highways england

A303 Stonehenge

Amesbury to Berwick Down
Technical Appraisal Report

Appendix D
Initial route option assessment
(Design Fix C)

Volume 5

Public Consultation 2017

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D.1 Initial route option assessment (Design Fix C)

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1 Introduction

1.1.1 The Initial Corridors Appraisal in Design Fix A recommended Corridor D and Corridor F as the preferred corridors for development and assessment of route options for the new improvement scheme. As part of Design Fix B, ten route options have then been developed for the two Corridors, informed by the previous studies that have been undertaken for the scheme.

1.1.2 However three of the ten route options utilised a 4.5km long tunnel under the WHS. All three options were assessed to generate scheme capital costs in the region of £2 Billion which significantly exceeded the scheme budget and were immediately rejected on affordability grounds.

1.1.3 The methodology used to appraise the remaining seven route options developed within the preferred Corridors D and F, follows on from that used for the Initial Corridors Appraisal in Design Fix A, and consists of the Transport Business Case Five Case Model criteria using the Option Assessment Framework contained within the Web-based Transport Analysis Guidance (WebTAG) Transport Appraisal Process.

1.1.4 The more detailed assessment methodologies and the assessments of the Corridor D and the Corridor F route options are detailed below. These are based on the Transport Business Case Five Case Model criteria and use the Option Assessment Framework contained within the WebTAG Transport Appraisal Process.

2 Assessment methodology

2.1 Strategic fit methodology

2.1.1 Further to the assessment undertaken on the identified Corridors for the historical routes for the scheme, the seven route options developed for Corridors D and F were now assessed for their alignment with the four headline Client scheme Requirements (CSRs) for the scheme as follows:

- **Transport:** To create a high quality Route option that resolves current and predicted traffic problems and contributes towards the creation of an expressway between London and the South West.
- **Economic growth:** In combination with other schemes on the Route option, to enable growth in jobs and housing by providing a free flowing and reliable connection between the East and the South West peninsula.
- **Cultural heritage:** To contribute to the conservation and enhancement of the Stonehenge, Avebury and Associated Sites World Heritage Site (WHS) by improving access both within and to the site.
- **Environment and community:** To contribute to the enhancement of the historic landscape within the WHS, to improve biodiversity along the Route option and to provide a positive legacy to communities adjoining the road.

2.1.2 The seven options were also assessed against relevant policy objectives set out in the following documents:

- National Policy Statement for National Networks (NPSNN).
- Road Investment Strategy (RIS), specifically the Roads Investment Strategy: for the 2015/16 – 2019/2020 Road Period (RIS1).
- Wiltshire Core Strategy.
- Third Wiltshire Local Transport Plan (LTP).
- Swindon and Wiltshire Local Enterprise Partnership (LEP) Revised Strategic Economic Plan.

2.1.3 Table 4- at the end of this appendix, provides further detail on each of these objectives and the reasoning behind their inclusion in the assessment.

2.1.4 Options were scored against the CSRs and policy objectives using the following three point scale:

- 3 - Strong alignment. Option makes a substantial positive contribution towards meeting relevant objectives.
- 2 - Moderate alignment. Option makes some contribution towards meeting relevant objectives.
- 1 - Weak alignment. Option makes little or no contribution towards meeting relevant objectives.

2.2 Value for money assessment methodology

Impact on economy

2.2.1 The economic appraisal was undertaken in accordance with WebTAG guidance. WebTAG specifies the approach by the Department for Transport (DfT) to be used to assess transport schemes in accordance with the requirements of HM Treasury's Green Book, which is used across Government for investment decisions.

2.2.2 The analysis of costs and benefits assesses the impact of each option over a 60 year appraisal period in comparison with a base case or 'do minimum' scenario. To allow comparison of costs and benefits that accrue at different points in time, all monetised impacts are discounted and converted to a present value. The results of the analysis are summarised in the Present Value of Costs (PVC) and the Present Value of Benefits (PVB) for each Route option.

2.2.3 In the economic assessment, attention is focussed primarily on transport economic efficiency (TEE) impacts with some consideration of environmental and social impacts in relation to greenhouse gas emissions and accident benefits respectively. The initial appraisal of options includes a comparison of the Present Value of Costs and the Present Value of the following benefits:

- User travel times – distinguishing between trips for business and commuting/other purposes.
- Vehicle operating costs – distinguishing between trips for business and commuting/other purposes.
- Greenhouse gas emissions.
- Indirect tax revenue.
- Accident benefits.

2.2.4 The traffic model is the source of the traffic data which underpins the estimation of the benefits identified above. For the assessment of the options at Design Fix C, the analysis is based on an enhanced version of the South West Area Multi-Modal

Study (SWARMMS) highway model developed for the earlier Project Control Framework (PCF) Stage 0 assessment. The model uses forecast years of 2021 and 2041.

2.2.5 When interpreting the results of the appraisal, it is important to understand the limitations of the analysis at this stage of the development of the project. In particular, it should be noted that:

- SWARMMS is a link-based model and therefore does not account for delays incurred at junctions. This is particularly relevant to the A303 Amesbury to Berwick Down given that the Countess Roundabout and Longbarrow Roundabout are non-segregated junctions.
- The model and appraisal are based on normal operating conditions between Mondays and Thursdays during a neutral month of March and therefore do not account for delays that occur on Fridays and during weekends. It also does not fully account for the seasonal nature of traffic flows, in particular when congestion issues are most severe on summer weekends, rather than traditional weekday mornings and evenings.
- The model uses a fixed trip matrix and therefore does not reflect the potential generation of traffic as a result of the A303 Amesbury to Berwick Down improvement scheme.

2.2.6 Taking these limitations into account, the traffic model still represents an adequate basis for the **comparative** assessment of the alternative options under consideration at Design Fix C.

2.2.7 Transport User Benefit Appraisal (TUBA) software has been used to undertake the analysis of costs and benefits. This software has been produced by the DfT to carry out transport scheme economic appraisal using a 'willingness to pay' approach with fixed or variable demand. The economic impacts of a scheme are derived by comparing the future year situation with the scheme (Do Something scenario) to the situation without the scheme (Do Minimum).

2.2.8 TUBA uses data taken from the traffic model forecasts on the number of trips, average journey times and average distances to calculate journey time impacts, vehicle operating costs, indirect tax effects and greenhouse gas emissions impacts in accordance with the WebTAG methodology and databook. The scheme investment and operating costs are also input to the TUBA software such that an overall comparison of costs and benefits can be made.

2.2.9 In accordance with WebTAG guidance, the benefits of journey time savings are determined by the 'value of time' ascribed to different types of user. The value of time reflects the opportunity cost of the time that a traveller spends on his/her journey. The assessment uses the DfT's proposals for changes to the values of time for the car business user class, as set out in Annex A of the DfT's consultation document[4] on the values of travel time savings. This modification varies the value of time used for business cars based on three distance bands for trip length (0-50km, 50-100km and over 100km). Although the changed values of time have yet to be formally adopted, the DfT has indicated that this is expected and hence the appraisal was undertaken using these new values of time.

4 'Understanding and Valuing Impacts of Transport Investment – Values of Travel Time Savings', Department for Transport, October 2015.

2.2.10 The main components of the capital costs for the scheme that are input to the TUBA software are:

- Construction costs, including main works, ancillary works, statutory undertakings, site supervision and testing.
- Land and property costs, including compensation.
- Preparation and supervision costs, including project management, design, public consultation, Public Inquiry, gaining statutory powers, surveys, compensation, supervision and testing.

2.2.11 Order of magnitude cost estimates for each of the options have been generated by Highways England's. At this stage, a detailed assessment of the impact of the scheme on maintenance and operating costs was not undertaken and modelling of any impacts on traffic during periods of maintenance has also been excluded. In lieu of specific assessment, an indicative allowance for tunnel operation, maintenance and renewal costs has been included in the cost estimates. This indicative allowance has been based on recently produced cost estimates for a tunnel of a similar type and length[6] taken from the Lower Thames Crossing scheme.

2.2.12 To maintain proportionality, at this stage of the options analysis a detailed cost assessment for Route Options F004, F005, and F010 was not carried out. In lieu of a specific assessment, indicative costs for Route Option F010 were estimated based on unit prices and benchmarking with other similar schemes. This provides a high level estimate for Route Option F010, which is then applied to Route Options F004 and F005 on a pro-rata basis based on relative lengths. To provide a high level estimate of the different components of costs the same proportions as the Corridor D 2.9km tunnel options have been applied to cost for Route Options F004, F005 and F010. Ongoing operational and maintenance costs have not been assessed at this stage.

2.2.13 No allowance has been made to account for avoided maintenance costs associated with the existing overland section of the A303 that would be replaced with the tunnel section, although such cost savings are expected to be relatively modest. This was considered to be a proportionate approach to the treatment of ongoing costs at this stage.

[6] The estimate provided for the Lower Thames Crossing is based on twin bore tunnel of 3,040m in length with an additional cut and cover section of 168m. In total, the Lower Thames Crossing tunnel is 308m longer than the 2,900m tunnel proposed for the A303 Amesbury to Berwick Down.

Business users

2.2.14 Impacts on business users with respect to journey time savings and vehicle operating costs have been assessed and monetised through application of DfT's TUBA software as described in paragraphs 2.2.7 and 2.2.8 above.

Wider impacts

2.2.15 WebTAG (Unit A2.1) defines Wider Impacts as impacts of transport interventions on welfare at a national level that are not captured by a conventional appraisal of transport user benefits. They are omitted because the conventional appraisal assumes theoretical 'perfectly competitive' transport-using markets, whereas in reality markets are imperfect, leading to the potential for additional benefits (or disbenefits).

2.2.16 There are three types of Wider Impact identified in WebTAG. These are agglomeration effects (the productivity benefits experienced by businesses as a result of improved accessibility or 'access to economic mass'), labour market impacts and the value of increased economic output resulting from lower business transport costs. For the purposes of Design Fix C, a qualitative assessment of Wider Impacts has been made. This assessment draws out the outputs of the traffic model and the indicative economic appraisal, as well as a broader understanding of the economic context to the scheme and conditions in which Wider Impacts are typically expected to be more or less significant.

Reliability

2.2.17 In line with WebTAG Unit A1.3, the consideration of reliability refers to the:

> *'Variation in journey times that individuals are unable to predict (journey time variability, or JTV). Such variation could come from recurring congestion at the same period each day (day-to-day variability, or DTDV) or from non-recurring events, such as incidents. It excludes predictable variation relating to varying levels of demand by time of day, day of week, and seasonal effects which travellers are assumed to be aware of.'*

2.2.18 According to the guidance, as long as demand is below capacity, incidents will be the main source of journey time variability. Day-to-day variability is a much less important source of reliability benefits except in urban areas.

2.2.19 Highways England has an established approach for the treatment of reliability on urban motorways and dual carriageways aided by the availability of information on the frequency and impact of incidents on such roads.

2.2.20 However, there is no corresponding approach available for rural single carriageway roads such as the A303 Amesbury to Berwick Down. Consequently, a qualitative approach has been developed that takes into account the following factors:

- The appraisal considers a neutral month and does not reflect the impact of seasonal variation which forms the main source of journey time variability impacts on the existing A303.
- The replacement of existing at-grade roundabouts at Countess and Longbarrow with grade-separated junctions will remove major causes of current journey time variability.
- The creation of an Expressway along the whole section of the Route option under review with a continuous dual carriageway will provide adequate capacity

for the traffic levels covered by the reliability assessment, i.e. excluding the impact of seasonality.

- It is anticipated that the creation of the dual carriageway and introduction of grade-separated junctions will reduce the level of incidents.
- The number of vehicles using the improved Expressway, and therefore benefitting from journey time reliability improvements, will vary between options.
- The options along Corridor D will tend to attract traffic from the local areas to the north and south of the existing A303 (e.g. Amesbury, Bulford, Durrington, Larkhill and Shrewton) onto the improved A303 and thereby reduce the impact of incidents in these communities.

Combined with the closure of the existing A303 route between Countess and Longbarrow Roundabouts, options along Corridor F will tend to encourage more traffic to divert into the local areas to the north and south of the existing A303 (e.g. Amesbury, Bulford, Durrington, Larkhill and Shrewton), thereby increasing the impact of incidents and worsening journey time reliability in these communities.

Regeneration

2.2.21 The WebTAG approach for the assessment of regeneration effects of a scheme are outlined in Unit A2.2 'Regeneration Impacts'. In the guidance, it is identified that a 'regeneration report only need to be considered for schemes that affect travel to, from or within one or more regeneration areas'.

2.2.22 As far as the A303 Amesbury to Berwick Down scheme is concerned, the only regeneration areas that are likely to be impacted by the scheme are in Cornwall, and it was assessed that there would be no discernible difference in the regeneration impact in Cornwall of the different route options in Corridor D and F. Additionally, non-designated regeneration areas were identified in Salisbury, and Wilton, which are unlikely to be significantly impacted by this scheme. Hence, at this stage, the impact was deemed neutral and no further assessment of the impact on regeneration was undertaken.

Public accounts

2.2.23 The cost to the broad transport budget is estimated by inputting estimated scheme costs into TUBA software and estimates of the impact on public accounts is taken from the TUBA Public Accounts table (present value in 2010 prices). At this stage, the publicly-funded option is the most likely commercial option to delivery of this scheme. Therefore it is assumed that all options will be publicly funded through Central Government.

Indicative costs and benefits

2.2.24 To enable a comparison between options a summary of the present value of costs and benefits is presented. The present value of costs is estimated as described above. The present value of benefits is an estimate of the following monetised benefits.

- Journey time benefits (business and commuting)
- Vehicle operating costs (business and commuting)
- Greenhouse gases
- Indirect taxes
- Accident benefits

Impact on the environment

2.2.25 The Transport Appraisal Process, comprises the WebTAG Options Appraisal Framework setting out the types of analysis, key input data and tools, and data outputs to be used in the assessment of potential options. The approach to the environment assessment at Design Fix C was based on this framework and was evolved to have regard to key policy and assessment documents that are relevant to the scheme, in so far as they were applicable at this stage in the options process, including:

- Transport Analysis Guidance: WebTAG.
- Design Manual for Roads and Bridges (DMRB) Volume 11 and relevant Interim Advice Notes.
- NPSNN relevant generic impacts and decision making criteria.
- WHS Management Plan.
- The Setting of Heritage Assets, Historic environment Good Practice Advice in Planning: 3 (Historic England 2015).
- Guidance on Heritage Impact Assessments for Cultural World Heritage Properties (ICOMOS 2011).

2.2.26 The approach was developed to identify the level of environmental risk associated with each project option, providing an early indication of potential significant environmental effects (as far as design and environmental information would allow at this stage), and to inform the comparison of options.

2.2.27 In accordance with WebTAG Guidance, the environmental appraisal:

- Was primarily a desk-based exercise, but informed by GIS and site walkovers where appropriate and necessary.
- Made best use of existing transport models and data, and recognised limitations of data where relevant.
- Had regard to the guidance provided in Practitioner Transport Analysis Guidance (TAG) Units in Unit A3 Environmental Appraisal where the information available allowed, applying the guidance proportionately, and to reflect the level of evidence required at this stage of the process, i.e. sufficient to be able to distinguish the relative benefits and impacts of options under consideration.
- Used a 3 or 7 point scale in providing a qualitative assessment of the scale of impact for environmental receptors and topics, adopting a prudent approach to scoring to reflect the quality of information on which scores are based and highlighting any key risks associated with options.
- Made use of quantitative evidence only where possible and appropriate, and where data and modelling was sufficiently accurate to rely upon. Where data was not sufficiently accurate to be relied upon, then a more qualitative approach was applied[7].
- Had regard to the relevant guidance set out in Highways England's DMRB in order to inform the approach to assessment and scoring.

2.2.28 An assessment of impact for each of the assessment areas listed in the Appendix A tables under the heading of 'Impact on the Environment' was undertaken:

[7] In the absence of a local traffic model the Design Fix C (Stage 0) traffic model was based on the South West Area Regional Model Multi Modal Study (SWARMMS) and the former TEMPRO 6.2 future year forecasts, and excludes junction modelling.

- Noise.
- Air quality.
- Greenhouse gases.
- Landscape.
- Historic environment.
- Biodiversity.
- Water environment.

2.2.29 In addition, and for consistency with the approach taken at Design Fix A the assessment of impact also considered materials, land contamination and agricultural land use. For landscape, for the purposes Design Fix C and the assets and receptors assessed, the townscape was assessed as a 'landscape character area' in the landscape methodology as defined in the South Wiltshire/Salisbury District Landscape Assessment 2008, with all other rural settlements subsumed into the other landscape character areas.

2.2.30 The WebTAG Guidance states that the assessment of environmental impacts during this stage of the process will generally be at a level which can be undertaken by individuals with a broad understanding and experience in undertaking environmental assessments. However given the level of detail required to differentiate between options and to ensure that expert judgement was exercised appropriately, topic methodologies and assessments were developed and undertaken by the relevant technical specialist.

2.2.31 Where possible, scoring systems and approaches have been designed to ensure that comparable approaches and assessments were produced for each topic.

2.2.32 Environmental impacts will vary for each Route option depending on the spatial requirements and any practical and technical requirements. As such it was necessary to have at least a basic understanding of these requirements to inform the Design Fix C assessment. Given the early stage in the options and design process, not all design specifications were fully understood or fixed. The assessment was therefore based on what were considered to be reasonable working assumptions, founded in the Draft Expressway Technical Note, and agreed between the environment and engineering teams. These assumptions were based on the information currently available, and may change as the design develops after Design Fix C. Any additional environmental effects will be identified through more detailed option assessment as part of subsequent stages in the design process and will be reported in the Environmental Impact Assessment that will be prepared as part of a Development Consent Order application.

2.2.33 For most topics the assessment was based on standard design and construction management measures, and options were generally assessed prior to any project specific mitigation. Where this was not the case it is identified within topic specific assessment methodologies and a justification is provided.

2.2.34 Further details of the working assumptions, and the approach applied to each topic assessment can be viewed within the "Initial route options Environmental Appraisal (Design Fix C) Report".

Impact on society assessment methodology

2.2.35 WebTAG provides guidance for the completion of Social Impact appraisals which were followed for the Options Assessment Framework. Social Impacts consider the

impact of transport on people – both local residents, and users of the transport network.

2.2.36 The purpose of the assessment and appraisal is to provide a greater understanding of where the benefits and disbenefits of the scheme will be distributed and who these benefits/disbenefits will impact on the most.

User benefits

2.2.37 This indicator identifies the potential user benefits of the scheme, and assesses whether the benefits and/or disbenefits are distributed proportionately across the users, which are then compared to the income category of indices of deprivation. At this stage, qualitative knowledge of congestion and journey time benefits was considered, along with the length of the route.

Reliability

2.2.38 The assessment of reliability does not distinguish between work (economy) and non-work trips (society). Therefore, the methodology for assessing reliability impacts is consistent with that set out above.

Physical activity

2.2.39 This assesses how transport can affect levels of physical activity and have a beneficial impact on health including reducing incidences of a range of chronic diseases such as coronary heart disease, stroke, diabetes and some cancers, as well as preventing weight gain and obesity and improving mental health. A qualitative assessment was done, considering how the scheme could encourage or discourage walking and cycling through provision of new route options and improvements to existing, as well as potential impacts on perceptions of walking and cycling in the area.

Journey quality

2.2.40 The assessment of journey quality impacts considered two main areas: travellers' views (the view and pleasantness of the external surroundings in the duration of the journeys); and traveller stress. A qualitative assessment of these areas was undertaken, and an estimate of the number of people affected by each was made.

2.2.41 For Traveller Views we looked at horizontal and vertical alignment drawings available at the time for each Route option and identified whether views from the road would be categorised as:

- No view.
- Restricted view.
- Intermittent view.
- Open view.

2.2.42 The assessments for Traveller Stress was subjective and used the following assumptions:

- A dualled Route option with grade separated junctions would reduce traveller stress by improving travellers' ability to make good progress along the route, improving route certainty and reducing fear of potential accidents.
- Upgrade to expressway standards would reduce route uncertainty and reduce fear of potential accidents.
- Grade-separated junctions could increase instances of route uncertainty and fear of potential accidents.

2.2.43 For both sub-factors (Traveller Views and Traveller Stress) the overall score is determined by the number of daily travellers affected, following the 7 point assessment scale in Table 2-1 below.

Table 2-1 Scoring on traveller views and traveller stress

Large Adverse	Moderate Adverse	Minor Adverse	Neutral	Minor Beneficial	Moderate Beneficial	Major Beneficial
Number of travellers affected daily >10,000	Number of travellers affected daily 500-10,000	Number of travellers affected daily <500	Balanced or no change	Number of travellers affected daily <500	Number of travellers affected daily 500-10,000	Number of travellers affected daily >10,000

2.2.44 An overall score for journey quality was determined based on the balance of the scores for traveller views and traveller stress.

Accidents

2.2.45 This aspect examines the likely changes to accident levels (positive or negative), as a result of the proposed scheme and compares this with the proportion of vulnerable groups within the scheme area. At this stage, the assessment considered changes to the route location along with changes in traffic flow as a result of the scheme to determine potential conflicts between pedestrians/cyclists and motor vehicles. Basic knowledge of the standards that will be applied to the road design were considered to determine if there is likely to be an impact on vulnerable groups.

2.2.46 The safety impacts of the scheme have been assessed quantitatively and monetised to be incorporated into the overall economic appraisal for the scheme. Accident saving benefits have been calculated separately using Cost and Benefit to Accidents – Light Touch (COBALT[8]), a spreadsheet application developed by the DfT to undertake the analysis of the impacts on accidents as part of the economic appraisal of road schemes.

2.2.47 COBALT compares accidents by severity and associated costs across a defined network in the Do Minimum Scenario with those in the Do Something scenario, using details of link and junction characteristics and forecast traffic volumes. Accident rates and costs used in COBALT are consistent with those defined in the TAG data book[9].

2.2.48 For the purpose of this assessment, accident benefits were only assessed for the A303 itself, between its junctions with the A36 at Wylye and the A338 junction south of Tidworth. Accident benefits or disbenefits arising elsewhere in the A303 corridor, or on other route options in the network, as a result of changes in traffic volumes arising from the scheme have been excluded from this assessment. This simplified assessment has used the COBALT default accident rates based on existing or proposed link characteristics.

