A303 Amesbury to Berwick Down

TR010025

7.4 Transport Assessment

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A303 Amesbury to Berwick Down

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TRANSPORT ASSESSMENT

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Table of contents

Table of Figures

Table of Tables

Appendices

Appendix 3.1: Scheme drawings

Appendix 5.1: Supply uncertainty log

Appendix 6.1: Hourly flow diagrams

Appendix 7.1: PIA study area

Appendix 8.1: WCHAR summary tables

Appendix 8.2: Maps of Public Rights of Way (PRoW)

Appendix 8.3: Supplementary consultation booklet, July 2018

Appendix 8.4: Maps of local cycle routes

Appendix 8.5: Assessment of Alternative Modes (PCF Stage 2) Technical Note

Appendix 9.1: Technical Note 022: Scheme Assumptions for DCO Construction Traffic Management Modelling

Appendix 9.2: Traffic flow diagrams showing the Annual Average Daily Traffic (AADT) in the construction scenarios

Foreword

The A303 Amesbury to Berwick Down scheme ("the Scheme") forms part of a programme of improvements for upgrading the A303/A358 corridor, improving this vital connection between the South West and London and the South East and including the upgrade of remaining single carriageway sections on the route to dual carriageway. This investment is stated as a priority project in the National Infrastructure Plan and Government's commitment is confirmed in the Road Investment Strategy (2015-2020). Subject to achieving an approved Development Consent Order ("DCO"), preliminary works are planned to start in 2020 with the main construction works following in 2021, and the Scheme is due to open to traffic in 2026.

Objectives for the Scheme have been formulated both to address identified problems and to take advantage of the opportunities that new infrastructure would provide. The objectives are defined by the Department for Transport ("DfT"):

a. **Transport** - To create a high quality reliable route between the South East and the South West that meets the future needs of traffic;

b. **Economic Growth** - To enable growth in jobs and housing by providing a free flowing and reliable connection between the South East and the South West.

c. **Cultural Heritage** - To help conserve and enhance the World Heritage Site and to make it easier to reach and explore; and

d. **Environment and Community** - To improve biodiversity and provide a positive legacy for nearby communities.

The objectives would be achieved by providing a high quality, two-lane dual carriageway on the A303 trunk road between Amesbury and Berwick Down in Wiltshire. The Scheme would resolve traffic problems and, at the same time, protect and enhance the Stonehenge, Avebury and Associated Sites World Heritage Site ("WHS"). The Scheme would be approximately 8 miles (13km) long and comprise the following key components:

a. A northern bypass of Winterbourne Stoke with a viaduct over the River Till valley;

b. A new junction between the A303 and A360 to the west of and outside the WHS, replacing the existing Longbarrow roundabout;

c. A twin-bore tunnel approximately 2 miles (3.3km) in length, past Stonehenge; and

d. A new junction between the A303 and A345 at the existing Countess roundabout.

Executive summary

The A303/A358 corridor is a vital transport connection between the South West and the South East of England. While most of the road is dual carriageway, there are still over 35 miles (56km) of single carriageway. These sections act as bottlenecks for users of the route and can result in congestion, particularly in the summer months and around school holidays. This can cause delays to traffic travelling between the M3 and the South West, of over an hour at the busiest times of the year. The A303 Amesbury to Berwick Down scheme is part of a wider package of proposals for the A303/A358 corridor designed to transform connectivity to and from the South West by creating a high-quality dual-carriageway along the corridor. This Transport Assessment has been produced to assess the impact of the Scheme on the strategic and local highway network, road safety and local sustainable modes of transport. It is submitted as part of the DCO application.

With regard to the local transport network, the Scheme aims to relieve the existing local highway infrastructure and allow more efficient network use by removing through traffic, re-connecting local communities, improving the efficiency of local journeys and encouraging sustainable and accessible travel choices. It will address congestion, connectivity, reliability, accessibility, capacity, safety and resilience issues currently experienced on the existing road network.

The Scheme

The Scheme would be approximately 8 miles (13km) long and comprise the following key components:

a. A northern bypass of Winterbourne Stoke with a viaduct over the River Till valley;

b. A new junction between the A303 and A360 to the west of and outside the WHS, replacing the existing Longbarrow roundabout;

c. A twin-bore tunnel approximately 2 miles (3.3km) in length, past Stonehenge; and

d. A new junction between the A303 and A345 at the existing Countess roundabout.

The Scheme has been subject to a Stage 1 Road Safety Audit (RSA). The findings of the RSA have been fully reviewed by qualified Designers. Audit recommendations have been accepted where appropriate Analysis has been undertaken into the effects of the Scheme on road safety in the local area and further afield. This has considered how the provision of a safer road design for the section of the A303 in question translates into a reduction in accident levels over a 60 year period. This analysis also considers the effects on accident levels of traffic diversions and travel patterns resulting from the Scheme, as some drivers will transfer onto routes with different accident rates to those routes that they are currently using. Local Personal Injury Accident data has also been interrogated to consider whether there are any potential safety risks in the areas where the Scheme will increase traffic levels. The analysis has concluded that the Scheme will have a positive, albeit reasonably limited, effect on road safety as a whole and is unlikely to result in any local road safety issues.

Highways England's South West Regional Transport Model (SWRTM) has been refined, updated, calibrated and validated to produce the "A303 Stonehenge SWRTM (DCO) model". This exercise has been undertaken in line with the Department for Transport WebTAG guidance, as well as guidelines produced during the development of the

Highways England Regional Traffic Models (RTMs). The model assesses neutral month morning, interpeak and evening peak periods. Given the specific issues on the A303 caused by holiday traffic, a busy period model has also been developed. This refined model provides the evidence base for Highways England's (the Applicant) Development Consent Order (DCO) application.

The "A303 Stonehenge SWRTM (DCO) model" is a strategic model which has been used to assess the effects of the Scheme in terms of traffic flows, including diversions as a result of the Scheme, and vehicle journey times. Additionally, two operational microsimulation models have been produced for the A303 and local road network in the vicinity of the Scheme.

Operational impacts

Traffic flows on the A303 are forecast to increase significantly between 2017 and 2041. Traffic flow increases on local roads are typically proportionally higher than on the A303 itself. A notable change between 2017 and the 2041 baseline scenario is the forecast increase in traffic on The Packway. With the A303 operating at capacity, trips being made in the area around the Scheme use alternative routes, with The Packway being the most attractive alternative.

The modelling shows that the introduction of the Scheme is forecast to result in increased traffic volumes using the A303 through increasing capacity, faster journey times and reducing delays. On the whole, this results in net reductions in traffic on local roads, although there are some increases as traffic diverts onto some routes to access the A303.

Journey times along the length of A303 between the A34 and A36 incorporating the Scheme are in the region of half an hour in both directions in all neutral month time periods in 2017, with journey times slightly higher in the eastbound direction in the AM peak, and westbound direction in the PM peak. In the busy day model, average journey times are around 10 minutes longer than the neutral peaks, and are forecast to increase by a further 10 minutes by 2041.

The addition of the Scheme will result in journey time savings of circa four minutes throughout most days, and an average of about 20 minutes across busy days. This demonstrates that the Scheme will deliver significant journey time benefits. The benefits will be most pronounced on busy days, where substantial journey time savings will result in journey times being comparable with the neutral month time periods, where there will be minimal congestion and delay.

Sensitivity testing has been undertaken considering higher levels of traffic growth and alternative local development scenarios. The results demonstrate that the Scheme will continue to provide journey time benefits and is resilient to potential increases in traffic flows.

The modelling shows little change in most local journey times as a result of the Scheme. There are expected to be benefits to journey times on The Packway due to traffic routeing via the A303 rather than using The Packway. There will also be journey time savings on the A345 southbound.

Sustainable transport

An HD42/17 Walking, Cycling and Horse Riding Assessment & Review (WCHAR) has been undertaken which sets objectives for the Scheme in terms of walking, cycling and horse riding, and sets out 'actions taken' or 'outcomes' related to these objectives, at DCO design stage.

The Scheme will cut across a number of existing Public Rights of Way (PRoWs) including Byways Open to All Traffic (BOATs), bridleways and public footpaths. Provision is made within the Scheme to maintain the existing function of the PRoWs with suitably located overbridges. The Scheme also includes new Non-Motorised User (NMU) routes to improve accessibility and connectivity for communities including Winterbourne Stoke and Amesbury.

The Scheme will not result in any changes to existing bus stops and will therefore have no direct impact on local bus routes. As a result, there will not be any material effect on local bus services that operators would need to respond to.

Construction

For the purposes of the EIA and the traffic assessment, two principal phases of the construction programme for the main works have been identified. These correspond to:

a. phase 1, when Winterbourne Stoke bypass, Longbarrow junction and Countess roundabout flyover are under construction (likely 2021-2023); and

b. phase 2, when the construction of the tunnel is the primary construction activity (2024 onwards). The Winterbourne Stoke bypass, Longbarrow junction and Countess roundabout flyover constructed in phase 1 would be operational.

The construction plan will be refined through detailed design of the Scheme with appropriate regard to reducing the overall impacts during construction.

The modelling shows that phase 1 of the construction programme has a greater traffic impact than phase 2, which follows a similar pattern but with lower magnitude of impacts. This is because the Winterbourne Stoke bypass, Longbarrow junction and Countess roundabout flyover will be in place in phase 2.

There is a forecast minor reduction in traffic flows on the A303 during construction phase 1 due to the traffic management measures on the A303 and at Longbarrow junction and Countess roundabout. There is forecast to be a corresponding increase in traffic on local alternative routes and wider routes including the M4. Generally these are modest increases dispersed over a wide area with no individual route experiencing more than a 5% or 200pcu increase in daily traffic volume.

There will be increases in journey times as a result of the Scheme construction. However, these increases are of an acceptable level, particularly considering that these impacts will be limited to phase 1 and recognising the significant journey time benefits which will be provided by the Scheme when it is operational. Furthermore, the modelling has demonstrated that the increases in journey times will not result in unacceptable increases in traffic on alternative routes.

The A303 Amesbury to Berwick Down scheme has been the subject of extensive design and analysis work which forms the basis of this DCO application, much of which has been

summarised in this Transport Assessment. There are major strategic benefits in that it is part of a wider package of proposals for the A303/A358 corridor designed to transform connectivity to and from the South West by creating a high-quality dual-carriageway along the corridor.

The Scheme aligns with local and national planning policy and guidance, provides road safety benefits, has traffic flows and journey time benefits on the A303 and local road network, and does not result in unacceptable transport impacts on either the local or strategic road networks. The needs of non-motorised users have been fully incorporated into scheme design and treatment of Public Rights of Way result in improvement to amenity.

1 Introduction

1.1 Purpose

1.1.1 The A303 Amesbury to Berwick Down scheme is part of a wider package of proposals for the A303/A358 corridor designed to transform connectivity to and from the South West by creating a high-quality dual-carriageway along the corridor. The purpose of this Transport Assessment (TA) is to assess the impact of the Scheme on the strategic and local highway network, road safety and local sustainable modes of transport. It is submitted as part of the DCO application.

1.1.2 The TA links to, and summarises, many other key pieces of technical work undertaken as part of this project. These are appended or referenced where appropriate. The TA is designed to communicate the findings of this technical work which are relevant to the consideration of the DCO application.

1.2 Background

1.2.1 The A303/A358 corridor is a vital transport connection between the South West and the South East of England. While most of the road is dual carriageway, there are still over 35 miles (56km) of single carriageway. These sections act as bottlenecks for users of the route and can result in congestion, particularly in the summer months and around school holidays. This can cause delays to traffic travelling along the A303 through the Stonehenge area of over an hour at busiest times of the year and even greater for traffic travelling between the M3 and the South West.

1.2.2 The existing A303 passes through the Stonehenge section of the Stonehenge, Avebury and Associated Sites WHS passing approximately 165 metres from the Stonehenge monument itself (hereafter referred to as the Stones). The WHS comprises two distinct components – Avebury to the north and Stonehenge to the south. The Scheme crosses the Stonehenge component only and all subsequent references to “the WHS” refer to the Stonehenge component.

1.2.3 Objectives for the Scheme have been formulated both to address identified problems and to take advantage of the opportunities that new infrastructure would provide. The objectives are defined by the Department for Transport (“DfT”):

a. **Transport** - to create a high quality reliable route between the South East and the South West that meets the future needs of traffic;

b. **Economic Growth** - to enable growth in jobs and housing by providing a free flowing and reliable connection between the South East and the South West.

c. **Cultural Heritage** - to help conserve and enhance the World Heritage Site and to make it easier to reach and explore; and

d. **Environment and Community** - to improve biodiversity and provide a positive legacy for nearby communities.

1.3 Scheme description

1.3.1 The Scheme would be approximately 8 miles (13km) long and comprise the following key components:

a. A northern bypass of Winterbourne Stoke with a viaduct over the River Till valley;

b. A new junction between the A303 and A360 to the west of and outside the WHS, replacing the existing Longbarrow roundabout;

c. A twin-bore tunnel approximately 2 miles (3.3km) long, past Stonehenge; and

d. A new junction between the A303 and A345 at the existing Countess roundabout.

1.3.2 For the purposes of describing the Scheme in more detail, we have divided it into three sections as shown on Figure 1-1 below.

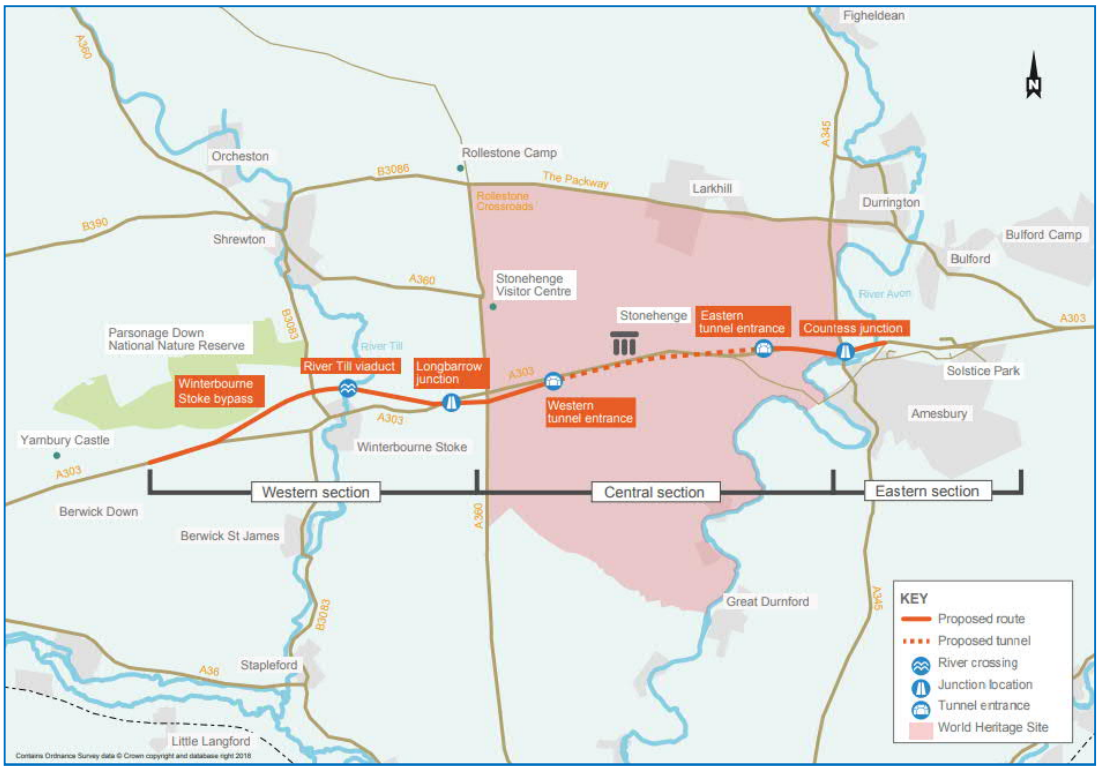


Figure 1-1: Scheme sections, A303[1]

[1] Source: Figure 5.1 Stonehenge Public Consultation Booklet (February 2018)

1.4 Selection of the Scheme

1.4.1 The process of options identification and route selection leading to the Scheme is summarised below. The process was split into the stages shown in Figure 1-2.

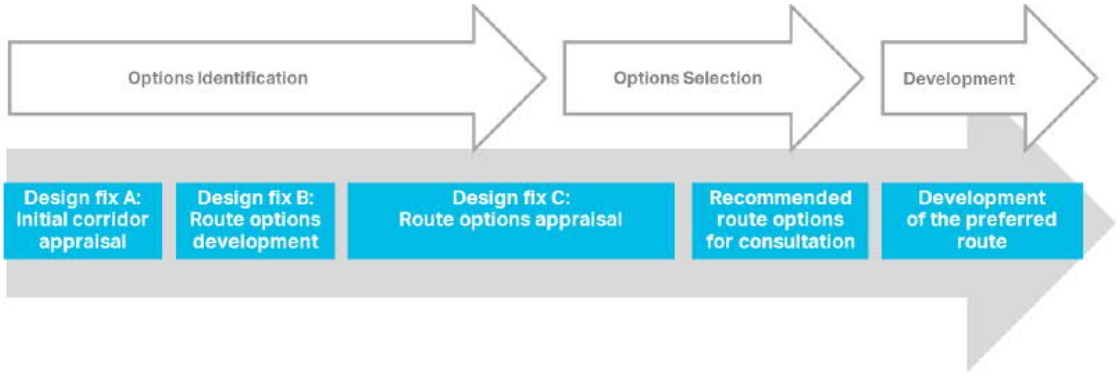


Figure 1-2: Option identification and selection process

Options identification

1.4.2 The process followed the following stages:

a. identification and initial sifting of corridors (Stage 1);

b. design development of route options within preferred corridors (Stage 2);

c. route options appraisal and sifting to identify options to take forward for further appraisal (Stage 3);

d. the selection of two preferred routes, which were taken to non-statutory public consultation (more details in section 1.5 below) in January/March 2017 (Stage 4); and

e. the selection of a Preferred Route which was announced by the Secretary of State in September 2017 and which forms the basis of the Scheme (Stage 5).

1.4.3 Full details of the options identification and selection process, along with the development of the Preferred Route can be found in the Scheme Assessment Report (Ref 3.4) available at: **www.highways.gov.uk/A303Stonehenge/consultation.** More detailed information specifically on the alternative options considered can be found in Chapter 3 of the Environmental Statement – Alternatives (Application Document 6.1).

1.5 Consultation

1.5.1 Non-statutory public consultation on two route options, Option '1N' and Option '1S' took place between 12 January and 5 March 2017 to inform the Preferred Route Announcement for the Scheme. Both options involved a 2.9km tunnel, but with northern and southern options to bypass Winterbourne Stoke. The purpose of this consultation was to seek feedback from the stakeholders, including the local community, on the two options identified via the options identification and selection process.

1.5.2 The responses to this consultation were considered in identifying the Preferred Route as documented in the Preferred Route Announcement booklet[2] and the February 2018 Consultation Booklet[3] and the Consultation Report (Application Document 5.1).

1.5.3 The Preferred Route (developed from Option 1Nd during the January/March 2017 consultation) was the route which received greater public support, and performed better from a heritage, landscape and biodiversity perspective, and provides greater potential for impacts to be mitigated than the other options. It also performed better in the engineering assessment predominantly due to it being a slightly shorter route.

1.5.4 Following consideration of the responses to the non-statutory consultation, the recommendations of the second UNESCO/ICOMOS advisory mission and after undertaking additional surveys and assessments, Highways England identified the preferred route for the scheme. This was announced by the Secretary of State for Transport on 12 September 2017.

1.5.5 To communicate the announcement of the preferred route, Highways England undertook activities such as; public information events, advertising via the website and social media, along with a press release.

1.5.6 Confirmation of the preferred route enabled further design development to take place, so that more detailed scheme proposals could be put forward for statutory consultation in early 2018.

1.5.7 The option was modified further, and the route through the western part of the WHS altered, to take into account the consultation responses from the 2017 consultation. The western portal was moved closer to the existing A303 to mitigate impacts on archaeology, the winter solstice alignment and the RSPB reserve at Normanton Down. This option forms the basis of the Scheme.

1.5.8 The statutory consultation for the project was planned to be held from Thursday 8 February 2018 to 6 April, however, this was extended to 23 April to account for the cancellation of some events in March due to heavy snow in Wiltshire. The consultation period enabled the public to review the draft proposals and provide feedback in the Public Consultation Booklet – February 2018.

1.5.9 See the Consultation Report (Application Document 5.1) for more information on the consultation process and scheme development.

1.5.10 In addition to the non-statutory public consultation, ongoing engagement has taken place between the project team and key stakeholders, including local landowners, Wiltshire Council, environmental bodies and heritage groups.

1.5.11 Engagement with Wiltshire Council has been undertaken at key stages:

a. during the statutory consultation where they provided a response, included in the Consultation Report submitted with the application (Application Document

[2] https://highwaysengland.citizenspace.com/cip/a303-stonehenge/results/moving-forward---the-preferred-route.pdf
[3] https://highwaysengland.citizenspace.com/he/a303-stonehenge-2018/supporting_documents/Digital%20consultation%20booklet_v2.pdf

5.1) which has been carefully considered and comments taken on board during finalising of the design; and

b. the scope of this Transport Assessment was drafted and circulated to Wiltshire Council for comment before commencement of the report. A response was received on 21st May 2018.

1.6 Supplementary consultation

1.6.1 As a result of the feedback received during the February 2018 consultation, a number of changes were made resulting in a supplementary consultation to be undertaken. These were:

a. to remove the previously proposed link between Byways 11 and 12 in the Stonehenge World Heritage Site;

b. to widen the green bridge proposed near the existing Longbarrow roundabout;

c. to move the proposed modification of Rollestone crossroads; and

d. to clarify the Public Rights of Way proposals along the Scheme.

1.6.2 Tables 3.7 to 3.17 of the Environmental Statement Chapter 3 – Alternatives (Application Document 6.1), take into account the consultation feedback and the effects of the development on the environment.

1.6.3 Full details of the supplementary consultation is available at: https://highwaysengland.citizenspace.com/cip/a303-stonehenge-consultation-july-2018/

1.7 Funding and delivery

1.7.1 The Road Investment Strategy (RIS), setting out government policy, explains the intent to fund investment in the Scheme as explained further in the funding statement (Application Document 4.2).

1.8 Report structure

1.8.1 To follow this introduction:

a. **Chapter Two** – discusses the policy relevant to the Scheme and subsequent compatibility;

b. **Chapter Three** – provides details of the Scheme and its development to the preferred options, including the Scheme design;

c. **Chapter Four** – sets out the base model development for both the strategic and operational models, baseline data and current network performance;

d. **Chapter Five** – provides an overview of the forecast model development;

e. **Chapter Six** - presents and summarises the assessment of the traffic impacts using the strategic and operational models;

f. **Chapter Seven** - summarises the existing road safety performance within the study area and assesses the impact of the Scheme on road safety, along with

personal injury accident analysis and accident predictions based on COBALT analysis;

g. **Chapter Eight** – describes accessibility by and impact of the Scheme on local sustainable modes of transport. This includes the treatment of PRoWs as part of the Scheme;

h. **Chapter Nine** – introduces the traffic management plan and summarises the assessment of traffic impacts of the Scheme during construction; and

i. **Chapter Ten** – provides the conclusions to the assessment of the preferred Scheme.

2 Planning policy

2.1 Introduction

2.1.1 This section sets out the relevant national, regional and local transport and planning policy which has been reviewed with a view to establishing the policy context of the Scheme. Other relevant strategies and guidance are also considered.

2.2 National planning policy and guidance

National Networks National Policy Statement

2.2.1 The *National Policy Statement for National Networks* (NPSNN) was presented to Parliament in December 2014 and designated as policy in January 2015. It sets out the need for and the 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 those promoting NSIPs and is used as the basis for the examination of Development Consent Order applications for NSIPs.

2.2.2 Section 2 of the NPSNN sets out the Government's vision, objectives and therefore need for the delivery and improvement of national networks that meet the UK's long term needs. It states that this means networks:

a. with the capacity and connectivity and resilience to support national and local economic activity and facilitate growth and create jobs;

b. which support and improve journey quality, reliability and safety;

c. which support the delivery of environmental goals and the move to a low carbon economy; and

d. which join up our communities and link effectively to each other.

2.2.3 Section 3 provides the Government's wider policy on the national networks. Paragraph 3.17 states that there is a role for the national road network to play in helping pedestrians and cyclists and expects NSIP promoters to identify 'opportunities to invest in infrastructure in locations where the national road network severs communities and acts as a barrier to cycling and walking'.

2.2.4 Paragraph 3.19 also highlights the Government's commitment to 'creating a more accessible and inclusive transport network' and expects NSIP promoters 'to take account of accessibility requirements of all those who use, or are affected by, national networks infrastructure including disabled users'.

2.2.5 Paragraph 3.10 expects NSIP promoters to take opportunities to improve road safety including introducing the most modern and effective safety measures where proportionate. There is also further detail regarding safety requirements in section 4.

2.2.6 Paragraph 4.64 expects schemes to be consistent with the "as was" Highways Agency's (now Highways England's) Safety Framework for the Strategic Road Network and with the national Strategic Framework for Road Safety and that schemes should have taken all reasonable steps to:

a. minimise the risk of death and injury arising from their development;

b. contribute to an overall reduction in road casualties;

c. contribute to an overall reduction in the number of unplanned incidents; and

d. contribute to improvements in road safety for walkers and cyclists.

2.2.7 Section 5 of the NPSNN sets out the Government's planning guidance on the generic impacts of national networks NSIPs. Paragraphs 5.201 to 5.218 explain how the impacts that national networks NSIPs have on wider transport networks and of construction sites on these networks whilst an NSIP is being developed should be considered by NSIP promoters and the decision maker for Development Consent Order applications.

2.2.8 Paragraph 5.202 states that 'development of national networks can have a variety of impacts on the surrounding transport infrastructure including connecting transport networks. Impacts may include economic, social and environmental effects. The consideration and mitigation of transport impacts is an essential part of Government's wider policy objectives for sustainable development'.

2.2.9 In assessing the impacts of NSIPs on the wider transport network and also when being constructed, paragraph 5.203 and 5.204 expect policies set out in local plans to be taken into account and that consultation with the relevant highway authority, and local planning authority, as appropriate, is undertaken on the assessment of transport impacts. Paragraph 5.212 also adds that schemes should be developed and options considered taking into account local models where appropriate.

2.2.10 There is also expectation that consideration should be given to providing reasonable opportunities to support other transport modes in developing infrastructure and also that reasonable endeavours have been used to address any existing severance issues that act as a barrier to non-motorised users.

2.2.11 Paragraph 5.215 identifies that mitigation measures for the impact of schemes on transport networks should be proportionate and reasonable, focused on promoting sustainable development. Paragraph 5.216 expects that 'where development will worsen accessibility such impacts should be mitigated so far as reasonably possible. There is a very strong expectation that impacts on accessibility for non-motorised users should be mitigated.'

National Planning Policy Framework, July 2018

2.2.12 The *National Planning Policy Framework* (NPPF) sets out the Government's national economic, environment and social planning policies and its strategy for sustainable development. The 2018 version of the NPPF features a number of changes from the earlier 2012 version as a result of implementing more recent policy change.

2.2.13 The framework supports economic growth stating that one of the core planning principles set out in the NPPF is to *'proactively drive and support sustainable economic development to deliver the homes, business and industrial units, infrastructure and thriving local places that the country needs'*.

2.2.14 The NPPF expects the planning system to support sustainable economic growth and specifically with regard to transport, promotes sustainable transport depending on the nature and location of the development site and supports development which achieves 'reductions in greenhouse gas emissions and reduce congestion' and provides safe and suitable access for all people.

2.2.15 Within Section 9, Paragraph 102 indicates 'transport issues should be considered from the earliest stages of plan-making and development proposals, so that:

a. the potential impacts of development on transport networks can be addressed;

b. opportunities from existing or proposed transport infrastructure, and changing transport technology and usage, are realised – for example in relation to the scale, location or density of development that can be accommodated;

c. opportunities to promote walking, cycling and public transport use are identified and pursued;

d. the environmental impacts of traffic and transport infrastructure can be identified, assessed and taken into account – including appropriate opportunities for avoiding and mitigating any adverse effects, and for net environmental gains; and

e. patterns of movement, streets, parking and other transport considerations are integral to the design of schemes, and contribute to making high quality places.

Planning Practice Guidance (published 2014)

2.2.16 The Government's Planning Practice Guidance provides advice on when Transport Assessments and Transport Statements are required, and what they should contain.

2.2.17 It states that the '*key issues to consider at the start of preparing a Transport Assessment or Statement may include:*

a. the planning context of the development proposal

b. appropriate study parameters (i.e. area, scope and duration of study)

c. assessment of public transport capacity, walking/cycling capacity and road network capacity

d. road trip generation and trip distribution methodologies and/ or assumptions about the development proposal

e. measures to promote sustainable travel

f. safety implications of development; and

g. mitigation measures (where applicable) – including scope and implementation strategy'

2.2.18 The guidance also identifies the importance of considering cumulative impacts arising from other committed development.

Circular 02/13, the strategic road network and the Delivery of Sustainable Development

2.2.19 Following the withdrawal, in October 2014, of The Department for Transport Document *Guidance on Transport Assessment* (March 2007), guidance on the preparation of supporting documentation in highway assessment terms is now provided in the Planning Practice Guidance (PPG) suite of documents and in particular in "Travel Plans, Transport Assessments and Statements in decision taking"[4].

2.2.20 Circular 02/13, published in September 2013, is the response to the changes brought about by the Localism Act 2011 and the NPPF, which established a new remit for Highways England (HE) to promote sustainable development. Circular 02/13, explains how HE will engage with the planning system. It also maintains how HE will fulfil its remit to be a delivery partner for sustainable economic growth while maintaining, managing and operating a safe and efficient Strategic Road Network (SRN)[5].

2.2.21 The circular refocused the role of the SRN towards enabling and supporting development and growth, seeking to create the conditions in which the barriers to opportunity were removed to offer greater certainty to Local Planning Authorities when working on development of their Local Plans.

Transport Investment Strategy 2017

2.2.22 The Transport Investment Strategy (TIS) was published by the DfT in July 2017. The TIS seeks to:

a. create a more reliable, less congested, and better connected transport network that works for the users who rely on it;

b. build a stronger, more balanced economy by enhancing productivity and responding to local growth priorities;

c. enhance our global competitiveness by making Britain a more attractive place to trade and invest; and

d. support the creation of new housing.

2.2.23 The TIS notes that good progress is being made on tackling the most notorious bottlenecks on the strategic road network, including the A303.

National Infrastructure Delivery Plan 2016-2021

2.2.24 The *National Infrastructure Delivery Plan* 2016 (NIDP), published in March 2016, states in its Executive Summary that:

[4] Travel Plans, Transport Assessments and Statements in decision taking - Planning Practice Guidance - http://planningguidance.communities.gov.uk/blog/guidance/travel-plans-transport-assessments-and-statements-in-decisiontaking/
transport-assessments-and-statements/ accessed 25 May 2016

[5] The Strategic Road Network is the network of motorways and trunk roads in England for which Highways England is responsible.

'Infrastructure is the foundation upon which our economy is built. The government remains determined to deliver better infrastructure in the UK to grow the economy and improve opportunities for people across the country'.

2.2.25 The NIDP highlights the Government's commitment to invest over £100 billion by 2020-21. In terms of priorities to 2020-21, the A303 Amesbury to Berwick Down Scheme is identified as a key project and long term programme for the A303/A358 Corridor to transform the route into dual carriageway extending to within 15 miles of Land's End (Paragraph 3.12). It also identifies work to unblock the most notorious traffic hotspots including the A303 as part of the £12.6bn allocated to the infrastructure pipeline to 2020-2021 (Chapter 2 Roads Infographic).

Road Investment Strategy: for the 2015/16 – 2019/20 Road Period (published March 2015)

2.2.26 The Government's *Road Investment Strategy* for the 2015/16 – 2019/20 Road Period (RIS1) published in March 2015 sets out the Government's investment plan for long term investment in the road network, and particularly the strategic road network. The Strategic Vision for the next 25 years is to '*revolutionise our roads to create a modern SRN that supports a modern Britain*.' As part of the Strategic Vision, the RIS sets out that Highways England is expected to:

'Make the network safer and improve user satisfaction, while smoothing traffic flow and encouraging economic growth. We want to see [Highways England] delivering better environmental outcomes and helping cyclists, walkers, and other vulnerable users of the network at the same as time as achieving real efficiency and keeping the network in good condition.'

2.2.27 Pages 12 to 16 of the Strategic Vision recognise that the Strategic Road Network has a vital role to play in delivering the Government's goals for national networks. The Strategic Vision sets out that the strategic road network is vital to British businesses and local and national economies, but that capacity problems leading to increased congestion have become a major issue. It recognises that the strategic road network has a good safety record and provides the lifeline for the logistics of everyday life, but that congestion is having a major effect on reliability.

2.2.28 The Strategic Vision acknowledges that the Strategic Road Network links people, places, and different transport modes, but that busy roads can generate noise, and sever access in towns and villages, impeding cyclists and walkers. It also confirms that improved construction standards and better road design can improve the aesthetic appearance of the network, mitigate biodiversity impacts and reduce the effect on the built and natural environment.

2.2.29 The RIS identifies three major improvements, as part of a total A303/A358 corridor package of commitments, one of which is the Scheme. The other two schemes are the A303 Sparkford to Ilchester dualling and the A358 Taunton to Southfields dualling.

2.2.30 The RIS1 recognises that the A303 corridor needs to be improved as it has over 35 miles of single carriageway with these sections constraining users of the route resulting in congestion, particularly in the summer months and at weekends, generating driver delay and the risk of accidents. In addition the sensitivity of the environment along this corridor means that the road currently limits the wider

enjoyment of the surrounding area, in particular the setting of nationally designated heritage assets.

2.3 Local planning policy and guidance

Wiltshire Core Strategy (WCS), January 2015

2.3.1 The Wiltshire Council Core Strategy Development Plan Document was adopted in 2015 and as part of its plans to deliver an Amesbury Area Strategy, it highlights that there is a need to overcome the problems experienced along the A303 by dualling it along its length and that Wiltshire Council 'will work collaboratively with agencies, such as the Highways Agency, the Department for Transport and English Heritage to try to achieve an acceptable solution to the dualling of the A303 that does not adversely affect the Stonehenge World Heritage Site and its setting'.

2.3.2 The wider strategic objectives of the Wiltshire Core Strategy also highlight the need to deliver a thriving local economy and ensure that infrastructure is in place to support communities.

2.3.3 Specifically in relation to transport impacts of development, Core Policy 62 Development impacts on the transport network expects appropriate mitigating measures to be provided to '*offset any adverse impacts on the transport network at both the construction and operational stages'.*

2.3.4 Core Policy 66 Strategic transport network supports the development and improvement of the strategic transport network to support the objectives and policies in the Core Strategy and Local Transport Plan.

2.3.5 The policy also protects land required for improvements on the strategic transport network which support the objectives and policies in the Core Strategy from inappropriate development.

Wiltshire Local Transport Plan 3 (LTP3), 2011 – 2026

2.3.6 The *Wiltshire Local Transport Plan* sets out the Council's objectives, plans and indicators for transport in Wiltshire. The third Wiltshire Local Transport Plan (LTP3) covers the period from March 2011 to March 2026. The LTP3 Strategy was published in March 2011. The vision for transport for Wiltshire is:

"To develop a transport system which helps support economic growth across Wiltshire's communities, giving choice and opportunity for people to safely access essential services. Transport solutions will be sensitive to the built and natural environment, with a particular emphasis on the need to reduce carbon emissions."

2.3.7 LTP3 sets out 18 goals. Those most appropriate to the A303 Amesbury to Berwick Down Scheme are set out below:

a. SO3: to reduce the impact of traffic on people's quality of life and Wiltshire's built and natural environment;

b. SO4: to minimise traffic delays and disruption and improve journey time reliability on key routes;

c. SO6: to make the best use of the existing infrastructure through effective design, management and maintenance;

d. SO8: to improve safety for all road users and to reduce the number of casualties on Wiltshire's roads;

e. SO9: to reduce the impact of traffic speeds in towns and villages;

f. SO15: to reduce barriers to transport and access for people with disabilities and mobility impairment;

g. SO17: to improve sustainable access to Wilshire's countryside and provide a more useable public rights of way network; and

h. SO18: to enhance the journey experience of transport users.

2.3.8 Table 2-1 provides a summary of the Transport Assessment compliance to the policies stated within this section.

Table 2-1: A303 Amesbury to Berwick Down policy consideration

Policy Reference		Section Ref
NPSNN	Paragraph 5.212 - schemes should be developed and options considered taking into account local models where appropriate.	6.6 to 6.14 – Operational Performance (specifically 6.7 Longbarrow junction)
	Paragraph 5.216 - There is a very strong expectation that impacts on accessibility for non-motorised users should be mitigated.	8.4 Walking and cycling (PRoW)
NPPF	Section 9 promotes sustainable transport depending on the nature and location of the development site and supports development which achieves 'reductions in greenhouse gas emissions and reduced congestion' and provides safe and suitable access for all people.	6 - Network Performance; 7 - Road Safety; and 8 -Sustainable Transport
Circular 02/13	The role of the SRN is refocused towards enabling and supporting development and growth, seeking to create the conditions in which the barriers to opportunity were removed.	3 - Development Proposals; and 8 - Sustainable Transport
TIS	Create a more reliable, less congested, and better connected transport network that works for the users who rely on it.	6 - Network Performance
NIDP	Government's commitment to invest over £100 billion by 2020-21.	3.2 to 3.4 – Development Proposals
RIS	Identifies three major improvements, as part of a total A303/A358 corridor package of commitments.	3.2 to 3.4 – Development Proposals
WCS	Core Policy 62 Development impacts on the transport network.	6 - Network Performance
Wiltshire	SO4: To minimise traffic delays and disruption	6 - Network

Policy Reference		Section Ref
LTP3	and improve journey time reliability on key routes.	Performance
	SO6: To make the best use of the existing infrastructure through effective design, management and maintenance.	3.3 to 3.4 – Development Proposals; 6.6 to 6.13 – Operational Performance
	SO8: To improve safety for all road users and to reduce the number of casualties on Wiltshire's roads.	7.4 – COBALT Assessment
	SO9: To reduce the impact of traffic speeds in towns and villages.	6.5 to 6.15 Journey Times and Operational Performance and speeds
	SO15: To reduce barriers to transport and access for people with disabilities and mobility impairment.	8.3 Walking and cycling (PRoW)
	SO17: To improve sustainable access to Wilshire's countryside and provide a more useable public rights of way network.	8.3 Walking and cycling (PRoW)
	SO18: To enhance the journey experience of transport users.	6 – Forecast Network Performance

3 Development proposals

3.1 Overview

3.1.1 This section of the Transport Assessment illustrates the proposals for the A303 Amesbury to Berwick Down Scheme, which has been collated from the Design and Access Statement (Application Document 7.2).

3.1.2 The following sections of this Chapter provides more detail on the Scheme, which has been divided into the following sections and illustrated in Figure 1-1 in Chapter 1:

a. Western section - Winterbourne Stoke bypass to Longbarrow junction;

b. Central section - within the World Heritage Site; and

c. Eastern section - Countess junction to just beyond the Solstice Park junction

3.1.3 The following paragraphs below describe the Scheme section by section from west to east.

3.2 Western section: Winterbourne Stoke bypass to Longbarrow junction

3.2.1 The western section of the Scheme is illustrated below in Figure 3-1 (And also contained in Appendix 3.1).

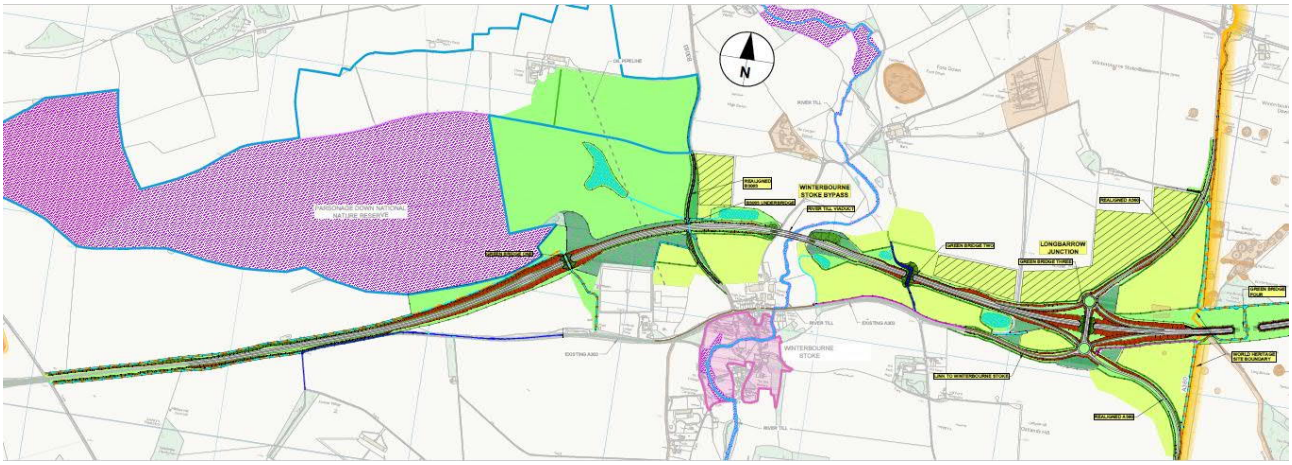


Figure 3-1 Western section of the Scheme

3.2.2 The Scheme would commence on the existing A303 approximately at Yarnbury Castle and would closely follow the existing A303 alignment, south of Parsonage Down NNR. It would then continue in a north easterly direction providing a bypass to the north of the village of Winterbourne Stoke.

3.2.3 A 'green bridge' would be constructed over the new A303 northwest of Scotland Lodge Farm near the southeast corner of Parsonage Down. This bridge would provide ecological and landscape connectivity across the Scheme and would form part of a non-motorised user (NMU) route and agricultural access route which would run from adjacent to a layby on the existing A303 to Parsonage Down and

Yarnbury Castle. An area east of Parsonage Down would be used to create chalk grassland habitat using excavated chalk material arising from construction.

3.2.4 Local access from Winterbourne Stoke, northwards towards Shrewton, would be provided by the B3083. This access would be maintained by the provision of a single span bridge to carry the new A303 over the B3083. The proposed new bridge would be located approximately 50m to the west of the existing B3083. This location would necessitate the realignment of some 400m of the B3083 but would enable the B3083 to be kept open to traffic throughout the construction period other than for discrete periods to allow short duration specific activities to be undertaken (e.g. construction of tie-ins etc.). The clear span of the bridge would accommodate both the re-aligned B3083 and a segregated verge on the east side to allow cattle movements and equestrian use across the new alignment. The minimum headroom would be 5.35m.

3.2.5 The Scheme would continue in an easterly direction, crossing the River Till valley on a new twin deck viaduct. The River Till viaduct would carry the proposed A303 over the River Till SAC and SSSI and its floodplain. The viaduct would be designed to minimise impacts on the river below while balancing other environmental considerations, such as landscape and visual impacts. It would be a twin deck structure, with each deck approximately 14m wide and 210m long, and with a gap of approximately 7m between the decks. The road level on the bridge would be approximately 10m above the River Till where it crosses the river channel. The location of the piers would not be within the SAC or SSSI and would allow the existing bridleway (WST04) from Winterbourne Stoke to remain at its current location. An environmental screen, approximately 1.5m in height, would be installed on the southern parapet to help screen vehicle movements from locations to the south.

3.2.6 A second green bridge at the Winterbourne Stoke Public Right of Way (PRoW) WST06B would maintain the existing PRoW over the new A303 alignment and as with other green bridges would provide for ecological and landscape connectivity across the Scheme.

3.2.7 Continuing to the east, the Scheme would cross the line of the existing A303 approximately 700m west of the existing A360 Longbarrow Roundabout. A new grade separated junction with the A360 is proposed to the west of the WHS boundary. This junction, known as the Longbarrow junction, would accommodate free-flowing traffic movements between the A360 and the A303. The junction would consist of two roundabouts connected by a short length of dual carriageway, carried over the A303 on a new green bridge with earth bunds on each side, to help mitigate visual impact and to provide ecological connectivity. The structure would be a single span bridge, with headroom of at least 5.35m. The roundabouts would be set below existing ground level.

3.2.8 Traffic lights would be required at the Longbarrow junction. The traffic lights could be used during both day and night. A link to the de-trunked A303 to the west,

accessing Winterbourne Stoke, would also be provided from the new Longbarrow Junction.

3.3 Central section: within the World Heritage Site

3.3.1 The central section of the Scheme is illustrated below in Figure 3-2 (and also contained in Appendix 3.1).

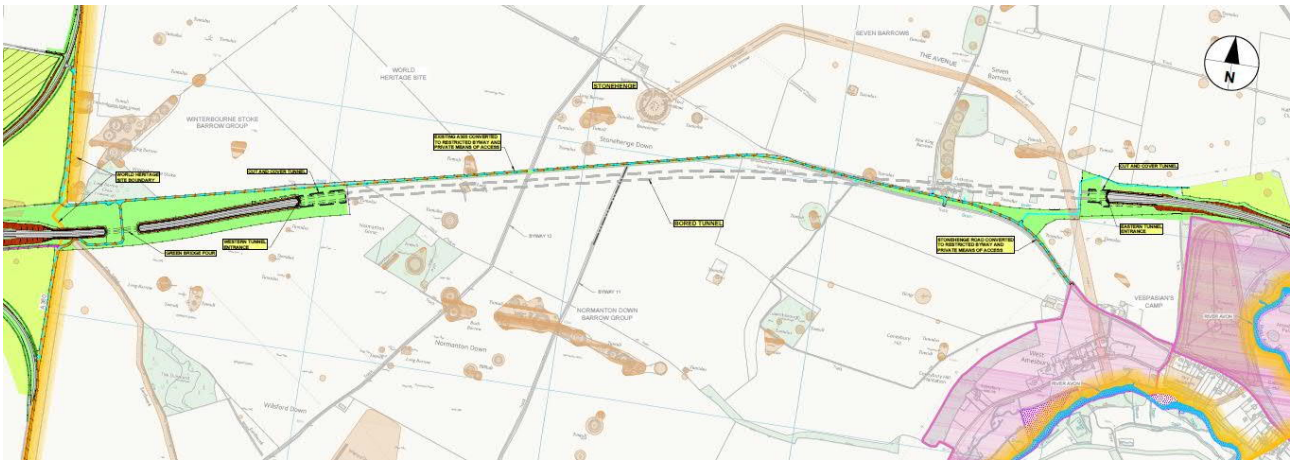


Figure 3-2: Central section of the Scheme

3.3.2 As the Scheme crosses the line of the existing A360, it would enter into the WHS where it then follows closely the line of the existing A303.

3.3.3 The proposed alignment over the first c.1.0km of this section would generally be in a cutting varying in depth between approximately 7m and 10m. Approximately 2.5m to the top of the cutting would have a 1 in 2 grassed slope. The bottom of the cutting would comprise vertical retaining walls.

3.3.4 Shortly after entering the WHS there would be a further green bridge (also known as a 'land bridge') that would be approximately 150m in length and would start approximately 150m from the western boundary of the WHS. In addition to an NMU route, this bridge would also provide visual and landscape connectivity between barrow groups to the north and south of the Scheme. The existing A303 through the WHS would be converted to a restricted byway.

3.3.5 The western tunnel portal would be located within the WHS, north west of Normanton Gorse, approximately 1.0km east of the existing Longbarrow roundabout and immediately to the south of the existing A303. The tunnel would commence with a fully grassed approximately 200m long over cut and cover tunnel before it becomes a bored tunnel. Tunnel service buildings would be located outside the tunnel portal.

3.3.6 The Scheme would then continue in tunnel in an easterly direction following an alignment that is broadly similar to the existing A303 but at a depth of up to approximately 50m.

3.3.7 The tunnel would be a twin-bore structure, approximately 2 miles (approximately 3.3 km) in length, and each tunnel bore would have an internal diameter of approximately 11.5m.

3.3.8 The two bores would be connected underground by a series of cross passages at regular intervals to allow for the safe evacuation of road users in the event of an incident in one of the bores.

3.3.9 The tunnel would contain a number of mechanical and electrical, operational and safety systems. The items of plant required to power and control these systems would predominantly be housed at the tunnel service buildings located outside of the tunnel.

3.3.10 The tunnel would emerge at the eastern tunnel portal through a short section of cut and cover tunnel approximately 85m in length extending eastwards from the bored tunnel section. The eastern tunnel portal would be located to the east of the King Barrow Ridge and The Avenue and just to the north of the existing A303. The portal approach would be in deep cutting formed with 1 in 2 grassed slopes.

3.3.11 The Scheme would then closely follow the line of the existing A303 to Countess Roundabout.

3.4 Eastern section: Countess roundabout to just beyond the Solstice Park junction

3.4.1 The eastern section of the Scheme is illustrated below in Figure 3-3 (and also contained in Appendix 3.1).

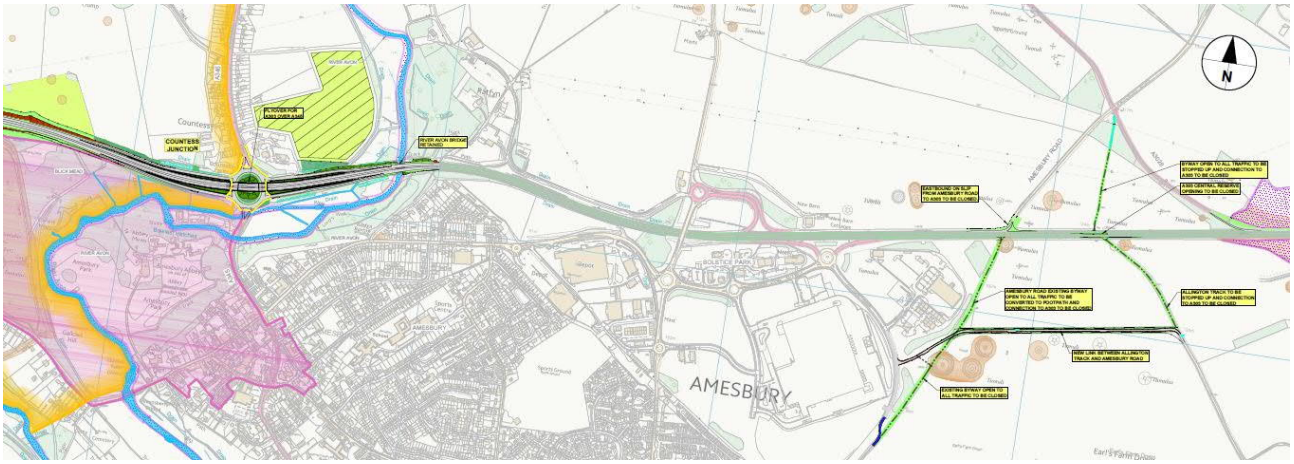


Figure 3-3: Eastern section of the Scheme

3.4.2 A new flyover above the existing roundabout would separate traffic going east-west along the A303 from traffic going north-south along the A345 Countess Road, with slip roads accommodating traffic movements between the two roads. The new flyover would include two single span bridges that would accommodate the existing roundabout traffic lanes. The minimum headroom of the bridges would be 5.35m.

3.4.3 Retaining walls would be required at this junction to support the A303 between the slip-roads. Noise barriers, approximately 1.8m high, would be installed along

both sides of the flyover to help screen vehicle and to help attenuate vehicle noise at nearby houses.

3.4.4 There are two existing subways between the proposed eastern tunnel portal and Countess Junction, which would be removed. Two new pedestrian crossings would be created around the existing Countess roundabout to provide north/south connectivity along Countess Road under the A303.

3.4.5 The Scheme would tie in with the existing A303 close to the existing River Avon Bridge, to the west of Solstice Park junction.

3.4.6 To the east of the Solstice Park Junction there would be a number of changes to existing rights of way and to points of access to and from the A303.

3.5 Phasing and construction

3.5.1 For the purposes of the EIA and the traffic assessment, two principal phases of the construction programme for the main works have been identified. These correspond to:

a. phase 1, when Winterbourne Stoke bypass, Longbarrow junction and Countess roundabout flyover are under construction (likely 2021-2023); and

b. phase 2, when the construction of the tunnel is the primary construction activity (2024 onwards). The Winterbourne Stoke bypass, Longbarrow junction and Countess roundabout flyover constructed in phase 1 would be operational.

3.5.2 The construction plan will be refined through detailed design of the Scheme with appropriate regard to reducing the overall impacts during construction.

3.6 Departure from Standards

3.6.1 Design standards are established and maintained to promulgate best practice. Compliance with current design standards is mandatory for all trunk road works, except where the overseeing organisation has either:

a. approved a Departure from Standards; or

b. agreed, through the departures process, that a new or revised standard should not be implemented on an individual scheme.

3.6.2 The need for departures from standard arises from constraints, such as the need to protect the environment. In certain circumstances it can be advantageous to depart from a standard depending on site features, environment, innovation of design, construction methods, materials or developments in associated standards.

3.6.3 This section of the TA serves as an overview of the Departures from Standards compiled for the A303 Amesbury to Berwick Down Scheme. This provides the basis for discussion with Highways England to reach agreement in principle, for potential Departures from Standards associated with the DCO design that could be potentially taken forward into detailed design.

3.6.4 The departures are listed by their location and type and are classified in terms of design step relaxations where appropriate. Detailed justification and mitigation associated with each departure is given to provide a comprehensive

understanding as well as listing any constraints that influence provision of compliant design elements.

3.6.5 Justification and, where necessary, mitigation measures have been provided to support each departure and to provide a comprehensive understanding, as well as listing any constraints that influence provision of compliant design elements, in order to clarify why they are deemed not to produce excessive risk. Therefore, resulting in a scheme that is safe to both motorised and non-motorised users.

3.6.6 As part of the review process, a summary of the departures were submitted for review. Comments were received and contained additional information on some departures and suggestions on the proposed outcome. The Designers then responded to the review, providing further comments and justifications for the Departures. A number of the comments arising during the review would be addressed during detailed design as the nature of those comments required more detail than is required for DCO design.

3.6.7 In accordance with Project Control Framework (PCF) Stage 3 requirements and Highways England policy, final agreements on departures are not expected until the Detailed Design Stage, when all options have been explored.

4 Model development

4.1 Overview / purpose

4.1.1 This Chapter of the Transport Assessment provides details on the model development process to include:

a. South West Regional Transport Model (SWRTM) structure;

b. site visits;

c. input data;

d. transport model development process;

e. base year;

f. future years; and

g. model parameters.

4.1.2 Transport modelling of the A303 and local roads in the vicinity of the A303 Amesbury to Berwick Down Scheme has been produced for traffic forecasting and economic appraisal purposes. This has included the production of a strategic model based on SWRTM[6], and two micro-simulation models of the A303 itself and the local road network to undertake more detailed modelling of local traffic conditions.

4.1.3 Traffic forecasts are required to determine the impacts of the A303 Amesbury to Berwick Down Scheme on the A303, surrounding local road network and on alternative SRN routes. Forecast traffic volumes (both in absolute volumes and changes due to the Scheme) have been produced to inform:

a. whether the Scheme addresses the identified transport problem;

b. scheme design standard requirements (e.g. against Design Manual for Roads and Bridges (DMRB) criteria for number of lanes, junction types, road standard);

c. the Environmental Statement (ES) through the impacts of changes brought about by the Scheme on air quality, noise pollution, health impacts and biodiversity assessment amongst others;

d. on the impacts of proposed construction and traffic management plans;

e. the Business Case – providing an assessment of transport user impacts of the Scheme, accident and construction impacts to the economy; and

4.1.4 The key requirement of the baseline model is that it adequately represents base year traffic patterns and volumes (both strategic and local) in the vicinity of the A303 Amesbury to Berwick Down Scheme and provides appropriate capability for

[6] one of the five Regional Transport Models developed by Highways England to facilitate scheme planning

forecasting, the outputs of which will feed into the many work streams noted above[7].

4.2 South West Regional Transport Model (SWRTM) structure

4.2.1 Highways England developed the South West Regional Transport Model to provide an evidence base for the future development of schemes on its SRN as part of the RIS. It comprises:

a. a trip-end model, used for estimating the number of trips generated / attracted by a specific zone;

b. a variable demand model (VDM), used for estimating how travellers will respond to changes in their travel costs, including modal considerations;

c. rail demand and network tool to represent changes in rail travel times, frequency or fares; and

d. a highway assignment model, used for estimating travel costs and identifying the routes travellers may take through a congested road network.

4.2.2 Figure 4-1 provides an overview of the approach in flowchart form, as taken from the SWRTM MVR.

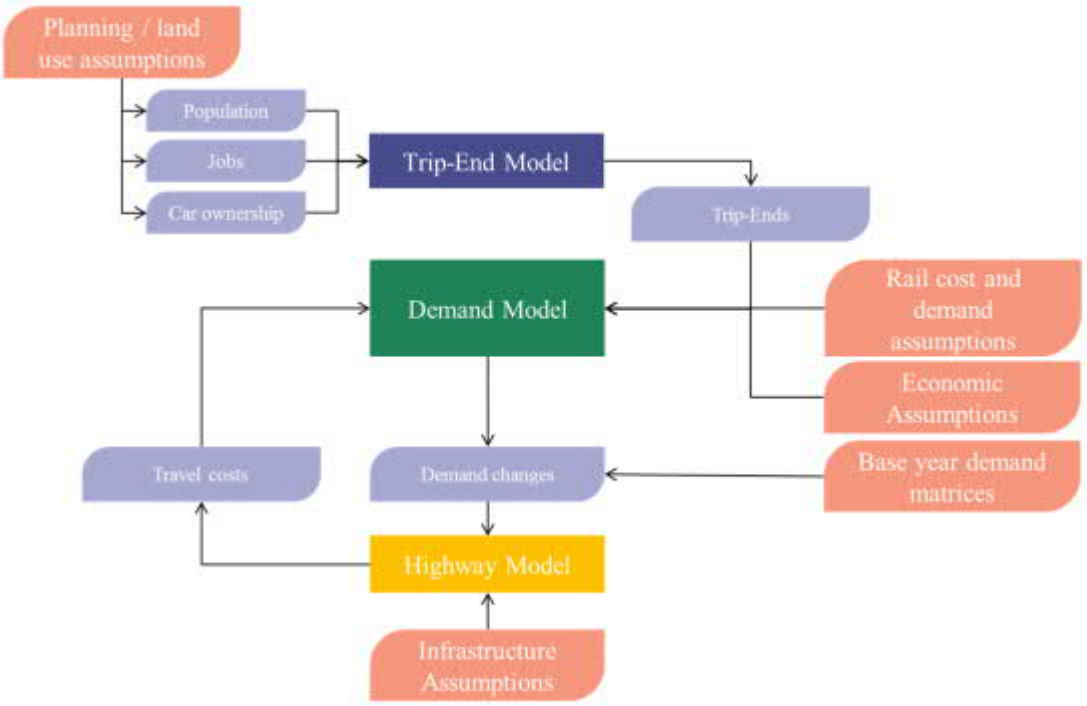


Figure 4-1: Regional Transport Model (RTM) suite design[8]

[7] Source: Local Model Validation Report in the Transport Model Package, Appendix B of the ComMA (Application Document 7.5)

[8] Source: Figure 4. South West Regional Transport Model: Local Model Validation Report in the Transport Model Package, Appendix B of the ComMA (Application Document 7.5)

4.2.3 The SWRTM has been used as the basis for developing transport models specific to assessing the Scheme.

4.3 Strategic transport model development process

4.3.1 Pre-existing transport models existed in the form of Highways England's South West Regional Transport Model (SWRTM). Information from these models has been augmented, particularly with the introduction of local demand data, local traffic counts and network refinements pertinent to the single scheme being taken forward at Stage 3 (the Development phase). Given the specific congestion pressures on the A303 caused by holiday traffic, a busy period model has also been developed. The refined model is known as the 'A303 Stonehenge SWRTM (DCO) model'. This refined model, comprising both a neutral day model and a busy day model, provides the evidence base for Highways England's (the Applicant) Development Consent Order (DCO) application and subsequently will provide evidence to questions raised by the Examining Authority during the DCO process.

4.3.2 The Local Model Validation Report[9] outlines the refinements to modelled areas, networks and local and strategic demand that have been made to produce a model that can provide evidence for the DCO application of the Scheme. Separate microsimulation models have also been developed to assess the operational performance of the Scheme.

4.3.3 The model has been developed, calibrated and validated in accordance with guidance: this includes appropriate elements of the Department for Transport's (DfT) Web-based Transport Analysis Guidance (WebTAG) as well as guidelines produced during the development of the Highways England Regional Traffic Models (RTMs).

A303 Stonehenge SWRTM (DCO) model – Fully Modelled Area

4.3.4 The 'A303 Stonehenge SWRTM (DCO) model' is a steady state assignment model. That is, the model represents average conditions over the model period – an average hour in the case of all four time periods modelled. The model assumes a fixed volume of trips and a uniform demand profile throughout each of the models.

4.3.5 The model has been developed in conventional SATURN software. SATURN is a UK industry standard software suite that comprises a number of different specialist modules. SATURN is particularly suited to the modelling of congested networks both in the strategic and inter-urban context. The software simulates junction delay in detail and represents the effect of flow metering (especially important on the section of the A303 in question) and blocking back (interaction of queues). Both flow metering and blocking back are observed on the A303 and surrounding urban road networks in the vicinity of Stonehenge.

4.3.6 The SWRTM Region of Focus (RoF) forms the Fully Modelled Area of the 'A303 Stonehenge SWRTM (DCO) model'. Furthermore, a detailed scheme-specific Area of Detailed Modelling ("AoDM") has been derived for the purposes of the A303 Amesbury to Berwick Down Scheme appraisal.

[9] Transport Model Package, Appendix B of the ComMA (Application Document 7.5)

4.3.7 The RoF is fully simulated (including junction modelling) in the vicinity surrounding the Strategic Road Newtork. Within the RoF, the modelled road network includes all motorways, A roads, B roads and any C roads that provide an important role in enabling strategic traffic movements within the model. Within the RoF, urban areas such as Bristol, Portsmouth, Southampton, Exeter and Plymouth are not modelled in detail and are instead coded with fixed speeds.

4.3.8 Outside of the RoF, the external area is an important element of the model in allowing full trip costs to be modelled, i.e. those that start or finish in the RoF. It provides the routeing for trips into the RoF. The external area is modelled as fixed speed network and does not include travel time responses to increased flow. The external area covers the wider UK SRN, as illustrated in Figure 4-2.

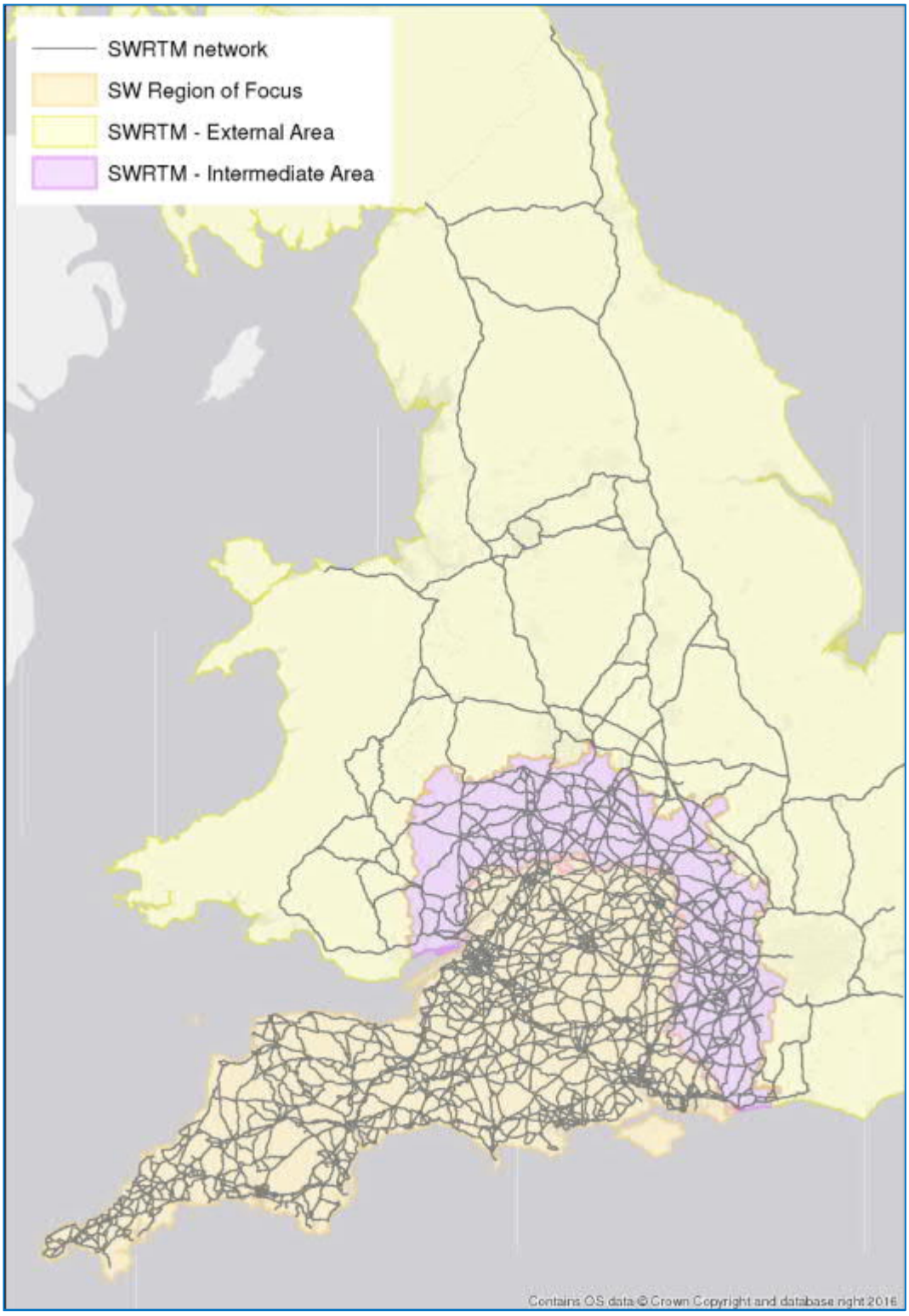


Figure 4-2: SWRTM modelled areas and network coverage[10]

A303 Stonehenge SWRTM (DCO) model – Area of Detailed Modelling

4.3.9 Figure 4-3 sets out the extents of the refined AoDM (highlighted in red), compared to the previous, wider AoDM used in the PCF Stage 2 model (highlighted blue).

