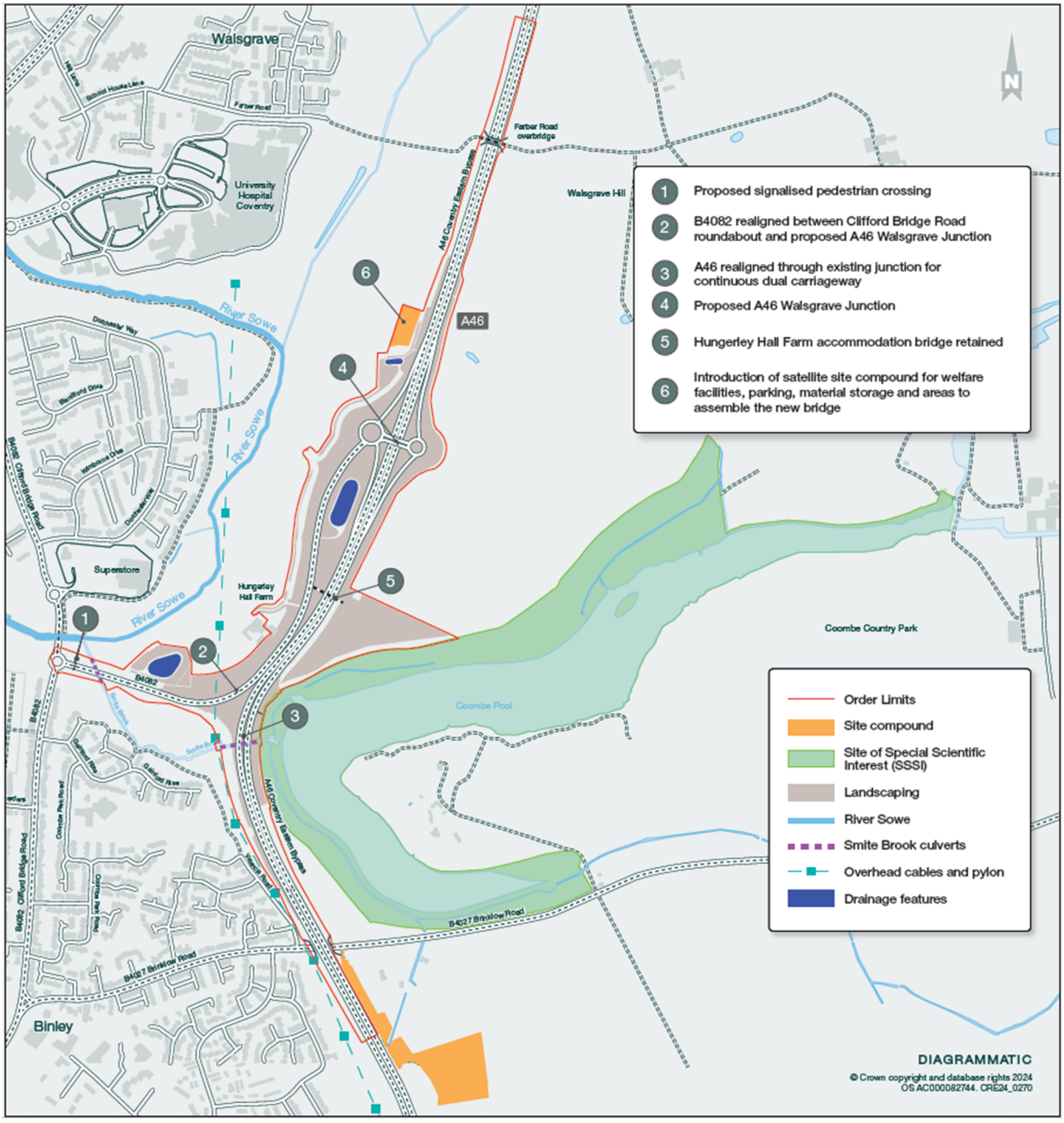
2.3.1. The Scheme was included as part of the Road Investment Strategy (RIS) published by the Government on 1 December 2014. National Highways is responsible for delivering elements of the RIS including the Scheme. The Scheme is to be delivered within the RIS2 period 2020-2025.

2.3.2. The Scheme follows the construction of the A46 Binley junction improvements, which involved delivering a grade separated junction which was completed in February 2023. The Scheme is not dependent on the completion or commencement of any other projects, transport related or otherwise.

2.3.3. Construction activities which are seasonally constrained due to environmental considerations are set out within the First Iteration Environmental Management Plan (EMP) (**TR010066/APP/6.5**). Constraints include common seasonal restrictions, such as for the protection of breeding birds, but do not impose any unusual or exceptional constraints on the Scheme programme.

2.4. Scheme location

Figure 2-1: Scheme location



2.4.1. The Scheme is located in the West Midlands, approximately 5km to the east of Coventry city centre. Figure 2-1 shows the location of the Scheme, and the Location Plan (**TR010066/APP/2.1**) shows the wider geography.

2.4.2. The Scheme is on the boundary of Coventry City Council and Warwickshire County Council. The A46 western edge is on the council boundaries.

2.4.3. The A46 lies between housing estates to the west and countryside to the east. The River Sowe on the west of the road is in a flood zone 3 with connecting watercourses crossing beneath the B4082 and A46. Coombe Abbey Park is a Site of Special Scientific Interest (SSSI) lying to the east side of the existing A46 Walsgrave Junction.

2.5. Scheme description

2.5.1. The main elements of the Scheme comprise:

- Realignment of the existing A46 dual carriageway through the existing at grade roundabout (which will be removed), for approximately 880m to improve the road geometry and allow for a 50mph speed limit.
- Earthworks on the eastern side of the A46 mainline to facilitate the realignment through the existing at grade roundabout.
- A new grade separated junction over the A46 mainline, approximately 800m north of the existing Walsgrave junction to connect the B4082 with the A46.
- A new overbridge structure across the existing A46, between the dumbbell roundabouts forming the grade separated junction.
- New merge and diverge slip roads at the grade separated junction for both northbound and southbound movements.
- Realignment of the B4082 to form a single carriageway link road, for approximately 900m, to connect the local road network to the new A46 grade separated junction with a proposed 40mph speed limit.
- Road assets and street furniture such as traffic signs and lines, variable message sign (VMS), street lighting columns, vehicle restraint systems (VRS), fences, retaining walls and kerbs.
- Drainage systems including a dry detention basin and two ponds that will be designed to be permanently wet.
- Proposed new maintenance accesses to the drainage features and VMS.
- Retention of the Hungerley Hall Farm accommodation bridge (the existing bridge that provides farm vehicle access over the A46 mainline).
- Farm access track to the north of Hungerley Hall Farm to provide gated access to the B4082 link road.
- Improvements to facilities for walkers, cyclists and horse-riders (WCH) through provision of a signalised pedestrian crossing on the B4082; and providing enabling works, including the retention of Hungerley Hall Farm accommodation overbridge, for a potential future WCH route to be provided by others.
- Replacement and installation of new highway boundary fencing.

- Replacement vegetation planting to compensate for the vegetation that needs to be removed to facilitate the Scheme.

2.5.2. A detailed description of the Scheme is provided in ES Chapter 2 (The Scheme) (**TR010066/APP/6.1**).

2.6. Programming of the Scheme

2.6.1. The Scheme has completed preliminary design ahead of the Development Consent Order (DCO) application planned for Autumn 2024. The milestone dates are shown in Table 2-1.

Table 2-1: Milestone dates

Milestone	Date
Preferred route announcement	Summer 2022
End of Option Selection	Winter 2022
End of Preliminary Design	Autumn 2024
End of Statutory Procedures and Powers	Spring 2026
End of Construction Preparation	Summer 2026
Start of works	Autumn 2026
End of works	Spring 2028

3. Policy context

3.1. Key policy

3.1.1. Key documents relating to the design of the Scheme can be divided into a primary and secondary policy framework. Section 104 of the Planning Act 2008 states that the Secretary of State must decide an application "in accordance with" any relevant, designated NPS and must have regard to any matters they regard as important and relevant, including the National Planning Policy Framework (NPPF) and relevant adopted local development plan policies. In this regard, the primary policy framework comprises the National Networks National Policy Statement (NPS NN) and the secondary policy framework comprises the NPPF and relevant adopted local development plan policies.

3.2. National Networks National Planning Statement

3.2.1. The relevant designated NPS for the Scheme is the NPS NN (Department for Transport (DfT), 2024).

3.2.2. Table 3-1 summarises the policies that specifically relate to design in the NPS NN and maps them to the ten design principles in the Road to Good Design. This demonstrates that by following the ten design principles, this is consistent with the criteria for good design as required by the NPS NN.

Table 3-1: National Networks National Policy Statement for criteria for good design, mapped to the National Highways 10 principles of good road design

National Networks National Policy Statement (2024)	The Road to Good Design (Highways England, 2018)	
Policy	**Guidance**	**Key design requirements**
4.27 Applicants should include design as an integral consideration from the outset of a proposal. Applying good design to national network projects should not be limited to general aesthetics. High quality and inclusive design extends far beyond aesthetic considerations. The National Infrastructure Commission have developed four Design Principles: • Climate – mitigate carbon emissions and adapt to climate change. It includes opportunities to enable decarbonisation, incorporates flexibility, and builds resilience against climate change. The functionality of projects, including fitness for purpose, resilience and sustainability, is equally important. • People – helping to improve the quality of life for local communities. It promotes inclusion, cohesion and increases accessibility. It creates safe spaces with clean air that improve health and wellbeing. • Places – well designed infrastructure gives places a strong sense of identity, and through that forms part of our national cultural heritage. Creating a sense of place, connecting communities, addressing community severance and integrating into its surroundings. It makes a positive contribution to local landscapes within and beyond the project boundary. Good design enhances local culture and character and supports local ecology, delivering net biodiversity gain, while protecting wildlife corridors and irreplaceable natural assets and habitats. • Value - adding value by defining issues clearly from the outset. Good design also finds opportunities to add value beyond the main purpose of the infrastructure to consider the	Good road design makes roads safe and useful	Safety is fundamental to good road design; it is integral to both the usefulness of its function and the confidence of road users and their well-being. Good design creates safe roads which support and link to other wider imperatives, both nationally and locally, and that are fundamentally useful, meeting users' need for mobility effectively.
	Good road design is inclusive	Inclusive environments facilitate dignified and equal use by all. An inter-disciplinary design process involves and places people's needs and views at its heart, nurturing well-being and creating a shared sense of ownership of the road. All users and communities are considered carefully in order to reduce barriers to access and participation, particularly mindful of the most vulnerable.
	Good road design makes roads understandable	Easy to read, a good road is intuitive to use so as to be safe and efficient for all. 'Self-explaining roads' focus on the essentials and eliminate unnecessary and confusing clutter to make them legible, while responding to place and enhancing both environmental and economic outcomes.
	Good road design fits in context	The aesthetic quality of a road and its design in relation to the places through which it passes, is integral to its function and the experience of those that use it. Good road design demonstrates sensitivity to the landscape, heritage and local community, seeking to enhance the place while being true to structural necessities. It builds a legacy for the future.

National Networks National Policy Statement (2024)	The Road to Good Design (Highways England, 2018)	
Policy	**Guidance**	**Key design requirements**
wider benefits savings on cost, the environment, materials and space. It is efficient in the use of natural resources, sustainable materials and energy used in construction. 4.28 A good design should meet the principal objectives of the Scheme by applying the mitigation hierarchy to avoid, mitigate, or as a last resort compensate for the identified problems and existing adverse impacts, by improving operational conditions, simultaneously minimising adverse impacts and contributing to the conservation and enhancement of the natural, built and historic environment. A good design will also be one that sustains the improvements to operational efficiency for as many years as is practicable, taking into account economic, social and environmental impacts. 4.29 In light of this, Scheme design will be a material consideration in decision making. The Secretary of State needs to be satisfied that national networks infrastructure projects are sustainable, having regard to appropriate industry good design guidance, and that the applicant has considered, as far as possible, both functionality (including fitness for purpose and sustainability) and aesthetics (including the Scheme's contribution to the quality of the area in which it would be located). 4.30 Applicants should have regard to appropriate guidance and plans such as: local nature recovery strategies, Local Air Quality Action Plans, the Green Infrastructure Design Guide, the purposes and Management Plans of National Parks, National Landscapes, the Broads and any local design codes. For road Schemes, the Design Manual for Roads and Bridges contains design standards for motorway and all-purpose trunk road projects. 4.31 In their application, applicants should be able to demonstrate how the design process was conducted, effective engagement with communities and stakeholders and how the	Good road design is restrained	Functional, but responding positively and elegantly to the context, good road design allows for the expression of the character and identity of the places and communities through which a road passes. Good road design can enhance a sense of place and add to what we have inherited, particularly through the use of appropriate materials and traditions, but does not make unnecessary superficial or superfluous visual statements.
	Good road design is environmentally sustainable	Making an important contribution to the conservation and enhancement of the natural, built and historic environment, good road design seeks to achieve net environmental gain. It is multi-functional, resilient and sustainable, allowing for future adaptation and technical requirements, while minimising waste and the need for new materials.
	Good road design is thorough	The result of robust processes that create a continual cycle of improvement, good road design starts with an in-depth understanding of people, place and context; learning from best practice worldwide. The design of all elements of the road environment are considered together and integrated into a responsive design.
	Good road design is innovative	Responding positively to change, good road design captures opportunities for betterment and develops in tandem with emerging new technologies. Designing to a standard is not the same as achieving good design; an innovative and resourceful approach that is mindful of context is necessary to achieve better outcomes.
	Good road design is a collaborative process	Collaboration ensures roads are useful to and accepted by the communities they serve. Collaborative working

National Networks National Policy Statement (2024)	The Road to Good Design (Highways England, 2018)	
Policy	**Guidance**	**Key design requirements**
proposed design evolved to maximise design outcomes. Where a number of different designs were considered, applicants should set out the reasons why the favoured choice has been selected with a clear articulation of its benefits. The Examining Authority and Secretary of State should consider the ultimate purpose of the infrastructure and the operational, safety and security requirements which the design must satisfy. 4.32 Applicants should consider taking independent professional advice on the design aspects of a proposal, from the earliest design stage. A project board level design champion could be appointed, and a representative design panel used to maximise the value provided by the infrastructure. Applicants should also commission an independent design review of their proposal prior to planning. The Design Council can provide or signpost recommendations for this service.		requires a rigorous process that identifies dependencies and wider opportunities and facilitates effective communication and engagement from the start. Community engagement will be led by a local sense of culture, place and value.
	Good road design is long lasting	With quality materials and careful detailing, good road design brings lasting value. The design process requires sufficient time for challenges to be resolved before delivery and is adaptable to future needs and technologies as part of the commitment to whole-life operation, management and maintenance.

3.3. National Highways Safety Framework

3.3.1. The National Highways Safety Framework contains policies relating to the safety in design, construction and end use. These have also been considered in the Scheme design development.

3.3.2. Health, Safety and Wellbeing policy – Long-term ambition is that on one should be harmed when travelling or working on the strategic road network

- Throughout the Scheme design the project has been reviewed for the stages of design, construction and use to be as safe as reasonably possible.
- In line with these assessments mitigation measures have been outlined to inform of and manage the risks at each stage (for example traffic management during construction and installation of barriers for end users to protect from collision with roadside infrastructure)
- The Scheme stakeholders have been engaged throughout this process to aid in understanding and knowledge that the road has been developed with safety in mind

3.3.3. Requirements for safety risk assessment (GG104) (2018) - GG 104 sets out the framework for managing safety risks for customers, workers or other parties.

- Throughout the Scheme design development, the design has been assessed in line with DMRB GG104
- The safety assessment aids designers to review the design for customers, workers and other parties to influence how the design can be made safer
- These assessments and actions taken improve the safety of the Scheme development stages (construction and end use)

3.4. Local Policy Context

3.4.1. There are a number of local policy documents which are applicable to the Scheme. The following tables reference a number of application documents, which have informed the Scheme Design Report (**TR01066/APP7.4**). These are set out below.