2.2.49 Traffic forecasts were extracted from the 2021 and 2041 model forecasts for input into COBALT. The 60-year assessment period for which benefits are taken was adjusted to run from the proposed 2023 opening year through to 2082. The

[8] COBALT (COst and Benefit to Accidents – Light Touch), Department for Transport, November 2015

[9] Transport Analysis Guidance: TAG data book, Department for Transport, November 2014

resulting accident benefits calculated by COBALT were then added to the main TUBA benefits for the scheme.

Security

2.2.50 This indicator considers changes in the perception of security, as well as actual changes to the level of security. A qualitative assessment was undertaken, looking at any changes in public transport waiting facilities / interchange facilities; pedestrian access; provision of lighting and visibility; landscaping; or formal or informal surveillance.

Accessibility (Access to services)

2.2.51 This indicator highlights any impact to public transport services operating along the route option as a result of the scheme, and any associated impact on accessing key services. At this stage a desktop review of public transport services in the area was undertaken to determine if any services operate on roads which are likely to be impacted by implementation of the scheme.

Severance

2.2.52 The ease with which people move around the area impacted by the scheme was broadly examined, and a qualitative assessment undertaken. This indicator included changes to footbridges and Public Rights of Way (PRoW), as well as changes to road alignments and traffic flow, and considered both PRoW severance (issues caused on specific PRoW) and community severance (the impact of traffic flow and resulting severance on communities along the Route option).

2.2.53 Assessments for Severance were undertaken in the absence of PRoW data or estimated number of people likely to be affected by community severance. As such the assessments for PRoW severance focused on number of PRoW affected and the assessment for community severance focused on the number of communities/settlements where residents may be affected by severance.

2.2.54 Scoring for Severance of PRoW is based on the following 7 point assessment scale in Table 2-2.

Table 2-2 Scoring for severance of PRoW

Large adverse	Moderate adverse	Slight adverse	Neutral	Slight beneficial	Moderate beneficial	Large beneficial
(-3)	(-2)	(-1)	(0)	(+1)	(+2)	(+3)
Increase in severance affects >6 PRoW	Increase in severance affects 4-6 PRoW	Increase in severance affects 1-3 PRoW	Increases in severance are broadly balanced	Reduction in severance affects 1-3 PRoW	Reduction in severance affects 4-6 PRoW	Reduction in severance affects >6 PRoW

2.2.55 The assessment score is determined by totalling the direct effects (from the downgrade of the existing route and provision of new Route option) and indirect effects (from changing traffic flows on the Affected Road Network (ARN) associated with the new Route option based on Annual Average Weekly Traffic (AAWT) forecasts available at the time). An overall assessment score is determined based on the balance of beneficial and adverse effects.

2.2.56 The same approach is taken with severance of communities in which case the 7 point assessment scale in Table 2-3 is used.

Table 2-3 Scoring of community severance

Large Adverse	Moderate Adverse	Slight Adverse	Neutral	Slight Beneficial	Moderate Beneficial	Large Beneficial
(-3)	(-2)	(-1)	(0)	(+1)	(+2)	(+3)
Increase in severance affects >6 communities	Increase in severance affects 4-6 communities	Increase in severance affects 1-3 communities	Increases in severance are broadly balanced	Reduction in severance affects 1-3 communities	Reduction in severance affects 4-6 communities	Reduction in severance affects >6 communities

Option values

2.2.57 Option and non-use values consider if the scheme being appraised includes measures that will substantially change the availability of transport services within the study area. A qualitative review of scheme elements was undertaken to determine any potential impact.

Affordability

2.2.58 This indicator identifies the potential user costs of the scheme, including changes in public transport fares, tolls and vehicle operating costs. A qualitative assessment of the potential impact on road users was done.

2.2.59 The Social Impacts assessment for all indicators is based on how any impacts impact on the population of relevant vulnerable groups in the area. In the absence of model data for the analysis, it was not possible to quantify exactly how the impacts are distributed across local populations, and so professional judgement has been used for the qualitative assessments as shown in Table 2-4 below.

Table 2-4 Social impacts qualitative assessment explanation

Impact	Assessment
Beneficial and the population impacted is significantly greater than the proportion of the total population.	Large beneficial
Beneficial and the population impacted is broadly in line with the proportion of the total population.	Moderate beneficial
Beneficial and the population impacted is smaller than the proportion of the total population.	Slight beneficial
There are no significant benefits or disbenefits experienced by the group for the specified impact.	Neutral
Adverse and the population impacted is smaller than the proportion of the total population.	Slight Adverse
Adverse and the population impacted is broadly in line with the proportion of the total population.	Moderate Adverse
Adverse and the population impacted is significantly greater than the proportion of the total population.	Large Adverse

Distributional impacts assessment methodology

2.2.60 WebTAG[10] provides guidance for the completion of Distributional Impacts appraisals which were followed for the Options Assessment Framework.

2.2.61 Distributional Impacts consider the variance of transport intervention impacts across different social groups. Both beneficial and/or adverse Distributional Impacts of transport interventions were considered, along with the identification of social groups likely to be affected.

2.2.62 The purpose of the assessment and appraisal is to provide a greater understanding of where the benefits and disbenefits of the scheme will be distributed and who these benefits/disbenefits will impact on the most.

2.2.63 The following have been considered:

- The potential general impacts that may arise due to the scheme.
- The areas impacted for each indicator.
- The socio-economic and demographic characteristics of the areas impacted.
- Amenities within impacted areas that may experience a benefit or disbenefits.

User benefits

2.2.64 This indicator identifies the potential user benefits of the scheme, and assesses whether the benefits and/or disbenefits are distributed proportionately across the users, which are then compared to the income category of indices of deprivation. At this stage, qualitative knowledge of congestion and journey time benefits were considered, along with the length of the Route option.

Noise

2.2.65 A noise analysis was carried out to identify potential changes as a result of the scheme. This was compared to current census data to assess the impact on nearby vulnerable groups. At this stage, the assessment considered changes to the route location along with changes in traffic flow as a result of the scheme.

Air quality

2.2.66 An air quality analysis was carried out to identify potential changes as a result of the scheme. This was compared to current census data to assess the impact on vulnerable groups. At this stage, the assessment considered changes to the route location along with changes in traffic flow as a result of the scheme.

Accidents

2.2.67 This aspect examines the likely changes to accident levels (positive or negative), as a result of the proposed scheme and compares this with the proportion of vulnerable groups within the scheme area. At this stage changes to the Route option were considered, along with changes in traffic flow as a result of the scheme, to determine potential conflicts between pedestrians/cyclists and motor vehicles. Basic knowledge of the standards that will be applied to the road design were considered to determine if there is likely to be an impact on these.

Security

[10] Web TAG Units A4-1 Social Impact Appraisal and A4-2 Distributional Impact Appraisal. (January 2014)

2.2.68 A qualitative assessment was undertaken, looking at any changes in public transport waiting facilities / interchange facilities; pedestrian access; provision of lighting and visibility; landscaping; or formal or informal surveillance. This included considering whether the scheme will improve or deteriorate the perception of personal security for vulnerable groups.

Severance

2.2.69 The ease with which people move around the area impacted by the scheme was broadly examined, and a qualitative assessment undertaken. This indicator included changes to footbridges and PRoW, as well as changes to road alignments and traffic flow, and considered both PRoW severance (issues caused on specific PRoWs) and community severance (the impact of traffic flow and resulting severance on communities along the Route option)., as well as levels of vulnerable groups in the area.

Accessibility

2.2.70 This indicator highlights any impact to public transport services operating along the Route option as a result of the scheme, and any associated impact on accessing key services. At this stage a desktop review of public transport services in the area was undertaken to determine if any services operate on roads which are likely to be impacted by implementation of the scheme.

Personal affordability

2.2.71 This indicator identified the potential user costs of the scheme, including changes in public transport fares, tolls and vehicle operating costs, and assessed whether the benefits and/or disbenefits are likely to be distributed proportionately across the users, which were then compared to the income category of indices of deprivation.

2.2.72 The distributional impacts assessment for all indicators is based on how any impacts impact on the population of relevant vulnerable groups in the area. In the absence of model data for the analysis, it was not possible to quantify exactly how the impacts are distributed across local populations, and so professional judgement was used for the qualitative assessments as shown in Table 2-5 below.

Table 2-5 Distributional impacts qualitative assessment explanation

Impact	Assessment
Beneficial and the population impacted is significantly greater than the proportion of the total population.	Large beneficial
Beneficial and the population impacted is broadly in line with the proportion of the total population.	Moderate beneficial
Beneficial and the population impacted is smaller than the proportion of the total population.	Slight beneficial
There are no significant benefits or disbenefits experienced by the group for the specified impact.	Neutral
Adverse and the population impacted is smaller than the proportion of the total population.	Slight adverse
Adverse and the population impacted is broadly in line with the proportion of the total population.	Moderate adverse
Adverse and the population impacted is significantly greater than the proportion of the total population.	Large adverse

2.3 Financial case assessment methodology

2.3.1 The financial case concerns the cost and therefore affordability of the alternative options. Under the WebTAG Options Assessment Framework, consideration is given to both capital and operating costs.

2.3.2 Capital costs – Indicative order of magnitude cost estimates for each of the options have been generated by the Highways England commercial team. The cost estimates include:

- The estimated construction costs
- An allowance for land costs
- Design and supervision costs
- Risk contingency costs, and
- Inflation between the base year of the estimate and the years of expenditure.

2.3.3 The cost estimates are presented in a range of 'Most Likely', 'Lower Bound' and 'Upper Bound' with the 'Most Likely' estimate used for the purposes of the economic assessment at this stage.

2.3.4 Operating and maintenance costs – A full assessment of operating and maintenance costs was not made at this stage. In respect of ongoing costs, the primary differentiator between options relates to ongoing costs of tunnel operations and maintenance. The assessment has therefore been informed by indicative operating, maintenance and renewals costs for a tunnelled solution, and an assessment against the relative scale of operating and maintenance costs for the appraisal of the Corridor F options.

2.4 Delivery case assessment methodology

2.4.1 There are three key elements associated with the assessment of the Delivery Case:

- Likely delivery agents.
- Stakeholder acceptability.
- Public acceptability.

2.4.2 At this early stage of assessment, the study team identified only immediately obvious challenges to deliverability rather than attempt to consider the complexity of scheme delivery and how this is related to the potential number of delivery agents.

2.4.3 In terms of Stakeholder/Public acceptability, the study team made a qualitative assessment of the anticipated level of support or challenge from the respective groups in relation to the options.

3 Corridor D route options assessment

3.1.1 Strategic fit assessment

3.1.2 This section provides a summary of an assessment of the four Corridor D shortlisted route options for the A303 Amesbury to Berwick Down scheme for their alignment with the CSRs for the scheme, and with relevant local and national planning, transport and economic policy objectives.

3.1.3 The four route options to be assessed within the Corridor D options are:

- **Route Option D001** – 2.9km tunnel with a bypass to the north of Winterbourne Stoke. The eastern tunnel portal is located to the east of the The Avenue.
- **Route Option D003** – 2.9km tunnel with a bypass to the south of Winterbourne Stoke. The eastern tunnel portal is located to the east of the The Avenue.
- **Route Option D021** – 2.9km tunnel with a bypass to the north of Winterbourne Stoke. The eastern tunnel portal is located to the west of the The Avenue.
- **Route Option D022** – 2.9km tunnel with a bypass to the south of Winterbourne Stoke. The eastern tunnel portal is located to the west of the The Avenue.

3.1.4 The following provides summary assessment tables for alignment with the CSRs and for national and local policy alignment, and high level summary assessments for all four route options in Corridor D.

3.1.5 CSR assessment

3.1.6 Table 3-1 provides a summary of the alignment with the CSRs for each of the assessed route options in Corridor D.

Table 3-1 Scheme objectives fit summary table

Document	Relevant objectives	D001	D003	D021	D022
CSR	**Transport:** to create a high quality Route option that resolves current and predicted traffic problems and contributes towards the creation of an expressway between London and the South West.	**3**	**3**	3	3
	Economic growth: in combination with other schemes on the Route option, to enable growth in jobs and housing	**3**	**3**	3	3

Document	Relevant objectives	D001	D003	D021	D022
	by providing a free flowing and reliable connection between the East and the South West peninsula.				
	Cultural heritage: to contribute to the conservation and enhancement of the WHS by improving access both within and to the site.	2	2	**1**	**1**
	Environment and community: to contribute to the enhancement of the historic landscape within the WHS, to improve biodiversity along the Route option, and to provide a positive legacy to communities adjoining the road.	**2**	**2**	2	2

3.1.7 Options in Corridor D generally align more closely with the CSRs than options in Corridor F. Tunnelled options would remove the road from a key part of the WHS, reducing severance within the WHS, improving access for visitors, and enhancing the visitor experience. Corridor D options would also increase capacity on the road, relieving congestion, improving traffic conditions for local and strategic journeys, and increasing accessibility to the WHS for visitors. Improved connectivity could help to support growth in jobs and housing, both locally and across the South West. Options in Corridor D would also support improved connectivity for local as well as through traffic, and help to resolve existing problems caused by rat-running through communities to the north of the A303.

3.1.8 In terms of cultural heritage, options in Corridor D would remove the road from a key part of the WHS and reduce severance, improving access for visitors. However, construction of the Route option would have very severe impacts on the setting and fabric of a large number of scheduled monuments within the WHS, and would result in the loss of important archaeological remains. Corridor D options would also impact directly and indirectly on designated nature conservation sites, and there is the potential for a northern bypass of Winterbourne Stoke to result in adverse air quality effects on Parsonage Down SSSI and on Salisbury Plain SSSI/SAC/SPA.

3.2 National policy alignment

3.2.1 Table 3-2 provides a summary of the alignment with the national policy objectives for each of the assessed route options in Corridor D.

Table 3-2 National policy alignment summary table

Document	Relevant objectives	D001	D003	D021	D022
NPSNN	Networks with the capacity and connectivity and resilience to support national and local economic activity and facilitate growth and create jobs	**3**	**3**	**3**	**3**
	Networks which support and improve journey quality, reliability and safety	**3**	**3**	**3**	**3**
	Networks which support the delivery of environmental goals and the move to a low carbon economy	**1**	**1**	**1**	**1**
	Networks which join up communities and link effectively to each other	**3**	**3**	**3**	**3**
RIS1	Making the network safer	**3**	**3**	**3**	**3**
	Improving user satisfaction	**3**	**3**	**3**	**3**
	Supporting the smooth flow of traffic	**3**	**3**	**3**	**3**

Document	Relevant objectives	D001	D003	D021	D022
	Encouraging economic growth by working to minimise delay	3	3	3	3
	Delivering better environmental outcomes	2	2	2	2
	Helping cyclists, pedestrians and other vulnerable users	3	3	3	3

3.2.2 All options in Corridor D generally align strongly with relevant national policy objectives. All would increase capacity and reduce congestion on the A303, improve end-to-end journey times, and improve traffic conditions in local towns and villages, including those currently affected by 'rat running'. This would be likely to support the local economy, by improving accessibility to key sites and transforming connectivity to and from the south-west. Corridor D options would all improve safety by providing a dual carriageway and managing junction access, and help to improve resilience to accidents.

3.2.3 Corridor D options align less strongly with policy objectives relating to environmental outcomes, particularly with regards to carbon reduction. All Corridor D options would result in an increase in greenhouse gas emissions, and would also have the potential to impact directly and indirectly on designated sites. Routes with a bypass to the north of Winterbourne Stoke (Route Options D001 and D021) would also have potential adverse air quality impacts on Parsonage Down Site of Special Scientific Interest (SSSI) and Salisbury Plain SSSI / Special Area of Conservation (SAC) / Special Protection Area (SPA), and therefore align less closely with environmental policy objectives than options with a bypass to the south (Route Options D003 and D022). However, based on current information, such differences are relatively slight and have not affected the scoring of options in Corridor D.

3.2.4 Local policy alignment

3.2.5 Table 3-3 provides a summary of the alignment with the local policy objectives for each of the assessed route options in Corridor D.

Table 3-3 Local policy alignment summary table

Document	Relevant objectives	D001	D003	D021	D022
Wiltshire Core Strategy	Strategic Objective 1: Delivering a thriving economy	3	3	3	3
	Strategic Objective 4: Helping to build resilient communities	3	3	3	3
	Strategic Objective 5: Protecting and enhancing the natural, historic and built environment	2	2	1	1
	Strategic Objective 6: Ensuring that adequate infrastructure is in place to support communities	2	2	2	2
	Core Policy 4: Spatial strategy for the Amesbury Community Area	2	2	2	2
	Core Policy 6: Stonehenge	2	2	1	1
	Core Policy 59: The Stonehenge, Avebury and Associated Sites WHS and its setting	2	2	1	1
Wiltshire LTP	Support economic growth	3	3	3	3
	Reduce carbon emissions	1	1	1	1
	Contribute to better safety, security and health	2	2	2	2
	Promote equality of opportunity	2	2	2	2

Document	Relevant objectives	D001	D003	D021	D022
	Improve quality of life and promote a healthy environment	2	2	2	2
Swindon and Wiltshire LEP, Strategic Economic Plan	Transport infrastructure improvements: we need a well-connected, reliable and resilient transport system to support economic and planned development growth at key locations	3	3	3	3
	Place shaping: we need to deliver the infrastructure required to deliver our planned growth and regenerate our City and Town Centres, and improve our visitor and cultural offer	3	3	3	3

3.2.6 Options in Corridor D align strongly with relevant policy objectives in terms of delivering transport infrastructure, improving traffic conditions for local traffic and strategic road users, encouraging economic growth, and supporting local communities. All options align to some extent with local policies for the Amesbury Community Area, as they would improve traffic conditions for journeys to and from the town. All options would reduce accident rates and traveller stress.

3.2.7 Alignment with objectives relating to protecting the natural and historic environment is again more moderate, and there is weak alignment across all Corridor D options with the goal set out in the Wiltshire LTP to reduce greenhouse gas emissions. Strategic Objective 6 of the Wiltshire Core Strategy includes reductions in greenhouse gas emissions associated with transport as a key outcome, alongside the provision of new or improved infrastructure, reductions in delays and disruption, improved road safety, and better access to jobs and services. Alignment with this objective was considered to be moderate, as Corridor D options would perform well against other key outcomes, but would result in an increase in greenhouse gas emissions.

3.2.8 In terms of the historic environment, all Corridor D options would remove the road from a key part of the WHS, but would result in adverse impacts on the setting and fabric of other monuments within the landscape. Where the eastern tunnel portal is located to the east of The Avenue (Route Options D001 and D003), options would allow the reconnection of The Avenue, an extremely rare ancient ceremonial Route option that is a fundamental element of the Outstanding Universal Value of the WHS. Where the eastern portal is located to the west (Route Options D021 and D022), options would require the further severance of The Avenue.

3.2.9 A second key difference between Corridor D options relates to the alignment of the Winterbourne Stoke bypass. Where the bypass is to the north of Winterbourne Stoke (Route Options D001 and D021), it is likely that the construction of the Route option would result in adverse impacts on the setting of a large number of scheduled monuments and archaeological remains. There is also greater potential for adverse air quality impacts on Parsonage Down. Options with the bypass to the south (Route Options D003 and D022) would reduce the number of monuments and designated sites affected, and would therefore align marginally more closely with relevant objectives and CSRs. However, based on the information currently available, such differences are relatively slight and have not affected the scoring of options in Corridor D.

3.3 CSR assessment

3.3.1 Table 3-4 provides a summary of the alignment with the CSRs for each of the assessed route options in Corridor D.

Table 3-4 Scheme objectives fit summary table

Document	Relevant objectives	D001	D003	D021	D022
CSR	**Transport:** to create a high quality Route option that resolves current and predicted traffic problems and contributes towards the creation of an expressway between London and the South West.	**3**	**3**	3	3
	Economic growth: in combination with other schemes on the Route option, to enable growth in jobs and housing by providing a free flowing and reliable connection between the East and the South West peninsula.	**3**	**3**	3	3
	Cultural heritage: to contribute to the conservation and enhancement of the WHS by improving access both within and to the site.	2	2	**1**	**1**
	Environment and community: to contribute to the enhancement of the historic landscape within the WHS, to improve biodiversity along the Route option, and to provide a positive legacy to communities adjoining the road.	**2**	**2**	2	2

3.3.2 Options in Corridor D generally align more closely with the CSRs than options in Corridor F. Tunnelled options would remove the road from a key part of the WHS, reducing severance within the WHS, improving access for visitors, and enhancing the visitor experience. Corridor D options would also increase capacity on the road, relieving congestion, improving traffic conditions for local and strategic journeys, and increasing accessibility to the WHS for visitors. Improved connectivity could help to support growth in jobs and housing, both locally and across the South West. Options in Corridor D would also support improved connectivity for local as well as through traffic, and help to resolve existing problems caused by rat-running through communities to the north of the A303.

3.3.3 In terms of cultural heritage, options in Corridor D would remove the road from a key part of the WHS and reduce severance, improving access for visitors. However, construction of the Route option would have very severe impacts on the setting and fabric of a large number of scheduled monuments within the WHS, and would result in the loss of important archaeological remains. Corridor D options would also impact directly and indirectly on designated nature conservation sites, and there is the potential for a northern bypass of Winterbourne Stoke to result in adverse air quality effects on Parsonage Down SSSI and on Salisbury Plain SSSI/SAC/SPA.

3.4 Value for Money Assessment

Impact on the Economy – Corridor D

3.4.1 This section summarises the assessment of the Corridor D schemes from the perspective of economic impacts.

Business users and transport providers

3.4.2 Corridor D route options generate a net positive impact for benefits for business users. Travel time benefits are positive and these outweigh negative vehicle operating cost impacts which are caused by slightly longer journey distances.

3.4.3 Estimates of benefits (present values in 2010 prices) from TUBA TEE table are:

- Travel time benefits: £85 million
- Vehicle operating cost benefits: -£28 million
- Net business impact: £57 million

3.4.4 A key objective of the scheme is to provide a high quality Route option that resolves the large levels of congestion currently experienced along the Route option, particularly at weekends and in the summer. Viewed in the context of the wider corridor, this section of the A303 creates a significant bottleneck due to the single carriageway section, therefore considerably increasing journey times compared with uncongested free flow conditions. The wider corridor proposal to create an Expressway between London and the South West is important for businesses operating across the wider area. A Corridor D Route option will increase capacity, and so reduce congestion and practical journey times, which will have time benefits for business users of the scheme, especially in peak hours and summer months.