[10] Source: Figure 6, South West Regional Traffic Model: Local Model Validation Report in the Transport Model Package, Appendix B of the ComMA (Application Document 7.5)

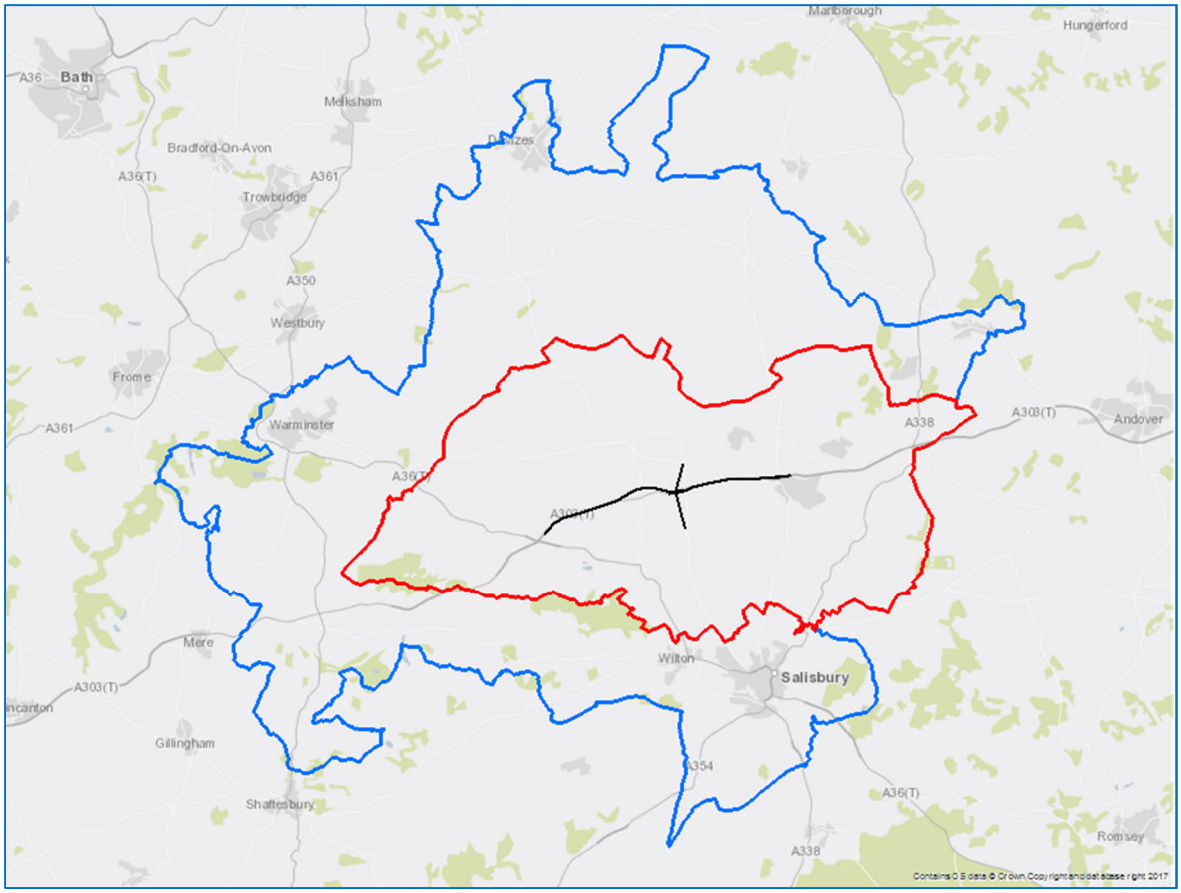


Figure 4-3: Refined Area of Detailed Modelling (red) for PCF Stage 3[11]

4.3.10 As Figure 4-3 indicates, the AoDM extends north on the Salisbury Plain, north of Larkhill and Bulford, and south to the northern extents of Wilton and Salisbury. The eastern extent of the AoDM extends to the east of the A34, whilst the area extends towards Warminster in the west, incorporating the A36.

4.3.11 More details on the formulation of the model and the zoning system are covered in the Local Model Validation Report in the Transport Model Package[12].

4.4 Base year model scenarios

Neutral month model

4.4.1 The neutral month model represents the average Monday-Friday weekday in October 2017. This is in accordance with the definition of a neutral month as per WebTAG unit M1.2 §3.3.6, and is consistent with the period where the vast amount of new demand and traffic count data were collected.

4.4.2 The assignment models cover a single average hour across three time periods, the modelled time periods being:

a. AM average hour (07:00 to 10:00hrs);

b. Inter Peak average hour (10:00 to 16:00hrs); and

[11] Source: Figure 4.2 of the South West Regional Traffic Model: Local Model Validation Report in the Transport Model Package, Appendix B of the ComMA (Application Document 7.5)
[12] Appendix B of the ComMA (Application Document 7.5)

c. PM average hour (16:00 to 19:00hrs).

'Busy day' model

4.4.3 The 'busy day' model represents an average Friday-Sunday from 15 July to 28 August 2017, but is also considered representative of other busy times of year. This is consistent with the period for which new demand and traffic count data were collected.

4.4.4 The time period to be modelled for the busy day model was determined through analysis of the available traffic flow and journey time data. Analysis of this data identified that the period from 10:00hrs to 19:00hrs generally had markedly longer journey times and higher traffic flows than off peak conditions; periods outside of these times experience flows and journey times with limited delays and closer to free flow conditions.

4.4.5 The busy day assignment model therefore covers a single average hour across the following time period:

a. busy day average hour (10:00 to 19:00hrs).

Input data

4.4.6 It was necessary to update the SWRTM (PCF Stage 2) to the 'A303 Stonehenge SWRTM (DCO) model' (PCF Stage 3). This was to ensure the data used was the most recent data available. As a result, a data collection strategy was developed that identified additional data required for PCF Stage 3 to that assembled during PCF Stage 2. This comprised the following sources and surveys:

b. automatic number plate recognition (ANPR) survey;

c. automatic traffic counts (ATCs);

d. manual classified turning counts (MCTCs);

e. journey time data (Trafficmaster);

f. trip information system (UK mobile phone data);

g. roadside interviews at Stonehenge Visitor Centre; and

h. freight surveys.

4.4.7 The multiple data sources have been used to build up a comprehensive dataset in order to:

a. update the trip matrices;

b. update the journey times; and

c. contribute to the calibration and validation of each model.

4.4.8 Data sets have been compared with each other in order to verify and produce a robust set of input parameters for the modelling. The traffic survey specification was tailored to address the particular requirements of the modelling, with the

completed models being used to provide input to the operational modelling, economic appraisal and environmental assessments.

4.5 Strategic model input parameters

Overview

4.5.1 This section provides a brief summary of the input parameters in the 'A303 Stonehenge SWRTM (DCO) model'. Input parameters are standard based on WebTAG unless specified otherwise. Full details on model development are included in the Local Model Validation Report within the Transport Model Package[13].

User classes

4.5.2 Five user-classes are represented in the highway assignment model. These user-classes are consistent between the neutral month and busy day models and are as follows:

a. Car Business;

b. Car Commute;

c. Car Other;

d. Light Goods Vehicles (LGVs); and

e. Heavy Goods Vehicles (HGVs), comprising both Ordinary Goods Vehicles type 1 (OGV1) and Ordinary Goods Vehicles type 2 (OGV2).

Passenger car unit factors

4.5.3 Passenger car unit ("PCU") factors allow for the conversion of different vehicle types to a standardised unit for representation in the demand trip matrices and assignment to the highway network. A single PCU represents a typical car length, in this case assumed to be 5.75 metres. The PCU factors used in the 'A303 Stonehenge SWRTM (DCO) model' are the same as those used in the standard SWRTM DF3.0 and the other Highways England RTMs.

Fixed route data

4.5.4 A full review of bus routes within the AoDM was undertaken during the network refinement stage. All routes either wholly within or passing through the AoDM were selected. In total, 82 separate routes were identified and input into the AoDM.

Bans and restrictions

4.5.5 A full review of bans and restrictions to vehicular movement in the AoDM has been undertaken. The closure of The Packway, Larkhill, due to roadworks is represented in the validated base year model, representing the observed situation in August and October 2017. This closure is removed from the model used as a basis for forecasting to ensure accurate representation and changes in routeing and costs.

[13] Appendix B of the ComMA (Application Document 7.5)

4.6 Strategic model -Traffic matrices

4.6.1 This section of the report provides an overview of the process used to produce the new local area demand matrices for the 'A303 Stonehenge SWRTM (DCO) model'.

4.6.2 The SWRTM DF3.0 prior matrices were taken as the starting point for further refinement. The general process to derive the refined prior matrices for the 2017 base year involved five broad stages:

a. stage 1 disaggregation of the SWRTM DF3.0 prior matrices to refined zoning system;

b. stage 2 base year uplift to 2017, principally using the DfT's National Trip End Model (NTEM) dataset;

c. stage 3 factoring of HGVs by CSRGT GB data;

d. stage 4 refinement of local demand using ANPR data; and

e. stage 5 refinement of Stonehenge Visitor Centre trips.

4.6.3 For the development of the busy day matrices, a further stage is introduced at the beginning, whereby the TIS data are used to factor the neutral month average inter-peak hour matrix to estimate busy day demand.

4.6.4 A flowchart outlining the process is given in Figure 4-4:

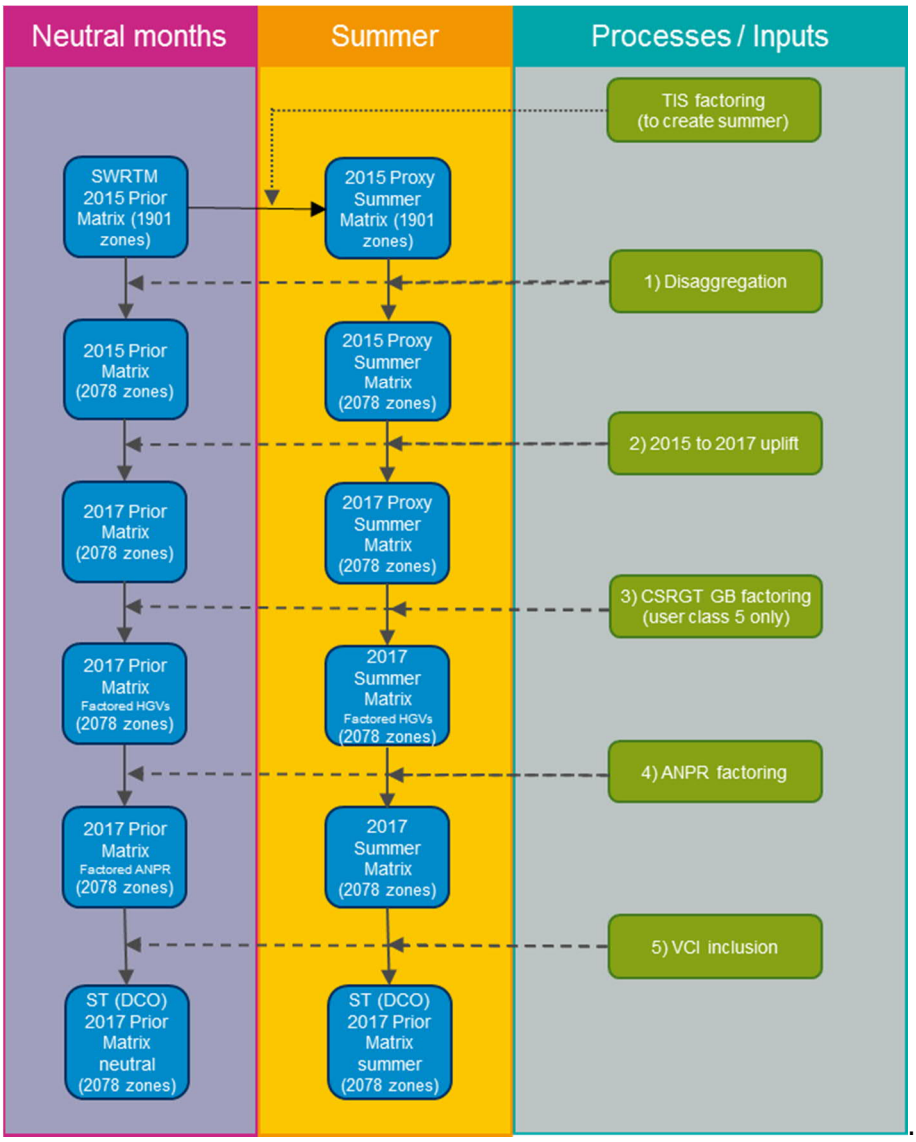


Figure 4-4: Flowchart of matrix build processes[14]

Base year traffic flows and journey times

4.6.5 Figure 4-5 shows modelled traffic flows along and near the A303 in the 2017 base year. Flows are presented as annual average daily traffic (AADT) flows, which represent the average traffic flow in a 24 hour period measured over the whole year.

[14] Source: Figure 7.3 of the South West Regional Traffic Model: Local Model Validation Report in the Transport Model Package, Appendix B of the ComMA (Application Document 7.5)

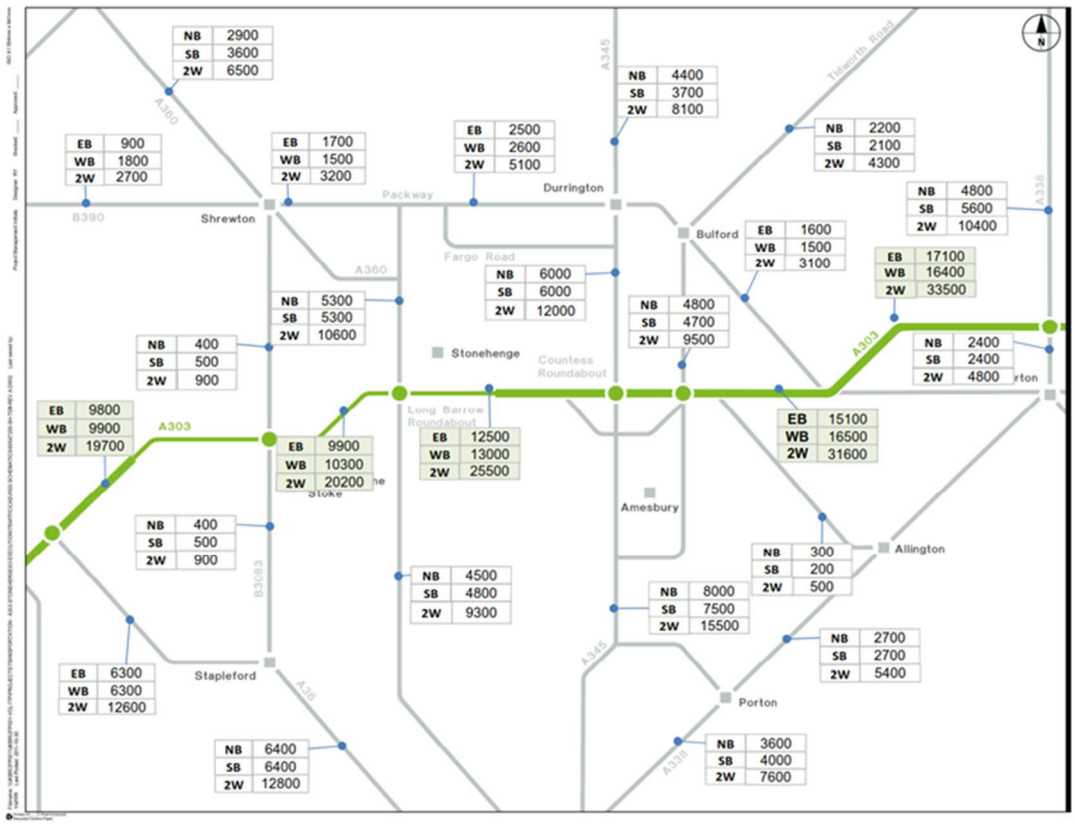


Figure 4-5: Modelled AADT, base 2017

4.6.6 Figure 4-6 and Figure 4-7 illustrates the traffic flows in the AM and PM peak hours, respectively, for the 2017 base year.

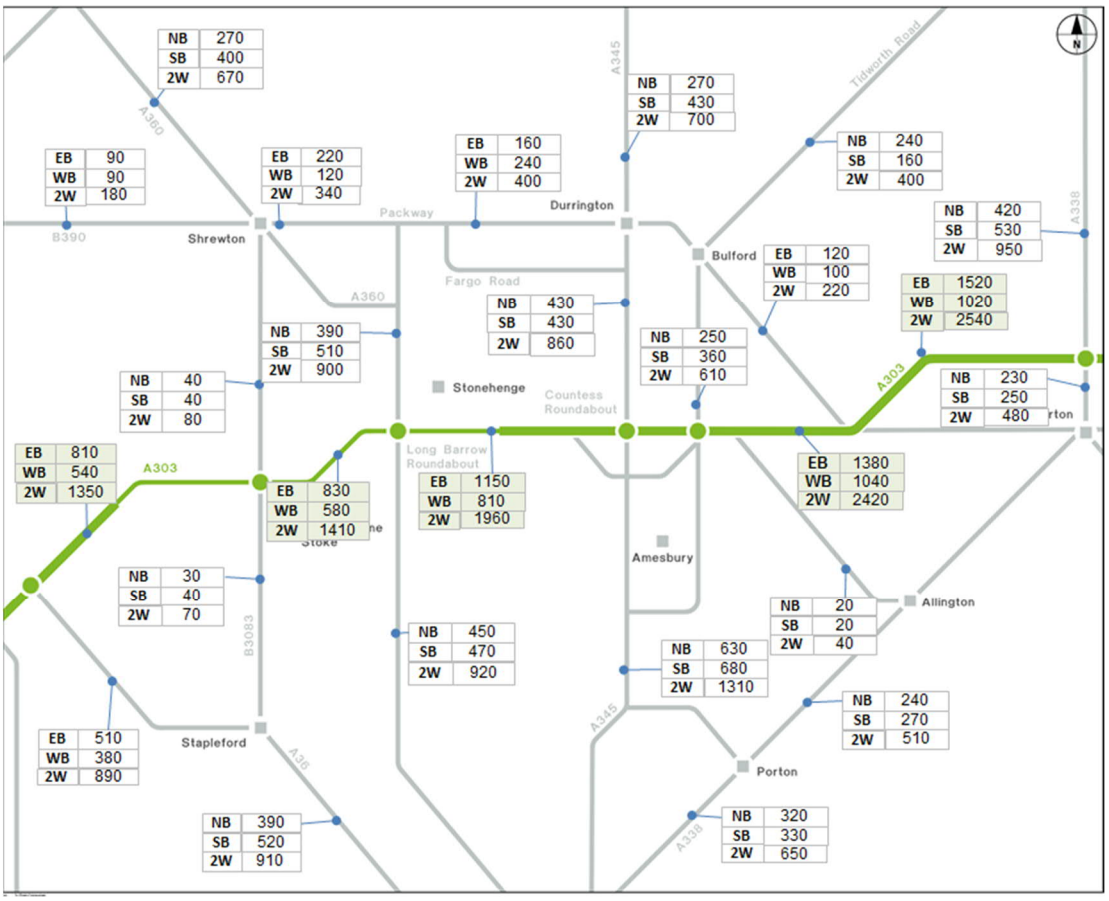


Figure 4-6: 2017 base year AM peak hour total flows

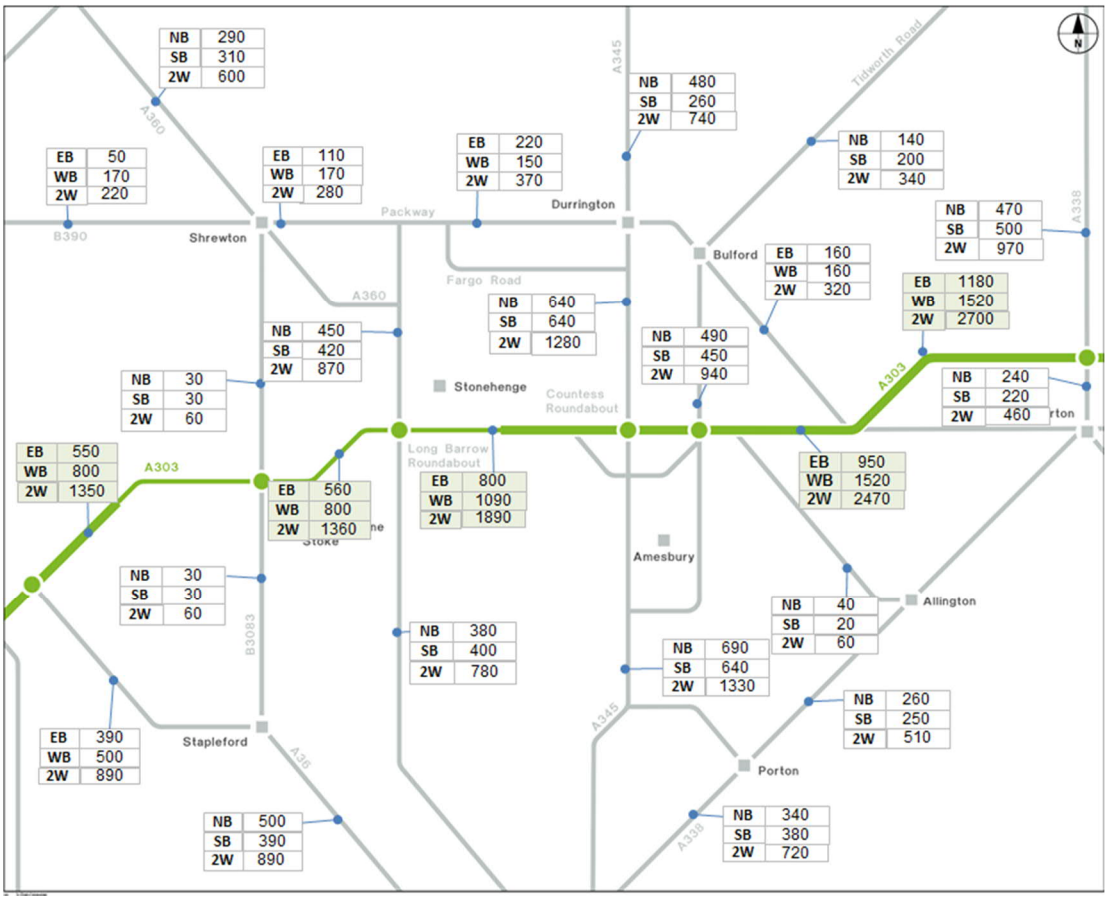


Figure 4-7: 2017 base year PM peak hour total flows

4.6.7 During both the AM and PM peaks, the A303 mainline flows are around 2,500 vehicles (2-way) at the far east of the Scheme near Amesbury and around 1,300 vehicles at the far west of the Scheme near Winterbourne Stoke.

4.6.8 In the AM peak the flows are highest travelling eastwards and in reverse in the PM peak with the flows highest travelling west.

4.6.9 The flows are relatively consistent around the surrounding network of local roads in both the AM and PM Peak. The one small difference is the traffic travelling both southbound and northbound between Countess roundabout and Durrington is just over 200 more vehicles in the PM Peak than the AM Peak.

4.6.10 Figure 4-8 shows 2016-2017 Trafficmaster average (Median) journey time data for the section of the A303 between the A36 and A338. The data confirms that the average journey time on most days of the year is less than 20 minutes. On 34 days the average journey time was over 30 minutes, over 50% longer than a typical day.

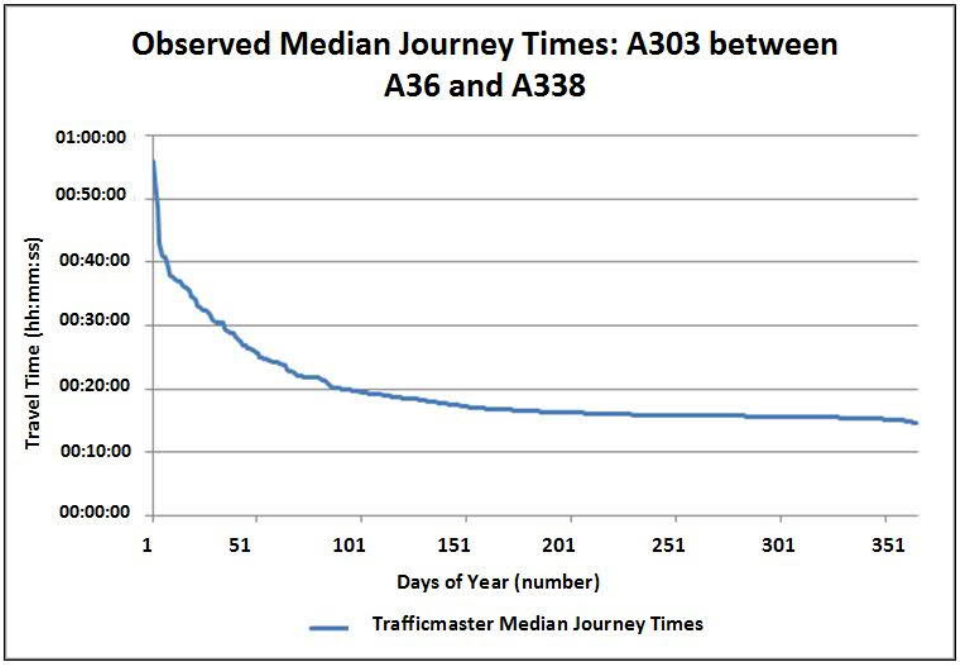


Figure 4-8: Average (Median) journey times across the day during each day of the year

Realism testing

4.6.11 As noted in WebTAG unit M2 §6, it is important to ensure that the model converges, is realistic and that sufficient sensitivity tests have been undertaken in order to further validate the suitability and to understand the operation of the model before its application.

4.6.12 Realism testing is undertaken to ensure that the variable demand model (VDM) behaves realistically, and that changes in components of travel costs and times provide results, in terms of demand response, that are aligned with general experience. There was no scope to alter the calibration parameters used in the VDM, as these had been set across all of the RTMs. Therefore, the objective of the realism testing was to ascertain that overall performance of the VDM was not materially altered by the refinements made to the highway assignment model.

4.6.13 For this purpose, standard WebTAG unit M2 realism tests have been undertaken:

a. car fuel cost elasticity;

b. public transport (main mode) fare elasticity; and

c. car journey time elasticity.

4.6.14 Overall, the development of the 'A303 Stonehenge SWRTM (DCO) model' has been demonstrated to have made no material change to the satisfactory sensitivity of the VDM, with realism testing providing similar elasticities and convergence being within the desired criteria. This provides confidence in the suitability of the model for the purpose of assessing the Scheme. More information on the model development is provided in the Local Model Validation Report within the Transport Model Package[15].

4.7 Operational model development

Introduction

4.7.1 The purpose of operational microsimulation and junction modelling is to assess in detail the operational impacts on the network of the Scheme during normal operation, during tunnel incidents / maintenance periods and during construction phases. This has been carried out using VISSIM. VISSIM is a microscopic, behaviour based simulation model developed to model traffic and public transport operations. The program can analyse traffic and transport operations under constraints such as lane configuration, traffic composition, traffic signals, public transport stops etc., thus making it a useful tool for the appraisal of transport schemes. The outputs can be presented using the inbuilt visualisation tools.

4.7.2 The operational models have provided detailed operational information to inform the design, verification and optimisation of the Scheme. Neutral month AM peak, Inter-peak (IP) and PM peak and busy day peak microsimulation models were developed to assess the Scheme operation.

Model overview

4.7.3 Drawing on the representation of routeing and travel patterns represented in the strategic traffic model, two microsimulation models were developed to assess operational performance:

a. a Local Road model north of the A303 including the B3086 and links through Larkhill, Durrington and Bulford; and

b. a Mainline A303 model including some local diversions through Amesbury.

4.7.4 Figure 4-9 shows the Local Road network in red and the A303 network in blue. A separate VISSIM model was built for each of the sections; the VISSIM network is shown in Figure 4-10.

[15] Appendix B of the ComMA (Application Document 7.5)

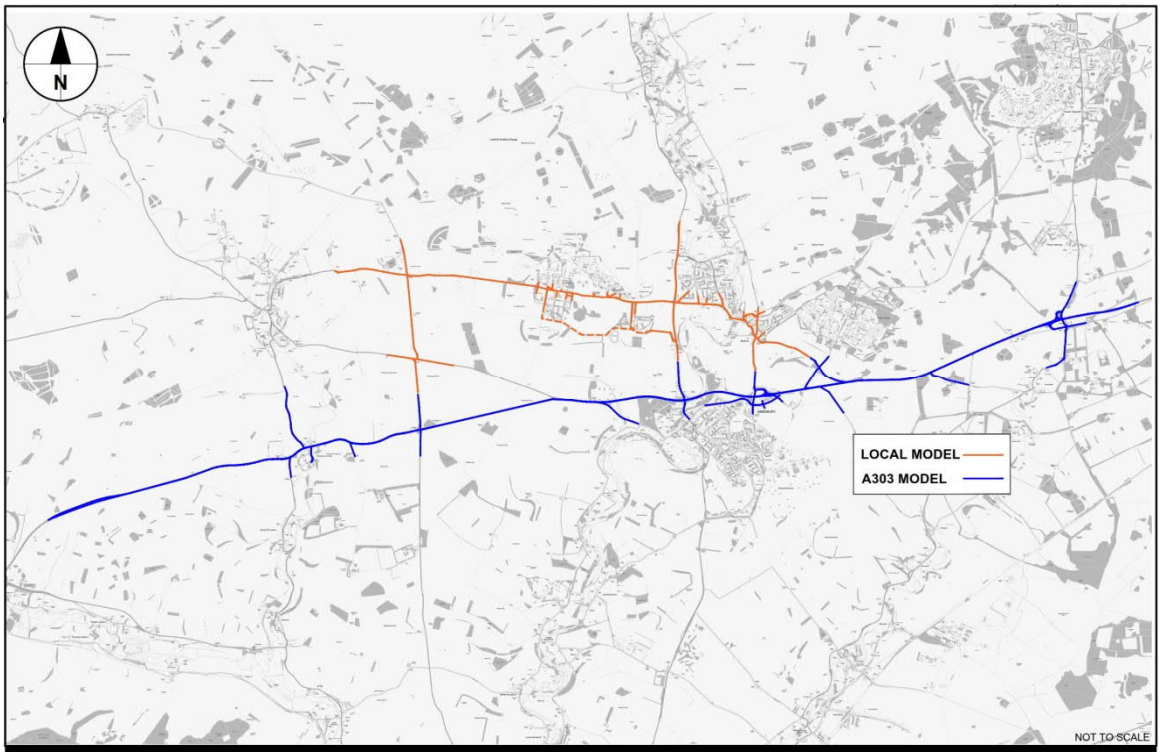


Figure 4-9: VISSIM network extents

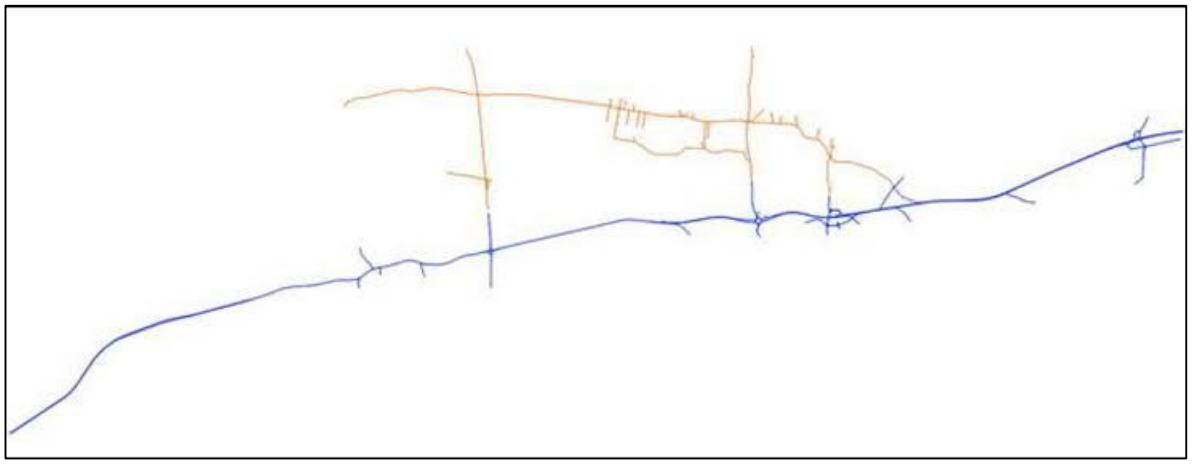


Figure 4-10: VISSIM modelled network

4.7.5 The mainline A303 network consists of six major junctions, with additional minor arms along the network:

a. B3083 at Winterbourne Stoke;

b. A360 at Longbarrow junction;

c. A345 at Countess roundabout;

d. Solstice Park slip roads and roundabouts;

e. A3028 slip road; and

f. A338 slip roads.

4.7.6 The Local Road network contains:

a. The Packway;

b. A360;

c. Fargo Road;

d. B3086;

e. A345;

f. A3028; and

g. Local roads in Bulford, Larkhill and Durrington.

Site visits

4.7.7 Two site visits were undertaken during July and August 2017 to inform the development of the busy day 2017 base year A303 microsimulation model, and a further site visit was undertaken in October 2017 to inform the neutral month model.

4.7.8 The purpose of the site visits was to observe the operation of the highway network, traffic behaviour and inform the specification of traffic surveys required to develop the operational traffic models.

4.7.9 General comments and observations from the busy day (summer) site visits are provided below:

a. eastbound congestion was observed on the mainline A303 where two lanes merge to one, to the west of Winterbourne Stoke;

b. eastbound queues along the A303 through Winterbourne Stoke, Longbarrow junction and Stonehenge, whilst traffic returned to freeflow conditions once past Stonehenge;

c. the eastbound congestion through Longbarrow junction leads to standstill vehicles on the roundabout and blocking of the A360 southbound entry, although southbound vehicles were observed weaving through this eastbound queue. The majority of vehicles use the nearside lane on exit for the A303 eastbound;

d. 'rubbernecking' was observed on the stretch of carriageway by Stonehenge as drivers viewed the stones. Vehicles were observed going extremely slow past the stones with large headway to the vehicle in front;

e. temporary one way traffic signals observed in Durrington between Meads Road and Philip Road;

f. The Packway was closed to all vehicles in both directions;

g. Fargo Road appeared to be used as an alternative route to The Packway, with apparently little regards for the 'Military Personnel Only' signage. A large queue was observed on Fargo Road into the junction with Countess Road;

h. some significant gradients were identified within the network;

i. heavy westbound traffic was observed on The Packway making it difficult to exit minor side roads, and in the afternoon queues were observed into the junction with the B3086; and

j. heavy westbound queueing on the A303 led to Google navigation directing vehicles via the M4 rather than A303.

4.7.10 The neutral month site visit was undertaken on 3 October 2017, during the neutral month survey programme. General comments and observations from the neutral month site visit are provided below:

a. the AM peak and Inter-peak (IP) periods were observed;

b. no obvious congestion was observed on the network, in either direction;

c. temporary one way traffic signals were in place in Durrington between Meads Road and Philip Road, blocking the access to and from Meads Road; and

d. Fargo Road appeared to be used as an alternative route as The Packway was closed.

Highway network

4.7.11 The modelled highway network was coded in VISSIM using OS Mapping to define the length, width and number of lanes for each modelled link. Google Maps and site observations were used to assist in defining the highway, lane allocation and to check that link distances were accurate.

4.7.12 Gradients were added to the links to ensure vehicle behaviour was representative on inclines and declines, with the data taken from Google Earth levels.

4.7.13 During coding, particular attention was paid to Longbarrow junction and Countess roundabout, to match observed behaviours:

a. Countess roundabout survey footage showed vehicles observing yellow boxes and ensuring exits are not blocked; and

b. Longbarrow junction is a priority roundabout, with queueing traffic observed during the busy day period on the eastbound circulatory, requiring detailed priority rules to ensure the traffic gives way appropriately and the observed conditions where the A303 southbound entry ‘weave’ through the eastbound queue on the A303 are replicated.

Traffic flows

4.7.14 The hourly traffic flows from the ATC data and the journey times from the ANPR data were analysed to derive the AM, Inter-peak and PM peak periods. These periods are illustrated in Table 4-1.

Table 4-1: Neutral month modelled periods

Time Period	Peak Hour	Modelled Period
AM	07:30 - 08:30	06:00* - 0900
IP	Average Hour; 10:00-16:00	11:15 - 13:45
PM	17:00 - 18:00	15:30 - 18:30

Note: *No MCTC data 06:00-07:00hrs

4.7.15 The A303 and Local Road base year VISSIM matrices were developed directly from observed MCTC data rather than from ANPR data. Matrices developed using MCTCs will often have closer representation of turn counts as these are a direct input in to the matrix creation process. However a matrix built with ANPR data will often have a closer representation of OD routeing as these are defined in the prior matrix.

4.7.16 The matrix development methodology based on MCTCs is appropriate for this study as the amount of traffic weaving/lane choice is negligible in the base year due to a single lane mainline carriageway and junctions which are not closely spaced. Whilst the Scheme does introduce multiple lanes on the mainline, the junctions remain in the same approximate location with sufficient distance between them to make the impact of traffic weaving/lane choice negligible. This methodology means that the baseline traffic flows in the operational models do not exactly match those derived from the strategic model. This is typical considering the differences in model type and function. Future traffic flows resulting from the Scheme have added to the operational models as changes to the base flows derived from the strategic model, rather than as absolute traffic flow volumes. This is industry standard methodology.

Impacts of roadworks on The Packway

4.7.17 The 2017 data collection period (both busy day and neutral month) coincided with planned temporary roadworks on The Packway through Larkhill. The temporary roadworks resulted in the complete closure of The Packway, East of Larkhill between Tombs Road and The Packway / Countess Road roundabout.

4.7.18 During the ‘busy’ period model The Packway is an alternative route or ‘rat-run’ used by vehicles to avoid delays on the A303, which was unavailable during the survey periods and could potentially bias the traffic information collected as traffic is pushed back on to the A303 or onto alternative ‘rat-runs’. During the survey periods the signed diversion route for this section of The Packway was via the A303.

4.7.19 The 2017 busy day and neutral month VISSIM base models were validated against this temporary arrangement, using the survey data “as is” to calibrate and validate the models. This approach ensured fully validated base models were produced. This ‘Packway closed’ VISSIM model can be adjusted to reflect the normal base situation, with The Packway open in both directions.

4.7.20 Site observations undertaken throughout the busy day (summer) survey period indicated that whilst The Packway was closed a significant number of vehicles were instead using Fargo Road between the A345 Countess Road and The Packway as an alternative route, instead of using the signed diversion via the A303.

4.7.21 A comparison of the busy day 2017 'Packway Closed' ANPR data, against the ANPR survey carried out in 2014 (for the PCF Stage 2 model) whilst The Packway was open, was undertaken to ascertain if the roadworks had a significant impact on vehicle routeings.

4.7.22 Analysis of the 2017 'Packway Closed' and 2014 'Packway Open' ANPR surveys suggests that:

a. **eastbound**: ANPR data suggests more local diversion in 2017. With a four percentage point rise in through traffic on The Packway, four percentage point rise in Shrewton, and three percentage point rise on Countess Road compared with 2014; through traffic drops one percentage point on the B3086 and two percentage points through Bulford; and

b. **westbound**: ANPR data suggests less local diversion in 2017; with a drop of six percentage points on The Packway, drop of three percentage points at Shrewton, and five percentage points drop at Bulford; however, through traffic increases by three percentage points on Countess Road.

4.7.23 Given the consistency between 2014 and 2017, the volumes (i.e. across all routes) of rat-running traffic in 2017 have not been adjusted to account for the presence of roadworks. In essence, the models represent the observed routeing behaviour (i.e. via Fargo Road rather than The Packway where drivers ignored 'Military Only' signs). Therefore, direct use of the models is acceptable.

4.8 Operational model calibration and validation summary

4.8.1 Both the A303 Mainline and the Local Road operational VISSIM models were developed from suitable data and calibrated to site observations, video footage and MCTC data. Independent validation was undertaken using ATC link count data and ANPR journey time data.

A303 Mainline model

4.8.2 Visual inspection and turn flow calibration demonstrates that the model represents the turning flows and queueing at junctions within acceptability guidelines. A balance was reached between visual queue calibration and journey time validation in the busy day model, resulting in higher journey times modelled in the westbound direction compared to observed journey times. The neutral month model journey times are within acceptability guidelines. The models validate within acceptability guidelines to ATC data.

4.8.3 The models are intended to test operational performance of the junctions and network. While the journey time is not represented to the WebTAG tolerances in the busy day, the model does appropriately represent substantial delay from traffic congestion. This ability to represent congestion, taken together with the representation of observed queueing behaviours is sufficient for the model to be used in testing operational impacts, subject to particular care should the forecasts indicate that the demand forecasts are near the capacity thresholds, i.e. the point where queues form.

Local Road model

4.8.4 A good level of calibration was achieved and the models validate well against ATC and journey time data. The neutral month model journey time validation is

within acceptability guidelines. These models are suitable to use for further work and scheme testing.

5 Forecast year model development

5.1 Overview

5.1.1 Forecast year models have been developed for the following years:

a. 2026 which has been taken as the **opening year** of the Scheme;

b. 2031 which is an **intermediate year** to comply with guidance that economic assessment should not be extrapolated over more than a 10 year interval;

c. 2041 **design year,** which provides an estimate of the Scheme impact 15 years after opening; and

d. 2051 which is the **year furthest in the future** for which national travel demand projections are available.

5.1.2 The 2026 and 2041 assessment scenarios are most relevant to the Transport Assessment as they assess the scenario where the impact of the Scheme is greatest, as well as considering absolute traffic conditions in the design year.

5.1.3 The traffic modelling should be capable of assessing the cumulative impacts of other interventions on the A303 / A358 corridor, given Highways England's proposals for a high quality dual carriageway between London and the South West. Whilst the model need not (and does not) assess the impacts of other schemes in detail (separate local models will be developed for those schemes), the model needs to be able to assess the impact of those on the A303 Amesbury to Berwick Down Scheme.

5.2 Strategic forecast model development – Traffic flows

Traffic growth forecasting

5.2.1 The assumptions for reference demand are prepared using an uncertainty log which assembles evidence of planned and anticipated change that may affect travel demand together with a level of certainty that the change will occur. Those changes deemed most likely are used to define forecasting assumptions for the core scenario.

5.2.2 In compliance with guidance, the population and employment growth rates identified from proposed developments for Wiltshire and Test Valley were constrained at a district level to NTEM forecasts.

5.2.3 NTEM is a national database which considers changes in population at local authority level, changes in employment at local authority level and changes to economic factors such as household incomes, reflecting national forecasts.

5.2.4 In addition to NTEM-derived growth factors, a number of committed developments have been explicitly modelled.

Uncertainty log - Demand (travel generating)

5.2.5 A list of planning permissions was collated for all developments within the county of Wiltshire and the Test Valley district within Hampshire. Development outside these areas was retained from TEMPro 7.2.

5.2.6 The following Local Plan documents were also analysed for sites to be included which presently do not have planning permission:

a. Wiltshire Core Strategy Adopted January 2015; and

b. Test Valley Borough Revised Local Plan DPD, adopted Local Plan 2011 – 2029) (January 2016).

5.2.7 The sites listed included all residential developments, employment, education, health and leisure facilities, to form the basis of the uncertainty log.

5.2.8 The information extracted for the purposes of traffic modelling for each site included specific details of each site to inform the trip generation forecasts including:

a. size of development (number of dwellings, employment gross floor area);

b. timing and phasing of development;

c. location (in terms of both grid reference, parish / model zone and TEMPRO zone);

d. completion year; and

e. level of uncertainty (according to WebTAG guidance).

5.2.9 Appendix A of the Transport Forecasting Package[16] presents the demand uncertainty log.

5.2.10 The initial list of developments was reviewed to select sites that were of sufficient magnitude materially to influence the traffic forecasts using the following criteria:

a. removal of housing sites that had 50 dwellings or less;

b. removal of employment sites with a gross floor area of 1,000 square metres or less; and

c. removal of sites with a net neutral or negative trip generation identified in the Transport Assessment.

NTEM / RTF

5.2.11 Growth forecasts for cars have been calculated using the TEMPro 7.2 software and NTEM 7.2 dataset. Growth forecasts have been calculated for 2026, 2031, 2041 and 2051. These forecasts have been based on the information contained in the uncertainty logs.

5.2.12 LGV and HGV growth is based on NTM RTF - March 2015 forecasts. Growth forecasts have been calculated for 2026, 2031, 2041 and 2051. Table 5-1 shows the growth forecasts for the South West region for LGVs and HGVs respectively.

[16] Appendix C of the ComMA (Application Document 7.5)

Table 5-1: RTF LGV and HGV growth (south west)

Vehicle Type	2017	2021	2026	2031	2041	2051
LGV	-	11%	24%	36%	58%	81%
HGV	-	3%	6%	9%	16%	24%

Demand forecasting – Explicitly modelled committed developments

5.2.13 This section details the developments which have been explicitly modelled in the core scenario.

5.2.14 The Army Basing Programme ("ABP") for Salisbury Plain outlines the future laydown of army units in the UK as units move back from Germany. The key proposals of the ABP on Salisbury Plain are:

a. 'Behind the Wire' development on existing Ministry of Defence (MoD) land, consisting of Single Living Accommodation (SLA), catering and extensive new build and some conversion of existing technical accommodation, including workshops, garages, armouries, stores and offices to cater for an expected increase of approximately 4,000 military personnel; and

b. Service Families Accommodation (SFA) consisting of approximately 1,200 new houses (included within the uncertainty log).

5.2.15 The SLA developments on existing MoD land are not represented in the standard TEMPro forecasting process so SLA trip generation has been calculated and included in the forecast demand.

5.2.16 The following developments listed in the uncertainty log have also been identified as needing to be modelled as absolute rather than incremental change in the core scenario. In each instance, nearby zones of a similar land use have been identified to inform an appropriate trip distribution.

Table 5-2: Explicitly modelled development trips

Reference	Development Land Use	HHs	Jobs
15/04736/OUT	C2 C3 (total 2,500dw), mixed development (150,000sqm)	2,500	2,972
15/12363/OUT	C3 (1,500dw), C2, B1, B2, D1, A1-4, D2	1,500	1,823
15/01800/OUT	A1, A2, A3, A4, A5, B1, B2, B8, C2, & D1 (Assumed 6,000sqm each) C3 (1200 Dw)	1,200	1,189
15/12351/OUT	C3 (700dw), D1, A1, A2, A3, A5	700	892
S/2011/0517	C3 (450dw), A1 (250sqm), B1 (24,000sqm, D1 (250sqm)	450	518
17/06370/FUL	C3 (94 dw)	94	0
14/06624/FUL	A1 (30sqm), A3 (283sqm), B1A (1,239sqm), B2 (4,056sqm), B8 (2,877sqm)	0	120
N/13/00308/OUT	B1A (4,100 SQM), B1B (4,200 SQM), B1C (4,200 SQM), B2 (12,500 SQM), B8 (25,000 SQM)	0	570
17/03417/OUT	B8 (92,900 SQM)	0	1,086
17/03547/WCM	B1, B2, B8 (Splits Unknown)	0	1,049

5.3 Network development

Introduction

5.3.1 The highway network was developed, following the uncertainty log guidance set out in WebTAG Unit M4.

Uncertainty log – Supply (road schemes)

5.3.2 Proposed highway infrastructure improvements were also included in the uncertainty log. This includes:

a. schemes promoted by Highways England on the SRN;

b. ongoing schemes [near certain or more than likely];

c. schemes that are part of the Road Investment Strategy (RIS) period 1, for development between 2015 and 2020 [near certain or more than likely] ;

d. schemes on the A303 corridor forming part of the emerging RIS period 2, for development between 2021 and 2026 [reasonably foreseeable or hypothetical]; and

e. schemes promoted by Local Highway Authorities.

5.3.3 Each highway infrastructure improvement has been added to the uncertainty log with the following information:

a. level of uncertainty (according to WebTAG guidance);

b. scheme opening year; and

c. location.

Without scheme coding

5.3.4 Schemes classified as being either 'near certain' or 'more than likely' have been included in the 'core' scenario. Schemes categorised as either 'reasonably foreseeable' or 'hypothetical' have been excluded.

5.3.5 The other A303 / A358 corridor schemes that are being planned in RIS period 1 have been included in the 'core' scenario. This follows discussion and advice with Highways England's Transport Planning Group ("TPG"), which confirmed that any scheme contained within a published RIS, including all Road Investment Programme ("RIP"), Smart Motorway Projects ("SMP") and Complex Infrastructure Project ("CIP") schemes, should be considered as 'more than likely' as the 'outcome is likely to happen but there is some uncertainty'. This definition therefore covers the RIP schemes in RIS1 to the west of Stonehenge: the A303 Sparkford to Ilchester improvement; and the A358 Taunton to Southfields Scheme.

5.3.6 In addition, a review of more local schemes in the vicinity of the AoDM has been undertaken. This has identified a number of schemes in the local area for delivery following the 2017 base year.

5.3.7 The schemes identified for inclusion in the forecast years are mapped in Figure 5-1. The scheme indicated by the red line is the A303 Amesbury to Berwick Down Scheme. The full list of schemes in the uncertainty log is contained in Appendix 5.1.

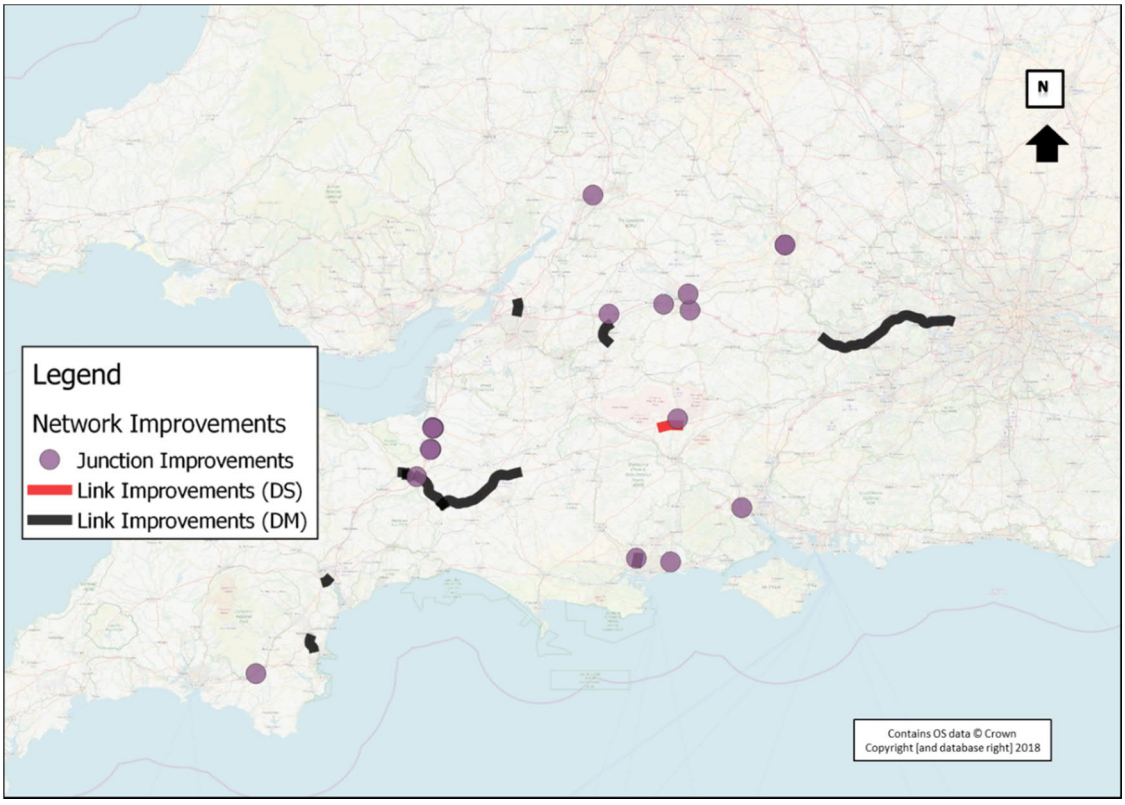


Figure 5-1: Schemes identified in uncertainty log

Network development - With scheme

5.3.8 The Scheme has been coded into the SATURN model based on the GA drawings and the Scheme description as set out in Chapter 3 of this TA.

5.4 Alternative scenarios – Sensitivity tests

High and low growth

5.4.1 To complement the core forecasts and examine the impact of different growth assumptions and different development assumptions the 'A303 Stonehenge SWRTM (DCO) model' has been subjected to three sensitivity tests. The first two are common WebTAG tests, referred to as high and low growth. These modify the reference case demand in each year by a standard factor. The purpose of these tests is to demonstrate whether the Economic Case is resilient to lower or higher overall demand. The high growth test is also used to examine whether the infrastructure is resilient to dealing with greater volumes of traffic.

Alternative local growth scenario – Boscombe Down

5.4.2 WebTAG M4 para 5.1.1 states that significant sources of local uncertainty may be tested. Therefore, the third sensitivity test has examined the impact of the potential employment development at Boscombe Down, primarily to examine whether this development will have an adverse impact on the performance of the Scheme in terms of journey times on the A303. As this is a sensitivity test, this development is not included in Table 5-2 above and will therefore only be included during the alternative growth scenario.

5.4.3 A Transport Assessment is yet to be produced for the Boscombe Down site. Based on a discussion with Wiltshire Council[17] it was agreed that a test assuming an additional 15,000 jobs at Boscombe Down will provide an adequate representation. Reflecting assumptions on typical trip rates, mode share and that some military staff will be based on-site, an assumption of there being 4,300 trips to and from the site per weekday was similarly assumed.

5.4.4 Given the size of the proposed development, the alternative scenario has assumed that the developer will have to ensure appropriate access arrangements. To ensure that the model test does not constrain the forecast demand, i.e. by the network not having sufficient capacity to allow the traffic to pass through it, these have been assumed to comprise:

a. provision for capacity enhancement at Solstice Park to allow for the junction to operate effectively with the development in place;

b. a link road between Allington Track and Solstice Park; and

c. improved connectivity between Allington Track and the A338.

5.4.5 For the purpose of the Transport Assessment, the core models are the ones used to identify the impact of the Scheme against the reference case. The sensitivity tests are used to show the resilience in the Scheme design to accommodate additional traffic in future years.

5.5 Operational forecast model development

Introduction

5.5.1 There are two operational model networks; the Local Road network and the A303 Mainline network. Each network was built from OS Mapping, with Google Maps

[17] 22 February 2018

and on-site observations used to support the network build. The methodology used in the construction of the base modelling is set out in Section 4.7.

5.5.2 The traffic growth applied to the strategic model was also applied to the operational models. Forecast year traffic flows in the operational model were produced by applying the absolute differences obtained from cordons of the without scheme and with scheme SATURN models for both mainline and local networks for each peak, in order to isolate the changes in traffic flows resulting from the Scheme. The absolute difference in traffic flow was calculated for each OD movement, and added to the base VISSIM peak hour matrices separately for the light and heavy goods vehicle types represented in the VISSIM model.

5.5.3 The operational model networks include the same network assumptions as with the strategic model. Minor refinements have been made in a small number of locations to ensure that model performance remains realistic and better replicates likely on-site driver behaviour, in line with standard industry methodology.

5.6 Construction scenarios

5.6.1 In addition to exploring the performance of the network in the forecast years, the 'A303 Stonehenge SWRTM (DCO) model' has been used to consider how the construction period will affect traffic. The construction phases have been represented by modifying junction layouts and including the location of speed limits taking assumptions which have been provided by third parties. More information on the construction phases and associated management is included in Chapter 9.

5.6.2 For the purposes of the EIA and the traffic assessment, two principal phases of the construction programme for the main works have been identified. These correspond to:

a. phase 1, when Winterbourne Stoke bypass, Longbarrow junction and Countess roundabout flyover are under construction (likely 2021-2023); and

b. phase 2, when the construction of the tunnel is the primary construction activity (2024 onwards). The Winterbourne Stoke bypass, Longbarrow junction and Countess roundabout flyover constructed in phase 1 would be operational.

5.6.3 The construction plan will be refined through detailed design of the Scheme with appropriate regard to reducing the overall impacts during construction.

5.6.4 Using the 2026 without scheme matrices as a "base" it was then necessary to add traffic relating to the construction site in each phase. Table 5-3 details the trips added to the matrices.

Table 5-3: Construction scenario - additional trips[18]

Vehicular Trips	Phase 1				Phase 2			
	AM	IP	PM	Busy day	AM	IP	PM	Busy day
Construction traffic	22	22	22	16	8	8	8	6
Civil & Tunnel workforce traffic	8	23	8	14	8	25	8	15

5.6.5 The traffic generated in Table 5-3 was then distributed across the zoning system.

Construction modelling assumptions

5.6.6 The operational model base mainline networks were updated to produce a phase 1 and 2 construction scenario model for AM, PM and 'busy day' periods.

5.6.7 The three additional construction zones were included in the network; an additional arm from the northern Longbarrow junction and an access near Stonehenge Cottages, the construction site at Countess roundabout has been included as part of the services zone.

5.6.8 The forecast traffic flows in the operational model, for the two construction scenarios, were produced using the same method as for the core networks as detailed above. The forecast flows from the SATURN construction models were used to generate an absolute difference which was then applied to the base VISSIM peak hour flows. The additional construction worker user class was combined with the lights vehicle class; the additional construction HGV class was included as a separate class in the operational models to allow for accurate route definitions.

[18] Source: Transport Forecasting Package, Appendix C of the ComMA (Application Document 7.5)

6 Forecast network performance

6.1 Introduction

6.1.1 This section of the Transport Assessment sets out the traffic forecasts and the assessment of the traffic impacts of the A303 Amesbury to Berwick Down Scheme utilising the 'A303 Stonehenge SWRTM (DCO) model'. This provides overall information on the effects of the Scheme on journey times and traffic flows.

6.1.2 In addition to appraising the core scheme scenario, the model has been used to assess the impacts of a number of alternative scenarios around the core assumptions. These include 'high' and 'low' growth tests, in accordance with guidance in WebTAG Unit M4, and has included an alternative local growth scenario to account for the proposed Boscombe Down development.

6.1.3 The traffic impact of the Scheme should be considered in relation to the core scenario. The results of the sensitivity tests are presented in brief to demonstrate that the benefits of the Scheme can still be realised under those scenarios.

6.1.4 The Transport Forecasting Package[19] sets out information, detail and evidence pertaining to the development of the future year forecasts as part of the PCF Stage 3 work.

6.1.5 This report also includes the results from the assessment of the operational performance of junctions along the length of the Scheme for the design year of the Scheme. Chapter 9 provides the results of forecasts to assess the impact during the construction phase.

6.2 Convergence

6.2.1 Well converged models are required to provide stable, consistent and robust model results and to differentiate between changes related to an intervention from those associated with model instability or noise. This section outlines the convergence and stability performance of the traffic forecasts.

6.2.2 The core scenario assignment models almost all converge to WebTAG criteria. The only assignment model which fails to meet the criteria is the 2031 without scheme PM peak core model and this model only fails marginally. The poorly converging nodes in this model are located away from the area of detailed modelling in Bridgwater, Bristol and Bidford-on-Avon.

6.2.3 The forecast demand model convergence meets the criteria, with the one exception being the 2051 with scheme scenario.

6.2.4 To check the stability of the demand model, an exploratory test was run on an earlier version of the 2051 forecast. The demand model was run for an additional loop and this showed no appreciable impact on traffic flows within the Area of Detailed Modelling across the neutral month peak hour models. Analysis of traffic

[19] Appendix C of the ComMA (Application Document 7.5)

flow changes in the wider model area showed some changes in Portsmouth, Bristol and Basingstoke.

6.2.5 In summary model flows are shown to be stable and robust in the Area of Detailed Modelling. The results are therefore suitable for use in the Scheme appraisal and the operational and environmental assessments in this area.

6.2.6 There are some areas of instability in the wider model area which may need further investigation in the economic assessment as this will use outputs from the whole model area.

6.3 Core scenario: Traffic flows

Overview

6.3.1 This section describes the traffic flows on the network for each of the forecast years, for the peak hours, AADT and a comparison of the with and without scheme scenarios.

6.3.2 The figures included within the body of the report display the differences in flows between the 2017 base year and 2041 forecast years for AADT and AM Peak, PM Peak and busy day periods.

6.3.3 All other traffic flow figures are contained in the appendices.

Traffic flows in Area of Detailed Modelling

6.3.4 Traffic flow diagrams showing the Annual Average Daily Traffic (AADT) in the core scenario are included in Appendix I of the Transport Forecasting Package[20] for:

a. all forecast years (2026, 2031, 2041, 2051);

b. without scheme and with scheme scenarios; and

c. core growth scenarios.

6.3.5 The 24 hour AADT flow was calculated from the individual modelled hours (AM, IP, PM and Busy) and identified annualisation factors. This is a weighted factor to account for all time periods.

6.3.6 Traffic flow diagrams showing the average hourly flow are included in Appendix J of the Transport Forecasting Package[20] for:

a. the 2017 base year;

b. the forecast years 2026 and 2041;

c. all modelled time periods; and

d. without scheme and with scheme scenarios.

[20] Appendix C of the ComMA (Application Document 7.5)

Traffic flows - Without the Scheme

6.3.7 Modelled traffic flows for the 2017 base year and for the forecast years are set out in Appendix 6.1. Figure 6-1 summarises the forecast change in traffic flows, without the Scheme, between the model base year, 2017, and 15 years after the assumed opening year of the Scheme, 2041 and Figure 6-2 shows the percentage change forecast relative to the modelled 2017 traffic volumes.

6.3.8 For ease of reference, all traffic flow figures used in this Chapter are simplified schematics, with the A303 highlighted in green.

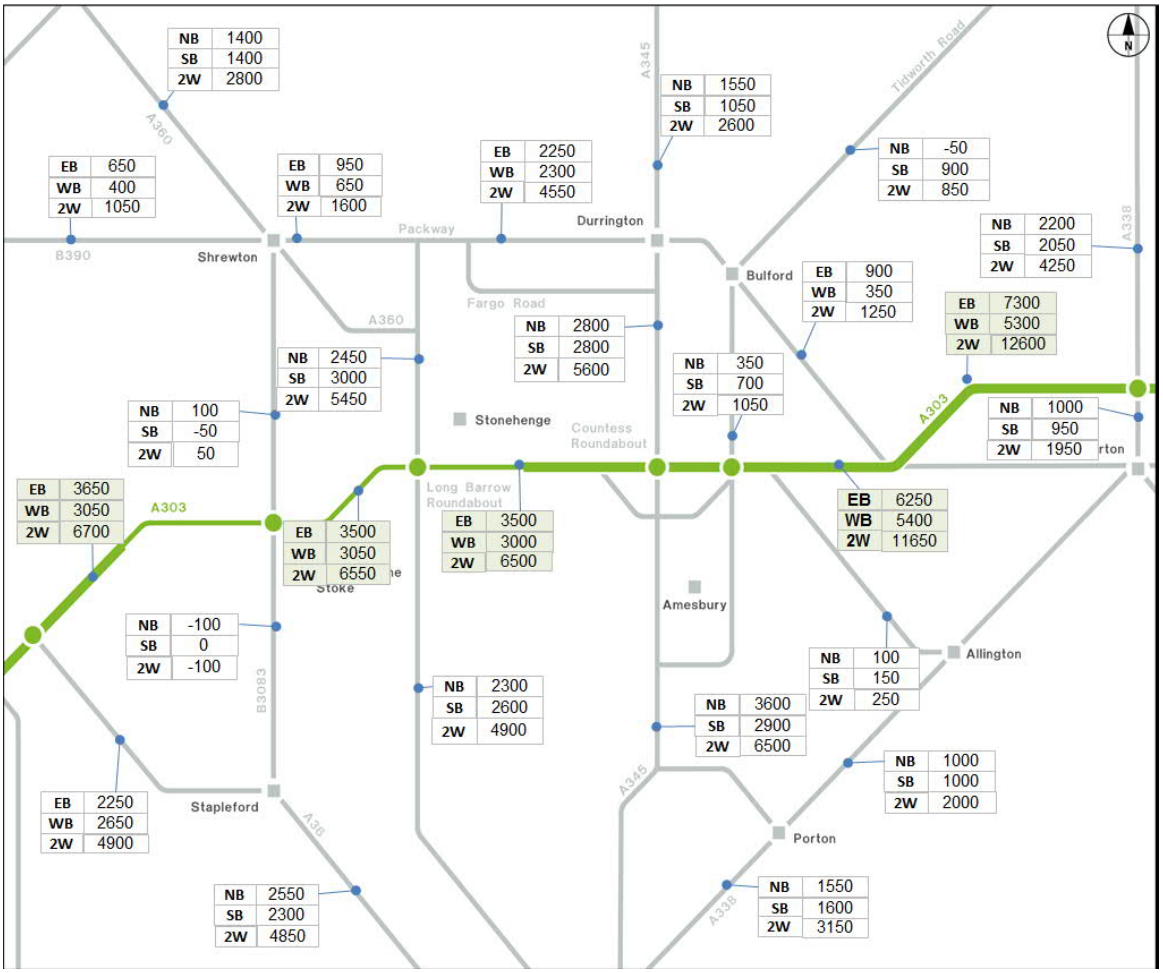


Figure 6-1: Forecast change in daily traffic 2017 – 2041 without the Scheme (Vehicles, AADT)

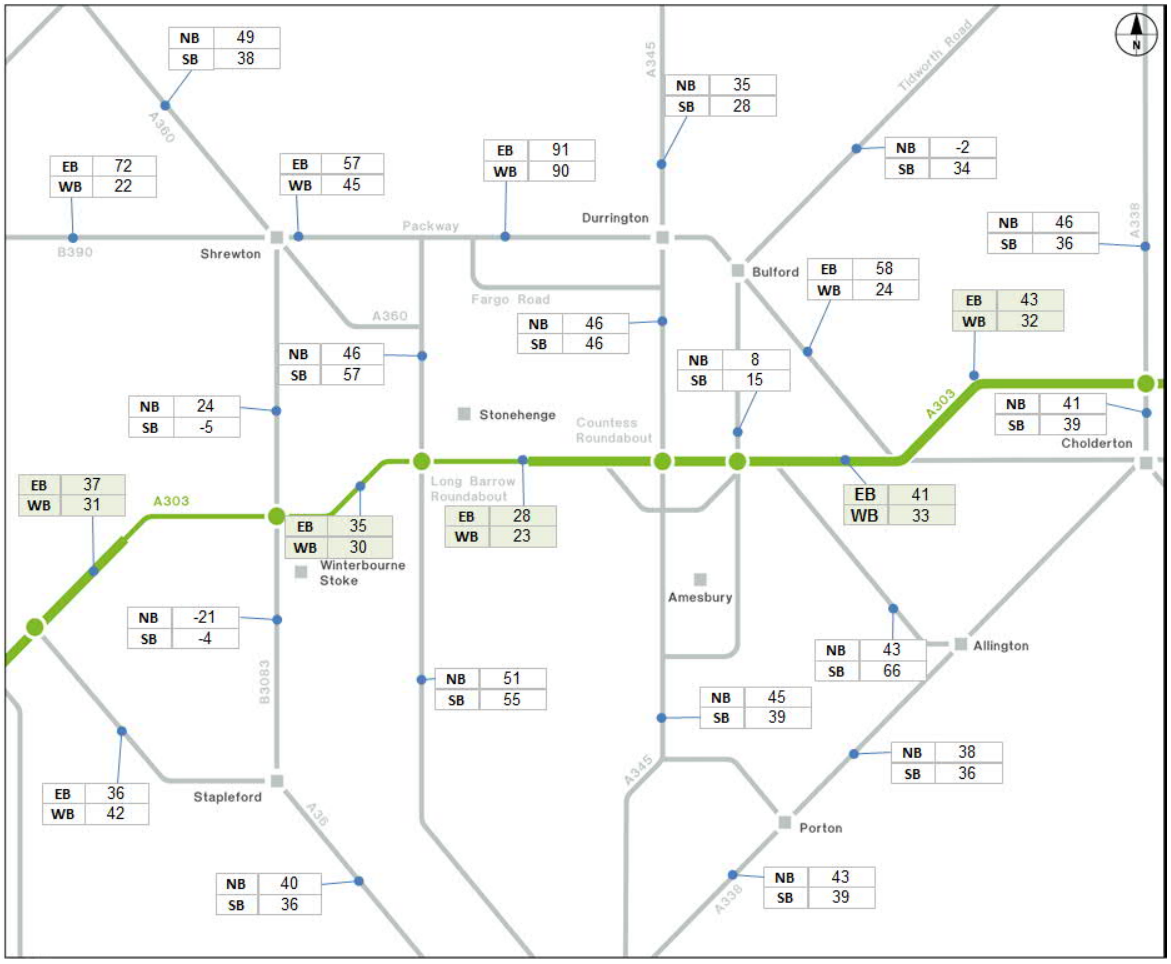


Figure 6-2: Forecast % change in AADT 2017 – 2041 without the Scheme

6.3.9 A notable change between 2017 and the 2041 baseline scenario is the increase in traffic on The Packway. As the A303 reaches capacity, trips being made in the area around the Scheme start to seek alternative routes, with The Packway being the most attractive alternative.

