

A417 Missing Link
TR010056

7.1 Case for the Scheme

Planning Act 2008

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Procedure) Regulations 2009

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A417 Missing Link

Development Consent Order 202[x]

7.1 Case for the Scheme

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1 Introduction

1.1 Purpose of this document

- 1.1.1 The Case for the Scheme has been prepared to accompany an application by Highways England (the Applicant) for a Development Consent Order (DCO) for the A417 Missing Link scheme (the scheme) under section 37 of the Planning Act 2008 (the Act). The scheme would provide 3.4 miles (5.5km) of new, rural all-purpose dual carriageway for the A417.
- 1.1.2 The Case for the Scheme is provided as an application document as defined by Regulation 5(q) – “any other documents considered necessary to support the application” of the Infrastructure Planning (Applications: Prescribed Forms and Procedures) Regulations 2009 (the APFP Regulations).
- 1.1.3 Under section 104(3) of the Act, the Secretary of State (SoS) must decide the DCO Application in accordance with any relevant National Policy Statement (NPS). The relevant NPS for the scheme is the National Policy Statement for National Networks (NPSNN). The relevant SoS for this scheme is the SoS for Transport.
- 1.1.4 The purpose of this document is to consider the compliance of the scheme as a whole with the requirements of the NPSNN and other relevant national and local planning policy. In doing so, the Case for the Scheme seeks to assist the Examining Authority and the SoS in applying the provisions of the Act.
- 1.1.5 This document also seeks to demonstrate the need for the scheme, providing a summary of the transport and economic assessment that has been carried out for the scheme and which evidences the costs and benefits associated with its implementation and operation.
- 1.1.6 The Case for the Scheme draws upon the conclusions of documents submitted in support of the application for a DCO. As such, this document should be read in conjunction with the Environmental Statement (ES) and other application documents as appropriate.
- 1.1.7 This document has been prepared in accordance with the Department for Communities and Local Government (DCLG) guidance, ‘Planning Act 2008: Application Form Guidance’¹ and Planning Inspectorate Advice Note 6² ‘Preparation and Submission of Application Documents’.

1.2 The Applicant

- 1.2.1 Highways England is the Applicant and the strategic highways company as defined in the Infrastructure Act 2015, and is charged with operating, maintaining and improving England’s motorways and major A-roads on behalf of the Department for Transport (DfT).

¹ Department for Communities and Local Government. Planning Act 2008: Application Form Guidance. London: The Stationery Office, 2013

² The Planning Inspectorate. Advice note six: Preparation and submission of application documents. Bristol: The Planning Inspectorate, 2020

1.2.2 Highways England's road network totals over 4,300 miles (6,920 kilometres). Whilst this represents only 2% of all roads in England by length, these roads carry a third of all traffic by mileage and two-thirds of all heavy goods traffic.

1.3 Requirement for a Development Consent Order

1.3.1 The scheme is a Nationally Significant Infrastructure Project (NSIP) under sections 14(1)(h) and 22(1)(a) of the Act.

1.3.2 Section 14(1)(h) of the Act defines an NSIP as highway-related development subject to falling within the criteria set out in section 22 of the Act.

1.3.3 Under section 22(1) of the 2008 Act, an NSIP for highway-related development must fall within one of three specified categories; construction, improvement or alteration of a highway.

1.3.4 The scheme is a new offline section of dual carriageway and therefore constitutes the "construction" of a highway within the meaning of section 22(1)(a) and meets the requirements of this definition under section (22)(2) and 22(4) as follows:

- The highway will (when constructed) be wholly in England (section 22(2)(a));
- Highways England (as the strategic highways company), will be the highway authority for the highway (section 22(2)(b)); and
- The speed limit on the section of the A417 in the DCO Boundary exceeds 50 mph and the area of development within the DCO Boundary is 198.2 hectares, which is greater than 12.5 hectares (sections 22(2)(c) and 22(4)(b)).

1.3.5 As the scheme is an NSIP, development consent must be obtained from the SoS to authorise it, and an application for a DCO must be made to the Planning Inspectorate who administer the DCO process on behalf of the SoS for Transport, under section 37 of the Act.

1.4 Policy framework

Policy hierarchy

1.4.1 A policy hierarchy exists in determining whether an application for development consent should be granted, where a designated NPS is in place. Section 104 of the Act states that the SoS must decide an application "in accordance with" any relevant, designated NPS and must have regard to any matters they regard as important and relevant. The documents in this hierarchy can be summarised as follows:

- The **NPSNN**, published in December 2014 and designated in January 2015, is the relevant NPS which sets out the Government's vision and policy for development of the strategic road and rail networks.
- The **National Planning Policy Framework (NPPF)** (June 2019) sets out the Government's planning policy framework for the whole of England, including the Government's expectation for content and quality of planning applications and local plan policy. The overall strategic aims of the NPSNN and NPPF are consistent. The NPPF may be an important and relevant matter but does not form the basis for a decision on an NSIP.
- At the local level, every local planning authority (LPA) should have an adopted **development plan** for the area, which sets out the planning policies and proposals for land use in their area. It is these policies that planning

applications for development in the area are determined in accordance with, provided they are not of a scale to qualify as an NSIP. The adopted development plan should align with the NPPF. In addition to the adopted development plan, emerging draft policy may be a material consideration in decision-making. The relevant LPAs for the scheme are Gloucestershire County Council, Tewkesbury Borough Council and Cotswold District Council. Each of these LPAs has an adopted development plan.

- In addition, an LPA may adopt **Supplementary Planning Documents (SPDs)** which do not form part of the development plan for the area, but which do provide additional guidance or detail on policies within the development plan, and are a material consideration for an LPA in their decision-making.

1.4.2 In terms of the relationships between documents in the policy hierarchy for the scheme, the following principles apply:

- A designated NPS provides the principal planning policy to be applied in determining a DCO Application. A designated NPS does not form part of the development plan for an area but has primacy over it, reflecting the national interest.
- Under section 104 of the Act, the SoS must have regard to any other matters which they think are both important and relevant to their decision, in addition to certain other specified matters.
- The NPPF requires local authorities to take account of the development principles set out in relevant NPSs when preparing their local plans.
- In general terms, there should be no conflict between policies in a designated NPS and the NPPF; however, if this does arise the designated NPS has primacy.
- The “development plan” for an area includes documents defined by section 38 of the Planning and Compulsory Purchase Act 2004; these are development plan documents prepared under the provisions of that Act and adopted by the relevant local authority.
- SPDs are capable of being important and relevant but are not part of the development plan for an area.

Interpreting policy

1.4.3 The correct approach to interpreting planning policy is outlined in previous key court cases. Important commentary can be found in SoS for Communities and Local Government v Hopkins Homes Ltd [2017] UKSC 37, Tesco Stores Ltd v Dundee City Council [2012] UKSC 13 and Barwood Strategic Land II LLP v East Staffordshire BC, SoS for HCLG [2017] EWCA Civ 893. There are three key messages arising from these cases:

- a) A simplistic approach to interpretation should be taken to avoid over-legalistic and over-complicated analysis.
- b) Planning policy is designed to shape on-the-ground decision making so a practical interpretation should always be favoured over a legal one.
- c) The policy should be read in its proper context which includes the subject matter of the policy and the wider policy framework.

1.4.4 This document provides an assessment of the scheme against the relevant national and local policy, focusing in particular on the NPSNN as the principal policy document for the scheme.

Technical standards

- 1.4.5 It should be noted that the design and assessment of strategic roads is also carried out with reference to technical standards, namely the Design Manual for Roads and Bridges (DMRB). DMRB contains information about current standards, advice notices and other published documents relating to the design, assessment and operation of trunk roads.
- 1.4.6 The scheme has been designed to comply with the DMRB. This forms the basis of a safe highway design which would minimise the risk of road casualties arising from the scheme and contribute to an overall improvement in the safety of the strategic road network (SRN).
- 1.4.7 The 10 principles of good design were implemented into the design of the scheme, as outlined in *'The road to good design'* document produced by Highways England³. In exercising its functions, Highways England has an obligation⁴ to have due regard to relevant principles and guidance on good design. In the design and development of the SRN appropriate consideration needs to be given to a scheme's geographical, environmental and socio-economic context.

1.5 Structure of this document

1.5.1 This document is structured as follows:

- Chapter 2: Scheme Development and Options Considered – sets out the history of the scheme and alternative options considered; options selections and identification; non-statutory and statutory consultation undertaken to date; and a summary of post-consultation design changes.
- Chapter 3: The Scheme – provides a high-level description of the scheme; sets out the scheme location; and, the scheme objectives.
- Chapter 4: Transport Case for the Scheme – sets out the baseline data and development model; current and future network performance overviews; and road safety assessments.
- Chapter 5: Economic Case for the Scheme – outlines the economic assessment of the scheme; the anticipated monetarised and non-monetarised benefits of the scheme; identified economic, environmental and social benefits; and the scheme's overall value for money, expressed as a benefit cost ratio.
- Chapter 6: Conformity with National Policy Statement for National Networks – sets out how the scheme complies with the NPSNN, providing an assessment of the scheme against the requirements of the NPSNN as per the assessment principles and generic impacts within it. Four aspects of the generic impacts are considered in more detail within Chapters 7 to 10, given their importance and relevance to the determination of the DCO Application for the scheme.
- Chapter 7: Development proposed within nationally designated areas – sets out how the case meets the NPSNN policy tests with regard to developing a scheme of national networks infrastructure within an Area of Outstanding Natural Beauty (AONB).
- Chapter 8: Biodiversity and ecological conservation – sets out how the scheme conforms with the NPSNN policy requirements detailed under the

³ The road to good design: Highways England's design vision and principles (January 2018)

⁴ SoS for Transport statutory directions and guidance to the strategic highways company (April 2015)

generic impact of biodiversity and ecological conservation, including how the scheme has taken advantage of opportunities to conserve and enhance biodiversity and geological conservation interests.

- Chapter 9: Special Category Land – sets out how the scheme conforms with the NPSNN policy requirements relating to open space and development affecting Common Land.
- Chapter 10: Historic Environment – sets out how the scheme conforms with the NPSNN policy requirements detailed under the generic impact of historic environment.
- Chapter 11: National Planning Policy Framework (NPPF) – sets out how the scheme is in accordance with the policies contained in the NPPF.
- Chapter 12: Conformity with Local Development Plans and Local Transport Plans – provides the context of the local planning policy relevant to the scheme, including the Gloucestershire, Cotswold and Tewkesbury local planning policy, relevant neighbourhood plans and planning guidance.
- Chapter 13: Conclusions – outlines the compliance of the scheme as a whole with the requirements of relevant planning and transport policy.
- Appendix A: National Policy Statement Accordance Table – this table sets out where in the DCO Application the requirements of the NPSNN are met.
- Appendix B: Local Policy Assessment – this table provides an assessment of the scheme against relevant local planning policies.

2 Scheme development and options considered

2.1 Project timeline

- 2.1.1 The scheme has been under consideration for more than 20 years. By 1998, dual-carriageway improvements were completed to over 90% of the length of the A417/A419 link. The single carriageway section near Birdlip in Gloucestershire was not improved as part of those works, resulting in the 'missing link' that this scheme seeks to address.
- 2.1.2 Between 2001 and 2006, the then Highways Agency (the strategic highway authority preceding Highways England) carried out assessments to consider options for improving the missing link of the A417 and to identify a route alignment that could be acceptable in terms of both environmental impacts and cost. As part of that work, a tunnel option was discounted due to the estimated cost (£1 billion) and a holding objection from the Environment Agency (EA) regarding ground water contamination. Instead, surface on-line dualling options were considered, ultimately resulting in agreement between Highways England and other stakeholders that a route named the 'Modified Brown Route' was suitable for inclusion in the Government's Road Programme. However, the scheme did not progress further as it did not get included in the Road Programme and was instead identified as project for completion in the longer-term (beyond the 10-year programme).
- 2.1.3 While the then Highways Agency did continue to consider options for improvement to the road, including short-term, lower-cost measures, these were not found to deliver as much of a long-term benefit to road safety, congestion and the environment as the Modified Brown Route. In addition, a lower cost scheme to create a grade-separated roundabout at the Air Balloon roundabout was considered in 2014 but not progressed further due to concerns over its buildability.
- 2.1.4 In 2014, DfT announced its first five-year investment programme, Road Investment Strategy (RIS1), for making improvements to the SRN across England. More than 100 schemes were identified as part of RIS1, one of which was the A417 Missing Link between the Brockworth bypass and Cowley roundabout in Gloucestershire. As a result, Highways England was able to commence the development of the current A417 Missing Link scheme, carrying out initial project prioritisation and options identification work, which led to the selection of two surface options (Option 12 and Option 30) to go forward for non-statutory public consultation in 2018.
- 2.1.5 Following the consultation and more design and assessment work, a Preferred Route Announcement (PRA) was made in March 2019 selecting Option 30 as the route to be taken forward in a DCO Application. Further information on this process is provided in the Scheme Assessment Report (Document Reference 7.4) and ES Chapter 3 Assessment of Alternatives (Document Reference 6.2).
- 2.1.6 Between 27 September 2019 and 8 November 2019, Highways England carried out a statutory public consultation on the scheme and sought feedback on the scheme design that was developed along the Option 30 alignment. This included consultation with prescribed consultees, persons with an interest in the land (PILs) affected by the scheme and the general public. A summary of how Highways England carried out the 2019 statutory consultation and had regard to

the responses received is provided in Chapters 5 to 7 of the Consultation Report (Document Reference 5.1).

- 2.1.7 Additional, targeted statutory consultation with PILs was carried out during January and May 2020 to seek feedback on changes to the scheme and the DCO Boundary, changes to land acquisition proposals or because Highways England had identified new information about land ownership. Details of how Highways England carried out this targeted statutory consultation and had regard to the responses received is provided in Chapter 11 of the Consultation Report (Document Reference 5.1).
- 2.1.8 In March 2020, Road Investment Strategy 2: 2020-2025 (RIS2)⁵ was published by the DfT, which sets out the road investment strategy between April 2020 and March 2025. The A417 Missing Link is identified in RIS2 as a 'committed' scheme for its second Road Period.
- 2.1.9 Taking into account the consultation feedback received alongside latest and emerging environmental survey results, Highways England made the decision in July 2020 to review and make changes to the scheme design. As set out in Chapter 7 of the Consultation Report (Document Reference 5.1), these changes included the removal of the previously proposed green bridge on Crickley Hill, and a change to the proposed gradient of the road on the Crickley Hill escarpment. Highways England also consulted on new crossings, the design of Cowley junction, the rerouting of the B4070 to Birdlip, improvements for walking, cycling and horse riding and disabled users and the replacement of Common Land.
- 2.1.10 In August 2020, Highways England published its Delivery Plan 2020-2025, which explains how Highways England will invest its government funding in the SRN up until 2025. This plan identifies the A417 Missing Link as one of 12 major enhancement schemes across the country that will be started in Road Period 2.
- 2.1.11 In November 2020, the HM Treasury published the National Infrastructure Strategy, which sets out the Government's strategy to improve the UK's infrastructure in order to 'level-up' the country. While the A417 is not specifically named, the Strategy sets out that there will be a record level of investment in strategic roads (over £27 billion), with increased focus on improving infrastructure outside of London and the south-east.
- 2.1.12 Following the changes to the scheme announced in July 2020, Highways England carried out a supplementary statutory consultation between 13 October 2020 and 12 November 2020 to seek feedback on the design changes within the revised scheme. A summary of how Highways England carried out the 2020 statutory consultation and had regard to the responses received is provided in Chapters 8 - 10 of the Consultation Report (Document Reference 5.1).
- 2.1.13 Having analysed the feedback from the supplementary statutory consultation, the scheme has been subject to further minor design changes in response. An additional targeted consultation with PILs was carried out between 8 February and 9 March 2021 in relation to these minor changes to the scheme design, to consider the pertinent DCO Boundary and land ownership information. Details of how Highways England carried out this targeted consultation and had regard to

⁵ <https://www.gov.uk/government/publications/road-investment-strategy-2-ris2-2020-to-2025>

the responses received is provided in Chapter 11 of the Consultation Report (Document Reference 5.1).

- 2.1.14 Having carried out an Environmental Impact Assessment (EIA) on the scheme and finalised the preliminary design following the supplementary and targeted consultations, the DCO Application for the scheme has been prepared for submission.
- 2.1.15 The key milestones of the scheme's history and development are set out in Table 2-1 below. A detailed account of the design development of the scheme is set out in ES Chapter 3 Assessment of Alternatives (Document Reference 6.2).
- 2.1.16 The Consultation Report (Document Reference 5.1) focuses on how Highways England has carried out consultation and engagement on the scheme since 2018 and evidences how the feedback received has been taken into account to inform the design of the scheme.

Table 2-1 Timeline of scheme development

Year	Event	Development
1998	A417/A419 dual carriageway completed	Dual-carriageway improvements were completed to over 90% of the length of the A417/A419 link. The single carriageway near Birdlip was not improved. This section is termed the A417 'Missing Link'.
2001	Constraints study commissioned	Highways Agency commissioned a study to identify the environmental assets and constraints within a study area centred on the existing route alignment.
2003	Tunnel options discounted	Results of the Highways Agency route options study support an on-line dualling option. Further development of a tunnel option is discounted due to cost and a holding objection from the EA.
2005	Route is reclassified to regional importance	Route is reclassified as being of regional importance rather than national importance. Funding would now have to be awarded through the South West Region's funding allocation. The South West Regional Assembly requested that the Highways Agency examine the possibility of a lower cost solution.
2006	Modified Brown Route identified for consultation	A scheme assessment report concluded the Modified Brown Route should be taken forward as the proposed solution. Modified Brown Route taken forward as the solution. Scheme is prepared for public consultation; however, it is not included in the roads programme therefore the consultation and development are not progressed.
2008 - 2014	Alternative options considered	The Highways Agency reviewed opportunities for a lower cost scheme or short-term measures to improve the route. None of the identified measures were implemented for the A417 Missing Link. It was concluded no such solutions would provide the long-term benefits offered by the previously identified Modified Brown Route scheme.
2014	RIS1 published	Publication of the first RIS1. The A417 Missing Link between the Brockworth bypass and Cowley roundabout in Gloucestershire is included in the Government's 5-year investment plan for improvements to the SRN.
2015	A417 Missing Link project begins	Consultants were appointed to develop the pre-project strategy, shaping and prioritisation of the A417 Missing Link scheme. The strategy concluded that a highways scheme was the most viable transport solution, and that a major roads project should be initialised.

Year	Event	Development
2016	Options identification	Highways England progressed the options assessment and identification stage of the scheme.
February 2018 - March 2018	Non-statutory consultation on route options	Having undergone a thorough modelling and sifting process in 2016, Highways England undertook a non-statutory public consultation on two surface route options: Option 12 and Option 30.
March 2019	Preferred Route Announcement	Following feedback on the proposals, the route was modified and improved, and it was announced that Option 30 had been chosen as the preferred route. The Scheme Assessment Report (Document Reference 7.4) is published which outlines how Option 30 was selected.
September 2019 - November 2019	Statutory consultation	Highways England carried out a statutory public consultation on the scheme, developed along the Option 30 alignment. A Preliminary Environmental Information (PEI) Report was published to set out an initial assessment of the likely environmental effects of the scheme.
January 2020 – May 2020	Targeted statutory consultation with land interests	Highways England carried out additional targeted consultation with affected landowners to seek views on changes to the DCO Boundary and/or land acquisition, as well as to seek views from additional land interests identified following statutory consultation.
March 2020	RIS2 is published	RIS2 identified the A417 Missing Link as a 'committed' scheme for Road Period 2, in which construction of the project is expected to start by 1 April 2025.
July 2020	Design changes announced	Highways England announced its decision in July 2020 to make changes to the scheme's design, including the removal of the previously proposed green bridge and a change to the proposed gradient of the road on the Crickley Hill escarpment.
August 2020	Highways England's Delivery Plan 2020-2025 is published	The Delivery Plan identified the A417 Missing Link as one of 12 major enhancement schemes across the country that will be started in Road Period 2.
October 2020 – November 2020	Supplementary statutory consultation on design changes	Highways England carried out a supplementary statutory consultation to seek feedback on the proposed changes to the scheme design. A PEI report is published to set out an updated assessment of the likely environmental effects of the scheme based on the revised design, and provided further information gathered through environmental surveys carried out since the 2019 statutory consultation.
November 2020	Publication of National Infrastructure Strategy	Publication of the Government's National Infrastructure Strategy reconfirmed a commitment to investment in road infrastructure countrywide.
February 2021 – March 2021	Targeted statutory consultation with land interests	Highways England carried out an additional targeted consultation with landowners in relation to minor changes to the scheme design, the DCO Boundary and land ownership information.

2.2 Option identification, sifting and appraisal

2.2.1 As set out above, the development of the current A417 Missing Link scheme commenced following the inclusion of the scheme in RIS1 in 2014. Highways England undertook a staged assessment process which sought to consider alternatives and identify options for the scheme to take forward to a non-statutory public consultation in 2018.

Alternatives considered

2.2.2 The first stage of the current A417 Missing Link scheme was project strategy, shaping and prioritisation, during which it was concluded that the most viable transport solution to address the problems would be a highways scheme. Section 2.6 of the Scheme Assessment Report (Document Reference 7.4) sets out that alternatives to a highways scheme were considered and discounted because they would not deliver the required level of road safety improvements and congestion relief. A high-level summary of those alternatives is provided below; for a more detailed account refer to Chapter 7 of this report, ES Chapter 3 Assessment of Alternatives (Document Reference 6.2) or the Scheme Assessment Report (Document Reference 7.4).

Public transport improvements including rail

2.2.3 Improving other modes of transport, such as public transport, was considered as an option because it could reduce demand for road travel, therefore reducing congestion and improving safety through lower traffic volumes on the A417. However, Highways England identified that the extent of traffic volume reduction that would be needed to deliver such benefits would be of such a scale (over 15,000 trips per day by 2039) that it would require a widespread, transformational change to existing public transport infrastructure and mode shift in order to be successful. Furthermore, Highways England found that this option would not address other safety issues existing on the road that are not related to volumes of traffic, such as its gradient, alignment, poor forward visibility, and crossings required to be made at road level (rather than segregated).

2.2.4 Specific consideration was given to rail as an alternative option to a highways scheme, given the dominance of medium and longer distance trips on the A417. However, Highways England found that the rail services on the line between Swindon, Gloucester and Cheltenham would not be competitive in terms of frequency and journey times, compared to road travel via the A417/A419. The study found that even by doubling the rail passenger demand, through a significant change to rail services and capacity, it would only deliver half the level of congestion relief (via modal shift) required on the A417. The extent of intervention required in rail, and the fact that it would still not address inherent safety issues of the road or serve all road users, meant that this option was not considered reasonable.

Alternative routes via the Strategic Road Network

2.2.5 Highways England considered whether an alternative route using the existing SRN could be feasible for long-distance journeys, which would reduce congestion on the A417. Taking an example route between the M5 near Gloucester and the M4 near Newbury, the study found that alternative routes via other strategic roads would be significantly longer and would also pass through AONBs. In addition to the cost for road users from the additional mileage, there would be associated works required to encourage this routing amongst users. The A417 route would have to be extensively downgraded and the alternatives upgraded to attract and manage the traffic; creating additional capacity on these alternative routes would result in works located in the Cotswolds AONB or the North Wessex Downs AONB. Furthermore, these alternative routes would not be suitable for diverting or reducing more local traffic using the existing A417, particularly east-west between

Swindon and the Gloucester/Cheltenham areas. This option was therefore discounted.

Do nothing

- 2.2.6 As part of the initial assessment, Highways England also considered the option of no intervention on the A417 Missing Link. However, traffic growth forecasts identified that without intervention, the existing problems on the A417 associated with congestion, capacity, road safety and severance of Public Rights of Way (PRoW) would only be exacerbated.

Selection of Option 12 and Option 30 for consultation

- 2.2.7 Having concluded that a major highways scheme would be required in order to meet the objectives of the scheme (which are set out in Chapter 3 of this report), Highways England commenced a second stage of the project to assess the route alignment options and identify those which would be taken forward to a public consultation. That process is summarised in ES Chapter 3 Assessment of Alternatives (Document Reference 6.2) and was detailed in the Technical Appraisal Report (Document Reference 7.9) published at the resulting public consultation in 2018. A high-level summary of the process is provided below.

Sifting

- 2.2.8 Based on previous studies for the scheme and feedback from a stakeholder workshop, 30 initial route options for the A417 scheme were identified. Those options included tunnel and surface route options.
- 2.2.9 Following a four-step sifting process, six options were shortlisted and taken forward for full assessment and appraisal. This included four tunnel options (Options 3, 21, 34 and 29) and two surface options (Option 12 and Option 30). The four step sifting process is outlined below:
- Step 1: Development and categorisation of options
 - Step 2: Engineering assessment of viability of options
 - Step 3: Assessment of remaining routes using Early Assessment and Sifting Tool (EAST) Plus methodology
 - Assessment of highest scoring routes on value for money and affordability

Further assessment

- 2.2.10 The six options underwent full assessment to identify which should be taken to public consultation. They were assessed with regard to:
- a) Effect on road safety
 - b) Effects on traffic, including journey time improvements
 - c) Likely effects on the environment, including landscape, historic environment, noise, air quality and ecology
 - d) Social impacts including effects on journey times and reliability for commuters and the public, physical activity, accidents and accessibility
 - e) Cost
 - f) Economic impacts, Benefit to Cost Ratio (BCR) and value for money
- 2.2.11 Stakeholders were engaged during the assessment process as set out in the Technical Appraisal Report (Document Reference 7.9). Furthermore, additional

studies were carried out to supplement the appraisal and to aid discussions with environmental focused stakeholders. This included a sustainability performance assessment; opportunity mapping for measures that would go beyond standard mitigation; a landscape monetisation assessment; and, a landscape study.

Conclusions of assessment: discounting of tunnel options

- 2.2.12 The assessment of the six shortlisted options concluded that whilst the surface options (12 and 30) performed well, the four tunnel options (3, 21, 24 and 29) outperformed the two surface options (12 and 30) against most of the environmental, social and economic appraisal criteria. However, the assessment showed that the higher level of performance of the tunnel options could only be achieved at a substantially higher financial cost than the surface options, such that the greater benefits attached to the tunnel options would be disproportionate to the additional costs they would incur. As such, the tunnel options offered poor value for money. This is because it was found that all of the tunnel options would exceed the upper limit of the cost range set for the scheme (£500 million) and would have a BCR of less than 1.0, meaning that for every £1 invested in the scheme, a value of less than £1 would be returned. As such, the costs would exceed the estimated returns and the tunnel options would not deliver value for money for the taxpayer.
- 2.2.13 As a result of the assessment, it was determined that options containing tunnels would not be progressed to the next stage of appraisal or for further development. Instead, the two surface options, Option 12 and Option 30, were selected to be taken forward to a non-statutory public consultation because they were concluded to be affordable and deliverable, whilst providing significant improvements to the existing situation.
- 2.2.14 As set out in the recommendation of section 17.9 of the Technical Appraisal Report (Document Reference 7.9), it was identified that Option 30 was the preferred choice of Highways England when compared to Option 12 because it would provide greater benefits in relation to air quality, road safety, journey times and value for money.

2.3 Selection of a preferred route

Non-statutory public consultation (15 February 2018 – 29 March 2018)

- 2.3.1 Having identified two potential surface routes for the scheme, Highways England decided to carry out a non-statutory public consultation in 2018. The purpose of the non-statutory route options consultation was to inform the public about the proposals and seek feedback while it was at a formative stage of development, focusing in particular on the route options of Option 12 and Option 30. This non-statutory consultation was carried out to help to inform the decision for a preferred route for the scheme.
- 2.3.2 The Report on Public Consultation (Document Reference 7.5), which was published in March 2019, sets out a full account of the 2018 route options consultation including how it was carried out, the feedback received and how Highways England had regard to the feedback in selecting a preferred route for the scheme. A summary of that information is also provided in Chapter 3 of the Consultation Report (Document Reference 5.1).

Response to the non-statutory consultation

- 2.3.3 In total, approximately 800 people attended the six public consultation events held during the consultation period and 1,951 responses to the consultation were received.
- 2.3.4 The feedback received to the non-statutory consultation demonstrated overall high levels of support for the Option 30 route alignment, with 72% of all respondents stating they either agreed or strongly agreed with Highways England's proposal for Option 30. In contrast, 8% of respondents stated a preference for Option 12.
- 2.3.5 Of those supporting Option 30, reasons given were that it would better meet the scheme objective of a free-flowing road network and that it would follow a more direct alignment. It was also considered that it would cause less disruption during construction and provide better value for money. However, concerns were raised over the potential effects of the scheme on the environment and natural beauty of the area.
- 2.3.6 In addition to expressions of support for the two proposed options as presented, other views were that Highways England should:
- pursue one or any of the shortlisted tunnel options
 - modify one of the proposed options (Option 12 or Option 30) by extending the proposed cuttings or creating cut and cover tunnels in various locations
 - widen the existing road to a dual carriageway, with amendments to Air Balloon roundabout
 - implement other transport solutions that do not involve building a new road
- 2.3.7 In addition to the comments about the route options, more general comments were made about impacts of the scheme on the AONB, cultural heritage, Sites of Special Scientific Interest (SSSI), and costs of the scheme and potential impact on local communities and businesses.
- 2.3.8 The discounted tunnel options were particularly commented upon in response to Question 3 of the feedback form, which sought feedback on options other than Option 12 and Option 30 regarding the options assessment work. Disappointment was expressed by some that the tunnel options had been discounted and that at least one tunnel option did not get taken to consultation. While some comments considered that a tunnel option would have lower impact on the AONB and environment, some respondents did consider that a tunnel option would be undeliverable due to cost, construction or geological impacts.
- 2.3.9 Beyond the route alignment, feedback was also received that related to various aspects of the design of the scheme and its effects on the environment, local communities and PRow.

Preferred Route Announcement

- 2.3.10 Highways England analysed the responses to the non-statutory consultation to inform selection of a preferred route for the scheme to take forward for preliminary design.
- 2.3.11 While comments were received expressing support for one or any of the shortlisted tunnel options, Highways England considered that no such comments raised considerations which made a material difference to the appraisal and

assessment process that had been undertaken prior to the consultation, in which tunnel options were discounted. As such, Option 12 and Option 30 were further assessed, taking into account the feedback on them received in response to the consultation. The response of Highways England to the matters raised in the 2018 consultation is set out fully in the Report on Public Consultation (Document Reference 7.5) published in March 2019 and submitted as part of this DCO Application.

- 2.3.12 The Scheme Assessment Report (Document Reference 7.4) sets out how Highways England carried out further comparative assessment of Option 12 and Option 30 following the public consultation. That included an assessment of the options with respect to various impacts under the themes of economy, environmental, social and public accounts (cost). That process is also summarised in ES Chapter 3 Assessment of Alternatives (Document Reference 6.2).
- 2.3.13 The assessment identified that Option 30 had greater support from the public and would be lower cost, better value for money and provide greater benefits than Option 12, whilst also delivering a more direct route and reliable journeys on the A417 and strategic road network. It would also provide opportunities for further landscape and environmental design development, by diverting the strategic road network away from the Cotswolds escarpment edge.
- 2.3.14 As a result of the consultation and further assessment, Highways England made and published a PRA in March 2019 confirming that the scheme would be taken forward for design using the Option 30 route alignment.
- 2.3.15 At the time of the announcement, Highways England published a Preferred Route Map, a PRA summary document, the Scheme Assessment Report (Document Reference 7.4) and the Report on Public Consultation (Document Reference 7.5) to provide further information on how its decision had been reached and setting out the next steps for the scheme's development. The PRA summary document identified that a further statutory consultation on the design would be held prior to the submission of a DCO Application.

2.4 Statutory consultation

Statutory public consultation (27 September 2019 – 8 November 2019)

- 2.4.1 Between 27 September 2019 and 8 November 2019, Highways England carried out a statutory public consultation on the scheme and sought feedback on the scheme design that was developed along the Option 30 alignment. Initial information relating to the likely environmental impacts of the scheme and proposed mitigation measures was also made available to the public at this stage in the 2019 PEI Report).
- 2.4.2 The consultation sought feedback on the scheme as a whole, however the feedback questionnaire also asked respondents to comment specifically on the following aspects:
- The proposed route between Brockworth bypass and Shab Hill junction
 - The proposed green bridge
 - The proposed route from Shab Hill to Cowley junction
 - The proposals the A436 link road
 - The proposals for the repurposing of the existing A417

- Considerations required for the construction of the scheme
- The 2019 PEI Report and proposed mitigation measures

2.4.3 In total, 897 responses were submitted to Highways England in response to the statutory consultation.

2.4.4 A detailed account of how Highways England carried out the 2019 statutory consultation and had regard to the responses received is provided in Chapters 5 – 7 of the Consultation Report (Document Reference 5.1). This includes a summary of the feedback received from the general public, statutory consultees, other relevant organisations and PILs.

Design changes resulting from 2019 statutory consultation

2.4.5 In carrying out the statutory consultation, Highways England had regard to the feedback received in accordance with section 49 of the Act, and implemented a process for considering changes to the design that arose from that feedback.

2.4.6 Design changes suggested in response to the public consultation were carefully considered and assessed by specialists involved in the design, including environmental, engineering and construction experts. In addition, Highways England continued to carry out environmental assessment and surveying, and continued to engage with key stakeholders, including statutory bodies and PILs, outside of formal consultation periods.

2.4.7 The feedback received to the 2019 statutory consultation, as well as other factors outlined above, resulted in Highways England concluding that changes to the proposed scheme design were required. The changes made to the scheme sought to further enhance local connectivity and accessibility and reduce the scheme's impact on communities, the environment, and the local landscape.

2.4.8 The principal changes made to the scheme design following the 2019 statutory consultation were:

- Removal of the green bridge at Crickley Hill.
- Introduction of a new 5m width crossing – the Cotswold Way crossing - near Emma's Grove, to provide a safe crossing for users of the Cotswold Way National Trail as well as cyclists, horse riders and cattle.
- Introduction of approximately 25m crossing west of Shab Hill junction – the Gloucestershire Way crossing – to provide a crossing for bats and other wildlife and to provide a crossing for the Gloucestershire Way footpath and walkers, cyclists and horse riders (WCH).
- A change in the gradient of the A417 as it climbs the escarpment on Crickley Hill from the existing 10% to a proposed 8% gradient, rather than 10% to 7% as originally proposed.
- The B4070 to Birdlip via Barrow Wake was rerouted.
- The vehicular access to Cowley from Cowley junction, via Cowley Wood Lane, was removed to provide access for residents and WCH only.

2.4.9 Full reasoning for these changes, and a summary of other notable changes, is provided in section 7.4 of the Consultation Report (Document Reference 5.1). A summary of changes that were suggested and were not implemented is also provided.

2.4.10 Highways England considered that the significance of these changes to the scheme design was such that they should be subject to a supplementary statutory

consultation to enable statutory consultees, members of the public and PILs to have their say on the design changes.

Supplementary statutory public consultation (13 October 2020 – 12 November 2020)

- 2.4.11 Following the changes to the scheme announced in July 2020, Highways England carried out a supplementary statutory consultation between 13 October 2020 and 12 November 2020 to seek feedback on the design changes within the revised scheme. An updated version of the 2020 PEI Report was published as part of the consultation, which provided an updated assessment of the scheme and its likely environmental effects based on the revised scheme design and identified proposed mitigation and enhancement measures.
- 2.4.12 The supplementary statutory consultation sought feedback on the revised scheme as a whole, however the feedback questionnaire also asked respondents to comment specifically on the following design changes:
- The Cotswold Way crossing
 - The Gloucestershire Way crossing
 - The change in gradient on Crickley Hill
 - The change to Cowley junction
 - The rerouting of the B4070 to Birdlip
 - The changes made to proposals for PRoW
 - The replacement of Common Land
 - The 2020 PEI Report and environmental effects of the scheme
- 2.4.13 Due to national restrictions in place at the time of the consultation due to the Covid-19 pandemic, the supplementary statutory consultation was necessarily carried out in a 'digital-first' format, with no local public information events held.
- 2.4.14 In total, 433 responses were submitted to Highways England in response to the supplementary statutory consultation.
- 2.4.15 A detailed account of how Highways England carried out the 2020 supplementary statutory consultation and had regard to the responses received is provided in Chapters 8 – 10 of the Consultation Report (Document Reference 5.1). This includes a summary of the feedback received from the general public, statutory consultees, other relevant organisations and PILs.

Design changes resulting from 2020 supplementary statutory consultation

- 2.4.16 In analysing and taking account of the feedback received to the 2020 supplementary consultation, Highways England assessed and considered suggested changes to the scheme design, using the same process as described above in relation to the 2019 statutory consultation. Highways England also continued to engage with stakeholders and PILs outside of the formal consultation periods to further discuss relevant matters.
- 2.4.17 Following the 2020 supplementary consultation, Highways England decided to make a number of further changes to the scheme design. The principal changes made were:
- The Gloucestershire Way was widened from approximately 25m to 37m and additional 'greening' of the crossing was incorporated into the design.

- The viewing platform on the Cotswold Way crossing was removed, however a resting area was retained.
- Habitat 'stepping-stones' were added to improve ecological connections between the Crickley Hill and Barrow Wake SSSI and Ullen Wood via the Gloucestershire Way crossing.
- Replacement Common Land was reshaped to be adjacent and separate to the repurposed A417 (Air Balloon Way), which was extended to the Cotswold Way crossing.
- Parking areas proposed near to Birdlip were relocated to near the Golden Heart Inn and refined.

- 2.4.18 Full reasoning for these changes, and a summary of other notable changes, is provided in section 10.4 of the Consultation Report (Document Reference 5.1). A summary of changes that were suggested and were not implemented is also provided.
- 2.4.19 These changes were not considered to be as significant in nature as the changes made following the 2019 statutory consultation and therefore Highways England considered that a further statutory public consultation was not required. Rather, some PILs were consulted through a targeted statutory consultation to seek feedback on changes that affected their land interest.

Targeted statutory consultation with PILs (2020 - 2021)

- 2.4.20 In addition to the statutory public consultations carried out in 2019 and 2020, Highways England carried out five targeted statutory consultations with PILs. These targeted consultations sought to inform PILs of changes made to the scheme design, to the DCO Boundary or to the type of land acquisition proposed which affected their land interest. In addition, targeted consultation was carried out when further technical assessment or diligent inquiry identified new land interests which had not previously been consulted. The five targeted statutory consultations were:
- Targeted Consultation 1 (13 January 2020 to 11 February 2020): Changes to the scheme following statutory consultation
 - Targeted Consultation 2 (19 March 2020 to 16 April 2020): Further changes to the scheme
 - Targeted Consultation 3 (11 March 2020 to 9 April 2020): Consultation with Category 3 land interests
 - Targeted Consultation 4 (22 April 2020 – 21 May 2020): Consultation with further identified land interests
 - Targeted consultation 5 (8 February 2021 – 9 March 2021): Consultation relating to further changes to the scheme and further identified land interests
- 2.4.21 Further detail on the purpose of these consultations, how they were carried out and how Highways England has had regard to the feedback received in accordance with section 49 of the Act is provided in Chapter 11 of the Consultation Report (Document Reference 5.1).
- 2.4.22 In addition to the targeted statutory consultations, Highways England has continued to engage with PILs through meetings and written communication. Changes requested by PILs through formal responses to the consultations and through other forms of engagement have been considered in the same manner as outlined above, with Highways England assessing the change before deciding

whether or not to implement it. Whilst many of these changes are comparatively minor in nature, key design changes made as a result of feedback from PILs are set out in the Consultation Report. A more detailed summary of changes made to the scheme design is provided in ES Chapter 3 Assessment of Alternatives (Document Reference 6.2), where it is identified if that change was made in response to PIL feedback or request.

2.5 Summary

- 2.5.1 This chapter has provided an overview of the history of the scheme, setting out a timeline of its development to date and identifying key milestones. It has provided a summary of the options appraisal process that led to the selection of Option 30 as the preferred route of the scheme, in which alternatives were considered and discounted, including tunnel options.
- 2.5.2 This chapter has also set out how Highways England has developed the scheme design informed by consultation and engagement with stakeholders, PILs and the general public. This has included carrying out a non-statutory public consultation to inform the selection of a preferred route; carrying out two statutory public consultations on the scheme design and subsequent changes; and, carrying out five targeted consultations with PILs on matters relating to land acquisition.
- 2.5.3 Finally, this chapter has demonstrated how Highways England has developed the scheme in an iterative, staged approach informed by both technical and environmental assessment and feedback from stakeholders. This has resulted in the implementation of significant changes to the scheme design where necessary to achieve to the landscape-led vision of the scheme, whilst still also delivering the required road safety improvements and value for money.

3 The scheme

3.1.1 This Chapter provides a high-level description of the scheme; a description of the scheme location; as well as detailing the scheme vision, design principles, scheme specific objectives and summarises how they align with the strategic objectives of the NPSNN. This section concludes with a summary on how the scheme conforms with the strategic objectives of the NPSNN.

3.1 Overview of scheme

- 3.1.1 The scheme would provide 3.4 miles (5.5km) of new, rural all-purpose dual carriageway for the A417. The new dual carriageway would connect the existing A417 Brockworth bypass with the existing dual carriageway A417 south of Cowley. The new dual carriageway would be completed in-line with current trunk road design standards. The section to the west of the existing Air Balloon roundabout would follow the existing A417 corridor, but to the south and east of the Air Balloon roundabout, the corridor would be offline, away from the existing road corridor.
- 3.1.2 The project would include a new crossing near Emma's Grove for WCH including disabled users, which would accommodate the Cotswold Way National Trail. A new junction would be incorporated at Shab Hill, providing a link from the A417 to the A436 (towards the A40 and Oxford), and to the B4070 (for Birdlip and other local destinations).
- 3.1.3 A new 37m wide multi-purpose crossing would provide essential mitigation for bats and enhancement opportunity of ecology and landscape integration. The public would also further benefit as the crossing would accommodate the Gloucestershire Way and provide an improved visitor experience.
- 3.1.4 A new junction would be included near Cowley, replacing the existing Cowley roundabout, making use of an existing underbridge to provide access to local destinations. The use of the existing underbridge would allow for all directions of travel to be made.
- 3.1.5 The current A417 between the existing 'Air Balloon roundabout' and 'Cowley roundabout' would be detrunked for its entire length. Some lengths of the existing road would be converted into a route for WCH including disabled users. Other sections would be retained as lower-class public roads, maintaining local access for residents. Some of the route would provide Common Land.
- 3.1.6 A detailed description of the scheme is provided in ES Chapter 2 The Project (Document Reference 6.2).

3.2 Scheme location

- 3.2.1 The A417/A419 is located along a strategic route between Gloucester and Swindon that provides an important link between the Midlands and south of England. The route is an alternative to the M5/M4 route via Bristol. The section of the A417 near Birdlip, known as the 'Missing Link', forms the only section of single carriageway along the route and is in the Cotswolds AONB. The location of the scheme is shown on the Location Plan (Document Reference 2.1).
- 3.2.2 The surrounding area of the existing A417 route contains a mix of agricultural land, woodland and Common Land. The nearest village is Birdlip, situated

approximately midway between Cowley roundabout to the east and Brockworth bypass to the west. Cowley village is located east of the scheme, between Cockleford and Coberley. Crickley Hill Country Park is situated immediately west of the Air Balloon roundabout.

- 3.2.3 The land required temporarily or permanently for the construction, operation and maintenance of the scheme is within the scheme boundary shown on the Land Plans (Document Reference 2.2).
- 3.2.4 The scheme is situated entirely within the Cotswolds AONB. The Cotswolds AONB is characterised by the presence of low-lying vales, steep escarpment, high wold and valleys. The escarpment also provides the setting for the Cotswold Way National Trail.
- 3.2.5 There are also ecological and heritage assets which contribute to the character of the landscape. These are identified in ES Figure 1.3 Environmental constraints plan (Document Reference 6.3). Adjacent to the existing A417, on the slopes of the escarpment is Crickley Hill and Barrow Wake SSSI. South-west of the study area is Cotswold Beechwoods Special Area of Conservation (SAC). Further south on the High Wold is Bushley Muzzard SSSI at Brimpsfield and to the east is Cowley Manor, a Grade II* Registered Park and Garden (RPG). Refer to the Heritage Designation Plans (Document Reference 2.12) and Environmental Features—Statutory or Non-Statutory Sites or Features of Nature Conservation (Document Reference 2.9) which identify the location of these features. These designations reflect the conservation value of the region, and its rich heritage of human settlement.
- 3.2.6 The extent of the scheme is wholly contained within the boundaries of Gloucestershire County Council (GCC), Cotswold District Council (CDC) and Tewkesbury Borough Council (TBC) (the host authorities).

3.3 Scheme objectives

- 3.3.1 The Cotswolds AONB is the largest of 38 AONBs in England and Wales, and the second largest protected landscape in England after the Lake District National Park. In view of its special landscape character, there is a clear need to balance economic and social benefits of an improved road against potentially negative environmental impacts.
- 3.3.2 The upgrading of this section of the A417 to dual-carriageway must be carried out in a way that is sensitive to the surrounding Cotswolds AONB.
- 3.3.3 The integrated project team have worked closely with key stakeholders including GCC, Cotswolds Conservation Board (CCB), National Trust (NT), Gloucestershire Local Nature Partnership (GLNP), Gloucestershire Wildlife Trust (GWT) and Gloucestershire Local Enterprise Partnership (GFirst LEP) to develop a scheme specific vision statement, four scheme specific objectives and a number of sub-objectives.
- 3.3.4 The Cotswolds AONB is managed and looked after by CCB.
- 3.3.5 The scheme vision, design principles, four scheme specific objectives and associated sub-objectives are identified in Table 3-1.

Table 3-1 Scheme vision, design principles, objectives and sub-objectives

Scheme vision				
<p><i>A landscape-led highways improvement scheme that will deliver a safe and resilient free-flowing road whilst conserving and enhancing the special character of the Cotswolds AONB; reconnecting landscape and ecology; bringing about landscape, wildlife and heritage benefits, including enhanced visitors' enjoyment of the area; improving local communities' quality of life; and contributing to the health of the economy and local businesses.</i></p>				
Scheme design principles				
<p>Any solution involving a new road must ensure that the scheme is designed to meet the character of the landscape, not the other way around.</p> <p>Any scheme should bring about substantial benefits for the Cotswolds landscape and environment as well as people's enjoyment of the area.</p> <p>Any scheme must have substantially more benefits than negative impacts for the Cotswolds AONB.</p>				
Scheme objectives				
<p>Safe, resilient and efficient network: to create a high-quality resilient route that helps to resolve traffic problems and achieves reliable journey times between the Thames Valley and West Midlands as well as providing appropriate connections to the local road network.</p>	<p>Improving the natural environment and heritage: to maximise opportunities for landscape, historic and natural environment enhancement within the Cotswolds AONB and to reduce negative impacts of the scheme on the surrounding environment.</p>	<p>Community and access: to enhance the quality of life for local residents and visitors by reducing traffic intrusion and pollution, discouraging rat-running through villages and substantially improving public access for the enjoyment of the countryside.</p>	<p>Supporting economic growth: to facilitate economic growth, benefit local businesses and improve prosperity by the provision of a free-flowing road giving people more reliable local and strategic journeys.</p>	
Scheme sub-objectives				
1	<p>Road safety would be improved by designing to current standards and better separating strategic and local traffic.</p>	<p>The scheme would have an identity which reflects, conserves and enhances the character of the local landscape.</p>	<p>The scheme would enhance community cohesion by improving local connectivity and accessibility by helping to separate strategic and local traffic.</p>	<p>The scheme would contribute towards national transport policies that support economic growth.</p>
2	<p>The scheme would be designed to provide greater road traffic capacity, improved network resilience and better journey time reliability for strategic and local journeys.</p>	<p>The scheme would improve landscape and ecological connectivity through landscape and habitat restoration and creation.</p>	<p>The scheme would reduce rat-running on local roads through provision of a more reliable strategic route with improved capacity, thereby enhancing the amenity of local settlements.</p>	<p>The scheme would complement Development Plans published by local authorities in the region to support regional and local economic growth and prosperity.</p>
3	<p>The scheme would enhance operational efficiency, improve maintenance safety and support best value whole-life cost benefits.</p>	<p>The horizontal and vertical alignments of the scheme would pay due regard to the nature of the local landform.</p>	<p>The scheme would contribute towards community and recreational opportunities through improved provision for</p>	<p>The scheme would contribute to the health of the local visitor economy through improved access and visitor experience of the Cotswolds AONB.</p>

			motorised and non-motorised users.	
4	The scheme would consider appropriate relaxations or departures from highways standards to reduce the environmental impact of the road without compromising safety.	The siting and form of structures, cuttings, embankments and landscape mounding would reflect local topography and landform.	The scheme would reduce road noise by applying sensitive noise mitigation measures where required.	The scheme would reduce disruption to local economic interests and businesses during both construction and operation.
5		The design of structures would be of lasting architectural quality.	The scheme would reduce light pollution through sensitive structural, junction, and lighting design and sign illumination.	The scheme would restore redundant highways land to agricultural, public access, community or nature benefit uses where appropriate.
6		The scheme would avoid significant interruption to groundwater flows or negative impacts on the aquifer, springs and watercourses.	The scheme would improve air quality by reducing pollution from traffic congestion.	The scheme would support the development and employment of local skills in its construction.
7		The scheme would avoid or, where absolutely necessary, reduce the direct loss of National Trust land, other areas owned and managed for conservation, open access land and country parks and at the same time reduce intrusion upon such land.	The scheme would improve continuity of access to the PRow network, the Cotswold Way National Trail and the Gloucestershire Way long distance footpath.	The scheme would seek sustainable opportunities to use locally sourced construction materials to support the local economy.
8		The scheme would enable enhanced preservation of heritage assets and their settings and adopt designs that reflect and enhance the historic character of the area.		

3.4 Alignment of the scheme with NPSNN strategic objectives

3.4.1 It is considered that the four key objectives of the scheme closely align with the strategic objectives of the NPSNN, as set out in Table 3-2.

Table 3-2 NPSNN and scheme objectives

NPSNN strategic objectives⁶	Scheme objectives
Networks with the capacity and connectivity and resilience to support national and local economic activity and facilitate growth and create jobs.	Supporting economic growth: to facilitate economic growth, benefit local businesses and improve prosperity by the provision of a free flowing road giving people more reliable local and strategic journeys.
Networks which support and improve journey quality, reliability and safety.	Safe, resilient and efficient network: to create a high-quality resilient route that helps to resolve traffic problems and achieves reliable journey times between the Thames Valley and West Midlands as well as providing appropriate connections to the local road network.
Networks which support the delivery of environmental goals and the move to a low carbon economy.	Improving the natural environment and heritage: to maximise opportunities for landscape, historic and natural environment enhancement within the Cotswolds AONB and to reduce negative impacts of the proposed scheme on the surrounding environment.
Networks which join up our communities and link effectively to each other.	Community & access: to enhance the quality of life for local residents and visitors by reducing traffic intrusion and pollution, discouraging rat-running through villages and substantially improving public access for the enjoyment of the countryside.

3.5 Summary

- 3.5.1 This Chapter has provided a high-level description of the scheme; a description of the scheme location; as well as detailing the scheme vision, design principles, scheme specific objectives and how they align with the strategic objectives of the NPSNN.
- 3.5.2 Table 3-3 summarises how the scheme supports and meets the strategic objectives of the NPSNN.
- 3.5.3 The next Chapters of this report will outline the transport case, detailing how the scheme will meet the objective for a 'safe, resilient and efficient network', and the economic case detailing how the scheme will meet the objective for 'supporting economic growth'.

⁶ Government's vision and strategic objectives for the national networks, Page 9, National Policy Statement for National Networks (December 2014)

Table 3-3 Conformity of the scheme with the NPSNN strategic objectives

NPSNN strategic objectives	Conformity of the scheme
<p>Networks with the capacity and connectivity and resilience to support national and local economic activity and facilitate growth and create jobs.</p>	<p>In relation to capacity and connectivity, as detailed in Chapter 4 of this report, the forecast increases in traffic on the A417 in the vicinity of the scheme are a result of traffic rerouting from various alternative roads and corridors, both local and strategic, to take advantage of the improvements to the route.</p> <p>At a local level, traffic is forecast to reroute away from existing known rat runs including via Elkstone towards Cheltenham and also via Birdlip Hill towards Gloucester. Traffic reductions are also forecast on the A436 with the scheme.</p> <p>At a strategic level, traffic is forecast to decrease on the M40 north of Banbury, the A34 north of Oxford and the M5 south of Cheltenham and Gloucester, and increase on the M4 east of Swindon and on the M5 north of Cheltenham and Gloucester, showing that traffic is rerouting to the A417 with the scheme in-situ.</p> <p>In relation to local economic activity and facilitate growth and create jobs, as detailed in Chapter 5 of this Report:</p> <ul style="list-style-type: none"> • The scheme is forecast to achieve significant wider economic benefits of £140.3 million. • The scheme is forecast to achieve substantial overall benefits, with a PVB of £305.8 million. • The adjusted BCR, which includes monetised journey time reliability and wider economic benefits, is estimated at 2.51. Based on the DfT’s Value for Money Framework the scheme is in the medium value for money category.
<p>Networks which support and improve journey quality, reliability and safety.</p>	<p>As detailed in Chapter 4 of this report, journey times for traffic using the A417 are forecast to decrease significantly as a result of the scheme. Journey times for traffic using the A436 and the A417 are forecast to decrease during certain times of day and directions and are forecast to increase for others.</p> <p>As described in Chapter 5 of this report the following journey time reliability benefits are expected:</p> <ul style="list-style-type: none"> • Total forecast monetised transport user benefits of £255.8 million are primarily a result of forecast journey time savings. • Forecast business user journey time reliability benefits of £39.9 million, representing an improved ability to plan business journeys and for transport providers to schedule business operations. • Forecast commuting and other user journey time reliability benefits of £30.6 million, representing an improved ability for employees to arrive at work on time and to keep to appointment times. <p>As detailed in Chapters 4 and 5 of this Report, the following benefits are expected to support and improve safety:</p> <ul style="list-style-type: none"> • The scheme is forecast to result in a large reduction in the number of KSI casualties, with 66 fewer fatalities and 201 fewer seriously injured over the 60-year appraisal period.

NPSNN strategic objectives	Conformity of the scheme
	<ul style="list-style-type: none"> Significant forecast accident benefits valued at £64.9 million across the 60-year appraisal period (2010 prices, discounted to 2010), due to substantial reduction in fatal and serious casualties.
<p>Networks which support the delivery of environmental goals and the move to a low carbon economy.</p>	<p>Chapters 6 – 10 of this report details how the scheme conforms with an assessment of the scheme against the requirements of the NPSNN as per the assessment principles and generic impacts within it.</p> <p>Highways England has taken a landscape-led approach to the scheme design which has sought to minimise or avoid adverse effects on the Cotswolds AONB landscape and its special qualities and where possible, sought to identify opportunities for enhancement. This is set out in further detail within the Design Summary Report (Document Reference 7.7) and Chapter 7 of this report.</p> <p>In relation to air quality, as outlined in Chapter 6 of this report. ES Chapter 5 Air Quality (Document Reference 6.2) concludes that the scheme would not result in significant effects on human health due to changes in air quality during construction or operation. It further concludes that there is no risk of affecting the UK’s ability to achieve compliance with the Air Quality Directive.</p> <p>As identified in section 5.7 of ES Chapter 5 Air Quality (Document Reference 6.2), there are two AQMA’s within 200m of the affected road network (ARN); Birdlip AQMA in Cotswold District and Cheltenham AQMA in Cheltenham Borough. The assessment concludes that there are no significant effects predicted in AQMAs.</p> <p>The existing A417 is a source of noise for nearby residents and other sensitive receptors. During operation of the scheme, ES Chapter 11 Noise and Vibration (Document Reference 6.2) identifies that a greater number of residential properties would experience significant beneficial noise effects than would experience significant adverse noise effects. The forecast reduction in noise impacts valued at £0.5 million and due in part to a reduction in traffic on local roads.</p> <p>ES Chapter 11 identifies that there would be direct beneficial significant noise effects on non-residential receptors: several non-residential receptors in Birdlip, including the Primary School and the Village Hall; along the existing section of A417 highway to be removed along the Cotswold Way; on part of the Gloucestershire Way long distance footpath between the Air Balloon roundabout and Coberley to the east; and on footpath links running for approximately 0.6 miles (one kilometre) to the east from Stockwell.</p> <p>In relation to ES Chapter 13 Road Drainage and the Water Environment (Document Reference 6.2) concludes that there would be no significant effects on the water environment resulting from the operation of the scheme. Furthermore, whilst there would be a temporary adverse significant effect during construction relating to the realigned tributary of Norman’s Brook, ES Chapter 13 Road Drainage and the Water Environment (Document Reference 6.2) identifies that a permanent outcome of the scheme would be enhancement to the ecological connectivity of aquatic species habitat in the realigned tributary of Norman’s Brook. Overall, the scheme would provide betterment of the existing road drainage system and improve the water quality of receiving waterbodies, whilst there would be</p>

NPSNN strategic objectives	Conformity of the scheme
	<p>additional enhancement via the removal or upgrading of existing foul drainage outfalls at some properties.</p> <p>A WFD compliance assessment has been completed and is included in Appendix 13.2 WFD Compliance Assessment (Document Reference 6.4). As reported in ES Chapter 13 Road Drainage and the Water Environment (Document Reference 6.2) this assessment indicates that the scheme would not result in a change in status of any WFD quality elements or prevent any water bodies from reaching 'Good' status in the future. The effect of the scheme is therefore assessed as neutral and not significant.</p> <p>It is considered that the scheme is compatible with the objective of supporting the move towards a low carbon economy. The assessment of effects on the environment, including climate change, is set out in ES Chapter 14 Climate (Document Reference 6.2).</p> <p>It concludes that whilst assets and infrastructure designed as part of the scheme are likely to be affected by climate change, such risks have been identified, assessed and mitigated for. Therefore, there would be no significant effects relating to the scheme's vulnerability to climate change during its construction and operation.</p> <p>It is also considered that this magnitude of emissions from the scheme in isolation would not have a material impact on the ability of the UK Government to meet its carbon budgets, and therefore is not anticipated to give rise to a significant effect on climate. Detailed consideration of carbon emissions is set out in Section 6.3 of Chapter 6 of this report.</p> <p>The scheme would contribute to sustainable development, helping better connect people to open space, services, facilities and communities as detailed further below.</p>
<p>Networks which join up our communities and link effectively to each other.</p>	<p>The scheme would help to join up communities and reduce journey times on this section of the A417. The scheme will improve journey times and network reliability in the area, which will also help to improve links between communities in the area.</p> <p>As outlined in Chapter 12 Population and Human Health (Document Reference 6.2), the scheme includes numerous proposals that seek to improve accessibility and connectivity across the PRoW network within the study area.</p> <p>The scheme would enhance the provision for walking, cycling and horse riding and the PRoW network with the following new features:</p> <ul style="list-style-type: none"> • The Cotswold Way crossing – a 5 metre wide restricted byway crossing, in the vicinity of Emma's Grove and connecting to Cold Slad is proposed, to provide benefits including a grade separated diversion of the Cotswold Way National Trail. • The Gloucestershire Way crossing - a new 37 metre wide multi-purpose crossing would provide essential mitigation for bats and enhancement opportunity of ecology and landscape integration.

NPSNN strategic objectives	Conformity of the scheme
	<p>The public would also further benefit as the crossing would accommodate the Gloucestershire Way long distance footpath and provide an improved visitor experience.</p> <ul style="list-style-type: none"> • Cowley overbridge – this crossing over the new A417 would provide access between Stockwell and Cowley. • Stockwell overbridge – this crossing over the new A417 would primarily provide a farm access track from Stockwell Farm in an east-west direction. The crossing would include provision for WCH, helping connect into existing routes to help improve connectivity for WCH. • Grove Farm underpass – this underpass would provide access to local properties and agricultural land, with provision for WCH via new sections of bridleway and footpath diversions to connect Cold Slad Lane. • Repurposed A417 – part of the existing A417 would be repurposed to provide a restricted byway connection between new car parking near the Stockwell Lane junction and the Cotswold Way crossing (and beyond), proposed to be called the ‘Air Balloon Way’. <p>With the measures set out above and within ES Appendix 2.1 EMP PRoW Management Plan, it is considered that construction of the scheme would lead to slight adverse effects on the majority of WCH during construction of the scheme, by virtue of the local and temporary disruption to users, which would not be significant.</p> <p>During operation, it is considered that the proposals would bring moderate beneficial effects to the PRoW and WCH network in the local area, which would be significant to users and the local communities.</p>

4 Transport case for the scheme

4.1 Overview of transport modelling and appraisal

- 4.1.1 The A417 Missing Link traffic model was developed using Highways England's South West Regional Traffic Model (SWRTM) with a number of enhancements made to improve the performance of the model local to the scheme. SWRTM is one of five Regional Traffic Models developed to provide the basis for the appraisal of RIS and Road Investment Programme (RIP) schemes.
- 4.1.2 The A417 Missing Link traffic model is a variable demand highway model developed in SATURN (version 11.4.07H).
- 4.1.3 At the option selection stage, the traffic model with the scheme reflected the design at that time. At the current Preliminary Design Stage, the traffic model with the scheme is based on the design at August 2020. The differences between the option selection scheme and the August 2020 scheme in terms of highway design are summarised as follows:
- Change in gradient along Crickley Hill from proposed 7% to proposed 8%;
 - Realignment of the B4070 Shab Hill/Birdlip link road;
 - Minor changes to the form of Shab Hill junction;
 - Minor changes to the form of Cowley junction; and
 - Closure of Cowley Wood Lane to motor vehicles.
- 4.1.4 Although the A417 Missing Link traffic model is based on an earlier scheme design than that now proposed within the DCO Application, design changes between August 2020 and December 2020 (when the DCO Application design was 'fixed') have related to drainage design, environmental mitigation and other refinements which do not materially change the forecast traffic modelling outcomes.
- 4.1.5 Outputs from the A417 Missing Link traffic model have been used in the economic appraisal of the scheme as discussed in Chapter 5 of this report.

4.2 Base year data

- 4.2.1 A review of existing and newly collected traffic data was undertaken. The data types are summarised below, and details of the review are included in the Combined Modelling and Appraisal Report (ComMA Report) (Document Reference 7.6):
- Automatic Traffic Count (ATC) data;
 - Manual Classified Turning Count (MCTC) data;
 - Journey Time data;
 - Matrix data;
 - Mapping data;
 - Operational data; and
 - Accident data.

4.3 Base year model development

- 4.3.1 The A417 Missing Link base year traffic model represents an average March 2015 weekday. A single average hour is modelled for four time-periods; AM peak,

inter peak, PM peak and off peak. Different user classes (combining vehicle class and journey purpose) are included in the model.

- 4.3.2 Most of the link speeds, link lengths and node locations in the model have been taken directly from the SWRTM with further enhancements made to provide a more detailed representation of local routes, junction configuration, signal plans and link characteristics.
- 4.3.3 Trip matrices determine the origins and destinations of travel demand within the model for each user class and for each time period. The model base year trip matrices have been taken directly from the SWRTM.

4.4 Base year calibration and validation

- 4.4.1 Model calibration and validation aims to achieve a good fit between modelled and observed link flows, turning movements and journey times through network adjustment and matrix estimation.
- 4.4.2 The DfT’s Transport Analysis Guidance (TAG) Unit M3.1 sets out validation criteria and acceptability guidelines for highway assignment models. These are presented in Table 4.1 below.

Table 4-1 TAG validation criteria

Criteria	Description of criteria	Acceptability guidelines
Screenline flow validation criterion and acceptability guidelines		
	Difference between modelled flows and counts should be less than 5% of the counts	All or nearly all screenlines
Link flow and turning movement validation criterion and acceptability guidelines		
1	Individual flows within 100 vehicles per hour (vph) for flows < 700 vph	>85% of cases
	Individual flows within 15% for flows 700-2700 vph	
	Individual flows within 400 vph for flows > 2700 vph	
2	GEH < 5 for individual flows	>85% of cases
Journey time validation criterion and acceptability guidelines		
	Modelled journey times along routes should be within 15% of surveyed times (or 1 minute, if higher than 15%)	>85% of routes

Source: TAG Unit M3.1, Table 2 (further details in the ComMA Report, Document Reference 7.6)

- 4.4.3 Table 4.2 summarises the calibration and validation performance of the A417 Missing Link base year model.

Table 4-2 Model Performance Summary

TAG Criteria	Acceptability Guidelines	Calibration/Validation	AM	IP	PM
Screenlines within 5%	All or nearly all	Calibration	100%	100%	95%
		Validation	100%	100%	83%
		Total	100%	100%	92%
Screenlines GEH <4	>85%	Calibration	100%	100%	100%
		Validation	100%	100%	100%

TAG Criteria	Acceptability Guidelines	Calibration/Validation	AM	IP	PM
		Total	100%	100%	100%
Links and turns passing GEH or flow criteria	>85%	Calibration	93%	97%	94%
		Validation	96%	100%	100%
		Total	93%	97%	95%
Journey Time Routes within 15%	>85%	Validation	100%	100%	100%

Source: PCF Stage 2 ComMA (further details in the ComMA Report, Document Reference 7.6)

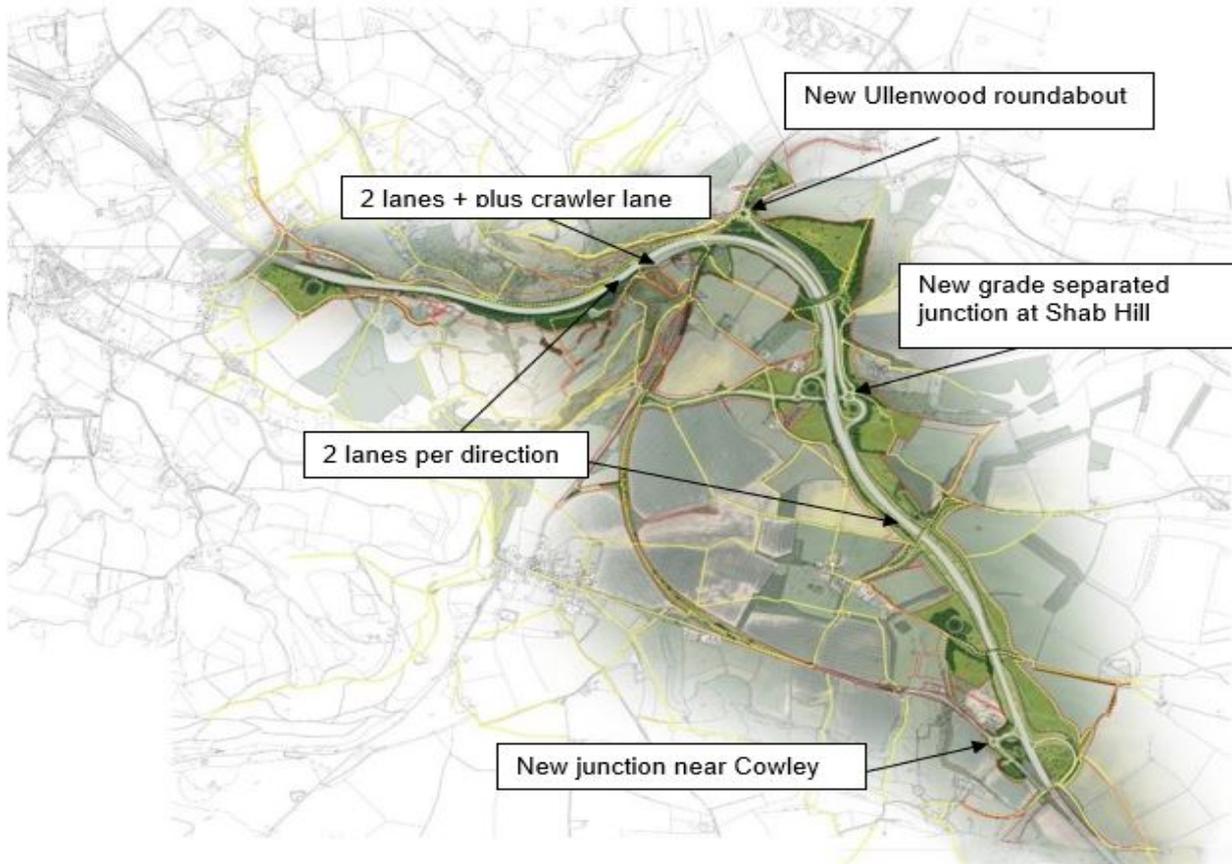
4.4.4 These results show that the A417 Missing Link base year model calibration and validation performance is good and, against some criteria, excellent.

4.5 Future year model development

4.5.1 The current estimated opening year for the scheme is 2026, and the scheme design year is 2041. Two additional forecast years, consisting of an intermediate year of 2031 and a final forecast year of 2051, each used in the economic appraisal, have also been modelled.

4.5.2 Forecast year Do-Minimum “without scheme” and Do-Something “with scheme” models have been developed for each time period as per the A417 Missing Link base year traffic model. The Do-Minimum models capture the enhancements made in the A417 Missing Link base year traffic model as well as proposed forecast year developments and transport infrastructure based on their level of certainty. Full details of this process can be found in the ComMA Report (Volume 7, Document Reference 7.6).

4.5.3 The Do-Something model is the Do-Minimum model plus the scheme. The alignment of the scheme is shown in Figure 4-1.

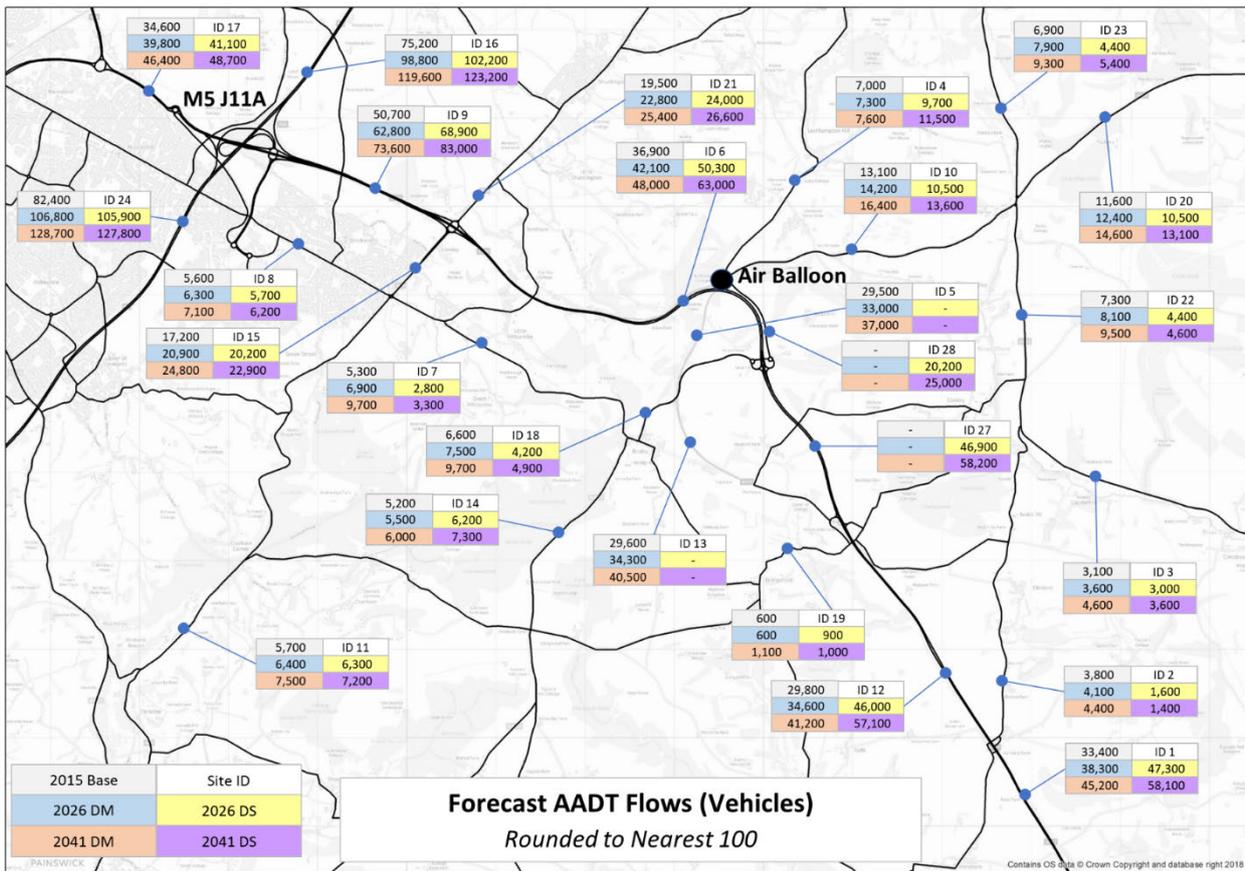


Source: PCF Stage 3 ComMA Report (Document Reference 7.6)

Figure 4-1 A417 Scheme Alignment

4.6 Future year model results

- 4.6.1 Forecast Annual Average Daily Traffic (AADT) at key locations in the vicinity of the scheme for the base year Do-Minimum (DM) and Do-Something (DS) models is presented in Figure 4-2.



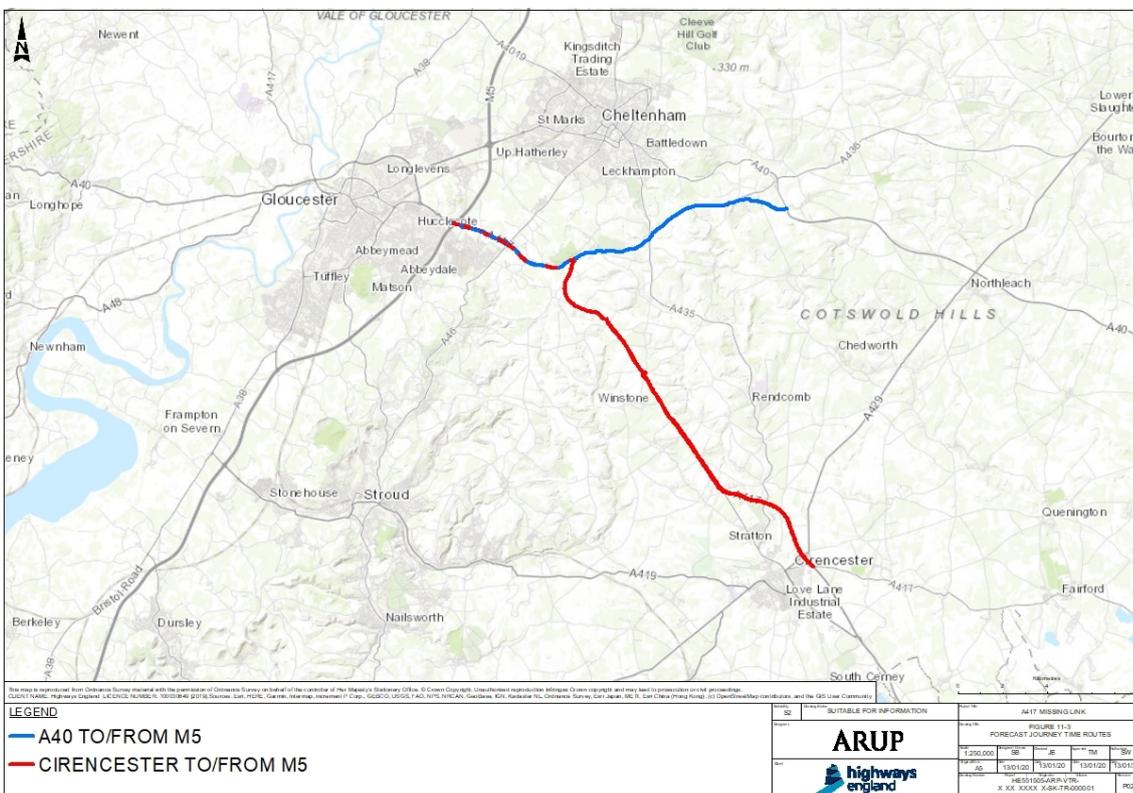
Source: PCF Stage 3 ComMA Report (further details in the ComMA Report, Document Reference 7.6)

Figure 4-2 Forecast AADT in Local Area

Do-Something traffic impacts

- 4.6.2 AADTs on the new dual carriageway section to the south of the new grade separated junction at Shab Hill (ID 27) are forecast to be 46,900 in 2026 and 58,200 in 2041. These are increases of 37% and 44% respectively when compared to the corresponding single carriageway section (ID 13) of the Do-Minimum. HGV proportions are forecast to change from 10% to 8% in 2026 and from 8% to 7% in 2041.
- 4.6.3 On the Crickley Hill section of the new dual-carriageway (ID 6) AADTs are forecast to be 50,300 in 2026 and 63,000 in 2041 with the scheme. These are increases of 19% and 31% respectively when compared to the Do-Minimum. HGV proportions are forecast to change from 11% to 9% in 2026 and from 10% to 8% in 2041.
- 4.6.4 Flows on the existing adjacent dual carriageway sections of the A417 are also forecast to increase as a result of the scheme. To the south of the A417 Elkstone junction (ID 1) AADTs are forecast to increase from 38,300 to 47,300 (+23%) between the Do-Minimum and Do-Something in 2026 and from 45,200 to 58,100 (+29%) in 2041. HGV proportions are forecast to change from 9% to 8% in 2026 and from 8% to 7% in 2041. To the west of Brockworth bypass (ID 9) AADTs are forecast to increase from 62,800 to 68,900 (+10%) between the Do-Minimum and Do-Something in 2026 and from 73,600 to 83,000 (+13%) in 2041. HGV proportions are forecast to change from 8% to 7% in 2026 and from 7% to 6% in 2041.

- 4.6.5 The forecast increases in traffic on the A417 in the vicinity of the scheme are a result of traffic rerouting from various alternative roads and corridors, both local and strategic, to take advantage of the improvements to the A417.
- 4.6.6 At a local level, traffic is forecast to reroute away from existing known ‘rat runs’ including via Elkstone towards Cheltenham and also via Birdlip Hill towards Gloucester.
- 4.6.7 Through Elkstone (ID 2) the AADT with the scheme is forecast to decrease compared to the Do-Minimum from 4,100 to 1,600 (-61%) in 2026 and from 4,400 to 1,400 (-68%) in 2041. HGV proportions are forecast to change from 3% to 6% in 2026 and from 2% to 6% in 2041.
- 4.6.8 On Birdlip Hill (ID 7) the AADT with the scheme is forecast to decrease compared to the Do-Minimum from 6,900 to 2,800 (-59%) in 2026 and from 9,700 to 3,300 (-66%) in 2041. HGV proportions are forecast not to change significantly in 2026 or in 2041.
- 4.6.9 At a strategic level, forecast AADT decreases on the M40 north of Banbury, the A34 north of Oxford and the M5 south of Cheltenham and Gloucester, coupled with increases on the M4 east of Swindon and on the M5 north of Cheltenham and Gloucester, show that traffic is rerouting to the A417 with the scheme in-situ.
- 4.6.10 To illustrate the impact of the scheme on forecast journey times, analysis has been undertaken for the following routes, which are shown in Figure 4-3:
 - A417 between the A429 junction at Cirencester and the M5/A417/B4641 roundabout; and
 - A40/A436 junction at Shipton to the M5/A417/B4641 roundabout.



Source: PCF Stage 3 ComMA Report (further details in the ComMA Report, Document Reference 7.6)

Figure 4-3 Forecast Journey Time Routes

4.6.11 Table 4-3 and Table 4-4 present the modelled journey times for the A417 route between Cirencester and the M5 for the westbound and eastbound directions respectively. The Do-Something percentage differences shown are relative to the corresponding Do-Minimum scenario. The Do-Minimum percentage differences are relative to the 2015 Base scenario.

Table 4-3 A417 Modelled Journey Times – Cirencester to M5 (westbound)

Year	Scenario	AM Peak		Inter Peak		PM Peak	
		Time (mm:ss)	% Diff.	Time (mm:ss)	% Diff.	Time (mm:ss)	% Diff.
2015	Base	17:33	N/A	17:12	N/A	18:25	N/A
2026	Do-Minimum	18:19	+4%	17:55	+4%	18:55	+3%
	Do-Something	13:33	-26%	13:21	-25%	13:49	-27%
2041	Do-Minimum	19:33	+11%	19:08	+11%	20:17	+10%
	Do-Something	14:07	-28%	13:49	-28%	14:21	-29%

Source: PCF Stage 3 ComMA Report (further details in the ComMA Report, Document Reference 7.6)

Table 4-4 A417 Modelled Journey Times – M5 to Cirencester (eastbound)

Year	Scenario	AM Peak		Inter Peak		PM Peak	
		Time (mm:ss)	% Diff.	Time (mm:ss)	% Diff.	Time (mm:ss)	% Diff.
2015	Base	15:38	N/A	14:42	N/A	15:03	N/A
2026	Do-Minimum	17:01	+9%	15:09	+3%	15:38	+4%
	Do-Something	13:15	-22%	12:36	-17%	12:54	-17%
2041	Do-Minimum	18:45	+20%	16:09	+10%	17:13	+14%
	Do-Something	14:12	-24%	12:58	-20%	13:38	-21%

Source: PCF Stage 3 ComMA Report (further details in the ComMA Report, Document Reference 7.6)

4.6.12 The scheme is forecast to reduce journey times along the A417 in both directions compared to the Do-Minimum scenarios.

4.6.13 Given the existing delays experienced by westbound traffic, the largest journey time savings are forecast to be achieved in that direction. In 2041, the westbound journey times are forecast to reduce by slightly over five minutes in the AM peak and by nearly six minutes in the PM peak. Across the 60-year appraisal period used in the economic assessment of the scheme this equates to very large journey time benefits for all users.

4.6.14 Forecast journey time savings are not as great in the eastbound direction, but are four and a half minutes in the AM peak and three and a half minutes in the PM peak in 2041. Across the 60-year appraisal period used in the economic assessment of the scheme this also equates to very large journey time benefits for all users.

4.6.15 Table 4-5 and Table 4-6 present the modelled journey times for the A436/A417 route between the A436/A40 junction and the M5 for the westbound and eastbound directions respectively.

Table 4-5 A436/A417 Modelled Journey Times – A436/A40 to M5 (westbound)

Year	Scenario	AM Peak		Inter Peak		PM Peak	
		Time (mm:ss)	% Diff.	Time (mm:ss)	% Diff.	Time (mm:ss)	% Diff.
2015	Base	13:37	N/A	13:21	N/A	15:18	N/A
2026	Do-Minimum	14:15	+5%	13:37	+2%	16:51	+10%
	Do-Something	14:44	+3%	14:35	+7%	15:13	-10%
2041	Do-Minimum	15:25	+13%	14:45	+10%	19:01	+24%
	Do-Something	15:10	-2%	15:03	+2%	15:56	-16%

Source: PCF Stage 3 ComMA Report (further details in the ComMA Report, Document Reference 7.6)

Table 4-6 A436/A417 Modelled Journey Times – M5 to A436/A40 (eastbound)

Year	Scenario	AM Peak		Inter Peak		PM Peak	
		Time (mm:ss)	% Diff.	Time (mm:ss)	% Diff.	Time (mm:ss)	% Diff.
2015	Base	13:24	N/A	12:45	N/A	12:54	N/A
2026	Do-Minimum	14:21	+7%	13:02	+2%	13:22	+4%
	Do-Something	15:03	+5%	14:25	+11%	14:44	+10%
2041	Do-Minimum	16:22	+22%	13:37	+7%	14:43	+14%
	Do-Something	16:06	-2%	14:50	+9%	15:31	+5%

Source: PCF Stage 3 ComMA Report (further details in the ComMA Report, Document Reference 7.6)

4.6.16 Journey times are forecast to increase with the scheme for westbound traffic in the 2026 AM and inter peak as a result of the increased journey distance. Journey times are forecast to decrease with the scheme for westbound traffic in the 2026 PM peak as a result of the decrease in delay at Ullenwood roundabout notwithstanding the increase in journey distance. In 2041, westbound journey times in the AM and inter peak are forecast to be comparable between the Do-Minimum and Do-Something as the impact of the delay reduction at Ullenwood roundabout with the scheme begins to be equivalent with the increase in journey distance. In 2041, westbound journey times in the PM peak are forecast to decrease by over three minutes.

4.6.17 Journey times for eastbound traffic are generally forecast to increase with the scheme. This is as a result of the increased journey distance compared to the Do-Minimum without the equivalent delay reductions achieved in the westbound direction at Ullenwood roundabout. Journey time increases in all periods are forecast to be greater in 2026 than in 2041; with journey times in the AM peak in 2041 comparable to the Do-Minimum.

4.7 Road safety

4.7.1 In the five years to the end of June 2019, there were 42 Personal Injury Accidents (PIAs)⁷ on the single carriageway section of the A417 between Brockworth

⁷ DfT STATS19 Database

bypass and Cowley roundabout. These accidents resulted in eight fatalities and 21 seriously injured casualties, with a further 53 slight casualties.

- 4.7.2 The casualty rates observed on the single carriageway section of the A417 are significantly higher than the national average for single carriageway roads, particularly for fatal and serious casualties, and are partially due to the high volumes of traffic, poor forward visibility and challenging gradients resulting in a particularly poor safety record.
- 4.7.3 The impact of the scheme in terms of accident benefits was assessed using DfT software COBALT (version 2013.02). Over a 60-year appraisal period the COBALT assessment evaluates the number of PIAs, the number of casualties and a monetised present value of cost of accidents for base year, Do-Minimum and Do-Something scenarios.
- 4.7.4 The results of the COBALT assessment for the scheme are presented in Table 4-7.

Table 4-7 Summary of accident benefit results

Scheme	Accident benefits (£000s)	Number of PIAs saved	Number of casualties saved			
			Fatal	Serious	Slight	Total
August 2020 design	64,890	-51.8	66.1	201.2	-29.4	237.9

Source: PCF Stage 3 ComMA Report (further details in the ComMA Report, Document Reference 7.6)

Notes: All monetary values are expressed in 2010 prices, discounted to 2010.

- 4.7.5 Across the 60-year appraisal period these changes equate to very large accident benefits for all users. The scheme is forecast to result in a large reduction in the number of Killed or Seriously Injured (KSI) casualties, with 66 fewer fatalities and 201 fewer seriously injured forecast. There is forecast to be an increase in the total number of PIAs and in the number of slight casualties, which is a result of the forecast increase in total traffic (vehicle kilometres) with the scheme.