3.4.5 The relatively small increase in the distance to travel along this option (compared with the existing situation) will increase vehicle operating costs therefore slightly reduce benefits to business users.

Reliability

3.4.6 Route options in Corridor D are **moderately beneficial** due to the reduction in incidents resulting from increased capacity along the route. Reliability is also improved by the attraction of traffic from local roads therefore reducing incidents**.**

3.4.7 The creation of an Expressway along the whole section of the Route option to dual carriageway standard will provide adequate capacity for predicted traffic levels, will reduce the level of incidents; and attract traffic onto the A303 from the local areas to the north and south of the existing alignment (e.g. Amesbury, Bulford, Durrington, Larkhill and Shrewton) and hence will reduce the impact of incidents in these communities.

3.4.8 These route options assume that the existing at-grade roundabouts at Countess and Longbarrow will be replaced with grade-separated junctions. The forecast flow levels lie with the available capacity for the options.

Regeneration

3.4.9 The scheme would have a **neutral** impact from the regeneration viewpoint – the option is not in a Regeneration Area, or is not expected to impact on accessibility to jobs for Regeneration Area employment.

3.4.10 Levels of deprivation in south Wiltshire are generally low. However, there are three Lower Layer Super Output Areas (LSOAs) located relatively close to the Route option that fall into the 20% most deprived in England. Two of these are at Wilton, and one is in central Salisbury.

3.4.11 The Salisbury Central Area Regeneration Programme, set out in the Wiltshire Core Strategy, identifies a number of regeneration sites within the city centre. In total these will provide 1,100 dwellings and 5 ha of predominantly B1 employment land.

3.4.12 Corridor D options would provide a new, partly-tunnelled dual carriageway along the route of the existing A303, and it was therefore not considered likely that it would have a significant impact on accessibility or economic activity in either the targeted regeneration areas in central Salisbury, or on areas of deprivation in Salisbury and Wilton.

Wider impacts

3.4.13 Corridor D options were assessed to have minor benefits relating to agglomeration and labour market effects. These reflect the improvement in travel costs along the corridor, improving connectivity, with particular benefits accruing from improved linkages between areas such as Salisbury, West Wiltshire and Bath. However, the impacts are limited as the improvements primarily occur on inter-urban movements, whereas agglomeration levels are typically most affected by improvements in intra-urban movements. Positive labour market impacts arise from an improvement in commuting travel costs along the corridor, offset to an extent by increases in journey times on some more local journeys within Wiltshire affected by the local impacts of the route realignment.

3.4.14 Corridor D options would have a **slight beneficial** wider impact – they offer a reduction in journey times and improve inter-urban connectivity positively affecting agglomeration impacts. Labour market impacts are slightly positive as a result of the reduction in travel costs.

3.5 Impact on environment assessment

Route Option D001 North of Winterbourne Stoke and eastern portal to the east of The Avenue

Noise

3.5.1 The environmental receptors and/or assets assessed included quiet places with community value, communities and sensitive receptors, and noise Important Areas (IAs).

3.5.2 Route Option D001 would have a Slight Beneficial effect on amenity in the WHS. This is based on a small reduction in the area subject to noise levels likely to generate moderate annoyance within the WHS as a result of traffic passing through the tunnel.

3.5.3 Traffic would be diverted away from Winterbourne Stoke but not close enough to other residences to generate new disbenefits to communities, and therefore Route Option D001 would result in a Moderate Beneficial effect for communities and sensitive facilities.

3.5.4 Based on the Design Fix C traffic model, Route Option D001 has the potential to change noise levels at Important Areas. A substantial reduction was identified at the two important areas in Winterbourne Stoke. Amesbury, Wilton and Salisbury, would experience smaller changes with increases in some areas and a decrease in noise levels in others. On balance, Route Option D001 would have a Moderate Beneficial effect on IAs.

3.5.5 Route Option D001 was assessed as having a Moderate Beneficial overall effect in noise terms.

Air quality

3.5.6 Environmental receptors and/or assets assessed: Air Quality Management Areas (AQMAs), human health receptors, ecological receptors and Stonehenge.

3.5.7 The change in the area of affected designated ecological sites within 200m of A303 suggested the potential for an adverse effect on designated ecological sites

(primarily Parsonage Down SSSI / Salisbury Plain SSSI / SAC / SPA to north of Winterbourne Stoke). A review of Natural England rare plants distribution mapping (dated 2007), suggested sensitive features have the potential to be affected by increased rates of nitrogen deposition. As such there is the potential for a significant effect to occur, and this would require further assessment should Route Option D001 be taken forward for further consideration.

3.5.8 The Affected Road Network (ARN) defined in accordance with DMRB criteria indicates significant increases in Annual Average Daily Traffic (AADT) and Heavy Duty Vehicles (HDV) flows would be unlikely to occur as a result of Route Option D001 beyond the extent of the scheme. Route Option D001 would not affect annual mean NO_2 concentrations within any existing AQMAs.

3.5.9 A lack of human receptors (e.g. residential properties, schools and hospitals) within 200m of tunnel portals suggested operational emissions from tunnel portals would be unlikely to have a significant effect on air quality at human receptors. A negative annual mean NO_2 impact score was predicted for Route Option D001, resulting in a potential positive net impact on air pollutant concentrations at human receptors, primarily due to re-routing of A303 around Winterbourne Stoke.

3.5.10 A lack of designated ecological sites (e.g. SSSIs, SACs, SPAs and Ramsar sites, for which the designated features are sensitive to air pollutants) within 200m of tunnel portals suggested that neither dust emissions associated with tunnel construction nor operational tunnel portal emissions would be likely to affect designated ecological sites. As tunnel portals would be located in excess of 350m from Stonehenge, dusts emissions associated with tunnel construction are unlikely to affect Stonehenge Lichen.

3.5.11 Overall assessment score: It was not considered appropriate or feasible to balance potential adverse and beneficial effects for the wide range of receptors considered under this topic heading. There are considerable differences between the receptors, both in terms of their characteristics (human receptors, designated ecological sites, AQMAs and Stonehenge Lichen) and the methods of assessment applied in each case. Furthermore, there is no clear guidance as to what weight should be attributed to one factor when considered against another. Therefore an overall air quality topic score was not provided as part of the Design Fix C assessment.

Greenhouse gases

3.5.12 Environmental receptors impacts assessed: Capital Carbon (as a factor of Route option length, length of tunnel, number of structures), and User Carbon (quantified emissions, length, number of junctions, and gradient)[13].

3.5.13 In terms of capital carbon, which is a secondary consideration in the overall conclusion of the carbon assessment, all the tunnel route options would perform generally similarly. The initial capital carbon of the tunnel construction can be minimised through the appropriate selection of tunnelling method and materials, which would need to be considered during the design development.

3.5.14 Overall assessment score: Although no industry guidance exists to assign levels of significance for greenhouse gases emissions at a project level, the Route Option

[13] The majority of the whole life carbon of a highway project is in the User carbon (tailpipe emissions), with the capital carbon comprising a small component of the total emissions.

D001 was assessed as having the lowest carbon impact of all Corridor D options along with Route Options D003 and D021.

Landscape

3.5.15 Environmental receptors and/or assets assessed: landscape designations, landscape character, visual receptors.

3.5.16 Potential Moderate Adverse effects on the non-statutory locally designated Special Landscape Area (SLA) and landscape of higher quality of national importance that forms part of WHS, including important characteristics and elements, with some features expected to be partly or wholly destroyed or their settings affected. Direct effects on the SLA are anticipated due to the physical change and the implementation of a part-widened, part-offline road corridor requiring deep cuttings at the downland / valley interfaces and high structures or earthworks across the river valleys. Even with mitigation, it will not be possible to fully integrate the new road into the landscape.

3.5.17 A range of visual receptors would experience Moderate to Large Adverse Effects, with a number of residential properties, ProW users and leisure/tourist destinations experiencing Beneficial Effects due to the removal of a section of the proposed road from the views available where it is tunnelled. Overall, a moderate number of visual receptors would be likely to experience Moderate Adverse effects on their visual amenity, with the greatest proportion being users of ProW and leisure/tourist destinations.

3.5.18 Overall assessment score: Route Option D001 was assessed as having a Moderate Adverse effect on landscape with Adverse effects outweighing the potential for beneficial effects resulting from 2.9km tunnel replacing the existing A303 south of Stonehenge.

Historic environment

3.5.19 Environmental receptors and/or assets assessed: WHS, Scheduled Monuments, Listed Buildings, Registered Parks and Gardens, Conservation Areas, and non-designated assets.

3.5.20 Route Option D001 would remove the existing A303 from a key part of the WHS providing a significant improvement for the setting of Stonehenge and other related monuments. The location of the eastern portal for Route Option D001 would also, importantly, reconnect The Avenue. These are substantial benefits, and are predicted to result in a Moderate Beneficial Effect for the WHS overall. The proposals would also contribute towards the CSRs to improve access within the WHS.

3.5.21 Construction of the Route option would however have very severe impacts on the setting and fabric of a large number of scheduled monuments within the WHS, and outside of the WHS to the west, including two important scheduled monuments to the north of Winterbourne Stoke. There are particular issues associated with the western portal location close to the Normanton Down Barrow Group.

3.5.22 The construction of the flyover at Countess Roundabout and approach road to the eastern portal would have adverse impacts on a number of listed buildings, a conservation area and a registered park and garden. The route option would also

inevitably result in the loss of important archaeological remains within, and outside, of the WHS.

3.5.23 This initial analysis would indicate that in purely numerical terms the adverse effects resulting from the scheme significantly outweigh the beneficial effects. However great weight must be given the beneficial effect resulting from the changes to WHS as a whole and also the beneficial impact on Stonehenge and The Avenue. In this context, an overall Slight Adverse Effect for the Historic environment is recorded (in accordance with the terminology employed in WebTAG 2015 guidance). This must be understood in the context of there being a large number of high scoring adverse effects, which have been offset to a large degree by other benefits.

3.5.24 Overall assessment score: Route Option D001 was assessed as having a Slight Adverse Effect on historic environment.

Biodiversity

3.5.25 Environmental receptors and/or assets assessed: international, national, regional and local designations, priority habitats, woodlands and hedgerows.

3.5.26 Subject to further design and more detailed assessment, potential significant effects were identified for the following ecological receptors:

- Salisbury Plain SAC.
- River Avon SAC (encompassing the River Avon and River Till).
- Parsonage Down SSSI.
- Parsonage Down National Nature Reserve (NNR).
- River Till SSSI.
- River Avon System SSSI.
- Steeple Langford Down SSSI.
- Yarnbury Castle SSSI.
- Three Country Wildlife Sites (CWSs) and one Protected Roadside Verge (PRV).
- 7.28ha of Priority Habitats.
- 6.36ha woodland.
- 9,494m hedgerow.

3.5.27 Route Option D001 was assigned an overall quantitative metric score of -30, reflecting the number and potential significance of effects identified for ecological receptors considered at this stage of the process.

3.5.28 Route Option D001 to the north of Winterbourne Stoke, takes the centreline of the Route option within 75m of the Parsonage Down compartment of Salisbury Plain SAC. In following this assessment methodology Parsonage Down would be directly impacted since it is within the 150m working width (75m from the centreline). However, if Route Option D001 was chosen, it is likely that measures would be put in place to ensure the site would be avoided in terms of land take. This would mean there would be no direct effects on Salisbury Plain SAC, Parsonage Down SSSI and Parsonage Down NNR (and the direct effects could be downgraded to indirect effects, which would improve the overall negative score.

3.5.29 Route Option D001 features the ‘eastern portals option’ in which the western portal lies within 60m of Normanton Gorse, an area of woodland. This is not a designated site but is accounted for in the total area of woodlands lost. If Route Option D001 was chosen however, measures would be taken to avoid any loss to this woodland.

3.5.30 Like all the Corridor D route options, Route Option D001 would be a lot shorter in length than the Corridor F route options and would therefore result in less overall habitat loss as reflected by the smaller total areas of Priority Habitat, woodland and length of hedgerows affected. Furthermore, Route Option D001 includes a 2.9km tunnel with limited surface works causing habitat loss for this stretch. Route Option D001 would subsequently result in less habitat severance and fragmentation with limited potential isolation /displacement of populations.

3.5.31 Overall assessment score: Route Option D001 was assessed as having a Large Adverse Effect on biodiversity.

Water environment

3.5.32 Environmental receptors and/or assets assessed: flood risk, surface water, groundwater, water dependent ecology, and cultural heritage (Blickmead Spring).

3.5.33 There are a number of potentially significant effects on water environment features associated with Route Option D001. One of the construction methodologies may require dewatering of the Chalk Aquifer. The current assessment shows that a number of water environment features would be potentially affected by Route Option D001, including local groundwater abstractions, surface and groundwater dependent biodiversity in the River Avon and River Till, flood risk areas and cultural assets such as Blickmead Spring.

3.5.34 Overall assessment score: Route Option D001 was assessed as having a Large Adverse Effect on water environment.

Agriculture land use

3.5.35 Environmental receptors and/or assets assessed: proportion of Best and Most Versatile (BMV) land affected and viability of farms.

3.5.36 For the Agricultural Land Use assessment, Route Option D001 would have an overall score of Large Adverse based on a worst case assessment of the potential loss of BMV agricultural land amounting to approximately 100ha. It should be noted that this is approximately the same area as for all other Corridor D route options, but is considerably lower than all options within Corridor F. Route Option D001 crosses approximately 5,600m of agricultural land and was therefore also assessed as having a 'slight adverse' impact on farm viability.

3.5.37 Overall assessment score: Route Option D001 was assessed as having a Large Adverse Effect on agriculture land use.

Land contamination

3.5.38 Environmental receptors and/or assets assessed include: human health receptors, controlled waters receptors, property receptors and ecological receptors.

3.5.39 Anticipated impacts relate to the mobilisation of existing soil and groundwater contamination during construction to which human and other environmental receptors may be exposed. Four low risk sites were identified in the Corridor D study area where there would be the potential for Slight Adverse Impacts, together with three moderate risk sites where there would be the potential for a Moderate Adverse Impacts and five high risk sites where there would be the potential for Large Adverse Impacts. The presence and magnitude of contamination, which may

be associated with historical military uses is a key uncertainty and all four Corridor D Route option alignments pass through these locations in both cutting and tunnel.

3.5.40 Overall assessment score: For land contamination the level of risk for Route Option D001 was largely considered to be the same for all four alignments in Corridor D.

Materials

3.5.41 Environmental Receptors and/or assets assessed: potential for generation of arisings to occur and potential for beneficial use of materials.

3.5.42 Route Option D001 was assessed as generating a moderate quantity of arisings after assuming that a percentage of those arisings could be used for cut and fill balance. Taking into account historical land use, underlying geology and the construction of a tunnel, Route Option D001 would have a moderate potential for the reuse of arisings within the scheme design.

3.5.43 The moderate quantities of excavated arisings predicted, may be reduced depending on the quantities of material needed for environmental mitigation and its suitability for this purpose. Any excavated material remaining that cannot be used onsite would need to be transported off-site to suitable destinations for reuse or disposal.

3.5.44 The construction of the tunnel may reduce the beneficial use of the material due to handling and disturbance (from the tunnelling process), which may change the material's physical and chemical characteristics. Potential contamination sources within the alignment may also alter the characteristics of the material and may reduce its potential for beneficial use.

3.5.45 Overall assessment score: Route Option D001 was assessed as having an overall score of Moderate based on the moderate generation of arisings after cut and fill, and moderate potential for the beneficial use of those arisings.

Route Option D003 South of Winterbourne Stoke and eastern portal to the east of The Avenue

Noise

3.5.46 The environmental receptors and/or assets assessed include quiet places with community value, communities and sensitive receptors, and noise Important Areas (IAs).

3.5.47 Route Option D003 would have a Slight Beneficial effect on amenity in the WHS. This is based on a small reduction in the area subject to noise levels likely to generate moderate annoyance within the WHS as a result of traffic noise now being within tunnel.

3.5.48 Traffic would be diverted away from Winterbourne Stoke but not close enough to other residences to generate new disbenefits to communities, and therefore Route Option D003 would result in a Moderate Beneficial effect for communities and sensitive facilities.

3.5.49 Based on the Design Fix C traffic model, Route Option D003 has the potential to change noise levels at Important Areas. A substantial reduction was identified at the two important areas in Winterbourne Stoke. Amesbury, Wilton and Salisbury would experience smaller changes with increases to some areas and a decrease

in noise levels at others. On balance, Route Option D003 was assessed as having a Moderate Beneficial impact on IAs.

3.5.50 Route Option D003 was assessed as having a Moderate Beneficial overall effect in noise terms.

Air quality

3.5.51 Environmental receptors and/or assets assessed: AQMAs, human health receptors, ecological receptors, and Stonehenge.

3.5.52 The change in area of designated ecological sites within 200m of A303 indicated neutral effect on designated ecological sites.

3.5.53 The Affected Route Network (ARN) defined in accordance with DMRB criteria indicated significant increases in AADT and HDV flows are unlikely occur as a result of Route Option D003 beyond the extent of the scheme. Route Option D003 was not predicted to affect annual mean NO_2 concentrations within any existing AQMAs.

3.5.54 A lack of human receptors (e.g. residential properties, schools and hospitals) within 200m of tunnel portals suggested emissions from tunnel portals would be unlikely to have a significant effect on air quality at human receptors. A negative annual mean NO_2 impact score suggested potential positive net impact on air pollutant concentrations at human receptors as a result of Route Option D003, primarily due to re-routing of A303 around Winterbourne Stoke.

3.5.55 A lack of designated ecological sites (e.g. SSSIs, SACs, SPAs and Ramsar sites, for which the designated features are sensitive to air pollutants) within 200m of tunnel portals suggested that neither dust emissions associated with tunnel construction nor operational tunnel portal emissions would be likely to affect designated ecological sites. As tunnel portals are located in excess of 350m from Stonehenge, dusts emissions associated with tunnel construction are unlikely to affect Stonehenge Lichen.

3.5.56 It was not considered appropriate or feasible to balance potential adverse and beneficial effects for the wide range of receptors considered under this topic heading. There were considerable differences between the receptors, both in terms of their characteristics (human receptors, designated ecological sites, AQMAs and Stonehenge Lichen) and the methods of assessment applied in each case. Furthermore, there was no clear guidance as to what weight should be attributed to one factor when considered against another. Therefore an overall air quality topic score was not provided as part of the Design Fix C assessment.

Greenhouse gases

3.5.57 Environmental impacts assessed: Capital Carbon (as a factor of Route option length, length of tunnel, number of structures), and User Carbon (quantified emissions, length, number of junctions, and gradient).

3.5.58 In terms of capital carbon, which is a secondary consideration in the overall conclusion of the carbon assessment, all tunnel options would perform generally similarly. Tunnel construction would be capital carbon intensive, but so would construction of a large viaduct. The initial capital carbon of the tunnel construction could be minimised through appropriate selection of tunnelling method and materials, which would need to be considered during the design development.

3.5.59 According to the quantification from the traffic models, all tunnelled Route Options (Route Options D001, D003, D021 and D022) would result in the lowest increase in tailpipe emissions (user carbon) relative to the Do-Minimum scenario. In addition, route options in Corridor D require fewer junctions which would likely result in lower user emissions than for route options in Corridor F. Route Option D003 has the 2nd lowest indicative gradients.

3.5.60 Overall assessment score: Although no industry guidance exists to assign levels of significance for greenhouse gases emissions at a project level, the Route Option D003 was assessed as having the lowest carbon impact of all Corridor D options along with Route Options D001 and D021.

Landscape

3.5.61 Environmental receptors and/or assets assessed: landscape designations, landscape character, visual receptors.

3.5.62 Potential Moderate Adverse Effects on the non-statutory locally designated SLA and landscape of higher quality of national importance that forms part of WHS, including important characteristics and elements, with some features expected to be partly or wholly destroyed or their settings affected. Direct effects on the SLA are anticipated due to the physical change and the implementation of a part-widened, part-offline road corridor requiring deep cuttings at the downland / valley interfaces and high structures or earthworks across the river valleys. Even with mitigation, it will not be possible to fully integrate the new road into the landscape.

3.5.63 A range of visual receptors would experience Moderate to Large Adverse Effects, with a number of residential properties, ProW users and leisure/tourist destinations experiencing Beneficial Effects due to the removal of a section of the proposed road from the views available where it is tunnelled. Overall, a moderate number of visual receptors would be likely to experience Moderate Adverse Effects on their visual amenity, with the greatest proportion being users of ProW and leisure/tourist destinations.

3.5.64 Overall assessment score: Route Option D003 was assessed as having a Moderate Adverse Effect on Landscape with adverse effects outweighing the potential for beneficial effects resulting from 2.9km tunnel replacing the existing A303 south of Stonehenge.

Historic environment

3.5.65 Environmental receptors and/or assets assessed: WHS, Scheduled Monuments, Listed Buildings, Registered Parks and Gardens, Conservation Areas, and non-designated assets.

3.5.66 Route Option D003 would remove the existing A303 from a key part of the WHS providing a significant improvement for the setting of Stonehenge and other related monuments. The location of the eastern portal for Route Option D003 would also, importantly, reconnect The Avenue. These are substantial benefits, and are predicted to result in a Moderate Beneficial effect for the WHS overall. The proposals would also contribute towards the CSRs to improve access within the WHS.

3.5.67 Construction of the route option would however have very severe impacts on the setting and fabric of a large number of scheduled monuments within the WHS,

unlike Route Option D001 it would not however harm two important scheduled monuments north of Winterbourne Stoke. As with Route Option D001, there would be particular issues associated with a western portal location close to the Normanton Down Barrow Group, and the impacts on the monuments and Outstanding Universal Value may make the option unacceptable to key stakeholders and reduce prospects of achieving consent.

3.5.68 The construction of the flyover at Countess Roundabout and approach road to the eastern portal would have adverse impacts on a number of listed buildings, a conservation area and a registered park and garden. The route option would also inevitably result in the loss of important archaeological remains within, and outside, of the WHS. The route option notably runs across part of an extent of non-designated archaeology west of the A360 which may be of national importance.