Table 3-2: Coventry Local Plan (2017) policies

Policy	Summary	How this is addressed in the Scheme design
Policy GE1 Green Infrastructure	This states new development proposals should make provision for green infrastructure to ensure that such development is integrated into the landscape and contributes to improvements in connectivity and public access, biodiversity, landscape	ES Chapters 8 (Biodiversity) and 7 (Landscape and Visual Effects) (**TR010066/APP/6.1**) demonstrate how the Scheme protects and enhances habitats and landscapes and green infrastructure in its vicinity. ES Figure 2.4 (Environmental Masterplan) (**TR010066/APP/6.3**) details habitat creation as part of the Scheme. Table 8-17 of ES Chapter 8

Policy	Summary	How this is addressed in the Scheme design
	conservation, design, archaeology and recreation. Coventry's existing and planned network of green infrastructure should be used as a way of adapting to climate change through the management and enhancement of existing habitats. New development will be expected to maintain the quantity, quality and functionality of existing green infrastructure. Policy GE1 Green Infrastructure states *"2. New development proposals should make provision for green infrastructure to ensure that such development is integrated into the landscape and contributes to improvements in connectivity and public access, biodiversity, landscape conservation, design, archaeology and recreation."* GE1 also asks developers to consider flood risk management and improving surface water quality.	(Biodiversity) (**TR010066/APP/6.1**) details the change in habitat areas a result of the Scheme. The provision of highway infrastructure including space for future provision of a walking and cycling route is detailed in ES Chapter 2 (The Scheme) (**TR010066/APP/6.1**). The Scheme also includes a signalised pedestrian crossing of the B4082 at the Clifford Bridge Road roundabout to facilitate north-south movements to the eastern side of the roundabout for pedestrians. The retention of Hungerley Hall Farm accommodation bridge will provide enabling works for a future connection into the Coombe Abbey Park if this is progressed by others. This assessment evaluates the impact of the Scheme on walking and cycling routes which is presented in section 12.11 of ES Chapter 12 (Population and Human Health) (**TR010066/APP/6.1**). Water quality and flood risk are considered within ES Chapter 13 (Road Drainage and the Water Environment) (**TR010066/APP/6.1**), ES Appendix 13.1 (Flood Risk Assessment) (**TR010066/APP/6.3**) and ES Appendix 13.3 (Water Quality Assessment) (**TR010066/APP/6.3**).
Policy DE1 Ensuring High Quality Design	This policy seeks that all development proposals must respect and enhance their surroundings and positively contribute towards the local identity and character of an area. All development will be expected to meet several key principles including being proactive in responding to climate change and adopt sustainable and low carbon construction principles and minimise adverse impact on important natural resources.	This report demonstrates why the preferred option was chosen, taking into account environmental effects. With regards to landscape and visual effects, embedded mitigation measures and essential mitigation measures for this aspect have been developed as presented within Section 7.10 of the ES Chapter 7 (Landscape and Visual Effects) (**TR010066/APP/76.1**). These are shown on ES Figure 2.4 Environmental Masterplan (**TR010066/APP/6.2**). The environmental design has been developed to integrate the Scheme into the existing landscape setting with the use of hedgerows, woodland (roadside belts), individual trees and grassland areas. Mitigation measures of relevance are included within the First Iteration EMP (**TR010066/APP/6.5**) which is secured through the draft DCO (**TR010066/APP/3.1**). The Plan and Policies therewithin have been used to inform the baseline in section 10.8 of ES Chapter 10 (Material Assets and Waste) (**TR010066/APP/6.1**). Mitigation measures in line with these policies have been included in section 10.10 of ES Chapter 10 to promote the management of waste as a resource and reduce the amount of waste going to landfill.

Policy	Summary	How this is addressed in the Scheme design
		With regards to climate, the Scheme has been designed to prevent consequential impacts from adaptation measures. The adaptation measures have been discussed within the Design, mitigation and enhancement measures section in ES Chapter 14 (Climate) (**TR010066/APP/6.1**). An Outline Carbon Management Plan, Appendix B.8 of the First Iteration EMP (**TR010066/APP/6.5**) has also been submitted as part of the Application, it outlines the framework for managing and reducing the greenhouse gas emissions of the Scheme. This document outlines the project-specific context as well as the carbon quantification methodology, carbon target review and the development of carbon mitigation strategies, of which all are required to be implemented from the outset of project development/initiation.
Policy EM2 Building Standards	This policy requires proposed developments to acknowledge the need for conserving water and minimising flood risk including flood resilient construction.	This has been considered for flood risk within ES Chapter 13 (Road Drainage and the Water Environment) (**TR010066/APP/6.1**) and ES Appendix 13.1 (Flood Risk Assessment) (**TR010066/APP/6.3**).
Policy EM5 Sustainable Drainage Systems (SuDS)	All development must apply SuDS and should ensure that surface water runoff is managed as close to its source as possible. All development should carry out infiltration tests and a ground water risk assessment, including seasonal groundwater monitoring, to demonstrate whether infiltration is possible, and that ground water would not be polluted to Environment Agency and LLFA requirements.	This has been considered for water quality within ES Chapter 13 (Road Drainage and the Water Environment) (**TR010066/APP/6.1**) and ES Appendix 13.4 (Groundwater Assessment) (**TR010066/APP/6.3**). Climate change has been considered in the drainage design in accordance with DMRB and current government guidance. The details are in the Flood Risk Assessment (ES Appendix 13.1 (**TR010066/APP/6.3**) of ES Chapter 13 (Road Drainage and the Water Environment) (**TR010066/APP/6.1**).
Policy EM6 Redevelopment of Previously Developed Land.	Development will be permitted where proposals do not have a negative impact on water quality, either directly through pollution of surface or ground water or indirectly through the treatment of wastewater by whatever means. Developers and operators must provide adequate information when submitting their proposals so that the potential impact on groundwater resources and quality can be adequately assessed. Development will not be permitted within a groundwater Source Protection Zone 1 which would	This has been considered for water quality within ES Chapter 13 (Road Drainage and the Water Environment) (**TR010066/APP/6.1**), ES Appendix 13.3 (Water Quality Assessment) (**TR010066/APP/6.3**) and ES Appendix 13.4 (Groundwater Assessment) (**TR010066/APP/6.3**). A controlled waters risk assessment has been undertaken and is presented in ES Appendix 9.3 (Ground Investigation Report) (**TR010066/APP/6.3**). A Water Frameworks Directive (WFD) assessment has been undertaken and is presented in ES Appendix 13.2 (Water Framework Directive Compliance Assessment)

Policy	Summary	How this is addressed in the Scheme design
	physically disturb an aquifer.	(**TR010066/APP/6**.3). This assessment has been undertaken in accordance with the requirements of Environment Agency, Land Contamination Risk Management.

Coventry Connected Supplementary Planning Document (SPD) (2018)

3.4.2. The Coventry Connected SPD provides further guidance to support Policies LPAC1 – LPAC4 of the Coventry Local Plan (2017) and sets out Coventry's long term spatial vision for how the city will grow, develop and change and how this vision will be delivered through a strategy for promoting, distributing and delivering sustainable development in relation to accessibility. Overall, the objective of this SPD is to ensure that forecasted growth in Coventry can be achieved through a series of developments that support and enhance the city's transport network.

3.4.3. Its content has been taken into account in the Scheme design, the preparation of the Transport Assessment (**TR010066/APP/7.3**) and ES Chapter 12 (Population and Human Health) (**TR010066/APP/6.1**). In addition, in line with this SPD, an Outline Traffic Management Plan (**TR010066/APP/7.5**) is submitted with the application for this Scheme.

3.4.4. The Council's Local Plan is supported by a number of other SPDs in addition to the Coventry Connected document. The Health Impact Assessment (HIA) SPD is of particular importance to this SPD and the Scheme, health impacts of the Scheme are considered in ES Chapter 12 (Population and Human Health) (**TR010066/APP/6.1**).

3.4.5. The assessment in ES Chapter 12 (Population and Human Health) (**TR010066/APP/6.1**) considers the effects of the Scheme on land use, accessibility, development land and businesses (Section 12.11).

Table 3-3: Rugby Borough Council Local Plan 2011-2031 (2019) policies

Policy	Summary	How this is addressed in the Scheme design
Policy NE2 Strategic Green and Blue Infrastructure	Policy NE2: Strategic Green and Blue Infrastructure, discusses how new developments 'must provide suitable Green and Blue Infrastructure corridors throughout the development and link into adjacent strategic and local Green and Blue Infrastructure networks or assets where present.' Green and Blue Infrastructure refer to a strategic network of green and blue	The landscape design has been developed to integrate the Scheme into the existing landscape setting including the use of hedgerows, woodland (roadside belts), individual trees and grassland areas (see ES Chapter 7 (Landscape and Visual Effects) (**TR010066/APP/6.1**) and the Environmental Masterplan (ES Figure 2.4) (**TR010066/APP/6.2**)). It also links in with existing landscape assets such as Coombe Abbey Park.

Policy	Summary	How this is addressed in the Scheme design
	spaces, such as woodlands, parks, amenity landscaping, ponds, canals and rivers, and the links between them.	The creation of drainage features that are permanently wet, would be planted with native aquatic vegetation would provide additional habitat for common amphibians, aquatic invertebrates and fish.
Policy NE3 Landscape Protection and Enhancement	Landscape Protection and Enhancement requires new development to positively contribute to landscape character and consider the local distinctiveness of the different natural and historic landscapes and character, including tranquility and relate well to local topography and built form and enhance key landscape features, ensuring their long-term management and maintenance.	Visual impacts on the local landscape and townscape and its immediate setting should be considered and landscaping undertaken to reduce impacts. Impacts on the landscape have been considered during the Scheme design, which is described in the Scheme design Report (**TR010066/APP/7.4**). The impacts on the landscape have been assessed in the ES Chapter 7 (Landscape and Visual Effects) (**TR010066/APP/6.1**). The landscape design has been developed with the engineering and ecology design teams from the outset, to ensure its integration into the overall design. The landscape design has been developed to integrate the Scheme into the existing landscape setting and minimise visual intrusion. The environmental mitigation strategy also reinstates landscape features lost due to the Scheme such as replanting of hedgerows within the Scheme, new plantation woodland, as well as general enhancement of the landscape context wherever possible. It also links in with existing landscape and heritage assets, for example by providing isolated trees or small groups, along the road verge to tie into the wider former parkland estate character near to Coombe Abbey Park. The Scheme planting design uses native planting species which are potentially suited to our changing climate (wetter winters and dry summers) i.e. more wet and dry tolerant species for long term climate change resistance. The Environmental Masterplan (ES Figure 2.4 (**TR010066/APP/6.2**)) has been in conjunction with ecologists to enhance and improve local habitats. Refer to ES Chapter 8 (Biodiversity) (**TR010066/APP/6.1**) for further details of habitat improvements. Mitigation measures of relevance are included within the First Iteration EMP (**TR010066/APP/6.5**) which is secured through the draft DCO (**TR010066/APP/3.1**). It has been determined that the study area consists of four distinct local landscape character areas. For the purposes of this assessment these areas are defined as Project Landscape Character Areas (paragraphs 7.8.6 to 7.8.16 of ES Chapter 7 (Landscape and Visual Effects)

Policy	Summary	How this is addressed in the Scheme design
		(**TR010066/APP/6.1**)). The Landscape and Visual Impact Assessment (LVIA) considers likely significant landscape and visual effects within Section 7.11 of ES Chapter 7 (Landscape and Visual Effects) (**TR010066/APP/6.1**). Viewpoints have been agreed in discussion with Coventry City Council and Rugby Borough Council. Related design considerations are also presented in ES Chapter 2 (The Scheme) (**TR010066/APP/6.1**) and the Scheme Design Report (**TR010066/APP/7.4**).
Policy SDC1 Sustainable Design	Sustainable Design ensures that all development should demonstrate high quality, inclusive and sustainable design and new development will only be supported where the proposals are of a scale, density and design that responds to the character of the areas in which they are situated.	Landscaping impact is considered in ES Chapter ES Chapter 7 (Landscape and Visual Effects) (**TR010066/APP/6.1**). The local geology and contaminated land have been considered in ES Chapter 9 (Geology and Soils) (**TR010066/APP/6.1**). The baseline is described in Section 9.8 of ES Chapter 9 and Section 9.10 of ES Chapter 9 describes embedded and essential mitigation measures.
Policy SDC2 Landscaping	Policy SDC2: Landscaping states that the landscape aspects of a development proposal will be required to form an integral part of the overall design and a high standard of appropriate hard and soft landscaping will be required.	An Arboricultural survey has been undertaken and the retention of veteran and tree preservation order trees within the Scheme is reported in ES Appendix 7.4 (Arboricultural Impact Assessment) (**TR010066/APP/6.3**). Sustainable drainage features are created within the Scheme and allow the provision of wetland planting to create new habitats in the area. The Scheme planting design uses native planting species which are potentially suited to our changing climate (wetter winters and dry summers) i.e. more wet and dry tolerant species for long term climate change resistance. Visual barriers will be provided to minimise the visual impact on the surrounding area through woodland planting, individual/ groups of scattered trees or hedgerows, whilst enhancing the visual appeal and blend of the Scheme into the existing environment. An Outline Landscape and Ecological Management Plan (OLEMP) is included in the First Iteration EMP (**TR010066/APP/6.5**). The OLEMP has been prepared to help ensure the protection and management of landscape and ecological features, such as vegetation and habitats, during construction of the Scheme and the successful establishment of landscape and ecological mitigation including planting and seeding associated with the Scheme. The OLEMP would be updated to a Landscape and Ecological Management Plan (LEMP) and

Policy	Summary	How this is addressed in the Scheme design
		included within the Second Iteration EMP prior to commencement of works in accordance with Requirement 4 of the draft DCO (**TR010066/APP/3.1**)
Policy SDC3 Protecting and Enhancing the Historic Environment	This policy requires development to sustain and enhance the significance of the Borough's heritage assets.	The Scheme's impact on the historic environment is described in ES Chapter 6 (Cultural Heritage) (**TR010066/APP/6.1**). This ES Chapter fully assesses the impacts of the Scheme on the cultural heritage features. The cultural heritage features assessed within ES Chapter 6 are detailed within the baseline conditions in section 6.8. Further detail is provided in Appendix 6.1 Cultural Heritage Information (**TR010066/APP/6.3**). Mitigation measures are detailed in section 6.10 of this ES Chapter and the assessment of likely significant effects is detailed in section 6.11. Mitigation is also included in the Register of Environmental Actions and Commitments (REAC) contained within the First Iteration EMP (**TR010066/APP/6.5**). The First Iteration EMP will be developed into the Second Iteration EMP for implementation during construction and is secured by Requirement 4 of the draft DCO (**TR010066/APP/3.1**).
Policy SDC5 Flood Risk Management	This requires new developments to be located in areas with the lowest probability of flooding, in order to minimise the flood risk to people and property and manage any residual risk.	Flood risk management has been incorporated into the Scheme design as detailed in section 7.4 of this Scheme Design Report, ES Chapter 13 (Road Drainage and the Water Environment) (**TR010066/APP/6.1**) and ES Appendix 13.1 (Flood Risk Assessment) (**TR010066/APP/6.3**).
Policy SDC6 Sustainable Drainage	This encourages the use of sustainable drainage techniques to reduce the potential impact of flood risk and improve water quality. The developer will carry out infiltration tests where practicable and a groundwater risk assessment to ensure that groundwater will not be polluted.	This has been considered for water quality and flood risk within ES Chapter 13 (Road Drainage and the Water Environment) (**TR010066/APP/6.1**), ES Appendix 13.1 (Flood Risk Assessment) (**TR010066/APP/6.3**), ES Appendix 13.3 (Water Quality Assessment) (**TR010066/APP/6.3**) and ES Appendix 13.4 (Groundwater Assessment) (**TR010066/APP/6.3**).

Table 3-4: Rugby Borough Council Climate Change and Sustainable Design and Construction Supplementary Planning Document (SPD) (2023)

Policy	Summary	How this is addressed in the Scheme design
Policy SDC5: Flood Risk and Resilience Measures, a sequential approach to flood risk is	This means favouring applications in Flood Zones 1 (low probability of flooding), rather than in Flood Zones 2 and 3 (medium and high probabilities of flooding	This policy has been considered for flood risk within ES Chapter 13 (Road Drainage and the Water Environment) (**TR010066/APP/6.1**), and ES Appendix 13.1 (Flood Risk Assessment)

Policy	Summary	How this is addressed in the Scheme design
followed to ensure that development is located in the areas of lowest flood risk.	respectively).	(**TR010066/APP/6.3**).
Policy SDC6 Sustainable drainage states the use of SuDS can be used to manage surface water runoff on-site and also alleviate flood pressure elsewhere.	The policy sets out the requirements for providing SuDS as part of developments.	This policy has been considered for flood risk within ES Chapter 13 (Road Drainage and the Water Environment) (**TR010066/APP/6.1**), and ES Appendix 13.1 (Flood Risk Assessment) (**TR010066/APP/6.3**).