4.8 Summary

- 4.8.1 The A417 Missing Link traffic model was produced in SATURN (version 11.4.07H), based on the August 2020 design.
- 4.8.2 To provide an assessment of likely impacts of the scheme in the future, the development of a base year model and future year models with and without the scheme is required.
- 4.8.3 The base year traffic model represents an average March 2015 weekday. A single average hour is modelled for four time-periods; AM peak, inter peak, PM peak and off peak. Different user classes (combining vehicle class and journey purpose) are included in the model.
- 4.8.4 The A417 Missing Link base year model calibration and validation performance is good and, against some criteria, excellent.
- 4.8.5 The current estimated opening year for the scheme is 2026, and the scheme design year is 2041. Two additional forecast years, consisting of an intermediate year of 2031 and a final forecast year of 2051, each used in the economic appraisal, have also been modelled.

- 4.8.6 The forecast increases in traffic on the A417 in the vicinity of the scheme are a result of traffic rerouting from various alternative roads and corridors, both local and strategic, to take advantage of the improvements to the route.
- 4.8.7 At a local level, traffic is forecast to reroute away from existing known rat runs including via Elkstone towards Cheltenham and also via Birdlip Hill towards Gloucester. Traffic reductions are also forecast on the A436 with the scheme.
- 4.8.8 At a strategic level, traffic is forecast to decrease on the M40 north of Banbury, the A34 north of Oxford and the M5 south of Cheltenham and Gloucester, and increase on the M4 east of Swindon and on the M5 north of Cheltenham and Gloucester, showing that traffic is rerouting to the A417 with the scheme in-situ.
- 4.8.9 Journey times for traffic using the A417 are forecast to decrease significantly as a result of the scheme. Journey times for traffic using the A436 and the A417 are forecast to decrease during certain times of day and directions and are forecast to increase for others.
- 4.8.10 The impact of the scheme in terms of accident benefits was assessed using DfT software COBALT. The scheme is forecast to result in a large reduction in the number of KSI casualties, with 66 fewer fatalities and 201 fewer seriously injured over the 60-year appraisal period.

5 Economic case for the scheme

5.1 Introduction

5.1.1 The economic case outlines the economic, environmental, and social impacts of the scheme and provides a means of establishing how the scheme supports its objectives and sub-objectives. The relationship between the economic case and scheme objectives is set out in Table 5-1.

Table 5-1 Relationship between economic case and scheme objectives

Objective	Economic case
Safe, resilient and efficient network	Accident savings Journey time changes (transport user benefits)
Maximise opportunities for landscape, historic and natural environment enhancement and reduce negative impacts of the scheme	Qualitative environmental assessments of impact on: <ul style="list-style-type: none"> • Landscape • Heritage • Biodiversity • Water environment
Community and access (enhance the quality of life for local residents and visitors)	Noise impacts Air quality impacts Qualitative assessment of social impacts
Support economic growth	Journey time reliability improvements Increased business outputs, productivity and employment effects

5.1.2 The various elements of the economic appraisal of the scheme have been updated to include the forecasts undertaken using the traffic model at the preliminary design stage. It uses the updated economic parameters issued by the DfT in the July 2020 version of the TAG databook. The appraisal also incorporates updated scheme cost estimates, which include estimated operational and maintenance costs. Costs were based on the August 2020 scheme design as the most up to date costs available at the time of the assessment.

5.2 Monetised benefits

5.2.1 Table 5-2 identifies the approach adopted to appraise the monetised impacts of the scheme as per TAG.

Table 5-2 Overview of economic assessments

Element	Assessment method
Transport economic appraisal	TUBA (Transport Users Benefit Appraisal) software (version 1.9.14)
Accidents	COBALT (COst and Benefit to Accidents – Light Touch) software (version 2013.02)
Journey time reliability	Comparison of observed journey time reliability (using journey time standard deviations derived from TrafficMaster data)

Element	Assessment method
Construction impacts	QUADRO (QUEUES And Delays at ROADWORKS) software (QUADRO 2020 v4.18.0.1)
Air quality	DfT's 'Local Air Quality Workbook' and 'Air Quality Valuation Workbook'
Noise impacts	Approach set out in TAG Unit A3 Chapter 2
Greenhouse gas emissions	Approach set out in TAG Unit A3 Chapter 4
Wider economic impacts	WITA (Wider Impacts in Transport Appraisal) software (version 2.0 beta)

Source: PCF Stage 3 ComMA Report

5.2.2 As described in Chapter 4, traffic forecasts have been prepared for an estimated opening year for the scheme of 2026, and the scheme design year of 2041. Two additional forecast years, consisting of an intermediate year of 2031 and a final forecast year of 2051, have also been used to support the economic appraisal of the scheme.

5.2.3 Cost estimates have been prepared by Highways England for the scheme and reflect the design as of August 2020. Table 5-3 summarises these costs.

Table 5-3 Scheme Cost Summary (2010 prices, undiscounted, £000s)

Cost Type	Scheme cost
Preparation	22,751
Supervision	8,794
Works	217,484
Land	25,678
Operation & maintenance	8,330
TOTAL	283,037

Source: Highways England (August 2018) and COBA manual (July 2017)

5.2.4 Table 5-4 shows Analysis of Monetised Costs and Benefits (AMCB) which includes economic assessment results from the TUBA, COBALT, QUADRO, environmental, wider economic benefits and reliability analysis. As per TAG all costs and benefits reported in this section are in 2010 prices, discounted to 2010.

Table 5-4 Analysis of monetised costs and benefits (£000s)

Item	August 2020 scheme cost / benefit
Accidents (not assessed by TUBA) ¹	64,890
Roadworks (not assessed by TUBA) ²	-17,148
Greenhouse gases (not assessed by TUBA) ³	-39,284
Noise (not assessed by TUBA) ⁴	466
Air quality (not assessed by TUBA) ⁵	-3,630
Economic efficiency: consumer users (commuting)	45,357
Economic efficiency: consumer users (other)	36,484
Economic efficiency: business users and providers	173,995
Wider public finances (indirect taxation revenues)	44,691
Present Value of Benefits (PVB)	305,821

Item	August 2020 scheme cost / benefit
Broad transport budget Present Value of Costs (PVC)	205,457
OVERALL IMPACTS	
Net present value (NPV)	100,364
Initial BCR	1.49
Reliability benefits	70,502
Wider economic benefits	140,327
Adjusted BCR	2.51

Source: PCF Stage 3 ComMA Report

Notes: All monetary values are expressed in 2010 prices, discounted to 2010. 1 from COBALT, 2 from QUADRO, 3 TAG Unit A3 Chapter 4, 4 TAG Unit A3 Chapter 2, 5 TAG Unit A3 Chapter 3.

- 5.2.5 The Present Value of Benefits (PVB) over the 60-year appraisal period is £305.8 million for the scheme.
- 5.2.6 The scheme achieves an initial BCR of 1.49 and an adjusted BCR of 2.51 when reliability and wider economic benefits are included. Based on the DfT's Value for Money Framework⁸ the scheme is in the 'medium' value for money category. The Value for Money assessment is based on an opening year of the scheme of 2024, as the anticipated 'open to traffic' date at the time of the assessment. Since this assessment was undertaken, the 'open to traffic' date has changed, however the change in opening years hasn't had a material impact on the BCR on which the Value for Money assessment is based.

Economic benefits

- 5.2.7 As illustrated in Table 5-4, over the 60-year appraisal period the scheme is forecast to achieve total transport economic efficiency benefits, including journey time changes and vehicle operation cost changes, of £255.8 million. This is a result of the additional capacity and reduced delay provided by the scheme. Compared with consumer users, business users and providers constitute the highest proportion of the reported benefits with £174.0 million.
- 5.2.8 Table 5-4 shows that the scheme is forecast to achieve significant reliability benefits of £70.5 million. This reflects the high levels of travel time variability currently experienced on the existing single carriageway section of the A417. Compared with consumer users, business users and providers constitute the highest proportion of the reported benefits with £39.9 million.
- 5.2.9 For the wider economic impacts of the scheme, impacts around agglomeration and labour supply have been calculated alongside impacts around increased output, which is based on an estimated 10% uplift to business user benefits. Over the 60-year appraisal period the scheme is forecast to achieve significant wider economic benefits, totalling £140.3 million.
- 5.2.10 These economic benefits contribute positively towards the resilient scheme design aspects of Paragraph 4.32 of the NPSNN and the economic growth aspects of section 6 of the NPPF.

Environmental benefits

5.2.11 An assessment of the environmental impacts for the scheme has been undertaken in line with TAG and DMRB guidance. The monetised air quality, noise and greenhouse gas impacts are presented in Table 5-5, Table 5-6 and Table 5-7 respectively. The noise benefits contribute positively towards the health, wellbeing and quality of life aspects of Paragraphs 4.79 to 4.82 of the NPSNN.

Table 5-5 Monetised air quality impacts (£000s)

Item	August 2020 scheme
Value of change in PM2.5 concentrations ⁹	-2,456
Value of change in NOx emissions	-1,175
Total value of change in air quality	-3,630

Source: PCF Stage 3 ComMA Report

Table 5-6 Monetised noise impacts (£000s)

Item	August 2020 scheme
Present value of noise benefits	466

Source: PCF Stage 3 ComMA Report

Table 5-7 Monetised greenhouse gases impacts (£000s)

Item	August 2020 scheme
Value of change greenhouse gases	-39,284

Source: PCF Stage 3 ComMA Report

Social benefits

5.2.12 As with business users, the scheme is also forecast to achieve journey time benefits for commuting and other users. These consumer user benefits are forecast to be £81.8 million over the 60-year appraisal period.

5.2.13 As with business users, the scheme is also forecast to achieve reliability benefits for commuting and other users. These consumer user benefits are forecast to be £30.6 million.

5.2.14 The large forecast reduction in the number of KSI with the scheme equates to substantial economic benefits of £64.9 million. The full accident appraisal results and further details are provided in the ComMA Report (Document Reference 7.6).

5.2.15 These social benefits contribute towards the resilient scheme design aspects of Paragraph 4.32 of the NPSNN, the economic growth aspects of section 6 of the NPPF and the road safety aspects of Paragraphs 4.60 to 4.66 of the NPSNN.

⁹A detailed assessment of PM10 and PM2.5 has been screened out as there are no AQMAs in the study area declared for any exceedance of the Government's Air Quality Strategy (AQS) PM10 or PM2.5 objectives and local monitoring has indicated there is no risk of exceeding the AQS PM10 or PM2.5 objective or Limit Value (LV). An assessment of total particulate emissions was undertaken for TAG and carried out as per Table 5-5.

5.3 Non-monetised benefits and disbenefits

Assessment of social and environmental non-monetised benefits

- 5.3.1 Non-monetised benefits have been qualitatively assessed and are informed by the findings of the ES (Document Reference 6.2). The results of these qualitative assessments are summarised below, where both benefits and disbenefits of the scheme are identified. Whilst they do not contribute to the BCR of the scheme, they do contribute to the economic case and the Value for Money of the scheme.
- The impact on landscape has been assessed as moderate adverse. Combining the landscape and visual effect for both operational assessments, overall, the scheme would give rise to moderate adverse effects on both landscape and visual receptors.
 - For the historic environment the impact of the scheme would be moderate adverse. The scheme would have major and moderate adverse impacts to the form, condition and survival, known non-designated heritage assets and archaeological potential, and minor adverse impacts to a Scheduled Monument within the boundary of the scheme. However, the impact of the scheme would also result in beneficial impacts to the context of buried archaeological remains by furthering understanding of the archaeology of the area.
 - The impact on biodiversity would be slight adverse. Very large and large adverse effects are expected for one veteran beech tree and the Ullen Wood LWI and AWI due to nitrogen deposition. Moderate adverse effects are expected on barn owls and slight adverse effects on foraging/commuting bat assemblages, breeding birds and wintering birds. Some beneficial effects are expected for badgers, other species listed on Section 41 of the of the Natural Environment and Rural Communities Act 2006, the Haroldstone Fields LWS, Hartley Wood LWS, Chatcombe Wood and Lineover Wood and Crickley Hill and Barrow Wake SSSI.
 - The impact of the proposed scheme on the water environment would be slight adverse. The scheme is expected to have no change or negligible impact on most areas assessed. However, minor impacts are anticipated on the baseflow of Norman's Brook during construction. Moderate impacts are also expected to impact groundwater flow paths towards groundwater dependent features in Crickley Hill escarpment.
 - The impact of the scheme for WCH and PRow has been assessed as moderate beneficial.
 - The impact of the scheme on journey quality is assessed as slight beneficial as journey quality is anticipated to improve for travellers utilising the road. This is due to reduced congestion reducing frustration, improved signage and improved safety.
 - The impact of the scheme on security is assessed as neutral as the assessment shows the same with or without the scheme.
 - The impact of the scheme on affordability has been assessed as moderate adverse due to increased vehicle operating costs due to redistribution effects (i.e. users choose to travel further due to reductions in travel times). However, for the majority of individual trips, and particularly those travelling along the A417, the scheme would reduce vehicle operating costs as the new alignments are more direct and less congested than the current route.

- The impact of the scheme on severance has been assessed as slight beneficial as the scheme is forecast to result in a slight decrease in severance for pedestrians within the study area.
- The impact of the scheme on health has been assessed as neutral, with beneficial impacts in relation to access to health facilities including healthcare, community and recreation, and education.

5.4 Summary

- 5.4.1 The economic appraisal has been prepared in line with TAG and has considered the full range of economic, environmental and social impacts of the scheme. Costs and benefits have been monetised as part of a cost benefit analysis, wherever possible.
- 5.4.2 The economic, environmental and social impact assessments, and the underpinning analysis, provide a means of establishing how the scheme supports the scheme objectives and sub-objectives.
- 5.4.3 The following benefits are expected to support the objective of providing a safe, resilient and efficient network:
- Significant forecast accident benefits valued at £64.9 million across the 60-year appraisal period (2010 prices, discounted to 2010), with fatal and serious casualties reduced substantially. There is forecast to be a reduction of 66 fatal and 201 serious casualties.
 - Total forecast monetised transport user benefits of £255.8 million are primarily a result of forecast journey time savings.
- 5.4.4 The following journey time reliability benefits are also expected to contribute towards the objective of supporting economic growth:
- Forecast business user journey time reliability benefits of £39.9 million, representing an improved ability to plan business journeys and for transport providers to schedule business operations.
 - Forecast commuting and other user journey time reliability benefits of £30.6 million, representing an improved ability for employees to arrive at work on time and to keep to appointment times.
- 5.4.5 The scheme is forecast to achieve significant wider economic benefits of £140.3 million.
- 5.4.6 The following benefits are expected to support the objective of enhancing the quality of life for local residents and visitors (community and access benefits):
- Forecast reduction in noise impacts valued at £0.5 million and due in part to a reduction in traffic on local roads. Overall a greater number of households will experience a decrease in traffic noise compared to the number of households that will experience an increase.
- 5.4.7 The scheme is forecast to achieve substantial overall benefits, with a PVB of £305.8 million.
- 5.4.8 The adjusted BCR, which includes monetised journey time reliability and wider economic benefits, is estimated at 2.51. Based on the DfT's Value for Money Framework the scheme is in the medium value for money category.

- 5.4.9 Non-monetised social benefits contribute to the economic case and the Value for Money of the scheme. The scheme impacts on landscape, historic environment, biodiversity and water environment with non-monetised environmental benefits on health, security, affordability and severance. These impacts/benefits are covered in more detail in Chapter 6 of this report and in the ES (Document Reference 6.2).
- 5.4.10 Overall, these economic benefits contribute towards the resilient scheme design aspect (Paragraph 4.32), the road safety aspects (Paragraphs 4.60 to 4.66) and the health, wellbeing and quality of life aspects (Paragraphs 4.79 to 4.82) of the NPSNN as well as the economic growth aspects of section 6 of the NPPF.

6 Conformity with National Policy Statement for National Networks

6.1 Overview

6.1.1 As set out in Chapter 1 of this report, the NPSNN is the relevant NPS for this scheme and is the primary policy document against which the scheme must be determined by the SoS, in accordance with section 104 of the Act.

6.1.2 Accordingly, Paragraph 1.2 of the NPSNN states that:

“The SoS will use this NPS as the primary basis for making decisions on development consent applications for national networks nationally significant infrastructure projects in England. Other NPSs may also be relevant to decisions on national networks nationally significant infrastructure projects. Under section 104 of the Planning Act the SoS must decide an application for a national networks nationally significant infrastructure project in accordance with this NPS unless he/she is satisfied that to do so would:

- *lead to the UK being in breach of its international obligations;*
- *be unlawful;*
- *lead to the SoS being in breach of any duty imposed by or under any legislation;*
- *result in adverse impacts of the development outweighing its benefits;*
- *be contrary to legislation about how the decisions are to be taken.”*

6.1.3 Paragraph 4.2 of the NPSNN sets out that subject to the detailed policies and protections in the NPS, and the legal constraints set out in the Act, there is a presumption in favour of granting development consent for national networks NSIPs that fall within the need for infrastructure established in the NPSNN. In considering a scheme, and weighing adverse impacts against benefits, Paragraph 4.3 sets out how the SoS should take into account:

- its potential benefits, including the facilitation of economic development, including job creation, housing and environmental improvement, and any long-term or wider benefits; and
- its potential adverse impacts, including any longer-term and cumulative adverse impacts, as well as any measures to avoid, reduce or compensate for any adverse impacts.

6.1.4 Within this context, the NPSNN requires that environmental, safety, social and economic benefits and adverse impacts, should be considered at national, regional and local levels.

6.1.5 This Chapter provides an assessment of the scheme’s conformity with the NPSNN. It first provides an assessment of the scheme against the relevant ‘assessment principles’ set out in the NPSNN and identifies how these have been addressed in the DCO Application. It then assesses the scheme against the relevant ‘generic impacts’ set out in the NPSNN and identifies how these have been addressed in the DCO Application.

6.1.6 It is considered that there are four topics within the generic impacts that are of particular importance and relevance to the determination of the DCO Application for the scheme, due to the nature of the proposals and its sensitive location within

environmentally designated areas, including the Cotswolds AONB and the Crickley Hill and Barrow Wake SSSI. As such, a detailed assessment of the scheme against these impacts is set out in Chapters 7-10 of this report, as below:

- Chapter 7: Development proposed within nationally designated areas
- Chapter 8: Biodiversity and ecological conservation
- Chapter 9: Special Category Land
- Chapter 10: Historic Environment

6.1.7 In addition, a full assessment of how the scheme conforms to the NPSNN including its technical assessment requirements, is provided in the National Policy Statement Accordance Table which comprises Appendix A of this report.

6.2 Assessment principles

6.2.1 This section provides an assessment of the scheme against the ten 'assessment principles' of the NPSNN.

Environmental impact assessment

6.2.2 Paragraphs 4.15 to 4.21 of the NPSNN set out the policy requirement for an ES for all proposals that are subject to the European Union's EIA Directive. The ES should describe the aspects of the environment likely to be significantly affected by the scheme, in accordance with Schedule 4 of the Infrastructure Planning (EIA) Regulations 2017 (the EIA Regulations). This should include a description of significant cumulative effects of the scheme in relation to its interaction with the effects of other development.

6.2.3 The DCO Application includes an ES (Document Reference 6.2). The ES considers the potential effects, including benefits, of the scheme and in accordance with Paragraph 4.15 of the NPSNN, the ES includes an assessment of effects on human beings, fauna and flora, soil, water, air, climate, the landscape, material assets and cultural heritage, and the interaction between them.

6.2.4 The ES describes the likely significant effects of the scheme and shows how these effects would be avoided or mitigated.

6.2.5 The scope of the ES was agreed with stakeholders and a Scoping Opinion Report was issued by the SoS on 24 June 2019. The following effects are assessed in the relevant Chapters of the ES (Document Reference 6.2):

- Chapter 5 Air Quality
- Chapter 6 Cultural Heritage
- Chapter 7 Landscape and Visual Effects
- Chapter 8 Biodiversity
- Chapter 9 Geology and Soils
- Chapter 10 Material Assets and Waste
- Chapter 11 Noise and Vibration
- Chapter 12 Population and Human Health
- Chapter 13 Road Drainage and the Water Environment
- Chapter 14 Climate
- Chapter 15 Assessment of Cumulative Effects

- 6.2.6 In accordance with Paragraph 4.15 of the NPSNN and the EIA Regulations, the ES assesses the likely significant effects of the scheme, covering direct effects and any indirect, secondary, cumulative, short, medium and long term, permanent and temporary, beneficial or adverse effects at all stages of the project (construction, operation and decommissioning and the interrelationship). The methodology is set out in ES Chapter 4 EIA Methodology (Document Reference 6.2).
- 6.2.7 ES Chapter 16 Summary (Document Reference 6.2) provides a summary of the likely significant effects of the scheme during construction and operation, as identified through the assessment reported in the ES. The scheme meets the requirements of NPSNN with regard to EIA.

Habitat Regulations Assessment

- 6.2.8 Paragraphs 4.22 to 4.25 of the NPSNN state that prior to granting a DCO, the SoS must, under the Habitats Regulations, consider whether it is possible that a scheme could have a significant effect on the objectives of a European site or any site to which the same protection is applied as a matter of policy, either alone or in combination with other plans or projects.
- 6.2.9 Subsequently, Paragraph 4.23 states that applicants for a DCO must provide sufficient information with their application to enable the SoS to carry out an Appropriate Assessment, or to determine that an Appropriate Assessment is not required as significant effects on European sites are sufficiently unlikely. Such information to be provided includes details of measures to avoid or mitigate any likely significant effects on a European site.
- 6.2.10 The Habitats Regulations Assessment: Screening Report and Statement to Inform an Appropriate Assessment (Document Reference 6.5) have been submitted in order to enable the competent authority, in this case the SoS for Transport, to make an Appropriate Assessment when deciding whether to authorise the scheme, if so required.
- 6.2.11 The Statement presents the conclusions of the Habitats Regulations Assessment (HRA) for the scheme, which contains the information required to determine whether it is likely to have significant effects on European Sites.
- 6.2.12 The first stage of the HRA, known as 'screening', is designed to identify whether there are elements of the project which are likely to give rise to significant effects on European Sites which could compromise a European Site's conservation objectives. The screening process identified six European Sites with the potential to be affected by the scheme, as follows:
- Cotswold Beechwoods SAC
 - Wye Valley and Forest of Dean Bat Sites SAC
 - North Meadow and Clattinger Farm SAC
 - Severn Estuary SAC
 - Severn Estuary Ramsar
 - Severn Estuary SPA
- 6.2.13 The screening assessment documents the potential effects that have been considered for each site and whether any likely significant effects exist. The findings of the screening exercise are presented through screening matrices for

each of the above sites in Section 3.4 of the Habitats Regulations Assessment: Screening Report (Document Reference 6.5a).

- 6.2.14 In the case of five of the European Sites (Wye Valley and Forest of Dean Bat Sites SAC, North Meadow and Clattinger Farm SAC, Severn Estuary SAC, Ramsar and SPA), the screening stage assessment concluded that the scheme was not likely to have a significant effect on the qualifying interest features or the sites either alone or in combination with other plans/projects.
- 6.2.15 For the remaining Cotswold Beechwoods SAC site, it was not possible to rule out a likely significant effect at the screening stage, particularly in relation to recreational pressures on the SAC. This site was therefore progressed to Stage 2 of the process, Appropriate Assessment, to assess whether the scheme would adversely affect the integrity of the site in view of its conservation objectives.
- 6.2.16 Sufficient information to enable the competent authority to make an Appropriate Assessment, if required for the Cotswolds Beechwoods SAC site, can be viewed in full within the Statement to Inform an Appropriate Assessment (SIAA) (Document Reference 6.5b).
- 6.2.17 The SIAA concludes that the provision of the Air Balloon Way, including additional car parking and other improvements to connected PRow will serve to meet the needs of the majority of existing and future visitors, and will divert/concentrate visitors away from the SAC. An increase in recreational pressure to the SAC is not considered to occur as a result of these measures that are integral to the scheme.
- 6.2.18 It is acknowledged in the SIAA that there is uncertainty to the efficacy of these integral measures, and it would therefore not be robust to draw a conclusion of no adverse effect on integrity based on those measures. Therefore, additional precautionary mitigation will be provided in the form of measures to control recreational use of the SAC to address this uncertainty. The SIAA concludes that there would be no adverse effect upon the integrity of the SAC as a result of the scheme, either alone or in combination with other plans or projects.
- 6.2.19 Therefore, the HRA was concluded at Stage 2: Appropriate Assessment, and there is no requirement for HRA Stage 3 or Stage 4 for the purposes of compliance with the Conservation of Habitats and Species Regulations 2017 (as amended).
- 6.2.20 It is considered that the scheme meets the requirements of the NPSNN with regard to HRA.

Alternatives

- 6.2.21 Paragraphs 4.26 and 4.27 of the NPSNN state that schemes with significant environmental effects must, in accordance with the EIA Directive, include an outline of the main alternative options considered by the Applicant and the main reasons for the Applicant's choice, taking into account the environmental effects. The NPSNN notes that there may also be other legal or policy requirements for the consideration of alternatives such as the Habitats and Water Framework Directives or for schemes within National Parks or other designated areas, including AONBs.
- 6.2.22 Paragraph 4.27 of the NPSNN states that the options appraisal of the scheme should consider viable modal alternatives and may also consider other options.

However, where projects have been subject to full options appraisal prior to their inclusion in the Road or Rail Investment Strategies (or other appropriate policies or investment plans), the SoS does not need to consider option testing. It is stated that proportionate option consideration of alternatives will have been undertaken as part of the investment decision making process and that it is not necessary for the SoS to reconsider this process, however they should be satisfied that such an assessment has been undertaken.

- 6.2.23 As set out in Chapter 2 of this report, whilst the principle of the scheme is committed in RIS1 and RIS2, Highways England has sought to develop the alignment of the scheme through an iterative process, in which alternative options for the route have been considered. The design process has been informed by environmental, socio-economic, technical and cost considerations, as well as through feedback received during non-statutory and statutory consultation and engagement with the public, PILs and relevant stakeholders.
- 6.2.24 In accordance with the EIA Directive, an outline of the main alternatives considered by Highways England is provided in ES Chapter 3 Assessment of Alternatives (Document Reference 6.2), which also sets out the main reasons for the choices made by Highways England, taking into account the environmental effects.
- 6.2.25 In addition, the DCO Application includes the following documents which provide further detail on how alternatives have been considered by Highways England during the development of the scheme:
- Technical Appraisal Report (Document Reference 7.9): sets out the assessment of alternatives that was undertaken by Highways England in order to shortlist routes to present and seek feedback on at a non-statutory public consultation in 2018.
 - Scheme Assessment Report (Document Reference 7.4): sets out how further assessment was undertaken on the shortlisted route options, taking into account feedback from the 2018 non-statutory public consultation, to identify a preferred route for the scheme, Option 30.
 - Consultation Report (Document Reference 5.1): provides an overview of the non-statutory and statutory consultation and engagement undertaken since 2018 and identifies how feedback received has informed changes made to the scheme design.
- 6.2.26 The scheme would constitute development in an AONB, for which there are further provisions made in the NPSNN under the generic impact of 'landscape and visual impacts'. Specific consideration is given to the case for developing a scheme within the Cotswolds AONB, and the scope for alternatives to doing so, within Chapter 7 of this report.
- 6.2.27 It is considered that the scheme meets the requirements of NPSNN with regard to consideration of alternatives.

Criteria for “good design” for national network infrastructure

- 6.2.28 Paragraphs 4.28 to 4.35 of the NPSNN set out the requirements for 'good design' in national networks infrastructure. Whilst the NPSNN recognises in Paragraph 4.30 that there are often limitations on the extent to which national network infrastructure can enhance the quality of an area due to the nature of the development, it states in Paragraph 4.29 that design qualities such as visual

appearance, functionality, fitness for purpose, sustainability and cost should nonetheless be key factors considered from the outset of the scheme. Applying 'good design' to national network projects should produce sustainable infrastructure that is sensitive to place, energy and resource efficient and which demonstrates good aesthetics as far as possible.

- 6.2.29 Paragraph 4.31 states that good design should meet the principal objectives of the scheme by eliminating or substantially mitigating the identified problems by improving operational conditions and simultaneously minimising adverse impacts. It should mitigate any adverse impacts wherever possible and should also be a design which sustains the improvements to operational efficiency for as many years as practicable taking into account other factors such as cost, economics and environmental impacts.
- 6.2.30 Paragraph 4.32 states that scheme design will be a material consideration in decision making and that the SoS will need to be satisfied that the scheme is sustainable, and as aesthetically sensitive, durable, adaptable and resilient as it can reasonably be.
- 6.2.31 Paragraphs 4.33 states that the Applicant should consider the role of technology in delivering national network projects and that the use of professional, independent advice on the design aspects of a proposal should be considered to ensure good design principles are embedded into the proposals. It cites the Design Council as an organisation that can provide support and design review for NSIPs.
- 6.2.32 Paragraph 4.34 notes that while Applicants may have limited choice in the physical appearance of some national networks infrastructure, good design may be able to be demonstrated in terms of siting and design measures relative to existing landscape and historical character and function, landscape permeability, landform and vegetation.
- 6.2.33 Paragraph 4.35 states that the Applicant should demonstrate how the design process was conducted and how the proposed design evolved. If a number of different designs were considered, the reasons for the favoured choice should be set out.
- 6.2.34 The Design Summary Report (Document Reference 7.7) demonstrates how the scheme meets the 10 principles of good road design¹⁰ and complies with the requirements of the NPSNN with regard to good design, with reference to the specific paragraphs of the NPSNN identified above. Please refer to that document for further information. It is considered that the scheme complies with the NPSNN with regard to 'good design'.

Climate change adaption

- 6.2.35 Paragraphs 4.36 to 4.47 of the NPSNN set out the requirement for new national networks infrastructure schemes to take into account climate change.
- 6.2.36 Paragraph 4.40 sets out that, as typically long-term investments, new national networks infrastructure will need to remain operational over many decades, in the face of a changing climate. Therefore, Applicants should take into account the projected impacts of climate change when planning the scheme location, design,

¹⁰ The road to good design: Highways England's design vision and principles (January 2018)

build and operation. It states that the ES should set out how the proposal will take account of the projected impacts of climate change.

- 6.2.37 Paragraph 4.41 states that where the scheme has safety-critical elements and its design life is 60 years or greater, the Applicant should apply the UK Climate Projections 2009 (UKCP09) high emissions scenario against the 2080 projections at the 50% probability level.
- 6.2.38 Paragraph 4.42 states that the Applicant should use the latest UK Climate Projections available at the time and ensure that the ES identifies appropriate mitigation or adaptation measures which cover the estimated lifetime of the scheme.
- 6.2.39 Paragraph 4.43 states that the Applicant should demonstrate that no critical feature of the scheme would be seriously affected by more radical changes to the climate beyond those projected in the latest UK climate projections.
- 6.2.40 Paragraph 4.44 states that any adaptation measures should be based on the latest set of UK Climate Projections, the Government's national Climate Change Risk Assessment and consultation with statutory consultation bodies. Any adaptation measures must themselves also be assessed as part of the EIA, and the ES should set out how and where such measures are proposed to be secured.
- 6.2.41 ES Chapter 14 Climate (Document Reference 6.2) reports on the potential effects of the scheme on climate, in accordance with the DMRB LA 114 methodology. It includes an assessment of:
- Impact of the scheme on climate (greenhouse gas (GHG) emissions assessment): the effect on the climate of GHG emissions arising from the scheme, including how the scheme would affect the ability of government to meet its carbon reduction plan targets (see 'carbon emissions' in section 6.3 of this report).
 - Vulnerability of the scheme to climate change (CCR assessment): the resilience of the scheme to climate change, including how the scheme design would be adapted to take account for the projected impacts of climate change.
 - In-combination climate impacts (ICCI) assessment: the combined effects of the impacts of the scheme and potential climate change impacts on the receiving environment.
- 6.2.42 In accordance with Paragraph 4.41 of the NPSNN, the scheme has been assessed using the latest UK climate projections available at the time of the assessment (UKCP18) high emissions scenario (high impact, low likelihood) against the 2080 projections at the 50% probability level.
- 6.2.43 In accordance with Paragraphs 4.42 and 4.44 of the NPSNN, table 14-20 of ES Chapter 14 Climate (Document Reference 6.2) and ES Appendix 14.2 (Document Reference 6.4) identifies appropriate mitigation and adaptation measures and how they will be delivered in the scheme, either embedded in the scheme design or are secured through ES Appendix 2.1 Environmental Management Plan (EMP) (Document Reference 6.4). These measures have themselves been assessed as part of the EIA as reported in ES Chapter 14 Climate (Document Reference 6.2).
- 6.2.44 ES Appendix 14.2 Climate Change Resilience Assessment (Document Reference 6.4) considers any potentially critical features of the design which may be seriously affected by climate change as projected in the latest UK climate

projections. The safety of the scheme is assessed against the high emissions Representative Concentration Pathways RCP8.5 global warming scenario. Additionally, a resilience assessment of the safety-critical features of the scheme against H++ climate scenarios has also been undertaken and is reported in section 14.10 Assessment of likely significant effects. The requirements of Paragraph 4.43 of the NPSNN are therefore met.

- 6.2.45 It is concluded in ES Chapter 14 Climate (Document Reference 6.2) that whilst assets and infrastructure designed as part of the scheme are likely to be affected by climate change, such risks have been identified, assessed and mitigated for. Therefore, there would be no significant effects relating to the scheme's vulnerability to climate change during its construction and operation.
- 6.2.46 It is considered that the scheme meets the requirements of the NPSNN with regard to climate change adaptation.

Pollution control and other environmental protection regimes

- 6.2.47 Paragraphs 4.48 to 4.56 of the NPSNN set out the requirement of a national networks scheme to obtain any other relevant consents or licenses relating to the pollution control framework or other regulatory regimes.
- 6.2.48 Paragraph 4.52 states that there is a statutory duty to consult the Marine Management Organisation (MMO) on any NSIPs which would affect or be likely to affect relevant marine areas defined in the Act.
- 6.2.49 Paragraph 4.54 encourages Applicants to begin pre-application discussions with the EA as early as possible.
- 6.2.50 Paragraph 4.55 states that the SoS should be satisfied that development consent can be granted taking full account of environmental impacts. This includes satisfaction that:
- the relevant pollution control authority is satisfied that potential releases can be adequately regulated under the pollution control framework; and
 - the effects of existing sources of pollution in and around the project are not such that the cumulative effects of pollution when the scheme is added would make that development unacceptable, particularly in relation to statutory environmental quality limits.
- 6.2.51 The scheme is located approximately 20km inland from the River Severn and approximately 45km from the coast. The scheme would therefore not affect any relevant marine areas and as such the MMO has not been identified as a prescribed consultee.
- 6.2.52 In the preparation of the ES, relevant topic Chapters have assessed the likely requirements for environmental permits and others consents or licences, in particular: Chapter 5 Air Quality; Chapter 8 Biodiversity; Chapter 10 Materials and Assets; Chapter 11 Noise and Vibration and Chapter 13 Road Drainage and Water Environment (all Document Reference 6.2).
- 6.2.53 With regard to pollution control and other environmental regulatory regimes, the following consents, licences and permits are expected to be required in addition to powers sought through the DCO, as detailed in the Consents and Agreements Position Statement (Document Reference 7.2):

- Approvals from the SoS for Transport, and where relevant the local planning authority and local highway authority pursuant to the Requirements contained in the DCO.
- Protected species licenses from Natural England under the Conservation of Habitats and Species Regulations 2017 and section 16 of the Wildlife and Countryside Act 1981 (in relation to Bats, Great Crested Newts and Roman Snail).
- A license under section 10 of the Protection of Badgers Act 1992.
- Authorisation from the EA to translocate fish under section 27a exception permit under the Salmon and Freshwater Fisheries Act 1975 (Form FR2).
- Trade Effluent Consent under the Water Industry Act 1991 where discharge of trade effluent from welfare facilities is required.
- Permits from the Environmental Agency under the Environmental Permitting (England and Wales) Regulations 2016 to cover management and disposal of waste.
- A mobile plant permit for crushing operations or site permits under the Pollution Prevention and Control Act 1999, Environmental Permitting (England and Wales) Regulations 2016.
- Asbestos licence under the Control of Asbestos Regulations 2012 should asbestos be found in any buildings to be demolished.
- Consent(s) from the relevant determining authority pursuant to section 61 of the Control of Pollution Act 1974.

6.2.54 Paragraph 4.56 of the NPSNN states that the SoS for Transport should not refuse consent on the basis of regulated impacts, unless there is good reason to believe that any relevant necessary operational pollution control permits, or licences, or other consents will not be subsequently granted.

6.2.55 The Applicant is seeking to agree with each determining authority the principles against which applications for the licences, permits and other consents should be considered, in order that all relevant issues may be explored during the Examination of its DCO Application. As detailed in the Statement of Commonality (Document Reference 7.3), Highways England is in discussion with relevant bodies such as the EA, GCC and Natural England. Furthermore, such organisations have been consulted with, including as part of statutory consultation, as evidenced in the Consultation Report (Document Reference 5.1).

Common law nuisance and statutory nuisance

6.2.56 Paragraphs 4.57 to 4.59 of the NPSNN require that a DCO Application for a national networks scheme should consider how possible sources of statutory nuisance under section 79(1) of the Environmental Protection Act 1990 may be mitigated or limited. This will allow for the Examining Authority to recommend appropriate requirements to the SoS to include in any subsequent DCO.

6.2.57 Highways England has prepared a Statement of Statutory Nuisance (Document Reference 6.6) within the DCO Application, which describes the relevant nuisances defined in the Environmental Protection Act 1990, which may arise as a result of the scheme. Potential statutory nuisances relevant to the scheme are identified as being dust, light and noise.

6.2.58 The assessment of these potential statutory nuisances is included within the following Chapters of the ES (Document Reference 6.2):

- Chapter 5 Air Quality assess air quality impacts of the scheme, including dust from construction.
- Chapter 7 Landscape and Visual Effects includes an assessment of the impact of lighting, including temporary construction lighting.
- Chapter 11 Noise and Vibration assesses the potential effects of the scheme on background noise and vibration levels, including during construction.

- 6.2.59 ES Appendix 2.1 EMP (Document Reference 6.4) has been produced to mitigate and manage the effects of construction, including dust, noise, lighting and working hours.
- 6.2.60 The assessment of dust and air quality impacts in ES Chapter 5 Air Quality (Document Reference 6.2) finds that during construction, the scheme would not result in any significant effects on human receptors or designated habitats as a result of construction dust or construction traffic. Best practice construction dust and control measures are incorporated into ES Appendix 2.1 EMP (Document Reference 6.4).
- 6.2.61 During operation, the assessment concludes no significant effects on air quality for human receptors and overall will bring a beneficial impact on local air quality due to reductions in NO₂ concentrations within the Air Balloon Air Quality Management Area (AQMA).
- 6.2.62 The assessment of noise and vibration impacts in ES Chapter 11 Noise and Vibration (Document Reference 6.2) identifies that during construction, the scheme would result in adverse significant effects to 45 residential properties and six non-residential receptors, however these effects would be temporary in nature and would be controlled through the commitments within ES Appendix 2.1 EMP (Document Reference 6.4).
- 6.2.63 ES Chapter 7 Landscape and Visual Effects (Document Reference 6.2) assesses the impact of light pollution during construction and operation of the scheme. It explains that the construction phase of the scheme would require additional temporary lighting. Outside daylight hours, task lighting would be required and where overnight working is dictated by road closure, the area will be generally lit with additional task lighting. Construction compounds will be lit during working hours and will require background lighting for safety and security reasons outside working hours.
- 6.2.64 It is not anticipated that operational nuisance would occur due to the task lighting. All lighting will be directed inwards to minimize impact and will make use of landscape screening to reduce light spill.
- 6.2.65 During the operational stage the assessment states that the scheme would not be lit. However, the visual assessment includes a qualitative assessment of the predicted changes in light levels/ light pollution due to traffic movement along the scheme.
- 6.2.66 The assessment concludes that the scheme layout and design would enhance the tranquillity and dark skies of the AONB (special qualities) as the road carriageway would be sunk into the landscape reducing noise pollution, light spill and skyglow as a result. This would also remove the visual disturbance of moving vehicles across this part of the AONB.
- 6.2.67 The Statement of Statutory Nuisance (Document Reference 6.6) has considered the potential for the scheme to cause a statutory nuisance under Section 79(1),

Environmental Protection Act 1990. It concludes that the construction activities that have the potential to create a nuisance would be controlled through the implementation of the ES Appendix 2.1 EMP (Document Reference 6.4). With mitigation in place, none of the statutory nuisances identified in Section 79(1) of the Environmental Protection Act 1990 is predicted to arise.

Safety

- 6.2.68 Paragraphs 4.60 to 4.66 of the NPSNN set out the requirements of national network schemes relating to road safety. It states that even when not the main purpose of a scheme, the opportunity to improve safety should be taken and that significant accident reduction benefits can be generated in well-designed schemes.
- 6.2.69 Paragraph 4.61 requires that the Applicant undertakes an objective impact assessment of the scheme on safety, including any mitigation measures proposed, in accordance with DfT (WebTAG) and Highways England methodology.
- 6.2.70 Paragraph 4.62 states that the Applicant should also put in place arrangements for undertaking the road safety audit process, which are a mandatory requirement for all trunk road highways improvements in the UK.
- 6.2.71 Paragraph 4.64 states that the Applicant should be able to demonstrate that the scheme is consistent with the Highways England Safety Framework for the SRN and the national Strategic Framework for Road Safety. The Applicant should demonstrate that they have taken all steps reasonably required to minimise risk of death and injury arising from the scheme; contribute to an overall reduction in road casualties and unplanned incidents; and, contribute to improvements in road safety for walkers and cyclists.
- 6.2.72 Paragraph 4.65 also states that the Applicant should demonstrate that they have considered the safety implications of the scheme from the outset and that rigorous processes for monitoring and evaluating safety are in place.
- 6.2.73 Paragraph 4.66 then makes it clear that the SoS should not grant development consent unless satisfied that all reasonable steps have been taken and will be taken to:
- minimise the risk of road casualties arising from the scheme; and
 - contribute to an overall improvement in the safety of the SRN
- 6.2.74 As set out in Chapter 3 of this report, one of the four objectives of the scheme is to create a safe, resilient and efficient network, whilst a sub-objective of the scheme is to improve road safety through designing the scheme to current standards and better separating strategic and local traffic.
- 6.2.75 Section 4.7 of this report explains how road safety has been subject to an impact assessment. It provides an analysis of road safety based on Personal Injury Accidents (PIAs) recorded through the DfT STATS19 Database. This shows that current casualty rates on the single carriageway section of the A417 between Brockworth bypass and Cowley roundabout are significantly higher than the national average for single carriageway roads, particularly when looking at the number of fatal and serious casualties. Furthermore, the impact of the scheme in terms of accident benefits has been assessed using DfT software, COBALT and

this analysis shows very large accident benefits for all users, with a forecast of 66 fewer fatalities and 201 fewer seriously injured.

- 6.2.76 Section 5 of this report explains how the significant forecast accident reductions translate to monetised benefits valued at £64.9 million across the 60-year appraisal period (2010 prices, discounted to 2010), with fatal and serious casualties reduced substantially.
- 6.2.77 The road safety audit (RSA) process has and continues to be undertaken in accordance with HD 19 of DMRB. A Stage 1 RSA has been carried out for the scheme, and the issues and proposed responses have been reviewed and have informed the safe design of the scheme submitted with the DCO Application. The Stage 1 RSA has been shared with the local highways authority, Gloucestershire County Council, and is agreed as set out in the draft Statement of Common Ground with the Joint Councils (Statement of Commonality, Document Reference 7.3). A Stage 2 RSA will be undertaken after the detailed design and prior to commencement of construction of the scheme. There would also be a Stage 3 and Stage 4 RSA, following construction of the scheme.
- 6.2.78 Paragraph 3.17 of the NPSNN also recognises the potential opportunity for pedestrians and cyclists, stating there is a direct role for the national road network to play in helping pedestrians and cyclists by investing in infrastructure where the national road network severs communities and acts as a barrier to cycling and walking, by correcting historic problems, retrofitting the latest solutions and ensuring that it is easy and safe for cyclists to use junctions.
- 6.2.79 The PRoW Management Plan in Annex F of ES Appendix 2.1 EMP (Document Reference 6.4) demonstrates a planned approach to the management of PRoW during the construction and operation of the scheme, ensuring public safety while reducing disruption to users. Overall, it seeks to provide a safer and more attractive environment for active travel and improve connectivity across the walking, cycling and horse riding network.
- 6.2.80 This includes repurposing part of the existing A417 as a WCH corridor (to be known as the Air Balloon Way) and providing grade separated crossings of the A417, such as with the proposed diversion of the Cotswold Way National Trail via a new crossing to enhance connectivity and improve safety of users throughout the study area. For example, in relation to the Cotswold Way National Trail, the scheme proposes to divert the route across the Cotswold Way crossing, providing a safe and attractive bridged route for the National Trail compared to a route which at present follows the A417 at grade for a section prior to users having to cross the A417 road at the same level.
- 6.2.81 With the current situation, all crossings of the A417 have to be made at grade, and relevant to this is the safety of people taking into account incidents involving vehicles, walkers, cyclists and horse riders. As set out in Section 4.7 of this report, within the 5-year period from July 2014 to June 2019 inclusive, on the single carriageway section of the A417 between Brockworth bypass and Cowley roundabout, there were 42 PIAs recorded. These accidents resulted in 82 casualties, of which 8 were fatalities, 21 seriously injured and 53 slight. In terms of collisions on the single carriageway section of the A417 between Brockworth bypass and Cowley roundabout involving WCH over the same period, records show two PIAs involved pedestrians, which resulted in 1 fatality and one serious injury.

- 6.2.82 With the scheme in place there would be multiple grade-separated crossings including the Grove Farm underpass, Cotswold Way crossing, Gloucestershire Way crossing, Cowley overbridge and Stockwell overbridge. This would provide a safer way for WCH to move around the area. For example, the proposed Grove Farm underpass would help address historic severance and fragmentation by the A417 to the west of the scheme, where north-south crossings would require pedestrians to cross the busy road, which is unsafe.
- 6.2.83 Highways England acknowledges feedback received in response to public consultation, which has suggested the relocation of the school bus stop in Birdlip. Concerns have been expressed about the safety of current turning movements by the school bus, and suggestions have been made about potential alternative locations for a new bus stop facility. This change has been carefully considered within the land available as part of the scheme and Highways England has discussed opportunities with the Cowley and Birdlip Parish Council and GCC officers.
- 6.2.84 Highways England has offered help to the relevant stakeholders to inform or facilitate any discussions about any changes that might be proposed to the bus stop and its access within or near Birdlip. Highways England will ensure the scheme would not adversely impact the existing bus stop arrangement, or could accommodate an enhanced future scenario where the bus stop and its access is improved or relocated if within the DCO Boundary.
- 6.2.85 Overall, the scheme therefore meets the safety target set out in the scheme objectives and it is considered that the scheme meets the requirements of NPSNN with regards to safety by virtue of it providing a safer road and pedestrian environment.

Security considerations

- 6.2.86 Paragraphs 4.74 to 4.78 of the NPSNN set out that where a scheme relates to potentially 'critical' infrastructure, there may be national security considerations requiring consultation with the Centre for the Protection of National Infrastructure (CPNI) and DfT security experts. Confirmation of their satisfaction with the scheme in terms of security issues should be provided to the Examining Authority.
- 6.2.87 The scheme does not relate to potentially critical infrastructure and subsequently there has been no requirement to consult CPNI and DfT on this issue. However, through the statutory consultation process prescribed by the Act, Highways England has consulted the Ministry of Defence (MoD) via the relevant SoS and the Defence Infrastructure Organisation (DIO). No concerns relating to national security have been raised through consultation with these consultees or any other consultee. Details of all organisations consulted during statutory consultation and their response (if given) is provided in the Consultation Report (Document Reference 5.1).
- 6.2.88 It is considered that the scheme meets the requirements of NPSNN with regard to security considerations.

Health

- 6.2.89 Paragraphs 4.79 to 4.82 of the NPSNN set out the relationship between national network schemes and human health, stating that schemes have the potential to affect the health, wellbeing and quality of life of the population.

- 6.2.90 Paragraph 4.79 sets out that impacts can be direct, such as: traffic, noise, vibration, air quality and emissions, light pollution, community severance, dust, odour, polluting water, hazardous waste and pests.
- 6.2.91 Paragraph 4.80 sets out that the impacts to health can also be indirect by affecting, for example: access to key public services, local transport, opportunities for cycling and walking, or the use of open space for recreation and physical activity.
- 6.2.92 Paragraph 4.81 states that where a scheme has likely significant environmental impacts that would have an effect on human beings, the ES should identify and set out the assessment of any likely significant adverse health impacts.
- 6.2.93 Paragraph 4.82 states that the Applicant should identify measures to avoid, reduce or compensate adverse health impacts. As these impacts may affect people simultaneously, the potential cumulative impact on health should be considered.
- 6.2.94 In accordance with Paragraph 4.81 of the NPSNN, ES Chapter 12 Population and Human Health (Document Reference 6.2) reports on the assessment of the scheme with regard to its overall effects on the population's wellbeing and quality of life. This includes health profiles of affected communities, health determinants and likely health outcomes. An assessment of the scheme has been undertaken on human health outcomes for the local wards of Ermin and Badgeworth, comprised of the following health determinants:
- Community, recreational and education facilities
 - Green/open space
 - Healthcare facilities
 - Transport and connectivity
 - Safety of the existing affected road network
 - Ambient air quality
 - Ambient noise environment
 - Sources and pathways of potential pollution
 - Landscape amenity
- 6.2.95 As required under Paragraph 4.82 of the NPSNN, ES Chapter 12 Population and Human Health (Document Reference 6.2) identifies the mitigation proposed to avoid, reduce or compensate adverse health effects during both construction and operation of the scheme. This includes:
- Essential mitigation for noise, visual and air quality impacts as identified in the relevant Chapters of the ES (for example, there are a variety of measures including provision of different medium noise barriers, as appropriate, such as stone walls, earth bunds and vertical barriers (absorptive and reflective of noise) to mitigate the health impacts related to noise)
 - Considerate construction management to mitigate indirect effects of construction (such as air quality and noise) and to prevent severance, as secured in ES Appendix 2.1 EMP (Document Reference 6.4)
 - Necessary access arrangements during construction is detailed in Annex B Construction Traffic Management Plan (CTMP) of ES Appendix 2.1 EMP (Document Reference 6.4)

- Annex F PRow Management Plan of ES Appendix 2.1 EMP (Document Reference 6.4) sets out proposals to mitigate effects of the scheme on public rights of way

- 6.2.96 ES Chapter 12 also sets out how the scheme would deliver enhancements proposed for local communities to access open spaces and to utilise well designed and integrated active travel options. For example, this includes repurposing part of the existing A417 as a walking, cycling and horse riding corridor (the Air Balloon Way) and providing a grade separated diversion of the Cotswold Way National Trail via the new Cotswold Way crossing, improving safety and enhancing connectivity for users. There would also be reprovision of a greater area of Common Land than that lost as part of the scheme, as open space for people to enjoy.
- 6.2.97 As reported in Table 12-30 of ES Chapter 12 Population and Human Health (Document Reference 6.2), all health effects would be neutral in the construction phase. During the operation of the scheme, there would be positive health outcomes in relation to access to facilities including healthcare, community and recreation, and education. All other health outcomes would be neutral.
- 6.2.98 It is therefore considered that the scheme meets the requirements of NPSNN with regard to health.

6.3 Generic impacts

- 6.3.1 This section provides an assessment of the scheme against the 'generic impacts' of the NPSNN.
- 6.3.2 It is considered that there are four topics within the generic impacts that are of particular importance and relevance to the determination of the DCO Application for the scheme, due to the nature of the proposals and its sensitive location within environmentally designated areas, including the Cotswolds AONB and the Crickley Hill and Barrow Wake SSSI. As such, a detailed assessment of the scheme against these impacts is set out in Chapters 7-10 of this report, as listed below:
- Chapter 7: Development proposed within nationally designated areas
 - Chapter 8: Biodiversity and ecological conservation
 - Chapter 9: Special Category Land
 - Chapter 10: Historic Environment
- 6.3.3 A cross-reference is made to these Chapters where relevant.

Air quality

- 6.3.4 Paragraphs 5.3 to 5.15 of the NPSNN set out how air quality should be considered in relation to a national networks scheme. Paragraph 5.5 of the NPSNN recognises that road schemes in particular create complex challenges with regard to air quality on account of the wide geographical area over which impacts (positive and negative) can potentially be felt.
- 6.3.5 Paragraph 5.6 of the NPSNN requires that where the impacts of a scheme would be likely to have significant air quality effects in relation to meeting EIA requirements and/or affect the UK's ability to comply with the Air Quality Directive, the air quality impacts of the scheme should be assessed in the ES. As set out in Paragraphs 5.7 – 5.9 this assessment should:

- describe existing air quality levels;
- describe forecasts of air quality at the time of opening, assuming that the scheme is not built (the future baseline) and taking account of the impact of the scheme;
- describe any significant air quality effects, their mitigation and any residual effects, distinguishing between the construction and operation stages of the scheme, taking account of the impact of road traffic it would generate;
- be consistent with future projections of air quality produced by Defra (although it may also include more detailed modelling to demonstrate local impacts); and
- provide the SoS with a judgement of risk as to whether the scheme would affect the UK's ability to comply with the Air Quality Directive.

6.3.6 Paragraphs 5.10 – 5.13 of the NPSNN provide guidance to the SoS on decision-making when considering air quality impacts of the scheme. It states that air quality considerations are likely to be particularly relevant where schemes are:

- proposed within or adjacent to an AQMA; and
- where changes are sufficient to bring about the need for a new or expanded AQMA, would change the exceedance of Limit Values, or have the potential to impact on nature conservation sites.

6.3.7 Paragraph 5.12 states that the SoS must attribute substantial weight to air quality considerations where, after taking into account mitigation, the scheme would lead to a significant air quality impact in relation to EIA and/or where it would lead to a deterioration in air quality in a zone or agglomeration (the UK has 43 zones for the purposes of reporting air quality to the European Commission).

6.3.8 It is further stated in Paragraph 5.13 that the SoS should refuse consent where the air quality impacts of a scheme, after taking into account mitigation, would result in a zone or agglomeration which is currently compliant with the Air Quality Directive becoming non-compliant or where it would affect the ability of a non-compliant area to achieve compliance within the most recent timescales reported to the European Commission.

6.3.9 ES Chapter 5 Air Quality (Document Reference 6.2) provides an assessment of the air quality impacts of the scheme. In accordance with the requirements of Paragraphs 5.6 to 5.9 of the NPSNN, this assessment:

- describes existing air quality levels
- describes forecasts of air quality at time of scheme opening
- identifies any significant air quality effects and mitigation during construction and operation of the scheme
- describes the data and methodology used for modelling effects
- provides a judgement as to whether the scheme would affect the UK's ability to comply with the Air Quality Directive

6.3.10 ES Chapter 5 Air Quality (Document Reference 6.2) concludes that the scheme would not result in significant effects on human health due to changes in air quality during construction or operation. It further concludes that there is no risk of affecting the UK's ability to achieve compliance with the Air Quality Directive.

6.3.11 As identified in section 5.7 of ES Chapter 5 Air Quality (Document Reference 6.2), there are two AQMA's within 200m of the affected road network (ARN); Birdlip AQMA in Cotswold District and Cheltenham AQMA in Cheltenham Borough. The assessment concludes that there are no significant effects predicted in AQMAs.

- 6.3.12 It is therefore considered that the scheme meets the requirements of the NPSNN with regard to air quality.
- 6.3.13 ES Chapter 5 Air Quality (Document Reference 6.2) does identify that there would be a significant effect in relation to nitrogen deposition in relation to two ecological receptors; Ullen Wood Ancient Woodland and Veteran Trees. Further assessment of the impacts of the scheme in relation to this is provided in ES Chapter 8 Biodiversity (Document Reference 6.2) and is therefore considered in more detail against the relevant NSPNN tests relating to biodiversity and ecological conservation in Chapter 8 of this report.

Carbon emissions

- 6.3.14 Paragraphs 5.16 to 5.19 of the NPSNN set out how carbon emissions should be assessed in relation to a national networks scheme. Paragraph 5.16 states that the UK Government has a legally binding framework to cut greenhouse gas emissions. This became a 100% target in June 2019 as a result of changes made to the Climate Change Act 2008.
- 6.3.15 Paragraph 5.17 states that carbon impacts of a scheme will be considered within the appraisal of scheme options (the business case) prior to the submission of a DCO Application, however if the scheme is subject to EIA, the ES will need to describe an assessment of any likely significant climate factors in accordance with the EIA Directive. While the NPSNN notes that it is very unlikely that a road project in isolation will affect the ability of Government to meet its carbon reduction plan targets, Applicants should provide evidence of the carbon impact of the project and an assessment against the Government's carbon budgets.
- 6.3.16 Paragraph 5.18 directs the SoS that any increase in carbon emissions is not a reason to refuse development consent, unless the increase in carbon emissions resulting from the scheme would be so significant as to have a material impact on the ability of the Government to meet its carbon reduction targets.
- 6.3.17 Paragraph 5.19 states that mitigation measures should be identified in both design and construction of the scheme, and the SoS will consider how effective these measures are in ensuring the carbon footprint is not unnecessarily high. Adequacy of these measures in relation to design and construction will be a material factor in the SoS for Transport's decision making process.
- 6.3.18 ES Chapter 14 Climate (Document Reference 6.2) reports on the potential effects of the scheme on climate, in accordance with the DMRB LA 114 methodology. It includes an assessment of:
- Impact of the scheme on climate (GHG emissions assessment): the effect on the climate of GHG emissions arising from the scheme, including how the scheme would affect the ability of government to meet its carbon reduction plan targets.
 - Vulnerability of the scheme to climate change (CCR assessment): the resilience of the scheme to climate change, including how the scheme design would be adapted to take account for the projected impacts of climate change (see 'climate change adaptation' in section 6.2 of this report).
 - In-combination climate impacts (ICCI) assessment: the combined effects of the impacts of the scheme and potential climate change impacts on the receiving environment.

- 6.3.19 As set out in ES Chapter 14 (Document Reference 6.2), an emissions quantification exercise has been undertaken to calculate the emissions anticipated to be generated or avoided by the scheme during the following four life cycle stages of the scheme's construction and operation:
- Construction works and supply chain carbon emissions
 - Operational maintenance-related emissions
 - Operational traffic carbon emissions (user carbon) from vehicle tailpipes
 - Emissions associated with ongoing land use change/sequestration
- 6.3.20 GHG emissions associated with the scheme have been compared to the national UK carbon budgets. The UK Government has carbon budgets up to 2032, with the recommended sixth carbon budget (up to 2037) due for legislation by the end of June 2021¹¹.

Table 6-1 Relevant carbon budgets for the UK

Period	Carbon Budget	Carbon Budget Level
2018 - 2022	Third carbon budget	2,544 MtCO ₂ e
2023 - 2027	Fourth carbon budget	1,950 MtCO ₂ e
2028 - 2032	Fifth carbon budget	1,725 MtCO ₂ e
2033 - 2037	Sixth carbon budget - not legislated for	Committee on Climate Change recommendation: 965 MtCO ₂ e ¹²

- 6.3.21 In accordance with Paragraph 3.20 of DMRB LA 114, a significant effect occurs where the increase in carbon emissions resulting from the scheme would have a '*material impact on the ability of Government to meet its carbon reduction targets*'.
- 6.3.22 ES Chapter 14 (Document Reference 6.2) sets out that the construction period for the scheme falls wholly within the fourth carbon budget. Operation of the scheme would commence in 2026 and is assessed against the fourth and fifth carbon budgets, up to 2032. Operational and maintenance emissions for the scheme between 2033 and 2037 (the period for the sixth carbon budget) are also presented in Table 14-18 of ES Chapter 14 Climate (Document Reference 6.2). The sixth carbon budget has been committed to by government and is expected to become law by June 2021.
- 6.3.23 The assessment of scheme net emissions in Table 14-18 of ES Chapter 14 Climate (Document Reference 6.2) identifies that construction of the scheme is estimated to contribute approximately 0.00380% of the fourth carbon budget. Operation of the scheme is estimated to contribute approximately 0.00114% of the fourth carbon budget and 0.00355% of the fifth carbon budget. It is considered that this magnitude of emissions from the scheme in isolation would not affect the ability of the UK Government to meet its carbon reduction plan targets, and therefore is not anticipated to give rise to a significant effect on climate. This assessment therefore is considered to comply with Paragraphs 5.17 and 5.18 of the NPSNN.

¹¹ The Committee on Climate Change published its recommended Sixth UK Carbon Budget on 9 December 2020. The report 'The Sixth Carbon Budget: The UK's path to Net Zero' is available online at: <https://www.theccc.org.uk/wp-content/uploads/2020/12/The-Sixth-Carbon-Budget-The-UKs-path-to-Net-Zero.pdf>. The report notes that "the Government must set the Sixth Carbon Budget in law by the end of June 2021. This must be followed, as soon as is practicable, by a set of policies and proposals to meet the budget.

¹² The sixth carbon budget has been committed to by government and is expected to become law by June 2021.

- 6.3.24 Mitigation measures are identified in ES Chapter 14 Climate (Document Reference 6.2) and include engineering design, materials, transport and construction mitigation measures that have been embedded into the design of the scheme.
- 6.3.25 Section 14.9 of ES Chapter 14 Climate (Document Reference 6.2) details the mitigation measures designed into the scheme to reduce carbon emissions, which include: reducing the need for energy consuming operational equipment such as lighting; reduced earthworks and depth of cutting; a plan for reduced energy consumption in construction; selecting low maintenance planting; and; managing material resources to reduce waste and import.
- 6.3.26 It is concluded that the scheme is compliant with the NPSNN with regard to carbon emissions.

Biodiversity and ecological conservation

- 6.3.27 The scheme is situated in a sensitive ecological location, which partially includes the Crickley Hill and Barrow Wake SSSI. As such, compliance of the scheme with the NPSNN with regard to the generic impact of 'biodiversity and ecological conservation' is considered separately and in detail within Chapter 8 of this report.

Waste management

- 6.3.28 Paragraphs 5.39 to 5.45 of the NPSNN set out the requirements of national network schemes with regard to hazardous and non-hazardous waste management, recognising in Paragraph 5.41 that large infrastructure projects may generate such waste during construction and operation.
- 6.3.29 Paragraph 5.42 states that the Applicant should set out the proposed arrangements for managing any waste produced by the scheme, including the proposed waste recovery and disposal system. The Applicant should seek to minimise waste produced and the volume sent for disposal, unless it can be demonstrated that the alternative is the best overall environmental outcome.
- 6.3.30 Paragraph 5.43 directs that in considering the waste impacts of a scheme, the SoS should be satisfied that:
- any waste will be properly managed (off-site and on-site);
 - waste can be dealt with appropriately by available waste infrastructure and would not have an adverse effect on the capacity of existing waste management facilities to deal with other waste arisings in the area; and,
 - that adequate steps have been taken to minimise the volume of waste arisings and the volume requiring disposal, except where an alternative is the most sustainable outcome.
- 6.3.31 ES Chapter 10 Material Assets and Waste (Document Reference 6.2) reports on the potential effects on the environment from the use of material assets and the generation, disposal and recovery of waste resulting from the scheme. The assessment concludes that there are no significant effects anticipated during construction or operation of the scheme.
- 6.3.32 In accordance with Paragraph 5.42 of the NPSNN, ES Chapter 10 Material Assets and Waste (Document Reference 6.2) sets out the proposed arrangements for managing waste produced by the scheme. It identifies that measures have been embedded in the design of the scheme to minimise the

waste produced. This includes – as set out in ES Chapter 2 The Project (Document Reference 6.2) – the decision during the design development process to reduce the cutting through the escarpment from 25m to 17m, which considerably reduced the amount of excavated material produced.

- 6.3.33 ES Chapter 10 Material Assets and Waste (Document Reference 6.2) sets out that whilst an earthwork surplus of 65,945m³ has been identified, measures would be taken to reduce the excess material to a point that no surplus will remain following the required cut and fill construction operations. Such measures are secured in Annex E Materials Management Plan (MMP) of ES Appendix 2.1 EMP (Document Reference 6.4). This sets out how the excess material would be managed during construction of the scheme, using the waste hierarchy in which waste prevention is the best outcome and waste disposal is the least favoured.
- 6.3.34 Measures would be implemented to ensure material is handled in accordance with the Waste (England and Wales) Regulations 2011 to ensure the best environmental outcome. The scheme would re-use as much material as possible on-site, if suitable for re-use. Testing would be undertaken during construction to confirm the materials meet the specification requirements, which would be developed in line with the CL:AIRE Definition of Waste: Development Industry Code of Practice. This would ensure excavated material can be used directly within the development, subject to being suitable for use or following site treatment. Any material that does not meet this specification would be disposed of appropriately.
- 6.3.35 A Site Waste Management Plan (SWMP) has been developed and forms Annex H of ES Appendix 2.1 EMP (Document Reference 6.4). The SWMP outlines the proposals for the identification, segregation, handling and storage of wastes arising from the scheme.
- 6.3.36 The location of waste management facilities for construction and demolition waste are shown in ES Figure 10.1 Waste management infrastructure (Document Reference 6.3). This figure includes seven types of waste infrastructure facility with data gathered from GCC. The waste management sites include composting, hazardous and clinical waste transfer station, hazardous waste treatment facility, landfill/non-hazardous, landfill or inert, metal recycling facility and waste transfer station. There are 22 waste transfer stations located in Gloucestershire.
- 6.3.37 Overall, there would be a limited amount of waste that would be removed from site and therefore it is unlikely that waste would be disposed of outside the region. Therefore, ES Chapter 10 Material Assets and Waste (Document Reference 6.2) concludes that the assessment of effects on waste management infrastructure is slight and not significant.
- 6.3.38 It is concluded that the scheme is compliant with the NPSNN with regard to waste management.

Civil and military aviation and defence interests

- 6.3.39 Paragraphs 5.46 to 5.66 of the NPSNN set out civil and military aviation and defence interests policy relating to national networks schemes.
- 6.3.40 The NPSNN identifies in Paragraph 5.47 the importance of UK airspace for both civilian and military aviation interests, stating that it is essential that the safety of UK aerodromes, aircraft and airspace is not adversely affected by new national networks infrastructure.

- 6.3.41 Paragraph 5.55 states that if a scheme may have an effect on civil or military aviation and/or other defence assets, an assessment of potential impacts upon them should be carried out. It states that the MoD, Civil Aviation Authority (CAA), National Air Traffic Services (NATS) and any aerodrome likely to be affected should be consulted.
- 6.3.42 The scheme is not likely to affect any civil and military aviation sites (or other defence assets). The MoD and CAA were consulted during statutory consultation on the scheme, with no objections raised in response. Details of all organisations consulted during statutory consultation and their response (if given) is provided in the Consultation Report (Document Reference 5.1).
- 6.3.43 Given that the scheme is not likely to affect any civil and military aviation sites (or defence assets), an assessment of such impacts has not been carried out.
- 6.3.44 It is considered that the scheme meets the requirements of the NPSNN with regard to civil and military aviation and defence interests.

Coastal change

- 6.3.45 Paragraphs 5.67 to 5.80 of the NPSNN set out considerations for national networks schemes proposed on the coast. The scheme is not located on or in the vicinity of a coast. This generic impact is therefore not applicable to the scheme and is not considered in this report.

Dust, odour, artificial light, smoke, steam

- 6.3.46 Paragraphs 5.81 to 5.89 of the NPSNN set out the requirements of national network schemes in relation to emissions such as odour, dust, steam, smoke and artificial light, all of which have the potential to cause detrimental effects on amenity, cause a common law nuisance or cause a statutory nuisance under Part 3 of the Environmental Protection Act 1990.
- 6.3.47 Paragraph 5.83 acknowledges that some impact on amenity for local communities is likely to be unavoidable for national networks NSIPs. However, it states that such impacts should be kept to a minimum and acceptable level.
- 6.3.48 Under Paragraph 5.84, if the scheme is subject to an EIA, the Applicant should assess any likely significant effects on amenity from emissions of odour, dust, steam, smoke and artificial light and describe them in the ES. This should describe the type and quantity of emissions; aspects of the development which may give rise to emissions during construction, operation and decommissioning; locations or premises affected by the emissions and the effects; and, measures for preventing or mitigating the emissions.
- 6.3.49 Paragraph 5.86 advises the Applicant to consult the local planning authority and, where appropriate, the EA, on the scope and methodology of such assessment.
- 6.3.50 Paragraph 5.87 states that the SoS should be satisfied that all reasonable steps have and will be taken to minimise detrimental impacts on amenity from the above listed emissions. It states that this should include the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.
- 6.3.51 In accordance with Paragraph 5.84 of the NPSNN, ES Chapter 5 Air Quality (Document Reference 6.2) provides an assessment of the effects of construction dust on sensitive human receptors and designated habitats within 200m of the

DCO Boundary. Overall, it is identified that the scheme could impact receptors during the construction phase and mitigation is required to reduce the frequency and intensity of dust impacts. The construction dust risk potential for the scheme has been categorised as large.

- 6.3.52 Mitigation measures to reduce impacts to a negligible level are secured through ES Appendix 2.1 EMP (Document Reference 6.4). With best practice mitigation measures in place the impacts are considered to be temporary, neutral and not significant. A mobile plant permit for crushing operations will be required as set out within the Consents and Agreements Position Statement (Document Reference 7.2) and committed to through the EMP. Any crushing / screening activity will be managed under an environmental permit from the EA, which contains requirements around managing nuisance.
- 6.3.53 Issues associated with odour, smoke and steam were not included within the scope of the ES, as these are not effects that are expected to arise from activities undertaken during construction and operation of the scheme. As set out in the Consultation Report (Document Reference 5.1) and the Statement of Commonality (Document Reference 7.3), Highways England has consulted with the local planning authorities and the EA on the environmental impact assessment for the scheme, including in relation to scope and methodology.
- 6.3.54 Highways England has prepared a Statement of Statutory Nuisance (Document Reference 6.6) which accompanies the DCO Application. This Statement has considered the potential for the scheme to cause a statutory nuisance under Section 79(1) of the Environmental Protection Act 1990. With aforementioned mitigation in place, it is concluded that none of the statutory nuisances, as identified in section 79(1) of the Environmental Protection Act 1990, are predicted to arise.
- 6.3.55 As set out in ES Chapter 7 Landscape and Visual Effects (Document Reference 6.2), the dark skies of the Cotswolds AONB contribute to its special character and CCB has produced a Position Statement to encourage a reduction in light pollution and enhance the dark skies. Therefore, Highways England proposes that there would be no permanent lighting as part of the scheme in order to avoid detrimental impacts on local amenity and the AONB landscape. It is likely that temporary lighting would be used during construction to enable safe working practice during hours of darkness, however such effects would be temporary.
- 6.3.56 It is considered that the scheme meets the requirements of the NPSNN with regard to dust and artificial light.

Flood risk

- 6.3.57 Paragraphs 5.90 to 5.115 of the NPSNN set out the requirements of national networks schemes relating to flood risk. It states in Paragraph 5.92 that applications should be accompanied by a Flood Risk Assessment (FRA) if the scheme is proposed:
- Within Flood Zones 2 and 3 (medium and high probability of river and sea flooding); or
 - Flood Zone 1 (low probability) if the scheme is greater than 1 hectare or may be subject to other sources of flooding (local watercourses, surface/ground water, reservoirs) or where the EA has notified the local planning authority that there are critical drainage problems.

- 6.3.58 Paragraphs 5.93 and 5.94 state that the FRA should consider the risk of all forms of flooding to and from the scheme and demonstrate how they will be managed and mitigated; take into account climate change and vulnerable users of the infrastructure; include a residual risk assessment; consider the need to remain operational in a worst case flood event; and provide evidence for the SoS to apply the Sequential Test and Exception Test as appropriate.
- 6.3.59 It is recommended in Paragraph 5.96 that Applicants engage in early discussions with the EA and other relevant bodies such as Internal Drainage Boards and statutory undertakers, where a scheme may be affected by, or add to, flood risk. Paragraph 5.101 states that if the EA objects to the grant of development consent on the grounds of flood risk, the SoS can grant consent but would need to be satisfied that all reasonable steps have been taken by the Applicant and the EA to resolve the concerns.
- 6.3.60 Paragraph 5.103 identifies that linear infrastructure and the use of embankments can reduce the risk of flooding for the surrounding area; where such cases occur, the SoS should take account of any positive benefits of placing linear infrastructure in a flood risk area.
- 6.3.61 Paragraphs 5.110 to 5.115 of the NPSNN sets out how the Applicant may be required to mitigate flood risk, including through the use of Sustainable Drainage Systems (SuDS). It states that surface water drainage arrangements should be such that the volumes and peak flow rates of surface water leaving the site are no greater than the rates prior to the scheme unless specific off-site arrangements are made and result in the same net effect.
- 6.3.62 A FRA (ES Appendix 13.3) has been undertaken for the scheme, in accordance with the EIA Scoping Report and Paragraph 5.92 of the NPSNN. The FRA identifies that the scheme is located in Flood Zone 1 and subsequently is at low risk of flooding. As set out in the Statements of Common Ground appended to the Statement of Commonality (Document Reference 7.3), Highways England has engaged in early discussions with GCC (as the Lead Local Flood Authority) and the EA (as Lead Authority for main rivers) on the FRA and flood risk. Both parties have also been formally consulted on the scheme as prescribed consultees under the Act, as set out in the Consultation Report (Document Reference 5.1).
- 6.3.63 As detailed within the FRA and also in ES Chapter 13 Road Drainage and the Water Environment (Document Reference 6.2), the assessment has found that the risk of flooding during construction of the scheme is low, although several areas at medium to high risk of pluvial flooding (around the tributary of Norman's Brook) and groundwater flooding have been identified in the FRA. The risk of fluvial flooding to or from the scheme is low, however there are areas at high risk from surface water and groundwater flooding.
- 6.3.64 During construction of the scheme, construction drainage installed early in the construction period is proposed to manage surface and groundwater flooding to ensure that flood risk would not increase as a result of the scheme. This is secured in ES Appendix 2.1 EMP (Document Reference 6.4).
- 6.3.65 During operation of the scheme, the risk of fluvial flooding to the site is considered to be low, with very low risk of fluvial flooding. Areas of medium to high risk of pluvial flooding, in particular around the tributary of Norman's Brook, and groundwater flooding have been identified in the FRA.

- 6.3.66 Whilst preliminary modelling outputs are presented in the FRA, which has improved the understanding of the current surface water flood risk around Crickley Hill, it is proposed that further detailed modelling will be undertaken. This will improve the understanding of any residual flood risk, following design of the realignment of the tributary of Norman's Brook and the scheme's drainage design, to ensure that flood risk does not increase as a result of the scheme.
- 6.3.67 It is anticipated that the scheme would provide a benefit to road users travelling through the area between Cowley junction and Witcombe by providing a greater standard of flood protection than existing.
- 6.3.68 ES Chapter 13 Road Drainage and the Water Environment (Document Reference 6.2) concludes that the effect of the scheme on flood risk during construction and operation would be neutral and not significant.
- 6.3.69 It is considered that the scheme meets the requirements of the NPSNN with regard to flood risk.

Land instability

- 6.3.70 Paragraphs 5.116 to 5.119 of the NPSNN set out the requirements of national networks schemes with regard to land instability.
- 6.3.71 It states in Paragraph 5.117 that if land stability could be an issue, Applicants should seek appropriate technical and environmental expert advice and liaise with the Coal Authority if necessary.
- 6.3.72 Paragraph 5.118 states that a preliminary assessment of ground instability should be carried out at the earliest possible stage prior to a detailed DCO Application being prepared and that Applicants should ensure that any necessary investigations are undertaken to ascertain that the site is and will remain stable or can be made so as part of the development. This needs to be assessed within the context of the surrounding area and could be in the form of a land stability or slope stability risk assessment report.
- 6.3.73 Risks associated with land stability have been assessed in the preliminary geotechnical design, in accordance with CD 622 Managing Geotechnical Risk and are presented in ES Appendix 9.2 Preliminary Ground Investigation Report (GIR) (Document Reference 6.4). This includes a geotechnical risk register, identifying all of the geotechnical (or ground-related) risks associated with the scheme, and a record of the mitigations to be employed to remove/avoid, reduce and control these risks during design, construction, operation and maintenance of the scheme.
- 6.3.74 The Preliminary GIR includes a qualitative assessment of the hazards and consequent risks posed by the marginally stable mass movement deposits on the wider slopes of the Crickley Hill valley and mitigation in the form of horizontal drainage has been proposed to control groundwater levels and limit pore water pressures during extreme rainfall events. The identified geotechnical risks and their mitigations will be further assessed as part of the detailed design in accordance with CD622. Land stability is also considered in ES Appendix 4.4 Major accidents and disasters long list and short list (Document Reference 6.4).
- 6.3.75 The detailed design of the scheme will be undertaken in accordance with CD622 and relevant design standards to ensure that the proposed embankment and cutting side slopes and any retaining structures and structure foundations are

designed to ensure long term stability, with requirements for ground improvement works where necessary.

- 6.3.76 As set out in the Consultation Report (Document Reference 5.1), the Coal Authority were consulted on the scheme proposals as part of the 2019 and 2020 statutory consultations and no concerns or objections were raised by the Coal Authority in response to those consultations.
- 6.3.77 It is considered that the scheme meets the requirements of the NPSNN with regard to land instability.

The historic environment

- 6.3.78 The scheme is located in an area of archaeological interest, including Crickley Hill Country Park which is owned and managed by the National Trust. As such, compliance of the scheme with the NPSNN with regard to the generic impact of 'the historic environment' is considered separately and in detail within Chapter 10 of this report.

Landscape and visual impacts

- 6.3.79 Paragraphs 5.143 to 5.161 of the NPSNN set out the requirements for national network schemes in relation to impacts on landscapes and visual amenity.
- 6.3.80 Paragraphs 5.150 to 5.153 set out the specific policy requirements for development proposed within nationally designated landscapes, including in National Parks, the Broads and AONBs. The scheme is entirely located within the Cotswolds AONB. As such, compliance of the scheme with Paragraphs 5.150 to 5.153 of the NPSNN is considered separately and in detail within Chapter 7 of this report. This section considers the generic impact of 'landscape and visual impacts' of the NPSNN with the exception of the aforementioned paragraphs.
- 6.3.81 For schemes subject to EIA, Paragraphs 5.144 to 5.146 state that Applicants should undertake an assessment of any likely significant landscape and visual impacts in the EIA. This assessment should include reference to any landscape character assessment and associated studies and should take account of any relevant policies based on these assessments in local development documents. The assessment should include any significant effects during construction of the scheme and/or the significant effects of the completed development and its operation on landscape components and character, including historic landscape characterisation. Furthermore, the assessment should include the visibility and conspicuousness of the scheme during construction and the potential impacts of its presence and operation on views and visual amenity, including impacts on noise and light pollution, local amenity, tranquillity and nature conservation.
- 6.3.82 Paragraph 5.147 requires any statutory undertaker commissioning or undertaking works in relation to, or so as to affect land in a National Park or AONBs, to comply with the respective duties in section 11A of the National Parks and Access to Countryside Act 1949 and section 85 of the Countryside and Rights of Way Act 2000.
- 6.3.83 Paragraph 5.148 states that: *'For significant road widening or the building of new roads in National Parks and the Broads applicants also need to fulfil the requirements set out in Defra's English national parks and the broads: UK government vision and circular 2010 or successor documents. These*

requirements should also be complied with for significant road widening or the building of new roads in Areas of Outstanding Natural Beauty’.

- 6.3.84 Paragraph 5.149 identifies that landscape effects depend both on the nature of the existing landscape likely to be affected and the nature of the effect likely to occur. Schemes must be designed carefully and whilst having regard to siting and constraints (including operational constraints), should aim to avoid or minimise harm to the landscape, providing reasonable mitigation where possible and appropriate. Paragraph 5.158 states that the SoS will have to judge whether the visual effects on sensitive receptors, such as local residents, and other receptors, such as visitors to the local area, outweigh the benefits of the development.
- 6.3.85 Paragraphs 5.159 to 5.161 describe how visual and landscape effects of a project can be avoided or mitigated. Paragraph 5.159 recognises that whilst reducing the scale of a project or making changes to its operation could help to avoid or mitigate such effects, it may also result in a significant operational constraint or reduction in function. However, it states that where the benefits of mitigation with regard to landscape effects significantly outweigh a loss of functional performance then exceptionally a small reduction in the scale or function of the project could be acceptable to the SoS.
- 6.3.86 Paragraph 5.160 states that adverse landscape and visual effects can be minimised through appropriate siting of infrastructure, design and landscaping schemes and that materials and designs should always be given careful consideration. Additionally, under Paragraph 5.161, it may be appropriate for an Applicant to undertake landscaping works off site, such as filling in of existing hedge and tree lines to mitigate the impact of the scheme when viewed from a distant vista.
- 6.3.87 In accordance with Paragraphs 5.144 to 5.145 of the NPSNN, a Landscape and Visual Impact Assessment (LVIA) has been undertaken in relation to the scheme and is reported in ES Chapter 7 Landscape and Visual Effects (Document Reference 6.2). This assessment was undertaken in accordance with the methodology set out in DMRB LA 107 and also follows guidance from the Landscape Institute and Natural England. ES Chapter 7 Landscape and Visual Effects (Document Reference 6.2) also sets out how the LVIA took account of landscape character assessments and relevant local policies. The effects of the scheme during both its construction and its operation have been assessed in the LVIA.
- 6.3.88 ES Chapter 7 Landscape and Visual Effects (Document Reference 6.2) concludes that construction activities would have significant adverse temporary effects on the area of the AONB within the study area and some special qualities of the Cotswolds AONB. Landscape character types (LCTs) that would be significantly adversely affected by the scheme during the construction phase include:
- AONB LCT 2 Escarpment
 - AONB LCT 7 High Wold
 - AONB LCT 8 High Wold Valleys
- 6.3.89 Construction activities would have a likely significant adverse temporary effect on the following visual receptors:

- Recreational users on the Cotswold Way National Trail, Gloucestershire Way long distance footpath, byways, bridleways, and PRoW including at Barrow Wake, Emma's Grove and Crickley Hill, and in relation to Shab Hill, Stockwell and Nettleton Bottom;
 - Communities including Nettleton Bottom, Shab Hill and Stockwell; and
 - Tourism receptors including visitors to the Cotswolds AONB, Great Witcombe roman villa, Crickley Hill Country Park, Barrow Wake, Emma' Grove and Leckhampton Hill.
- 6.3.90 Combining the landscape and visual effect for construction assessment, overall, the scheme will give rise to significant, adverse effects on both landscape and visual receptors.
- 6.3.91 The operation of the scheme would have significant and adverse permanent effects for character areas directly affected. LCTs that would be significantly affected by the scheme at year 1 of the operational phase include:
- AONB LCT 2 Escarpment (adverse)
 - AONB LCT 7 High Wold (adverse)
 - AONB LCT 8 High Wold Valleys (adverse)
- 6.3.92 LCTs that would be significantly affected by the scheme at year 15 of the operational phase include:
- AONB LCT 2 Escarpment (adverse)
 - AONB LCT 7 High Wold (adverse)
- 6.3.93 As a result of the scheme at year 1, there would be adverse permanent significant effects experienced by the following visual receptors:
- Recreational users on the Cotswold Way National Trail, Gloucestershire Way long distance footpath, byways, bridleways, and PRoW including at Barrow Wake, Emma's Grove and Crickley Hill, and in relation to Shab Hill and Stockwell;
 - Visitors to the Crickley Hill Country Park, Great Witcombe Roman Villa, and Barrow Wake; and
 - Communities including Shab Hill and Stockwell.
- 6.3.94 As a result of the scheme at year 15, there would be adverse permanent significant effects experienced by the following visual receptors:
- Recreational users on the Cotswold Way National Trail; and
 - Visitors to the Crickley Hill Country Park and Barrow Wake.
- 6.3.95 Non-significant beneficial effects would be experienced at the following receptors:
- Communities at Birdlip and Nettleton Bottom.
 - Combining the landscape and visual effect for both operational assessments, overall, the scheme will give rise to significant, adverse effects on both landscape and visual receptors.
 - Likely changes to the special qualities of the Cotswolds AONB.

Special Qualities of the Cotswolds AONB

- 6.3.96 Beyond the requirements of EIA, Table 7-13 in ES Chapter 7 Landscape and Visual Effects (Document Reference 6.2) includes an appraisal of effects on

landscape character; the special qualities of the AONB (including tranquillity and dark skies); and views and visual amenity, including on recreational, community and tourism receptors. This concludes that the operation of the scheme would have beneficial and adverse permanent effects on the special qualities of the AONB within the study area.

6.3.97 Permanent adverse effects on the special qualities of the Cotswolds AONB include:

- Cotswold escarpment, including views from and to the AONB – with the increased depth and width of cutting, and additional carriageway width; and
- River valleys – due to infilling the head of the valley at Coldwell Bottom and the presence of Shab Hill junction.

6.3.98 Permanent beneficial effects on the special qualities of the Cotswolds AONB include:

- Unifying character of the limestone geology – increasing its visible presence in the landscape through the cutting and use as a building material on the structure and extensive stone walling;
- High wold long distance views – reducing the visual dominance of road infrastructure with the repurposing of the existing A417 and setting the scheme into the landscape, enclosing it with landscape bunding and Cotswold stone walling;
- Distinctive dry-stone walls – provision of extensive, additional new sections of dry stone walling across the scheme;
- Internationally important flower-rich grasslands, particularly limestone grasslands – provision of large areas of calcareous grassland;
- Internationally important ancient broadleaved woodland, particularly along the crest of the escarpment – provision on additional areas of broadleaved woodland;
- Variations in the colour of the stone from one part of the AONB to another which add a vital element of local distinctiveness – positively contributing to local distinctiveness with the use of Cotswold stone walling and cladding on structures;
- Tranquillity of the area – with the removal of lit junctions and better integrated carriageway to reduce noise and visual disturbance;
- Extensive dark sky area – removal of lit junction and better integrated carriageway to reduce light spill from car headlights;
- Accessible landscape for quiet recreation – improved recreational access with the provision and upgrading of PRoW, traffic free WCH crossings via the Cotswold Way and Gloucestershire Way crossings.