6.3.10 Traffic flows on the A303 are forecast to increase by between 23% and 43% depending on location, with eastbound flows forecast to increase by a higher proportion than westbound flows. Traffic flow increases on local roads are typically proportionally higher than on the A303 itself, with some exceptions, such as the B3083 between Stapleford and Shrewton.

Traffic flows - Impact of the Scheme

6.3.11 Figure 6-3 shows the change in daily traffic flows on the local road network forecast to result from the Scheme in 2041, by direction and for the total two way volume (2W).

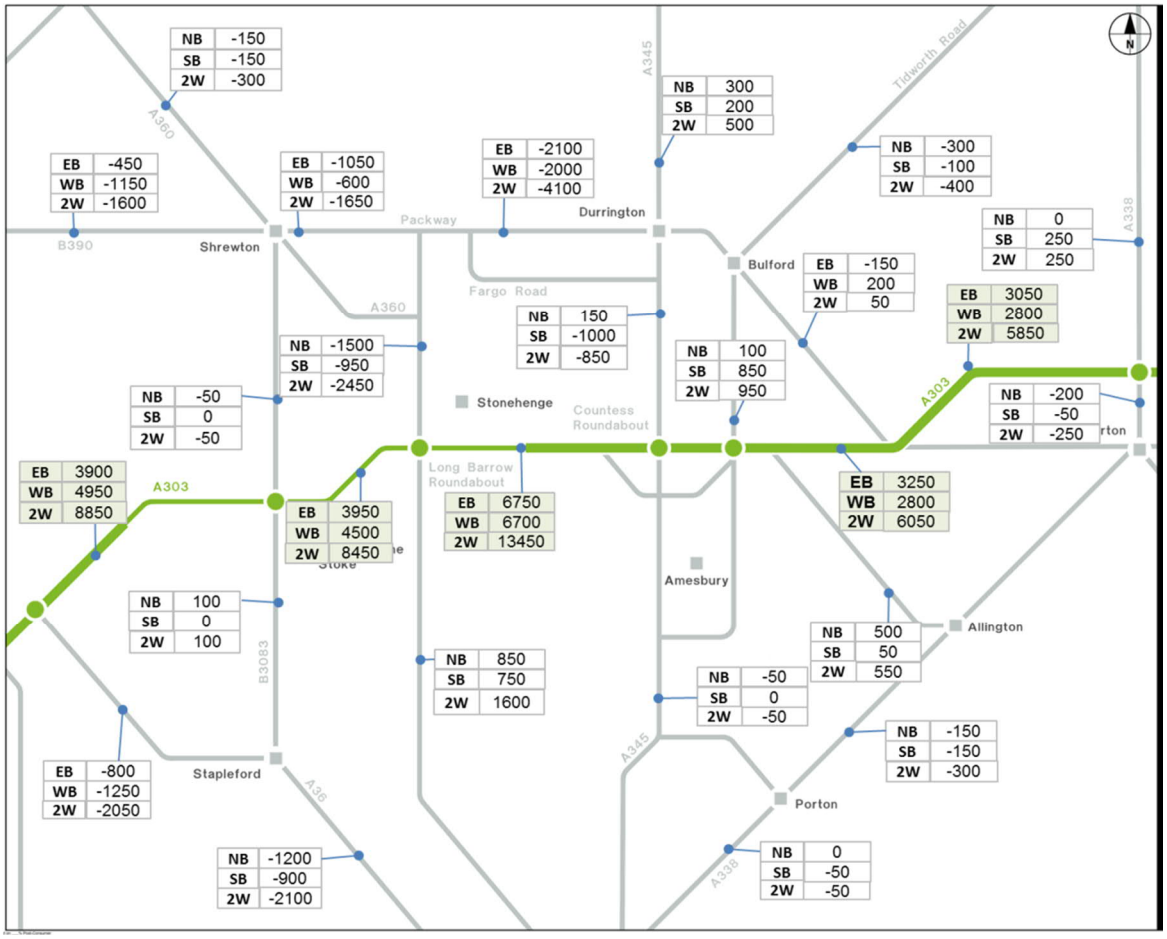


Figure 6-3: Change in daily traffic (2041 AADT vehicles) forecast to result from the Scheme

6.3.12 The modelling shows that the Scheme will enable significant increases in traffic volumes to use the A303 through increasing capacity and reducing delays. On the whole, this results in net reductions in traffic on local roads, although there are some increases as traffic diverts onto some routes to access the A303.

6.3.13 The main local impacts of the Scheme are the reduction of trips on the existing A303 alignment through Winterbourne Stoke (EB, -800 vehicles; WB, -1250 vehicles) and the reduction in trips on The Packway, shown in Figure 6-3.

6.3.14 This reduction along The Packway is complemented by other reductions north of the A303 including the B390 through Shrewton and the A360/B3086 between Longbarrow junction and Rollestone Cross. These changes represent a reduction of just over 40% of traffic that will be forecast to use these roads without the Scheme.

6.3.15 Little change in traffic is forecast for traffic flows on the B3083 north/south through Winterbourne Stoke, the main change being access to Berwick St James for the A303 west becoming to the south and via the A36. There is some re-routing at the Rolleston junction with vehicles forecast to access the A360 at Airman's Corner (Stonehenge Visitor Centre), rather than through the centre of Shrewton.

6.3.16 The Scheme is forecast to have little net impact on traffic volumes to the east of Durrington. While there are routeing changes evident on The Packway the increase in traffic from Bulford and Durrington accessing the A303 rather than

using The Packway is offset by a reduction in traffic from Amesbury accessing The Packway. The main change evident is a forecast increase in use of Salisbury Road between Bulford and Solstice junction (950 vehicles represents less than a 10% increase), together with a corresponding reduction (850 vehicles per day, about 5%) in traffic forecast to use the A345 between Durrington and Countess roundabout.

6.3.17 To the south of the A303 the largest change is forecast to be some re-routeing for areas to the north west of Salisbury to access the A303 /west via the A360 rather than the A36, due to the journey time savings delivered by the Scheme along the new Winterbourne Stoke Bypass relative to the existing route through Winterbourne Stoke. The forecast reductions of just over 2000 vehicles per day on the A36 and an increase in 1600 vehicles on the A360 represent a change of about 10%.

6.3.18 Within north Amesbury, the closure of the existing A303 means that Stonehenge Road can no longer serve traffic from Amesbury to the west. The dominant change is forecast to be re-routeing of traffic from the Woodford Valley and Stonehenge Road, instead to use Church Street and High Street to access the A303 via Countess roundabout with the Scheme, broadly 500 trips per day.

6.3.19 To the west of Amesbury, the Scheme will include stopping up of the direct connection between Allington Track and the A303 and instead providing a link to Equinox Drive within Solstice Park. While traffic volumes are low, this is forecast to improve access to north Amesbury and through Solstice junction to Bulford, with an increase of about 500 vehicles per day forecast to use Allington Track rather than taking alternative minor routes from the A338 to the A345.

6.3.20 The traffic forecasts indicate no material changes on the A345 south of Amesbury or A338 and other roads to the north of Salisbury (other than the re-routeing between A360 and A36 previously discussed). On busy days the forecasts suggest that there may be some small additional demand for the A338/A36 route, arising from delays on the A303 past Stonehenge without the Scheme, that the Scheme will alleviate.

6.3.21 Similarly to Figure 6-3 above, Figure 6-4, Figure 6-5 and Figure 6-6 illustrates the AM peak hours, PM peak hour and busy day traffic, respectively, forecast to result from the Scheme in 2041.

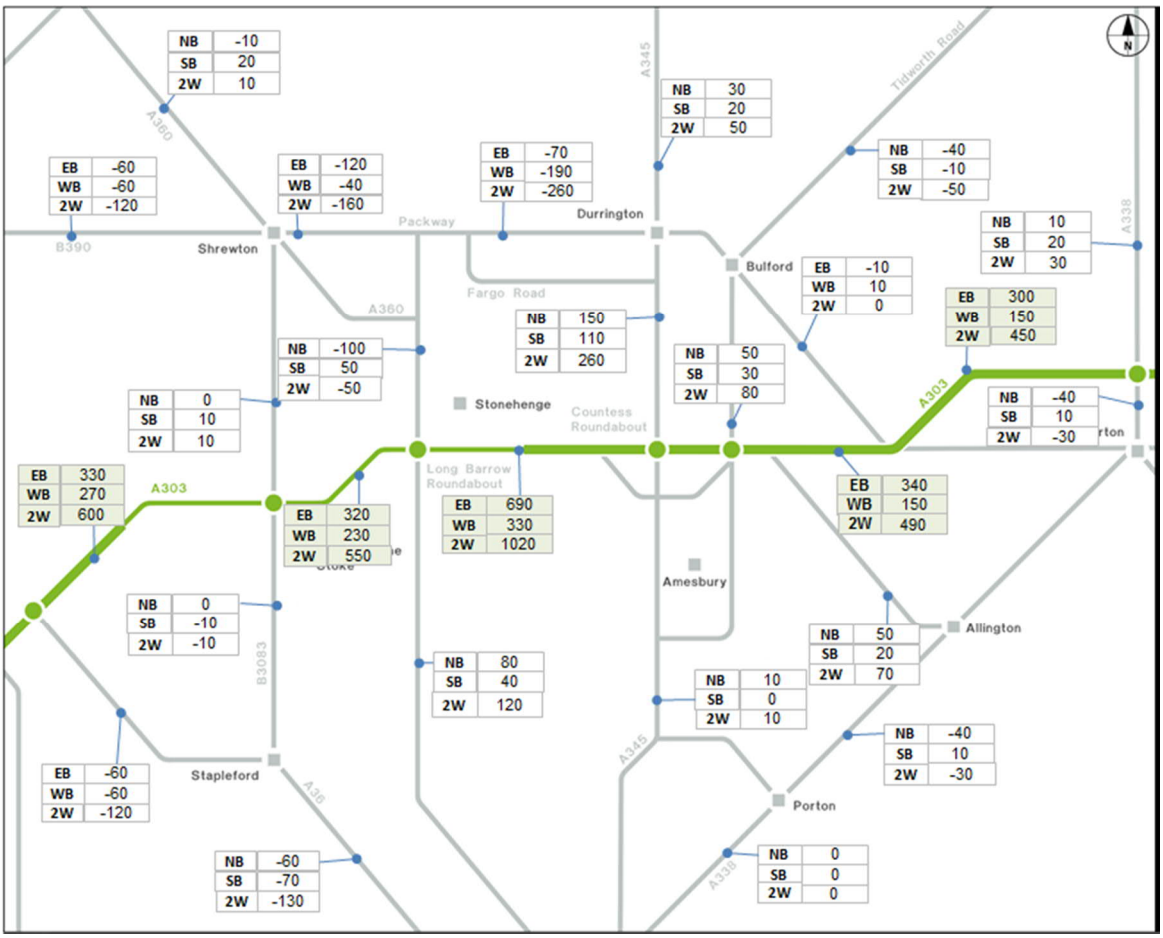


Figure 6-4: Change in daily traffic (2041 AM Peak Hour) forecast to result from the Scheme

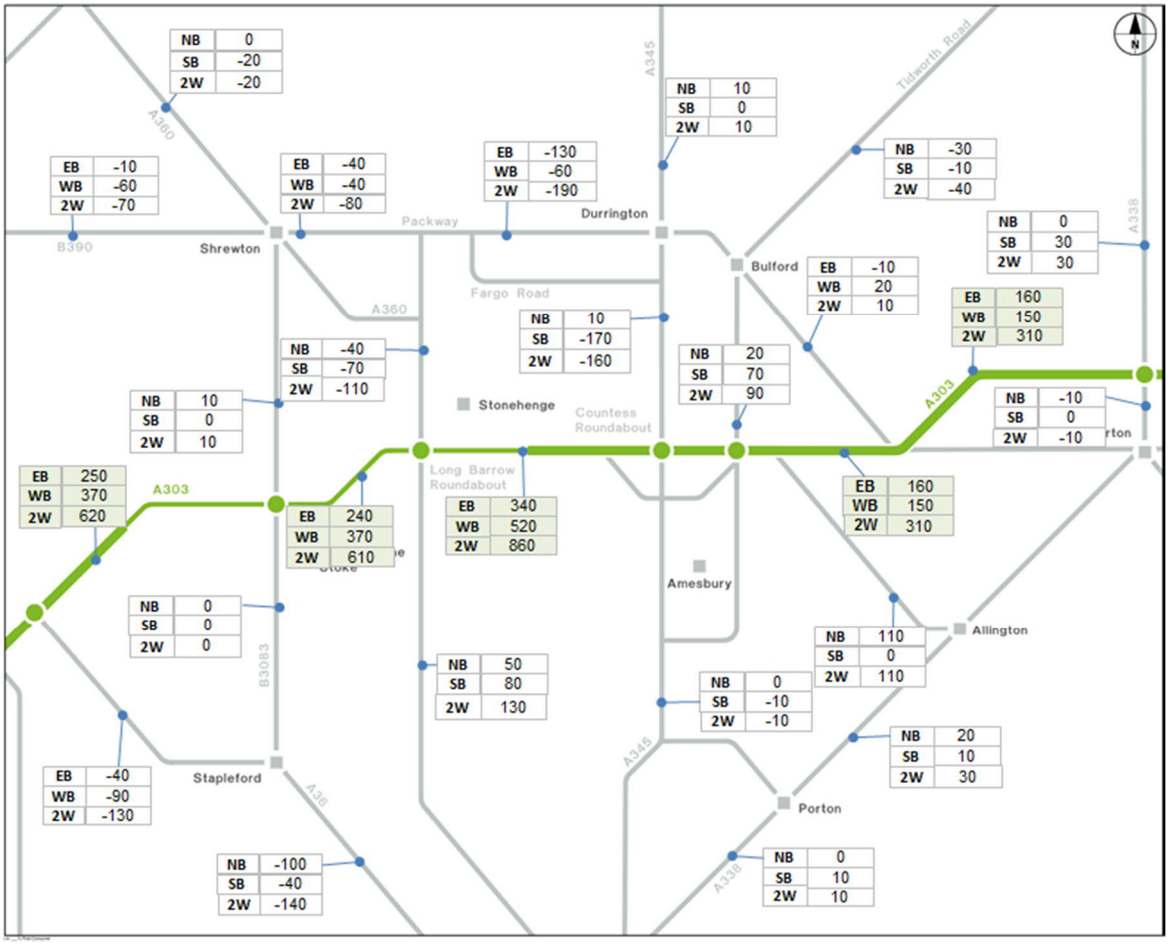


Figure 6-5: Change in daily traffic (2041 PM Peak Hour) forecast to result from the Scheme

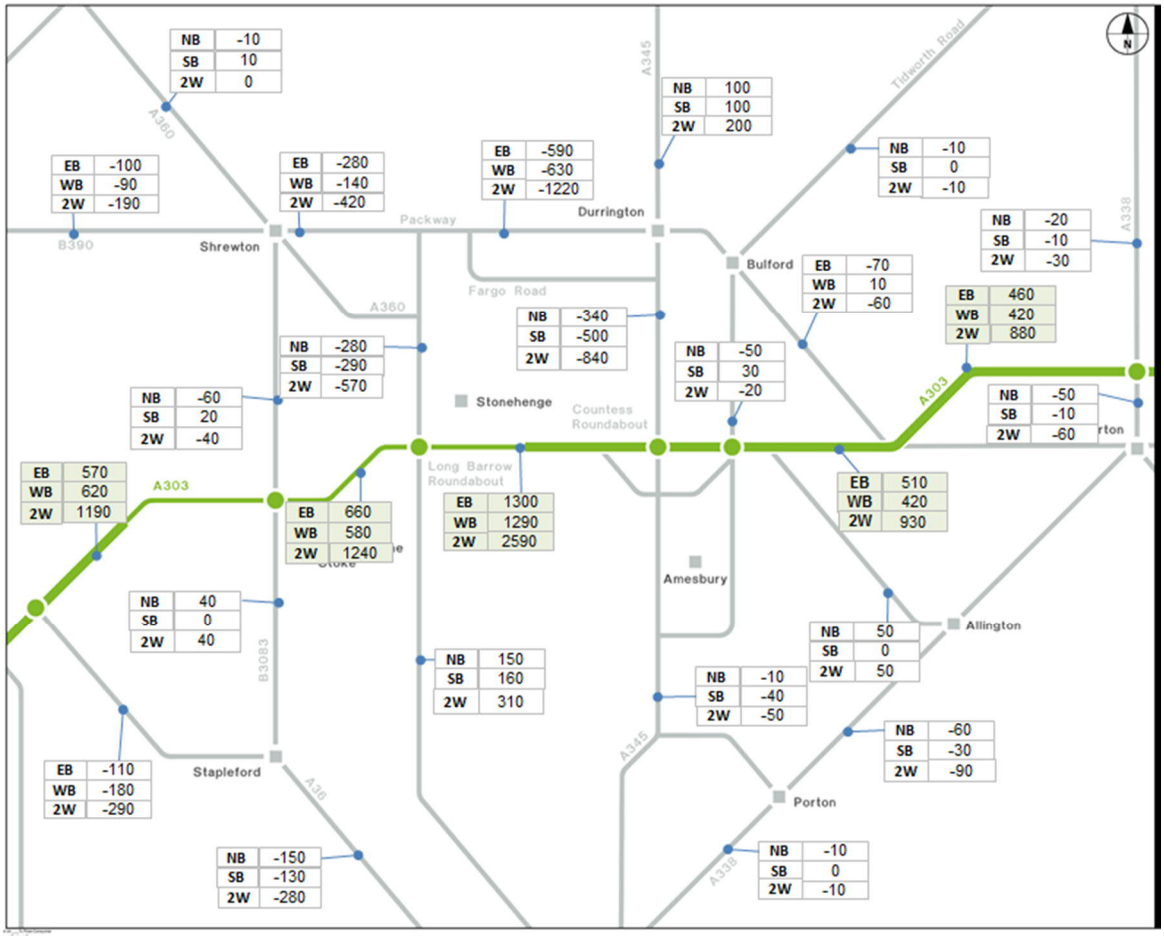


Figure 6-6: Change in daily traffic (2041 busy day) forecast to result from the Scheme

6.4 Link capacity

Overview

6.4.1 This section describes volume over capacity (V/C) and illustrates the differences in the V/C on the network in 2041 with the Scheme and without the Scheme.

Volume over capacity

6.4.2 Volume over capacity (V/C) is the means of assessing the performance of a road, with 100% being at capacity. When a link reaches or exceeds 85% capacity, it is already experiencing a level of congestion. The forecasts show that the Scheme reduces the number of links near or over capacity (V/C). Figure 6-7 shows the volume over capacity in percentage for links with values above 85% near Stonehenge for the 2041 core model in the AM peak, illustrated by the green lines. The thicker the green lines, the higher the V/C.

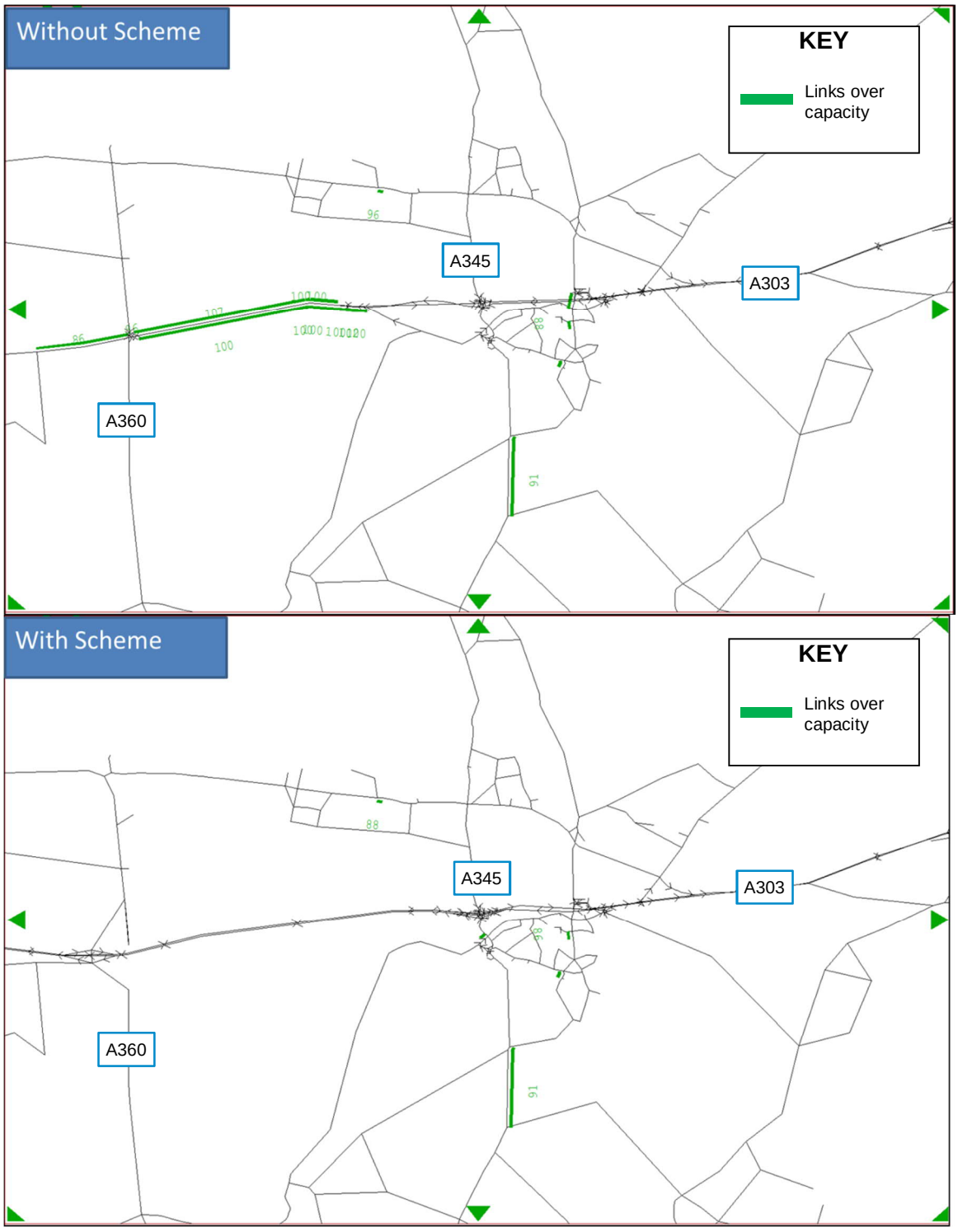


Figure 6-7: Volume over capacity in the 2041 core model AM peak

6.4.3 The figures illustrate that there are fewer links over capacity with the Scheme in place, and of those links that are over capacity, the degree to which they are over capacity either remains the same or slightly decreases. This is illustrated by the removal of the links over capacity on the eastern section of the A303, for example.

6.4.4 Table 6-1 shows the volume over capacity as a percentage across all time periods on the A303 mainline near Stonehenge.

Table 6-1: Volume over capacity on the A303 at Stonehenge

2041 Core Scenario			
Time Period	**Direction**	**Volume over capacity without Scheme**	**Volume over capacity with Scheme**
AM Peak	EB	107	50
	WB	100	41
Inter-peak	EB	101	40
	WB	100	41
PM Peak	EB	101	41
	WB	100	45
Busy day	EB	122	56
	WB	128	54

6.4.5 Table 6-1 indicates that without the Scheme in place, in 2041, the A303 mainline near Stonehenge is at 100% capacity or over, with the busy day scenario being the worst (128% in the WB direction). With the Scheme in place, in 2041, the A303 mainline is well under capacity, at 56% during the WB busy day scenario. This represents a substantial improvement in traffic capacity as a result of the Scheme.

6.5 Journey times

Overview

6.5.1 This section describes the assessments undertaken to understand the journey times on the network and the journey time routes used. The assessments compare the 2017 base journey times to 2026 and 2041 with and without scheme scenarios.

6.5.2 The section then goes further by undertaking sensitivity testing by assessing high and low growth scenarios to examine scheme performance under different growth scenarios. A further sensitivity test involved an alternative growth scenario assuming employment growth that is being proposed at Boscombe Down.

Introduction

6.5.3 Journey time assessments are an important metric in understanding how the Scheme will affect congestion levels and driver delay. This includes effects both from the capacity benefits of the Scheme itself and from traffic flow changes across multiple routes. Figure 6-8 and Figure 6-9 show the journey time routes considered in the Transport Forecasting Package[21].

[21] Appendix C of the ComMA (Application Document 7.5)

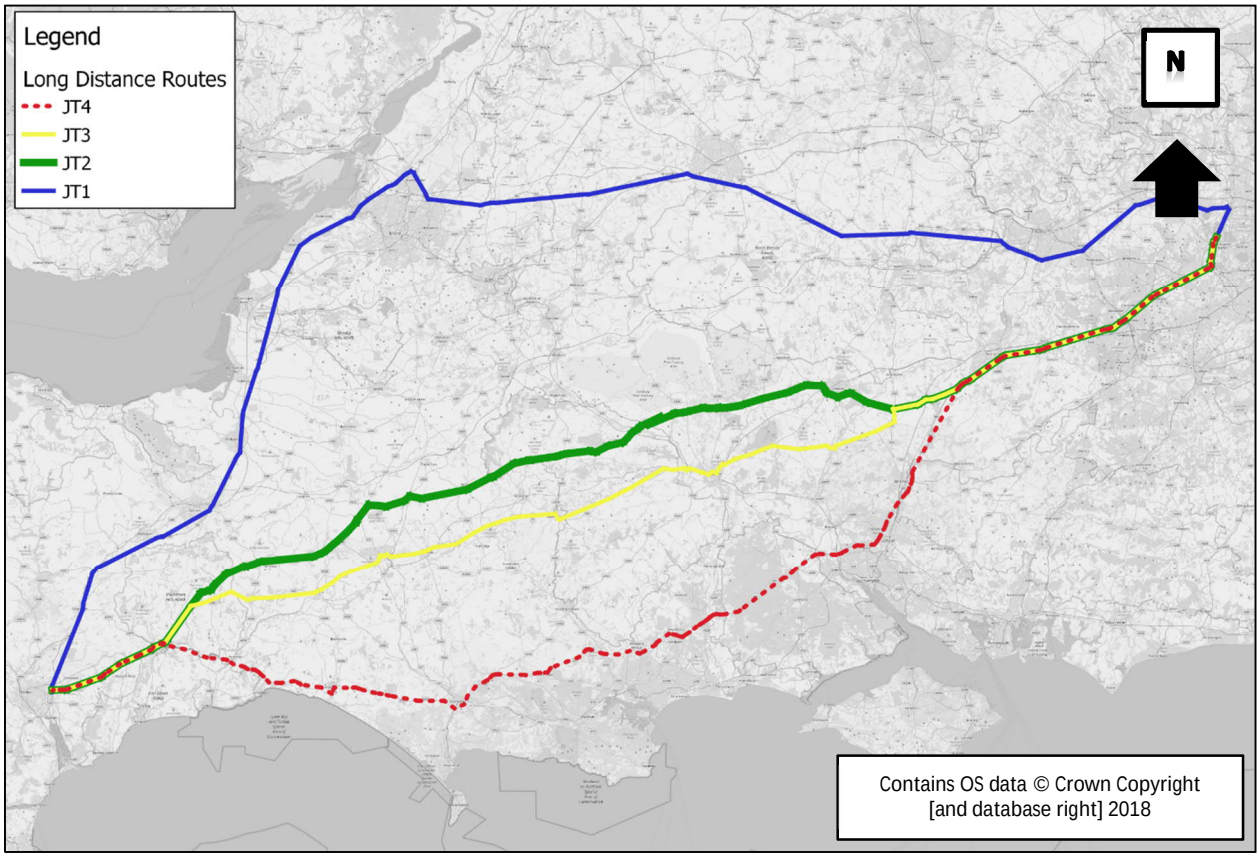


Figure 6-8: Journey time routes (long distance)

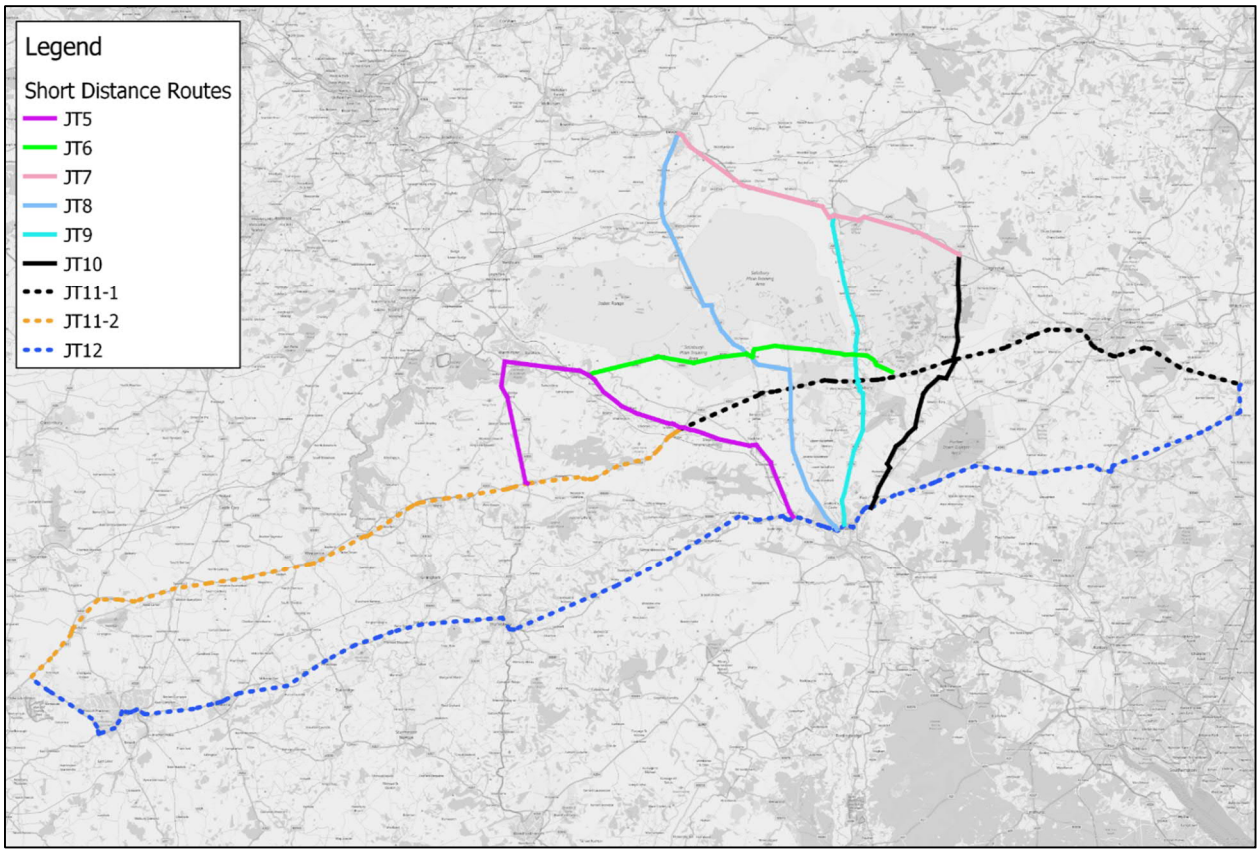


Figure 6-9: Journey time routes (short distance)

Overview of journey times

6.5.4 Table 6-2 shows journey times for 2017, 2026 and 2041 for the A303 between the A34 and A36, without the Scheme.

Table 6-2: A303 - A34 to A36 journey times, without scheme

Without scheme					
Route	**Time Period**	**Direction**	**2017 (hh:mm:ss)**	**2026 (hh:mm:ss)**	**2041 (hh:mm:ss)**
11-1 A303: A34 to A36	AM	WB	00:29:57	00:30:42	00:32:12
		EB	00:31:46	00:33:22	00:35:45
	IP	WB	00:30:21	00:31:03	00:32:24
		EB	00:30:09	00:30:57	00:32:39
	PM	WB	00:31:06	00:32:12	00:34:30
		EB	00:29:59	00:30:54	00:32:03
	Busy day	WB	00:40:36	00:43:24	00:50:32
		EB	00:37:57	00:42:33	00:48:53

6.5.5 Journey times are in the region of half an hour in both directions in all neutral month time periods in 2017, with journey times slightly higher in the eastbound direction in the AM peak, and westbound direction in the PM peak. In the busy day model, average journey times are around 41 minutes in the westbound direction and 38 minutes in the eastbound direction.

6.5.6 There are consistent forecast increases in journey times on the section of the A303 between the A34 and A36 for all neutral time periods between 2017 and 2041 without scheme scenarios; the increase in the 2041 forecast compared to 2017 is between two and nearly four minutes for neutral scenarios, although the increase in 2041 in the busy period is almost 10 minutes westbound and 11 minutes eastbound.

6.5.7 Table 6-3 illustrates the forecast journey times for the year 2041, with and without the Scheme.

Table 6-3: A303 - A34 to A36 journey times, 2041

2041						
Route	**Time Period**	**Direction**	**Without scheme (hh:mm:ss)**	**With scheme (hh:mm:ss)**	**Difference**	**% Difference**
11-1 A303: A34 to A36	AM	WB	00:32:12	00:27:55	-00:04:17	-13%
		EB	00:35:45	00:29:55	-00:05:50	-16%
	IP	WB	00:32:24	00:28:12	-00:04:12	-13%
		EB	00:32:39	00:28:23	-00:04:16	-13%
	PM	WB	00:34:30	00:29:46	-00:04:44	-14%
		EB	00:32:03	00:28:26	-00:03:37	-11%
	Busy Period	WB	00:50:32	00:31:05	-00:19:27	-38%
		EB	00:48:53	00:30:38	-00:18:15	-37%

6.5.8 There will be modelled journey time savings in both directions on the A303 between the A34 and A36 as a result of the Scheme. This applies to all time periods during the neutral months, with journey time savings amounting to over four minutes in all cases except PM eastbound. For a busy day, the average journey time saving due to the Scheme approaches twenty minutes in each direction.

6.5.9 This demonstrates that the Scheme will deliver significant journey time benefits in all peaks. The benefits most pronounced in the busy period, where substantial journey time savings will result in journey times being comparable with the neutral month time periods where there will be minimal congestion and delay.

Sensitivity Test – High and alternative growth journey times

6.5.10 As previously stated, sensitivity testing has been undertaken to examine scheme performance under different growth scenarios. The results of these sensitivity tests are discussed in detail in the Transport Forecasting Package[22] . Typically, traffic flows on the A303 in the "high growth" scenario are between 5% and 6% higher than in the core scenario. Traffic flows are more variable in comparison with the core scenario in the "alternative growth" scenario, with changes ranging from a negligible reduction of -1% eastbound between Allington Track and the A34, and an increase of 6-7% westbound on the same section.

6.5.11 Table 6-4 shows 2041 journey times for the sensitivity test scenarios, compared with the core scenario.

Table 6-4: A303 - A34 to A36 journey times, 2041 comparison of high and alternative growth scenarios

			2041 (hh:mm:ss)			
Route	Time Period	Direction	Core Scenario Without scheme	With scheme		
				Core growth	Alternative local growth	High Growth
11-1 A303: A34 to A36	AM	WB	00:32:12	00:27:55	00:28:09	00:28:12
		EB	00:35:45	00:29:55	00:29:57	00:30:34
	IP	WB	00:32:24	00:28:12	00:28:19	00:28:30
		EB	00:32:39	00:28:23	00:28:24	00:28:42
	PM	WB	00:34:30	00:29:46	00:30:06	00:30:41
		EB	00:32:03	00:28:26	00:28:31	00:28:50
	Busy Day	WB	00:50:32	00:31:05	00:31:17	00:31:50
		EB	00:48:53	00:30:38	00:30:41	00:31:14

6.5.12 The results show that the forecast journey times in the high and alternative growth scenarios are similar with the Scheme to the core growth scenario, and represent improvements over the without scheme scenario.

6.5.13 The forecast journey time savings for the high growth scenario with the Scheme in place are forecast to be greater than in the core scenario as journey times

[22] Appendix C of the ComMA (Application Document 7.5)

without the Scheme are expected to be greater with high growth. This benefit is most pronounced in the busy day modelled period.

6.5.14 The results show that the Scheme can accommodate higher levels of background traffic growth and still provide journey time benefits. Thus demonstrating the resilience of the Scheme. Indeed, the journey time benefits will be greater for higher levels of background growth due to the increasing levels of congestion that will occur without the Scheme in these scenarios.

Local journey time routes

6.5.15 Full details of the journey times for these routes are included in Appendix K of the Transport Forecasting Package[23]. The local routes are represented by routes five to ten.

6.5.16 Tables 5-20 and 5-21 in the Transport Forecasting Package[23] provide selected local journey times for the year 2026 and 2041 respectively.

6.5.17 The 2026 forecasts indicate that there is little change in most local journey times as a result of the Scheme. There is an increase in modelled journey times of around 30 seconds in all time periods for the route on the A360, which is a negligible impact. The increase in journey time is due to the length of this route being extended by 0.4km around Longbarrow junction with the Scheme in place.

6.5.18 In the busy period the journey times on The Packway are forecast to improve with the Scheme by over two minutes in both directions. This is due to traffic routeing via the A303 with the Scheme instead of using The Packway. There is also a reduction in journey times of almost a minute on the A345 southbound.

6.5.19 In the 2041 forecasts, journey times as a result of the Scheme improve further on The Packway, where average savings are forecast to increase to over three minutes westbound and nearly four minutes eastbound during a busy day and the A345 southbound, where savings increase to almost two minutes. The journey time increases on the A360 remain at around 30 seconds, a similar level to 2026.

6.5.20 The journey time routes illustrate a modest net improvement to local travel conditions arising from the Scheme, together with relief of rat-running of through traffic on the local roads, particularly during busy days.

6.5.21 The following sections present the forecast operational performance of individual junctions / links of the A303 Scheme, focusing on absolute capacity performance in the design year of 2041 with analysis of relative scheme impact in the opening year 2026 where appropriate. The performance of the Scheme is explained for each section of carriageway working west to east along the A303 corridor.

6.5.22 The results set out here are generated by the forecast VISSIM operational models, and cover a ‘busy day’ typical of a Friday summer period between 12:00 and 18:00hrs, and neutral month AM, Inter-peak and PM peak periods.

6.6 Winterbourne Stoke

6.6.1 This section describes the Scheme improvements at Winterbourne Stoke and its operational performance.

[23] Appendix C of the ComMA (Application Document 7.5)

6.6.2 The Scheme will divert the existing A303 through Winterbourne Stoke on to the northern Winterbourne Bypass. Through traffic will be removed from the existing road and traffic use of the existing A303 through Winterbourne Stoke becomes more 'local' in nature as indicated in Figure 6-10.

Figure 6-10 Design of Winterbourne Stoke

6.6.3 The modelling indicates that there are no operational concerns with the downgraded existing A303 or B3083 under the Scheme, even on a busy day.

6.6.4 The new A303 Winterbourne Stoke Bypass is part of the upgraded A303 and modelling indicates no operational issues with this section of the Scheme in any of the modelled periods.

6.7 Longbarrow junction

6.7.1 This section describes the Scheme improvements at Longbarrow junction and its operational performance including speeds and queueing at and around the junction. It also illustrates an update to the junction in order to reduce queueing resulting with the original junction design.

6.7.2 The proposed Longbarrow junction arrangement consists of a dumb-bell roundabout; two roundabouts joined by a two lane dual carriageway, separated by a central reservation. Both roundabouts feature two circulatory lanes.

6.7.3 In the 'busy day' peak and 'neutral' AM peak models the forecast traffic flows indicated the critical interaction will be between southbound flows from the A360 with opposing traffic using the northern roundabout, leading to queues on the A360 southbound.

6.7.4 No notable queues are observed during the 'normal' IP or PM peak periods. The Transport Forecasting Package[24] compares journey times through Longbarrow junction for each 'normal' AM, PM, inter-peak and average 'busy day' periods. The AM and 'busy day' peak periods are forecast to have an average journey time approximately one minute greater than the uncongested inter-peak and PM periods in the southbound direction. Therefore the TA focuses on the AM and "busy day" periods for ease of reference.

[24] Appendix C of the ComMA (Application Document 7.5)

6.7.5 The original design proposed a short two lane flare on the A360 southbound approach to the northern roundabout. Figure 6-11 shows average speeds through Longbarrow junction during the 2041 AM peak and 2041 'busy day' peak periods, showing the queues on the A360 southbound.

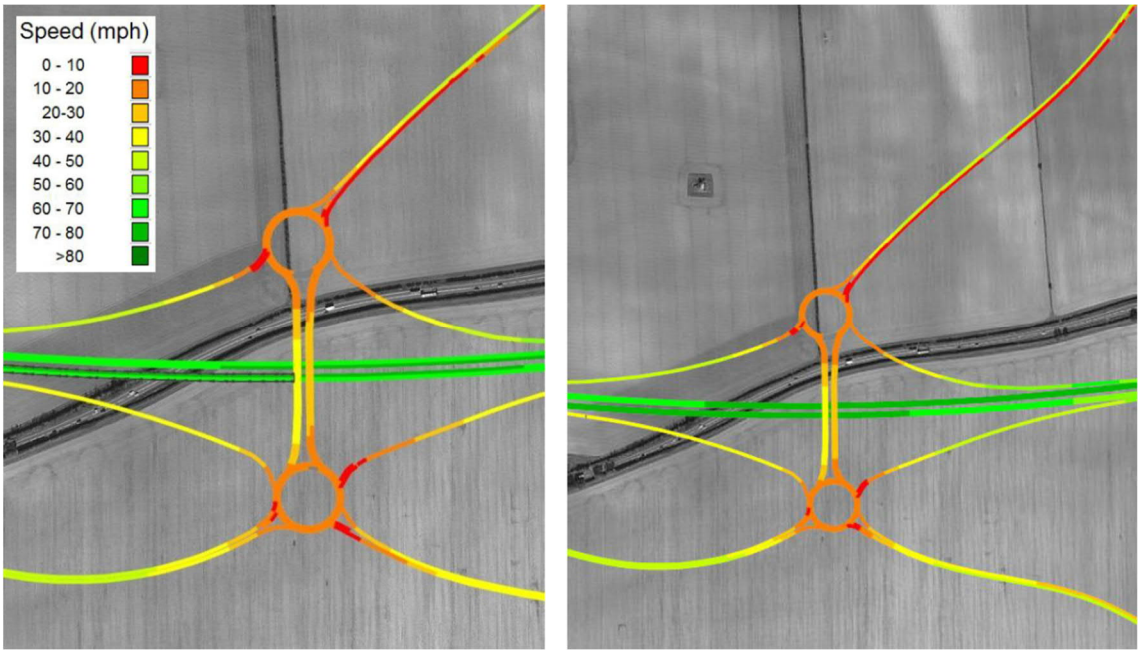


Figure 6-11: Longbarrow junction average speeds (mph): AM (left), busy day (right)

6.7.6 The Scheme was refined to provide additional capacity on the A360 southbound approach, with the provision of a dedicated left turn lane from the A360 to the eastbound on-slip. Figure 6-12 shows the average speeds through Longbarrow junction with a dedicated left turn lane from A360 to the eastbound on-slip.

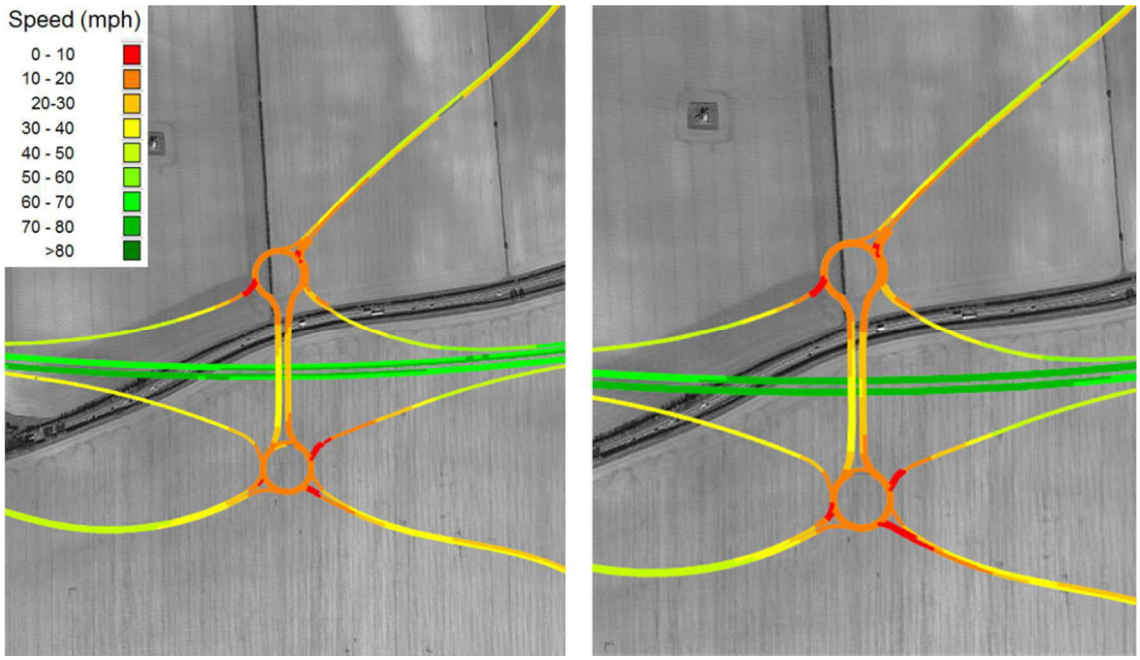


Figure 6-12: Updated scheme test – Longbarrow junction average speeds (mph): AM (left), busy day (right)

6.7.7 This design revision results in limited queues on the approach to junctions, allowing the design to operate without forecast congestion. There will be no significant congestion on the A303 slip roads which is important to avoiding impact on the A303 mainline.

6.8 Stonehenge tunnel

6.8.1 The Stonehenge tunnel is modelled with a 70mph speed limit under average speed camera control, with two lanes in each direction.

6.8.2 There are no modelled operational issues on the approach to, or within, the tunnel section in each of the 'busy day' or neutral AM, IP and PM modelled peak periods.

6.9 Countess roundabout

6.9.1 This section describes the Scheme improvements at Countess roundabout and its operational performance, detailing speeds and any queuing at and around the junction. There is little variation in journey time between each period and no forecast capacity issues in any peak.

6.9.2 Under the Scheme proposals the mainline A303 is diverted onto a two lane dual carriageway overpass which removes east-west traffic from the roundabout itself. Whilst there is construction required for the ramps connecting the roundabout to the main carriageway, this is to retain connectivity, and the operational modelling accordingly represents no physical change to the highway layout at Countess roundabout itself.

6.9.3 The construction of the new carriageway removes the existing underpass for pedestrian movements and instead the Countess roundabout scheme design provides for non-motorised users at-grade. Given the need for pedestrian crossings for non-motorised users the signals are proposed to be retained.

6.9.4 The traffic signal staging and inter-greens are unchanged from the existing operation; the signal timings are optimised to accommodate the new traffic volume distributions present in the with scheme future year scenarios.

6.9.5 Figure 6-13 shows average speeds through the Countess roundabout during the 2041 'busy day' model and indicates there are no operational concerns.

Figure 6-13: Countess roundabout average speeds (mph): Busy day

6.9.6 Further detail is provided in the Transport Forecasting Package[25], where Figure 611 compares the north / south journey times through Countess roundabout along the A345 for each 'normal' AM, PM, inter-peak and average 'busy day' periods in the with scheme future year scenario. The graphs show there is very little variation in journey time between each period and no forecast capacity issues in any peak.

6.10 Solstice Park junction

6.10.1 This section describes the performance of the Solstice Park junctions in 2041 with the Scheme, in the AM Peak, PM Peak and busy day periods. The section includes the impacts of the queuing of the southern junction on the A303 mainline and potential design options to improve junction performance and remove the impact on the A303.

6.10.2 Solstice Park consists of a 'northern' roundabout (north of the A303 mainline) with approaches from Porton Road, Salisbury Road and the A303 eastbound off-slip, and three 'southern' roundabouts (south of the A303 mainline) stretching from the A303 westbound off-slip/ Equinox Drive to London Road /Porton Road. Under the Scheme proposals, the highway network at Solstice Park is unchanged from the existing layout.

6.10.3 Under the current junction arrangements model forecasts indicate that the northern and southern London Road / Porton Road roundabouts will operate over capacity with or without the Scheme, with the Scheme itself not having a severe impact. This is detailed in the following paragraphs.

Solstice Park northern roundabout

6.10.4 The northern roundabout at Solstice Park will experience southbound queueing on Salisbury Road by 2041 during weekday peak periods. In the AM period the

[25] Appendix C of the ComMA (Application Document 7.5)

model shows queues approaching 1km, and in the PM period queue lengths exceed 300m. These queues are forecast to occur with or without the Scheme.

6.10.5 Operational analysis demonstrated that the AM peak is the “worst case” time period for the Solstice Park northern roundabout and thus this TA focuses on the AM peak.

6.10.6 Figure 6-14 shows average speeds through the Solstice Park junction with the Scheme during the 2041 AM period and indicates the southbound queueing on Salisbury Road.

Figure 6-14: Solstice Park average speeds (mph): AM period

Solstice Park southern roundabout (London Road / Porton Road / Solstice Park Avenue)

6.10.7 The Solstice Park south-western roundabout between London Road / Porton Road / Solstice Park Avenue is forecasting queueing on the westbound Solstice Park Avenue approach during the 2041 Do Something ‘busy day’ period, with queues extending back to the A303 westbound mainline.

6.10.8 On a busy day without the Scheme, queues form blocking back from Stonehenge. These are forecast, without the Scheme, to extend back past Solstice Park junction, by 2041. The Scheme removes this constraint. However the demand forecast to use Solstice Park junction is also forecast to exceed its current capacity by 2041 (with or without the Scheme). One consequence of this constraint is that on busy days queues could block back from the junction onto the westbound A303 carriageway.

6.10.9 Figure 6-15 shows average speeds through the Solstice Park junction during the 2041 busy day and indicates the westbound queueing.

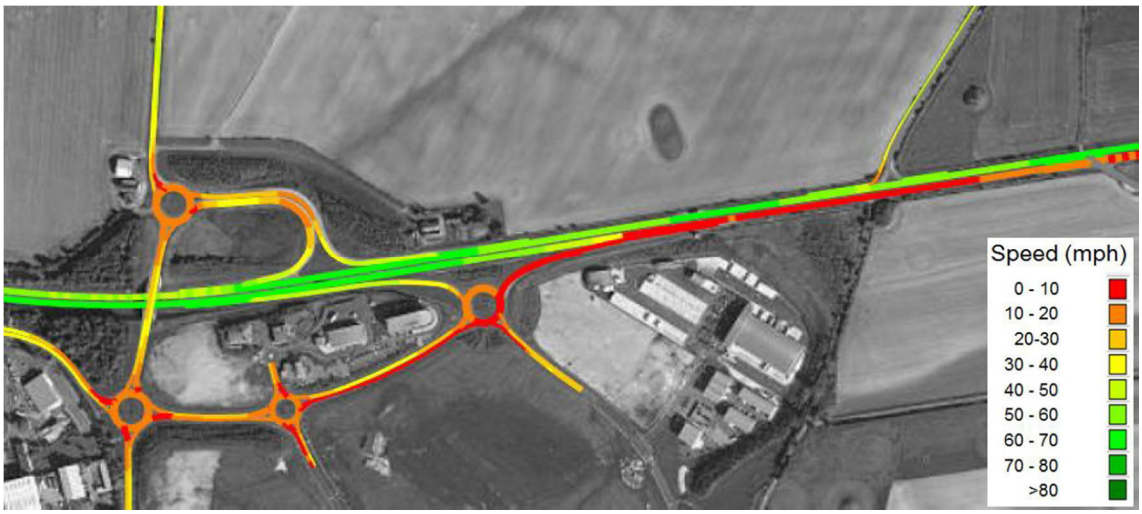


Figure 6-15: Solstice Park average speeds (mph): Busy day

6.10.10 The average 'busy day' journey times will experience delay of approximately three minutes due to the congestion on Solstice Park Avenue extending onto the mainline.

Solstice Park northern and southern roundabout – Potential solutions

6.10.11 Highways England is the responsible authority for this junction and, as such, has an obligation to both review development traffic impacts as they occur and, through the planning system, agree mitigation for proposed development plans as part of their responsibility to maintain the operation of the network to acceptable standards.

6.10.12 Assuming that, through the standard development and planning processes, decisions are taken to augment the capacity of Solstice Park junction, consideration of potential improvements which could be made to the current layout, have been modelled. It should be noted that the capacity issues are not as a result of the Scheme and therefore any junction upgrades do not form either part of the Scheme or a mitigation requirement of the Scheme. This modelling has been undertaken to demonstrate that this issue could be mitigated in future.

6.10.13 To alleviate the southbound congestion in the AM and PM periods on Salisbury Road, the two lane entry flare has been extended to 25m and a two lane exit assumed on the exit to the overbridge, 40m in length. This allows two lanes to be used for the southbound movement around the roundabout.

6.10.14 Figure 6-16 shows the average speeds in the AM period with the potential network changes at the northern Solstice Park roundabout.

Figure 6-16: Potential solution - Solstice Park average speeds (mph): AM period

6.10.15 This option addresses the southbound congestion on Salisbury Road. The change does result in increased levels of congestion southbound on the A303 overbridge, indicated by the orange colouring; however queues do not impact on the A303 eastbound off-slip.

6.10.16 To alleviate the westbound congestion in the 'busy day' period on Solstice Park Avenue, a potential option with two lanes running from the off-slip through to the roundabout junction with Porton Road in the westbound direction was modelled. This change will allow two lanes to be used for the ahead movement through the two Solstice Park roundabouts with Equinox Road and Meridian Way.

6.10.17 Figure 6-17 shows the average speeds in the 'busy day' model with the potential network amendments to Solstice Park Avenue.

Figure 6-17: Potential solution - Solstice Park average speeds (mph): Busy period

6.10.18 This shows that potential network amendments to Solstice Park Avenue will resolve the A303 mainline queuing issue.

Solstice Park summary

6.10.19 Under the current junction arrangements model forecasts indicate that the northern and southern (London Road / Porton Road) roundabouts will operate over capacity with or without the Scheme. This is not as a result of the Scheme itself and therefore mitigation or scheme amendments are not required as part of this scheme.

6.10.20 Highways England is the responsible authority for this junction and, as such, has a responsibility to maintain the operation of the network to acceptable standards. Given the potential impacts on the A303 mainline which will begin to occur between 2026 and 2041, with or without the Scheme, it is important to understand potential requirements to address this issue. Assuming that, through the standard development and planning processes, decisions are taken to augment the capacity of the Solstice Park junctions, then Solstice Park is shown to operate within capacity.

6.10.21 The improvements assumed in the assessment of Solstice Park are:

a. northern roundabout southbound approach from Salisbury Road entry flare extended to 25m, and a two lane exit assumed on the exit to the overbridge, 40m in length - and to be provided by 2026; and

b. southern roundabouts two lanes running from the off-slip through to the roundabout junction with Porton Road in the westbound direction - to be provided between 2026 and 2041.

6.10.22 This demonstrates that improvements can be delivered to address these capacity issues. The details of the design of these improvements will be determined through the appropriate technical work by the relevant scheme promoters at such a time as they are progressed.

6.10.23 In summary, the modelling presented shows that, whilst there will be capacity issues at Solstice Park junction between 2031 and 2041, these issues will be caused by the additional development assumed to come forward during the forecast period and is not as a result of the Scheme. This Transport Assessment has undertaken sensitivity tests to indicate that solutions to this issue are feasible. Delivery of any necessary capacity increase at Solstice Junction will routinely be considered as part of the planning process as developments come forward over time.

A303 mainline by Double Hedges

6.10.24 The mainline A303 eastbound is on a climbing gradient up to the merge section with the A3028 Double Hedges.

6.10.25 Under the Scheme proposals there is a design change to lengthen the merging section for safety reasons only, and hence this has not been represented in the forecast year ‘with scheme’ models.

6.10.26 The modelling shows no issues with slow moving traffic due to the gradient.

6.11 A303 mainline

6.11.1 Initial model runs indicated the westbound mainline average 'busy day' journeys will be delayed by approximately three minutes due to the congestion on Solstice Park Avenue extending onto the mainline.

6.11.2 Eastbound and westbound journey times were compared on the A303 with scheme 2041 future year scenario with capacity improvements at Solstice Park.

6.11.3 For both westbound and eastbound, there is little difference in journey time between AM, PM, inter-peak and average 'busy day' with the Scheme, assuming no blocking back from Solstice Park junction. This demonstrates that the A303 will be operating in free-flow conditions with no sources of delay in any of the modelled peak periods. This is commensurate with the findings of the strategic Model journey time assessments.

6.12 Rollestone Cross junction

6.12.1 This section describes the Rollestone Cross junction improvements and its operational performance in 2041 with scheme.

6.12.2 The Scheme proposals which have been tested at the Rollestone Cross junction are indicated in Figure 6-18. The junction is re-aligned making The Packway and B3086 the unopposed route with two T-junctions; one for access to Rollestone Camp and the other to join with The Packway/London Road. The speed limit on the bend is reduced from national speed limit to 40mph.

Figure 6-18: Modelled Rollestone Cross junction design

6.12.3 The most recent scheme proposals at the Rollestone Cross junction were revised as indicated in Figure 6-19. This retains The Packway and B3086 as the unopposed route, but includes a single priority junction for access to Rollestone Camp and The Packway / London Road. This design change will not change the conclusions drawn from the forecast models.

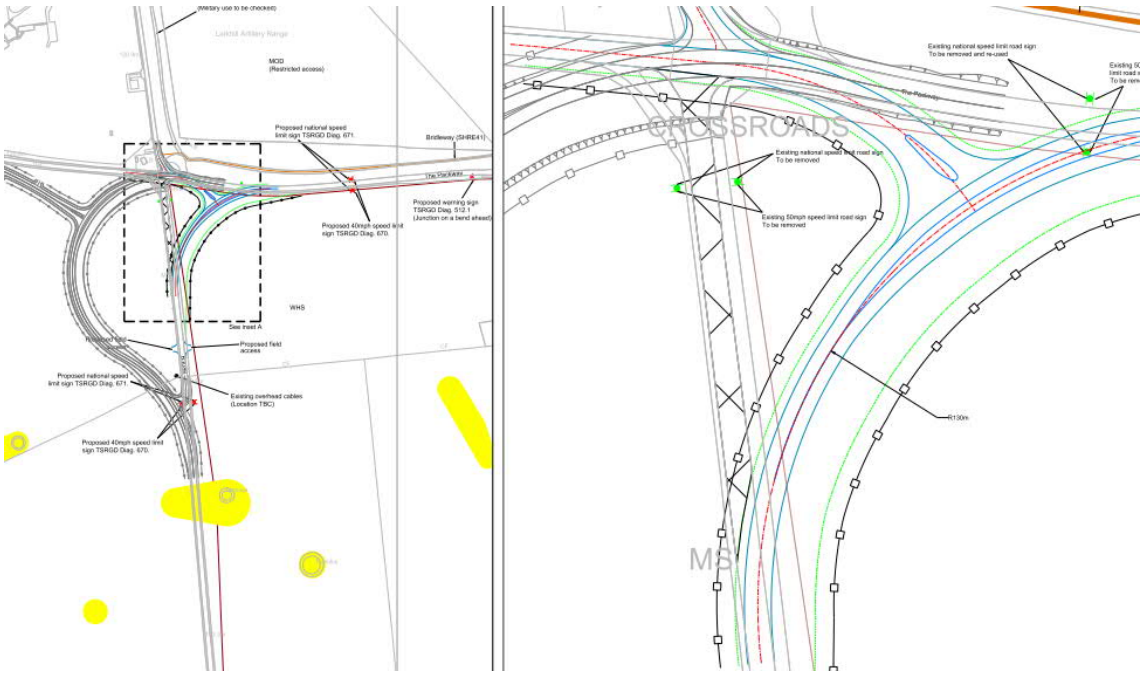


Figure 6-19: Rollestone Cross junction design

6.12.4 Figure 6-20 shows average modelled speeds through the Rollestone Cross junction during the 2041 AM period.

Figure 6-20: Rollestone Cross average speeds (mph): AM period

6.12.5 There are no operational issues at Rollestone Cross junction in any of the modelled peak periods.

6.13 A345/ The Packway roundabout

6.13.1 This section describes the performance of the A345/The Packway in 2041 and compares between with and without scheme scenarios. It also includes a potential scenario to reduce the minor congestion on one arm of the roundabout.

6.13.2 Under the Scheme proposals, the highway network at The Packway roundabout is unchanged from the existing layout.

6.13.3 Figure 6-21 shows average speeds forecast through The Packway roundabout during the 2041 AM period.

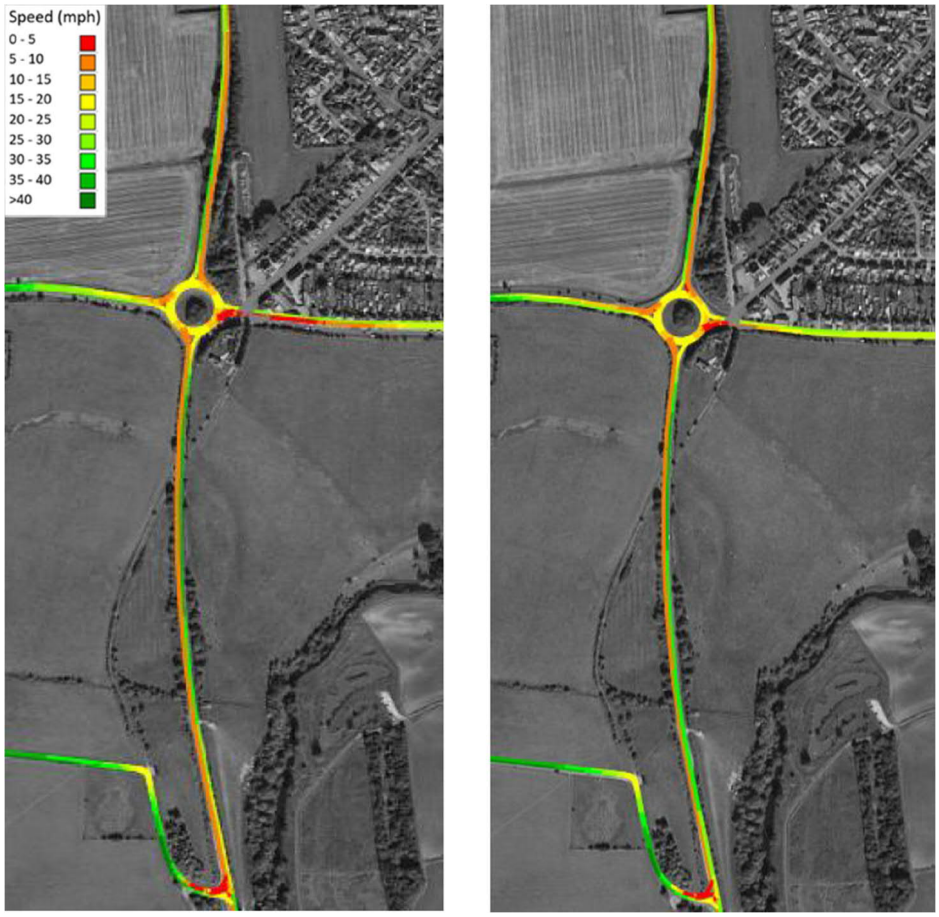


Figure 6-21: A345/The Packway average speeds (mph): AM period with scheme (left) and without scheme (right)

6.13.4 This junction is forecast to experience congestion in the 2041 AM 'with scheme' and 2041 AM 'without scheme' models. There is a consistent slow moving queue modelled northbound on Countess Road, and queues form and disperse on all other arms. Queues on the approaches to this roundabout cause queuing on side roads, including Fargo Road and Stonehenge Road, due to blocking back from the roundabout.