4. Principles of good road design

4.1.1. The Scheme design has given due regard to the 10 principles of good design which are outlined in DMRB GG 103 and The Road to Good Design 2018[4]. The guidance document states that good road design:

1) makes roads safe and useful
2) is inclusive
3) makes roads understandable
4) fits in context
5) is restrained
6) is environmentally sustainable
7) is thorough
8) is innovative
9) is a collaborative process
10) is long lasting

4.1.2. Each of the ten design principles have been taken into account in the design. Table 4-1 below sets out how the Scheme design reflects the ten design principles contained in the Road to Good Design. This has also been summarised briefly in the Case for the Scheme (**TR010066/APP/7.1**), and the NPS NN Accordance Tables (**TR010066/APP/7.2**), which provides an assessment of the Scheme against the designated NPS NN.

Table 4-1: How the design principles have been applied to the Scheme

Design principle	Description	How the design principles have been applied to the Scheme
1. Good road design makes roads safe and useful	*Safety is fundamental to good road design; it is integral to both the usefulness of its function and the confidence of road users and their well-being. Good design creates safe roads which support and link to other wider*	**Change in junction arrangement** The existing at-grade Walsgrave Junction is operating at over capacity and experiences congestion. Feedback from statutory consultation highlighted that it is difficult to access the roundabout from the B4082 due to congestion and the speed of traffic accelerating through the junction on the A46. This would reinforce the evidence that the majority of collisions recorded within the Scheme area are located at the existing roundabout.

[4] Highways England (2018) The road to good design (2018). [online] available at: https://www.gov.uk/government/publications/the-road-to-good-design-highways-englands-design-vision-and-principles

Design principle	Description	How the design principles have been applied to the Scheme
	imperatives, both nationally and locally, and that are fundamentally useful, meeting users' need for mobility effectively.	The Scheme will deliver a grade separated junction to the north of the existing Walsgrave roundabout. The B4082 will be extended to the new dumbbell arrangement with slip roads providing access to and egress off the A46. The new junction arrangement will provide improved safety for traffic wanting to leave or join the new A46 and remove the congestion generated by the at-grade roundabout. A road safety audit has been undertaken on the preliminary design by a third party. Recommendations arising from these audits have been considered by the design team and incorporated into the design where appropriate. **Pedestrian crossing** The findings from the Walking cycling horse-riding (WCH) surveys show that there are a notable number of unaccompanied minors crossing the B4082 near Clifford Bridge Road roundabout. Timings of these movements coincide with school hours. The existing crossing point that is used is an uncontrolled crossing to an island. The Scheme will provide a new signalised pedestrian crossing at this location to provide a safe crossing point on B4082. **Adjacent development** The alignment of the new B4082 hugs the A46 corridor in order to avoid Hungerley Hall Farm, but also to minimise land take to the west where the land is allocated for a housing development in the Coventry City Council Local Plan[5]. The development is somewhat dependent on the Scheme progressing with regards to the re-aligned B4082 and Junction for access to the new development. The roundabout has been designed to accommodate an additional future link, connecting to the University Hospital Coventry, an aspiration in Coventry City Council's Local Plan. The Scheme is 'useful' as it will: • improve safety and reduce collisions • help sustainable economic growth by supporting employment and residential development opportunities, particularly for the adjacent development land identified in the Coventry City Council's Local Plan • reduce delays and make journey times more reliable • improve amenities for pedestrians

[5] Coventry City Council Coventry Local Plan (2011-2031) [online] available at: https://www.coventry.gov.uk/planning-policy/coventry-local-plan-2011-2031 (last accessed March 2024)

Design principle	Description	How the design principles have been applied to the Scheme
2. Good road design is inclusive	*Inclusive environments facilitate dignified and equal use by all. An inter-disciplinary design process involves and places people's needs and views at its heart, nurturing well-being and creating a shared sense of ownership of the road. All users and communities are considered carefully in order to reduce barriers to access and participation, particularly mindful of the most vulnerable.*	**Active travel** Through early consultation with local authorities and local user groups it was identified that there is an aspiration to create a connection across the A46 to Coombe Abbey Park. Since the completion of the statutory consultation, structural surveys of the Hungerley Hall Farm accommodation bridge have been carried out and it has been found to be structurally sound. The Applicant proposes to retain the Hungerley Hall Farm accommodation bridge as part of the Scheme, and will continue to maintain the asset. Should the requirements for farm access change in future as a result of development in the area, the Applicant is open to discussing the future use of the bridge with any prospective applicant of Local Plan allocation H2:3 and Coventry City Council in regard to it's future use as an active travel route, at that point in time. **Inclusivity** The widened verge to the new B4082 is wide enough to accommodate a segregated cycleway and footway in accordance with Local Transport Note 1/20[6]. The new pedestrian crossing will be designed in accordance with DMRB CD 143.
3. Good road design makes roads understandable	*Easy to read, a good road is intuitive to use so as to be safe and efficient for all. 'Self-explaining roads' focus on the essentials and eliminate unnecessary and confusing clutter to make them legible, while responding to place and enhancing both environmental and economic outcomes.*	**Mainline** The new grade-separated junction will remove the final bottleneck on the A46 before the M6, creating a free flowing link and reducing the risk of congestion. **Signage strategy** A signage strategy has been developed that will provide clear and concise signage for users of the A46 and B4082. Signage clutter will be avoided wherever possible, for example by attaching signs to other highway assets such as street lighting columns. This will be developed at detailed design in conjunction with Coventry City Council. Some sign foundations will be increased in size to allow for future changes to sign faces due to the adjacent development.
4. Good road design fits in context	*The aesthetic quality of a road and its design in relation to the places through which it passes, is integral to its function and the experience of those that use it. Good road design*	**Integration with existing landscape** The A46 highway corridor through the Scheme extents is a largely rural landscape characterised by agricultural land use and Coombe Abbey Park, with Walsgrave located to the west of the Scheme. Further west the land is densely populated with seven schools within 2km of the junction, and University Hospital Coventry &

[6] Department for transport (2020) Local Transport Note 1/20 Cycle infrastructure design [online] available at: https://assets.publishing.service.gov.uk/media/5ffa1f96d3bf7f65d9e35825/cycle-infrastructure-design-ltn-1-20.pdf (last accessed March 2024)

Design principle	Description	How the design principles have been applied to the Scheme
	demonstrates sensitivity to the landscape, heritage and local community, seeking to enhance the place while being true to structural necessities. It builds a legacy for the future.	Warwickshire Coventry located approximately 1.2km to the north. Physical features in the immediate vicinity of the existing A46 corridor which contribute to the landscape character of the wider area include thick woodland belts and fields enclosed by hedgerows with mature trees. The landscape design (refer to the Environmental Masterplan (ES Figure 2.4 (**TR010066/APP/6.2**)) aligns with the design objectives to integrate the Scheme into the surrounding landscape character and minimise visual intrusion. The environmental mitigation strategy also reinstates landscape features lost as a result of the Scheme such as replanting of hedgerows within the DCO boundary and new plantation woodland, as well as general enhancement of the landscape context wherever possible. Summary of the design rationale: • Integration and reinstatement of landscape character: Restoring landscape features and characteristics lost during construction. Whilst ensuring that the design reflects baseline landscape and visual characteristics of surrounding area. Limiting gradients of earthworks on the Scheme to 1:3 where possible, and smoothly profiled cuttings and embankments will soften earthworks and help assimilate landform within the surrounding landscape. • Visual Screening Implement visual barriers to minimise the visual impact on the surrounding area through woodland planting, individual/ groups of scattered trees or hedgerows. Whilst enhancing the visual appeal and blend of the Scheme into the existing environment. • Design Mitigation Develop strategies to offset any loss of biodiversity by implementing mitigation measures to restore habitats lost through construction of the Scheme. Such as hedgerows with intermittent trees for Barn owls. • Species Protection Focus on the protection of species, such as Barn owls and bats. Create and preserve habitats that support and enhance local wildlife. Design elements adopted: • Hedgerows with/ without trees: Retains the local landscape character and helps avoid gaps in relation to bird strike and habitat corridors. Aids in screening Scheme from nearby footpath users. • Woodland belts / scattered trees: Helps recover the original landscape character that may have been lost due to the development of the Scheme. Aids integrating the Scheme into the surrounding environment by softening the transition between the natural and built environment.

Design principle	Description	How the design principles have been applied to the Scheme
		• Scrub Area: Helps promote biodiversity by providing varied habitats for different species. Discourages birds from foraging in long grass, though scrubland planting which can be beneficial in reducing risk of bird strikes and other wildlife-related incidents. • Ground Cover: Improves the aesthetic quality of the landscape, providing a green and lush appearance. Provides a low-maintenance solution that enhances the visual appeal of the Scheme. Ground cover supports local wildlife by providing food and shelter for small animals and insects. • Grass (various): Amenity grass areas are important for maintaining clear visibility and safe road conditions. Reduces the risk of accidents by preventing overgrowth that could obstruct sightlines. Grass land areas provide diverse habitats, supporting a range of flora and fauna. • Marginal Planting in Sustainable Drainage Systems (SuDS) Area: Helps to compensate for biodiversity loss due to the development of the Scheme. Creates additional habitats that support a variety of species. Enhances water filtration and retention, helping to manage stormwater and reduces flooding risks. **Integration with existing heritage assets** The Scheme bounds the grade II* Coombe Abbey registered park and garden, and the grade II listed Hungerley Hall Farm its associated grade II listed barn sit within close proximity of the works. Design measures adopted to ensure integration with, and enhancement of the existing heritage assets include: • Isolated trees or small groups, along the road verge tie into the wider former parkland estate character near to Coombe Abbey Park. • Specific mitigation measures in relation to Hungerley Hall Farm include a hedgerow with trees and a woodland belt in close proximity to the property and associated buildings. The proposed SuDS area at Hungerley Hall Farm landscape integration includes hedgerow planting with individual trees, scrub planting and different grassland habitats.
5. Good road design is restrained	*Functional, but responding positively and elegantly to the context, good road design allows for the expression of the character and identity of the places and communities through which a road passes. Good road design can enhance a sense of*	**Mainline alignment** The A46 alignment maintains as much of the existing road alignment as possible which reduces its visual intrusion to the area, as well as reducing carbon emissions generated by the works within the Scheme. By removing the existing at-grade roundabout the requirement for lighting the mainline has also been removed. **Grade separated junction**

Design principle	Description	How the design principles have been applied to the Scheme
	place and add to what we have inherited, particularly through the use of appropriate materials and traditions, but does not make unnecessary superficial or superfluous visual statements.	The new grade separated junction is designed to ensure that the height of the overbridge has been kept to a minimum, thereby reducing the visual intrusion of the junction on nearby receptors and receptors with far-reaching views. **Drainage** The majority of the carriageway and catchment surface runoff will drain to a retention pond or attenuation basin. These have been designed with shallow embankment gradients to appear less engineered and to assimilate into the surrounding landscape. The ponds will be permanently wet which will facilitate improved biodiversity supporting biodiversity net gain (BNG) targets.
6. Good road design is environmentally sustainable	*Making an important contribution to the conservation and enhancement of the natural, built and historic environment, good road design seeks to achieve net environmental gain. It is multi-functional, resilient and sustainable, allowing for future adaptation and technical requirements, while minimising waste and the need for new materials.*	**Planting design** The design approach to the new planting within the Environmental Masterplan (ES Figure 2.4) (**TR010066/APP/6.2**) ensures a measured balance of new planting with existing landscape, biodiversity and the built and historic environment. This includes: • suitably selected grass verges that are low maintenance and minimise height growth for visibility splays • biodiversity driven species rich grassland and habitat creation throughout the Scheme • appropriate mixes for tree, hedgerow and shrub planting to replace, compensate and mitigate for identified impacts within the environmental assessment • appropriate planting offsets from new and existing highway infrastructure such as drainage, fencing, lighting, bridges (concrete), etc and existing and proposed utilities **Environmental mitigation and enhancement measures** As part of the Environmental Impact Assessment (EIA) process design influence and mitigation / enhancement measures are integrated as early as possible. Continued dialogue and close working with the design team has ensured that, where possible: • environmental constraints have been avoided, such as residential receptors and existing vegetation / habitat • BNG has been maximised where possible, such as with the introduction of species-rich and marshy, wet grassland Integrating Scheme infrastructure (notably the elevated overbridge) with landscape planting design. Planting, once established, will reinstate the woodland belt landscape character present along the A46, the key driver in developing the design.

Design principle	Description	How the design principles have been applied to the Scheme
		Design changes to reduce carbon At options stage the carbon emission for the construction phase of the Scheme was anticipated to be approximately 44273.53 tCO_2e. The First Iteration EMP (**TR010066/APP/6.5**) includes an Outline Carbon Management Plan (Appendix B.8) which outlines the framework for co-managing and reducing greenhouse gas emissions in relation to the Scheme. A hierarchical approach to carbon management has been applied, i.e. build nothing, build less, build clever, build efficiently (as described in carbon management in infrastructure standard PAS 2080). Throughout preliminary design, a carbon opportunities log has been developed and populated, and workshops have been held with the discipline leads and the contractor to explore how carbon emissions can be reduced from the options baseline, both through construction operations and within the permanent Scheme design. Measures incorporated into the design following this process include: • reduction in overbridge cross section by the removal of the median • retention of the existing Hungerley Hall Farm accommodation overbridge to avoid demolition • removal of piles from bridge foundations • reduction in the extent of surfacing required within the Scheme • design speed of the B4082 reduced from 60mph to 40mph which reduces user emissions • ongoing engagement with the principal contractor to reduce the area of vegetation clearance, in particular the number of trees to be felled Carbon emissions for the construction phase of the Scheme are now calculated for the Scheme design are estimated to be 16,165 tCO2e. The use of the National Highways Carbon Tool to monitor and manage carbon will continue through Detailed Design.
7. Good road design is thorough	*The result of robust processes that create a continual cycle of improvement, good road design starts with an in-depth understanding of people, place and context; learning from best practice worldwide. The design of all elements of the road environment are considered together*	**Specialist driven design** The design process has included teams of professionals in a wide range of disciplines from engineers and modellers to contractors and legal advisors. The teams have undertaken an iterative process to explore innovative approaches to be included within the design. This has enabled flexibility to incorporate changes in the design, due to surveys, environmental assessment, consultation and design reviews to ensure design betterment. **Consistency in design with the Binley Scheme** The same Principal Contractor construction team that was involved on the Binley Scheme have been closely

Design principle	Description	How the design principles have been applied to the Scheme
	and integrated into a responsive design.	involved with the design development of this Scheme. Lessons learnt from site and design issues have been shared with the Walsgrave design team, where appropriate. Key design leads, such as geotechnics and structures, were also involved on the Binley Scheme which has brought local experience to the design team. Furthermore the liaison with National Highways Safety, Engineering & Standards and Operations Directorate teams has already been established through the Binley Scheme, which has created a collaborative working environment from the start. **Statutory and public consultation** In addition to statutory and non-statutory consultation with stakeholders and the public, preliminary design included in-depth consultation with environmental technical specialists, a wide range of statutory and non-statutory consultees and members of the public. As Coventry City Council will be owning and adopting the new B4082, regular meetings have been held with their technical teams to agree design details and specifications. All local authorities have been kept abreast of design decisions and have been consulted with in relation to environmental aspects of the Scheme. **Choosing by Advantage workshop** Once it was agreed to keep the Hungerley Hall Farm accommodation overbridge, a Choosing by Advantage workshop was held to discuss and agree the interface of the A46, B4082 and Hungerley Hall Farm. Feedback on the options was received from all disciplines, including environmental and traffic, in order to have a full understanding of the impacts that each option had. The agreed solution was to have a 1:2.5 slope (maximum) between the A46 and B4082 and a 1:3 slope towards Hungerley Hall Farm. The other options included retaining walls that would restrict planting and screening opportunities and increase maintenance requirements. A Choosing by Advantage workshop was also used to select the bridge substructure and super structure types.
8. Good road design is innovative	*Responding positively to change, good road design captures opportunities for betterment and develops in tandem with emerging new technologies. Designing to a standard is not the same as achieving good design; an innovative and resourceful approach*	**Badger crossing** Badgers currently use the Hungerley Hall Farm accommodation overbridge to cross the A46. In order to not sever access to their setts a Badger crossing will be provided under the B4082. Badger fencing will be provided to direct them to the crossing location. **Noise attenuation** The removal of the existing environmental bund to the east of the existing roundabout results in an impact on the SSSI of Coombe Abbey Park. A temporary noise barrier may be required during the construction phase to reduce the impact within the SSSI on the following

Design principle	Description	How the design principles have been applied to the Scheme
	that is mindful of context is necessary to achieve better outcomes.	species: breeding heron, wintering wildfowl including shoveler and breeding wildfowl associated with lowland open waters and their margins; wintering and breeding birds are also within the SSSI woodland. **GIS web app** A GIS web-based app has been used as part of the design process to collate and display Scheme specific information such as the design, survey locations and survey results. This has enabled efficient sharing of information between members of the environment Project team and helped to influence the design, due to the app being used to view, query or analyse the datasets. **Use of a video fly-through during statutory consultation** A video fly-through showing imagery of the completed was produced by the Project team and displayed at the statutory consultation. The fly-through allowed members of the public to understand what the Scheme would look like once operational.
9. Good road design is a collaborative process	*Collaboration ensures roads are useful to and accepted by the communities they serve. Collaborative working requires a rigorous process that identifies dependencies and wider opportunities and facilitates effective communication and engagement from the start. Community engagement will be led by a local sense of culture, place and value.*	**Collaboration between the Project team and with external stakeholders** An iterative design process has meant collaboration between all Project team disciplines from the outset. Regular discussions have been held between the design, environment, transport, and construction teams. Arcadis (Technical Assurance (TA)) have also attended meetings and calls to ensure the TA requirements are met. Weekly design decision calls have been held in order to agree a team decision on certain key aspects. The construction team from the Principal Contractor have been involved with each decision and provided invaluable construction and buildability advise. Regular collaborative planning meetings between the client, TA, Principal Contractor and design team have been held to assist in ensuring that the Scheme is on track and that each discipline is aware of other discipline activities and how they feed in to inform the design in different ways. An open dialogue with stakeholders has been maintained across the stages of the Scheme. As Coventry City Council will be owning and adopting the new B4082, regular meetings have been held with their technical teams to agree design details and specifications. All local authorities have been kept abreast of design decisions and have been consulted with in relation to environmental aspects of the Scheme.