3.5.69 This initial analysis would indicate that in purely numerical terms the adverse effects resulting from the scheme would significantly outweigh the beneficial effects. However great weight must be given the beneficial effect resulting from the changes to WHS as a whole and also the beneficial impact on Stonehenge and the Avenue. In this context, an overall Slight Adverse Effect for the Historic environment was recorded (in accordance with the terminology employed in WebTAG 2015 guidance). This must be understood in the context of there being a large number of high scoring adverse effects which were offset to a large degree by other benefits.

3.5.70 Overall assessment score: Route Option D003 was assessed as having a Slight Adverse Effect on historic environment.

Biodiversity

3.5.71 Environmental receptors and/or assets assessed: international, national, regional and local designations, priority habitats, woodlands and hedgerows.

3.5.72 Subject to further design and more detailed assessment, potential significant effects were identified for the following ecological receptors:

- Salisbury Plain SAC.
- River Avon SAC (encompassing River Avon and River Till).
- Parsonage Down SSSI.
- Parsonage Down NNR.
- River Till SSSI.
- River Avon System SSSI.
- Steeple Langford Down SSSI.
- Yarnbury Castle SSSI.
- Two CWSs and two PRVs.
- 9.40ha of Priority Habitat.
- 9.81ha woodland.
- 7,622m hedgerow.

3.5.73 Route Option D003 was assigned an overall quantitative metric score of -27, reflecting the number and potential significance of effects identified for ecological receptors considered at this stage of the process.

3.5.74 Route Option D003 to the south of Winterbourne Stoke, tales the alignment further away from the Parsonage Down compartment of Salisbury Plain SAC. Indirect

effects on the chalk grassland site, notably air quality and hydrological effects are therefore expected to be less than Route Options D001 and D021 to the north of Winterbourne Stoke.

3.5.75 Route Option D003 features the 'eastern portals option' in which the western portal lies within 60m of Normanton Gorse an area of woodland. This is not a designated site but is accounted for in the total area of woodlands lost. If this Route Option D003 was chosen, however, measures would be taken to avoid any loss to this woodland.

3.5.76 Like all the Corridor D route options, Route Option D003 would be a lot shorter in length than the Corridor F route options and would therefore result in less overall habitat loss as reflected by the smaller total areas of Priority Habitat, woodland and length of hedgerows affected. Furthermore, Route Option D003 includes a 2.9km tunnel with limited surface works causing habitat loss for this stretch. Route Option D003 would subsequently result in less habitat severance and fragmentation with limited potential isolation /displacement of populations.

3.5.77 Overall assessment score: Route Option D003 was assessed as having a Large Adverse Effect on biodiversity.

Water environment

3.5.78 Environmental Receptors and/or assets assessed: Flood Risk, Surface Water, Ground Water, Water Dependent Ecology, Cultural Heritage (Blickmead Spring)

3.5.79 There are a number of potentially significant effects on water environment features associated with Route Option D003. One of the construction methodologies may require dewatering of the Chalk Aquifer. The assessment showed that a number of water environment features would be potentially affected by Route Option D003, including local groundwater abstractions, surface and groundwater dependent biodiversity in the River Avon and River Till, flood risk.

3.5.80 Overall assessment score: Route Option D003 was assessed as having a Large Adverse Effect on water environment.

Agriculture land use

3.5.81 Environmental receptors and/or assets assessed: proportion of BMV land affected and viability of farms.

3.5.82 For the Agricultural Land Use assessment, Route Option D003 would have an overall score of Large Adverse based on a worst case assessment of the potential loss of BMV agricultural land amounting to approximately 100ha. It should be noted that this is approximately the same area as for other options in Corridor D, but is considerably lower than all options within Corridor F. The option crosses approximately 6,100m of agricultural land and was therefore also assessed as having a 'slight adverse' impact on farm viability.

3.5.83 Overall assessment score: Route Option D003 was assessed as having a Large Adverse Effect on agriculture land use.

Land contamination

3.5.84 Environmental receptors and/or assets assessed: human health receptors, controlled waters receptors, property receptors and, ecological receptors.

3.5.85 Anticipated impacts relate to the mobilisation of existing soil and groundwater contamination during construction to which human and other environmental receptors may be exposed. Four low risk sites have been identified in the Corridor D study area where there would be the potential for Slight Adverse Impacts, together with three moderate risk sites where there is the potential for Moderate Adverse Impacts and five high risk sites where there is the potential for Large Adverse Impacts. The presence and magnitude of contamination, which may be associated with the historical military uses sites is a key uncertainty and all four Corridor D Route option alignments pass through these locations in both cutting and tunnel.

3.5.86 Overall assessment score: For land contamination the level of risk for Route Option D003 was largely considered to be the same for all four alignments in Corridor D.

Materials

3.5.87 Environmental Receptors and/or assets assessed: potential for generation of arisings to occur and potential for beneficial use of materials.

3.5.88 Route Option D003 was assessed as generating a moderate quantity of arisings after assuming that a percentage of those arisings could be used for cut and fill balance. Taking into account historical land use, underlying geology and the construction of the tunnel, Route Option D003 was assessed as having moderate potential for reuse of arisings within the scheme design.

3.5.89 The moderate quantities of excavated arisings may be reduced depending on the quantities of material needed for environmental mitigation and its suitability for this purpose. Any excavated material remaining that cannot be used onsite would need to be transported off-site to suitable destinations for reuse or disposal.

3.5.90 The construction of the tunnel may reduce the potential for beneficial use of the material due to handling and disturbance (from the tunnelling process), which may change the material's physical and chemical characteristics. Potential contamination sources within the alignment may also alter the characteristics of the material and may reduce its potential for beneficial use.

3.5.91 Overall assessment score: Route Option D003 was assessed as having an overall score of Moderate based on the moderate generation of arisings after cut and fill, and moderate potential for the beneficial use of those arisings.

Route Option D021 North of Winterbourne Stoke and eastern portal to the west of The Avenue

Noise

3.5.92 Environmental receptors and/or assets assessed: quiet places with community value, communities and sensitive receptors, and noise Important Areas (IAs).

3.5.93 Route Option D021 would have a Slight Beneficial effect on amenity in the WHS. This is based on a small reduction in the area subject to noise levels likely to

generate moderate annoyance within the WHS as a result of traffic noise now being within tunnel.

3.5.94 Traffic would be diverted away from Winterbourne Stoke but not close enough to other residences to generate new disbenefits to properties, and therefore Route Option D021 is anticipated to result in a Moderate Beneficial effect for communities and sensitive facilities.

3.5.95 Based on the Design Fix C traffic model, Route Option D021 has the potential to change noise levels at Important Areas. A substantial reduction was identified at the two important areas in Winterbourne Stoke. Amesbury, Wilton and Salisbury would experience a smaller changes with increases to some areas and a decrease in noise levels at others. On balance, Route Option D021 would have a Moderate Beneficial Impact on IAs.

3.5.96 Overall assessment score: Route option D021 was assessed as having a Moderate Beneficial effect in noise terms.

Air quality

3.5.97 Environmental receptors and/or assets assessed: AQMAs, human health receptors, ecological receptors, and Stonehenge.

3.5.98 The change in area of designated ecological sites within 200m of A303 indicated the potential for an adverse effect on designated ecological sites (primarily Parsonage Down SSSI / Salisbury Plan SSSI / SAC / SPA to north of Winterbourne Stoke). A review of Natural England rare plants distribution mapping (dated 2007), suggested sensitive features have the potential to be affected by increased rates of nitrogen deposition. As such there is the potential for a significant effect to occur, and this would require further assessment should Route Option D021 be taken forward for further consideration.

3.5.99 There are three human receptors (1, 2 & 3 Custodian Cottages) located within 200m of the eastern tunnel portal (closest approx. 180m from portal) which would suggest emissions from tunnel portals have potential to affect air quality at human receptors. However, in reality the closure of the existing A303, which is located adjacent and considerably closer to these receptors than the proposed portal location, means that it could potentially result in a reduction in annual mean NO_2 concentrations at these receptors.

3.5.100 The ARN defined in accordance with DMRB criteria indicates significant increases in AADT and HDV flows are unlikely to occur as a result of Route Option D021 beyond the extent of the scheme. Route Option D021 would not affect annual mean NO_2 concentrations within any existing AQMAs. Negative annual mean NO_2 impact score suggested that there would be a potential positive net impact on air pollutant concentrations at human receptors as a result of Route Option D021, primarily due to re-routing of A303 around Winterbourne Stoke.

3.5.101 A lack of designated ecological sites (e.g. SSSIs, SACs, SPAs and Ramsar sites, for which the designated features are sensitive to air pollutants) within 200m of tunnel portals suggested that neither dust emissions associated with tunnel construction nor operational tunnel portal emissions are likely to affect designated ecological sites. As tunnel portals are located in excess of 350m from Stonehenge, dusts emissions associated with tunnel construction are unlikely to affect Stonehenge Lichen.

3.5.102 It was not considered appropriate or feasible to balance potential adverse and beneficial effects for the wide range of receptors considered under this topic heading. There are considerable differences between the receptors, both in terms of their characteristics (human receptors, designated ecological sites, AQMAs and Stonehenge Lichen) and the methods of assessment applied in each case. Furthermore, there is no clear guidance as to what weight should be attributed to one factor when considered against another. Therefore an overall air quality topic score was not provided as part of the Design Fix C assessment.

Greenhouse gases

3.5.103 Environmental impacts assessed: Capital Carbon (as a factor of Route option length, length of tunnel, number of structures), and User Carbon (quantified emissions, length, number of junctions, and gradient).

3.5.104 In terms of capital carbon, which is a secondary consideration in the overall conclusion of the carbon assessment, all tunnel options perform generally similarly. The initial capital carbon of the tunnel construction can be minimised through appropriate selection of tunnelling method and materials, which would need to be considered during the design development.

3.5.105 According to the quantification from the traffic models, all tunnelled route options (Route Options D001, D003, D021 and D022) would result in the lowest increase in tailpipe emissions (user carbon) relative to the Do-Minimum scenario. In addition, route options in Corridor D require fewer junctions which would likely result in lower user emissions than for route options in Corridor F. Route Option D003 has the 2nd lowest indicative gradients.

3.5.106 Overall assessment score: Although no industry guidance exists to assign levels of significance for greenhouse gas emissions at a project level, the Route Option D021 was assessed as having the worst carbon impact of the Corridor D options.

Landscape

3.5.107 Environmental receptors and/or assets assessed: landscape designations, landscape character and visual receptors.

3.5.108 Potential Moderate Adverse effects on the non-statutory locally designated SLA and landscape of higher quality of national importance that forms part of WHS, including important characteristics and elements, with some features expected to be partly or wholly destroyed or their settings affected. Direct effects on the SLA are anticipated due to the physical change and the implementation of a part-widened, part-offline road corridor requiring deep cuttings at the downland / valley interfaces and high structures or earthworks across the river valleys. Even with mitigation, it will not be possible to fully integrate the new road into the landscape.

3.5.109 A range of visual receptors would experience Moderate to Large Adverse Effects, with a number of residential properties, ProW users and leisure/tourist destinations experiencing Beneficial Effects due to the removal of a section of the proposed road from the views available where it is tunnelled. Overall, a moderate number of visual receptors are likely to experience Moderate Adverse Effects on their visual amenity, with the greatest proportion being users of ProW and leisure/tourist destinations.

3.5.110 Overall assessment score: Route Option D021 was assessed as having a Moderate Adverse effect on Landscape with adverse effects outweighing the potential for beneficial effects resulting from 2.9km tunnel replacing the existing A303 south of Stonehenge.

Historic environment

3.5.111 Environmental Receptors and/or assets assessed: WHS, Scheduled Monuments, Listed Buildings, Registered Parks and Gardens, Conservation Areas, and non-designated assets.

3.5.112 Route Option D021 would remove the A303 from a key part of the WHS providing a significant improvement for the setting of Stonehenge and other related monuments. These are substantial benefits. The proposals would also contribute towards the CSRs to improve access within the WHS.

3.5.113 Construction of the Route option would however have very severe impacts on the setting and fabric of a large number of scheduled monuments within the WHS, and outside of the WHS to the west, including two important scheduled monuments to the north of Winterbourne Stoke. In particular the location of the eastern portal would cause the further severance of The Avenue. This asset is a fundamental element of the Outstanding Universal Value of the WHS and directly connected to Stonehenge itself. The additional severance would be highly unlikely to be acceptable to UNESCO and would be very likely to result in refusal of consent given the availability of other route options.

3.5.114 To the west the tunnel portal lies further away from the Normanton Barrow Group than Route Option D001 and D003. The impacts here are therefore lower in scale and number, but there are still a number of significant adverse effects.

3.5.115 The construction of the flyover at Countess Roundabout and approach road to the eastern portal would have adverse impacts on a number of listed buildings, a conservation area and a registered park and garden. The Route option will also inevitably result in the loss of important archaeological remains within, and outside, of the WHS.

3.5.116 This initial analysis would indicate that in purely numerical terms the adverse effects resulting from the scheme outweigh the beneficial effects. Additionally, great weight must be given to the adverse effect resulting from the changes to WHS as a whole; even taking into account the beneficial impact on Stonehenge itself and other monuments. In this context, an overall Moderate to Large Adverse Effect for the Historic environment was recorded (in accordance with the terminology employed in WebTAG 2015 guidance).

3.5.117 Overall Assessment Score: Route Option D021 was assessed as having Moderate / Large Adverse Effect on the historic environment.

Biodiversity

3.5.118 Environmental receptors and/or assets assessed: international, national, regional and local designations, priority habitats, woodlands and hedgerows.

3.5.119 Subject to further design and more detailed assessment, potential significant effects were identified for the following ecological receptors:

- Salisbury Plain SAC.
- River Avon SAC (encompassing River Avon and River Till).
- Parsonage Down SSSI.
- Parsonage Down NNR.
- River Till SSSI.
- River Avon System SSSI.
- Steeple Langford Down SSSI.
- Yarnbury Castle SSSI.
- Four CWS and one PRV.
- 7.21ha of Priority Habitat.
- 6.52ha woodland.
- 9123m hedgerow.

3.5.120 Route Option D021 was assigned an overall quantitative metric score of -31, reflecting the number and potential significance of effects identified for ecological receptors considered at this stage of the process.

3.5.121 Route Option D021 to the north of Winterbourne Stoke, takes the centreline of the Route option within 75m of the Parsonage Down compartment of Salisbury Plain SAC. In following this assessment methodology Parsonage Down will be directly impacted since it would be within the 150m working width (75m from the centreline). However, if Route Option D021 was chosen, it is likely that measures would be put in place to ensure the site would be avoided in terms of land take. This would mean there would be no direct effects on Salisbury Plain SAC, Parsonage Down SSSI and Parsonage Down NNR, only indirect effects. Nevertheless, the Route option would still be considerably near to Parsonage Down and indirect effects such as air quality and hydrological effects would be expected to be more pronounced.

3.5.122 Route Option D021 features the 'western portals option' in which the western tunnel portal lies approximately 400m away from Normanton Gorse. There would therefore be no direct or indirect effects expected on this woodland site based on current information.

3.5.123 Like all the Corridor D route options, Route Option D021 is a lot shorter in length than the Corridor F options and will therefore result in less overall habitat loss as reflected by the smaller total areas of Priority Habitat, woodland and length of hedgerows affected. Furthermore, based on information available at this stage, Route Option D021 includes a 2.9km tunnel with limited surface works causing habitat loss for this stretch. Route Option D021 would subsequently result in less habitat severance and fragmentation with limited potential isolation /displacement of populations.

3.5.124 Overall assessment score: Route Option D021 was assessed as having a Large Adverse Effect on biodiversity.

Water environment

3.5.125 Environmental receptors and/or assets assessed: flood risk, surface water, groundwater, water dependent ecology, and cultural heritage (Blickmead Spring).

3.5.126 There are a number of potentially significant effects on water environment features associated with Route Option D021. One of the construction methodologies may require dewatering of the Chalk Aquifer. The current assessment shows that a number of water environment features would be potentially affected by Route

Option D021, including local groundwater abstractions, surface and groundwater dependent biodiversity in the River Avon and River Till, flood risk areas and cultural assets such as Blickmead Spring.

3.5.127 Overall assessment score: Route Option D021 was assessed as having a Large Adverse Effect on water environment.

Agriculture land use

3.5.128 Environmental receptors and/or assets assessed: proportion of BMV land affected and viability of farms.

3.5.129 For the Agricultural Land Use assessment, Route Option D021 was allocated an overall score of Large Adverse based on a worst case assessment of potential loss of BMV agricultural land amounting to approximately 100ha. It should be noted that this is approximately the same area as for other options in Corridor D, but is considerably lower than all options within Corridor F. The option crosses approximately 5,300m of agricultural land and was therefore also assessed as having a Slight Adverse Impact on farm viability.

3.5.130 Overall assessment score: Route Option D021 was assessed as having a Large Adverse Effect on agriculture land use.

Land contamination

3.5.131 Environmental receptors and/or assets assessed: human health receptors, controlled waters receptors, property receptors and ecological receptors.

3.5.132 Anticipated impacts relate to the mobilisation of existing soil and groundwater contamination during construction to which human and other environmental receptors may be exposed. Four low risk sites were identified in the Corridor D study area where there is the potential for Slight Adverse Impacts, together with three moderate risk sites where there is the potential for Moderate Adverse Impacts and five high risk sites where there is the potential for Large Adverse Impacts. The presence and magnitude of contamination which may be associated with historical military uses is a key uncertainty and all four Corridor D alignments pass through these locations in both cutting and tunnel.

3.5.133 Overall assessment score: For land contamination the level of risk for Route Option D021 was largely considered to be the same for all four alignments in Corridor D. The D alignments are considered less preferable than Route Options F004, F005 and F010 at this stage.

Materials

3.5.134 Environmental Receptors and/or assets assessed: potential for generation of arisings to occur and potential for beneficial use of materials.

3.5.135 Route Option D021 was assessed as generating a moderate quantity of arisings after assuming that a percentage of those arisings could be used for cut and fill balance. Taking into account historical land use, underlying geology and the construction of a tunnel, Route Option D021 would have a moderate potential for the reuse of arisings within the scheme design.

3.5.136 The moderate quantities of excavated arisings may be reduced depending on the quantities of material needed for environmental mitigation and its suitability for this purpose. Any excavated material remaining that cannot be used onsite will need to be transported off-site to suitable destinations for reuse or disposal.

3.5.137 The construction of the tunnel may reduce the beneficial use of the material due to handling and disturbance (from the tunnelling process), which may change the material's physical and chemical characteristics. Potential contamination sources within the alignment may also alter the characteristics of the material and may reduce its potential for beneficial use.

3.5.138 Overall assessment score: Route Option D021 was assessed as having an overall score of Moderate based on the moderate generation of arisings after cut and fill, and moderate potential for the beneficial use of those arisings.

Route Option D022 South of Winterbourne Stoke and eastern portal to the west of The Avenue

Noise

3.5.139 Environmental receptors and/or assets assessed: quiet places with community value, communities and sensitive receptors, and noise Important Areas (IAs).

3.5.140 Route Option D022 would have a Slight Beneficial effect on amenity in the WHS. This is based on a small reduction in the area subject to noise levels likely to generate moderate annoyance within the WHS as a result of traffic noise now being within tunnel.

3.5.141 Traffic would be diverted away from Winterbourne Stoke but not close enough to other residences to generate new disbenefits to communities, and therefore Route Option D022 is anticipated to result in a Moderate Beneficial effect for communities and sensitive facilities.

3.5.142 Based on the Design Fix C traffic model, the Route option has the potential to change noise levels at Important Areas. A substantial reduction was identified at the two important areas in Winterbourne Stoke. Amesbury, Wilton and Salisbury, are likely to experience a smaller changes with increases to some areas and a decrease in noise levels at others. On balance, Route Option D022 would have a Moderate Beneficial Impact on IAs.

3.5.143 Overall assessment score: Route Option D022 was assessed as having a Moderate Beneficial Effect in noise terms.

Air quality

3.5.144 Environmental receptors and/or assets assessed: AQMAs, human health receptors, ecological receptors, and Stonehenge.

3.5.145 Three human receptors (1, 2 & 3 Custodian Cottages) within 200m of eastern tunnel portal (closest approx. 180m from portal) which suggests emissions from tunnel portals have potential to affect air quality at human receptors. However, in reality the closure of the existing A303, which is located adjacent and considerably closer to these receptors than the proposed portal location, means that it would be likely to could potentially result in a significant reduction in annual mean NO_2 concentrations at these receptors.

3.5.146 The ARN defined in accordance with DMRB criteria indicates significant increases in AADT and HDV flows are unlikely occur as a result of this Route option beyond the extent of the scheme. Route Option D022 is not predicted to affect annual mean NO_2 concentrations within any existing AQMAs. Negative annual mean NO_2 impact score suggested that there would be a potential positive net impact on air pollutant concentrations at human receptors as a result of Route option, primarily due to re-routing of A303 around Winterbourne Stoke.

3.5.147 A lack of designated ecological sites (e.g. SSSIs, SACs, SPAs and Ramsar sites, for which the designated features are sensitive to air pollutants) within 200m of tunnel portals suggests that neither dust emissions associated with tunnel construction nor operational tunnel portal emissions are likely to affect designated ecological sites. As tunnel portals are located in excess of 350m from Stonehenge, dust emissions associated with tunnel construction are unlikely to affect Stonehenge Lichen.

3.5.148 It was not considered appropriate or feasible to balance potential adverse and beneficial effects for the wide range of receptors considered under this topic heading. There are considerable differences between the receptors, both in terms of their characteristics (human receptors, designated ecological sites, AQMAs and Stonehenge Lichen) and the methods of assessment applied in each case. Furthermore, there is no clear guidance as to what weight should be attributed to one factor when considered against another. Therefore an overall air quality topic score was not provided as part of the Design Fix C assessment.

Greenhouse gases

3.5.149 Environmental impacts assessed: Capital Carbon (as a factor of Route option length, length of tunnel, number of structures), and User Carbon (quantified emissions, length, number of junctions, and gradient).