6.3.99 ES Chapter 7 Landscape and Visual Effects (Document Reference 6.2) concludes that the scheme would have a range of changes on the character and special qualities of the Cotswolds AONB. In the short to medium term (up to the intended design year - year 15) these would generally be adverse in nature before the embedded and essential mitigation takes effect and the proposed enhancements are realised. In the long-term the scheme would help to conserve and enhance the natural beauty of the AONB, providing enhancements to some of the special qualities.

6.3.100 Overall, the scheme would provide several opportunities to enhance the character and benefit the special qualities of the Cotswolds AONB in the long-term by

removing some of the historic impacts of the existing A417. However, the scheme would give rise to temporary adverse changes as a result of the construction phase to a number of special qualities as set out above. A number of these adverse changes would continue into the early operational years. Benefits would be realised as the proposed landscape planting matures to a sufficient level and features of the scheme weather, becoming more integrated with the landscape, at operational design year (year 15), more of the adverse changes would be mitigated and further benefits realised.

- 6.3.101 It is therefore considered that the scheme complies with the NPSNN in relation to the requirement for assessment of landscape and visual impacts within the EIA.
- 6.3.102 In relation to Paragraph 5.147, which references Section 11A of the National Parks and Access to Countryside Act 1949 and Section 85 of the Countryside and Rights of Way Act 2000 and Paragraph 5.148, which link to conserving and enhancing the natural beauty, wildlife, and cultural heritage. Highways England has had regard to the purpose of conserving and enhancing the natural beauty of the AONB.
- 6.3.103 The landscape proposals are shown on the ES Figure 7.11 Environmental Masterplan (Document Reference 6.3) and detailed in section 7.9 Design, mitigation, and enhancement measures of ES Chapter 7 Landscape and Visual Effects (Document Reference 6.2). The Design Summary Report (Document Reference 7.7) demonstrates how Highways England has taken a 'landscape-led' approach to the design of the scheme and how the scheme complies with the requirements of the NPSNN in minimising or avoiding harm to the AONB landscape, and in delivering 'good design' (as also required by Paragraphs 4.28 to 4.35 of the NPSNN). It is considered that the scheme complies with the NPSNN with regard to landscape and visual impacts.
- 6.3.104 With regard to Paragraphs 5.149 and 5.159 – 5.161 of the NPSNN, which set out how a scheme's design should avoid or mitigate landscape and visual effects, please refer to the Design Summary Report (Document Reference 7.7).

Land use including open space, green infrastructure and Green Belt

- 6.3.105 Paragraphs 5.162 to 5.185 of the NPSNN relate to requirements for national network schemes in relation to open spaces, green infrastructure and the Green Belt.
- 6.3.106 There is no designated Green Belt in the DCO Boundary and therefore this is not considered within this section, nor are the relevant Paragraphs of the NPSNN referred to in this section. This section is sub-divided by topic within the generic impact, so as to focus on each relevant aspect of the policy requirements.

Open space

- 6.3.107 It is stated in Paragraph 5.162 of the NPSNN that the provision of access to high quality open space and the countryside for sport and recreation can be a means of providing necessary mitigation and/or compensation for a scheme, whilst green infrastructure can also enable developments to provide positive environmental and economic benefits.
- 6.3.108 The SoS is directed under Paragraph 5.174 of the NPSNN to refuse consent for development on existing open space, sports and recreational buildings/lands unless an assessment undertaken by the local authority or independently

demonstrates the open space, buildings or land to be surplus to requirements, or the SoS determines that the benefits (including need) of the project outweigh the potential loss of the facilities, taking into account the positive proposals by the Applicant to provide new, improved or compensatory land or facilities.

- 6.3.109 The scheme does not include the loss of any sports and recreation buildings / land, although it does involve the acquisition of, and therefore impact on open space, areas of Common Land, Open Access Land and Country Park.
- 6.3.110 Where open space is required to facilitate the scheme, the need for compensatory land in the form of replacement land or exchange land has been considered in detail against the key tests within Sections 131 and 132 of the Act within chapter 7 of the Statement of Reasons (Document Reference 4.1).
- 6.3.111 In relation to exchange land, Paragraph 5.181 of the NPSNN states that such land should be at least as good in terms of size, usefulness, attractiveness, quality and accessibility.
- 6.3.112 Following assessment of the special category land required for the scheme, the Statement of Reasons and its Appendix D (Document Reference 4.1) concludes that replacement land is not required for those areas of Open Space (Open Access Land and Country Park) required for the scheme as this land meets the tests within sections 131 and 132 of the Act.
- 6.3.113 The scheme also requires the acquisition of areas of Common Land (which is also Open Access Land) and for those areas, suitable replacement Common Land is proposed, as identified in the Statement of Reasons (Document Reference 4.1) and shown on the Special Category Land Plans (Document Reference 2.3).
- 6.3.114 This proposed replacement Common Land complies with the definition contained in Section 131(12) of the Act as it is greater in area than the land acquired and would be more advantageous to the persons entitled to rights of common, or to the public. It is therefore considered that the scheme complies with the NPSNN in relation to Open Space. The wider effects on Special Category Land are considered in further detail within Chapter 9 of this report.

Land use

- 6.3.115 Paragraph 5.163 of the NPSNN identifies that the re-use of previously developed land can make a major contribution to sustainable development by reducing the amount of countryside and undeveloped greenfield land needing to be reused, however this may not be possible in particular for linear infrastructure such as roads and railway lines.
- 6.3.116 Paragraph 5.165 of the NPSNN states that the Applicant should carry out a proportionate assessment which identifies existing and proposed land uses near the scheme and any effects of replacing an existing use of the site with the scheme, or preventing a development or use on a neighbouring site from continuing.
- 6.3.117 ES Chapter 12 Population and Human Health (Document Reference 6.2) identifies that there are no development allocations within the Joint Core Strategy that would be directly affected by the scheme, nor any known planning applications currently pending determination within the Order Limits or within proximity of the scheme. Proposed developments with planning permission within

500m of the scheme have been taken into account when assessing cumulative effects of the scheme, as set out in ES Chapter 15 Assessment of Cumulative Effects (Document Reference 6.2).

- 6.3.118 The land use and accessibility assessment included within Chapter 12 Population and Human Health (Document Reference 6.2) concludes that the construction of the scheme is not anticipated to lead to any significant effects on development land with operation of the scheme bringing accessibility benefits in the wider area and beneficial impacts for the delivery of strategic allocations within the region, such as that at North Brockworth.
- 6.3.119 It is therefore considered that the scheme complies with the NPSNN in relation to land use.

Agricultural land

- 6.3.120 Paragraph 5.168 of the NPSNN refers to agricultural land. It states that Applicants should take into account the economic and other benefits of the best and most versatile agricultural land and where significant development of agricultural land is demonstrably necessary, should seek to use areas of poorer quality in preference of higher quality. It also states that Applicants should identify and seek to minimise any negative effects on soil quality, as well as identifying and taking into account possible contamination on previously developed land if such land forms part of the development site.
- 6.3.121 Effects on agricultural land and soil resources are assessed in ES Chapter 9 Geology and Soils (Document Reference 6.2), with wider potential effects on agricultural land holdings assessed in ES Chapter 12 Population and Human Health (Document Reference 6.2).
- 6.3.122 In order to inform the assessment, a detailed agricultural land classification (ALC) survey was undertaken for areas of the scheme not covered by previous survey work.
- 6.3.123 The scheme requires both temporary (including temporary with permanent rights) and permanent use of agricultural land through the construction of the mainline carriageway, as well as land for wider scheme mitigation and enhancements.
- 6.3.124 The area of agricultural land that would be affected by the construction of the scheme has been estimated to be approximately 130ha, as shown in Table 6-2. This is also shown on ES Figure 9.6 Agricultural land classification (Document Reference 6.3).

Table 6-2 Agricultural land affected by the construction of the scheme

Works	ALC grade	Area (ha)
Permanent Works	Subgrade 3a (BMV)	18.9
Permanent Works	Subgrade 3b	69.36
Permanent Works	Grade 4	19.49
Temporary Works	Subgrade 3a (BMV)	13.13
Temporary Works	Subgrade 3b	5.9
Temporary Works	Grade 4	3.2
TOTAL AGRICULTURAL LAND AFFECTED		130.2

- 6.3.125 The assessment in Chapter 9 Geology and Soils (Document Reference 6.2) concludes that the permanent loss of grade 3a agricultural land, which is considered to be best and most versatile (BMV), would lead to a large adverse effect which would be significant. In addition, the loss of grade 3b agricultural land has also been assessed as a moderate adverse effect which is also significant.
- 6.3.126 Although significant effects have been identified it is not possible to mitigate these effects, or therefore provide any monitoring.
- 6.3.127 The permanent loss of grade 4 agricultural land and the temporary use of grades 3 and 4 land during construction is considered to bring neutral or slight adverse effects which would not be significant.
- 6.3.128 Where agricultural land is proposed to be used temporarily during construction, monitoring is required as part of the proposed mitigation measures despite these temporary effects not being significant. The land would be restored and returned to the landowner through measures outlined in the Soil Management Plan to be developed by the Contractor as part of the ES Appendix 2.1 EMP (Document Reference 6.4). In this instance, post construction monitoring would be required to determine whether pre-existing agricultural soil capability had been reinstated. Following the completion of construction activities, agricultural land taken on a temporary basis would be restored and returned to the landowner for unrestricted agricultural use in the same agricultural condition (ALC grade) that currently exists. This mitigation measure to maintain the quality of soils is identified in the Register of Environmental Actions and Commitments (REAC), contained within ES Appendix 2.1 EMP (Document Reference 6.4). The design includes shallow bund slopes, with the intention to return the back slopes by agreement to the landowner to enable the land to be returned to grazing / to maximise agricultural use.
- 6.3.129 In considering the overall effect on agricultural land holdings, Chapter 12 Population and Human Health (Document Reference 6.2) concludes a significant adverse effect on Shab Hill Farm given the proportion of land take required for the scheme and the potential to impact on the viability of the holding. All other holdings are assessed as experiencing neutral or slight adverse effects during both construction and operation of the scheme.
- 6.3.130 The main areas of permanent land take of agricultural land are focussed on the construction of the mainline carriageway and Shab Hill junction. This land take is considered to be unavoidable given the linear nature of the scheme, with efforts made to minimise land take from agricultural holdings wherever possible.
- 6.3.131 Through measures in the ES Appendix 2.1 EMP (Document Reference 6.4), the scheme would seek to minimise potential effects on soil quality where temporary land take is proposed.
- 6.3.132 It is therefore considered that the scheme complies with the NPSNN in relation to agricultural land.

Mineral resources

- 6.3.133 Paragraph 5.169 of the NPSNN states that Applicants should seek to safeguard any mineral resources on the proposed site as far as possible. Paragraph 5.182 states that the SoS should ensure the Applicant puts forward appropriate mitigation to safeguard mineral resources where development has an impact on a Mineral Safeguarding Area (MSA).

- 6.3.134 Mineral resources and MSAs are considered in ES Chapter 10 Material Assets and Waste (Document Reference 6.2). The scheme footprint would overlap a MSA for sandstone and limestone and a MSA for sand and gravel. The assessment concludes that the scheme would not diminish access to the MSAs and would not sterilise the use of the wider resource.
- 6.3.135 In addition to the MSAs, the scheme would also directly affect an extant dormant quarry (Birdlip Quarry) which is located to the north of Cowley roundabout. Although dormant, ES Chapter 10 Material Assets and Waste (Document Reference 6.2) assumes a worst-case scenario whereby the scheme would sterilise this quarry and prevent future extractions. Through correspondence with GCC, Highways England understand that there has been no active working in the past 25 years. Therefore, the assessment of effects on mining and material resources is considered slight and not significant. Discussions are ongoing with the owner/operator of the site; this is captured in Appendix B of the Statement of Reasons (Document Reference 4.1), see entry for PIL ID14.
- 6.3.136 It is therefore considered that the scheme complies with the NPSNN in relation to mineral resources.

Green infrastructure

- 6.3.137 Paragraph 5.175 of the NPSNN identifies the value of linear infrastructure and its footprint in supporting biodiversity and ecosystems, which the SoS should take into account when assessing the impacts on green infrastructure. However, it also identifies that where development plans identify the protection of green infrastructure networks, they should be protected from development and where possible, strengthened by or integrated within it.
- 6.3.138 With regard to mitigating the effects of a scheme, Paragraph 5.180 states that Applicants should aim to ensure the functionality and connectivity of the green infrastructure network is maintained and should therefore mitigate any adverse impact and, where appropriate, improve that network and other areas of open space, including appropriate access to National Trails and other PRoW.
- 6.3.139 The scheme would provide an increased number of safe wildlife crossings, as well as the creation of the following features to provide improved ecological connectivity and landscape integration:
- 6.8 miles of new Cotswold dry-stone walls;
 - 9,024 metres of native species-rich hedgerows;
 - 25.57ha of native broadleaved woodland;
 - 4.34ha of native scrub, e.g. small bushes and trees;
 - 7.60ha of species-rich neutral grassland; and
 - 75.41ha of limestone grassland.
- 6.3.140 Replacement or enhancement vegetation is also included as part of the scheme design. For example, the southern side of the A417 between Brockworth bypass and Air Balloon roundabout is an area identified for replacement or enhancement planting. This is shown in the Trees and Hedgerows to be Removed or Managed Plans (Document Reference 2.13) and illustrated on Figure 7.11 Environmental Masterplan (Document Reference 6.3).
- 6.3.141 Furthermore, Highways England has chosen to repurpose a section of the existing A417 highway to a recreational route (to be named the Air Balloon Way)

and corridor to help improve ecological connectivity and landscape integration, exemplifying a design approach in which opportunities to improve on the existing situation have been identified and progressed where feasible.

PRoW

- 6.3.142 Under Paragraphs 5.184 and 5.185 of the NPSNN, the SoS is required to have regard to whether proposals to mitigate impacts on PRoW, National Trails and other rights of access to land are acceptable (and whether any requirements attached to the DCO are required). Consideration needs to be given to the use, character, attractiveness and convenience of a right of way when considering revisions to it, whilst the Applicant should consider opportunities to improve access as well as mitigate adverse effects. PRoW can be extinguished under section 136 of the Act if the SoS is satisfied an alternative is provided or not required.
- 6.3.143 ES Chapter 12 Population and Human Health (Document Reference 6.2) identifies that the scheme has the potential to affect the Cotswold Way National Trail, Gloucestershire Way long distance footpath, and more than 20 footpaths, bridleways and restricted byways. There are also a number of local routes that interface with the scheme with public access rights as highways. PRoW and local routes that intersect with the scheme are shown on ES Figure 12.2 Public rights of way and local routes (Document Reference 6.3).
- 6.3.144 Annex F PRoW Management Plan of ES Appendix 2.1 EMP (Document Reference 6.4) demonstrates a planned approach to the management of PRoW during the construction and operation of the scheme, ensuring public safety while reducing disruption to users. It also sets out how it would secure through the DCO appropriate surfacing, signage and enclosures, which would be discussed and agreed with GCC (the local highway authority) at the detailed design stage.
- 6.3.145 It seeks to manage closures where possible (e.g. managed crossing and/or early re-provision) retaining rights of way as per current routes and seeking to reduce the effect on users. This would include:
- use of signage where PRoW can remain open, but users need to be warned of the presence of construction vehicles (local management);
 - implementation of short, temporary closures where local works might affect safety of users (local closures);
 - closure of/extinguishment of a PRoW following the early implementation of an alternative/new route (e.g. via a new overbridge/underbridge) (early re-provision);
 - closure of/extinguishment of a PRoW without re-provision (e.g. where works sequencing would not provide a new crossing in advance of the carriageway works) and/or permanent extinguishment of a PRoW (full closure); and
 - provision of new crossings/routes as part of the scheme (new routes).
- 6.3.146 There would only be one instance of a permanent closure without substitute (Badgeworth bridleway 125) where the value of the route is not sufficient to justify re-provision or diversion as part of the scheme (but appropriate alternative routes are available).
- 6.3.147 All potential diversions and proposed new routes are also shown on the Rights of Way and Access Plans (Document Reference 2.5).

6.3.148 As outlined in Chapter 12 Population and Human Health (Document Reference 6.2), the scheme includes numerous proposals that seek to improve accessibility and connectivity across the PRoW network within the study area. In summary this includes:

- 7 sections of proposed new footpath (including new stepped accesses)
- 10 sections of proposed new bridleway
- 7 sections of proposed new restricted byway, including the repurposed A417 / Air Balloon Way
- 2 sections of new byways open to all traffic
- 3 instances where proposals include reclassification of PRoW in order to provide greater access rights and improve connectivity for users between the existing and proposed network (one footpath to bridleway, and two footpaths to restricted byways)
- 2 instances where access rights are proposed to provide greater connectivity between the existing and proposed PRoW

6.3.149 All new structures proposed, as described in detail in ES Chapter 2 The Project (Document Reference 6.2) would carry public access rights and/or PRoW, providing a key element of mitigation in order to reduce severance for WCH across the study area.

6.3.150 In particular, the scheme would enhance the WCH and PRoW network with the following new features:

- The Cotswold Way crossing – a 5 metre wide restricted byway crossing, in the vicinity of Emma’s Grove and connecting to Cold Slad is proposed, to provide benefits including a grade separated diversion of the Cotswold Way National Trail. It would enhance the visitor experience of this important long-distance route, bringing a significant improvement when compared to the existing situation. New sections of bridleway and restricted byway would connect into existing routes to help enhance WCH connectivity east-west and north-south. The structure could also accommodate seasonal cattle crossings from nearby agricultural holdings, as requested by local farmers. At 5 metres wide, the crossing would be wide enough to accommodate different users, and there would be resting places along it to help assist those with mobility needs.
- The Gloucestershire Way crossing - a new 37 metre wide multi-purpose crossing would provide essential mitigation for bats and enhancement opportunity of ecology and landscape integration. The public would also further benefit as the crossing would accommodate the Gloucestershire Way long distance footpath and provide an improved visitor experience. Walkers would use the structure to connect to Cowley footpaths 1, 16 and 3 which form part of the promoted Gloucestershire Way long distance footpath and new/diverted routes. Other non-motorised users would use the structure to connect to unclassified roads and avoid the need to cross through the Shab Hill junction, giving users choice. Either side of the crossing, separate bridleways, side roads and footpaths would connect users onto a 3.5 metre wide bridleway running over the crossing.
- Cowley overbridge – this crossing over the new A417 would provide access between Stockwell and Cowley. The crossing would include provision for WCH, helping connect into the existing PRoW and unclassified roads via new steps and sections of restricted byway and footpath.

- Stockwell overbridge – this crossing over the new A417 would primarily provide a farm access track from Stockwell Farm in an east-west direction. The crossing would include provision for WCH, helping connect into existing routes to help improve connectivity for WCH.
- Grove Farm underpass – this underpass would provide access to local properties and agricultural land, with provision for WCH via new sections of bridleway and footpath diversions to connect Cold Slad Lane.
- Repurposed A417 – part of the existing A417 would be repurposed to provide a restricted byway connection between new car parking near the Stockwell Lane junction and the Cotswold Way crossing (and beyond), proposed to be called the ‘Air Balloon Way’.

6.3.151 With the measures set out above and within Annex F PRoW Management Plan of ES Appendix 2.1 EMP (Document Reference 6.4), it is considered that construction of the scheme would lead to slight adverse effects on the majority of WCH during construction of the scheme, by virtue of the local and temporary disruption to users, which would not be significant. However, during operation, it is considered that the proposals would bring moderate beneficial effects to the PRoW and WCH network in the study area, which would be significant to users and the local communities.

Summary

6.3.152 In summary, the scheme has provided appropriate mitigation where PRoW and local routes are affected, and has developed numerous proposals which seek to bring improved access and enhancements to the local recreational networks. Therefore, it is considered the scheme complies with the NPSNN in relation to PRoW.

6.3.153 It is considered that the scheme meets the requirements of the NPSNN with regard to land use (including open space, green infrastructure and Green Belt).

Noise and vibration

6.3.154 Paragraphs 5.186 to 5.200 of the NPSNN set out the requirements of national network schemes in relation to noise and vibration impacts.

6.3.155 Paragraphs 5.186 to 5.188 identify that excessive noise can have a wide range of effects, including on human health, on wildlife and biodiversity and on enjoyment and quality of landscapes and areas valued for their tranquillity and acoustic environment (including AONBs).

6.3.156 It is set out in Paragraph 5.189 that when development is subject to an EIA and significant noise impacts are likely, the following should be included in the Applicant’s noise assessment within the ES:

- a description of noise sources;
- identification of noise sensitive areas and premises;
- the characteristics of the existing noise environment;
- the predicted impacts of the scheme on the noise environment throughout construction in the short term, during operation in the longer term and at particular times of the day, evening and night as appropriate;
- the predicted impacts on noise sensitive premises and areas; and
- mitigating measures including the consideration of the best available techniques.

- 6.3.157 It is stated in Paragraphs 5.189 and 5.190 that the nature and extent of the noise assessment should be proportionate to the predicted noise impact of the scheme. Additionally, any changes in road traffic movements elsewhere in the network directly associated with the scheme should be considered.
- 6.3.158 It is specified in Paragraph 5.191 that operational noise for human receptors should be assessed using British Standards and the method described in Calculation of Road Traffic Noise. For the assessment of construction noise, any relevant British Standards and any other guidance should be taken into account, using relevant mitigation examples. In addition, Paragraph 5.192 states that the Applicant should consult with Natural England regarding noise impact on designated nature conservation sites, protected landscapes, protected species and other wildlife.
- 6.3.159 Under Paragraph 5.194, it is identified that good design should be demonstrated in the scheme to minimise noise emissions through optimisation of layout and reduce noise transmission through the use of landscaping, bunds or noise barriers.
- 6.3.160 The SoS is directed under Paragraph 5.195 not to grant development consent unless they are satisfied that the proposals will meet the following aims:
- avoid significant adverse impacts on health and quality of life from noise as a result of the scheme;
 - mitigate and minimise other adverse impacts on health and quality of life from noise from the scheme; and
 - contribute to improvements to health and quality of life through the effective management and control of noise, where possible.
- 6.3.161 It is stated that mitigation measures for noise impacts should be proportionate and reasonable, and may include one or more of the following:
- containment of noise generated through engineering; use of materials such as low noise surfacing;
 - design methods to minimise noise transmission through screening; and
 - specification of acceptable operating noise limits or times of use.
- 6.3.162 In addition to mitigating through proportionate and reasonable measures, it is stated in Paragraph 5.199 that for most national network projects, relevant Noise Insulation Regulations will apply, providing powers to the relevant authority to offer noise mitigation to associated dwellings in the form of improved noise insulation. Likely eligibility for this should be included in the assessment. It is also stated in Paragraph 5.200 that Applicants should consider the opportunity to address noise impacts on Important Areas, as identified through the noise action planning process.
- 6.3.163 ES Chapter 11 Noise and Vibration (Document Reference 6.2) provides an assessment of noise and vibration impacts of the scheme during construction and operation, following the methodology of DMRB LA 111. This assessment complies with the requirements of Paragraphs 5.189 to 5.190 of the NPSNN because it contains the following elements:
- a description of noise sources, the identification of noise sensitive areas/premises and the characteristics of the existing noise environment;

- the predicted impacts of the scheme during construction and operation, during both day and night and including on noise sensitive areas/premises;
- the identification of mitigation measures during construction and operation; and
- an assessment of potential noise impacts elsewhere in the road network directly associated with the scheme (namely those within 50m of other non-scheme road links beyond 600m from new or altered scheme roads with the potential to experience short-term Basic Noise Level (BNL) change of more than 1dB(A) in the short term or 3dB(A) in the long term).

6.3.164 In accordance with Paragraph 5.191 of the NPSNN, the assessment has been carried out using relevant British Standards and the Calculation of Road Traffic Noise. As set out in the Consultation Report (Document Reference 5.1) and the Statement of Commonality (Document Reference 7.3), Highways England has engaged with Natural England during the development of the scheme, including through formal statutory consultation in 2019 and 2020, and has taken account of Natural England's feedback on the scheme design and the preliminary environmental assessment. The scheme therefore complies with Paragraph 5.192 of the NPSNN.

6.3.165 The assessment reported upon in ES Chapter 11 Noise and Vibration (Document Reference 6.2) concludes that construction of the scheme would result in temporary significant adverse noise effects (during the daytime only) at 45 residential properties and six non-residential locations.

6.3.166 In order to mitigate construction effects, a commitment is made in ES Appendix 2.1 EMP (Document Reference 6.4) for a Noise and Vibration Management Plan (NVMP) to be prepared, which must include the requirement to undertake noise and vibration monitoring to ensure compliance with agreed threshold levels. Best Practicable Means (BPM) is assumed as embedded mitigation to control construction noise in the form of low noise emission plant and processes. If situations arise where despite the implementation of BPM, the noise exposure exceeds the criteria defined in the EMP, the main contractor may offer noise insulation or ultimately temporary re-housing (although the latter is not anticipated to be required for the scheme).

6.3.167 During operation of the scheme, ES Chapter 11 Noise and Vibration (Document Reference 6.2) identifies that a greater number of residential properties would experience significant beneficial noise effects than would experience significant adverse noise effects. The effects are categorised as direct or indirect, as well as by thresholds defined by the Significant Observed Adverse Effect Levels (SOAEL) and Lowest Observed Adverse Effect Levels (LOAEL). These are set out in the table below and reflect the information in ES Chapter 11 Noise and Vibration (Document Reference 6.2) and ES Chapter 16 Summary (Document Reference 6.2).

Table 6-3 Summary of significant noise effects of the scheme during operation

Direct/Indirect	Beneficial or adverse significant noise effect	Level of beneficial or adverse effect	Number of residential properties
Direct	Beneficial	Residential properties currently exceeding the SOAEL.	19

Direct/Indirect	Beneficial or adverse significant noise effect	Level of beneficial or adverse effect	Number of residential properties
Direct	Beneficial	Residential properties between the LOAEL and SOAEL	31
Direct	Adverse	Residential properties between the LOAEL and SOAEL	21
Indirect	Beneficial	Residential properties exceeding the SOAEL.	15
Indirect	Beneficial	Residential properties between the LOAEL and SOAEL.	6
Indirect	Beneficial	Residential properties between the LOAEL and SOAEL, 600m or more beyond new or altered road links.	83
Indirect	Adverse	Residential properties exceeding the SOAEL, 600m or more beyond new or altered road links.	17

6.3.168 As identified in Table 6-3 there would be 50 direct beneficial significant noise effects as a result of the scheme, compared to direct adverse significant noise effects on 21 residential properties. The direct beneficial effects include five locations which are Noise Important Areas (NIAs). There would be indirect beneficial significant noise effects at 104 residential properties as a result of the scheme, compared to indirect adverse significant noise effects on 17 residential properties.

6.3.169 In addition to the effects on residential properties, the assessment reported in ES Chapter 11 Noise and Vibration (Document Reference 6.2) identifies that there would be direct beneficial significant noise effects on the following non-residential receptors:

- several non-residential receptors in Birdlip, including the Primary School and the Village Hall;
- along the existing section of A417 highway to be removed along the Cotswold Way;
- on part of the Gloucestershire Way long distance footpath between the Air Balloon roundabout and Coberley to the east; and
- on footpath links running for approximately 0.6 miles (one kilometre) to the east from Stockwell.

6.3.170 As required under Paragraph 5.194 of the NPSNN, the scheme has been designed taking into account how noise emissions could be minimised through layout and the use of measures such as landscaping, bunds and noise barriers. This is set out in section 11.9 of ES Chapter 11 Noise and Vibration (Document Reference 6.2), in which the noise mitigation embedded into the scheme design is identified. This includes the use of earth bunds, stone walls and vertical noise barriers, in addition to consideration of the horizontal and vertical alignment of the scheme. ES Chapter 11 Noise and Vibration (Document Reference 6.2) identifies that such measures have been informed by varied considerations including: stakeholder engagement; engineering practicability; noise benefit in comparison to mitigation cost; and, the potential for other environment effects. This reflects

the overall landscape-led design approach to the scheme, which is described in the Design Summary Report (Document Reference 7.7).

- 6.3.171 As set out in section 6.2 of this report, effects of the scheme on health has been assessed in ES Chapter 12 Population and Human Health (Document Reference 6.2), including with regard to effects of noise. This assessment concludes that there would be a neutral effect on health relating to noise during both construction and operation of the scheme.
- 6.3.172 In summary, the scheme would overall result in permanent significant beneficial effects to substantially more residential properties than those residential properties that would experience a permanent significant adverse effect. This would include significant beneficial effects at five Noise Important Areas. The scheme would also result in significant beneficial noise effects at non-residential locations, including public rights of way and community assets such as Birdlip Primary School. Mitigation has been embedded within the design to avoid or minimise adverse effects.
- 6.3.173 It is recognised that during construction, the scheme would result in adverse significant effects to 45 residential properties and six non-residential receptors, however these effects would be temporary in nature and would be controlled through the commitments within ES Appendix 2.1 EMP (Document Reference 6.4).
- 6.3.174 ES Appendix 2.1 EMP (Document Reference 6.4) would ensure that operational noise controls are implemented and that the effectiveness of any installed mitigation measures is verified to ensure it performs adequately. Noise insulation would be offered if and where future noise levels exceed the noise level trigger value and the other requirements referred to in the Noise Insulation Regulations 1975 (NIR). Confirmation of qualification for noise insulation would be made by the responsible authority before the scheme comes into operation, based on built information in accordance with the NIR. This would also be secured through ES Appendix 2.1 EMP (Document Reference 6.4). Discussions are ongoing with interested parties regarding possible measures to mitigate the significant effects identified to properties at Stratton and Leckhampton Hill. Potential solutions have been presented by Highways England to the local highway authority, GCC, and discussed at an initial stage, to help identify possible further mitigation measures. This is reflected in the Statement of Common Ground with the Joint Councils (see Statement of Commonality, Document Reference 7.3).
- 6.3.175 It is therefore considered that the scheme meets the requirements of the NPSNN with regard to noise and vibration.

Impacts on transport networks

- 6.3.176 Paragraphs 5.201 to 5.218 of the NPSNN set out the requirements for national network schemes in relation to wider transport networks. It is stated that schemes may have economic, social and environmental effects on surrounding transport infrastructure.
- 6.3.177 It is stated in Paragraphs 5.203 to 5.206 that the Applicant should have regard to policies set out in local plans and should consult the relevant highways authority and relevant local planning authority as appropriate, regarding the proposed schemes' potential impacts on transport. Any reasonable opportunities to support other transport modes in developing infrastructure must be considered by the

Applicant, and evidence that they have used reasonable endeavours to address any existing severance issues that act as a barrier to non-motorised users should be provided. Additionally, it is stated that if a scheme requires an EIA and is likely to have significant impacts on transport networks, the ES should describe those impacts and any mitigating commitments.

- 6.3.178 It is stated in Paragraph 5.215 that mitigation for schemes should be proportionate, reasonable, and focus on promoting sustainable development. Development that would worsen accessibility should be mitigated as much as reasonably possible, with a very strong expectation that impacts to non-motorised users should be mitigated.
- 6.3.179 As set out in the Consultation Report (Document Reference 5.1), Highways England has engaged with the local highway authority, GCC, and the relevant local planning authorities, TBC and CDC, throughout the development of the scheme. This has included non-statutory engagement and consultation, such as technical or specialist meetings, as well as formal statutory consultation in 2019 and 2020, under section 42(1)(b) of the Act. This engagement has taken place with the authorities both separately and together (as the 'Joint Councils') as appropriate and the position of the Councils' and Highways England following the engagement undertaken to date is reflected in the Statement of Common Ground with the Joint Councils (see Statement of Commonality, Document Reference 7.3).
- 6.3.180 As set out in the Consultation Report (Document Reference 5.1), Highways England has also engaged with individuals and organisations with an interest in walking, cycling and horse riding throughout the development of the scheme. This has included non-statutory engagement and consultation through a Walking, Cycling and Horse riding Technical Working Group (WCH TWG), as well as formal statutory consultation in 2019 and 2020, under section 42(1)(b) of the Act. The position of the WCH TWG following the engagement undertaken to date is reflected in the Statement of Common Ground with the WCH TWG (see Statement of Commonality, Document Reference 7.3).
- 6.3.181 In relation to impacts on the transport and PRow networks, Highways England has specifically engaged with GCC on such matters, as the relevant authority for those networks in the county. In particular, data from GCC has been used for the calibration and validation of the transport model and the likely effects of the scheme on the local road network has been discussed with GCC Officers. The ComMA Report (Document Reference 7.6) details the traffic data collection, traffic modelling, traffic forecasting and economic appraisal in relation to the scheme.
- 6.3.182 ES Chapter 12 Population and Human Health (Document Reference 6.2) considers the effects of the scheme on the surrounding population including in relation to the transport network and access for WCH, during both construction and operation of the scheme.
- 6.3.183 During the operation of the scheme, the resulting improved travel conditions would offer indirect benefits to people using the bus services and accessing other modes of transport. As is set out in the Equality Impact Assessment that has been prepared for the scheme (Document Reference 7.8), it would reduce congestion, improve safety and enhance the PRow and walking, cycling and horse riding network in the area, which would improve access and travel conditions for all. ES Chapter 12 Population and Human Health (Document Reference 6.2) identifies that during construction of the scheme, accessibility to the existing road network

and public transport would not be affected significantly. It identifies that no operational public transport routes or operational bus stops would be affected by the scheme.

- 6.3.184 Highways England acknowledges feedback received in response to public consultation, which has suggested the relocation of the school bus stop in Birdlip. Concerns have been expressed about the safety of current turning movements by the school bus, and suggestions have been made about potential alternative locations for a new bus stop facility. This change has been carefully considered within the land available as part of the scheme and Highways England has discussed opportunities with the Cowley and Birdlip Parish Council and GCC officers.
- 6.3.185 Highways England has offered help to the relevant stakeholders to inform or facilitate any discussions about any changes that might be proposed to the bus stop and its access within or near Birdlip. Highways England will ensure the scheme would not adversely impact the existing bus stop arrangement, or could accommodate an enhanced future scenario where the bus stop and its access is improved or relocated if necessary within the DCO Boundary.
- 6.3.186 It is identified that construction would result in impacts on a number of PRoW due to diversion and disruption, subsequently affecting the availability of options for active travel. Annex F PRoW Management Plan of ES Appendix 2.1 EMP (Document Reference 6.4) sets out how impacts on PRoW would be managed during construction, in which Highways England intends to keep the majority of PRoW open via local management, early re-provision and/or use of short-term, temporary closures. Realignment or diversion of local routes is proposed, utilising new side roads, overbridges and junctions where possible to maintain access for users. This would enable local communities to maintain access to active travel options during the construction phase, albeit inconvenienced for short periods.
- 6.3.187 During the operation of the scheme, ES Chapter 12 Population and Human Health (Document Reference 6.2) concludes that the scheme would provide improved active travel facilities for walking, cycling and horse riding. Whilst it is considered unlikely that the scheme would result in an increase in active travel journeys for commuting (due to the travel distances required), the scheme could result in more active travel journeys to access services or for recreation in the local area – for example due to improved connectivity between Cowley and Birdlip villages via the new Air Balloon Way or between Leckhampton Hill to Brockworth via the new Dog Lane to Cold Slad connection. The latter would provide an east-west route for walking, cycling or horse riding trips as an alternative to trips otherwise made by car along the A417, helping contribute to sustainable development particularly in the Brockworth area.
- 6.3.188 The scheme design has sought to identify opportunities for improving PRoW options around the proposed A417 and provide options for active travel for more people, including vulnerable users such as children and older people. In addition, car parking is to be provided with disabled provision near The Golden Heart Inn in close proximity to the existing A417. This would be associated with a PRoW which is segregated and tarmacked, making it suitable for wheelchairs and mobility scooters.
- 6.3.189 The scheme has also sought to address existing severance issues that act as a barrier to non-motorised users through the measures set out in Annex F PRoW Management Plan of ES Appendix 2.1 EMP (Document Reference 6.4). For

example, the Grove Farm underpass would connect existing and new PRow which would provide a grade separated north-south crossing of the existing A417 where there is evidence of pedestrians making dangerous attempts to cross the highway at grade. As set out in section 6.2 of this report, there has been a pedestrian fatality, and with the scheme in place there would be multiple grade-separated crossings including the Grove Farm underpass, Cotswold Way crossing, Gloucestershire Way crossing, Cowley overbridge and Stockwell overbridge. This would provide a safer way for people to move around the area.

- 6.3.190 Overall, it is considered that the proposals and anticipated benefits for all modes of transport would contribute to sustainable development, helping better connect people to open space, services, facilities and communities.
- 6.3.191 It is considered that the scheme meets the requirements of the NPSNN in relation to its impacts on transport networks.

Water quality and resources

- 6.3.192 Paragraphs 5.219 to 5.231 of the NPSNN set out the requirements for national network schemes in relation to the water environment.
- 6.3.193 It is stated in Paragraph 5.219 that during both construction and operation, infrastructure development can have adverse effects on groundwater, inland surface water, transitional waters and coastal waters, including through increased water demand, discharges to water, and spills and pollutants. This can have an effect on health and on protected species and habitats, and could result in surface waters, groundwaters and protected areas failing to meet environmental objectives of the Water Framework Directive (WFD).
- 6.3.194 Paragraph 5.220 states that where applicable, an application for a development consent order must contain a plan with accompanying information identifying water bodies in a River Basin Management Plan.
- 6.3.195 It is stated in Paragraph 5.221 that the Applicant should make early contact with relevant regulators of the water environment, including the EA, for abstraction licensing and with water suppliers. It is stated that development that requires an EIA, and which may have significant adverse effects on the water environment, should ascertain the existing status of water quality and water resources, and carry out an assessment of the impacts of the scheme on them.
- 6.3.196 For those schemes which are improvements to existing infrastructure such as road widening, Paragraph 5.222 directs that opportunities should be taken where feasible to improve upon the quality of existing discharges where they will contribute to WFD commitments.
- 6.3.197 Paragraph 5.223 states that the ES should describe:
- the existing quality of affected waters;
 - existing water resources that will be affected by the proposed scheme;
 - existing physical characteristics of the water environment that will be affected by the scheme and any impact of physical modification to these characteristics;
 - any impacts on water bodies or protected areas under the Water Framework Directive (WFD) and source protection zones around potable groundwater abstractions; and
 - any cumulative effects.

- 6.3.198 Paragraph 5.224 identifies that activities which discharge to the water environment are subject to pollution control and therefore the considerations of NPSNN Paragraphs 4.48-4.56 on pollution control apply. These considerations will also apply in an analogous way to the abstraction licensing regime regulating activities that take water from the water environment, and to the control regimes relating to works to, and structures in, on, or under a controlled water.
- 6.3.199 Paragraph 5.225 states that the SoS will generally need to give more weight to impacts on the water environment where a scheme would adversely affect the achievement of the environmental objectives of the WFD. Paragraph 5.226 states that schemes should aim to result in no deterioration of ecological status in watercourses, ensuring that Article 4.7 of the WFD does not need to be applied.
- 6.3.200 Paragraph 5.227 states that if the EA objects to the grant of development consent on the grounds of water quality/resources, the SoS can grant consent but would need to be satisfied that all reasonable steps have been taken by the Applicant and the EA to resolve the concerns, and that the EA is satisfied with the outcome.
- 6.3.201 Paragraphs 5.228 to 5.231 set out how the Applicant may mitigate effects on the water environment. It is stated that the impact of proposed projects can be minimised through planning and design for the efficient use of water, including water recycling and that risks of impacts can be reduced through careful design to facilitate good pollution control practice. It is also stated that proposed projects should adhere to any National Standards for SUDs.
- 6.3.202 ES Chapter 13 Road Drainage and Water Environment (Document Reference 6.2) assesses the impact of the scheme on road drainage and the water environment, including the effects on water quality and resources. In accordance with Paragraphs 5.220 and 5.223 of the NPSNN, this assessment: identifies and describes water bodies and resources affected by the scheme and their existing quality; describes the potential impacts of the scheme on physical characteristics of the water environment; and, identifies any impacts on WFD water bodies and source protection zones. Cumulative effects of the scheme are considered in ES Chapter 15 Assessment of Cumulative Effects (Document Reference 6.2).
- 6.3.203 As set out in the Statements of Common Ground appended to the Statement of Commonality (Document Reference 7.3), Highways England has engaged in early discussions with the EA (as Lead Authority for main rivers) and GCC (as the Lead Local Flood Authority) on matters relating to the water environment. Both parties have also been formally consulted on the scheme as prescribed consultees under the Act, as set out in the Consultation Report (Document Reference 5.1).
- 6.3.204 As set out in section 6.2 of this report (under 'pollution control and other environmental protection regimes') and Appendix A of the Consents and Agreements Position Statement (Document Reference 7.2), Highways England is seeking to disapply legislation relating to a number of licenses, permits and consents relating to the water environment, although a trade effluent consent would be required where welfare facilities propose to discharge.
- 6.3.205 In accordance with Paragraphs 5.228 to 5.231 of the NPSNN, ES Chapter 13 Road Drainage and Water Environment (Document Reference 6.2) sets out the mitigation measures relating to the engineering design, construction and operation of the scheme that would seek to minimise any harmful impacts to the water environment and address likely significant effects. These measures are

included in Annex G Ground and Surface Water Management Plan of ES Appendix 2.1 EMP (Document Reference 6.4) and secured by a requirement of the draft DCO (Document Reference 3.1).

- 6.3.206 The assessment of effects on the water environment from the construction of the scheme has found that when incorporating the mitigation measures included in the Annex G of ES Appendix 2.1 EMP (Document Reference 6.4) there would be a temporary significant adverse effect on hydromorphology, due to the realignment of the tributary of Norman's Brook during the construction phase.
- 6.3.207 A WFD compliance assessment has been completed and is included in Appendix 13.2 WFD Compliance Assessment (Document Reference 6.4). As reported in ES Chapter 13 Road Drainage and Water Environment (Document Reference 6.2), this assessment indicates that the scheme would not result in a change in status of any WFD quality elements or prevent any water bodies from reaching 'Good' status in the future. The effect of the scheme is therefore assessed as neutral and not significant.
- 6.3.208 ES Chapter 13 Road Drainage and Water Environment (Document Reference 6.2) concludes that there would be no significant effects on the water environment resulting from the operation of the scheme. Furthermore, whilst there would be a temporary adverse significant effect during construction relating to the realigned tributary of Norman's Brook, ES Chapter 13 Road Drainage and Water Environment (Document Reference 6.2) identifies that a permanent outcome of the scheme would be enhancement to the ecological connectivity of aquatic species habitat in the realigned tributary of Norman's Brook. Overall, the scheme would provide betterment of the existing road drainage system and improve the water quality of receiving waterbodies, whilst there would be additional enhancement via the removal or upgrading of existing foul drainage outfalls at some properties.
- 6.3.209 Taking into account the conclusions of the assessment, it is considered that the scheme meets the requirements of the NPSNN with regard to water quality and resources.

6.4 Summary

- 6.4.1 This chapter has demonstrated how the scheme complies with the requirements of the 'assessment principles' and the 'generic impacts' of the NPSNN, with the exception of the below topics, which are considered in more detail in the following Chapters of this report:
- Chapter 7: Development proposed within nationally designated areas
 - Chapter 8: Biodiversity and ecological conservation
 - Chapter 9: Special Category Land
 - Chapter 10: Historic Environment
- 6.4.2 A full assessment of how the scheme conforms to the NPSNN, including its technical assessment requirements, is provided in the National Policy Statement Accordance Table which comprises Appendix A of this report.

7 Development proposed within nationally designated areas

7.1 Overview

- 7.1.1 The scheme is situated entirely within the Cotswolds AONB. As such, it is subject to the policies in Paragraphs 5.150 to 5.153 of the NPSNN under the generic impact 'landscape and visual impacts' which apply to development proposed within nationally designated areas, such as AONBs.
- 7.1.2 It is considered that, given the national significance and environmental sensitivity of the Cotswolds AONB landscape, the case for developing the scheme within the AONB requires detailed assessment and forms a key consideration in the determination of the DCO Application for the scheme.
- 7.1.3 This chapter therefore considers in detail the compliance of the scheme with the NPSNN Paragraphs 5.150 to 5.153 in relation to its development within the Cotswolds AONB.

7.2 AONB policy tests within the NPSNN

- 7.2.1 Paragraphs 5.150 to 5.153 of the NPSNN set out the policy for development proposed within nationally designated areas.
- 7.2.2 Paragraph 5.150 of the NPSNN sets out that great weight should be given to conserving landscape and scenic beauty in nationally designated areas. It identifies that such areas have the highest status of protection relating to landscape and scenic beauty and directs that, in making decisions, the SoS has a duty to have regard to the statutory purposes of designated areas such as AONBs.
- 7.2.3 The key policy tests for development located in nationally designated areas, such as AONBs, are set out within Paragraphs 5.151 to 5.153 of the NPSNN.
- 7.2.4 It is considered that these tests are sequential, such that the SoS must be confident that the first test is satisfied before the next test would be considered. This Chapter therefore takes this sequential approach and sets out the case and the evidence to support each NPSNN policy test in turn.
- 7.2.5 NPSNN Paragraph 5.151 states that:
- “The SoS should refuse development consent in [AONBs] except in exceptional circumstances and where it can be demonstrated that it is in the public interest.”* It states that the SoS should consider:
- *“the need for the development, including in terms of any national considerations, and the impact of consenting, or not consenting it, upon the local economy;*
 - *the cost of, and scope for, developing elsewhere, outside the designated area, or meeting the need for it in some other way; and*
 - *any detrimental effect on the environment, the landscape and recreational opportunities, and the extent to which that could be moderated.”*
- 7.2.6 NPSNN Paragraph 5.152 states that:

“There is a strong presumption against any significant road widening or the building of new roads in...[AONBs], unless it can be shown there are compelling reasons for the new or enhanced capacity and with any benefits outweighing the costs very significantly.”

7.2.7 NPSNN Paragraph 5.153 states that:

“Where consent is given [in AONBs], the SoS should be satisfied that the Applicant has ensured that the project will be carried out to high environmental standards and where possible includes measures to enhance other aspects of the environment.”

7.2.8 In summary, there are three key NPSNN policy tests relating to development in an AONB, which are the focus of this Chapter:

1. Whether there are **exceptional circumstances** for the grant of consent of a highways NSIP in the Cotswolds AONB?
2. Whether there are **compelling reasons** for new or road enhanced capacity; and whether the **benefits of the scheme very significantly outweigh its costs?**
3. Whether the scheme will be carried out to **high environmental standards**, including, where possible, measures to enhance other aspects of the environment?

7.3 Exceptional circumstances

7.3.1 Each of the considerations in Paragraph 5.151 of the NPSNN is assessed in turn.

Need

7.3.2 The first bullet point of Paragraph 5.151 states that in considering whether exceptional circumstances exist to consent a development in an AONB, the SoS should consider the need for the development, which includes ‘any national considerations, and the impact of consenting, or not consenting it, upon the local economy’.

7.3.3 Case law has established that ‘need’ is an ordinary word to be understood at a high level of abstraction, given the wide range of circumstances to which such policy applies across the country¹³.

Existing context

7.3.4 The A417/A419 is a strategic route between Gloucester and Swindon that provides an important link between the Midlands/North and South of England. The route is also a vital alternative to the M5/M4 route via Bristol particularly when there are incidents or delays. The scheme seeks to address existing road safety and congestion problems and has been under consideration by Highways England for more than 20 years.

7.3.5 By 1998, dual-carriageway improvements were completed to over 90% of the length of the A417/A419 link to address transport related problems, however the single carriageway section near Birdlip in Gloucester was not able to be improved

¹³ *Joan Girling v East Suffolk Council v EDF Energy Nuclear Generation Limited, NNB Generation Company (SZC) Limited* [2020] EWHC 2579 (Admin)

as part of those wider works. That section still experiences incidents, congestion and delays throughout the year, with poor journey time reliability.

- 7.3.6 As part of the strategic road network, congestion on the A417 causes bottlenecks and delays in the wider Gloucestershire area and prevents reliable east to west journeys, stifling economic growth. Traffic modelling undertaken for the existing A417 and wider network evidences the problems relating to journey times, reliability and road safety. This information is provided in the ComMA Report (Document Reference 7.6) but is summarised below for convenience.
- 7.3.7 The A417/A419 route is used by both local and strategic traffic, for a range of journey purposes. As shown in Figure 7-1, the full A417/A419 route serves a range of origins and destinations across the country. The route serves an essential role, connecting the ports and airports of the south-east to the west Midlands, mid and north Wales, and north-west England.

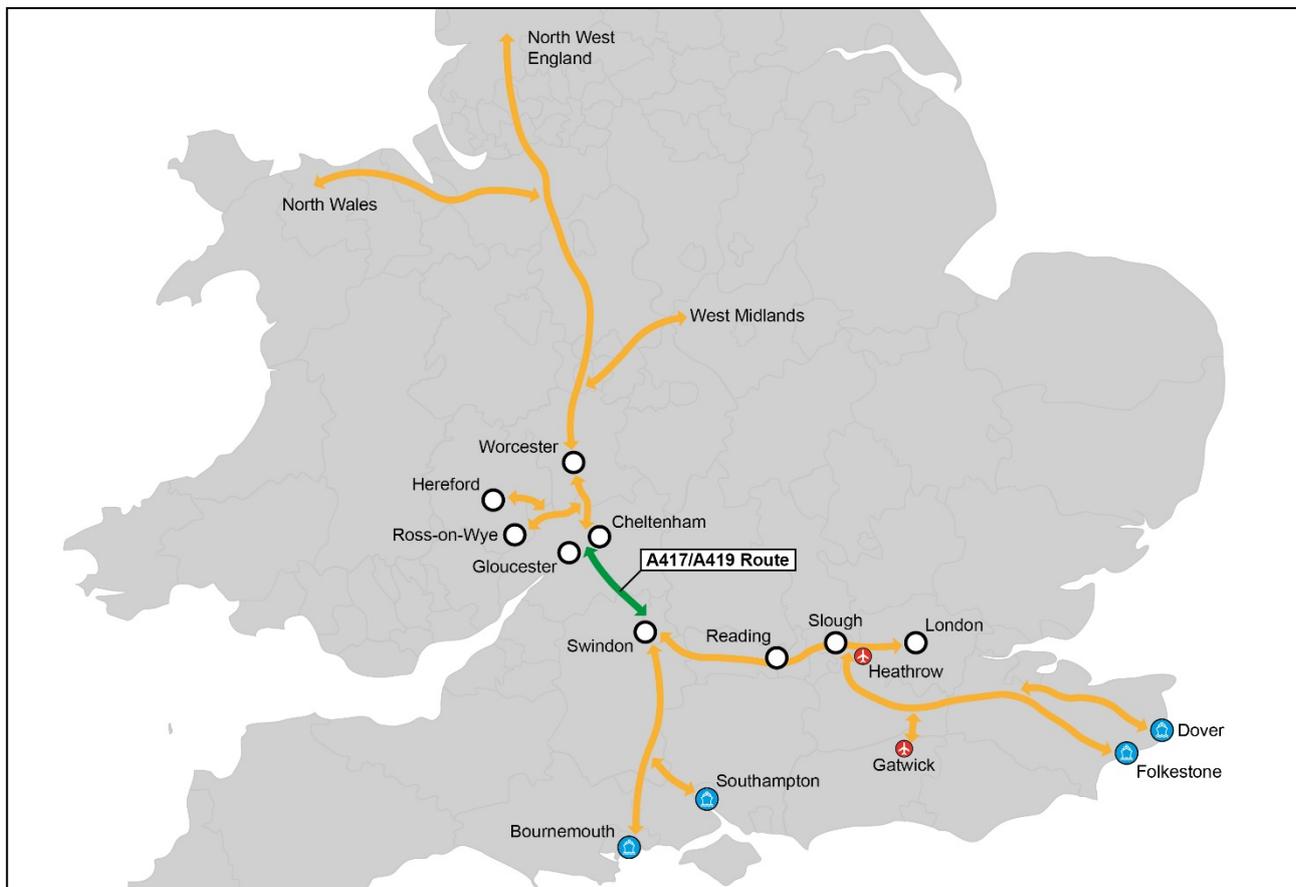


Figure 7-1 A417/A419 route strategic origins and destinations

- 7.3.8 The A436, which joins the A417 at the Air Balloon Roundabout, is part of the Primary Route Network and part of the designated Freight Network¹⁴ in Gloucestershire. It is the signed primary route between south Oxfordshire and Gloucester via M5 Junction 11a. The majority of traffic on the A436 will therefore also use the western part of the A417 Missing Link between the Air Balloon roundabout and the bottom of Crickley Hill.

¹⁴ Gloucestershire's Local Transport Plan 2015-2013 sets out the roads that form part of Gloucestershire's Freight Network.

7.3.9 Supply chains connect businesses along the Gloucester – Swindon corridor, with businesses in Gloucester supplying industries in Swindon. The route also plays a key role as a direct connection between the south-east and south coast to the Midlands and north-west England.

Journey times and reliability

7.3.10 Table 7-1 shows the journey times for the base (2015) traffic model for the A417/A419 from Cirencester to the M5 for the peak periods.

Table 7-1 Journey times for the A417/A419 (2015 base traffic model)

Year	Direction	AM Peak	Inter Peak	PM Peak
2015	Cirencester to M5 (westbound)	17:33	17:12	18:25
	M5 to Cirencester (eastbound)	15:38	14:42	15:03

Source: PCF Stage 3 ComMA

7.3.11 Table 7-1 demonstrates that currently westbound journey times are considerably higher than those travelling eastbound. This is primarily due to congestion and capacity issues at the Air Balloon roundabout. These capacity issues are due to the high volume of traffic travelling through this junction and that the Air Balloon is not designed to cope with these high traffic volumes. The lack of capacity results in congestion at the Air Balloon roundabout and this results in the high journey times and the poor journey time reliability.

7.3.12 As shown in Figure 7-1 the A417/A419 route serves an essential role in providing access between the port and airports in the south-east and the west Midlands, mid and north Wales and north-west England. As such poor journey times on the A417 impact on vehicles travelling between these destinations. Although an alternative route via the M4/M5 is possible, this is 66 miles in length and would add significant time and cost to trips in comparison to travelling by the A417/A419.

7.3.13 Highways England undertook an alternative modes assessment and further details on this are provided later in this section. The findings of the assessment demonstrate that no suitable alternative highway solutions using the existing SRN would address the issues and that there are no feasible alternatives to the delivery of the scheme at the location of the existing A417.

7.3.14 In addition to journey times, journey time variability and subsequent reliability is an issue on the existing A417. Reliable journey times are essential to a functioning road network. It is important to both businesses and freight providers to know how long specific journeys will take so that they can plan efficiently and economically.

7.3.15 A measure of journey time variability has been calculated for each weekday period separately by calculating the standard deviation of journey times in seconds per kilometre for dual carriageway and single carriageway sections of the A417.

7.3.16 Table 7-2 presents the resulting standard deviations in journey times. Outliers have been defined as a single record in which the measured journey time (per km) is five times greater than the average for the particular time period and road type, and any such records have been removed prior to the calculation of the

standard deviations. The removal of outliers is intended to ensure that delays associated with day to day variation, rather than incidents, are accounted for in the assessment.

Table 7-2 Existing journey time variability on the A417

Road type of the A417	Travel Time Standard Deviation (sec/km)			
	AM Peak	Inter Peak	PM Peak	Off Peak
Dual carriageway	5.0	3.1	2.7	4.0
Single carriageway westbound	38.6	33.2	38.2	12.9
Single carriageway eastbound	46.7	11.4	16.6	11.2

Source: PCF Stage 3 ComMA

- 7.3.17 From this analysis, substantial differences are evident between the single and dual carriageway sections of the A417, with the dual carriageway sections experiencing low journey time variability and the single carriageway sections generally experiencing high journey time variability. Differences are also evident between the directions of travel on the single carriageway sections, with the westbound direction typically having greater variability and less reliability than the eastbound direction. The exception to this is the eastbound direction in the morning peak, which shows the greatest journey time variability.
- 7.3.18 This data demonstrates the lack of reliability for users of the existing A417, particularly on the only remaining single carriageway section between the Brockworth bypass and Cowley junction. Frequent and unpredictable traffic congestion on the A417 also leads motorists (including HGV drivers) to divert onto smaller local roads in an attempt to avoid delay. This has harmful impacts on neighbouring communities, as their local roads were not built to accommodate such traffic, which is intended for the strategic road network.

Road safety

- 7.3.19 The existing alignment and design of the A417 is unsuitable for the traffic speeds and volume of traffic it accommodates, resulting in a poor road safety record. This is exacerbated because of a steep vertical gradient, in which the existing gradient is up to 10% on Crickley Hill, whereas the DMRB recommends a maximum gradient of 8% for roads such as the A417 in this location with permitted relaxations. There are also limited opportunities for safe overtaking, poor forward visibility in some locations and numerous junctions or accesses to minor roads where traffic enters, exits or crosses the main A417 carriageway.
- 7.3.20 Accident data for July 2014 through to June 2019 inclusive obtained from the DfT¹⁵ identified that in that 5-year period there were a total of 42 PIAs on the single carriageway section of the A417 between Brockworth bypass and Cowley roundabout. This resulted in eight fatalities and 21 seriously injured casualties and a further 53 slight casualties.
- 7.3.21 Representing a significant social and financial cost, the fatal and serious casualty rates observed on the A417 are significantly higher than the national average for single carriageway roads. Figure 7-1 shows the observed casualty rates per PIA

¹⁵ At the time it was collated, this represented the latest available data

on the single carriageway section of the A417 against the national average for equivalent road types.



Source: PCF Stage 3 ComMA

Figure 7-2 Number of casualties per PIA for the A417 and the national average

- 7.3.22 Upgrading this section of the A417 to dual carriageway will improve safety compared with the existing route and contribute to Highways England's target of reducing the number of people killed or seriously injured on its network. Analysis shows that over the assessment area, the scheme is forecast to lead to a large reduction in the number fatalities or seriously injured, with 66 less fatalities and 201 less seriously injured casualties over the 60-year appraisal period.
- 7.3.23 Within this context, it is considered that there is a strong need case for an intervention to address the significant existing congestion and road safety issues on the A417. While it is recognised that great weight is attached to conserving the AONB, it is also considered that addressing the existing road safety issues and removing an impediment to strategic economic growth is in the public interest.

National considerations

- 7.3.24 As set out in Chapter 2 of this report, the need for the scheme has been identified by the DfT in its two successive RIS publications. In RIS1 (2015-2020), the scheme was identified as one of more than 100 schemes in its investment plan for improving the SRN across England. Funding for delivery of the scheme has been confirmed within the sRIS2 published in 11 March 2020, which covers the period between 2020 and 2025.
- 7.3.25 RIS2 sets out a vision for the SRN comprising:
- i. A network that supports the economy
 - ii. A greener network
 - iii. A safer and more reliable network
 - iv. A more integrated network
 - v. A smarter network

- 7.3.26 If not improved, the existing infrastructure of the A417 will continue to contribute to growing congestion and poor journey time reliability, road safety and efficiency, resulting in harmful effects to the economy and local communities. The road will therefore continue to fail to align with the Government's strategic vision for the SRN. Delivery of the scheme would meet a need that has been identified and committed to within RIS2 and contribute to achieving the national vision for the SRN.
- 7.3.27 Table 7-3 shows the forecast journey times from the traffic model for the opening and design year without the scheme (Do-Minimum).

Table 7-3 Do-Minimum journey times on the A417/A419

Direction	Year	AM Peak		Inter Peak		PM Peak	
		Time (mm:ss)	% Diff.	Time (mm:ss)	% Diff.	Time (mm:ss)	% Diff.
Cirencester to M5 (westbound)	2015	17:33	N/A	17:12	N/A	18:25	N/A
	2026	18:19	+4%	17:55	+4%	18:55	+3%
	2041	19:33	+11%	19:08	+11%	20:17	+10%
M5 to Cirencester (eastbound)	2015	15:38	N/A	14:42	N/A	15:03	N/A
	2026	17:01	+9%	15:09	+3%	15:38	+4%
	2041	18:45	+20%	16:09	+10%	17:13	+14%

Source: PCF Stage 3 ComMA

- 7.3.28 As can be seen from Table 7-3, the journey times on the A417/A419 are forecast to increase when compared to the 2015 base year. For westbound traffic, the increase in journey times is similar across all three time periods (AM peak, inter-peak, PM peak) for both 2026 and 2041. For 2026 the increase is approximately 4% and for 2041 it is approximately 11%. The eastbound direction shows a more varied forecast increase in journey times across the three time periods. The eastbound AM peak sees a large increase between 2015 and 2026 and between 2015 and 2041, the inter peak sees similar increases as those for westbound traffic and the PM peak sees increases greater than for those westbound.
- 7.3.29 As shown in Figure 7-1 the A417/A419 route serves an essential role connecting the south-east with the west Midlands, mid and north Wales and north-west England. With the forecast increase in journey times without the scheme this would impact on journey times between these destinations and thus impact on the wider economy.
- 7.3.30 This data demonstrates that without intervention, journey times on the existing A417 will continue to increase in both directions, further contributing to the associated harmful effects both on road users and the wider community, environment and economy.

Impact on local economy

- 7.3.31 As stated above, the existing section of the A417 at Air Balloon has a detrimental impact on the local economy by causing delays and poor journey time reliability on what is a strategic road connection in the Gloucestershire area. The NPSNN directs the SoS to consider the impact of consenting the scheme on the local economy (as well as the impact of not consenting it).

- 7.3.32 Traffic modelling of the scheme¹⁶ forecasts that it would deliver significant journey time savings overall. For example, the model forecasts that westbound journey times (Cirencester to the M5) would be reduced by almost six minutes in the PM peak by 2041 (the scheme design year). This is considered a very large journey time saving within the context of the economic appraisal of the scheme.
- 7.3.33 The economic appraisal undertaken has identified significant economic benefits of the scheme. The full appraisal results and further details are provided in the ComMA Report (Document Reference 7.6). Key figures are set out below:
- Over the 60-year appraisal period the scheme is forecast to achieve total transport economic efficiency benefits, including journey time changes and vehicle operation cost changes, of £255.8 million.
 - As a result of improved journey time reliability, the scheme is forecast to achieve total benefits valued at £70.5 million. This would comprise of:
 - Business user and journey time reliability benefits of £39.9 million, representing an improved ability to plan business journeys and for transport providers to schedule business operations; and
 - Commuting and other user journey time reliability benefits of £30.6 million, representing an improved ability for employees to arrive at work on time and to keep to appointment times.
 - The scheme is forecast to achieve significant wider economic benefits of £140.3 million. These benefits represent impacts to agglomeration, labour supply and increased output.
- 7.3.34 The assessment has also forecast the benefits of the scheme with regard to road safety. Across the 60-year appraisal period there would be a substantial reduction in casualties as a result of the scheme. The forecast reduction of 66 fatalities and 201 serious casualties is valued in monetary terms at £64.9 million and is considered to be a very large benefit with regard to road safety. The full accident appraisal results and further details are provided in the ComMA Report (Document Reference 7.6).
- 7.3.35 The BCR is a cost-benefit analysis calculation which indicates, in quantitative terms, the overall value for money of a project. The scheme achieves an adjusted BCR of 2.51 when reliability and wider economic benefits are included. This means that for every £1 spent on the scheme, £2.51 is generated in economic, environmental and social benefits. Based on the DfT's Value for Money Framework, the scheme is in the 'medium value for money' category. In economic terms, this indicates that the forecast benefits of the scheme would significantly outweigh its costs.
- 7.3.36 Besides the economic assessment of the scheme, the need for the scheme to enable strategic growth is evident in local planning policy. The Joint Core Strategy¹⁷ plan adopted in 2017 by three local authorities – Gloucester City Council, CBC and TBC (with the support of GCC) – sets out the strategic growth objectives for the wider area. It identifies the need for over 35,000 new homes to be delivered across the three authorities by 2031, including through 7 strategic allocations and associated green belt development. Four of these allocations are located on the eastern and northern fringe of Gloucester, and two further

¹⁶ Based on August 2020 scheme design

¹⁷ <https://www.cheltenham.gov.uk/downloads/file/7211/jcs>

allocations are to the north-west of Cheltenham. Allocations A2 (South Churchdown) and A3 (North Brockworth) are directly bounded by the A417 in the east of Gloucester city and will deliver 2,600 homes within near proximity to the scheme. The need for increased capacity, reduced congestion and safer journeys on the A417 is therefore situated within this context of significant planned economic and housing growth to the surrounding settlements within the Joint Core Strategy plan area.

- 7.3.37 The JCS states¹⁸ that the Local Transport Plan is the 'key strategy for delivery of essential transport infrastructure to support the delivery of growth identified through the JCS'. The GCC Local Transport Plan¹⁹ identifies the A417 Missing Link project as a priority scheme for 'maintaining a functioning highways network' in the county, within the context of the Plan seeking to create a 'fit for purpose, reliable and efficient transport network that connects communities, employment and services, with minimal congestion and competitive journey times.'
- 7.3.38 Furthermore, the scheme is identified in three Infrastructure Delivery Plans in the region: the Joint Core Strategy IDP (covering TBC, CDC and Gloucester City Council authorities)²⁰; the Gloucester City IDP²¹; and, the CDC IDP²². The latter identifies the A417 as a piece of critical infrastructure required to enable the delivery of growth within the district.
- 7.3.39 As set out in Chapter 2 of this report, the feedback received to the non-statutory consultation demonstrated overall high levels of support for the Option 30 route alignment, with 72% of all respondents stating they either agreed or strongly agreed with Highways England's proposal for Option 30.
- 7.3.40 As set out in Section 10.2 of the Consultation Report (Document Reference 5.1), Table 10-3 demonstrates that overall, respondents expressed high levels of support (60% and above) for the changes to the scheme design as presented at the 2020 supplementary statutory consultation. In particular, the two new proposed crossings, the Cotswold Way crossing and Gloucestershire Way crossing, were highly supported (both 77.5% in support). Respondents expressing a neutral stance varied between 12.6% and 25.8%, whilst levels of opposition to the changes varied between 8.6% and 14.2%.
- 7.3.41 The Joint Councils, the GFirst LEP and some Local MPs all have stated in principle, strong support for the scheme and the benefits it will bring to the local and regional economy and to the strategic road network. For further details see Appendix 10.2 and Appendix 10.4 of the Consultation Report Appendices (Document Reference 5.2).

Cost and scope of development alternatives

- 7.3.42 The second bullet point of Paragraph 5.151 also states that in considering whether exceptional circumstances exist to consent a development in an AONB, the SoS should consider the cost and scope of 'development elsewhere, outside the designated area, or meeting the need for it in some other way'.

¹⁸ Para 5.2.4, page 77

¹⁹ <https://www.gloucestershire.gov.uk/media/2227/11-pd-4-highways-nov-2017.pdf>

²⁰ https://www.gloucester.gov.uk/media/1122/jcs_infrastructure_delivery_plan_full_document_august_2014.pdf

²¹ https://www.gloucester.gov.uk/media/3775/gloucester-city-idp_final_26-sept-2019-for-upload-v2.pdf

²² <https://www.cotswold.gov.uk/media/21ajkejk/6302-infrastructure-delivery-plan-2016-update-apr-2016.pdf>

- 7.3.43 In considering the scope to develop the scheme outside of the designated area, it must be recognised that the existing section of the A417 that the scheme seeks to improve is located wholly within the Cotswolds AONB. As such, there is no possible realignment or improvement of the existing A417 section which would avoid development in the AONB. In order to avoid the AONB, the development would be required to be either an alternative mode of transport or to use alternative routes using the strategic road network.
- 7.3.44 As detailed in Chapter 2 of this report, Highways England has investigated the possibility of alternative interventions to address the existing issues of the A417. This includes considering the cost and scope of other modes of transport and smaller-scale highways interventions. In ultimately opting to develop new highway in the AONB, Highways England has also undergone a route assessment and selection process which has considered the cost and scope of various routes including surface and tunnel options.

Alternative transport modes

- 7.3.45 As detailed in ES Chapter 3 Assessment of Alternatives (Document Reference 6.2), Highways England undertook a study to understand the potential for modes of transport other than highways to be used to address the problems identified on the existing section of the A417 between Brockworth bypass and Cowley junction. The outcome of the study, as reported in the Scheme Assessment Report (Document Reference 7.4), concluded that while a package of alternative mode initiatives could potentially complement the scheme, these alternative measures could not realistically provide an effective solution on their own. Such interventions would not address the inherent road safety issues associated with the existing route (i.e. road alignment, steep gradients, poor forward visibility, at grade junctions, etc.).
- 7.3.46 Considering the dominance of medium and longer distance trips currently on the A417 route, it was considered that the alternative mode most likely to encourage modal shift away from road travel is rail, with non-motorised or local public transport modes (e.g. local bus services) unlikely to be able to achieve anything other than a minor (and insignificant) reduction in car travel on the route.
- 7.3.47 Rail services along the A417/A419 corridor between Swindon, Gloucester and Cheltenham are generally uncompetitive compared to road travel when service frequency and journey times are considered. While improvements would deliver some modal shift from car to rail, this would be expected to be very modest in comparison to the scale of mode shift necessary to achieve the benefits of the proposed road scheme with regard to reducing congestion. Given the existing levels of rail use, even a doubling of existing rail passenger demand on the line, which would not be feasible without a transformational change in the competitiveness of rail services and a significant increase in rail capacity, would only equate to around one half of the modal shift needed to replicate the levels of congestion relief provided by the scheme (as is deemed necessary to address the identified scale of the transport related problems).
- 7.3.48 The Scheme Assessment Report (Document Reference 7.4) also sets out how Highways England has considered whether an alternative route using the existing SRN could be feasible for long-distance journeys. It cites an example of re-routing a journey between the M5 near Gloucester and the M4 near Newbury. It found

that alternative routes would be significantly longer and would also pass through AONBs, for example:

- M5 southbound, then M4 eastbound (88 miles) – passes through the Cotswolds AONB via the M4 near Bath; or
- M5 Northbound, then M42 northbound, then M40 southbound, then A34 southbound, then M4 eastbound (128 miles) – passes through the North Wessex Downs AONB on the A34 to the south of Oxford.

7.3.49 Those options would be 34 miles and 74 miles longer (respectively) than the existing route via the A417/A419 then M4 (54 miles). In addition to the cost for road users in travelling this extra distance, there would be associated works required to encourage this routing amongst users. The A417 route would have to be extensively downgraded and the alternatives upgraded to attract and manage the traffic. Both identified alternatives would require additional capacity to be added to the SRN in either another part of the Cotswolds AONB or the North Wessex Downs AONB. Furthermore, those alternative routes would not be suitable for diverting or reducing more local traffic using the existing A417, particularly east-west between Swindon and the Gloucester/Cheltenham areas. They would therefore be unlikely to deliver the required journey time, safety and economic benefits to the local communities as well as to users of the SRN; such benefits are a key objective of the scheme.

7.3.50 An assessment of the potential of alternative transport modes and of alternative solutions using the existing SRN has identified that none would address, to a satisfactory level, the existing issues on the A417 and deliver the improvements required. It is therefore concluded that there are no feasible alternatives to the delivery of the scheme at the location of the existing A417.

Smaller scale interventions

7.3.51 The Scheme Assessment Report (Document Reference 7.4) identifies that improvements to this section of the A417 have been under consideration for more than 20 years. In 2001, the Highways Agency (now Highways England) carried out a study to identify the environmental constraints centred on the existing route and to identify if options were available to improve the section of road that would have acceptable environmental impacts. The results of this study published in 2003 supported a surface on-line dualling option, which was subsequently developed into a route known as the 'Modified Brown Route'.

7.3.52 Following changes to the classification and funding source of the scheme in 2005, the Highways Agency re-examined the options for a lower cost solution. It carried out a review of off-line schemes, quick-win solutions and junction improvements. The conclusion was that there were no realistic schemes that could achieve a significant improvement other than the full dualling of the route between Cowley roundabout and Brockworth bypass.

7.3.53 In 2008, the Highways Agency again reviewed the opportunities to provide a lower cost scheme. It was concluded that there were no lower cost solutions which would be capable of providing long-term benefits to safety, congestion and environment along the A417 between Cowley roundabout and Brockworth bypass. The work confirmed the A417 Modified Brown Route as the only solution considered deliverable at that time.

- 7.3.54 In 2010, the Highways Agency led workshops identifying short-term, low-cost measures to improve the route. These measures included:
- a. Facilitating the removal of broken-down vehicles and providing laybys.
 - b. A version of Active Traffic Management that could include speed detection loops, Automatic Number Plate Recognition (APNR), control room connectivity, emergency refuges, Traffic Officers and post mounted Vehicle Message Signing (VMS).
 - c. CCTV cameras to provide real time video; initially being connected to the Regional Control Centre with access rights to other parties.
 - d. Strategic signing on the M4 and M5 could be implemented by the Regional Control Centre when an incident was positively confirmed via CCTV.
 - e. Restricting Heavy Goods Vehicles to lane 1 on lengths of 2+1 lane layout and around Air Balloon roundabout where the capacity of lane 2 might be increased.
 - f. Further measures that focussed on enhancements to the Air Balloon roundabout for the improvement of safety and congestion were established to:
 - i. Restrict turning movements- A417 from Swindon to A436;
 - ii. Segregated left turn from the A436 arm to the southbound A417;
 - iii. Geometric improvement to the roundabout configuration; and
 - iv. A436 link to Birdlip junction.
- 7.3.55 However, none of the measures identified were subsequently implemented as they were not considered to provide value for money and would make a limited (and unsatisfactory) contribution to address the objectives related to safety and congestion.
- 7.3.56 In 2014, a further study was undertaken by the Highways Agency on the potential for low cost (less than £50 million) improvement options to help solve the congestion problems that exist on the A417 focussing particularly on the Air Balloon roundabout. The study identified two options for grade separation of the Air Balloon junction. Neither of those options were taken forward due to concerns over buildability.
- 7.3.57 Since 2014, the A417 Missing Link has been identified in the DfT RIS. A strategy, shaping and prioritisation exercise undertaken prior to the commencement of the project (PCF Stage 0) concluded that a highways scheme was the most viable transport solution and that a major roads project should be initialised.
- 7.3.58 In reviewing the historic context of the scheme over the last two decades, it is evident that Highways England has evaluated, on multiple occasions, whether smaller-scale interventions could resolve the congestion and safety issues on the A417 at Air Balloon. However, it has been concluded that only a full dualling scheme would address the problems and achieve the objectives to provide the long-term benefits required.

Tunnel options

- 7.3.59 In concluding that a dualling scheme would be required to resolve the issues of the A417, and that no alternative transport modes or small-scale interventions would be sufficient, it is unavoidable that this scheme would be situated wholly within the Cotswolds AONB. However, Highways England has considered, as part of its route selection process, a sub-surface or tunnel route as an option which could reduce effects of development on the AONB.

- 7.3.60 In the development of the Modified Brown Route in the early 2000s, the Scheme Assessment Report (Document Reference 7.4) notes that tunnel options were primarily discounted due to an estimated cost of £1 billion and a holding objection in respect of ground water contamination from the EA.
- 7.3.61 The Technical Appraisal Report (Document Reference 7.9) provides details on how the optioneering process for the current scheme was undertaken in order to identify options to take to non-statutory public consultation in 2018. In summary, 30 initial route options were developed and assessed, including tunnel and surface routes. Through four steps of sifting, six options were fully assessed and appraised to inform the options to be taken to public consultation. This comprised four tunnel options (3, 21, 24 and 29) and two surface options (12 and 30).
- 7.3.62 The economic appraisal of each option followed the guidance set out in TAG; the method estimates the economic impacts of the scheme based on the efficiency of the journey for the road user, costs or benefits to the environment and the impact of accidents and road works.
- 7.3.63 While the tunnel options were identified as delivering greater benefits than the surface routes, resulting in high benefit values in the economic appraisal, they were also shown to give poor value for money for the taxpayer. The most significant factor causing this was the high estimated costs of the tunnel options, all of which were estimated to cost significantly more than the upper limit of the cost range of £250 - £500 million as defined by DfT. The tunnel options cost estimates ranged at that time between £875 million (Option 3) and £1.625 billion (Option 21), significantly exceeding the cost range set for the scheme. The estimated BCR scores of the tunnel options ranged from 0.79 (Option 3) to 0.47 (Option 21). This meant the costs significantly outweighed the estimated benefits.
- 7.3.64 Therefore, tunnel options were discounted as unaffordable and not offering value for money. Further detail on this process is provided in the Technical Appraisal Report (Document Reference 7.9), Scheme Assessment Report (Document Reference 7.4) and ES Chapter 3 Assessment of Alternatives (Document Reference 6.2).

Detrimental effect on the environment

- 7.3.65 The third bullet point of Paragraph 5.151 of the NPSNN states that in considering whether exceptional circumstances exist to consent a development in an AONB, the SoS should consider 'any detrimental effect on the environment, the landscape and recreational opportunities, and the extent to which that could be moderated'.
- 7.3.66 An EIA has been carried out for the scheme which is reported in the ES (Volume 6 of the DCO Application). This identifies the likely effects of the scheme on the environment and sets out mitigation and enhancement measures proposed within the scheme to moderate any detrimental effect.
- 7.3.67 ES Chapter 16 Summary (Document Reference 6.2) provides an overview of the significant effects of the scheme as reported in the ES topic Chapters. It identifies that no significant effects – beneficial or adverse – are likely in relation to air quality, material assets and waste, climate or cumulative effects. In addition, it identifies that there are three topic areas in which significant adverse effects are only likely during the construction of the scheme: geology and soils; population and human health; and, road drainage and the water environment.

- 7.3.68 As reported in ES Chapter 16, likely significant adverse effects are identified during both construction and operation in relation to cultural heritage; landscape and visual effects; biodiversity; and, noise and vibration. However, it should be noted that significant beneficial effects are also identified in relation to these topics, with the exception of cultural heritage.
- 7.3.69 It should be recognised that the principal residual effects will be temporary in nature, which is characteristic of construction activities. Mitigation as identified in the ES would ensure that the adverse effects are controlled where feasible and practicable during the construction stage. The quantity of adverse effects of the scheme on the environment would therefore reduce as the scheme progresses from construction to operation, such that at Year 15 of the scheme's operation, some effects would be removed entirely due to the maturation of mitigation measures, such as planting for visual screening and habitat creation.
- 7.3.70 In contrast to the majority of adverse effects occurring on a short-term basis during construction, the significant beneficial effects of the scheme are most numerous during the operation stage of the scheme, creating permanent benefit. This includes permanent beneficial effects to users of PRoW; health, social and economic benefits; reduced road noise to residential properties; and, permanent benefits to several special qualities of the AONB landscape. A full assessment of how the scheme complies with the requirements of the NPSNN in relation to specific environmental topics is set out within Chapters 6 – 10 of this report.
- 7.3.71 Furthermore, Highways England has taken a landscape-led approach to the scheme design which has sought to minimise or avoid adverse effects on the Cotswolds AONB landscape and its special qualities and where possible, sought to identify opportunities for enhancement. This is set out within the Design Summary Report (Document Reference 7.7).

Moderation of effects on the environment through design changes

- 7.3.72 As demonstrated in ES Chapter 3 Assessment of Alternatives (Document Reference 6.2), Highways England has sought to make changes to the scheme design throughout its development in order to decrease its detrimental effects on the environment and take opportunities for enhancement. These changes have been informed by environmental assessment and survey information; feedback from stakeholders during statutory and non-statutory consultation and engagement; and, engineering design refinement.
- 7.3.73 The Consultation Report (Document Reference 5.1) sets out that Highways England made substantial changes to the scheme design following the 2019 statutory consultation which sought to reduce the detrimental effects of the scheme on the environment and address concerns raised in response to the consultation. For example, the previously proposed green bridge on Crickley Hill was removed from the scheme due to its likely significant impacts on the Crickley Hill and Barrow Wake SSSI and veteran trees. Alternative crossings have now been incorporated into the scheme design (the Cotswold Way crossing, the Gloucestershire Way crossing and a new bat underpass) which deliver the required purpose of the previous green bridge whilst reducing harmful environmental effects associated with the design.
- 7.3.74 Similarly, the proposed gradient of the road climbing the escarpment has been amended since the 2019 statutory consultation in order to realise substantial reductions in the environmental effects of the scheme in that location. Previously

proposed at 7% (from the existing 10% gradient), a change in the proposals to an 8% gradient has resulted in better outcomes in terms of the effects on landscape, material/waste, groundwater, geology, carbon footprint and agricultural land, amongst others.

- 7.3.75 In addition to the specific changes to the scheme identified in the aforementioned ES Chapter 3 and Consultation Report, the Design Summary Report (Document Reference 7.7) demonstrates how the landscape-led design approach has sought to make the AONB landscape a primary consideration in design decisions and has resulted in effects to the environment being moderated where possible.
- 7.3.76 It is therefore considered that it is evidenced that, whilst there are residual significant adverse effects on the environment as a result of the scheme, Highways England has sought to avoid such effects in the first instance and moderate them wherever feasible, including through making changes to the design where appropriate.

Summary: does the scheme constitute ‘exceptional circumstances’?

- 7.3.77 Paragraph 5.151 of the NPSNN sets out three aspects of the scheme that the SoS should consider when determining whether there are exceptional circumstances that would support the grant of development consent in an AONB. These are the need for the development; the cost and scope of alternatives; and the detrimental effect on the environment.
- 7.3.78 There is a strong case to be made for the need for the scheme, given the existing congestion and road safety issues on the section of the A417 at Air Balloon. This is supported by the commitment in central Government to delivering and funding the scheme through the RIS programme, most recently in the publication of RIS2 in 2020. The economic assessment of the scheme evidences that the scheme would be of medium value for money and would deliver economic benefit to the wider area. This is recognised by the local authorities in the region who identify the scheme as priority infrastructure needed to support housing development and further economic growth. Traffic modelling forecasts the significant journey time savings and reduction in road accidents that the scheme would deliver – benefits that would be in the public interest. Conversely, it could be argued that not consenting the scheme would serve to continue to stifle economic development that could be unlocked and put road users at continued risk on a road that is no longer fit for purpose.
- 7.3.79 The scope for developing elsewhere or outside of the AONB is extremely limited in the case of this scheme, such that there is no other realistic alternative to the proposed scheme. This is because the existing section of road is located entirely within the AONB. The extensive 20 year history of the development of the scheme evidences that Highways England has considered alternatives to a dualling scheme, such as smaller scale interventions, modal shift schemes or rerouting the SRN, however none of these have been sufficiently feasible or would result in the desired outcomes with regard to addressing congestion and safety issues on the road.
- 7.3.80 In concluding a highways solution is required, Highways England has assessed different routes, surface and tunnel options. While accepting that some tunnel options may offer some increased benefits compared to a surface route, the SoS would need to have regard to the economic case against tunnelling, in which costs would greatly outweigh benefits, and consequently the feasibility of such a

scheme ever being delivered. As explained above, even the lowest cost estimate for a tunnel option significantly exceeds the cost range for the scheme set by DfT and that option has an estimated BCR of 0.79. Tunnel options that do not offer value for money, and that cannot be delivered based on the funding that is available for the scheme, should be discarded when there are acceptable alternative surface routes that would address the problems, achieve the objectives, and offer value for money.

- 7.3.81 A review of the residual significant adverse effects expected to result from the scheme, as reported in the ES (Volume 6), has identified that there are residual adverse significant effects relating to landscape, cultural heritage, biodiversity and noise during construction and operation of the scheme, and other residual adverse significant effects during construction only. However, it can be demonstrated that Highways England has actively sought to avoid or moderate such detrimental effects through the incorporation of appropriate mitigation, the adoption of a landscape-led approach to the design of the scheme, and through making substantial changes to the scheme design where reductions in adverse effects could be achieved.
- 7.3.82 It is therefore considered that it is demonstrated and evidenced that exceptional circumstances do exist for development of the scheme within an AONB, in accordance with the tests contained in Paragraph 5.151 of the NPSNN.

7.4 Compelling reasons, costs and benefits of development in the AONB

- 7.4.1 NPSNN Paragraph 5.152 states that:

“There is a strong presumption against any significant road widening or the building of new roads in... [AONBs], unless it can be shown there are compelling reasons for the new or enhanced capacity and with any benefits outweighing the costs very significantly.”

- 7.4.2 Therefore, in considering whether a scheme within an AONB should be developed, the SoS is required to have regard to the overall balance of benefits and costs of the scheme, as well as whether there are compelling reasons for the scheme.
- 7.4.3 The NPSNN also requires that the overall benefits of the scheme outweigh the costs very significantly. In terms of economic assessment, this is established in the adjusted BCR of 2.51, in which for every £1 spent on the scheme, it would generate £2.51 in social and economic benefits. However, this assessment does not take account of qualitative assessment of environmental effects. Given that it is established that the scheme would result in residual significant adverse effects on some aspects of the environment, as well as some significant beneficial effects, it should be evidenced that these ‘costs’ are very significantly outweighed by the benefits of the scheme.

Do benefits of the scheme very significantly outweigh its costs?

Costs of no enhanced capacity on the A417

- 7.4.4 It is considered that a ‘do nothing’ option in relation to the A417 would not be without a financial, safety and environmental cost. The following costs are identified if the scheme were not to be implemented:

- Without the scheme, journey times on the A417 between Cirencester and the M5 are predicted to increase approximately 4% westbound by 2026 and approximately 5% eastbound by 2026.
- The road gradient on Crickley Hill would remain at 10%, which is above DMRB modern standards, impacting on road safety and contributing to continued high rates of fatal and serious casualties compared to the national average.
- Without the scheme, traffic would need to continue to navigate a number of at grade junctions and accesses from the A417 which can impact on the overall flow of traffic.
- As a priority infrastructure project required to support the Joint Core Strategy, regional growth ambitions and housing delivery may not be realised to their full extent, suppressing long-term economic growth and productivity.
- Users of the Cotswold Way National Trail and Gloucestershire Way footpath would continue to have to cross the A417 at-grade, affecting the safety and enjoyment of the route for users of all ages and abilities.
- Rat-running through local villages would continue and potentially worsen due to continued issues with congestion, unreliable journey times and poor road safety on the A417 mainline. This would continue to detrimentally affect the safety and wellbeing of local communities.