Design principle	Description	How the design principles have been applied to the Scheme
		Other liaison with other statutory consultees such as Natural England and the Environment Agency has been arranged as necessary with good attendance. **Collaboration with The Applicant's Operations Directorate** Through experience on the Binley Scheme, regular meetings were arranged with National Highways Operations Directorate discipline leads to review the design proposals as they were developed. This has allowed the design to accommodate any additional maintenance or operational considerations. **Non-statutory and statutory consultation** Statutory and non-statutory consultation was undertaken during preliminary design to inform the design. These consultation periods included a series of landowner meetings, public events and individual meetings for consultees such as Statutory Environmental Bodies, facilitating engagement from numerous user groups. The consultation has gathered feedback on the design proposals as they progressed. A total of 229 responses were received and this feedback was analysed. No design changes were required to be made based on the consultation feedback, but design changes were made due to general design development and landowner engagement. **Adjacent developer** To the west of the Scheme is land that has been identified for housing development within the Coventry City Council Local Plan. The Applicant have held regular meetings with the developer to share information. As part of the Coventry City Council Local Plan allocation, the development will provide a blue light route to University Hospital Coventry from the Walsgrave dumbbell junction. To accommodate this, and to avoid unnecessary additional works in the highway, the western roundabout of the new dumbbell junction has been designed to accommodate a fifth arm into the new development.
10. Good road design is long lasting	*With quality materials and careful detailing, good road design brings lasting value. The design process requires sufficient time for challenges to be resolved before delivery and is adaptable to future needs and technologies as part of the commitment to whole-life operation,*	**Maintenance requirements** Regular meetings have been held with National Highways Operations Directorate to review the maintenance facilities. The following have been provided: • A maintenance layby on the A46 for the relocated VMS. • All three drainage features will have a maintenance access track • A direct access has been provided off the new B4082 to access the central pond (to be owned/maintained by the Applicant).

Design principle	Description	How the design principles have been applied to the Scheme
	management and maintenance.	• The southern detention basin will be accessed off the existing direct access to Hungerley Hall Farm (to be owned/maintained by the Applicant). • A gap in the planting has been provided from the new Hungerley Hall Farm access along the new drainage ditch to north of the new junction to access the northern pond (to be owned/maintained by the Applicant). Discussions will continue through the construction phase to ensure safe maintenance access is provided. **Planting strategy** The proposed environmental design planting strategy takes reference from the native plant species found in the surrounding area. Species include oak, birch, hawthorn and field maple. The inclusion of diversity within planting mixes will embed an aspect of resilience and adaptation for vegetation faced with increasing pest, disease and climate change threats. The planting strategy also acknowledges the character of existing vegetation, which typically consists of field boundary hedgerows with individual trees, and woodland plantations. The various Scheme planting types are consistent with DMRB defined elements and compatible with standard highway practices for long term operational maintenance and management. The ultimate outcome of using locally occurring native species, which replicate existing features, and which are maintained in a manner consistent with that of the wider highway network will contribute to consistency and integration of the proposals with their surroundings. **Structure** The new overbridge structure has been designed with due regard to the long-term maintenance requirements. The bridge has been designed as integral bridges thereby removing the requirements for articulated bearings which improves the durability of the structure and reduces maintenance requirements over the life of the structure. All structures have been designed to a design life of 120 years.

4.1.3. Universal good design is a balance and coordination of aesthetic, functional and technological considerations. The benefits and costs of the Scheme are combined to produce a benefit to cost ratio which informs an overall Value for Money assessment. A summary of the economic case for the Scheme is presented in the Case for the Scheme (**TR010066/APP/7.1**).

5. Scheme design process

5.1.1. Design reviews are an integral part of the process for delivering the 10 design principles in the Road to Good Design. National Highways has created an independent design review panel of built environment experts.

5.1.2. The review panel impartially evaluates Scheme design with a remit to constructively challenge design approach. The panel helps to deliver Schemes which benefit local communities and the environment. They provide Scheme specific observations and general recommendations that help National Highways put good design at the heart of network improvements.

5.1.3. At the Preliminary Design stage, a Design Panel was set up by the Project team. A Scheme briefing and site visit was carried out on 17 June 2024, with key attendees from the Design Panel and the Scheme Team in attendance. The Scheme briefing included a site walkover, panel discussion and presentation.

5.1.4. The Scheme Team received the Design Panel's confidential letter of advice on the 27 June 2024. A summary of the advice received and how the Project team responded to this advice is provided in Table 5-1 below.

Table 5-1: Design panel observations and design team responses.

	Design panel observation	Response
1	Advise that wider stakeholders be brought in to ensure you explore creating greater connections to the wider masterplan ambitions and town developments. These might include a greater collaboration with Coventry City Council, Rugby Borough Council, Coombe Abbey Country Park, and the developers responsible for future Schemes on either side of the A46.	The Scheme has met with stakeholders throughout the design process to incorporate local developments and collaborate on design development: • The design team have met regularly with Coventry City Council for the development of the B4082 with discussions between the specialists from both parties with the design considering requirements in the design for maintenance and local preferences. • The design team and National Highways have met with the housing developer regularly, building in consideration for the future site with inclusion of a passive WCH route, retention of the accommodation overbridge and enlarged roundabout for a potential blue light route. • The applicant is exploring opportunities to enable the mitigation wedge to the east of the A46 to potentially be part of the existing Coombe Abbey Park and SSSI.
2	Develop a compelling design narrative that clearly articulates the journey and purpose of this Scheme from beginning to end. This narrative should highlight the direct benefits for users and residents beyond the highway itself and refer to the housing and commercial Schemes that might come forward in the future. The	The Scheme has developed a design narrative suitable for the location and objectives which includes: Integration and Reinstatement of Landscape Character • Restoring landscape features and characteristics lost during construction. Whilst ensuring that the

	Design panel observation	Response
	Scheme should be able to increase a sense of local pride and better permeability into the neighbouring country park. A design narrative and vision should be the driving force behind any design considerations in the future, as we believe this Scheme, completing the development of the interventions on the east and south sides of Coventry, should be more ambitious in its design.	design reflects baseline landscape and visual characteristics of surrounding area. Visual Screening • Implementing visual barriers to minimise the visual impact on the surrounding area through woodland planting, individual/ groups of scattered trees or hedgerows. Whilst enhancing the visual appeal and blend of the Scheme into the existing environment. Design Mitigation/ Species Protection • Developing strategies to offset the loss of biodiversity by implementing mitigation measures to restore habitats lost through construction of the Scheme. Focusing on the protection of species, such as Barn owls, through specific mitigation measures of hedgerows with intermittent trees. As well as the creation and preservation of habitats that support and enhance local wildlife. The Environmental Masterplan, ES Figure 2.4 (**TR010066/APP/6.2**) utilises the National Networks National Policy Statement Good Design Criteria: • Integrated design team approach from outset of the Environmental Masterplan, working with various teams including but not limited to, Highways, Ecology, Heritage, Drainage, and Arboriculture. As such the Environmental Masterplan reflects our understanding of local context, heritage and the enhancement of local landscape character. • Visual appearance and integration of the design into surrounding landscape is a key factor in the development of the Environmental Masterplan to contribute to the quality of the surrounding area of the A46. Environmental design aims to *'meet the principal object of the Scheme'* through mitigation of identified issues afforded by the Scheme as such minimising adverse impacts. Reflecting the existing baseline landscape and visual characteristics as well as reduction in habitat loss.
3	Recommend that the project team embrace the Scheme's location, allowing it to influence design choices. This Scheme straddles two regions governed by different councils so it is essential that it seamlessly knits Coventry and Rugby and integrates the surrounding development aspirations. Establishing connections with key landmarks such as Tesco Superstore on Clifford Bridge Rd, University Hospital Coventry, and the Coombe Abbey Country Park is equally important	• The Scheme has been liaising with the adjacent developer for the allocated land west of the Scheme and will continue to do so through detailed design to accommodate the development's planning as it progresses. • The western roundabout is sized to enable future connection with the University Hospital Coventry through blue light route to be incorporated. • No direct connections with Tesco will be provided by the Scheme as it is outside the Order Limits and Scheme objectives. The design does not prohibit future provision developments.

	Design panel observation	Response
		• Improved pedestrian access across the B4082 will be provided at the Clifford Bridge Road roundabout with a signalised crossing. • Retention of the Hungerley Hall Farm accommodation overbridge and a widened verge allow for future WCH connections between Walsgrave and Coombe Abbey Park.
4	The proposed lack of support for active travel (WCH) is concerning; we suggest that further exploration is needed on how to encourage travel and nature networks, ensuring the Scheme supports the community effectively. We welcome the continued use of the existing farm bridge but given the allocation of 800 new homes in the Coventry Local Plan, we advise that additional pedestrian options be created to strengthen the east-west connection. We urge the project team to plan and draw these additional connections into the Scheme to ensure that they remain an ongoing agenda item. These connections should consider walking and cycling routes, without ignoring the need for ecological links across the highway.	A widened verge will be provided within the new B4082 to provide enabling works for a cycleway/shared use path to be delivered in the future by others, in conjunction with the adjacent development. Since the completion of the statutory consultation, structural surveys of the Hungerley Hall Farm accommodation bridge have been carried out and it has been found to be structurally sound. The Applicant proposes to retain the Hungerley Hall Farm accommodation bridge as part of the Scheme, and will continue to maintain the asset. Should the requirements for farm access change in future as a result of development in the area, the Applicant is open to discussing the future use of the bridge with any prospective applicant of Local Plan allocation H2:3 and Coventry City Council in regard to its future use as an active travel route, at that point in time.
5	On behalf of a Landscape and Visual Impact Assessment, we urge the team to identify landscape receptors that use the character of the existing place to help develop the design response further. We believe that the existing linear landscape can help tell the story of this Scheme by creating distinct characters for the two sides of the highway, highlighting the residential context to the west against the industrial land to the east.	The landscape design (see ES Chapter 7 (Landscape and Visual Effects) (**TR010066/APP/6.1**)) draws upon the existing woodland belt landscape character present along the A46. Reinstatement of this strong character language has been the key driver in developing the design in line with DMRB LA 117. The two sides of the A46 have been sensitively designed to reflect the current character and future proofing the landscape design. The design reflects the existing A46 landscape character at this point and allows for space for potential future access links for the local community. The design has been developed in close collaboration with the Scheme ecologists in terms of BNG, protection of wildlife (species/ areas/ corridors) and the conservation and creation of new habitats for local ecosystems/ ecology. The Environmental Masterplan, ES Figure 2.4 (**TR010066/APP/6.2**) key aspects include: • Along the Scheme's western boundary, there would be hedgerows with tree planting to reinstate the field pattern lost along the Scheme embankments' base. Woodland belts and scrub planting with scattered trees along the B4082 link road aim to integrate and screen the Scheme. • Specific visual mitigation measures relating to Hungerley Hall Farm would include hedgerow with trees to the rear with and a dense woodland belt

	Design panel observation	Response
		between the property and associated buildings A46 and B4082 link road. The proposed SuDS area at Hungerley Hall Farm offers landscape and visual integration and includes hedgerow planting with individual trees, woodland, scrub planting and different grassland habitats. • Along the Scheme's eastern boundary, hedge planting to reinstate field pattern lost along the embankments base, along with isolated trees along the road verge which tie into the wider former parkland estate character near to Coombe Abbey Park would be introduced. Note: due to the proximity of Coombe Abbey Park and the wider connections, the design is building upon these relationships, opposed to light industry located near Central Boulevard over 1.5km northeast from the Scheme.
6	Views: Enhance the road user experience by celebrating views from elevated roundabouts. Additionally, consider how these views change throughout the year, particularly in the winter when trees are more exposed, and views are more expansive.	As per detailed site work and demonstrated on the viewpoint images, there are no long-distance views from the Scheme as the existing topography is relatively flat. One of the key drivers of the Scheme is to screen the Scheme from nearby residential areas. Mitigation planting in relation to the grade separated junction would screen the associated roundabouts and traffic movements.
7	Biodiversity Net Gain: Before considering offsite mitigation, we urge the team to make the existing landscape work harder to meet the necessary 10% BNG target. As a national organisation, National Highways has the opportunity to set a strong precedent and provide guidance on how to respond to BNG requirements while celebrating its achievements.	The design team have maximised the opportunities within the Order Limits to meet the 10% BNG target. Offsite measures are not required. A Landscape and Ecological Management Plan (LEMP) will be developed during detailed design and will form part of the Second Iteration EMP. The Project team will continue to work with the local authorities through detailed design to ensure adopted landscaping and habitat areas will be maintained in accordance with the LEMP.
8	Planting: Further to meeting the BNG requirements, this Scheme should ensure that there's a mix of species on the road corridor and that maintenance is carefully considered. We note that there should be a strategy to address the ash dieback issue seemingly affecting a significant number of trees on site.	The planting palette has been developed in collaboration with National Highways Operations Directorate, Scheme ecologists and heritage consultants. For a full list of DCO application planting mixes – refer to Schedule of Planting Mixes on ES Figure 2.4 (Environmental Masterplan) (**TR010066/APP/6.2**) Planting palettes include: • Grassland • Woodland, trees, and shrubs • Planting areas • Hedgerows • Trees (individual) • Aquatic areas

	Design panel observation	Response
		A key aspect of the NPS NN Design Principles is sustainable development. It includes opportunities to enable carbonisation, incorporates flexibility, and builds resilience against climate change. The Schemes fitness for purpose, resilience and sustainability, is equally important and has been incorporated into the Scheme planting design which uses native planting species which are potentially suited to our changing climate (wetter winters and dry summers) i.e. more wet and dry tolerant species for long term climate change resistance. As well at detailed design reviewing alternative species in terms of non-native/ cultivars.
9	At the junction with B4082 where the highway is immediately adjacent to Coombe Pool SSSI, we recommend that planting efforts to the west side of the A46 borrow from the woodlands to the east. Similarly, we recommend planting more woodland on the large triangular land around that same junction. This would help more directly link the landscape design of this Scheme with the existing nature of the country park.	As per the Environmental Masterplan, ES Figure 2.4 (**TR010066/APP/6.2**), there are significant areas of woodland proposed to increase biodiversity and habitat creation across the whole Scheme, including environmental mitigation wedge next to Coombe Abbey Park. In specific regard to the Scheme junction (A46/ B4082) on the site of the former roundabout, a woodland block is proposed, surrounded by scrub land with scattered trees and grassland, as shown on the Environmental Masterplan. Specific woodland mixes to reflect Scheme locality have been used, such as increased in evergreen species/ larger broadleaved woodland types in closer proximity to Coombe Abbey Park.
10	Attenuation ponds: Ensure the pond design feels like a natural feature with ecological connectivity. While these sustainable drainage systems (SuDS) serve a practical function for this Scheme, they should benefit from a strong visual and ecological character.	As per the Environmental Masterplan, ES Figure 2.4 (**TR010066/APP/6.2**), which has been produced in collaboration with project ecologists and drainage teams National Highways and Coventry City Council. The aim of the SuDS area is to create additional habitats that support a variety of species and add value to local area by compensating for any biodiversity loss due to the development of the Scheme; while enhancing water filtration and retention, helping to manage stormwater and reduce flooding risks.
11	The lack of detail on certain elements of this proposal is holding the Scheme back from its maximum potential. Further detailed design concerning the new and existing bridges, typography, reducing traffic noise impact, and enhancing ecology is needed.	Detailed design will see the design team refine the structural design and any other environmental mitigation measure required by the Scheme. Enhancing habitats for ecology is already high on the design team's agenda and the landscaping proposals have been developed closely with the biodiversity team to meet the wider ecology mitigation and improvements.
12	Bridge Design: We recommend attempting to improve the efficiency of the required clearance for the bridge, in order to minimise the height required. Using more steel might allow for a shallower design, providing visual benefits and enabling a lower elevation. The efficiency of the bridge deck would also impact the	The bridge deck design has been reduced in depth as part of the preliminary design. A value engineering review was undertaken which established that the junction could be lowered by approximately 450mm which would reduce the fill required, Scheme footprint, visual impact and reduce retaining walls along the slip roads. The materials have been chosen with