3.5.150 In terms of capital carbon, which is a secondary consideration in the overall conclusion of the carbon assessment, all tunnel options perform generally similarly. Tunnel construction is capital carbon intensive, but so is construction of a large viaduct. The initial capital carbon of the tunnel construction can be minimised through appropriate selection of tunnelling method and materials, which would need to be considered during the design development.

3.5.151 According to the quantification from the traffic models, all tunnelled route options (Route Options D001, D003, D021 and D022) would result in the lowest increase in tailpipe emissions (user carbon) relative to the Do-Minimum scenario. In addition, route options in Corridor D require fewer junctions which would likely result in lower user emissions than for route options in Corridor F. Route Option D003 has the 2nd lowest indicative gradients.

3.5.152 Overall assessment score: Although no industry guidance exists to assign levels of significance for greenhouse gases emissions at a project level, the Route Option D022 was assessed as having the lowest carbon impact of all Corridor D options along with Route Options D001 and D003.

Landscape

3.5.153 Environmental receptors and/or assets assessed: landscape designations, landscape character and visual receptors.

3.5.154 Potential Moderate Adverse Effects on the non-statutory locally designated SLA and landscape of higher quality of national importance that forms part of WHS, including important characteristics and elements, with some features expected to be partly or wholly destroyed or their settings affected. Direct effects on the SLA are anticipated due to the physical change and the implementation of a part-widened, part-offline road corridor requiring deep cuttings at the downland / valley interfaces and high structures or earthworks across the river valleys. Even with mitigation, it will not be possible to fully integrate the new road into the landscape.

3.5.155 A range of visual receptors would experience Moderate to Large Adverse Effects, with a number of residential properties, ProW users and leisure/tourist destinations experiencing Beneficial Effects due to the removal of a section of the proposed road from the views available where it is tunnelled. Overall, a moderate number of visual receptors are likely to experience Moderate Adverse Effects on their visual amenity, with the greatest proportion being users of ProW and leisure/tourist destinations.

3.5.156 Overall assessment score: Route Option D022 was assessed as having a Moderate Adverse Effect on Landscape with adverse effects outweighing the potential for beneficial effects resulting from 2.9km tunnel replacing the existing A303 south of Stonehenge.

Historic environment

3.5.157 Environmental Receptors and/or assets assessed: WHS, Scheduled Monuments, Listed Buildings, Registered Parks and Gardens, Conservation Areas and non-designated assets.

3.5.158 Route Option D022 would remove the A303 from a key part of the WHS providing a significant improvement for the setting of Stonehenge and other related monuments. These are substantial benefits. The proposals would also contribute towards the CSRs to improve access within the WHS.

3.5.159 Construction of the Route option would however have very severe impacts on the setting and fabric of a large number of scheduled monuments within the WHS but would not however harm two important scheduled monuments north of Winterbourne Stoke. In particular the location of the eastern portal would cause the further severance of The Avenue. This asset is a fundamental element of the Outstanding Universal Value of the WHS and directly connected to Stonehenge itself. The additional severance is highly unlikely to be acceptable to UNESCO and is very likely to result in refusal of consent given the availability of other options.

3.5.160 To the west the tunnel portal lies further away from the Normanton Barrow Group than Route Options D001 and D003. The impacts here are therefore lower in scale and number, but there are still a number of significant adverse effects.

3.5.161 The construction of the flyover at Countess Roundabout and approach road to the eastern portal would have adverse impacts on a number of listed buildings, a conservation area and a registered park and garden. The Route option will also inevitably result in the loss of important archaeological remains within, and outside, of the WHS. The Route option notably runs across part of an extent of non-designated archaeology west of the A360, which may be of national importance

3.5.162 This initial analysis would indicate that in purely numerical terms the adverse effects resulting from the scheme outweigh the beneficial effects. Additionally, great weight

must be given the adverse effect resulting from the changes to WHS as a whole; even taking into account the beneficial impact on Stonehenge itself and other monuments. In this context, an overall Moderate to Large Adverse Effect for the Historic environment is recorded (in accordance with the terminology employed in WebTAG 2015 guidance).

3.5.163 The relocation of the eastern portal and approach roads to an online location would notably reduce the scale of impact, but the overall score would still be adverse. Route Option D022 south of Winterbourne Stoke would affect fewer designated scheduled monuments than Route Option D021 to the north. There would be greater loss of known archaeological remains, but further design refinement of the alignment could possibly address this.

3.5.164 Overall assessment score: Route Option D022 was assessed as having a Moderate/Large Adverse Effect on the historic environment.

Biodiversity

3.5.165 Environmental Receptors and/or assets assessed: International, national, regional and local designations, priority habitats, woodlands and hedgerow

3.5.166 Subject to further design and more detailed assessment, potential significant effects were identified for the following ecological receptors:

- Salisbury Plain SAC.
- River Avon SAC (encompassing River Avon and River Till).
- Parsonage Down SSSI.
- Parsonage Down NNR.
- River Till SSSI.
- River Avon System SSSI.
- Steeple Langford Down SSSI.
- Yarnbury Castle SSSI.
- Four CWS and one PRV.
- 9.29ha of Priority Habitats.
- 9.97ha woodland.
- 7254m hedgerow.

3.5.167 Route Option D022 was assigned an overall quantitative metric score of -28, reflecting the number and potential significance of effects identified for ecological receptors considered at this stage of the process.

3.5.168 Route Option D022 to the south of Winterbourne Stoke, takes the alignment further away from the Parsonage Down compartment of Salisbury Plain SAC. Indirect effects on the chalk grassland site, notably air quality and hydrological effects are therefore expected to be less than are expected to result from the route options to the north of Winterbourne Stoke.

3.5.169 Route Option D022 features the ‘western portals option’ in which the western tunnel portal lies approximately 400m away from Normanton Gorse. There would therefore be no direct or indirect effects expected on the woodland site based on current information.

3.5.170 Like all the Corridor D route options, Route Option D022 is a lot shorter in length than the Corridor F options and would therefore result in less overall habitat loss

as reflected by the lower total areas of Priority Habitat, woodland and length of hedgerows affected. Furthermore, based on information available at this stage, Route Option D022 includes a 2.9km tunnel with limited surface works causing habitat loss for this stretch. Route Option D022 would subsequently result in limited habitat severance and fragmentation with less potential isolation /displacement of populations.

3.5.171 Overall assessment score: Route Option D022 was assessed as having a Large Adverse Effect on biodiversity.

Water environment

3.5.172 Environmental receptors and/or assets assessed: flood risk, surface water, groundwater, water dependent ecology, and cultural heritage (Blickmead Spring).

3.5.173 There are a number of potentially significant effects on water environment features associated with Route Option D022. One of the construction methodologies may require dewatering of the Chalk Aquifer. Current assessment shows that a number of water environment features would be potentially affected by Route Option D022, including local groundwater abstractions, surface and groundwater dependent biodiversity in the River Avon and River Till, flood risk areas and cultural assets such as Blickmead Spring.

3.5.174 Overall assessment score: Route Option D022 was assessed as having a Large Adverse Effect on the water environment.

Agriculture land use

3.5.175 Environmental receptors and/or assets assessed: proportion of BMV land affected and viability of farms.

3.5.176 For the Agricultural Land Use assessment, Route Option D022 was allocated an overall score of Large Adverse based on a worst case assessment of potential loss of BMV agricultural land amounting to approximately 100ha. It should be noted that this is approximately the same area as for other options in Corridor D, but is considerably lower than all options within Corridor F. The option crosses approximately 5,700m of agricultural land and was therefore also assessed as having a Slight Adverse impact on farm viability.

3.5.177 Overall assessment score: Route Option D022 was assessed as having a Large Adverse Effect on agriculture land use.

Land contamination

3.5.178 Environmental receptors and/or assets assessed: human health receptors, controlled waters receptors, property receptors and ecological receptors.

3.5.179 Anticipated impacts relate to the mobilisation of existing soil and groundwater contamination during construction to which human and other environmental receptors may be exposed. Four low risk sites have been identified where there is the potential for Slight Adverse Impacts, three moderate risk sites where there is the potential for Moderate Adverse Impacts and five high risk sites where there is the potential for Large Adverse Impacts have been identified in the study area. The presence and magnitude of contamination which may be associated with historical

military uses is a key uncertainty and all four Corridor D alignments pass through these locations in both cutting and tunnel.

3.5.180 Overall assessment score: For land contamination the level of risk for Route Option D022 was largely considered to be the same for all four alignments in Corridor D.

Materials

3.5.181 Environmental Receptors and/or assets assessed: potential for generation of arisings to occur and potential for beneficial use of materials.

3.5.182 Route Option D022 was assessed as generating a moderate quantity of arisings after assuming that a percentage of those arisings could be used for cut and fill balance. Taking into account historical land use, underlying geology and the construction of the tunnel, Route Option D022 was assessed as having moderate potential for use of arisings within the scheme design.

3.5.183 The moderate quantities of excavated arisings may be reduced depending on the quantities of material needed for environmental mitigation and its suitability for this purpose. Any excavated material remaining that cannot be used onsite will need to be transported off-site to suitable destinations for reuse or disposal.

3.5.184 The construction of the tunnel may reduce the potential for beneficial use of the material due to handling and disturbance (from the tunnelling process), which may change the material's physical and chemical characteristics. Potential contamination sources within the alignment may also alter the characteristics of the material and may reduce its potential for beneficial use.

3.5.185 Overall assessment score: Route Option D022 was allocated an overall score of moderate, based on moderate generation of arisings after cut and fill, and moderate potential for beneficial use of those arisings.

3.6 Impact on society assessment

3.6.1 Table 3-5 shows the Corridor D summary table of the Impact on Society assessment assessment scores.

Table 3-5 Corridor D summary of impact on society assessment

Assessment Topic	D001	D003	D021	D022
Commuting and Other users (£000, 2010 prices, discounted to 2010)	211,748	211,748	211,748	211,748
Reliability impact on Commuting and Other users	Moderate Beneficial	Moderate Beneficial	Moderate Beneficial	Moderate Beneficial
Physical activity	Slight Beneficial	Slight Beneficial	Slight Beneficial	Slight Beneficial
Journey quality	Neutral	Neutral	Neutral	Neutral
Accidents (£000, 2010 prices, discounted to 2010)	32,782	32,782	32,782	32,782

Assessment Topic	D001	D003	D021	D022
Security	Neutral	Neutral	Neutral	Neutral
Affordability	Slight Adverse	Slight Adverse	Slight Adverse	Slight Adverse
Severance	Moderate Beneficial	Moderate Beneficial	Moderate Beneficial	Moderate Beneficial
Option and non-use values	Neutral	Neutral	Neutral	Neutral

Commuter and Other Users

3.6.2 User benefits experienced by commuter and other users have been assessed in a similar manner to the business user benefits outlined in Section 3.2.

3.6.3 Each of the options delivers estimated benefits of £211.748 million.

Reliability

3.6.4 The assessment of reliability (for all users) is provided in Section 3.2. As stated, route options in Corridor D are **moderately beneficial** in respect of reliability.

Accidents

3.6.5 As noted, monetised accident impacts have been assessed using the COBALT software tool based on traffic model outputs. Corridor D options would provide an improved standard of highway which would reduce accident rates on this section of the A303. Further benefits are derived as a result of the reassignment of traffic from other routes with higher accident rates.

3.6.6 In overall terms, the Corridor D options were assessed as delivering £32.782 million worth of accident savings.

Physical activity

3.6.7 All route options are classed as slight beneficial overall, as the removal of traffic from the existing A303 alignment will encourage walking and cycling and create a new direct car free Route option. All options will to some degree cause severance elsewhere on the network, which may have an adverse impact.

Journey quality

3.6.8 All route options are classed as Large Beneficial for traveller stress and Large Adverse for traveller views. An overall score of Neutral is determined for the four route options

Security

3.6.9 All route options are classed as neutral overall, although exact lighting and surveillance conditions on the route options have yet to be determined, so this may change at future stages.

Accessibility (Access to services)

3.6.10 All route options have been classed as neutral overall, as none of them will cause any substantial change in routes served by public transport.

Severance

3.6.11 In terms of severance of existing ProW, all route options have been assessed as Large Beneficial. Slight Beneficial Effects are assessed for the four route options in terms of community severance. The assessment showed a slight increase in severance between the villages of Winterbourne Stoke and Berwick St James, if the A303 were to be aligned to the south of Winterbourne Stoke (Route Options D003 and D022). All four route options score an overall Moderate Beneficial Effect for severance.

Option values

3.6.12 All route options have been classed as neutral overall, as none of them will cause any change in provision of public transport.

Affordability

3.6.13 All options within Corridor D are classed as slight adverse, as while the reduction in congestion would have a small beneficial impact on vehicle operating costs, this will be outweighed by the slight increase in journey distance.

3.7 Distributional impact assessment

3.7.1 Table 3-6 shows the summary table for the distributional impact scores in Corridor D.

Table 3-6 Corridor D summary of distributional impacts scores

Assessment Topic	D001	D003	D021	D022
User benefits	Slight Beneficial	Slight Beneficial	Slight Beneficial	Slight Beneficial
Noise	Moderate Beneficial	Moderate Beneficial	Moderate Beneficial	Moderate Beneficial
Air quality	Moderate Beneficial	Moderate Beneficial	Moderate Beneficial	Moderate Beneficial
Accidents	Slight Beneficial	Slight Beneficial	Slight Beneficial	Slight Beneficial
Security	Neutral	Neutral	Neutral	Neutral
Severance	Moderate Beneficial	Moderate Beneficial	Moderate Beneficial	Moderate Beneficial
Accessibility	Neutral	Neutral	Neutral	Neutral
Personal Affordability	Slight Adverse	Slight Adverse	Slight Adverse	Slight Adverse

User benefits

3.7.2 All route options have been classed as Slight Beneficial, as while there is likely to be an increase in vehicle operating costs for all options, this is likely to be outweighed by the reduction in practical journey times due to reduced congestion.

Noise

3.7.3 All options within Corridor D are classed as Moderate Beneficial, as these alignments would remove through traffic from Winterbourne Stoke and noise impacts on this section of the A303. Concentrations of children who would be particularly impacted by these changes have been identified in impacted areas for all alignments.

Air quality

3.7.4 All options within Corridor D are classed as Moderate Beneficial, as these alignments would remove through traffic from Winterbourne Stoke and air quality impacts on this section of the A303. Concentrations of children who would be particularly impacted by these changes have been identified in impacted areas for all alignments.

Accidents

3.7.5 All route options are classed as Slight Beneficial overall, as the existing length of A303 is a high risk accident site and the new road alignment will have increased capacity and will be designed to improve safety. The removal of traffic from Winterbourne Stoke and reduction in traffic for some other local settlements may reduce the potential for conflict with vulnerable users. Concentrations of children and older people who would be particularly impacted by these changes have been identified in impacted areas for all alignments.

Security

3.7.6 All route options are classed as neutral overall, although exact lighting and surveillance conditions on the Route option have yet to be determined, so this may change at future stages.

Severance

3.7.7 All options within Corridor D are classed as Moderate Beneficial, as these alignments would remove through traffic from Winterbourne Stoke and reduce severance on this section of the A303, as well as at several PRoWs. The assessment showed a slight increase in severance between the villages of Winterbourne Stoke and Berwick St James, if the A303 were to be aligned to the south of Winterbourne Stoke (Route Options D003 and D022). Vulnerable user groups who may be particularly impacted by these changes have been identified in impacted areas for all options.

Accessibility

3.7.8 All route options have been classed as neutral overall, as they will not cause any substantial change in routes served by public transport services.

Personal Affordability

3.7.9 All options within Corridor D are classed as Slight Adverse, as while the reduction in congestion would have a small beneficial impact on vehicle operating costs, this will be outweighed by the increased journey distance. The scheme area does not include areas with high levels of income deprivation, but people on low incomes will still be impacted.

3.8 Public accounts assessment

3.8.1 All options will be publicly funded through Central Government. The Corridor D options will have a higher draw on public accounts due to the higher relative construction, maintenance and operating costs of the tunnel option, and will result in the lowest level of indirect tax revenues due to the low level of additional fuel consumption.

3.8.2 The cost to the broad transport budget is £1,013 million as shown in the TUBA Public Accounts table (present value in 2010 prices).

3.8.3 The publicly-funded option is the most likely commercial Route option to delivery of this scheme, given public commitments made to start work on site by end March 2020.

3.9 Indirect tax revenues

3.9.1 The Indirect tax revenues generated are £30.1 million as shown in the TUBA Public Accounts table (present value in 2010 prices).

3.10 Indicative present value of costs and benefits summary

3.10.1 Cost estimates for all route options are input to the TUBA appraisal software In accordance with WebTAG guidance, costs and benefits are given in 2010 prices.

Cost to private sector

3.10.2 Cost to private sector – it is anticipated that the project will be publically funded therefore the cost to the private sector is not applicable.

Indicative PVC and PVB

3.10.3 The increase in capacity, reduced congestion and improved journey times resulting from the tunnelled options will generate significant benefits for business and non-business users. The following summarises the present value of costs and benefits for corridor D route options.

Table 3-7 Indicative costs and benefits of Corridor D options

	Corridor D Route Options (2010 present value, 2010 prices)
PVC	-£1,013m
PVB	£278m

Source: Stage 0 TUBA outputs

3.10.4 Benefits calculations presented at this stage under-estimate journey time benefits as they do not include weekend and summer month benefits. Additionally, the quantitative analysis does not monetise the range of environmental and heritage benefits which a tunnelled solution seeks to achieve.

3.11 Financial case assessment

Capital costs

3.11.1 Each of the Corridor D options is of a similar length both in terms of the tunnelled and surface sections of the Route option. On this basis, a single capital cost estimate has been generated for Corridor D options for this stage of assessment.

3.11.2 The 'Most Likely' capital cost estimate is £1,385m with the Lower Bound estimate being £1,130m and the Upper Bound estimate being £1,800m.

Maintenance costs

3.11.3 Operational and maintenance costs associated with tunnel solutions are significantly greater than for a conventional road. In lieu of a detailed assessment, an indicative allowance for tunnel operating, maintenance and renewal costs has been made based on recently produced cost estimates for a tunnel of a similar type and length taken from the Lower Thames Crossing scheme provided by Highways England.

3.11.4 The Lower Thames Crossing bored tunnel length is 3,040m with an additional cut and cover element of 168m. Therefore the indicative cost estimate is based on a tunnel 308m longer than the 2,900m tunnel proposed for Corridor D route options. An operating and maintenance cost assessment has been undertaken for a period of 60 years. The estimate excludes risk, opportunity cost and optimism bias.

3.11.5 Over the 60 year period, routine operating and maintenance costs would be in the region of £142m in 2010 present value terms (applying the HM Treasury Green Book discount rate). Renewals costs, including preliminary costs, are estimated to be £72m.

3.12 Delivery case assessment

3.12.1 An assessment of construction deliverability was undertaken and it was considered that all Corridor D route options could be delivered to acceptable, desirable minimum highway geometric standards. All would require a tunnel of approximately 2.9km in length and an associated significant dewatering programme during construction. A new bridge structure over the River Till and new all-movement junctions for the A360 and A345 would also be required for all options.

3.12.2 Significant traffic management would be required to ensure the existing A303 could remain operational during construction, particularly at the eastern portal and the section of road east of the WHS through Amesbury and the junction with the A345.

3.12.3 Route Options D001 and D021, running to north of the village of Winterbourne Stoke, would cross the existing A303 east of the village and depending on the location of the new junction for the A360, could require an additional road bridge structure to maintain access to Winterbourne Stoke.

3.12.4 It was considered that route options within Corridor D could be processed through the scheme preparation phase such that a start on site date of March 2020 is achievable. It is then estimated that all route options would require a similar construction programme of approximately 4-5 years.

Likely delivery agents

3.12.5 At the current stage of the project development, the delivery agents and funding sources are considered to be the same for all route options.

Stakeholder and public acceptability

3.12.6 Although no direct public consultation on the alignments has been undertaken during the options identification stage of this project to date, it is clear from previous engagement with stakeholders (parish councillors, land owners and occupiers, farmers, National Trust, Wiltshire Council) that there is a general acceptance of a tunnel and associated surface works to the north of Winterbourne Stoke in Corridor D.

3.12.7 A key issue will be the detail of the alignment of the tunnel and the appearance and location of the two portals as well as the alignment around Winterbourne Stoke together with how the scheme deals with “local issues” including local access, land-take and visual impact. This is based on the adoption of the preferred Route option and proposals for a tunnel with the previous published scheme.

3.12.8 From the initial key environmental stakeholder engagement on the WHS, there is a strong preference to locate an eastern tunnel portal to the east of The Avenue, although there were significant concerns with the resulting location of the western

portal which will require careful consideration and mitigation during design development to obtain full support from the key stakeholders.

3.12.9 There is an increased risk with any Route option to the south of Winterbourne Stoke (Route Options D003 and D022) not being acceptable to the public and key stakeholders as these move away from the route of the previous scheme.

3.12.10 The overall assessment against the delivery case has shown no substantial difference between the Corridor D options.

4 Corridor F route options assessment

4.1 Strategic fit assessment

4.1.1 This section provides a summary of an assessment of the three Corridor F shortlisted route options for the A303 Amesbury to Berwick Down scheme for their alignment with the CSRs for the scheme, and with relevant local and national planning, transport and economic policy objectives.

4.1.2 The route options to be assessed within Corridor F are:

- **Route Option F004** – a route to the south of the existing A303 (central route).
- **Route Option F005** – a route to the south of the existing A303 (southerly route).
- **Route Option F010** – a route to the south of the existing A303 (northerly route).

4.1.3 The following provides summary assessment tables for alignment with the CSRs and for national and local policy alignment, and high level summary assessments for all three options in Corridor F.

CSR assessment

4.1.4 Table 4-1 provides a summary of alignment with the CSRs for each of the assessed route options in Corridor F. The best performing option is Route Option F010.

Table 4-1 Scheme objectives fit summary table

Document	Relevant objectives	F004	F005	F010
Client Scheme Requirements	**Transport:** to create a high quality Route option that resolves current and predicted traffic problems and contributes towards the creation of an expressway between London and the South West	2	2	**2**
	Economic growth: in combination with other schemes on the Route option, to enable growth in jobs and housing by providing a free flowing and reliable connection between the East and the South West peninsula	2	2	**2**
	Cultural heritage: to contribute to the conservation and enhancement of the WHS by improving access both within and to the site	3	3	**3**
	Environment and community: to contribute to the enhancement of the historic landscape within the WHS, to improve biodiversity along the Route option, and to provide a positive legacy to communities adjoining the road	1	1	**2**

4.1.5 Options in Corridor F generally align less strongly with the CSRs than options in Corridor D. While Corridor F options would provide benefits in terms of improved capacity and reliability, the longer length of these route options restricts potential journey time savings in comparison to Corridor D, thereby limiting potential benefits in terms of improved connectivity and economic growth.