Costs of doing something

- 7.4.5 As set out in the preceding sections, there are environmental ‘costs’ associated with the implementation of the scheme and these will need to be significantly outweighed by the benefits in order to make a compelling case for the scheme. These ‘costs’, identified as residual adverse significant effects in ES Chapter 16 Summary (Document Reference 6.2), are outlined below.
- 7.4.6 Adverse effects of construction on:
- Heritage assets including designated assets (Listed Buildings and Scheduled Monuments) and archaeology;
 - Some aspects of the AONB landscape and on views from some receptors;
 - Habitats, hedgerows, veteran trees, bats (included protected species), barn owls and terrestrial invertebrates;
 - Agricultural land;
 - Residential properties and non-residential receptors (such as PRow) relating to noise; and
 - Hydromorphology due to the removal of the tributary of Norman’s Brook.
- 7.4.7 Operational effects on:
- The setting of a Listed Building;
 - Some aspects of the AONB landscape and on views from some receptors;
 - Barn owls through habitat severance;
 - Ullen Wood Local Wildlife Site, ancient woodland and a veteran tree due to increased nitrogen deposition from vehicle emissions;
 - Residential properties and non-residential receptors (such as PRow) relating to noise.
- 7.4.8 It is, however, noted that the construction effects would be temporary in nature and would be mitigated during the construction period as much as possible through the implementation of measures set out and secured in ES Appendix 2.1 EMP (Document Reference 6.4).

7.4.9 It is also noted that the operational, permanent ‘costs’ of the scheme are fewer than those occurring through construction, with the harmful effects on the environment reducing during the operational period as long-term mitigation measures such as planting establish and mature.

Benefits of doing something

7.4.10 It is considered that the following are the main benefits of the scheme, that will be balanced against the costs of developing the scheme, as set out above.

7.4.11 These benefits are categorised by the objective of the scheme to which they relate. The definition of objectives early in the scheme development emerged as part of the landscape-led vision and approach that Highways England has sought to adopt, in recognition of the value and sensitivity of the Cotswolds AONB landscape within which the scheme is located. The objectives set out the ambition of Highways England to maximise opportunities to provide benefits through the scheme and to have regard, in making design decisions, to the conservation and enhancement of the Cotswold AONB landscape and its special character.

Safe, resilient and efficient network:

- The scheme is forecast to result in a significant reduction in the number of casualties, with 66 fewer fatalities and 201 fewer seriously injured over the 60-year appraisal period.
- A reduced gradient on Crickley Hill in line with modern highways standards (DMRB) and the introduction of a ‘crawler’ lane up Crickley Hill for slower-moving vehicles to prevent unsafe overtaking.
- The introduction of a grade-separated junction at Shab Hill to facilitate the continued flow of through-traffic and safe entry and exit from the A417.
- Junctions designed to meet forecast capacity to reduce congestion.
- Provision of segregated crossings for PRoW that cross the scheme, including the Cotswold Way National Trail and the Gloucestershire Way crossing which enable safe crossings of the A417, address existing severance, and improve accessibility.
- Creation of the ‘Air Balloon Way’ between Cowley junction at the Golden Heart Inn and Barrow Wake to provide a motor traffic free route through the Cotswolds AONB for WCH.
- Reduction in rat running through local communities and the use of local roads by inappropriate traffic.

Improving the natural environment and heritage:

- Integrating landscape and habitat creation: 6.8 miles of new Cotswold dry-stone walls; 5.61 miles of new hedgerows; 25.57ha of new native woodland; 4.34ha of new scrub, e.g. small bushes and trees; 7.6ha of new species-rich neutral grassland; and 75.41ha of new/ restored limestone grassland.
- Repurposing the existing A417 with a recreational route (the Air Balloon Way) and reducing the width of the former carriageway to provide a wide strip of land which would be planted with woodland and sown to establish rich calcareous grassland with biodiversity and landscape benefits.
- Through the multi-purpose Gloucestershire Way crossing, provide planting and hedgerows to help bats and other animals such as [REDACTED] and barn owls to cross safely.

- Habitat ‘stepping-stones’ are proposed to improve ecological connections between the Crickley Hill and Barrow Wake SSSI via the Gloucestershire Way crossing.
- Provision of an architectural ‘landmark’ bridge at the Cotswold Way crossing.
- The extension of Ullen Wood (ancient woodland) by planting a large area of native deciduous woodland.
- The scheme layout and design would enhance the special qualities of tranquillity and dark skies of the AONB as the road carriageway would be sunk into the landscape reducing noise pollution, light spill and skyglow as a result. This would also remove the visual disturbance of moving vehicles across this part of the AONB.
- Increased tranquillity would be experienced at Crickley Hill as result of the reduced gradient of the road meaning vehicles would be able to cross the escarpment with less effort and less engine noise.
- Improved air quality and reduced pollution caused by congestion.
- Exposure of important geological features.

Community and access:

- A motor traffic-free crossing of the Cotswold Way National Trail via the new Cotswold Way crossing. This would enable users of the Cotswold Way National Trail to safely cross the A417 (meaning users of this National Trail would no longer have to cross the A417 at-grade as they currently do). The crossing would be of a high-quality architectural style and include a resting area. It would reconnect the Cotswold Way National Trail, and provide better links to Emma’s Grove, the Gloucestershire Way and the proposed new Air Balloon Way.
- A motor traffic-free crossing of the Gloucestershire Way via the Gloucestershire Way crossing, enabling WCH, including disabled users to safely cross the A417. This would improve access to places of historical interest, such as at Emma’s Grove and Barrow Wake and link key landscape features in the area, including Ullen Wood, Emma’s Grove and the new Air Balloon Way.
- A Grove Farm underpass to provide a safe north-south crossing of the A417 where there is existing severance that acts as a barrier to non-motorised users.
- Improvements to Barrow Wake car park with landscaping, resurfacing and introducing greater natural surveillance by the re-routing of the B4070, which has the potential to discourage anti-social behaviour, which is an existing problem at that location.
- Provision of a new parking areas as part of the repurposed A417 for users of the Air Balloon Way and help redistribute parking in the area to help reduce existing recreational pressures on environmentally sensitive locations such as at Barrow Wake and Crickley Hill Country Park. Located near the Golden Heart Inn and Stockwell Lane, the new car parks would include disabled and horse box spaces to provide improved access for all users.
- Reduced noise impacts. Overall a greater number of households will experience a decrease in traffic noise compared to the number of households that will experience an increase. As identified in Table 6.3 there would be 50 direct beneficial significant noise effects as a result of the scheme, compared to direct adverse significant noise effects on 21 residential properties. The direct beneficial effects include five locations which are Noise Important Areas.

There would be indirect beneficial significant noise effects at 104 residential properties as a result of the scheme, compared to indirect adverse significant noise effects on 17 residential properties.

- In addition to the effects on residential properties, the assessment reported in ES Chapter 11 Noise and Vibration (Document Reference 6.2) identifies that there would be direct beneficial significant noise effects on the following non-residential receptors: several non-residential receptors in Birdlip, including the Primary School and the Village Hall; along the existing section of A417 highway to be removed along the Cotswold Way; on part of the Gloucestershire Way long distance footpath between the Air Balloon roundabout and Coberley to the east; and on footpath links running for approximately 0.6 miles (one kilometre) to the east from Stockwell.
- Reduced rat-running through the villages of Birdlip and Cowley due to a more free-flowing carriageway and the design of junctions to prevent/deter such routing.

Supporting economic growth:

- Total monetised transport user benefits of £255.8 million are primarily a result of journey time savings forecast.
- The scheme is forecast to provide significant wider economic benefits of £140.3 million.
- Forecast business user journey time reliability benefits of £39.9 million, representing an improved ability to plan business journeys and for transport providers to schedule business operations.
- Forecast commuting and other user journey time reliability benefits of £30.6 million, representing an improved ability for employees to arrive at work on time and to keep to appointment times.
- Significant accident benefits valued at £64.9 million.
- Delivery of priority infrastructure required to enable delivery of the Joint Core Strategy plans for strategic economic growth and housing development in Gloucestershire.

Summary: are there compelling reasons for the scheme and do the benefits outweigh the costs very significantly?

- 7.4.12 It is considered that there are compelling reasons for increasing capacity and improving road safety on the 'missing link' of the A417. As set out in the preceding section, this is based not only on the existing evidence of delays and accidents, but also the forecast significant journey time savings and casualty reductions as a result of the scheme.
- 7.4.13 The existing A417 is operating over-capacity and is of a design that does not align with modern highways standards. The resulting issues of congestion, unreliable journey times and poor road safety have an effect not only on road users but on local communities due to rat-running on local roads and on non-motorised users required to traverse the busy A417. The problems with the existing A417 also have a wider effect on the local economy, stifling growth and preventing the region – and its population – from fulfilling its economic and strategic growth potential. It is therefore considered that there are compelling reasons to enhance the capacity of the A417 and address these problems. Furthermore, it is considered that the alternative, to do nothing, would be unacceptable due to the

'costs' associated with the continuation or worsening of these issues with the existing road.

- 7.4.14 It is recognised that there are costs associated with the scheme, primarily relating to adverse environmental effects, mainly during its construction in relation to cultural heritage; landscape and visual effects; biodiversity; and, noise and vibration. However, it should be noted that significant beneficial effects are also identified in relation to these topics, with the exception of cultural heritage. While some of these costs will be temporary in nature, others will have a permanent adverse effect on the environment of the Cotswolds AONB. Highways England has evidenced the efforts taken to avoid or reduce such costs in the preceding section. The scheme achieves an initial BCR of 1.49 and an adjusted BCR of 2.51 when reliability and wider economic benefits are included. Based on DfT's Value for Money Framework the scheme is in the 'medium' value for money category.
- 7.4.15 Weighing against the identified costs of the scheme, this section has demonstrated the wide range of benefits that the scheme would provide. The quantity of adverse effects of the scheme on the environment would reduce as the scheme progresses from construction to operation, such that at Year 15 of the scheme's operation, some effects would be removed entirely due to the maturation of mitigation measures, such as planting for visual screening and habitat creation. In contrast to the majority of adverse effects occurring on a short-term basis during construction, the significant beneficial effects of the scheme are most numerous during the operation stage of the scheme, creating permanent benefit.
- 7.4.16 It would, as a highways scheme, provide fundamental benefits to the road network through improving road safety; upgrading infrastructure in line with modern standards; increasing road capacity; and, reducing rat running through local communities / on local roads. These benefits of the scheme extend beyond addressing the immediate issues facing road users, by providing the infrastructure identified as being necessary to support economic and housing development in the area to meet strategic growth ambitions in the region.
- 7.4.17 Finally, through high quality embedded mitigation and enhancement measures, there would be some benefits of the scheme to the surrounding environment which would represent an improvement compared to existing. This includes permanent beneficial effects to non-road users and local communities through improving the safety and experience of PRow and providing a new recreational route on the Air Balloon Way; health, social and economic benefits; reduced road noise to some residential properties; and, permanent benefits to several special qualities of the AONB landscape. As detailed within Chapter 8 of this report, there would be net permanent gains in priority habitat types: 9.59ha of lowland mixed deciduous woodland; 72.88ha of lowland calcareous grassland; and 5,551m of hedgerow.
- 7.4.18 Given the permanent nature of the suite of benefits identified, and the demonstrable need for the scheme, it is considered that the benefits of the scheme significantly outweigh both the costs of the scheme and the costs of no intervention. It is therefore concluded that the policy test of Paragraph 5.152 of the NPSNN is met by the scheme.

7.5 High environmental standards and measures to enhance

High environmental standards

7.5.1 NPSNN Paragraph 5.153 states that:

“Where consent is given [in AONBs], the SoS should be satisfied that the Applicant has ensured that the project will be carried out to high environmental standards and where possible includes measures to enhance other aspects of the environment.”

7.5.2 In considering whether the scheme will be carried out to the required high environmental standards, it must be recognised that the existing ‘baseline’ in this location, as an AONB and with a number of designated nature and heritage sites nearby, is one of high environmental quality. Therefore, the minimum measures required to mitigate the effects of the scheme will also be required to be more expansive and of a higher quality than would be necessary in an area of lower environmental value. Only after achieving this minimum requirement of a high standard of mitigation can opportunities for further enhancement be considered.

7.5.3 Highways England has recognised this by applying the landscape-led approach to designing the scheme, including mitigation measures. The landscape-led approach is detailed in the Design Summary Report (Document Reference 7.7), however Table 7-4 below demonstrates how this approach has resulted in different outcomes and design decisions than would be taken in designing mitigation for a ‘standard’ highways scheme in a less environmentally sensitive location. It is considered that this information is important in demonstrating that the scheme would be carried out to high environmental standards before additional enhancement measures are considered.

Table 7-4 Comparison of typical and landscape-led approach to mitigation

Issue	Typical approach	Landscape-led approach	Special qualities of the Cotswolds AONB
Scheme wide			
1. Earthworks and false cuttings	Hard engineered slopes	Landscape earthworks to supplement the basic engineering slopes required to support the vertical and horizontal alignment. Landscape earthworks are carefully designed to gently tie the road into existing AONB topography. These features (between Shab Hill and Cowley junctions) build in false cuttings to create immediate visual screening and noise mitigation to the west and east of the scheme. The landscape earthworks are sustainably constructed from excavated materials. Slopes are planted (on highway side) with locally important habitat. The intention would be to return the back slopes by agreement to the landowner to maximise agricultural use and reduce maintenance liabilities.	<ul style="list-style-type: none"> • The unifying character of the limestone geology – its visible presence in the landscape and use as a building material. • Variations in the colour of the stone from one part of the AONB to another which add a vital element of local distinctiveness. • The Cotswold escarpment, including views from and to the AONB. • The High Wolds – a large open, elevated predominately arable landscape with commons, ‘big’ skies and long-distance views.
2. Noise mitigation	Noise fencing	Noise mitigation integrated into landscape earthworks bunds and dry stone walls wherever possible.	<ul style="list-style-type: none"> • The tranquillity of the area, away from major sources of inappropriate noise, development, visual clutter and pollution. • Distinctive dry stone walls.
3. Drainage design	Drainage ponds	Drainage basins have been integrated within the landscape topography and have been designed so as not to retain water. The decision to have seasonally dry basins for drainage is to protect the landscape character type in this area as permanent ponds are not typical of this part of the AONB. Naturalise Norman’s Brook tributary rather than culvert it (general policy to avoid culverts and keep water features on the surface is a landscape-led decision).	<ul style="list-style-type: none"> • River valleys, the majority forming the headwaters of the Thames, with high-quality water.

Issue	Typical approach	Landscape-led approach	Special qualities of the Cotswolds AONB
4. Field boundaries	Standard timber highway fence	Combination of new Cotswold dry-stone walling and hedgerows to field boundaries affected by the road infrastructure in place of standard highways timber fences to ensure better fit with landscape character.	<ul style="list-style-type: none"> • The High Wolds – a large open, elevated predominately arable landscape with commons, 'big' skies and long-distance views. • Distinctive dry-stone walls.
5. Road detailing	Standard highway details	<p>The road carriageway would be sunk into the landscape reducing noise pollution, light spill and skyglow as a result. This would also remove the visual disturbance of moving vehicles across this part of the AONB.</p> <p>No permanent lighting as part of the scheme in order to avoid detrimental impacts on local amenity and the AONB landscape.</p> <p>Where possible, road edges for side roads will not have kerbs or they will be flush to the new road - this is to better fit with the rural character of the local landscape.</p>	<ul style="list-style-type: none"> • The tranquillity of the area, away from major sources of inappropriate noise, development, visual clutter and pollution. • Extensive dark sky areas. • Internationally important flower-rich grasslands, particularly limestone grasslands.
6. Materials and finishes	Standard highway materials and finishes	Materials and finishes will be appropriate to local character including restoring and introducing local landscape features such as dry-stone walls as an integral part of the scheme.	<ul style="list-style-type: none"> • Distinctive dry-stone walls. • Variations in the colour of the stone from one part of the AONB to another which add a vital element of local distinctiveness.
7. Treatment of rock cuttings	Standard highway approach	<p>Project is looking to achieve the steepest angle technically possible for the cutting through the escarpment. This depends on geotechnical survey findings.</p> <p>It is proposed that there will be no netting on the rock slopes in order to create a more natural looking cutting (with ecological potential).</p>	<ul style="list-style-type: none"> • The unifying character of the limestone geology – its visible presence in the landscape and use as a building material. • The Cotswold escarpment, including views from and to the AONB. • Variations in the colour of the stone from one part of the AONB to another which add a vital element of local distinctiveness.
Mainline			

Issue	Typical approach	Landscape-led approach	Special qualities of the Cotswolds AONB
8. Cut slopes	35 degree uniform slopes	35 degree overall slope but rather than being uniform, this includes 60 degree benched cuttings and slope faces to match geological features and reduce the scar on the landscape.	<ul style="list-style-type: none"> The unifying character of the limestone geology – its visible presence in the landscape and use as a building material. Variations in the colour of the stone from one part of the AONB to another which add a vital element of local distinctiveness.
Junctions			
9. Shab Hill junction	Standard junction design	The integration of the junction into the landscape, using the levels of the existing valley effectively ‘moving the head of the valley’ further east to create a logical resolution of the landscape in this area. A combination of woodland planting with significant volume of landscape earthworks are designed to help integrate and visually screen the road infrastructure into the AONB landscape.	<ul style="list-style-type: none"> The Cotswold escarpment, including views from and to the AONB. The High Wolds – a large open, elevated predominately arable landscape with commons, ‘big’ skies and long-distance views. Internationally important ancient broadleaved woodland, particularly along the crest of the escarpment.
10. Cowley junction	Standard junction design	The integration of the junction into the landscape using a combination of woodland planting with landscape earthworks to help visually screen the road infrastructure.	<ul style="list-style-type: none"> The Cotswold escarpment, including views from and to the AONB. The High Wolds – a large open, elevated predominately arable landscape with commons, ‘big’ skies and long-distance views. Internationally important ancient broadleaved woodland, particularly along the crest of the escarpment.
Crossings			
11. Severance of Cotswold Way National Trail (CWNT)	Footbridge	Circa 5m wide bridge providing a crossing with restricted byway status and carrying the CWNT, to provide the following features: <ul style="list-style-type: none"> Crossing for WCH (including disabled users). 	<ul style="list-style-type: none"> An accessible landscape for quiet recreation for both rural and urban users, with numerous walking and riding routes, including the Cotswolds Way National Trail.

Issue	Typical approach	Landscape-led approach	Special qualities of the Cotswolds AONB
		<ul style="list-style-type: none"> Accommodate cattle movements to remove them from the road network. Provision of a resting area on the bridge to accommodate disabled usage and provide a safe place to stop. The crossing will connect from CWNT with repurposed A417 (Air Balloon Way) and new local walking/ cycling/ links e.g. to Golden Heart Inn and beyond offering new walking links and opportunities. The bridge will be of a high quality architectural design and will use materials suited to the landscape. 	<ul style="list-style-type: none"> The Cotswold escarpment, including views from and to the AONB.
<p>12. Gloucestershire Way crossing</p>	<p>Standard bat mitigation structure</p>	<p>A 37m wide multi-use crossing to provide bat mitigation beyond what is necessary as well as additional habitat connectivity and enhancement to the Gloucestershire Way crossing.</p> <p>The bridge has been designed with the following features:</p> <ul style="list-style-type: none"> A mosaic of habitats including calcareous grassland, groundcover shrub and small tree / scrub to support wildlife movement between Crickley Hill and Barrow Wake SSSIs’. High quality architectural design which will tie in with the Stockwell and Cowley overbridges to form a cohesive ‘set’ of bridges. Have sought to follow the historical alignment of the Gloucestershire Way. Would link key landscape features in the area including Ullen Wood, Emma’s Grove and the new Air Balloon Way. 	<ul style="list-style-type: none"> Internationally important flower-rich grasslands, particularly limestone grasslands. Internationally important ancient broadleaved woodland, particularly along the crest of the escarpment.

Issue	Typical approach	Landscape-led approach	Special qualities of the Cotswolds AONB
13. Stockley Lane and Cowley Lane overbridges	Standard bridge design	<p>The approach to the design of the bridges has included:</p> <ul style="list-style-type: none"> • Columns are designed to be as wide as possible to allow views out from the bridge to the surrounding landscape. • Landscape earthworks have been designed to gently tie the road crossings into the surrounding AONB landscape. The intention would be to return the back slopes by agreement to the landowner to maximise agricultural use and reduce HE maintenance liabilities. • Both bridges will feature new tree avenues on their approaches to tie into historic avenue planting in the area. • Bridges will incorporate ecological grassland and hedges to create wildlife connections across the A417. 	<ul style="list-style-type: none"> • The High Wolds – a large open, elevated predominately arable landscape with commons, ‘big’ skies and long-distance views. • Internationally important flower-rich grasslands, particularly limestone grasslands.
14. Bridges and structures	Standard DMRB design	High architectural quality, finished in locally sourced material and other materials which complement the local vernacular.	<ul style="list-style-type: none"> • The unifying character of the limestone geology – its visible presence in the landscape and use as a building material. • Distinctive dry-stone walls. • Variations in the colour of the stone from one part of the AONB to another which add a vital element of local distinctiveness.
The repurposed A417 / Air Balloon Way			
15. De-trunk existing A417	Stop up and leave in-situ	<p>The existing A417 would be repurposed to provide:</p> <ol style="list-style-type: none"> a) A ‘purpose-designed’ width for footpath, bridleway and cycle access to provide recreational route. b) Replacement Common Land, to provide a type of open space for people to enjoy. 	<ul style="list-style-type: none"> • An accessible landscape for quiet recreation for both rural and urban users, with numerous walking and riding routes, including the Cotswolds Way National Trail. • The High Wolds – a large open, elevated predominately arable landscape with

Issue	Typical approach	Landscape-led approach	Special qualities of the Cotswolds AONB
		<p>c) Ecological connectivity and landscape integration with appropriate planting. It would include the following features:</p> <ul style="list-style-type: none"> • Former road to be resurfaced with locally appropriate toppings, such as crushed stone. • Links into other public rights of way to provide circular routes. • Levels of the old A417 alignment are to be rationalised in places through infilling using excavated materials to restore land to original grades. • New car park facilities at Golden Heart Inn to encourage visitors to the Inn and to use the repurposed walking/ cycle /horse riding route. Regrading routes north from the Inn to meet the repurposed WCH route along the detrunked A417. • New disabled parking and horse box parking facility at the start of the repurposed section. This takes advantage of the flatter topography northwards for these users. • Significant new planting of tree belts and hedgerow along the 6.14km repurposed section utilising space created by narrowing down the A417 road a purpose designed right of way for walkers/ cyclists/ horse riders. • Are of replacement Common Land which connects to the existing Common in the vicinity of Barrow Wake and includes restoration of the landscape occupied by the former A417. 	<p>commons, 'big' skies and long-distance views.</p> <ul style="list-style-type: none"> • Internationally important ancient broadleaved woodland, particularly along the crest of the escarpment. • Internationally important flower-rich grasslands, particularly limestone grasslands. • Variations in the colour of the stone from one part of the AONB to another which add a vital element of local distinctiveness.

Issue	Typical approach	Landscape-led approach	Special qualities of the Cotswolds AONB
16. Barrow Wake car park	No action	<ul style="list-style-type: none">• Environmental upgrading car park and interpretation to increase attraction for visitors and provide local information.	<ul style="list-style-type: none">• An accessible landscape for quiet recreation for both rural and urban users, with numerous walking and riding routes, including the Cotswold Way National Trail.

Measures to enhance other aspects of the environment

- 7.5.4 The following measures are considered to be ways in which the scheme will provide enhancements to the environment and for users of the A417.

Scheme wide

Ecological enhancement measures

- 7.5.5 Opportunities have been taken to connect previously isolated woodlands with new woodland and hedgerow planting to create connectivity of habitats throughout the landscape.
- 7.5.6 Landscaping would contain species favoured by dormouse such as hazel and honeysuckle especially around the southern end of the proposed scheme near Birdlip and Brimpsfield to allow future colonisation from a known population within Siccaridge Wood approximately eight miles (8 miles (13 kilometres)) south of the proposed scheme.
- 7.5.7 The landscaping contains calcareous grassland habitat creation along the proposed scheme, which provides additional habitat for invertebrates. The scheme proposes 25.57ha of new native woodland; 4.34ha of new native scrub, e.g. small bushes and trees; 7.6ha of new species-rich neutral grassland; and 75.41ha of new/ restored limestone grassland. The scheme design has made every effort to provide for priority habitats within the DCO Boundary, including 6.8 miles of new Cotswold dry-stone walls and 5.61 miles (9.02 kilometres) of new hedgerows, which also have a wildlife connectivity function.
- 7.5.8 The new Norman's Brook would be designed to cater for the ecological requirements of aquatic species present in Norman's Brook. The barriers (man-made weirs) currently present within Norman's Brook would not be recreated in the new channel, which would be characterised by steep-pool habitat, typical of higher gradient headwater streams. The new channel would improve connectivity of habitat for aquatic species due to the removal of barriers.
- 7.5.9 The existing stone-built bus stop which would be decommissioned as part of the de-trunking and repurposing of the A417, would be retrofitted to form an artificial bat roost in order to increase roosting opportunities in this area.

Extension of Ullen Wood ancient woodland

- 7.5.10 New planting of native deciduous woodland would provide an extension of Ullen Wood ancient woodland.

Geological exposures

- 7.5.11 The construction of the proposed scheme would enhance the existing sensitive geological exposures of the Leckhampton Member at Crickley Hill and Barrow Wake SSSI. Enhancement measures would include lowered slope angles and vegetation clearance where exposures have previously been concealed on the north side of the A417.
- 7.5.12 New exposures of the Leckhampton Member would be created within the cuttings. To increase the understanding of the stratigraphy, Highways England will provide access for Natural England or their nominated specialists for the detailed sampling of fossils and recording of stratigraphic horizons from temporary geological sections exposed during construction, where safe and

practical. This includes identifying an area within the site compound where material could be looked at in more detail. This measure is identified in the REAC contained within ES Appendix 2.1 EMP (Document Reference 6.4).

Dark Skies

- 7.5.13 The proposed scheme layout and design would enhance the tranquillity and dark skies of the AONB (special qualities) as the road carriageway would be sunk into the landscape reducing noise pollution, light spill and skyglow as a result. This would also remove the visual disturbance of moving vehicles across this part of the AONB. Increased tranquillity would be experienced at Crickley Hill as result of the reduced gradient of the road meaning vehicles would be able to cross the escarpment with less effort and less engine noise.

Mainline

- 7.5.14 One of the main design developments on the scheme was the change to the horizontal alignment on Crickley Hill. This drastically reduced the amount of temporary works required during construction, avoided the need for temporary and permanent retaining walls and allowed the Grove Farm underpass to be incorporated into the scheme.

Junctions

- 7.5.15 The two major junctions on the scheme have been designed sensitively in order to reflect the environment within which they sit.
- 7.5.16 The final design for Shab Hill junction takes the form of a half clover leaf arrangement which is a more compact layout than those proposed at earlier design stages. The design reduces the extent of the slips roads on the mainline and allows the junction to be placed more sympathetically within the landscape whilst also better serving the connections required to adjacent roads and properties (e.g. Rushwood Kennels and the A436).
- 7.5.17 The location of the junction was selected due to its proximity to an existing localised valley to the east of Birdlip Radio Station. This has enabled the junction link to be positioned beneath the mainline rather than over the mainline.
- 7.5.18 The Cowley junction largely follows the principles of a compact grade separated junction, utilising an existing underbridge to the south of the Cowley roundabout.
- 7.5.19 The junction has been integrated into the landscape using a combination of woodland planting with landscape earthworks to help visually screen the road infrastructure.

Crossings

- 7.5.20 The Cotswold Way National Trail and Gloucestershire Way: the scheme would provide two new bridge crossings for public rights of way; the Cotswold Way crossing for the Cotswold Way National Trail and the Gloucestershire Way crossing for the Gloucestershire Way footpath. These crossings would provide safe, grade separated recreational access away from the busy road, providing an enhancement to users, who currently are required to navigate and cross the existing A417 carriageway at-grade.
- 7.5.21 Stockwell and Cowley overbridges: the scheme would provide two new bridge crossings for public rights of way and motor traffic. These crossings would provide safe, grade separated recreational access away from the busy road, but also

provide ecological and landscape connectivity through appropriate planting. They would help connect existing routes with public access as part of an enhanced PRow network.

- 7.5.22 Grove Farm underpass: the scheme would provide a grade separated crossing of the A417, which would address existing severance that acts as a barrier to non-motorised users. This would help address existing safety concerns, where some pedestrians seek to cross the busy section of carriageway at grade, contributing to a poor safety record including a pedestrian fatality in this area.

The repurposed A417/Air Balloon Way

- 7.5.23 Approximately 2.7km of the existing A417 between the Golden Heart Inn interchange with Stockwell Lane and the Birdlip Link Road near Barrow Wake would be converted into a “purpose built” route for non-motorised users including WCH. The remaining 1km of the existing A417 between Birdlip Link Road near Barrow Wake and the existing Air Balloon roundabout (which would be demolished as part of the scheme) would be landscaped, with a connection maintaining local access for residents.
- 7.5.24 The de-trunked section of existing A417 would deliver several enhancements to the area. It would:
- i. Provide benefits to biodiversity by creating new / additional habitat and improving ecological connectivity along the route;
 - ii. Provide a new, traffic-free walking, cycling and horseriding route which would also increase connectivity between existing and proposed PRow routes;
 - iii. Provide new areas of landscaping replacing existing sections of highway;
 - iv. Increase connectivity to existing and proposed new WCH routes;
 - v. Help reduce anti-social behaviour through increased pedestrian surveillance in the Barrow Wake area alongside improved access and landscaping arrangements;
 - vi. Improve the enjoyment of the area by local communities and visitors through providing greater access to the unique Cotswolds landscape;
 - vii. Reduce the impact of traffic and its associated environmental effects on residential properties, community facilities and businesses along the existing A417, including at Birdlip;
 - viii. Provide opportunities for replacing Common Land, which is required as part of the scheme, and compensatory SSSI with land that was previously taken for the current scheme, returned to Common Land; and
 - ix. Reduce pressure on parking areas at Crickley Hill Country Park and Barrow Wake and associated recreational routes/designated areas through provision for car parking in the vicinity of the Golden Heart Inn. This would facilitate use of the recreational route in this location and dispersing activity over a wider area.

Summary: is the scheme carried out to high environmental standards and does it include measures to enhance the environment?

- 7.5.25 It is recognised that the location of this scheme within an area designated as both an AONB and SSSI means that the existing environment is of high quality, value and sensitivity. Meeting the NPSNN requirement for the project to be carried out to high environmental standards therefore means designing mitigation which as a minimum meets the high environmental baseline of the area, and which therefore

must go beyond the standard measures provided for highways schemes in undesignated areas.

- 7.5.26 This section has outlined how Highways England has applied a landscape-led approach to designing the scheme and how this has informed the design of embedded mitigation measures to a high environmental standard. It is considered that this is well evidenced through the comparison of what Highways England would consider a 'standard' approach to mitigation on a highways scheme and what has been designed into the scheme. This evidences that the scheme design has been informed by the environmental assessment and has sought to deliver a bespoke design of embedded mitigation that is commensurate with, and reflective of, the existing high quality environment. This is further reflected in the alignment of the special features of the AONB with the mitigation measures proposed, demonstrating that the scheme design has been shaped by the location in which it is situated, as opposed to imposing a standard approach to highways design. It is concluded therefore that Highways England can demonstrate that the scheme would be carried out to the high environmental standards required by Paragraph 5.153 of the NPSNN and is policy compliant.
- 7.5.27 This section has also set out the measures that Highways England has designed into the scheme which would go further than to provide mitigation for its effects and would actually enhance the environment beyond the existing baseline. While the NPSNN recognises that such enhancement should be provided 'where possible', it can be demonstrated that Highways England has incorporated enhancement measures that would provide benefit to varied aspects of the AONB environment. This includes enhancements to ecology through habitat creation; to the landscape qualities of the AONB; to geological exposures characteristic of the SSSI; and substantial enhancements to the users of PRoW including a National Trail. It is therefore demonstrated that the scheme would include measures which would enhance the environment, in accordance with the requirements of the NPSNN.

7.6 Summary: does the scheme comply with NPSNN policy for development within an AONB?

- 7.6.1 The Applicant has considered in detail the key NPSNN policy tests relating to development in an AONB. In conclusion, Highways England considers that there are exceptional circumstances for the grant of consent for the scheme in the Cotswolds AONB; there are compelling reasons for the new road and its enhanced capacity and the benefits of the scheme significantly outweigh its costs; and the scheme will be carried out to a high environmental standard, including measures that would enhance the environment.

8 Biodiversity and ecological conservation

8.1 Overview

- 8.1.1 The scheme is situated entirely within the Cotswolds AONB. Contributing to its significance and the reason for its designation as an AONB are its special qualities, which includes its ecological features such as lowland calcareous (limestone) grasslands and lowland mixed deciduous woodland. The scheme is also located partially within the Crickley Hill and Barrow Wake SSSI, a statutory conservation designation of national importance. A number of other statutory designated sites are within the vicinity of the scheme, including three SACs, which are sites of international importance, three SSSIs and a number of non-statutory designated sites such as Local Wildlife Reserves (LWR) and Local Wildlife Sites (LWS) including Ullen Wood ancient woodland.
- 8.1.2 Given the scheme's location within an area of high ecological importance and sensitivity, and the contribution that the biodiversity of the area makes to the qualities of the AONB, biodiversity is considered an important topic in the determination of the DCO Application. This chapter provides a detailed consideration of the requirements of Paragraphs 5.20 to 5.38 of the NPSNN, which set out the 'generic impact' of biodiversity and ecological conservation. It demonstrates how the scheme complies with the policy requirements.

8.2 General principles of assessment and decision making

- 8.2.1 The NPSNN paragraph 5.20 states that:
- 'The [Natural Environment White Paper] sets out a vision of moving progressively from net biodiversity loss to net gain, by supporting healthy, well-functioning ecosystems and establishing more coherent ecological networks that are more resilient to current and future pressures.'*
- 8.2.2 In terms of assessment, Paragraph 5.22 of the NPSNN states that where a scheme is subject to EIA, the ES should clearly set out any likely significant effects on:
- sites subject to international, national and local designations of ecological or geological conservation importance;
 - on protected species; and
 - on habitats and other species of principal importance for the conservation of biodiversity.
- 8.2.3 It also states that the ES should consider the full range of potential impacts on ecosystems.
- 8.2.4 Paragraph 5.23 of the NPSNN states that the Applicant should show how the project has taken advantage of opportunities to conserve and enhance biodiversity and geological conservation interests.
- 8.2.5 In terms of decision making, Paragraph 5.24 states that the Government's biodiversity strategy is set out in Biodiversity 2020: A Strategy for England's wildlife and ecosystem services. Its aim is to halt overall biodiversity loss, support healthy well-functioning ecosystems and establish coherent ecological networks, with more and better places for nature for the benefit of wildlife and people. This

aim needs to be viewed in the context of the challenge of climate change: failure to address this challenge will result in significant impact on biodiversity.

- 8.2.6 Paragraph 5.25 of the NPSNN states that as a general principle, development should avoid significant harm to biodiversity and geological conservation interests, including through mitigation and consideration of reasonable alternatives. It states that the Applicant may also wish to make use of biodiversity offsetting in devising compensation proposals to counteract any impacts on biodiversity which cannot be avoided or mitigated. Where significant harm cannot be avoided or mitigated, as a last resort, appropriate compensation measures should be sought.
- 8.2.7 ES Chapter 8 Biodiversity (Document Reference 6.2) reports on the likely significant effects of the construction and operation of the scheme on biodiversity, including on designated sites, protected species and on habitats and other species of principal importance for the conservation of biodiversity. The assessment takes into account the assessments undertaken for other environmental topic areas which may also impact on the ecosystems considered, including ES Chapter 5 Air Quality, ES Chapter 11 Noise and Vibration, ES Chapter 12 Population and Human Health and ES Chapter 13 Road Drainage and the Water Environment (all Document Reference 6.2).
- 8.2.8 ES Chapter 8 Biodiversity (Document Reference 6.2) sets out in section 8.9 (Design, mitigation, and enhancement measures) how opportunities to conserve and enhance biodiversity conservation interests have been taken within the scheme. Embedded design measures to avoid significant harm to biodiversity interests are set out in ES Chapter 2 The Project (Document Reference 6.2). ES Chapter 9 Geology and Soils (Document Reference 6.2) sets out in section 9.9 how opportunities to conserve and enhance geological conservation interests have been taken within the scheme. These sections also identify how Highways England has sought to avoid significant harm, including through measures embedded into the design (including consideration of alternatives where relevant) and through mitigation measures secured through the DCO. Further detail on these measures is provided in section 8.4 of this report, whilst the Design Summary Report (Document Reference 7.7) demonstrates the landscape-led design approach that Highways England has adopted for the scheme, in which conserving the special qualities of the AONB landscape – including those relating to its ecological and geological features – has been the primary consideration in designing the scheme.
- 8.2.9 Where relevant and necessary within the chapter, opportunities for appropriate compensation have been explored and are set out where significant harm on certain biodiversity features is unavoidable given the nature of the scheme (e.g. tufa habitats and ancient woodland).
- 8.2.10 It is considered the scheme is compliant with Paragraphs 5.22 to 5.25 of the NPSNN.

8.3 Effects on designated sites and other habitats and species

- 8.3.1 Paragraph 5.26 of the NPSNN directs the SoS to ensure that appropriate weight is attached to different types of ecological or geological interests, with Paragraphs 5.27 to 5.35 identifying specific considerations for particular designations or conservation interests. These are considered in turn within this section, with the

exception of Paragraph 5.30 which concerns Marine Conservation Zones and is therefore not relevant for this inland scheme.

International sites

- 8.3.2 Paragraph 5.27 of the NPSNN states that the most important sites for biodiversity are those identified through international conventions and European Directives, which are under statutory protection through the Habitats Regulations. It states that the following wildlife sites should also have the same protection, as per the NPPF:
- potential Special Protection Areas and possible Special Areas of Conservation;
 - listed or proposed Ramsar sites; and
 - sites identified or required as compensatory measures for adverse effects on European sites or the above.
- 8.3.3 There are three internationally designated sites within the study area of the scheme described within ES Chapter 8 Biodiversity (Document Reference 6.2): Cotswold Beechwoods SAC; Wye Valley and Forest of Dean Bat Sites SAC; and North Meadow and Clattinger Farm SAC. In addition to the assessment within the ES and in accordance with paragraph 4.22 of the NPSNN, a HRA Screening Report (Document Reference 6.5a) has also been undertaken on these sites and included consultation with Natural England. The HRA Screening Report additionally includes assessment of the potential for likely significant effects upon Severn Estuary SAC/ SPA/ Ramsar site, which meets the HRA screening criteria for this scheme. There will be no land-take or habitat loss within any of these sites as a direct result of the scheme.
- 8.3.4 Due to the distance of these sites from the scheme no observable impacts or significant effects on the SACs resulting from hydrological changes, changes in air quality, recreational pressure or impacts to bat populations are anticipated as a result of the scheme. This conclusion was reached within the HRA Screening Report (Document Reference 6.5a) for all sites except Cotswold Beechwoods SAC, for which likely significant effects from the scheme from recreational pressure were not dismissed at the screening stage. An HRA: Statement to Inform an Appropriate Assessment (SIAA) (Document Reference 6.5b) details further assessment of impacts upon Cotswold Beechwoods SAC. The SIAA concludes that there will be no adverse effect upon the integrity of Cotswold Beechwoods SAC as a result of the scheme, either alone or in combination with other plans or projects.
- 8.3.5 Natural England has reviewed the HRA Screening Report and SIAA and has confirmed their agreement with the conclusions. This agreement is reported within the Statement of Common Ground with Natural England (see Statement of Commonality, Document Reference 7.3). Natural Resources Wales has also reviewed the HRA Screening Report (because elements of the Wye Valley and Forest of Dean Bat Sites SAC and Severn Estuary SAC / SPA / Ramsar site are located within Wales) and has confirmed their agreement with the conclusions.

SSSI

- 8.3.6 Paragraph 5.28 of the NPSNN states that: 'Many Sites of Special Scientific Interest (SSSIs) are also designated as sites of international importance and will

be protected accordingly. Those which are not should also be given a high degree of protection.'

- 8.3.7 Paragraph 5.29 states that where a proposed development on land within or outside a SSSI is likely to have an adverse effect on an SSSI (either individually or in combination with other developments), development consent should not normally be granted. In the case that an adverse effect on the site's notified special interest features is likely, it further states that an exception should only be made if the benefits of the scheme at the site clearly outweigh both:
- the impacts that it is likely to have on the features of the site that make it of special scientific interest; and
 - any broader impacts on the national network of SSSIs.
- 8.3.8 The paragraph further states that the SoS should ensure that proposals to mitigate harmful aspects of the development, and where possible to conserve and enhance the site's biodiversity or geological interests, are acceptable; this may include requirements and/or planning obligations where necessary to ensure delivery.
- 8.3.9 There are four nationally designated sites within the study area of the scheme, Crickley Hill and Barrow Wake SSSI; Bushley Muzzard Brimpsfield SSSI; Cotswold Commons and Beechwoods SSSI; and Leckhampton Hill and Charlton Kings Common SSSI.
- 8.3.10 No observable impacts or significant effects are anticipated at these SSSIs during construction or operation of the scheme, with the exception of the Crickley Hill and Barrow Wake SSSI which is unavoidably impacted by the scheme.
- 8.3.11 Crickley Hill and Barrow Wake SSSI falls partly within the scheme boundary, although the scheme does not lead to any impacts on the Crickley Hill Unit of the SSSI to the north of the A417. The loss of SSSI habitat has been avoided and reduced where possible during the design phase of the scheme with detailed dialogue between ecology and engineering disciplines. For example, existing and proposed PRow have been removed and repositioned.
- 8.3.12 There does however remain unavoidable loss of 900m² (0.09ha) of calcareous grassland habitat for which the SSSI is notified, due to the widening of the existing A417. Approximately 560m² (0.056ha) of this habitat would be permanently lost to the cutting embankment (rock face) and a drainage cascade. Approximately 340m² (0.034ha) of habitat would be lost during the construction phase but would be reinstated as calcareous grassland following completion of the works. Creation of a roundabout on the B4070 will result in a further loss of 0.05ha of SSSI habitat, which is not considered to form part of the site's notified special interest features because it comprises road verge containing scrub, semi-mature trees and ruderal species.
- 8.3.13 The loss of SSSI habitat will be compensated for by creation of calcareous grassland (the qualifying habitat of the SSSI) within and adjacent to the SSSI, in excess of the area lost. This area of compensation would be part of a larger area of replacement Common Land as shown on ES Figure 12.4 Special category land (Document Reference 6.3), totalling approximately 10,534m² (1.053ha) and comprising the existing A417 carriageway and areas of existing verge habitat, both trees and grassland, to be retained. The area of Common Land replacement includes compensation for loss of SSSI habitat through the conversion of approximately 3,600m² (0.36ha) of hardstanding to calcareous grassland.

Approximately 1,000 m² (0.1ha) of this hardstanding is already within the SSSI boundary, therefore the compensation will result in a net increase the area of calcareous grassland within the existing SSSI boundary and provide additional adjacent habitat.

- 8.3.14 The residual effect of the adverse impacts of habitat loss within the SSSI during the construction phase is considered to be adverse and significant. The creation of calcareous grassland habitat within an adjacent to the SSSI is considered to be beneficial and significant. It is considered that the benefits of the creation of 0.36ha of calcareous grassland, including 0.1ha within the SSSI, would outweigh the unavoidable permanent loss of 0.056ha of habitat for which the SSSI is designated.
- 8.3.15 The widening of the A417 in the area to the south of Crickley Hill also leads to increased fragmentation between the two SSSI units (Crickley Hill to the North and Barrow Wake to the south). In order to seek to mitigate this fragmentation, Highways England have engaged with relevant stakeholders including Natural England, GWT, and NT through the scheme design process. The engagement has focussed on the function of the proposed Gloucestershire Way crossing in providing connectivity across the scheme and input from stakeholder groups has been invaluable in the design of habitat patches, or 'stepping stones', either side of the crossing which seek to counteract the impacts of increased fragmentation by providing new functionally connected areas of similar habitat that would enable populations of plants and invertebrates associated with the SSSI to disperse and expand their distribution. ES Chapter 8 Biodiversity (Document Reference 6.2) concludes that with mitigation, increased habitat fragmentation would represent a negligible adverse impact upon Crickley Hill and Barrow Wake SSSI.
- 8.3.16 Impacts from recreational pressure, pollution and changes in nitrogen deposition are assessed for the operational phase of the scheme. In summary, an increase in recreational pressure at Crickley Hill and Barrow Wake SSSI results in a minor adverse impact from habitat degradation due to the improved PRow network including the Cotswold Way crossing and Air Balloon Way, the residual effect is considered not significant. Protection measures will be implemented during the construction phase to protect SSSI habitat adjacent to the scheme and educational and interpretation boards will be installed on new PRow educate the public regarding the biodiversity of the site and the sensitivity of the SSSI habitats.
- 8.3.17 In addition, during the operational phase of the scheme, there would be a minor beneficial impact at Crickley Hill and Barrow Wake SSSI due to a reduction in nitrogen deposition from vehicle emissions as the new A417 is further to the east. The residual beneficial effect is considered not significant.
- 8.3.18 In summary, the benefits of the proposed calcareous grassland creation are considered to outweigh the impacts that will occur due to the unavoidable loss of a small area of the SSSI unit at Barrow Wake. In addition, the scheme would lead to wider beneficial effects on the SSSI due to a reduction in nitrogen deposition from vehicle emissions with the scheme moving the A417 further away from the SSSI. The scheme is therefore considered to be compliant with the requirements within paragraphs 5.28 and 5.29 of the NPSNN.

Regional and Local Sites

- 8.3.19 Paragraph 5.31 of the NPSNN states that the SoS should give 'due consideration' to regional or local designations, given their role in meeting overall national biodiversity targets and contributing to quality of life, community wellbeing, research and education. However, the SoS is directed that such designations should not in themselves be used to refuse development consent given the need for new infrastructure.
- 8.3.20 There are 14 non-statutory sites and four potential non-statutory sites within the 1.2 mile (2 kilometre) study area which have been assessed within ES Chapter 8 Biodiversity (Document Reference 6.2). Crickley Hill and Barrow Wake LWRs are components of the SSSI discussed above. Many of the LWS are ancient woodland sites and through design of the scheme there will be no habitat loss within any ancient woodland (see section below on Irreplaceable habitat).
- 8.3.21 There is no land take and no observable impacts in any other regional or local non-statutory site during the construction phase or operational phase except at Haroldstone Field potential LWS. Soil pinning for slope stabilisation may be required but this will not be confirmed until either detailed design or during construction.
- 8.3.22 If required, the permanent loss of approximately 0.25ha of predominantly coniferous tree planting and some broadleaved trees adjacent to the A417 is assumed, resulting in a minor adverse impact from habitat loss during the construction phase of the scheme. The residual adverse effect is considered not significant.
- 8.3.23 In summary, the assessment has had due regard to regional and local designations with no significant effects anticipated as a result of the construction or operation of the scheme.

Irreplaceable habitats including ancient woodland and veteran trees

- 8.3.24 Paragraph 5.32 of the NPSNN directs that the SoS should not grant development consent for any development that would result in the loss or deterioration of irreplaceable habitats including ancient woodland and the loss of aged or veteran trees found outside ancient woodland, unless the national need for and benefits of the development, in that location, clearly outweigh the loss.
- 8.3.25 It states that the loss of aged or veteran trees outside of ancient woodland should also be avoided. Where such trees would be affected by a scheme, the Applicant is required to set out conservation proposals or identify the reasons for any unavoidable loss.
- 8.3.26 Ullen Wood LWS and ancient woodland is adjacent to the scheme. The scheme and associated works such as the location of compounds have been designed to avoid habitat loss or the degradation of ancient woodland during the construction phase of the scheme through embedded design measures and the use of buffer zones.
- 8.3.27 Every effort has been made to retain veteran trees throughout the design process. Veteran trees that can be retained would be protected using methods in accordance with the British Standards BS 2837:2012 to include fencing of root protection areas, and applying protective buffer zones in accordance with Natural England Guidance. Of 21 broadleaved veteran trees (of which only one is

considered ancient) within or adjacent to the scheme, three veteran trees are unavoidably lost due to their location directly beneath the scheme alignment. As partial compensation for the loss of veteran trees, young trees of the same species as those to be lost will be planted as standard trees within a meadow south of Ullen Wood, which is in close proximity to the veteran trees to be lost. This loss of irreplaceable habitat is considered to be adverse and significant.

- 8.3.28 In addition to the direct impacts described above, which have been avoided or minimised as much as possible through design and mitigation, air quality modelling undertaken as part of the EIA shows an increase in nitrogen deposition upon irreplaceable habitats during operation, associated with increases in forecast traffic on the A417.
- 8.3.29 When considered within ES Chapter 8 Biodiversity (Document Reference 6.2) the effect of nitrogen deposition on areas of Ullen Wood closest to the scheme and a single veteran beech tree in the south of the scheme are reported as significant adverse effects. These impacts would not result in the loss of irreplaceable habitat, and even in the absence of the scheme the level of nitrogen deposition on these features would be at triple the amount at which significant degradation of the habitat is predicted. Nonetheless, following the precautionary assessment methodology within DMRB LA 105 the predicted increase in nitrogen deposition arising from the scheme is of an amount (>0.4kg N/ha/yr) considered to lead to permanent degradation of the ancient woodland through a reduction in species richness and/or changes in species composition. Permanent degradation to the condition of the veteran tree is predicted on the same basis.
- 8.3.30 There are no feasible mitigation measures to directly reduce nitrogen deposition impacts from the scheme on Ullen Wood ancient woodland. Native broadleaved woodland habitat will be planted to compensate for the predicted degradation of 2.1ha of ancient woodland. The landscape design includes a buffer of woodland and scrub planting to the south-west of Ullen Wood, as shown in ES Figure 7.11 Environmental Masterplan (Document Reference 6.3). This buffer has been designed to include a minimum of 2.1ha of compensatory woodland creation in a location where the predicted change in nitrogen deposition is below the 0.4kg N/ha/yr threshold for habitat degradation.
- 8.3.31 As an additional enhancement to Ullen Wood, the Applicant is committed to seeking opportunities to expand an existing woodland restoration project across parts of the woodland that has in recent years been funded by the Forestry Commission and supported by CCB. The aim would be to expand this project to additional areas of woodland to alleviate existing threats and pressures, in order to improve the overall conservation status of the ancient woodland. Further details are described below in paragraph 8.5.6.
- 8.3.32 With regard to the veteran beech tree, mitigation is proposed to reduce existing threats and pressures acting upon this individual tree to benefit its health, by reducing risks of future structural failure, moderating competition from adjacent woody vegetation, and reducing risk of damage from farming operations and browsing animals. These mitigation measures will improve the health and condition of the veteran tree and counteract the impact of degradation to some degree, but they will not directly reduce the amount of nitrogen deposition. As the effectiveness of this mitigation is not readily quantifiable, a significant adverse effect on the veteran tree is concluded on a precautionary basis.

- 8.3.33 In response to the policy requirements of the NPSNN, the Applicant has avoided direct loss of any ancient woodland and avoided loss of the majority of the veteran trees within or adjacent to the scheme. In response to the unavoidable loss of three veteran trees and predicted degradation of ancient woodland and one further veteran tree from nitrogen deposition, the Applicant has undertaken to provide mitigation measures where feasible, and appropriate compensation measures where mitigation is unfeasible. These measures, together with a commitment to explore additional enhancement proposals, will conserve Ullen Wood ancient woodland and the vast majority of the veteran trees within the scheme boundary during the operation of the scheme and into the future.
- 8.3.34 The national need for and benefits of the development are detailed in Section 7.3 (Exceptional circumstances) and Section 7.4 (Compelling reasons, costs and benefits of development in the AONB) of Chapter 7 of this report. It is concluded that the need for and benefits of the scheme outweigh the loss, as such the requirements in paragraph 5.32 of the NPSNN is met by the scheme.

Biodiversity within and around developments

- 8.3.35 Paragraph 5.33 of the NPSNN states that the SoS should have consideration to whether the Applicant has maximised opportunities for building in beneficial biodiversity or geological features as part of good design. Requirements or planning obligations may be used to ensure such features are delivered.
- 8.3.36 The aim of the scheme is to maximise opportunities for biodiversity delivery within the land acquired for the scheme design. The landscape-led approach to this scheme has brought together ecology and landscape specialists with stakeholders from a range of disciplines. This has delivered a balanced landscape design that is appropriate for the landscape character and special qualities of the Cotswolds AONB but also focusses on habitat connectivity and creation of locally distinctive priority habitats to benefit biodiversity and provide species-specific mitigation.
- 8.3.37 The re-purposing of the detrunked section of A417 was identified early in the scheme design as an opportunity to provide additional habitat by creating wider calcareous grassland verges with areas of woodland, scrub and scattered trees adjacent to the new WCH route.
- 8.3.38 As shown in Table 8.1 in the summary below, the landscape design achieves a gain in area of the following priority habitats:
- Lowland mixed deciduous woodland;
 - Lowland calcareous grassland; and
 - Native species-rich hedgerows.
- 8.3.39 Native species of local provenance will be used with some consideration for the use of non-native trees to provide resilience against climate change.
- 8.3.40 Highways England is continuing to investigate further opportunities to achieve additional habitat enhancement or creation with neighbouring landowners and through looking at other off-site measures; see section 8.5 Biodiversity Net Gain of this report for further information.
- 8.3.41 In summary, Highways England, through taking a landscape led approach to scheme design, have maximised opportunity for building beneficial biodiversity features in accordance with paragraph 5.33 of the NPSNN.

Protection of other habitats and species

- 8.3.42 Paragraph 5.34 of the NPSNN acknowledges that a range of legislative provisions exist to provide statutory protection to wildlife species.
- 8.3.43 Paragraph 5.35 of the NPSNN requires that measures are taken to ensure other species and habitats identified as being of principal importance for conservation of biodiversity in England and Wales are protected from the adverse effects of development. This may include the use of requirements or planning obligations where required. It further directs the SoS to refuse consent where harm to the habitats or species and their habitats would result, unless the benefits of the development (including need) clearly outweigh that harm.
- 8.3.44 The following relevant legislation has been considered in survey and mitigation design and assessment with regard to protection of species and habitats of nature conservation importance:
- The Conservation of Habitats and Species Regulations 2017 (the 'Habitat Regulations 2017');
 - The Ramsar Convention on Wetlands 1971;
 - Wildlife and Countryside Act (WCA) 1981;
 - Natural Environment and Rural Communities (NERC) Act 2006;
 - Protection of Badgers Act 1992;
 - The Eels (England and Wales) Regulations 2009;
 - Salmon and Freshwater Fisheries Act 1975.
 - The Water Environment (Water Framework Directive) (WFD) (England and Wales) Regulations 2017; and
 - The Hedgerows Regulations 1997.
- 8.3.45 As set out in the Consents and Agreements Position Statement (Document Reference 7.2) a bat mitigation licence, badger development licence and Roman snail conservation licence will be obtained from Natural England to enable construction works to proceed that would otherwise result in an offence. A license may also be required for great crested newt and should a requirement be identified in advance of construction; a license would be obtained from Natural England.
- 8.3.46 Where protected species licences are not required, for example with regard to section 41 of the Natural Environment and Rural Communities Act 2006, Species of Principal Importance (SPI), nesting birds or widespread reptile species, sensitive timing of works, precautionary methods of working written and overseen by an ecological clerk of works and best practice methods will be implemented to reduce the risk of injury or mortality to these species. Such methods are captured in the REAC, contained within ES Appendix 2.1 EMP and Annex D Landscape and Ecological Management Plan (LEMP) (Document Reference 6.4) through which these measures will be secured.
- 8.3.47 The licenses and measures described are considered sufficient to protect other habitats and species identified through assessment work, in accordance with paragraph 5.35 of the NPSNN.

8.4 Measures to conserve biodiversity and geological conservation interests

- 8.4.1 Paragraphs 5.36 to 5.38 of the NPSNN set out the policy expectations for mitigation measures relating to biodiversity and ecological conservation.
- 8.4.2 Paragraph 5.36 states that appropriate mitigation measures should be an integral part of the scheme and it should be demonstrated:
- where and how such measures would be secured;
 - how activities will be confined to the minimum areas required for the works during construction;
 - how best practice will be followed to ensure risks of disturbance or damage to species or habitats is minimised (including as a consequence of transport access arrangements), during both construction and operation;
 - that habitats will be restored after construction works have finished, where practicable;
 - that developments will be designed and landscaped to provide green corridors and minimise habitat fragmentation where reasonable; and
 - that opportunities will be taken to enhance existing habitats and, where practicable, to create new habitats of value within the site landscaping proposals (e.g. through 'greening' of existing crossing points, the use of green bridges and habitat improvement of the verges).
- 8.4.3 In paragraphs 5.37 and 5.38, the SoS is directed to consider appropriate requirements and/or planning obligations to ensure delivery of such mitigation measures, and to take account of agreements between the Applicant and Natural England, including whether Natural England intends to grant or refuse relevant licenses.
- 8.4.4 With regard to paragraph 5.36, appropriate mitigation measures have been developed throughout the scheme design and are based on ecological survey data collected between 2017 and 2020. The design of certain mitigation such as the Gloucestershire Way Crossing and habitat stepping-stones has involved extensive consultation with the relevant environmental stakeholders. Mitigation measures and best practice measures to ensure impacts to species or habitats are minimised are identified in the REAC, contained within ES Appendix 2.1 EMP and Annex D LEMP (Document Reference 6.4) through which these measures will be secured.
- 8.4.5 Restrictions on the scheme's Limits of Deviation (LoD) have been set to limit the extent to which proposed works can deviate from the plan in areas of ecological sensitivity. Protection measures in the form of fencing will be implemented, as detailed in within ES Appendix 2.1 EMP (Document Reference 6.4), where works occur in proximity to sensitive habitats to be retained such as Ullen Wood ancient woodland, veteran trees and calcareous grassland. The use of a clerk of works during construction will ensure this is implemented.
- 8.4.6 Landscape design incorporating ecological mitigation is detailed on ES Figure 7.11 Environment Masterplan (Document Reference 6.3). This has been developed in consultation with relevant environmental stakeholders and in broad alignment with the Wildlife Trust Nature Recovery Network plans. Mitigation measures include hedgerows across the greened Gloucestershire Way crossing and two smaller overbridges with hedgerows to maintain habitat connectivity for species, especially bats.

- 8.4.7 With regard to paragraphs 5.37 and 5.38, mitigation relating to protected species for bats, badgers and Roman Snails will be delivered in accordance with the relevant Natural England licences, as set out within the Consents and Agreements Position Statement submitted in support of the application (Document Reference 7.2) and committed to through ES Appendix 2.1 EMP (Document Reference 6.4). Draft licences will be submitted to Natural England during the DCO process with letters of no impediment sought prior to the conclusion of the Examination. Licences will then be finalised based on data collected during pre-construction surveys.

8.5 Measures to enhance biodiversity and geological conservation interests

- 8.5.1 Paragraphs 5.23, 5.33 and 5.36 of the NPSNN set out the policy expectations for enhancement measures relating to biodiversity, which require the Applicant to maximise opportunities to enhance biodiversity interests and deliver beneficial features in and around developments. The enhancement opportunities that will be provided for this scheme are described below. The measures are shown within ES Figure 7.11 Environmental Masterplan (Document Reference 6.3) and detailed as part of Annex D LEMP of ES Appendix 2.1 EMP (Document Reference 6.4).
- 8.5.2 The aim of the scheme is to maximise opportunities for biodiversity delivery within the land acquired for the scheme design. The landscape-led approach to this scheme has brought together ecology and landscape specialists with stakeholders from a range of disciplines. This has delivered a balanced landscape design that is appropriate for the landscape character and special qualities of the Cotswolds AONB but also focusses on habitat connectivity and creation of locally distinctive priority habitats to benefit biodiversity and provide species-specific mitigation.
- 8.5.3 The key priority for biodiversity enhancement of the Cotswolds AONB for this scheme that has been established through extensive stakeholder consultation, including Natural England, NT, GWT and CCB, is the restoration and creation of calcareous grassland. This is because this habitat has seen sharp declines from around 40% of the Cotswolds in the 1930s to less than 1.5% today. The landscape design has therefore focussed on maximising the provision of lowland calcareous grassland priority habitat, which aligns with the draft local Nature Recovery Network being produced by the Gloucestershire Local Nature Partnership (led by GWT). As a result, the scheme will deliver 75.41ha of calcareous grassland. Taking account of the 2.53ha of this habitat lost to the scheme, there will be a net gain in area of calcareous grassland priority habitat of 72.88ha. The gain far outweighs the requirements for compensation for the losses of this habitat. This is considered to represent a major benefit to biodiversity interests both within the scheme, and on adjacent land through the enhanced connectivity the network of new grassland will provide.
- 8.5.4 Furthermore, the extensive network of restored and created calcareous grassland will include a 25m wide corridor of calcareous grassland across the Gloucestershire Way crossing. This will provide a continuous habitat link for calcareous grassland flora and fauna to disperse through the landscape. This is an enhancement in comparison to the existing A417 which provides no such continuous connectivity of calcareous grassland. Hedgerows on the Gloucestershire Way crossing would be planted on hedge-banks that would be

constructed to provide enhanced connectivity across the scheme for species such as reptiles and invertebrates.

- 8.5.5 The re-purposing of the detrunked section of A417 was identified early in the scheme design as an opportunity to provide additional habitat by creating wider calcareous grassland verges with areas of woodland, scrub and scattered trees adjacent to the new WCH route. The verges of much of the section to be detrunked provide a linear habitat corridor through areas of agricultural land of low ecological value. The removal of traffic and habitat creation from hardstanding along the detrunked section will enhance the biodiversity value of this linear habitat corridor through the landscape.
- 8.5.6 The landscape planting design has maximised opportunities to connect previously isolated areas of woodland such as Emma's Grove, Ullen Wood and other small areas of woodland at Birdlip Radio Station, by planting new woodland and hedgerows. New woodland creation will target the creation of lowland mixed deciduous woodland priority habitat, which is an appropriate habitat type for biodiversity enhancement within the Cotswolds AONB. There will be losses of 12.42ha of semi-natural broadleaved woodland and 3.56ha of broadleaved plantation woodland and creation of 25.57ha of new priority woodland, giving a net gain in the area of native broadleaved woodland within the scheme of 9.59ha.
- 8.5.7 In addition, opportunities to connect and enhance defunct hedgerows have been taken across the scheme. There will be a large net gain in the length of hedgerow of 5.5km, with all new planting comprising native species-rich hedgerows. This habitat provision is considered to exceed the compensation required for the loss of 3.5km of hedgerow and will enhance biodiversity interests once established.
- 8.5.8 Although hazel dormouse has not been recorded on site, tree and hedgerow species utilised by dormice have been included in the planting. In combination with increased habitat connectivity provided by new hedgerows and woodland planting, the area within and adjacent to the scheme will be enhanced for dormice, providing an opportunity for future colonisation.
- 8.5.9 Opportunities will be sought to expand an existing woodland restoration project led by CCB to additional areas of Ullen Wood, with the landowner/s agreement. The aim of conservation-led woodland management measures would be to reduce the impact of typical threats and pressures to ancient woodland that are relevant to Ullen Wood such as browsing by deer, decline in woodland management and increasing levels of shade and non-native species. Enhancement measures such as selective thinning of trees, rotational coppicing of hazel, and erection of deer exclusion fencing would aim to alleviate these pressures and improve the overall conservation status of the ancient woodland by improving woodland structure, creating variation of light conditions in the woodland and increasing diversity of the ground flora.
- 8.5.10 A limited amount of selected scrub and small tree clearance would be undertaken at Emma's Grove, subject to landowner consent, at the location of the Barrows and approach paths to them. This would be primarily a heritage enhancement to enable greater access to and interpretation of a heritage resource, but creation of a glade and enhancement of rides within the woodland would provide variation in light conditions, enhancing the habitat for woodland ground flora and in turn, birds and invertebrates.

- 8.5.11 The existing stone-built bus stop, which would be decommissioned as part of the detrunking and repurposing of the A417, would be retrofitted to form an artificial bat roost in order to increase roosting opportunities in this area. Similarly, bat roosting opportunities would be incorporated into the unlit Crickley Hill bat underpass.
- 8.5.12 Subject to detailed design of the entrance grills, badgers and other wildlife could also use the underpass designed for bats at the western end of the scheme at chainage 1+085. Badger surveys showed a territory to span both sides of [REDACTED] however badgers are thought to use the existing [REDACTED] and therefore the [REDACTED] would provide a safer method of crossing within the existing territory. [REDACTED] underpass would also be suitable to be used by species such as bats, badger, fox and deer. These measures would enhance the permeability of the scheme for such species in comparison with the existing A417.
- 8.5.13 It is considered the scheme is compliant with Paragraphs 5.23, 5.33 and 5.36 of the NPSNN.

Biodiversity Net Gain

- 8.5.14 Paragraph 5.20 of the NPSNN does refer to the Government vision of 'moving progressively from net biodiversity loss to net gain', as set out in the Natural Environment White Paper at the time of the NPSNN's publication in 2014. This vision is reflected in the subsequent publication of the recent 25 Year Environmental Plan (2018) and the draft Environment Bill, both of which seek to secure biodiversity net gain in new development.
- 8.5.15 Highways England has adopted a corporate target of no net loss of biodiversity across its activities by 2025, progressing towards delivering a net gain in biodiversity by 2040. This target applies at a national / programme level, in which some projects will result in a loss and others in a gain; therefore, the focus for the scheme is on maximising biodiversity delivery within the land acquired for the scheme design.
- 8.5.16 The scheme has sought to maximise biodiversity delivery through its design, taking advantage of all opportunities to enhance biodiversity value within the land to be acquired for the scheme (DCO Boundary/order limits) as detailed in the ES Figure 7.11 Environmental Masterplan (Document Reference 6.3). Habitat creation has focussed on the priority habitats that are appropriate to the Cotswolds AONB: lowland mixed deciduous woodland, lowland limestone (calcareous) grassland and native species-rich hedgerows, to deliver gains in area of these habitats, and improve connectivity of habitats to the wider landscape for the benefit of wildlife.
- 8.5.17 Highways England has worked collaboratively with Natural England and other environmental bodies to consider the evolving DEFRA Biodiversity Metric 2.0 tool. This currently scores the scheme at a loss partly due to the way that high-distinctiveness habitats are rewarded in the calculations.
- 8.5.18 Highways England has reached agreement with stakeholders, including Natural England, that it is correct to focus on providing locally appropriate priority habitats, which are in keeping with the special qualities of the Cotswolds AONB, rather than habitat types that score more highly due to taking less time to establish or reach a target condition, but are not appropriate. This is reflected in the

Statements of Common Ground with such stakeholders, summarised in the Statement of Commonality (Document Reference 7.3).

- 8.5.19 Highways England is also investigating further opportunities to achieve biodiversity improvements with neighbouring landowners and through other off-site measures.

8.6 Summary

- 8.6.1 This chapter has demonstrated how the scheme complies with the requirements of the NPSNN in relation to measures to conserve and enhance biodiversity and ecological conservation, through mitigation, compensation and enhancement measures.

- 8.6.2 The table below summarises the gains in priority habitat appropriate to the Cotswolds AONB across the scheme, with further details of all habitats included in ES Chapter 8 Biodiversity (Document Reference 6.2).

Table 8-1 Losses and gains in area of priority habitats

Priority Habitat type	Total habitat type within the DCO Boundary Hectares (ha) and metres (m) for hedgerow	Total habitat type lost as a result of the scheme Hectares (ha) and metres (m) for hedgerow	Total habitat type proposed as part of the scheme Hectares (ha) and metres (m) for hedgerow	Net permanent gain as a result of the scheme Hectares (ha) and metres (m) for hedgerow
Lowland mixed deciduous woodland	20.04ha (plus 6.45ha of broadleaved plantation (non-priority habitat))	12.42ha (plus 3.56ha of broadleaved plantation loss)	25.57ha	9.59ha (taking into account losses of lowland mixed deciduous and broadleaved plantation woodland)
Lowland calcareous grassland	4.94ha	2.53ha	75.41ha	72.88ha
Hedgerow	5,463m	3,473m	9,024m	5,551m

- 8.6.3 The scheme maximises opportunities for building in beneficial biological features in line with NPSNN paragraph 5.33 through delivery of enhancements for species and habitats and creation of new habitats. The large net gain in in area of priority habitats conserves biodiversity as required by NPSNN paragraph 5.23 and enhances particular habitats in line with paragraph 5.23.

- 8.6.4 The scheme has been designed, as far as possible, to avoid and minimise impacts and effects on ecological features through the process of design-development (refer to the Design Summary Report, Document Reference 7.7). The scheme would deliver net permanent gain in area of priority habitat types and has carefully considered mitigation and compensation measures to ensure they are effective and themselves do not lead to significant adverse effects (e.g. through planting that is appropriate to the landscape character). In line with NPSNN requirements, the benefits of the scheme are considered to outweigh any harm to biodiversity.

9 Special Category Land

9.1 Overview

- 9.1.1 The scheme includes the development and acquisition of special category land, including:
- Land forming part of a Common;
 - Open Access Land; and
 - Land owned by the National Trust.
- 9.1.2 These areas are shown on the Special Category Land Plans (Document Reference 2.3), described further in the Statement of Reasons (Document Reference 4.1) and Part 5 of the Book of Reference (Document Reference 4.3).
- 9.1.3 This Chapter considers the potential impact on special category land as a result of the scheme and how the scheme, including proposals for replacement land align with the NPSNN policy requirements.

9.2 Requirements of the Act and the NPSNN

Planning Act 2008

- 9.2.1 The Act enables an Applicant to include the permanent compulsory acquisition of land and rights over any special category land required for the construction, operation and mitigation of a project as part of the application for development consent.
- 9.2.2 Any compulsory acquisition of land or rights over special category land may be subject to Special Parliamentary Procedures (SPP) unless the tests in sections 130 (in respect of National Trust land), 131 (for permanent acquisition) and 132 (the acquisition of permanent rights) of the Act are met. The tests are different depending on the type of special category land and whether it is the land or rights which are being acquired. The relevant tests and how these are met are set out in the Statement of Reasons (Document Reference 4.1). This Chapter focusses on the elements of the Act which are also key policy tests through the NPSNN.

NPSNN policy

- 9.2.3 Paragraph 5.166 of the NPSNN states that ‘existing open space, sports and recreational buildings and land should not be developed unless the land is surplus to requirements or the loss would be replaced by equivalent or better provision in terms of quantity and quality in a suitable location’.
- 9.2.4 Furthermore, Paragraph 5.174 outlines that the SoS should not grant consent for development on existing open space, sports and recreational buildings and land, including playing fields, unless an assessment has been undertaken either by the local authority or independently, which has shown the open space or the buildings and land to be surplus to requirements, or the SoS determines that the benefits of the project (including need) outweigh the potential loss of such facilities, taking into account any positive proposals made by the Applicant to provide new, improved or compensatory land or facilities.
- 9.2.5 When considering exchange land as mitigation, Paragraph 5.181 outlines that ‘any exchange land should be at least as good in terms of size, usefulness, attractiveness, quality and accessibility. In addition, where Sections 131 and 132

of the Planning Act 2008 apply, any replacement land provided under those sections will need to conform to the requirements of those sections’.

9.2.6 The requirements of these sections of the Act are as follows:

Section 131 (in respect of compulsory acquisition of land)

“replacement land” means land which is not less in area than the order land and which is no less advantageous to the persons, if any, entitled to rights of common or other rights, and to the public”

Section 132 (in respect of compulsory acquisition of rights over land)

“replacement land” means land which will be adequate to compensate the following persons for the disadvantages which result from the compulsory acquisition of the order right—

a) the persons in whom the order land is vested,

b) the persons, if any, entitled to rights of common or other rights over the order land, and

c) the public.

9.2.7 Paragraph 5.184 of the NPSNN recognises that public rights of way, National Trails, and other rights of access to land (e.g. open access land) are important recreational facilities for walkers, cyclists and equestrians. This paragraph advises that applicants are expected to take appropriate mitigation measures to address adverse effects on coastal access, National Trails, other public rights of way and open access land and, where appropriate, to consider what opportunities there may be to improve access.

9.3 Compliance with NPSNN policy

9.3.1 As set out above, the scheme requires a number of areas of special category land to enable the construction and operation of the scheme. The requirements are summarised in Table 9-1 below.

Table 9-1 Special Category Land required for the scheme

Special Category Land	Amount Required by the Scheme	
	Square Meters	Hectares
Common Land	6,576.2	0.66
Open Space (Open Access Land)	44,795 (including the 6,576 of Common Land)	4.48 (including the 0.66Ha of Common Land)
Open Space (Country Park)	1,435.6	0.14

9.3.2 Open Access Land falls within the definition of Open Space by virtue of it being land that is used for the purposes of public recreation on foot only. The Open Access Land required for the scheme is considered to benefit from such designation by virtue of its nature as open countryside and provides informal access for the public. Many areas of the land are not known to be regularly used for the purposes of recreation and whilst the scheme therefore seeks to remove minor areas of Open Access Land, proposals as a whole, seek to improve WCH access and connectivity across the A417 and within the surrounding areas.

9.3.3 The response of the scheme to the use of this land is considered in turn below, referencing the key NPSNN policy requirements where relevant.

Country Park and Open Access Land (Open Space)

- 9.3.4 The scheme requires 12,905 square metres of land to be acquired permanently, 21,293 square metres of land to be used temporarily with rights to be acquired permanently for access/maintenance or other purposes, and 6,891 square metres of land to be used temporarily.
- 9.3.5 In accordance with the requirements of both the Act and paragraph 5.181 of the NPSNN, the provision of exchange land for the areas of Open Space required for the scheme has been considered in detail through the Statement of Reasons and its associated Appendix D (Document Reference 4.1).
- 9.3.6 Having considered the areas of Open Space required, the reason for their inclusion within the scheme, and the situation following acquisition, the Statement of Reasons (Document Reference 4.1) concludes as follows.
- 9.3.7 In respect of land to be acquired permanently, all of the Open Space land (Open Access Land and Country Park) is required in relation to widening or drainage works of an existing highway and it is not necessary to provide replacement land given that post completion of the scheme, the land will be in the ownership of Highways England and will be within the highway boundary, which means the public will have the right to pass and repass over the land. In addition, some of the land required is not currently easily accessible by the public and therefore inclusion of the land within the scheme would not adversely impact on the public interests. Furthermore, the scheme proposes a number of improvements and additions to the WCH network which improve formal public accessibility across and in the vicinity of the scheme.
- 9.3.8 Whilst the scheme therefore proposes removal of some areas of Open Access Land and Country Park, as a whole, the scheme has sought to improve WCH access and connectivity across the A417 and within the surrounding areas. The benefits associated with this improved connectivity and safety for WCH users are considered to outweigh the loss of Open Access Land, particularly given that many areas will remain accessible and the acquisition will not adversely impact on public interests.
- 9.3.9 In respect of the land where permanent rights are required, the nature of the Open Access Land would not be affected by the rights and the ability for the public to access the land following construction would be no different to the current situation. The tests in both paragraphs 5.174 and 5.181 in relation to impact and potential mitigation are therefore met.
- 9.3.10 In respect of land required temporarily, access would be fully reinstated to its current position following construction of the scheme and therefore the tests in both paragraphs 5.174 and 5.181 in relation to impact and potential mitigation are therefore met.
- 9.3.11 On the basis of the above, it is considered that the tests in paragraphs 5.174, 5.181 and 5.184 of the NPSNN are met, with replacement land not necessary in relation to Open Space land to be used for the scheme and appropriate mitigation and enhancement measures to improve access across and in the area surrounding the scheme proposed through Annex F PRoW Management Plan of

ES Appendix 2.1 (Document Reference 6.4) and shown on the Rights of Way and Access Plans (Document Reference 2.5).

Common Land

- 9.3.12 The Common Land affected by the scheme is an area of land known as Barrow Wake near Birdlip and is registered as Common Land parcel CL274.
- 9.3.13 The scheme requires the acquisition of Common Land in the vicinity of Barrow Wake and also to the south of the existing A417 in the vicinity of Crickley Ridge. In total, the scheme requires 3,970 square metres of land to be acquired permanently to facilitate construction of the scheme in these areas.
- 9.3.14 In addition to the land acquired permanently, temporary possession is also sought over a further 2,606 square metres of Common Land. This land is solely to be used for the construction of a dry-stone wall / highway boundary feature on land adjacent to the Common Land. No works are proposed on the Common itself at this location.
- 9.3.15 In response to the requirements of the NPSNN and the legal tests set out within Section 131 of the Act, the scheme identifies an area of replacement land. This is shown on the Special Category Land Plans (Document Reference 2.3) and described further in the Statement of Reasons (Document Reference 4.1). The land proposed as replacement utilises part of the current A417 to be de-trunked as part of the scheme and would provide in the region of 10,540 square metres of replacement Common Land.
- 9.3.16 An assessment of this area of replacement land and others considered as part of the scheme is contained within the Statement of Reasons, Appendix D (Document Reference 4.1).
- 9.3.17 This replacement land is considered to offer the following benefits:
- The land is contiguous with the existing Common Land.
 - The land would be fully accessible because it is contiguous with the existing Common Land and also through proposals to create a new 5m wide public walking, cycling and horse-riding link along the re-purposed A417 which would be separate but run adjacent to the proposed replacement land.
 - As part of the scheme, the land will be formed so that it is of the same character as the existing Common Land, which could potentially lead to the replacement land being established in the future as SSSI quality / designation as on the existing Common Land.
 - The land is currently in the ownership of Highways England and therefore it would not require further, unnecessary acquisition of land.
 - The replacement land would in part return to its former Common Land status, which was previously de-registered to facilitate the construction of the existing A417.
 - The area of replacement land would be circa 10,540 square metres. This is greater in area (6,570 square metres greater) than the existing Common Land which is proposed to be removed / de-registered (3,970 square metres).
- 9.3.18 It is therefore considered that the scheme, through proposals for replacement Common Land complies with the definition contained in Section 131(12) of the Act and Paragraphs 5.174 and 5.181 of the NPSNN as it is greater in area than the land acquired and would be more advantageous to the persons entitled to

rights of common, or to the public, notwithstanding the fact that it could not be provided until after the scheme has been constructed.

Land owned by the National Trust

- 9.3.19 As described in Part 5 of the Book of Reference (Document Reference 4.3) and as shown on the Special Category Land Plans (Document Reference 2.3), should the DCO be made, it would authorise the compulsory acquisition of land held inalienably by the National Trust. This land is Open Space as defined in section 19 of the Acquisition of Land Act 1981, and within section 130 of the Act.
- 9.3.20 The plots owned by the National Trust and affected by the scheme include:
- Plots 2/14, 2/14a and 2/14b – A strip of land to the north of the A417 and to the west of Air Balloon cottages. This land is required to facilitate works to Cold Slad Lane, associated earthworks and drainage works and the establishment of a new private means of access for Air Balloon Cottages.
 - Plot 2/14c – A lozenge of land located to the south east of Air Balloon Cottages and required for works to Cold Slad Lane and the proposed Ullenwood roundabout, and the creation of a layby to be provided for Air Balloon Cottages.
- 9.3.21 All plots of land required for the scheme are subject to two Deeds of Dedication which dedicate the land as highway. These are included in Appendix E of the Statement of Reasons (Document Reference 4.1). Following completion of the works, the land would be within the highway boundary and therefore the public would have the right to pass and repass over the land. The land is not known to be currently used for the purposes of recreation and the interests of the public would not therefore be adversely affected by the inclusion of the land in the scheme.
- 9.3.22 The Applicant has been engaged in discussions with the National Trust since 2016 and has shared information in relation to the areas to be acquired, working with the National Trust to refine areas where possible. On the basis that no land is required outside of the plots which form part of the two Deeds of Dedication, the National Trust has agreed in principle to the acquisition of this land for the scheme and Highways England do not therefore anticipate an objection which would trigger SPP.

9.4 Summary

- 9.4.1 The potential impact of the scheme on Special Category Land has been considered against the key tests within the NPSNN, and where relevant tests set out within the Act.
- 9.4.2 Given the nature of the Open Space land affected by the scheme, with the land being designated Open Access Land by virtue of its nature as open countryside, the Applicant does not consider an assessment by the local authority is necessary. In any case, wider proposals to improve WCH accessibility across and in the areas surrounding the scheme are considered to outweigh any impacts on including the Open Access Land within the scheme. Therefore the tests at paragraph 5.174 are met.
- 9.4.3 The requirements of paragraph 5.181 of the NSPNN and those set by the Act in relation to exchange or replacement land have been met through the provision of replacement Common Land in order to mitigate areas of Common Land to be

permanently acquired as part of the scheme. This replacement Common Land meets the tests which are summarised above and considered in detail in the Statement of Reasons Appendix D (Document Reference 4.1).

- 9.4.4 Land in the ownership of the National Trust, which is also Open Space, is subject to the Deeds of Dedication included at Appendix E of the Statement of Reasons (Document Reference 4.1). Following construction of the scheme, the interests of the public in this land would not be adversely affected.
- 9.4.5 More broadly, the scheme, through Annex F PRow Management Plan of the EMP (Document Reference 6.4) has sought to both mitigate impacts on the PRow network but also enhance formal connectivity and accessibility both across the scheme (through the provision of new safe, grade separated crossings), and in the areas surrounding the scheme (through new sections of PRow). These proposals are considered to fully align to the requirements of paragraph 5.184 of the NPSNN.

10 Historic Environment

10.1 Overview

- 10.1.1 The scheme is situated entirely within the Cotswolds AONB. Contributing to its significance and the reason for its designation as an AONB are its special qualities, which includes its *'significant archaeological, prehistoric and historic associations dating back 6,000 years, including Neolithic stone monuments, ancient drove roads, Iron Age forts, Roman villas, ridge and furrow fields, medieval wool churches and country estates and parks'*²³.
- 10.1.2 It is recognised that the scheme is situated within an area of archaeological importance and sensitivity, and that the history and archaeology of the area contributes to the qualities of the AONB. It is therefore an important topic for consideration in the determination of the DCO Application. This chapter provides a detailed consideration of the requirements of Paragraphs 5.120 to 5.142 of the NPSNN, which set out the 'generic impact' of the historic environment. It demonstrates how the scheme complies with the policy requirements.

10.2 Principles of assessment

- 10.2.1 Paragraphs 5.120 to 5.125 of the NPSNN describe the nature of the historic environment and how the significance of heritage assets derives from its setting as well as its physical presence. It is identified that whilst some assets are of a significance that justifies an official designation, the absence of a designation does not necessary indicate a lower significance.
- 10.2.2 Paragraph 5.124 states that non-designated heritage assets of archaeological interest that have, demonstrably, a significance equivalent to a scheduled monument, should be subject to the policies for designated heritage assets. Furthermore, Paragraph 5.125 directs the SoS to consider impacts on other non-designated heritage assets, where it is clearly evidenced that the assets have a significance which merits consideration, even if they are of lesser value than designated heritage assets.
- 10.2.3 Paragraphs 5.126 and 5.127 require that, where a proposed national networks scheme is subject to an EIA, an assessment of any likely significant heritage impacts of the scheme must be carried out and any identified impacts described in the ES. This assessment should:
- describe the significance of any heritage assets, including any contribution made by their setting;
 - provide a level of detail proportionate to the asset's importance; no more than is sufficient to understand the potential impact of the scheme on their significance;
 - consult the relevant Historic Environment Record (HER);
 - assess the heritage assets using appropriate expertise; and
 - include an appropriate desk based assessment and (where necessary) a field evaluation if the scheme site includes or has potential to include heritage assets with archaeological interest.

²³Cotswolds AONB Management Plan 2018-2023 <https://www.cotswoldsaonb.org.uk/wp-content/uploads/2018/12/Management-Plan-2018-23.pdf>

- 10.2.4 ES Chapter 6 Cultural Heritage (Document Reference 6.2) details the assessment undertaken by Highways England relating to heritage impacts of the scheme. Whilst only one designated heritage resource is within the DCO Boundary of the scheme – a scheduled monument known as Emma’s Grove – there are numerous designated heritage resources within 1km of the scheme (the study area of the assessment) including 9 Scheduled Monuments, 50 Listed Buildings, a Registered Park and Garden (RPG) and 2 Conservation Areas. In addition are 256 non-designated heritage resources within the 1km study area, of which 116 are within the DCO Boundary.
- 10.2.5 ES Chapter 6 sets out that identification of these heritage assets has been informed by the Gloucestershire Historic Environment Record (HER), non-intrusive archaeological investigations, walkover surveys, aerial photography and archaeological evaluation through a programme of trial trenching.
- 10.2.6 The significance of the identified heritage assets is described in ES Appendices 6.1 to 6.4 (Document Reference 6.4). This includes a description of any contribution made by the setting of heritage assets and is provided at a level of detail which is proportionate to the asset’s importance.
- 10.2.7 As identified in ES Appendix 1.2 (Document Reference 6.4), the assessment of heritage assets reported in ES Chapter 6 has been undertaken by a competent expert.
- 10.2.8 It is therefore considered that the requirements of Paragraphs 5.126 and 5.127 of the NPSNN are met.

10.3 Principles of decision-making

- 10.3.1 Paragraphs 5.128 to 5.130 of the NPSNN provide direction to the SoS in decision-making when considering the effects of a proposed scheme on the historic environment and heritage assets.
- 10.3.2 Paragraphs 5.128 to 5.130 state that the SoS should take into account:
- available evidence and any necessary expertise;
 - the particular nature of the significance of a heritage asset and the value for current and future generations;
 - the desirability of sustaining and enhancing (where appropriate) the significance of heritage assets and the positive contribution their conservation can make to sustainable communities, including economic vitality; and
 - the desirability of the new development in making a positive contribution to the character and local distinctiveness of the historic environment; this consideration of design should include scale, height, massing, alignment, use and landscaping.
- 10.3.3 As set out above, ES Chapter 6 Cultural Heritage (Document Reference 6.2) provides a description of the significance of identified heritage assets within the DCO Boundary and within 1km of the scheme. Highways England has engaged with relevant experts, including Historic England and the county archaeologist at Gloucestershire County Council in carrying out the assessment reported in the ES. As well as formal statutory consultation described in the Consultation Report (Document Reference 5.1), this has also included technical meetings and other non-statutory engagement, as reflected in the Statement of Common Ground with

Historic England and the Statement of Common Ground with the Joint Councils (see Statement of Commonality, Document Reference 7.3).