	Design panel observation	Response
	amount of fill required and yield a greater design quality.	consideration to Scheme carbon impacts and more steel in the structure would be a negative impact. This change will be developed at detailed design.
13	Lighting: Consider whether lighting the slip roads is absolutely necessary. If so, we urge the team to begin designing what this will look like and the wider impact it will have. The Scheme should aim to minimise night light pollution, which could be explored with CGIs at the very least.	The lighting assessment has been carried out to DMRB TA501 which determined the lighting on the A46 carriageway was not required which has been removed compared to the options phase. This also reduces the need for additional materials to construct and lighting pollution in the environmentally sensitive areas. The assessment concludes lighting is required on the junction with consideration for the traffic use and location. The light pollution is under review and baffles will be considered during the detailed design development if required.
14	Signage: Further to the streamlined signage, we recommend that the team design the necessary access points to ensure that they are not compromised by possible delivery changes.	The Scheme incorporates maintenance accesses to signs which would need to be changed for future developments by others. The posts and foundation design has considered the future sign face sizes so that these would accommodate replacement faces.
15	Noise: With the expectation that a large housing development will be built to the west of the highway, we advise the team to proactively address concerns about noise pollution from road use.	Should the development to the west of the Scheme come forward it will be the responsibility of that development to implement any noise mitigation measures identified during the design and assessment of that development.
16	Sustainability: We have concerns about the imported fill required to achieve the proposed roundabout levels. As a suggestion, dropping the main carriageway might reduce visual impact and generate fill for raising the necessary areas. We also note that the proposal specifies the use of concrete and steel for construction. We recommend that the team consider the broader carbon impact of material choices and compare that against land infill requirements more holistically.	The Scheme will require imported fill to create the new junction, but dropping the mainline alignment will require a significant amount of the existing carriageway to be re-built. The Scheme has been designed based on the PAS 2080 carbon principals to avoid, reduce, etc. The extent of the pavement reconstruction has been reduced to the areas of the A46 that are affected by the works and this has reduced the Scheme carbon impacts. A Choosing by Advantage session was held to decide on the most appropriate structural solution which also included the impact on earthworks and carbon, which considers the principles of the NPS NN 4.27. Implementing the lower junction design, as per observation 12, would reduce the volume of fill required.
17	Futureproofing: While the team has planned for the road's usage up to 60 years into the future, we recommend considering how the details of the highway design will remain relevant and effective. For example, the A46 Binley roundabout which opened for traffic in 2022 has bollards that seem inappropriate	The bollards at the A46 Binley Scheme serve two purposes. A requirement to prevent vehicles striking the over bridge at the central pier was identified as part of the structural design process. A further requirement to prevent unauthorised camping was advised by Warwickshire County Council who the asset was handed over to.

	Design panel observation	Response
	for their primary purpose and detract from the Scheme's quality. Furthermore, understanding and anticipating how our British landscape might evolve is crucial for futureproofing this project and ensuring climate resilience.	We are engaging very closely with Coventry City Council on the design of the B4082 and will continue to do so through detailed design, to avoid unnecessary additions being requested during construction that do not reflect the design principles.
18	As the Schemes progresses, we encourage the team to consider collaborations beyond the delivery team. If the country park is council-owned, this relationship could be leveraged for strategic improvements beyond the highway. For example, the park might have a tree nursery that could supplement some of the needs of this Scheme. We also recommend collaborating with artists experienced with landscapes to further enhance the community link and sense of place.	We are in ongoing discussions with Coventry City Council about gifting them the environmental mitigation wedge that sits between the A46 and Coombe Abbey Park. This will assist Coventry City Council in their aspirations to expand the country park. The Principal Contractor will procure construction materials including vegetation and planting from local suppliers wherever possible.
19	We acknowledge that funding often creates a constraint to raising aspirations of infrastructure projects. That being said, we believe the suggestions made at this design review could largely be achieved without additional funds. If the project team feels further funds are needed, we recommend exploring Designated Funds. Additional considerations might be Section 106 funding on behalf of upcoming housing developments, tree planting grants from Forestry England, and grants from river trusts that might be operating in the area.	We will work collaboratively with Local Authorities and key stakeholders in exploring all opportunities for funding, including National Highways Designated Funds and other regional and national funding streams. We are currently working closely with Coventry City Council and the prospective developer in considering how S106 monies from any future development of the Hungerley Hall Farm by the Coventry City Council Local Plan allocation (H2:3) could be utilised in delivering aspirational elements of the Scheme, including transport and environmental improvements that the Scheme is unable to deliver through the DCO.

6. Geographical and Environmental Context

6.1. Geographical context

6.1.1. The Scheme is located approximately 5km to the east of Coventry city centre. The Scheme involves improvements to the B4082 which runs eastwards from Clifford Bridge Road to the existing A46 Walsgrave Junction. Binley Junction, located on the A46, is approximately 1.7km to the south of the existing Walsgrave Junction and the M6 and M69 junctions are approximately 2.5km to the north of the existing Walsgrave Junction.

6.1.2. The Scheme is situated within the Coventry City Council and Rugby Borough Council administrative areas, with the boundary located along the western side of the A46. Rugby Borough Council's administrative area also lies within Warwickshire County Council's administrative area, which share the same border with Coventry City Council.

6.1.3. The A46 is currently owned, maintained and operated by National Highways. The B4082 is currently owned by National Highways and maintained and operated by Coventry City Council.

6.1.4. To the west of the existing Walsgrave Junction, the area is densely populated with seven schools within 2km of the junction. University Hospital Coventry is located approximately 1.2km to the north, with the A46 serving as a blue-light (i.e., emergency services) route to the hospital.

6.1.5. To the immediate south-west of Walsgrave Junction is Smite Brook which is fed from Coombe Pool to the east. The land around Smite Brook is agricultural with areas of public open space, beyond which are residential areas.

6.1.6. A high voltage electricity line runs north-south on the western side of the A46, crossing the B4082 near Walsgrave Junction.

6.1.7. North of the existing junction the A46 is bounded on both sides by areas of agricultural land associated with Hungerley Hall Farm and Walsgrave Hill Farm. The farmland to the west is separated from Walsgrave by the River Sowe corridor and its associated floodplain.

6.1.8. Immediately east of Walsgrave Junction is Coombe Abbey Park, part of which includes Coombe[7] Pool SSSI and Coombe Abbey Grade II* Park and Garden/Conservation Area.

6.1.9. The key characteristics of the area are large irregular agricultural fields bound by gappy hedgerows and linear mature woodland belt and hedgerows along the

[7] Coombe is also spelt as Combe in some databases. For consistency, hereafter the spelling of Coombe will be used.

A46 verges. Overall, the A46 has a strong influence on the area in landscape character terms physically and perceptually by cutting through the agricultural fields on the eastern edge of Coventry near Hungerley Hall Farm.

6.1.10. The A46 and B4082 corridor boundaries are heavily vegetated on all approaches to the Walsgrave Junction, which quickly give way to farmland and public open space beyond. The exception is the section of road adjacent to Coombe Abbey Park where there is significant tree belt separating the road from Coombe Pool. This whole woodland is subject to a Tree Protection Order.

6.1.11. The Scheme involves realigning the existing A46 within the existing highway boundary. The new B4082 link will be sited within the farmland to the west of the Scheme and pass in front of Hungerley Hall Farm. The new dumbbell junction will be located approximately 800m north of the existing Walsgrave Junction. It will straddle the A46 with slip roads, roundabouts and associated embankments sited within farmland both sides of the A46, including the Green Belt to the east.

6.1.12. The Scheme layout avoids impacting the constraints of the River Sowe floodplain and the overhead powerlines. However, Hungerley Hall Farm will be located close to the new B4082, and works are needed to some trees within the SSSI.

6.1.13. The layout extents are shown in the General Arrangement (**TR010066/APP/2.6**).

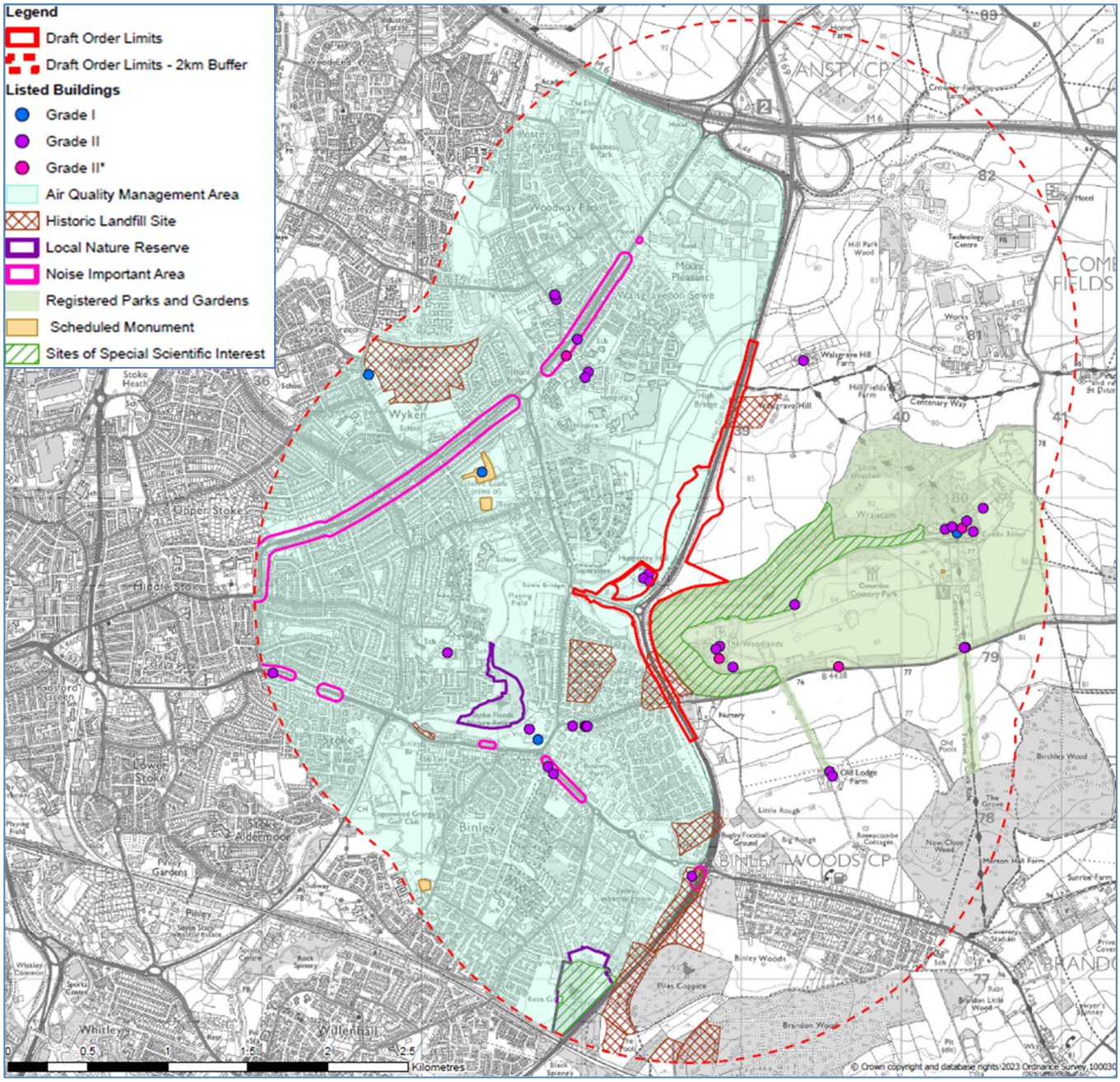
6.2. Environmental features and designations

6.2.1. Key environmental constraints are shown on the Environmental Constraints, ES Figure 2.3 (**TR010066/APP/6.2**) reproduced below as Figure 6-1, and includes:

- Coventry City Council citywide Air Quality Management Areas (AQMA), the boundary of which is immediately adjacent to the Scheme Order Limits.
- No noise important areas within the study area.
- Caludon Castle scheduled monument, located within the study area.
- The grade II* registered park and garden of Coombe Abbey Park conservation area, which forms the south-eastern boundary of the Scheme.
- Group of grade II listed buildings centred on Hungerley Hall Farmhouse including its associated granary, cowshed, stable range, barns, garden wall and yard.
- Coombe Pool Site of Special Scientific Interest (SSSI), which is partially within the Order Limits.
- Herald Way Marsh SSSI, located 1.6km south of the Order Limits and scoped into the ES assessment due to potential impacts upon the groundwater dependent terrestrial ecosystem
- Stoke Floods Local Nature Reserve (LNR) which has a direct hydrological connection with the Order Limits through the River Sowe and Smite Brook.

- Historic landfill sites located within the Order Limits and the study area.

Figure 6-1: Environmental constraints



7. Development of the Scheme

7.1. Introduction

7.1.1. Throughout the Options stage the need for the Scheme and options are reviewed. This is at a high level informing the route alignments and junction arrangements. Potential solutions are reviewed to take forward a selection with most potential for Options Selection.

7.1.2. The Options stage concluded in a non-statutory consultation where the public, community groups and statutory bodies can provide comments on the designs and feed into the process. This resulted in a preferred route announcement.

7.1.3. The route is developed at preliminary design covering design disciplines and environmental studies to take through the DCO. The design sets out sufficient detail to carry out a statutory consultation, land use, and boundary (Order Limits) to the Scheme.

7.1.4. Following the decision from the Secretary of State of the DCO application and order being confirmed, the Scheme will advance to the detailed design stage and commencement of construction.

7.2. Stage 2 Scheme design

7.2.1. The options stage optioneered designs and assessed their suitability to progress, these are detailed in ES Chapter 3 (Assessment of Alternatives) (**TR010066/APP/6.1**).

7.2.2. The parameters of the Scheme design were set by the selection of Option 11 as the preferred route. The options assessment is set out in the ES Chapter 3 (Assessment of Alternatives) (**TR010066/APP/6.1**).

7.2.3. Option 11 was selected due to its design featuring the following:

- Full movement junction between local roads and strategic network
- Junction layout improving A46 congestion
- Junction location outside of Environmentally significant areas
- A46 alignment within existing road corridor
- Continuous A46 carriageway with grade-separated junction

7.2.4. The key elements of the Scheme are summarised in paragraph 1.2.8 above and are described in detail in ES Chapter 2 (The Scheme) (**TR010066/APP/6.1**).

7.2.5. This section explains the rationale behind the features and how they have been developed from the design described in the Staged Overview of Assessment Report (SOAR), published alongside the non-statutory consultation in 2022. The

consultation materials are available on the Scheme website (https://nationalhighways.co.uk/our-roads/west-midlands/a46-coventry-junctions-upgrade/).

7.3. From the SOAR to 2023 Statutory Consultation design

Highways design

7.3.1. The proposed vertical realignment of the A46 mainline has been lowered to reduce the extents of works within the Scheme boundary. This results in avoiding works to a significant amount of the existing A46, which subsequently reduces traffic management and disruption to users. This change demonstrates good design principle for environmentally sustainable as there is reduced road reconstruction. Reducing the level of works required to the A46 mainline also results in a substantial reduction in the volume of materials required to deliver the Scheme and realise it's benefits. This has the benefits of minimising the use of natural resources and subsequent carbon emission related to construction.

7.3.2. The proposed western dumbbell roundabout has been designed to accommodate a future link road to the University Hospital Coventry. As stated within Coventry City Council's Local Plan[8], the delivery of the link road will be developed by others which will be collaborated with the Scheme as both plans progress. The design of the highway will therefore provide enabling infrastructure for creation of communities and increase future resident's access to services across Coventry and Rugby.

7.3.3. The existing B4082 has a speed limit of 60mph. Through discussions with Coventry City Council, it has been agreed to reduce the speed limit of the B4082 to 40mph, which will also benefit the future development land to the west of the Scheme.