4.1.6 The length and alignment of route options in Corridor F could also encourage traffic on to local roads to the north of the existing A303, limiting the benefits for local traffic and connectivity relative to options in Corridor D, and potentially resulting in an increase in pollutant concentrations for some human receptors. These route options could introduce adverse severance effects and adverse noise effects to communities to the south of the existing A303. The longer length of route options in Corridor F is likely to impact on larger areas of priority habitats and result in greater areas of habitat loss than options in Corridor D, reducing the extent to which these options align with the environment and community CSR. Route Option F004 and F005 have the potential for larger adverse air quality impacts than Route Option F010, further reducing alignment with this CSR.

4.1.7 With regards to the historic environment, options in Corridor F would remove the road entirely from the WHS and allow the reconnection of The Avenue, which aligns strongly with the cultural heritage CSR. There is, however, the potential for these options to result in adverse effects for designated heritage assets outside the WHS. The central option (Route Option F004), for example, would include a crossing of the Woodford Valley and attendant large embankments which would seriously harm a large number of listed buildings and a conservation area. For the most northerly option (Route Option F010), there may be some visibility of the Route option from the southern fringes of the WHS. However, the substantial benefits for the WHS would be likely to outweigh adverse effects for heritage assets elsewhere along the route options.

National policy alignment

4.1.8 Table 4-2 provides a summary of alignment with the national policy objectives for each of the assessed Route option in Corridor F. The top performing option is Route Option F010.

Table 4-2 Corridor F route options national policy alignment summary table

Document	Relevant objectives	F004	F005	F010
NPSNN	Networks with the capacity and connectivity and resilience to support national and local economic activity and facilitate growth and create jobs	2	2	**2**
	Networks which support and improve journey quality, reliability and safety	2	2	**2**
	Networks which support the delivery of environmental goals and the move to a low carbon economy	1	1	**1**
	Networks which join up communities and link effectively to each other	1	1	**1**
RIS1	Making the network safer	2	2	**2**
	Improving user satisfaction	2	2	**2**
	Supporting the smooth flow of traffic	2	2	**2**
	Encouraging economic growth by working to minimise delay	2	2	**2**

Document	Relevant objectives	F004	F005	F010
	Delivering better environmental outcomes	1	1	**2**
	Helping cyclists, pedestrians and other vulnerable users	2	2	**2**

4.1.9 Options in Corridor F generally align fairly strongly with relevant national policy objectives. Corridor F options involve the construction of a long surface route which offers less significant journey time savings. Corridor F route options are also expected to encourage more traffic to use local roads adjacent to communities to the north of the existing A303, resulting in adverse severance effects for communities to the south of the existing A303. As such, Corridor F performs less well against objectives relating to local traffic issues and communities. Corridor F options would all improve safety by providing a dual carriageway, managing junction access and helping to improve resilience to accidents.

4.1.10 Options in Corridor F also align less strongly with national policy objectives relating to environmental outcomes and particularly with regards to carbon reduction. Again, all options would result in an increase in greenhouse gas emissions. Due to their greater length, options in Corridor F would impact on larger areas of priority habitats and result in greater areas of habitat loss than options in Corridor D. Options in Corridor F would also impact on existing AQMAs. Route Options F004 and F005 also have the potential to result in an increase in pollutant concentrations for some human receptors due to the redistribution of traffic on to minor roads.

4.1.11 Local policy alignment

4.1.12 Table 4-3 provides a summary of alignment with the local policy objectives for each of the assessed route options in Corridor F. The top performing option is Route Option F010.

Table 4-3 Local policy alignment summary table

Document	Relevant objectives	F004	F005	F010
Wiltshire Core Strategy	Strategic Objective 1: Delivering a thriving economy	2	2	**2**
	Strategic Objective 4: Helping to build resilient communities	2	2	**2**
	Strategic Objective 5: Protecting and enhancing the natural, historic and built environment	2	2	**2**
	Strategic Objective 6: Ensuring that adequate infrastructure is in place to support our communities	1	1	**1**
	Core Policy 4: Spatial strategy for the Amesbury Community Area	2	2	**2**
	Core Policy 6: Stonehenge	3	3	**3**
	Core Policy 59: The Stonehenge, Avebury and Associated Sites WHS and its setting	3	3	**3**
Wiltshire LTP	Support economic growth	2	2	**2**
	Reduce carbon emissions	1	1	**1**
	Contribute to better safety, security and health	2	2	**2**
	Promote equality of opportunity	2	2	**2**
	Improve quality of life and promote a healthy environment	1	1	**2**

Document	Relevant objectives	F004	F005	F010
Swindon and Wiltshire LEP, Strategic Economic Plan	Transport infrastructure improvements: we need a well-connected, reliable and resilient transport system to support economic and planned development growth at key locations	2	2	**2**
	Place shaping: we need to deliver the infrastructure required to deliver our planned growth and regenerate our City and Town Centres, and improve our visitor and cultural offer	2	2	**2**

4.1.13 As noted above, options in Corridor F are longer than options in Corridor D, which limits the potential for journey time savings. This limits the extent to which these options align with policy objectives regarding the economy and connectivity. This could also result in larger areas of habitat loss, reducing alignment with environmental objectives. All Corridor F options would result in an increase in carbon dioxide and greenhouse gas emissions, and therefore align weakly with the relevant goal in the Wiltshire LTP and with Strategic Objective 6 of the Wiltshire Core Strategy, which includes reductions in greenhouse gas emissions associated with transport as a key outcome.

4.1.14 The potential benefits for communities along the Route option are also limited by the alignment of route options in Corridor F, which could have the potential to encourage traffic to divert into areas to the north of the existing A303. This reduces alignment with relevant local policy objectives relating to community infrastructure and quality of life. Options in Corridor F are likely to cause severance for communities to the south of the existing A303, and could introduce adverse noise effects. As noted, Route Options F004 and F005 have more adverse implications for air quality than Route Option F010. However, all options align to an extent with the local policy for Amesbury, as they would improve traffic conditions around the town. All options would reduce accident rates and traveller stress.

4.1.15 Options in Corridor F perform strongly in relation to the Stonehenge WHS and the historic environment, as they would remove the A303 and associated transport infrastructure from the WHS in its entirety. This would result in substantial benefits to the setting of the WHS and its Outstanding Universal Value which would outweigh adverse effects to other designated assets including scheduled monuments, listed buildings, and conservation areas elsewhere along the route options.

4.2 Value for money assessment

Impact on the economy – Corridor F

4.2.1 This section summarises the assessment of the Corridor F schemes from the perspective of economic impacts.

4.2.2 A key objective of the scheme is to provide a high quality route that resolves the large levels of congestion currently experienced along the Route option, particularly at weekends and in the summer. Viewed in the context of the A303 corridor overall this section of the route creates a significant bottleneck due to the single carriageway, therefore considerably increasing journey times compared with uncongested free flow condition. The A303 corridor running between London and the South West is important for businesses operating across the wider area. The Route option will increase capacity, and so reduce congestion and journey times,

which will have time benefits for business users of the scheme, especially in peak hours and summer months.

Business users and transport providers

4.2.3 All Corridor F options provide a net negative impact on business users: Route Options F004 and F005 result in a net negative business impact due to the increased vehicle operating costs which are greater than the journey time benefits. In the case of Route Option F005 journey time benefits and vehicle operating costs are negative due to the longer distance of the route option. Route Option F010 is the best performing of the three Corridor F options. Journey time benefits are higher than Route Options F004 and F005. However, vehicle operating costs increase in comparison to the existing route and are a disbenefit to business users.

4.2.4 Net business impacts is the sum of travel time benefits and vehicle operating cost benefits.

4.2.5 Estimates of benefits for **Route Option F004** (present values in 2010 prices) from TUBA TEE table are:

- Travel time benefits: +£4.6 million
- Vehicle operating cost benefits: -£54.5 million
- Net business impact: -£50.1 million

4.2.6 Route Option F004 will provide a longer travel distance than the current A303. This will increase vehicle operating costs and produce only small journey time benefits. These journey time benefits are outweighed by the increase in operating costs resulting in a net disbenefit for business users.

4.2.7 Estimates of benefits for **Route Option F005** (present values in 2010 prices) from TUBA TEE table are:

- Travel time benefits: -£24.1 million
- Vehicle operating cost benefits: -£40.4 million
- Net business impact: -£64.5 million

4.2.8 The distance to travel along Route Option F005 will increase the length of the route, which in turn increases vehicle operating costs and therefore reduces benefits to business users. As a result of the longer distance journey time benefits to business users are negative. Overall there is a net disbenefit for business users.

4.2.9 Route Option F005 will provide a longer travel distance than the current A303. This will increase vehicle operating costs and produce negative journey time benefits. These negative journey time benefits together with the increase in operating costs result in a net negative impact on business users.

4.2.10 Estimates of benefits for Route Option F010 (present values in 2010 prices) from TUBA TEE table are:

- Travel time benefits: +£30.3 million
- Vehicle operating cost benefits: -£58 million
- Net business impact: -£27.7 million

4.2.11 Route Option F010 will provide a longer travel distance than the current A303. This will increase vehicle operating costs and produce moderate journey time benefits.

These journey time benefits are outweighed by the increase in operating costs resulting in a net disbenefit for business users.

Reliability

4.2.12 The creation of an Expressway along the whole section of the Route option to dual carriageway standard will provide adequate capacity for predicted traffic levels and will reduce the level of incidents. The three Corridor F options are assessed as having a **Slight Beneficial** impact. There is a potential that some traffic may divert onto local roads due to the increased journey length. This somewhat offsets the positive impact of increased capacity along the main route options**.**

4.2.13 Options in Corridor F tend to encourage more traffic to divert into the local areas to the north and south of the existing alignment (e.g. Amesbury, Bulford, Durrington, Larkhill and Shrewton) and will thereby increase the impact of incidents in these communities and hence worsen reliability.

Regeneration

4.2.14 The scheme would have a **neutral** impact from the regeneration viewpoint – the option is not in a Regeneration Area, or is not expected to impact on accessibility to jobs for Regeneration Area employment.

4.2.15 Levels of deprivation in south Wiltshire are generally low. However, there are three Lower Layer Super Output Areas (LSOAs) located relatively close to the Route option that fall into the 20% most deprived in England. Two of these are at Wilton, and one is in central Salisbury.

4.2.16 The Salisbury Central Area Regeneration Programme, set out in the Wiltshire Core Strategy, identifies a number of regeneration sites within the city centre. In total these will provide 1,100 dwellings and 5 ha of predominantly B1 employment land.

4.2.17 The options in Corridor F would provide a new dual carriageway south of Winterbourne Stoke and Amesbury is not considered likely to have a significant impact on accessibility or economic activity in either the targeted regeneration areas in central Salisbury, or on areas of deprivation in Salisbury and Wilton.

Wider impacts

4.2.18 The wider impacts of the three Corridor F options are all assessed as **Slight Adverse** linked to the possible negative impacts on journey times.

4.3 Impact on environment assessment

Route Option F004 – a route to the south of the existing A303 (central route)

Noise

4.3.1 Environmental receptors and/or assets assessed: quiet places with community value, communities and sensitive receptors, and noise Important Areas (IAs).

4.3.2 Route Option F004 would take traffic away from Winterbourne Stoke but close to Salterton Down. Lower Woodford and Stapleton, which generates new nuisance to communities in these areas. The majority of properties are likely to have a negligible benefit or disbenefit from the scheme. 54 properties are predicted to experience a decrease in noise nuisance and 108 properties are predicted to experience an increase in noise nuisance. Overall, Route Option F004 was

anticipated to result in a Moderate Adverse Impact for communities and sensitive facilities.

4.3.3 Based on the assessment undertaken to date, Route Option F004 was predicted to result in a Moderate Beneficial effect on amenity in the WHS. This is based on a substantial reduction in the area subject to noise levels likely to generate moderate annoyance within the WHS, as a result of the traffic passing the area at a greater distance.

4.3.4 Based on the Design Fix C traffic model, the Route option has the potential to change noise levels in IAs. A substantial reduction was identified at the two important areas in Winterbourne Stoke and a further two in Amesbury. The remaining IAs are likely to experience smaller changes in noise levels with increases to some areas and a decrease at others. On balance, the option was assessed as having a Moderate Beneficial Impact on IAs.

4.3.5 Overall assessment score: Route Option F004 was assessed as having a Slight Beneficial effect in noise terms.

Air quality

4.3.6 Environmental receptors and/or assets assessed: AQMAs, human health receptors, ecological receptors, and Stonehenge.

4.3.7 The ARN defined in accordance with DMRB criteria indicates potentially significant increases in AADT and HDV flows along a number of road links, namely the A3028, The Packway, B3086, B390 and A360 to the north of the A303 and the A345 and A36 to the north of Salisbury. Annual mean NO_2 concentrations within the existing Salisbury AQMAs may be adversely affected by this redistributed traffic, based on the ARN.

4.3.8 Positive annual mean NO_2 impact score suggested potential negative net impact on air pollutant concentrations at human receptors (e.g. residential properties, schools and hospitals) as a result of Route option despite re-routing of A303 around Amesbury and Winterbourne Stoke, primarily due to redistribution of traffic onto minor roads.

4.3.9 Results suggested this route option would lead to an absolute reduction in the volume of traffic which uses the A303 compared to the Do-Minimum scenario (by approximately – 3,500 AADT). This traffic was modelled to be displaced across a large number of alternative route options, however as this assessment only considered the Affected Road Network defined in accordance with DMRB criteria, the full extent of this displacement and associated impacts may not be fully captured in this assessment. This is evidenced by the fact that a reduction in total HDV km was modelled to occur along the assessed road network, suggesting that HDV movements displaced as a result of this Route option do not all occur in the defined study area.

4.3.10 The results of this assessment are inherently limited by the assumptions and limitations of the traffic data on which the assessment is based, which are likely to be significant at this stage given the relative simplicity and coarseness of the traffic model employed in advance of the Local Traffic Model being available.

4.3.11 A change in area of designated ecological sites (e.g. SSSIs, SACs, SPAs and Ramsar sites, for which the designated features are sensitive to air pollutants)

within 200m of route option indicated a net beneficial effect on designated ecological sites due to realignment of A303. The Lower Woodford Water Meadows SSSI however may be adversely affected.

4.3.12 Overall assessment score: It was not considered appropriate or feasible to balance potential adverse and beneficial effects for the wide range of receptors considered under this topic heading. There are considerable differences between the receptors, both in terms of their characteristics (human receptors, designated ecological sites, AQMAs and Stonehenge Lichen) and the methods of assessment applied in each case. Furthermore, there is no clear guidance as to what weight should be attributed to one factor when considered against another. Therefore an overall air quality topic score was not provided as part of the Design Fix C assessment.

Greenhouse gases

4.3.13 Environmental Receptors impacts assessed: Capital Carbon (as a factor of Route option length, length of tunnel, number of structures), and User Carbon (Quantified emissions, length, number of junctions, and gradient)[14]

4.3.14 For Route Option F004, the traffic model computes the highest increase in carbon emissions out of all options relative to the Do-Minimum scenario. This option would have the second highest increase in carbon emissions. This option would also have the highest number of junctions although was considered to have the lowest indicative gradients.

4.3.15 In terms of capital carbon, which is a secondary consideration in the overall conclusion of the carbon assessment, Route Option F004 was the second best performing Corridor F option with a length of new road construction and number of expected structures lying between Route Options F005 and F010.

4.3.16 Overall assessment score: Although no industry guidance exists to assign levels of significance for greenhouse gas emissions at a project level, the Route Option F004 was assessed as having the second lowest carbon impact of the Corridor F options.

Landscape

4.3.17 Environmental receptors and/or assets assessed: landscape designations, landscape character and visual receptors.

4.3.18 Large Adverse Effects on both the Cranborne Chase and Wiltshire Downs AONB and the non-statutory locally designated SLA, detracting from the landscape of recognised quality and important characteristics or elements. Direct effects would be associated with the physical change and implementation of a new large-scale road corridor through the SLA that would include deep cuttings at the downland / valley interfaces and high structures or earthworks across the river valleys. Indirect effects would be on the setting of the northern edge of the AONB and across a large proportion of the SLA. Even with mitigation, it will not be possible to fully integrate the new road into the landscape. Some features will be partly or wholly destroyed or their settings affected.

[14] The majority of the whole life carbon of a highway project is in the User carbon (tailpipe emissions), with the capital and operational carbon comprising a small component of the total emissions.

4.3.19 A substantial number of visual receptors are likely to experience Moderate to Large Adverse Effects, with a number of residential properties, PRoW users and leisure/tourist destinations experiencing Beneficial Effects due to the closure of the A303. A moderate number of visual receptors are likely to experience Moderate Adverse Effects on their visual amenity, with the greatest proportion being users of PRoW and leisure/tourist destinations.

4.3.20 Overall assessment score: Route Option F004 was assessed as having a Large Adverse Effect on Landscape with adverse effects outweighing the potential for beneficial effects resulting from the closure of the existing A303 south of Stonehenge.

Historic environment

4.3.21 Environmental Receptors and/or assets assessed: WHS, Scheduled Monuments, Listed Buildings, Registered Parks and Gardens, Conservation Areas, Non-designated assets

4.3.22 The removal of the A303 from within the WHS is a substantial benefit for the WHS and a vast amount of individual scheduled monuments within the site. This substantial benefit to assets of national and international importance outweighs, in historic environment terms, the harm done to other designated assets, including scheduled monuments, listed buildings and conservation areas, outside of the WHS.

4.3.23 Route Option F004 would also result in the removal of known and potential archaeological remains along its length. Current analysis is based on readily available data and is not comprehensive. Further prospection and survey is likely to identify more remains which would need to be assessed and addressed. The scale of works is however likely to be fundamentally similar to other major highways schemes.

4.3.24 The line of the crossing of the Woodford Valley and the attendant large embankments would seriously harm a large number of listed buildings and a conservation area. Consequently the overall score is worse than other route options in Corridor F. In this case the harm to the other designated assets weighs against the major benefits and the scheme would deliver a Slight to Moderate Beneficial Effect for the Historic environment (in accordance with the terminology employed in WebTAG 2015 guidance). This must be understood in the context of there being a large number of high scoring adverse effects.

4.3.25 Overall assessment score: Route Option F004 was assessed as having a Slight / Moderate Beneficial Effect on the historic environment.

Biodiversity

4.3.26 Environmental receptors and/or assets assessed: international, national, regional and local designations, priority habitats, woodlands and hedgerows.

4.3.27 Subject to further design and more detailed assessment, potential significant effects were identified for the following ecological receptors:

- River Avon SAC (encompassing the River Avon and River Till).
- Salisbury Plain SAC.
- Salisbury Plain SPA.

- Lower Woodford Water Meadows SSSI.
- River Till SSSI.
- River Avon System SSSI.
- Parsonage Down SSSI.
- Parsonage Down NNR.
- Porton Meadows SSSI.
- Steeple Langford Down SSSI.
- Yarnbury Castle SSSI.
- Salisbury Plain SSSI.
- 13 x CWS and 2 x PRVs.
- 17.55ha Priority Habitats.
- 16.16ha woodland.
- 13,126m hedgerow.

4.3.28 Route Option F004 was assigned an overall quantitative metric score of -50, reflecting the number and potential significance of effects identified for ecological receptors considered at this stage of the process.

4.3.29 All three F route options have a significant impact on habitat loss due to their long lengths and the fact the route options are above ground for the entire length of the route options. Route Option F004 is longer than Route Option F010 but not as long as long as Route Option F005. It passes over the River Avon between Middle Woodford and Lower Woodford.

4.3.30 Route Option F004 was assessed to result in the second largest impact of all route options on designated sites (with a cumulative score of -47 for impact significance on designations). It would have the second largest impact on habitat loss as reflected in the higher total areas of Priority Habitat, woodland and hedgerow loss. Based on information available at this stage, Route Option F004 could reasonably be predicted to have the second highest effect of landscape scale severance and subsequent isolation/displacement of species populations.

4.3.31 Overall assessment score: Route Option F004 was assessed as having a Large Adverse Effect on biodiversity.

Water environment

4.3.32 Environmental receptors and/or assets assessed: flood risk, surface water, groundwater, water dependent ecology, and cultural heritage (Blickmead Spring).

4.3.33 Most of the effects associated with Route Option F004 (shading by bridges, increased flood risk and changes in flow volume and water quality in both groundwater and surface water) would be eliminated by mitigation and design. Route Option F004 crosses 3.3 km of SPZ 2 and this would require a project specific mitigation approach which is reflected in the score provided. In addition Route Option F004 crosses very close (40 m) to a protected species, the Desmoulins Whorl Snail. Even with mitigation due to the proximity there still remains a risk to the health of the snail population.

4.3.34 Overall assessment score: Route Option F004 was assessed as having a Large Adverse Effect on biodiversity.

Agriculture land use

4.3.35 Environmental receptors and/or assets assessed: proportion of BMV land affected and viability of farms.

4.3.36 For the Agricultural Land Use assessment, Route Option F004 was allocated an overall score of Large Adverse based on a worst case assessment of potential loss of BMV agricultural land amounting to approximately 300ha. It should be noted that this considerably higher than all options within Corridor D, lower than Route Option F005 and higher than Route Option F010. The option crosses approximately 24,856m of agricultural land and was therefore also assessed as having a Large Adverse Impact on farm viability.

4.3.37 Overall assessment score: Route Option F004 was assessed as having a Large Adverse Effect on agriculture land use.

Land contamination

4.3.38 Environmental receptors and/or assets assessed: human health receptors, controlled waters receptors, property receptors, ecological receptors.

4.3.39 Anticipated impacts relate to the mobilisation of existing soil and groundwater contamination during construction to which human and other environmental receptors may be exposed.

4.3.40 Seven low risk sites where there is the potential for Slight Adverse Impacts, and three high risk sites where there is the potential for Large Adverse Impacts have been identified in the study area.