6.13.5 In the PM 2041 with scheme there is a slight impact on the eastern arm, but not severe, with no change on other arms.

6.13.6 The results show that, whilst there will be capacity issues in 2041, the impact of the Scheme will not be "severe" and therefore no mitigation is required.

A345/The Packway roundabout – Potential solution

6.13.7 As with the Solstice Park junctions, potential solutions to this issue which could be implemented by Wiltshire Council have been considered. This exercise suggests that improvements to The Packway/A345 roundabout could be made to alleviate the congestion. The provision of two lanes for the northbound movement will reduce the level of queueing modelled on Countess Road; the flare on approach is 20m. Some congestion will remain on the A345 southbound into the roundabout and westbound on Larkhill Road.

6.13.8 Figure 6-22 shows the average speeds in the AM period with the potential network changes at the A345/The Packway roundabout with the Scheme.

Figure 6-22: Potential solution – A345/The Packway roundabout average speeds (mph): AM period

6.13.9 This illustrates that benefits could be achieved with junction alterations, however, this is not considered to be required as part of the Scheme.

6.14 Modelling summary

6.14.1 This section provides a summary of the operational modelling.

a. the new A303 Winterbourne Stoke Bypass is part of the upgraded A303 and modelling indicates no operational issues with this section of the Scheme in any of the modelled periods;

b. the modelling indicates that there are no operational concerns with the downgraded existing A303 or B3083 under the Scheme, even on a busy day;

c. Longbarrow has been refined to provide additional capacity on the A360 southbound approach, with the provision of a dedicated left turn lane from the A360 to the eastbound on-slip. The design revision allows the design to operate without forecast congestion;

d. there will be no modelled operational issues on the approach to, or within, the tunnel section in each of the 'busy day' or neutral AM, IP and PM modelled peak periods;

e. Countess roundabout will operate without operational issues in the 2041 scenarios;

f. the 2041 modelling indicates that the Solstice Park northern and southern (London Road / Porton Road) roundabouts will operate over capacity with or without the Scheme. The Scheme is therefore not required to provide mitigation. It has been demonstrated that capacity solutions are available to address these issues in future when required, but not as part of the A303 Amesbury to Berwick Down Scheme;

g. the Rollestone Junction will be re-aligned and as a result, there will be no operational issues during any of the time periods modelled; and

h. the A345 / The Packway junction is forecast to experience congestion in the 2041 AM 'with scheme' and 2041 AM 'without scheme' models. The impact of the Scheme will not be "severe" and therefore no mitigation is required. It has been demonstrated that capacity solutions are available to address these issues in future when required, but not as part of the A303 Amesbury to Berwick Down Scheme.

6.14.2 This demonstrates that the Scheme is appropriate in traffic capacity terms and no additional mitigation is required.

6.15 Network maintenance and closures

Overview

6.15.1 There are various scenarios for unplanned maintenance or events:

a. single lane closure – traffic management in the tunnel will be implemented i.e. lane closure signals and speed restriction if deemed necessary;

b. one bore closure - available diversion will be via The Packway route to the north; and

c. twin bore closure – available diversion will be via The Packway route to the north.

6.15.2 The tunnel will only be run with traffic in contraflow during planned maintenance at low traffic volumes overnight.

6.15.3 In the event of the emergency closure of both bores of the tunnel, traffic will be diverted along the high load route (paragraph 6.16.7 below), but using the A345 (Countess Road) rather than the A3028 to re-join the A303 at Countess roundabout. It is considered that the closure of both bores will be an extremely rare event.

Restricted vehicles

6.15.4 There are some vehicles that will be restricted from using the tunnels from a safety perspective. These include:

a. abnormal height vehicles;

b. some agricultural vehicles; and

c. non-motorised vehicles.

6.15.5 The existing A303 in the Scheme area is identified as a high load route for vehicles with a maximum height of 6.1m. A restriction on abnormal height vehicles in the new tunnel will mean that only normal height vehicles can use the new tunnel. The high load route will therefore be diverted from the new Longbarrow junction, north on the A360 and B3086, then east on The Packway and A3028, and south on Salisbury Road to Solstice Park. It is anticipated that the high load route will be used less than once per year.

6.15.6 There were no vehicles of abnormal height observed during the freight surveys undertaken in 2017 and abnormal vehicle movements registered with Highways England show about two vehicles of abnormal height registered as using the A303 per year.

6.15.7 Modest use of the A303 by agricultural vehicles has been noted, but the levels are much lower than the volume of traffic forecast to divert from The Packway to use the A303.

6.15.8 The design includes provision for non-motorised users to continue to travel along the existing A303 alignment; the removal of motorised traffic to the new alignment will thus provide for a much improved experience for non -motorised users.

7 Road safety

7.1 Overview

7.1.1 This section of the TA considers the effect of the Scheme on highway safety. This firstly sets out the comments provided in response to the Road Safety Audits (RSA) undertaken for the Scheme, including the Designers' Responses, in order to demonstrate the suitability of the Scheme design in safety terms.

7.1.2 COBALT analysis is also presented, which shows how the provision of a safer road design for the section of the A303 in question translates into a reduction in accident levels over a 60 year period. This analysis also considers the effects on accident levels of traffic diversions resulting from the Scheme, as some drivers will transfer onto routes with different accident rates to those routes that they are currently using.

7.1.3 Finally, Personal Injury Accident data is interrogated to determine whether there are any localised safety issues which could be exacerbated by increases in traffic flows as a result of the Scheme.

7.2 Road Safety Audit 1 & Designer's Response

Overview

7.2.1 The design team has carefully considered the problems and recommendations in the Stage 1 Road Safety Audit (RSA1) Report and has provided a response to all problems and recommendations raised by the Road Safety Audit Team.

7.2.2 The RSA1 was undertaken using the General Arrangement (GA) plans for the Scheme. The GA's have been progressed since that audit and are included as one of the DCO application documents (Application Document 2.9).

7.2.3 This section of the TA provides a summary of the comments provided in the designer's response. These comments are a response to the comments raised in the RSA1 and relate to the following categories:

a. general;

b. signing;

c. walkers, cyclists and horse riders;

d. road restraint systems (RRS); and

e. drainage.

General

7.2.4 The five general issues received within the RSA are all based on visibility issues, with the recommendation of adequate forward visibility being maintained. The Designer's Response to three of the comments state that the visibility has been maximised where appropriate without affecting existing features such as the existing footbridge. Any works required to remove this departure would unreasonably increase the cost of the Scheme and result in adverse impacts on the adjacent environmentally sensitive land.

7.2.5 A visibility issue was raised at Rollestone junction, with the recommendation of *'Adequate forward visibility must be maintained throughout this junction to ensure vehicles travelling at speed are capable of stopping'.* The Designer's Response is that the proposed speed limit at the junction is to be reduced to 40mph and that visibility assessments were carried out and the minimum 120m SSD is achieved. Further consideration will be given to 'advanced warning' during detailed design with the aim of slowing traffic. This problem has therefore been addressed.

7.2.6 A further response specifically to the mainline lay by is that this is a bespoke maintenance hardstanding required for operational purposes which has been designed to deter use by the general public. Due to the presence of the Longbarrow overbridge and the RRS protecting the structure and its associated structure free zone it is not possible to achieve full 295m visibility from eye height to object height with the RRS being the cause of this. However, 295m eye to eye height is achieved.

Signing

7.2.7 There are seven issues within the RSA regarding signage and visibility.

7.2.8 Three of the issues are regarding the reduced visibility near laybys that may lead to a collision between traffic exiting these areas and traffic already on the A303. A Recommendation to *'Ensure adequate visibility is provided to allow drivers to safely re-join the A303'* was made. The Designer's Response states that visibility checks were carried out during design in accordance with the corresponding standard (TD9/93) and no issues were found with the visibility and all three areas conform to the corresponding standard.

7.2.9 Two further issues were made regarding sign visibility. One of these was in relation to the proposals for two large signs to be positioned close together, and the second was regarding apparent sign clutter on the A303 west of Countess roundabout.

7.2.10 The Designer's Response for both issues states that visibility checks were carried out and all signs were found to have the minimum clear sign visibility distance aside from the 'Route Confirmatory Sign' along the A303 westbound carriageway west of the junction with the Countess junction which, through 3D visibility checking, was found to be temporarily blocked by the 'Average Speed Check' and 'Emergency Telephone ½ Mile' signs. It is expected that adjusting the offset and mounting heights of the sign will provide full visibility; this will be assessed and investigated during detailed design.

7.2.11 One issue identified within the RSA relates to the western extent of the Scheme where drivers may not be fully aware of the proposed layby. In response to this issue the sign will be placed in advance of the new emergency area at the start of the Scheme which is also in advance of the road leaving the original alignment.

7.2.12 The final issue is regarding the proposed local diversion through Larkhill if the tunnel is closed. The issue from the RSA details a lack of 'black diamond' signage (on the drawings) along the diversion route after the A303 junction. The Designer's Response states that diamond diversion symbols were included in the design of Advanced Directional Signs at each junction to ensure an accurate sign size. Diversion signing will therefore be developed further in detailed design.

Walking, cycling and horses

7.2.13 There were three issues regarding NMU routes. Two of these relate to Longbarrow junction, discussing the *'Potential for collisions between horse riders and vehicles'* and the *'Risk of vehicles using the proposed Bridleway as a short-cut to bypass Longbarrow junction'*. The Designer's Response to the potential collision between equestrians and vehicles is that Pegasus crossings shall be provided at the Longbarrow south roundabout. Furthermore, on the A360 link road and on the former A303, Kent carriage gates will be provided at all access points to prevent access by motor vehicles.

7.2.14 *'Failure to light underpasses may deter WCH use and/or may present risk to personal safety'* was raised as an issue in the RSA, with the recommendation to *'Ensure the underpasses where WCH routes pass through are adequately illuminated'*. The designers responded that there is no illumination proposed at the underpasses except Countess roundabout. The Scheme is in a rural place where none of the PRoW through underpasses are on lit routes.

Road restraint systems

7.2.15 There are six issues in the RSA regarding Road Restraint Systems (RRS), five of which are in relation to the *'Potential for increase to the severity of injuries suffered to vehicle occupants/passengers'*.

7.2.16 Two of the issues are regarding the Longbarrow junction offslips, and recommend to *'Carrying out a RRRAP assessment along the A303 westbound offslip at Longbarrow junction'*. The Designer's Response was that the slip road and the A303 mainline are within cut to mask the junction from the surrounding landscape. A RRRAP was carried out and the height of the cut was deemed high enough to stop vehicles travelling over the embankment onto the A303.

7.2.17 Regarding the short gap in RRS along the A303 eastbound carriageway east of Green Bridge No.4 the RSA recommended to *'Close the gap in the RRS and join 'the two adjacent sections together'.* The Designer's Response was that because of an update to the barrier within this location, the gap in the barriers between the eastbound off-slip and bridge is now 150m which is larger than the 50m minimum as specified in DMRB TD19/06.

7.2.18 Another issue from the RSA about the RRS describes how there is a gap in the RRS allowing pedestrians to access adjacent fields. The recommendation was to *'Restrict public access through the RRS and into the adjacent land'*. The Designer's Response is that the overlap of barriers is in accordance with Figure 3-11 of TD19/06, and is to allow the safe parking of maintenance vehicles. The arrangement of barriers discourages public access and the area is within the retained cut >15m resulting in pedestrians being unable to access the land.

7.2.19 The final issue relates to a section of RRS where it is uncertain what is being protected. The recommendation was to *'Review the need for this section of RRS and remove if deemed unnecessary'*. The Designer's Response was that the barriers in that section are to protect MS4's and contraflow technology signing, so it will remain in place at this stage with terminals to standard added during the detailed design stage.

7.2.20 The comment in the RSA '*P4 road restraint terminals should be used wherever possible*' recommends that *'P4 terminal ends be used on RRS wherever possible'*. The Designer's Response is that the type of barrier will not be specified at this stage and that it will be chosen during detailed design.

Drainage

7.2.21 The final three comments from the RSA were regarding drainage. The first relates to the *'Risk of vehicles unintentionally encroaching onto the drainage channels resulting in loss of control'*, with the second comment regarding a departure from standards where the super elevation at the east tie-in is proposed to be three steps below the minimum desirable standard. The Designer's Response is that the preliminary highway design has sufficient crossfall and longfall to drain the carriageway effectively.

7.2.22 The final comment relates to restricting access to drainage ponds with the Designer's Response stating that fencing to prevent access will be provided around the ponds as well as life saving devices at regular intervals around the perimeter.

Summary

7.2.23 In summary, one change was made as a result of the comments raised in the RSA (para 7.2.9).The Designer's Response to all other comments raised in the RSA have been explained further, with suitable justifications. Therefore, where these comments have been raised, the Designer has provided an explanation and justification for the decisions made and on occasion, the necessary assessments that were also undertaken.

7.2.24 A small number of comments resulted in the Designer's Response specifying that the appropriate level of detail is provided for this stage and these will be further assessed during detailed design.

7.3 Scheme impact on accident rates (COBALT)

7.3.1 The Scheme will result in safety benefits through providing a safer road design than the existing road. It will also result in changes in volumes of traffic flows on other routes. Different route types have different accident rates and therefore these traffic flow changes will result in changes in accident rates as a result of the Scheme. An assessment has been made of the change in accidents and their associated costs as a result of the Scheme, with this analysis presented in full in the Economic Appraisal Package, Appendix D to the ComMA (Application Document 7.5). Standard incident rates by road type have been applied to traffic forecasts with and without the Scheme.

7.3.2 Accident benefits have been calculated by type (slight, serious or fatal) by COBA-LT, using the standard national average accident rates as set out in the WebTAG Databook.

7.3.3 Table 7-1 sets out an assessment of the number of accidents forecast from the traffic flow and accident rates over the 60-year appraisal period for the section of the A303 affected by the Scheme.

Table 7-1: Estimated accidents and casualties for 60-year appraisal period, A303 Scheme section only

Accident type	Without scheme	With scheme	Difference
Summary of accidents			
No. accidents	1,406	1,374	32
Summary of casualties			
Slight	1,794	1,728	66
Serious	223	186	37
Fatal	32	27	5
Total	**2,049**	**1,941**	**108**

Note: COBA-LT outputs rounded to nearest whole number

7.3.4 Table 7-1 reports that the Scheme is forecast to reduce the number of accidents and casualties. This includes five fewer fatalities over the appraisal period and 108 fewer casualties in total.

7.3.5 The forecast reduction in both accidents and casualties occurs despite the increases in traffic that are forecast through this section of the A303 following implementation of the Scheme, and despite overall increases in distance of the A303 as a result of the realigned Longbarrow junction and Winterbourne Stoke bypass. This is due to the reduced incident rates that can be anticipated for modern dual 2-lane roads compared to older 2 lane dual carriageways or single carriageway roads such as the existing A303. Hence, reflecting a safer road design for the Scheme than the existing road.

7.3.6 There will also be wider changes in traffic routeing and volumes along the A303, M4 and M5 and on other roads. The accident appraisal has been developed to assess the impacts of re-routeing onto the A303 as well as capturing induced demand on the corridor. This represents the forecast increased traffic on unimproved sections of the corridor, increasing the expected frequency of accidents occurring. Additionally, there is a small element of re-routeing away from the M4 and M5, with motorways having lower accident rates than modern dual 2-lane roads in COBA-LT. Conversely to this, however, are the benefits of traffic re-routeing onto the A303 from local roads with higher accident rates.

7.3.7 Table 7-2 sets out the total number of accidents forecast over the 60-year appraisal period, accounting for the impacts of local and regional re-routeing across the wider road network.

Table 7-2: Predicted accidents and casualties for 60-year appraisal period

Accident type	Without scheme	With scheme	Difference
Summary of accidents			
No. accidents	33,284	33,279	5
Summary of casualties			
Slight	44,708	44,685	23
Serious	4,201	4,173	28
Fatal	543	542	1
Total	**49,452**	**49,400**	**52**

Note: COBA-LT outputs rounded to nearest whole number

7.3.8 Over the 60-year appraisal period, the COBA-LT assessment forecasts five fewer accidents across all of the assessed links. Further to this, 23 fewer slight and 28 fewer serious personal injury accidents (PIAs) are forecast, with one less fatality.

7.3.9 The net effects of re-routing and increased traffic along the A303 corridor is to moderate the accident reductions expected on the new route relative to the existing A303 Scheme section.

7.4 Personal injury accident analysis

Overview

7.4.1 The COBALT analysis provides a high level assessment of overall changes in the numbers of accidents based on standard accident rates by road type. It is also important to consider highways conditions in the vicinity of the Scheme to determine whether there are any localised safety issues which could be exacerbated by increases in traffic flows as a result of the Scheme in order to determine whether mitigation may be required.

7.4.2 In order to carry out this assessment, Personal Injury Accident (PIA) data has been obtained from Wiltshire Council (WC) for the five year period between 1st January 2012 and 31st December 2016. The study area begins approximately 1.5km east of Solstice Park at Amesbury, where the A303 meets the A3028. The study area is bounded to the west at Yarnbury Castle, where the A303 reverts back to dual carriageway, approximately 4km west of Winterbourne Stoke. The study area also includes local roads in the vicinity of the Scheme where traffic flows are expected to change as a result of the Scheme.

7.4.3 The purpose of the PIA analysis is to identify any locations where there are potential existing highways safety issues which could be exacerbated by the Scheme. Therefore the area of detailed analysis has been refined to only include locations where traffic flows are forecast to increase at a link or a junction in any direction as a result of the Scheme. Where traffic flows decrease or remain the same, it is considered that the Scheme does not have the potential to worsen the condition of highways safety and therefore further analysis has not been carried out. The extent of the A303 which passes through the study area has been omitted for this analysis as the Scheme design is the subject of separate Road Safety Audit (RSA). A plan showing the extent of the study area can be found at Appendix 7.1. Figure 7-1: reproduces the information in Appendix 7.1 for ease of reference, albeit at a smaller scale. This shows PIAs which have occurred within the study area as well as the sites which have been subject to further detailed analysis.

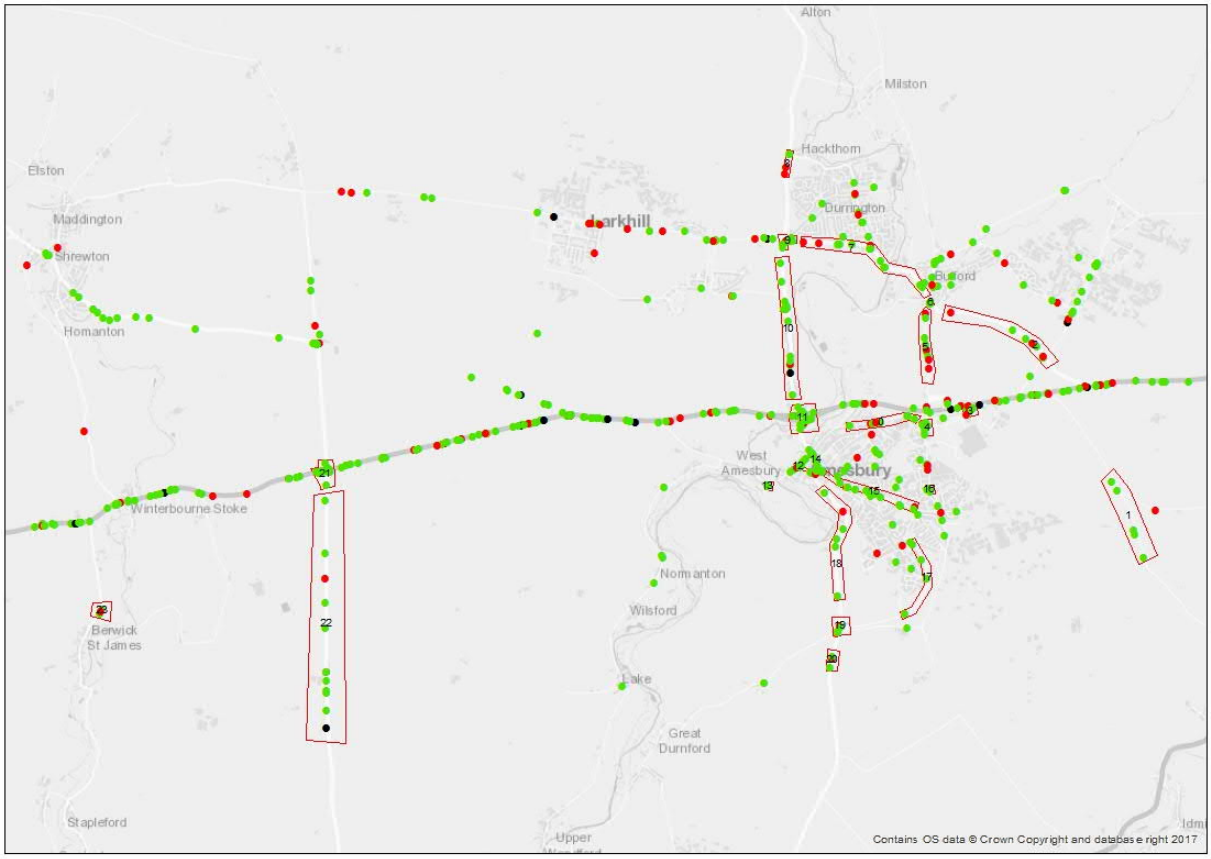


Figure 7-1: PIA study area

7.4.4 A total of 112 PIAs were reported in the five year period, in the parts of the study area where traffic flows are forecast to increase. Of these PIAs, zero were fatal, 14 were 'serious' and the remaining 98 classified as 'slight'.

7.4.5 Given the significant size of the area, the data has been broken down to show the existing safety conditions at particular links and junctions. Isolated PIAs occurring outside of the selected links/junctions have been excluded as they are unlikely to be part of an accident trend which could be exacerbated by the Scheme. Note the number of PIAs and casualties are likely to differ as some PIAs may involve multiple casualties.

Site 1 – Allington Track between Allington and A303

7.4.6 Over the five year period, a total of four PIAs occurred on this link. A summary of these PIAs can be found in Table 7-3.

Table 7-3: Summary of PIAs - Allington Track between Allington and A303

User type	Fatal	Serious	Slight	Total
Total Accidents	0	0	4	4
Total Casualties	0	0	4	4
Cyclist	0	0	0	0
Pedestrian	0	0	0	0

7.4.7 As shown in Table 7-3, all PIAs on this link were classified as 'slight', and did not involve pedestrian or cyclist casualties. The accident record in this location does not show a sufficiently high frequency of accidents, or commonality of causal

factors, to indicate an inherent highways safety issue which could be exacerbated by increases in traffic resulting from the Scheme.

Site 2 – A3028 between Bulford and A303

7.4.8 Over the five year period, a total of four PIAs occurred on this link. A summary of these PIAs can be found in Table 7-4.

Table 7-4: Summary of PIAs - A3028 between Bulford and A303

User type	Fatal	Serious	Slight	Total
Total Accidents	0	3	1	4
Total Casualties	0	5	1	6
Cyclist	0	1	0	1
Pedestrian	0	0	0	0

7.4.9 Three of the four PIAs to occur on this link were classified as 'serious', with one of these resulting in a cyclist casualty. The first 'serious' PIA occurred on the A3028 approximately 300m southeast from its junction with Salisbury Road where a car struck the rear of a pedal cycle whilst overtaking another vehicle, causing serious injury to the rider.

7.4.10 The second 'serious' PIA occurred on the A3028 approximately 200m northwest of its junction with Amesbury Road, between a motorcycle and a car. In this instance, a motorcycle was overtaking a moving vehicle before suffering a head-on collision with an oncoming car, resulting in serious injury to the rider.

7.4.11 The third 'serious' PIA occurred on the A3028 at its crossroads with Amesbury Road where there was a collision between a Light Goods Vehicle and a taxi, causing the taxi to leave the carriageway and collide with a wall.

7.4.12 The accident record in this location does not show a sufficiently high frequency of accidents, or commonality of causal factors, to indicate an inherent highways safety issue which could be exacerbated by increases in traffic resulting from the Scheme. Moreover, it should be noted that changes to the A3028 as part of the Scheme will see it become a one way route, thus reducing the likelihood of future PIAs on this link.

Site 3 – Roundabout joining Solstice Park Avenue, Equinox Drive and A303 on/off slips

7.4.13 Over the five year period, a total of four PIAs occurred at this roundabout. A summary of these PIAs can be found in Table 7-5.

Table 7-5: Summary of PIAs - Roundabout joining Solstice Park Avenue, Equinox Drive and A303 on/off slips

User type	Fatal	Serious	Slight	Total
Total Accidents	0	1	3	4
Total Casualties	0	1	3	4
Cyclist	0	0	0	0
Pedestrian	0	0	0	0

7.4.14 As shown in Table 7-5, one of the PIAs was classified as being 'serious', resulting in an injury to one car passenger. This occurred when a vehicle exiting the

roundabout skidded whilst doing so, before leaving the carriageway and colliding with a lamppost.

7.4.15 The accident record in this location does not show a sufficiently high frequency of accidents, or commonality of causal factors, to indicate an inherent highways safety issue which could be exacerbated by increases in traffic resulting from the Scheme.

Site 4 – Roundabout joining Porton Road, Solstice Park Avenue and London Road

7.4.16 Over the five year period, a total of six PIAs occurred at this roundabout. A summary of these PIAs can be found in Table 7-6.

Table 7-6: Summary of PIAs - roundabout joining Porton Road, Solstice Park Avenue and London Road

User type	Fatal	Serious	Slight	Total
Total Accidents	0	0	6	6
Total Casualties	0	0	8	8
Cyclist	0	0	0	0
Pedestrian	0	0	0	0

7.4.17 As summarised in Table 7-6, all PIAs at this roundabout were classified as 'slight', and didn't involve pedestrian or cyclist casualties.

7.4.18 The accident record in this location does not show a sufficiently high frequency of accidents, or commonality of causal factors, to indicate an inherent highways safety issue which could be exacerbated by increases in traffic resulting from the Scheme.

Site 5 – London Road link between Porton Road and A345

7.4.19 Over the five year period, a total of six PIAs occurred on this link. A summary of these PIAs can be found in Table 7-7.

Table 7-7: Summary of PIAs - London Road link between Porton Road and A345

User type	Fatal	Serious	Slight	Total
Total Accidents	0	1	5	6
Total Casualties	0	1	6	7
Cyclist	0	0	1	1
Pedestrian	0	1	0	1

7.4.20 There was one 'serious' PIA on this link which involved a pedestrian casualty. This occurred on London Road, east of its junction with Holders Road where a pedestrian was struck by a vehicle whilst using a crossing facility.

7.4.21 There was one 'slight' PIA involving a cyclist casualty, which occurred on London Road at its junction with Lidl Supermarket where a vehicle exiting the junction onto London Road collided with a cyclist using the main carriageway.

7.4.22 The accident record in this location does not show a sufficiently high frequency of accidents, or commonality of causal factors, to indicate an inherent highways

safety issue which could be exacerbated by increases in traffic resulting from the Scheme.

Site 6 – Salisbury Road link between A303 and A3028

7.4.23 Over the five year period, only three PIAs occurred on this link, all being classified as 'slight'. There was one incident involving a pedestrian casualty which occurred on Salisbury Road approximately 180m south of its junction with the A3028. The pedestrian was walking along the carriageway when the incident occurred.

Site 7 – Salisbury Road / A3028 junction at Bulford

7.4.24 Over the five year period, only two PIAs occurred at this junction, both classified as 'slight'. Neither pedestrian nor cyclist casualties were involved.

Site 8 – A3028 between Bulford and A345

7.4.25 Over the five year period, a total of seven PIAs occurred on this link. A summary of these PIAs can be found in Table 7-8.

Table 7-8: Summary of PIAs - A3028 between Bulford and A345

User type	Fatal	Serious	Slight	Total
Total Accidents	0	1	6	7
Total Casualties	0	2	6	8
Cyclist	0	0	1	1
Pedestrian	0	0	1	1

7.4.26 There was one 'serious' PIA on this link over the five year period. This occurred on the A3028 approximately 240m east of the roundabout joining the A345 / A3028 / The Packway and involved a collision between three vehicles, resulting in 'serious' injury to two casualties.

7.4.27 There was one 'slight' PIA involving a pedestrian casualty, which occurred on the A3028 at the southern end of Bulford Hill where a pedestrian was struck by a Light Goods Vehicle whilst walking on the footway.

7.4.28 There was one 'slight' PIA involving a cyclist casualty, which occurred on the A3028 at its junction with Robin Hill Lane and Bulford Road where a car entering the mini-roundabout collided with a cyclist.

7.4.29 The accident record in this location does not show a sufficiently high frequency of accidents, or commonality of causal factors, to indicate an inherent highways safety issue which could be exacerbated by increases in traffic resulting from the Scheme.

Site 9 – A345, north of A3028

7.4.30 Over the five year period, two PIAs occurred on this link, both being classified as 'slight'. Neither pedestrian nor cyclist casualties were involved.

Site 10 – Roundabout joining A345, A3028 and The Packway

7.4.31 Over the five year period, a total of six PIAs occurred at this roundabout. A summary of these PIAs can be found in Table 7-9.

Table 7-9: Summary of PIAs - Roundabout joining A345, A3028 and The Packway

User type	Fatal	Serious	Slight	Total
Total Accidents	0	1	5	6
Total Casualties	0	5	5	10
Cyclist	0	0	0	0
Pedestrian	0	0	1	1

7.4.32 There was one 'serious' PIA at this junction over the five year period, resulting in five casualties, all car occupants. This occurred on the eastern side of the roundabout and involved four vehicles which lost control whilst entering the roundabout. Three of the four vehicles collided with the central island before leaving the carriageway. This is likely to be an anomalous incident which is not indicative of a wider highways safety issue.

7.4.33 There was one 'slight' PIA involving a pedestrian casualty which occurred on the A3028 approach to the roundabout where a pedestrian was struck whilst crossing the carriageway away from a formal crossing point.

Site 11 – A345, north of Countess roundabout

7.4.34 Over the five year period, a total of eight PIAs occurred on this link. A summary of these PIAs can be found in Table 7-10.

Table 7-10: Summary of PIAs - A345, north of Countess roundabout

User type	Fatal	Serious	Slight	Total
Total Accidents	0	1	7	8
Total Casualties	0	1	12	13
Cyclist	0	0	1	1
Pedestrian	0	0	1	1

7.4.35 There was one 'serious' PIA on this link over the five year period. This occurred on the A345, approximately 620m north of Countess roundabout where a Light Goods Vehicle was struck by a car whilst attempting to move off onto the main carriageway.

7.4.36 There was one 'slight' PIA involving a pedestrian casualty which occurred approximately 345m from Countess roundabout where a pedestrian was struck whilst stationary in the carriageway, following a collision between two vehicles.

7.4.37 There was one 'slight' PIA involving a cyclist casualty which occurred at the junction between the A345 and Fargo Road where an overtaking vehicle collided with a cyclist, resulting in minor injury to the rider.

7.4.38 The accident record in this location does not show a sufficiently high frequency of accidents, or commonality of causal factors, to indicate an inherent highways safety issue which could be exacerbated by increases in traffic resulting from the Scheme.

Site 12 – Countess roundabout

7.4.39 Over the five year period, a total of eight PIAs occurred at this roundabout. A summary of these PIAs can be found in Table 7-11.

Table 7-11: Summary of PIAs - Countess roundabout

User type	Fatal	Serious	Slight	Total
Total Accidents	0	0	8	8
Total Casualties	0	0	11	11
Cyclist	0	0	0	0
Pedestrian	0	0	0	0

7.4.40 As shown in the above table, all PIAs at this roundabout were classified as 'slight', and did not involve pedestrian or cyclist casualties. This does not suggest an inherent accident issue which could be exacerbated by the Scheme.

Site 13 – High Street / Salisbury Street link (Amesbury Centre)

7.4.41 Over the five year period, a total of eight PIAs occurred on this link. A summary of these PIAs can be found in Table 7-12.

Table 7-12: Summary of PIAs - High Street / Salisbury Street link (Amesbury Centre)

User type	Fatal	Serious	Slight	Total
Total Accidents	0	2	6	8
Total Casualties	0	2	6	8
Cyclist	0	0	2	2
Pedestrian	0	1	3	5

7.4.42 There were two 'serious' PIAs on this link, with one involving a pedestrian casualty. The first PIA occurred approximately 30m west of the junction between High Street and Salisbury Street where a pedestrian was struck by a passing car whilst stationary in the carriageway. The second 'serious' PIA occurred at the mini-roundabout joining Salisbury Street, the A345 and Smithfield Street where a motorcycle was struck by a car whilst making a right-turn.

7.4.43 There were two 'slight' PIAs involving cyclist casualties. The first of these occurred on High Street approximately 60m from its junction with Salisbury Street where a cyclist collided with the rear of a Light Goods Vehicle that was stationary on the carriageway. The second PIA occurred on High Street approximately 40m northeast of its junction with Church Lane where a cyclist collided with an agricultural vehicle, resulting in the rider leaving the carriageway and colliding with a wall.

7.4.44 There were three 'slight' PIAs involving pedestrian casualties. The first of these occurred on High Street 20m northeast of Fairfax Close where a pedestrian was struck by a minibus whilst attempting to cross the carriageway. According to incident reports, the pedestrian's visibility of the carriageway may have been affected by parked or stationary vehicles. The second PIA occurred at the junction between High Street and Salisbury Street where a pedestrian was struck by a car whilst crossing the carriageway away from a crossing facility. Incident reports suggest that the pedestrian's visibility may have been impaired by parked vehicles. The third PIA occurred approximately 35m northwest of the mini-roundabout joining Salisbury Street, the A345 and Smithfield Street where a pedestrian was struck by a car whilst crossing the carriageway away from a crossing facility.

7.4.45 Whilst a reasonable number of PIAs have been recorded, including those involving pedestrians and cyclists, this is indicative of the town centre setting and does not suggest an inherent highways safety issue which could be exacerbated by the Scheme.

Site 14 – Church Street / Recreation Road junction

7.4.46 Over the five year period, only one PIA occurred at this junction, classified as 'slight'. Neither pedestrian nor cyclist casualties were involved.

Site 15 – A345 between Countess roundabout and Amesbury Library

7.4.47 Over the five year period, a total of eight PIAs occurred on this link. A summary of these PIAs can be found in Table 7-13.

Table 7-13: Summary of PIAs - A345 between Countess roundabout and Amesbury Library

User type	Fatal	Serious	Slight	Total
Total Accidents	0	0	8	8
Total Casualties	0	0	20	20
Cyclist	0	0	1	1
Pedestrian	0	0	2	2

7.4.48 None of the PIAs on this link were classified as 'serious'. There was one 'slight' PIA involving a cyclist casualty, which occurred on the A345 south of its junction with High Street where a vehicle turning left collided with a cyclist on the footway.

7.4.49 There were two 'slight' PIAs involving pedestrian casualties. The first PIA occurred on the A345 south of its junction with High Street where a vehicle moving off from the footway struck a pedestrian who was using the pavement. The second PIA occurred on the A345 north of its junction with Salisbury Street / Smithfield Street where a vehicle exiting the nearby junction struck a pedestrian using a crossing facility.

7.4.50 The accident record in this location does not show a sufficiently high frequency of accidents, considering the setting, or commonality of causal factors, to indicate an inherent highways safety issue which could be exacerbated by increases in traffic resulting from the Scheme.

Site 16 – Earls Court Road / Boscombe Road link between Amesbury Library and Underwood Drive

7.4.51 Over the five year period, a total of 10 PIAs occurred on this link. A summary of these PIAs can be found in Table 7-14.

Table 7-14: Summary of PIAs - Earls Court Road / Boscombe Road link between Amesbury Library and Underwood Drive

User type	Fatal	Serious	Slight	Total
Total Accidents	0	1	9	10
Total Casualties	0	2	10	12
Cyclist	0	0	2	2
Pedestrian	0	0	3	3

7.4.52 There was one 'serious' PIA on this link, which occurred on Boscombe Road at its junction with Underwood Drive where a motorcycle skidded off the carriageway whilst making a left-turn, before colliding with a lamppost, resulting in serious injury to the rider.

7.4.53 There were two 'slight' PIAs involving cyclist casualties. The first of these occurred on Boscombe Road at its junction with Mill Green Road where a vehicle turning left onto the main road collided with a passing cyclist, causing minor injury to the rider. The second PIA occurred on Earls Court Road at its junction with Parsonage Road where a Light Goods Vehicle turning left onto the main road collided with a passing cyclist.

7.4.54 There were three 'slight' PIAs involving pedestrian casualties. The first of these occurred on Earls Court Road at its junction with Smithfield Street where a pedestrian was struck by a car whilst attempting to cross the carriageway away from a crossing facility. The second PIA occurred on Boscombe Road at its junction with Butterfield Drive where a pedestrian was struck by a Light Goods Vehicle whilst attempting to cross the carriageway away from a controlled crossing, albeit one was located within 50m of the PIA site. The third 'slight' PIA involving a pedestrian casualty occurred at the junction between Boscombe Road and Mill Green Road where a pedestrian was struck by a car whilst crossing the carriageway away from a crossing facility.

7.4.55 The accident record in this location does not show a sufficiently high frequency of accidents, considering the setting, or commonality of causal factors, to indicate an inherent highways safety issue which could be exacerbated by increases in traffic resulting from the Scheme.

Site 17 – Roundabout joining Porton Road, Boscombe Road, Butterfield Drive and Raleigh Crescent

7.4.56 Over the five year period, a total of two PIAs occurred at this roundabout, both classified as 'slight'. Neither pedestrian nor cyclist casualties were involved.

Site 18 – Stockport Avenue link between Underwood Drive and A345

7.4.57 Over the five year period, a total of three PIAs occurred on this link, all classified as 'slight'. There was one 'slight' PIA involving a pedestrian casualty. On this occasion, the pedestrian was struck whilst on the carriageway, away from a crossing facility.

Site 19 – A345 between Amesbury Library and Stockport Avenue

7.4.58 Over the five year period, a total of two PIAs occurred on this link, both classified as 'slight'. Neither pedestrian nor cyclist casualties were involved.

Site 20 – Roundabout joining A345 and Stockport Avenue

7.4.59 Over the five year period, only one PIA occurred at this roundabout, classified as 'slight'. Neither pedestrian nor cyclist casualties were involved.

Site 21 – A345, south of Stockport Avenue

7.4.60 Over the five year period, a total of three PIAs occurred on this link, with one of the incidents being classified as 'serious'. The 'serious' PIA involved a

motorcyclist casualty and occurred approximately 40m south of a rural access junction. Neither pedestrian nor cyclist casualties were involved.

Site 22 – Longbarrow junction

7.4.61 Over the five year period, a total of nine PIAs occurred at this junction. A summary of these PIAs can be found in Table 7-15.

Table 7-15: Summary of PIAs - Longbarrow junction

User type	Fatal	Serious	Slight	Total
Total Accidents	0	0	9	9
Total Casualties	0	0	13	13
Cyclist	0	0	0	0
Pedestrian	0	0	1	1

7.4.62 As shown in the above table, all PIAs to occur at this roundabout were classified as being 'slight'. One PIA involved a pedestrian casualty, occurring approximately 110m south of Longbarrow junction. The pedestrian was struck whilst stationary in the carriageway and was not using a formal crossing facility.

Site 23 – A360, south of Longbarrow junction

7.4.63 Over the five year period, a total of three PIAs occurred on this link, with one of the incidents being classified as 'serious'. The 'serious' PIA occurred on the A360, north of its junction with York Road at Druids Lodge where two vehicles were involved in a head-on collision. Neither pedestrian nor cyclist casualties were involved.

Site 24 – B3083 between Winterbourne Stoke and Stapleford

7.4.64 Over the five year period, a total of three PIAs occurred on this link, with one of the incidents being classified as 'serious'. The 'serious' PIA involved a motorcyclist casualty, occurring on the bend located circa 380m north of Berwick St James. Neither pedestrian nor cyclist casualties were involved.

Conclusion

7.4.65 Five years of Personal Injury Accident (PIA) data have been analysed for links and junctions in the study area where traffic flows are forecast to increase as a result of the Scheme. "Clusters" of PIAs at links or junctions have been analysed to identify whether there is a potential highways safety issue which could be exacerbated by increases in traffic resulting from the Scheme. We conclude that the accident data does not indicate inherent existing safety issues in the area around the site that could be exacerbated by the Scheme.

8 Sustainable transport

8.1 Overview

8.1.1 This section provides an overview of the provision for travel in the vicinity of the A303, past the Stonehenge WHS, by sustainable[26] modes of transport. It also seeks to identify the current type and quality of provision as well as improvements and enhancements delivered as part of the Scheme.

8.2 Non-Motorised User scheme objectives

8.2.1 HD42/17 Walking, Cycling and Horse Riding Assessment and Review (WCHAR) is the current Highways England overall process for the consideration of walking, cycling & horse-riding facilities within highway schemes. It replaced HD42/05 Non-Motorised User (NMU) Audits.

8.2.2 AAJV prepared an HD42/05 NMU Context Report for the A303 Amesbury to Berwick Down, which was approved on 8 May 2017. Gap analysis has confirmed that the information presented in the NMU Context Report is largely compliant with HD42/17 WCHAR Assessment Report requirements. The Context Report has been updated with the acquisition of supplementary data. The WCHAR Assessment Report provides background user information that can be referred to throughout the design process. The WCHAR Review Report reviews the proposals for pedestrians, cyclists and equestrians, and identifies opportunities for improvement.

8.2.3 Outline objectives were identified as part of the NMU Context Report and these ten objectives have been reviewed at this DCO design stage and have formed the main basis of the WCHAR[27]. The WCHAR Report provides ‘actions taken’ or ‘outcomes’ related to the NMU objectives, at DCO design stage.

8.2.4 In addition to the objectives set during the NMU assessment, the WCHAR identifies a further 29 objectives and also provides ‘actions taken’ or ‘outcomes’ relating to those objectives. All objectives and their outcomes are summarised in Appendix 8.1, with full detail in the WCHAR Report itself.

8.2.5 Whilst there is substantial agreement on the objectives identified and their associated outcomes, they will likely be refined as the Scheme progresses onto Detailed Design, where an agreed position will be reached between Highways England and Wiltshire Council. The dialogue is currently ongoing and will be recorded in the statement of common Ground.

8.3 Walking and cycling network

Public Rights of Way (PRoW)

8.3.1 Public Rights of Way comprise Footpaths, Bridleways, Restricted Byways and Byways Open to All Traffic (BOAT). All Public Rights of Way (PRoW) are highways, and are shown on ‘Definitive Maps’ held by highway authorities.

[26] Accessible means of transport with an overall low impact on the environment, including walking, cycling public transport

[27] HD42/17 Walking, Cycling & Horse Riding Review at Preliminary Design ; HE551506-AMW-ENM-SW_ZZ_ZZ_ZZ-RP-CH-0001

Existing rights of way are shown on Plans 009a, 009b, 009c, and 009d in Appendix 8.2[28].

8.3.2 A PRoW plan, including the updates detailed in the supplementary consultation, has been produced and is contained in the supplementary consultation booklet, July 2018, inserted into Appendix 8.3 of this TA.

8.3.3 The Scheme will cut across a number of existing PRoWs including Byways Open to All Traffic (BOATs), bridleways and public footpaths. Provision is made within the Scheme to maintain the existing function of the PRoWs with suitably located bridges. However, the Scheme also includes new NMU routes to improve accessibility and connectivity for communities including Winterbourne Stoke and Amesbury. From west to east these are:

a. a new restricted byway on the northern side of the new alignment, west of Winterbourne Stoke to Yarnbury Castle, which will tie in to PRoW SLAN3 north of the A303;

b. a new NMU route, part BOAT and part restricted byway, along the southern side of the new alignment, which will tie in with PRoW SLAN3 south of the A303;

c. a new restricted byway with agricultural access from the existing track on the A303, running north across the new green bridge north-west of Scotland Lodge Farm.

d. a new bridleway, east from Winterbourne Stoke to the new Longbarrow junction, connecting with the new restricted byway through the WHS via the new green bridge to the east of the existing Longbarrow junction. The new bridleway and the new NMU route through the WHS will enable pedestrian, cycle and equestrian journeys between Winterbourne Stoke and Amesbury;

e. a new restricted byway along the existing and redundant A360 alignment, crossing the new A303 alignment on the new green bridge to the east of the existing Longbarrow junction, and extending to the Stonehenge Visitor Centre to the north byway AMES12 to the south;

f. a new restricted byway open to NMUs, agricultural and statutory utility vehicles will be created through the WHS along the route of the existing A303, connecting with Stonehenge Road at the eastern end of the Scheme; and

g. a new link between byway AMES1 and Equinox Drive in Solstice Park which also replaces bridleway AMES29.

h. It is currently possible to gain access between byways AMES11 and AMES12 along the existing A303, although right turns are banned. This vehicular access will be removed by the placement of this section of the A303 in tunnel (see Chapter 3). NMU and agricultural access between AMES 11 and 12 will be available via the new restricted byway along the line of the old A303, but vehicular access will not be retained.

[28] Source: NMU Context Report Stage 2 - HE551506-AA-ENM-SWI-RP-CX-000001.

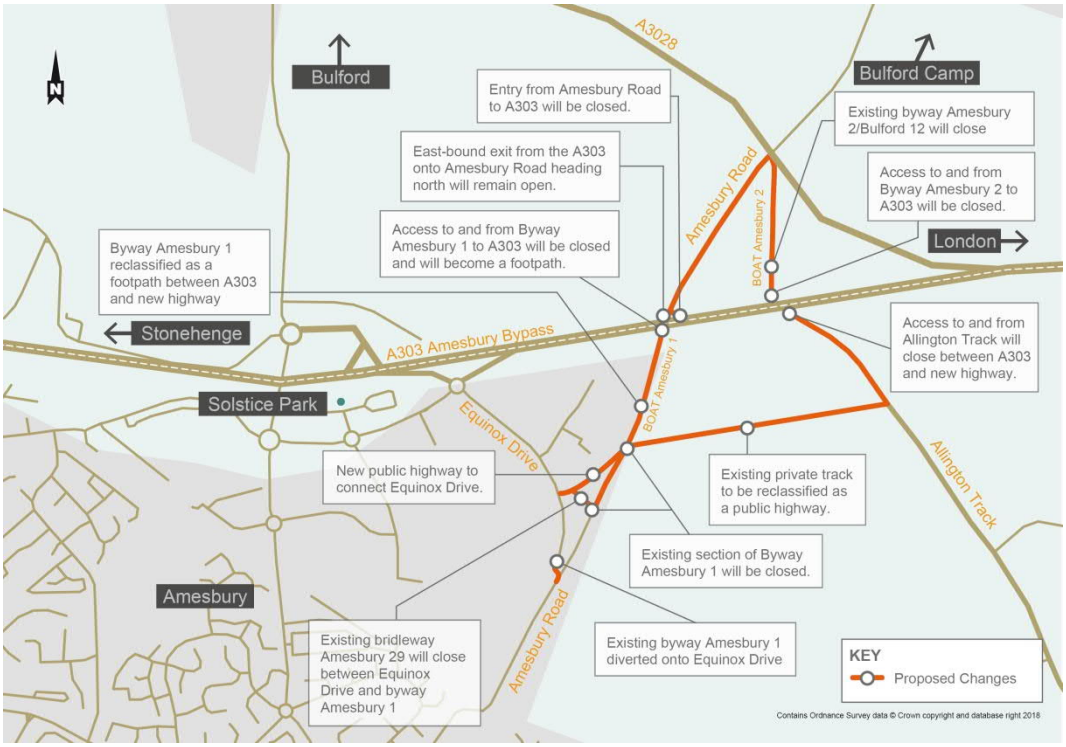


Figure 8-1 Changes to rights of way at the eastern end of the Scheme

Promoted routes

8.3.4 'Promoted' routes are those identified or designated as NMU routes by local authorities. The promoted cycling and walking routes in the vicinity of the Scheme are shown in Table 8-1 and Table 8-2 respectively.

Table 8-1: Promoted cycling routes[29]

Route Name and Promoter	Route Description	Crosses the A303?	How is it being addressed?
National Cycle Network Route 24 (Sustrans)	National Cycle Network (NCN) Route 24 is a 75 mile link running east-west from Eastleigh to Bath, passing through Salisbury, Warminster and Radstock. This route does not cross the existing A303.	N	n/a
National Cycle Network Route 45 (Sustrans)	National Cycle Network Route 45 is a 270 mile link running north-south from Chester to Salisbury, passing through Shrewsbury, Worcester, Gloucester and Swindon. This route crosses over the existing A303, via Porton road, at Solstice Junction in Amesbury.	Y	Through Solstice Junction; not affected
Wiltshire Cycleway Section 7 (Wiltshire Council)	Wiltshire Cycleway Section 7 is a 9.5 mile route running south-north between	N	Improved linkage to WHS

[29] Source: columns 1 and 2 from Table 7-2 from NMU Context Report

Route Name and Promoter	Route Description	Crosses the A303?	How is it being addressed?
National Cycle Network Route 24 (Sustrans)	National Cycle Network (NCN) Route 24 is a 75 mile link running east-west from Eastleigh to Bath, passing through Salisbury, Warminster and Radstock. This route does not cross the existing A303.	N	n/a
National Cycle Network Route 45 (Sustrans)	National Cycle Network Route 45 is a 270 mile link running north-south from Chester to Salisbury, passing through Shrewsbury, Worcester, Gloucester and Swindon. This route crosses over the existing A303, via Porton road, at Solstice Junction in Amesbury.	Y	Through Solstice Junction; not affected
	Salisbury and Amesbury. This route follows route 45 of the National Cycle Network with a slight variation as it approaches Amesbury. This section of the route does not cross the existing A303.		
Wiltshire Cycleway Section 8 (Wiltshire Council)	Wiltshire Cycleway Section 8 is a 10.2 mile route running south-north between Amesbury and Everleigh. It crosses the existing A303 via Porton Road at Solstice Junction (following route 45 of the National Cycle Network across the A303) and into Amesbury.	Y	Solstice Junction; not affected

Table 8-2: Promoted walking routes within the study area[30]

Route Name and Promoter	Route Description	Crosses the A303?	How is it being addressed?
Pewsey Avon Trail (GPS Cycle and Walking Routes)[4]	The Pewsey Avon Trail is a 45km long distance footpath, from Pewsey to Salisbury. It crosses the existing A303 around West Amesbury.	N	n/a
Salisbury Country Way (GPS Cycle and Walking Routes)	The Salisbury Country Way is a 98km circular route around Salisbury, crossing the existing A303 near Stonehenge.	Y	Will not be affected by the A303 (in tunnel at this location)
Upper Woodford Valley (Visit Wiltshire)[5]	Upper Woodford Valley is a 10.5km northern circular route starting and finishing at Woodford. This route does not cross the existing A303.	N	n/a

[30] Source: columns 1 and 2 from Table 7-3 from NMU Context Report

Route Name and Promoter	Route Description	Crosses the A303?	How is it being addressed?
Woodford Valley (Visiting Wiltshire)	Woodford Valley is a 16km circular route starting and finishing at Middle Woodford Recreation Park. This route does not cross the existing A303.	N	n/a
Orange Way (Walking Pages)	The Orange Way is a 549km route starting at Brixham Harbour, Torbay, and finishing at St James's Palace, London. It crosses the existing A303 near Stonehenge.	Y	Will not be affected by the A303 (in tunnel at this location)
Great Stones Way (Friends Of The Ridgeway)[7]	The Great Stones Way is a 74km path starting at Coate Water Country Park, near Swindon, and finishes at Salisbury Cathedral. It crosses the existing A303 in Amesbury.	N	n/a
Great Stones Way Stonehenge Loop (Friends Of Ridgeway)	A 14km loop off the main Great Stones Way, crossing the existing A303 near Stonehenge.	Y	Will not be affected by the A303 (in tunnel at this location)
Celtic Way (The Celtic Way)	The Celtic Way is a 1,161km route running from Stumble Head in Pembrokeshire to St Michael's Mount in Cornwall. The route crosses the existing A303 twice. The western crossing point of the A303 is located just to the east of Yarnbury Castle whereas the eastern crossing point lies directly west of Stonehenge itself.	Y	Eastern crossing will not be affected by the A303 (in tunnel at this location). A diversion of the route will be required from Winterbourne Stoke to Winterbourne Stoke Clump via the PRoW.
Wylye Way (GPS Cycle and Walking Routes)	A 53km route following the River Wylye starting at Stourhead Visitor Car Park and finishes at Wilton House Park. It crosses the existing A303 at Wylye.	N	n/a
Sarum Way (GPS Cycle and Walking Routes)	Sarum Way is a 50km circular route around Salisbury starting and finishing at Lower Woodford. This route does not cross the existing A303.	N	n/a
Monarch's Way (The Monarch's Way)[9]	The Monarch's Way is a 990km route running from Worcester to Brighton and does not cross the existing A303.	Y	Will not be affected by the A303 (in tunnel at this location)

8.3.5 Wiltshire Council cycle map for Amesbury illustrates the cycle provisions within the eastern section of the preferred route of A303 Amesbury to Berwick Down

proposal. This is included within Appendix 8.4, along with maps covering NCN45, Amesbury cycle route and other individual routes.

8.4 Public transport – Bus

8.4.1 The Scheme will not result in any changes to existing bus stops and will therefore have no direct impact on local bus routes. As a result, there will not be any material effect on local bus services that operators would need to respond to.

8.5 Public transport – Rail

8.5.1 The environmental and social objectives of the A303 Amesbury to Berwick Down Scheme are to conserve and enhance the World Heritage Site (WHS) by improving access both within and to/from the site; to contribute to the enhancement of the WHS, improve the biodiversity along the route and provide a positive legacy for the communities adjoining the A303.

8.5.2 From a transport and economic perspective, the Scheme's objectives are to contribute to the provision of a high quality, free-flowing and reliable connection between the South East and South West, and to resolve existing and future predicted congestion problems.

8.5.3 The Assessment of Alternative Modes (PCF Stage 2) Technical Note (Appendix 8.4) utilised the Highways England's Traffic Appraisal Modelling and Economics (TAME) Advice Note 2 v1.0 published in July 2015. The advice note describes the requirements at Project Control Framework (PCF) Stage 2 in terms of the questions that must be answered to satisfy Highways England that all alternative modes have been examined and the highway solution is the correct option.

8.5.4 In answer to the Level 1 question *"Could an alternative modal intervention solve the identified problem?"*, the Technical Note demonstrates that walking, cycling and local public transport are not viable alternatives to car use for most of the journeys made on this section of the A303 due to the trip lengths that are involved. Coach is a possible alternative for some journeys between urban centres. However, the frequencies of services to major destinations in the South West are low and coaches using the A303 would be subject to the same delays as cars. Hence, where a car is available, using the coach is relatively unattractive for most users of the A303. Also, the capacity of the coach services provided is relatively small in comparison with the number of people that can be accommodated in vehicles using an improved dual carriageway. Rail is considered the only modal alternative which can seriously compete with road for the types of journey being made by A303 road users. However, there is no planned or prospective rail scheme or investment which would offer a solution to existing and future anticipated traffic problems.

8.5.5 In considering the Level 2 question *"Knowing the benefits of the preferred option, what impact would a modal alternative require in order to relieve the problem to the same degree and is that viable?"* this review demonstrates that it would require provision of capacity for an additional 36,000 rail passengers per day to relieve the problem to the level offered by the road improvement. This is equivalent to three or four eight cars trains per hour in each direction running between London Waterloo and Exeter.

8.5.6 Realistically, rail investment could not achieve the same level of impact as the road scheme in alleviating the problem. Therefore, the road scheme is the most viable, and only option.

8.5.7 More detailed analysis of the potential for modal transfer to rail, assuming a hypothetical step-change in rail facilities, showed that traffic flows on the A303 could only be reduced by in the order of 11%. This would not relieve the problem to any noticeable extent.

8.6 Summary

8.6.1 An HD42/05 NMU Context Report for the A303 Amesbury to Berwick Down was undertaken, which identified outline objectives. These ten objectives have been reviewed at this DCO design stage and formed the main basis of the HD42/17 WCHAR Assessment Report. The WCHAR Report provides 'actions taken' or 'outcomes' for these objectives and also identified a further 29 objectives. This provides a detailed summary of the actions taken to ensure the Scheme does not adversely affect the rights of way in the study area.

8.6.2 The Scheme will cut across a number of existing PRoWs including Byways Open to All Traffic (BOATs), bridleways and public footpaths. Provision is made within the Scheme to maintain the existing function of the PRoWs with suitably located bridges. The Scheme also includes new NMU routes to improve accessibility and connectivity for communities including Winterbourne Stoke and Amesbury.

8.6.3 Furthermore, NMU access between AMES 11 and 12 will be available along the new restricted byway along the line of the old A303, but vehicular access will not be retained, except for authorised vehicles.

8.6.4 The Scheme will not result in any changes to existing bus stops and will therefore have no direct impact on local bus routes. As a result, there will be no material effect on local bus services that operators would need to respond to.

8.6.5 Furthermore, rail investment could not, realistically, achieve the same level of impact as the road scheme in alleviating the problem. Therefore, the road scheme is deemed the most viable, and only option.

8.6.6 To conclude, the alternative modes considered will not, by themselves, provide a solution to the problems on the A303 between Amesbury and Berwick Down or meet the principle objectives of the Scheme.

9 Construction impact assessment

9.1 Introduction

9.1.1 A construction plan (Appendix 9.1 of this TA) was prepared by our construction advisors and utilised to model the impact of the construction phases on the network. A Traffic Management Plan (TMP) for the Scheme will outline the traffic management strategies for three key scenarios; construction, operation stages and emergency situations. It will also consider the strategy for managing construction traffic. The TMP will be prepared by the successful contractor and will be a live document that is updated and modified as the Scheme progresses.

9.1.2 The traffic management strategy within the TMP will be developed with engagement and input from key stakeholders such as Highways England (Emergency Planners, Maintaining Agents, Abnormal Loads Team), National Technical Information Services (NTIS), Local Authorities, South West Regional Control Centre (SWRCC), Police Constabularies and Ministry of Defence (MOD), before it is finalised.

9.2 Overview of Construction Phases

9.2.1 For the purposes of the EIA and the traffic assessment, two principal phases of the construction programme for the main works have been identified. These correspond to:

a. phase 1, when Winterbourne Stoke bypass, Longbarrow junction and Countess roundabout flyover are under construction (likely 2021-2023); and

b. phase 2, when the construction of the tunnel is the primary construction activity (2024 onwards). The Winterbourne Stoke bypass, Longbarrow junction and Countess roundabout flyover constructed in phase 1 would be operational.

9.2.2 The construction plan will be refined through detailed design of the Scheme with appropriate regard to reducing the overall impacts during construction.

9.2.3 Traffic modelling has been undertaken for both of these phases. The traffic management assumptions outlined in the Transport Forecasting Package (Appendix C to the ComMA – Application Document 7.5) have been selected on the basis of the individual elements of traffic management which are in place for the longest period during the construction phase and likely severity of impact.

9.3 Construction traffic

9.3.1 This section of the Transport Assessment provides an overview of the HGV movements to and from site and the transportation of the excavated materials. More detail on this process can be found in Section 5 of the Technical Note 022: Scheme assumptions for DCO Construction Traffic Management modelling (Appendix 9.1).

9.3.2 Based on the quantity of materials and duration of the phases, Table 9-1 sets out the estimate of the daily number of HGV movements that will be required to deliver materials to the site during the two construction phases.

Table 9-1 Estimated daily HGV movements during construction phases

Delivery Type	Phase 1	Phase 2
Concrete: non-tunnel	40	14
Concrete: tunnel	74	44
Structural Steel	0.2	
Rebar	3.5	1.5
Type 1 and backfill structures	1.0	0.5
Hardcore	0.7	0.1
Timber	1.0	
Pre-cast concrete	0.05	0.02
Road surfacing	6	6
Drainage Stone & RE-MEDI8	1.0	0.6
Lime/cement	0.12	0.18
Total	**128**	**67**

9.3.3 It is assumed that deliveries will be scheduled during a 12 hour period (7am to 7pm) 6 days a week. Recognising that the contractor will develop a detailed construction plan, the implied hourly flow was increased by 30% to provide a robust assessment of the potential impacts. For impact assessment purposes it was assumed that there will be 14 deliveries / hour in phase 1 and 7 in phase 2.

9.3.4 80% of the deliveries are assumed to access the main compound from Longbarrow junction and 20% to the compound near Countess. Deliveries are assumed to route along the following main corridors, based on the percentage distribution identified:

a. A36 (north) – 55%;

b. A36 (south) – 15%;

c. A303, west of the A36 junction – 15%; and

d. A303, east of the Scheme – 15%.

9.3.5 In addition to delivery of materials to the site, it is assumed that there will be the following intra-compound HGV movements:

a. 8 HGV movements per hour moving excavated material from the eastern portal (Countess) to the Longbarrow compound along the A303; and

b. HGV movements between Longbarrow and River Till compounds (along the new alignment (i.e. not on public roads).

9.4 Staff travel

Workforce requirements

9.4.1 At this stage in the project it has been necessary to make robust assumptions regarding the numbers of staff required to work on each activity in the construction phase. As more details become available through the planning of the construction programme it is likely that these numbers will be refined. The following Figures show the forecast profile of workforce for phase 1 and phase 2,

which should be seen as a “worst case” scenario in terms of travel demand. This is summarised in Table 9-2 below.

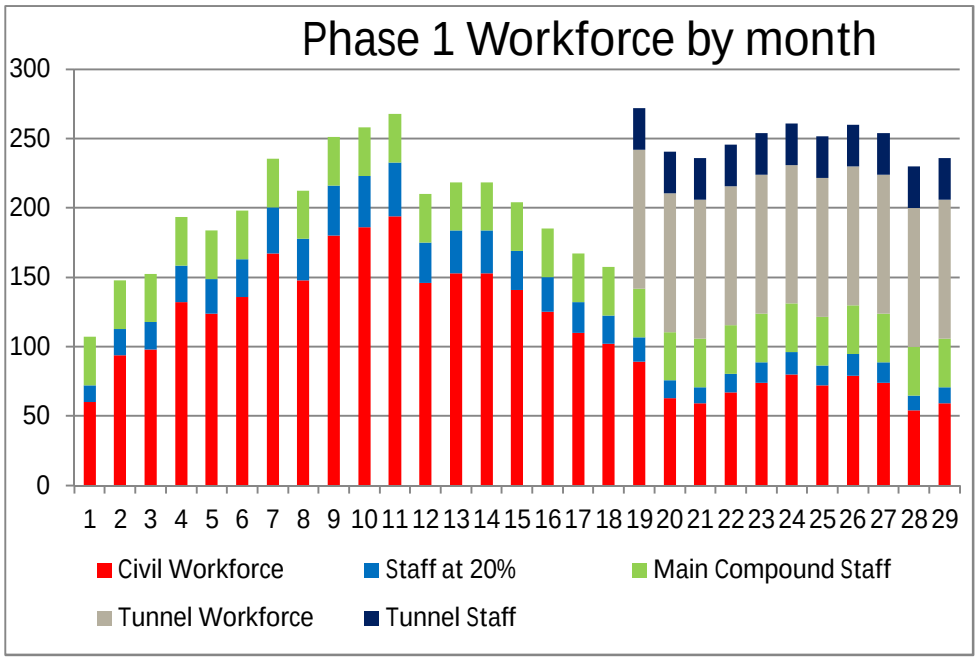


Figure 9-1: Staff profile for phase 1 construction

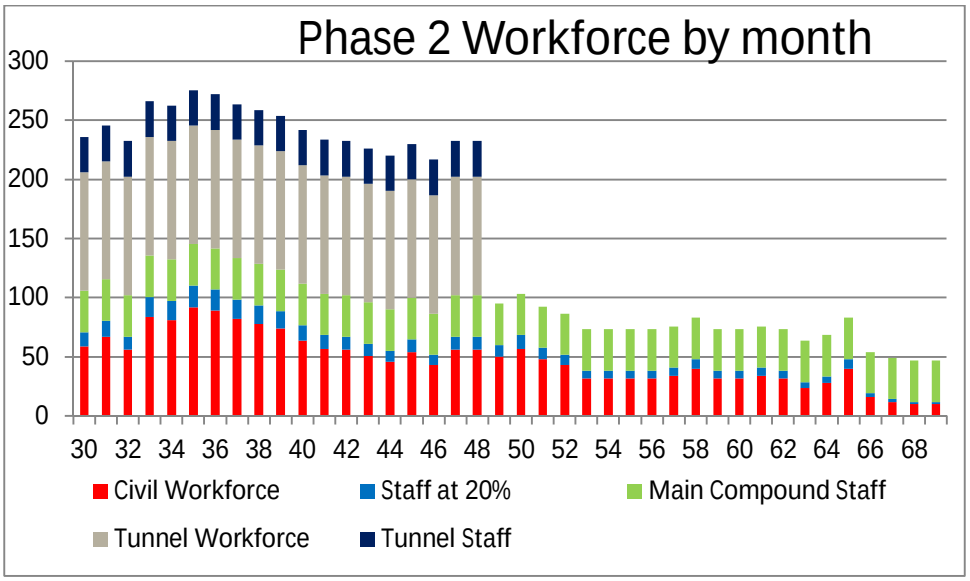


Figure 9-2: Staff profile for phase 2 construction

Table 9-2: Construction staff requirements

Staff	Phase 1	Phase 2
Average across Phase	218	244 (months 30-48)
Maximum monthly	268	275
Assumed number for the purpose of a robust assessment	280	300

Staff travel assumptions

9.4.2 Shift work assumes that civil work is being carried out between 07:00–19:00hrs meaning workers will arrive and leave outside of peak hours.

9.4.3 During the construction of the tunnel, workers are assumed to work in two 12 hour shifts 07:00–19:00hrs and 19:00–07:00hrs. This will result in workers leaving the site between the AM peak (07:00–08:00hrs) and arriving at site in the PM peak (18:00–19:00hrs).

9.4.4 It is assumed the workforce is split over the two site compounds, at Longbarrow and Countess, and all tunnel workers will use the site at Longbarrow and that 70% of civil workers will arrive at Longbarrow, 30% at Countess.