Lighting

7.3.4. An assessment of the lighting requirement of the Scheme has been undertaken. It concluded that the A46 mainline does not require lighting, but lighting would be provided on the junction, on the slip roads and along the B4082. This reduces construction materials and light exposure to the natural environment making the Scheme environmentally sustainable and restrained to the good road design principles. It will also draw on less operational energy saving on carbon emissions compared to if the A46 was lit.

7.3.5. The lighting design reduces light levels across the Scheme in line with the DMRB and as observed by the design panel comment 13. At detailed design the

[8] Coventry City Council Coventry Local Plan (2011-2031) [online] available at: https://www.coventry.gov.uk/planning-policy/coventry-local-plan-2011-2031 (last accessed March 2024)

lighting will be developed with the potential for guards to be incorporated in the columns to reduce light spill from the roads.

Walking, cycling and horse riding

7.3.6. Initial consultation with local walking, cycling and horse riding (WCH) user groups and Coventry City Council identified an aspiration for a WCH link across the A46 to Coombe Abbey Park. To facilitate a potential future WCH link, the Scheme provides a widened western verge to the new B4082 which provides enabling works for a segregated/shared cycleway and footway. The delivery of the cycleway and footway would be by others in conjunction with the adjacent developments.

7.3.7. WCH surveys of the local infrastructure identified a notable number of WCH users crossing over the eastern arm of the Clifford Bridge Road roundabout at the uncontrolled crossing. Many of these movements were attributed to unaccompanied minors reflecting pupils making their way to and from school. To address the need for formalising this crossing, the Scheme provides a signalised pedestrian crossing at this location allowing greater connections between the communities of Binley and Wyken, especially school aged children walking to school in the local area.

7.3.8. The Scheme WCH plans have been considerate of the good road design principles being restrained for this stage of development while providing opportunities for being inclusive at appropriate time surrounding developments progress. The signalised crossing also considers the National Highways Health, Safety and Wellbeing policy making the road safer to cross for unaccompanied minors.

7.4. From 2023 Statutory Consultation design to DCO submission

7.4.1. The following changes have evolved from design development and are not in response to the Statutory Consultation, which was undertaken in the Autumn of 2023.

Structures

7.4.2. The findings of the structural surveys of the Hungerley Hall Farm accommodation overbridge confirmed that it was structurally sound and could be retained. The Scheme now includes the retention of the accommodation overbridge for use by Hungerley Hall Farm. This is both environmentally sustainable as demolition and new construction is removed from the Scheme and fits in context as the existing use of the bridge is continued.

7.4.3. There is scope at detailed design development to reduce the height of the junction as the deck depth has been optimised. As in the design panel observation 12 reducing the levels of the bridge and junction would reduce the

volume of imported fill and benefit the Scheme if it could be realised. This would reduce the use of natural resources and bring with it benefits to climate change through reduced carbon emissions related to diminished construction activities.

7.4.4. Since the completion of the statutory consultation, structural surveys of the Hungerley Hall Farm accommodation bridge have been carried out and it has been found to be structurally sound. The Applicant proposes to retain the Hungerley Hall Farm accommodation bridge as part of the Scheme, and will continue to maintain the asset. Should the requirements for farm access change in future as a result of development in the area, the Applicant is open to discussing the future use of the bridge with any prospective applicant of Local Plan allocation H2:3 and Coventry City Council in regard to it's future use as an active travel route, at that point in time.

Highways design

7.4.5. To access the retained Hungerley Hall Farm accommodation overbridge the vertical alignment of the new B4082 link road has been raised to allow for vehicular access from Hungerley Hall Farm. This would also allow give enabling works to a future WCH crossing of the B4082 should the WCH link to Coombe Abbey Park be delivered in the future.

7.4.6. A new access has been provided for Hungerley Hall Farm to access the retained accommodation overbridge. This will provide a more direct route to access fields to the east of A46 to avoid farm vehicles travelling from the existing Hungerley Hall Farm access road.

7.4.7. The embankment slopes to the new B4082 in front of the Hungerley Hall Farm have been reduced to 1:3 slopes to allow planting on the slopes for screening to the property. This design is environmentally sustainable as it supports landscaping growth and fits in context with the surrounding feel of the Scheme.

Drainage

7.4.8. The development of the drainage design has resulted in the northern drainage attenuation basin and its maintenance access being significantly reduced. The associated drainage catchment connects to the central attenuation basin, which has increased slightly to accommodate this additional flow.

7.4.9. A smaller pond has been introduced in place of the drainage basin to meet water quality requirements for the road drainage discharge to the watercourse. This design realigns the existing field drainage discharge and creates a new discharge point for the road drainage outfall.

Flood risk

7.4.10. The development of the hydrology models has identified a need for an environmental bund along the eastern boundary of the new A46 mainline north of the Smite Brook culvert. The bund will increase the road resilience as it is protected from a 1:100 year storm event plus climate change. The permanent bund will replicate the existing bund profile and not encroach into the existing flood zone to be environmentally sustainable and provide specific protection to the road and local area from flooding.

7.4.11. The works required to construct the new environmental bund will be close to the Coombe Pool SSSI boundary and will impact the root protection zones of a few trees within the SSSI, and will require some trees to have the canopies raised. The Order Limits have been adjusted to accommodate these works within the SSSI. During detailed design the Scheme will further review the works to confirm the impact on retained trees. Further details of the tree protection works can be found in the Arboricultural Impact Assessment, ES Appendix 7.4 (**TR010066/APP/6.3**).

Fencing and barriers

7.4.12. The boundary fence to the Coombe Pool SSSI is in a poor state of repair and the Scheme will look to repair the fence, or replace like-for-like, where works are in close proximity to the boundary fence. Works will involve placing protective matting over root protection zones of trees located within the SSSI, and works will be required within the SSSI. The Order Limits have been adjusted to accommodate these works within the SSSI. Further details of the tree protection works can be found in the Arboricultural Impact Assessment, ES Appendix 7.4 (**TR010099/APP/6.3**).

7.4.13. In accordance with DMRB standards, appropriate safety barriers (Road Restraint Systems) have been included where required by the outcome of a risk assessment. As part of the design development this is also in line with the good road design principle for making roads safe and useful.

Signage

7.4.14. A signage strategy has been completed for the Scheme to inform the overall design. The strategy has been designed to be compliant with national guidance including the DMRB and Traffic Signs Manual and is how the road will be made understandable for users.

7.4.15. The signage design has been developed with consideration the future developments by others post Scheme construction. As design panel comment 14 allowance has been made to the post and foundation designs so that changes to the sign faces should not require post and foundation replacement.

7.4.16. A new variable message sign and gantry will be installed on the A46 within the new junction on the northbound verge on the approach to the junction bridge. This will replace an existing sign and gantry that will be impacted by the Scheme located within the new northbound merge.

Environmental

7.4.17. Surveys of the area have identified the need for a Badger crossing beneath the B4082 to maintain foraging routes. The Scheme provides a large buried pipe and associated fencing to direct Badgers to the crossing point and across the existing accommodation overbridge between the fields. This has been designed in accordance with LD 118.

7.4.18. Mitigation measures will be integrated into the design of the proposed Scheme to reduce identified landscape and visual effects. Mitigation design proposals will utilise Highways England (2020) DMRB LD 117 Landscape Design guidance.

7.4.19. An environmental masterplan identifies the main areas where planting is likely to be required to mitigate potential landscape and visual effects and to address ecological objectives and make the Scheme environmentally sustainable. Mitigation measures will seek to reduce impacts during both construction and operation phases and residual effects will be presented in the ES. Further details of the can be found in ES Chapter 7 (Landscape and Visual Effects) (**TR010066/APP/6.1**) and the Environmental Masterplan, ES Figure 2.4 (**TR010066/APP/6.2**).

Construction

7.4.20. At statutory consultation a haul road from the existing B4082 and behind Hungerley Hall Farm was presented. Construction access for the works was changed to be accessed along the existing section of the B4082, A46 and the new B4082 in front of Hungerley Hall farm. This contributes to the NPS NN Places principal to protect assets part of cultural heritage. The Order Limits have been adjusted to accommodate this revised construction methodology.

7.4.21. A satellite compound within the Order Limits will be used to construct the bridge deck offline.

8. Structures design

8.1. Overview

8.1.1. There is one new bridge at the new Walsgrave Junction in the Scheme shown on the Engineering drawings (**TR010066/APP/2.5**). There are also existing structures within the Scheme extents which are retained, these are Smite Brook culvert and Hungerley Hall Farm accommodation overbridge.

8.1.2. An existing gantry is removed and replaced as part of the Scheme shown on the General Arrangement (**TR010066/APP/2.6**).

8.2. Walsgrave Junction bridge

8.2.1. A new bridge (S01) that forms part of the new grade separated junction connecting the B4082 with the A46. This would be a single span integral bridge of approximately 34.2m. It carries two lanes of traffic between two roundabouts either side of the A46. The superstructure will be comprised of 6No plate girders in weathering steel with a composite reinforced concrete deck slab.

8.2.2. The abutments to the bridge will be formed of reinforced soil blocks and wing walls which have been designed to reduce the excavation depths and use of piles given the ground materials and groundwater levels.

8.2.3. The bridge design was developed with a choosing by advantage workshop involving all disciplines with a collaborative and innovative approach in line with 'Good Design' principles. The workshop assessed options for material, carbon, buildability, environment, safety and programme to determine the above solution. The materials have been chosen as weathering steel and concrete deck which results in a slender profile keeping the overall junction height as low as possible with less visual impacts fitting in with the context of the surrounding area. The construction can be offline in the satellite compound making it safer for workers and road users as there is minimal construction over the carriageway.

8.3. Hungerley Hall Farm accommodation overbridge

8.3.1. Hungerley Hall Farm Accommodation Overbridge is an existing private accommodation overbridge which crosses the A46 mainline north of the existing Walsgrave Junction roundabout. The bridge is a continuous two span post-tensioned concrete bridge. It is square in plan and symmetrical about the central pier with each span measuring 26m.

8.3.2. At the end of Option finalisation, the recommendation was that the bridge was to be demolished. However, as part of A46 Walsgrave Scheme preliminary design stage, a structural survey was undertaken which confirmed the structural

integrity of the bridge. It is currently proposed to retain the bridge in its current capacity as a farm accommodation overbridge.

8.3.3. Retaining the existing accommodation bridge meets the four design criteria for good design in the NPS NN paragraph 4.27. It removes demolition saving on carbon emissions and use of new materials to construct a new structure and provides a potential structure to facilitate the delivery of a new pedestrian route in the future. Retaining existing allows Badgers to continue to use the bridge as a crossing point between fields with fencing providing to guide them under the B4082 safely. The outline cost is reduced as new materials and construction is not required.

8.4. Smite Brook mainline culvert

8.4.1. Smite Brook Mainline Culvert is a single span reinforced concrete box culvert for Smite Brook beneath the A46. This is immediately to the south of the existing Walsgrave Junction.

8.4.2. A structural review was undertaken which concluded that there is no impact to the structure by the proposed Scheme.

8.4.3. Retaining the existing culvert meets the design criteria for good design as it removes the need for demolition, saving on carbon emissions and use of new materials to construct a new structure. Assessment of the structure has concluded it is not impacted by the A46 design. The outline cost of the Scheme is restrained as new materials and construction is not required, as it retains the existing use and space. The design and construction have accommodated it with consideration to works in the vicinity.

8.5. Sign gantry

8.5.1. The existing variable message sign (VMS) gantry No. 35 will be demolished as part of the new junction construction as it is located where the new junction northbound slip road will join the A46 carriageway.

8.5.2. A new structure is proposed consisting of a steel cantilever gantry supported on a reinforced concrete pile cap founded on in-situ bored pile. It spans over the verge of the northbound carriageway of the A46 mainline, south of the proposed new Walsgrave Junction.

8.5.3. The inclusion of the gantry and location is in line with the Good Road Design principles. The messaging sign will inform road users of any incidents on the road or general safety information, a departure is approved in principle for location as positioned within the proposed Junction to give enough warning of the next section of road.

9. Drainage Design

9.1. Overview

9.1.1. The drainage design utilises the existing infrastructure where possible. There are three new drainage features (pond or basin) with outfalls to the existing drainage network or at two new discharge points to watercourses.

9.1.2. The drainage networks are split between the B4082 which will be owned and maintained by Coventry City Council and the A46 owned and maintained by The Applicant.

9.1.3. The drainage design for the Scheme is explained in outline in this section. For further information and assessment of the impacts of the design, refer to the Drainage Strategy Report, ES Appendix 13.6 (**TR0100966/APP/6.3**).

9.2. Existing drainage

9.2.1. Where possible, existing drainage will remain in place at the tie-ins with the existing A46 and B4082. Drainage ditches will be maintained where possible to allow existing flow routes to continue and new sections may be implemented to maintain the operation of the drainage on the existing A46 and B4082.

9.2.2. Where existing drainage directly discharges to streams not taking any increased road run-off from the Scheme, these outfalls will remain in place.

9.2.3. The existing drainage network was surveyed and by retaining existing outfall points and connecting into the existing network where possible the Scheme reduces demolition, saving on carbon emissions and use of new materials to construct a new networks and outfalls.

9.3. Drainage features

9.3.1. An attenuation basin, and two ponds are included in the design. These will receive surface water discharges from the A46 and B4082 and will discharge to the River Sowe, via existing outfalls, as shown on the Engineering Drawings and Sections (**TR010066/APP/2.5**):

- Southern detention basin – This will take drainage from the B4082 and be situated near the Hungerley Hall Farm access. The design of the pond is shaped around the existing pylon and hedgerow remaining alongside the B4082 being retained.
- Central pond – This will take the drainage from the A46 and Walsgrave Junction and is located between the B4082 and A46 carriageways. This pond combines the Stage 2 two ponds into a single pond for the purpose of road drainage and is to be permanently wet.
- Northern pond – The pond is designed to improve water quality from the A46 road drainage network before discharging to the watercourse improving the

Scheme environmental sustainability. The pond takes existing road drainage separated from field drainage which then combine to a single outfall.

9.3.2. The drainage features will be designed to accommodate a rainfall event of 100-year return period with 20 percent climate change, and a 300mm freeboard. A sensitivity test will be undertaken to ensure that the proposed basin does not flood in a 40 percent climate change event. This approach to design will aid the SRN resilience to climate change.

9.4. Flood impacts

9.4.1. There are flood zones associated with Coombe Pool, Smite Brook and the River Sowe.

9.4.2. The permanent footprint of the Scheme sits outside these flood zones, but works near Coombe Pool will require temporary works within Flood Zone 2 and 3 to construct the environmental bund.

9.5. Structure drainage

9.5.1. Deck drainage will be provided on the overbridge with a combined kerb drainage system. For the reinforced soil walls and wing-walls, back of wall drainage will be provided as necessary and connect to the highway drainage network.

9.6. Carriageway drainage

9.6.1. The A46 proposed drainage system will include:

- Combination of gullies, surface water channels and filter drains. The run-off would then be conveyed to the outfalls via a combination of carrier drains, ditches and attenuation basins
- Filter drains are provided at the toe of any cuttings along the mainline and will collect run-off from the slopes or carriageway
- Central reserve drainage is provided with triangular surface water channels, which will be provided where the road is in super-elevation
- Toe drains, where required draining embankments greater than 1.5m in height, will drain via ditches or along existing surface water pathways to a watercourse

9.6.2. The B4082 proposed drainage system will include:

- Gullies conveyed to the outfalls via a combination of carrier drains, filter drains and a detention basin
- Filter drains are provided at the toe of any cuttings along the mainline and will collect run-off from the slopes or carriageway
- Toe drains, where required draining embankments greater than 1.5m in height, will drain via ditches or along existing surface water pathways to a watercourse

9.6.3. Treatment will be provided in the form of filter drains, ditches and attenuation basins and ponds.

9.6.4. The water quality at the outfall will be assessed in line with guidance stated in LA 113. The 'Highways England water risk assessment tool' (HEWRAT) assessment identified the outfall SP3880_4708a (modelled as Network 'A46 - Part 3') as failing the assessment, so in order to provide mitigation a small pond feature was included which provides interception and treatment to improve the water quality. This will require a new headwall outfall into the existing ditch, opposite the existing highway drainage outfall (which will be removed). The works to install this feature will have a long-lasting impact on improving the water quality to the watercourse and is an environmentally sustainable option.

10. Environmental Design

10.1. Overview

10.1.1. The Scheme has been developed taking account of environmental assessments and appraisal throughout its progression. The ES (**TR010066/APP/6.1**) sets out the full assessment of the Scheme as well as the need for design, mitigation and enhancement measures where there are identified effects. The first option in mitigating any impact is to seek design measures that would enable the impact to be avoided or, if this is not possible, reduced. This is referred to as embedded mitigation and includes measures such as changing the road's horizontal and vertical alignment, reducing the temporary and permanent footprint of the Scheme and altering construction methods.