4.3.41 Route Option F004 was considered to be the most preferable of all seven options, in terms of land contamination, across Corridors D and F on the basis that the fewest number of high risk sites are located in the study area and although they are located within the assumed construction footprint, they are located 'off-line' of the anticipated alignment. There was therefore a low potential for contamination to have migrated into the footprint of the alignment and, as such, the financial and programme liabilities associated with remediation measures would be less onerous.

4.3.42 Overall assessment score: For land contamination the level of risk for Route Option F004 was largely considered to be the same for all three alignments in Corridor F. The F alignments were considered less preferable than route options in corridor D at this stage.

Materials

4.3.43 Environmental Receptors and/or assets assessed: potential for generation of arisings to occur and potential for beneficial use of materials.

4.3.44 Route option F004 was assessed as generating a high quantity of arisings both before and after assuming that a percentage of those arisings could be used for cut and fill balance. Taking into account historical land use and underlying geology, Route Option F004 was assessed as having high potential for use of arisings within the scheme design

4.3.45 The high quantities of excavated arisings may be reduced depending on the quantities of material needed for environmental mitigation and its suitability for this purpose. Any excavated material remaining that cannot be used onsite will need to be transported off-site to suitable destinations for beneficial use or disposal.

4.3.46 Potential contamination sources within the alignment may alter the characteristics of the material and may reduce its potential for beneficial use.

4.3.47 Overall assessment score: Route Option F004 was allocated an overall score of high, based on high generation of arisings after cut and fill. Whilst the option was anticipated to have high potential for beneficial use of those arisings, the overall score has been determined based on the application of the waste hierarchy which prioritises minimisation of waste over beneficial use.

Route Option F005 – a route to the south of the existing A303 (southerly route)

Noise

4.3.48 Environmental receptors and/or assets assessed: quiet places with community value, communities and sensitive receptors, and noise Important Areas (IAs).

4.3.49 Route Option F005 would take traffic away from Winterbourne Stoke and Amesbury but close to Upper Woodford and Berwick St James and other residences. This generates new disbenefits to communities. The majority of properties are likely to have negligible benefit or disbenefit from the scheme. 54 properties are predicted to experience a decrease in noise nuisance and 100 properties are predicted to experience an increase in noise nuisance. Overall, Route Option F005 was anticipated to result in a Moderate Adverse Impact for communities and sensitive facilities.

4.3.50 Based on the assessment undertaken to date, Route Option F005 was predicted to result in a Moderate Beneficial effect on amenity in the WHS. This was based on a substantial reduction in the area subject to noise levels likely to generate moderate annoyance within the WHS, as a result of the traffic passing at a greater distance.

4.3.51 Based on the Design Fix C traffic model, Route Option F005 has the potential to change noise levels in IAs. A substantial reduction was identified at the two important areas in Winterbourne Stoke and a further two in Amesbury. The remaining IAs are likely to experience a smaller changes in noise levels with increases to some areas and a decrease at others. On balance, the option was assessed as having a Moderate Beneficial Impact on IAs.

4.3.52 Overall assessment score: Route Option F005 was assessed as having a Slight Beneficial Effect in noise terms.

Air quality

4.3.53 Environmental receptors and/or assets assessed: AQMAs, human health receptors, ecological receptors, and Stonehenge.

4.3.54 The ARN defined in accordance with DMRB criteria indicates potentially significant increases in AADT and HDV flows over a large area and along a large number of road links, namely the A3028, The Packway, B3086, B390 and A360 to the north of the A303 and the A345 and A360 to the north of Salisbury. Annual mean NO_2 concentrations within the existing Salisbury AQMAs may be adversely affected by

this redistributed traffic. In addition a significant displacement in HDV movements (approx. 600 per day) was modelled to occur from the A303 to the A30 for the length of the A30, based on the ARN at the time.

4.3.55 Positive annual mean NO2 impact score (Route Option F005 ranked 7 of 7) suggested potential negative net impact on air pollutant concentrations at human receptors (e.g. residential properties, schools and hospitals) as a result of Route option despite re-routing of A303 around Amesbury and Winterbourne Stoke, primarily due to redistribution of traffic onto other local roads.

4.3.56 The Model results suggested that Route Option F005 would result in an absolute reduction in the volume of traffic which uses the A303 compared to the Do-Minimum scenario (by approximately -4,000 AADT). This traffic was modelled to be displaced across a large number of alternative route options, however as this assessment only considered the ARN defined in accordance with DMRB criteria, the full extent of this displacement and associated impacts may not be fully captured in this assessment. This was evidenced by the fact that a reduction in total HDV km was modelled to occur along the assessed road network, suggesting that HDV movements displaced as a result of this Route option do not all occur in the defined study area.

4.3.57 The results of this assessment are inherently limited by the assumptions and limitations of the traffic data on which the assessment is based, which are likely to be significant at this stage given the relative simplicity and coarseness of the traffic model employed in advance of the Local Traffic Model being available.

4.3.58 A change in the area of designated ecological sites (e.g. SSSIs, SACs, SPAs and Ramsar sites, for which the designated features are sensitive to air pollutants) within 200m of Route Option F005 (Route Option F005 ranked 1 of 7) indicated a net beneficial effect would be likely on designated ecological sites due to the realignment of the existing A303. The Camp Down SSSI however may be adversely affected.

4.3.59 Overall assessment score: It was not considered appropriate or feasible to balance potential adverse and beneficial effects for the wide range of receptors considered under this topic heading. There were considerable differences between the receptors, both in terms of their characteristics (human receptors, designated ecological sites, AQMAs and Stonehenge Lichen) and the methods of assessment applied in each case. Furthermore, there was no clear guidance as to what weight should be attributed to one factor when considered against another. Therefore an overall air quality topic score was not provided as part of the Design Fix C assessment.

Greenhouse gases

4.3.60 Environmental impacts assessed: Capital Carbon (as a factor of Route option length, length of tunnel, number of structures), and User Carbon (Quantified emissions, length, number of junctions, and gradient)[15]

4.3.61 For Route Option F005, the traffic model computes the highest increase in carbon emissions of all options relative to the Do-Minimum scenario. This option has the

[15] The majority of the whole life carbon of a highway project is in the User carbon (tailpipe emissions), with the capital and operational carbon comprising a small component of the total emissions.

second highest indicative gradients although but the lowest number of junctions of all options.

4.3.62 In terms of capital carbon, which is a secondary consideration in the overall conclusion of the carbon assessment, Route Option F005 was the worst performing of the Corridor F options with the longest length of new road construction and the highest number of structures.

4.3.63 Overall assessment score: Although no industry guidance exists to assign levels of significance for greenhouse gas emissions at a project level, the Route Option F005 was assessed as having the worst carbon impact of the Corridor F options.

Landscape

4.3.64 Environmental Receptors and/or assets assessed: Landscape Designations, Landscape Character, Visual Receptors.

4.3.65 Large adverse effects on both the Cranborne Chase and Wiltshire Downs AONB and the non-statutory locally designated SLA, detracting from the landscape of recognised quality and important characteristics or elements. Direct effects would be associated with the physical change and implementation of a new large-scale road corridor through the SLA that would include deep cuttings at the downland / valley interfaces and high structures or earthworks across the river valleys. Indirect effects would be on the setting of the northern edge of the AONB and across a large proportion of the SLA. Even with mitigation, it will not be possible to fully integrate the new road into the landscape. Some features will be partly or wholly destroyed or their settings affected.

4.3.66 A substantial number of visual receptors are likely to experience Moderate to Large Adverse Effects, with a number of residential properties, PRoW users and leisure/tourist destinations experiencing Beneficial Effects due to the closure of the existing A303. Overall, a moderate number of visual receptors are likely to experience Moderate Adverse Effects on their visual amenity, with the greatest proportion being users of PRoW and leisure/tourist destinations.

4.3.67 Overall assessment score: Route Option F005 was assessed as having a Large Adverse Effect on Landscape with adverse effects outweighing the potential for beneficial effects resulting from the closure of the existing A303 south of Stonehenge.

Historic environment

4.3.68 Environmental Receptors and/or assets assessed: WHS, Scheduled Monuments, Listed Buildings, Registered Parks and Gardens, Conservation Areas, Non designated assets

4.3.69 The removal of the A303 from the entirety of the WHS is a substantial benefit for the WHS and a vast amount of individual scheduled monuments within the site. This substantial benefit to assets of national and international importance outweighs, in historic environment terms, the harm done to a limited number of designated assets, including scheduled monuments, listed buildings and conservation areas, outside of the WHS.

4.3.70 Route Option F005 would also result in the removal of known and potential archaeological remains along its length. Current analysis is based on readily

available data and is not comprehensive. Further prospection and survey would undoubtedly identify more remains which would need to be assessed and addressed. The scale of works is however likely to be fundamentally similar to other major highways schemes.

4.3.71 The harm to the other assets does however weigh slightly against the overwhelming benefits but the scheme is still considered to deliver a Large Beneficial Effect for the Historic environment (in accordance with the terminology employed in WebTAG 2015 guidance). This must be understood in the context of there being a limited number of high scoring adverse effects.

4.3.72 Overall assessment score: Route Option F005 was assessed as having a Large Beneficial Effect on the historic environment.

Biodiversity

4.3.73 Environmental Receptors and/or assets assessed: International, national, regional and local designations, priority habitats, woodlands and hedgerow

4.3.74 Subject to further design and more detailed assessment, potential significant effects were identified for the following ecological receptors:

- River Avon SAC (encompassing River Avon and River Till).
- Salisbury Plain SAC.
- Salisbury Plain SPA.
- River Till SSSI.
- River Avon System SSSI.
- Camp Down SSSI.
- Yarnbury Castle SSSI.
- Steeple Langford Down SSSI.
- Lower Woodford Water Meadows SSSI.
- Porton Meadows SSSI.
- Salisbury Plain SSSI.
- Parsonage Down SSSI.
- Parsonage Down NNR.
- 16 x CWS and 1 x PRV.
- 19.50ha Priority Habitats.
- 19.57ha woodland.
- 13,334m hedgerow.

4.3.75 Route Option F005 was assigned an overall quantitative metric score of -55, reflecting the number and potential significance of effects identified for ecological receptors considered at this stage of the process.

4.3.76 All three F route options have a significantly greater impact on habitat loss due to their long lengths and the fact the route options are above ground for their entire lengths.

4.3.77 Route Option F005 is the longest of all three F route options, crossing over the River Avon to the south of Little Durnford. Since it is the longest it would cause the largest impact of all route options on designated sites (with a cumulative score of -52 for impact significance on designations). It would also have the largest impact on habitat loss as reflected in the highest total areas of Priority Habitat, woodland

and hedgerow loss. Based on information available at this stage, Route Option F005 could reasonably be predicted to have the highest landscape scale severance impacts and subsequent potential isolation/displacement of species populations.

4.3.78 Overall assessment score: Route Option F005 was assessed as having a Large Adverse Effect on biodiversity.

Water environment

4.3.79 Environmental Receptors and/or assets assessed: Flood Risk, Surface Water, Ground Water, Water Dependent Ecology, Cultural Heritage (Blickmead Spring).

4.3.80 Most of the effects associated with Route Option F005 (shading by bridges, increased flood risk and changes in flow volume and water quality in both groundwater and surface water) would be eliminated by mitigation and design however a major constraint associated with Route Option F005 is that it crosses over 1.7 km of SPZ1 and over 2 km of SPZ2. This would be likely to limit the further development of this Route option and this would be reflected in the overall topic assessment score.

4.3.81 Overall assessment score: Route Option F005 was assessed as having a Very Large Adverse Impact.

Agriculture land use

4.3.82 Environmental receptors and/or assets assessed: proportion of BMV land affected and viability of farms.

4.3.83 For the Agricultural Land Use assessment, Route Option F005 was allocated an overall score of Large Adverse based on a worst case assessment of potential loss of BMV agricultural land amounting to approximately 330ha. It should be noted that this was considerably higher than all options within Corridor D, and higher than Route Options F010 and F004. The option is the longest of all route options, crossing approximately 26,835m of agricultural land and was therefore also assessed as having a 'large adverse' impact on farm viability.

4.3.84 Overall assessment score: Route Option F005 was assessed as having a Large Adverse Effect on agriculture land use.

Land contamination

4.3.85 Environmental receptors and/or assets assessed: human health receptors, controlled waters receptors, property receptors, ecological receptors.

4.3.86 Anticipated impacts relate to the mobilisation of existing soil and groundwater contamination during construction to which human and other environmental receptors may be exposed.

4.3.87 Four low risk sites have been identified where there is the potential for Slight Adverse Impacts, one moderate risk site where there is the potential for Moderate Adverse Impacts and four high risk sites where there is the potential for Large Adverse Impacts have been identified in the study area.

4.3.88 Overall assessment score: Route Option F005 was considered to be the least preferable on the basis that significant constraints exist with regards to cutting

through Camp Hill historical landfill. This constraint was not present in Route Options F004 and F010. Lateral relocation of Route Option F005 to avoid the historical landfill would reduce the level of risk.

Materials

4.3.89 Environmental Receptors and/or assets assessed: potential for generation of arisings to occur and potential for beneficial use of materials.

4.3.90 Route Option F005 was assessed as generating a high quantity of excavated arisings both before and after assuming that a percentage of those arisings could be used for cut and fill balance. Taking into account historical land use and the underlying geology, Route Option F005 was assessed as having high potential for use of arisings within the scheme design.

4.3.91 The high quantities of excavated arisings may be reduced depending on the quantities of material needed for environmental mitigation and its suitability for this purpose. Any excavated material remaining that cannot be used onsite would need to be transported off-site to suitable destinations for beneficial use or disposal.

4.3.92 Potential contamination sources within the alignment may alter the characteristics of the material and may reduce its potential for beneficial use.

4.3.93 Overall Assessment Score: Route Option F005 was allocated a score of High, based on high generation of arisings after cut and fill (this option was predicted to generate more than double the quantity of waste arisings to Route Option F010 and other options in Corridor D). Whilst the option is anticipated to have high potential for beneficial use of those arisings, the overall score was determined based on the application of the waste hierarchy which prioritises minimisation of waste over beneficial use.

Route Option F010 – a route to the south of the existing A303 (northerly route)

Noise

4.3.94 Environmental receptors and/or assets assessed: quiet places with community value, communities and sensitive receptors, and noise Important Areas (IAs).

4.3.95 Based on the assessment undertaken to date, Route Option F010 was predicted to result in a Moderate Beneficial Effect on amenity in the WHS. This was based on a substantial reduction in the area subject to noise levels likely to generate moderate annoyance within the WHS, as a result of the traffic passing the area at a greater distance.

4.3.96 The route option takes traffic away from Winterbourne Stoke and Amesbury but close to Upper Woodford and Berwick St James and other residences, which generates new disbenefits to these communities. This is anticipated to result in a Moderate Adverse Impact for communities and sensitive facilities.

4.3.97 Based on the Design Fix C traffic model, the Route option has the potential to change noise levels at Important Areas. A substantial reduction was identified at the two important areas in Winterbourne Stoke and a further two in Amesbury. The remaining IAs are likely to experience a smaller changes in noise levels with increases to some areas and a decrease at others. On balance, the option was assessed as having a Moderate Beneficial Impact on IAs.

4.3.98 Based on the above, overall Route Option F010 was assessed as having a Slight Beneficial Effect in noise terms.

Air quality

4.3.99 Environmental receptors and/or assets assessed: AQMAs, human health receptors, ecological receptors, and Stonehenge.

4.3.100 The ARN defined in accordance with DMRB criteria indicates potentially significant increases in AADT and HDV flows on a small number of road links, namely along the Packway, B3086 and A360 to the north of the A303 and the A36 to the west of Salisbury. Annual mean NO_2 concentrations within the existing Salisbury AQMAs may be adversely affected by this redistributed traffic, based on the ARN at the time.

4.3.101 Negative annual mean NO_2 impact score (Route option ranked 1 of 7) suggested potential positive net impact on air pollutant concentrations at human receptors (e.g. residential properties, schools and hospitals) as a result of Route Option F010, primarily due to the re-routing of the existing A303 around Winterbourne Stoke (as for all D options) as well as Amesbury.

4.3.102 The model results suggest this route option would result in an absolute reduction in the volume of traffic which uses the A303 compared to the Do-Minimum scenario (by approximately -2,500 AADT). This traffic was modelled to be displaced across a large number of alternative routes, however as this assessment only considered the ARN defined in accordance with DMRB criteria, the full extent of this displacement and associated impacts may not be fully captured in this assessment.

4.3.103 The results of this assessment are inherently limited by the assumptions and limitations of the traffic data on which the assessment is based, which are likely to be significant at this stage given the relative simplicity and coarseness of the traffic model employed in advance of the Local Traffic Model being available.

4.3.104 Change in area of designated ecological sites (e.g. SSSIs, SACs, SPAs and Ramsar sites, for which the designated features are sensitive to air pollutants) within 200m of Route option (Route Option F010 ranked 3 of 7) indicated a net beneficial effect on designated ecological sites due to the realignment of the existing A303. The Yarnbury Castle SSSI however may be adversely affected.

4.3.105 Overall assessment score: It was not considered appropriate or feasible to balance potential adverse and beneficial effects for the wide range of receptors considered under this topic heading. There are considerable differences between the receptors, both in terms of their characteristics (human receptors, designated ecological sites, AQMAs and Stonehenge Lichen) and the methods of assessment applied in each case. Furthermore, there was no clear guidance as to what weight should be attributed to one factor when considered against another. Therefore an overall air quality topic score was not provided as part of the Design Fix C assessment.

Greenhouse gases

4.3.106 Environmental impacts assessed: Capital Carbon (as a factor of Route option length, length of any tunnel, number of structures), and User Carbon (Quantified emissions, length, number of junctions, and gradient)[16].

4.3.107 For Route Option F010, the traffic model computes the lowest increase in user carbon emissions out of all options relative to the Do-Minimum scenario as it is the shortest of the F options. However, it has the greatest number of junctions of all options and the highest indicative gradients.

4.3.108 In terms of capital carbon, which is a secondary consideration in the overall conclusion of the carbon assessment, Route Option F010 was the best performing with the shortest length of new road construction and the lowest number of expected structures.

4.3.109 Overall assessment score: Although no industry guidance exists to assign levels of significance for greenhouse gas emissions at a project level, the Route Option F010 was assessed as having the least carbon impact of the Corridor F options and was the best performing.

Landscape

4.3.110 Environmental Receptors and/or assets assessed: Landscape Designations, Landscape Character and Visual Receptors.

4.3.111 Large adverse effects on both the Cranborne Chase and Wiltshire Downs AONB and the non-statutory locally designated SLA, detracting from the landscape of recognised quality and important characteristics or elements. Direct effects would be associated with the physical change and implementation of a new large-scale road corridor through the SLA that would include deep cuttings at the downland / valley interfaces and high structures or earthworks across the river valleys. Indirect effects would be on the setting of the northern edge of the AONB and across a large proportion of the SLA. Even with mitigation, it will not be possible to fully integrate the new road into the landscape. Some features will be partly or wholly destroyed or their settings affected.

4.3.112 A substantial number of visual receptors are likely to experience Moderate to Large Adverse Effects, with a number of residential properties, PRoW users and leisure/tourist destinations experiencing Beneficial Effects due to the closure of the existing A303. Overall, a moderate number of visual receptors are likely to experience Moderate Adverse Effects on their visual amenity, with the greatest proportion being users of PRoW and leisure/tourist destinations.

4.3.113 Overall assessment score: Route Option F010 was assessed as having a Large Adverse Effect on Landscape with adverse effects outweighing the potential for beneficial effects resulting from the closure of the existing A303 south of Stonehenge.

[16] The majority of the whole life carbon of a highway project is in the User carbon (tailpipe emissions), with the capital and operational carbon comprising a small component of the total emissions.

Historic environment

4.3.114 Environmental receptors and/or assets assessed: WHS, Scheduled Monuments, Listed Buildings, Registered Parks and Gardens, Conservation Areas, and non-designated assets.

4.3.115 The removal of the A303 from the entirety of the WHS was a substantial benefit for the WHS and a vast amount of individual scheduled monuments with the site. This substantial benefit to assets of national and international, national importance outweighs, in historic environment terms, the harm done to a number of designated assets, including scheduled monuments, listed buildings and conservation areas, outside of the WHS.

4.3.116 Route Option F010 would also result in the removal of known and potential archaeological remains along its length. Current analysis is based on readily available data and is not comprehensive. Further prospection and survey would undoubtedly identify more remains which would need to be assessed and addressed. The scale of works is however likely to be fundamentally similar to other major highways schemes.

4.3.117 The harm to the other assets does however weight slightly against the overwhelming benefits but the scheme was still felt to deliver a Large Beneficial Effect for the Historic environment (in accordance with the terminology employed in WebTAG 2015 guidance). This must be understood in the context of there being a limited number of high scoring adverse effects.

4.3.118 Overall assessment score: Route Option F010 was assessed as having a Large Beneficial Effect on the historic environment.

Biodiversity

4.3.119 Environmental Receptors and/or assets assessed: International, national, regional and local designations, priority habitats, woodlands and hedgerow

4.3.120 Subject to further design and more detailed assessment, potential significant effects were identified for the following ecological receptors:

- River Avon SAC.
- Salisbury Plain SAC.
- Salisbury Plain SPA.
- River Till SSSI.
- River Avon System SSSI.
- Parsonage Down SSSI.
- Parsonage Down NNR.
- Yarnbury Castle SSSI.
- Salisbury Plain SSSI.
- Porton Meadows SSSI.
- 7 x CWS and 1 x PRV.
- 15.69ha Priority Habitat.
- 18.29ha woodland.
- 11,521m hedgerow.

4.3.121 Route Option F010 was assigned an overall quantitative metric score of -36, reflecting the number and potential significance of effects identified for ecological receptors considered at this stage of the process.

4.3.122 All three F route options would have a great impact on habitat loss due to their longer lengths and the fact the route options are above ground for their entire lengths.

4.3.123 Route Option F010 is the shortest of the three F route options, passing between the villages of Great Durnford and Netton. Out of the three Corridor F route options it therefore has the least extent of total habitat loss as shown by the slightly lower figures for habitat loss for Priority Habitats, woodlands and hedgerows. The effects resulting from habitat loss such as severance and fragmentation, isolation/displacement of populations may therefore be on a lesser scale than the other F route options.