9.4.5 Travel Plans will be in place for the workforce so with the combination of car sharing, mini-buses and single occupancy vehicles, an assumption of an average vehicle occupancy of three has been made.

9.4.6 Workforce trips have been distributed across model zones within 10km radius of Longbarrow, based on the number of dwellings within each zone.

9.5 Traffic modelling results

Traffic flows

9.5.1 Traffic flow diagrams showing the forecast change in Annual Average Daily Traffic (AADT) in the construction scenarios are included in Appendix 9.2[31].

9.5.2 Figure 9-3 and Figure 9-4 show the change in forecast AADT flows relative to the without scheme 2026 scenario. This accounts for both additional traffic on the network as part of the construction activities, and the traffic flow diversion effects of the traffic management measures which will be in place. Negative values indicate a decrease in AADT in the construction scenarios compared to the without scheme scenario.

[31] Source: Transport Forecasting Package, Appendix C of the ComMA (Application Document 7.5)

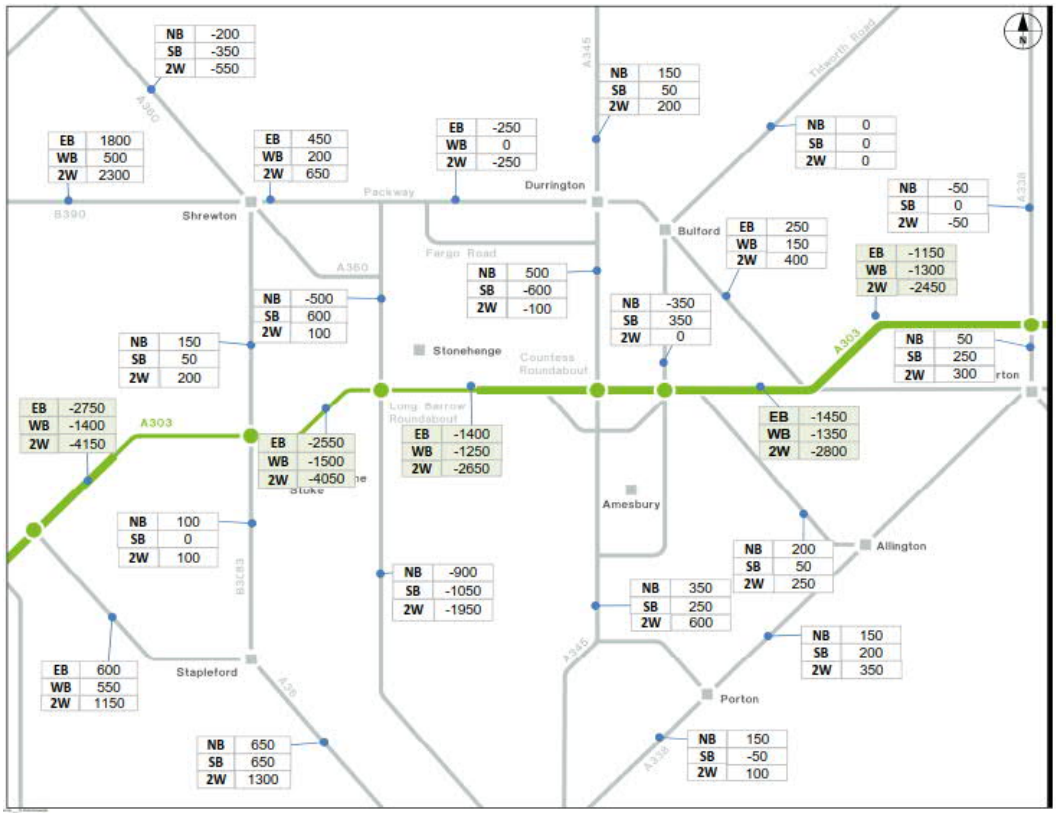


Figure 9-3: Difference between construction scenario phase 1 AADT & 2026 without scheme AADT

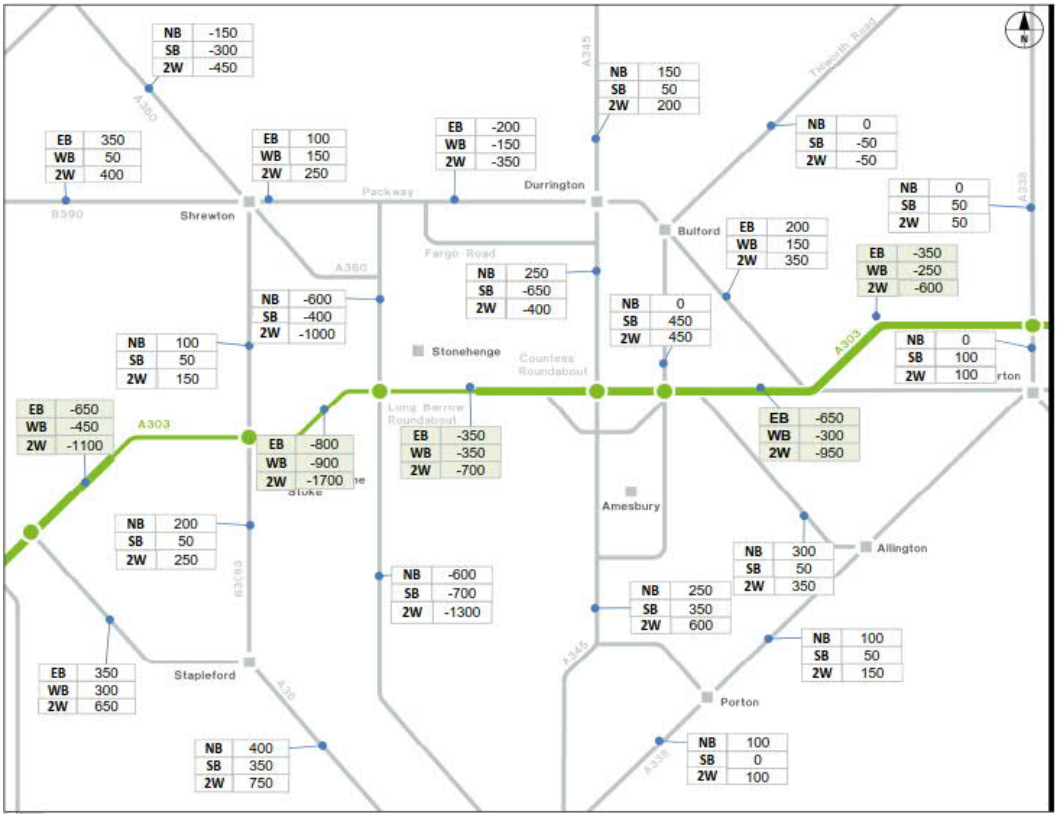


Figure 9-4: Difference between construction scenario phase 2 AADT & 2026 without scheme AADT

9.5.3 Figure 9-3 and Figure 9-4 show that during construction there is forecast to be a decrease in flows on the A303 mainline near the Scheme.

9.5.4 To the north of the A303 there will be an increase in flow on the B390 through Shrewton as traffic re-routes from the A36/A303 as a result of increased journey times on the A303. To the south of the A303 there is forecast to be some re-routeing for areas to the north west of Salisbury to access the A303 west via the A36 rather than the A360, again due to the increase in journey time on the A303.

9.5.5 In phase 2 of construction the bypass at Winterbourne Stoke is in place, as well as the flyover at Countess, which means that the change in forecast traffic flows is smaller in magnitude than in phase 1 but follows a similar pattern. Traffic flows through Winterbourne Stoke will reduce to local access in this phase.

9.5.6 To understand the wider re-routeing during the construction phase, analysis has been undertaken of forecast flows extending from the M4 at the north through to the A31 at the south. Table 9-3 highlights the flows for construction phase 1. The results are only presented for phase 1 as phase 2 changes follow the same pattern as phase 1 but to a lower magnitude.

Table 9-3: 2026 flows (two way, AADT) - Construction phase 1

	Name	2026 without scheme	2026 Construction phase 1	% difference
North of A303	M4	81,500	82,100	1%
	A4	11,300	11,400	1%
	A342	8,700	9,000	5%
	N of A303	3,800	3,800	-1%
	Packway	6,900	6,400	-6%
A303	A303	29,400	26,700	-9%
South of A303	S of A303	7,600	7,600	0%
	S of A303	3,000	3,000	0%
	Nettons	1,700	1,900	13%
	S of A303	18,300	19,100	4%
	A34	8,000	8,300	4%
	A36	19,300	19,400	0%
	A30	12,300	12,900	5%
	A31	70,100	70,000	0%
Total		**281,800**	**281,700**	**0%**

9.5.7 There is a forecast reduction in AADT of 3,200pcu on the A303 (2,700pcu) and The Packway (500pcu) in construction phase 1, due to the traffic management measures on the A303 and at Longbarrow and Countess roundabout. The analysis shows that there is forecast to be a corresponding increase in traffic of 3,200pcu on these alternative routes. Generally these are modest increases dispersed over a wide area with no individual route experiencing more than a 5% or 200pcu increase in daily traffic volume.

Journey times

9.5.8 Analysis has also been undertaken to illustrate the impacts of the construction on journey times through the area, with a focus on journey times for route 11-1 (A303: A34 to A36) in the without scheme scenario, phase 1 of the construction scenario and phase 2 of the construction scenario. Table 9-4 illustrates these outputs.

Table 9-4: A303 - A34 to A36 journey times, construction scenarios

Route	Time Period	Direction	Without scheme (hh:mm:ss)	Phase 1		Phase 2	
				(hh:mm:ss)	difference from without scheme	(hh:mm:ss)	difference from without scheme
11_1 A303: A34 to A36	AM	EB	00:30:42	00:34:31	00:03:49	00:31:15	00:00:33
		WB	00:33:22	00:36:02	00:02:40	00:33:34	00:00:12
	IP	EB	00:31:03	00:34:57	00:03:54	00:31:32	00:00:29
		WB	00:30:57	00:34:44	00:03:47	00:31:38	00:00:41
	PM	EB	00:32:12	00:35:49	00:03:37	00:32:30	00:00:18
		WB	00:30:54	00:34:46	00:03:52	00:31:38	00:00:44
	Busy Period	EB	00:43:24	00:45:27	00:02:03	00:43:32	00:00:08
		WB	00:42:33	00:44:48	00:02:15	00:43:41	00:01:08

9.5.9 As indicated in Table 9-4 there is a forecast increase in journey times of between two and four minutes in construction phase 1, principally due to the speed limits in place during the construction phase. In construction phase 2 the bypass at Winterbourne Stoke is in place, as well as the flyover at Countess, which results in forecast journey times that are mostly within a minute of the without scheme scenario.

9.5.10 During phase 1 of construction there are increases in journey times of up to a minute in the neutral time periods on The Packway and the A360 in comparison to the 2026 without scheme model.

9.5.11 Phase 2 of construction in general leads to an increase in journey times of 30 seconds to one minute on the A360 (route 8), in comparison to the without scheme 2026 model. There are limited changes on the other local routes.

9.5.12 These results show that, whilst there will be increases in journey times as a result of the Scheme construction, these increases are within an acceptable level of tolerance, particularly considering the short time period over which they will be experienced and the significant journey time benefits which will be provided by the Scheme when it is operational. Furthermore, the modelling has demonstrated that the increases in journey times will not result in unacceptable increases in traffic on alternative routes.

Traffic queues – Operational models

9.5.13 The AM and 'busy day' operational models show that the re-routeing forecast by the SATURN models results in long queues southbound into Longbarrow junction on the A360 in the different construction phases; this is due to an increase in traffic using the A360.

9.5.14 Figure 9-5 shows the levels of queuing modelled southbound into Longbarrow junction in the AM period. This indicates an increase in queue length in both phases of construction, compared with the without scheme scenario, with significantly longer queues occurring in phase 1.

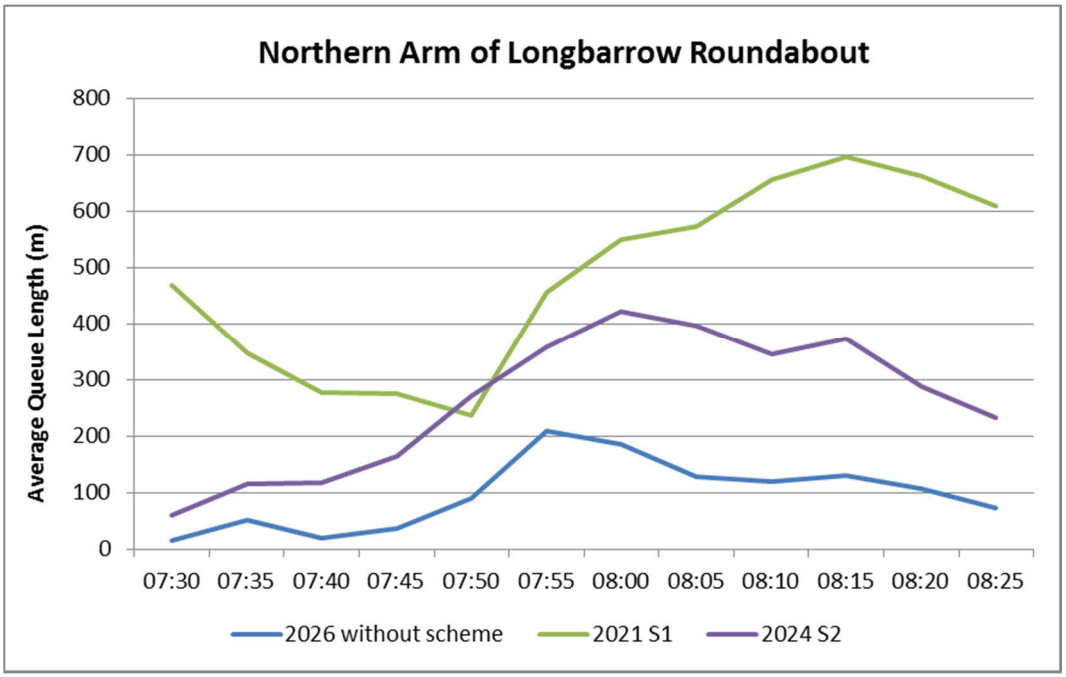


Figure 9-5: Average queue length (m) on A360 southbound into Longbarrow junction in the AM period (07:30-08:30hrs)

9.5.15 The AM and 'busy day' models also show an increase in queue length on the western arm of Longbarrow junction in construction phase 2. The model indicates this is not a stationary queue but a long slow moving queue. Time savings along the rest of the network in this phase make up for the additional delay here so there is no overall increase in journey time between the A36 and A34.

9.5.16 This is a localised impact, with it only really being high in phase 1, and predominantly in the latter half of the morning peak hour.

9.5.17 In both AM and PM operational models the signals have been adjusted to minimise queueing and journey time increases through Countess roundabout. This will need to be monitored and optimised for the final traffic management scheme but demonstrates that it is achievable.

9.6 Public Transport

9.6.1 There is only one bus service (Route 2 – Salisbury Reds) operating along the B3083, via the A303, with one bus stop that is located directly on the existing A303 within the Scheme limits. This is in the centre of Winterbourne Stoke at the T-junction between the A303 and the B3083, travelling northbound towards Shrewton. This service will likely be affected during the construction of the new B3083 line and underpass, however this would only be a temporary impact, with service delays likely to decrease following the Scheme completion.

9.7 Construction traffic impact summary

9.7.1 A construction plan was drafted and utilised to model the impact of the construction phases on the network. The modelling is indicative of the construction plan in its existing form (Appendix 9.1 of this TA) and will be further developed as the Scheme progresses through to Detailed Design.

9.7.2 The modelling shows that phase 1 of the construction programme has a greater traffic impact than phase 2, which follows a similar pattern but with lower magnitude of impacts. This is because the Winterbourne Stoke bypass, Longbarrow junction and Countess roundabout flyover will be in place in phase 2.

9.7.3 There is a forecast reduction in AADT of 3,200pcu on the A303 (2,700pcu) and The Packway (500pcu) in construction phase 1, due to the traffic management measures on the A303 and at Longbarrow and Countess roundabout. The analysis shows that there is forecast to be a corresponding increase in traffic of 3,200pcu on these alternative routes. Generally these are modest increases dispersed over a wide area with no individual route experiencing more than a 5% or 200pcu increase in daily traffic volume.

9.7.4 There will be increases in journey times as a result of the Scheme construction. However, these increases are of an acceptable level, particularly considering that they would be limited to phase 1 and recognising the significant journey time benefits which will be provided by the Scheme when it is operational. Furthermore, the modelling has demonstrated that the increases in journey times will not result in unacceptable increases in traffic on alternative routes.

9.7.5 There will be a localised increase in traffic queues on the southbound approach to the Longbarrow junction in phase 1 of the construction programme. This will be a short term effect and is considered acceptable in the wider context of scheme delivery and the associated benefits that the Scheme will provide.

9.7.6 In both AM and PM operational models the signals have been adjusted to minimise queueing and journey time increases through Countess roundabout. This will need to be monitored and optimised for the final traffic management scheme.

9.7.7 In conclusion, whilst there will be traffic impacts as a result of the construction of the Scheme, these impacts will be of an acceptable level and will be short-term.

10 Conclusions

10.1 Introduction

10.1.1 This Transport Assessment has been produced to assess the impact of the development of the A303 Amesbury to Berwick Down Scheme (the Scheme) on the strategic and local highway network, road safety and local sustainable modes of transport. It is submitted as part of the DCO application.

10.1.2 The A303/A358 corridor is a vital transport connection between the South West and the South East of England. While most of the road is dual carriageway, there are still over 35 miles (56km) of single carriageway. These sections act as bottlenecks for users of the route and can result in congestion, particularly in the summer months and around school holidays. This can cause delays to traffic travelling between the M3 and the South West of over an hour at the busiest times of the year. The A303 Amesbury to Berwick Down Scheme is part of a wider package of proposals for the A303/A358 corridor designed to transform connectivity to and from the South West by creating a high-quality dual-carriageway along the corridor.

10.2 Planning policy

10.2.1 The A303 Amesbury to Berwick Down Scheme is supported by, and aligns with, national, regional and local planning and transport policies. The Scheme will create a high quality, reliable route that meets the future needs of traffic demand, enables economic growth and improves the quality of life for local communities, whilst reducing journey times for users. It will improve connectivity and accessibility for walkers, cyclists and horse riders through the creation of new public rights of way. The Scheme will also help to conserve and enhance the World Heritage Site as well as making it easier to reach and explore.

10.2.2 With regard to the local transport network, the Scheme aims to relieve the existing highway infrastructure in local communities and allow more efficient use by removing through traffic, re-connecting local communities, improving the efficiency of local journeys and encouraging sustainable and accessible travel choices. It will address congestion, connectivity, reliability, accessibility, capacity, safety and resilience issues currently experienced on the existing road network.

10.2.3 Table 10-1 provides a summary of the Transport Assessment compliance to the policies stated within Chapter 2.

Table 10-1: A303 Amesbury to Berwick Down policy compliance

Policy Reference		Policy Compliance
NPSNN	Paragraph 5.212 - schemes should be developed and options considered taking into account local models where appropriate.	During the planning stages a thorough assessment has been undertaken into the localised effect of the Scheme.
	Paragraph 5.216 - There is a very strong expectation that impacts on accessibility for non-motorised users should be mitigated.	The PROWs for the Scheme are being retained and enhanced where necessary.
NPPF	Section 4 promotes sustainable transport depending on the nature and location of	The enhancement of the road network and inclusion of a new dual

Policy Reference		Policy Compliance
	the development site and supports development which achieves 'reductions in greenhouse gas emissions and reduced congestion' and provides safe and suitable access for all people.	carriageway will ultimately reduce journey times, and localised rat-running thus reducing congestion. However, a consequence of success in supporting economic growth, is some forecast redistribution of travel with some longer journeys along the corridor. The Road Safety Audit process has demonstrated safe and suitable design of the Scheme itself. The Scheme will have a positive overall effect on accident levels as demonstrated by the COBALT assessment.
Circular 02/13	The role of the SRN is refocused towards enabling and supporting development and growth, seeking to create the conditions in which the barriers to opportunity were removed.	The Scheme aims to reduce barriers for accessibility and enhance journeys for all transport users.
TIS	Create a more reliable, less congested, and better connected transport network that works for the users who rely on it.	The Scheme will provide assistance in tackling a notorious bottleneck on the A303 SRN.
NIDP	Government's commitment to invest over £100 billion by 2020-21.	The Scheme is identified as a key project and long term programme for the A303/A358 Corridor to transform the route into a high level Dual Carriageway.
RIS	Identifies three major improvements, as part of a total A303/A358 corridor package of commitments.	The Scheme forms part of a set of major improvements recognised by the RIS.
WCS	Core Policy 62 Development impacts on the transport network.	A Construction Plan and Traffic Management will manage and minimise the impacts of the construction traffic and delays on the network, along with planned and unplanned maintenance and diversions.
Wiltshire LTP3	SO4: To minimise traffic delays and disruption and improve journey time reliability on key routes.	The enhancement of the road network and inclusion of a new dual carriageway will result in reduce journey times and localised rat running.
	SO6: To make the best use of the existing infrastructure through effective design, management and maintenance.	As part of the Scheme, sections of the existing A303 SRN and some associated junctions are being enhanced. The Scheme also results in net reductions on the local road network, reducing potential pressure on the local road network allowing best use of the existing infrastructure.
	SO8: To improve safety for all road users	The Scheme will result in safety

Policy Reference		Policy Compliance
	and to reduce the number of casualties on Wiltshire's roads.	benefits through providing a safer road design than the existing road. And furthermore, diverting traffic from roads with higher incident rates
	SO9: To reduce the impact of traffic speeds in towns and villages.	The Scheme relieves the existing local highway infrastructure and alleviates busy day rat-running through Amesbury and local villages by building a high level dual carriageway that meets the needs of future traffic demand.
	SO15: To reduce barriers to transport and access for people with disabilities and mobility impairment.	All rights of way will remain accessible to disabled within the extents of the Scheme. The whole of the WHS will be accessible, presumably from use of the existing A303.
	SO17: To improve sustainable access to Wilshire's countryside and provide a more useable public rights of way network.	The existing PROWs for the Scheme are being retained and enhanced. The existing corridor across the WHS being de-trunked and becoming a new PROW, with enhanced connectivity around Winterbourne Stoke and Longbarrow.
	SO18: To enhance the journey experience of transport users.	The Scheme will ease congestion on the mainline, enhance user experience and relieve Amesbury and local villages of busy day rat-running, reducing overall journey times for transport users.

10.3 Development proposals

10.3.1 The Scheme would be approximately 8 miles (13km) long and comprise the following key components:

a. A northern bypass of Winterbourne Stoke with a viaduct over the River Till valley;

b. A new junction between the A303 and A360 to the west of and outside the WHS, replacing the existing Longbarrow roundabout;

c. A twin-bore tunnel approximately 2 miles (3.3km) long, past Stonehenge; and

d. A new junction between the A303 and A345 at the existing Countess roundabout.

10.4 Road safety

10.4.1 The Scheme has been subject to Stage 1 Road Safety Audit (RSA). The findings of the RSA have been fully reviewed by the Designers. Audit recommendations have been accepted where appropriate.

10.4.2 In summary, one change was made as a result of the comments raised in the RSA (para 7.2.9).The Designer's Response to all other comments raised in the

RSA have been explained further, with suitable justifications. Therefore, where these comments have been raised, the Designers have provided an explanation and justification for the decisions made and on occasion, the necessary assessments that were also undertaken.

10.4.3 A small number of comments resulted in the Designer's Response specifying that the appropriate level of detail is provided for this stage and these will be further assessed during detailed design.

10.4.4 COBALT analysis is also presented, which shows how the provision of a safer road design for the section of the A303 in question translates into a reduction in accident levels over a 60 year period. This analysis also considers the effects on accident levels of traffic diversions resulting from the Scheme, as some drivers will transfer onto routes with different accident rates to those routes that they are currently using.

10.4.5 The Scheme itself is forecast to reduce the number of accidents and casualties along the section of the A303 in question. This includes five fewer fatalities over the appraisal period and 108 fewer casualties in total. The reduction in both accidents and casualties occurs despite the increases in traffic that are forecast through this section of the A303 following implementation of the Scheme, and despite overall increases in distance of the A303 as a result of the realigned Longbarrow junction and Winterbourne Stoke bypass. This is due to the reduced incident rates for modern dual 2-lane roads compared to older S2 A-roads.

10.4.6 However, when wider changes in routeing are taken into account, with more drivers using other sections of the A303 which are not being upgraded as part of the proposals, the Scheme will result in a slight accident benefit over the whole road network. The net effects of re-routing and increased traffic along the A303 corridor is to moderate the accident reductions expected on the new route relative to the existing A303 Scheme section.

10.4.7 Personal Injury Accident ("PIA") data has been analysed for links and junctions on the local road network where traffic flows are forecast to increase as a result of the Scheme. "Clusters" of PIAs at links or junctions have been analysed to identify whether there is a potential highways safety issue which could be exacerbated by increases in traffic resulting from the Scheme. It is concluded that the accident data do not indicate inherent existing safety issues in the area around the Scheme that could be exacerbated by the Scheme.

10.5 Network performance

Modelling methodology

10.5.1 Highways England's South West Regional Transport Model (SWRTM) has been updated, calibrated and validated to produce the "A303 Stonehenge SWRTM (DCO) model". This exercise has been undertaken in line with the Department for Transport WebTAG guidance, as well as guidelines produced during the development of the Highways England Regional Traffic Models ("RTMs"). The model assesses neutral month AM, inter-peak and PM peak periods. Given the specific issues on the A303 caused by holiday traffic, a busy day model has also been developed. This refined model provides the evidence base for Highways England's (the Applicant) Development Consent Order (DCO) application.

10.5.2 The “A303 Stonehenge SWRTM (DCO) model” is a strategic model which has been used to assess the effects of the Scheme in terms of traffic flows, including diversions as a result of the Scheme, and vehicle journey times. Additionally, two operational microsimulation models have been produced for the A303 and local road network in the vicinity of the Scheme. The operational models have been used to consider traffic impact at a more local scale.

Scenarios

10.5.3 The models have been calibrated and validated to a base year of 2017. The opening year will be 2026 and the design year is 2041. The modelling assessment considers the absolute performance of the Scheme in the design year of 2041. Where it has been necessary to draw comparison between with and without scheme scenarios, this has been done for the opening year of 2026.

Traffic flows

10.5.4 Traffic flows on the existing A303 are forecast to increase between 2017 and 2041 by between 23% and 43% depending on location. Traffic flow increases on local roads are typically proportionally higher than on the A303 itself. A notable change between 2017 and 2041 baseline scenario is the increase in traffic on The Packway. With the A303 currently operating at capacity, trips being made in the area around the Scheme use alternative routes, with The Packway being the most attractive alternative.

10.5.5 The modelling shows that the introduction of the Scheme will enable significant increases in traffic volumes to use the A303 through increasing available capacity and reducing delays. On the whole, this results in net reductions in traffic on local roads, although there are some increases as traffic diverts onto some routes to access the A303.

10.5.6 Therefore, it is evident that the existing situation requires attention and the Scheme not only allows more traffic to travel along the A303, congestion and delays will be reduced.

Journey times – A303

10.5.7 Journey time assessments are an important metric in understanding how the Scheme will affect congestion levels and driver delay. This includes effects both from the capacity benefits of the Scheme itself and from traffic flow changes across multiple routes.

10.5.8 Journey times along the length of the Scheme are in the region of half an hour in both directions in all neutral month time periods in 2017, with journey times slightly higher in the eastbound direction in the AM peak, and westbound direction in the PM peak. In the busy day model, average journey times are around 40 minutes.

10.5.9 There are consistent forecast increases in journey times on the section of the A303 between the A34 and A36 for all neutral time periods between 2017 and 2041 without scheme scenarios; the increase in the 2041 forecast compared to 2017 is about three minutes for neutral weekdays and ten minutes on average during busy days.

10.5.10 The Scheme is forecast to result in journey time savings of circa four minutes in all neutral weekday periods, and nearly 20 minutes on average during a busy day. This demonstrates that the Scheme will deliver significant journey time benefits in all peaks. The benefits most pronounced on busy days, where substantial journey time savings will result in journey times being comparable with the neutral month time periods where there will be minimal congestion and delay.

10.5.11 Sensitivity testing has been undertaken considering higher levels of traffic growth and alternative local development scenarios. The results demonstrate that the Scheme will continue to provide journey time benefits and is resilient to potential increases in traffic flows.

Journey times – Local road network

10.5.12 The modelling shows little change in most local journey times as a result of the Scheme. There are expected to be benefits to journey times on The Packway due to traffic routeing via the A303 rather than using The Packway. There will also be journey time savings on the A345 southbound.

Link capacity

10.5.13 The modelling shows that all A303 links will be over 100% capacity in all 2041 modelled periods. With the Scheme in place, each A303 link will be operating at between 40% and 60% capacity. This represents a substantial improvement in traffic capacity as a result of the Scheme.

10.5.14 The modelling presented shows that whilst there will be capacity issues at Solstice Park junction between 2031 and 2041, these issues will be caused by the additional development assumed to come forward during the forecast period and is not as a result of the Scheme. This Transport Assessment has undertaken sensitivity tests to indicate that solutions to this issue are feasible. Delivery of any necessary capacity increase at Solstice Junction will routinely be considered as part of the planning process as developments come forward over time.

Operational modelling

10.5.15 The operational modelling has demonstrated that the Scheme is appropriate in traffic capacity terms and no additional mitigation is required.

10.6 Sustainable transport

10.6.1 An HD42/17 Walking, Cycling and Horse Riding Assessment & Review (WCHAR) has been undertaken which sets objectives for the Scheme in terms of walking, cycling and horse riding, and sets out ‘actions taken’ or ‘outcomes’ related to these objectives, at DCO design stage.

10.6.2 The objectives and their associated outcomes will likely be refined as the Scheme progresses onto Detailed Design, where an agreed position will be reached between Highways England and Wiltshire Council. The dialogue is currently ongoing and will be recorded in the statement of common Ground.

10.6.3 The Scheme will cut across a number of existing Public Rights of Way (PRoWs) including Byways Open to All Traffic (BOATs), bridleways and public footpaths. Provision is made within the Scheme to maintain the existing function of the PRoWs with suitably located overbridges. The Scheme also includes new Non-

Motorised User (NMU) routes to improve accessibility and connectivity for communities including Winterbourne Stoke and Amesbury.

10.6.4 The Scheme will not result in any changes to existing bus stops and will therefore have no direct impact on local bus routes. As a result, there will not be any material effect on local bus services that operators would need to respond to.

10.7 Construction impact assessment

10.7.1 A construction plan (Appendix 9.1 of this TA) was prepared utilised to model the impact of the construction phases on the network. A TMP for the Scheme will outline the traffic management strategies for three key scenarios; construction, operation stages and emergency situations. It will also consider the strategy for managing construction traffic.

10.7.2 The TMP will be prepared by the successful contractor and will be a live document that is updated and modified as the Scheme progresses. The traffic management strategy within the TMP will be developed with engagement and input from key stakeholders before it is finalised.

10.7.3 For the purposes of the EIA and the traffic assessment, two principal phases of the construction programme for the main works have been identified. These correspond to:

a. phase 1, when Winterbourne Stoke bypass, Longbarrow junction and Countess roundabout flyover are under construction (likely 2021-2023); and

b. phase 2, when the construction of the tunnel is the primary construction activity (2024 onwards). The Winterbourne Stoke bypass, Longbarrow junction and Countess roundabout flyover constructed in phase 1 would be operational.

10.7.4 The construction plan will be refined through detailed design of the Scheme with appropriate regard to reducing the overall impacts during construction.

10.7.5 Phase 1 will generate approximately 128 daily HGV trips, with a mixture of uses and phase 2 is forecast to generate circa 67 daily trips, also with a mixture of uses (Table 9-1).

10.7.6 It is assumed that deliveries will be scheduled during a 12 hour period (7am to 7pm) 6 days a week. Recognising that the contractor will develop a detailed construction plan, the implied hourly flow was increased by 30% to provide a robust assessment of the potential impacts. For impact assessment purposes it was assumed that there will be 14 deliveries / hour in phase 1 and 7 in phase 2.

10.7.7 80% of the deliveries are assumed to access the main compound from Longbarrow junction and 20% to the compound near Countess.

10.7.8 The modelling shows that phase 1 of the construction programme has a greater traffic impact than phase 2, which follows a similar pattern but with lower magnitude of impacts. This is because the Winterbourne Stoke bypass, Longbarrow junction and Countess roundabout flyover will be in place in phase 2.

10.7.9 There is a forecast reduction in AADT traffic flows on the A303 and The Packway of 3,200pcu in construction phase 1, due to the traffic management measures on the A303 and at Longbarrow and Countess roundabouts. The analysis shows that

there is forecast to be a corresponding increase in traffic of 3,200pcu on the alternative routes. Generally these are modest increases dispersed over a wide area with no individual route experiencing more than a 5% or 200pcu increase in daily traffic volume.

10.7.10 There will be increases in journey times as a result of the Scheme construction. However, these increases are of an acceptable level, particularly considering they will be limited to phase 1 and the significant journey time benefits which will be provided by the Scheme when it is operational. Furthermore, the modelling has demonstrated that the increases in journey times will not result in unacceptable increases in traffic on alternative routes.

10.7.11 There will be a localised increase in traffic queues on the southbound approach to the Longbarrow junction in phase 1 of the construction programme. This will be a short term effect and is considered acceptable in the wider context of scheme delivery and the associated benefits that the Scheme will provide.

10.7.12 In conclusion, whilst there will be short term traffic impacts as a result of the construction of the Scheme, these impacts will be of an acceptable level and will be short-term.

10.8 Conclusion

10.8.1 The A303 Amesbury to Berwick Down Scheme has been the subject of extensive design and analysis work which forms the basis of this DCO application, much of which has been summarised in this TA. There are major strategic benefits in that it is part of a wider package of proposals for the A303 / A358 corridor designed to transform connectivity to and from the South West by creating a high-quality dual-carriageway along the corridor.

10.8.2 The Scheme aligns with local and national planning policy and guidance, provides road safety benefits, has traffic flows and journey time benefits on the A303 and local road network, and does not result in unacceptable transport impacts on either the local or strategic road networks. The needs of non-motorised users have been fully incorporated into scheme design and treatment of Public Rights of Way result in improvement to amenity. The Scheme is therefore considered acceptable in transport planning terms.

Abbreviations list

AADT	Annual Average Daily Traffic
AAJV	Atkins Arup Joint Venture
ABP	Army Basing Programme
ADS	Advance Direction Sign
AM	Morning peak
AMCB	Analysis of Monetised Costs and Benefits
AmW	AECOM, mace and WSP – Technical Partner to Highways England
ANPR	Automatic Number Plate Recognition
AoDM	Area of Detailed Modelling
AQMA	Air Quality Management Area
ATC	Automatic Traffic Count
BOAT	Byways Open to All Traffic
CIP	Complex Infrastructure Project
COBALT	Cost and Benefits to Accidents – Light Touch
CSR	Client Scheme Requirements
DCO	Development Consent Order
DfT	Department for Transport
DM	Do Minimum
DMRB	Design Manual for Roads and Bridges
DS	Do Something
EAP	Economic Assessment Package
ES	Environmental Statement
FMA	Fully Modelled Area
GIS	Geographic Information Systems
HGV	Heavy Goods Vehicle
IAN	Interim Advice Note
IP	Interpeak period

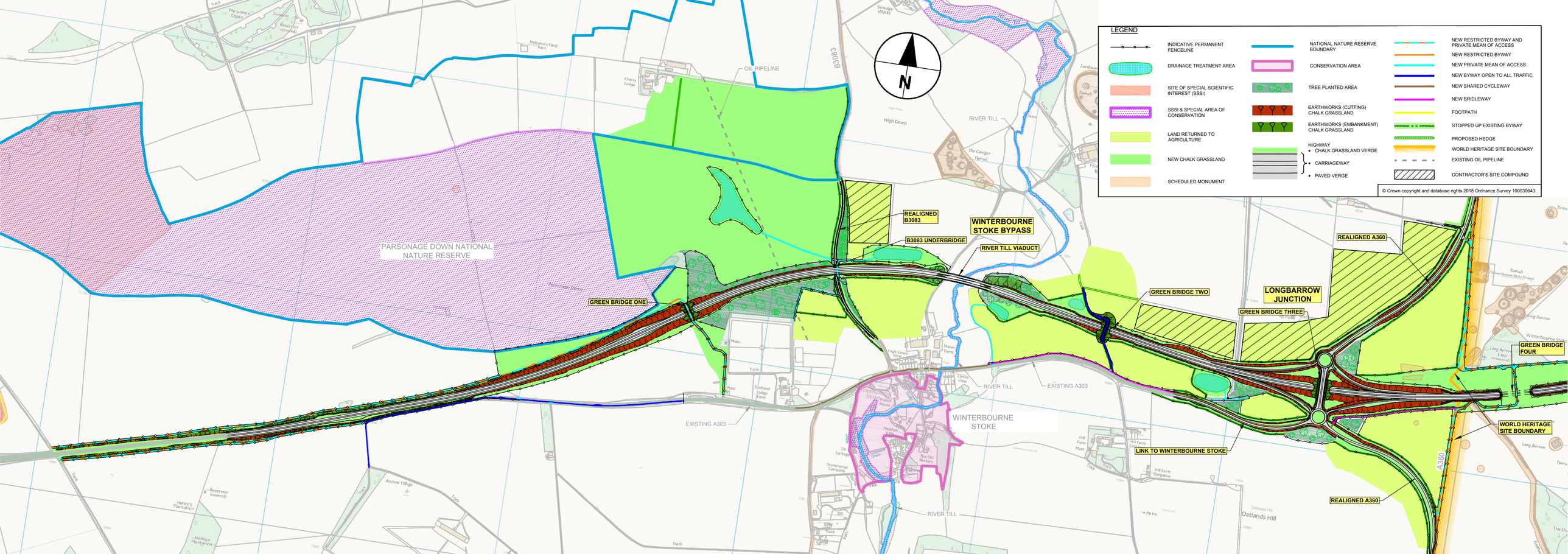
ITN	Integrated Transport Network
Km	Kilometre
Km/h	Kilometres per hour
LGV	Light Goods Vehicle
LTP3	Local Transport Plan 3
M	Metre
MCTC	Manual Classified Turning Counts
MoD	Ministry of Defence
Mph	Miles per hour
NCN	National Cycle Network
NDIP	National Infrastructure Delivery Plan
NNR	National Nature Reserve
NMU	Non-Motorised User
NPPF	National Planning Policy Framework
NPSNN	National Policy Statement for National Networks
NSIP	Nationally Significant Infrastructure Projects
NTEM	National Trip End Model
OD	Origin-Destination
OGV	Ordinary Goods Vehicle
PCU	Passenger Car Units
PCF	Project Control Framework
PIA	Personal Injury Accidents
PPG	Planning Practice Guidance
PM	Evening peak period
RIS	Roads Investment Strategy
RoF	Region of Focus
RSI	Roadside Interview
RIP	Road Investment Programme
RSA	Road Safety Audit

RTF	Road Traffic Forecasts
RTM	Regional Traffic Model
SATURN	Simulation and Assignment of Traffic to Urban Road Networks
SFA	Service Families Accommodation
SLA	Single Living Accommodation
SMP	Smart Motorway Projects
SRN	Strategic Road Network
SWRTM	South West Regional Traffic Model
TAME	Traffic Appraisal Modelling and Economics
TEMPro	Trip End Model Programme
TIS	Traffic Information System
TMP	Traffic Management Plan
TPG	Highways England's Transport Planning Group
VDM	Variable Demand Model
V/C	Volume over Capacity
VISSIM	Verkehr In Städten - SIMulationsmodell
WC	Wiltshire Council
WCHAR	Walking, Cycling and Horse Riding Assessment and Review
WCS	Wiltshire Core Strategy
WebTAG	Web-based Transport Analysis Guidance
WebTRIS	Highways England's web-based Traffic Information System
WHS	World Heritage Site

Appendices

Appendix 3.1: Scheme drawings

Western section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SSSI & SPECIAL AREA OF CONSERVATION
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NEW CHALK GRASSLAND
SCHEDULED MONUMENT
NATIONAL NATURE RESERVE BOUNDARY
CONSERVATION AREA
TREE PLANTED AREA
EARTHWORKS (CUTTING) CHALK GRASSLAND
EARTHWORKS (EMBANKMENT) CHALK GRASSLAND
HIGHWAY
CHALK GRASSLAND VERGE
CARRIAGEWAY
PAVED VERGE
NEW RESTRICTED BYWAY AND PRIVATE MEAN OF ACCESS
NEW RESTRICTED BYWAY
NEW PRIVATE MEAN OF ACCESS
NEW BYWAY OPEN TO ALL TRAFFIC
NEW SHARED CYCLEWAY
NEW BRIDLEWAY
FOOTPATH
STOPPED UP EXISTING BYWAY
PROPOSED HEDGE
WORLD HERITAGE SITE BOUNDARY
EXISTING OIL PIPELINE
CONTRACTOR'S SITE COMPOUND
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N
OIL PIPELINE
B3083
REALIGNED B3083
B3083 UNDERBRIDGE
WINTERBOURNE STOKE BYPASS
RIVER TILL VIADUCT
REALIGNED A360
GREEN BRIDGE TWO
LONGBARROW JUNCTION
GREEN BRIDGE THREE
GREEN BRIDGE FOUR
GREEN BRIDGE ONE
PARSONAGE DOWN NATIONAL NATURE RESERVE
EXISTING A303
WINTERBOURNE STOKE
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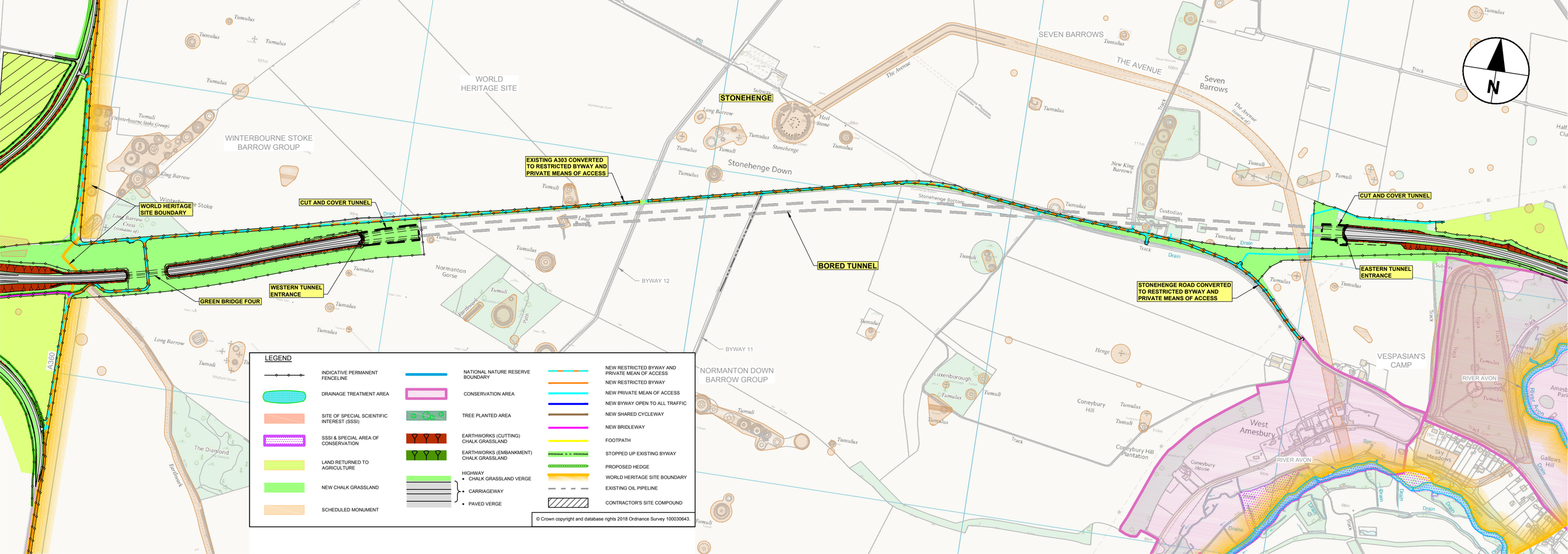
WORLD HERITAGE SITE BOUNDARY
REALIGNED A360
A360
RIVER TILL
Oatlands Hill

Central section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WESTERN TUNNEL ENTRANCE
GREEN BRIDGE FOUR
EXISTING A303 CONVERTED TO RESTRICTED BYWAY AND PRIVATE MEANS OF ACCESS
BORED TUNNEL
STONEHENGE ROAD CONVERTED TO RESTRICTED BYWAY AND PRIVATE MEANS OF ACCESS
EASTERN TUNNEL ENTRANCE
CUT AND COVER TUNNEL
STONEHENGE
WORLD HERITAGE SITE
WINTERBOURNE STOKE BARROW GROUP
NORMANTON DOWN BARROW GROUP
SEVEN BARROWS
THE AVENUE
VESPASIAN'S CAMP
Stonehenge Down
Normanton Gorse
BYWAY 12
BYWAY 11
A360
RIVER AVON
West Amesbury
Seven Barrows
Coneybury Hill
Coneybury Hill Plantation
Luxenborough
Sky Meadows
Gallows Hill
Tumulus
Long Barrow
Track
Drain
LEGEND
INDICATIVE PERMANENT FENCELINE
DRAINAGE TREATMENT AREA
SITE OF SPECIAL SCIENTIFIC INTEREST (SSSI)
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EXISTING OIL PIPELINE
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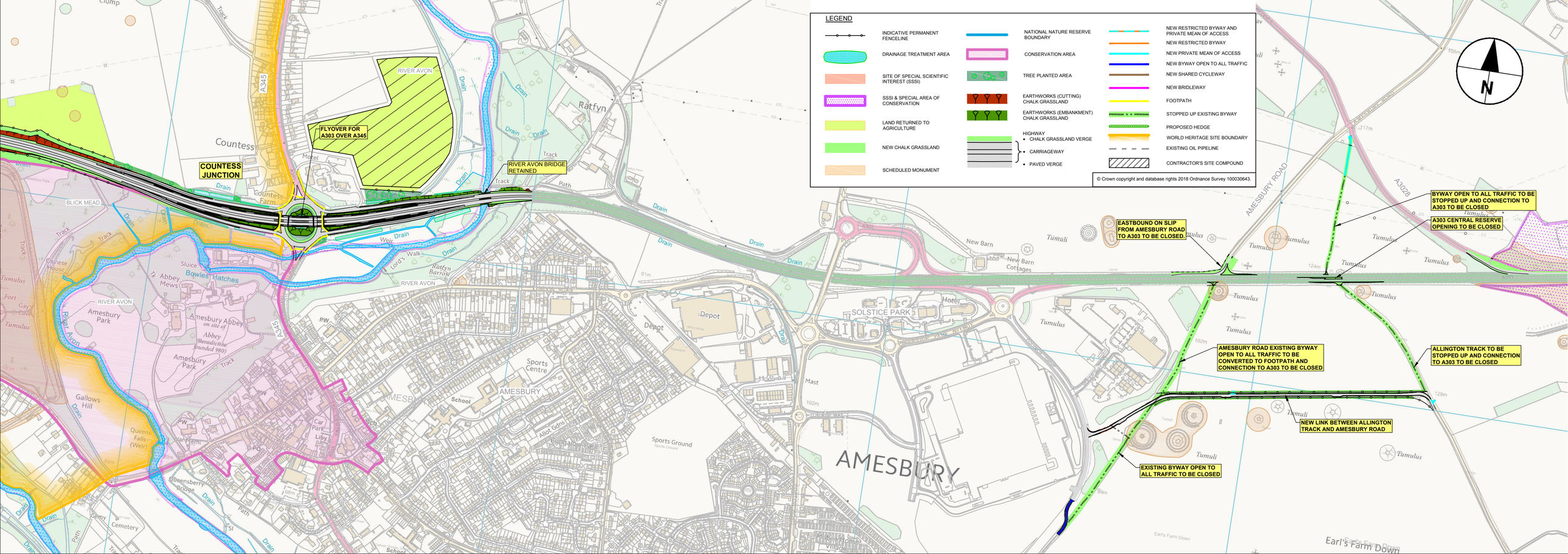
Eastern section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HIGHWAY
• CHALK GRASSLAND VERGE
• CARRIAGEWAY
• PAVED VERGE
NEW RESTRICTED BYWAY AND PRIVATE MEAN OF ACCESS
NEW RESTRICTED BYWAY
NEW PRIVATE MEAN OF ACCESS
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PROPOSED HEDGE
WORLD HERITAGE SITE BOUNDARY
EXISTING OIL PIPELINE
CONTRACTOR'S SITE COMPOUND
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N
COUNTESS JUNCTION
FLYOVER FOR A303 OVER A345
RIVER AVON BRIDGE RETAINED
EASTBOUND ON SLIP FROM AMESBURY ROAD TO A303 TO BE CLOSED.
BYWAY OPEN TO ALL TRAFFIC TO BE STOPPED UP AND CONNECTION TO A303 TO BE CLOSED
A303 CENTRAL RESERVE OPENING TO BE CLOSED
AMESBURY ROAD EXISTING BYWAY OPEN TO ALL TRAFFIC TO BE CONVERTED TO FOOTPATH AND CONNECTION TO A303 TO BE CLOSED
ALLINGTON TRACK TO BE STOPPED UP AND CONNECTION TO A303 TO BE CLOSED
NEW LINK BETWEEN ALLINGTON TRACK AND AMESBURY ROAD
EXISTING BYWAY OPEN TO ALL TRAFFIC TO BE CLOSED
AMESBURY
SOLSTICE PARK
Countess
Ratfyn
RIVER AVON
A345
A303
A3028
AMESBURY ROAD
BLICK MEAD
Countess Farm
Motel
New Barn
New Barn Cottages
Tumuli
Tumulus
Depot
Sports Centre
Sports Ground
Hotel
Mast
Earl's Farm Down
Amesbury Park
Amesbury Abbey
Abbey (Benedictine founded 980)
Abbey Mews
Bowles Hatches
Gallows Hill
Queens Falls (Weir)
Queensberry Bridge
Cemetery
Allot Gdns
Bowling Green
Car Park
Library
Chinese House
Lord's Walk
Ratfyn Barrow
Track
Path
Drain
Weir
Sluice
PW
PO
SI
88m
91m
102m
124m
129m

Appendix 5.1: Supply uncertainty log

Supply uncertainty log

Application			Location		Included in Core Scenario?
Applicant for 'other development' and brief description	**Certainty**	**Opening Year**	**Location**	**Area**	
RIS1 Schemes, to be delivered in RIS period 1					
A30 Temple to Higher Carblake: The A30 Temple to Higher Carblake scheme will dual the last section of single carriageway on the A30 between the M5 at Exeter and the Carland Cross junction with the A39 north of Truro (approximately 2.8 miles or 4.5 kilometres)	Completed	2017	Cornwall		Include
M3 Junctions 2-4a Smart Motorway Programme (SMP): J2 (M25 interchange) to J4a (A327 Farnborough): upgrading the M3 to Smart Motorway including hard shoulder running.	Near Certain	2018	Surrey	Rushmoor	Include
M49 Avonmouth Junction: New junction on the M49 to provide strategic access to Severnside and Avonmouth; this will support the Enterprise Zone and local growth in the Bristol area.	More than likely	2020	Bristol	Bristol	Include
A31 Ringwood: Widening to three lanes and junction improvements providing more capacity for local traffic; adjustments to nearby road network to provide improvements for pedestrians and address safety	More than likely	2020	Hampshire	New Forest	Include
A34 Oxford Junctions: Improvements at Peartree and Botley interchanges	More than likely	2021	Oxfordshire		Include
M27 Junction 4-11 Smart Motorway Programme (SMP): J4 (M3 interchange) to J11 (Fareham): upgrading to Smart Motorway, linking with the Smart Motorway scheme on the M3.	More than likely	2022	Hampshire	Fareham	Include
M3 Junctions 9-14 Smart Motorway Programme (SMP): J 9 (Winchester/A34 interchange) to J14 (M27 interchange): upgrading to Smart Motorway, linking with the Smart Motorway scheme on the M27	More than likely	2022	Hampshire	Southampton	Include
M271 and A35 Redbridge Roundabout upgrade - An upgrade to the Redbridge Roundabout. Improvements will include a dedicated left turn lane for traffc leaving the M271 to access Southampton Docks and the city centre.	Near Certain	2022	Hampshire	Southampton	Include
M4 junctions 3-12: smart motorway - Provision of an additional running lane in both directions. The extra lane will continue through junctions 4,5,6,7,8/9 and 11. To enable provision of a smart motorway, it will be necessary to replace or widen bridges where there is currently no hard shoulder.	Near Certain	2022	Berkshire	Heathrow to Reading	Include
A30 Chiverton to Carland Cross: Upgrading the A30 to dual carriageway north of Truro, linking existing dual carriageways around Bodmin with the Redruth bypass; coupled with the Temple to Higher Carblake scheme with will improve the A30 to Expressway standard between Camborne and the M5	More than likely	2023	Cornwall		Include
M27 Junctions 5-8 (Southampton Junctions): J5 (Southampton Airport) to J8 (A3024): widening and signalisation of slip roads and access routes to junction 8, and replacement of rail bridges in Southampton (on local road network) to reduce pressure on the motorway	More than likely	2023	Hampshire	Southampton	Include

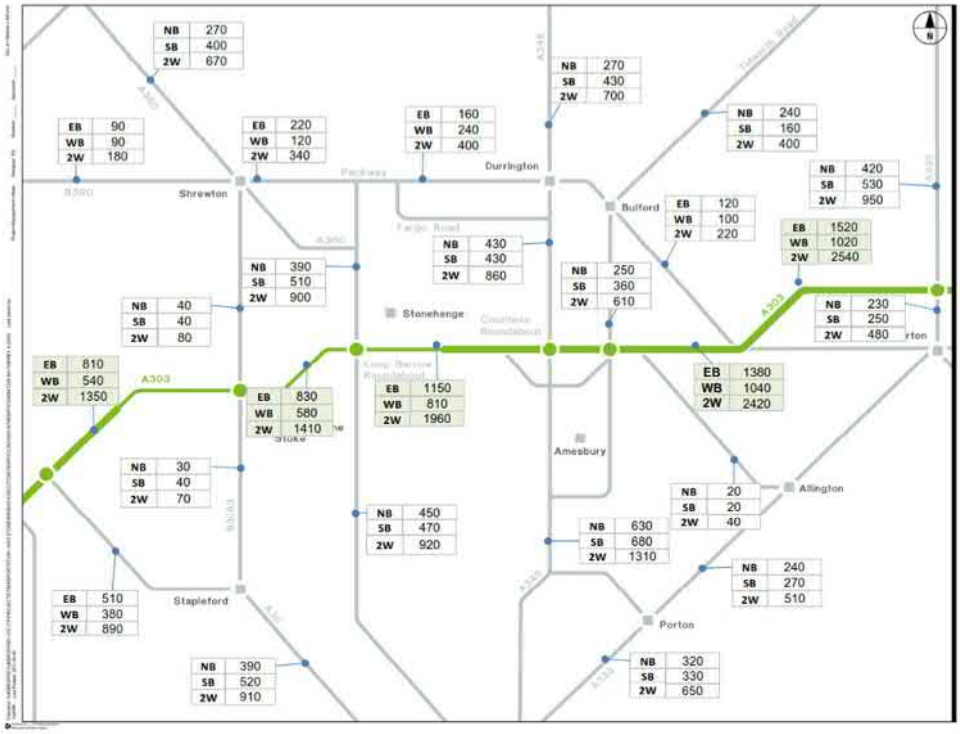
Application			Location		Included in Core Scenario?
Applicant for 'other development' and brief description	**Certainty**	**Opening Year**	**Location**	**Area**	
A358 Taunton to Southfields - Widening the existing carriageway from West Hatch Lane to Southfields Roundabout.	More than likely	2023	Somerset	Taunton	Include
M3 Junction 9 (A34) Improvements: A comprehensive package of improvements, to include new links and widening and remodelling of junction 9 to allow more free flowing connections and reduce congestion	More than likely	2024	Hampshire	Winchester	Include
A303 Stonehenge - Construction of a twin-bored tunnel of at least 1.8 miles as the road passes Stonehenge, coupled with a dual carriageway bypass for Winterbourne Stoke to link the existing dual carriageway section around Amesbury with the dual carriageway at Berwick Down.	Near Certain	2026	Wiltshire	Amesbury	With Scheme
A303 Sparkford - Ilchester dualling - Dualling of a single carriageway section of the A303, linking together the Sparkford and Ilchester bypasses.	Near Certain	2028	Somerset	Sparkford	Include
Local Authority Schemes					
A380 South Devon Highway (Kingskerswell By-pass) - 5.5km dual carriageway, providing a bypass for Kingskerswell.	Completed	2015	Devon	Newton Abbot	Include
Dunyeat's Roundabout and Queen Anne Drive junctions - Improvements to Dunyeat's roundabout and Queen Anne Drive junctions on the A349 to reduce congestion and improve journey times on major commuter route, including improvements for pedestrians and cyclists.	Completed	2016	Dorset	Bournemouth	Include
A34 Milton Interchange improvement - Increased capacity at this roundabout junction by adding a 'hamburger lane' dedicated left turn lanes and widening. A34 is within SRN.	Completed	2016	Oxfordshire	Milton	Include
A34 Chilton Interchange improvement - Adding two north facing slip roads to connect the A34 with the A4185 Newbury Road and Hagbourne Hill. A34 is within SRN.	Completed	2016	Oxfordshire	Chilton	Include
M5 J24 Huntworth Roundabout - Improvement to roundabout required to mitigate impact of several developments.	Completed	2016	Somerset	Bridgwater	Include
M5 J30/31 - A379 Bridge Road widening Exeter - Local highway scheme to widen A379.	Completed	2017	Devon	Exeter	Include
A349 Major improvement - Major improvement works to A349 (Gravel Hill), stabalising and strengthening embankments, increasing capacity for motor vehicles and delivering improvements to sustainable transport options.	Completed	2017	Dorset	Poole	Include
A40 Elmbridge Court Roundabout - Hamburger' - through about junction, widen approach lanes and signalise.	Completed	2017	Gloucestershire	Gloucester	Include
M5 J24 HPC Park & Ride - 700 space park & ride site to serve HPC construction only.	Completed	2017	Somerset	Bridgwater	Include
Northern Inner Distribution Road (NIDR) - New road connecting Priory Bridge Road to Staplegrove Road.	Completed	2017	Somerset	Taunton	Include
M4 J17 partial signalisation - Partial MOVA signalisation of junction. Required to mitigate effects of housing and business growth in Chippenham. Also to improve safety by preventing queues on off-slip backing onto main line.	Completed	2017	Wiltshire	Chippenham	Include

Application			Location		Included in Core Scenario?
Applicant for 'other development' and brief description	**Certainty**	**Opening Year**	**Location**	**Area**	
M4 J16 improvement - Upgrading capacity and changing the gyratory layout at J16 (Swindon). Third party scheme required to accommodate the nearby extension of Swindon at Wichelstowe.	Near Certain	2018	Wiltshire	Swindon	Include
A38 M5 J16 to Aztec West - Widening southbound to 5 lanes.	Near Certain	2018	South Gloucestershire	South Gloucestershire	Include
M5 J23 Signalisation - Signalisation of 3 arms to mitigate the impact of Hinkley Point C construction. Third party funded scheme.	Near Certain	2018	Somerset	Bridgwater	Include
M5 J23 HPC Park & Ride - 1300 space park & ride site to serve HPC construction only.	Near Certain	2018	Somerset	Bridgwater	Include
Staplegrove - Access link off Staplegrove Road to east of Cross Keys / Silk Mills Roundabout.	More than likely	2018	Somerset	Taunton	Include
A350 Chippenham improvements - The A350 southbound from M4 J17 bypasses Chippenham to the west and heads south to Melksham, Trowbridge and eventually to Poole in Dorset. Wilts C has delivered a £2m package of improvements to the Chippenham bypass section, including the golf course and Bumpers Farm roundabouts and dualling sections of road immediately to the north of both junctions.	Near Certain	2018	Wiltshire	Chippenham	Include
A419 White Hart junction improvement - Remodelling and upgrading of gyratory below A419. Required to accommodate new Eastern Villages urban extension east of A419.	Near Certain	2019	Wiltshire	Swindon	Include
M5 J25 - Major junction improvement with new arm and access to a proposed strategic employment site to the south east of the junction. Proposed and designed by Somerset CC with funding from developer, local growth fund and potentially Highways England HGF.	More than likely	2019/20	Somerset	Taunton	Include
Blackwater junction - Widening the A338 from Blackwater south to Cooper Dean junction with A3060. A new junction is to be built at Wessex Fields just north of Bournemouth Hopsital linking the A338 with development land north of the hospital.	Near Certain	2020	Dorset	Bournemouth	Include
M4 J15 improvement - Upgrading capacity and changing the gyratory layout at J15 (Swindon East). Third party scheme required to accommodate the nearby extension of Swindon at Commonhead. Additional lane on gyratory, additional lane on A419 southbound approach and dedicated lane onto eastbound M4 slip.	More than likely	2020	Wiltshire	Swindon	Include
A38 Deep Lane Junction east of Plymouth - Improved junction capacity with associated park & ride scheme. Required to provide additional junction capacity to enable development of Sherford new town, 5,500 new homes, jobs, schools etc.	More than likely	2021	Devon	Plymouth	Include
M5 J23 Dunball roundabout improvements - Improvement to Dunball roundabout junction with A38 as requirement for Huntspill Energy Park development. Third party scheme.	More than likely	Unknown	Somerset	Bridgwater	Include
Other Area of Detailed Modelling Schemes					
Army Re-basing works, Larkhill: Re-modelling of existing priority junction between The Packway and Tombs Road to create a roundabout. Access to Tombs Road from The Packway prohibited. Part of the Army re-basing works, to facilitate access to development north of the Packway.	Completed	2017	Wiltshire	Larkhill	Include

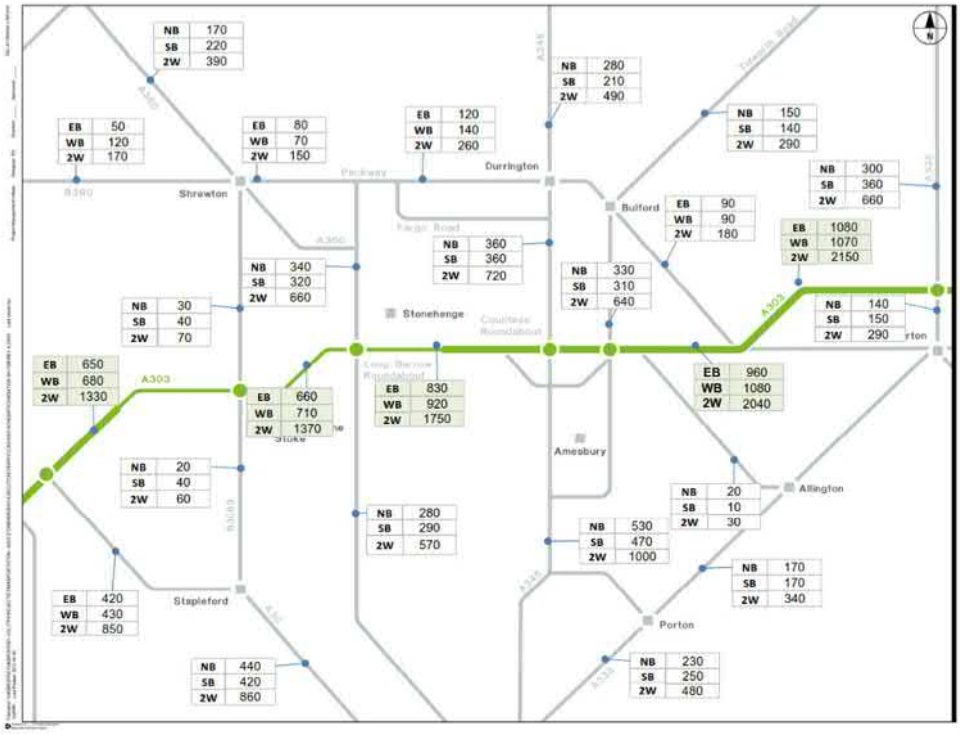
Application			Location		Included in Core Scenario?
Applicant for 'other development' and brief description	**Certainty**	**Opening Year**	**Location**	**Area**	
Bulford Junction Changes - Traffic signage and road marking amendments to accommodate the A303 High Loads diversion route. These will be implemented at the mini-roundabouts located on the A3028 at the Salisbury Road and Orchard End junctions.	Near Certain	2020	Wiltshire	Bulford	Include
Other Wider Area or Buffer Network Schemes					
M4 / M48 River Severn Crossing tolls: Removal of the westbound tolls on the M4/M48 River Severn crossings	Near Certain	2019	Wales / Bristol	Wales / Bristol	Include

Appendix 6.1: Traffic flow diagrams – Average hourly flow

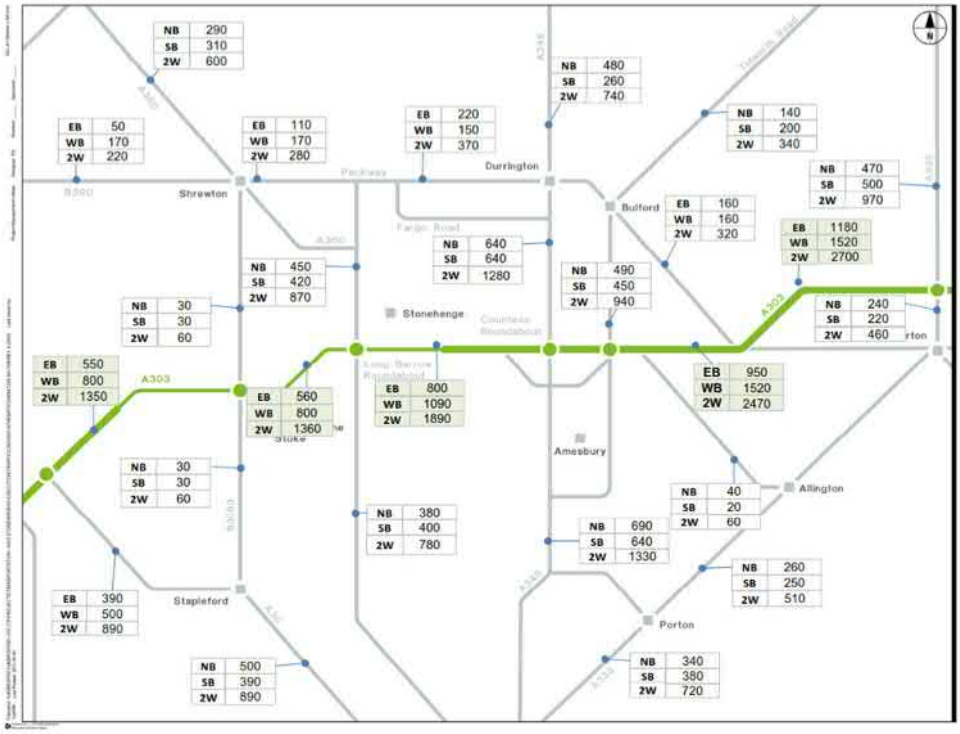
AM Peak Flows, Base 2017 (Vehicles)