10.1.2. The landscape design has been undertaken in accordance with 'Good Design' to enhance local culture, character, supports local ecology, delivering net biodiversity gain, while protecting wildlife corridors and irreplaceable natural assets and habitats.

10.1.3. The proposed landscaping integrates with the existing landscape setting and character areas, and by improving and enhancing biodiversity habitats and connectivity. The impact of the Scheme on existing ecological and heritage features has been mitigated where possible by improving habitats, providing screening and connecting the planting into existing features.

10.1.4. The Scheme delivers at least 10% BNG on-site along the proposed road corridor and within the mitigation wedge, exploring with stakeholders to provide an expansion to the existing SSSI this contributing to the enhancing irreplaceable habitats. Badger tunnels and retention of the accommodation bridge will also protect wildlife corridors.

10.2. Mitigation design

10.2.1. The environmental mitigation identified for the Scheme is defined in each of the chapters of the ES (**TR010099/APP/6.1**). The relevant chapter section relating to mitigation is presented in Table 10-1 below along with a high level summary of the proposed design mitigation:

Table 10-1: Environmental mitigation references from the ES (**TR010066/APP/6.1**)

Environment Statement reference	High level mitigation summary
Chapter 5 – Air Quality (section 5.10)	• Development of dust management plan with measures to monitor effectiveness of mitigation • Daily on site and off site inspections • Record of complaints/exceptional dust events
Chapter 6 – Cultural Heritage (section 6.10)	• Vibration monitoring for the Grade II Listed barn at Hungerley Hall Farm • Written, photographic and drawn record of the Listed yard wall at

Environment Statement reference	High level mitigation summary
	Hungerley Hall Farm, prior to construction • Landscaping around Hungerley Hall Farm to screen the Scheme and to preserve as much rural character within its setting as much as practicable • Protocols to manage unexpected archaeological finds, survey and trial trenching reports for quick reference
Chapter 7 – Landscape and Visual Effects (section 7.10)	Integration and Reinstatement of Landscape Character • Restoring landscape features and characteristics lost during construction. Whilst ensuring that the design reflects baseline landscape and visual characteristics of surrounding area. Visual Screening • Implement visual barriers to minimise the visual impact on the surrounding area through woodland planting, individual/ groups of scattered trees or hedgerows. Whilst enhancing the visual appeal and blend of the Scheme into the existing environment. Design Mitigation/ Species Protection • Develop strategies to offset the loss of biodiversity by implementing mitigation measures to restore habitats lost through construction of the Scheme. Focus on the protection of species, such as Barn owls, through specific mitigation measures of hedgerows with intermittent trees. As well as the creation and preservation of habitats that support and enhance local wildlife.
Chapter 8 – Biodiversity (section 8.10)	• The Scheme design and working areas have been kept to a minimum to reduce habitat loss with habitat temporarily lost to construction works focused on less ecologically valuable habitat such as the arable land within the Order Limits. • The Environmental Masterplan (ES Figure 2.4 (**TR010066/APP/6.2**)) has been designed to be appropriate to those habitats lost whilst also providing more ecologically valuable habitat in some cases (e.g., in place of cereal crops) and be composed primarily of native species and species recognised of being of higher benefit to pollinators and birds with regards to food sources. • Habitat creation would include species-rich grassland, woodland, scrub, native hedgerows with trees, wet grassland and tree planting. • An area within the Order Limits to the north-east of the existing junction will be used for mitigation woodland planting to mitigate for loss of woodland due to the Scheme. • Habitat connectivity along the Scheme would be achieved through the creation of native hedgerows and tree lines along the verges created as a vegetative screen and to maintain the local landscape character of the area
Chapter 9 - Geology and Soils (section 9.10)	Environmental management procedures and appropriate waste management • Ensuring adequate space for storage of topsoil and subsoil which must be segregated during excavation • Protection of watercourses from entry of polluting matter • Stripping, storing and reinstating of soils using best practice measures to minimise the risk of degradation to soils • The key principle considered to minimise effects on soils is to ensure that the footprint of the Scheme is reduced as much as practicable,

Environment Statement reference	High level mitigation summary
	without adversely affecting the design.
Chapter 11 – Noise and Vibration (section 11.10)	Noise • Temporary barrier to Coombe Abbey Park during construction Vibration • An instrument monitoring system for periods when works are in proximity to the Hungerley Hall Farm barn structures • Thresholds set to trigger inspections and/or halting works
Chapter 12 – Population and Human Health (section 12.10)	• Liaison with stakeholders • Traffic management plan • Enhanced WCH features with new signalised crossing and widened verge for future provision • Landscaping in keeping with environmental area
Chapter 13 – Road Drainage and Water Environment (section 13.10)	Road Drainage • Filter drains • Detention basin • Attenuation pond Water Environment • Lined filter drains if within ground water levels • Environmental bund to Coombe Pool
Chapter 14 – Climate (section 14.10)	Structures • Bankseat abutment • Existing accommodation overbridge retained Pavement • Lower strength concrete
Chapter 15 – Cumulative Effects	Maintenance of mitigation such as planting and seeding will continue for a period of five years post construction.

10.2.2. A triangular shaped area of land to the east of the A46 immediately north of Coombe Pool SSSI has been proposed by the Applicant for the planting of new trees to directly replace those lost elsewhere within the Order Limits. The location has been chosen as it provides the greatest opportunity for habitat connectivity with the SSSI and associated woodland habitats, so is the most suitable location to replace the habitat types being replaced. Early discussions with Coventry City Council have been held to discuss this mitigation area being managed as part of the Coombe Abbey Park site. The Applicant has considered an alternative site to the south of the realigned B4082, and considers the area proposed within the application more appropriate and provides greater benefits.

11. Construction

11.1. Overview

11.1.1. The approach to construction described below is indicative but it is representative of the likely approach to be adopted. Further provisions in relation to construction of the Scheme are provided in the First Iteration EMP (**TR010066/APP/6.5**).

11.2. Land required for the Scheme

11.2.1. The powers to compulsorily acquire the land required permanently and to use land temporarily to deliver the Scheme are being sought by the Applicant through the DCO.

11.2.2. Temporary and permanent land requirements have been identified through a combination of the design-development, environmental assessment, buildability advice from Octavius (the Applicant's appointed Principal Contractor) and through engagement with landowners that would be affected by the Scheme. The Land Plans identify the required land (**TR010066/APP/2.2**).

11.2.3. The Order limits and land use have been reviewed following Statutory Consultation for the DCO design. The usage has changed as the Scheme reduced working areas to the east of the A46, made adjustments to alignments to reduce land where possible, and refined the areas for landscaping and environmental mitigation.

11.2.4. Land requirements include:

- 34.66 hectares (ha) of permanent land take for operation of the Scheme (18.36 ha of land is already owned by National Highways to be used permanently for the Scheme)
- 1.95 ha of temporary land take for construction
- 0.02 of permanent acquisition of rights over land
- The total area within the Order Limits is therefore 36.63 ha.

11.3. Construction programme

11.3.1. The indicative construction programme for the Scheme has been informed by Octavius as National Highways appointed Principal Contractor, although some aspects are likely to be refined during the detailed design stage.

11.3.2. The impacts of construction activities are considered in each chapter of the ES (**TR010066/APP/6.1**). Standard best practice construction techniques that will be adopted are set out in the First Iteration EMP (**TR010066/APP/6.5**).

11.3.3. Construction is anticipated to take approximately 22 months. This would be carried out in phases, so not all sections of the Scheme would be under construction for the full period.

11.3.4. The proposed phases of construction are set out in Table 11-1 (Construction phasing programme).

Table 11-1: Construction phasing programme

Works Phase	Duration	Summary of construction activities
Pre-commencement works	7 weeks	• Ecological Surveys – Site Walkover • Survey Control • Scheme Boards – Mainline • Scheme Boards – B4082 • Intrusive surveys • Non- Intrusive surveys • Layby closure and removal of emergency roadside telephones • Vegetation clearance on the Applicant's land to facilitate access construction • Temporary accesses on the Applicant's land (hardened access) • Temporary boundary fencing on third party land, under agreement. • Construction of temporary site compound. • Statutory utility protection works
1	12 weeks	• Works access/egress points extended beyond the Applicant's land boundary. • Site clearance/ vegetation clearance on the remainder of the Scheme area. • Temporary fencing to the remainder of the Scheme area. • Construction of the new junction slip roads, roundabouts and B4082, including topsoil strip, cut/fill earthworks, drainage installation, ducting and lighting installation, signage, kerbs and installation of the VRS barrier and retaining walls, where required. • Construction of drainage features including fencing, excavation, drainage, lining, soiling. • Construction of new private access farm road off the B4082 link road to Hungerley Hall Farm. • Phase 1 would also include the mitigation planting area to the east of the A46. • Badger-proof fencing installation would start where practicable. • Phase 1 would be completed without static traffic management with A46 lanes remaining at full width and current speed limits.
1a	18 weeks	• Construction continues for the new junction slip roads, roundabouts and B4082, including carriageway construction. • Construction of the overbridge substructure and drainage. • Construction of the new overbridge at the northern satellite compound and driven into place during a night closure of both A46 carriageways. • Temporary widening of the existing A46 mainline southbound (south of Walsgrave roundabout) into the southbound verge, pushing the road up to 5m eastwards to allow for a running lane for traffic during

Works Phase	Duration	Summary of construction activities
		construction (to be removed in Phase 6). • Removal of the existing bund (90m) by Coombe Abbey Park, placement of clay, and construction of a new bund to the design height. This is done in parallel to the temporary widening. • Installation of temporary crossovers (i.e. hardening of the central reservation so it can take traffic for approximately 500m) of the A46 for traffic management during later phases. • A46 mainline carriageway construction works including earthworks, drainage, ducting, VRS installation, carriageway sub-base and surfacing as well as verge works including lighting and signage. • B4082 link road works continue, including carriageway construction and the tie into the existing B4082. • Construction of signalised crossing at Clifford Bridge Road roundabout. • Phase 1a would also include the mitigation planting area to the east of the A46. • Narrow lanes installed on the mainline A46 and B4082 to allow construction of the tie-ins. • Speed limits reduced to 40mph on both the A46 and B4082
2	17 weeks	• Temporary widening completed to the southbound verge to facilitate later phases. • Construction of the new bund alongside Coombe Abbey Park. • Works to the northbound carriageway of the A46 from the existing Walsgrave roundabout to beyond the new junction. • A46 northbound traffic to be diverted on the newly constructed B4082. • A46 southbound traffic to be diverted onto the newly construction slip roads.
3	12 weeks	• Works to the A46 mainline southbound carriageway to rebuild the carriageway including earthworks, drainage, ducting, VRS installation, carriageway sub-base and surfacing as well as verge works including lighting and signage. • A46 southbound traffic to be diverted onto the newly construction A46.
4	9 weeks	• Works to the existing Walsgrave roundabout (pavement of existing Walsgrave roundabout removed once traffic has been moved onto new carriageway), B4082 spur off the existing roundabout and the new western dumbbell roundabout including earthworks, drainage, ducting, VRS installation, carriageway sub-base and surfacing as well as verge works including lighting and signage. • Surfacing of A46 mainline southbound and western dumbbell roundabout. • A46 southbound traffic to use the newly constructed A46 through the new junction and diverted onto temporary widened verge to the south of the existing roundabout. • A46 northbound traffic to use the newly constructed A46 through the new junction. • B4082 traffic to use the new B4082 and junction roundabouts and slip roads.
5	8 weeks	• Works to the existing roundabout (pavement removal once traffic has moved back) and to the northbound carriageway on the mainline A46 south of the existing Walsgrave roundabout (pavement widening). • Northbound traffic diverted onto new southbound carriageway, south of

Works Phase	Duration	Summary of construction activities
		the existing roundabout. • Southbound traffic continues to use temporary widened verge to the south of the existing roundabout. • B4082 traffic to use the new B4082 and junction roundabouts and slip roads.
6	11 weeks	• Northbound A46 traffic on permanent A46 alignment. • Southbound A46 traffic in narrow lanes south of the roundabout. • Removal of the temporary widening south of the existing roundabout, verge reinstated. • Central reservation constructed south of existing roundabout. • Final resurfacing.
7	2 weeks	• Removal of satellite site compound and reinstatement of temporary areas to original condition/land use (where required) • Removal of temporary fencing. • Landscaping of remaining areas to be completed (programme dependent on season).

11.4. Construction compounds and site accesses

11.4.1. Construction compound locations have been identified in balance of practical locations near key areas of work and avoidance of environmental impact (such as retention of trees and hedgerows, fitting withing context of the landscape). Table 11-2 indicates indicative areas, access arrangements of use of each of the compound locations.

11.4.2. The proposed main site compound is located on land to the south of the Brinklow Road (B4428) and the east of the A46 (Binklow Road compound). The site currently contains site offices, welfare and storage facilities for plant and materials.

11.4.3. The Binklow Road compound has been secured under an extension to the existing planning permission relating to the Binley Scheme and thus has not been included within the Order Limits. More details are provided in section 3.9 of the Case for the Scheme (**TR010066/APP/7.1**).

11.4.4. A satellite compound within the Order Limits will also be required to provide welfare facilities. It will be in use throughout the construction phases and would also be used to construct the bridge deck offline.

Table 11-2: Proposed compound details

Compound number	Approximate area (m^2)	Purpose / justification	Access arrangements
Main	13,000	• Main project offices and welfare facilities.	• Accessed via an existing haul road from Brinklow Road.

Compound number	Approximate area (m^2)	Purpose / justification	Access arrangements
Satellite	5,500	• Welfare, equipment and materials. Offline bridge deck construction.	• Accessed off the A46 northbound within the existing layby

11.5. Material storage and stockpiles

11.5.1. Topsoil and subsoil will need to be removed from the proposed B4082 alignment and then temporarily stockpiled until needed for re-use.

11.5.2. Short Term Stockpiling may be required for imported general fill and aggregates for use in the permanent works.

11.5.3. The stockpiles would generally be located at the perimeter of working areas, approximately 2m to 3m in height (in accordance with British Standard BS3882: 2015).

11.6. Construction traffic

11.6.1. An access and egress point would be created from the B4082 and A46 north bound and south bound carriageways. It is proposed to not create any temporary haul roads. Site access routes would be cut/ built along the permanent road alignment. As fill is imported/exported, the permanent road alignment would be used and built up.

11.6.2. The change to the access to the construction site with use of the proposed B4082 alignment instead of a haul road through Hungerley Hall Farm creates access points directly off the A46 which will reduce the level of construction traffic on local roads, thus reducing the impact on local residents and emissions in the residential areas.

11.6.3. The Scheme would aim for just-in-time deliveries of materials to the point of work where practicable to reduce inefficient material handling. Some bulk materials would need to be stored in the compounds and laydown areas that have been strategically positioned across the Scheme so they could be distributed when needed.

11.6.4. The expected site vehicle movements are as follows:

- Internal - These are the HGVs dedicated to the haulage of materials within the extents of the Scheme along the public highway. This refers exclusively to the movement of excavated materials between work fronts (e.g. cut to fill) and the distribution of materials stored in the compounds to the different work fronts. For the peak month of cut and fill operations (expected to be during the spring of 2027), there are estimated to be 60 daily internal movements on Mondays to Fridays (i.e. 30 movements in, and 30 out), 30 movements on Saturdays, and none on Sundays.

- Imports – These encompass all the deliveries coming into the Scheme from outside its boundaries and include, but are not limited to, readymix concrete, asphalt, granular materials, and miscellaneous materials such as pipes, signs, barriers, fences and cabins. For the peak month of the construction phase period (expected to be during the summer of 2027), there are estimated to be approximately 200 (i.e. 100 movements in, and 100 out) daily import HGV movements on Mondays to Fridays, 50 movements on Saturdays, and none on Sundays

11.6.5. An Outline Traffic Management Plan (**TR010066/APP/7.5**) provides detailed traffic management proposals for each area of construction work.

11.7. Existing A46 during construction

11.7.1. The Scheme contains both online and offline alignments. Traffic management measures would be put in place for each stage of the construction.

11.7.2. Throughout the construction stages traffic will continue to use the existing A46 and B4082 with traffic management including the switch over to the new B4082. At this stage all current junction movements will be maintained.

11.7.3. A diversion using existing local roads via the A46 Binley Junction will be in place for occasions when the mainline A46 or B4082 carriageways are closed.

11.8. Construction methods

11.8.1. The construction of the Scheme would use typical construction techniques associated with major infrastructure projects.

11.8.2. Standard working hours are considered to be between 07:00 and 19:00 between Monday and Friday, and between 07:00 and 14:00 on Saturday. Any night working would be between 19:00 and 07:00.