4.3.124 Overall assessment score: Route Option F010 was assessed as having a Large Adverse Effect on biodiversity

Water environment

4.3.125 Environmental Receptors and/or assets assessed: Flood Risk, Surface Water, Ground Water, Water Dependent Ecology, Cultural Heritage (Blickmead Spring).

4.3.126 Most of the effects associated with Route Option F010 (shading by bridges, increased flood risk and changes in flow volume and water quality in both groundwater and surface water) would be eliminated by mitigation and design. Route Option F010 crosses 2.4 km of SPZ 2 and this would require a project specific mitigation approach which is reflected in the score provided.

4.3.127 Overall assessment score: Route Option F010 was assessed as having a Large Adverse Effect on water environment.

Agriculture land use

4.3.128 Environmental receptors and/or assets assessed: proportion of BMV land affected and viability of farms.

4.3.129 For the Agricultural Land Use assessment, Route Option F010 was allocated an overall score of Large Adverse based on a worst case assessment of potential loss of BMV agricultural land amounting to approximately 250ha. It should be noted that this is considerably higher than all options within Corridor D, but lower than for Route Options F005 and F004. Route Option F010 crosses approximately 21,574m of agricultural land and was therefore also assessed as having a Large Adverse Impact on farm viability.

4.3.130 Overall assessment score: Route Option F010 was assessed as having a Large Adverse Effect on agriculture land use.

Land contamination

4.3.131 Environmental receptors and/or assets assessed: human health receptors, controlled waters receptors, property receptors, ecological receptors.

4.3.132 Anticipated impacts relate to the mobilisation of existing soil and groundwater contamination during construction to which human and other environmental receptors may be exposed. Four low risk sites have been identified where there would be the potential for Slight Adverse Impacts and four high risk sites where there is the potential for Large Adverse Impacts have been identified in the study area.

4.3.133 Overall assessment score: Route Option F010 was considered to be the second most preferable of the Corridor D and Corridor F options in terms of land contamination, on the basis that although all of the identified high risk sites are located within the assumed construction footprint they are 'off-line' of the anticipated alignment. There was therefore a low potential for contamination to have migrated into the footprint of the alignment and, as such, the financial and programme liabilities associated with remediation measures will be less onerous.

Materials

4.3.134 Environmental Receptors and/or assets assessed: potential for generation of arisings to occur and potential for beneficial use of materials.

4.3.135 Route Option F010 was assessed as generating a low quantity of arisings both before and after assuming that a percentage of those arisings could be used for cut and fill balance. Taking into account historical land use and the underlying geology, the route option was assessed as having high potential for use of excavated arisings within the scheme design.

4.3.136 The low quantities of excavated arisings may be reduced depending on the quantities of material needed for environmental mitigation and its suitability for this purpose. Any excavated material remaining that cannot be used onsite will need to be transported off-site to suitable destinations for beneficial use or disposal.

4.3.137 Potential contamination sources within the alignment may alter the characteristics of the material and may reduce its potential for beneficial use.

4.3.138 Overall assessment score: Route Option F010 was allocated score of Low, based on low generation of arisings after cut and fill, and high potential for beneficial use of those arisings.

4.4 Impact on society assessment

4.4.1 Table 4-4 shows the summary table of impact on society scores for Corridor F.

Table 4-4 Corridor F summary of impact on society scores

Assessment topic	F004	F005	F010
Commuting and Other users (£000, 2010 prices, discounted to 2010)	32,062	-20,916	76,544
Reliability impact on Commuting and Other users	Slight Beneficial	Slight Beneficial	Slight Beneficial
Physical activity	Slight Beneficial	Slight Beneficial	Slight Beneficial

Assessment topic	F004	F005	F010
Journey quality	Slight Adverse	Slight Adverse	Slight Adverse
Accidents (£000, 2010 prices, discounted to 2010)	38,639	39,388	36,368
Security	Neutral	Neutral	Neutral
Accessibility	Neutral	Neutral	Neutral
Affordability	Moderate Adverse	Moderate Adverse	Moderate Adverse
Severance	Large Adverse	Large Adverse	Large Adverse
Option and non-use values	Neutral	Neutral	Neutral

Commuter and Other Users

4.4.2 User benefits experienced by commuter and other users have been assessed in a similar manner to the business user benefits outlined in Section 3.2.

4.4.3 Estimated benefits for each of the Corridor F options are as follows:

- F004 - £32.062 million
- F005 - - £20.916 million
- F010 - £76.544 million

4.4.4 On this basis, Option F010 is preferred.

Reliability

4.4.5 The assessment of reliability (for all users) is provided in Section 3.2. As stated, route options in Corridor D are **slight beneficial** in respect of reliability.

Accidents

4.4.6 As noted, monetised accident impacts have been assessed using the COBALT software tool based on traffic model outputs. Corridor D options would provide an improved standard of highway which would reduce accident rates on this section of the A303. Further benefits are derived as a result of the reassignment of traffic from other routes with higher accident rates.

4.4.7 In overall terms, the Corridor D options were assessed as delivering approximately £36 million worth of accident savings.

Physical activity

4.4.8 All route options are classed as Slight Beneficial overall, as the removal of traffic from the existing A303 alignment will encourage walking and cycling and create a new direct car free Route option. All options will to some degree cause severance elsewhere on the network, which may have an adverse impact, with options within Corridor F causing greater severance.

Journey quality

4.4.9 In terms of journey quality, the three Route option would have Moderate Beneficial Effects in terms of traveller stress and Large Adverse Effects on traveller views. The overall score for journey quality for each of the route options is Slight Adverse.

Security

4.4.10 All route options are classed as neutral overall, although exact lighting and surveillance requirements have yet to be determined, so this may change at future stages.

Accessibility (Access to services)

4.4.11 All route options have been classed as neutral overall, as none of them will cause any substantial change in route options served by public transport.

Severance

4.4.12 In terms of severance of existing PRoW and severance of Communities, each of the route options are assessed as Large Adverse. As such an overall Large Adverse Effect on severance is scored for each of the route options.

Option Values

4.4.13 All route options have been classed as neutral overall, as none of them will cause any change in provision of public transport.

Affordability

4.4.14 All options within Corridor F are classed as Moderate Adverse, as while the reduction in congestion would have a Small Beneficial Impact on vehicle operating costs, this will be outweighed by the increase due to travelling further, with Route Option F010 having the shortest additional distance and Route Option F005 having the longest additional distance.

4.5 Distributional impact assessment

4.5.1 Table 4-5 shows the summary table for distributional impact scores for route options in Corridor F.

Table 4-5 Corridor F summary of distributional impacts scores

Assessment topic	F004	F005	F010
User benefits	Slight Beneficial	Slight Beneficial	Slight Beneficial
Noise	Slight Beneficial	Slight Beneficial	Slight Beneficial
Air quality	Slight Beneficial	Slight Beneficial	Slight Beneficial
Accidents	Slight Beneficial	Slight Beneficial	Slight Beneficial
Security	Neutral	Neutral	Neutral
Severance	Large Adverse	Large Adverse	Large Adverse
Accessibility	Neutral	Neutral	Neutral
Affordability	Moderate Adverse	Moderate Adverse	Moderate Adverse

User benefits

4.5.2 All route options have been classed as Slight Beneficial, as while there is likely to be an increase in vehicle operating costs for all options, this is likely to be outweighed by the reduction in journey times due to reduced congestion. While all options are classed as Slight Beneficial, Route Option F010 is expected to perform

slightly better, as the shorter Route Option distance will mean a lower increase in vehicle operating costs than for Route Options F004 or F005.

Noise

4.5.3 All options within Corridor F are classed as Slight Beneficial overall. These alignments would remove through traffic from Winterbourne Stoke, and so reduce noise impacts, but introduce new road alignments close to other settlements such as Upper, Middle and Lower Woodford, and Berwick St James, increasing noise impacts in these areas. Concentrations of children who would be particularly impacted by these changes have been identified in impacted areas for all alignments.

Air quality

4.5.4 All options within Corridor F are classed as Slight Beneficial overall. These alignments would remove through traffic from Winterbourne Stoke, and so reduce air quality impacts, but introduce new road alignments close to other settlements such as Upper, Middle and Lower Woodford, and Berwick St James, increasing air quality impacts in these areas. Concentrations of children who would be particularly impacted by these changes have been identified in impacted areas for all alignments.

Accidents

4.5.5 All route options are classed as Slight Beneficial overall, as the existing length of A303 is a high risk accident site and the new road alignment will have increased capacity and will be designed to improve safety. The removal of traffic from Winterbourne Stoke and reduction in traffic for some other local settlements may reduce the potential for conflict with vulnerable users, while the increase of traffic through some other settlements due to the route options within Corridor F may increase the potential for conflict with vulnerable users. Concentrations of children and older people who would be particularly impacted by these changes have been identified in impacted areas for all alignments.

Severance

4.5.6 All options within Corridor F are classed as Large Adverse, as while these options would remove through traffic from Winterbourne Stoke, they are introducing new road links close to other settlements such as Upper, Middle and Lower Woodford, and Berwick St James, creating community severance, and also causing severance at PRoWs in the area. Increases in traffic flows are forecast for a small number of adjacent road links which would increase severance within Durrington, Larkhill and Shrewton. Concentrations of children and older people who would be particularly impacted by these changes have been identified in impacted areas for all options.

Security

4.5.7 All route options are classed as neutral overall, although exact lighting and surveillance conditions on the Route option have yet to be determined, so this may change at future stages.

Accessibility

4.5.8 All route options have been classed as neutral overall, as none of them will cause any substantial change in route options served by public transport.

Affordability

4.5.9 All options within Corridor F are classed as Moderate Adverse, as while the reduction in congestion would have a Small Beneficial impact on vehicle operating costs, this will be outweighed by the increase due to travelling further, with Route Option F010 having the shortest additional distance and Route Option F005 having the longest additional distance. The scheme area does not include areas with high levels of income deprivation, but people on low incomes will still be impacted.

4.6 Public accounts assessment

4.6.1 All options will be publicly funded through Central Government. From the three Corridor F options, Route Option F010 performs the best in terms cost to the transport budget, and indirect tax revenues generated are marginally more than Route Option F004. **Overall the Route Option F010 is the best performing option in terms of net impact on public accounts.**

4.6.2 Cost to broad transport budget as output from TUBA in Present Value (2010 prices) for each option is:

- Route Option F004: £663million.
- Route Option F005: £957million.
- Route Option F010: £501million.

Indirect tax revenues

4.6.3 For each option, there would be an increase in indirect tax revenue paid to the exchequer as a result of an increase in journey lengths and hence a rise in fuel consumption.

4.6.4 The increase in indirect tax revenues as output from TUBA in Present Value (2010 prices) for each option is:

- Route Option F004: £59million.
- Route Option F005: £55million.
- Route Option F010: £56million.

4.7 Indicative PVB and PVC

Cost to private sector

4.7.1 It is anticipated that the project will be publically funded therefore the cost to the private sector is not applicable.

Indicative PVB and PVC

4.7.2 The increase in capacity, reduced congestion and journey time impacts will generate relatively small business and non-business user benefits. However, the surface dual carriageway options result in a longer Route option than the tunnelled options and therefore show reduced user benefits in comparison to the tunnelled options. Additionally, the relatively longer distance increases vehicle operating costs. The net impact is that relatively lower scheme costs of the corridor F options are outweighed by net negative business user benefits. The net impact results in negative benefits overall. Indicative scheme costs and benefits are summarised in Table 4-6.

Table 4-6 Corridor F summary of PVC and PVB (PV 2010, 2010 prices)

	F004	F005	F010
PVC	-£663.4m	-£957.4m	-£500.8m
PVB	-£58.2m	-£142.6m	+£22.6m

4.7.3 Benefits calculations presented here under-estimate journey time benefits as they only capture partially the full extent of benefits as they don't include weekend and summer month benefits. Additionally, the quantitative cost benefit analysis does not take into account the range of environmental and heritage benefits which a surface Route option outside of the WHS has.

4.8 Financial case assessment

Capital costs

4.8.1 Each of the Corridor F options has a lower capital cost that the Corridor D options and are therefore assessed as the better performing. Route Option F010 is the most affordable of the Corridor F route options with a Most Likely cost estimate of £966m. For Route Option F010, the Lower Bound estimate is £780m and the Upper Bound estimate is £1,402m.

4.8.2 The cost estimate ranges for the three Corridor F route options are shown in Table 4-7 below.

Table 4-7 Corridor F summary of option capital costs

	F004	F005	F010
Lower Bound	£944m	£949m	£780m
Most Likely	£1,076m	£1,082m	£966m
Upper Bound	£1,530m	£1,538m	£1,402m

Maintenance costs

4.8.3 As for capital costs, the Corridor F options are more affordable to operate and maintain than the Corridor D options. In lieu of estimates for operational and maintenance costs for the corridor F route options, appraisal of the F route options has been carried at a high level based on the relative scale of costs between the three options. Route Option F010, the shortest of the three options, it would have the lowest operating and maintenance costs and was therefore the best performing of the three Corridor F options. Route Option F005 was the poorest performing with its longer length.

4.9 Delivery case assessment

4.9.1 In terms of the practicality of delivering the Corridor F route options and any significant issues, all options could be delivered to acceptable, desirable minimum highway geometric standards with all options requiring two substantial bridge structures over the River Till and the River Avon.

4.9.2 The traffic management requirements on the existing A303 and other major roads would only be required at the tie-ins and at the new junctions with impact on the existing network likely to be minimal.

4.9.3 Route options within Corridor F have not had any environmental or geotechnical surveys undertaken to date. Collection of this data is likely to increase the scheme preparation phase by up to one year, meaning a likely start on site date of March 2021, which is beyond the aspiration to start on site by March 2020.

4.9.4 A construction programme for the Corridor F route options is estimated to range between approximately 2.5 to 3 years, with Route Option F010 requiring the least time with its shorter length.

Likely delivery agents

4.9.5 At the current stage of the project development, the delivery agents and funding sources are considered to be the same for all route options.

Stakeholder and public acceptability

4.9.6 As no public consultation has been undertaken at this stage, it is not possible to indicate if there is a public preference over the Corridor F route options. The nature of Corridor F is that, other than in the vicinity of Amesbury, the area is homogenous in terms of settlement pattern, plot sizes and land uses so it is not clear that other than to individual landowners and residents that any Route option would be more or less likely to be supported or criticised than another.

4.9.7 Given the reduced construction programme, and reduced scale of construction relative to the other two route options, Route Option F010 was considered the best performing Route option against the delivery case.

National and local policy objectives

Table 4-8 Relevant policy objectives

Document	Relevant objectives	Further information
National policy alignment		
NPSNN	Networks with the capacity and connectivity and resilience to support national and local economic activity and facilitate growth and create jobs	The National Networks National Policy Statement (NNNPS) sets out the need for, and Government's policies to deliver, development of nationally significant infrastructure projects (NSIPs) on the national road and rail networks in England. It provides planning guidance for promoters of nationally significant infrastructure projects on the road and rail networks, and the basis for the examination by the Examining Authority and decisions by the Secretary of State.
	Networks which support and improve journey quality, reliability and safety	
	Networks which support the delivery of environmental goals and the move to a low carbon economy	
	Networks which join up our communities and link effectively to each other	
RIS1	Making the network safer	Target to reduce the number of people killed or seriously injured in accidents on the Strategic Road Network (SRN) by 40% by the end of 2020 against the 2005-2009 average baseline.
	Improving user satisfaction	Target to achieve 90% of respondents to the National Road User Satisfaction Survey who are very or fairly satisfied by March 2017.
	Supporting the smooth flow of traffic	Targets to ensure that 97% of the SRN is available to traffic, and that 85% of motorway incidents are cleared within one hour.
	Encouraging economic growth by working to minimise delay	Target to reduce average time lost per vehicle per mile.
	Delivering better environmental outcomes	Targets to reduce the impact of noise and to improve biodiversity. Additional performance indicators cover impacts on air quality, carbon dioxide, and greenhouse gas emissions.
	Helping cyclists, pedestrians and other vulnerable users	Aims to support the Government's aspiration to improve provision for cyclists, walkers and other vulnerable users on and around the SRN.

Document	Relevant objectives	Further information
Regional policy alignment		
Wiltshire Core Strategy	Strategic Objective 1: Delivering a thriving economy	Relevant key outcomes include: Wiltshire's tourism sector will have grown in a sustainable way, ensuring the protection and where possible enhancement of Wiltshire's environmental and heritage assets, including the delivery of new tourist accommodation and where appropriate the safeguarding of existing facilities.
	Strategic Objective 4: Helping to build resilient communities	Relevant key outcomes include: A positive contribution will have been made to help areas of social exclusion, especially access to essential services and local facilities in the rural areas, which will have been improved.
	Strategic Objective 5: Protecting and enhancing the natural, historic and built environment	Relevant key outcomes include: Where possible, development will have been directed away from our most sensitive and valuable natural assets, habitats and species, towards less sensitive locations. New development will have contributed to delivery of the Wiltshire Biodiversity Action Plan (BAP) targets and protected, maintained and enhanced BAP habitats and species, particularly within areas identified for landscape scale conservation. Good air quality will have been maintained and significant progress will have been made in treating areas of risk through the implementation of air quality management plans. The quality and quantity of Wiltshire's groundwater and surface water features will have been improved, helping to achieve the objectives of the Water Framework Directive. Features and areas of historical and cultural value will have been conserved and where possible enhanced, including the sensitive re-use of historical buildings where appropriate. Archaeological sites and features will have been adequately protected. The Stonehenge and Avebury WHS and its setting will have been protected from inappropriate development in order to sustain its outstanding universal value.
	Strategic Objective 6: ensuring that adequate infrastructure is in place to support our communities	Relevant key outcomes include: The provision of new or improved infrastructure will have been positively supported provided there is no detrimental environmental impact. Progress will have been made to ensure policies are helping to reduce greenhouse gas emissions associated with transport. Measures will have been implemented which reduce traffic delays and disruption, and improve journey time reliability on key route options. Safety for all road users will have been improved, the number of casualties on Wiltshire's roads reduced and the impact of traffic speeds in towns and villages mitigated. Access to local jobs and services will have been improved.

Document	Relevant objectives	Further information
		Strategic transport corridors within Wiltshire will have been safeguarded and, where appropriate, improved in a sustainable way.
Wiltshire LTP	Support economic growth	Relevant Strategic Objectives include: SO1: To support and help improve the vitality, viability and resilience of Wiltshire's economy and market towns SO4: To minimise traffic delays and disruption and improve journey time reliability on key route options SO10: To encourage the efficient and sustainable distribution of freight in Wiltshire SO16: To improve the resilience of the transport system to impacts such as adverse weather, climate change and peak oil
	Reduce carbon emissions	Relevant Strategic Objectives include: SO11: To reduce the level of air pollutant and climate change emissions from transport
	Contribute to better safety, security and health	Relevant Strategic Objectives include: SO8: To improve safety for all road users and to reduce the number of casualties on Wiltshire's roads SO9: To reduce the impact of traffic speeds in towns and villages SO14: To promote travel modes that are beneficial to health
	Promote equality of opportunity	Relevant Strategic Objectives include: SO5: To improve sustainable access to a full range of opportunities particularly for those people without access to a car SO15: To reduce barriers to transport and access for people with disabilities and mobility impairment
	Improve quality of life and promote a healthy natural environment	Relevant Strategic Objectives include: SO3: To reduce the impact of traffic on people's quality of life and Wiltshire's built and natural environment SO7: To enhance Wiltshire's public realm and streetscape SO18: To enhance the journey experience of transport users
Stonehenge, Avebury and Associated Sites WHS Management Plan	Aim 3: Sustain the OUV of the Stonehenge WHS through the conservation and enhancement of the Site and its attributes of OUV	Relevant policies include: Policy 3a – Manage the WHS to protect the physical remains which contribute to its attributes of OUV and improve their condition Policy 3c – Maintain and enhance the setting of monuments and sites in the landscape and their interrelationships and astronomical alignments with particular attention given to achieving an appropriate landscape setting for the monuments and the WHS itself

Document	Relevant objectives	Further information
	Aim 6: Reduce significantly the negative impacts of roads and traffic on the Stonehenge WHS and its attributes of OUV and increase sustainable access to the Stonehenge WHS.	Relevant policies include: Policy 6a – Identify and implement measures to reduce the negative impacts of roads, traffic and parking on the WHS and to improve road safety and the ease and confidence with which residents and visitors can explore the WHS
Swindon and Wiltshire LEP Strategic Economic Plan	Transport infrastructure improvements - we need a well-connected, reliable and resilient transport system to support economic and planned development growth at key locations	Relevant Priority Actions include: Deliver key road junction and infrastructure improvements to support economic and planned development growth Deliver a whole corridor approach to traffic management and maintenance on key route options to improve reliability and resilience
	Place shaping - we need to deliver the infrastructure required to deliver our planned growth and regenerate our City and Town Centres, and improve our visitor and cultural offer	Relevant Priority Actions include: Deliver infrastructure improvements to support economic growth, support higher value skilled employment and attract inward investment Develop a strong visitor economy resulting in new investment as well as increased trade, visitor spend and national and international staying visitors
Local policy alignment		
Wiltshire Core Strategy	Core Policy 4: Spatial strategy for the Amesbury Community Area	Scheme is located within Amesbury Community Area. Policy sets out allocations for employment and housing land in this area, and identifies existing Principal Employment Areas.
	Core Policy 6: Stonehenge	Scheme will have direct impact on Stonehenge WHS. CSRs include objectives to contribute to the setting and environment of both the Stonehenge monument and the wider WHS landscape. Policy sets out commitment to protecting WHS and criteria for new visitor facilities.
	Core Policy 59: The Stonehenge, Avebury and Associated Sites WHS and its setting	Scheme will have direct impact on Stonehenge WHS. CSRs include objectives to contribute to the setting and environment of both the Stonehenge monument and the wider WHS landscape. Policy sets out commitment to sustaining the Outstanding Universal Value of the WHS.

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Highways England creative job number S160569

Report No HA540039-HHJ-ZZZ-REP-ZZZ-010

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The Technical Assessment Report details the assessment of options leading up to consultation.