- 10.3.4 Reflecting the location of the scheme within the Cotswolds AONB, Highways England has taken a landscape-led approach to the design of the scheme, in which conserving the special qualities of the AONB landscape – including those relating to its historic features – has been the primary consideration in designing the scheme. This is set out in the Design Summary Report (Document Reference 7.7) and demonstrates how the scheme would contribute and respond to the character and local distinctiveness of the area.

10.4 Effects on heritage assets

- 10.4.1 Paragraphs 5.131 to 5.138 of the NPSNN provide direction to the SoS in attributing weight to heritage assets in the decision-making process and considering harm to or loss of designated heritage assets.
- 10.4.2 Paragraph 5.131 states that great weight should be attributed to the conservation of a designated heritage asset, with the level of weight reflecting the importance of the asset. It identifies that the significance of an asset can be harmed or lost through both alteration or destruction of the asset itself, or development within its setting. As such, harm or loss to a designated heritage asset requires clear and convincing justification, and substantial harm to or loss of a Grade II Listed Building or Grade II RPG should be exceptional. Substantial harm to or loss of designated assets of the highest significance should be wholly exceptional; this includes World Heritage Sites, Scheduled Monuments, Grade I and II* Listed Buildings and RPGs, and Registered Battlefields.
- 10.4.3 Paragraph 5.132 states that any harm to the significance of a designated heritage asset should be weighed against the public benefits of development; such justification will need to reflect the significance of the asset.
- 10.4.4 Paragraph 5.133 directs the SoS to refuse consent for a scheme where it will lead to substantial harm to or total loss of significance of a designated heritage asset, unless it can be demonstrated that such harm or loss is necessary to deliver substantial public benefits which outweigh the harm or loss. Alternatively, the Applicant may demonstrate that: the heritage asset prevents all reasonable uses of a site; viable use or conservation is demonstrably not possible; and that the harm or loss is outweighed through bringing the site back into use.
- 10.4.5 Paragraph 5.134 states that where a scheme will lead to less than substantial harm to the significance of a heritage asset, this harm should be weight against the public benefits of the scheme, which includes securing optimum viable use.
- 10.4.6 Paragraph 5.137 advises Applicants to seek opportunities through development to enhance the setting of heritage assets or better reveal their significance. It directs that proposals which preserve the elements of a setting which positively contribute to the significance of a heritage asset should be treated favourably by the SoS.
- 10.4.7 As reported in ES Chapter 6 Cultural Heritage (Document Reference 6.2), the construction of the scheme would result in significant adverse effects to two designated heritage assets: Emma's Grove Scheduled Monument and Grade II Listed Shab Hill Barn. Both of these effects arise from the impact of the scheme on the setting of heritage assets (there is no direct impact on either asset).

- 10.4.8 Construction of the scheme would also result in the removal or partial removal of 11 non-designated heritage resources, including earthwork remains, part of the Ermin Way Roman road, World War II anti-aircraft batteries and the Air Balloon Public House. The assessment reported in ES Chapter 6 concludes that the effect is not considered significant given the low or medium value of the resources affected and the proposed mitigation of preservation by record.
- 10.4.9 All other effects during construction of the scheme would be slight adverse or neutral and would therefore not constitute a significant effect.
- 10.4.10 The operation of the scheme would result in a significant adverse effect to Shab Hill Barn. This effect is the result of increased traffic noise on the setting of the asset.
- 10.4.11 Emma's Grove Scheduled Monument would experience a slight beneficial effect due to the reduction in traffic noise within its setting, however this would not be a significant enhancement to its value.
- 10.4.12 Section 6.9 of ES Chapter 6 Cultural Heritage (Document Reference 6.2) also identifies that the scheme would result in the following enhancements to the historic environment:
- The removal of vegetation from the Barrows at Emma's Grove Scheduled Monument would enhance their interpretation and enable them to be removed from the Historic England Heritage at Risk Register.
 - The improvements to the Cotswold Way National Trail and Gloucestershire Way footpath would enable greater permeability within the landscape. This would allow greater access to and understanding of heritage resources by members of the public – between Emma's Grove, Barrow Wake and Crickley Hill heritage assets.
 - Interpretation boards would be provided as part of the scheme, adjacent to the Cotswold Way crossing.
- 10.4.13 In summary, the construction and operation of the scheme would not result in the total or partial loss of any designated heritage asset. However, it would result in significant adverse effects to the setting of two designated heritage assets, one of which would experience both construction and operational effects. In addition, the scheme would result in the total or partial loss of a number of non-designated heritage assets during construction.
- 10.4.14 Highways England has made efforts during the design process to avoid effects to the historic environment and to seek to identify opportunities for enhancement, as characterised by the landscape-led design approach to the scheme, detailed in the Design Summary Report (Document Reference 7.7). However, it is acknowledged that the resulting harm to the setting of a Grade II Listed Building and the setting of a Scheduled Monument requires a clear and convincing justification in accordance with the NPSNN. It is considered that the harm to these designated heritage assets is justified and substantially outweighed by benefits to the public that the scheme would deliver.
- 10.4.15 The need for an intervention of this section of the A417 is clearly set out in section 7.3 (exceptional circumstances) of this report, which demonstrates how the road as existing results in an above average number of road fatalities and casualties and suffers from congestion and journey delays, both of which impact harmfully on local communities and the wider economy. Section 7.4 (compelling reasons) of

this report identifies how the scheme would deliver substantial public benefits by addressing the existing issues with road capacity and safety, whilst also delivering substantial benefits through the landscape-led design of the scheme, which include (but are not limited to) habitat creation, improved access and experience for users of PRow, reduced rat running through local communities and substantial economic benefits supporting strategic growth and housing development in the wider area.

- 10.4.16 Beyond the wider benefits of the scheme, it must be recognised that it would also deliver enhancements relating to the historic environment of the area, which would enable members of the public improved access and understanding of the local heritage assets and the special qualities of the Cotswolds AONB.
- 10.4.17 In demonstrating that the scheme would provide substantial public benefits which outweigh the likely harm to two designated heritage assets, it is considered that the scheme complies with the policy contained in the NPSNN.

10.5 Recording

- 10.5.1 Paragraph 5.139 of the NPSNN establishes that the ability to record evidence of a heritage asset should not be a factor in deciding whether consent should be given, as a record of the past is not as valuable as retaining the asset itself.
- 10.5.2 Paragraph 5.140 directs that where the partial or total loss of a heritage asset's significance is justified, the SoS should require the Applicant to record and advance understanding of the asset's significance prior to being lost. This requirement should be proportionate to the impact of the scheme and importance of the asset, and should require the Applicant to deposit copies of the record with the relevant HER and local museum or other public depository. Paragraph 5.141 adds that the SoS may also require that such recording is undertaken and completed in a timely manner in accordance with a written scheme of investigation agreed with the Local Authority and Historic England.
- 10.5.3 Paragraph 5.142 states that where there is a high probability of undiscovered heritage assets with archaeological interest, the SoS should consider requirements to ensure appropriate procedures for the identification and treatment of such assets discovered during construction.
- 10.5.4 Section 6.9 of ES Chapter 6 Cultural Heritage (Document Reference 6.2) identifies how it is proposed that direct impacts (physical damage) to heritage assets would be mitigated through recording.
- 10.5.5 It states that archaeological remains would undergo 'preservation by record' in which archaeological remains would be investigated prior to construction, artefacts would be analysed, and the results published following the construction of the scheme. The approach taken would vary depending on the significance of the impacted heritage resources and may include detailed archaeological excavation of high value buried archaeological remains; a strip-map-sample where archaeological remains are expected to be present dispersed over a wide area; or an archaeological watching brief in areas of lower archaeological potential. The type and location of mitigation required has been agreed with the GCC Archaeological Officer in Annex C Detailed Archaeological Mitigation Strategy and Overarching WSI of ES Appendix 2.1 EMP (Document Reference 6.4).

- 10.5.6 Annex C of the EMP also sets out recording proposed prior to the demolition of the Air Balloon Public House building, a non-designated heritage asset. This would comprise of a detailed record by photographic and measured survey.
- 10.5.7 The programme of mitigation set out in Annex C of the EMP would be secured by DCO requirement as set out in the draft DCO (Document Reference 3.1). It is considered that the scheme complies with the policy of the NPSNN in relation to recording, with Highways England going beyond the requirements of NPSNN by committing to doing a full measured building survey of a non-designated heritage asset, the Air Balloon public house.

10.6 Summary

- 10.6.1 This Chapter has demonstrated how the scheme complies with the requirements of the NPSNN in relation to the historic environment.

11 National Planning Policy Framework (NPPF) 2019

11.1.1 The NPPF, (first published March 2012, and most recently amended in June 2019), sets out the Government's planning policies for England and how they are expected to be applied. Policies set out in the NPPF are based upon a 'presumption in favour of sustainable development', conveyed through social, environmental and economic policies. To achieve sustainable development, plans and decision need to represent and consider the local context.

11.1 Relevant sections of the NPPF

Section 1 – Introduction

11.1.1 The NPPF does not contain any specific policies relating to NSIPs. Paragraph 5 states that:

“The Framework does not contain specific policies for nationally significant infrastructure projects. These are determined in accordance with the decision-making framework in the Planning Act 2008 (as amended) and relevant national policy statements for major infrastructure, as well as any other matters that are relevant (which may include the National Planning Policy Framework). National policy statements form part of the overall framework of national planning policy, and may be a material consideration in preparing plans and making decisions on planning applications”.

11.1.2 Paragraph 1.17 of the NPSNN states that the overall strategic aims of the NPS and the NPPF are consistent, however, the two documents have differing but equally important roles. Paragraph 1.18 of the NPSNN states that the NPPF is likely to be an important and relevant consideration in decisions on nationally significant infrastructure projects, 'but only to the extent relevant to [the] project'. As a result, this report briefly considers the extent of any such relevance and compliance with NPPF policies.

Section 2 – Achieving sustainable development

11.1.3 Paragraph 7 of the NPPF explains that the role of the planning system is to contribute to the achievement of sustainable development, which is summarised as meeting the needs of the present without compromising the ability of future generations to meet their own needs.

11.1.4 Paragraph 8 of the NPPF states that there are three overarching objectives to achieving sustainable development, which are interdependent and should be pursued in mutually supportive ways. These themes are outlined below:

- *“a) an economic objective – to help build a strong, responsive and competitive economy, by ensuring that sufficient land of the right types is available in the right places and at the right time to support growth, innovation and improved productivity; and by identifying and coordinating the provision of infrastructure;*
- *b) a social objective – to support strong, vibrant and healthy communities, by ensuring that a sufficient number and range of homes can be provided to meet the needs of present and future generations; and by fostering a well-designed and safe built environment, with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being; and*

- *c) an environmental objective – to contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.”*

- 11.1.5 Paragraph 10 explains that there is a ‘presumption in favour of sustainable development’ ‘at the heart of the Framework’, ‘so that sustainable development is pursued in a positive way’.
- 11.1.6 The compelling reasons for the scheme and its overall need are set out in Chapter 7 of this report.
- 11.1.7 Sustainable development is an inherent element of the scheme, the design of which has been developed to deliver, wherever possible, the best balance between maximising benefits and minimising environmental impacts. As set out in chapter 3 of this report, the objectives of the scheme reflect the NPPF’s three overarching objectives for sustainable development; as it seeks to:
- support economic growth through improved infrastructure;
 - support the health and wellbeing of the population through improved the safety on the road and PRow network, and improved quality of life for local communities through reduced rat running;
 - contribute to protecting and enhancing the natural and historic environment through mitigation and enhancement measures incorporated into the landscape-led design

Section 6 – Building a strong, competitive economy

- 11.1.8 This section of the NPPF is clear about the need for economic growth and the role of planning in facilitating this. Paragraph 80 states that:
- “Significant weight should be placed on the need to support economic growth and productivity, taking into account both local business needs and wider opportunities for development.”*
- 11.1.9 As explained in chapter 5 of this report, the scheme is forecast to provide significant wider economic benefits of £140.3 million. The scheme is also forecast to provide substantial overall benefits, with a PVB of £305.8 million. Over the 60-year appraisal period, the scheme achieves total transport economic efficiency benefits, including journey time changes and vehicle operation cost changes, of £255.8 million. Of this the majority is attributable to business trips which constitute £174.0 million of the transport efficiency benefits forecast with the scheme.
- 11.1.10 As outlined in chapter 7 of this report, the benefits of the scheme are recognised by the local authorities in the region who identify the scheme as priority infrastructure needed to support housing development and further economic growth.

Section 8 – Promoting healthy and safe communities

- 11.1.11 This section of the NPPF seeks to achieve healthy, inclusive and safe places. Paragraph 98 states that:
- “Planning policies and decisions should protect and enhance public rights of way and access, including taking opportunities to provide better facilities for users, for*

example by adding links to existing rights of way networks including National Trails.”

- 11.1.12 A summary of how the scheme protects and enhances PRow is provided in section 6.3 of this report. It identifies that, as set out in ES Chapter 12 Population and Human Health (Document Reference 6.2), access to open space and opportunities for active travel would be improved as a result of the scheme. This would bring health benefits to those people who make use of the new and improved assets created, improving the current experience for users of the Cotswold Way National Trail and Gloucestershire Way footpath and creating a new walking, cycling and horse riding facility via the Air Balloon Way which would connect to other routes in the surrounding PRow network.
- 11.1.13 As identified in chapter 4 of this report, the scheme would also provide safety benefits for road users, with a forecast reduction of 66 fewer fatalities and 201 fewer seriously injured casualties. Safety and quality of life for communities in close proximity to the scheme would also be improved, as the scheme would reduce rat-running on local roads and address existing issues associated with strategic road traffic routing through local residential areas to avoid the congested A417.
- 11.1.14 With regards to open space, Paragraph 97(b) advises that ‘loss resulting from the proposed development would be replaced by equivalent or better provision in terms of quantity and quality in a suitable location’.
- 11.1.15 Further detail about how the scheme has responded to open space is set out in chapter 9 Special Category Land, which considers the issue under the NPSNN policies contained in the generic impact of ‘land use, including open space, green infrastructure and Green Belt’, which replicates the NPPF policy.

Section 9 – Promoting sustainable transport

- 11.1.16 Section 9 of the NPPF sets out the requirement to consider and promote sustainable transport at the earliest stage of development proposals. Paragraph 102 states that transport proposals should identify opportunities from existing and proposed transport infrastructure, promote walking, cycling and public transport and identify opportunities to avoid and mitigate adverse effects and for environmental net gains.
- 11.1.17 Chapter 7.3 of this report identifies how Highways England had consideration to sustainable transport alternatives to the scheme early in the design development process. Whilst it was ultimately concluded that a road scheme was required to deliver the objectives and requirements of the scheme, Highways England has continued to seek opportunities within the design to promote walking, cycling and horse riding through improved access and facilities. Please refer to section 6.3 of this report which summarises the proposals for the PRow network in the scheme and demonstrates how this would enhance overall connectivity and encourage active travel across the network.
- 11.1.18 In terms of environmental gains, the scheme would improve landscape and ecological connectivity through habitat restoration and creation, including planting of calcareous grassland, hedgerows and woodland. Landscape features such as Cotswold stone walling and crossings of high architectural quality would also be delivered. This would contribute towards the scheme having an identity which reflects, conserves and enhances the character of the local AONB landscape.

Please refer to Chapter 8 of this report for further information on the gains for biodiversity through the scheme and the Design Summary Report (Document Reference 7.7) for further information on the landscape design of the scheme.

Section 12 – Achieving well-designed places

- 11.1.19 Paragraph 124 states that: “Good design is a key aspect of sustainable development, creates better places in which to live and work and helps make development acceptable to communities.”
- 11.1.20 As described in Chapter 3 of this report, the scheme is ‘landscape-led’, which means that landscape is a primary consideration in every design decision that is made. The scheme vision has been to create a landscape-led highways scheme that will deliver a safe and resilient free-flowing road while conserving and enhancing the special character of the Cotswolds AONB; reconnecting landscape and ecology; bringing about landscape, wildlife and heritage benefits, including enhanced residents’ and visitors’ enjoyment of the area; improving quality of life for local communities; and contributing to the health of the economy and local businesses.
- 11.1.21 The Design Summary Report (Document Reference 7.7) demonstrates how the landscape-led vision has been implemented in the scheme’s design and how this meets the requirements for good design with the NPSNN, which are also reflected in the NPPF. Please refer to that document for further information.

Section 14 – Meeting the challenge of climate change, flooding and coastal change

- 11.1.22 Paragraph 148 of the NPPF states that the planning system “... should support the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change.”
- 11.1.23 As set out in ES Chapter 14 Climate (Document Reference 6.2), the scheme has been designed taking into account climate change such that any risks to the proposed infrastructure due to a changing climate have been identified and mitigated for. A greenhouse gas emissions assessment has been undertaken and it is concluded that the scheme would not have a material impact on the ability of Government to meet its carbon reduction targets.
- 11.1.24 In relation to flood risk, ES Appendix 13.3 FRA (Document Reference 6.4) undertaken for the scheme identifies that the scheme is located in Flood Zone 1 and subsequently is at low risk of flooding. The assessment reported in ES Chapter 13 Road Drainage and the Water Environment (Document Reference 6.2) concludes that there are no significant effects of flood risk resulting from the scheme.
- 11.1.25 A detailed assessment of the scheme’s compliance with NPSNN policy on climate change, carbon emissions and flood risk are provided in Chapter 6 of this report.

Section 15 – Conserving and enhancing the natural environment

- 11.1.26 Paragraph 172 states that: “Great weight should be given to conserving and enhancing landscape and scenic beauty in National Parks, the Broads and Areas of Outstanding Natural Beauty, which have the highest status of protection in relation to these issues.” The paragraph outlines that the “scale and extent of development within these designated areas should be limited.”

- 11.1.27 Chapter 9 of this report provides a detailed justification for developing the scheme within an AONB and sets out how its landscape-led design would deliver a scheme of a high environmental standard which seeks to conserve and enhance the special qualities of the AONB.
- 11.1.28 In terms of limiting the scale and extent of development, ES Chapter 3 Assessment of Alternatives (Document Reference 6.2) sets out how Highways England has revised the scheme design through an iterative process to reduce environmental effects, including the reduction of land required for the scheme.
- 11.1.29 The NPPF places particular emphasis on the provision of net gain in terms of the conservation and enhancement of the natural environment (Paragraphs 170, 174 and 175), with requirements for measurable net gains for biodiversity.
- 11.1.30 Paragraph 175 states that, “development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists”.
- 11.1.31 The scheme has sought to maximise biodiversity delivery through its design, taking advantage of all opportunities to enhance biodiversity value within the land to be acquired for the scheme (DCO Boundary/order limits).
- 11.1.32 This is focussed on creation of new priority habitats; woodland, limestone (calcareous) grassland and hedgerows, to deliver gains in area of these habitats, and improve connectivity within the local area. These new and improved habitats would be in keeping with the AONB and have been carefully designed to improve local habitat connectivity and biodiversity, in line with the nature recovery network strategy for the area.
- 11.1.33 As identified in ES Chapter 8 Biodiversity (Document Reference 6.2), the scheme would have an adverse effect on ancient woodland and veteran trees.
- 11.1.34 Please refer to Chapter 8 of this report for a further, detailed assessment of the effects of the scheme on biodiversity. This includes consideration of irreplaceable habitats and the delivery of biodiversity net gain.

Section 16 – Conserving and enhancing the historic environment

- 11.1.35 When considering the impact of a scheme on the significance of a designated heritage asset, paragraph 193 states that: “... great weight should be given to the asset’s conservation (and the more important the asset, the greater the weight should be). This is irrespective of whether any potential harm amounts to substantial harm, total loss or less than substantial harm to its significance.”
- 11.1.36 Chapter 10 of this report demonstrates how the scheme complies with the NPSNN policy requirements relating to the historic environment, which reflect those of the NPPF. In summary, the scheme would not result in the total or partial loss of any designated heritage assets, however it would result in significant adverse effects to two designated heritage assets and the loss or partial loss of a number of non-designated heritage assets. It is concluded that the substantial public benefits of the scheme would outweigh the harm to the designated heritage assets and is therefore justified and compliant with national policy.

11.2 Summary

- 11.2.1 This Chapter has demonstrated that the scheme complies with the relevant policy considerations of the NPPF in so far as they are important and relevant.

12 Local development plans and local transport plans

12.1 Relevant local policy context

12.1.1 Local plans are not the policy basis against which NSIPs are considered but may contain policies which are material to decision making. As a result, this report briefly considers the extent of relevant local plans and any policies of relevance.

Development plans

12.1.2 At the local level, the scheme has been considered against the following adopted development plans:

- Minerals Local Plan for Gloucestershire (2018-2032) (Adopted 2020)
- Gloucestershire County Council Waste Core Strategy (Adopted 2012);
- Gloucestershire County Council Waste Local Plan 2002 - 2012²⁴ Saved Policies (Adopted 2004);
- Gloucestershire County Council Local Transport Plan 2015 – 2031 (Adopted 2017);
- Gloucestershire Highways Biodiversity Guidance (Adopted December 2019)²⁵;
- Cotswolds District Council Local Plan (Adopted 2018);
- Joint Core Strategy (Adopted 2017); and
- Tewkesbury Borough Council Local Plan 2006 – 2011 Saved Policies (Adopted 2006).

12.1.3 Appendix B of the report contains a review of scheme against the local plan policies set out below. Relevant policies from the adopted Local Development Plans include:

Minerals Local Plan for Gloucestershire (2018-2032) (Adopted 2020)

- Policy DM01 – Amenity;
- Policy DM02 – Cumulative Impact;
- Policy DM03 – Transport;
- Policy DM05 – Water Resources;
- Policy DM06 – Biodiversity and Geodiversity;
- Policy DM07 – Soil Resources;
- Policy DM08 – Historic Environment;
- Policy DM09 – Landscape;
- Policy MR01 - Restoration
- Policy MS01 – Non-mineral developments within MSAs;
- Policy MS02 – Safeguarding mineral infrastructure;
- Policy SR01 – Maximising the use of secondary and recycled aggregates;

Gloucestershire County Council Waste Core Strategy (Adopted 2012)

- Policy WCS1 – Presumption in Favour of Sustainable Development;
- Policy WCS2 – Waste Reduction;
- Policy WCS10 – Cumulative Impact;
- Policy WCS12 – Flood Risk;

- Policy WCS14 – Landscape;
- Policy WCS15 – Nature Conservation (Biodiversity and Geodiversity);
- Policy WCS16 – Historic Environment;
- Policy WCS17 – Design; and
- Policy WCS19 – Sustainable Transport.

*Gloucestershire County Council Waste Local Plan 2002 – 2012 Saved Policies
(Adopted 2004)*

- Policy 1 – Best Practicable Environmental Option;
- Policy 2 – Regional Self-Sufficiency;
- Policy 3 – Proximity Principle;
- Policy 6 – Waste Management Facilities for ‘Other’ Sites;
- Policy 21 – Agricultural Improvements;
- Policy 23 – Internationally and Nationally Designated Sites for Nature Conservation;
- Policy 24 – Locally Designated Sites for Nature Conservation;
- Policy 25 – Conservation Outside Designated Sites;
- Policy 26 – Areas of Outstanding Natural Beauty;
- Policy 30 – Listed Buildings and Conservation Areas;
- Policy 31 – Historic Heritage;
- Policy 32 – Agricultural Land;
- Policy 33 – Water Resources: Pollution Control;
- Policy 34 – Water Resources: Flood Control;
- Policy 36 – Waste Minimisation;
- Policy 39 – Transport;
- Policy 40 – Traffic;
- Policy 41 – Public Rights of Way; and
- Policy 43 – After Use.
- Policy 45 – Planning Obligations

Gloucestershire’s Local Transport Plan 2020-2041

- Policy LTP PD 0.1 – Reducing Carbon Emissions and Adapting to Climate Change
- Policy LTP PD 0.2 – Local Environment Protection
- Policy LTP PD 0.3 – Maximising Investment In a Sustainable Transport Network
- Policy LTP PD 0.4 – Integration with Land Use Planning and New Development
- Policy LTP PD 0.5 – Community Health and Wellbeing
- Policy LTP PD 0.6 – ThinkTravel- Influencing Travel Behaviour Change
- Policy LTP PD 2.1 – Gloucestershire’s Cycle Network
- Policy LTP PD 2.2 – Cycle Asset Management
- Policy LTP PD 2.3 – Active Travel: Safety, Awareness and Confidence
- Policy LTP PD 3.1 – Gloucestershire’s Freight Network
- Policy LTP PD 4.1 – Gloucestershire’s Highway Network
- Policy LTP PD 4.2 – Highway Network Resilience
- Policy LTP PD 4.3 – Highway Maintenance
- Policy LTP PD 4.4 – Road Safety
- Policy LTP PD 6.1 – Gloucestershire’s Pedestrian Network

- Policy LTP PD 6.2 – Rights of Way
- Policy LTP PD 6.3 – Pedestrian Asset Management
- Policy LTP PD 6.4 – Pedestrian Safety

Cotswolds District Council Local Plan 2011 – 2031 (Adopted 2018)

- Policy EN1 – Built, Natural and Historic Environment;
- Policy EN2 – Design of the Built and Natural Environment;
- Policy EN4 - The Wider Natural and Historic Landscape;
- Policy EN5 - Cotswolds Area of Outstanding Natural Beauty (AONB);
- Policy EN7 – Trees, Hedgerows and Woodlands;
- Policy EN8 – Biodiversity and Geodiversity: Features, Habitats and Species;
- Policy EN9 - Biodiversity and Geodiversity: Designated Sites;
- Policy EN10 - Historic Environment: Designated Heritage Assets;
- Policy EN12 – Historic Environment: Non-Designated Heritage Assets;
- Policy EN15 – Pollution and Contaminated Land;
- Policy INF3 – Sustainable Transport;
- Policy INF4 – Highway Safety; and
- Policy INF7 – Green Infrastructure.

Gloucester City Council, Cheltenham Borough Council, and Tewkesbury Borough Council – Joint Core Strategy (Adopted 2017)

- Policy SD3 – Sustainable Design and Construction;
- Policy SD6 – Landscape;
- Policy SD7 – The Cotswolds Area of Outstanding Natural Beauty (AONB);
- Policy SD8 – Historic Environment;
- Policy SD9 – Biodiversity and Geodiversity;
- Policy SD14 – Health and Environmental Quality;
- Policy INF1 – Transport Network; and
- Policy INF3 – Green Infrastructure.

Tewkesbury Local Plan 2006 – 2011 Saved Policies (Tewkesbury Borough Council, 2006)

- Policy GNL1 – General Design;
- Policy GNL3 – Architectural Features;
- Policy TPT3 – Pedestrian Networks;
- Policy TPT4 – Footpath and Bridleway Protection in the Implementation of Highways Schemes;
- Policy TPT5 – Cycle Network Enhancements;
- Policy HEN1 – Conservation Areas – General;
- Policy HEN2 – Conservation Areas – Setting and Impact;
- Policy HEN20 – Scheduled Ancient Monuments;
- Policy HEN21 – Archaeological Assessment;
- Policy HEN22 – Archaeological Recordings;
- Policy HEN23 – Management and Interpretation of Archaeological Sites;
- Policy EVT4 – Air Quality;
- Policy LND1 – Areas of Outstanding Natural Beauty (AONB);
- Policy TOR1 – Tourism – General Policy;
- Policy RCN5 – Recreational Rights of Way;

- Policy NCN3 – Protection of Other Sites of Nature Conservation or Geological/Geomorphological Interest; and
- Policy NCN7 – Wildlife Corridors.

12.2 Neighbourhood plans

12.2.1 There are no relevant adopted neighbourhood plans located within the DCO Boundary or in the vicinity of the scheme.

12.3 Emerging policy

12.3.1 The scheme has considered the following emerging planning policy documents against the scheme:

- Tewkesbury Borough Council Local Plan 2011 – 2031 Preferred Options (2018).
- Tewkesbury Borough Plan 2011-2031 (Submission for examination May 2020)

12.4 Planning guidance – Cotswold AONB Management Plan 2018 – 2023

Local policy context

- 12.4.1 CCB has a statutory duty to prepare and review a management plan for the Cotswolds AONB at five-yearly intervals. The Management Plan (published in 2018) sets out the vision, outcomes, ambitions and policies to guide the management of the AONB for the period 2018-2023.
- 12.4.2 While considered a non-statutory planning document, policies and guidance set out in the management plan are reflected in planning policy adopted in the Gloucester, Cheltenham and Tewkesbury Joint Core Strategy (2011-2031) and the CDC Local Plan (2011-2031).
- 12.4.3 The Cotswolds AONB Management Plan outlines a vision that the Cotswolds AONB will be:
- a distinctive, unique and accessible living landscape treasured for its diversity which is recognised by all for its wide-open views, dry stone walls, intimate valleys, flower rich grasslands, ancient woodlands, dark skies, tranquillity, archaeology, historic and cultural heritage and distinctive Cotswold stone architecture; and
 - a thriving, collaborative, pioneering and proactive place, sustained by the passions of residents, visitors and businesses alike, where communities and businesses value its special qualities.
- 12.4.4 The Cotswolds AONB Management Plan outlines three key threats to the AONB which are: the erosion of the natural beauty and special qualities, lack of consistent approach and lack of understanding of the benefits of the Cotswolds AONB.
- 12.4.5 Appendix B contains a review of scheme against the AONB Management Plan policies set out below. Relevant policies include:
- Policy CC2 – Compliance with Section 85 of the Countryside and Rights of Way Act 2000;
 - Policy CC3 – Working in Partnership;

- Policy CC4 – Natural and Cultural Capital and Ecosystems Services – Principles;
- Policy CC7 – Climate Change Mitigation;
- Policy CC8 – Climate Change Adaption;
- Policy CE1 – Landscape;
- Policy CE2 – Geology;
- Policy CE3 – Local Distinctiveness;
- Policy CE4 – Tranquillity;
- Policy CE6 – Historic Environment and Cultural Heritage
- Policy CE7 – Biodiversity
- Policy CE10 – Development and Transport Principles
- Policy CE11 – Major Developments
- Policy CE12 – Development Priorities and Evidence of Need;
- Policy UE2 – Access and Recreation
- Policy UE3 – Health and Wellbeing.

12.4.6 In addition to the AONB's special qualities are CCB's position statements, landscape strategy and guidelines, local distinctiveness and landscape change report and the area's landscape character assessment:

- Cotswolds AONB Landscape Character Assessment;
- Cotswolds AONB Landscape Strategy and Guidelines for LCT 2 Escarpment, LCT 7 High Wold, LCT 8 High Wold Valley, and LCT 18 Settled Unwooded Vale;
- CCB Local Distinctiveness and Landscape Change Report (2005);
- Tranquillity Position Statement (2019);
- Cotswolds Dark Skies & Artificial Light Position Statement (2019);
- Tree Species and Provenance (2017);
- Transport (Revised 2013); and
- Management of Roadside Verges (2015).

12.4.7 All of these documents have helped to steer the design, providing important baseline information and guidance on what design solutions would be acceptable and how best to protect and enhance the important aspects of the AONB. This is set out in further detail within the Design Summary Report (Document Reference 7.7).

12.5 Local planning policy assessment

12.5.1 An assessment of the proposed scheme against adopted and emerging local planning policy documents has been undertaken and is provided in Appendix B of this report.

13 Conclusions

Summary and conclusions

- 13.1.1 Under section 104(3) of the Act, the SoS must decide the DCO Application in accordance with any relevant NPS. The relevant NPS for the scheme is the NPSNN.
- 13.1.2 Paragraph 4.2 of the NPSNN states that there is a presumption in favour of granting development consent for national networks NSIPs that fall within the need for infrastructure established in the NPSNN. This is subject to the detailed policies and protections in the NPSNN, which have been considered in this report.
- 13.1.3 In considering a scheme, and weighing adverse impacts against benefits, Paragraph 4.3 of the NPSNN sets out that the SoS should take into account:
- its potential benefits, including the facilitation of economic development, including job creation, housing and environmental improvement, and any long-term or wider benefits; and
 - its potential adverse impacts, including any longer-term and cumulative adverse impacts, as well as any measures to avoid, reduce or compensate for any adverse impacts.
- 13.1.4 Chapter 2 has detailed the history of the scheme development and options considered over the past twenty years for this section of the A417. It has also outlined the iterative design process, interventions made and integrated into the scheme with the primary purpose to make the scheme fit better into its landscape setting.
- 13.1.5 As set out in Chapter 3 of this report, the integrated project team has worked closely with key stakeholders to develop a scheme specific vision statement, four scheme specific objectives and a number of sub-objectives. Fundamental to this is the scheme vision for:
- “A landscape-led highways improvement scheme that will deliver a safe and resilient free-flowing road whilst conserving and enhancing the special character of the Cotswolds AONB; reconnecting landscape and ecology; bringing about landscape, wildlife and heritage benefits, including enhanced visitors’ enjoyment of the area; improving local communities’ quality of life; and contributing to the health of the economy and local businesses.”*
- 13.1.6 Chapter 3 of this report also outlines how the four key objectives of the scheme to support economic growth; a safe, resilient and efficient network; improving the natural environment and heritage and community and access – closely aligned with and supporting the delivery of the strategic objectives of the NPSNN.

The Transport Case

- 13.1.7 The transport case for the scheme, in Chapter 4, details the A417 Missing Link base year model calibration and validation performance, which is classified as ‘good’ and, against some criteria, ‘excellent’. At a local level, traffic is forecast to reroute away from existing known rat runs including via Elkstone towards Cheltenham and also via Birdlip Hill towards Gloucester. Traffic reductions are also forecast on the A436 with the scheme.

- 13.1.8 At a strategic level, traffic is forecast to decrease on the M40 north of Banbury, the A34 north of Oxford and the M5 south of Cheltenham and Gloucester, with an increase on the M4 east of Swindon and on the M5 north of Cheltenham and Gloucester, showing that traffic is rerouting to the A417 with the scheme in-situ.
- 13.1.9 The A417/A419 route is used by both local and strategic traffic, for a range of journey purposes. As shown in Figure 7 1, the full A417/A419 route serves a range of origins and destinations across the country. The route serves an essential role, connecting the ports and airports of the south-east to the west Midlands, mid and north Wales, and north-west England. Journey times for traffic using the A417 are forecast to decrease significantly as a result of the scheme. Journey times for traffic using the A436 and the A417 are forecast to decrease during certain times of day and directions and are forecast to increase for others.
- 13.1.10 The impact of the scheme is significant in terms of accident benefits. The scheme is forecast to result in a large reduction in the number of people who are killed or seriously injured on this part of the network, with 66 fewer fatalities and 201 fewer seriously injured over the 60-year appraisal period.

The Economic Case

- 13.1.11 The economic case for the scheme, in Chapter 5, details the economic appraisal which considered the full range of economic, environmental and social impacts of the scheme.
- 13.1.12 The following benefits are expected to support the objective of providing a safe, resilient and efficient network: significant forecast accident benefits valued at £64.9 million across the 60-year appraisal period (2010 prices, discounted to 2010), with fatal and serious casualties reduced substantially with a forecast reduction of 66 fatal and 201 serious casualties. The total forecast monetised transport user benefits of £255.8 million are primarily a result of forecast journey time savings.
- 13.1.13 The following journey time reliability benefits are also expected to contribute towards the objective of supporting economic growth: in relation to forecast business user journey time reliability benefits of £39.9 million, representing an improved ability to plan business journeys and for transport providers to schedule business operations; as well as forecast commuting and other user journey time reliability benefits of £30.6 million, representing an improved ability for employees to arrive at work on time and to keep to appointment times.
- 13.1.14 The scheme is forecast to achieve significant wider economic benefits of £140.3 million.
- 13.1.15 A benefit expected to support the objective of enhancing the quality of life for local residents and visitors (community and access benefits) is a forecast reduction in noise impacts valued at £0.5 million and due in part to a reduction in traffic on local roads.
- 13.1.16 The scheme is forecast to achieve substantial overall benefits, with a PVB of £305.8 million. The adjusted BCR, which includes monetised journey time reliability and wider economic benefits, is estimated at 2.51. Based on the DfT's Value for Money Framework the scheme is in the medium value for money category.

13.1.17 These benefits contribute towards the resilient scheme design aspect (Paragraph 4.32), the road safety aspects (Paragraphs 4.60 to 4.66) and the health, wellbeing and quality of life aspects (Paragraphs 4.79 to 4.82) of the NPSNN as well as the economic growth aspects of section 6 of the NPPF.

Environmental Impacts

13.1.18 The benefits outlined in Chapters 4 – 5, must be weighed against the adverse impacts predicted in the ES (Document Reference 6.2).

13.1.19 ES Chapter 16 Summary (Document Reference 6.2) provides an overview of the significant effects of the scheme as reported in the ES topic Chapters. It identifies that no significant effects – beneficial or adverse – are likely in relation to air quality, material assets and waste, climate or cumulative effects. It identifies that there are three topic areas in which significant adverse effects are only likely during the construction of the scheme: geology and soils; population and human health; and, road drainage and the water environment.

13.1.20 As reported in ES Chapter 16 Summary (Document Reference 6.2), likely significant adverse effects are identified during both construction and operation in relation to cultural heritage; landscape and visual effects; biodiversity; and, noise and vibration. However, as has been noted, significant beneficial effects are also identified in relation to these topics, with the exception of cultural heritage.

13.1.21 It should be recognised that the principal residual effects will be temporary in nature, which is characteristic of construction activities. Mitigation as identified in the ES would ensure that the adverse effects are controlled where feasible and practicable during the construction stage.

13.1.22 The scheme has been appraised in detail against all of the various policies contained in the NPSNN in Chapters 6 – 10 in this report. The appraisal undertaken has had regard in particular to the assessments undertaken within the ES in relation to the policy requirements of the NPSNN.

13.1.23 In particular, a key consideration is the impact of the scheme on the landscape, including the Cotswolds AONB, as detailed within Chapter 7 of this report. In conclusion, Highways England considers that there are exceptional circumstances for the grant of consent for the scheme in the Cotswolds AONB; there are compelling reasons for the new road and its enhanced capacity; the benefits of the scheme very significantly outweigh its costs; and the scheme will be carried out to a high environmental standard, including measures that would enhance the environment. Furthermore, Highways England has taken a landscape-led approach to the scheme design which has sought to minimise or avoid adverse effects on the Cotswolds AONB landscape and its special qualities and where possible, sought to identify opportunities for enhancement. This is set out within the Design Summary Report (Document Reference 7.7).

13.1.24 In Chapter 8, it is recognised that the scheme is situated within an area of high ecological importance and sensitivity, and that the biodiversity of the area contributes to the special qualities of the AONB. Chapter 8 has demonstrated how the scheme would deliver net permanent gain of priority habitat types and has carefully considered mitigation and compensation measures to ensure they are effective and themselves do not lead to significant adverse effects (e.g. through planting that is appropriate to the landscape character). In line with NPSNN requirements, the benefits of the scheme are considered to outweigh any harm to

biodiversity. The scheme has been designed, as far as possible, to avoid and minimise impacts and effects on ecological features through the process of design development (refer to the Design Summary Report, Document Reference 7.7).

- 13.1.25 Chapter 9 details how the acquisition of ‘special category land’, which includes Common Land and Open Space, meets the tests within paragraph 5.174 and also how proposals for replacement Common Land meet the tests within paragraph 5.181 of the NPSNN and also tests set through the Act which set requirements for replacement or exchange land. In addition, the section considers more broadly, the tests set in paragraph 5.184 of the NPSNN and considers how these are met through the detailed proposals for enhanced accessibility and connectivity across the scheme and in the areas surrounding the scheme. The relevant tests for the acquisition of special category land and how these are met is detailed in the Statement of Reasons (Document Reference 4.1).
- 13.1.26 Land held inalienably by the National Trust which is required for the scheme is all subject to two Deeds of Dedication, which dedicate the land as highway, and on this basis the National Trust has agreed in principle to the acquisition of this land for the scheme. These are included in Appendix E of the Statement of Reasons (Document Reference 4.1).
- 13.1.27 It is recognised in Chapter 10 that the scheme is situated within an area of archaeological importance and sensitivity, and that the history and archaeology of the area contributes to the special qualities of the AONB. Chapter 10 has demonstrated how the scheme complies with the requirements of the NPSNN in relation to the historic environment.

National Planning Policy Framework

- 13.1.28 Whilst the NPPF does not contain any specific policies relating to NSIPs, which are determined under the Act, Chapter 11 outlined how the scheme aligns with the aims of the NPPF, notably by improving the conditions in which people travel. This is a key objective of the scheme. The scheme supports the delivery of the NPPF’s core land-use planning principles, by providing improved infrastructure to support economic growth within the region through improved capacity on the SRN.
- 13.1.29 Development within the AONB and the acquisition of land defined as Open Space are key issues within the NPPF. A full assessment of the scheme against the relevant policy tests has been carried out in Chapter 7, demonstrating the exceptional circumstances for the grant of consent for the scheme in the Cotswolds AONB and in Chapter 9, setting out the Replacement land proposed as part of the scheme for the areas of Common Land which are to be acquired permanently.

Local planning policy

- 13.1.30 Delivery of priority infrastructure is required to enable delivery of the Joint Core Strategy plans for strategic economic growth and housing development in Gloucestershire.
- 13.1.31 The Joint Core Strategy²⁶ adopted in 2017 by three local authorities – Gloucester

²⁶ <https://www.cheltenham.gov.uk/downloads/file/7211/jcs>

City Council, Cheltenham Borough Council and Tewkesbury Borough Council (with the support of Gloucestershire County Council) – sets out the strategic growth objectives for the wider area. It identifies the need for over 35,000 new homes to be delivered across the three authorities by 2031. The need for increased capacity, reduced congestion and safer journeys on the A417 is therefore situated within this context of significant planned economic and housing growth to the surrounding settlements within the Joint Core Strategy plan area.

- 13.1.32 The GCC Local Transport Plan²⁷ identifies the A417 Missing Link project as a priority scheme for ‘maintaining a functioning highways network’ in the county, within the context of the Plan seeking to create a ‘fit for purpose, reliable and efficient transport network that connects communities, employment and services, with minimal congestion and competitive journey times.’
- 13.1.33 Furthermore, the scheme is identified in three Infrastructure Delivery Plans in the region: the Joint Core Strategy IDP²⁸; the Gloucester City IDP²⁹; and, the Cotswold District Council IDP³⁰. The latter identifies the A417 as a piece of critical infrastructure required to enable the delivery of growth within the district.
- 13.1.34 There is a distinction between development plan policies which support the principle of the scheme and the benefits it can deliver and policies which in particular, seek to protect characteristics of the area such as the AONB and Common Land.
- 13.1.35 There is a fine balance to be drawn in this regard and the potential harm is not understated in the assessments undertaken. However, it is considered that the demonstrable need for the scheme and the wider public benefits would outweigh any impacts and potential conflicts identified with particular local plan policies.

Planning Balance

- 13.1.36 On balance, Highways England considers that the benefits of the scheme will very significantly outweigh any harm predicted. Mitigation measures have been identified as set out in the ES (Document Reference: 6.2) and summarised above to ensure that the harm is reduced as far as possible.
- 13.1.37 Under section 104(3) of the Act, the SoS must decide the Application in accordance with any relevant national policy statement, except where any of subsections (4) to (8) of that section apply. This report has demonstrated that the scheme accords with the NPSNN. In addition, for the purposes of section 104(7) of the Act, this report has demonstrated it is not the case that “the adverse impact of the proposed development would outweigh its benefits”.
- 13.1.38 Having weighed up each of the elements assessed in respect of the ES and their compliance with national and local planning policy, aligned to the transport and economic case for the scheme, it is considered that the tests in Section 104 have been met. Accordingly, the policy presumption in favour of the scheme and the overall planning balance lie strongly in favour of the grant of development consent.

²⁷ <https://www.gloucestershire.gov.uk/media/2227/11-pd-4-highways-nov-2017.pdf>

²⁸ https://www.gloucester.gov.uk/media/1122/jcs_infrastructure_delivery_plan_full_document_august_2014.pdf

²⁹ https://www.gloucester.gov.uk/media/3775/gloucester-city-idp_final_26-sept-2019-for-upload-v2.pdf

³⁰ <https://www.cotswold.gov.uk/media/21ajkejk/6302-infrastructure-delivery-plan-2016-update-apr-2016.pdf>

Appendices

Appendix A National Policy Statement Accordance Table

A.1.1 Overview

- A.1.1.1 The following tables set out the evidence that the scheme complies with the relevant sections of the NPSNN. It should be read in conjunction with Chapters 6 to 12 of this report, which provide a detailed assessment of the scheme's compliance with the 'assessment principles' and 'generic impacts' contained in sections 4 and 5 of the NPSNN.

Table 1: Accordance with relevant section of NPSNN Chapter 2

NPSNN Paragraph Number	Requirement of the National Networks National Policy Statement (NPSNN)	Compliance with the NPSNN
2	The need for development of the national networks and Government’s policy	
2.1	<p>The national road and rail networks that connect our cities, regions and international gateways play a significant part in supporting economic growth, as well as existing economic activity and productivity and in facilitating passenger, business and leisure journeys across the country. Well-connected and high-performing networks with sufficient capacity are vital to meet the country’s long-term needs and support a prosperous economy.</p>	<p>The need for the A417 Missing Link scheme has been identified by the DfT in its two successive RIS publications. In RIS1 (2015-2020), the scheme was identified as one of more than 100 schemes in its investment plan for improving the SRN across England. Funding for delivery of the scheme has been confirmed within RIS2 published in 11 March 2020, which covers the period between 2020 and 2025.</p> <p>Chapter 5 of this report provides an overview of the economic case for the scheme and identifies how the scheme would deliver economic benefits through increased efficiency, reliability, capacity and safety on the A417. This includes benefits which would support wider economic growth.</p>
2.2	<p>There is a critical need to improve the national networks to address road congestion and crowding on the railways to provide safe, expeditious and resilient networks that better support social and economic activity, and to provide a transport network that is capable of stimulating and supporting economic growth. Improvements may also be required to address the impact of the national networks on quality of life and environmental factors.</p>	<p>Chapter 4 of this report demonstrates how the scheme would deliver benefits to the SRN through journey time savings and improved road safety. It presents the modelled journey times for the A417 route between Cirencester and the M5 and between the A436/A40 junction and the M5, for the westbound and eastbound directions. It identifies that between Cirencester and the M5, there would be very large journey time benefits for all users in both directions by 2041. Between the A436/A40 to the M5, journey times are forecast to increase overall in the eastbound direction due to the increase in journey distance, however decreases for westbound traffic are forecast at particular times of day by 2041, namely the ‘PM peak’. Chapter 4 also identifies that the scheme is forecast to result in 66 fewer fatalities and 201 fewer seriously injured casualties, equating to a very large accident benefit for all users.</p> <p>At a local level, traffic is forecast to re-route away from existing known rat runs including via Elkstone towards Cheltenham and also via Birdlip Hill towards Gloucester. Traffic reductions are also forecast on the A436 with the scheme. This would provide improvement to the quality of life for some local communities where rat running is currently an issue due to congestion and delays on the A417.</p>

NPSNN Paragraph Number	Requirement of the National Networks National Policy Statement (NPSNN)	Compliance with the NPSNN
2	The need for development of the national networks and Government’s policy	
		<p>The landscape-led design of the scheme has further sought to deliver improvements which would address the impact of the national networks on quality of life and environmental factors. This has included mitigation and enhancement measures relating to the special qualities of the Cotswolds AONB, including for wildlife, for local communities and for recreational users (e.g. of PRoW). These measures are set out by topic within the ES (Document Reference 6.2), whilst the andscape-led approach is detailed in the Design Summary Report (Document Reference 7.9).</p>
2.6	<p>There is also a need for development on the national networks to support national and local economic growth and regeneration, particularly in the most disadvantaged areas. Improved and new transport links can facilitate economic growth by bringing businesses closer to their workers, their markets and each other. This can help rebalance the economy.</p>	<p>Chapter 5 of this report provides an overview of the economic case for the scheme and identifies how the scheme would deliver economic benefits through increased efficiency, reliability, capacity and safety on the A417. This includes benefits which would support wider economic growth.</p> <p>Over the 60-year appraisal period the scheme is forecast to achieve total transport economic efficiency benefits, including journey time changes and vehicle operation cost changes, of £255.8 million. This is a result of the additional capacity and reduced delay provided by the scheme. Compared with consumer users, business users and providers constitute the highest proportion of the reported benefits with £174.0 million.</p> <p>As a result of improved journey time reliability, the scheme is forecast to achieve total benefits valued at £70.5 million. This would comprise of:</p> <ul style="list-style-type: none"> • Business user and journey time reliability benefits of £39.9 million, representing an improved ability to plan business journeys and for transport providers to schedule business operations; and • Commuting and other user journey time reliability benefits of £30.6 million, representing an improved ability for employees to arrive at work on time and to keep to appointment times. <p>The scheme is forecast to achieve significant wider economic benefits of £140.3 million. These benefits represent impacts to agglomeration, labour supply and ncreased output.</p>

NPSNN Paragraph Number	Requirement of the National Networks National Policy Statement (NPSNN)	Compliance with the NPSNN
2	The need for development of the national networks and Government's policy	
		<p>Furthermore, as identified in section 7.3 of this report, the scheme would help to enable strategic growth planned in the area by Gloucester City Council, Cheltenham Borough Council and Tewkesbury Borough Council within their Joint Core Strategy (2017).</p> <p>Furthermore, the scheme is identified in three Infrastructure Delivery Plans in the region: the Joint Core Strategy IDP (covering Tewkesbury Borough Council, Cotswold District Council and Gloucester City Council authorities) ; the Gloucester City IDP ; and, the Cotswold District Council IDP . The latter identifies the A417 as a piece of critical infrastructure required to enable the delivery of growth within the district.</p>
2.7	In some cases, there may be a need for development to improve resilience on the networks to adapt to climate change and extreme weather events rather than just tackling a congestion problem.	ES Chapter 14 Climate (Document Reference 6.2) reports on the potential effects of the scheme on climate, in accordance with the DMRB LA 114 methodology. It includes an assessment of vulnerability of the scheme to climate change (Climate Change Resilience assessment), considering the resilience of the scheme to climate change and how the scheme design would be adapted to take account for the projected impacts of climate change. ES Appendix 14.2 Climate Change Resilience Assessment (Document Reference 6.4) considers any potentially critical features of the design which may be seriously affected by climate change as projected in the latest UK climate projections. It is concluded in ES Chapter 14 Climate (Document Reference 6.2) that whilst assets and infrastructure designed as part of the scheme are likely to be affected by climate change, such risks have been identified, assessed and mitigated for. Therefore, there would be no significant effects relating to the scheme's vulnerability to climate change during its construction and operation.
2.9	Broader environment, safety and accessibility goals will also generate requirements for development. In particular, development will be needed to address safety problems, enhance the environment or enhance accessibility for non-motorised users. In their current state, without development, the national networks will act as a constraint to sustainable economic growth, quality of life and wider environmental objectives.	Chapter 3 of this report identifies the objectives of the scheme, which reflect the broader goals cited in Paragraph 2.9 of the NPSNN: <ul style="list-style-type: none"> • Safe, resilient and efficient network: to create a high-quality resilient route that helps to resolve traffic problems and achieves reliable journey times between the Thames Valley and West Midlands as well as providing appropriate connections to the local road network.

NPSNN Paragraph Number	Requirement of the National Networks National Policy Statement (NPSNN)	Compliance with the NPSNN
2	The need for development of the national networks and Government’s policy	
		<ul style="list-style-type: none"> • Environment and heritage: To reduce the impact on the landscape and the natural and historic environment of the Cotswolds and, where possible, enhance the surrounding environment. • Community and access: To reduce queuing traffic and pollution, improve access for local people to the SRN and support residents’ and visitors’ enjoyment of the countryside. • Supporting economic growth: to facilitate economic growth, benefit local businesses and improve prosperity by the provision of a free-flowing road giving people more reliable local and strategic journeys. <p>Evidence of how the scheme delivers these objectives and accords with the specific requirements of the NPSNN in relation to the environment, safety and accessibility (including for non-motorised users) is provided in Chapters 6 to 10 of this report. This includes identification of enhancement measures to be delivered by the scheme, where relevant, with reference to the ES (Document Reference 6.2).</p>
2.13	<p>The Strategic Road Network provides critical link between cities, joins up communities, connects our major ports, airports and rail terminals. It provides a vital role in people's journeys, and drives prosperity by supporting new and existing development, encouraging trade and attracting investment. A well-functioning Strategic Road Network is critical in enabling safe and reliable journeys and the movement of goods in support of the national and regional economies.</p>	<p>The need for the scheme has been identified by the DfT in its two successive RIS publications. In RIS1 (2015-2020), the scheme was identified as one of more than 100 schemes in its investment plan for improving the SRN across England. Funding for delivery of the scheme has been confirmed within RIS2 published on 11 March 2020, which covers the period between 2020 and 2025. Chapter 5 of this report provides an overview of the economic case for the scheme and identifies how the scheme would deliver economic benefits through increased efficiency, reliability, capacity and safety on the A417. This includes benefits which would support wider economic growth.</p>
2.23	<p>The Government’s wider policy is to bring forward improvements and enhancements to the existing Strategic Road Network to address the needs set out earlier. Enhancements to the existing national road network will include:</p> <ul style="list-style-type: none"> • junction improvements, new slip roads and upgraded technology to address congestion and improve performance and resilience at junctions, which are a major source of congestion; 	<p>The scheme provides a significant improvement to the SRN between the Brockworth bypass and the Cowley roundabout by dualling the only remaining single carriageway section of the A417. This single carriageway section causes congestion and delays, resulting in rat running through neighbouring communities. It is also associated with significantly higher casualty rates than the national average for single carriageway roads, particularly for fatal and serious casualties, which is partially due to the high volumes of traffic, poor forward visibility and challenging gradients of the road. The scheme would also address capacity and safety issues associated with the Air Balloon roundabout by providing a grade-</p>

NPSNN Paragraph Number	Requirement of the National Networks National Policy Statement (NPSNN)	Compliance with the NPSNN
2	The need for development of the national networks and Government's policy	
	<ul style="list-style-type: none"> implementing "smart motorways" (also known as "managed motorways") to increase capacity and improve performance; improvements to trunk roads, in particular dualling of single carriageway strategic trunk roads and additional lanes on existing dual carriageways to increase capacity and to improve performance and resilience. 	separated junction at Shab Hill and a link road to the A436 via Ullenwood junction. Associated slip roads and other junctions on the scheme would be designed to modern highway standards, with increased safety, resilience and capacity.
2.24	The Government's policy on development of the Strategic Road Network is not that of predicting traffic growth and then providing for that growth regardless. Individual schemes will be brought forward to tackle specific issues, including those of safety, rather than to meet unconstrained traffic growth (i.e. 'predict and provide').	Section 7.3 of this report identifies the specific existing issues with the A417 between Brockworth bypass and Cowley roundabout that this scheme seeks to address. It sets out how this single carriageway section of the A417 experiences incidents, congestion and delays throughout the year, with poor journey time reliability. Traffic modelling shows that journey times are highly variable and unreliable, with significant variance depending on the direction of travel, primarily due to congestion at the Air Balloon roundabout. Frequent and unpredictable traffic congestion on the A417 also leads to motorists (including HGV drivers) to divert onto smaller local roads in an attempt to avoid delay. This has harmful impacts on neighbouring communities, as their local roads were not built to accommodate such traffic. This stretch of the A417 also has casualty rates that are significantly higher than the national average for single-carriageway roads. Therefore, as set out in Chapter 7 of this report, the case for improving this single carriageway road is compelling and the benefits of the scheme demonstrate that it is in the public interest.
2.25	On the road network different approaches and measures will be appropriate for different places. This reflects differences in local preferences and choices and differing scope for alternatives to road travel. The network must also offer a coherent mode of transport for national journeys and must combine to form a single, usable network. In general, the nature of some journeys on the Strategic Road Network mean that there will tend to be less scope for the use of alternative transport modes.	Section 7.3 of this report sets out how alternatives modes of transport have been considered in developing the scheme. Highways England undertook a study to understand the potential for modes of transport other than highways to be used to address the problems identified on the existing section of the A417 between Brockworth bypass and Cowley junction. This identified that none would address, to a satisfactory level, the existing issues on the A417 and deliver the improvements required. It is therefore concluded that there are no feasible alternatives to the delivery of the proposed scheme at the location of the existing A417.

Table 2: Accordance with relevant section of NPSNN Chapter 3

NPSNN Paragraph Number	Requirement of the National Networks National Policy Statement (NPSNN)	Compliance with the NPSNN
3	Wider Government policy on the national networks	
Environment and social impacts		
3.2	The Government recognises that for development of the national road and rail networks to be sustainable these should be designed to minimize social and environmental impacts and improve quality of life.	The ES (Document Reference 6.2) sets out the effects of the scheme and the mitigation measures designed into the scheme to minimise social and environmental impacts and to improve quality of life where possible.
3.3	In delivering new schemes, the Government expects applicants to avoid and mitigate environmental and social impacts in line with the principles set out in the NPPF and the Government's planning guidance. Applicants should also provide evidence that they have considered reasonable opportunities to deliver environmental and social benefits as part of schemes.	At the core of the NPPF is a presumption in favour of sustainable development. The principles of the NPPF relevant to each of the topics covered in the ES (Document Reference 6.2), and local planning policies that need to be considered, are set out in Chapter 11 and Appendix A of this report respectively. The ES sets out the effects of the scheme and the mitigation measures designed into the scheme to avoid or to minimise social and environmental impacts. Reasonable opportunities to deliver environmental and social benefits are identified and considered within the ES.
3.4	The Appraisal of Sustainability accompanying this NPS recognises that some developments will have some adverse local impacts on noise, emissions, landscape/visual amenity, biodiversity, cultural heritage and water resources. The significance of these effects and the effectiveness of mitigation is uncertain at the strategic and non-locationally specific level of this NPS. Therefore, whilst applicants should deliver developments in accordance with Government policy and in an environmentally sensitive way, including considering opportunities to deliver environmental benefits, some adverse local effects of development may remain.	The ES (Document Reference 6.2) sets out the effects of the scheme and the mitigation measures designed into the scheme to minimise social and environmental impacts (including in relation to noise, emissions, landscape/visual amenity, biodiversity, cultural heritage and water resources). The ES identifies where adverse effects of the scheme on the environment will remain, having taken into account proposals for mitigation. ES Chapter 16 Summary (Document Reference 6.2) provides a summary of all significant effects – both adverse and beneficial – identified as likely as a result of the scheme.
3.5	Outside the nationally significant infrastructure project regime, Government policy is to bring forward targeted works to address existing environmental problems on the Strategic Road Network and improve the performance of the network. This includes reconnecting habitats and ecosystems, enhancing the settings of historic and cultural heritage features, respecting and enhancing landscape character, improving water quality and reducing flood risk, avoiding significant	The ES (Document Reference 6.2) sets out the effects of the scheme and the mitigation measures designed into the scheme. This identifies where the scheme will result in improvements to the existing environment, including those features relating to ecology, cultural heritage, landscape, water and flood risk, noise and vibration and air quality.

NPSNN Paragraph Number	Requirement of the National Networks National Policy Statement (NPSNN)	Compliance with the NPSNN
3	Wider Government policy on the national networks	
	adverse impacts from noise and vibration and addressing areas of poor air quality.	
3.8	<p>The impact of road development on aggregate levels of emissions is likely to be very small. Impacts of road development need to be seen against significant projected reductions in carbon emissions and improvements in air quality as a result of current and future policies to meet the Government’s legally binding carbon budgets and the European Union’s air quality limit values. For example:</p> <p>Carbon – the annual CO2 impacts from delivering a programme of investment on the Strategic Road Network of the scale envisaged in Investing in Britain's Future amount to well below 0.1% of average annual carbon emissions allowed in the fourth carbon budget. This would be outweighed by additional support for ULEVs also identified as overall policy.</p> <p>Air quality – aggregate air quality impacts from delivering a programme of investment on the Strategic Road Network of the scale envisaged in Investing in Britain's Future are small. Total PM10 and NOX might be expected to increase slightly, but this needs to be seen in the context of projected reductions in emissions over time. PM10 and NOX are expected to decrease over the next decade or so as a result of tighter vehicle emission standards, then flatten, with further falls over time due to greater levels of electric and other ultra-low emission vehicles.</p>	<p>ES Chapter 14 Climate (Document Reference 6.2) assesses the scheme in relation to CO2 emissions and climate change. It is concluded that the scheme would not have a significant effect in relation to carbon emissions.</p> <p>ES Chapter 5 Air Quality (Document Reference 6.2) assesses the scheme in relation to air quality. ES Chapter 5 Air Quality (Document Reference 6.2) concludes that the scheme would not result in significant effects on human health due to changes in air quality during construction or operation.</p> <p>ES Chapter 5 Air Quality (Document Reference 6.2) does identify that there would be a significant effect in relation to nitrogen deposition in relation to two ecological receptors; Ullen Wood Ancient Woodland and a veteran tree. Whilst mitigation measures are proposed that would improve habitat condition in the impacted areas of Ullen Wood and of the veteran tree by relieving existing threats and pressures to these habitats, the degree to which these measures would counteract changes in species richness and/or composition from nitrogen deposition are not quantifiable. Therefore, the residual effect of increased nitrogen deposition on Ullen Wood and one veteran tree during the operational phase of the scheme is considered to be adverse and significant.</p>
3.10	<p>The Government’s overall vision and approach on road safety is set out in the Strategic Framework for Road Safety. It is a vision in which Britain remains a world leader in road safety; where highway authorities are empowered to take informed decisions within their area; where driver and rider training gives learners the skills they need to be safe on our roads; and where tough measures are taken against the minority of offenders who deliberately choose to drive dangerously. As set out in paragraphs 4.60 to 4.66, Scheme promoters are expected to take opportunities to improve road safety, including introducing the most modern and effective safety measures where proportionate.</p>	<p>Chapter 5 of this report sets out the benefits of the scheme in relation to safety. This analysis shows very large accident benefits for all users, with a forecast of 66 fewer fatalities and 201 fewer seriously injured. A Stage 1 Road Safety Audit has been carried out for the scheme. The Road Safety Audit is mandatory for Highways England and the scheme has been designed in accordance with the Design Manual for Roads and Bridges (DMRB).</p> <p>ES Chapter 12 Population and Human Health (Document Reference 6.2) details the provision of walking, cycling and horse-riding routes throughout the scheme, and the overall benefits with regard to safety for these road users.</p>

NPSNN Paragraph Number	Requirement of the National Networks National Policy Statement (NPSNN)	Compliance with the NPSNN
3	Wider Government policy on the national networks	
3.17	<p>There is a direct role for the national road network to play in helping pedestrians and cyclists. The Government expects applicants to use reasonable endeavours to address the needs of cyclists and pedestrians in the design of new schemes. The Government also expects applicants to identify opportunities to invest in infrastructure in locations where the national road network severs communities and acts as a barrier to cycling and walking, by correcting historic problems, retrofitting the latest solutions and ensuring that it is easy and safe for cyclists to use junctions.</p>	<p>Annex F PRoW Management Plan of ES Appendix 2.1 EMP (Document Reference 6.4) demonstrates a planned approach to the management of PRoW during the construction and operation of the scheme, ensuring public safety while reducing disruption to users. Overall it seeks to provide a safer and more attractive environment for active travel and improve connectivity across the walking, cycling and horse riding network.</p> <p>This includes repurposing part of the existing A417 as a walking, cycling and horse riding corridor (to be known as the Air Balloon Way) and providing grade separated crossings of the A417, such as with the proposed diversion of the Cotswold Way National Trail via a new crossing to enhance connectivity and improve safety of users throughout the study area. For example, in relation to the Cotswold Way National Trail, the scheme proposes to divert the route across the Cotswold Way crossing, providing a safe and attractive bridged route for the National Trail compared to a route which at present follows the A417 at grade for a section prior to users having to cross the A417 road at the same level.</p> <p>With the current situation, all crossings of the A417 have to be made at grade, and relevant to this is the safety of people taking into account incidents involving vehicles, walkers, cyclists and horse riders. As set out in Section 4.7 of this report, within the 5-year period from July 2014 to June 2019 inclusive, on the single carriageway section of the A417 between Brockworth bypass and Cowley roundabout, there were 42 Personal Injury Accidents (PIAs) recorded. These accidents resulted in 82 casualties, of which 8 were fatalities, 21 seriously injured and 53 slight. In terms of collisions on the single carriageway section of the A417 between Brockworth bypass and Cowley roundabout involving WCH over the same period, records show two PIAs involved pedestrians, which resulted in 1 fatality and one serious injury.</p> <p>With the scheme in place there would be multiple grade-separated crossings including the Grove Farm underpass, Cotswold Way crossing, Gloucestershire Way crossing, Cowley overbridge and Stockwell overbridge. This would provide a safer way for people to move around the area. For example, the proposed Grove</p>

NPSNN Paragraph Number	Requirement of the National Networks National Policy Statement (NPSNN)	Compliance with the NPSNN
3		Wider Government policy on the national networks
		Farm underpass would help address historic severance and fragmentation of the A417 to the west of the scheme, where north-south crossings would require pedestrians to cross the busy road, which is unsafe.
3.20	<p>The Government's strategy for improving accessibility for disabled people is set out in Transport for Everyone: an action plan to improve accessibility for all. In particular:</p> <p>The Government will continue to work to ensure that the bus and train fleets comply with modern access standards by 2020, and to improve rail station access for passengers with reduced mobility. The private car will continue to play an important role, providing disabled people with independence where other forms of transport are not accessible or available. The Government expects applicants to improve access, wherever possible, on and around the national networks by designing and delivering Schemes that take account of the accessibility requirements of all those who use, or are affected by, national networks infrastructure, including disabled users.</p> <p>All reasonable opportunities to deliver improvements in accessibility on and to the existing national road network should also be taken wherever appropriate.</p>	<p>ES Chapter 12 Population and Human Health (Document Reference 6.2) outlines the methodology adopted to undertake the assessments. The Assessment Methodology outlines that the 'Wales Health Impact Assessment Support Unit' (WHIASU) has developed a guide to identifying vulnerable groups for the purpose of health assessments. This has been used to identify which vulnerable groups within the local population should be identified as having high relevance to the scheme and therefore considered in more detail in the assessment. Detail is provided for WCH routes that are regularly used by vulnerable travellers such as the elderly, school children and people with disabilities, has been given a 'very high' receptor sensitivity scoring to inform the environmental value (sensitivity) of key receptors. In ES Chapter 12 Population and Human Health (Document Reference 6.2), people with physical or learning disabilities and difficulties¹ has been given a 'high' sensitivity scoring in the context of the scheme for Population and Human Health. The reason for the assigned sensitivity is because there is a college within 250m of the scheme that caters for people with physical and learning disabilities².</p> <p>Annex F PRow Management Plan of ES Appendix 2.1 EMP (Document Reference 6.4) details the proposed new walking, cycling and horse-riding routes, which provides the opportunity to improve the north-south permeability across scheme. The scheme design has sought to identify opportunities for improving PRow options around the proposed A417 and provide options for active travel for more people, including vulnerable users such as children and older people. In addition, car parking is to be provided with disabled provision near The Golden Heart Inn in close proximity to the existing A417. This would be associated with a PRow which is segregated and tarmacked, making it suitable for wheelchairs and mobility scooters. As set out in the Statement of Common Ground with the WCH</p>

¹ As defined as 'Other vulnerable groups and groups with protected characteristics (as defined by the Equality Act 2010)

² The National Star Independent College

NPSNN Paragraph Number	Requirement of the National Networks National Policy Statement (NPSNN)	Compliance with the NPSNN
3	Wider Government policy on the national networks	
		TWG (see Document Reference 7.3), these proposals have been developed taking into account the views of the Disabled Ramblers as a group represented within the Walking Cycling and Horse Riding Technical Working Group.
3.21	Applicants are reminded of their duty to promote equality and to consider the needs of disabled people as part of their normal practice. Applicants are expected to comply with any obligations under the Equalities Act 2010.	An Equality Impact Assessment has been carried out for the scheme (Document Reference 7.8). It details how the scheme considers protected characteristic groups, paying particular attention to vulnerable users of the highway network. Furthermore, the Consultation Report (Document Reference 5.1) details the engagement and consultation undertaken with groups representing the interests of the disabled community during periods of non-statutory and statutory consultation.
3.22	Severance can be a problem in some locations. Where appropriate applicants should seek to deliver improvements that reduce community severance and improve accessibility.	<p>ES Chapter 12 Population and Human Health (Document Reference 6.2) provides an assessment of the scheme in relation to severance of local communities, including any proposed mitigation to minimise or avoid adverse effects.</p> <p>Annex F PRow Management Plan of ES Appendix 2.1 EMP (Document Reference 6.4) details the proposed new walking, cycling and horse-riding routes, which provides the opportunity to improve the north-south permeability across scheme. The scheme has sought to address existing severance issues that act as a barrier to walkers, cyclists and horse riders through the measures set out in the PRow Management Plan. With the scheme in place there would be multiple grade-separated crossings including the Grove Farm underpass, Cotswold Way crossing, Gloucestershire Way crossing, Cowley overbridge and Stockwell overbridge. This would provide a safer way for people to move around the area. For example, the proposed Grove Farm underpass would help address historic severance and fragmentation of the A417 to the west of the scheme, where north-south crossings would require pedestrians to cross the busy road, which is unsafe.</p>

Table 3: Accordance with relevant section of NPSNN Chapter 4

NPSNN Paragraph Number	Requirement of the National Networks National Policy Statement (NPSNN)	Compliance with the NPSNN
4	ASSESSMENT PRINCIPLES	
Assessment principles: general principles of assessment		
4.2	<p>Subject to the detailed policies and protections in the NPS, and the legal constraints set out in the Planning Act, there is a presumption in favour of granting development consent for national networks NSIPs that fall within the need for infrastructure established in the NPS. The statutory framework for deciding NSIP applications where there is a relevant designated NPS is set out in Section 104 of the Planning Act.</p>	<p>Chapter 2 of this report has detailed the history of the scheme development and options considered over the past twenty years for this section of the A417. It has also outlined the iterative design process, interventions made and integrated into the scheme with the primary purpose to make the scheme fit better into its landscape setting.</p> <p>As set out in Chapter 3 of this report, the integrated project team has worked closely with key stakeholders to develop a scheme specific vision statement, four scheme specific objectives and a number of sub-objectives. Fundamental to this is the scheme vision for:</p> <p><i>“A landscape-led highways improvement scheme that will deliver a safe and resilient free-flowing road whilst conserving and enhancing the special character of the Cotswolds AONB; reconnecting landscape and ecology; bringing about landscape, wildlife and heritage benefits, including enhanced visitors’ enjoyment of the area; improving local communities’ quality of life; and contributing to the health of the economy and local businesses.”</i></p> <p>Chapter 3 of this report also outlines how the four key objectives of the scheme to support economic growth; a safe, resilient and efficient network; improving the natural environment and heritage and community and access – closely aligned with and supporting the delivery of the strategic objectives of the NPSNN.</p>
4.3	<p>In considering any proposed development, and in particular, when weighing its adverse impacts against its benefits, the Examining Authority and the Secretary of State should consider:</p> <ul style="list-style-type: none"> its potential benefits, including the facilitation of economic development, including job creation, housing and environmental improvement, and any long term or wider benefits 	<p>An economic appraisal has been undertaken for the scheme, in accordance with Treasury Green Book principles and TAG guidance. Chapter 5 of this report summarises the economic appraisal for the scheme and sets out the overall BCR of the scheme is 2.51, which means that for every £1 spent on the scheme, £2.51 is generated in economic, environmental and social benefits. Based on the DfT’s Value for Money Framework, the scheme is in the ‘medium value for money’</p>

NPSNN Paragraph Number	Requirement of the National Networks National Policy Statement (NPSNN)	Compliance with the NPSNN
4	ASSESSMENT PRINCIPLES	
	<ul style="list-style-type: none"> its potential adverse impacts, including any longer-term and cumulative adverse impacts, as well as any measures to avoid, reduce or compensate for any adverse impacts. 	category. In economic terms, this indicates that the forecast benefits of the scheme would significantly outweigh its costs.
4.4	In this context, environmental, safety, social and economic benefits and adverse impacts, should be considered at national, regional and local levels. These may be identified in this NPS, or elsewhere.	The ES (Document Reference 6.2) sets out the aspects of the environment likely to be affected by the scheme and identifies the significance of these effects. It sets out the environmental and social benefits and adverse impacts at the national, regional and local levels. The ES also assesses any longer term and cumulative impacts, and the mitigation measures proposed within the scheme to reduce, compensate or avoid any adverse impacts.
4.5	Applications for road and rail projects (with the exception of those for SRFIs, for which the position is covered in paragraph 4.8 [of the NPSNN]) will normally be supported by a business case prepared in accordance with Treasury Green Book principles. This business case provides the basis for investment decisions on road and rail projects. The business case will normally be developed based on the Department’s Transport Business Case guidance and WebTAG guidance. The economic case prepared for a transport business case will assess the economic, environmental and social impacts of a development. The information provided will be proportionate to the development. This information will be important for the Examining Authority and the Secretary of State’s consideration of the adverse impacts and benefits of a proposed development. It is expected that NSIP schemes brought forward through the development consent order process by virtue of Section 35 of the Planning Act 2008, should also meet this requirement.	
4.6	Applications for road and rail projects should usually be supported by a local transport model to provide sufficiently accurate detail of the impacts of a project. The modelling will usually include national level factors around the key drivers of transport demand such as economic growth, demographic change, travel costs and labour market participation, as well as local factors. The Examining Authority and the Secretary of State do not need to be concerned with the national methodology and national assumptions around the key drivers of transport demand. We do encourage an assessment of the benefits and costs of schemes under high and low growth scenarios, in addition to the core case. The modelling should be proportionate to the scale of	Traffic modelling has been undertaken for the scheme, throughout the development of its design and assessment. This is summarised in Chapter 4 of this report, however for further detail on how the modelling was carried out please refer to the Combined Modelling and Appraisal Report (ComMA Report) (Document Reference 7.6):

NPSNN Paragraph Number	Requirement of the National Networks National Policy Statement (NPSNN)	Compliance with the NPSNN
4	ASSESSMENT PRINCIPLES	
	the scheme and include appropriate sensitivity analysis to consider the impact of uncertainty on project impacts.	
4.7	The Department's WebTAG guidance is updated regularly. This is to allow the evidence used to inform decision-making to be up-to-date. Where updates are made during the course of preparing analytical work, the updated guidance is only expected to be used where it would be material to the investment decision and in proportion to the scale of the investment and its impacts.	
4.9	The Examining Authority should only recommend, and the Secretary of State should only impose, requirements in relation to a development consent, that are necessary, relevant to planning, relevant to the development to be consented, enforceable, precise, and reasonable in all other respects. Guidance on the use of planning conditions or any successor to it, should be considered where requirements are proposed.	Requirements proposed for the scheme are provided in Schedule 2 of the Draft DCO (Document Reference 3.1). The requirements have been drafted in accordance with government policy in NPPF paragraph 55 and ODPM Circular 11/95 on the use of planning conditions.
4.10	Planning obligations should only be sought where they are necessary to make the development acceptable in planning terms, directly related to the proposed development and fairly and reasonably related in scale and kind to the development.	No planning obligations have been sought or agreed in relation to this application.
4.12	In considering applications for linear infrastructure, decision-makers will need to bear in mind the specific conditions under which such developments must be designed. The generic impacts section of this NPS has been written to take these differences into account.	The scheme has been assessed in relation to the generic impacts as set out in the NPSNN. This assessment is located in Chapter 6 of this report.
4.13	This NPS does not identify locations at which development of the road and rail networks should be brought forward. However, the road and rail networks provide access for people, business and goods between places and so the location of development will usually be determined by economic activity and population and the location of existing transport networks.	The scheme relates to an existing transport network, namely the section of single carriageway of the A417 between Cowley roundabout and Brockworth bypass. Chapters 2 and 7 of this report consider alternatives to the scheme and summarise the options appraisal process that led to the selection of the preferred route of the scheme.
Environmental Impact Assessment		
4.15	All proposals for projects that are subject to the European Union's Environmental Impact Assessment Directive and are likely to have	The DCO application includes an ES (Document Reference 6.2). The ES considers the potential effects, including benefits, of the scheme and in

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	<p>significant effects on the environment, must be accompanied by an environmental statement (ES), describing the aspects of the environment likely to be significantly affected by the project. The Directive specifically requires an environmental impact assessment to identify, describe and assess effects on human beings, fauna and flora, soil, water, air, climate, the landscape, material assets and cultural heritage, and the interaction between them. Schedule 4 of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 sets out the information that should be included in the environmental statement including a description of the likely significant effects of the proposed project on the environment, covering the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the project, and also the measures envisaged for avoiding or mitigating significant adverse effects. Further guidance can be found in the online planning portal. In this NPS, the terms ‘effects’, ‘impacts’ or ‘benefits’ should accordingly be understood to mean likely significant effects, impacts or benefits.</p>	<p>accordance with Paragraph 4.15 of the NPSNN, the ES includes an assessment of effects on human beings, fauna and flora, soil, water, air, climate, the landscape, material assets and cultural heritage, and the interaction between them.</p> <p>The ES describes the likely significant effects of the scheme and shows how these effects would be avoided or mitigated. The scope of the ES was agreed with stakeholders and a Scoping Opinion Report was issued by the SoS on 24 June 2019.</p> <p>In accordance with Paragraph 4.15 of the NPSNN and the EIA Regulations, the ES assesses the likely significant effects of the scheme, covering direct effects and any indirect, secondary, cumulative, short, medium and long term, permanent and temporary, positive and negative effects at all stages of the project (construction, operation and decommissioning and the interrelationship).</p> <p>ES Chapter 16 Summary (Document Reference 6.2) provides a summary of the likely significant effects of the scheme during construction and operation, as identified through the assessment reported in the ES. The scheme meets the requirements of NPSNN with regard to EIA.</p>
4.16	<p>When considering significant cumulative effects, any environmental statement should provide information on how the effects of the applicant’s proposal would combine and interact with the effects of other development (including projects for which consent has been granted, as well as those already in existence)...</p>	<p>ES Chapter 15 Assessment of Cumulative Effects (Document Reference 6.2) provides an assessment of the scheme in relation to cumulative effects, which are those that arise as a result of impacts from more than one project, or element of a single project, combining to have an effect on a receptor, or group of receptors, that may be larger than if the effect were considered separately. ES Chapter 15</p>
4.17	<p>The Examining Authority should consider how significant cumulative effects and the interrelationship between effects might as a whole affect the environment, even though they may be acceptable when considered on an individual basis with mitigation measures in place.</p>	<p>Assessment of Cumulative Effects (Document Reference 6.2) concludes that there are no significant cumulative effects anticipated which would result in any new or materially different significant effects to those identified in each environmental factor chapter of the ES (ES chapters 5-14, Document Reference 6.2). No mitigation measures are required further to those set out in the individual environmental factor chapters and ES Appendix 2.1 EMP (Document Reference 6.4).</p>
4.18	<p>In some instances it may not be possible at the time of the application for development consent for all aspects of the proposal to have been settled in precise detail. Where this is the case, the applicant should</p>	<p>The Limits of Deviation of the scheme are set out in article 8 of the Draft DCO (Document Reference 3.1). Other matters that are subject to further detailed design will be secured through requirements in Schedule 2 of the DCO.</p>

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	explain in its application which elements of the proposal have yet to be finalised, and the reasons why this is the case.	
4.19	Where some details are still to be finalised, applicants are advised to set out in the environmental statement, to the best of their knowledge, what the maximum extent of the proposed development may be (for example in terms of site area) and assess the potential adverse effects which the project could have to ensure that the impacts of the project as it may be constructed have been properly assessed.	As set out in ES Chapter 4 EIA Methodology (Document Reference 6.2), the Limits of Deviation as outlined in Article 8 of the Draft DCO (Document Reference 3.1) have been considered by those undertaking assessments for the ES (Document Reference 6.2).
4.20	Should the Secretary of State decide to grant development consent for an application where details are still to be finalised, this will need to be reflected in appropriate development consent requirements in the development consent order. If development consent is granted for a proposal and at a later stage the applicant wishes for technical or commercial reasons to construct it in such a way that it is outside the terms of what has been consented, for example because its extent will be greater than has been provided for in terms of the consent, it will be necessary to apply for a change to be made to the development consent. The application to change the consent may need to be accompanied by environmental information to supplement that which was included in the original environmental statement.	The draft requirements contained in the Draft Development Consent Order (Volume 3, Document Reference 3.1) make provision where appropriate for consideration of elements of the detailed design of the scheme.
4.21	In cases where the EIA Directive does not apply to a project, and an environmental statement is not therefore required, the applicant should instead provide information proportionate to the project on the likely environmental, social and economic effects	The scheme is subject to the EIA Directive (2014/52/EU) and subsequently an ES (Document Reference 6.2) has been prepared for submission within the DCO application.
Habitats Regulations Assessment		
4.22	Applicants should also refer to paragraphs 5.20 to 5.38 of this national policy statement on biodiversity and geological conservation and to paragraphs 5.3 to 5.15 on air quality. The applicant should seek the advice of Natural England and, where appropriate, for cross-boundary impacts, Natural Resources Wales and Scottish Natural Heritage to ensure that impacts on European sites in Wales and Scotland are adequately considered.	The HRA: Screening Report and Statement to Inform an Appropriate Assessment (Document Reference 6.5) have been submitted in order to enable the competent authority, in this case the Secretary of State for Transport, to make an Appropriate Assessment when deciding whether to authorise the scheme, if so required.