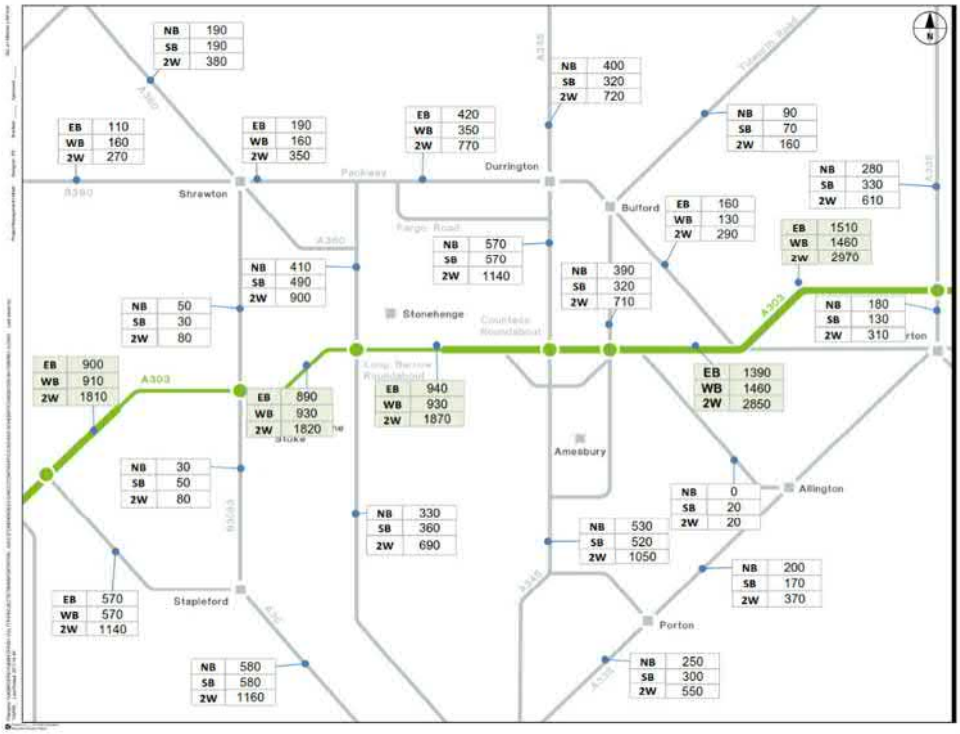
Interpeak Flows, Base 2017 (Vehicles)



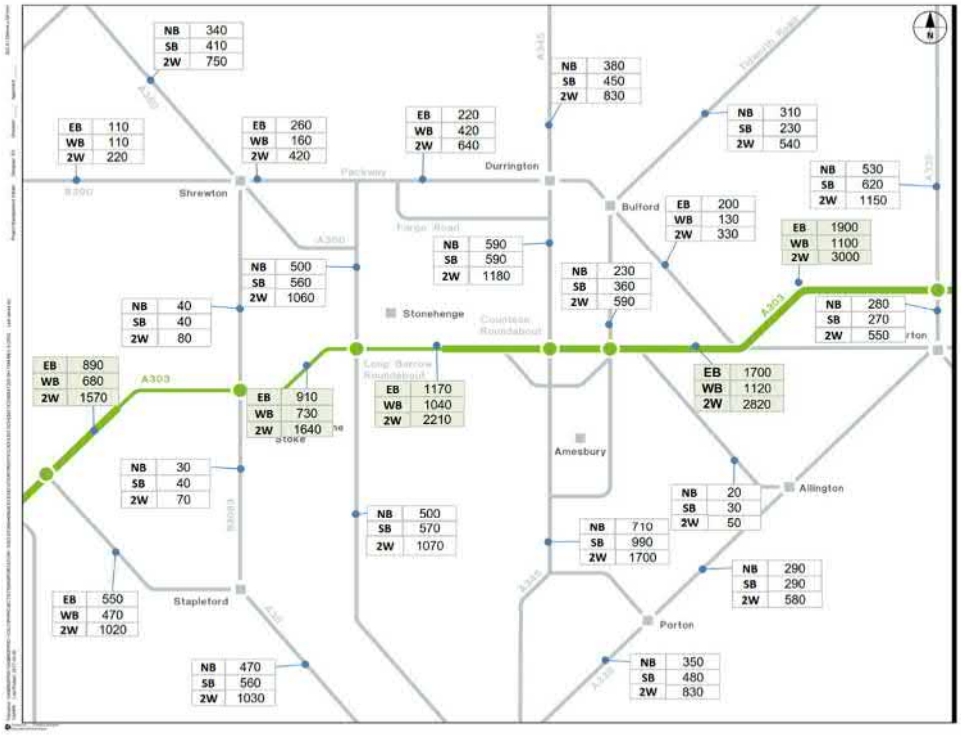
PM Peak Flows, Base 2017 (Vehicles)



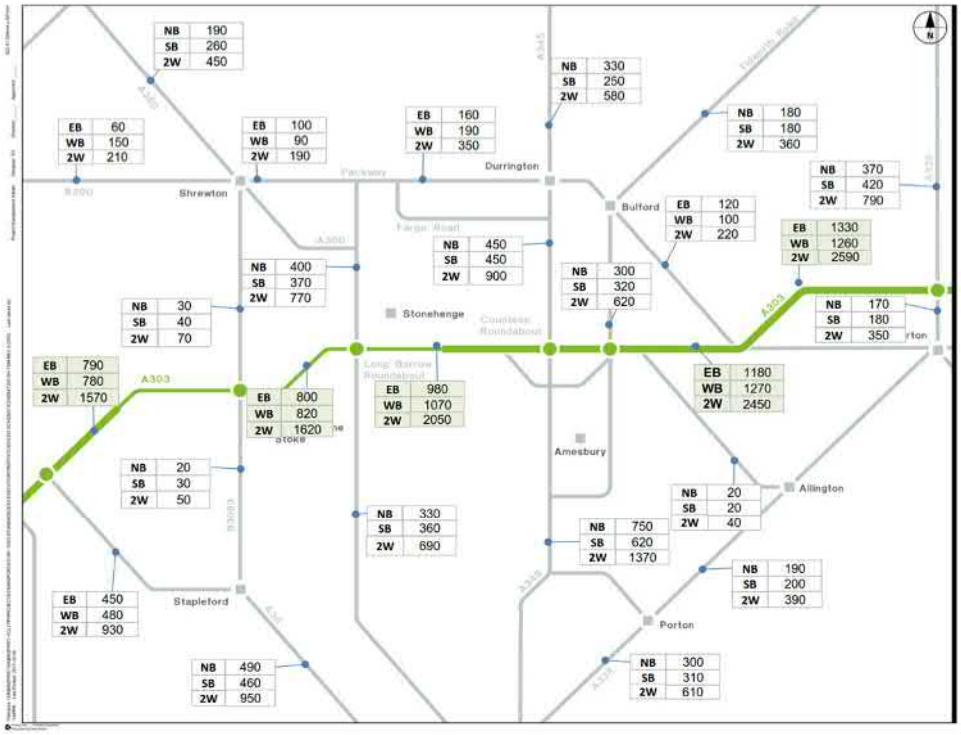
Busy Period Flows, Base 2017 (Vehicles)



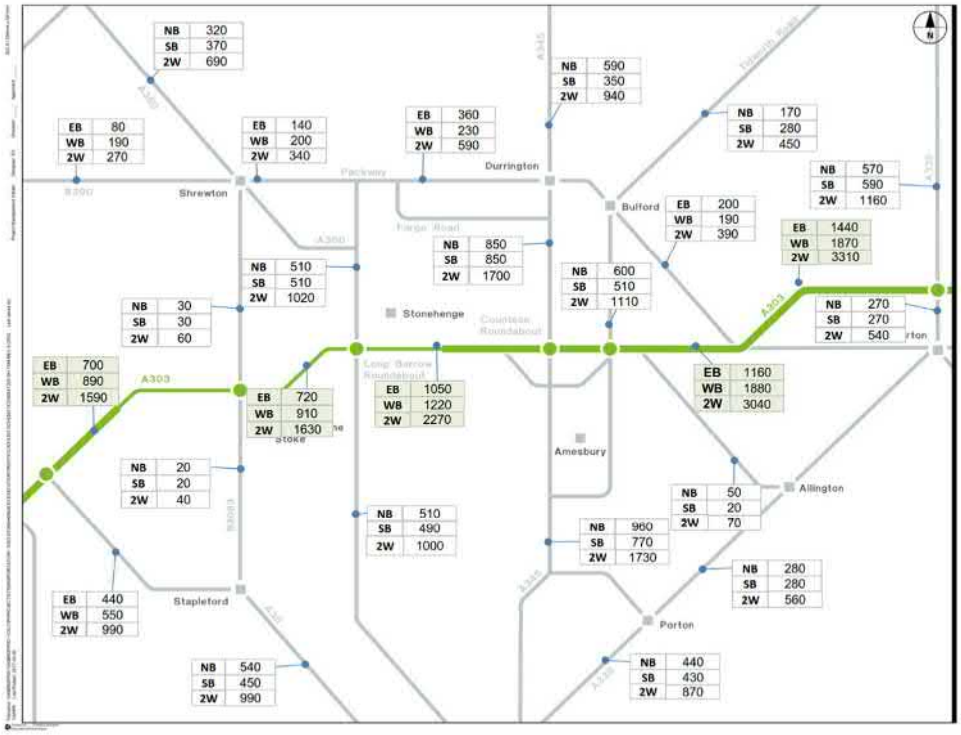
AM Peak Flows, Without Scheme 2026 (Vehicles)



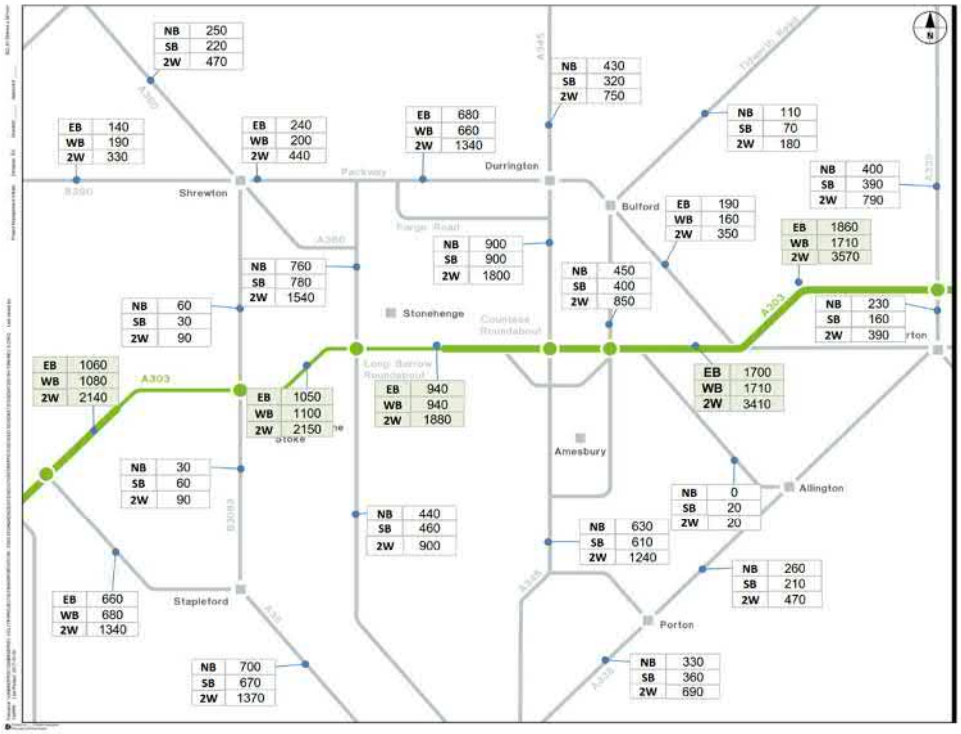
Interpeak Flows, Without Scheme 2026 (Vehicles)



PM Peak Flows, Without Scheme 2026 (Vehicles)



Busy Period Flows, Without Scheme 2026 (Vehicles)



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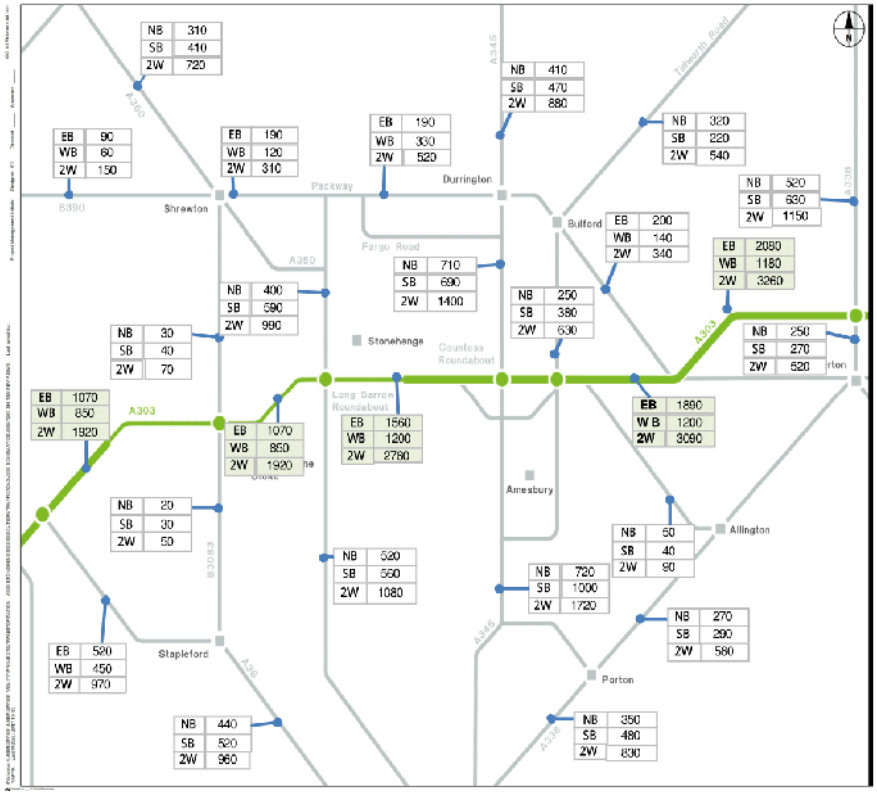

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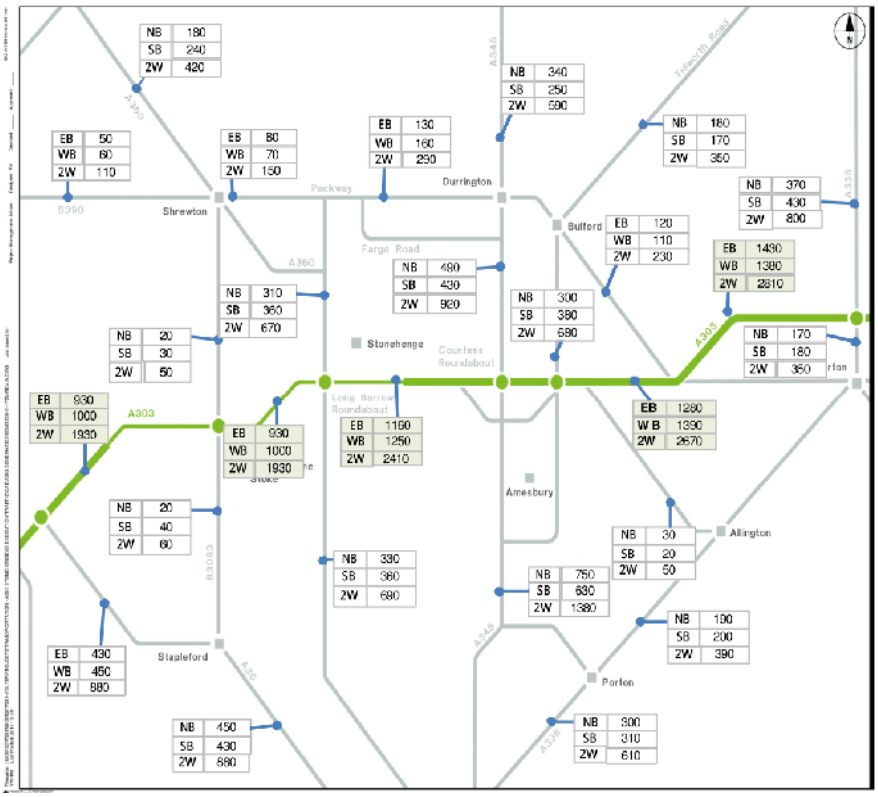

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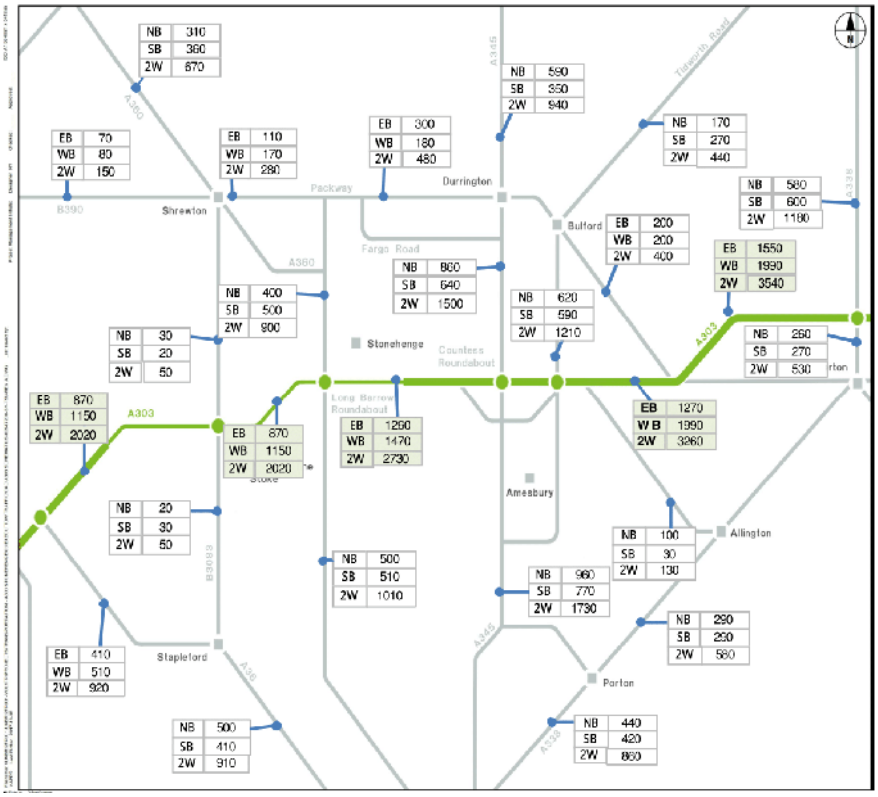
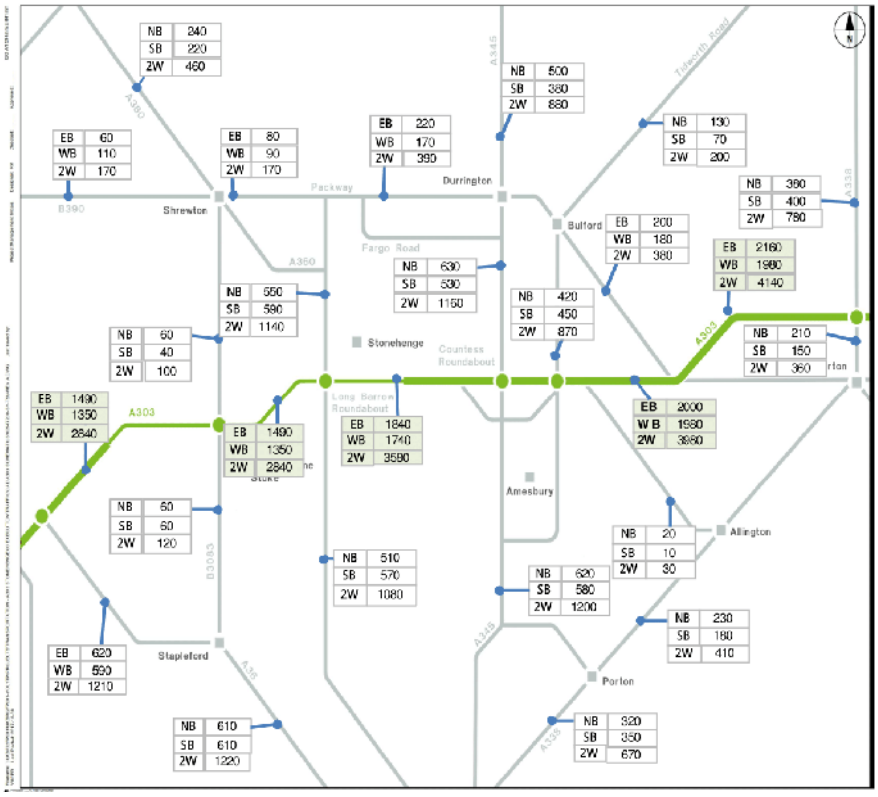
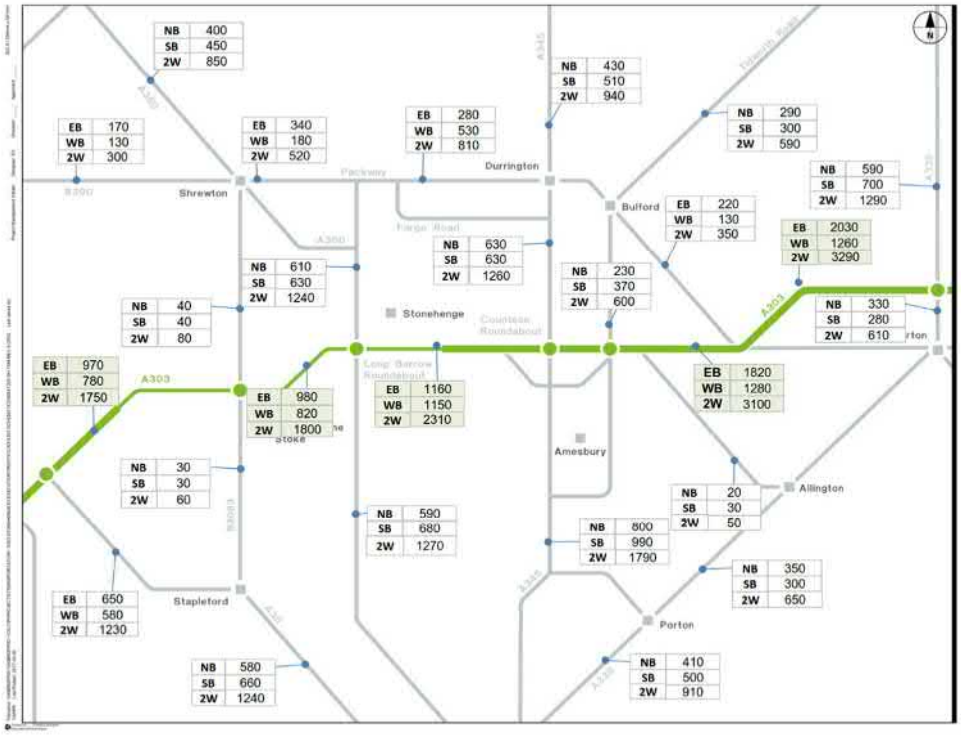


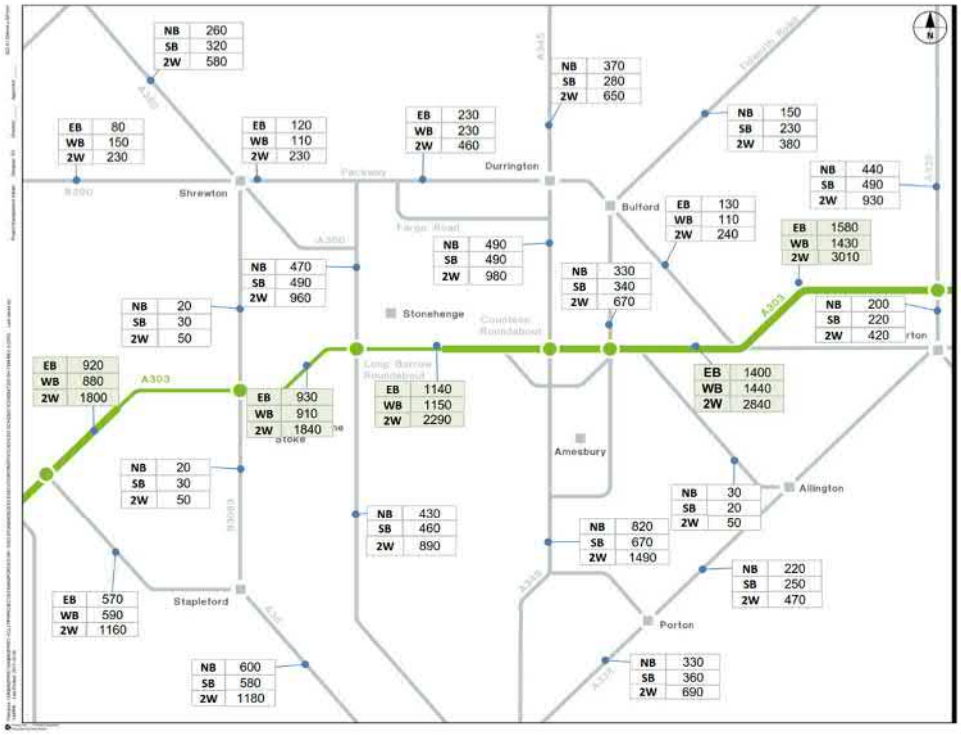
Busy Period Flows, With Scheme 2026 (Vehicles)



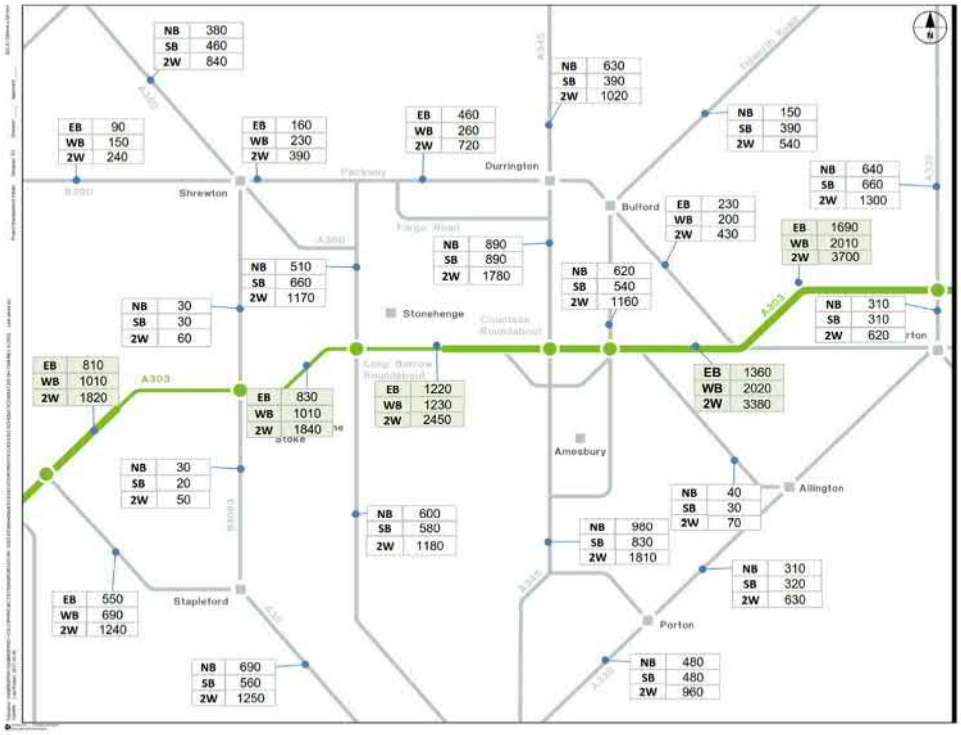
AM Peak Flows, Without Scheme 2041 (Vehicles)



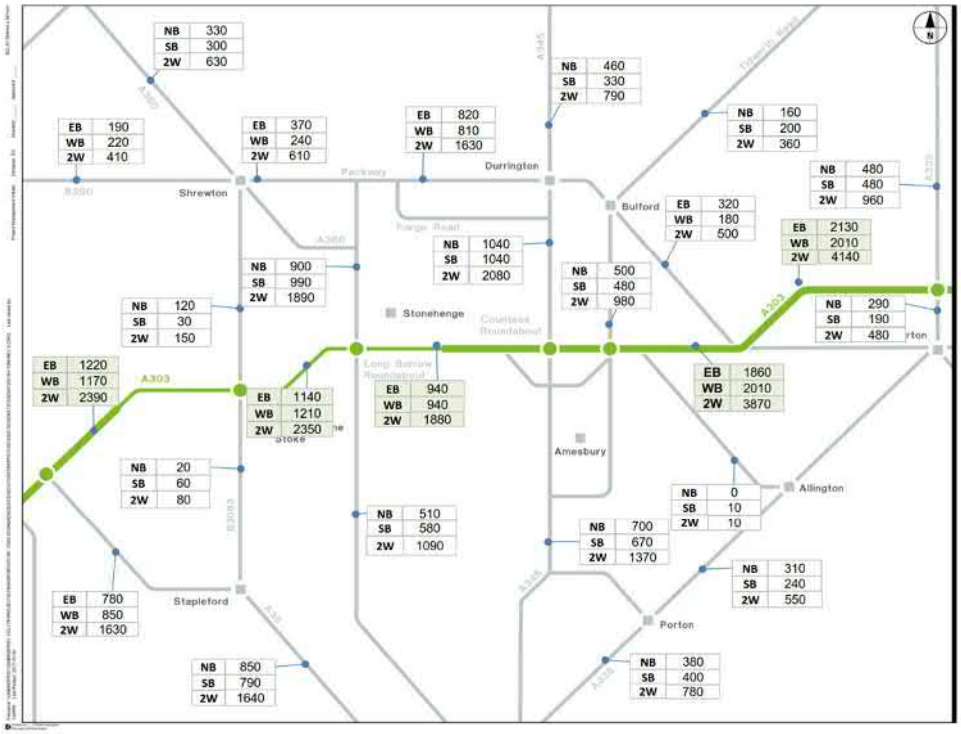
Interpeak Flows, Without Scheme 2041 (Vehicles)



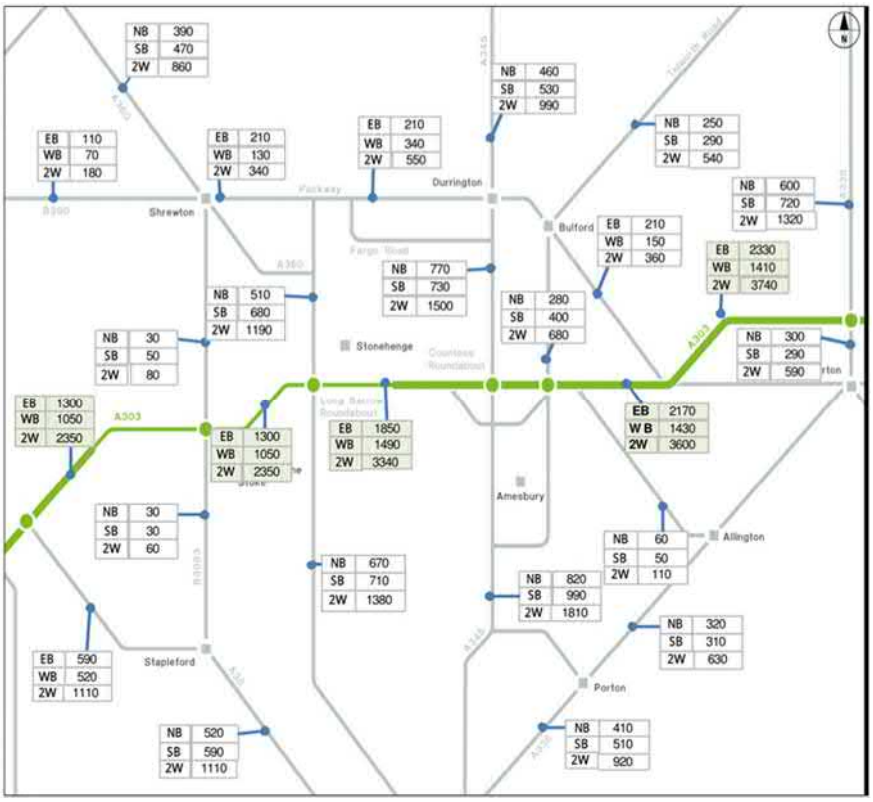
PM Peak Flows, Without Scheme 2041 (Vehicles)



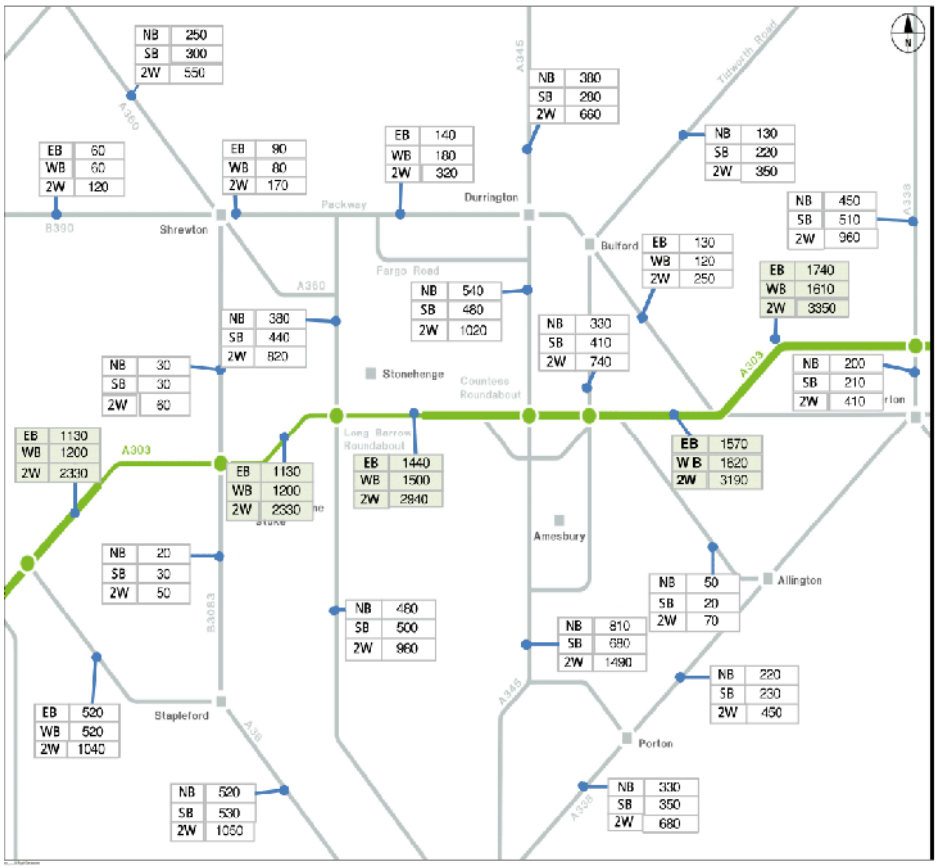
Busy Period Flows, Without Scheme 2041 (Vehicles)



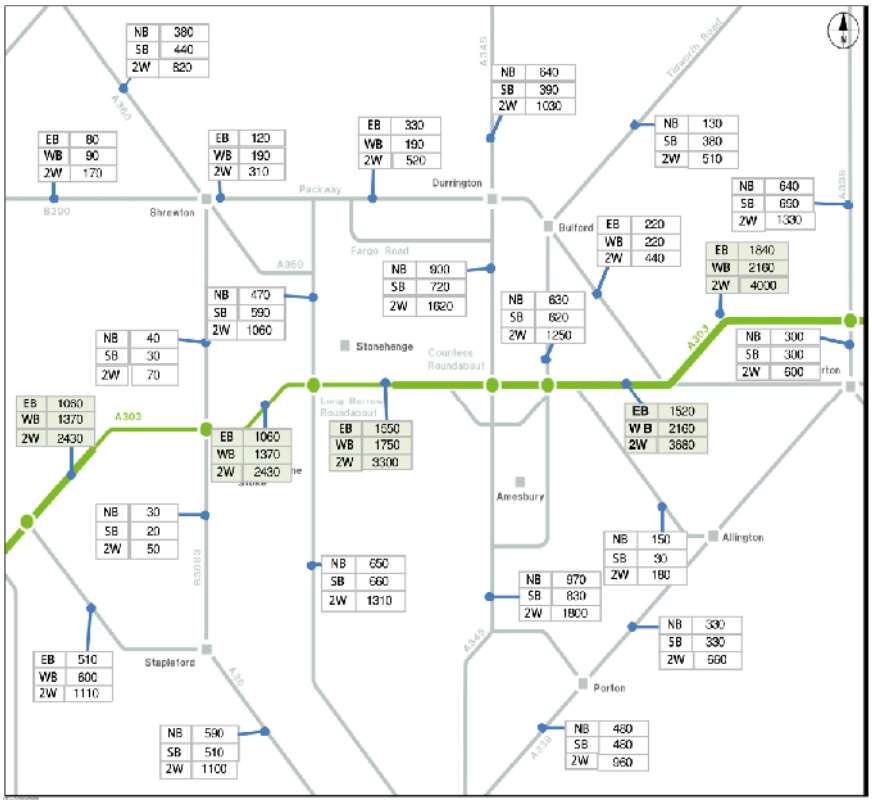
AM Peak Flows, With Scheme 2041 (Vehicles)



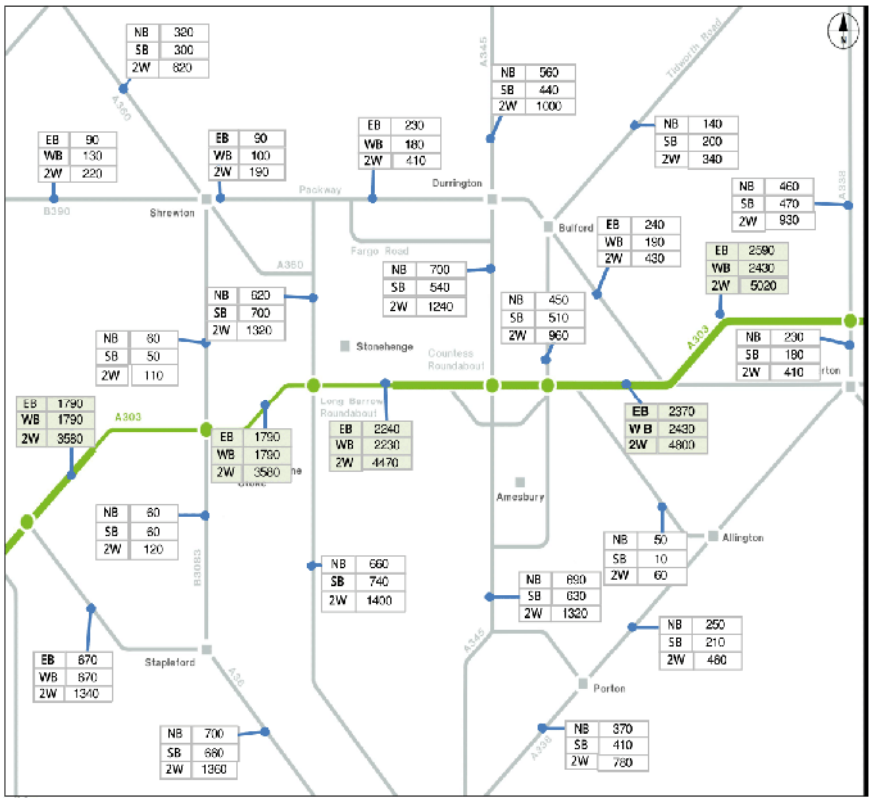
Interpeak Flows, With Scheme 2041 (Vehicles)



PM Peak Flows, With Scheme 2041 (Vehicles)



Busy Period Flows, With Scheme 2041 (Vehicles)



Appendix 7.1: PIA study area

Key:

"Slight" PIA

"Serious" PIA

"Fatal" PIA

PIA Study Area

Milston

Hackthorn

Durrington

Larkhill

Bulford

Winterbourne Stoke

West Amesbury

Amesbury

Normanton

Wilsford

Lake

Great Durnford

Berwick St James

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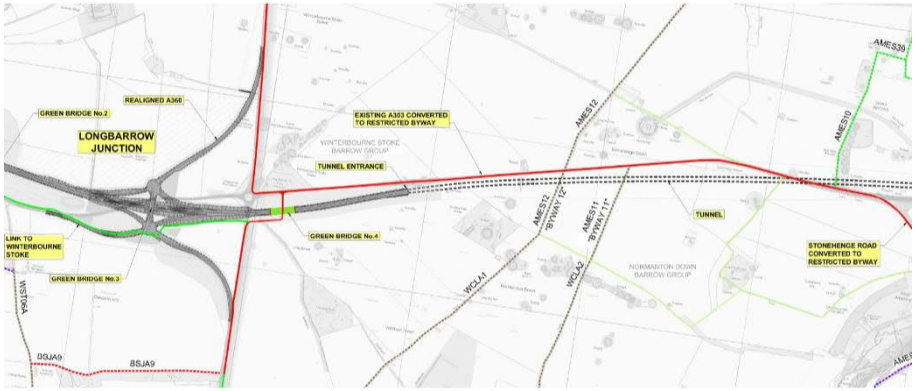
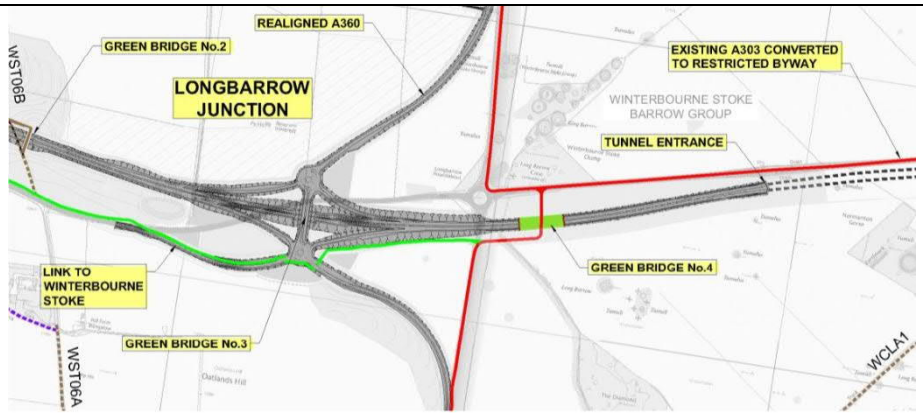
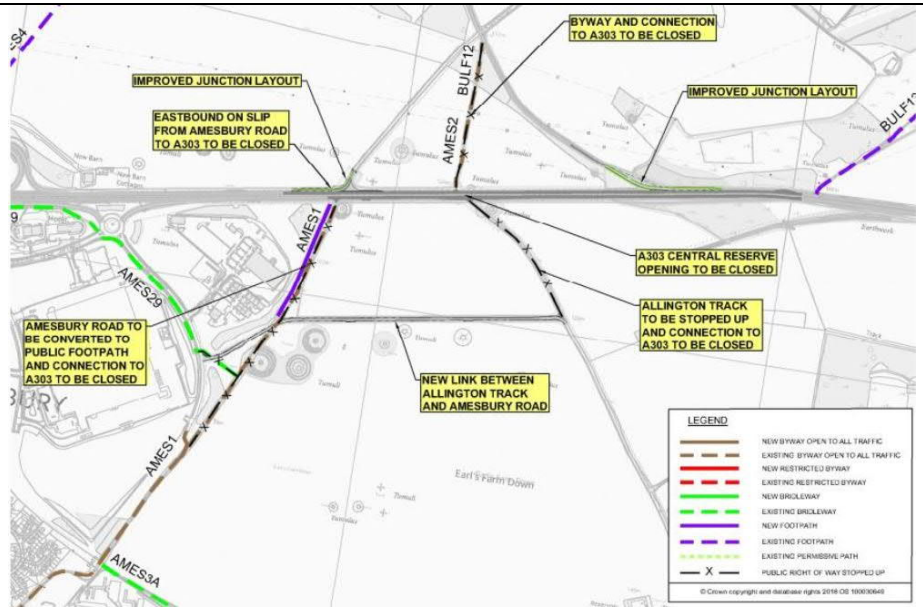
Appendix 8.1: WCHAR summary tables

NMU Objectives/Opportunities identified by the NMU Assessment Report

Opportunity	Details	Action Taken/ Outcome
1	Maintain connectivity of existing PRoW that cross the proposed routes D061 and D062.	Selected route option for A303 Winterbourne Stoke Bypass is D061 (northern option, crossing WST04 and WST006B. Connectivity of both routes maintained albeit a short diversion is needed for WST06B.
2	Improve NMU connectivity north and south of the existing A303 within the World Heritage Site (WHS) between Longbarrow Roundabout and Stonehenge Road, and in doing so open up the WHS landscape south of the existing A303 to NMUs.	• Proposed restricted byway on previous A360 route, connecting Stonehenge Visitor Centre and old A334 with new NMU route at Longbarrow Junction and restricted byway BSJA9 and byway WFOR16. • Byway AMES12 continuous across the WHS linking Larkhill with proposed A360 and existing southern routes. • Byway AMES11 will connect to proposed east west NMU route linking Lake in south to northern WHS. • Bridleway AMES10 to link proposed restricted byway connecting Larkhill to west Amesbury. 
3	Provision of safe, attractive and comfortable east-west NMU connectivity between the existing Longbarrow Roundabout and the new proposed NMU corridor replacing the existing A303 within the World Heritage Site.	Proposals have been amended since NMU Context Report was written. Proposed tunnel route now more closely mirrors existing A303. The NMU facilities will avoid Longarrow junction, with the proposed route crossing via Green Bridge No.4.

		
4	Provision of a safe, attractive, comfortable east-west NMU route along the proposed, downgraded section of the A303 from Longbarrow Roundabout to Winterbourne Stoke. This route to facilitate use by all types of NMUs.	Bridleway connecting proposed Longbarrow Junction to Winterbourne Stoke, pedestrians and cyclists able to use proposed 3m wide footway/cycleway. Equestrians will use the former A303 carriageway. Carriageway will have 30mph speed limit and lower traffic volumes than present.
5	Improve safety, attractiveness, and environmental quality for NMUs within Winterbourne Stoke.	• Former A303 through village detrunked and turned into a byway. Speed limit in village reduced to 30mph. • Northern footway widened by narrowing carriageway to create footway/cycleway link between bridleway link to Longbarrow Junction.
6	Improve safety, attractiveness, and environmental quality for NMUs within the World Heritage Site.	Diverting vehicular traffic into tunnel will improve safety, attractiveness and environmental quality for NMUs within WHS to meet DfT scheme objective; also providing a tranquil, rural and ecologically diverse setting for the WHS consistent with the WHS Management Plan.
7	Accommodate NMU movements by fully maintaining existing rights of way supplemented by a new NMU route replacing the existing A303 within the World Heritage Site.	Previous A303 route to become NMU route connecting existing RoW. Existing RoW to remain apart from several routes east of Amesbury, currently connected to the A303 but are proposed for removal. Details in map below.

		
8	Ensure a safe, accessible and attractive link north-south across Countess Roundabout, including cyclists travelling along the NCN route.	Toucan crossings to be provided across all arms of the Countess Roundabout, linking to an on-road cycle route south of the junction, in turn linking the NMU route towards Longbarrow Junction.
9	Provide connectivity for equestrian users to follow ‘round routes’ with safe crossings of the proposed A303.	Equestrian routes have been provided.
10	Maintain accessible and attractive pedestrian connectivity between Berwick St James and Winterbourne Stoke.	Selection of route D061 over D062 reduces potential negative effects on links between Berwick St James and Winterbourne Stoke.

Additional NMU Objectives/Opportunities identified by the WCHAR

Opportunity	Details	Action taken/ Outcome / Status
11	Improve signing, communication of pedestrian, cyclist and equestrian routes across the area. Sign design should be non-intrusive and sympathetic to the WHS.	• All proposed NMU routes to be signed, all existing routes to be signed where they connect to proposed routes. • Consideration to be given during detailed design re. the strategy for communication (in all forms) of the provision of NMU routes across the area to the general public. This will be consistent with WHS Management Plan.
12	Develop strategy for NMU links between A338 Junction and Amesbury Solstice Park Junction, with consideration given to diversions to avoid pedestrians, cyclists and equestrians needing to use the A303.	• Byway AMES2 stopped up. • Byway NMU-42 converted into footpath, existing access to A303 stopped up. • Allington track stopped up, existing private track converted to highway.
13	Restricted byways to be provided on both sides of proposed dual carriageway linking byways SLAN3 and BSJA3 with Winterbourne Stoke.	Restricted byways to be provided on both sides of proposed dual carriageway linking byways SLAN3 and BSJA3 with Winterbourne Stoke.
14	Amend highway features within Winterbourne Stoke to reduce traffic speeds and improve attractiveness to pedestrians, cyclists and equestrians.	The following measures will be implemented in the village: • Speed limit reduced to 30mph. • Carriageway narrowed (increasing width of footway). • Existing junctions to be redesigned to tighten radii, therefore reducing traffic speeds and width of road crossings.
15	Provide safe link for pedestrians, cyclists and equestrians to the junction of Byway WFOR16 with the A360.	New RoW constructed adjacent to A360 from proposed Longbarrow junction to connect Byway WFOR16. Proposed Restricted Byway NMU-20 linking existing restricted byway BSJA9 and proposed Bridleway NMU-20 to connect Proposed Restricted Byway to Byway WFOR16 (bridleway rather than byway due to width restriction).

16	Provide safe link between restricted byway BSJA9 and other pedestrian, cyclist and equestrian routes adjacent to A360.	Uncontrolled crossing point provided from BSJA9 to NMU20. A360 is national speed limit at this location however visibility is considered sufficient to allow for safe crossing.
17	Provide safe route for pedestrians, cyclists and equestrians to access Stonehenge Visitor Centre.	Restricted byway NMU-17 provided from Longbarrow Junction to Airmans Corner Roundabout will be 3m wide to reduce impact on WHS. New restricted byway following A303 route NMU-25 will connect to old A3444 and visitor's centre.
18	Provide safe route from bridleway SLAN2 to Byway SLAN3.	Under consideration
19	Provide safe pedestrian, cyclist and equestrian facilities within new B3083 underbridge.	1.5m and 2m verges to be provided. Further consideration to be given to designing proposed cattle access so that equestrians can use the track when not in use by cattle.
20	Place access restrictions on proposed Byway NMU04.	Restrictions considered but not proposed due to the need to provide access for multiple landowners along the byway.
21	Amend existing junction between A303 and B3083 to Berwick St James to reduce speeds and improve crossing facilities for pedestrians, cyclists and equestrians.	To be confirmed during detailed design.
22	Amend existing junction between A303 and B3083 to Shrewton to reduce speeds and improve crossing facilities for pedestrians, cyclists and equestrians.	Junction size to be reduced, returning some carriageway to landscaping. Width of road crossing for users of shared use path to be reduced.
23	Provide suitable access to byway WST03 from realigned B3083.	Access and signage to be provided to byway from B3083.
24	Consider if route from Longbarrow Junction to Winterbourne Stoke can be located on the south side of the detrunked A303 rather than the north to reduce crossings of the Longbarrow Junction.	Under consideration

25	Undertake maintenance of existing routes, several of which are currently impassable.	Maintenance of existing RoW is outside the scope of this scheme. All maintenance requirements are to be identified during Detailed Design Phase and passed to Wiltshire Council for action.
26	Provide safe and attractive route for pedestrians, cyclists and equestrians using the existing corridor of the A303 between Longbarrow Roundabout and Stonehenge Road.	4m wide restricted byway provided using existing route of A303. 4m considered to be minimum width for the safety of all user groups using the route for access.
27	Use appropriate surfacing materials for different user groups on NMU route between Longbarrow Roundabout and Stonehenge Road.	4m wide restricted byway to be of a bound surface. Remainder of existing carriageway to be grassed to provide a route for equestrians. Colour of surface under consideration.
Pedestrian specific opportunities		
28	Improve access to bus stops – Winterbourne Stoke.	Under consideration.
Cyclist specific opportunities		
29	Provide missing link in Sustrans Route 45, on London Road in Amesbury between Countess Road junction and Holders Road junction.	Under consideration.
Equestrian specific opportunities		
30	To provide carriage gates suitable for carriage users.	Carriage gate locations identified. Further design details under consideration.
31	Provide connectivity for carriage drivers.	Proposed restricted byway along A303 route links to proposed byway to Airman's Corner which links back to the A303 route via the traffic free A344.
32	Provide safe access from proposed bridleway NMU-11 to de-trunked A303.	Access arrangement to be confirmed during detailed design, sufficient visibility has been identified at this location.
33	Provide connectivity for carriage drivers from Green	Not possible to provide safe crossing points at Longbarrow Junction for carriage drivers, therefore access to the proposed restricted byway NMU-

	Bridge No.4 to Winterbourne Stoke.	19 is provided further south on the A360 where sufficient visibility can be achieved.
Pedestrian and cyclist specific opportunities		
34	Provide safe pedestrian and cyclist crossings within Winterbourne Stoke.	Controlled and uncontrolled pedestrian and cyclist crossings to be developed at detailed design stage.
35	Provide a continuous footway/cycleway within Winterbourne Stoke.	The route does not continue across accesses to garage forecourt and Manor Farm / The Bell Inn. The option of continuing footway/cycleway across accesses to be explored during detailed design.
36	Provide protected footway / cycleway into Western Amesbury by narrowing Stonehenge Road from proposed restricted byway NMU-21.	Opportunity to be considered.
37	Reduce traffic speeds by reducing junction size between Stonehenge Road and road to West Amesbury.	Opportunity to be considered.
38	Widen Bridleway AMES44 to ensure accessibility for all users.	It is not possible to widen the path adjacent to Ratfyn Road due to land ownership issues.
39	Ensure a safe, accessible and attractive link north from Countess Roundabout, to AMES9A/AMES37 and improve access to bridleway.	Opportunity to be considered.

Appendix 8.2: Maps of Public Rights of Way (PRoW)

SHEET 2 OF 4
HE551506-AA-ENM-D_SWI-DR-CX-000902

SHEET 3 OF 4
HE551506-AA-ENM-D_SWI-DR-CX-000903

SHEET 4 OF 4
HE551506-AA-ENM-D_SWI-DR-CX-000904

LEGEND

- ROUTE OPTION D061
- ROUTE OPTION D062
- TUNNEL SECTION

PUBLIC RIGHTS OF WAY

- A14 FOOTPATH
- A14 BRIDLEWAY
- A14 BYWAY
- A14R RESTRICTED BYWAY
- NCR SUSTRANS NATIONAL CYCLE ROUTE

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction

None

Maintenance / Cleaning

None

Use

None

Decommission/ Demolition

None

Rev	Date	Description	By	Chk'd	App'd
P02	30/03/17	UPDATED FIGURE TITLE	EB	TT	SL

Drawing Status: FIT FOR INTERNAL REVIEW AND COMMENT
Suitability: S3

Client: highways england

Designers: ARUP ATKINS

Project Title: A303 AMESBURY TO BERWICK DOWN

Drawing Title: 009A EXISTING RIGHTS OF WAY NETWORK KEY PLAN SHEET 1 OF 4

Scale	Designed / Drawn	Checked	Approved	Authorised
1:25,000	EB	TT	SL	SH

Original Size	Date	Date	Date	Date
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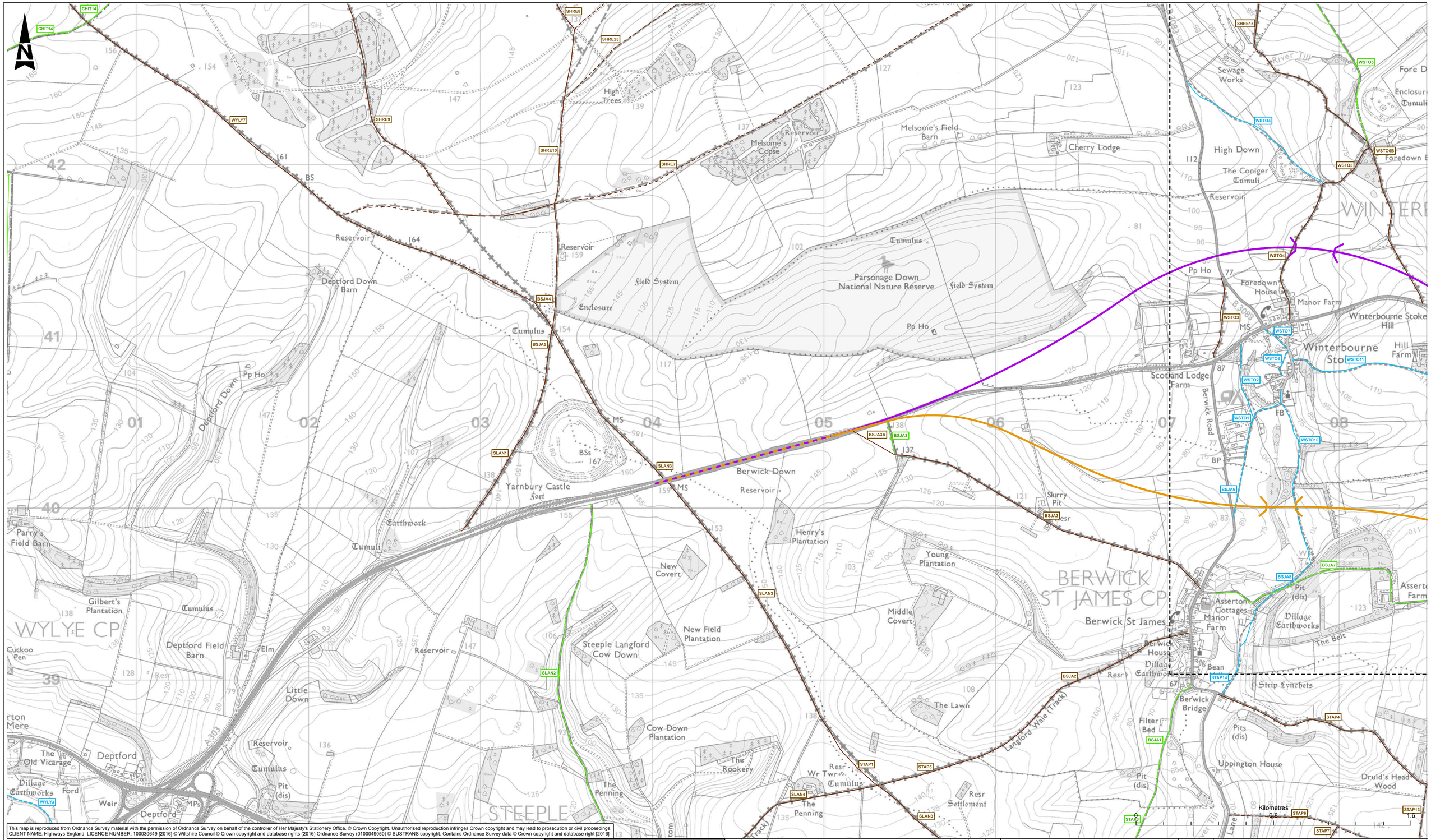
Drawing Number: HE551506-AA-ENM-D_SWI-DR-CX-000901
(Project | Originator | Volume | Location | Type | Role | Number)

Revison: P02



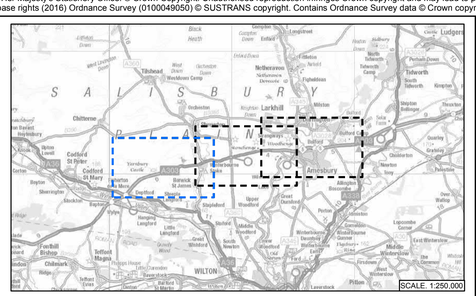
LEGEND

- ROUTE OPTION D061
- ROUTE OPTION D062

PUBLIC RIGHTS OF WAY

- A14 — FOOTPATH
- A14 — BRIDLEWAY
- A14 — BYWAY
- A14R — RESTRICTED BYWAY
- NCR — SUSTRANS NATIONAL CYCLE ROUTE

A = AMESBURY
B = BULFORD
BC = BULFORD CAMP
BSJ = BERWICK ST JAMES
D = DURRINGTON
S = SHREWTON
SL = STEEPLE LANGFORD
WBS = WINTERBOURNE STOKE
WCL = WILFORD CUM LAKE



SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction
None

Maintenance / Cleaning
None

Use
None

Decommission/ Demolition
None

Rev	Date	Description	By	Chk'd	App'd
P02	30/03/17	UPDATED FIGURE TITLE	EB	TT	SL

Drawing Status: FIT FOR INTERNAL REVIEW AND COMMENT
Suitability: S3

Client: highways england

Designers: ARUP ATKINS

Project Title: A303 AMESBURY TO BERWICK DOWN

Drawing Title: 009B EXISTING RIGHTS OF WAY NETWORK SHEET 2 OF 4

Scale	Designed / Drawn	Checked	Approved	Authorised
1:10,000	EB	TT	SL	SH
Original Size	**Date**	**Date**	**Date**	**Date**
A1	30/03/17	30/03/17	30/03/17	30/03/17

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HE551506-AA-ENM-D_SWI-DR-CX-000902

Revison: P02

FOR CONTINUATION PLEASE SEE HE551506-AA-ENM-D_SWI-DR-CX-000902

FOR CONTINUATION PLEASE SEE HE551506-AA-ENM-D_SWI-DR-CX-000904

WINTERBOURNE STOKE CP

WILSFORD CUM LAKE CP

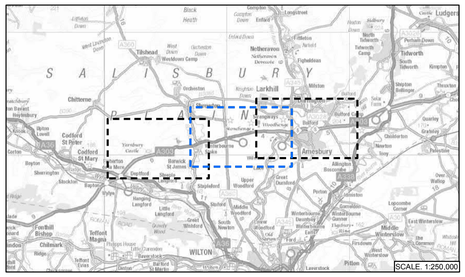
LEGEND

- ROUTE OPTION D061
- ROUTE OPTION D062
- TUNNEL SECTION

PUBLIC RIGHTS OF WAY

- A14 FOOTPATH
- A14 BRIDLEWAY
- A14 BYWAY
- A14R RESTRICTED BYWAY
- NCR SUSTRANS NATIONAL CYCLE ROUTE

A = AMESBURY
B = BULFORD
BC = BULFORD CAMP
BSJ = BERWICK ST JAMES
D = DURRINGTON
S = SHREWTON
SL = STEEPLE LANGFORD
WBS = WINTERBOURNE STOKE
WCL = WILFORD CUM LAKE



SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction
None

Maintenance / Cleaning
None

Use
None

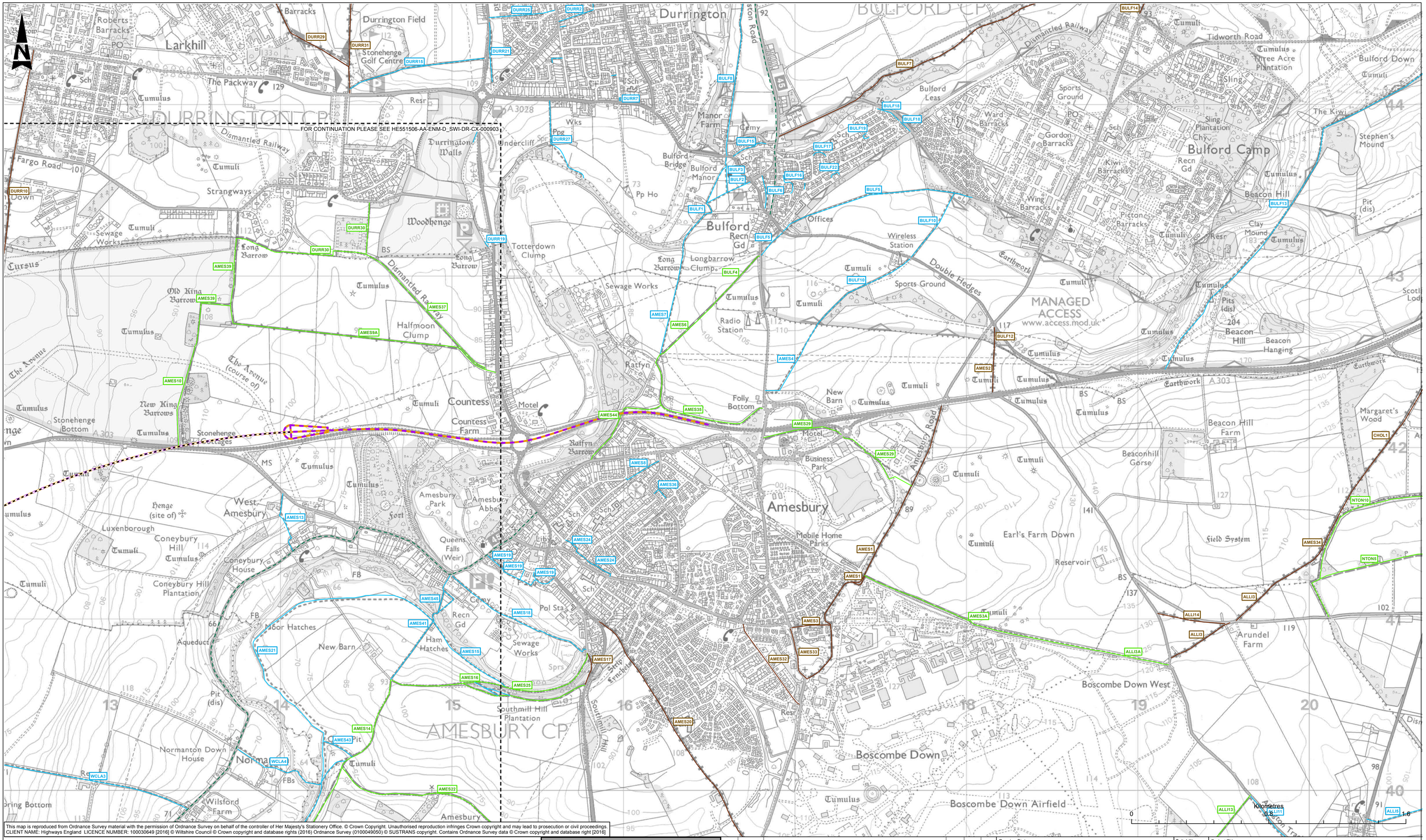
Decommission/ Demolition
None

Rev	Date	Description	By	Chk'd	App'd
P02	30/03/17	UPDATED FIGURE TEMPLATE	EB	TT	SL

Drawing Status: FIT FOR INTERNAL REVIEW AND COMMENT
Suitability: S3
Project Title: A303 AMESBURY TO BERWICK DOWN
Client: highways england
Drawing Title: 009C EXISTING RIGHTS OF WAY NETWORK SHEET 3 OF 4
Designers: ARUP ATKINS

Scale	Designed / Drawn	Checked	Approved	Authorised
1:10,000	EB	TT	SL	SH
Original Size	Date	Date	Date	Date
A1	30/03/17	30/03/17	30/03/17	30/03/17

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HE551506-AA-ENM-D_SWI-DR-CX-000903
Revison: P02



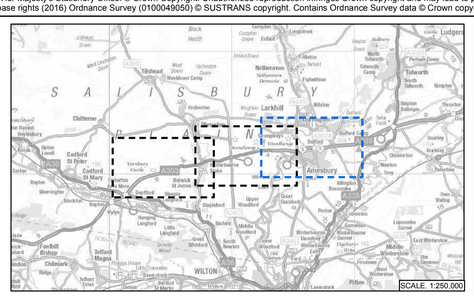
LEGEND

- ROUTE OPTION D061
- ROUTE OPTION D062
- TUNNEL SECTION

PUBLIC RIGHTS OF WAY

- A14 FOOTPATH
- A14 BRIDLEWAY
- A14 BYWAY
- A14R RESTRICTED BYWAY
- NCR SUSTRANS NATIONAL CYCLE ROUTE

A = AMESBURY
B = BULFORD
BC = BULFORD CAMP
BSJ = BERWICK ST JAMES
D = DURRINGTON
S = SHREWTON
SL = STEEPLE LANGFORD
WBS = WINTERBOURNE STOKE
WCL = WILFORD CUM LAKE



SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction
None

Maintenance / Cleaning
None

Use
None

Decommission/ Demolition
None

Rev	Date	Description	By	Chk'd	App'd
P02	30/03/17	UPDATED FIGURE TITLE	EB	TT	SL

Drawing Status: FIT FOR INTERNAL REVIEW AND COMMENT
Suitability: S3

Client: highways england

Designers: ARUP ATKINS

Project Title: A303 AMESBURY TO BERWICK DOWN

Drawing Title: 009D EXISTING RIGHTS OF WAY NETWORK SHEET 4 OF 4

Scale	Designed / Drawn	Checked	Approved	Authorised
1:10,000	EB	TT	SL	SH

Original Size	Date	Date	Date	Date
A1	30/03/17	30/03/17	30/03/17	30/03/17

Drawing Number: HE551506-AA-ENM-D_SWI-DR-CX-000904
Project | Originator | Volume | Location | Type | Role | Number
Revison: P02

Appendix 8.3: Supplementary consultation booklet, July 2018

highways england

A303 Stonehenge

Amesbury to Berwick Down

Supplementary consultation booklet

July 2018

Introduction

Why are we undertaking supplementary consultation?