11.8.3. Works which are currently planned to be completed outside of standard daytime working hours are listed in Table 11-3.

Table 11-3: Indicative working times by phase

Phase	Summary of works outside standard daytime working	Nights / Weekends	Indicative Locations
All Phases	Traffic Management (TM) installation, switches and removal	Nights	Scheme Wide
Pre-Commencement Works	Construction of access on existing Walsgrave Roundabout	Nights	Existing Walsgrave Roundabout
1	No works other than traffic management switches currently planned outside Standard working Hours	N/A	N/A
1a	Construction of B4082. Tie into new link Road	Nights	B4082 tie-in

Phase	Summary of works outside standard daytime working	Nights / Weekends	Indicative Locations
	Construction of signalized crossing on Clifford Bridge Road	Nights	East side of Clifford Bridge Road Roundabout
	Construction of new slip road tie-ins to the A46	Nights	A46 NB and SB at new junction
	Installation of bridge deck (constructed off line)	Weekend	New A46 overbridge
2	No works other than TM switches currently planned outside Standard working Hours	N/A	N/A
3	Tie in of temporary carriageway widening on A46 SB	Nights	A46 SB south of existing Walsgrave Roundabout
4	No works other than TM switches currently planned outside Standard working Hours	N/A	N/A
5	No works other than TM switches currently planned outside Standard working Hours	N/A	N/A
6	Construct Central Reservation to the south of the existing Walsgrave roundabout	Nights	South of existing Walsgrave Roundabout
	Final Surfacing and White Lining	Nights	Extent of A46 within order limits

11.8.4. Earthworks, including cuttings and embankments, would be required to create the route alignment. The cuttings and embankments would be constructed using a 'cut-and-fill' approach, using the alignment to move materials along the route corridor. The formation of the road surface would use standard techniques, including construction of capping, sub-base and pavement layers.

11.9. Plant and equipment

11.9.1. Construction activities would involve the use of heavy plant items with the potential to emit high levels of noise and vibration and contribute to pollution, such as excavators, dumper trucks, dozers and compaction equipment.

11.9.2. Further information considering construction impacts are set out in ES Chapter 11 (Noise and Vibration) (**TR010066/APP/6.1**).

11.10. Utilities

11.10.1. There are no diversions required as part of the Scheme.

11.10.2. There is a Severn Trent Water owned pumped sewer main which runs north–south along the western side of the A46. It is within the Order Limits at the satellite compound. In this location it veers westwards towards the River Sowe.

Any protection works required to the sewer would be identified with Severn Trent during the detailed design stage.

11.10.3. There is a Vodafone ducted cable asset located in the western verge of the A46 opposite Coombe Abbey Park. This has been located by trial hole. This asset does not require diversion due to the Scheme. Proposed drainage outfalls will cross beneath the asset, these works will be coordinated with Vodafone.

11.11. Demolition

11.11.1. The Scheme does not require the demolition of existing buildings but does remove a Grade II listed garden wall at Hungerley Hall Farm. This wall is removed as the B4082 alignment is proposed over it's position. The wall is detailed in the ES Chapter 6 (Cultural Heritage) (**TR010066/APP/6.1**).

11.12. Excavated materials

11.12.1. Construction of the Scheme would require excavation in places to form cuttings for the highway, ground improvement, foundations, soakaways, other drainage and miscellaneous features. Where material is recoverable, this material would then be used to form embankments or for other fill requirements. This is considered in greater detail in ES Chapter 10 (Material Assets and Waste) (**TR010066/APP/6.1**).

11.13. Environmental Management Plan

11.13.1. A First Iteration EMP (**TR010066/APP/6.5**) has been prepared to include construction, operational and maintenance good practice and mitigation measures. These have been identified in part by the assessments presented in the ES (**TR010066/APP/6.1**). The First Iteration EMP includes the Register of Environmental Actions and Commitments (REAC) (**TR010066/APP/6.5**) and is secured by Requirement 1 of the draft DCO (**TR010066/APP/3.1**).

11.13.2. In line with DMRB LA 120 (Environmental Management Plan), the First Iteration EMP establishes a suitable mechanism to link assessment assumptions, DCO Requirements and obligations. The Second Iteration EMP is secured by Requirement 4 of the draft DCO (**TR010066/APP/3.1**). The EMP is a live document which will be revised as more information becomes available throughout the lifetime of the Scheme.

11.13.3. During detailed design the Second Iteration EMP will be developed within the limits of the design as set out on the Engineering drawings and sections, any changes to the preliminary scheme design shown in the Engineering drawings and sections would have to be agreed with the Secretary of State, following consultation with the relevant planning authority and relevant highway authority and would only be granted if such changes do not give rise to any materially new or materially different environmental effects to those set out in the ES (**TR010066/APP/6.1**).

11.14. Operation and long-term management

11.14.1. The A46 mainline and new Walsgrave Junction would be managed by National Highways on a day to day basis using the monitoring and control systems in accordance with the relevant design standards.

11.14.2. The B4082 from the point where it connects with the new junction would be owned and operated by Coventry City Council.

11.14.3. The Scheme has been designed with maintenance and safe operation in mind, with liaison having taken place with National Highways Operations Directorate and Coventry City Council (the day-to-day maintainers), at multiple points in the Scheme development and the feedback incorporated into the submitted proposals. Maintenance is defined as actions needed to inspect, repair, adjust, alter, remove, replace or reconstruct all aspects that relate to the Scheme.

11.14.4. Long-term maintenance and repairs to the highways and associated assets (including drainage) would be undertaken as required to maintain the appropriate standards for the relevant highway authority.

11.14.5. The new junction structure has been designed as a fully integral structure without bearings. This reduces the maintenance requirement. Lane closures would be required to safely facilitate the principal inspection for the new structure.

11.15. Decommissioning

11.15.1. It is considered highly unlikely that the Scheme would be demolished before the end of its design life of 60 years as the road would have become an integral part of the strategic road network.

11.15.2. In the event of the Scheme needing to be demolished, this would conform to the statutory process at that time, including EIA if required.

Acronyms and Abbreviations

Acronyms and Abbreviations	Meaning
AQMA	Air Quality Monitoring Area
BNG	Biodiversity Net Gain
CRP	Carbon Reduction Plan
DCO	Development Consent Order
DMRB	Design Manual for Roads and Bridges
EMP	Environmental Management Plan
ES	Environmental Statement
ha	Hectares
km	Kilometres
LNR	Local Nature Reserve
LWS	Local Wildlife Site
m	Metres
Mph	Miles per hour
NPPF	National Planning Policy Framework
NPS	National Policy Statement
NPS NN	National Networks National Policy Statement
NSIP	Nationally Significant Infrastructure Project
RIS 2	Road Investment Strategy 2
RSA	Road Safety Audit
SRN	Strategic Road Network
SSSI	Site of Special Scientific Interest
VMS	Variable message sign
VRS	Vehicle restraint system
WCH	Walking, Cycling and Horse Riding

Glossary of Terms

Term	Acronym	Meaning
The Applicant		National Highways.
Arboricultural Impact Assessment	AIA	A document submitted as part of the application for development consent that details existing tree constraints and trees/areas of arboricultural significance using available tree survey data with the information used to help minimise and/or avoid impacts on trees.
At-grade		On the same level. For example, when a road is on the current ground level.
Biodiversity		The variability among living organisms from all sources, including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part of. This includes diversity within species, between species and of ecosystems.
Biodiversity Net Gain	BNG	An approach that aims to leave biodiversity within the natural environment in a measurably better state than its condition prior to implementation of a project.
Bund		An embankment that acts as a visual or noise screen, or acts as a barrier to control the spillage of fluids.
Bypass		The diversion of a major road to carry traffic around a built-up area, constructed to improve the journey of through traffic and/or improve the environmental conditions along the original route.
Case for the Scheme		This document.
Climate		Long-term weather conditions prevailing over a region.
Climate change		This refers to a change in the state of the climate, which can be identified by changes in average climate characteristics which persist for an extended period, typically decades or longer.
Congestion		A situation where the volume of traffic is too great for the road, causing vehicles to slow down or stop, often caused by bottlenecks, traffic incidents and junction design.
Conservation area		An area designated under section 69 of the Planning (Listed Buildings and Conservation Areas) Act 1990 as being of special architectural or historic interest and with a character or appearance that is desirable to preserve or enhance.
Cultural heritage		Historic monuments, historic groups of buildings and/or historic sites.
Culvert		A tunnel (pipe or box shaped) that carries a stream or open drain under a road or railway.
Department for Transport	DfT	The national Government body responsible for transport in Britain, and therefore in overall control of the road network. It is responsible for policy decisions, and its responsibilities are carried out by a range of agencies and local authorities.
Development Consent Order	DCO	The consent for a Nationally Significant Infrastructure Project required under the Planning Act 2008.
Design Manual for Roads and Bridges	DMRB	The Design Manual for Roads and Bridges contains information about current standards relating to the design, assessment and operation of motorway and all-purpose trunk roads in England.
Development plan		Documentation which that seeks to guide development and planning in a local authority area for a set period.

Term	Acronym	Meaning
Dust		All airborne particulate matter.
Earthworks		The removal or placement of soils and rocks such as in cuttings, embankments and environmental mitigation, including the in-situ improvement of soils/rocks to achieve the desired properties.
Embedded mitigation		Design measures that are integrated into the Scheme for the purpose of minimising environmental effects.
Environment Agency	EA	Government agency established to protect and improve the environment and contribute to sustainable development in England. Responsibilities include: water quality and resources, flooding and coastal risk management and contaminated land.
Environmental Management Plan	EMP	A site specific plan developed to ensure that a project is implemented in an environmentally sustainable manner where all contractors and subcontractors, including consultants, understand the environmental constraints within the site.
Environmental Statement	ES	A statutory document which reports the EIA process, produced in accordance with the EIA Directive as transposed into UK law by the EIA Regulations.
Flood Risk		A combination of the probability (likelihood or chance) of a flood event happening, and the consequences (impact) if it occurred.
Flood Zone 2		The area of the floodplain where there is a low to medium flood risk.
Flood Zone 3		The area of the floodplain where there is a high risk of flooding.
Floodplain		Land adjacent to a watercourse over which water flows or would flow in times of flood, but for defences in place.
Geology		The physical structure, substance and history of the earth (rocks and minerals).
Grade separated		A type of junction where the major route (or routes) through the junction do not stop and do not cross any other road on the level. Movements to other roads are made using slip roads and bridges.
Green Belt		A designation for land around certain cities and large built-up areas, which aims to keep this land permanently open or largely undeveloped.
Green infrastructure		Green infrastructure is a network of multi-functional green and blue features and other natural features, urban and rural, which are capable of delivering a wide range of environmental, economic, health and wellbeing benefits for nature, climate, local and wider communities and prosperity. Green Infrastructure can include nature-based solutions to prevent or reduce environmental impacts. Green infrastructure can also enable developments to provide positive environmental, social and economic benefits. The Green Infrastructure Framework – Principles and Standards for England can be used to consider green infrastructure in development and plan for good quality and targeted creation or improvement.
Groundwater		Water found underground in porous geological strata and soils.
Habitat		The place or type of site where an organism or population naturally occurs. Often used in the wider sense referring to major assemblages of plants and animals found together.

Term	Acronym	Meaning
Heritage Asset		A building, monument, site, place, area or landscape of historic value.
Junction		A place where two roads meet, regardless of design or layout.
Land Use		What land is used for, based on broad categories of functional land cover, such as urban and industrial use and the different types of agriculture and forestry.
Landscape		An area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors.
Landscape and Ecology Management Plan	LEMP	Is a site-specific document, which details immediate and long-term commitments to manage the planting, protection and enhancement of biodiversity in and around a new development site.
Listed building		A building of special architectural or historic interest. Listed buildings are graded I, II* or II, with Grade I being as the highest. Listing includes the interior, as well as the exterior, of the building.
Local Enterprise Partnership	LEP	Partnerships between local authorities and businesses. They decide what the priorities should be for investment in roads, buildings and facilities in the area
Mitigation		Measures intended to avoid, reduce and, where possible, remedy significant adverse environmental effects as the result of the Scheme.
Monitoring		An assessment of the performance of the Scheme, including mitigation measures. This determines if effects occur as predicted or if operations remain within acceptable limits, and if mitigation measures are as effective as predicted.
Motorway		A special type of road reserved for motorised traffic only, the numbers of which are prefixed with the letter 'M'.
Nationally Significant Infrastructure Project	NSIP	Nationally Significant Infrastructure Project, further defined within Chapter 1 of this Case for the Scheme.
National Planning Policy Framework	NPPF	A planning framework which sets out the Government's planning policies for England and how these are expected to be applied.
National Policy Statements	NPS	Statements produced by the government. They give reasons for the policy set out in the statement, and must include an explanation of how the policy takes account of government policy relating to the mitigation of, and adaptation to, climate change.
National Networks National Policy Statement	NPS NN	A statement setting out the need for, and the Government's policies to deliver, the development of Nationally Significant Infrastructure Projects on the national road and rail networks in England.
Natural England	NE	Executive non-departmental public body constituted under the Natural Environment and Rural Communities Act 2006 (section 2(1)) to ensure that the natural environment is conserved, enhanced and managed for the benefit of present and future generations, thereby contributing to sustainable development.
Noise barrier		Fence placed between a road and a noise sensitive receptor to reduce noise levels. Includes all elements of the fence (posts and fixings, as well as panels).
Noise Important Area	NIA	Areas identified with respect to noise from major roads and from roads within agglomerations where 'the 1% of the population that

Term	Acronym	Meaning
		are affected by the highest noise levels from major roads' are located according to the results of the strategic noise mapping.
Operational		The functioning of the Scheme on completion of construction.
Order Limits		The extent of the area within which the Scheme may be carried out.
Preferred Option		The chosen design option that most successfully achieves the Scheme objectives and becomes subject to further design and assessment
Preferred Route Announcement	PRA	An announcement made by National Highways following the selection of a preferred option or solution for a road scheme.
Principal Contractor		A person or organisation responsible for the overall management of a construction project, particularly when there is more than one contractor involved in a project.
Road Investment Strategy	RIS	A document which sets a long-term strategic vision for the network. With that vision in mind, it then: specifies the performance standards Highways England must meet; lists planned enhancement schemes we expect to be built; and states the funding that we will make available during the first Road Period (RP), covering the financial years 2015/16 to 2019/20.
Road Investment Strategy 2	RIS2	A document which sets a long-term strategic vision for the network. With that vision in mind, it then: specifies the performance standards Highways England must meet; lists planned enhancement schemes we expect to be built; and states the funding that we will make available during the second Road Period (RP2), covering the financial years 2020/21 to 2024/25.
Road Safety Audit 1	RSA1	There are four stages of a Road Safety Audit (RSA). Stage 1 RSAs are undertaken at the completion of preliminary design and normally before planning consent is granted.
Roundabout		A circular, one-way junction at which other roads meet and terminate.
Runoff		The flow of water over the ground surface.
Screening		The formal process undertaken to determine whether it is necessary to carry out a statutory Environmental Impact Assessment and publish an Environmental Statement in accordance with the EIA Regulations.
Severance (walkers, cyclists and horse riders)		The extent to which members of communities are able (or not able) to move around their community and access services/facilities.
Significance (of effect)		A measure of the importance or gravity of the environmental effect, defined by generic significance criteria or criteria specific to an environmental topic.
The Scheme		The A46 Coventry Junctions (Walsgrave) Scheme for which development consent is being sought.
Site of Special Scientific Interest	SSSI	Area of land notified by Natural England under section 28 of the Wildlife and Countryside Act 1981 as being of special interest due to its flora, fauna or geological or physiological features.
Soil		An assemblage of mineral particles and/or organic matter, which includes variable amounts of water and air (and sometimes other gases).
Stakeholder		An organisation or individual with a particular interest in the

Term	Acronym	Meaning
		Scheme.
Strategic Road Network	SRN	The network of motorways and trunk roads in England.
Supplementary Planning Document	SPD	Documents not part of a development plan for a particular authority area that provide additional guidance or detail on policies within the development plan and are a material consideration for an LPA in their decision-making.
Sustainable Drainage System	SuDS	Techniques for managing water runoff to reduce the quantity, and increase the quality, of surface water that drains from a development.
Tonnes of carbon dioxide equivalent	tCO2e	A measure that allows the different greenhouse gases to be compared on a like-for-like basis relative to one unit of CO2.
Traffic Management Plan	TMP	A document that sets out how construction traffic including site personnel movements will be controlled to ensure the safe and efficient delivery of the Scheme.
Walkers, cyclists and horse-riders	WCH	A collective term used to describe pedestrians, cyclists and equestrians.