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4.23	<p>Applicants are required to provide sufficient information with their applications for development consent to enable the Secretary of State to carry out an Appropriate Assessment if required. This information should include details of any measures that are proposed to minimise or avoid any likely significant effects on a European site. The information provided may also assist the Secretary of State in concluding that an appropriate assessment is not required because significant effects on European sites are sufficiently unlikely that they can be excluded.</p>	<p>The Statement presents the conclusions of the HRA the scheme, which contains the information required to determine whether it is likely to have significant effects on European Sites.</p> <p>The first stage of the HRA, known as ‘screening’, is designed to identify whether there are elements of the project which are likely to give rise to significant effects on European Sites which could compromise a European Site’s conservation objectives. The screening process identified five European Sites with the potential to be affected by the scheme, as follows:</p>
4.24	<p>If a proposed national network development makes it impossible to rule out an adverse effect on the integrity of a European site, it is possible to apply for derogation from the Habitats Directive, subject to the proposal meeting three tests.</p> <p>These tests are that no feasible, less damaging alternatives should exist, that there are imperative reasons of overriding public interest for the proposal going ahead, and that adequate and timely compensation measures will be put in place to ensure the overall coherence of the network of protected sites is maintained.</p>	<ul style="list-style-type: none"> • Cotswold Beechwoods SAC • Wye Valley and Forest of Dean Bat Sites SAC • North Meadow and Clattinger Farm SAC • Severn Estuary SAC • Severn Estuary Ramsar • Severn Estuary SPA
4.25	<p>Where a development may negatively affect any priority habitat or species on a site for which they are a protected feature, any Imperative Reasons of Overriding Public Interest (IROPI) case would need to be established solely on one or more of the grounds relating to human health, public safety or beneficial consequences of primary importance to the environment.</p>	<p>The screening assessment documents the potential effects that have been considered for each site and whether any likely significant effects exist. The findings of the screening exercise are presented through screening matrices for each of the above sites in Section 3.4 of the Habitat Regulation Assessment: Screening Report (Document Reference 6.5a).</p> <p>In the case of five of the European Sites (Wye Valley and Forest of Dean Bat Sites SAC, North Meadow and Clattinger Farm SAC, Severn Estuary SAC, Ramsar and SPA), the screening stage assessment concluded that the scheme was not likely to have a significant effect on the qualifying interest features or the sites either alone or in combination with other plans/projects.</p> <p>For the remaining Cotswold Beechwoods SAC site, it was not possible to rule out a likely significant effect at the screening stage, particularly in relation to recreational pressures on the SAC. This site was therefore progressed to Stage 2 of the process: Appropriate Assessment to assess whether the scheme would</p>

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Alternatives		
4.26	<p>Applicants should comply with all legal requirements and any policy requirements set out in this NPS on the assessment of alternatives. In particular:</p> <ul style="list-style-type: none"> The EIA Directive requires projects with significant environmental effects to include an outline of the main alternatives studied by the applicant and an indication of the main reasons for the applicant’s choice, taking into account the environmental effects. There may also be other specific legal requirements for the consideration of alternatives, for example, under the Habitats and Water Framework Directives. There may also be policy requirements in this NPS, for example the flood risk sequential test and the assessment of alternatives for developments in National Parks, the Broads and Areas of Outstanding Natural Beauty (AONB). 	<p>Whilst the principle of the scheme is committed in RIS1 and RIS2, Highways England has sought to develop the alignment of the scheme through an iterative process, in which alternative options for the route have been considered. The design process has been informed by environmental, socio-economic, technical and cost considerations, as well as through feedback received during non-statutory and statutory consultation and engagement with the public, landowners and relevant stakeholders.</p> <p>In accordance with the EIA Directive, an outline of the main alternatives considered by Highways England is provided in ES Chapter 3 Assessment of Alternatives (Document Reference 6.2), which also sets out the main reasons for the choices made by Highways England, taking into account the environmental effects.</p> <p>In addition, the DCO application includes the following documents which provide further detail on how alternatives have been considered by Highways England during the development of the scheme:</p> <ul style="list-style-type: none"> Technical Appraisal Report (Document Reference 7.9): sets out the assessment of alternatives that was undertaken by Highways England in order to shortlist routes to present and seek feedback on at a non-statutory public consultation in 2018. Scheme Assessment Report (Document Reference 7.4): sets out how further assessment was undertaken on the shortlisted route options, taking into account feedback from the 2018 non-statutory public consultation, to identify a preferred route for the scheme. Consultation Report (Document Reference 5.1): provides an overview of the non-statutory and statutory consultation and engagement undertaken since 2018 and identifies how feedback received has informed changes made to the scheme design.
4.27	<p>All projects should be subject to an options appraisal. The appraisal should consider viable modal alternatives and may also consider other options (in light of the paragraphs 3.23 to 3.27 of this NPS). Where projects have been subject to full options appraisal in achieving their status within Road or Rail Investment Strategies or other appropriate policies or investment plans, option testing need not be considered by the examining authority or the decision maker. For national road and rail schemes, proportionate option consideration of alternatives will have been undertaken as part of the investment decision making process. It is not necessary for the Examining Authority and the decision maker to reconsider this process, but they should be satisfied that this assessment has been undertaken.</p>	<p>Alternatives are also considered in Chapters 2 and 7 of this report.</p>
Criteria for ‘good design’ for national network infrastructure		
4.28	<p>Applicants should include design as an integral consideration from the outset of a proposal.</p>	<p>The Design Summary Report (Document Reference 7.7) demonstrates how the scheme complies with the requirements of the NPSNN with regard to good design.</p>

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4.29	Visual appearance should be a key factor in considering the design of new infrastructure, as well as functionality, fitness for purpose, sustainability and cost. Applying “good design” to national network projects should therefore produce sustainable infrastructure sensitive to place, efficient in the use of natural resources and energy used in their construction, matched by an appearance that demonstrates good aesthetics as far as possible.	It is considered that the scheme complies with the NPSNN with regard to ‘good design’.
4.31	A good design should meet the principal objectives of the Scheme by eliminating or substantially mitigating the identified problems by improving operational conditions and simultaneously minimising adverse impacts. It should also mitigate any existing adverse impacts wherever possible, for example, in relation to safety or the environment. A good design will also be one that sustains the improvements to operational efficiency for as many years as is practicable, considering capital cost, economics and environmental impacts.	
4.32	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 and as aesthetically sensitive, durable, adaptable and resilient as they can reasonably be (having regard to regulatory and other constraints and including accounting for natural hazards such as flooding).	
4.33	The applicant should therefore take into account, 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). Applicants will want to consider the role of technology in delivering new national networks projects. The use of professional, independent advice on the design aspects of a proposal should be considered, to ensure good design principles are embedded into infrastructure proposals.	
4.34	Whilst the applicant may only have limited choice in the physical appearance of some national networks infrastructure, there may be opportunities for the applicant to demonstrate good design in terms of siting and design measures relative to existing landscape and historical	

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	character and function, landscape permeability, landform and vegetation.	
4.35	Applicants should be able to demonstrate in their application how the design process was conducted and how the proposed design evolved. Where a number of different designs were considered, applicants should set out the reasons why the favoured choice has been selected.	ES Chapter 3 Assessment of Alternatives (Document Reference 6.2) sets out the alternatives that were considered by Highways England in relation to the scheme and how the design of the scheme has been changed taking into account technical/environmental assessment and the feedback received during non-statutory and statutory consultation (as detailed in the Consultation Report, Document Reference 5.1). The design rationale for the scheme and how this has influenced design decisions is summarised in the Design Summary Report (Document Reference 7.7).
Climate Change Adaption		
4.36	Section 10(3)(a) of the Planning Act requires the Secretary of State to have regard to the desirability of mitigating, and adapting to, climate change in designating an NPS.	ES Chapter 14 Climate (Document Reference 6.2) reports on the potential effects of the scheme on climate, in accordance with the DMRB LA 114 methodology. It includes an assessment of: <ul style="list-style-type: none"> • Impact of the scheme on climate (Greenhouse Gas emissions assessment): the effect on the climate of Greenhouse Gas emissions arising from the scheme, including how the scheme would affect the ability of government to meet its carbon reduction plan targets (see ‘carbon emissions’ in section 6.3 of this report). • Vulnerability of the scheme to climate change (CCR assessment): the resilience of the scheme to climate change, including how the scheme design would be adapted to take account for the projected impacts of climate change. • In-Combination Climate Impacts (ICCI) assessment: the combined effects of the impacts of the scheme and potential climate change impacts on the receiving environment. The scheme has been assessed using the latest UK Climate Projections available at the time of the assessment (UKCP18) high emissions scenario (high impact, low likelihood) against the 2080 projections at the 50% probability level.
4.38	Adaptation is therefore necessary to deal with the potential impacts of these changes that are already happening. New development should be planned to avoid increased vulnerability to the range of impacts arising from climate change. When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaptation measures, including through the provision of green infrastructure.	
4.40	New national networks infrastructure will be typically long-term investments which will need to remain operational over many decades, in the face of a changing climate. Consequently, applicants must consider the impacts of climate change when planning location, design, build and operation. Any accompanying environment statement should set out how the proposal will take account of the projected impacts of climate change.	
4.41	Where transport infrastructure has safety-critical elements and the design life of the asset is 60 years or greater, the applicant should apply the UK Climate Projections 2009 (UKCP09) high emissions	

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	scenario (high impact, low likelihood) against the 2080 projections at the 50% probability level.	
4.42	The applicant should take into account the potential impacts of climate change using the latest UK Climate Projections available at the time and ensure any environment statement that is prepared identifies appropriate mitigation or adaptation measures. This should cover the estimated lifetime of the new infrastructure...	Table 14-20 of ES Chapter 14 Climate (Document Reference 6.2) and ES Appendix 14.2 (Document Reference 6.4) identifies appropriate mitigation and adaptation measures and how they will be delivered in the scheme, either embedded in the scheme design or are secured through ES Appendix 2.1 EMP (Document Reference 6.4). These measures have themselves been assessed as part of the EIA as reported in ES Chapter 14 Climate (Document Reference 6.2).
4.43	The applicant should demonstrate that there are no critical features of the design of new national networks infrastructure which may be seriously affected by more radical changes to the climate beyond that projected in the latest set of UK climate projections. Any potential critical features should be assessed taking account of the latest credible scientific evidence on, for example, sea level rise (e.g. by referring to additional maximum credible scenarios such as from the Intergovernmental Panel on Climate Change or Environment Agency) and on the basis that necessary action can be taken to ensure the operation of the infrastructure over its estimated lifetime through potential further mitigation or adaptation.	ES Appendix 14.2 Climate Change Resilience Assessment (Document Reference 6.4) considers any potentially critical features of the design which may be seriously affected by climate change as projected in the latest UK climate projections. The safety of the scheme is assessed against the high emissions Representative Concentration Pathways RCP8.5 global warming scenario. Additionally, a resilience assessment of the safety-critical features of the scheme against H++ climate scenarios has also been undertaken and is reported in section 14.10 Assessment of likely significant effects of ES Chapter 14 Climate (Document Reference 6.2). The requirements of Paragraph 4.43 of the NPSNN are therefore met.
4.44	Any adaptation measures should be based on the latest set of UK Climate Projections, the Government's national Climate Change Risk Assessment and consultation with statutory consultation bodies. Any adaptation measures must themselves also be assessed as part of any environmental impact assessment and included in the environment statement, which should set out how and where such measures are proposed to be secured.	It is concluded in ES Chapter 14 Climate (Document Reference 6.2) that whilst assets and infrastructure designed as part of the scheme are likely to be affected by climate change, such risks have been identified, assessed and mitigated for. Therefore, there would be no significant effects relating to the scheme's vulnerability to climate change during its construction and operation.
4.45	If any proposed adaptation measures themselves give rise to consequential impacts the Secretary of State should consider the impact in relation to the application as a whole and the impacts guidance set out in this part of this NPS (e.g. on flooding, water resources, biodiversity, landscape and coastal change).	

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4.46	Adaptation measures can be required to be implemented at the time of construction where necessary and appropriate to do so.	
4.47	Where adaptation measures are necessary to deal with the impact of climate change, and that measure would have an adverse effect on other aspects of the project and/or surrounding environment (e.g. coastal processes), the Secretary of State may consider requiring the applicant to ensure that the adaptation measure could be implemented should the need arise, rather than at the outset of the development (e.g. reserving land for future extension, increasing the height of an existing sea wall, or requiring a new sea wall).	
Pollution control and other environmental protection regimes		
4.50	In deciding an application, the Examining Authority and the Secretary of State should focus on whether the development itself is an acceptable use of the land, and on the impacts of that use, rather than the control of processes, emissions or discharges themselves. They should assess the potential impacts of processes, emissions or discharges to inform decision making, but should work on the assumption that in terms of the control and enforcement, the relevant pollution control regime will be properly applied and enforced. Decisions under the Planning Act should complement but not duplicate those taken under the relevant pollution control regime.	The scheme is located approximately 20km inland from the River Severn and approximately 45km from the coast. The scheme would not affect any relevant marine areas and as such the MMO has not been identified as a prescribed consultee. In the preparation of the ES, relevant topic chapters have assessed the likely requirements for environmental permits and others consents or licences, in particular: Chapter 5 Air Quality (Document Reference 6.2) ; Chapter 8 Biodiversity (Document Reference 6.2); Chapter 10 Materials and Assets (Document Reference 6.2); Chapter 11 Noise and Vibration (Document Reference 6.2) and Chapter 13 Road Drainage and Water Environment (Document Reference 6.2).
4.52	There is a statutory duty on applicants to consult the Marine Management Organisation (MMO) on nationally significant projects which would affect, or would be likely to affect, any relevant marine areas as defined in the Planning Act (as amended by section 23 of the Marine and Coastal Access Act 2009).	
4.53	When an applicant applies for an Environmental Permit, the relevant regulator (the Environment Agency) requires that the application demonstrates that processes are in place to meet all relevant Environmental Permit requirements...	The scheme is located approximately 20km inland from the River Severn and approximately 45km from the coast. The scheme would therefore not affect any relevant marine areas and as such the MMO has not been identified as a prescribed consultee.
4.54	Applicants are encouraged to begin pre-application discussions with the Environment Agency as early as possible. It is however expected	

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	<p>that an applicant will have first thought through the requirements as a starting point for discussion. Some consents require a significant amount of preparation; as an example, the Environment Agency suggests that applicants should start work towards submitting the permit application at least 6 months prior to the submission of an application for a Development Consent Order, where they wish to parallel track the applications. This will help ensure that applications take account of all relevant environmental considerations and that the relevant regulators are able to provide timely advice and assurance to the Examining Authority.</p>	<p>In the preparation of the ES, relevant topic chapters have assessed the likely requirements for environmental permits and others consents or licences, in particular: Chapter 5 Air Quality; Chapter 8 Biodiversity; Chapter 10 Materials and Assets; Chapter 11 Noise and Vibration and Chapter 13 Road Drainage and Water Environment.</p> <p>With regard to pollution control and other environmental regulatory regimes, the consents, licences and permits are expected to be required, are detailed in the Consents and Agreements Position Statement (Document Reference 7.2).</p>
4.55	<p>The Secretary of State should be satisfied that development consent can be granted taking full account of environmental impacts. This will require close cooperation with the Environment Agency and/or the pollution control authority, and other relevant bodies, such as the MMO, Natural England, Drainage Boards, and water and sewerage undertakers, to ensure that in the case of potentially polluting developments:</p> <ul style="list-style-type: none"> • the relevant pollution control authority is satisfied that potential releases can be adequately regulated under the pollution control framework; and • the effects of existing sources of pollution in and around the project are not such that the cumulative effects of pollution when the proposed development is added would make that development unacceptable, particularly in relation to statutory environmental quality limits. 	
4.56	<p>The Secretary of State for Transport should not refuse consent on the basis of regulated impacts, unless there is good reason to believe that any relevant necessary operational pollution control permits, or licenses, or other consents will not be subsequently granted.</p>	<p>The Applicant is seeking to agree with each determining authority the principles against which applications for the licences, permits and other consents should be considered, in order that all relevant issues may be explored during the Examination of its DCO application. As detailed in the Statement of Commonality (Document Reference 7.3), Highways England is in discussion with relevant bodies such as the Environment Agency, GCC and Natural England. Furthermore, such organisations have been consulted with, including as part of statutory consultation, as evidenced in the Consultation Report (Document Reference 5.1).</p>

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Common law nuisance and statutory nuisance		
4.58	<p>It is very important that during the examination of a nationally significant infrastructure project, possible sources of nuisance under section 79(1) of the 1990 Act, and how they may be mitigated or limited are considered by the Examining Authority so they can recommend appropriate requirements that the Secretary of State might include in any subsequent order granting development consent. More information on the consideration of possible sources of nuisance is at paragraphs 5.81-5.89.</p>	<p>Highways England has prepared a Statement of Statutory Nuisance (Document Reference 6.6) within the DCO application, which describes the relevant nuisances defined in the Environmental Protection Act 1990, which may arise as a result of the scheme. Potential statutory nuisances relevant to the scheme are identified as being dust, light and noise.</p> <p>The assessment of these potential statutory nuisances is included within the following chapters of the ES (Document Reference 6.2):</p> <ul style="list-style-type: none"> • Chapter 5 Air Quality assess air quality impacts of the scheme, including dust from construction. • Chapter 7 Landscape and Visual Effects includes an assessment of the impact of lighting, including temporary construction lighting. • Chapter 11 Noise and Vibration assesses the potential effects of the scheme on background noise and vibration levels, including during construction. <p>ES Appendix 2.1 (Document Reference 6.4) has been produced to mitigate and manage the effects of construction, including dust, noise, lighting and working hours.</p> <p>The assessment of dust and air quality impacts in ES Chapter 5 Air Quality (Document Reference 6.2) finds that during construction, the scheme would not result in any significant effects on human receptors or designated habitats as a result of construction dust or construction traffic. Best practice construction dust</p>

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		<p>and control measures are incorporated into ES Appendix 2.1 (Document Reference 6.4).</p> <p>During operation, the assessment concludes no significant effects on air quality for human receptors and overall will bring a beneficial impact on local air quality due to reductions in No2 concentrations within the Air Balloon AQMA.</p> <p>The assessment of noise and vibration impacts in ES Chapter 11 Noise and Vibration (Document Reference 6.2) identifies that during construction, the scheme would result in adverse significant effects to 45 residential properties and six non-residential receptors, however these effects would be temporary in nature and would be controlled through the commitments within ES Appendix 2.1 EMP.</p> <p>ES Chapter 7 Landscape and Visual Effects (Document Reference 6.2) assesses the impact of light pollution during construction and operation of the scheme. It explains that the construction phase of the scheme would require additional temporary lighting. Outside daylight hours, task lighting would be required and where overnight working is dictated by road closure, the area will be generally lit with additional task lighting. Construction compounds will be lit during working hours and will require background lighting for safety and security reasons outside working hours.</p> <p>It is not anticipated that operational nuisance would occur due to the task lighting. All lighting will be directed inwards to minimize impact and will make use of landscape screening to reduce light spill.</p> <p>During the operational stage the assessment states that the scheme would not be lit. However, the visual assessment includes a qualitative assessment of the predicted changes in light levels/ light pollution due to traffic movement along the scheme.</p>

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		<p>The assessment concludes that the scheme layout and design would enhance the tranquility and dark skies of the AONB (special qualities) as the road carriageway would be sunk into the landscape reducing noise pollution, light spill and skyglow as a result. This would also remove the visual disturbance of moving vehicles across this part of the AONB.</p> <p>The Statement of Statutory Nuisance (Document Reference 6.6) has considered the potential for the scheme to cause a statutory nuisance under Section 79(1), Environmental Protection Act 1990. It concludes that the construction activities that have the potential to create a nuisance would be controlled through the implementation of the ES Appendix 2.1 EMP (Document Reference 6.4)). With mitigation in place, none of the statutory nuisances identified in Section 79(1) of the Act is predicted to arise.</p>
Safety		
4.60	New highways developments provide an opportunity to make significant safety improvements. Some developments may have safety as a key objective, but even where safety is not the main driver of a development the opportunity should be taken to improve safety, including introducing the most modern and effective safety measures where proportionate. Highway developments can potentially generate significant accident reduction benefits when they are well designed.	<p>One of the four objectives of the scheme is to create a safe, resilient and efficient network, whilst a sub-objective of the scheme is to improve road safety through designing the scheme to current standards and better separating strategic and local traffic.</p> <p>Section 4.7 of this report explains how road safety has been subject to an impact assessment. The impact of the scheme in terms of accident benefits has been assessed using DfT software, COBALT (COst and Benefit to Accidents) and this analysis shows very large accident benefits for all users, with a forecast of 66 fewer fatalities and 201 fewer seriously injured.</p>
4.61	The applicant should undertake an objective assessment of the impact of the proposed development on safety including the impact of any mitigation measures. This should use the methodology outlined in the guidance from DfT (WebTAG) and from the Highways Agency.	<p>Chapter 5 of this report explains how the significant forecast accident reductions translate to monetised benefits valued at £64.9 million across the 60-year appraisal period (2010 prices, discounted to 2010), with fatal and serious casualties reduced substantially.</p>
4.62	They should also put in place arrangements for undertaking the road safety audit process. Road safety audits are a mandatory requirement for all trunk road highway improvement schemes in the UK (including motorways).	
4.64	The applicant should be able to demonstrate that their scheme is consistent with the Highways Agency's Safety Framework for the Strategic Road Network and with the national Strategic Framework for	<p>The road safety audit (RSA) process has and continues to be undertaken in accordance with HD 19 of the Design Manual for Roads and Bridges (DMRB). A</p>

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	<p>Road Safety. Applicants will wish to show that they have taken all steps that are reasonably required to:</p> <ul style="list-style-type: none"> • minimise the risk of death and injury arising from their development; • contribute to an overall reduction in road casualties; • contribute to an overall reduction in the number of unplanned incidents; and • contribute to improvements in road safety for walkers and cyclists. 	<p>Stage 1 RSA has been carried out for the scheme, and the issues and proposed responses have been reviewed and have informed the safe design of the scheme submitted with the DCO application. The Stage 1 RSA has been shared with the local highways authority, GCC, and is agreed as set out in the draft Statement of Common Ground with the Joint Councils (Document Reference 7.3). A Stage 2 RSA will be undertaken after the detailed design and prior to commencement of construction of the scheme. There would also be a Stage 3 and Stage 4 RSA, following construction of the scheme.</p>
4.65	<p>They will also wish to demonstrate that:</p> <ul style="list-style-type: none"> • they have considered the safety implications of their project from the outset; and • they are putting in place rigorous processes for monitoring and evaluating safety. 	<p>Annex F PRoW Management Plan of ES Appendix 2.1 EMP (Document Reference 6.4) demonstrates a planned approach to the management of PRoW during the construction and operation of the scheme, ensuring public safety while reducing disruption to users. Overall it seeks to provide a safer and more attractive environment for active travel and improve connectivity across the walking, cycling and horse riding network.</p>
4.66	<p>The Secretary of State should not grant development consent unless satisfied that all reasonable steps have been taken and will be taken to:</p> <ul style="list-style-type: none"> • minimise the risk of road casualties arising from the Scheme; and • contribute to an overall improvement in the safety of the Strategic Road Network 	<p>This includes repurposing part of the existing A417 as a walking, cycling and horse riding corridor (to be known as the Air Balloon Way) and providing grade separated crossings of the A417, such as with the proposed diversion of the Cotswold Way National Trail via a new crossing to enhance connectivity and improve safety of users. For example, in relation to the Cotswold Way National Trail, the scheme proposes to divert the route across the Cotswold Way crossing, providing a safe and attractive bridged route for the National Trail compared to a route which at present follows the A417 at grade for a section prior to users having to cross the A417 road at the same level.</p> <p>With the current situation, all crossings of the A417 have to be made at grade, and relevant to this is the safety of people taking into account incidents involving vehicles, walkers, cyclists and horse riders. As set out in Section 4.7 of this report, within the 5-year period from July 2014 to June 2019 inclusive, on the single carriageway section of the A417 between Brockworth bypass and Cowley roundabout, there were 42 Personal Injury Accidents (PIAs) recorded. These accidents resulted in 82 casualties, of which 8 were fatalities, 21 seriously injured</p>

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		<p>and 53 slight. In terms of collisions on the single carriageway section of the A417 between Brockworth bypass and Cowley roundabout involving WCH over the same period, records show two PIAs involved pedestrians, which resulted in 1 fatality and one serious injury.</p> <p>With the scheme in place there would be multiple grade-separated crossings including the Grove Farm underpass, Cotswold Way crossing, Gloucestershire Way crossing, Cowley overbridge and Stockwell overbridge. This would provide a safer way for people to move around the area. For example, the proposed Grove Farm underpass would help address historic severance and fragmentation of the A417 to the west of the scheme, where north-south crossings would require pedestrians to cross the busy road, which is unsafe.</p> <p>Highways England acknowledges feedback received in response to public consultation, which has suggested the relocation of the school bus stop in Birdlip. Concerns have been expressed about the safety of current turning movements by the school bus, and suggestions have been made about potential alternative locations for a new bus stop facility. This change has been carefully considered within the land available as part of the scheme and Highways England has discussed opportunities with the Cowley and Birdlip Parish Council and GCC officers.</p> <p>Highways England has offered help to the relevant stakeholders to inform or facilitate any discussions about any changes that might be proposed to the bus stop and its access within or near Birdlip. Highways England will ensure the A417 scheme would not adversely impact the existing bus stop arrangement, or could accommodate an enhanced future scenario where the bus stop and its access is improved or relocated if within the DCO boundary.</p>
Security		
4.76	Where national security implications have been identified, the applicant should consult with relevant security experts from CPNI [Centre for the Protection of National Infrastructure] and the Department for Transport, to ensure that physical, procedural and personnel security measures	The scheme does not relate to potentially critical infrastructure and subsequently there has been no requirement to consult CPNI and DfT on this issue. However, through the statutory consultation process prescribed by the Act, Highways England has consulted the Ministry of Defence (MoD) via the relevant Secretary of

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	have been adequately considered in the design process and that adequate consideration has been given to the management of security risks. If CPNI and the Department for Transport (as appropriate) are satisfied that security issues have been adequately addressed in the project when the application is submitted, they will provide confirmation of this to the Secretary of State, and the Examining Authority should not need to give any further consideration to the details of the security measures during the examination.	State and the Defence Infrastructure Organisation. No concerns relating to national security have been raised through consultation with these consultees or any other consultee. Details of all organisations consulted during statutory consultation and their response (if given) is provided in the Consultation Report (Document Reference 5.1).
4.77	The applicant should only include such information in the application as is necessary to enable the Examining Authority to examine the development consent issues and make a properly informed recommendation on the application.	
4.78	In exceptional cases, where examination of an application would involve public disclosure of information about defence or national security which would not be in the national interest, the Secretary of State can intervene and may appoint an examiner to consider evidence in closed session.	Not relevant to the application.
Health		
4.81	As described in the relevant sections of this NPS, where the proposed project has likely significant environmental impacts that would have an effect on human beings, any environmental statement should identify and set out the assessment of any likely significant adverse health impacts.	<p>ES Chapter 12 Population and Human Health (Document Reference 6.2) reports on the assessment of the scheme with regard to its overall effects on the population’s wellbeing and quality of life. This includes health profiles of affected communities, health determinants and likely health outcomes. An assessment of the scheme has been undertaken on human health outcomes for the local wards of Ermin and Badgeworth, comprised of the following health determinants:</p> <ul style="list-style-type: none"> • Community, recreational and education facilities • Green/open space • Healthcare facilities • Transport and connectivity • Safety of the existing affected road network • Ambient air quality • Ambient noise environment

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		<ul style="list-style-type: none"> • Sources and pathways of potential pollution • Landscape amenity
4.82	<p>The applicant should identify measures to avoid, reduce or compensate for adverse health impacts as appropriate. These impacts may affect people simultaneously, so the applicant, and the Secretary of State (in determining an application for development consent) should consider the cumulative impact on health.</p>	<p>As required under Paragraph 4.82 of the NPSNN, ES Chapter 12 Population and Human Health (Document Reference 6.2) identifies the mitigation proposed to avoid, reduce or compensate adverse health effects during both construction and operation of the scheme. This includes:</p> <ul style="list-style-type: none"> • Essential mitigation for noise, visual and air quality impacts as identified in the relevant chapters of the ES (for example, there are a variety of measures including provision of different medium noise barriers, as appropriate, such as stone walls, earth bunds and vertical barriers (absorptive and reflective of noise) to mitigate the health impacts related to noise); • Considerate construction management to mitigate indirect effects of construction (such as air quality and noise) and to prevent severance, as secured in ES Chapter 2.1 Environmental Management Plan (EMP); • Necessary access arrangements during construction is detailed in a Construction Traffic Management Plan (CTMP) (Annex B of ES Appendix 2.1 EMP (Document Reference 6.4)); and • A Public Rights of Way Management Plan (Annex F of the EMP) which sets out proposals to mitigate effects of the scheme on public rights of way. <p>ES Chapter 12 Population and Human Health (Document Reference 6.2) also sets out how the scheme would deliver enhancements proposed for local communities to access open spaces and to utilise well designed and integrated active travel options. For example, this includes repurposing part of the existing A417 as a walking, cycling and horse riding corridor (the Air Balloon Way) and providing a grade separated diversion of the Cotswold Way National Trail via the new Cotswold Way crossing, improving safety and enhancing connectivity for users. There would also be reprovision of a greater area of Common Land than that lost as part of the scheme, as open space for people to enjoy.</p>

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		As reported in Table 12-30 of ES Chapter 12 Population and Human Health (Document Reference 6.2)), all health effects would be neutral in the construction phase. During the operation of the scheme, there would be positive health outcomes in relation to access to facilities including healthcare, community and recreation, and education. All other health outcomes would be neutral.

Table 4: Accordance with relevant section of NPSNN Chapter 5

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Generic Impacts: overview		
5.2	Sufficient relevant information is crucial to good decision-taking, particularly where formal assessments are required (such as Environmental Impact Assessment, Habitats Regulations Assessment and Flood Risk Assessment). To avoid delay, applicants should discuss what information is needed with statutory environmental bodies as early as possible.	As set out in the Consultation Report (Document Reference 5.1), Highways England has sought to engage with relevant statutory bodies throughout the development of the scheme’s design and assessment, including through non-statutory consultation in 2018 and two statutory consultations in 2019 and 2020. Additional engagement has been undertaken through technical working groups, specialist/technical meetings and the Statement of Common Ground process (see Document Reference 7.3).
Air Quality		
5.6	Where the impacts of the project (both on and off Scheme) are likely to have significant air quality effects in relation to meeting EIA requirements and / or affect the UKs ability to comply with the Air Quality Directive, the applicant should undertake an assessment of the impacts of the proposed project as part of the environmental statement.	ES Chapter 5 Air Quality (Document Reference 6.2) provides an assessment of the air quality impacts of the scheme. In accordance with the requirements of Paragraphs 5.6 to 5.9 of the NPSNN, this assessment: <ul style="list-style-type: none"> • describes existing air quality levels • describes forecasts of air quality at time of scheme opening • identifies any significant air quality effects and mitigation during construction and operation of the scheme • describes the data and methodology used for modelling effects • provides a judgement as to whether the scheme would affect the UK’s ability to comply with the Air Quality Directive
5.7	The environmental statement should describe: <ul style="list-style-type: none"> • existing air quality levels; • forecasts of air quality at the time of opening, assuming that the Scheme is not built (the future baseline) and taking account of the impact of the Scheme; and 	

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	<ul style="list-style-type: none"> any significant air quality effects, their mitigation and any residual effects, distinguishing between the construction and operation stages and taking account of the impact of road traffic generated by the project. 	<p>ES Chapter 5 Air Quality (Document Reference 6.2) concludes that the scheme would not result in significant effects on human health due to changes in air quality during construction or operation. It further concludes that there is no risk of affecting the UK's ability to achieve compliance with the Air Quality Directive.</p>
5.8	<p>Defra publishes future national projections of air quality based on evidence of future emissions, traffic and vehicle fleet. Projections are updated as the evidence base changes. Applicant's assessment should be consistent with this but may include more detailed modelling to demonstrate local impacts.</p>	<p>As identified in section 5.7 of ES Chapter 5 Air Quality (Document Reference 6.2), there are two AQMA's within 200m of the affected road network (ARN); Birdlip AQMA in Cotswold District and Cheltenham AQMA in Cheltenham Borough. The assessment concludes that there are no significant effects predicted in AQMAs.</p>
5.9	<p>In addition to information on the likely significant effects of a project in relation to EIA, the Secretary of State must be provided with a judgement on the risk as to whether the project would affect the UK's ability to comply with the Air Quality Directive.</p>	<p>ES Chapter 5 Air Quality (Document Reference 6.2) does identify that there would be a significant effect in relation to nitrogen deposition in relation to two ecological receptors; Ullen Wood Ancient Woodland and Veteran Trees. Further assessment of the impacts of the scheme in relation to this is provided in ES Chapter 8 Biodiversity (Document Reference 6.2) and is therefore considered in more detail against the relevant NSPNN tests relating to biodiversity and ecological conservation in Chapter 8 of this report.</p>
5.10	<p>The Secretary of State should consider air quality impacts over the wider area likely to be affected, as well as in the near vicinity of the Scheme. In all cases the Secretary of State must take account of relevant statutory air quality thresholds set out in domestic and European legislation. Where a project is likely to lead to a breach of the air quality thresholds, the applicant should work with the relevant authorities to secure appropriate mitigation measures with a view to ensuring so far as possible that those thresholds are not breached.</p>	
5.12	<p>The Secretary of State must give air quality considerations substantial weight where, after taking into account mitigation, a project would lead to a significant air quality impact in relation to EIA and / or where they lead to a deterioration in air quality in a zone/agglomeration.</p>	
5.14	<p>The Secretary of State should consider whether mitigation measures put forward by the applicant are acceptable. A management plan may help codify mitigation at this stage. The proposed mitigation measures should ensure that the net impact of</p>	

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	a project does not delay the point at which a zone will meet compliance timescales.	
5.15	Mitigation measures may affect the project design, layout, construction, operation and/or may comprise measures to improve air quality in pollution hotspots beyond the immediate locality of the Scheme. Measures could include, but are not limited to, changes to the route of the new Scheme, changes to the proximity of vehicles to local receptors in the existing route, physical means including barriers to trap or better disperse emissions and speed control. The implementation of mitigation measures may require working with partners to support their delivery.	
Carbon emissions		
5.17	Carbon impacts will be considered as part of the appraisal of scheme options (in the business case), prior to the submission of an application for DCO. Where the development is subject to EIA, any ES will need to describe an assessment of any likely significant climate factors in accordance with the requirements in the EIA Directive. It is very unlikely that the impact of a road project will, in isolation, affect the ability of Government to meet its carbon reduction plan targets. However, for road projects applicants should provide evidence of the carbon impact of the project and an assessment against the Government's carbon budgets.	ES Chapter 14 Climate (Document Reference 6.2) reports on the potential effects of the scheme on climate, in accordance with the DMRB LA 114 methodology. It includes an assessment of: <ul style="list-style-type: none"> • Impact of the scheme on climate (Greenhouse Gas emissions assessment): the effect on the climate of Greenhouse Gas emissions arising from the scheme, including how the scheme would affect the ability of government to meet its carbon reduction plan targets. • Vulnerability of the scheme to climate change (Climate Change Resilience assessment): the resilience of the scheme to climate change, including how the scheme design would be adapted to take account for the projected impacts of climate change (see 'climate change adaptation' in section 6.2 of this report). • In-Combination Climate Impacts (ICCI) assessment: the combined effects of the impacts of the scheme and potential climate change impacts on the receiving environment.
5.18	The Government has an overarching national carbon reduction strategy (as set out in the Carbon Plan 2011) which is a credible plan for meeting carbon budgets. It includes a range of non-planning policies which will, subject to the occurrence of the very unlikely event described above, ensure that any carbon increases from road development do not compromise its overall carbon reduction commitments. The Government is legally required to meet this plan. Therefore, any increase in	

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	<p>carbon emissions is not a reason to refuse development consent, unless the increase in carbon emissions resulting from the proposed Scheme are so significant that it would have a material impact on the ability of Government to meet its carbon reduction targets.</p>	<p>As set out in ES Chapter 14 Climate (Document Reference 6.2), an emissions quantification exercise has been undertaken to calculate the emissions anticipated to be generated or avoided by the scheme during the four life cycle stages of the scheme's construction and operation.</p>
5.19	<p>Evidence of appropriate mitigation measures (incorporating engineering plans on configuration and layout, and use of materials) in both design and construction should be presented. The Secretary of State will consider the effectiveness of such mitigation measures in order to ensure that, in relation to design and construction, the carbon footprint is not unnecessarily high. The Secretary of State's view of the adequacy of the mitigation measures relating to design and construction will be a material factor in the decision making process.</p>	<p>Greenhouse Gas emissions associated with the scheme have been compared to the national UK carbon budgets. In accordance with Paragraph 3.20 of DMRB LA 114, a significant effect occurs where the increase in carbon emissions resulting from the scheme would have a 'material impact on the ability of Government to meet its carbon reduction targets'.</p> <p>ES Chapter 14 Climate (Document Reference 6.2) sets out that the construction period for the scheme falls wholly within the fourth carbon budget. Operation of the scheme would commence in 2026 and is assessed against the fourth and fifth carbon budgets, up to 2032. Whilst Operational and maintenance emissions for the scheme between 2033 and 2037 (the period for the sixth carbon budget) also presented in Table 14-18 of ES Chapter 14 Climate (Document Reference 6.2). The sixth carbon budget has been committed to by government and is expected to become law by June 2021.</p> <p>The assessment of scheme net emissions in Table 14-18 of ES Chapter 14 Climate (Document Reference 6.2) identifies that construction of the scheme is estimated to contribute approximately 0.00297% of the fourth carbon budget. Operation of the scheme is estimated to contribute approximately 0.00114% of the fourth carbon budget and 0.00355% of the fifth carbon budget. It is considered that this magnitude of emissions from the scheme in isolation would not affect the ability of the UK Government to meet its carbon reduction plan targets, and therefore is not anticipated to give rise to a significant effect on climate. Mitigation measures are identified in ES Chapter 14 Climate (Document Reference 6.2) and include engineering design, materials, transport and construction mitigation measures that have been embedded into the design of the scheme.</p>

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		<p>ES Chapter 14 Climate (Document Reference 6.2) at section 14.9 details the mitigation measures designed into the scheme to reduce carbon emissions, which include: reducing the need for energy consuming operational equipment such as lighting; reduced earthworks and depth of cutting; a plan for reduced energy consumption in construction; selecting low maintenance planting; and; managing material resources to reduce waste and import.</p>
Biodiversity		
5.20	<p>Biodiversity is the variety of life in all its forms and encompasses all species of plants and animals and the complex ecosystems of which they are a part. Government policy for the natural environment is set out in the Natural Environment White Paper (NEWP). The NEWP sets out a vision of moving progressively from net biodiversity loss to net gain, by supporting healthy, well-functioning ecosystems and establishing more coherent ecological networks that are more resilient to current and future pressures. Geological conservation relates to the sites that are designated for their geology and/or their geomorphological importance.</p>	<p>Paragraph 5.20 does refer to the Government vision of ‘moving progressively from net biodiversity loss to net gain’, as set out in the Natural Environment White Paper at the time of the NPSNN’s publication in 2014. This vision is reflected in the subsequent publication of the recent 25 Year Environmental Plan (2018) and the draft Environment Bill, both of which seek to secure biodiversity net gain in new development.</p> <p>Highways England has adopted a corporate target of no net loss of biodiversity across its activities by 2025, progressing towards delivering a net gain in biodiversity by 2040. This target applies at a national / programme level, in which some projects will result in a loss and others in a gain; therefore, the focus for the scheme is on maximising biodiversity delivery within the land acquired for the scheme design.</p> <p>The scheme has sought to maximise biodiversity delivery through its design, taking advantage of all opportunities to enhance biodiversity value within the land to be acquired for the scheme (red line boundary/order limits) as detailed in the ES Figure 7.11 Environmental Masterplan (Document Reference 6.3). Habitat creation has focussed on the priority habitats that are appropriate to the Cotswolds AONB: lowland mixed deciduous woodland, lowland limestone (calcareous) grassland and native species-rich hedgerows, to deliver gains in area of these habitats, and improve connectivity of habitats to the wider landscape for the benefit of wildlife.</p> <p>Highways England has worked collaboratively with Natural England and other environmental bodies to consider the evolving DEFRA Biodiversity Metric 2.0 tool.</p>

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		<p>This currently scores the scheme at a loss due to the way that high-distinctiveness habitats are rewarded in the calculations.</p> <p>Highways England has reached agreement with stakeholders, including Natural England, that it is correct to focus on providing locally appropriate priority habitats, which are in keeping with the special qualities of the Cotswolds AONB, rather than habitat types that score more highly due to taking less time to establish or reach a target condition, but are not appropriate. This is reflected in the Statements of Common Ground with such stakeholders, summarised in the Statement of Commonality (Document Reference 7.3).</p> <p>Highways England is also investigating further opportunities to achieve biodiversity improvements with neighbouring landowners and through other off-site measures.</p>
5.22 - 5.23	<p>Where the project is subject to EIA the applicant should ensure that the environmental statement clearly sets out any likely significant effects on internationally, nationally and locally designated sites of ecological or geological conservation importance (including those outside England) on protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity and that the statement considers the full range of potential impacts on ecosystems.</p> <p>The applicant should show how the project has taken advantage of opportunities to conserve and enhance biodiversity and geological conservation interests.</p>	<p>ES Chapter 8 Biodiversity (Document Reference 6.2) reports on the likely significant effects of the construction and operation of the scheme on biodiversity, including on designated sites, protected species and on habitats and other species of principal importance for the conservation of biodiversity. The assessment takes into account the assessments undertaken for other environmental topic areas which may also impact on the ecosystems considered, including ES Chapter 5 Air Quality (Document Reference 6.2) Air Quality, ES Chapter 12 Population and Human Health (Document Reference 6.2) Population and Human Health and ES Chapter 13 Road Drainage and the Water Environment (Document Reference 6.2) Road Drainage and the Water Environment (all Document Reference 6.2).</p>
5.25	<p>As a general principle, and subject to the specific policies below, development should avoid significant harm to biodiversity and geological conservation interests, including through mitigation and consideration of reasonable alternatives. The applicant may also wish to make use of biodiversity offsetting in devising compensation proposals to counteract any impacts on biodiversity which cannot be avoided or mitigated. Where significant harm cannot be avoided or mitigated, as a last resort, appropriate compensation measures should be sought.</p>	<p>ES Chapter 8 Biodiversity (Document Reference 6.2) sets out in section 8.9 how opportunities to conserve and enhance biodiversity conservation interests have been taken within the scheme. ES Chapter 9 Geology and Soils (Document Reference 6.2) Geology and Soils (Document Reference 6.2) sets out in section 9.9 how opportunities to conserve and enhance geological conservation interests have been taken within the scheme. These sections also identify how Highways England has sought to avoid significant harm, including through measures embedded into the design (including consideration of alternatives where relevant) and through mitigation measures secured through the DCO. Further detail on these measures is provided in</p>

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		<p>section 8.4 of this report, whilst the Design Summary Report (Document Reference 7.7) demonstrates the landscape-led design approach that Highways England has adopted for the scheme, in which conserving the special qualities of the AONB landscape – including those relating to its ecological and geological features – has been the primary consideration in the designing the scheme.</p> <p>Where relevant and necessary within the Chapter, opportunities for appropriate compensation have been explored and are set out where significant harm on certain biodiversity features is unavoidable given the nature of the scheme (e.g. tufa habitats and ancient woodland).</p>
5.26	<p>In taking decisions, the Secretary of State should ensure that appropriate weight is attached to designated sites of international, national and local importance, protected species, habitats and other species of principal importance for the conservation of biodiversity, and to biodiversity and geological interests within the wider environment.</p>	<p>ES Chapter 8 Biodiversity (Document Reference 6.2) provides an assessment of the scheme in relation to designated sites of international, national and local importance, protected species, habitats and other species of principal importance for the conservation of biodiversity, and to biodiversity and geological interests within the wider environment.</p>
5.27	<p>The most important sites for biodiversity are those identified through international conventions and European Directives. The Habitats Regulations provide statutory protection for European sites (see also paragraphs 4.22 to 4.25). The National Planning Policy Framework states that the following wildlife sites should have the same protection as European sites:</p> <ul style="list-style-type: none"> • Potential Special Protection Areas and possible Special Areas of Conservation; • listed or proposed Ramsar sites; and • sites identified, or required, as compensatory measures for adverse effects on European sites, potential Special Protection Areas, possible Special Areas of Conservation and listed or proposed Ramsar sites. 	<p>There are three internationally designated sites within the study area of the scheme, described within ES Chapter 8 Biodiversity (Document Reference 6.2): the Cotswold Beechwoods Special Area of Conservation (SAC), Wye Valley and Forest of Dean Bat Sites SAC and North Meadow and Clattinger Farm SAC. In addition to the assessment within the ES and in accordance with paragraph 4.22 of the NPSNN, a HRA Screening Report (Document Reference 6.5a) has also been undertaken on these sites and included consultation with Natural England. The HRA Screening Report additionally includes assessment of the potential for likely significant effects upon Severn Estuary SAC/ SPA/ Ramsar site, which meets the HRA screening criteria for this scheme. There will be no land-take or habitat loss within any of these sites as a direct result of the scheme.</p> <p>Due to the distance of these sites from the scheme no observable impacts or significant effects on the SACs resulting from hydrological changes, changes in air quality, recreational pressure or impacts to bat populations are anticipated as a result of the scheme. This conclusion was reached within the HRA Screening Report for all sites except Cotswold Beechwoods SAC, for which likely significant effects from the</p>

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		<p>scheme from recreational pressure were not dismissed at the screening stage. An HRA: Statement to Inform an Appropriate Assessment (SIAA) (Document Reference 6.5b) details further assessment of impacts upon Cotswold Beechwoods SAC. The SIAA concludes that there will be no adverse effect upon the integrity of Cotswold Beechwoods SAC as a result of the scheme, either alone or in combination with other plans or projects.</p> <p>Natural England has reviewed the HRA Screening Report and SIAA and has confirmed their agreement with the conclusions. This agreement is reported within the Statement of Common Ground with Natural England (see Statement of Commonality, Document Reference 7.3). Natural Resources Wales has also reviewed the HRA Screening Report (because elements of the Wye Valley and Forest of Dean Bat Sites SAC and Severn Estuary SAC / SPA / Ramsar site are located within Wales) and has confirmed their agreement with the conclusions.</p>
5.28	<p>Many Sites of Special Scientific Interest (SSSIs) are also designated as sites of international importance and will be protected accordingly. Those that are not, or those features of SSSIs not covered by an international designation, should be given a high degree of protection. All National Nature Reserves are notified as SSSIs.</p>	<p>There are four nationally designated sites within the study area of the scheme, Crickley Hill and Barrow Wake SSSI; Bushley Muzzard Brimpsfield SSSI; Cotswold Commons and Beechwoods SSSI and Leckhampton Hill and Charlton Kings Common SSSI. No observable impacts or significant effects are anticipated at these SSSIs during construction or operation of the scheme, with the exception of the Crickley Hill and Barrow Wake SSSI which is unavoidably impacted by the scheme.</p>
5.29	<p>Where a proposed development on land within or outside a SSSI is likely to have an adverse effect on an SSSI (either individually or in combination with other developments), development consent should not normally be granted. Where an adverse effect on the site's notified special interest features is likely, an exception should be made only where the benefits of the development at this site clearly outweigh both the impacts that it is likely to have on the features of the site that make it of special scientific interest, and any broader impacts on the national network of SSSIs. The Secretary of State should ensure that the applicant's proposals to mitigate the harmful aspects of the development and, where possible, to ensure the conservation and enhancement of the site's biodiversity or geological interest, are acceptable. Where necessary, requirements</p>	<p>Crickley Hill and Barrow Wake SSSI falls partly within the scheme boundary, although the scheme does not lead to any impacts on the Crickley Hill SSSI to the north of the A417. The loss of SSSI habitat has been avoided and reduced where possible during the design phase of the scheme with detailed dialogue between ecology and engineering disciplines. For example, existing and proposed Public Rights of Way have been removed and repositioned.</p> <p>There does however remain unavoidable loss of 900m² (0.09ha) of calcareous grassland habitat for which the SSSI is notified, due to the widening of the existing A417. Approximately 560m² (0.056ha) of this habitat would be permanently lost to the cutting embankment (rock face) and a drainage cascade. Approximately 340m² (0.034ha) of habitat would be lost during the construction phase but would be</p>

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5	and/or planning obligations should be used to ensure these proposals are delivered.	GENERIC IMPACTS
		<p>reinstated as calcareous grassland following completion of the works. Creation of a roundabout on the B4070 will result in a further loss of 0.05ha of SSSI habitat, which is not considered to form part of the site’s notified special interest features because it comprises road verge containing scrub, semi-mature trees and ruderal species.</p> <p>The loss of SSSI habitat will be compensated for by creation of calcareous grassland (the qualifying habitat of the SSSI) within and adjacent to the SSSI, in excess of the area lost. This area of compensation would be part of a larger area of replacement Common Land as shown on ES Figure 12.4 Special category land (Document Reference 6.3), totalling approximately 10,534m² (1.053ha) and comprising the existing A417 carriageway and areas of existing verge habitat, both trees and grassland, to be retained. The area of Common Land replacement includes compensation for loss of SSSI habitat through the conversion of approximately 3,600m² (0.36ha) of hardstanding to calcareous grassland. Approximately 1,000 m² (0.1ha) of this hardstanding is already within the SSSI boundary, therefore the compensation will result in a net increase the area of calcareous grassland within the existing SSSI boundary and provide additional adjacent habitat.</p> <p>The residual effect of the adverse impacts of habitat loss within the SSSI during the construction phase is considered to be adverse and significant. The creation of calcareous grassland habitat within an adjacent to the SSSI is considered to be beneficial and significant. It is considered that the benefits of the creation of 0.36ha of calcareous grassland, including 0.1ha within the SSSI, would outweigh the unavoidable permanent loss of 0.056ha of habitat for which the SSSI is designated.</p> <p>The widening of the A417 in the area to the south of Crickley Hill also leads to increased fragmentation between the two SSSI units (Crickley Hill to the North and Barrow Wake to the south). In order to seek to mitigate this fragmentation, Highways England have engaged with relevant stakeholders including Natural England, Gloucestershire Wildlife Trust, and National Trust through the scheme design process. The engagement has focussed on the function of the proposed Gloucestershire Way crossing in providing connectivity across the scheme and input from stakeholder groups has been invaluable in the design of habitat patches, or</p>

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		<p>stepping stones, either side of the crossing which seek to counteract the impacts of increased fragmentation by providing new functionally connected areas of similar habitat that would and enable populations of plants and invertebrates associated with the SSSI to disperse and expand their distribution. The ES concludes that with mitigation, increased habitat fragmentation would represent a negligible adverse impact upon Crickley Hill and Barrow Wake SSSI.</p> <p>Impacts from recreational pressure, pollution and changes in nitrogen deposition are assessed for the operational phase of the scheme. In summary, an increase in recreational pressure at Crickley Hill and Barrow Wake SSSI results in a minor adverse impact from habitat degradation due to the improved PROW network including the Cotswold Way Crossing and Air Balloon Way, the residual effect is considered not significant. Protection measures will be implemented during the construction phase to protect SSSI habitat adjacent to the scheme and educational and interpretation boards will be installed on new PROW to educate the public regarding the biodiversity of the site and the sensitivity of the SSSI habitats.</p> <p>In addition, during the operational phase of the scheme, there would be a minor beneficial impact at Crickley Hill and Barrow Wake SSSI due to a reduction in nitrogen deposition from vehicle emissions as the new A417 is further to the east. The residual beneficial effect is considered not significant.</p> <p>In summary, the benefits of the proposed calcareous grassland creation is considered to outweigh the impacts that will occur due to the unavoidable loss of a small area of the SSSI unit at Barrow Wake. In addition, the scheme would lead to wider beneficial effects on the SSSI due to a reduction in nitrogen deposition from vehicle emissions with the scheme moving the A417 further away from the SSSI.</p>
5.30	<p>Marine Conservation Zones (MCZs), introduced under the Marine and Coastal Access Act 2009, are areas that have been designated for the purpose of conserving marine flora or fauna, marine habitat or types of marine habitat or features of geological or geomorphological interest. The protected feature or features and the conservation objectives for the MCZ are stated in the</p>	<p>The scheme would not impact a Marine Conservation Zone and therefore this Paragraph of the NPSNN is not relevant.</p>

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	<p>designation order for the MCZ, which provides statutory protection for these areas. Measures to restrict damaging activities will be implemented by the Marine Management Organisation (MMO) and other relevant organisations. As a public authority, the Secretary of State is bound by the duties in relation to MCZs imposed by sections 125 and 126 of the Marine and Coastal Access Act 2009.</p>	
5.31	<p>Sites of regional and local biodiversity and geological interest (which include Local Geological Sites, Local Nature Reserves and Local Wildlife Sites and Nature Improvement Areas) have a fundamental role to play in meeting overall national biodiversity targets, in contributing to the quality of life and the wellbeing of the community, and in supporting research and education. The Secretary of State should give due consideration to such regional or local designations. However, given the need for new infrastructure, these designations should not be used in themselves to refuse development consent.</p>	<p>There are 14 non-statutory sites and four potential non-statutory sites within the 1.2 mile (2 kilometre) study area which have been assessed within the Biodiversity Chapter of the Environmental Statement. Crickley Hill and Barrow Wake Local Wildlife Reserves (LWR) are components of the SSSI discussed above. Many of the Local Wildlife Sites (LWS) are ancient woodland sites and through design of the scheme there will be no habitat loss within any ancient woodland (see Section below on Irreplaceable habitat).</p> <p>There is no land take and no observable impacts in any other regional or local non-statutory site during the construction phase or operational phase except at Haroldstone Field potential LWS. Soil pinning for slope stabilisation may be required but this will not be confirmed until either detailed design or during construction. If required, the permanent loss of approximately 0.25ha of predominantly coniferous tree planting and some broadleaved trees adjacent to the A417 is assumed, resulting in a minor adverse impact from habitat loss during the construction phase of the scheme. The residual adverse effect is considered not significant.</p> <p>The assessment has therefore had due regard to regional and local designations with no significant effects anticipated as a result of the construction or operation of the scheme.</p>
5.32	<p>Ancient woodland is a valuable biodiversity resource both for its diversity of species and for its longevity as woodland. Once lost it cannot be recreated. The Secretary of State should not grant development consent for any development that would result in the loss or deterioration of irreplaceable habitats including ancient woodland and the loss of aged or veteran trees found outside ancient woodland, unless the national need for and benefits of the</p>	<p>Ullen Wood LWS and ancient woodland is adjacent to the scheme. The scheme and associated works such as the location of compounds have been designed to avoid habitat loss or the degradation of ancient woodland during the construction phase of the scheme through embedded design measures and the use of buffer zones.</p>

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5	<p>development, in that location, clearly outweigh the loss. Aged or veteran trees found outside ancient woodland are also particularly valuable for biodiversity and their loss should be avoided. Where such trees would be affected by development proposals, the applicant should set out proposals for their conservation or, where their loss is unavoidable, the reasons for this.</p>	GENERIC IMPACTS
		<p>Every effort has been made to retain veteran trees throughout the design process. Veteran trees that can be retained would be protected using methods in accordance with the British Standards BS 2837:2012 to include fencing of root protection areas, and applying protective buffer zones in accordance with Natural England Guidance. Of 21 broadleaved veteran trees (of which only one is considered ancient) within or adjacent to the scheme, three veteran trees are unavoidably lost due to their location directly beneath the scheme alignment. As partial compensation for the loss of veteran trees, young trees of the same species as those to be lost will be planted as standard trees within a meadow south of Ullen Wood, which is in close proximity to the veteran trees to be lost. This loss of irreplaceable habitat is considered to be adverse and significant.</p> <p>In addition to the direct impacts described above, which have been avoided or minimised as much as possible through design and mitigation, air quality modelling undertaken as part of the ES shows an increase in nitrogen deposition upon irreplaceable habitats during operation, associated with increases in forecast traffic on the A417.</p> <p>When considered within ES Chapter 8 Biodiversity (Document Reference 6.2) the effect of nitrogen deposition on areas of Ullen Wood closest to the scheme and a single veteran beech tree in the south of the scheme are reported as significant adverse effects. These impacts would not result in the loss of irreplaceable habitat, and even in the absence of the scheme the level of nitrogen deposition on these features would be at triple the amount at which significant degradation of the habitat is predicted. Nonetheless, following the precautionary assessment methodology within DMRB LA 105 the predicted increase in nitrogen deposition arising from the scheme is of an amount (>0.4kg N/ha/yr) considered to lead to permanent degradation of the ancient woodland through a reduction in species richness and/or changes in species composition. Permanent degradation to the condition of the veteran tree is predicted on the same basis.</p> <p>There are no feasible mitigation measures to directly reduce nitrogen deposition impacts from the scheme on Ullen Wood ancient woodland. Native broadleaved</p>

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		<p>woodland habitat will be planted to compensate for the predicted degradation of 2.1ha of ancient woodland. The landscape design includes a buffer of woodland and scrub planting to the south-west of Ullen Wood, as shown in ES Figure 7.11 Environmental Masterplan (Document Reference 6.3). This buffer has been designed to include a minimum of 2.1ha of compensatory woodland creation in a location where the predicted change in nitrogen deposition is below the 0.4kg N/ha/yr threshold for habitat degradation.</p> <p>As an additional enhancement to Ullen Wood, the Applicant is committed to seeking opportunities to expand an existing woodland restoration project across parts of the woodland that has in recent years been funded by the Forestry Commission and supported by CCB. The aim would be to expand this project to additional areas of woodland to alleviate existing threats and pressures, in order to improve the overall conservation status of the ancient woodland.</p> <p>With regard to the veteran beech tree, mitigation is proposed to reduce existing threats and pressures acting upon this individual tree to benefit its health, by reducing risks of future structural failure, moderating competition from adjacent woody vegetation, and reducing risk of damage from farming operations and browsing animals. These mitigation measures will improve the health and condition of the veteran tree and counteract the impact of degradation to some degree, but they will not directly reduce the amount of nitrogen deposition. As the effectiveness of this mitigation is not readily quantifiable, a significant adverse effect on the veteran tree is concluded on a precautionary basis.</p> <p>In response to the policy requirements of the NPSNN, the Applicant has avoided direct loss of any ancient woodland and avoided loss of the majority of the veteran trees within or adjacent to the scheme. In response to the unavoidable loss of three veteran trees and predicted degradation of ancient woodland and one further veteran tree from nitrogen deposition, the Applicant has undertaken to provide mitigation measures where feasible, and appropriate compensation measures where mitigation is unfeasible. These measures, together with a commitment to explore additional enhancement proposals, will conserve Ullen Wood ancient woodland and the vast</p>

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		<p>majority of the veteran trees within the scheme boundary during the operation of the scheme and into the future.</p> <p>The national need for and benefits of the development are detailed in Section 7.3 (Exceptional circumstances) and Section 7.4 (Compelling reasons, costs and benefits of development in the AONB) of Chapter 7 of this report.</p>
5.33	<p>Development proposals potentially provide many opportunities for building in beneficial biodiversity or geological features as part of good design. When considering proposals, the Secretary of State should consider whether the applicant has maximised such opportunities in and around developments. The Secretary of State may use requirements or planning obligations where appropriate to ensure that such beneficial features are delivered.</p>	<p>The aim of the scheme is to maximise opportunities for biodiversity delivery within the land acquired for the scheme design. The landscape-led approach to this scheme has brought together ecology and landscape specialists with stakeholders from a range of disciplines. This has delivered a balanced landscape design that is appropriate for the landscape character and special qualities of the Cotswold AONB but also focusses on habitat connectivity and creation of locally distinctive priority habitats to benefit biodiversity and provide species specific mitigation.</p> <p>The re-purposing of the detrunked section of A417 was identified early in the scheme design as an opportunity to provide additional habitat by creating wider calcareous grassland verges with areas of woodland, scrub and scattered trees adjacent to the new WCH route.</p> <p>The landscape design achieves a gain in area of the following priority habitats,</p> <ul style="list-style-type: none"> • Lowland mixed deciduous woodland; • lowland calcareous grassland; and • native species-rich hedgerows. <p>Native species of local provenance will be used with some consideration for the use of non-native trees to provide resilience against climate change.</p> <p>Highways England is continuing to investigate further opportunities to achieve additional habitat enhancement or creation with neighbouring landowners and through looking at other off-site measures, see section 8.5 Biodiversity Net Gain of this report.</p> <p>Highways England, through taking a landscape led approach to scheme design, have maximised opportunity for building beneficial biodiversity features.</p>

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5.34	Many individual wildlife species receive statutory protection under a range of legislative provisions.	The following relevant legislation has been considered in survey and mitigation design and assessment with regard to protection of species and habitats of nature conservation importance:
5.35	Other species and habitats have been identified as being of principal importance for the conservation of biodiversity in England and Wales and therefore requiring conservation action. The Secretary of State should ensure that applicants have taken measures to ensure these species and habitats are protected from the adverse effects of development. Where appropriate, requirements or planning obligations may be used in order to deliver this protection. The Secretary of State should refuse consent where harm to the habitats or species and their habitats would result, unless the benefits of the development (including need) clearly outweigh that harm.	<ul style="list-style-type: none"> • The Conservation of Habitats and Species Regulations 2017 (the ‘Habitat Regulations 2017’); • The Ramsar Convention on Wetlands 1971; • Wildlife and Countryside Act (WCA) 1981; • Natural Environment and Rural Communities (NERC) Act 2006; • Protection of Badgers Act 1992; • The Eels (England and Wales) Regulations 2009; and • Salmon and Freshwater Fisheries Act 1975. • The Water Environment (Water Framework Directive) (WFD) (England and Wales) Regulations 2017 • The Hedgerows Regulations 1997; <p>As set out in the Consents and Agreements Position Statement (Document Reference 7.2) a bat mitigation licence, badger development licence and Roman snail conservation licence will be obtained from Natural England to enable construction works to proceed that would otherwise result in an offence. A license may also be required for great crested newt and should a requirement be identified in advance of construction; a license would be obtained from Natural England.</p> <p>Where protected species licences are not required, for example with regard to section 41 of the Natural Environment and Rural Communities Act 2006, Species of Principal Importance (SPI), nesting birds or widespread reptile species, sensitive timing of works, precautionary methods of working written and overseen by an ecological clerk of works and best practice methods will be implemented to reduce the risk of injury or mortality to these species. Such methods are captured in the REAC, contained within ES Appendix 2.1 EMP and Annex D LEMP (Document Reference 6.4) through which these measures will be secured.</p>

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5.36	<p>Applicants should include appropriate mitigation measures as an integral part of their proposed development, including identifying where and how that:</p> <ul style="list-style-type: none"> • during construction, they will seek to ensure that activities will be confined to the minimum areas required for the works; • during construction and operation, best practice will be followed to ensure that risk of disturbance or damage to species or habitats is minimised (including as a consequence of transport access arrangements); • habitats will, where practicable, be restored after construction works have finished; • developments will be designed and landscaped to provide green corridors and minimise habitat fragmentation where reasonable; • opportunities will be taken to enhance existing habitats and, where practicable, to create new habitats of value within the site landscaping proposals, for example through techniques such as the 'greening' of existing network crossing points, the use of green bridges and the habitat improvement of the network verge. 	<p>Appropriate mitigation measures have been developed throughout the scheme design and are based on ecological survey data collected between 2017 and 2020. The design of certain mitigation such as the Gloucestershire Way Crossing and habitat stepping-stones has involved extensive consultation with the relevant environmental stakeholders. Mitigation measures and best practice measures to ensure impacts to species or habitats are minimised are identified in the REAC, contained within ES Appendix 2.1 EMP and Annex D LEMP (Document Reference 6.4) through which these measures will be secured.</p> <p>Restrictions on the schemes Limits of Deviation (LoD) have been set to limit the extent to which proposed works can deviate from the plan in areas of ecological sensitivity. Protection measures in the form of fencing will be implemented, as detailed in the EMP, where works occur in proximity to sensitive habitats to be retained such as Ullen Wood ancient woodland, veteran trees and calcareous grassland. The use of a clerk or works during construction will ensure this is implemented.</p> <p>Landscape design incorporating ecological mitigation is detailed on ES figure 7.11 Environment Masterplan. This has been developed in consultation with relevant environmental stakeholders and in broad alignment with the Wildlife Trust Nature Recovery Network plans. Mitigation measures include hedgerows across the greened Gloucestershire Way crossing and two smaller overbridges with hedgerows to maintain habitat connectivity for species, especially bats.</p> <p>The key priority for biodiversity enhancement of the Cotswolds AONB for this scheme that has been established through extensive stakeholder consultation, including Natural England, National Trust, Gloucestershire Wildlife Trust and Cotswold Conservation Board, is the restoration and creation of calcareous grassland. This is because this habitat has seen sharp declines from around 40% of the Cotswolds in the 1930s to less than 1.5% today. The landscape design has therefore focussed on maximising the provision of lowland calcareous grassland priority habitat, which aligns with the draft local Nature Recovery Network being produced by the Gloucestershire Local Nature Partnership (led by GWT). As a result, the scheme will</p>

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		<p>deliver 75.41ha of calcareous grassland. Taking account of the 2.53ha of this habitat lost to the scheme, there will be a net gain in area of calcareous grassland priority habitat of 72.88ha. The gain far outweighs the requirements for compensation for the losses of this habitat. This is considered to represent a major benefit to biodiversity interests both within the scheme, and on adjacent land through the enhanced connectivity the network of new grassland will provide.</p> <p>Furthermore, the extensive network of restored and created calcareous grassland will include a 25m wide corridor of calcareous grassland across the Gloucestershire Way crossing. This will provide a continuous habitat link for calcareous grassland flora and fauna to disperse through the landscape. This is an enhancement in comparison to the existing A417 which provides no such continuous connectivity of calcareous grassland. Hedgerows on the Gloucestershire Way crossing would be planted on hedge-banks that would be constructed to provide enhanced connectivity across the scheme for species such as reptiles and invertebrates.</p> <p>The re-purposing of the detrunked section of A417 was identified early in the scheme design as an opportunity to provide additional habitat by creating wider calcareous grassland verges with areas of woodland, scrub and scattered trees adjacent to the new WCH route. The verges of much of the section to be detrunked provide a linear habitat corridor through areas of agricultural land of low ecological value. The removal of traffic and habitat creation from hardstanding along the detrunked section will enhance the biodiversity value of this linear habitat corridor through the landscape.</p> <p>The landscape planting design has maximised opportunities to connect previously isolated areas of woodland such as Emma’s Grove, Ullen Wood and other small areas of woodland at Birdlip Radio Station, by planting new woodland and hedgerows. New woodland creation will target the creation of lowland mixed deciduous woodland priority habitat, which is an appropriate habitat type for biodiversity enhancement within the Cotswolds AONB. There will be losses of 9.84ha of semi-natural broadleaved woodland and 6.14ha of broadleaved plantation</p>

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		<p>woodland and creation of 25.57ha of new priority woodland, giving a net gain in the area of native broadleaved woodland within the scheme of 9.59ha.</p> <p>In addition, opportunities to connect and enhance defunct hedgerows have been taken across the scheme. There will be a large net gain in the length of hedgerow of 5.5km, with all new planting comprising native species-rich hedgerows. This habitat provision is considered to exceed the compensation required for the loss of 3.5km of hedgerow and will enhance biodiversity interests once established.</p> <p>Although hazel dormouse has not been recorded on site, tree and hedgerow species utilised by dormice have been included in the planting. In combination with increased habitat connectivity provided by new hedgerows and woodland planting, the area within and adjacent to the scheme will be enhanced for dormice, providing an opportunity for future colonisation.</p> <p>Opportunities will be sought to expand an existing woodland restoration project led by Cotswold Conservation Board to additional areas of Ullen Wood, with the landowner/s agreement. The aim of conservation-led woodland management measures would be to reduce the impact of typical threats and pressures to ancient woodland that are relevant to Ullen Wood such as browsing by deer, decline in woodland management and increasing levels of shade and non-native species. Enhancement measures such as selective thinning of trees, rotational coppicing of hazel, and erection of deer exclusion fencing would aim to alleviate these pressures and improve the overall conservation status of the ancient woodland by improving woodland structure, creating variation of light conditions in the woodland and increasing diversity of the ground flora.</p> <p>Landscape planting design has maximised the opportunities to connect previously isolated areas of woodland such as Emma’s Grove, Ullen Wood and other small areas of woodland at Birdlip Radio Station, by planting new woodland and hedgerows. In addition, opportunities to connect and enhance defunct hedgerows have been taken across the scheme. Although dormice have not been recorded on site, tree and hedgerow species utilised by dormice have been included in the</p>

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		<p>planting, so that along with increased habitat connectivity, dormice would be able move through the landscape.</p> <p>A limited amount of selected scrub and small tree clearance would be undertaken at Emma’s Grove, subject to landowner consent, at the location of the Barrows and approach paths to them. This would be primarily a heritage enhancement to enable greater access to and interpretation of a heritage resource, but creation of a glade and enhancement of rides within the woodland would provide variation in light conditions, enhancing the habitat for woodland ground flora and in turn, birds and invertebrates.</p> <p>The existing stone-built bus stop, which would be decommissioned as part of the detrunking and repurposing of the A417, would be retrofitted to form an artificial bat roost in order to increase roosting opportunities in this area. Similarly, bat roosting opportunities would be incorporated into the unlit Crickley Hill bat underpass.</p> <p>Subject to detailed design of the entrance grills, badgers and other wildlife could also use the underpass designed for bats at the [redacted] end of the scheme at [redacted]. Badger surveys showed a territory to span [redacted] in this location, however badgers are thought to use the [redacted] and therefore the [redacted] would provide a safer method of crossing within the existing territory. [redacted] underpass would also be suitable to be used by species such as bats, badger, fox and deer. These measures would enhance the permeability of the scheme for such species in comparison with the existing A417.</p>
5.37	The Secretary of State should consider what appropriate requirements should be attached to any consent and/or in any planning obligations entered into, to ensure that mitigation measures are delivered.	Requirements for the scheme are set out within Schedule 2 of the Draft DCO (Document Reference 3.1).
5.38	The Secretary of State will need to take account of what mitigation measures may have been agreed between the applicant and Natural England and/or the MMO, and whether Natural England and/or or the MMO has granted or refused, or intends to grant or	Mitigation relating to protected species for bats, badgers and Roman Snails will be delivered in accordance with the relevant Natural England licences, as set out within the Consents and Agreements Position Statement submitted in support of the application (Document Reference 7.2) and committed to through the EMP. Draft licences will be submitted to Natural England during the DCO process with letters of

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	refuse, any relevant licences, including protected species mitigation licences.	No Impendent sought prior to the conclusion of the Examination. Licenses will then be finalised based on data collected during pre-construction surveys. .
Waste management		
5.42	The applicant should set out the arrangements that are proposed for managing any waste produced. The arrangements described should include information on the proposed waste recovery and disposal system for all waste generated by the development. The applicant should seek to minimise the volume of waste produced and the volume of waste sent for disposal unless it can be demonstrated that the alternative is the best overall environmental outcome.	ES Chapter 10 Material Assets and Waste (Document Reference 6.2) Material Assets and Waste (Document Reference 6.2) reports on the potential effects on the environment from the use of material assets and the generation, disposal and recovery of waste resulting from the scheme. The assessment concludes that there are no significant effects anticipated during construction or operation of the scheme. In accordance with Paragraph 5.42 of the NPSNN, ES Chapter 10 Material Assets and Waste (Document Reference 6.2) Material Assets and Waste (Document Reference 6.2) sets out the proposed arrangements for managing waste produced by the scheme. It identifies that measures have been embedded in the design of the scheme to minimise the waste produced. This includes – as set out in ES Chapter 2 The Project (Document Reference 6.2) – the decision during the design development process to reduce the cutting through the escarpment from 25m to 17m, considerably reduced the amount of excavated material produced.
5.43	<p>The Secretary of State should consider the extent to which the applicant has proposed an effective process that will be followed to ensure effective management of hazardous and non-hazardous waste arising from the construction and operation of the proposed development. The Secretary of State should be satisfied that the process sets out:</p> <ul style="list-style-type: none"> • any such waste will be properly managed, both on-site and off-site • the waste from the proposed facility can be dealt with appropriately by the waste infrastructure which is, or is likely to be, available. Such waste arising's should not have an adverse effect on the capacity of existing waste management facilities to deal with other waste arising's in the area; and • adequate steps have been taken to minimise the volume of waste arising's, and of the volume of waste arising's sent to disposal, except where an alternative is the most sustainable outcome overall. 	<p>ES Chapter 10 Material Assets and Waste (Document Reference 6.2) Material Assets and Waste (Document Reference 6.2) sets out that whilst an earthwork surplus of 65,945m³ has been identified, measures would be taken to reduce the excess material to a point that no surplus will remain following the required cut and fill construction operations. Such measures are secured in Annex E MM of ES Appendix 2.1 EMP (Document Reference 6.4). This sets out how the excess material would be managed during construction of the scheme, using the waste hierarchy in which waste prevention is the best outcome and waste disposal is the least favoured.</p> <p>Measures would be implemented to ensure material is handled in accordance with the Waste (England and Wales) Regulations 2011 to ensure the best environmental outcome. The scheme would re-use as much material as possible on-site, if suitable for re-use. Testing would be undertaken during construction to confirm the materials meet the specification requirements, which would be developed in line with the CL:AIRE Definition of Waste: Development Industry Code of Practice. This would</p>

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		<p>ensure excavated material can be used directly within the development, subject to being suitable for use or following site treatment. Any material that does not meet this specification would be disposed of appropriately.</p> <p>A Site Waste Management Plan (SWMP) has been developed and forms Annex H of ES Appendix 2.1 EMP (Document Reference 6.4). The SWMP outlines the proposals for the identification, segregation, handling and storage of wastes arising from the scheme.</p> <p>The location of waste management facilities for construction and demolition waste are shown in ES Figure 10.1 Waste management infrastructure (Document Reference 6.3). This figure includes seven types of waste infrastructure facility with data gathered from GCC. The waste management sites include composting, hazardous and clinical waste transfer station, hazardous waste treatment facility, landfill/non-hazardous, landfill or inert, metal recycling facility and waste transfer station. There are 22 waste transfer stations located in Gloucestershire.</p> <p>Overall, there would be a limited amount of waste that would be removed from site and therefore it is unlikely that waste would be disposed of outside the region. Therefore, ES Chapter 10 Material Assets and Waste (Document Reference 6.2) concludes that the assessment of effects on waste management infrastructure is slight and not significant.</p>
5.44	Where necessary, the Secretary of State should use requirements or planning obligations to ensure that appropriate measures for waste management are applied.	Draft requirements for the scheme are set out within Schedule 2 of the Draft DCO (Document Reference 3.1).
5.45	Where the project will be subject to the Environment Agency's environmental permitting regime, waste management arrangements during operations will be covered by the permit and the considerations set out in paragraphs 4.48 to 4.56 will apply.	The Consents and Agreement Position Statement (Document Reference 7.2) outlines the other consents and licenses required for the construction and operation of the scheme.
Civil military aviation and defence interests		
5.54	Other operational defence assets may be affected by new development, e.g. the maritime acoustic facilities used to test and calibrate noise emissions from naval vessels, such as at Portland	The scheme is not likely to affect any civil and military aviation sites (or other defence assets). The MoD and CAA were consulted during statutory consultation on the scheme, with no objections raised in response. Details of all organisations consulted

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	<p>Harbour. The MoD also operates Air Defence radars and Meteorological radars which have wide coverage over the UK (onshore and offshore). It is important that new national networks infrastructure does not significantly impede or compromise the safe and effective use of any defence assets.</p>	<p>during statutory consultation and their response (if given) is provided in the Consultation Report (Document Reference 5.1). Given that the scheme is not likely to affect any civil and military aviation sites (or defence assets), an assessment of such impacts has not been carried out.</p>
5.55	<p>Where the proposed development may have an effect on civil or military aviation and/or other defence assets, an assessment of potential effects should be carried out.</p>	
5.56	<p>The applicant should consult the MoD, CAA, National Air Traffic Services (NATS) and any aerodrome – licensed or otherwise – likely to be affected by the proposed development in preparing an assessment of the proposal on aviation or other defence interests.</p>	
5.57	<p>Any assessment on aviation or other defence interests should include potential impacts during construction and operation of the project upon the operation of CNS infrastructure, flight patterns (both civil and military), other defence assets and aerodrome operational procedures.</p>	
5.58	<p>If any relevant changes are made to proposals for an NSIP during the pre-application period or before the end of the examination of an application , it is the responsibility of the applicant to ensure that the relevant aviation and defence consultees are informed as soon as reasonably possible.</p>	
5.59	<p>The Secretary of State should be satisfied that effects on civil and military aviation and other defence assets have been addressed by the applicant and that any necessary assessment of the proposal on aviation or defence interests has been carried out. It should be satisfied that the proposal has been designed to minimise adverse impacts on the operation and safety of aerodromes and that reasonable mitigation is carried out. It may also be appropriate to expect operators of the aerodrome to consider making reasonable changes to operational procedures. The Secretary of State will have regard to the necessity, acceptability and reasonableness of</p>	

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	operational changes to aerodromes, and the risks or harm of such changes when taking decisions. When making such a judgement in the case of military aerodromes, the Secretary of State should have regard to interests of defence and national security.	
5.60	If there are conflicts between the Government’s national networks policies and military interests in relation to the application, the Secretary of State expects the relevant parties to have made appropriate efforts to work together to identify realistic and pragmatic solutions to the conflicts. In so doing, the parties should seek to protect the aims and interests of the other parties as far as possible.	
5.61	There are statutory requirements concerning lighting to tall structures. Where lighting is requested on structures that go beyond statutory requirements by any of the relevant aviation and defence consultees, the Secretary of State should be satisfied of the necessity of such lighting taking into account the case put forward by the consultees. The effect of such lighting on the landscape, local residents and ecology may be a relevant consideration, depending on the circumstances be a relevant consideration.	
5.62	Where, after reasonable mitigation, operational changes and planning obligations and requirements have been proposed, development consent should not be granted if the Secretary of State considers that: <ul style="list-style-type: none"> • a development would prevent a licensed aerodrome from maintaining its licence; • the benefits of the proposed development are outweighed by the harm to aerodromes serving business, training or emergency service needs; or • the development would significantly impede or compromise the safe and effective use of defence assets or significantly limit military training. 	
Coastal change		

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5.71	Applications for development in a Coastal Change Management Area (CCMA) should make it clear why there is a need for it to be located in a CCMA. For developments in a CCMA, applicants should undertake an assessment of the vulnerability of the proposed development to coastal change, taking account of climate change, during the project's operational life.	The scheme is not located on or in the vicinity of a coast. This generic impact is therefore not applicable to the scheme and is not considered in this report.
5.72	For any projects involving dredging or disposal into the sea, the applicant should consult the Marine Management Organisation (MMO), and where appropriate, for cross-boundary impacts, Natural Resource Wales and Scottish Natural Heritage, at an early stage. The applicant should also consult the MMO on projects which could impact on coastal change, since the MMO may also be involved in considering other projects which may have related coastal impacts.	
5.73	The applicant should examine the broader context of coastal protection around the proposed project, and the influence in both directions, i.e. coast on project, and project on coast.	
5.74	The applicant should be particularly careful to identify any effects of physical changes on the integrity and special features of Marine Conservation Zones, candidate marine Special Areas of Conservation (SACs), coastal SACs and candidate coastal SACs, coastal Special Protection Areas (SPAs) and potential coastal SPAs, Ramsar sites, Sites of Community Importance (SCIs) and potential SCIs and sites of Special Scientific Interest. For any projects affecting the above marine protected areas, the applicant should consult Natural England and where appropriate, for cross-boundary impacts, Natural Resource Wales and Scottish Natural Heritage, at an early stage.	
5.75	When assessing applications in a CCMA, the Secretary of State should not grant development consent unless it is demonstrated that the development: <ul style="list-style-type: none"> • will be safe over its planned lifetime and will not have an unacceptable impact on coastal change; • will not compromise the character of the coast covered by designations; • provides wider sustainability benefits; and 	

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	<ul style="list-style-type: none"> does not hinder the creation and maintenance of a continuous signed and managed route around the coast. 	
5.79	<p>Applicants should propose appropriate mitigation measures to address adverse physical changes to the coast in consultation with the MMO, the Environment Agency, Natural England, Natural Resource Wales, Scottish Natural Heritage, Local Planning Authorities, other statutory consultees, Coastal Partnerships and other coastal groups, as it considers appropriate. The Secretary of State should consider whether the mitigation requirements put forward by an applicant are acceptable and will be delivered and whether requirements should be attached to any grant of development consent in order to secure their delivery.</p>	
Dust, odour, artificial light, smoke steam		
5.82	<p>Because of the potential effects of these emissions and in view of the availability of the defence of statutory authority against nuisance claims s.104 of the Planning Act 2008 described previously, it is important that the potential for these impacts is considered by the applicant in their application, by the Examining Authority in examining applications and by the Secretary of State in taking decisions on development consents.</p>	<p>ES Chapter 5 Air Quality (Document Reference 6.2) provides an assessment of the effects of construction dust on sensitive human receptors and designated habitats within 200m of the DCO boundary. Overall, it is identified that the scheme could impact receptors during the construction phase and mitigation is required to reduce the frequency and intensity of dust impacts. The construction dust risk potential for the scheme has been categorised as large.</p>
5.83	<p>For nationally significant infrastructure projects of the type covered by this NPS, some impact on amenity for local communities is likely to be unavoidable. Impacts should be kept to a minimum and should be at a level that is acceptable.</p>	<p>Mitigation measures to reduce impacts to a negligible level are secured through ES Appendix 2.1 EMP (Document Reference 6.4). With best practice mitigation measures in place the impacts are considered to be temporary, neutral and not significant. A mobile plant permit for crushing operations will be required as set out within the Consents and Agreements Position Statement (Document Reference 7.2) and committed to through the EMP. Any crushing/ screening activity will be managed under an environmental permit from the Environment Agency, which contains requirements around managing nuisance.</p>
5.84	<p>Where the development is subject to an Environmental Impact Assessment, the applicant should assess any likely significant effects on amenity from emissions of odour, dust, steam, smoke and artificial light and describe these in the ES.</p>	
5.85	<p>In particular, the assessment provided by the applicant should describe:</p> <ul style="list-style-type: none"> the type and quantity of emissions; 	<p>Issues associated with odour, smoke and steam were not included within the scope of the ES, as these are not effects that are expected to arise from activities undertaken during construction and operation of the scheme. As set out in the</p>

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	<ul style="list-style-type: none"> aspects of the development which may give rise to emissions during construction, operation and decommissioning; premises or locations that may be affected by the emissions; effects of the emission on identified premises or locations; and measures to be employed in preventing or mitigating the emissions. 	<p>Consultation Report (Document Reference 5.1) and the Statement of Commonality (Document Reference 7.3), Highways England has consulted with the local planning authorities and the Environment Agency on the environmental impact assessment for the scheme, including in relation to scope and methodology.</p> <p>Highways England has prepared a Statement of Statutory Nuisance (Document Reference 6.6) within the DCO application, which describes the relevant nuisances defined in the Environmental Protection Act 1990, which may arise as a result of the scheme. Potential statutory nuisances relevant to the scheme are identified as being dust, light and noise.</p>
5.86	The applicant is advised to consult the relevant local planning authority and, where appropriate, the Environment Agency about the scope and methodology of the assessment.	The assessment of these potential statutory nuisances is included within the following chapters of the ES (Document Reference 6.2):
5.87	The Secretary of State should be satisfied that all reasonable steps have been taken, and will be taken, to minimise any detrimental impact on amenity from emissions of odour, dust, steam, smoke and artificial light. This includes the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.	<ul style="list-style-type: none"> Chapter 5 Air Quality assess air quality impacts of the scheme, including dust from construction. Chapter 7 Landscape and Visual Effects includes an assessment of the impact of lighting, including temporary construction lighting. Chapter 11 Noise and Vibration assesses the potential effects of the scheme on background noise and vibration levels, including during construction.
5.88	If development consent is granted for a project, the Secretary of State should consider whether there is a justification for all of the authorised project (including any associated development) being covered by a defence of statutory authority against nuisance claims. If the Secretary of State cannot conclude that this is justified, then the defence should be disapplied, in whole or in part, through a provision in the Development Consent Order.	ES Chapter 7 Landscape and Visual Effects (Document Reference 6.2) assesses the impact of light pollution during construction and operation of the scheme. It explains that the construction phase of the scheme would require additional temporary lighting. Outside daylight hours, task lighting would be required and where overnight working is dictated by road closure, the area will be generally lit with additional task lighting. Construction compounds will be lit during working hours and will require background lighting for safety and security reasons outside working hours.
5.89	The Secretary of State should ensure the applicant has provided sufficient information to show that any necessary mitigation will be put into place. In particular, the Secretary of State should consider whether to require the applicant to abide by a scheme of management and mitigation concerning emissions of odour, dust, steam, smoke, artificial light from the development to reduce any loss to amenity which might arise during the construction and	It is not anticipated that operational nuisance would occur due to the task lighting. All lighting will be directed inwards to minimize impact and will make use of landscape screening to reduce light spill.

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	operation of the development. A construction management plan may help codify mitigation.	<p>During the operational stage the assessment states that the scheme would not be lit. However, the visual assessment includes a qualitative assessment of the predicted changes in light levels/ light pollution due to traffic movement along the scheme.</p> <p>The assessment concludes that the scheme layout and design would enhance the tranquility and dark skies of the AONB (special qualities) as the road carriageway would be sunk into the landscape reducing noise pollution, light spill and skyglow as a result. This would also remove the visual disturbance of moving vehicles across this part of the AONB.</p>
Flood Risk		
5.91	The National Planning Policy Framework (paragraphs 100 to 104) makes clear that inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk. But where development is necessary, it should be made safe without increasing flood risk elsewhere. The guidance supporting the National Planning Policy Framework explains that essential transport infrastructure (including mass evacuation routes), which has to cross the area at risk, is permissible in areas of high flood risk, subject to the requirements of the Exception Test.	<p>An ES Appendix 13.3 FRA (Document Reference 6.4) has been undertaken for the scheme, in accordance with the EIA Scoping Report and Paragraph 5.92 of the NPSNN. The FRA identifies that the scheme is located in Flood Zone 1 and subsequently is at low risk of flooding.</p> <p>As set out in the Statements of Common Ground appended to the Statement of Commonality (Document Reference 7.3), Highways England has engaged in early discussions with GCC (as the Lead Local Flood Authority) and the EA (as Lead Authority for main rivers) on the FRA and flood risk. Both parties have also been formally consulted on the scheme as prescribed consultees under the Act, as set out in the Consultation Report (Document Reference 5.1).</p>
5.92	Applications for projects in the following locations should be accompanied by a flood risk assessment (FRA): Flood Zones 2 and 3, medium and high probability of river and sea flooding; Flood Zone 1 (low probability of river and sea flooding) for projects of 1 hectare or greater, projects which may be subject to other sources of flooding (local watercourses, surface water, groundwater or reservoirs), or where the Environment Agency has notified the local planning authority that there are critical drainage problems.	As detailed within the FRA and also in ES Chapter 13 Road Drainage and the Water Environment (Document Reference 6.2), the assessment has found that the risk of flooding during construction of the scheme is low, although several areas at medium to high risk of pluvial flooding (around the tributary of Norman’s Brook) and groundwater flooding have been identified in the FRA. The risk of fluvial flooding to or from the scheme is low, however there are areas at high risk from surface water and groundwater flooding.
5.93	This should identify and assess the risks of all forms of flooding to and from the project and demonstrate how these flood risks will be managed, taking climate change into account.	During construction of the scheme, construction drainage installed early in the construction period is proposed to manage surface and groundwater flooding to

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5.94	<p>In preparing an FRA the applicant should:</p> <ul style="list-style-type: none"> • consider the risk of all forms of flooding arising from the project (including in adjacent parts of the United Kingdom), in addition to the risk of flooding to the project, and demonstrate how these risks • will be managed and, where relevant, mitigated, so that the development remains safe throughout its lifetime; • take the impacts of climate change into account, clearly stating the development lifetime over which the assessment has been made; • consider the vulnerability of those using the infrastructure including arrangements for safe access and exit; • include the assessment of the remaining (known as 'residual') risk after risk reduction measures have been taken into account and demonstrate that this is acceptable for the particular project; • consider if there is a need to remain operational during a worst case flood event over the development's lifetime; • provide the evidence for the Secretary of State to apply the Sequential Test and Exception Test, as appropriate. 	<p>ensure that flood risk would not increase as a result of the scheme. This is secured in ES Appendix 2.1 EMP (Document Reference 6.4).</p> <p>During operation of the scheme, the risk of fluvial flooding to the site is considered to be low, with very low risk of fluvial flooding. Areas of medium to high risk of pluvial flooding, in particular around the tributary of Norman's Brook, and groundwater flooding have been identified in the FRA.</p> <p>Whilst preliminary modelling outputs are presented in the FRA, which has improved the understanding of the current surface water flood risk around Crickley Hill, it is proposed that further detailed modelling will be undertaken. This will improve the understanding of any residual flood risk, following design of the realignment of the tributary of Norman's Brook and the scheme's drainage design, to ensure that flood risk does not increase as a result of the scheme.</p> <p>It is anticipated that the scheme would provide a benefit to road users travelling through the area between Cowley junction and Witcombe by providing a greater standard of flood protection than existing.</p> <p>ES Chapter 13 Road Drainage and the Water Environment (Document Reference 6.2) concludes that the effect of the scheme on flood risk during construction and operation would be neutral and not significant.</p>
5.96	<p>Applicants for projects which may be affected by, or may add to, flood risk are advised to seek sufficiently early pre-application discussions with the Environment Agency, and, where relevant, other flood risk management bodies such as lead local flood authorities, Internal Drainage Boards, sewerage undertakers, highways authorities and reservoir owners and operators. Such discussions can be used to identify the likelihood and possible extent and nature of the flood risk, to help scope the FRA, and identify the information that will be required by the Secretary of State to reach a decision on the application once it has been submitted and examined. If the Environment Agency has concerns about the proposal on flood risk grounds, the applicant is</p>	

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	encouraged to discuss these concerns with the Environment Agency and look to agree ways in which the proposal might be amended, or additional information provided, which would satisfy the Environment Agency’s concerns, preferably before the application for development consent is submitted.	
5.97	For local flood risk (surface water, groundwater and ordinary watercourse flooding), local flood risk management strategies and surface water management plans provide useful sources of information for consideration in Flood Risk Assessments. Surface water flood issues need to be understood and then account of these issues can be taken, for example flow routes should be clearly identified and managed.	
5.98	<p>Where flood risk is a factor in determining an application for development consent, the Secretary of State should be satisfied that, where relevant:</p> <ul style="list-style-type: none"> • the application is supported by an appropriate FRA; • the Sequential Test (see the National Planning Policy Framework) has been applied as part of site selection and, if required, the Exception Test (see the National Planning Policy Framework). 	ES Appendix 13.3 FRA (Document Reference 6.4) has been undertaken for the scheme. It outlines the development is classed as ‘essential infrastructure’ and as it is in Flood Zone 1, it passes the Sequential Test in accordance with Table 3 in the NPPF Technical Guidance. As the development passes the Sequential Test, an Exception Test is not required.
5.99	When determining an application, the Secretary of State should be satisfied that flood risk will not be increased elsewhere and only consider development appropriate in areas at risk of flooding where (informed by a flood risk assessment, following the Sequential Test and, if required, the Exception Test), it can be demonstrated that: within the site, the most vulnerable development is located in areas of lowest flood risk unless there are overriding reasons to prefer a different location; and development is appropriately flood resilient and resistant, including safe access and escape routes where required, and that any residual risk can be safely managed, including by emergency planning; and priority is given to the use of sustainable drainage systems.	