Earlier this year we consulted on our proposals for improving the A303 past Stonehenge, between Amesbury and Berwick Down. We have been using the feedback received to further develop our plans. From this we have identified three changes on which we would welcome your views before we submit our application to build the scheme.

These are:

- To remove the previously proposed link between Byways 11 and 12 in the Stonehenge World Heritage Site (see page 12 for more details)
- To widen the green bridge proposed near the existing Longbarrow roundabout (see page 14 for more details)
- To move the proposed modification of Rollestone crossroads (see page 15 for more details)

A number of people also asked us to clarify our public rights of way proposals along the scheme, so we are taking this opportunity to provide that clarification.

Consultation on the proposed changes runs from 17 July 2018 to 14 August 2018.

The above changes are those that we believe would benefit from further consultation. You will be able to view all the changes we are making in response to consultation in our Consultation Report. This will be published as part of our application to build the scheme which we intend to submit in autumn 2018.

Public rights of way

The scheme will make it easier for walkers, cyclists and horse riders to access the Stonehenge World Heritage Site (WHS) more widely by creating new public rights of way.

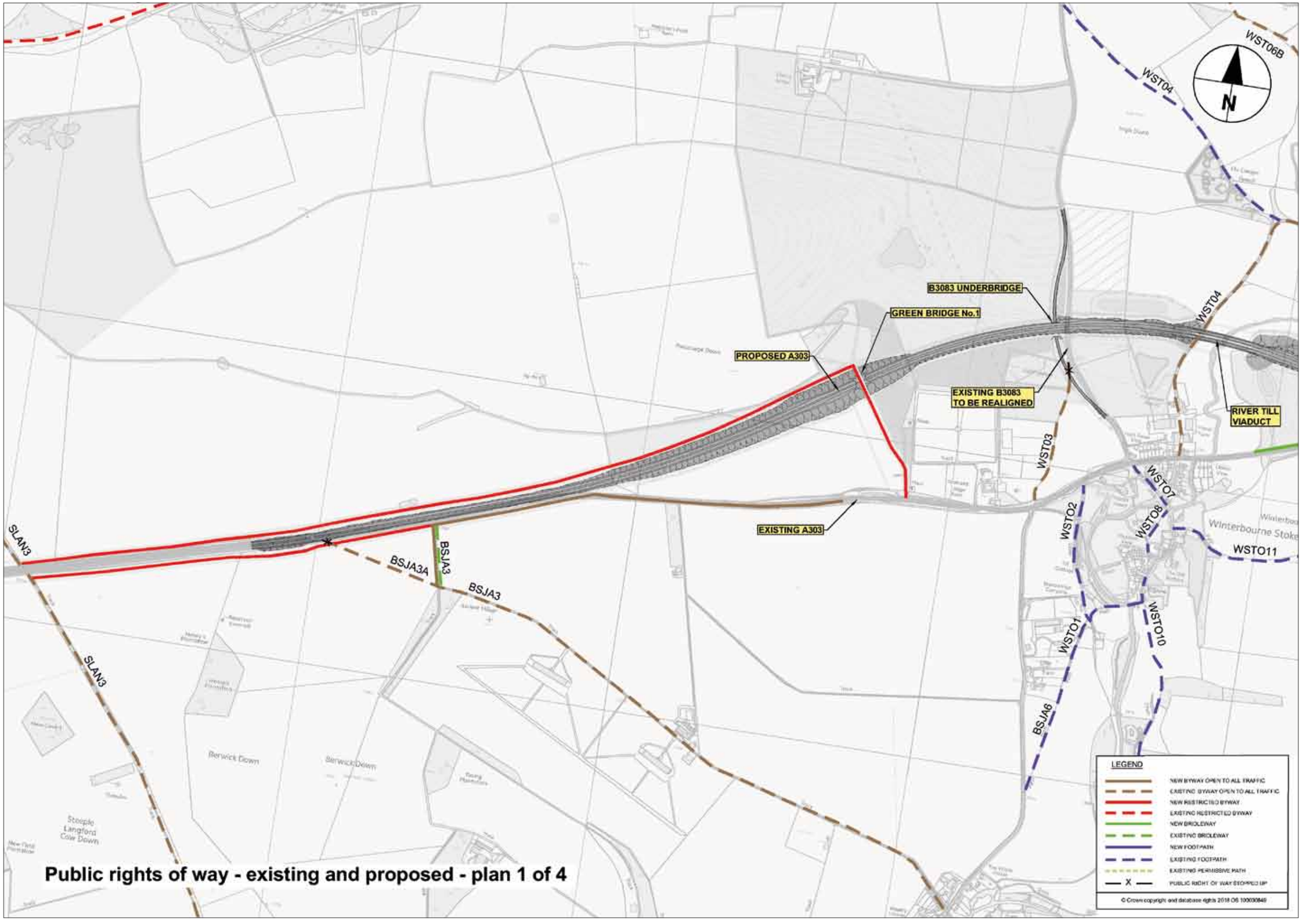
Our proposals will link Yarnbury Castle and Winterbourne Stoke and allow access all the way through the WHS to Amesbury.

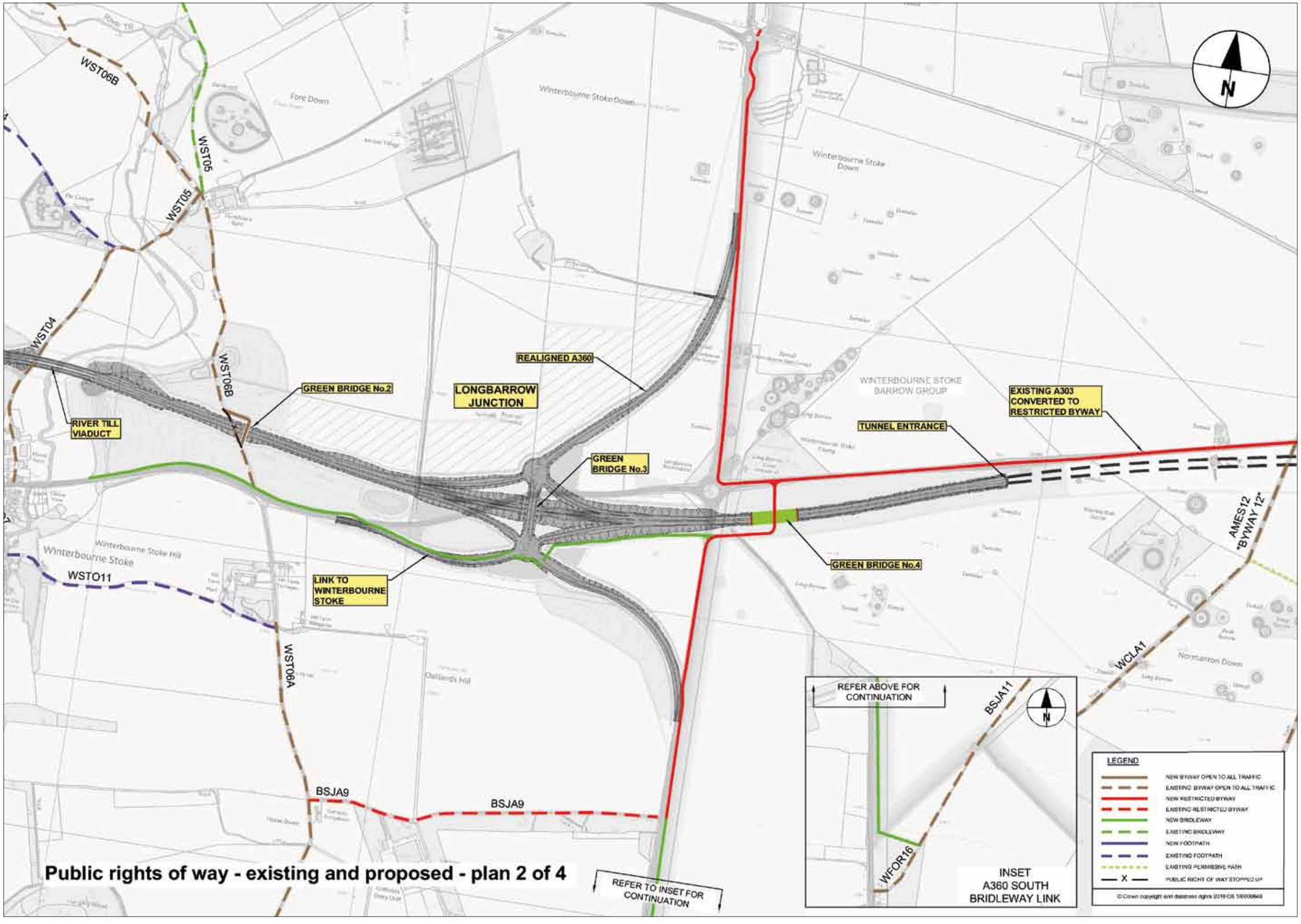
What is a public right of way?

There are different types of legal restrictions that allow or prohibit different types of use on public rights of way. These are set out in the table below:

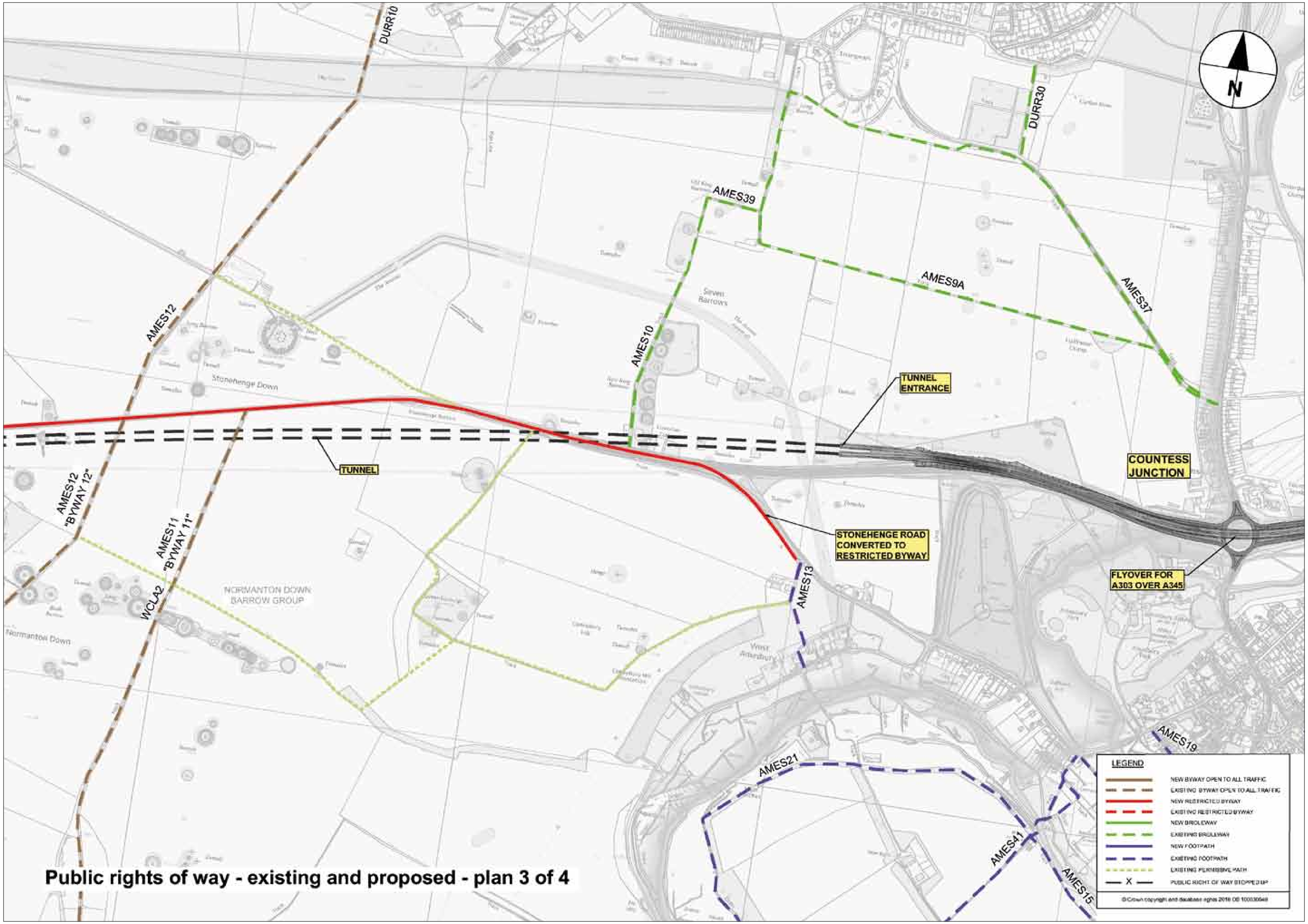
Public right of way	Open to
Public footpath	Walkers, wheelchairs, mobility scooters and powered wheelchairs
Public bridleway	Public footpath users plus horse-riders and pedal cyclists
Restricted byway	Public bridleway users plus drivers/riders of non-motorised vehicles (such as horse-drawn carriages)
Byway open to all traffic (BOAT) – BOATs are generally not maintained to the same standard as ordinary roads	Restricted byway users plus motor vehicles

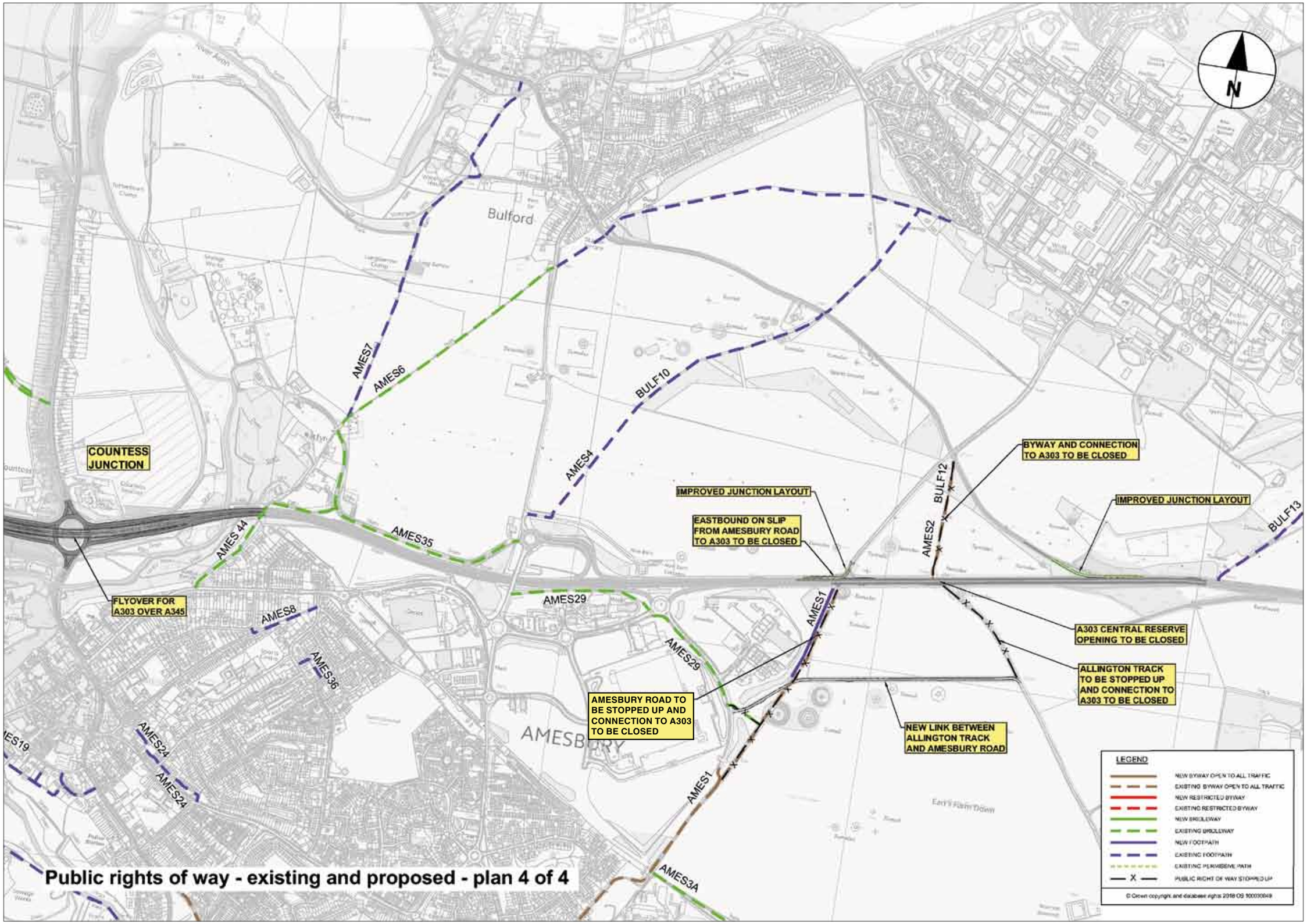
The plans on the following pages show clearly the types of public rights of way we're proposing along the scheme and how they will link with existing ones.


WST06B
WST04
N
B3083 UNDERBRIDGE
GREEN BRIDGE No.1
PROPOSED A303
WST04
EXISTING B3083
TO BE REALIGNED
RIVER TILL
VIADUCT
WST03
WST07
WST02
WST08
Winterbourne Stoke
WST011
EXISTING A303
SLAN3
BSJA3A
BSJA3
BSJA3
WST01
WST010
BSJA6
SLAN3
Berwick Down
Berwick Down
Steeple
Langford
Clow Down
LEGEND
NEW BYWAY OPEN TO ALL TRAFFIC
EXISTING BYWAY OPEN TO ALL TRAFFIC
NEW RESTRICTED BYWAY
EXISTING RESTRICTED BYWAY
NEW BRIDLEWAY
EXISTING BRIDLEWAY
NEW FOOTPATH
EXISTING FOOTPATH
EXISTING PERMISSIVE PATH
PUBLIC RIGHT OF WAY STOPPED UP
© Crown copyright and database rights 2018 OS 100030649
Public rights of way - existing and proposed - plan 1 of 4



Public rights of way - existing and proposed - plan 2 of 4


Public rights of way - existing and proposed - plan 3 of 4
DURR10
DURR30
AMES39
AMES9A
AMES37
AMES10
AMES12
AMES12 "BYWAY 12"
AMES11 "BYWAY 11"
WCLA2
TUNNEL
TUNNEL ENTRANCE
COUNTESS JUNCTION
STONEHENGE ROAD CONVERTED TO RESTRICTED BYWAY
FLYOVER FOR A303 OVER A345
AMES13
AMES19
AMES21
AMES41
AMES15
Seven Barrows
Stonehenge Down
NORMANTON DOWN BARROW GROUP
Normanton Down
West Amesbury
LEGEND
NEW BYWAY OPEN TO ALL TRAFFIC
EXISTING BYWAY OPEN TO ALL TRAFFIC
NEW RESTRICTED BYWAY
EXISTING RESTRICTED BYWAY
NEW BRIDLEWAY
EXISTING BRIDLEWAY
NEW FOOTPATH
EXISTING FOOTPATH
EXISTING PERMISSIVE PATH
PUBLIC RIGHT OF WAY STOPPED UP



Public rights of way - existing and proposed - plan 4 of 4

The changes we are consulting on

1) Removing the previously proposed link between Byways 11 and 12

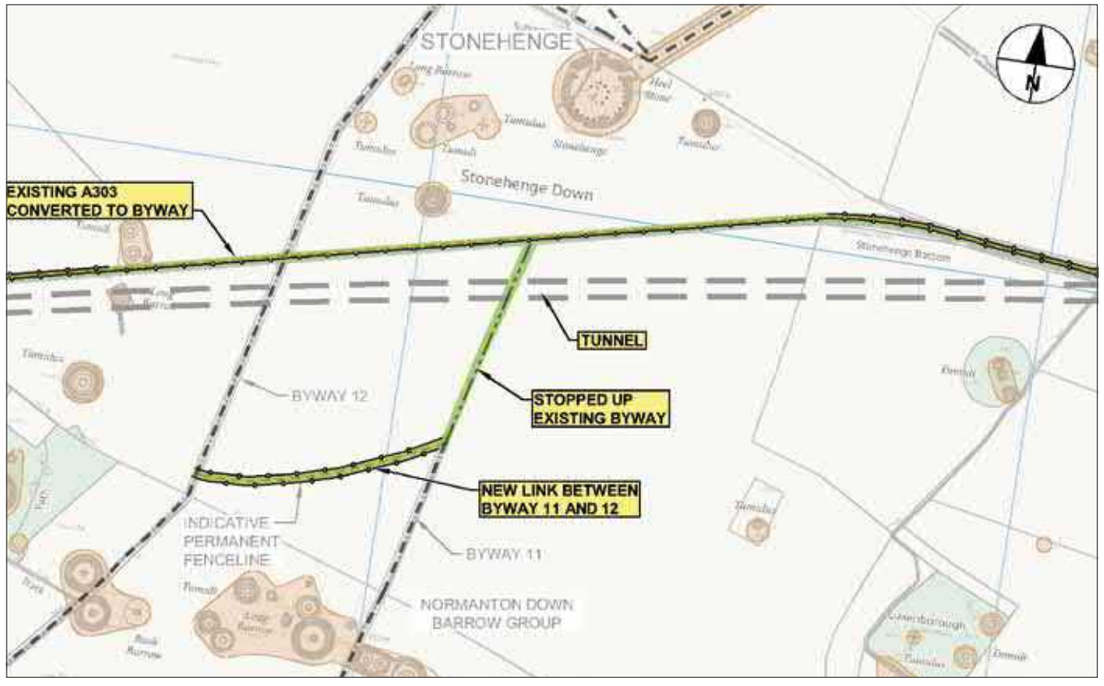
Byways 11 and 12 are BOATs that run through the WHS and link up with the existing A303 (see plan 3 of 4 on pages 8 and 9). We previously proposed a new link between Byways 11 and 12 to the south of the A303, accompanied by stopping up the northern part of Byway 11.

However, respondents were concerned that vehicles on the new link would have an adverse impact on the adjacent Normanton Down barrow group and on the tranquillity of the WHS at this location.

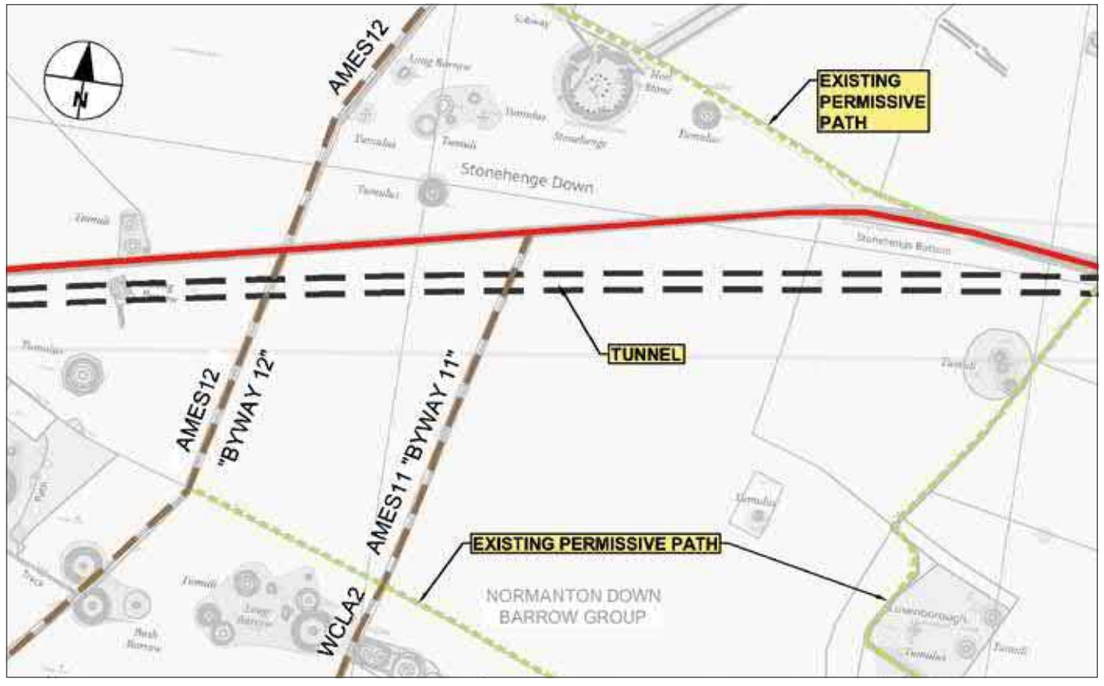
Following further consideration, we are no longer proposing this new link or stopping up part of Byway 11. The plans opposite show the change. The change means that motor vehicles will no longer be able to travel between Byways 11 and 12 because motorised access will be removed along the existing A303 when the tunnel is constructed. Non-motorised users will still have access between Byways 11 and 12 via the proposed new restricted byway along the line of the existing A303.

This will help achieve our objective to remove the sight and sound of traffic from much of the WHS landscape, a key aspiration also of the WHS Management Plan.

Question 1 in the response form gives you an opportunity to comment on our removal of the previously proposed link between Byways 11 and 12.



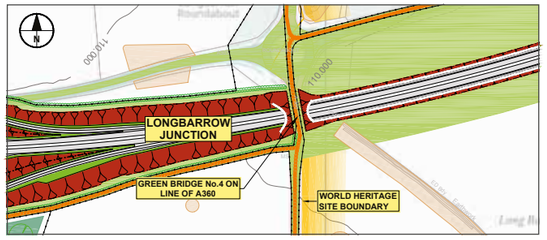
Plan showing previously proposed link between Byways 11 and 12



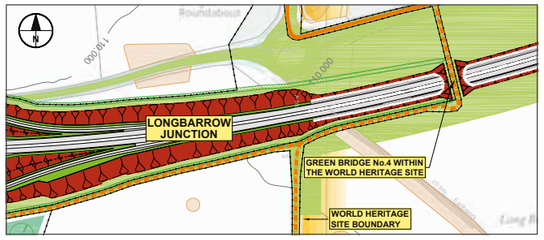
Plan showing new proposal without link between Byways 11 and 12

2) Green bridge near the existing Longbarrow roundabout

Our previous consultation options for the green bridge near Longbarrow (also known as green bridge No.4) were to either locate it on the line of the existing A360 or further east, within the WHS. These options are shown on the plans below:

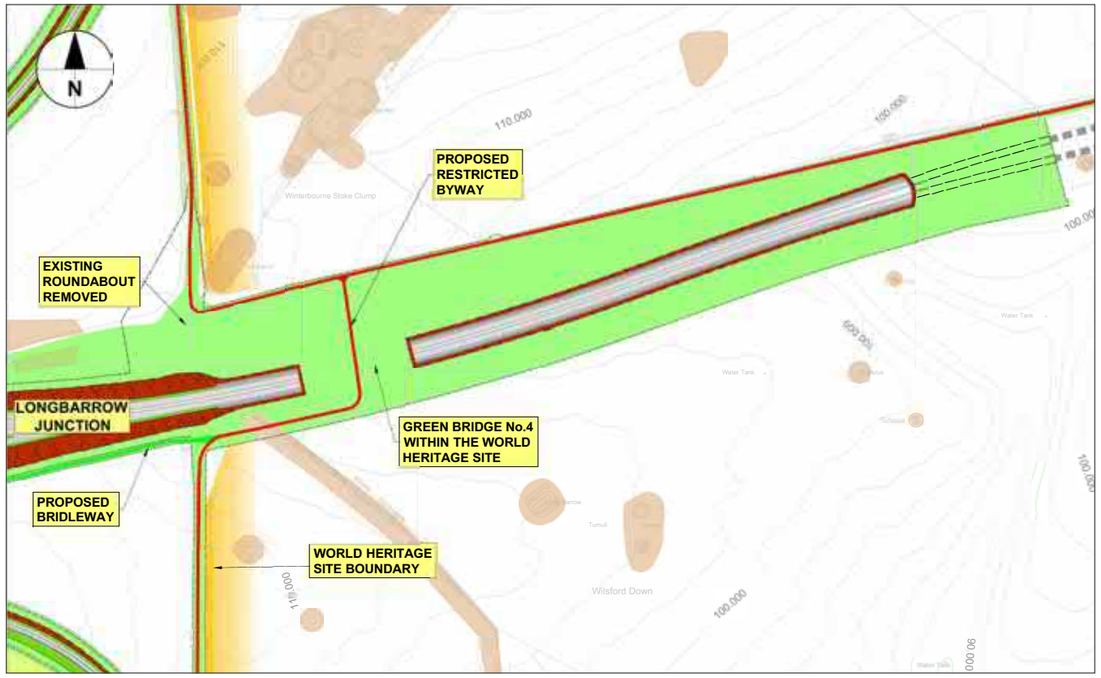


Green bridge No.4 along the line of the existing A303



Green bridge No.4 located further east into the WHS

Having analysed the responses, we have chosen to locate the green bridge within the WHS. We also propose to widen the bridge to approximately 150 metres. The location and width of the green bridge are shown on the plan below:



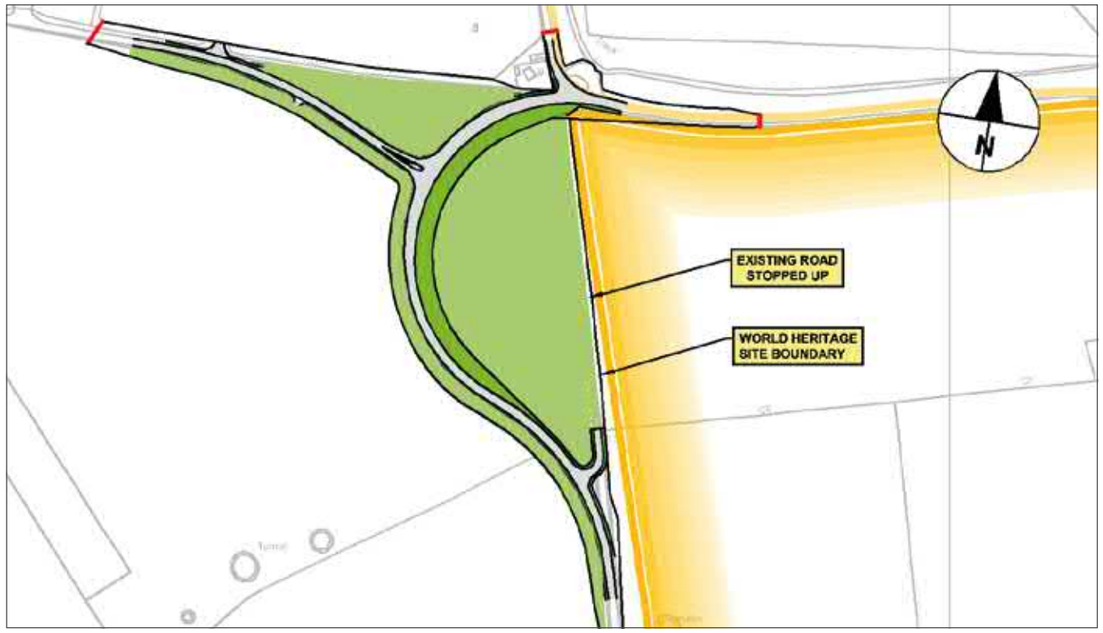
Plan showing revised location and width of green bridge

A wider green bridge at the proposed location will improve the physical and visual connection between the northern and southern parts of the WHS and the monuments within it.

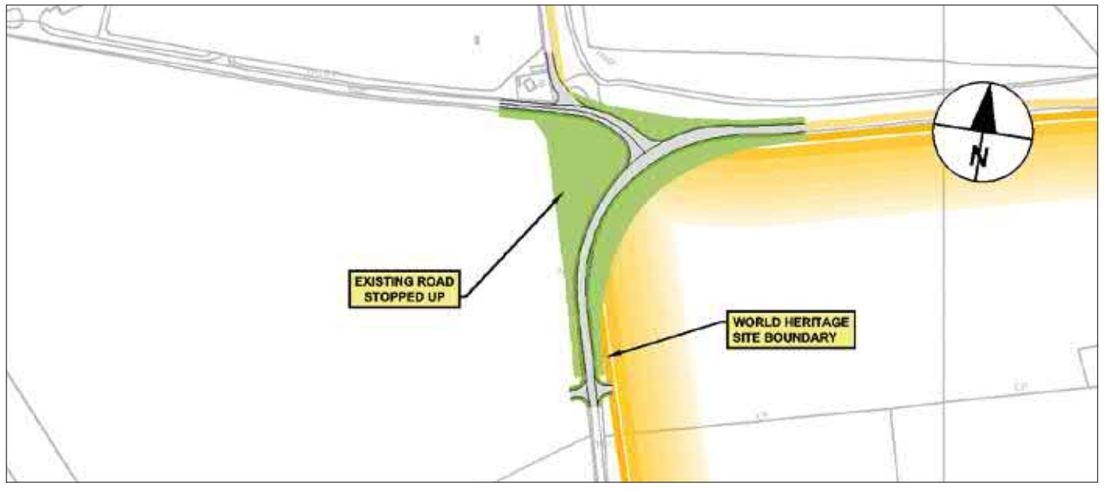
Question 2 in the response form gives you an opportunity to comment on our proposals for the green bridge near Longbarrow.

3) Rollestone crossroads

As part of the scheme, we are proposing to modify the layout of Rollestone crossroads to alter the traffic flow priorities and accommodate long vehicles. The new layout is more compact than that previously proposed, as illustrated on the plans below.



Plan showing statutory consultation proposal for Rollestone crossroads



Plan showing new layout now proposed for Rollestone crossroads

The change means the junction will be located just inside the north west corner of the WHS. However, the area has been surveyed and found to be free of archaeological remains and there will be no adverse effect on the Outstanding Universal Value of the WHS.

Question 3 in the response form gives you an opportunity to comment on the proposed change at Rollestone crossroads.

Preliminary environmental information relating to the changes

The following tables summarise the main preliminary environmental effects of the changes we are consulting on now, compared with the effects of the proposals presented for statutory consultation.

Where a topic is not covered in the tables, there are no differences against the effects assessed for the statutory consultation proposals.

Change: removing the previously proposed link between Byways 11 and 12	
Preliminary environmental effects at statutory consultation	Preliminary environmental effects after change
Cultural heritage The previous proposal would have accommodated the movement of vehicles via a new link running close to the Normanton Down Barrow Group. This would have resulted in adverse impacts on the setting of the barrows and on the integrity of the WHS.	The change will avoid adverse impacts on the Normanton Down Barrow Group and on the integrity of this part of the WHS.
People and communities The byways are used by motorised and non-motorised users. The link would have maintained full connectivity between the byways.	The change will disadvantage motorised users by removing connectivity between the byways for motorised vehicles, while non-motorised users will be able to travel in a more tranquil environment between Byways 11 and 12 via the existing A303 that will become a restricted byway.
Biodiversity The previously proposed link would have run close to the Normanton Down RSPB Reserve. This would have resulted in the disturbance of nesting stone curlew.	The change will avoid adverse impacts on the Normanton Down RSPB Reserve and stone curlew.

Change: widening the green bridge proposed near Longbarrow roundabout	
Preliminary environmental effects at statutory consultation	Preliminary environmental effects after change
Cultural heritage The existing A303 within the WHS acts as a physical barrier to the connectivity between monuments and to users of public rights of way. The options at statutory consultation represented beneficial effects on setting, connectivity and accessibility.	There will be an increase to the beneficial effects on the setting of monuments within the WHS, due to enhanced connectivity within the WHS created by the wider bridge, in particular between the Winterbourne Stoke and Normanton Down and Diamond Barrow Groups.
Landscape and visual The statutory consultation options represented beneficial effects for improved connectivity.	There will be a slight increase to the beneficial effects due to the wider bridge giving improved connectivity and greater visual screening of the new road in this part of the WHS.
Biodiversity The existing A303 acts as a barrier to the movement of flora and fauna. The statutory consultation options represented beneficial effects for ecological connectivity.	There will be a slight increase to the beneficial effect on ecological connectivity due to a wider green expanse.

Change: moving the proposed modification of Rollestone crossroads	
Preliminary environmental effects at statutory consultation	Preliminary environmental effects after change
Cultural heritage The existing B3086 is adjacent to the WHS and runs past several scheduled monuments. The previous proposal would have moved the road closer to scheduled monuments, involving landtake in an area with high potential for buried archaeology.	The junction will be placed further from scheduled monuments and recent archaeological evaluation shows that no buried remains will be affected. Although the proposal requires new landtake within the WHS, this will have no adverse effect on its Outstanding Universal Value.
Landscape and visual The previous proposal would have increased the area of road footprint in this location.	The change will have a smaller footprint, resulting in a slight reduction of the adverse effect to the landscape.
People and communities The previous proposal for the junction would have resulted in loss of agricultural land.	The change will need less landtake, resulting in a slight reduction of the adverse effect on agricultural land.

How to have your say

This is your opportunity to give your views on our proposals. You can do so:

Online: **www.highways.gov.uk/A303Stonehenge/consultation**

By email: **A303Stonehenge@highwaysengland.co.uk**

By post: **Freepost A303 Stonehenge Consultation (you do not need a stamp)**

If you need a paper copy of the response form, let us know and we can post one to you.

Please submit your response by 23:59 on 14 August 2018.

Next steps

Your feedback will inform our continuing development of the scheme. Once we have taken your feedback into consideration, we plan to submit our application for a Development Consent Order in autumn 2018.

Data protection statement

Your comments will be analysed by Highways England and its appointed agents. Copies may be made available in due course to the Secretary of State, the Planning Inspectorate and other relevant statutory authorities so that your comments can be considered as part of the Development Consent Order (DCO) application process. We will request that your personal details are not placed on public record and will be held securely by Highways England in accordance with the General Data Protection Regulations and will be used solely in connection with the consultation process and subsequent DCO application and, except as noted above, will not be passed to third parties.

If you'd like more information about how we manage data, or a copy of our privacy notice, please contact **DataProtectionAdvice@Highwaysengland.co.uk**

Contact us

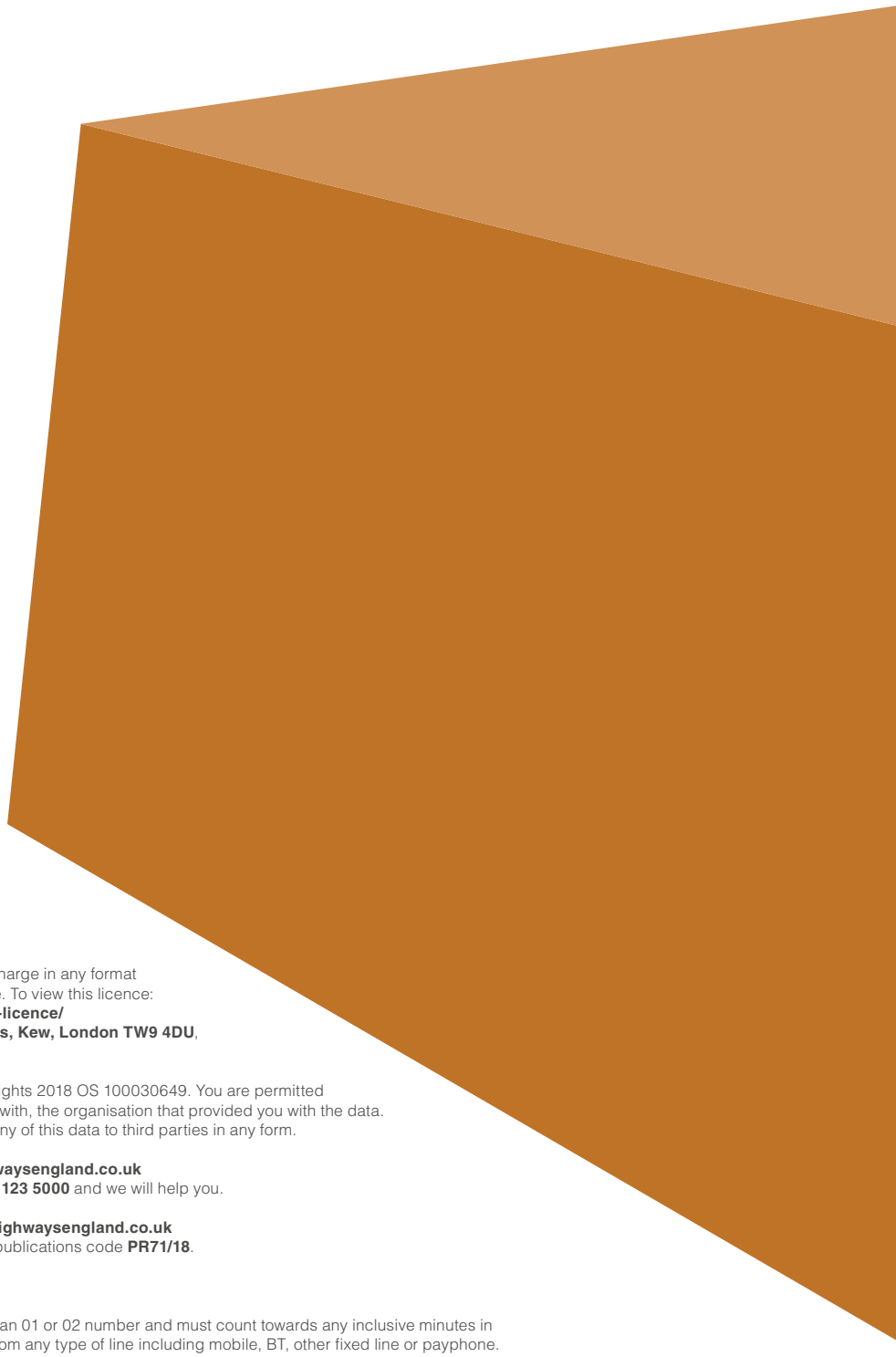
Visit our scheme website for information about the scheme and how to have your say, or call or email us to find out more:

Online: **www.highways.gov.uk/A303Stonehenge/consultation**

By email: **A303Stonehenge@highwaysengland.co.uk**

By phone: **0300 123 5000**

If you need help accessing this or any other Highways England information, please call **0300 123 5000** and we will help you.



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For an accessible version of this publication please call **0300 123 5000** and we will help you.

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Highways England creative job number BRS18_0159

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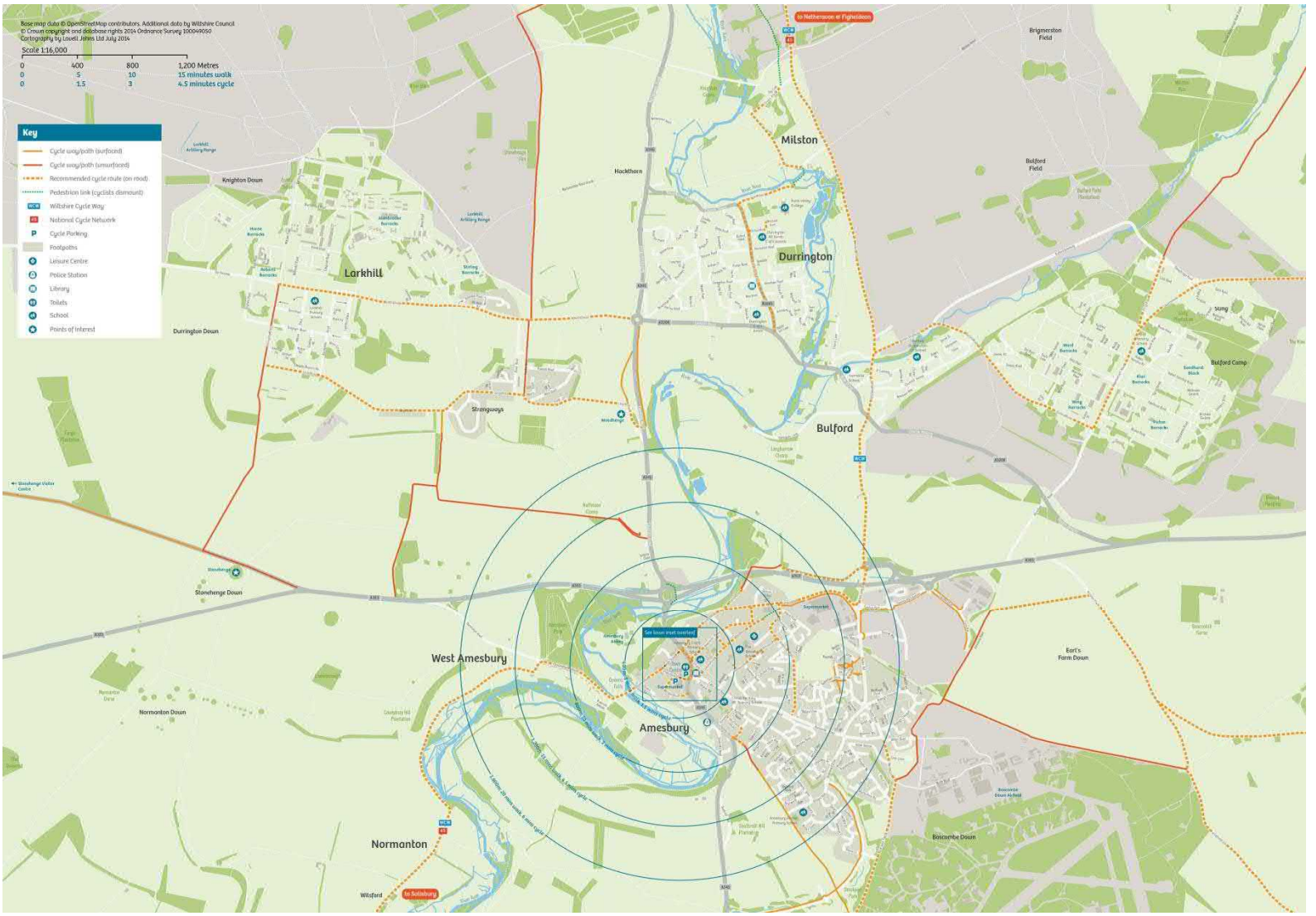
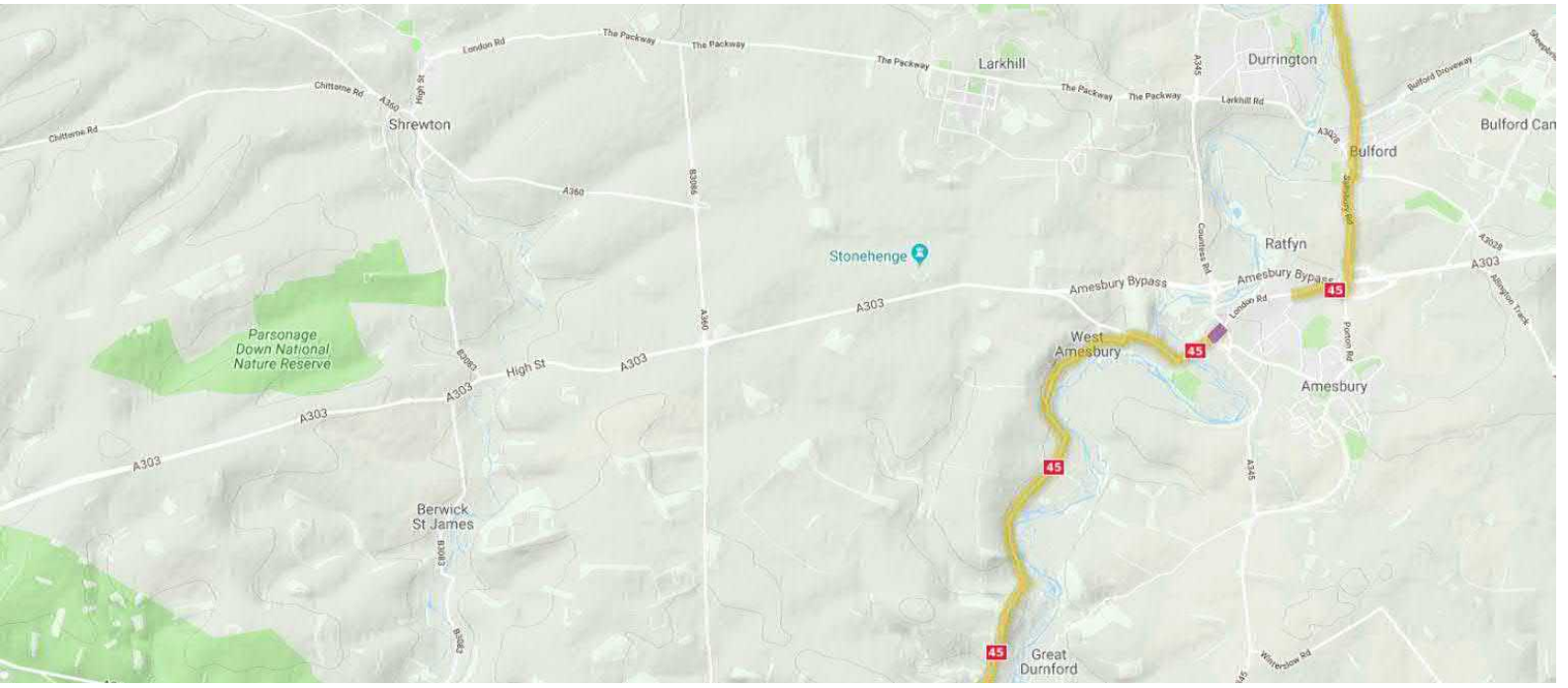
Appendix 8.4: Maps of local cycle routes

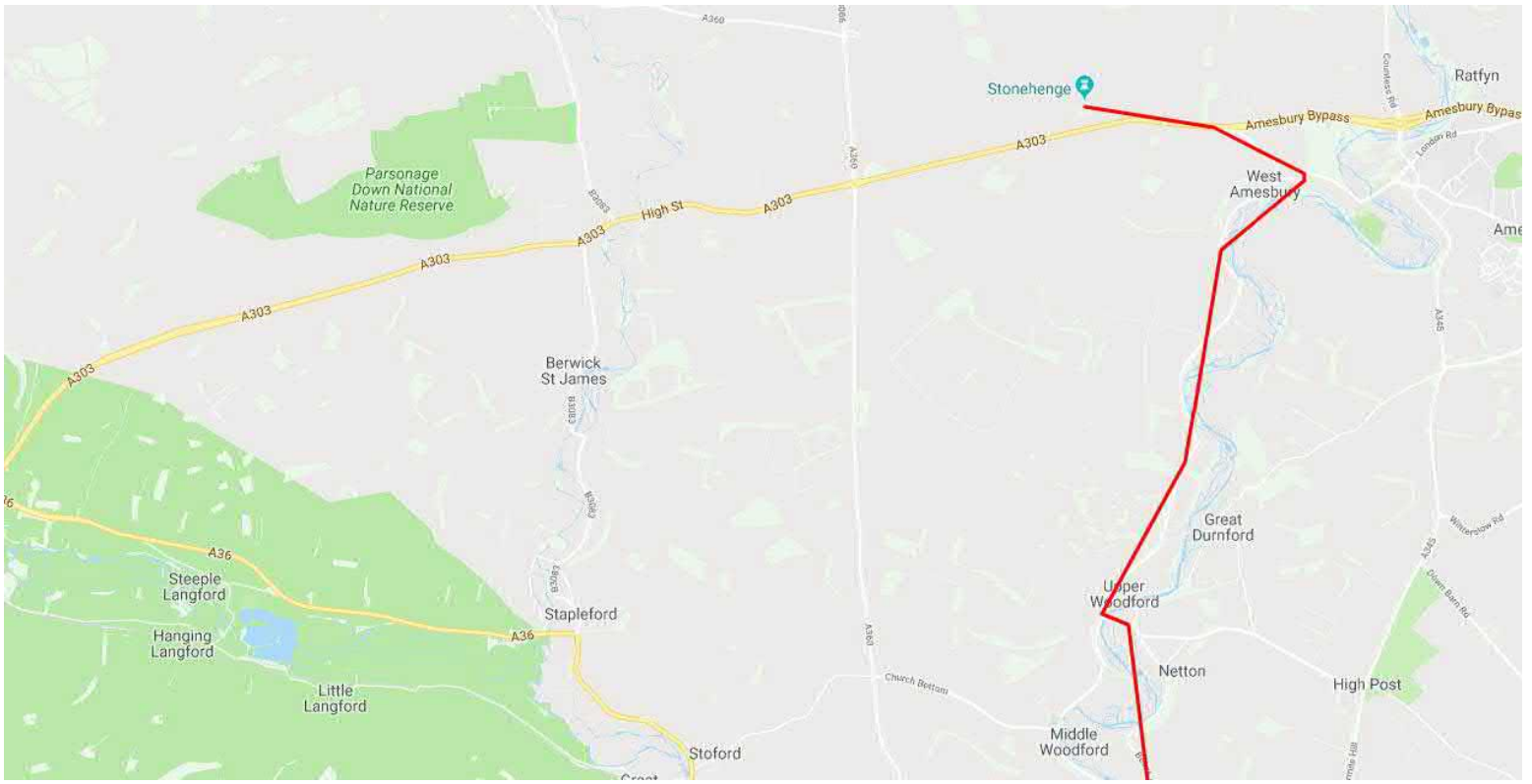


Amesbury cycle route [1] - http://www.connectingwiltshire.co.uk/wp-content/uploads/2015/04/Amesbury_web.pdf



Sustrans National Cycle Network - Route 45 [1]- [2] - https://www.sustrans.org.uk/ncn/map/route/route-45

[3] - https://www.cycle-route.com/routes/Salisbury_to_Stonehenge_Loop-Cycle-Route-2480.html



[4] - http://www.gps-routes.co.uk/routes/home.nsf/RoutesLinksCycle/salisbury-to-stonehenge-cycle-route

Appendix 8.5: Assessment of Alternative Modes (PCF Stage 2) Technical Note

Technical Note

A303 Stonehenge

Subject:	Assessment of Alternative Modes (PCF Stage 2)		
Date:	02 June 2017	**Reference:**	HE551506-AA-HGN-SWI-FN-CX-000009
Copies:			
Prepared by:			

1 Introduction

1.1 Purpose of the Report

1.1.1 The purpose of this report is to provide an assessment of alternative modal options for the A303 Stonehenge (Amesbury to Berwick Down) scheme, based on the requirement that scheme promoters should assess other modes and sustainable transport options, as a possible alternative to the given road scheme.

1.1.2 This report considers the feasible alternative modes and follows the guidelines set out in Highways England's Traffic Appraisal Modelling and Economics (TAME) Advice Note 2 v1.0 published in July 2015. The advice note describes the requirements at Project Control Framework (PCF) Stage 2 in terms of the questions that must be answered to satisfy Highways England that all alternative modes have been examined and the proposed highway solution is the correct option. An assessment was undertaken during the Stage 0 Feasibility Study in 2015, this was based on a previous version of the guidance. This assessment has, therefore, been prepared in Stage 2 to update the assessment against the amended guidance.

1.2 Client Scheme Requirements

1.2.1 The principal objectives of the scheme are:

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

1.2.2 The Client Scheme Requirements include further requirements, including the following under the economic growth and transport headings.

Economic growth:

- The road capacity, together with Non-Motorised User provision, will be increased to dual carriageway all-purpose between Amesbury and Berwick Down, linking with existing dual carriageways to the East and West.
- Grade separated junctions will be introduced to create a road that meets expressway standards, designed to accommodate foreseeable traffic growth.
- Grade separation will also assist traffic and Non-Motorised Users wishing to cross the A303 and so stimulate local economic activity and reduce severance.

Transport:

- The road will be designed to modern standards and, in addition, to perform as an expressway.
- The design of the road and connections with the local network will address issues of congestion, resilience and reliability. It will reduce risk of traffic diverting onto local roads.
- Road safety will be improved to at least the national average for a road of this type.

1.3 The Requirements of TAME Advice Note 2 v1.0

1.3.1 The PCF Stage 2 assessment of alternative modes consists of a simple two level assessment. Two questions must be addressed as follows:

Level 1: *"Could an alternative modal intervention solve the identified problem?"*

1.3.2 In the event that the answer to this question is 'yes', a second level of test must be considered and assessed.

Level 2: *"Knowing the benefits of the preferred option, what impact would a modal alternative require in order to relieve the problem to the same degree and is that viable?"*

2 Alternative Modes Considered

2.1 Introduction

2.2 This section addresses the Level 1 question – whether an alternative modal intervention could solve the identified problem – in the context of the existing transport facilities and committed transport improvement. It describes the possible contribution of alternative modes to help satisfy the future travel demands and meet the scheme objectives.

2.3 Non-Motorised Users (NMUs) and Local Public Transport

2.3.1 As exhibited in the origin / destination plots in Section 5, almost 90% of journeys are medium or long distance. It is known that no local scheduled bus services pass along the scheme section of the A303, nor do any National Cycle Network routes run parallel to the A303. The impact of the scheme on NMUs will be covered by the separate NMU Context Report.

2.4 Road-based Public Transport

2.4.1 National Express operates coaches along the A303 between Salisbury and London Victoria, via Amesbury, Andover, Basingstoke and Heathrow Airport. There are four scheduled coaches per day in each direction with an approx. journey time of 3hr 15 min between Salisbury and London, a distance of 90 miles. Based on Google Maps Journey Planner (excluding congestion and delays), the typical driving journey time between Salisbury and London Victoria is 1hr 50min and the train takes about 1hr 30min.

2.4.2 Regular longer distance coach services operated by National Express, Megabus and others use the M4 between London Victoria Coach Station, Heathrow, Reading Calcot and towns and cities in the west of England such as Swindon, Bristol, Taunton, Exeter and Plymouth. These services operate on roughly a 2-3 hour headway throughout the day.

2.4.3 It is considered that the existing A303 capacity problems cannot be solved by the introduction of road-based public transport given that services would have to provide a significant improvement in speed, quality, frequency and capacity. It is considered that road-based public transport would not meet most of the objectives set out for the scheme in the introduction.

2.5 Rail Services

2.5.1 For the type of medium and long-distance movements that dominate the flows on the A303 the only realistic alternative for travellers is to use rail. There are three rail routes which offer relevant services:

- London Waterloo–Exeter Line, via Salisbury;
- Hants and Berks Line between London Paddington and Taunton/Exeter, via Reading, Newbury and Westbury; and
- Great Western Mainline, via Bristol.

2.5.2 Figure 2-1 shows an extract of the National Rail Network Map (2015), which contains the three routes listed above.

2.5.3 The London Waterloo-Exeter Line is most directly competitive with the A303 in terms of its alignment and the intermediate stations which it serves (Basingstoke, Andover, Salisbury, Yeovil, Axminster and Honiton). However, the train frequencies are relatively low west of Salisbury (one train per hour) and train speeds are modest. For example, travelling from Exeter to London is much faster via Reading.

2.5.4 Train speed on the Hants and Berks Line are more attractive for passengers, but frequencies are low west of Westbury.

2.5.5 The Great Western Mainline (GWML) offers frequent trains travelling at high speeds, but passengers travelling to the west of England (destinations west of Bristol) generally have to interchange.

2.5.6 Despite the limitations outlined above, rail is likely to be the only viable modal alternative for travellers currently driving on the A303 at Stonehenge.

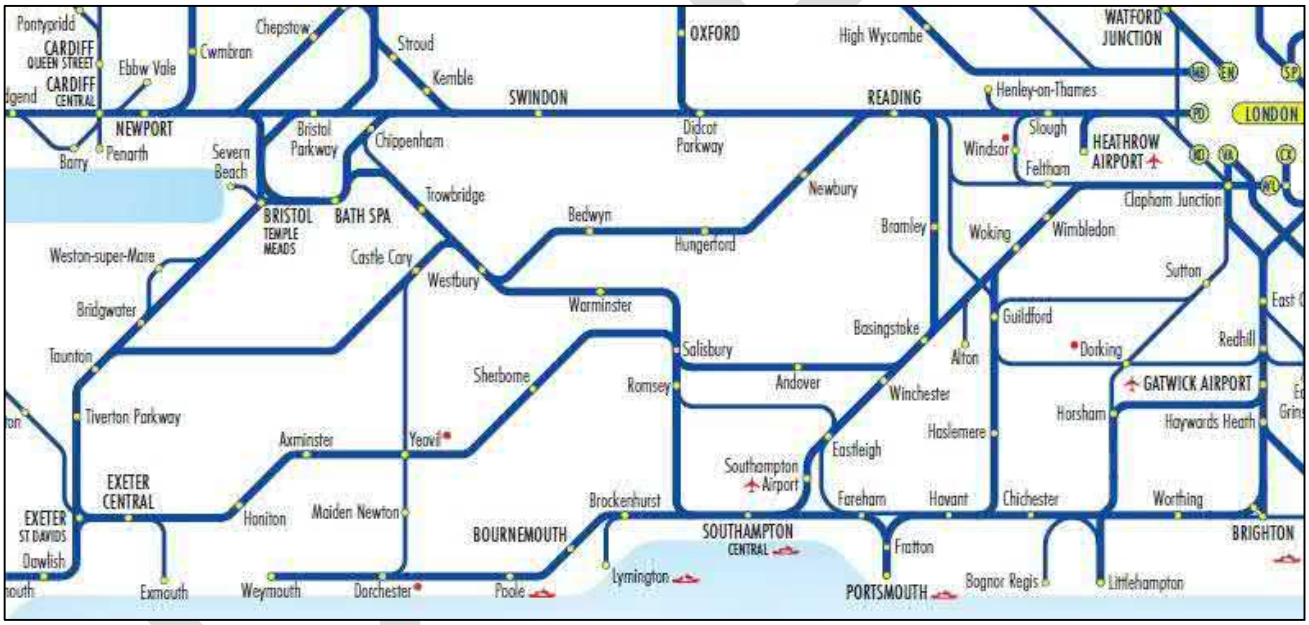


Figure 2-1 Extract from National Rail UK Network Map (2015)

2.6 Rail Freight

2.6.1 The main rail freight movements that cross the A303 corridor are containers from Southampton to the Midlands, North West and Scotland; aggregates from Westbury to London (Ealing); china clay from Cornwall to Stoke-on-Trent and timber from Newton Abbott to Chirk (Shropshire).

2.7 Conclusion

2.7.1 Transport improvements to cater for walking, cycling and local public transport, though possibly complementary to the proposed road scheme, on their own do not offer potential solutions to the existing or future anticipated traffic congestion

and safety problems. Rail is the only realistic alternative mode for most drivers using the A303 at Stonehenge.

3 Problem Definition

3.1 Introduction

3.1.1 This section summarises the characteristics of users on the A303 Stonehenge to understand the volume, trip purpose, vehicle type and origin / destination profile. The information contained in this section has been drawn from the Traffic Data Collection Report, issued by Arup Atkins JV in July 2016.

3.1.2 This section also defines the existing and future anticipated problems for A303 users in terms of congestion, rat-running and safety.