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5.100	<p>For construction work which has drainage implications, approval for the project's drainage system will form part of any development consent issued by the Secretary of State. The Secretary of State will therefore need to be satisfied that the proposed drainage system complies with any National Standards published by Ministers under Paragraph 5(1) of Schedule 3 to the Flood and Water Management Act 2010.⁹³ In addition, the development consent order, or any associated planning obligations, will need to make provision for the adoption and maintenance of any Sustainable Drainage Systems (SuDS), including any necessary access rights to property. The Secretary of State, should be satisfied that the most appropriate body is being given the responsibility for maintaining any SuDS, taking into account the nature and security of the infrastructure on the proposed site. The responsible body could include, for example, the applicant, the landowner, the relevant local authority, or another body such as the Internal Drainage Board.</p>	<p>ES Chapter 13 Road Drainage and the Water Environment (Document Reference 6.2) assesses the scheme in relation to drainage and provides detail of proposed mitigation relating to drainage and flood risk. ES Appendix 13.3 FRA (Document Reference 6.4) has been undertaken for the scheme, in accordance with the EIA Scoping Report. The methodology for the Flood Risk Assessment has been agreed with Highways England (as the Highway Authority), GCC (as the Lead Local Flood Authority) and the EA (as Lead Authority for main rivers).</p> <p>The FRA identifies that the scheme is located in Flood Zone 1 and subsequently is at low risk of flooding. As detailed within the FRA and also in ES Chapter 13 Road Drainage and the Water Environment (Document Reference 6.2), assessment has found that the scheme is not expected to cause any detriment to fluvial, surface or groundwater flood risk. There are subsequently no significant effects of flood risk resulting from the scheme.</p> <p>During construction of the scheme, construction drainage installed early in the construction period is proposed to manage surface and groundwater flooding to ensure that flood risk would not increase as a result of the scheme. This is secured in ES Appendix 2.1 EMP (Document Reference 6.4).</p>
5.102	<p>The Secretary of State should expect that reasonable steps have been taken to avoid, limit and reduce the risk of flooding to the proposed infrastructure and others. However, the nature of linear infrastructure means that there will be cases where:</p> <ul style="list-style-type: none"> • upgrades are made to existing infrastructure in an area at risk of flooding; • infrastructure in a flood risk area is being replaced; • infrastructure is being provided to serve a flood risk area; and • infrastructure is being provided connecting two points that are not in flood risk areas, but where the most viable route between the two passes through such an area. 	<p>During operation of the scheme, the risk of fluvial flooding to the site is considered to be low, with very low risk of fluvial flooding. Areas of medium to high risk of pluvial flooding, in particular around the tributary of Norman's Brook, and groundwater flooding have been identified in the FRA.</p> <p>Whilst preliminary modelling outputs are presented in the FRA, which has improved the understanding of the current surface water flood risk around Crickley Hill, it is proposed that further detailed modelling will be undertaken. This will improve the understanding of any residual flood risk, following design of the realignment of the tributary of Norman's Brook and the scheme's drainage design, to ensure that flood risk does not increase as a result of the scheme.</p>
5.103	<p>The design of linear infrastructure and the use of embankments in particular, may mean that linear infrastructure can reduce the risk of flooding for the surrounding area. In such cases the Secretary of</p>	<p>risk does not increase as a result of the scheme.</p>

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	State should take account of any positive benefit to placing linear infrastructure in a flood risk area.	It is anticipated that the scheme would provide a benefit to road users travelling through the area between Cowley junction and Witcombe by providing a greater standard of flood protection than existing.
5.104	Where linear infrastructure has been proposed in a flood risk area, the Secretary of State should expect reasonable mitigation measures to have been made, to ensure that the infrastructure remains functional in the event of predicted flooding.	
5.109	In addition, any project that is classified as 'essential infrastructure' and proposed to be located in Flood Zone 3a or b should be designed and constructed to remain operational and safe for users in times of flood; and any project in Zone 3b should result in no net loss of floodplain storage and not impede water flows.	The scheme is not located in Flood Zone 3a or 3b and therefore this Paragraph of the NPSNN is not relevant to the scheme.
5.112	Site layout and surface water drainage systems should cope with events that exceed the design capacity of the system, so that excess water can be safely stored on or conveyed from the site without adverse impacts.	Drainage basins are included in the scheme to attenuate peak flow rates of surface water. These are shown on the Works Plans (Document Reference 2.4) and referred to in ES Chapter 13 Road Drainage and the Water Environment (Document Reference 6.2).
5.113	The surface water drainage arrangements for any project should be such that the volumes and peak flow rates of surface water leaving the site are no greater than the rates prior to the proposed project, unless specific off-site arrangements are made and result in the same net effect.	
5.114	It may be necessary to provide surface water storage and infiltration to limit and reduce both the peak rate of discharge from the site and the total volume discharged from the site. There may be circumstances where it is appropriate for infiltration attenuation storage to be provided outside the project site, if necessary through the use of a planning obligation.	
5.115	The sequential approach should be applied to the layout and design of the project. Vulnerable uses should be located on parts of the site at lower probability and residual risk of flooding. Applicants should seek opportunities to use open space for multiple purposes such as amenity, wildlife habitat and flood storage uses.	

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	Opportunities can be taken to lower flood risk by improving flow routes, flood storage capacity and using SuDS.	
Land Stability		
5.117	Where necessary, land stability should be considered in respect of new development, as set out in the National Planning Policy Framework and supporting planning guidance. Specifically, proposals should be appropriate for the location, including preventing unacceptable risks from land instability. If land stability could be an issue, applicants should seek appropriate technical and environmental expert advice to assess the likely consequences of proposed developments on sites where subsidence, landslides and ground compression is known or suspected. Applicants should liaise with the Coal Authority if necessary.	Risks associated with land stability have been assessed in the preliminary geotechnical design, in accordance with CD 622 Managing Geotechnical Risk and are presented in ES Appendix 9.2 Preliminary Ground Investigation Report (GIR) (Document Reference 6.4). This includes a geotechnical risk register, identifying all of the geotechnical (or ground-related) risks associated with the scheme, and a record of the mitigations to be employed to remove/avoid, reduce and control these risks during design, construction, operation and maintenance of the scheme. The Preliminary GIR includes a qualitative assessment of the hazards and consequent risks posed by the marginally stable mass movement deposits on the wider slopes of the Crickley Hill valley and mitigation in the form of horizontal drainage has been proposed to control groundwater levels and limit pore water pressures during extreme rainfall events. The identified geotechnical risks and their mitigations will be further assessed as part of the detailed design in accordance with CD622. Land stability is also considered in ES Appendix 4.4 Major accidents and disasters long list and short list (Document Reference 6.4).
5.118	A preliminary assessment of ground instability should be carried out at the earliest possible stage before a detailed application for development consent is prepared. Applicants should ensure that any necessary investigations are undertaken to ascertain that their sites are and will remain stable or can be made so as part of the development. The site needs to be assessed in context of surrounding areas where subsidence, landslides and land compression could threaten the development during its anticipated life or damage neighbouring land or property. This could be in the form of a land stability or slope stability risk assessment report.	The detailed design of the scheme will be undertaken in accordance with CD622 and relevant design standards to ensure that the proposed embankment and cutting side slopes and any retaining structures and structure foundations are designed to ensure long term stability, with requirements for ground improvement works where necessary.
5.119	Applicants have a range of mechanisms available to mitigate and minimise risks of land instability. These include: Establishing the principle and layout of new development, for example avoiding mine entries and other hazards. Ensuring proper design of structures to cope with any movement expected, and other hazards such as mine and/or ground gases; or	As set out in the Consultation Report (Document Reference 5.1), the Coal Authority were consulted on the scheme proposals as part of the 2019 and 2020 statutory consultations and no concerns or objections were raised by the Coal Authority in response to those consultations.

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	<p>Requiring ground improvement techniques, usually involving the removal of poor material and its replacement with suitable inert and stable material.</p> <p>For development on land previously affected by mining activity, this may mean prior extraction of any remaining mineral resource.</p>	
Historic environment		
5.125	<p>The Secretary of State should also consider the impacts on other non-designated heritage assets (as identified either through the development plan process by local authorities, including 'local listing', or through the nationally significant infrastructure project examination and decision-making process) on the basis of clear evidence that the assets have a significance that merit consideration in that process, even though those assets are of lesser value than designated heritage assets.</p>	<p>ES Chapter 15 Assessment of Cumulative Effects (Document Reference 6.2) details the assessment undertaken by Highways England relating to heritage impacts of the scheme. Whilst only one designated heritage resource is within the DCO boundary of the scheme – a scheduled monument known as Emma’s Grove – there are numerous designated heritage resources within 1km of the scheme (the study area of the assessment) including 9 Scheduled Monuments, 50 Listed Buildings, a Registered Park and Garden (RPG) and 2 Conservation Areas. In addition are 256 non-designated heritage resources within the 1km study area, of which 116 are within the DCO boundary.</p>
5.126	<p>Where the development is subject to EIA the applicant should undertake an assessment of any likely significant heritage impacts of the proposed project as part of the Environmental Impact Assessment and describe these in the environmental statement.</p>	<p>ES Chapter 15 Assessment of Cumulative Effects (Document Reference 6.2) sets out that identification of these heritage assets has been informed by the Gloucestershire Historic Environment Record (HER), non-intrusive archaeological investigations, walkover surveys, aerial photography and archaeological evaluation through a programme of trial trenching.</p>
5.127	<p>The applicant should describe the significance of any heritage assets affected, including any contribution made by their setting. The level of detail should be proportionate to the asset’s importance and no more than is sufficient to understand the potential impact of the proposal on their significance. As a minimum the relevant Historic Environment Record should have been consulted and the heritage assets assessed using appropriate expertise. Where a site on which development is proposed includes or has the potential to include heritage assets with archaeological interest, the applicant should include an appropriate desk-based assessment and, where necessary, a field evaluation.</p>	<p>The significance of the identified heritage assets is described in ES Appendices 6.1 to 6.4 (Document Reference 6.4). This includes a description of any contribution made by the setting of heritage assets and is provided at a level of detail which is proportionate to the asset’s importance.</p> <p>As identified in ES Appendix 1.2 (Document Reference 6.4), the assessment of heritage assets reported in ES Chapter 6 Cultural Heritage (Document Reference 6.2) has been undertaken by a competent expert.</p>
5.128	<p>In determining applications, the Secretary of State should seek to identify and assess the significance of any heritage asset that may</p>	

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	<p>be affected by the proposed development (including by development affecting the setting of a heritage asset), taking account of the available evidence and any necessary expertise from:</p> <ul style="list-style-type: none"> • relevant information provided with the application and, where applicable, relevant information submitted during examination of the application; • any designation records; • the relevant Historic Environment Record(s), and similar sources of information; • representations made by interested parties during the examination; and • expert advice, where appropriate, and when the need to understand the significance of the heritage asset demands it. 	<p>Highways England has engaged with relevant experts, including Historic England and the county archaeologist at GCC in carrying out the assessment reported in the ES. As well as formal statutory consultation described in the Consultation Report (Document Reference 5.1), this has also included technical meetings and other non-statutory engagement, as reflected in the Statement of Common Ground with Historic England and the Statement of Common Ground with the Joint Councils (see Statement of Commonality, Document Reference 7.3).</p>
5.129	<p>In considering the impact of a proposed development on any heritage assets, the Secretary of State should take into account the particular nature of the significance of the heritage asset and the value that they hold for this and future generations. This understanding should be used to avoid or minimise conflict between their conservation and any aspect of the proposal.</p>	
5.130	<p>The Secretary of State should consider the desirability of sustaining and, where appropriate, enhancing the significance of heritage assets, the contribution of their settings and the positive contribution that their conservation can make to sustainable communities - including their economic vitality. The Secretary of State should also take into account the desirability of new development making a positive contribution to the character and local distinctiveness of the historic environment. The consideration of design should include scale, height; massing, alignment, materials, use and landscaping (for example, screen planting).</p>	<p>Reflecting the location of the scheme within the Cotswolds AONB, Highways England has taken a landscape-led approach to the design of the scheme, in which conserving the special qualities of the AONB landscape – including those relating to its historic features – has been the primary consideration in the designing the scheme. This is set out in the Design Summary Report (Document Reference 7.7) and demonstrates how the scheme would contribute and respond to the character and local distinctiveness of the area.</p>

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5.131	<p>When considering the impact of a proposed development on the significance of a designated heritage asset, the Secretary of State should give great weight to the asset’s conservation. The more important the asset, the greater the weight should be. Once lost, heritage assets cannot be replaced and their loss has a cultural, environmental, economic and social impact. Significance can be harmed or lost through alteration or destruction of the heritage asset or development within its setting. Given that heritage assets are irreplaceable, harm or loss affecting any designated heritage asset should require clear and convincing justification. Substantial harm to or loss of a grade II Listed Building or a grade II Registered Park or Garden should be exceptional. Substantial harm to or loss of designated assets of the highest significance, including World Heritage Sites, Scheduled Monuments, grade I and II* Listed Buildings, Registered Battlefields, and grade I and II* Registered Parks and Gardens should be wholly exceptional.</p>	<p>As reported in ES Chapter 6 Cultural Heritage (Document Reference 6.2) the construction of the scheme would result in significant adverse effects to two designated heritage assets: Emma’s Grove Scheduled Monument and Grade II Listed Shab Hill Barn. Both of these effects arise from the impact of the scheme on the setting of heritage assets (there is no direct impact on either asset).</p> <p>Construction of the scheme would also result in the removal or partial removal of 11 non-designated heritage resources, including earthwork remains, part of the Ermin Way Roman road, World War II anti-aircraft batteries and the Air Balloon Public House. The assessment reported in ES Chapter 6 Cultural Heritage (Document Reference 6.2) concludes that the effect is not considered significant given the low or medium value of the resources affected and the proposed mitigation of preservation by record.</p> <p>All other effects during construction of the scheme would be slight adverse, moderate adverse or neutral and would therefore not constitute a significant effect.</p>
5.132	<p>Any harmful impact on the significance of a designated heritage asset should be weighed against the public benefit of development, recognising that the greater the harm to the significance of the heritage asset, the greater the justification that will be needed for any loss.</p>	<p>The operation of the scheme would result in a significant adverse effect to Shab Hill. This effect is the result of increased traffic noise on the setting of the asset.</p>
5.133	<p>Where the proposed development will lead to substantial harm to or total loss of significance of a designated heritage asset, the Secretary of State should refuse consent unless it can be demonstrated that the substantial harm or loss of significance is necessary in order to deliver substantial public benefits that outweigh that loss or harm, or alternatively that all of the following apply:</p> <ul style="list-style-type: none"> • the nature of the heritage asset prevents all reasonable uses of the site; and • no viable use of the heritage asset itself can be found in the medium term through appropriate marketing that will enable its conservation; and 	<p>Emma’s Grove Scheduled Monument would experience a slight beneficial effect due to the reduction in traffic noise within its setting, however this would not be a significant enhancement to its value.</p> <p>Section 6.9 of ES Chapter 6 Cultural Heritage (Document Reference 6.2) also identifies that the scheme would result in the following enhancements to the historic environment:</p> <ul style="list-style-type: none"> • The removal of vegetation from the Barrows at Emma’s Grove Scheduled Monument would enhance their interpretation and enable them to be removed from the Historic England Heritage at Risk Register. • The improvements to the Cotswold Way National Trail and Gloucestershire Way footpath would enable greater permeability within the landscape. This

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	<ul style="list-style-type: none"> conservation by grant-funding or some form of charitable or public ownership is demonstrably not possible; and the harm or loss is outweighed by the benefit of bringing the site back into use. 	<p>would allow greater access to and understanding of heritage resources by members of the public – between Emma’s Grove, Barrow Wake and Crickley Hill heritage assets.</p> <ul style="list-style-type: none"> Interpretation boards would be provided as part of the scheme, adjacent to the Cotswold Way crossing.
5.134	Where the proposed development will lead to less than substantial harm to the significance of a designated heritage asset, this harm should be weighed against the public benefits of the proposal, including securing its optimum viable use.	<p>In summary, the construction and operation of the scheme would not result in the total or partial loss of any designated heritage asset. However, it would result in significant adverse effects to the setting of two designated heritage assets, one of which would experience both construction and operational effects. In addition, the scheme would result in the total or partial loss of a number of non-designated heritage assets during construction.</p> <p>Highways England has made efforts during the design process to avoid effects to the historic environment and to seek to identify opportunities for enhancement, as characterised by the landscape-led design approach to the scheme, detailed in the Design Summary Report (Document Reference 7.7). However, it is acknowledged that the resulting harm to the setting of a Grade II Listed Building and the setting of a Scheduled Monument requires a clear and convincing justification in accordance with the NPSNN. It is considered that the harm to these designated heritage assets is justified and substantially outweighed by benefits to the public that the scheme would deliver.</p> <p>The need for an intervention of this section of the A417 is clearly set out in section 7.3 (exceptional circumstances) of this report, which demonstrates how the road as existing results in an above average number of road fatalities and casualties and suffers from congestion and journey delays, both of which impact harmfully on local communities and the wider economy. Section 7.4 (compelling reasons) of this report identifies how the scheme would deliver substantial public benefits by addressing the existing issues with road capacity and safety, whilst also delivering substantial benefits through the landscape-led design of the scheme, which include (but are not limited to) habitat creation, improved access and experience for users of PRoW,</p>
5.135	Not all elements of a World Heritage Site or Conservation Area will necessarily contribute to its significance. The Secretary of State should treat the loss of a building (or other element) that makes a positive contribution to the site' significance either as substantial harm or less than substantial harm, as appropriate, taking into account the relative significance of the elements affected and their contribution to the significance of the Conservation Area or World Heritage Site as a whole.	
5.136	Where the loss of significance of any heritage asset has been justified by the applicant based on the merits of the new development and the significance of the asset in question, the Secretary of State should consider imposing a requirement that the applicant will prevent the loss occurring until the relevant development or part of development has commenced.	
5.137	Applicants should look for opportunities for new development within Conservation Areas and World Heritage Sites, and within the setting of heritage assets, to enhance or better reveal their significance. Proposals that preserve those elements of the setting that make a positive contribution to or better reveal the significance of the asset should be treated favourably.	
5.138	Where there is evidence of deliberate neglect of or damage to a heritage asset the Secretary of State should not take its deteriorated state into account in any decision.	

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		<p>reduced rat running through local communities and substantial economic benefits supporting strategic growth and housing development in the wider area.</p> <p>Beyond the wider benefits of the scheme, it must be recognised that it would also deliver enhancements relating to the historic environment of the area, which would enable members of the public improved access and understanding of the local heritage assets and the special qualities of the Cotswolds AONB.</p>
5.139	A documentary record of our past is not as valuable as retaining the heritage asset and therefore the ability to record evidence of the asset should not be a factor in deciding whether consent should be given.	Section 6.9 of ES Chapter 15 Assessment of Cumulative Effects (Document Reference 6.2) identifies how it is proposed that direct impacts (physical damage) to heritage assets would be mitigated through recording.
5.140	Where the loss of the whole or part of a heritage asset's significance is justified, the Secretary of State should require the applicant to record and advance understanding of the significance of the heritage asset before it is lost (wholly or in part). The extent of the requirement should be proportionate to the importance and the impact. Applicants should be required to deposit copies of the reports with the relevant Historic Environment Record. They should also be required to deposit the archive generated in a local museum or other public depository willing to receive it.	It states that archaeological remains would undergo 'preservation by record' in which archaeological remains would be investigated prior to construction, artefacts would be analysed and the results published following the construction of the scheme. The approach taken would vary depending on the significance of the impacted heritage resources and may include detailed archaeological excavation of high value buried archaeological remains; a strip-map-sample where archaeological remains are expected to be present dispersed over a wide area; or an archaeological watching brief in areas of lower archaeological potential. The type and location of mitigation required has been agreed with the GCC Archaeological Officer in Annex C Detailed Archaeological Mitigation Strategy and Overarching WSI of ES Appendix 2.1 Environmental Management Plan (EMP) (Document Reference 6.4).
5.141	The Secretary of State may add requirements to the development consent order to ensure that this is undertaken in a timely manner in accordance with a written scheme of investigation that meets the requirements of this section and has been agreed in writing with the relevant Local Authority and that the completion of the exercise is properly secured.	Annex C of the EMP also sets out recording proposed prior to the demolition of the Air Balloon Public House building, a non-designated heritage asset. This would comprise of a detailed record by photographic and measured survey.
5.142	Where there is a high probability that a development site may include as yet undiscovered heritage assets with archaeological interest, the Secretary of State should consider requirements to ensure that appropriate procedures are in place for the identification and treatment of such assets discovered during construction.	The programme of mitigation set out in Annex C of the EMP would be secured by DCO requirement as set out in the draft DCO (Document Reference 3.1). It is considered that the scheme complies with the policy of the NPSNN in relation to recording, with Highways England going beyond the requirements of NPSNN by

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		committing to doing a full measured building survey of a non-designated heritage asset, the Air Balloon public house.
Landscape and visual impacts		
5.144	Where the development is subject to EIA the applicant should undertake an assessment of any likely significant landscape and visual impacts in the environmental impact assessment and describe these in the environmental assessment. A number of guides have been produced to assist in addressing landscape issues. The landscape and visual assessment should include reference to any landscape character assessment and associated studies, as a means of assessing landscape impacts relevant to the proposed project. The applicant's assessment should also take account of any relevant policies based on these assessments in local development documents in England.	A Landscape and Visual Impact Assessment (LVIA) has been undertaken in relation to the scheme and is reported in ES Chapter 7 Landscape and Visual Effects. This assessment was undertaken in accordance with the methodology set out in DMRB LA 107 and also follows guidance from the Landscape Institute and Natural England. ES Chapter 7 Landscape and Visual Effects (Document Reference 6.2) also sets out how the LVIA took account of landscape character assessments and relevant local policies. The effects of the scheme during both its construction and its operation have been assessed in the LVIA. ES Chapter 7 Landscape and Visual Effects (Document Reference 6.2) concludes that construction activities would have significant adverse temporary effects on the area of the AONB within the study area and some special qualities of the Cotswolds AONB. Landscape character types that would be significantly adversely affected by the scheme during the construction phase include:
5.145	The applicant's assessment should include any significant effects during construction of the project and/or the significant effects of the completed development and its operation on landscape components and landscape character (including historic landscape characterisation).	<ul style="list-style-type: none"> • AONB LCT 2 Escarpment • AONB LCT 7 High Wold • AONB LCT 8 High Wold Valleys
5.146	The assessment should include the visibility and conspicuousness of the project during construction and of the presence and operation of the project and potential impacts on views and visual amenity. This should include any noise and light pollution effects, including on local amenity, tranquility and nature conservation.	Construction activities would have a likely significant adverse temporary effect on the visual receptors: <ul style="list-style-type: none"> • Recreational users on the Cotswold Way National Trail, Gloucestershire Way long distance footpath, byways, bridleways, and PRow including at Barrow Wake, Emma's Grove and Crickley Hill, and in relation to Shab Hill, Stockwell and Nettleton Bottom; • Communities including Nettleton Bottom, Shab Hill and Stockwell; and • Tourism receptors including visitors to the Cotswolds AONB, Great Witcombe roman villa, Crickley Hill Country Park, Barrow Wake, Emma' Grove and Leckhampton Hill.

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		<p>Combining the landscape and visual effect for construction assessment, overall, the scheme will give rise to significant, adverse effects on both landscape and visual receptors.</p> <p>The operation of the scheme would have significant and adverse permanent effects for character areas directly affected. Landscape character types that would be significantly affected by the scheme at year 1 of the operational phase include:</p> <ul style="list-style-type: none"> • AONB LCT 2 Escarpment (adverse) • AONB LCT 7 High Wold (adverse) • AONB LCT 8 High Wold Valleys (adverse) <p>Landscape character types that would be significantly affected by the scheme at year 15 of the operational phase include:</p> <ul style="list-style-type: none"> • AONB LCT 2 Escarpment (adverse) • AONB LCT 7 High Wold (adverse) <p>As a result of the scheme at year 1, there would be adverse permanent significant effects experienced by the following visual receptors:</p> <ul style="list-style-type: none"> • Recreational users on the Cotswold Way National Trail, Gloucestershire Way long distance footpath, byways, bridleways, and PRoW including at Barrow Wake, Emma’s Grove and Crickley Hill, and in relation to Shab Hill and Stockwell; • Visitors to the Crickley Hill Country Park, Great Witcombe Roman Villa, and Barrow Wake; and • Communities including Shab Hill and Stockwell. <p>As a result of the scheme at year 15, there would be adverse permanent significant effects experienced by the following visual receptors:</p> <ul style="list-style-type: none"> • Recreational users on the Cotswold Way National Trail; and

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		<ul style="list-style-type: none"> • Visitors to the Crickley Hill Country Park and Barrow Wake. <p>Non-significant beneficial effects would be experienced at the following receptors:</p> <ul style="list-style-type: none"> • Communities at Birdlip and Nettleton Bottom. • Combining the landscape and visual effect for both operational assessments, overall, the scheme will give rise to significant, adverse effects on both landscape and visual receptors. • Likely changes to the special qualities of the Cotswolds AONB. <p>Beyond the requirements of EIA, Table 7-13 in ES Chapter 7 Landscape and Visual Effects (Document Reference 6.2) includes an appraisal of effects on landscape character; the special qualities of the AONB (including tranquility and dark skies); and views and visual amenity, including on recreational, community and tourism receptors. This concludes that the operation of the scheme would have beneficial and adverse permanent effects on the special qualities of the AONB within the study area.</p> <p>Permanent adverse effects on the special qualities of the Cotswolds AONB include:</p> <ul style="list-style-type: none"> • Cotswold escarpment, including views from and to the AONB – with the increased depth and width of cutting, and additional carriageway width; and • River valleys – due to infilling the head of the valley at Coldwell Bottom and the presence of Shab Hill junction. <p>Permanent beneficial effects on the special qualities of the Cotswolds AONB include: Unifying character of the limestone geology – increasing its visible presence in the landscape through the cutting and use as a building material on the structure and extensive stone walling;</p> <ul style="list-style-type: none"> • High wold long distance views – reducing the visual dominance of road infrastructure with the repurposing of the existing A417 and setting the scheme into the landscape, enclosing it with landscape bunding and Cotswold stone walling;

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		<ul style="list-style-type: none"> • Distinctive dry-stone walls – provision of extensive, additional new sections of dry stone walling across the scheme; • Internationally important flower-rich grasslands, particularly limestone grasslands – provision of large areas of calcareous grassland; • Internationally important ancient broadleaved woodland, particularly along the crest of the escarpment – provision on additional areas of broadleaved woodland; • Variations in the colour of the stone from one part of the AONB to another which add a vital element of local distinctiveness – positively contributing to local distinctiveness with the use of Cotswold stone walling and cladding on structures; • Tranquility of the area – with the removal of lit junctions and better integrated carriageway to reduce noise and visual disturbance; • Extensive dark sky area – removal of lit junction and better integrated carriageway to reduce light spill from car headlights; • Accessible landscape for quiet recreation – improved recreational access with the provision and upgrading of PRow, traffic free WCH crossings via the Cotswold Way and Gloucestershire Way crossings. <p>ES Chapter 7 Landscape and Visual Effects (Document Reference 6.2) concludes that the scheme would have a range of changes on the character and special qualities of the Cotswolds AONB. In the short to medium term (up to the intended design year - year 15) these would generally be adverse in nature before the embedded and essential mitigation takes effect and the proposed enhancements are realised. In the long-term the scheme would help to conserve and enhance the natural beauty of the AONB, providing enhancements to some of the special qualities.</p> <p>Overall, the scheme would provide several opportunities to enhance the character and benefit the special qualities of the Cotswolds AONB in the long-term by removing some of the historic impacts of the existing A417. However, the scheme would give rise to temporary adverse changes as a result of the construction phase to a number of special qualities as set out above. A number of these adverse changes would</p>

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		continue into the early operational years. Benefits would be realised as the proposed landscape planting matures to a sufficient level and features of the scheme weather, becoming more integrated with the landscape, at operational design year (year 15), more of the adverse changes would be mitigated and further benefits realised.
5.147	Any statutory undertaker commissioning or undertaking works in relation to, or so as to affect land in a National Park or Areas of Outstanding Natural Beauty, would need to comply with the respective duties in section 11A of the National Parks and Access to Countryside Act 1949 and section 85 of the Countryside and Rights of Way Act 2000.	In relation to Paragraph 5.147, which references Section 11A of the National Parks and Access to Countryside Act 1949 and Section 85 of the Countryside and Rights of Way Act 2000 and Paragraph 5.148, which link to conserving and enhancing the natural beauty, wildlife, and cultural heritage. Highways England has had regard to the purpose of conserving and enhancing the natural beauty of the AONB.
5.148	For significant road widening or the building of new roads in National Parks, and the Broads applicants also need to fulfil the requirements set out in Defra's <i>English national parks and the broads: UK government vision and circular 2010</i> or successor documents. These requirements should also be complied with for significant road widening or the building of new roads in Areas of Outstanding Natural Beauty.	The landscape proposals are shown on the ES Figure 7.11 Environmental Masterplans (Document Reference 6.3) and detailed in section 7.9 Design, mitigation, and enhancement measures of ES Chapter 7 Landscape and Visual Effects (Document Reference 6.2). The Design Summary Report (Document Reference 7.7) demonstrates how Highways England has taken a 'landscape-led' approach to the design of the scheme and how the scheme complies with the requirements of the NPSNN in minimising or avoiding harm to the AONB landscape, and in delivering 'good design' (as also required by Paragraphs 4.28 to 4.35 of the NPSNN). It is considered that the scheme complies with the NPSNN with regard to landscape and visual impacts.
5.149	Landscape effects depend on the nature of the existing landscape likely to be affected and nature of the effect likely to occur. Both of these factors need to be considered in judging the impact of a project on landscape. Projects need to be designed carefully, taking account of the potential impact on the landscape. Having regard to siting, operational and other relevant constraints, the aim should be to avoid or minimise harm to the landscape, providing reasonable mitigation where possible and appropriate.	The Design Summary Report (Document Reference 7.7) demonstrates how Highways England has taken a 'landscape-led' approach to the design of the scheme and how the scheme complies with the requirements of the NPSNN in minimising or avoiding harm to the AONB landscape, and in delivering 'good design' (as also required by Paragraphs 4.28 to 4.35 of the NPSNN).
5.150	Great weight should be given to conserving landscape and scenic beauty in nationally designated areas. National Parks, the Broads and Areas of Outstanding Natural Beauty have the highest status of protection in relation to landscape and scenic beauty. Each of these designated areas has specific statutory purposes which help ensure	Chapter 7 of this report provides a detailed account of the evidence that demonstrates that there are exceptional circumstances for development in the Cotswolds AONB and that the scheme is in the public interest. This includes an assessment of:

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5.151	<p>their continued protection and which the Secretary of State has a statutory duty to have regard to in decisions.</p> <p>The Secretary of State should refuse development consent in these areas except in exceptional circumstances and where it can be demonstrated that it is in the public interest. Consideration of such applications should include an assessment of:</p> <ul style="list-style-type: none"> • the need for the development, including in terms of any national considerations, and the impact of consenting, or not consenting it, upon the local economy; • the cost of, and scope for, developing elsewhere, outside the designated area, or meeting the need for it in some other way; and • any detrimental effect on the environment, the landscape and recreational opportunities, and the extent to which that could be moderated. 	<ul style="list-style-type: none"> • the need for the scheme including national considerations and the impact of consenting it (or not consenting it) on the local economy; • the cost of and scope of developing elsewhere, outside of the designated area or meeting the need in some other way; • any detrimental effects of the environment, the landscape and recreational opportunities and the extent to which that could be moderated; • the compelling reasons for enhanced capacity and how benefits significantly outweigh the costs; and • how the scheme will be carried out to high environmental standards and would include measures to enhance other aspects of the environment, where possible. <p>In summary, there is a strong case to be made for the need for the scheme, given the existing congestion and road safety issues on the section of the A417 at Air Balloon. This is supported by the commitment in central Government to delivering and funding the scheme through the RIS programme, most recently in the publication of RIS2 in 2020. The economic assessment of the scheme evidences that the scheme would be of medium value for money and would deliver economic benefit to the wider area. This is recognised by the local authorities in the region who identify the scheme as priority infrastructure needed to support housing development and further economic growth. Traffic modelling forecasts the significant journey time savings and reduction in road accidents that the scheme would deliver – benefits that would be in the public interest. Conversely, it could be argued that not consenting the scheme would serve to continue to stifle economic development that could be unlocked and put road users at continued risk on a road that is no longer fit for purpose.</p> <p>The scope for developing elsewhere or outside of the AONB is extremely limited in the case of this scheme, such that there is no other realistic alternative to the proposed scheme. This is because the existing section of road is located entirely within the AONB. The extensive 20 year history of the development of the scheme evidences that Highways England has considered alternatives to a dualling scheme, such as smaller scale interventions, modal shift schemes or rerouting the SRN,</p>

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		<p>however none of these have been sufficiently feasible or would result in the desired outcomes with regard to addressing congestion and safety issues on the road.</p> <p>In concluding a highways solution is required, Highways England has assessed different routes, surface and tunnel options. While accepting that some tunnel options may offer some increased benefits compared to a surface route, the Secretary of State would need to have regard to the economic case against tunnelling, in which costs would greatly outweigh benefits, and consequently the feasibility of such a scheme ever being delivered. As explained above, even the lowest cost estimate for a tunnel option significantly exceeds the cost range for the scheme set by DfT and that option has an estimated BCR of 0.79. Tunnel options that do not offer value for money, and that cannot be delivered based on the funding that is available for the scheme, should be discarded when there are acceptable alternative surface routes that would address the problems, achieve the objectives, and offer value for money.</p> <p>A review of the residual significant adverse effects expected to result from the scheme, as reported in the ES (Volume 6), has identified that there are residual adverse significant effects relating to landscape, cultural heritage, biodiversity and noise during construction and operation of the scheme, and other residual adverse significant effects during construction only. However, it can be demonstrated that Highways England has actively sought to avoid or moderate such detrimental effects through the incorporation of appropriate mitigation, the adoption of a landscape-led approach to the design of the scheme, and through making substantial changes to the scheme design where reductions in adverse effects could be achieved.</p> <p>It is therefore considered that it is demonstrated and evidenced that exceptional circumstances do exist for development of the scheme within an AONB.</p> <p>Chapter 7 of this report and the documents referred to therein also demonstrate that there are compelling reasons for the scheme and that the benefits of it outweigh the costs very significantly.</p>
5.152	There is a strong presumption against any significant road widening or the building of new roads and strategic rail freight interchanges in	It is considered that there are compelling reasons for increasing capacity and improving road safety on the 'missing link' of the A417. As set out in Chapter 7 of this

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	<p>a National Park, the Broads and Areas of Outstanding Natural Beauty, unless it can be shown there are compelling reasons for the new or enhanced capacity and with any benefits outweighing the costs very significantly. Planning of the Strategic Road Network should encourage routes that avoid National Parks, the Broads and Areas of Outstanding Natural Beauty.</p>	<p>report, this is based not only on the existing evidence of delays and accidents, but also the forecast significant journey time savings and casualty reductions as a result of the scheme.</p> <p>The existing A417 is operating over-capacity and is of a design that does not align with modern highways standards. The resulting issues of congestion, unreliable journey times and poor road safety have an effect not only on road users but on local communities due to rat-running on local roads and on non-motorised users required to traverse the busy A417. The problems with the existing A417 also have a wider effect on the local economy, stifling growth and preventing the region – and its population – from fulfilling its economic and strategic growth potential. It is therefore considered that there are compelling reasons to enhance the capacity of the A417 and address these problems. Furthermore, it is considered that the alternative, to do nothing, would be unacceptable due to the ‘costs’ associated with the continuation or worsening of these issues with the existing road.</p> <p>It is recognised that there are costs associated with the scheme, primarily relating to adverse environmental effects, mainly during its construction in relation to cultural heritage; landscape and visual effects; biodiversity; and, noise and vibration. However, it should be noted that significant beneficial effects are also identified in relation to these topics, with the exception of cultural heritage. While some of these costs will be temporary in nature, others will have a permanent adverse effect on the environment of the Cotswolds AONB. Highways England has evidenced the efforts taken to avoid or reduce such costs in the preceding section. The scheme achieves an initial Benefit to Cost Ratio (BCR) of 1.49 and an adjusted BCR of 2.51 when reliability and wider economic benefits are included. Based on the DfT’s Value for Money Framework the scheme is in the ‘medium’ value for money category.</p> <p>Weighing against the identified costs of the scheme, this section has demonstrated the wide range of benefits that the scheme would provide. The quantity of adverse effects of the scheme on the environment would reduce as the scheme progresses from construction to operation, such that at Year 15 of the scheme’s operation, some effects would be removed entirely due to the maturation of mitigation measures, such</p>

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		<p>as planting for visual screening and habitat creation. In contrast to the majority of adverse effects occurring on a short-term basis during construction, the significant beneficial effects of the scheme are most numerous during the operation stage of the scheme, creating permanent benefit.</p> <p>It would, as a highways scheme, provide fundamental benefits to the road network through improving road safety; upgrading infrastructure in line with modern standards; increasing road capacity; and, reducing rat running through local communities / on local roads. These benefits of the scheme extend beyond addressing the immediate issues facing road users, by providing the infrastructure identified as being necessary to support economic and housing development in the area to meet strategic growth ambitions in the region.</p> <p>Finally, through high quality embedded mitigation and enhancement measures, there would be some benefits of the scheme to the surrounding environment which would represent an improvement compared to existing. This includes permanent beneficial effects to non-road users and local communities through improving the safety and experience of Public Rights of Way and providing a new recreational route on the Air Balloon Way; health, social and economic benefits; reduced road noise to some residential properties; and, permanent benefits to several special qualities of the AONB landscape. As detailed within Chapter 8, there would be net permanent gains in priority habitat types: 8.66ha of lowland mixed deciduous woodland; 72.78ha of lowland calcareous grassland; and 5,551m of hedgerow.</p> <p>Given the permanent nature of the suite of benefits identified, and the demonstrable need for the scheme, it is considered that the benefits of the scheme significantly outweigh both the costs of the scheme and the costs of no intervention.</p>
5.153	Where consent is given in these areas, the Secretary of State should be satisfied that the applicant has ensured that the project will be carried out to high environmental standards and where possible includes measures to enhance other aspects of the environment. Where necessary, the Secretary of State should	It is recognised that the location of this scheme within an area designated as both an AONB and SSSI means that the existing environment is of high quality, value and sensitivity. Meeting the NPSNN requirement for the project to be carried out to high environmental standards therefore means designing mitigation which as a minimum meets the high environmental baseline of the area, and which therefore must go

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	<p>consider the imposition of appropriate requirements to ensure these standards are delivered.</p>	<p>beyond the standard measures provided for highways schemes in undesignated areas.</p> <p>Chapter 7 of this report has outlined how Highways England has applied a landscape-led approach to designing the scheme and how this has informed the design of embedded mitigation measures to a high environmental standard. It is considered that this is well evidenced through the comparison of what Highways England would consider a ‘standard’ approach to mitigation on a highways scheme and what has been designed into the scheme. This evidences that the scheme design has been informed by the environmental assessment and has sought to deliver a bespoke design of embedded mitigation that is commensurate with, and reflective of, the existing high quality environment. This is further reflected in the alignment of the special features of the AONB with the mitigation measures proposed, demonstrating that the scheme design has been shaped by the location in which it is situated, as opposed to imposing a standard approach to highways design. It is concluded therefore that Highways England can demonstrate that the scheme would be carried out to the high environmental standards required by Paragraph 5.153 of the NPSNN and is policy compliant</p> <p>Chapter 7 of this report also sets out the measures that Highways England has designed into the scheme which would go further than to provide mitigation for its effects and would actually enhance the environment beyond the existing baseline. While the NPSNN recognises that such enhancement should be provided ‘where possible’, it can be demonstrated that Highways England has incorporated enhancement measures that would provide benefit to varied aspects of the AONB environment. This includes enhancements to ecology through habitat creation; to the landscape qualities of the AONB; to geological exposures characteristic of the SSSI; and substantial enhancements to the users of Public Rights of Way, including a National Trail.</p>
5.154	<p>The duty to have regard to the purposes of nationally designated areas also applies when considering applications for projects outside the boundaries of these areas which may have impacts within them. The aim should be to avoid compromising the</p>	<p>Appendix B of this report contains a review of scheme against the AONB Management Plan policies. Relevant policies include:</p>

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	<p>purposes of designation and such projects should be designed sensitively given the various siting, operational, and other relevant constraints. This should include projects in England which may have impacts on designated areas in Wales or on National Scenic Areas in Scotland. The fact that a proposed project will be visible from within a designated area should not in itself be a reason for refusing consent.</p>	<ul style="list-style-type: none"> • Policy CC2 – Compliance with Section 85 of the Countryside and Rights of Way Act 2000; • Policy CC3 – Working in Partnership; • Policy CC4 – Natural and Cultural Capital and Ecosystems Services – Principles; • Policy CC7 – Climate Change Mitigation; • Policy CC8 – Climate Change Adaption;
5.156	<p>Outside nationally designated areas, there are local landscapes that may be highly valued locally and protected by local designation. Where a local development document in England has policies based on landscape character assessment, these should be given particular consideration. However, local landscape designations should not be used in themselves as reasons to refuse consent, as this may unduly restrict acceptable development.</p>	<ul style="list-style-type: none"> • Policy CE1 – Landscape; • Policy CE2 – Geology; • Policy CE3 – Local Distinctiveness; • Policy CE4 – Tranquillity; • Policy CE6 – Historic Environment and Cultural Heritage • Policy CE7 – Biodiversity • Policy CE10 – Development and Transport Principles • Policy CE11 – Major Developments • Policy CE12 – Development Priorities and Evidence of Need; • Policy UE2 – Access and Recreation • Policy UE3 – Health and Wellbeing. <p>In addition to the AONB’s special qualities are CCB’s position statements, landscape strategy and guidelines, local distinctiveness and landscape change report and the area’s landscape character assessment:</p> <ul style="list-style-type: none"> • Cotswolds AONB Landscape Character Assessment; • Cotswolds AONB Landscape Strategy and Guidelines for LCT 2 Escarpment, LCT 7 High Wold, LCT 8 High Wold Valley, and LCT 18 Settled Unwooded Vale; • CCB Local Distinctiveness and Landscape Change Report (2005); • Tranquillity Position Statement (2019); • Cotswolds Dark Skies & Artificial Light Position Statement (2019); • Tree Species and Provenance (2017); • Transport (Revised 2013); and

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		<ul style="list-style-type: none"> Management of Roadside Verges (2015). <p>All of these documents have helped to steer the design, providing important baseline information and guidance on what design solutions would be acceptable and how best to protect and enhance the important aspects of the AONB. This is set out in further detail within the Design Summary Report (Document Reference 7.7).</p>
5.157	<p>In taking decisions, the Secretary of State should consider whether the project has been designed carefully, taking account of environmental effects on the landscape and siting, operational and other relevant constraints, to avoid adverse effects on landscape or to minimise harm to the landscape, including by reasonable mitigation.</p>	<p>The Design Summary Report (Document Reference 7.7) demonstrates how Highways England has taken a 'landscape-led' approach to the design of the scheme and how the scheme complies with the requirements of the NPSNN in minimising or avoiding harm to the AONB landscape, and in delivering 'good design' (as also required by Paragraphs 4.28 to 4.35 of the NPSNN).</p>
5.158	<p>The Secretary of State will have to judge whether the visual effects on sensitive receptors, such as local residents, and other receptors, such as visitors to the local area, outweigh the benefits of the development. Coastal areas are particularly vulnerable to visual intrusion because of the potential high visibility of development on the foreshore, on the skyline and affecting views along stretches of undeveloped coast, especially those defined as Heritage Coast.</p>	<p>An LVIA has been undertaken in relation to the scheme and is reported in ES Chapter 7 Landscape and Visual Effects (Document Reference 6.2). The effects of the scheme during both its construction and its operation have been assessed in the LVIA. This includes an assessment of its effects on landscape character; the special characteristics of the AONB (including tranquility and dark skies); and, views and visual amenity, including on recreational, community and tourism receptors.</p>
5.159	<p>Reducing the scale of a project or making changes to its operation can help to avoid or mitigate the visual and landscape effects of a proposed project. However, reducing the scale or otherwise amending the design or changing the operation of a proposed development may result in a significant operational constraint and reduction in function.</p> <p>There may, be exceptional circumstances, where mitigation could have a very significant benefit and warrant a small reduction in scale or function. In these circumstances, the Secretary of State may decide that the benefits of the mitigation to reduce the landscape effects outweigh the marginal loss of scale or function.</p>	<p>The Design Summary Report (Document Reference 7.7) demonstrates how Highways England has taken a 'landscape-led' approach to the design of the scheme and how the scheme complies with the requirements of the NPSNN in minimising or avoiding harm to the AONB landscape, and in delivering 'good design' (as also required by Paragraphs 4.28 to 4.35 of the NPSNN).</p>
5.160	<p>Adverse landscape and visual effects may be minimised through appropriate siting of infrastructure, design (including choice of</p>	

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	materials), and landscaping Schemes, depending on the size and type of proposed project. Materials and designs for infrastructure should always be given careful consideration.	
5.161	Depending on the topography of the surrounding terrain and areas of population it may be appropriate to undertake landscaping off site, although if such landscaping was proposed to be consented by the development consent order, it would have to be included within the order limits for that application. For example, filling in gaps in existing tree and hedge lines would mitigate the impact when viewed from a more distant vista.	
Land use including open space, green infrastructure and Green Belt		
5.165	The applicant should identify existing and proposed land uses near the project, any effects of replacing an existing development or use of the site with the proposed project or preventing a development or use on a neighbouring site from continuing. Applicants should also assess any effects of precluding a new development or use proposed in the development plan. The assessment should be proportionate.	ES Chapter 12 Population and Human Health (Document Reference 6.2) identifies that there are no development allocations within the Joint Core Strategy (adopted by Gloucester City Council, Cheltenham Borough Council and Tewkesbury Borough Council) that would be directly affected by the scheme, nor any known planning applications currently pending determination within the Order Limits or within proximity of the scheme. Proposed developments with planning permission within 500m of the scheme have been taken into account when assessing cumulative effects of the scheme, as set out in ES Chapter 15 Assessment of Cumulative Effects (Document Reference 6.2).
5.166	Existing open space, sports and recreational buildings and land should not be developed unless the land is surplus to requirements or the loss would be replaced by equivalent or better provision in terms of quantity and quality in a suitable location. Applicants considering proposals which would involve developing such land should have regard to any local authority's assessment of need for such types of land and buildings.	The land use and accessibility assessment included within Chapter 12 Population and Human Health (Document Reference 6.2) concludes that the construction of the scheme is not anticipated to lead to any significant effects on development land with operation of the scheme bringing accessibility benefits in the wider area and beneficial impacts for the delivery of strategic allocations within the region, such as that at North Brockworth.
5.167	During any pre-application discussions with the applicant, the local planning authority should identify any concerns it has about the impacts of the application on land-use, having regard to the development plan and relevant applications, and including, where	Consultation with the local planning authorities affected by the scheme is detailed in the Consultation Report (Document Reference 5.1) and reflected in the Statement of Common Ground with the Joint Councils (see Document Reference 7.3).

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	<p>relevant, whether it agrees with any independent assessment that the land is surplus to requirements. These are also matters that local authorities may wish to include in their Local Impact Report which can be submitted after an application for development consent has been accepted.</p>	
5.168	<p>Applicants should take into account the economic and other benefits of the best and most versatile agricultural land (defined as land in grades 1, 2 and 3a of the Agricultural Land Classification). Where significant development of agricultural land is demonstrated to be necessary, applicants should seek to use areas of poorer quality land in preference to that of a higher quality. Applicants should also identify any effects, and seek to minimise impacts, on soil quality, taking into account any mitigation measures proposed. Where possible, developments should be on previously developed (brownfield) sites provided that it is not of high environmental value. For developments on previously developed land, applicants should ensure that they have considered the risk posed by land contamination and how it is proposed to address this.</p>	<p>Effects on agricultural land and soil resources are assessed in ES Chapter 9 Geology and Soils (Document Reference 6.2) with wider potential effects on agricultural land holdings assessed in ES Chapter 12 Population and Human Health (Document Reference 6.2).</p> <p>In order to inform the assessment, a detailed agricultural land classification (ALC) survey was undertaken for areas of the scheme not covered by previous survey work.</p> <p>The scheme requires both temporary (including temporary with permanent rights) and permanent use of agricultural land through the construction of the mainline carriageway, as well as land for wider scheme mitigation and enhancements.</p> <p>The areas of agricultural land that would be affected by the construction of the scheme has been estimated to be approximately 130ha. This is also shown on ES Figure 9.6 Agricultural land classification (Document Reference 6.3)</p> <p>The assessment in Chapter 9 Geology and Soils (Document Reference 6.2) concludes that the permanent loss of grade 3A agricultural land (which is considered to be best and most versatile (BMV)) would lead to a large adverse effect which would be significant. In addition, the loss of grade 3B agricultural land has also been assessed as a moderate adverse effect which is also significant.</p> <p>Although significant effects have been identified it is not possible to mitigate these effects, or therefore provide any monitoring. The permanent loss of grade 4 agricultural land and the temporary use of grades 3 and 4 land during construction is considered to bring neutral or slight adverse effects which would not be significant.</p>

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		<p>Where agricultural land is proposed to be used temporarily during construction, monitoring is required as part of the proposed mitigation measures despite these temporary effects not being significant. The land would be restored and returned to the landowner through measures outlined in the Soil Management Plan to be developed by the Contractor as part of ES Appendix 2.1 EMP (Document Reference 6.4). In this instance, post construction monitoring would be required to determine whether pre-existing agricultural soil capability had been reinstated. Following the completion of construction activities, agricultural land taken on a temporary basis would be restored and returned to the landowner for unrestricted agricultural use in the same agricultural condition (ALC grade) that currently exists. This mitigation measure to maintain the quality of soils is identified in the Register of Environmental Actions and Commitments (REAC), contained within ES Appendix 2.1 Environmental Management Plan (EMP). The design includes shallow bund slopes, with the intention to return the back slopes by agreement to the landowner to enable the land to be returned to grazing / to maximise agricultural use.</p> <p>In considering the overall effect on agricultural land holdings, Chapter 12 Population and Human Health (Document Reference 6.2) concludes a significant adverse effect on Shab Hill Farm given the proportion of land take required for the scheme and the potential to impact on the viability of the holding. All other holdings are assessed as experiencing neutral or slight adverse effects during both construction and operation of the scheme.</p> <p>The main areas of permanent land take of agricultural land are focussed on the construction of the mainline carriageway and Shab Hill junction. This land take is considered to be unavoidable given the linear nature of the scheme, with efforts made to minimise land take from agricultural holdings wherever possible.</p> <p>Through measures in ES Appendix 2.1 EMP (Document Reference 6.4), the scheme would seek to minimise potential effects on soil quality where temporary land take is proposed.</p>
5.169	Applicants should safeguard any mineral resources on the proposed site as far as possible.	Mineral resources and Mineral Safeguarding Areas (MSA) are considered in ES Chapter 10 Material Assets and Waste (Document Reference 6.2). The scheme

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		<p>footprint would overlap a MSA for sandstone and limestone and a MSA for sand and gravel. The assessment concludes that the scheme would not diminish access to the MSAs and would not sterilise the use of the wider resource.</p> <p>In addition to the MSAs, the scheme would also directly affect an extant dormant quarry (Birdlip Quarry) which is located to the north of Cowley roundabout. Although dormant, ES Chapter 10 Material Assets and Waste (Document Reference 6.2) assumes a worst-case scenario whereby the scheme would sterilise this quarry and prevent future extractions. Through correspondence with GCC, Highways England understand that there has been no active working in the past 25 years. Therefore, the assessment of effects on mining and material resources is considered slight and not significant. Discussions are ongoing with the owner/operator of the site, this is captured in Appendix B of the Statement of Reasons (Document Reference 4.1), see entry for PIL ID 14.</p>
5.170	<p>The general policies controlling development in the countryside apply with equal force in Green Belts but there is, in addition, a general presumption against inappropriate development within them. Such development should not be approved except in very special circumstances. Applicants should therefore determine whether their proposal, or any part of it, is within an established Green Belt and, if so, whether their proposal may be considered inappropriate development within the meaning of Green Belt policy. Metropolitan Open Land, and</p> <p>land designated as Local Green Space in a local or neighbourhood plan, are subject to the same policies of protection as Green Belt, and inappropriate development should not be approved except in very special circumstances.</p>	<p>There is no designated Green Belt in the DCO boundary and therefore this is not relevant to the scheme.</p>
5.171	<p>Linear infrastructure linking an area near a Green Belt with other locations will often have to pass through Green Belt land. The identification of a policy need for linear infrastructure will take account of the fact that there will be an impact on the Green Belt and as far as possible, of the need to contribute to the achievement of the objectives for the use of land in Green Belts.</p>	

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5.173	Where the project conflicts with a proposal in a development plan, the Secretary of State should take account of the stage which the development plan document has reached in deciding what weight to give to the plan for the purposes of determining the planning significance of what is replaced, prevented or precluded. The closer the development plan document is to being adopted by the local plan, the greater the weight which can be attached to the impact of the proposal on the plan.	Appendix B of this report includes an assessment of relevant local plan policies contained in the adopted and emerging development plans for GCC, Cotswolds District Council and Tewkesbury Borough Council, which are the host authorities for the scheme.
5.174	The Secretary of State should not grant consent for development on existing open space, sports and recreational buildings and land, including playing fields, unless an assessment has been undertaken either by the local authority or independently, which has shown the open space or the buildings and land to be surplus to requirements, or the Secretary of State determines that the benefits of the project (including need) outweigh the potential loss of such facilities, taking into account any positive proposals made by the applicant to provide new, improved or compensatory land or facilities.	<p>The scheme does not include the loss of any sports and recreation buildings / land, although it does involve the acquisition, and therefore impact on open space, including areas of Common Land, Open Access Land and Country Park. Where open space is required to facilitate the scheme, the need for compensatory land in the form of replacement land or exchange land has been considered in detail against the key tests within Section 131 and 132 of the Act within the Statement of Reasons (Document Reference 4.1).</p> <p>The scheme requires 12,905 square metres of land to be acquired permanently, 21,293 square metres of land to be used temporarily with rights to be acquired permanently for access/maintenance or other purposes, and 6,891 square metres of land to be used temporarily. The area of replacement land would be circa 10,540 square metres. This is greater in area (6,570 square metres greater) than the existing Common Land which is proposed to be removed / de-registered (3,970 square metres).</p> <p>Please refer to the information provided under paragraph 5.181 or within section 9.3 of this Report for further information on the new, improved or compensatory land or facilities proposed. Chapter 9 of this report considers the effects of the scheme on this special category land and compliance with the relevant paragraphs of the NPSNN.</p>
5.175	Where networks of green infrastructure have been identified in development plans, they should normally be protected from development, and, where possible, strengthened by or integrated within it. The value of linear infrastructure and its footprint in	Appendix B of this report includes an assessment of relevant local plan policies contained in the adopted and emerging development plans for GCC, Cotswolds District Council and Tewkesbury Borough Council, which are the host authorities for

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	supporting biodiversity and ecosystems should also be taken into account when assessing the impact on green infrastructure.	the scheme. Please refer to the entry under Paragraph 5.180 for a consideration of how green infrastructure is impacted by the scheme.
5.176	The decision-maker should take into account the economic and other benefits of the best and most versatile agricultural land. The decision maker should give little weight to the loss of agricultural land in grades 3b, 4 and 5, except in areas (such as uplands) where particular agricultural practices may themselves contribute to the quality and character of the environment or the local economy.	<p>The assessment in Chapter 9 Geology and Soils (Document Reference 6.2) concludes that the permanent loss of grade 3A agricultural land (which is considered to be best and most versatile (BMV)) would lead to a large adverse effect which would be significant. In addition, the loss of grade 3B agricultural land has also been assessed as a moderate adverse effect which is also significant.</p> <p>Although significant effects have been identified it is not possible to mitigate these effects, or therefore provide any monitoring.</p> <p>The permanent loss of grade 4 agricultural land and the temporary use of grades 3 and 4 land during construction is considered to bring neutral or slight adverse effects which would not be significant.</p> <p>Where agricultural land is proposed to be used temporarily during construction, monitoring is required as part of the proposed mitigation measures despite these temporary effects not being significant. The land would be restored and returned to the landowner through measures outlined in the Soil Management Plan to be developed by the Contractor as part of ES Appendix 2.1 EMP (Document Reference 6.4). In this instance, post construction monitoring would be required to determine whether pre-existing agricultural soil capability had been reinstated.</p> <p>In considering the overall effect on agricultural land holdings, Chapter 12 Population and Human Health (Document Reference 6.2) concludes a significant adverse effect on Shab Hill Farm given the proportion of land take required for the scheme and the potential to impact on the viability of the holding. All other holdings are assessed as experiencing neutral or slight adverse effects during both construction and operation of the scheme.</p> <p>The main areas of permanent land take of agricultural land are focussed on the construction of the mainline carriageway and Shab Hill junction. This land take is</p>

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		<p>considered to be unavoidable given the linear nature of the scheme, with efforts made to minimise land take from agricultural holdings wherever possible.</p> <p>Through measures in ES Appendix 2.1 EMP (Document Reference 6.4), the scheme would seek to minimise potential effects on soil quality where temporary land take is proposed.</p>
5.177	In considering the impact on maintaining coastal recreation sites and features, the Secretary of State should expect applicants to have taken advantage of opportunities to maintain and enhance access to the coast. In doing so the Secretary of State should consider the implications for development of the creation of a continuous signed and managed route around the coast, as proposed in the Marine and Coastal Access Act 2009.	The scheme is not located in close proximity to coastal recreation sites and features and therefore this Paragraph of the NPSNN is not relevant to the scheme..
5.178	When located in the Green Belt national networks infrastructure projects may comprise inappropriate development. Inappropriate development is by definition harmful to the Green Belt and there is a presumption against it except in very special circumstances. The Secretary of State will need to assess whether there are very special circumstances to justify inappropriate development. Very special circumstances will not exist unless the potential harm to the Green Belt by reason of inappropriateness, and any other harm, is clearly outweighed by other considerations. In view of the presumption against inappropriate development, the Secretary of State will attach substantial weight to the harm to the Green Belt, when considering any application for such development.	There is no designated Green Belt in the DCO boundary and therefore this Paragraph of the NPSNN is not relevant to the scheme.
5.180	Where green infrastructure is affected, applicants should aim to ensure the functionality and connectivity of the green infrastructure network is maintained and any necessary works are undertaken, where possible, to mitigate any adverse impact and, where appropriate, to improve that network and other areas of open space, including appropriate access to new coastal access routes, National Trails and other public rights of way.	<p>The scheme would provide an increased number of safe wildlife crossings, as well as the creation of the following features to provide improved ecological connectivity and landscape integration:</p> <ul style="list-style-type: none"> • 6.8 miles of new Cotswold drystone walls; • 9,024 metres of native species-rich hedgerows; • 25.57ha of native broadleaved woodland; • 4.34ha of native scrub, e.g. small bushes and trees;

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		<ul style="list-style-type: none"> • 7.60ha of species-rich neutral grassland; and • 75.41ha of limestone grassland. <p>Replacement or enhancement vegetation is also included as part of the scheme design. For example, the southern side of the A417 between Brockworth bypass and Air Balloon roundabout is an area identified for replacement or enhancement planting. This is shown in the Trees and Hedgerows to be Removed or Managed Plans (Document Reference 2.13) and illustrated on the Environmental Masterplans (ES Figure 7.11, Document Reference 6.3).</p> <p>Furthermore, Highways England has chosen to repurpose a section of the existing A417 highway to a recreational route (to be named the Air Balloon Way) and corridor to help improve ecological connectivity and landscape integration, exemplifying a design approach in which opportunities to improve on the existing situation have been identified and progressed where feasible.</p> <p>The PRoW Management Plan (ES Appendix 2.1 Environmental Management Plan Annex F (Document Reference 6.4)) demonstrates a planned approach to the management of PRoW during the construction and operation of the scheme, ensuring public safety while reducing disruption to users. Overall it seeks to provide a safer and more attractive environment for active travel and improve connectivity across the walking, cycling and horse riding network.</p> <p>In relation to the Cotswold Way National Trail, the scheme proposes to divert the route across the Cotswold Way crossing, providing a safe and attractive bridged route for the National Trail compared to a route which at present follows the A417 at grade for a section prior to users having to cross the A417 road at the same level.</p>
5.181	The Secretary of State should also consider whether mitigation of any adverse effects on green infrastructure or open space is adequately provided for by means of any planning obligations, for example, to provide exchange land and provide for appropriate management and maintenance agreements. Any exchange land should be at least as good in terms of size, usefulness,	The scheme requires the acquisition of Common Land, Open Access Land and Country Park. The need for compensatory land in the form of replacement land or exchange land has been considered in detail against the key tests within Section 131 and 132 of The Planning Act (2008) within the Statement of Reasons (Document Reference 4.1). Chapter 9 of this report provides further information on this matter.

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	<p>attractiveness, quality and accessibility. Alternatively, where Sections 131 and 132 of the Planning Act 2008 apply, any replacement land provided under those sections will need to conform to the requirements of those sections.</p>	<p><u>Country Park and Open Access Land (Open Space)</u></p> <p>The scheme requires 12,905 square metres of land to be acquired permanently, 21,293 square metres of land to be used temporarily with rights to be acquired permanently for access/maintenance or other purposes, and 6,891 square metres of land to be used temporarily.</p> <p>In accordance with the requirements of both the Act and paragraph 5.181 of the NPSNN, the provision of exchange land for the areas of Open Space required for the scheme has been considered in detail through the Statement of Reasons and its associated Appendix D (Document Reference 4.1).</p> <p>Having considered the areas of Open Space required, the reason for their inclusion within the scheme, and the situation following acquisition, the Statement of Reasons (Document Reference 4.1) concludes as follows.</p> <p>In respect of land to be acquired permanently, all of the Open Space land (Open Access Land and Country Park) is required in relation to widening or drainage works of an existing highway and it is not necessary to provide replacement land given that post completion of the scheme, the land will be in the ownership of Highways England and will be within the highway boundary, which means the public will have the right to pass and repass over the land. In addition, some of the land required is not currently easily accessible by the public and therefore inclusion of the land within the scheme would not adversely impact on the public interests. Furthermore, the scheme proposes a number of improvements and additions to the WCH network which improve formal public accessibility across and in the vicinity of the scheme.</p> <p>Whilst the scheme therefore proposes removal of some areas of Open Access Land and Country Park, as a whole, the scheme has sought to improve WCH access and connectivity across the A417 and within the surrounding areas. The benefits associated with this improved connectivity and safety for WCH users are considered</p>

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		<p>to outweigh the loss of Open Access Land, particularly given that many areas will remain accessible and the acquisition will not adversely impact on public interests.</p> <p>In respect of the land where permanent rights are required, the nature of the Open Access Land would not be affected by the rights and the ability for the public to access the land following construction would be no different to the current situation. The tests in both paragraphs 5.174 and 5.181 in relation to impact and potential mitigation are therefore met.</p> <p>In respect of land required temporarily, access would be fully reinstated to its current position following construction of the scheme and therefore the tests in both paragraphs 5.174 and 5.181 in relation to impact and potential mitigation are therefore met.</p> <p><u>Common Land</u></p> <p>The Common Land affected by the scheme is an area of land known as Barrow Wake near Birdlip and is registered as Common Land parcel CL274.</p> <p>The scheme requires the acquisition of Common Land in the vicinity of Barrow Wake and also to the south of the existing A417 in the vicinity of Crickley Ridge. In total, the scheme requires 3,970 square metres of land to be acquired permanently to facilitate construction of the scheme in these areas.</p> <p>In addition to the land acquired permanently, temporary possession is also sought over a further 2,606 square metres of Common Land. This land is solely to be used for the construction of a dry-stone wall / highway boundary feature on land adjacent to the Common Land. No works are proposed on the Common itself at this location.</p> <p>In response to the requirements of the NPSNN and the legal tests set out within Section 131 of the Act, the scheme identifies an area of replacement land. This is shown on the Special Category Land Plans (Document Reference 2.3) and described further in the Statement of Reasons (Document Reference 4.1). The land proposed as replacement utilises part of the current A417 to be de-trunked as part of the</p>

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		<p>scheme and would provide in the region of 10,540 square metres of replacement Common Land.</p> <p>An assessment of this area of replacement land and others considered as part of the scheme is contained within the Statement of Reasons, Appendix D (Document Reference 4.1).</p> <p>This replacement land is considered to offer the following benefits:</p> <ul style="list-style-type: none"> • The land is contiguous with the existing Common Land. • The land would be fully accessible because it is contiguous with the existing Common Land and also through proposals to create a new 5m wide public walking, cycling and horse-riding link along the re-purposed A417 which would be separate but run adjacent to the proposed replacement land. • As part of the scheme, the land will be formed so that it is of the same character as the existing Common Land, which could potentially lead to the replacement land being established in the future as SSSI quality / designation as on the existing Common Land. • The land is currently in the ownership of Highways England and therefore it would not require further, unnecessary acquisition of land. • The replacement land would in part return to its former Common Land status, which was previously de-registered to facilitate the construction of the existing A417. • The area of replacement land would be circa 10,540 square metres. This is greater in area (6,570 square metres greater) than the existing Common Land which is proposed to be removed / de-registered (3,970 square metres).
5.182	Where a proposed development has an impact on a Mineral Safeguarding Area (MSA), the Secretary of State should ensure that the applicant has put forward appropriate mitigation measures to safeguard mineral resources.	<p>Mineral resources and MSAs are considered in Chapter 10 Material Assets and Waste (Document Reference 6.2). The scheme footprint would overlap a MSA for sandstone and limestone and a MSA for sand and gravel. The assessment concludes that the scheme would not diminish access to the MSAs and would not sterilise the use of the wider resource.</p> <p>In addition to the MSAs, the scheme would also directly affect an extant dormant quarry (Birdlip Quarry) which is located to the north of Cowley roundabout. Although</p>

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		<p>dormant, ES Chapter 10 Material Assets and Waste (Document Reference 6.2) Material Assets and Waste (Document Reference 6.2) assumes a worst-case scenario whereby the scheme would sterilise this quarry and prevent future extractions. Through correspondence with GCC, Highways England understand that there has been no active working in the past 25 years. Therefore, the assessment of effects on mining and material resources is considered slight and not significant.</p>
5.184	<p>Public rights of way, National Trails, and other rights of access to land (e.g. open access land) are important recreational facilities for walkers, cyclists and equestrians. Applicants are expected to take appropriate mitigation measures to address adverse effects on coastal access, National Trails, other public rights of way and open access land and, where appropriate, to consider what opportunities there may be to improve access. In considering revisions to an existing right of way consideration needs to be given to the use, character, attractiveness and convenience of the right of way. The Secretary of State should consider whether the mitigation measures put forward by an applicant are acceptable and whether requirements in respect of these measures might be attached to any grant of development consent.</p>	<p>ES Chapter 12 Population and Human Health (Document Reference 6.2) identifies that the scheme has the potential to affect the Cotswold Way National Trail, Gloucestershire Way long distance footpath, and more than 20 footpaths, bridleways and restricted byways. There are also a number of local routes that interface with the scheme with public access rights as highways. PRow and local routes that intersect with the scheme are shown on ES Figure 12.2 Public rights of way and local routes (Document Reference 6.3).</p> <p>Annex F PRow Management Plan of ES Appendix 2.1 EMP (Document Reference 6.4) demonstrates a planned approach to the management of PRow during the construction and operation of the scheme, ensuring public safety while reducing disruption to users. It also sets out how it would secure through the DCO appropriate surfacing, signage and enclosures, which would be discussed and agreed with Gloucestershire Country Council (local highway authority) at the detailed design stage.</p> <p>It seeks to manage closures where possible (e.g. managed crossing and/or early re-provision) retaining rights of way as per current routes and seeking to reduce the effect on users. This would include:</p> <ul style="list-style-type: none"> • use of signage where PRow can remain open, but users need to be warned of the presence of construction vehicles (local management); • implementation of short, temporary closures where local works might affect safety of users (local closures); • closure of/extinguishment of a PRow following the early implementation of an alternative/new route (e.g. via a new overbridge/underbridge) (early re-provision);

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		<ul style="list-style-type: none"> • closure of/extinguishment of a PRoW without re-provision (e.g. where works sequencing would not provide a new crossing in advance on the carriageway works) and/or permanent extinguishment of a PRoW (full closure); and • provision of new crossings/routes as part of the scheme (new routes). <p>There would only be one instance of a permanent closure without substitute (Badgeworth bridleway 125) where the value of the route is not sufficient to justify re-provision or diversion as part of the scheme (but appropriate alternative routes are available).</p> <p>All potential diversions and proposed new routes are also shown on the Rights of Way and Access Plans (Document Reference 2.5) supporting the DCO application.</p> <p>As outlined in Chapter 12 Population and Human Health (Document Reference 6.2), the scheme includes numerous proposals that seek to improve accessibility and connectivity across the PRoW network within the study area. In summary this includes:</p> <ul style="list-style-type: none"> • 7 sections of proposed new footpath (including new stepped accesses) • 10 sections of proposed new bridleway • 7 sections of proposed new restricted byway, including the repurposed A417 / Air Balloon Way • 2 sections of new byways open to all traffic • 3 instances where proposals include reclassification of PRoW in order to provide greater access rights and improve connectivity for users between the existing and proposed network (one footpath to bridleway, and two footpaths to restricted byways) • 2 instances where access rights are proposed to provide greater connectivity between the existing and proposed PRoW <p>All new structures proposed, as described in detail in ES Chapter 2 The project (Document Reference 6.2) would carry public access rights and/or PRoW, providing a</p>

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		<p>key element of mitigation in order to reduce severance for WCH across the study area.</p> <p>In particular, the scheme would enhance the WCH and PRoW network with the following new features:</p> <ul style="list-style-type: none"> • The Cotswold Way crossing – a 5 metre wide restricted byway crossing, in the vicinity of Emma’s Grove and connecting to Cold Slad is proposed, to provide benefits including a grade separated diversion of the Cotswold Way National Trail. It would enhance the visitor experience of this important long-distance route, bringing a significant improvement when compared to the existing situation. New sections of bridleway and restricted byway would connect into existing routes to help enhance WCH connectivity east-west and north-south. The structure could also accommodate seasonal cattle crossings from nearby agricultural holdings, as requested by local farmers. At 5 metres wide, the crossing would be wide enough to accommodate different users, and there would be resting places along it to help assist those with mobility needs. • The Gloucestershire Way crossing - a new 37 metre wide multi-purpose crossing would provide essential mitigation for bats and enhancement opportunity of ecology and landscape integration. The public would also further benefit as the crossing would accommodate the Gloucestershire Way long distance footpath and provide an improved visitor experience. Walkers would use the structure to connect to Cowley footpaths 1, 16 and 3 which form part of the promoted Gloucestershire Way long distance footpath and new/diverted routes. Other non-motorised users would use the structure to connect to unclassified roads and avoid the need to cross through the Shab Hill junction, giving users choice. Either side of the crossing, separate bridleways, side roads and footpaths would connect users onto a 3.5 metre wide bridleway running over the crossing. • Cowley overbridge – this crossing over the new A417 would provide access between Stockwell and Cowley. The crossing would include provision for WCH, helping connect into the existing PRoW and unclassified roads via new steps and sections of restricted byway and footpath.

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		<ul style="list-style-type: none"> • Stockwell overbridge – this crossing over the new A417 would primarily provide a farm access track from Stockwell Farm in an east-west direction. The crossing would include provision for WCH, helping connect into existing routes to help improve connectivity for WCH. • Grove Farm underpass – this underpass would provide access to local properties and agricultural land, with provision for WCH via new sections of bridleway and footpath diversions to connect Cold Slad Lane. • Repurposed A417 – part of the existing A417 would be repurposed to provide a restricted byway connection between new car parking near the Stockwell Lane junction and the Cotswold Way crossing (and beyond), proposed to be called the ‘Air Balloon Way’. <p>With the measures set out above and within the PRow Management Plan, it is considered that construction of the scheme would lead to slight adverse effects on the majority of WCH during construction of the scheme, by virtue of the local and temporary disruption to users, which would not be significant. However, during operation, it is considered that the proposals would bring moderate beneficial effects to the PRow and WCH network in the study area, which would be significant to users and the local communities. In summary, the scheme has provided appropriate mitigation where PRow and local routes are affected, and has developed numerous proposals which seek to bring improved access and enhancements to the local recreational networks.</p>
Noise and vibration		
5.187	Noise resulting from a proposed development can also have adverse impacts on wildlife and biodiversity. Noise effects of the proposed development on ecological receptors should be assessed in accordance with the Biodiversity and Geological Conservation section of this NPS.	<p>ES Chapter 8 Biodiversity (Document Reference 6.2) acknowledges and assesses the potential impacts on biodiversity and wildlife relating to noise and vibration. Disturbance due to noise is identified a direct impact in ES Chapter 8 that would affect biodiversity and is considered in relation to different ecological receptors. No likely significant effects relating to noise are identified.</p> <p>It is acknowledged in Chapter 8 Biodiversity (Document Reference 6.2) that noise and vibration during construction can result in temporary disturbance to species. For example, such temporary disturbance can lead to the abandonment of badger setts</p>

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		<p>and young, or collapse of sett tunnels. Therefore, suitable working methods are incorporated in Annex D of the ES Appendix 2.1 EMP (Document Reference 6.4) to avoid such impacts.</p> <p>ES Chapter 11 Noise and Vibration (Document Reference 6.2) assesses the impacts of the scheme relating to noise and vibration on residential and non-residential receptors during both construction and operation. Mitigation measures proposed to minimise or avoid adverse impacts are identified.</p>
5.189	<p>Where a development is subject to EIA and significant noise impacts are likely to arise from the proposed development, the applicant should include the following in the noise assessment, which should form part of the environment statement:</p> <ul style="list-style-type: none"> • a description of the noise sources including likely usage in terms of number of movements, fleet mix and diurnal pattern. For any associated fixed structures, such as ventilation fans for tunnels, information about the noise sources including the identification of any distinctive tonal, impulsive or low frequency characteristics of the noise. • identification of noise sensitive premises and noise sensitive areas that may be affected. • the characteristics of the existing noise environment. • a prediction on how the noise environment will change with the proposed development: <ul style="list-style-type: none"> • In the shorter term such as during the construction period; • in the longer term during the operating life of the infrastructure; • at particular times of the day, evening and night as appropriate. • an assessment of the effect of predicted changes in the noise environment on any noise sensitive premises and noise sensitive areas. 	<p>ES Chapter 11 Noise and Vibration (Document Reference 6.2) provides an assessment of noise and vibration impacts of the scheme during construction and operation, following the methodology of DMRB LA 111. This assessment complies with the requirements of Paragraphs 5.189 to 5.190 of the NPSNN because it contains the following elements:</p> <ul style="list-style-type: none"> • a description of noise sources, the identification of noise sensitive areas/premises and the characteristics of the existing noise environment; • the predicted impacts of the scheme during construction and operation, during both day and night and including on noise sensitive areas/premises; • the identification of mitigation measures during construction and operation; and • an assessment of potential noise impacts elsewhere in the road network directly associated with the scheme (namely those within 50m of other non-scheme road links beyond 600m from new or altered scheme roads with the potential to experience short-term Basic Noise Level (BNL) change of more than 1dB(A) in the short term or 3dB(A) in the long term).

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	<ul style="list-style-type: none"> measures to be employed in mitigating the effects of noise. Applicants should consider using best available techniques to reduce noise impacts. the nature and extent of the noise assessment should be proportionate to the likely noise impact. 	
5.190	The potential noise impact elsewhere that is directly associated with the development, such as changes in road and rail traffic movements elsewhere on the national networks, should be considered as appropriate.	
5.191	Operational noise, with respect to human receptors, should be assessed using the principles of the relevant British Standards and other guidance. The prediction of road traffic noise should be based on the method described in Calculation of Road Traffic Noise. For the prediction, assessment and management of construction noise, reference should be made to any relevant British Standards and other guidance which also give examples of mitigation strategies.	The assessment in ES Chapter 11 Noise and Vibration (Document Reference 6.2) has been carried out using relevant British Standards and the Calculation of Road Traffic Noise.
5.192	The applicant should consult Natural England with regard to assessment of noise on designated nature conservation sites, protected landscapes, protected species or other wildlife. The results of any noise surveys and predictions may inform the ecological assessment. The seasonality of potentially affected species in nearby sites may also need to be taken into account.	As set out in the Consultation Report (Document Reference 5.1) and the Statement of Commonality (Document Reference 7.3), Highways England has engaged with Natural England during the development of the scheme, including through formal statutory consultation in 2019 and 2020, and has taken account of Natural England's feedback on the scheme design and the preliminary environmental assessment.
5.193	Developments must be undertaken in accordance with statutory requirements for noise. Due regard must have been given to the relevant sections of the Noise Policy Statement for England, National Planning Policy Framework and the Government's associated planning guidance on noise.	ES Chapter 11 Noise and Vibration (Document Reference 6.2) sets out how the relevant legislative and policy framework that has been taken into account in undertaking the assessment of effects of the scheme regarding noise. This includes the Noise Policy Statement for England, the NPPF and associated planning guidance.
5.194	The project should demonstrate good design through optimization of Scheme layout to minimise noise emissions and, where possible, the use of landscaping, bunds or noise barriers to reduce noise transmission. The project should also consider the need for the	The scheme has been designed taking into account how noise emissions could be minimised through layout and the use of measures such as landscaping, bunds and noise barriers. This is set out in section 11.9 of ES Chapter 11 Noise and Vibration (Document Reference 6.2), in which the noise mitigation embedded into the scheme

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	mitigation of impacts elsewhere on the road and rail networks that have been identified as arising from the development according to Government policy.	design is identified. This includes the use of earth bunds, stone walls and vertical noise barriers, in addition to consideration of the horizontal and vertical alignment of the scheme. ES Chapter 11 Noise and Vibration (Document Reference 6.2) identifies that such measures have been informed by varied considerations including:
5.195	<p>The Secretary of State should not grant development consent unless satisfied that the proposals will meet, the following aims, within the context of Government policy on sustainable development:</p> <ul style="list-style-type: none"> • avoid significant adverse impacts on health and quality of life from noise as a result of the new development; • mitigate and minimise other adverse impacts on health and quality of life from noise from the new development; and • contribute to improvements to health and quality of life through the effective management and control of noise, where possible. 	<p>stakeholder engagement; engineering practicability; noise benefit in comparison to mitigation cost; and, the potential for other environment effects. This reflects the overall landscape-led design approach to the scheme, which is described in the Design Summary Report (Document Reference 7.7).</p> <p>The assessment reported upon in ES Chapter 11 Noise and Vibration (Document Reference 6.2) concludes that construction of the scheme would result in temporary significant adverse noise effects (during the daytime only) at 45 residential properties and six non-residential locations.</p>
5.196	In determining an application, the Secretary of State should consider whether requirements are needed which specify that the mitigation measures put forward by the applicant are put in place to ensure that the noise levels from the project do not exceed those described in the assessment or any other estimates on which the decision was based.	In order to mitigate construction effects, a commitment is made in ES Appendix 2.1 Environmental Management Plan (EMP) (Document Reference 6.4) for a Noise and Vibration Management Plan (NVMP) to be prepared, which must include the requirement to undertake noise and vibration monitoring to ensure compliance with agreed threshold levels. Best Practicable Means (BPM) is assumed as embedded mitigation to control construction noise in the form of low noise emission plant and processes. If situations arise where despite the implementation of BPM, the noise exposure exceeds the criteria defined in the EMP, the main contractor may offer noise insulation or ultimately temporary re-housing (although the latter is not anticipated to be required for the scheme).
5.197	The Examining Authority and the Secretary of State should consider whether mitigation measures are needed both for operational and construction noise over and above any which may form part of the project application. The Secretary of State may wish to impose requirements to ensure delivery of all mitigation measures.	During operation of the scheme, ES Chapter 11 Noise and Vibration (Document Reference 6.2) identifies that a greater number of residential properties would experience significant beneficial noise effects than would experience significant adverse noise effects. There would be 50 direct beneficial significant noise effects as a result of the scheme, compared to direct adverse significant noise effects on 21 residential properties. The direct beneficial effects include five locations which are Noise Important Areas. There would be indirect beneficial significant noise effects at
5.198	<p>Mitigation measures for the project should be proportionate and reasonable and may include one or more of the following:</p> <ul style="list-style-type: none"> • engineering: containment of noise generated; • materials: use of materials that reduce noise, (for example low noise road surfacing); 	

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	<ul style="list-style-type: none"> lay-out: adequate distance between source and noise-sensitive receptors; incorporating good design to minimise noise transmission through screening by natural or purpose-built barriers; administration: specifying acceptable noise limits or times of use (e.g., in the case of railway station PA systems). 	<p>104 residential properties as a result of the scheme, compared to indirect adverse significant noise effects on 17 residential properties.</p> <p>In addition to the effects on residential properties, the assessment reported in ES Chapter 11 Noise and Vibration (Document Reference 6.2) identifies that there would be direct beneficial significant noise effects on the following non-residential receptors:</p> <ul style="list-style-type: none"> several non-residential receptors in Birdlip, including the Primary School and the Village Hall; along the existing section of A417 highway to be removed along the Cotswold Way; on part of the Gloucestershire Way long distance footpath between the Air Balloon roundabout and Coberley to the east; and on footpath links running for approximately 0.6 miles (one kilometre) to the east from Stockwell. <p>As set out in section 6.2 of this report, effects of the scheme on health has been assessed in ES Chapter 12 Population and Human Health (Document Reference 6.2) Population and Human Health, including with regard to effects of noise. This assessment concludes that there would be a neutral effect on health relating to noise during both construction and operation of the scheme.</p> <p>Overall, the scheme would overall result in permanent significant beneficial effects to substantially more residential properties than those residential properties that would experience a permanent significant adverse effect. This would include significant beneficial effects at five Noise Important Areas. The scheme would also result in significant beneficial noise effects at non-residential locations, including public rights of way and community assets such as Birdlip Primary School. Mitigation has been embedded within the design to avoid or minimise adverse effects.</p> <p>It is recognised that during construction, the scheme would result in adverse significant effects to 45 residential properties and six non-residential receptors,</p>

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		however these effects would be temporary in nature and would be controlled through the commitments within ES Appendix 2.1 EMP.
5.199	For most national network projects, the relevant Noise Insulation Regulations will apply. These place a duty on and provide powers to the relevant authority to offer noise mitigation through improved sound insulation to dwellings, with associated ventilation to deal with both construction and operational noise. An indication of the likely eligibility for such compensation should be included in the assessment. In extreme cases, the applicant may consider it appropriate to provide noise mitigation through the compulsory acquisition of affected properties in order to gain consent for what might otherwise be unacceptable development. Where mitigation is proposed to be dealt with through compulsory acquisition, such properties would have to be included within the development consent order land in relation to which compulsory acquisition powers are being sought.	ES Appendix 2.1 EMP (Document Reference 6.4) would ensure that operational noise controls are implemented and that the effectiveness of any installed mitigation measures is verified to ensure it performs adequately. Noise insulation would be offered if and where future noise levels exceed the noise level trigger value and the other requirements referred to in the Noise Insulation Regulations 1975 (NIR). Confirmation of qualification for noise insulation would be made by the responsible authority before the scheme comes into operation, based on built information in accordance with the NIR. This would also be secured through the EMP. Discussions are ongoing with interested parties regarding possible measures to mitigate the significant effects identified to properties at Stratton and Leckhampton Hill. Potential solutions have been presented by Highways England to the local highway authority, GCC, and discussed at an initial stage, to help identify possible further mitigation measures. This is reflected in the Statement of Common Ground with the Joint Councils (see Statement of Commonality, Document Reference 7.3).
5.200	Applicants should consider opportunities to address the noise issues associated with the Important Areas as identified through the noise action planning process.	ES Chapter 11 Noise and Vibration (Document Reference 6.2) assesses the effects of the scheme relating to noise and vibration on residential and non-residential reception during both construction and operation. As set out above, this assessment identifies that the scheme would result in direct beneficial effects during operation in five locations which are Noise Important Areas.
Impacts on transport networks		
5.203	Applicants should have regard to the policies set out in local plans, for example, policies on demand management being undertaken at the local level.	As set out in the Consultation Report (Document Reference 5.1), Highways England has engaged with the local highway authority, GCC, and the relevant local planning authorities, TBC and CDC, throughout the development of the scheme. This has included non-statutory engagement and consultation, such as technical or specialist meetings, as well as formal statutory consultation in 2019 and 2020, under section 42(1)(b) of The Planning Act (2008). This engagement has taken place with the authorities both separately and together (as the 'Joint Councils') as appropriate and the position of the Councils' and Highways England following the engagement undertaken to date is reflected in the Statement of Common Ground with the Joint Councils (see Statement of Commonality, Document Reference 7.3).
5.204	Applicants should consult the relevant highway authority, and local planning authority, as appropriate, on the assessment of transport impacts.	
5.205	Applicants should consider reasonable opportunities to support other transport modes in developing infrastructure. As part of this, consistent with paragraph 3.19-3.22 above, the applicant should provide evidence that as part of the project they have used	

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	reasonable endeavours to address any existing severance issues that act as a barrier to nonmotorised users.	
5.206	For road and rail developments, if a development is subject to EIA and is likely to have significant environmental impacts arising from impacts on transport networks, the applicant's environmental statement should describe those impacts and mitigating commitments. In all other cases the applicant's assessment should include a proportionate assessment of the transport impacts on other networks as part of the application.	As set out in the Consultation Report (Document Reference 5.1), Highways England has also engaged with individuals and organisations with an interest in walking, cycling and horse riding (non-motorised users) throughout the development of the scheme. This has included non-statutory engagement and consultation through a Walking, Cycling and Horse riding Technical Working Group (WCH TWG), as well as formal statutory consultation in 2019 and 2020, under section 42(1)(b) of the Act. The position of the WCH TWG following the engagement undertaken to date is reflected in the Statement of Common Ground with the WCH TWG (see Statement of Commonality, Document Reference 7.3). In relation to impacts on the transport and PRoW networks, Highways England has specifically engaged with GCC on such matters, as the relevant authority for those networks in the county. In particular, data from GCC has been used for the calibration and validation of the traffic model and the likely effects of the scheme on the local road network has been discussed with GCC Officers. The ComMA Report (Document Reference 7.6) details the traffic data collection, traffic modelling, traffic forecasting and economic appraisal in relation to the scheme. ES Chapter 12 Population and Human Health (Document Reference 6.2) Population and Human Health considers the effects of the scheme on the surrounding population including in relation to the transport network and access for walkers, cyclists and horse riders, during both construction and operation of the scheme. During the operation of the scheme, the resulting improved travel conditions would offer indirect benefits to people using the bus services and accessing other modes of transport. As is set out in the Equality Impact Assessment that has been prepared for the scheme (Document Reference 7.8), it would reduce congestion, improve safety and enhance the PRoW and walking, cycling and horse riding network in the area, which would improve access and travel conditions for all. ES Chapter 12 Population and Human Health (Document Reference 6.2) identifies that during construction of the scheme, accessibility to the existing road network and public transport would not
5.208	Where appropriate, the applicant should prepare a travel plan including management measures to mitigate transport impacts. The applicant should also provide details of proposed measures to improve access by public transport and sustainable modes where relevant, to reduce the need for any parking associated with the proposal and to mitigate transport impacts.	
5.209	For schemes impacting on the Strategic Road Network, applicants should have regard to DfT Circular 02/2013 The Strategic Road Network and the delivery of sustainable development (or prevailing policy) which sets out the way in which the highway authority for the Strategic Road Network, will engage with communities and the development industry to deliver sustainable development and, thus, economic growth, whilst safeguarding the primary function and purpose of the Strategic Road Network.	
5.210	If new transport infrastructure is proposed, applicants should discuss with network providers the possibility of co-funding by Government for any third-party benefits. Guidance has been issued in England which explains the circumstances where this may be possible. The Government cannot guarantee in advance that funding will be available for any given uncommitted scheme at any specified time, and cannot provide financial support to a scheme that solely mitigates the impacts of a specific development. Any decisions on co-funded transport infrastructure will need to be taken	

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	in the context of the Government’s wider policy of transport improvements.	be affected significantly. It identifies that no operational public transport routes or operational bus stops would be affected by the scheme.
5.211	The Examining Authority and the Secretary of State should give due consideration to impacts on local transport networks and policies set out in local plans, for example, policies on demand management being undertaken at the local level.	Highways England acknowledges feedback received in response to public consultation, which has suggested the relocation of the school bus stop in Birdlip. Concerns have been expressed about the safety of current turning movements by the school bus, and suggestions have been made about potential alternative locations for a new bus stop facility. This change has been carefully considered within the land available as part of the scheme and Highways England has discussed opportunities with the Cowley and Birdlip Parish Council and GCC officers.
5.212	Schemes should be developed and options considered in the light of relevant local policies and local plans, taking into account local models where appropriate, however the Scheme must be decided in accordance with the NPS except to the extent that one or more of sub-sections 104(4) to 104(8) of the Planning Act 2008 applies.	Highways England has offered help to the relevant stakeholders to inform or facilitate any discussions about any changes that might be proposed to the bus stop and its access within or near Birdlip. Highways England will ensure the A417 scheme would not adversely impact the existing bus stop arrangement, or could accommodate an enhanced future scenario where the bus stop and its access is improved or relocated if within the DCO boundary.
5.215	Mitigation measures for Schemes should be proportionate and reasonable, focused on promoting sustainable development.	
5.216	Where development would worsen accessibility such impacts should be mitigated so far as reasonably possible. There is a very strong expectation that impacts on accessibility for non-motorised users should be mitigated.	
5.217	Mitigation measures may relate to the design, layout or the operation of the Scheme.	<p>It is identified that construction would result in impacts on a number of PRoW due to diversion and disruption, subsequently affecting the availability of options for active travel. The PRoW Management Plan contained in Annex F of ES Appendix 2.1 EMP (Document Reference 6.4) sets out how impacts on PRoW would be managed during construction, in which Highways England intends to keep the majority of PRoW open via local management, early re-provision and/or use of short-term, temporary closures. Realignment or diversion of local routes is proposed, utilising new side roads, overbridges and junctions where possible to maintain access for users. This would enable local communities to maintain access to active transport options during the construction phase, albeit if inconvenienced for a short period.</p> <p>During the operation of the scheme, ES Chapter 12 Population and Human Health (Document Reference 6.2) concludes that the scheme would provide improved active travel facilities for walking, cycling and horse riding. Whilst it is considered unlikely that the scheme would result in an increase in active travel journeys for commuting</p>

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		<p>(due to the travel distances required), the scheme could result in more active travel journeys to access services or for recreation in the local area – for example due to improved connectivity between Cowley and Birdlip villages via the new Air Balloon Way or between Leckhampton Hill to Brockworth via the new Dog Lane to Cold Slad connection. The latter would provide an east-west route for walking, cycling or horse riding trips as an alternative to trips otherwise made by car along the A417, helping contribute to sustainable development particularly in the Brockworth area.</p> <p>The scheme design has sought to identify opportunities for improving PRow options around the proposed A417 and provide options for active travel for more people, including vulnerable users such as children and older people. In addition, car parking is to be provided with disabled provision near The Golden Heart Inn in close proximity to the existing A417. This would be associated with a PRow which is segregated and tarmacked, making it suitable for wheelchairs and mobility scooters.</p> <p>The scheme has also sought to address existing severance issues that act as a barrier to walkers, cyclists and horse riders through the measures set out in the PRow Management Plan. For example, a proposed Grove Farm underpass and connecting existing and new PRow would provide a grade separated north-south crossing of the existing A417 where there is evidence of pedestrians making dangerous attempts to cross the highway at grade. As set out in section 6.2 of this report, there has been a pedestrian fatality, and with the scheme in place there would be multiple grade-separated crossings including the Grove Farm underpass, Cotswold Way crossing, Gloucestershire Way crossing, Cowley overbridge and Stockwell overbridge. This would provide a safer way for people to move around the area.</p> <p>Overall, it is considered that the proposals and anticipated benefits for all modes of transport would contribute to sustainable development, helping better connect people to open space, services, facilities and communities.</p>
Water quality and resources		

NPSNN Paragraph Number	Requirement of the National Networks National Policy Statement (NPSNN)	Compliance with the NPSNN
5	GENERIC IMPACTS	
5.220	Where applicable, an application for a development consent order has to contain a plan with accompanying information identifying water bodies in a River Basin Management Plan.	ES Chapter 13 Road Drainage and the Water Environment (Document Reference 6.2) Road Drainage and Water Environment (Document Reference 6.2) assesses the impact of the scheme on road drainage and the water environment, including the effects on water quality and resources. This assessment: identifies and describes water bodies and resources affected by the scheme and their existing quality; describes the potential impacts of the scheme on physical characteristics of the water environment; and, identifies any impacts on WFD water bodies and source protection zones. Cumulative effects of the scheme are considered in ES Chapter 15 Assessment of Cumulative Effects (Document Reference 6.2) Assessment of Cumulative Effects (Document Reference 6.2). As set out in the Statements of Common Ground appended to the Statement of Commonality (Document Reference 7.3), Highways England has engaged in early discussions with the EA (as Lead Authority for main rivers) and GCC (as the Lead Local Flood Authority) on matters relating to the water environment. Both parties have also been formally consulted on the scheme as prescribed consultees under the Act, as set out in the Consultation Report (Document Reference 5.1). As set out in section 6.2 of this report (under ‘pollution control and other environmental protection regimes’) and Appendix A of the Consents and Agreements Position Statement (Document Reference 7.2), Highways England is seeking to disapply legislation relating to a number of licenses, permits and consents relating to the water environment, although a trade effluent consent would be required where welfare facilities propose to discharge. ES Chapter 13 Road Drainage and the Water Environment (Document Reference 6.2) sets out the mitigation measures relating to the engineering design, construction and operation of the scheme that would seek to minimise any harmful impacts to the water environment and address likely significant effects. These measures are included in Annex G Ground and Surface Water Management Plan of ES Appendix 2.1 EMP (Document Reference 6.4) and secured by a requirement of the draft DCO (Document Reference 3.1).
5.221	Applicants should make early contact with the relevant regulators, including the Environment Agency, for abstraction licensing and with water supply companies likely to supply the water. Where a development is subject to EIA and the development is likely to have significant adverse effects on the water environment, the applicant should ascertain the existing status of, and carry out an assessment of the impacts of the proposed project on water quality, water resources and physical characteristics as part of the environmental statement.	
5.222	For those projects that are improvements to the existing infrastructure, such as road widening, opportunities should be taken, where feasible, to improve upon the quality of existing discharges where these are identified and shown to contribute towards Water Framework Directive commitments.	
5.223	Any environmental statement should describe: <ul style="list-style-type: none"> • the existing quality of waters affected by the proposed project; • existing water resources affected by the proposed project and the impacts of the proposed project on water resources; • existing physical characteristics of the water environment (including quantity and dynamics of flow) affected by the proposed project, and any impact of physical modifications to these • characteristics; • any impacts of the proposed project on water bodies or protected areas under the Water Framework Directive and source protection zones (SPZs) around potable groundwater abstractions; and 	

NPSNN Paragraph Number	Requirement of the National Networks National Policy Statement (NPSNN)	Compliance with the NPSNN
5	GENERIC IMPACTS	
	<ul style="list-style-type: none"> any cumulative effects. 	
5.225	The Secretary of State will generally need to give impacts on the water environment more weight where a project would have adverse effects on the achievement of the environmental objectives established under the Water Framework Directive.	The assessment of effects on the water environment from the construction of the scheme has found that when incorporating the mitigation measures included in the Annex G of ES Appendix 2.1 EMP (Document Reference 6.4) there would be a temporary significant adverse effect on hydromorphology, due to the realignment of the tributary of Norman’s Brook during the construction phase.
5.226	The Secretary of State should be satisfied that a proposal has had regard to the River Basin Management Plans and the requirements of the Water Framework Directive (including Article 4.7) and its daughter directives, including those on priority substances and groundwater. The specific objectives for particular river basins are set out in River Basin Management Plans. In terms of Water Framework Directive compliance, the overall aim of projects should be no deterioration of ecological status in watercourses, ensuring that Article 4.7 of the Water Framework Directive Regulations does not need to be applied. ...	A Water Framework Directive 2000/60/EC compliance assessment has been completed and is included in Appendix 13.2 Water Framework Directive 2000/60/EC Compliance Assessment (Document Reference 6.4). As reported in ES Chapter 13 Road Drainage and the Water Environment (Document Reference 6.2), this assessment indicates that the scheme would not result in a change in status of any Water Framework Directive quality elements or prevent any water bodies from reaching ‘Good’ status in the future. The effect of the scheme is therefore assessed as neutral and not significant.
5.227	The Examining Authority and the Secretary of State should consider proposals put forward by the applicant to mitigate adverse effects on the water environment and whether appropriate requirements should be attached to any development consent and/or planning obligations. If the Environment Agency continues to have concerns and objects to the grant of development consent on the grounds of impacts on water quality/resources, the Secretary of State can grant consent, but will need to be satisfied before deciding whether or not to do so that all reasonable steps have been taken by the applicant and the Environment Agency to try to resolve the concerns, and that the Environment Agency is satisfied with the outcome.	ES Chapter 13 Road Drainage and the Water Environment (Document Reference 6.2) concludes that there would be no significant effects on the water environment resulting from the operation of the scheme. Furthermore, whilst there would be a temporary adverse significant effect during construction relating to the realigned tributary of Norman’s Brook, ES Chapter 13 Road Drainage and the Water Environment (Document Reference 6.2) identifies that a permanent outcome of the scheme would be enhancement to the ecological connectivity of aquatic species habitat in the realigned tributary of Norman’s Brook. Overall, the scheme would provide betterment on the existing road drainage system and improve the water quality of receiving waterbodies, whilst there would be additional enhancement via the removal or upgrading of existing foul drainage outfalls at some properties.
5.229	The Secretary of State should consider whether the mitigation measures put forward by the applicant which are needed for operation and construction (and which are over and above any which may form part of the project application) are acceptable. A construction management plan may help codify mitigation.	

NPSNN Paragraph Number	Requirement of the National Networks National Policy Statement (NPSNN)	Compliance with the NPSNN
5	GENERIC IMPACTS	
5.230	<p>The project should adhere to any National Standards for sustainable drainage systems (SuDs). The National SuDs Standards will introduce a hierarchical approach to drainage design that promotes the most sustainable approach but recognises feasibility, and use of conventional drainage systems as part of a sustainable solution for any given site given its constraints.</p>	

Appendix B Local Policy Assessment

B.1.1 Overview

- B.1.1.1 The following tables provide an assessment of the compliance of the scheme with relevant local policies and guidance identified in Chapter 12 of this report. The assessment is organised to consider compliance with policies relevant to the Chapters of the ES (Volume 6 of the DCO Application).

B.1.2 Local policy assessment

Table B-1 Local policy assessment in relation to air quality

Air quality (Chapter 5 of the ES)		
Policy document	Policy reference	Assessment
Mineral Local Plan for Gloucestershire (2018-2032) (Adopted 2020)	Policy DM03 - Transport	<p>The A417 EIA scoping report determined that a ‘detailed’ level of assessment is required for the scheme in consideration of air quality as there is potential for significant impacts to air quality at sensitive human and ecological receptors. The detailed assessment should include construction traffic and operation phase impacts.</p> <p>ES Chapter 5 Air Quality (Document Reference 6.2) therefore provides an assessment of the air quality impacts of the scheme in accordance with DMRB LA105 Air Quality and the Defra Local Air Quality Management Technical Guidance (LAQM TG.16). It describes existing air quality levels and provides forecasts of air quality at time of the scheme opening in scenarios with and without the scheme. Effects are determined during both construction and operation of the scheme. As set out in Chapter 6 of this report, the assessment reported in ES Chapter 5 Air Quality (Document Reference 6.2) complies with the requirements of the NPSNN.</p> <p>The scheme has been designed, to avoid and prevent adverse environmental effects on air quality through the process of design development and consideration of good design principles. This has sought to move traffic away from local sensitive receptors, in particular those receptors in the existing Birdlip AQMA. Embedded mitigation measures are reported as part of the scheme description in ES Chapter 2: The project (Document Reference 6.2).</p> <p>Best practice construction mitigation measures to reduce effects from construction dust are incorporated into ES Appendix 2.1 EMP (Document Reference 6.4). . These measures include the following:</p> <ul style="list-style-type: none"> • Minimisation of areas to be stripped of vegetation; • Dampening down of dust generating activities and materials, including site roads, during dry weather, in addition to site monitoring (e.g. periodic visual inspections within and along site boundaries); • Ensuring vehicles entering and leaving sites are covered to prevent escape of materials during transport; • As far as possible temporary roads should be hard surfaced to reduce dust generation;
Gloucestershire County Council Waste Local Plan 2002-2012 Saved Policies (Adopted 2004)	Policy 39 - Transport	
Gloucestershire County Council Waste Local Plan 2002-2012 Saved Policies (Adopted 2004)	Policy 1 – Best Practicable Environmental Option	
	Policy 40 - Traffic	
Gloucestershire’s Local Transport Plan 2020-2041	LTP PD 0.1- Reducing Transport Carbon Emissions and Adapting to Climate Change	
	LTP PD 0.2- Local Environment Protection	
	LTP PD 0.5- Community Health and Wellbeing	
Cotswold District Council Local Plan 2011-2031 (Adopted 2018)	Policy EN15 – Pollution and Contaminated Land	
Gloucester, Cheltenham and Tewkesbury Borough Council Joint Core Strategy (Adopted 2017) (Adopted 2017)	Policy SD14 – Health and Environmental Quality	
Tewkesbury Local Plan 2006 – 2011 Saved Policies (Tewkesbury Borough Council 2006)	Policy EVT4 – Air Quality	
Cotswold AONB Management Plan (Cotswolds Conservation	Policy CC7 – Climate Change Mitigation	

Air quality (Chapter 5 of the ES)		
Policy document	Policy reference	Assessment
Board 2018-2023)	Policy CC8 – Climate Change Adaption	<ul style="list-style-type: none"> Road sweeping to be carried out on access roads and local roads to remove any material tracked out of the site; and Management of stockpiled materials with the potential to generate dust by rolling, covering and//or revegetating as soon as appropriate. <p>As identified in section 5.7 of ES Chapter 5 Air Quality (Document Reference 6.2), there are two AQMA’s within 200m of the affected road network (ARN); Birdlip AQMA in Cotswold District and Cheltenham AQMA in Cheltenham Borough. The assessment concludes that there are no significant effects predicted in AQMAs and that it overall it would bring a beneficial impact on local air quality due to reductions in No2 concentrations within the Air Balloon Air Quality Management Area (AQMA). On the basis that the proposed scheme would have a positive impact (due to relieving congestion and moving the road away from receptors) on local air quality concentrations, no specific mitigation or Air Quality Action Plans are required for the operation of the proposed scheme.</p> <p>ES Chapter 5 Air Quality (Document Reference 6.2) concludes that the scheme would not result in significant effects on human health due to changes in air quality during construction or operation. It further concludes that there is no risk of affecting the UK’s ability to achieve compliance with the Air Quality Directive. It is identified that there would be a significant effect in relation to nitrogen deposition in relation to two ecological receptors; Ullen Wood Ancient Woodland and Veteran Trees. Further assessment of the impacts of the scheme in relation to this is provided in ES Chapter 8 Biodiversity (Document Reference 6.2) and is therefore considered in more detail against the relevant local policy relating to biodiversity and ecological conservation within this Appendix.</p> <p>On the basis of the above and the assessment contained in ES Chapter 5, the scheme is considered to accord with the requirements of identified local planning policy relating to air quality.</p>
	Policy UE3 – Health and Wellbeing	

Table B-2 Local policy assessment in relation to cultural heritage

Cultural heritage (Chapter 6 of the ES)		
Policy document	Policy reference	Assessment
Minerals Local Plan for Gloucestershire (2018-2032) (Adopted 2020)	Policy DM08 – Historic Environment	ES Chapter 6 Cultural Heritage (Document Reference 6.2) provides an assessment of the cultural heritage impacts of the scheme in accordance with DMRB LA106. ES Chapter 6 outlines the methodology for assessing effects is based on the principle that the environmental effects of the scheme, in relation to a single heritage resource, is determined by: <ul style="list-style-type: none"> • an asset's value; • the magnitude of change the scheme would have on an asset's significance (where significance is defined as the attributes that give the asset its value); and • the combination of these two elements to identify the significance of effect.
	Policy MR01 - Restoration	
Gloucestershire County Council Waste Core Strategy (Adopted 2012)	Policy WCS16 – Historic Environment	ES Chapter 6 Cultural Heritage (Document Reference 6.2) sets out that identification of these heritage assets has been informed by the Gloucestershire Historic Environment Record (HER), non-intrusive archaeological investigations, walkover surveys, aerial photography and archaeological evaluation through a programme of trial trenching. The significance of the identified heritage assets is described in ES Appendices 6.1 to 6.4 (Document Reference 6.4). This includes a description of any contribution made by the setting of heritage assets and is provided at a level of detail which is proportionate to the asset's importance. ES Chapter 6 Cultural Heritage (Document Reference 6.2) identifies that the construction of the scheme has the potential to create both beneficial and adverse impacts upon cultural heritage resources. Benefits include improvements to the settings of heritage resources and the removal of existing physical severance caused by the current A417. Construction of the scheme has the potential for adverse impacts including: <ul style="list-style-type: none"> • partial or total removal of heritage assets, including archaeological remains, within the scheme footprint; • compaction of archaeological deposits by construction traffic and structures; • temporary impacts upon the settings of heritage assets; • permanent impacts upon the setting of heritage assets;
Gloucestershire County Council Waste Local Plan 2002-2012 Saved Policies (Adopted 2004)	Policy 30 – Listed Buildings and Conservation Areas	
	Policy 31 – Historic Heritage	
Cotswold District Council Local Plan 2011-2031 (Adopted 2018)	Policy EN1 – Built, Natural and Historic Environment	
	Policy EN4 – The Wider Natural and Historic Landscape	
	Policy EN5 – Cotswolds Area of Outstanding Natural Beauty (AONB)	
	Policy EN10 – Historic Environment: Designated Heritage Assets	
	Policy EN12 – Historic Environment: Non-Designated Heritage Assets	
Gloucester, Cheltenham and Tewkesbury Borough Council Joint Core Strategy (Adopted 2017) (Adopted 2017)	Policy SD7 – The Cotswolds Area of Outstanding Natural Beauty (AONB)	
	Policy SD8 – Historic Environment	
Tewkesbury Local Plan 2006 – 2011 Saved Policies	Policy HEN1 – Conservation Areas – General	

Cultural heritage (Chapter 6 of the ES)		
Policy document	Policy reference	Assessment
(Tewkesbury Borough Council, 2006)	Policy HEN2 – Conservation Areas – Setting and Impact	<ul style="list-style-type: none"> changes to key views and sight lines; and impacts to paleoenvironmental deposits. <p>The operational phase of the scheme has the potential to result in both beneficial and adverse impacts on the setting of cultural heritage resources due to traffic noise and the visibility of moving vehicles on the road. Potential impacts include:</p> <ul style="list-style-type: none"> changes to the settings of monuments; and changes to key views and sight lines. <p>The scheme has been designed, as far as possible, to avoid or prevent impacts on heritage resources through the process of design development and consideration of good design principles. Embedded mitigation measures for cultural heritage are reported as part of the scheme description in ES Chapter 2: The project (Document Reference 6.2). Mitigation during construction of the scheme includes preservation by record of archaeological remains; the temporary removal of a non-designated milestone; and building recording prior to demolition. During operation of the scheme, noise mitigation is proposed to reduce noise effects at the Grade II Listed Shab Hill Barn. More detail on mitigation provided on this within section 6.9 of ES Chapter 6 Cultural Heritage (Document Reference 6.2)</p>
	Policy HEN20 – Scheduled Ancient Monuments	
	Policy HEN21 – Archaeological Assessment	
	Policy HEN 22 – Archaeological Recordings	
	Policy HEN23 – Management and Interpretation of Archaeological Sites	
	Policy LND1 – Areas of Outstanding Natural Beauty (AONB)	
Submitted Tewksbury Borough Local Plan 2011-2031	HER 1- Conservation areas	<p>The assessment concludes that the construction of the A417 Missing Link scheme would result in significant adverse effects to two designated heritage assets: Emma’s Grove Scheduled Monument and Grade II Listed Shab Hill Barn. Both of these effects arise from the impact of the scheme on the setting of heritage assets. Construction of the scheme would also result in the removal or partial removal of 11 non-designated heritage resources, including earthwork remains, part of the Ermin Way Roman road, World War II anti-aircraft batteries and the Air Balloon Public House, however the effect is not considered significant given the low or medium value of the resources affected and the proposed mitigation of preservation by record. This is secured in Annex C Detailed Archaeological Mitigation Strategy and Overarching WSI of ES Appendix 2.1 EMP (Document Reference 6.4).</p> <p>All other effects during construction of the scheme would be slight adverse, moderate adverse or neutral and would therefore not constitute a significant effect.</p> <p>The operation of the scheme would result in a significant adverse effect to Shab Hill. This effect is the result of increased traffic noise on the setting of the asset despite proposed mitigation. Emma’s Grove Scheduled Monument would experience a slight beneficial</p>
	HER 2- Listed Buildings	
	HER 3- Historic Parks and Gardens	
	HER 4- Archaeological Sites and Scheduled Monuments	
	HER 5- Locally important Heritage Assets	
Cotswold AONB Management Plan (Cotswolds Conservation Board 2018-2023)	Policy CC4 Natural and Cultural Capital and Ecosystems Services - Principles	<p>All other effects during construction of the scheme would be slight adverse, moderate adverse or neutral and would therefore not constitute a significant effect.</p> <p>The operation of the scheme would result in a significant adverse effect to Shab Hill. This effect is the result of increased traffic noise on the setting of the asset despite proposed mitigation. Emma’s Grove Scheduled Monument would experience a slight beneficial</p>
	Policy CE6 – Historic Environment and Cultural Heritage	

Cultural heritage (Chapter 6 of the ES)		
Policy document	Policy reference	Assessment
		<p>effect due to the reduction in traffic noise within its setting, however this would not be a significant enhancement to its value.</p> <p>Section 6.9 of ES Chapter 6 Cultural Heritage (Document Reference 6.2) also identifies that the scheme would result in the following enhancements to the historic environment:</p> <ul style="list-style-type: none"> • The removal of vegetation from the Barrows at Emma’s Grove Scheduled Monument would enhance their interpretation and enable them to be removed from the Historic England Heritage at Risk Register. • The improvements to the Cotswold Way National Trail and Gloucestershire Way footpath would enable greater permeability within the landscape. This would allow greater access to and understanding of heritage resources by members of the public. • Interpretation boards would be provided as part of the scheme, adjacent to the Cotswold Way crossing. <p>In summary, the scheme would not result in the total or partial loss of any designated heritage asset, however, it would result in significant adverse effects to the setting of two designated heritage assets. In addition, the scheme would result in the total or partial loss of a number of non-designated heritage assets during construction. Taking into account the substantial public benefits of the scheme and the evidenced need for the scheme, as set out in Chapter 7 of this report, it is considered that the scheme is compliant with local planning policy requirements, as it would not result in substantial harm to the significance of heritage assets or their setting such that it would outweigh the public benefits of the scheme.</p>

Table B-3 Local policy assessment in relation to landscape and visual effects

Landscape and visual effects (Chapter 7 of the ES)		
Policy document	Policy reference	Assessment
Minerals Local Plan for Gloucestershire (2018-2032) (Adopted 2020)	Policy DM07 – Soil Resources	ES Chapter 7 Landscape and Visual Effects (Document Reference 6.2) assesses the potential landscape and visual effects from the construction and operation of the scheme, following the methodology set out in DMRB LA107 and also follows guidance from the Landscape Institute and Natural England The Landscape and Visual Impact Assessment (LVIA) undertaken has taken account of landscape character assessments and relevant local policies. It includes an assessment of the scheme's effects on landscape character; the special characteristics of the AONB (including tranquillity and dark skies); and, views and visual amenity, including on recreational, community and tourism receptors. ES Chapter 7 Landscape and Visual Effects (Document Reference 6.2) identifies that the landscape and visual baseline was established through desk-based research, developing a Zone of Theoretical Visibility (ZTV) on consultation with relevant stakeholders, and through site visits and site surveys. ES Chapter 7 Landscape and Visual Effects (Document Reference 6.2) sets out that to make judgments on the likely significance of effect on landscape receptors requires consideration of the nature of the receptor (sensitivity) and the nature of the effect on those receptors (magnitude of change), and how sensitivity and magnitude of change interrelate to form a professional judgement on the overall level of effect and if this is judged to be significant or not. In recognition of the scheme's location within an AONB, a landscape-led approach has been taken in developing the design of the scheme, including mitigation and enhancement measures. Whilst embedded mitigation measures for landscape and visual amenity are reported as part of the scheme description in ES Chapter 2 The project (Document Reference 6.2), a detailed account of the landscape-led design approach is provided in the Design Summary Report (Document 7.7). Section 7.9 of ES Chapter 7 Landscape and Visual Effects (Document Reference 6.2) identifies the mitigation proposed during construction and operation of the scheme. During construction, such measures include protection of trees, the screening and rendering of construction compounds; protection of soil structures; and, advanced planting where practical. During operation, a number of measures are proposed such as landscape bunds/false cuttings; characteristic Cotswolds stone walls; and, a substantial
	Policy DM09 - Landscape	
Gloucestershire County Council Waste Core Strategy (Adopted 2012)	Policy WCS14 – Landscape	
	Policy WCS17 – Design	
Gloucestershire County Council Waste Local Plan 2002-2012 Saved Policies (Adopted 2004)	Policy 1 – Best Practicable Environmental Option	
	Policy 21 – Agricultural Improvements	
	Policy 32 – Agricultural Land	
	Policy 39 – Transport	
Gloucestershire's Local Transport Plan 2020-2041	LTP PD 0.2- Local Environment Protection	
Cotswold District Local Plan 2011-2031 (Adopted 2018)	Policy EN1 – Built, Natural and Historic Environment	
	Policy EN2 – Design of the Built and Natural Environment	
	Policy EN4 – The Wider Natural and Historic Landscape	
	Policy EN15 – Pollution and Contaminated Land	
Gloucester, Cheltenham and Tewkesbury Borough Council Joint Core Strategy (Adopted 2017) (Adopted 2017)	Policy SD6 - Landscape	
Submitted Tewkesbury Borough Plan 2011-2031 (Issued October	Policy AGR1 – Agricultural Development	

Landscape and visual effects (Chapter 7 of the ES)		
Policy document	Policy reference	Assessment
2019)	Policy AGR2 – Agricultural Diversification	<p>masterplan of planting to include habitat restoration and creation. Please refer to ES Chapter 7 Landscape and Visual Effects (Document Reference 6.2) for further detail on these measures.</p> <p>The assessment reported in ES Chapter 7 concludes that scheme construction would have significant adverse temporary effects on the study area and some of the special qualities of the Cotswolds AONB. This would include significant adverse temporary effects to three landscape character types and on some visual receptors such as recreational users of PRoW, three residential communities and tourism receptors (visitors).</p> <p>The assessment concludes that the operation of the scheme would have significant adverse effects to three character types at Year 1 of operation, reduced to two character types at Year 15 of operation. Significant adverse effects would be experienced by some visual receptors at Year 1 of operation, namely recreational users of some PRoW, visitors to some tourism receptors and two residential communities. However, by Year 15 these effects would have reduced to users of one PRoW (Cotswold Way National Trail) and visitors to two tourism receptors (Crickley Hill Country park and Barrow Wake).</p> <p>In relation specifically to the special qualities of the Cotswolds AONB, the scheme would result in both beneficial and adverse permanent effects. Adverse effects would impact upon the Cotswold escarpment and river valleys. However, permanent effects would impact upon geology, High Wold long-distance views, dry-stone walls, limestone grasslands, broadleaved woodland, tranquillity, dark skies and improved recreational access to the landscape.</p> <p>These beneficial effects to the AONB are reflected in the number of enhancements identified in ES Chapter 7 Landscape and Visual Effects (Document Reference 6.2), under section 7.9. Such enhancement to the landscape and its special qualities would result from measures such as:</p> <ul style="list-style-type: none"> the provision of recreational and ecological crossings; enhanced rock exposures; the repurposing of the existing A417;
	Policy HER1 Conservation Areas	
	Policy HER2 – Listed Buildings	
	Policy HER3 – Historic Parks and Gardens	
	Policy HER4 – Archaeological Sites and Scheduled Monuments	
	Policy HER5 – Locally Important Heritage Assets	
	Policy LAN1 – Special Landscape Areas	
	Policy LAN2 – Landscape Protection Zone	
	Policy NAT1 – Biodiversity, Geodiversity and Important Natural Features	
	Policy NAT3 – Green Infrastructure: Building with Nature	
Tewkesbury Local Plan 2006 – 2011 Saved Policies (Tewkesbury Borough Council 2006)	Policy GNL1 – General Design	<p>These beneficial effects to the AONB are reflected in the number of enhancements identified in ES Chapter 7 Landscape and Visual Effects (Document Reference 6.2), under section 7.9. Such enhancement to the landscape and its special qualities would result from measures such as:</p>
	Policy GNL3 – Architectural Features	
Cotswold AONB Management Plan (Cotswolds Conservation Board 2018-2023)	Policy CC4 – Natural and Cultural Capital and Ecosystems Services - Principles	<p>These beneficial effects to the AONB are reflected in the number of enhancements identified in ES Chapter 7 Landscape and Visual Effects (Document Reference 6.2), under section 7.9. Such enhancement to the landscape and its special qualities would result from measures such as:</p> <ul style="list-style-type: none"> the provision of recreational and ecological crossings; enhanced rock exposures; the repurposing of the existing A417;
	Policy CC7 – Climate Change Mitigation	
	Policy CC8 – Climate Change Adaption	

Landscape and visual effects (Chapter 7 of the ES)		
Policy document	Policy reference	Assessment
	Policy CE1 – Landscape	<ul style="list-style-type: none"> the provision of native woodland, including adjacent to the Ullen Wood ancient woodland, the planting of calcareous grassland habitat to provide ecological connectivity; the replacement of Common Land; scrub and woodland clearance at Emma’s Grove Scheduled Monument; the removal of existing lighting; improvements to Barrow Wake car park and; the provision of interpretation boards; <p>Refer to ES Chapter 7 Landscape and Visual Effects (Document Reference 6.2) for full details of the enhancement provided by the scheme.</p> <p>In summary, whilst the scheme would result in some adverse landscape and visual effects, these would be temporary during construction and would reduce over time during operation. Whilst significant adverse effects would remain at Year 15 of the operation of the scheme, there would also be permanent beneficial effects to the special qualities of the AONB landscape and a range of enhancements providing improvements to the area which go beyond the provision of mitigation. The scheme is therefore considered to accord with the requirements of identified local planning policy relating to landscape.</p>
	Policy CE2 - Geology	
	Policy CE10 – Development and Transport Principles	
	Policy CE11 – Major Development	
	Policy CE12 – Development Priorities and Evidence of Need	

Table B-4 Local policy assessment in relation to biodiversity

Biodiversity (Chapter 8 of the ES)		
Policy document	Policy reference	Assessment
Minerals Local Plan for Gloucestershire (2018-2032) (Adopted 2020)	Policy DM05 – Water Resources	ES Chapter 8 Biodiversity (Document Reference 6.2) Biodiversity (Document Reference 6.2) assesses the potential impacts on biodiversity from the construction and operation of the scheme, in accordance with DMRB LA 108. ES Chapter 8 Biodiversity (Document Reference 6.2) assesses the impact of the scheme on biodiversity and ecological conservation, including designated and non-designated sites of ecological importance, habitats, protected species and other species of principal importance. A HRA Statement to Inform an Appropriate Assessment (Document Reference 6.5b) also been prepared to enable the competent authority, in this case the SoS for Transport, to make an Appropriate Assessment when deciding whether to authorise the project, if so required. To undertake the assessment, data was collected through desk-based research and field surveys as identified in ES Chapter 8 Biodiversity (Document Reference 6.2) .Section 8.9 of ES Chapter 8 Biodiversity (Document Reference 6.2) identifies how mitigation for biodiversity has been embedded in the scheme design to avoid or reduce the impacts of habitat loss, habitat fragmentation, habitat degradation and species disturbance and mortality and thus avoid or reduce significant adverse environmental effects. This includes the provision of three badger culverts, a [REDACTED] and three greened overbridges.
	Policy DM06 – Biodiversity and Geodiversity	
	Policy DM09 Landscape	
Gloucestershire County Council Waste Core Strategy (Adopted 2012)	Policy WCS14 - Landscape	The landscape design shown in ES Figure 7.11 Environmental masterplan (Document Reference 6.3) replaces priority habitats with a greater amount than that lost. The landscape design focusses on provision of priority habitats which are present within the Cotswold AONB; lowland calcareous grassland, lowland broadleaved woodland and native species rich hedgerows. There would be an increase in all these habitats following construction.
	Policy WCS15 – Nature Conservation (Biodiversity and Geodiversity)	
Gloucestershire County Council Waste Local Plan 2002-2012 Saved Policies (Adopted 2014)	Policy 23 – Internationally and Nationally Designated Sites for Nature Conservation	The landscape design shown in ES Figure 7.11 Environmental masterplan (Document Reference 6.3) replaces priority habitats with a greater amount than that lost. The landscape design focusses on provision of priority habitats which are present within the Cotswold AONB; lowland calcareous grassland, lowland broadleaved woodland and native species rich hedgerows. There would be an increase in all these habitats following construction.
	Policy 24 – Locally Designated Sites for Nature Conservation	
	Policy 25 – Conservation Outside Designated Sites	
	Policy 26 – Areas of Outstanding Natural Beauty	
	Policy 39 - Transport	
Gloucestershire's Local Transport Plan 2020-2041	LTP PD 0.2- Local Environment Protection	
Cotswold District Council Local Plan 2011-2031 (Adopted 2018)	Policy EN1 – Built, Natural and Historic Environment	In addition to embedded mitigation, ES Chapter 8 Biodiversity (Document Reference 6.2) summarises the proposals to mitigate the effects of the scheme during construction and operation. During construction, best practice working methods would be implemented to avoid or reduce impacts through pollution and dust or through habitat loss, severance, disturbance and species mortality. During operation, measures would include the use of signage and interpretation boards, the introduction of conservation-led woodland management at Ullen Wood and strategic planting and management to prevent collision risks to barn owls. These measures are detailed in ES Appendix 2.1 Environmental Management Plan (Document Reference 6.4) and secured as a requirement in the DCO.
	Policy EN7 – Trees, Hedgerows and Woodlands	
	Policy EN8 – Biodiversity and Geodiversity: Features, Habitats and Species	
	Policy EN9 – Biodiversity and Geodiversity: Designated Sites	

Biodiversity (Chapter 8 of the ES)		
Policy document	Policy reference	Assessment
Gloucester, Cheltenham and Tewkesbury Borough Council Joint Core Strategy (Adopted 2017) (Adopted 2017)	Policy SD6 - Landscape	The assessment reported in ES Chapter 8 Biodiversity (Document Reference 6.2) identifies a number of significant adverse effects during construction, including on: the Barrow Wake unit of the Crickley Hill and Barrow Wake SSSI; semi-natural broadleaved woodland; veteran trees, hedgerows; species-rich grassland; assemblages of bats (including Annex II species) and barn owls. Significant beneficial effects are also identified during construction through the creation of 75.41 ha of calcareous grassland, 25.57ha of woodland and 9km of species-rich hedgerow, as well as restoration of an Annex 1 habitat (petrifying springs with tufa formation).
	Policy SD7 – The Cotswolds Area of Outstanding Natural Beauty (AONB)	
	Policy SD9 – Biodiversity and Geodiversity	
	Policy INF3 – Green Infrastructure	
Submitted Tewkesbury Borough Plan 2011-2031 (Issued October 2019)	Policy AGR1 – Agricultural Development	Despite the proposed mitigation measures, residual significant adverse effects during operation are identified at Ullen Wood ancient woodland and a veteran tree through nitrogen deposition, and to barn owls through increased risk of mortality and injury. There are no feasible mitigation measures to directly reduce nitrogen deposition impacts from the scheme on Ullen Wood ancient woodland. Native broadleaved woodland habitat will be planted to compensate for the predicted degradation of 2.1ha of ancient woodland. The landscape design includes a buffer of woodland and scrub planting to the south-west of Ullen Wood, as shown in ES Figure 7.11 Environmental Masterplan (Document Reference 6.3). This buffer has been designed to include a minimum of 2.1ha of compensatory woodland creation in a location where the predicted change in nitrogen deposition is below the 0.4kg N/ha/yr threshold for habitat degradation.
	Policy AGR2 - Agricultural Diversification	
	Policy HER1 – Conservation Areas	
	Policy HER2 – Listed Buildings	
	Policy HER3 – Historic Parks and Gardens	Section 8.9 of ES Chapter 8 Biodiversity (Document Reference 6.2) sets out how the scheme would provide enhancement to biodiversity which would deliver benefits over and above those required to mitigate the effects of the scheme. It identifies that opportunities have been taken to conserve and enhance biodiversity, which includes providing planting of priority habitats such as calcareous grassland which exceeds that required for mitigation. The current area of unimproved and semi-improved calcareous grassland within the scheme boundary is approximately 4.5ha. the scheme will deliver 75.41ha of calcareous grassland. Taking account of the 2.53ha of this habitat lost to the scheme, there will be a net gain in area of calcareous grassland priority habitat of 72.88ha. The gain far outweighs the requirements for compensation for the losses of this habitat. This is considered to represent a major benefit to biodiversity interests both within the scheme, and on adjacent land through the enhanced connectivity the network of new grassland will provide.
	Policy HER4 – Archaeological Sites and Scheduled Monuments	
	Policy HER5 – Locally Important Heritage Assets	
	Policy LAN1 – Special Landscape Areas	
	Policy LAN2 – Landscape Protection Zone	
	Policy NAT1 – Biodiversity, Geodiversity and Important Natural Features	
Policy NAT3 – Green Infrastructure: Building with Nature		

Biodiversity (Chapter 8 of the ES)		
Policy document	Policy reference	Assessment
	Policy ENV2 – Flood Risk and Water Management	<p>Furthermore, the extensive network of restored and created calcareous grassland will include a 25m wide corridor of calcareous grassland across the Gloucestershire Way crossing. This will provide a continuous habitat link for calcareous grassland flora and fauna to disperse through the landscape. This is an enhancement in comparison to the existing A417 which provides no such continuous connectivity of calcareous grassland. Opportunities to connect and enhance defunct hedgerows have been taken across the scheme. There will be a large net gain in the length of hedgerow of 5.5km, with all new planting comprising native species-rich hedgerows. This habitat provision is considered to exceed the compensation required for the loss of 3.5km of hedgerow and will enhance biodiversity interests once established. Although hazel dormouse has not been recorded on site, tree and hedgerow species utilised by dormice have been included in the planting. In combination with increased habitat connectivity provided by new hedgerows and woodland planting, the area within and adjacent to the scheme will be enhanced for dormice, providing an opportunity for future colonisation.</p> <p>The landscape planting design has maximised opportunities to connect previously isolated areas of woodland such as Emma’s Grove, Ullen Wood and other small areas of woodland at Birdlip Radio Station, by planting new woodland and hedgerows. New woodland creation will target the creation of lowland mixed deciduous woodland priority habitat, which is an appropriate habitat type for biodiversity enhancement within the Cotswolds AONB. There will be losses of 12.42ha of semi-natural broadleaved woodland and 3.56ha of broadleaved plantation woodland and creation of 25.57ha of new priority woodland, giving a net gain in the area of native broadleaved woodland within the scheme of 9.59ha. A decommissioned bus stop would also be retrofitted to provide an artificial bat roost, whilst the selected clearance of vegetation at Emma’s Grove Scheduled Monument would benefit woodland species through providing a variation in light conditions.</p> <p>In summary, whilst significant adverse effects are anticipated during the construction and operation of the scheme, it would also deliver significant beneficial effects through a scheme design which has sought opportunities to provide high quality mitigation and enhancement upon the existing situation, particularly in relation to the delivery of priority habitats.</p>
Tewkesbury Local Plan 2006-2011 Saved Policies (Tewkesbury Borough Council 2006)	Policy LND1 – Areas of Outstanding Natural Beauty (AONB)	
	Policy HEN1 – Conservation Areas – General	
	Policy HEN2 – Conservation Areas – Setting and Impact	
	Policy NCN3 – Protection of Other Sites of Nature Conservation or Geological/Geomorphological Interest	
	Policy NCN7 – Wildlife Corridors	
Cotswold AONB Management Plan (Cotswolds Conservation Board 2018-2023)	Policy CC4 – Natural and Cultural Capital and Ecosystems Services - Principles	
	Policy CC7 – Climate Change Mitigation	
	Policy CC8 – Climate Change Adaption	
	Policy CE1 - Landscape	
	Policy CE7 – Biodiversity	

Table B-5 Local policy assessment in relation to geology and soils

Geology and soils (Chapter 9 of the ES)		
Policy document	Policy reference	Assessment
Minerals for Local Plan for Gloucestershire (2018-2032) (Adopted 2032)	Policy MS01 – Non-mineral developments within MSAs	ES Chapter 9 Geology and Soils (Document Reference 6.2) assesses the potential effects of the construction and operation of the scheme on geology and soils impacts from the construction and operation of the scheme, following methodology set out in DMRB LA109. The effects on agricultural land holdings and development land and businesses are described in ES Chapter 12 Population and human health (Document Reference 6.2). ES Chapter 9 sets out that the baseline geological conditions of the area have been established through desk-based study and Phase 2A ground investigation information. Baseline conditions for soils have been based on Agricultural Land Classification survey information. These reports are provided in the ES Appendices (Document Reference 6.4). It is acknowledged that geological features form one of the special qualities of the Cotswolds AONB, including its limestone geology, the Cotswold escarpment and the High Wolds landscape. Conserving and enhancing this quality has therefore been a consideration of the landscape-led design approach as detailed in the Design Summary Report (Document Reference 7.7). The scheme has been designed, to avoid and prevent adverse effects on the geology and soils environment through the process of design development and consideration of good design principles. Embedded mitigation measures for geology and soils are reported as part of the scheme description in ES Chapter 2: The project (Document Reference 6.2). In addition, mitigation measures are proposed during construction to reduce, remediate or compensate likely significant adverse environmental effects. As set out in section 9.9 of ES Chapter 9 Geology and Soils (Document Reference 6.2), a temporary physical barrier would be constructed to protect the identified exposures of the Leckhampton Member within the Crickley Hill SSSI. A variety of measures to mitigate potential impacts of contamination of soil resources would be implemented, as secured through the ES Appendix 2.1 EMP (Document Reference 6.3), which would enable most soils to continue their various ecosystem functions on or off site during construction. The EMP also establishes procedures for dealing with unexpected soil or groundwater contamination that may be encountered and for implementing appropriate health and safety and pollution controls relating to human receptors. Where agricultural land is proposed to be used temporarily during construction, monitoring is required as part of the proposed mitigation measures despite these
	Policy MD02 – Safeguarding mineral infrastructure	
	Policy SR01 - Maximising	
	Policy DM06 – Biodiversity and Geodiversity	
Gloucestershire County Council Waste Core Strategy (Adopted 2012)	Policy WCS14 – Landscape	
	Policy WCS15 Nature Conservation (Biodiversity and Geodiversity)	
Gloucestershire County Council Waste Local Plan 2002-2012 Saved Policies (Adopted 2004)	Policy 21 – Agricultural Improvements	
	Policy 32 – Agricultural Land	
Gloucestershire's Local Transport Plan 2020-2041	LTP 0.2- Local Environment Protection	
Cotswold District Council Local Plan 2011-2031 (Adopted 2018)	Policy EN1 – Built, Natural and Historic Environment	
	Policy EN8 – Biodiversity and Geodiversity: Features, Habitats and Species	
	Policy EN9 – Biodiversity and Geodiversity: Designated Sites	
	Policy EN15 – Pollution and Contaminated Land	
Gloucester, Cheltenham and Tewkesbury Borough Council	Policy SD6 - Landscape	
	Policy SD9 – Biodiversity and Geodiversity	

Geology and soils (Chapter 9 of the ES)		
Policy document	Policy reference	Assessment
Joint Core Strategy (Adopted 2017) (Adopted 2017)	Policy SD14 – Health and Environmental Quality	temporary effects not being significant. The land would be restored and returned to the landowner through measures outlined in the Soil Management Plan produced as part of the EMP.
Tewkesbury Local Plan 2006 – 2011 (Tewkesbury Borough Council 2006)	Policy NCN3- Protection of Other Sites of Nature Conservation or Geological/Geomorphological Interest	<p>During operation of the scheme, mitigation measures detailed in ES Chapter 13 Road drainage and the water environment (Document Reference 6.2) and Chapter 2 The project (Document Reference 6.2) would prevent the pollution of controlled waters during the scheme operational phase. Spillages following road accidents would be managed by Highways England, whilst risks to maintenance workers would be mitigated through adherence to appropriate site and task specific health and safety documentation, required for legal compliance. The Materials Management Plan (MMP) presented in Annex E of the EMP, would mitigate risks to end users of the scheme (including maintenance workers) and controlled waters, associated with materials reuse of site.</p> <p>The assessment reported in ES Chapter 9 Geology and Soils (Document Reference 6.2) concludes that construction of the scheme is not considered to result in a significant effect on the designated geological features at Crickley Hill and Barrow Wake SSSI or tufa deposits. The scheme is considered to have no significant effect on geology or contaminated land during construction. However, it is also concluded that the permanent loss of grade 3A agricultural land (which is considered to be best and most versatile (BMV)) would lead to a large adverse effect which would be significant. In addition, the loss of grade 3B agricultural land has also been assessed as a moderate adverse effect which is also significant. It is not possible for this effect to be mitigated. The main areas of permanent land take of agricultural land are focussed on the construction of the mainline carriageway and Shab Hill junction. This land take is considered to be unavoidable given the linear nature of the scheme, with efforts made to minimise land take from agricultural holdings wherever possible.</p> <p>ES Chapter 9 Geology and Soils (Document Reference 6.2) concludes that the operation of the scheme would have no significant effect on geology, soils resources or contaminated land.</p> <p>Section 9.9 of ES Chapter 9 Geology and Soils (Document Reference 6.2) identifies how the scheme would provide enhancement, though providing new exposures of the Leckhampton Member and interpretation boards adjacent to the Cotswold Way crossing. In addition, access would be arranged (subject to appropriate risk assessment) where possible for Natural England or their nominated specialists for the recording of stratigraphic horizons and sampling of fossils from geological sections during construction</p>
Submitted Tewkesbury Borough Plan 2011-2031 (Issued October 2019)	Policy AGR1 – Agricultural Development	
	Policy AGR2 – Agricultural Diversification	
	Policy NAT1 – Biodiversity, Geodiversity and Important Natural Features	
Cotswold AONB Management Plan (Cotswolds Conservation Board 2018-2023)	Policy CC4 – Natural and Cultural Capital and Ecosystems Services - Principles	
	Policy CE1 - Landscape	
	Policy CE2 – Geology	
	Policy CE7 - Biodiversity	

Geology and soils (Chapter 9 of the ES)		
Policy document	Policy reference	Assessment
		<p>to provide further information on the geology at the Crickley Hill and Barrow Wake SSSI and also in areas of other cuttings e.g. Shab Hill.</p> <p>In summary, no significant effects are likely on geology during construction or operation of the scheme and it would deliver enhancement through increased exposures and opportunities for further understanding of the geology of the SSSI. However, significant adverse effects are anticipated on agricultural land which cannot be mitigated, although efforts have been made to minimise land take where possible. It is considered that the scheme accords with the requirements of identified local planning policy relating to geology and soils.</p>

Table B-6 Local policy assessment in relation to material assets and waste

Material assets and waste (Chapter 10 of the ES)		
Policy document	Policy reference	Assessment
Minerals Local Plan for Gloucestershire (2018-2032) (Adopted 2020)	Policy DM07 – Soil Resources	ES Chapter 10 Material Assets and Waste (Document Reference 6.2) Material Assets and Waste (Document Reference 6.2) Material Assets and Waste (Document Reference 6.2) assesses the potential effects on the environment from the use of material assets and the generation, disposal and recovery of waste resulting from the scheme, following the methodology set out in DMRB LA110. Section 10.7 of ES Chapter 10 Material Assets and Waste (Document Reference 6.2) sets out the baseline conditions relating to the existing use of material assets and generation of waste, availability of construction materials, mining and material resources, superficial deposits, waste generation, potential hazardous waste arisings and waste management facilities. The baseline conditions have been informed by desk-based studies and information from ground investigations, including (but not limited to) data from: <ul style="list-style-type: none"> • The EA; • Gloucestershire County Council; and • local development policies and topic papers. To identify the baseline conditions, data has also been collected from Highways England and members of the design team on the materials which are likely to be used during each stage of the proposed scheme, and the waste that is likely to arise. ES Chapter 10 Material Assets and Waste (Document Reference 6.2) sets out that measures have been embedded in the design of the scheme to minimise the waste produced. This includes – as set out in ES Chapter 2 The Project (Document Reference 6.2) – the decision during the design development process to reduce the cutting through the escarpment from 25m to 17m, which considerably reduced the amount of excavated material produced. ES Chapter 10 Material Assets and Waste (Document Reference 6.2) sets out that whilst an earthwork surplus of 65,945m ³ has been identified, measures would be taken to reduce the excess material to a point that no surplus will remain following the required cut and fill construction operations. Such measures are secured in Annex E Materials Management Plan (MMP) of ES Appendix 2.1 EMP (Document Reference 6.4). . This sets out how the excess material would be managed during construction of the scheme,
	Policy DM09 – Landscape	
	Policy MS01 – Non-mineral developments within MSAs	
	Policy MS02 – Safeguarding mineral infrastructure	
Gloucestershire County Council Waste Core Strategy (Adopted 2012)	Policy WCS1 – Presumption in Favour of Sustainable Development	
	Policy WCS2 – Waste Reduction	
	Policy WCS17 - Design	
Gloucestershire County Council Waste Local Plan 2002-2012 Saved Policies (Adopted 2004)	Policy 1 – Best Practicable Environmental Option	
	Policy 2 – Regional Self-Sufficiency	
	Policy 3 – Proximity Principle	
	Policy 6 – Waste Management Facilities for ‘Other’ Sites	
	Policy 36 – Waste Minimisation	
	Policy 40 - Traffic	
	Policy 43 – After Use	
	Policy 45- Planning Obligations	
Gloucestershire County Council Waste Local Plan 2002-2012 Saved Policies (Adopted 2004)	LTP PD 3.4 Construction Management Plans	
	LTP PD 4.9 - Environment	
Cotswold District Council Local Plan 2011-2031 (Adopted 2018)	Policy EN1 – Built, Natural and Historic Environment	

Material assets and waste (Chapter 10 of the ES)		
Policy document	Policy reference	Assessment
	Policy EN15 – Pollution and Contaminated Land	using the waste hierarchy in which waste prevention is the best outcome and waste disposal is the least favoured.
Gloucester, Cheltenham and Tewkesbury Borough Council Joint Core Strategy (Adopted 2017) (Adopted 2017)	Policy SD3 – Sustainable Design and Construction	Measures would be implemented to ensure material is handled in accordance with the Waste (England and Wales) Regulations 2011 to ensure the best environmental outcome. The scheme would re-use as much material as possible on-site, if suitable for re-use. Testing would be undertaken during construction to confirm the materials meet the specification requirements, which would be developed in line with the CL:AIRE Definition of Waste: Development Industry Code of Practice. This would ensure excavated material can be used directly within the development, subject to being suitable for use or following site treatment. Any material that does not meet this specification would be disposed of appropriately.
	Policy INF3 – Green Infrastructure	
Submitted Tewkesbury Borough Plan 2011-2031 (Issued October 2019)	Policy NAT4- Green Infrastructure: Building and Nature	<p>A Site Waste Management Plan (SWMP) has been developed and forms Annex H of ES Appendix 2.1 Environmental Management Plan (Document Reference 6.4). The SWMP outlines the proposals for the identification, segregation, handling and storage of wastes arising from the scheme.</p> <p>The Minerals Local Plan, Policy MS01 includes a Mineral Safeguarding Area (MSA) for sandstone and limestone within the footprint of the scheme. The designation of MSA aims to ensure that non-minerals development doesn't needlessly prevent the future extraction of mineral resources which are of local and national importance.</p> <p>A Mineral Safeguarding Area (MSA) for sandstone and limestone and a MSA for sand and gravel overlap the footprint of the scheme. The scheme would affect a small proportion of the resource and would not diminish access to the MSAs or sterilise the use of the wider resource. Birdlip Quarry (owned by Hanson Quarry Products Europe Limited) is located to the north of Cowley roundabout. The quarry is an extant dormant quarry under the Environmental Act 1995. An assessment of a worst-case scenario has been undertaken whereby the scheme would sterilise this quarry and prevent future extractions. It should be noted that this is an extant dormant quarry, and through correspondence with Gloucestershire County Council, Highways England understand that there has been no active working in the past 25 years. Therefore, the assessment of effects on mining and material resources is considered slight and not significant.</p> <p>The assessment in ES Chapter 10 Material Assets and Waste (Document Reference 6.2) concludes that there would be no significant effects on material assets and waste during construction or operation of the scheme. It is therefore considered compliant with local policy requirements.</p>

Table B-7 Local policy assessment in relation to noise and vibration

Noise and vibration (Chapter 11 of the ES)		
Policy document	Policy reference	Assessment
Minerals Local Plan for Gloucestershire (2018-2032) (Adopted 2020)	Policy DM03 – Transport	<p>ES Chapter 11 Noise and Vibration (Document Reference 6.2) Noise and Vibration (Document Reference 6.2) provides an assessment of noise and vibration impacts of the scheme during construction and operation, following the methodology of DMRB LA 111. A description is given of the baseline noise environment in section 11.7 of ES Chapter 11, where it is identified that noise or vibration sensitive locations have been identified through surveys whilst baseline noise conditions are determined through a Calculation of Road Traffic Noise (CRTN) noise prediction model for a forecast traffic scenario of 2026. In order to mitigate construction effects of noise and vibration, a commitment is made in ES Appendix 2.1 EMP (Document Reference 6.4). for a Noise and Vibration Management Plan (NVMP) to be prepared, which must include the requirement to undertake noise and vibration monitoring to ensure compliance with agreed threshold levels. Best Practicable Means (BPM) is assumed as embedded mitigation to control construction noise in the form of low noise emission plant and processes. If situations arise where despite the implementation of BPM, the noise exposure exceeds the criteria defined in the EMP, the main contractor may offer noise insulation or ultimately temporary re-housing (although the latter is not anticipated to be required for the scheme). The scheme has been designed taking into account how noise emissions could be minimised through layout and the use of measures such as landscaping, bunds and noise barriers. This is set out in section 11.9 of ES Chapter 11, in which the noise mitigation embedded into the scheme design is identified. This includes the use of earth bunds, stone walls and vertical noise barriers, in addition to consideration of the horizontal and vertical alignment of the scheme. ES Chapter 11 Noise and Vibration (Document Reference 6.2) identifies that such measures have been informed by varied considerations including: stakeholder engagement; engineering practicability; noise benefit in comparison to mitigation cost; and, the potential for other environment effects. This reflects the overall landscape-led design approach to the scheme, which is described in the Design Summary Report (Document Reference 7.7). The EMP would ensure that operational noise controls are implemented and that the effectiveness of any installed mitigation measures is verified to ensure it performs adequately. Noise insulation would be offered if and where future noise levels exceed the noise level trigger value and the other requirements referred to in the Noise Insulation Regulations 1975 (NIR). Confirmation of qualification for noise insulation would be made</p>
Gloucestershire County Council Waste Local Plan 2002-2012 Saved Policies (Adopted 2004)	Policy 40 - Traffic	
Gloucestershire's Local Transport Plan 2020-2041	LTP PF 0.2- Local Environment Protection	
	LTP PD 0.5- Community Health and Wellbeing	
Cotswold District Council Local Plan 2011-2031 (Adopted 2018)	Policy EN15 – Pollution and Contaminated Land	
Gloucester, Cheltenham and Tewkesbury Borough Council Joint Core Strategy (Adopted 2017) (Adopted 2017)	Policy SD3 – Sustainable Design and Construction	
	Policy SD14 – Health and Environmental Quality	
Cotswold AONB Management Plan (Cotswolds Conservation Board 2018-2023)	Policy CE4 – Tranquillity	
	Policy UE3 – Health and Wellbeing	

Noise and vibration (Chapter 11 of the ES)		
Policy document	Policy reference	Assessment
		<p>by the responsible authority before the scheme comes into operation, based on built information in accordance with the NIR. This would also be secured through the EMP.</p> <p>The assessment reported upon in ES Chapter 11 Noise and Vibration (Document Reference 6.2) concludes that construction of the scheme would result in temporary significant adverse noise effects (during the daytime only) at 45 residential properties (comprising of 7 receptors in the assessment) and five non-residential locations.</p> <p>During operation of the scheme, ES Chapter 11 Noise and Vibration (Document Reference 6.2) identifies that a greater number of residential properties would experience significant beneficial noise effects than would experience significant adverse noise effects. There would be 50 direct beneficial significant noise effects as a result of the scheme, compared to direct adverse significant noise effects on 21 residential properties. The direct beneficial effects include five locations which are Noise Important Areas. There would be indirect beneficial significant noise effects at 104 residential properties as a result of the scheme, compared to indirect adverse significant noise effects on 17 residential properties. In addition, there would be direct significant beneficial noise effects to non-residential receptors including Birdlip Primary School and Birdlip Village Hall and to parts of the PRow network.</p> <p>The effects of the scheme on human health has been assessed in ES Chapter 12 Population and Human Health (Document Reference 6.2), including with regard to effects of noise. This assessment concludes that there would be a neutral effect on health relating to noise during both construction and operation of the scheme.</p> <p>The scheme would overall result in permanent significant beneficial effects to substantially more residential properties than those residential properties that would experience a permanent significant adverse effect. This would include significant beneficial effects at five Noise Important Areas. The scheme would also result in significant beneficial noise effects at non-residential locations. Whilst it is recognised that during construction, the scheme would result in adverse significant effects to 45 residential properties and five non-residential receptors, these effects would be temporary in nature and would be controlled through the commitments within ES Appendix 2.1 EMP</p> <p>It is considered that the scheme is in accordance with the identified local planning policy relating to noise and vibration.</p>

Table B-8 Local policy assessment in relation to population and human health

Population and human health (Chapter 12 of the ES)		
Policy document	Policy reference	Assessment
Minerals Local Plan for Gloucestershire (2018-2032) (Adopted 2020)	Policy DM01 – Amenity	ES Chapter 12 Population and Human Health (Document Reference 6.2) Population and Human Health (Document Reference 6.2) provides an assessment of the effects of the scheme on population and health during construction and operation, in accordance with DMRB LA112 and LA104. It considers the effects on various aspects of land use and accessibility and human health.
	Policy DM02 – Cumulative Impact	
Gloucestershire County Council Waste Core Strategy (Adopted 2012)	Policy WCS1 – Presumption in Favour of Sustainable Development	In relation to land use and accessibility, the assessment considers private property and housing, community land and assets, development land and businesses, agricultural land holdings and WCH. In relation to human health, it considers health profiles of affected communities, health determinants and likely health outcomes. ES Appendix 2.1 EMP (Document Reference 6.4) provides a list of outline mitigation measures to be taken into account as part of the construction stage, including in relation to effects on land use, accessibility and human health during both construction and operation of the scheme. These include:
	Policy WCS19 – Sustainable Transport	
Gloucestershire County Council Waste Local Plan 2002-2012 Saved Policies (Adopted 2004)	Policy 2 – Regional Self-Sufficiency	<ul style="list-style-type: none"> Essential mitigation for noise, visual and air quality impacts as identified in the relevant Chapters of the ES (for example, there are a variety of measures including provision of different medium noise barriers, as appropriate, such as stone walls, earth bunds and vertical barriers (absorptive and reflective of noise) to mitigate the health impacts related to noise);
	Policy 41 – Public Rights of Way	
Gloucestershire's Local Transport Plan 2020-2041	LTP PD 0.5 – Community Health and Wellbeing	<ul style="list-style-type: none"> Restoration of land required for construction compounds; Considerate construction management to mitigate indirect effects of construction (such as air quality and noise) and to prevent severance; Necessary access arrangements during construction as detailed in ES Appendix 2.1 EMP Annex B CTMP (Document Reference 6.4); and A Public Rights of Way (PRoW) Management Plan (Annex F of the EMP) which sets out proposals to mitigate effects of the scheme on public rights of way. <p>As set out in in Annex F PRoW Management Plan of ES Appendix 2.1 (Document Reference 6.4) Highways England would seek to manage closures where possible (e.g. managed crossing and/or early re-provision) retaining rights of way as per current routes and seeking to reduce the effect on users. There would only be one instance of a permanent closure without substitute (Badgeworth bridleway 125) where</p>
	LTP PD 0.6- ThinkTravel, Influencing Travel Behaviour	
	LTP PD 2.1- Gloucestershire's Cycle Network	
	LTP PD 2.2- Cycle Asset Management	
	LTP PD 2.3 Active Travel: Safety, Awareness and Confidence	
	LTP PD 3.1- Gloucestershire's Freight Network	
	LTP PD 4.1- Gloucestershire's Highway Network	
	LTP PD 4.2 Highway Network Resilience	
	LTP PD 4.3- Highway Maintenance	
LTP PD 4.4- Road Safety		

Population and human health (Chapter 12 of the ES)		
Policy document	Policy reference	Assessment
	LTP PD 6.1- Gloucestershire's Pedestrian Network	<p>the value of the route is not sufficient to justify re-provision or diversion as part of the scheme (but appropriate alternative routes are available).</p> <p>ES Chapter 12 Population and Human Health (Document Reference 6.2)concludes that there would be permanent large adverse effects relating to three private properties and two businesses during construction, including due to total demolition of two of the properties and both businesses. There would be temporary adverse significant effects on two community assets; Crickley Hill Country park and National Star College during construction. In considering the construction effects on agricultural land holdings, Chapter 12 concludes a significant adverse effect on Shab Hill Farm given the proportion of land take required for the scheme and the potential to impact on the viability of the holding. No significant effects are anticipated during construction on walking, cycling and horse riding, or in relation to human health outcomes. All other effects would be neutral or slight adverse.</p> <p>During operation of the scheme, the assessment in Chapter 12 identifies that there would be a mixture of slight adverse and slight beneficial effects on private property and housing, however no such effects would be significant. Similarly, slight beneficial effects are likely on community land and assets and development land and businesses. Agricultural land holdings would experience no significant effects. In relation to walking, cycling and horse riding, there would be permanent beneficial significant effects, including on the Cotswold Way National Trail and Gloucestershire Way.</p> <p>During the operation of the scheme, there would be positive health outcomes in relation to access to facilities including healthcare, community and recreation, and education. All other health outcomes would be neutral.</p> <p>ES Chapter 12 Population and Human Health (Document Reference 6.2)also sets out how the scheme would deliver enhancements proposed for local communities to access open spaces and to utilise well designed and integrated active travel options. For example, this includes repurposing part of the existing A417 as a walking, cycling and horse riding corridor (the Air Balloon Way) and providing a grade separated diversion of the Cotswold Way National Trail via the new Cotswold Way crossing, improving safety and enhancing connectivity for users. There would also be reprovision of a greater area of Common Land than that lost as part of the scheme, as open space for people to enjoy.</p>
	LTP PD 6.2- Rights of Way	
	LTP PD 6.3- Pedestrian Asset Management	
	LTP PD 6.4- Pedestrian Safety	
Cotswold District Council Local Plan 2011-2031 (Adopted 2018)	Policy INF4 – Highway Safety	
Gloucester, Cheltenham and Tewkesbury Borough Council Joint Core Strategy (Adopted 2017) (Adopted 2017)	Policy SD14 – Health and Environmental Quality	
	Policy INF1 – Transport Network	
Tewkesbury Local Plan 2006 – 2011 Saved Policies (Tewkesbury Borough Council 2006)	Policy TPT3 – Pedestrian Networks	
	Policy TPT4 – Footpath and Bridleway Protection in the Implementation of Highways Schemes	
	Policy TPT5 – Cycle Network Enhancements	
	Policy VT4 – Air Quality	
	Policy TOR1 – Tourism – General Policy	
	Policy RCN5 – Recreational Rights of Way	
	Policy RAC1 – Pedestrian Accessibility	
Submitted Tewkesbury Borough Plan 2011-2031	Policy HEA1 Healthy & Active Communities	
	Policy RCN1 Public Outdoor Space, Sports Pitch and Sports Facility Provision	
	Policy TRAC1 – Pedestrian Accessibility	

Population and human health (Chapter 12 of the ES)		
Policy document	Policy reference	Assessment
(Issued October 2019)	Policy TRAC2 – Cycle Network & Infrastructure	Therefore, whilst significant adverse effects are likely in relation to some aspects of population and human health, these are primarily experienced during construction, with an overall benefit being experienced to most receptors once the scheme is in operation. The scheme is considered to accord with the requirements of identified local planning policy relating to population and health.
	Policy NAT3 – Green Infrastructure: Building with Nature	
Cotswold AONB Management Plan (Cotswolds Conservation Board 2018-2023)	Policy CC2 – Compliance with Section 85 of the Countryside and Rights of Way Act 2000	
	Policy CC3 – Working in Partnership	
	Policy CE3 – Local Distinctiveness	
	Policy CE4 – Tranquillity	
	Policy UE2 – Access and Recreation	
Policy UE3 – Health and Wellbeing		

Table B-9 Local policy assessment in relation to road drainage and the water environment

Road drainage and the water environment (Chapter 13 of the ES)		
Policy document	Policy reference	Assessment
Minerals Local Plan for Gloucestershire (2018-2032) (Adopted 2020)	Policy DM05 – Water Resources	<p>ES Chapter 13 Road Drainage and the Water Environment (Document Reference 6.2) assesses the impact of the scheme on road drainage and the water environment, including the effects on water quality and resources and on flood risk, in accordance with DMRB LA113.A Flood Risk Assessment (FRA) has been undertaken for the scheme and is provided in ES Appendix 13 (Document Reference 13.3).</p> <p><i>Flood Risk</i></p> <p>The FRA outlines the fluvial, surface water, groundwater and artificial drainage flood risk in consideration of the scheme. The FRA identifies that the scheme is located in Flood Zone 1 and subsequently is at low risk of flooding. During construction of the scheme, construction drainage installed early in the construction period is proposed to manage surface and groundwater flooding to ensure that flood risk would not increase as a result of the scheme. This is secured in ES Appendix 2.1 EMP (Document Reference 6.4).</p> <p>The assessment has found that the risk of flooding during construction of the scheme is low, although several areas at medium to high risk of pluvial flooding (around the tributary of Norman’s Brook) and groundwater flooding have been identified in the FRA. The risk of fluvial flooding to or from the scheme is low, however there are areas at high risk from surface water and groundwater flooding.</p> <p>During operation of the scheme, the risk of fluvial flooding to the site is considered to be low, with very low risk of fluvial flooding. Areas of medium to high risk of pluvial flooding, in particular around the tributary of Norman’s Brook, and groundwater flooding have been identified in the FRA. Whilst preliminary modelling outputs are presented in the FRA, which has improved the understanding of the current surface water flood risk around Crickley Hill, it is proposed that further detailed modelling will be undertaken. This will improve the understanding of any residual flood risk, following design of the realignment of the tributary of Norman’s Brook and the scheme’s drainage design, to ensure that flood risk does not increase as a result of the scheme. ES Chapter 13 Road Drainage and the Water Environment (Document Reference 6.2) concludes that the effect of the scheme on flood risk during construction and operation would be neutral and not significant. Furthermore, it is anticipated that the scheme would provide a benefit to road users travelling through the area</p>
	Policy DM09 – Landscape	
Gloucestershire County Council Waste Core Strategy (Adopted 2012)	Policy WCS1 – Presumption in Favour of Sustainable Development	
	Policy WCS2 – Waste Reduction	
	Policy WCS12 – Flood Risk	
Gloucestershire County Council Waste Local Plan 2002-2012	Policy 1 – Best Practicable Environmental Option	
	Policy 33 – Water Resources: Pollution Control	
	Policy 34 – Water Resources: Flood Control	
	Policy 39 - Transport	
Gloucestershire’s Local Transport Plan 2020-2041	LTP PD 0.2 Local Environment Protection	
Cotswold District Council Local Plan 2011-2031 (Adopted 2018)	Policy EN1 – Built, Natural and Historic Environment	
Submitted Tewkesbury Borough Plan 2011-2031 (Issued October 2019)	Policy NAT2 – The Water Environment	
	Policy ENV2 – Flood Risk and Water Management	
Gloucester, Cheltenham and Tewkesbury Borough Council Joint Core Strategy (Adopted 2017) (Adopted 2017)	Policy SD14 – Health and Environmental Quality	

Road drainage and the water environment (Chapter 13 of the ES)		
Policy document	Policy reference	Assessment
Cotswold AONB Management Plan (Cotswolds Conservation Board 2018-2023)	Policy CC7 – Climate Change Mitigation	between Cowley junction and Witcombe by providing a greater standard of flood protection than existing.
	Policy CC8 – Climate Change Adaption	<p><i>Water environment</i></p> <p>ES Chapter 13 Road Drainage and the Water Environment (Document Reference 6.2) identifies and describes water bodies and resources affected by the scheme and their existing quality and describes the potential impacts of the scheme on physical characteristics of the water environment. It identifies any impacts on Water Framework Directive (WFD) water bodies and source protection zones.</p> <p>ES Chapter 13 Road Drainage and the Water Environment (Document Reference 6.2) sets out the mitigation measures relating to the engineering design, construction and operation of the scheme that would seek to minimise any harmful impacts to the water environment and address likely significant effects. This includes the use of: standard good practice; surface water management systems; water quality monitoring and tracer testing; drainage basin design; watercourse realignment; management of dewatering activities; and further monitoring, amongst others. All such measures are listed in section 13.9 of Chapter 13 and are included in Annex G Ground and Surface Water Management Plan of the EMP. This is secured by a requirement of the draft DCO (Document Reference 3.1).</p> <p>The assessment of effects on the water environment from the construction of the scheme has found that when incorporating the mitigation measures included in the Annex G of the EMP, there would a temporary significant adverse effect on hydromorphology, due to the realignment of the tributary of Norman’s Brook during the construction phase. ES Chapter 13 Road Drainage and the Water Environment (Document Reference 6.2) further concludes that there would be no significant effects on the water environment resulting from the operation of the scheme.</p> <p>Whilst there would be a temporary adverse significant effect during construction relating to the realigned tributary of Norman’s Brook, ES Chapter 13 Road Drainage and the Water Environment (Document Reference 6.2) identifies that a permanent outcome of the scheme would be enhancement to the ecological connectivity of aquatic species habitat in the realigned tributary of Norman’s Brook. Overall, the scheme would provide betterment on the existing road drainage system and improve the water quality of receiving waterbodies, whilst there would be additional enhancement via the removal or upgrading of existing foul drainage outfalls at some properties.</p> <p>The scheme is therefore considered to accord with the requirements of identified local planning policy relating to road drainage and the water environment.</p>

Table B-10 Local policy assessment in relation to climate

Climate (Chapter 14 of the ES)		
Policy document	Policy reference	Assessment
Minerals Local Plan for Gloucestershire	Policy DM03 - Transport	<p>ES Chapter 14 Climate (Document Reference 6.2) reports on the potential effects of the scheme on climate, in accordance with the DMRB LA 114. It includes an assessment of greenhouse gas (GHG) emissions, vulnerability of the scheme to climate change (CCR assessment) and an in-combination climate impacts (ICCI) assessment.</p> <p>As set out in ES Chapter 14, an emissions quantification exercise has been undertaken to calculate the emissions anticipated to be generated or avoided by the scheme during the following four life cycle stages of the scheme's construction and operation. GHG emissions associated with the scheme have been compared to the national UK carbon budgets. The UK Government has carbon budgets up to 2030. The construction period for the scheme falls wholly within the fourth carbon budget. Operation of the scheme would commence in 2026 and is assessed against the fourth and fifth carbon budgets, up to 2032. Whilst operational and maintenance emissions for the scheme between 2033 and 2037 (the period for the sixth carbon budget) are provided in ES Chapter 14, emissions after 2032 are not assessed as no carbon budget has yet been set in law after this date.</p> <p>ES Chapter 14 Climate (Document Reference 6.2) details the mitigation measures designed into the scheme to reduce carbon emissions, which include: reducing the need for energy consuming operational equipment such as lighting; reduced earthworks and depth of cutting; a plan for reduced energy consumption in construction; selecting low maintenance planting; and; managing material resources to reduce waste and import.</p> <p>ES Chapter 14 Climate (Document Reference 6.2) also identifies appropriate mitigation and adaptation measures in relation to climate change resilience, such as through design and material specifications which would manage or address risks associated with climate change.</p> <p>In accordance with Paragraph 3.20 of DMRB LA 114, a significant effect occurs where the increase in carbon emissions resulting from the scheme would have a 'material impact on the ability of Government to meet its carbon reduction targets'.</p> <p>The assessment of ES Chapter 14 Climate (Document Reference 6.2) identifies that construction of the scheme is estimated to contribute approximately 0.00380% of the fourth carbon budget, whilst operation of the scheme is estimated to contribute approximately 0.00114% of the fourth carbon budget and 0.00355% of the fifth carbon budget. It is considered that this magnitude of emissions from the scheme in isolation</p>
	Policy DM05 – Water Resources	
	Policy DM06 – Biodiversity and Geodiversity	
Gloucestershire County Council Waste Core Strategy (Adopted 2012)	Policy WCS1 – Presumption in Favour of Sustainable Development	
	Policy WCS17 - Design	
	Policy WCS19 – Sustainable Transport	
Gloucestershire County Council Waste Local Plan 2002-2012 Saved Policies (Adopted 2004)	Policy 1 – Best Practicable Environmental Option	
	Policy 3 – Proximity Principle	
	Policy 33 – Water Resources: Pollution Control	
	Policy 34 – Water Resources: Flood Control	
	Policy 36 – Waste Minimisation	
	Policy 39 – Transport	
Policy 40 - Traffic		
Gloucestershire County Council Local Transport Plan 2015-2031 (Adopted 2017)	LTP PD 4.9 – Environment	
Cotswold District Council Local Plan 2011 – 2031 (Adopted 2018)	Policy EN1 – Built, Natural and Historic Environment	
	Policy EN15 – Pollution and Contaminated Land	
Gloucester, Cheltenham and	Policy SD6 – Landscape	

Climate (Chapter 14 of the ES)		
Policy document	Policy reference	Assessment
Tewkesbury Borough Council Joint Core Strategy (Adopted 2017) (Adopted 2017)	Policy SD14 – Health and Environmental Quality	would not have a material impact on the ability of the UK Government to meet its carbon budgets, and therefore is not anticipated to give rise to a significant effect on climate.
Gloucestershire’s Local Transport Plan 2020-2041	LTP PD 0.1- Reducing Transport carbon Emissions and Adapting to Climate Change	ES Appendix 14.2 Climate Change Resilience Assessment (Document Reference 6.4) considers any potentially critical features of the design which may be seriously affected by climate change as projected in the latest UK climate projections. It is concluded in ES Chapter 14 Climate (Document Reference 6.2) that whilst assets and infrastructure designed as part of the scheme are likely to be affected by climate change, such risks have been identified, assessed and mitigated for. Therefore, there would be no significant effects relating to the scheme’s vulnerability to climate change during its construction and operation. In relation to sustainable travel, Chapters 2 and 7 of this report set out how the optioneering process for the scheme considered the possibility of intervention through the public transport system (as opposed to road improvements), however such measures would not have delivered the required improvements to safety and capacity that are objectives of the scheme. As set out in ES Chapter 12 Population and Human Health, during construction of the scheme, accessibility to the existing road network and public transport would not be affected significantly. It identifies that no operational public transport routes or operational bus stops would be affected by the scheme. During the operation of the scheme, the resulting improved travel conditions would offer indirect benefits to people using the bus services and accessing other modes of transport. As is set out in the Equality Impact Assessment that has been prepared for the scheme (Document Reference 7.8), it would reduce congestion, improve safety and enhance the PRoW and walking, cycling and horse riding network in the area, which would improve access and travel conditions for all. ES Chapter 12 concludes that the scheme would provide improved active travel facilities for walking, cycling and horse riding. Whilst it is considered unlikely that the scheme would result in an increase in active travel journeys for commuting (due to the travel distances required), the scheme could result in more active travel journeys to access services or for recreation in the local area – for example due to improved connectivity between Cowley and Birdlip villages via the new Air Balloon Way or between Leckhampton Hill to Brockworth via the new Dog Lane to Cold Slad connection. The latter would provide an east-west route for walking, cycling or horse riding trips as an
	LTP PD 0.2 Local Environment Protection	
	LTP PD 0.3- Maximising Investment in a Sustainable Transport Network	
Cotswold District Council Local Plan 2011 – 2031 (Adopted 2018)	Policy EN15 – Pollution and Contaminated Land	As set out in ES Chapter 12 Population and Human Health, during construction of the scheme, accessibility to the existing road network and public transport would not be affected significantly. It identifies that no operational public transport routes or operational bus stops would be affected by the scheme. During the operation of the scheme, the resulting improved travel conditions would offer indirect benefits to people using the bus services and accessing other modes of transport. As is set out in the Equality Impact Assessment that has been prepared for the scheme (Document Reference 7.8), it would reduce congestion, improve safety and enhance the PRoW and walking, cycling and horse riding network in the area, which would improve access and travel conditions for all. ES Chapter 12 concludes that the scheme would provide improved active travel facilities for walking, cycling and horse riding. Whilst it is considered unlikely that the scheme would result in an increase in active travel journeys for commuting (due to the travel distances required), the scheme could result in more active travel journeys to access services or for recreation in the local area – for example due to improved connectivity between Cowley and Birdlip villages via the new Air Balloon Way or between Leckhampton Hill to Brockworth via the new Dog Lane to Cold Slad connection. The latter would provide an east-west route for walking, cycling or horse riding trips as an
	Policy INF – Sustainable Transport	
Submitted Tewkesbury Borough Plan 2011-2031 (Issued October 2019)	Policy LAN1 – Special Landscape Areas	As set out in ES Chapter 12 Population and Human Health, during construction of the scheme, accessibility to the existing road network and public transport would not be affected significantly. It identifies that no operational public transport routes or operational bus stops would be affected by the scheme. During the operation of the scheme, the resulting improved travel conditions would offer indirect benefits to people using the bus services and accessing other modes of transport. As is set out in the Equality Impact Assessment that has been prepared for the scheme (Document Reference 7.8), it would reduce congestion, improve safety and enhance the PRoW and walking, cycling and horse riding network in the area, which would improve access and travel conditions for all. ES Chapter 12 concludes that the scheme would provide improved active travel facilities for walking, cycling and horse riding. Whilst it is considered unlikely that the scheme would result in an increase in active travel journeys for commuting (due to the travel distances required), the scheme could result in more active travel journeys to access services or for recreation in the local area – for example due to improved connectivity between Cowley and Birdlip villages via the new Air Balloon Way or between Leckhampton Hill to Brockworth via the new Dog Lane to Cold Slad connection. The latter would provide an east-west route for walking, cycling or horse riding trips as an
	Policy LAN2 – Landscape Protection Zone	
	Policy NAT1 – Biodiversity, Geodiversity and Important Natural Features	
	Policy NAT2 – The Water Environment	
	Policy ENV2 – Flood Risk and Water Management	
Gloucester, Cheltenham and Tewkesbury Borough Council Joint Core Strategy (Adopted 2017) (Adopted 2017)	Policy SD3 – Sustainable Design and Construction	As set out in ES Chapter 12 Population and Human Health, during construction of the scheme, accessibility to the existing road network and public transport would not be affected significantly. It identifies that no operational public transport routes or operational bus stops would be affected by the scheme. During the operation of the scheme, the resulting improved travel conditions would offer indirect benefits to people using the bus services and accessing other modes of transport. As is set out in the Equality Impact Assessment that has been prepared for the scheme (Document Reference 7.8), it would reduce congestion, improve safety and enhance the PRoW and walking, cycling and horse riding network in the area, which would improve access and travel conditions for all. ES Chapter 12 concludes that the scheme would provide improved active travel facilities for walking, cycling and horse riding. Whilst it is considered unlikely that the scheme would result in an increase in active travel journeys for commuting (due to the travel distances required), the scheme could result in more active travel journeys to access services or for recreation in the local area – for example due to improved connectivity between Cowley and Birdlip villages via the new Air Balloon Way or between Leckhampton Hill to Brockworth via the new Dog Lane to Cold Slad connection. The latter would provide an east-west route for walking, cycling or horse riding trips as an
	Policy INF3 – Green Infrastructure	

Climate (Chapter 14 of the ES)		
Policy document	Policy reference	Assessment
	Policy SD14 – Health and Environmental Quality	alternative to trips otherwise made by car along the A417, helping contribute to sustainable development particularly in the Brockworth area.
Cotswold AONB Management Plan (Cotswolds Conservation Board 2018-2023)	Policy CC4 – Natural and Cultural Capital and Ecosystems Services - Principles	Overall it is considered that the proposals and anticipated benefits for all modes of transport would contribute to sustainable development, helping better connect people to open space, services, facilities and communities. The scheme is considered to accord with the requirements of identified local planning policy relating to climate change.
	Policy CC7 – Climate Change Mitigation	
	Policy CC8 – Climate Change Adaption	
	Policy CE1 - Landscape	
	Policy CE7 - Biodiversity	

Table B-11 Local policy assessment in relation to cumulative development

Cumulative development (Chapter 15 of the ES)		
Policy document	Policy reference	Assessment
Minerals Local Plan for Gloucestershire (2018-2032) (Adopted 2020)	Policy DM01 – Amenity	<p>ES Chapter 15 Assessment of Cumulative Effects (Document Reference 6.2) provides an assessment of the scheme in relation to cumulative effects, which are those that arise as a result of impacts from more than one project, or element of a single project, combining to have an effect on a receptor, or group of receptors, that may be larger than if the effect were considered separately. This is carried out in consideration of DMRB LA 104 and Planning Inspectorate (PINS) Advice note 17 Cumulative Effects Assessment. It provides the following assessments:</p> <ul style="list-style-type: none"> • Combined effects assessment: comprising an assessment of the combined impact of a number of different impacts from the scheme upon a single resource/receptor, which are individually assessed, and findings reported within each environmental factor Chapter of this ES; and • Cumulative effects assessment: comprising an assessment of cumulative impacts of a number of different projects within the vicinity, in combination with the environmental impact of the scheme on a single resource/receptor. <p>A four-stage approach to the cumulative effects assessment is set out in ES Chapter 15, which describes how other developments are identified for inclusion in the assessment that have the potential to give rise to significant cumulative effects. It confirms that relevant planning authorities within 5km of the scheme were consulted in identifying such developments, including GCC, TBC and CDC.</p> <p>ES Chapter 15 Assessment of Cumulative Effects (Document Reference 6.2) concludes that there are no significant cumulative effects anticipated which would result in any new or materially different significant effects to those identified in each environmental factor Chapter of the ES (ES Chapters 5-14, Document Reference 6.2). No mitigation measures are required further to those set out in the individual environmental factor Chapters and ES Appendix 2.1 EMP (Document Reference 6.4).</p> <p>The scheme is therefore considered to accord with the requirements of identified local planning policy relating to cumulative development.</p>
	Policy DM02 – Cumulative Impact	
Gloucestershire County Council Waste Core Strategy (Adopted 2012)	Policy WCS10 – Cumulative Impact	
	Policy WCS17 – Design	
Gloucestershire's Local Transport Plan 2020-2041	LTP PD 0.4- Integration with Land Use Planning and New Development	
Cotswold AONB Management Plan (Cotswolds Conservation Board 2018-2023)	Policy CE11 – Major Development	