3.2 The Existing Problem

3.2.1 This is one of the few remaining sections of single carriageway on the 93 miles (150km) of the A303 between the M3 Junction 8 near Basingstoke and the junction with the A30 in the Blackdown Hills. Regarding the existing problems, analysis of A303 traffic counts, journey time data and recently collected roadside interview data highlights that:

- the personal injury accident rate on this section of the A303 is well above the average for the A303 route between the M3 and A358/M5;
- traffic using this section of the A303 often exceeds its capacity, especially during periods of the summer months;
- heavy delays occur during the summer months and also on Friday and Sunday afternoons and evenings in non-summer months; and
- congestion on the A303 causes “rat-running” onto unsuitable roads through neighbouring villages such as Bulford, Durrington, Larkhill and Shrewton.

3.3 Current Traffic Volumes

3.3.1 As part of the Highways England Traffic Information System (WebTRIS), Highways England holds traffic flow information for permanent automatic traffic count (ATC) sites across the Strategic Road Network (SRN). This data has been used to profile the flows on the A303 east of Longbarrow Roundabout (Site T11), a single carriageway location within the scheme area. For 2014, the Annual Average Daily Traffic (AADT) flow at T11 eastbound was 12,990 vpd and westbound was 12,650 vpd.

3.3.2 Hourly two-way flow profiles at site T11 are shown in Figure 3-1. Hourly profiles for the average weekday, Saturday and Sunday are shown for both March and August traffic volumes. The flat profile of August flows between 0700 and 1900 suggests that the restricted capacity of this single carriageway section impacts significantly on the ability of the road to cater for the total traffic demand and that the saturation level has been reached. Similar patterns occur outside the summer months on Friday and Sunday afternoons.

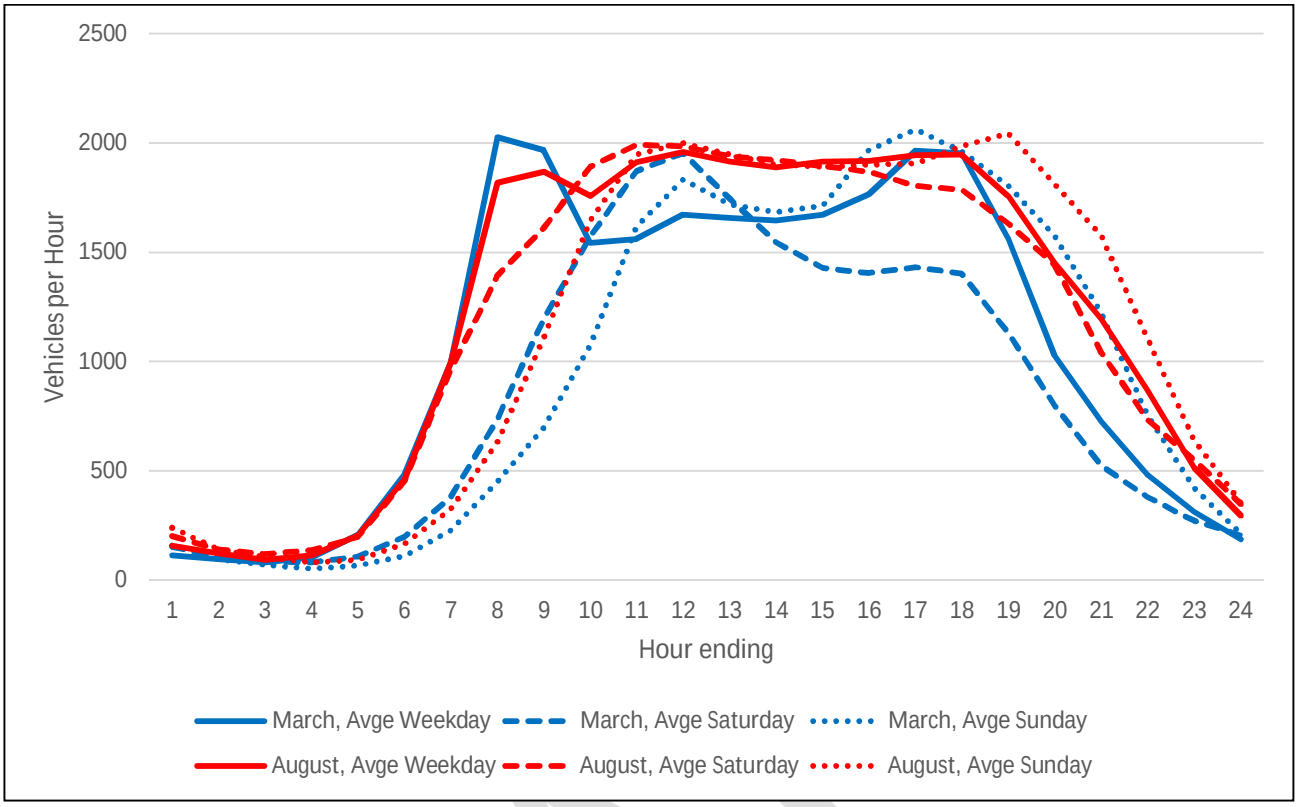


Figure 3-1 A303, East of Longbarrow Roundabout – 2014 Hourly Flow Profiles

3.4 Traffic Forecasts and Capacity Assessment

3.4.1 With the delivery of the A303 Stonehenge scheme, the stress factors on the B3083 – A345 segment are set to reduce from levels exceeding saturation, to manageable levels, as detailed in Table 3-1. This is primarily due to the dualling of this section. The Congestion Reference Flow (CRF) provides an estimate of the flow capacity in a neutral month. The Annual Average Daily Traffic (AADT) values are the forecast flows for the opening year (2026) and design year (2041). The traffic forecasts for Option 1Nd have been taken as representative for this analysis.

Table 3-1 B3083 - A345 Do Nothing and Do Something Stress Factor Comparison

Direction	Do Nothing				Do Something			
	2026		2041		2026		2041	
	AADT	Stress Factor	AADT	Stress Factor	AADT	Stress Factor	AADT	Stress Factor
West of A360	25,011	1.10	27,207	1.20	35,859	0.38	41,833	0.44
East of A360	33,173	1.46	34,786	1.53	48,067	0.50	50,548	0.53

3.5 Scheme Benefits

3.5.1 To address the specific questions raised by the Highways England guidance it is firstly necessary to identify the scale of relief provided by the scheme. This analysis can be used to determine the volume of movements that alternative modes would need to cater for.

3.5.2 The Stage 2 traffic forecasts show that, in the design year of 2041, the highest stress factor for the corridor (east of the A360) is 1.53 in the Do Minimum. This stress level is reduced to 0.53 in the Do Something.

3.6 Public Transport Requirements

3.6.1 It has been established the rail is the only viable alternative to the improvement of the A303, due to the length and distribution of journeys using the existing road.

3.6.2 To achieve a stress factor of 0.53 in the Do Minimum, the corridor traffic flow would need to reduce to an AADT of 12,000 vehicles per day (vpd), a reduction of 22,800 vpd. Based on an average vehicle occupancy of 1.6 persons (from the WebTAG Databook) this converts to a reduction of 36,000 person movements per day.

3.6.3 If it is assumed that seven or eight car train sets with first class seating (1 carriage) and first class seating plus buffet car (1 carriage) could be operated between London Waterloo and Exeter, their capacity would be, say, 500 seated passengers.

3.6.4 It would require three tph in each direction over the 12 main hours of operation (0700-1900) to cater for this volume of passenger demand. This assumes that the demand is fairly regular through the day and the year, without any significant peaks (e.g. in holiday periods).

4 Existing Rail Situation

4.1 Overview

4.1.1 To examine the existing and future role of passenger rail in satisfying the objectives of the scheme, the following primary reference sources from Network Rail were used:

- Replanning the Investment Programme (Hendy Report), November 2015;
- Network Specification 2016: Wessex, March 2016;
- Route Specifications 2016: Wessex, March 2016;
- Network Specification 2016: Western, March 2016;
- Route Specifications 2016 Western, March 2016;
- Network Route Utilisation Strategy – Electrification, October 2009;
- Route 12 Reading to Penzance (CP4 Delivery Plan), 2009; and
- Route Plan C Wessex, Route Plans, March 2010.

4.1.2 These documents set out the current situation with regard to provision of rail services and the plans for improvements in the respective areas. The existing passenger provision for each of the three main routes is described in some detail below. This is followed by a brief discussion of the rail proposals included in the South West Regional Area Multi Modal Study (SWARMMS) in 2002. The note then sets out a summary of the rail improvement schemes in CP5 2014 – 2019 and, if relevant, CP6 2020 – 2024. Finally, a discussion of rail freight issues is given.

4.2 London Waterloo–Exeter Line, via Salisbury

Existing Passenger Services

4.2.1 Between London Waterloo and Salisbury, the service frequency is generally two trains per hour (tph) in each direction and the train sets are generally six or nine cars. However, trains stop at many local stations. This increases journey times for passengers making longer journeys (to/from Somerset, Dorset and Devon).

4.2.2 Between Basingstoke and Salisbury, the route has dual track with a half-hourly service. One train per hour goes from Salisbury onto Exeter. The remaining trains run to Bristol, Yeovil or Weymouth. Between Salisbury and Exeter, the West of England Line is predominantly single track with some short sections of dual track. The single track sections prevent the introduction of any significant increases in frequency. Towards the end of 2009 the Axminster loop was opened which enabled an hourly service to operate between London Waterloo and Exeter. The journey time is approximately 3 hrs 30 mins. In comparison, the London-Exeter journey can be made in two and a half hours via Taunton and the Hants and Berks Line.

4.2.3 The Network Rail Route Utilisation Study of 2006 recommended that the Axminster loop should be extended to create double track as far as Chard Junction. It was also recommended that an addition passing loop should be provided at Whimple. However, these improvements have not been implemented.

4.2.4 The rolling stock on the London Waterloo - Exeter route is class 158 and 159 Express Sprinters. The 158s are diesel multiple units (DMUs) built between 1989 and 1992. The Class 159 units are now over twenty years old. Between Salisbury and Exeter trains are generally operated in three or six car sets. The capacity per set is 150-200 passengers for the 158s and 250 per set for the 159s. Capacity also depends on the number of first class seats (usually no more than 20-30 for a Class 159). The incumbent train operating company is South West Trains.

Future Rail Passenger Provision

4.2.5 The 2002 SWARMMS Final Report, prepared on behalf of the Department for Transport, provided a summary of what the re-instatement of double track between Salisbury and Exeter would require:

- Tisbury station: land on former double-track section sold for development;
- Honiton Tunnel (1,345 yards): singled due to drainage problems in the tunnel and there may be problems reinstating double track section;

- Pinhoe M5 overbridge: currently only a single portal under the M5 but HA prepared to build a second portal to accommodate new line;
- Signalling: Existing signalling systems are antiquated and Railtrack concluded in its 1999 NMS that no significant work is required on the signalling system before 2006, but that was less than 4 years away and would clearly be needed for double-tracking; and
- Track alignment: The existing single line formation had been slewed to deliver improved line-speeds along the route and, by introducing an additional line, some of these benefits may well be reduced as the existing track is moved, for example, to achieve signal-sighting requirements.

4.2.6 The SWARMMS report also outlined three proposed new stations that would also require rail infrastructure improvements including suitable signalling, amendments to track layout and construction of station building and facilities. The proposed locations for new stations are:

- Wilton;
- Porton; and
- Clyst Hayes.

4.2.7 Table 4-1, extracted from the SWARMMS report provides some broad estimates of the additional costs of each of these elements:

Table 4-1 SWARMMS Infrastructure and Service Improvement Cost Estimates (2002)

Infrastructure	Cost (£ million)	
	Capital Cost	Operating Cost per annum
Re-introduction of full double track Exeter – Salisbury	165	-
New Stations at Porton, Wilton, Clyst Hayes	5	-
Operating Cost	-	5

4.2.8 Since 2002, of the three proposed new stations, only Clyst Hayes (now named Cranbrook station), has opened. The final cost of the station is understood to have been £5m. No calculations have been undertaken to growth the SWARMMS 2002 cost estimates to current prices, but they are likely to have increased significantly. It is noted that out-turn costs for rail schemes such as the GWML Electrification are far exceeding Network Rail's published estimates. It would not be unreasonable to assume that the costs of introducing full double track between Exeter and Salisbury could be five to ten times higher than the SWARMMS estimate from 2002.

4.2.9 The Wessex Route Study outlines the possible options to improve journey times between Exeter St Davids and London Waterloo. It states that electrification cannot deliver significant journey time saving on its own, as speeding up services in this way has the knock-on effect of impacting on the locations at which services travelling in opposite directions need to cross, to fit in with the single and double

track sections. Therefore, should any of these options be taken forward, more work will be required to understand the benefit and value for money that each would provide. There is no information available to suggest that this is being pursued.

4.2.10 Works during the CP5 period consist of consolidation of signalling control at Basingstoke Rail Operating Centre and improvements to station accessibility for disabled passengers.

Freight

4.2.11 Between Salisbury and Exeter this route is not currently used by regular freight trains, although it is used occasionally for diversions. A small number of freight trains use the line east of Salisbury towards Woking.

4.2.12 Exeter Skypark is a development near to Exeter Airport and the M5 Junction 29. The nearest station on the West of England Line is Pinhoe. The aspiration of the developers and Devon County Council is to develop a gateway intermodal freight terminal with container handling. This requires a private siding for road-rail interchange. One of the major players in the project – Sainsbury's – has recently withdrawn, casting some doubt on the future of the project. Lidl is understood to have acquired the site with a view to developing a logistics centre. However, the current status of the rail freight interchange is unknown.

4.3 Berks and Hants Line, via Newbury and Westbury

Existing Passenger Services

4.3.1 This is a major branch of the GWML with trains between Reading and Taunton operated by Great Western Railway (which is owned by FirstGroup). The line re-joins the GWML at Cogload junction, north of Taunton. The route is double track with passing loops. Electrification of this route was proposed by a Parliamentary Select Committee in 1977. However, the scheme was never progressed. High Speed Trains (HSTs) operate on this route, running between London Paddington and Penzance, Plymouth and Paignton. Journey times from Reading to Taunton vary from 90 to 100 minutes. The maximum speed between Reading and Taunton is 110mph.

4.3.2 Higher service frequencies are operated at the eastern end of the line which is the western edge of the London commuter catchment area. Two tph operate between Newbury and London with 1 tph between Bedwyn and London. The only direct through services between London and Frome operate in the morning (up to London) and evening (down from London). Otherwise, passengers are required to change at Westbury.

4.3.3 The main pinch-point on the route is between Reading West and Southcote Junction where the line is shared with passenger and freight trains to Basingstoke and the South Coast ports.

Future Rail Passenger Provision

4.3.4 SWARMMS recommended an increase in the service frequency on the Berks and Hants Line to two tph with a regular pattern of fast and semi-fast services between London and Devon/Cornwall. Although changes have been made to the timetable through the latest franchise, this frequency of service is not yet provided.

4.3.5 Under the GWML improvement plans Reading to Newbury will be electrified by 2018 (CP5), and the remodelling of Reading Station (CP4) has increased capacity and reduced delays on this route.

Freight

4.3.6 Aggregates, including china clay, are transported on the line between Taunton and Reading. The line is connected to limestone quarries at Torr Works (Merehead) and Whatley Quarry. Materials from points west of Taunton are also carried through this corridor.

4.4 Great Western Mainline, via Bristol

Existing Passenger Services

4.4.1 Between London Paddington and Bristol Temple Meads, the service frequency is generally two tph and the train sets are generally eight cars. The typical journey time from Bristol Temple Meads to London is 1hr 45min.

4.4.2 Current rolling stock is InterCity 125s which were introduced in the late 1970s and have been periodically refurbished.

Future Rail Passenger Provision

4.4.3 Since SWARMMS, the rebuilding of Reading station has been completed. A planned upgrade in rolling stock on GWML will be in operation by 2017. Electrification of GWML will take place over the next five to ten years. All elements of the programme will result in electric trains running in Control Period CP6.

4.4.4 In March 2011, the Government confirmed its commitment to the electrification of the GWML for the following routes: London Paddington to Cardiff Central (via Bristol Parkway), Reading to Newbury, Didcot to Oxford, Swindon to Bristol Temple Meads, Bristol Temple Meads to Bristol Parkway and Filton Abbey Wood towards the boundary with the Wales Route (Severn Tunnel).

4.4.5 The electrified routes would enable the progressive introduction of electric passenger train services on main line, regional and suburban services, and selective electric haulage of freight services.

4.4.6 Sir Peter Hendy set out the revised completion dates of each element of the delayed GWML electrification programme in January 2016. All elements of the programme would only start seeing electric trains running in CP6 (2019-2024), but the dates set for infrastructure authorisation were:

- Maidenhead to Didcot: December 2017;
- Didcot to Wootton Bassett Junction: December 2018;
- Wootton Bassett Junction to Bristol Parkway: December 2018;
- Reading to Newbury: December 2018;
- Bristol Parkway to Cardiff: December 2018;
- Didcot to Oxford: June 2019;
- Wootton Bassett Junction to Bristol Temple Meads: February 2019-April 2020; and
- Filton Bank: Early CP6.

4.4.7 Electrification of the line is predicted to reduce journey times between Bristol Temple Meads and London by 15-20 minutes, bringing the journey time to less than 1hr 30min.

4.4.8 Network Rail aspires to increase frequencies to four tph between Bristol Temple Meads and London Paddington with two travelling via Bath and two via Bristol Parkway.

4.4.9 Proposed infrastructure investment in CP6 includes MetroWest in Bristol and the Western Rail Link to Heathrow.

4.4.10 A Government announcement in November 2016 stated that electrification of four sections had been "deferred" because newer trains with more capacity can "bring in the benefits expected by passengers" without requiring "costly and disruptive electrification works". The four sections being delayed are:

- Oxford to Didcot Parkway;
- Bristol Parkway to Bristol Temple Meads;
- Bath Spa to Bristol Temple Meads; and
- Thames Valley branches to Henley and Windsor.

4.4.11 The decision would free up between £146 million and £165 million, which would be used to deliver "additional benefits to passengers". Network Rail said work to electrify the four sections would be carried out between 2019 and 2024.

Freight

4.4.12 Freight trains operate over the GWML between Bristol and the London area. There are regular Freightliner trains to Bristol and the central part of the route provides an additional route for aggregate trains between Wiltshire and the London area.

4.4.13 Passing loops along the route allow faster passenger trains to overtake freight trains in each direction and so freight trains typically advance between passing loops. The high frequency of fast intercity trains means that freight movements along this line are often slow with the Berks and Hants being the preferred route

5 Further Considerations

5.1 Vehicle Type and Trip Purpose of A303 Users

5.1.1 Two Roadside Interview (RSI) surveys were carried out on the A303 during October 2015. From the RSIs, around 25% of vehicles on the Stonehenge section of the A303 are vans or goods vehicles. Of the remaining 75% car traffic, the bulk of trips (40%) are made for leisure reasons with 25% commuting and 10% on business purposes.

5.2 Trip Lengths of A303 Users

5.2.1 For the car drivers intercepted by the RSI surveys, the average crow-fly distances between origin and destination car were as follows:

- eastbound = 155km (96 miles); and
- westbound = 163km (101 miles).

5.2.2 To put this in context the crow-fly distance from central London to Amesbury is 120 km (74 miles).

5.3 Trip Origins and Destinations of A303 Users

5.3.1 The RSI data highlights that 48% of journeys past Stonehenge are long distance with both origin and destination being more than 30 miles away. An additional 33% of trips have either an origin or destination further than 30 miles away. In contrast, only 11% of journeys on this section of the A303 have both trip ends within 10 miles of Stonehenge.

5.3.2 The origin / destination locations surveyed during the RSIs have been plotted to illustrate their spread and show where clustering occurs. Figure 5-1 shows the eastbound movements; the red dots show the origins and the green dots show the destinations.

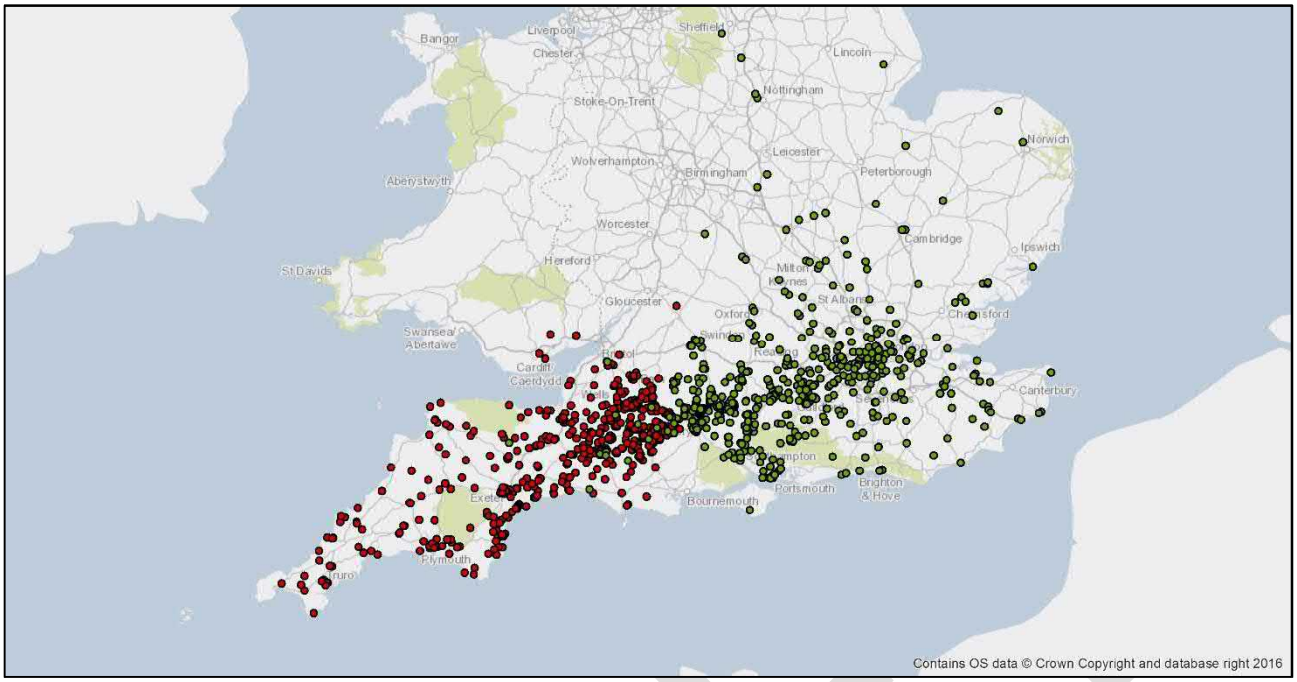


Figure 5-1 A303 Roadside Interview Surveys - Origin / Destination Plots (Eastbound)

5.3.3 The plots show the origins/destinations are dispersed across a range of counties, with clusters in London, in the surrounding counties and A303 corridor. Figure 5-2 shows the same plots in relation to the three main rail routes and railway stations.

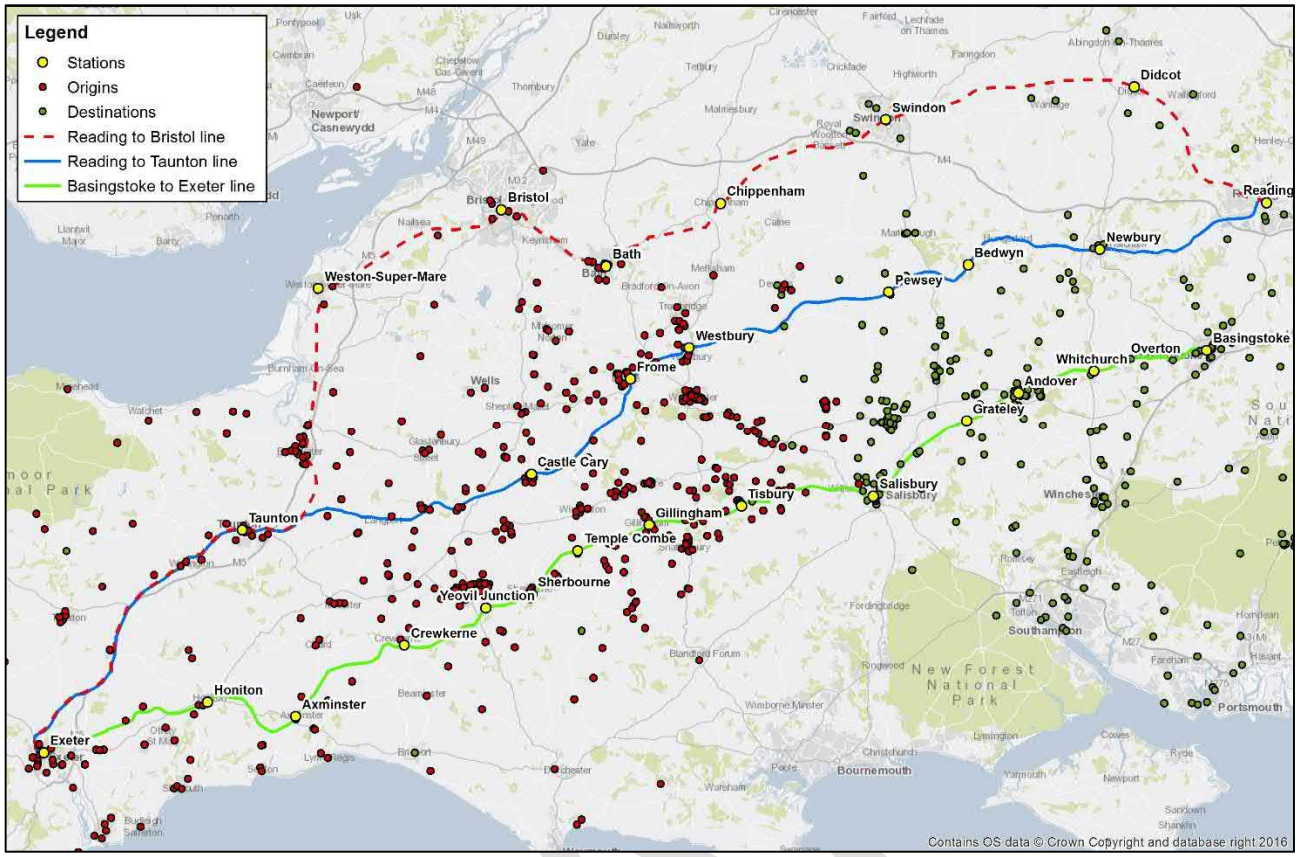


Figure 5-2 A303 Roadside Interview Surveys - Origin / Destination Plots (Eastbound) with main Rail Routes and Stations

5.3.4 Figure 5-2 shows that, whilst there are journeys made by car from/to locations with railway stations, many are to locations without any rail provision. This suggests that improvements to rail provision on existing routes would not meet the requirements of existing car users.

5.3.5 Figure 5-3 shows the westbound movements; the red dots show the origins and the green dots show the destinations.

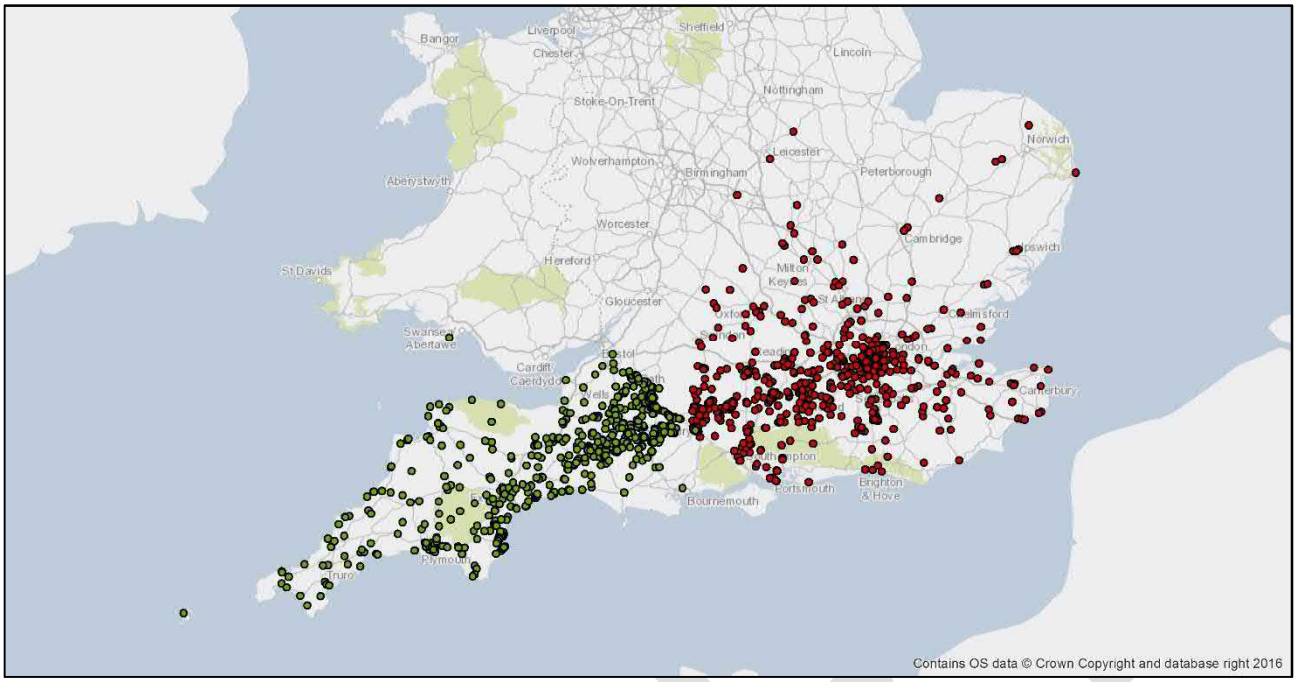


Figure 5-3 A303 Roadside Interview Surveys - Origin / Destination Plots (Westbound)

5.3.6 Similarly to Figure 5-1, the plots in Figure 5-3 show the origins / destinations spread across a range of counties, with clusters in London, in the surrounding counties and in the A303 corridor. Figure 5-4 shows the same plots in relation to the three main rail routes and railway stations.

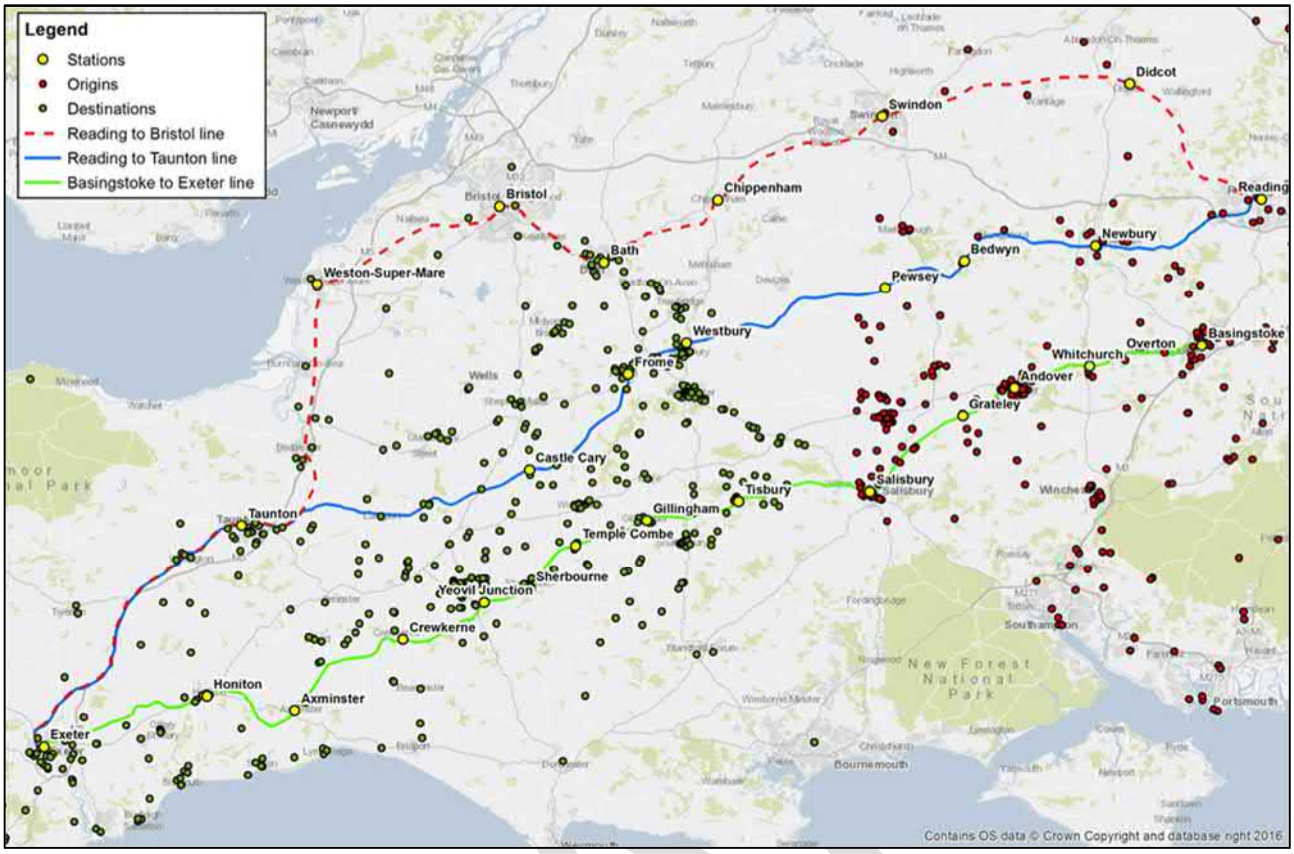


Figure 5-4 A303 Roadside Interview Surveys - Origin / Destination Plots (Westbound) with main Rail Routes and Stations

5.3.7 Similarly to Figure 5-2, Figure 5-4 also shows that whilst there are journeys made by car from / to locations with railway stations, many are to locations without any rail provision, indicating that improvements to rail provision on existing routes would not meet the requirements of existing car users.

5.4 Analysis of Rail as a Potential Solution

5.4.1 In response to the Level 1 question (C*ould an alternative modal intervention solve the identified problem?),* this section examines the extent to which theoretical rail improvements could reduce traffic volumes on the A303 Stonehenge single carriageway section. The analysis draws on research reported in TRL report TRL568 “Factors influencing trip mode choice” (2003). The methodology, results and conclusions of this work are discussed below.

5.4.2 It should be noted that the analysis reported here takes no specific account of any committed or planned rail improvements reported in Section 4. However, there is no scheme identified in Section 4 which would dramatically alter the competitive position between travelling by rail or car in the A303 corridor in the foreseeable future.

5.5 Methodology for Defining Trips in Scope for Modal Transfer

5.5.1 During the 12 hour RSI surveys, carried out at the two sites on the A303, 1546 interview records were collected (a sample size of approximately 10%). Following data cleaning and logic checks, a subset of 1356 records was used for this analysis. The first stage of analysis removed records for LGVs and OGVs which could not plausibly be transferred to passenger rail services. This left 1106 records for car trips or 81.6% of the total.

5.5.2 Catchment areas around stations were then defined. Car journeys that begin and end within 3km and 5km of a station were considered 'in-scope' to transfer to rail. Table 5-1 shows the number of car journeys falling within the station catchment areas at both ends of the trip.

Table 5-1 Car Trips where Origin and Destination are within Railway Station Proximity Threshold

	Roadside interview trip records					
	Westbound			Eastbound		
	Total (all vehicles)	Within 3km of station	Within 5km of station	Total (all vehicles)	Within 3km of station	Within 5km of station
Number	703	157	237	653	107	175
%	100%	22%	34%	100%	16%	27%

5.6 Propensity for Modal Transfer

5.6.1 An extract from TRL568 is shown in Table 5-2, detailing the percentage modal transfer factors applicable to medium and long distance car trips. There is some variation in the importance placed on different travel characteristics depending on distance travelled. All of the RSI car trip records in the dataset which were 'in-scope' to transfer to rail were for journeys longer than 15 miles. These are categorised as 'long distance' according to the 2003 TRL report. The most important factors for long distance journeys were shown to be reliability and fares.

Table 5-2 Impact of different types of public transport improvement on car users

Public transport improvement	Car users likely to switch to public transport (%)	
	Long-distance journeys	Medium-distance journeys
Completely reliable services	12	4
Fares reduced by 50%	11	3
Journey times reduced by 20%	6	6
Reduced travel times to/from stations/stops*	3	-
Fewer interchanges*	2	2
Better passenger information	2	2
Increased service frequencies	1	1
Source: TRL report TRL568 "Factors influencing trip mode choice" (2003)		

5.6.2 Combining the factors relevant to a strategy of improving inter-urban rail infrastructure, gives a total maximum potential 32% mode shift from car to rail for long distance journeys. This is the maximum level of transfer that could be achieved with a very significant investment in rail infrastructure and operations.

5.7 Results

5.7.1 After applying the combined TRL factors to the 'in-scope' car journeys, the percentage impact of the mode shift (for car journeys), in combination with the progressive filtering of the RSI trip records described, was calculated in relation to the total number of vehicle interview records. This implicitly shows the potential reduction in traffic volume on the A303 as summarised in Table 5-3.

Table 5-3 Potential Impact of Mode Shift (Car to Rail)

Direction of Travel	Eastbound		Westbound	
Assumed Station Catchment Area	**≤3km**	**≤5km**	**≤3km**	**≤5km**
Reduction in A303 traffic volumes	-7%	-11%	-5%	-9%

5.7.2 Referring back to Table 3.1, a reduction of 11% in the 2041 Do Minimum traffic forecasts would reduce the AADT flow from 34,800 to 31,000 vpd. This would leave a residual stress factor of 1.36, and would not come close to achieving the level of impact of the proposed road scheme.

5.8 Summary

5.8.1 The proportion of trips 'in-scope' to use rail (the most directly competitive alternative mode in the A303 corridor) was estimated using the RSI data. The propensity of car drivers to switch modes was estimated using information from the report TRL568 "Factors influencing trip mode choice" (2003). Based on the TRL research, a hypothetical situation was considered where rail fares were halved, journey times were reduced by 20%, journey time reliability was 100% and passenger information was readily available. Under these assumptions, the maximum level of reduction in vehicular traffic on the A303 that could be achieved by the transfer of car trips to rail was estimated to be 11%.

5.8.2 Therefore, it must be concluded that, in the scheme opening and design years even a very significant investment in rail infrastructure and operations would not significantly reduce traffic levels and, hence, congestion and travel time variability on the A303 near Stonehenge.

6 Summary and Conclusions

6.1 Summary

Scheme Objectives

6.1.1 The environmental and social objectives of the A303 Stonehenge scheme are to conserve and enhance the World Heritage Site (WHS) by improving access both within and to/from the site; to contribute to the enhancement of the WHS, improve

the biodiversity along the route and provide a positive legacy for the communities adjoining the A303.

6.1.2 From a transport and economic perspective, the scheme's objectives are to contribute to the provision of a high quality, free-flowing and reliable connection between the South East and South West, and to resolve existing and future predicted congestion problems.

TAME Guidance

6.1.3 This note has followed the requirements of TAME Advice Note 2 v1.0 for PCF Stage 2 by firstly addressing the Level 1 question "*Could an alternative modal intervention solve the identified problem?*.

6.1.4 The Level 2 question ""*Knowing the benefits of the preferred option, what impact would a modal alternative require in order to relieve the problem to the same degree and is that viable?*" was also considered.

Alternatives Modes Considered

6.1.5 This note demonstrates that walking, cycling and local public transport are not viable alternatives to car use for most of the journeys made on this section of the A303 due to the trip lengths that are involved. Coach is a possible alternative for some journeys between urban centres. However, the frequencies of services to major destinations in the South West are low and coaches using the A303 would be subject to the same delays as cars. Hence, where a car is available, using the coach is relatively unattractive for most users of the A303. Also, the capacity of the coach services provided is relatively small in comparison with the number of people that can be accommodated in vehicles using an improved dual carriageway. Rail is considered the only modal alternative which can seriously compete with road for the types of journey being made by A303 road users.

The Problem

6.1.6 This is one of the few remaining sections of single carriageway on the 93 miles (150km) of the A303 between the M3 Junction 8 near Basingstoke and the M5 Junction 26 at Taunton. Regarding the existing problems on this section of the A303/A358 corridor, analysis of traffic counts, journey time data and recently collected roadside interview data shows the following:

- the personal injury accident rate on this section of the A303 is well above the average for the A303 route between the M3 and A358/M5;
- the volume of traffic using this section of the A303 often exceeds its capacity, especially during weekends and in the summer months, leading to congestion and delays; and
- congestion on the A303 causes "rat-running" onto unsuitable roads through neighbouring villages such as Bulford, Durrington, Larkhill and Shrewton.

Scheme Benefits

6.1.7 To address the specific questions raised by the Highways England guidance it was firstly necessary to identify the scale of relief provided by the scheme. This is the volume of movements that alternative modes will need to cater for. The Stage 2 traffic forecasts show that, in the design year of 2041, the scheme reduces the stress factor for the corridor from 1.53 to 0.53. The scheme will also reduce journey times for A303 traffic by upwards of four minutes per vehicle. In the busy summer months the time savings will exceed 30 minutes.

Public Transport Requirements

6.1.8 Rail is the only viable alternative to the improvement of the A303, due to the length and distribution of journeys using the existing road. In 2041, the design year, to achieve a stress factor of 0.53 in the Do Minimum, the AADT would need to decrease to 12,000 vpd, a reduction of 22,800 vpd. Based on an average vehicle occupancy of 1.6 persons (from the WebTAG Databook) this converts to 36,000 person movements per day.

6.1.9 If it is assumed that seven or eight car train sets with first class seating (1 carriage) and first class seating plus buffet car (1 carriage) could be operated between London Waterloo and Exeter, their capacity would be, say, 500 seated passengers.

6.1.10 It would require a service of three tph of this capacity in each direction over the 12 main hours of operation (0700-1900) day to cater for this volume of demand. This assumes that the demand is fairly regular through the day and the year without any significant peaks (e.g. in holiday periods).

Existing Rail Situation

6.1.11 With regards to rail, the main services that compete with the A303 in this general corridor between London and the South West are:

- London Waterloo–Exeter Line, via Salisbury;
- Hants and Berks Line between London Paddington and Taunton/Exeter, via Reading, Newbury and Westbury; and
- GWML via Bristol.

6.1.12 On the London Waterloo-Exeter route, which is operated by South West Trains, beyond Salisbury there is generally one tph on weekdays. The hourly service was made possible by the Axminster loop opened in 2009. Passenger demand has been increasing over the last five years. However, the scope for significant modal shift from road to rail appears to be extremely limited as no further major infrastructure improvements that would increase service frequencies or improve journey times are planned in CP5 or CP6.

6.1.13 The SWARMMS report provides some broad estimates of the investment that would be required to re-instate double track between Salisbury and Exeter, totalling £165m capital cost and the cost of new stations at Porton, Wilton, Clyst Hayes at £5m. Of the three proposed new stations, only Clyst Hayes (Cranbrook)

station, has opened. The final cost of the station was £5m. No calculations were undertaken to growth the 2002 cost estimates for double track to current prices, but the costs are likely to have increased significantly.

6.1.14 On the London Paddington-Taunton-Exeter route, via Newbury, which is operated by Great Western Railway, on weekdays there is one tph as far as Bedwyn, and two tph as far as Newbury. Long distance trains between London and Exeter, Plymouth/Penzance tend to use this route, thereby avoiding Bristol. This section of route will benefit from partial electrification in the next couple of years. Also, the recent improvements to Reading station should improve reliability. Passenger demand has been growing in the last five years. However, there is no prospect of any significant improvement in frequencies or reduction in journey times for the longer distance journeys to Devon and Cornwall. Therefore, once again, the scope for significant modal shift from road to rail appears to be limited.

6.1.15 The London Paddington - Bristol Temple Meads route, will experience the biggest improvement by the end of CP6 in 2024, as a result of the electrification via Bath and Bristol Parkway and introduction of new rolling stock. However, again the planned reductions in journey times and timetable changes are not likely to massively change the competitive situation relative to travelling by car.

Further Considerations

6.1.16 Approximately 25% of the traffic on the A303 at Stonehenge is made up of goods vehicles. The origins and destinations car trips using the A303 were identified from roadside interview surveys carried out in October 2015. These showed that most of the journeys using the A303 between Amesbury and Berwick Down are making relatively long journeys. The average crow-fly distance between origin and destination car was approximately 160km (almost 100 miles). Also, the trip origins and destinations are dispersed, particularly to the west of the scheme.

Potential for Modal Transfer to Rail

6.1.17 A review of the extent to which rail improvements could reduce traffic volumes on the A303 Amesbury to Berwick Down has shown that hypothetically, if there were a step-change in rail services, the maximum achievable reduction in traffic flow on A303 is 11%. This level of modal transfer to rail would reduce the 2041 Do Minimum forecasts flows to 31,000 vpd. This would leave a residual Stress Factor of 1.36. By comparison the current road proposals are forecast to operate with a stress factor (on the busiest section) of 0.53 in 2041.

6.1.18 Even using the TRL's estimate of the maximum practical level of modal transfer from road to rail, at 32%, the residual flow on the existing A303 in 2041 would not produce a stress factor close to 0.53. If it were, hypothetically, possible to achieve the same impact as the proposed road scheme through modal transfers, the increase in rail passenger numbers could not be accommodated on the existing rail network. To accommodate this level of passenger demand would require a huge investment in rail infrastructure and rolling stock, none of which is currently included in any of the investment plans of Network Rail or the Department for Transport.

6.2 Conclusions

6.2.1 In answer to the Level 1 question *"Could an alternative modal intervention solve the identified problem?"*, due to the characteristics of the trips involved, rail is the only viable alternative mode for most drivers using the A303 at Stonehenge. However, there is no planned or prospective rail scheme or investment which would offer a solution to existing and future anticipated traffic problems.

6.2.2 In considering the Level 2 question *"Knowing the benefits of the preferred option, what impact would a modal alternative require in order to relieve the problem to the same degree and is that viable?"* this review demonstrates that it would require provision of capacity for an additional 36,000 rail passengers per day to relieve the problem to the level offered by the proposed road improvement. This is equivalent to three or four eight cars trains per hour in each direction running between London Waterloo and Exeter.

6.2.3 Realistically, rail investment could not achieve the same level of impact as the road scheme in alleviating the problem. Therefore, the road scheme is the most viable, and only option. Therefore, it can be concluded that there is no justification for any further analysis of the Level 2 question for PCF Stage 2.

6.2.4 More detailed analysis of the potential for modal transfer to rail, assuming a hypothetical step-change in rail facilities, shows that traffic flows on the A303 could only be reduced by in the order of 11%. This would not relieve the problem to any noticeable extent.

6.2.5 To conclude, the alternative modes considered will not provide a solution to the problems on the A303 between Amesbury and Berwick Down or meet the principle objectives of the scheme.

Arup Atkins Joint Venture Approvals

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Appendix 9.1: Technical Note 022: Scheme Assumptions for DCO Construction Traffic Management Modelling

Technical Note

A303 Stonehenge

Project:	**A303 Stonehenge**				
Title:	**Technical Note 022: Scheme assumptions for DCO Construction Traffic Management modelling**				
Doc ID:					
Date:	**14/05/18**	Version:	**P01**	Status:	**S03**

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P01	21/05/2018	Chloe Bates	Traffic, Solutions, Buildability	
P02	01/06/2018	Chloe Bates	Ken Marshall, Mike Sarling, Jeremy Damrel, Nik Bowyer	
P03	07/06/2018	Roger Dickinson	Craig Bell, Ken Marshall	Ken Marshall

1 Introduction

Background

1.1 Highways England is currently progressing development of the A303 Stonehenge (Amesbury to Berwick Down) scheme. The scheme is being delivered through the Complex Infrastructure Programme (CIP), part of Highways England's Major Projects directorate.

1.2 The scheme is being developed in accordance with Highways England's Project Control's Framework (PCF), which aligns stages of work with key decision points in the standard lifecycle of a major project. The scheme has successfully passed through PCF Stage 0 (Strategy, Shaping and Prioritisation) and Stage 1 (Option identification). The scheme is currently in the middle of PCF Stage 3 (Preliminary design) which represents the beginning of the Development phase of works.

1.3 AmW (AECOM, mace, WSP) has been appointed as Highways England's Technical Partner to develop the preliminary design for the scheme, manage and lead on the Development Consent Order (DCO) application for the scheme.

Context

1.4 As the scheme progresses through the Development phase of works (PCF Stage 3) and towards DCO, the traffic management measures during construction need to be defined to assist in determining a robust assessment of the scheme construction period.

1.5 Whilst construction information will be provided by the Buildability team, outputs are required from the traffic models (both strategic and operational) to inform both environmental and economic appraisal of the construction works and to understand the operation of the A303 mainline, its junctions and the local road network during the

construction period.

Technical Note structure

1.6 This Technical Note sets out the assumptions made for the traffic management measures during the construction phase(s).

1.7 Following the review of construction programme P10, two main phases of the construction programme have been identified. These correspond to:

- Phase 1 (5th July 2021 to 28th November 2023) when Winterbourne Stoke bypass, Longbarrow Interchange and Countess Roundabout flyover are under construction; and
- Phase 2 (December 2023 to 27th January 2027) when the construction of the tunnel is the primary construction activity. The Winterbourne Stoke bypass, Longbarrow Interchange and Countess Roundabout flyover constructed in the prior phase and are now operational.

1.8 The traffic management assumptions outlined in Section 2 and Section 3 have been selected on the basis of the individual elements of traffic management which are in place for the longest period during the construction phase and likely severity of impact. There will be short term variations within these two phases, which will not be assessed using the traffic models.

1.9 Following this introductory section the remainder of this report is structured as follows:

- Section 2, which sets out the traffic management assumptions (in terms of road layouts and speeds) during the first phase of construction (2022-2023);
- Section 3, which sets out assumptions for the second phase of construction (2024-2026);
- Section 4, which provides a brief overview of how the stages will be coded in the strategic traffic model developed for PCF Stage 3; and
- Section 5, which provides details on the number of HGVs accessing the network at Longbarrow during construction.

2 Phase 1 (2021 – 2023) assumptions

Introduction

2.1 This section of the Technical Note sets out to define the input assumptions relating to traffic management during Phase 1. This phase is expected to run through 2021-2023 (29 months) when the Winterbourne Stoke bypass, Longbarrow interchange and Countess Roundabout flyover are under construction.

2.2 The following scheme elements are expected to have been completed prior to this phase of works:

- Rollestone Cross junction;
- Closure of Stonehenge Road;
- Stopping-up of Allington Track and A303 junction, and realignment of

Allington Track to Equinox Drive (Solstice Park); and

- Alterations to minor at-grade accesses east of Solstice Park (Amesbury Road and A3028 Double Hedges).

2.3 As part of the A303 construction works, the following section outlines the proposed TM works and what will be modelled. Drawings are included within Appendix A. This construction phase comprises:

Western Tie In

- Stage 3 of the TM will be modelled, as this represents the TM in place for the longest period during Phase 1.
- **Stage 3 TM (18 weeks) November 2021 to April 2022** - Traffic to run two-way on the **eastbound** carriageway from the new temporary crossover approximately 120 metres west of chainage zero to the second crossover required for the tie in back to the existing road through Winterbourne Stoke whilst the westbound carriageway is constructed.

  The eastbound speed limit reduces from 70mph to 50mph to 30mph ahead of the temporary crossover. Between the two crossovers, the speed limit will be 30mph until after the road ties back into existing carriageway through Winterbourne Stoke when speed limit will be reduced to 40mph due to the close proximity of the existing 40mph speed limit on the entry to Winterbourne Stoke.

  Upon leaving Winterbourne Stoke existing 40mph speed limit will be extended to the crossover, where the westbound speed limit will drop to 30mph ahead of the crossover onto new carriageway at around chainage 1800. Between the two crossovers, the speed limit will be 30mph until traffic passes through the temporary crossover to west of chainage zero, where it can then be released back to existing (national) speed limit.

New Longbarrow Interchange

- Northern roundabout construction is completed and used for the A303 mainline movement as a single lane in each direction with no adjoining arms (no opposing flow).
- A303 traffic will use the existing A303 through Winterbourne Stoke and then use a temporary bridge over the new alignment to the new northern Longbarrow roundabout. The existing 40mph speed limit east of Winterbourne Stoke will be extended in both directions to the point where the new temporary road/bridge is constructed where 30mph speed limit will be introduced. Passing through the roundabout with no opposing flow, traffic then uses a temporary road to join onto the existing Longbarrow roundabout. There will be a 30mph speed limit through this section, in both directions from the temporary bridge to include the existing Longbarrow Roundabout where it can then return to existing.

Existing Longbarrow Roundabout

- Western (eastbound entry) arm of the existing roundabout is re-aligned to the north with the lane allocation being the same as the existing western arm.
- Southern (northbound arm) arm of the existing roundabout is re-aligned to use a temporary bridge over the new A303 mainline with 30mph speed limit to

cross the temporary bridge.

- Eastern (westbound entry) and Northern (southbound entry) arms remain unchanged. Westbound entry is currently signed as the nearside lane being for ahead and left, the middle lane for ahead only and the offside lane for right turn only.
- A303 mainline traffic will use the roundabout as currently with no changes to its capacity or lane allocation. The roundabout speed limit will reduce from 40mph to 30mph. The A303 eastbound and westbound exit arms will see traffic merge from two lanes to one as per the existing situation.

Countess Roundabout

- Eastbound from Stonehenge Cottages to Countess Roundabout, a single lane is in operation with a temporary left-in left-out access to a construction site with a 200 metre merge/diverge section for construction traffic following this.
- The eastbound entry to Countess Roundabout has a one lane approach from the point after the construction site entry / exit flaring to two lanes at stop line with a flare of 100 metres. Assume two lanes eastbound through the roundabout.
- The eastbound exit slip drops to one lane after services access.
- In the westbound direction, a single lane approach to the roundabout to allow for ramp works is assumed, flaring to two lanes at the stop line. Assuming flare length of 60 metres.
- Continuing westbound, a two lane exit for the A303 is assumed for a distance of 205 metres before returning to single lane for 300 metres before returning to two lanes until the point of the existing lane drop to single lane on the A303.
- Signal timings for the strategic model are assumed to be the same as in the 2017 Base Year. The detailed operational model will see signal timings optimised to improve operational efficiency.
- No changes to the A345 northbound and southbound arms.

2.4 The speed limits assumed are:

- 30mph **eastbound** from the new temporary crossover to the west of chainage zero to after the crossover to tie back into the existing road through Winterbourne Stoke.
- 40mph from the crossover to the west of Winterbourne Stoke and through Winterbourne Stoke to the point where the A303 leaves the existing alignment to cross over to the new Longbarrow junction via the temporary road / bridge.
- 30mph through Longbarrow construction (due to speed restriction required on temporary bridge) from before the tie-in with the A303 on the western side of the junction through to the exit on the eastern side of the existing Longbarrow roundabout;
- Unrestricted (national) speed limit between Longbarrow and Stonehenge Cottages;

- 40mph Stonehenge Cottages to the end of the traffic management (eastbound) after Avon Bridge, except 30mph through Countess Roundabout between the two ramps;
- 40mph **westbound** from start of TM (existing crossover to the west of Solstice Park – chainage 12,800) to Countess Roundabout;
- 30mph through Countess Roundabout between the two ramps in construction.
- Return to existing national speed limit between the end of Countess TM (chainage 10,800) and existing Longbarrow Roundabout;
- 30mph between the entry to the existing Longbarrow and the tie in to the A303 east of Winterbourne Stoke.
- 40mph from when the road returns to the existing A303 alignment to the east of Winterbourne Stoke and through Winterbourne Stoke to the crossover onto the new carriageway.
- 30mph from the crossover onto the new road to the temporary crossover to the west of chainage zero where the road returns to the original alignment and speed limit can increase back to national speed limit.

3 Phase 2 (2024 – 2026) assumptions

3.1 This phase is expected to approximately run from 2024 to end of 2026 (36 months). The construction of the tunnel is the primary construction activity during this phase of works. The Winterbourne Stoke bypass, Longbarrow Interchange and Countess Roundabout flyover are assumed to have been constructed in the prior phase and are now operational.

3.2 The following assumptions are made through this construction phase, outlined below West to East.

Winterbourne Stoke Bypass

- Existing dual carriageway extended towards Parsonage Down.
- Crossover from dual carriageway operation to use of the southern carriageway to occur at chainage 3,000.
- Speed limit to be 70mph from chainage 0 to chainage 1800. Then reduces to 50mph before crossover at chainage 3,000, which would have speed limit of 30mph.
- From this point eastwards, the new eastbound carriageway is open to construction traffic only (used in both directions).
- The westbound carriageway is open to general traffic operating as contraflow, with one lane in each direction to the new Longbarrow Interchange. Speed limit for both directions of 50mph.

New Longbarrow Interchange

- Both northern and southern roundabouts completed with a single lane in each direction used throughout, including along the new permanent overbridge

between the two roundabouts.

- Eastbound A303 traffic accesses the interchange at the southern roundabout making a tight left turn onto the overbridge to the northern roundabout. This flow is unopposed through the junction.
- Westbound A303 traffic accesses the interchange at the northern roundabout, via the temporary road from the existing Longbarrow Roundabout, then passing over the overbridge and around the southern roundabout to join onto the new A303 Winterbourne Stoke westbound carriageway. This flow is opposed only by local trips coming from Winterbourne Stoke along the existing A303.
- The existing A303 from Winterbourne Stoke remains open to local traffic and joins onto the southern roundabout as in the final scheme with no flaring. The existing 40mph speed limit east of Winterbourne Stoke will be extended east to 100 metres before new southern Longbarrow Roundabout where 30mph speed limit will be in place.
- The A360 is not connected to the interchange along the new alignment to allow for unobstructed A303 flow through the new interchange. Instead, A360 traffic continues on the existing alignment, interacting with A303 traffic at the existing Longbarrow roundabout.

Existing Longbarrow Roundabout

- Remains the same as in Phase 1.

Countess Roundabout

- Flyover in place with two lanes running eastbound and one lane running westbound
- A single lane westbound approach to the roundabout flaring to 2 lanes at stop line with flare length of 28 metres.
- All other approaches and circulatory the same as in the final scheme.
- Signal timings for the strategic model are assumed to be the same as in the 2026 Opening Year scheme coding

3.3 The following speed limits are assumed:

- National Speed Limit reduced to 50mph then 30mph ahead of the new crossover to the west of Parsonage Down;
- 50mph in both directions along the Winterbourne Stoke bypass;
- The 40mph speed limit through Winterbourne Stoke is extended to the new Longbarrow Interchange;
- 30mph through new Longbarrow interchange and existing Longbarrow Roundabout;
- Unrestricted (national) speed limit from eastern side of existing Longbarrow roundabout to Stonehenge Cottages. Southern arm 30mph speed limit from point south of temporary bridge);
- 40mph from Stonehenge Cottages to the eastbound off slip to Countess

roundabout

- 70mph limit eastbound from western end of new Countess Roundabout flyover. The speed-limit on the eastbound off slip to Countess roundabout is assume to have a 40mph limit;
- 50mph from existing crossover to the west of Solstice Park westbound over flyover and 40mph around Countess Roundabout; and
- 60mph limit westbound from the lane-gain at the western side of Countess Roundabout to Stonehenge Cottages.

4 Scheme coding in the traffic models

A303 Stonehenge SWRTM (DCO) – Strategic Model

4.1 Coding of the scheme in the strategic model will use standardised values (e.g. saturation flows, Speed Flow Curves) that are consistent with those used in the Base Year, 'Do Minimum' and 'Do Something' models. These will follow the Highways England Regional Traffic Model (RTM) coding guidelines.

4.2 Distances will be a combination of distances taken from the scheme and Base Year coding.

5 HGV Demand assumptions

HGV Movements to/from site

HGV Deliveries to Concrete Batching Plant, Longbarrow

5.1 A construction compound is to be based at Longbarrow which will contain a "remote" concrete batching plant. The concrete will be transported from this plant to the various construction sites along the route.

5.2 Information provided by Buildability team indicates 40,000 HGV deliveries to supply raw material for the concrete batching plant for non-tunnel construction. 70% of the deliveries are assumed to be in the construction period from July 2021 to end 2023 (**Phase 1**) is assumed to be 126 weeks with deliveries arriving 5.5 days a week (Monday-Saturday) in a 12 hour window (7am-7pm). Hence:

40,000 * 70% = 28,000

28,000 / 126 = 222 *HGVs per week*

222 / 5.5 = 40 *HGVs per day*

40 / 12 = 3.6 *HGVs per hour*

So there are approximately 3.6 HGVs per hour arriving and leaving the Longbarrow compound due to the delivery of materials for use in concrete production for period between July 2021 and end of 2023

5.3 Information provided by Buildability team indicates 40,000 HGV deliveries to supply raw material for the concrete batching plant for non-tunnel construction. 30% of the deliveries are assumed to be in the construction period from Jan 2024 to end 2026 (**Phase 2**) is assumed to be 156 weeks with deliveries arriving 5.5 days a week (Monday-Saturday) in a 12 hour window (7am-7pm). Hence:

40,000 * 30% = 12,000

12,000 / 156 = 77 *HGVs per week*

77 / 5.5 = 14 *HGVs per day*

14 / 12 = 1.2 *HGVs per hour*

So there are approximately 1.2 HGVs per hour arriving and leaving the Longbarrow compound due to the delivery of materials for use in concrete production for period between Jan 2024 and end of 2026

Information provided by the Buildability team indicates 19,500 (18,000 concrete + 1,500 grout) HGV deliveries to supply raw materials for the concrete batching plant for the tunnel construction in Phase 1 for 44 weeks, from Feb 2023 to end of Nov 2023. Assuming the production of concrete takes place 6 days a week, for 12 hours a day during this period we have:

Phase 1

19,500 / 44 = 443 *HGVs per week*

443 / 6 = 74 *HGVs per day*

74 / 12 = 6 *HGVs per hour*

So there are approximately 6 HGVs per hour arriving and leaving the Longbarrow

compound due to production of concrete for use in the tunnel construction, during Phase 1.

5.4 Information provided by the Buildability team indicates 23,800 (22,300 concrete + 1,500 grout) HGV deliveries to supply raw materials for the concrete batching plant for the tunnel construction in Phase 2 for 86 weeks, from Dec 2023 to end of July 2025.

5.5 Assuming the production of concrete takes place 6 days a week, for 12 hours a day during this period we have:

Phase 2

22,800 / 86 = 265 *HGVs per week*

265 / 6 = 44 *HGVs per day*

44 / 12 = 4 *HGVs per hour*

So there are approximately 4 HGVs per hour arriving and leaving the Longbarrow compound due to production of concrete for use in the tunnel construction, during Phase 2

Additional HGV delivery assumptions:

- The following numbers are number of deliveries so vehicle movements will be twice this
- Structural Steel: Currently assumed 60 deliveries during Phase 1. Assume 0.2 deliveries per day
- Approximately 74,000 Tonnes of rebar. Approximately 3,700 loads. Split between phase 1 and phase 2 the same as the Civils concrete i.e. 70% & 30%. Phase 1 - 3.5 deliveries per day. Phase 2 - 1.5 deliveries per day.
- Type 1 and backfill to structures amounting to approximately 23,000 tonne. Approximately 1,150 loads. Approximately 70% phase 1 and 30% phase 2. Phase 1 - 1 delivery per day. Phase 2 - 0.5 deliveries per day.
- Hardcore for haul roads and working platforms: approximately 12,000 tonne / 600 loads. Vast majority 85% phase 1. Phase 1 - 0.7 deliveries per day. Phase 2 - 0.1 deliveries per day.
- Timber: At the commencement of each zone of work around 5 deliveries per week would be expected (assume an average of 1 a day), after which would reduce to 1 delivery per week. Phase 1 assume 1 delivery per day.
- Pre-cast concrete components: 760 tonnes. Equating to approximately 50 loads. The locations that kerbing is spread along the length of the works, but say 65% phase 1 35% phase 2. Phase 1 assume 0.05 deliveries per day. Phase 2 assume 0.02 deliveries per day
- Road surfacing, approximately 190,400 tonnes, 9,520 loads. Split between phase 1 and phase 2 approximately 50% each. 6 deliveries per day.
- Drainage stone and RE-MEDI8 Filter material 24,000 tonnes, 1200 loads. Split between phase 1 and 2 approximately 60% / 40%. Phase 1 assume 1 delivery per day. Phase 2 assume 0.6 deliveries per day.

- Lime/cement for drying wet chalk approximately 7,000 tonne in 30 tonne loads, = 233 spread between phase 1 and 2 of 40 % / 60%. Phase 1 assume 0.12 deliveries per day, Phase 2 assume 0.18 deliveries per day

Other large loads;

- TBM 6 abnormal loads plus approximately 40/50 40' containers all phase 1
- Geotextiles/miscellaneous approximately 4 per week phase 1 and 2/3 phase 2

Delivery Type	Phase 1 2021-2023		Phase 2 2024-2026	
	Daily	Av. Hour	Daily	Av. Hour
Concrete: non-tunnel	40	3.6	14	1.2
Concrete: tunnel	74	6	44	4
Structural Steel	0.2			
Rebar	3.5		1.5	
Type 1 and backfill structures	1.0		0.5	
Hardcore	0.7		0.1	
Timber	1.0			
Pre-cast concrete	0.05		0.02	
Road surfacing	6		6	
Drainage Stone & RE-MEDI8	1.0		0.6	
Lime/cement	0.12		0.18	
Total	**128**	**10.6**	**67**	**5.6**
Suggested Robust Assumption for Traffic Assessment (30% increase Phase 1 and Phase 2)		**14**		**7**

5.6 Deliveries of the above materials would be made in a 12 hour period between 7am and 7pm.

5.7 Deliveries are assumed to route along the following main corridors, based on the percentage distribution identified

- A36 (North) – 55%
- A36 (South) – 15%
- A303, West of A36 Junction – 15%
- A303, East of Scheme – 15%

5.8 This distribution assumes that 85% of deliveries will approach / leave the construction site on the A303 west of the construction site

5.9 HGV trips will be added to the traffic model by selecting appropriate model zones further than 10km outside the Area of Detailed Model (AODM)

5.10 Assumed 80% of all deliveries are assumed to go to Longbarrow, the other 20% going to the Countess compound.

Site HGV movements on Public Highway

Longbarrow Compound to Eastern Portal Construction Site

- Approximately 58,000m³ to eastern construction sites (chainage 10,400 +) in 8m³ agitator trucks = 7,250. All in phase 2. **8 per day**.
- In addition to the above will be miscellaneous equipment etc. say average of4 per day.

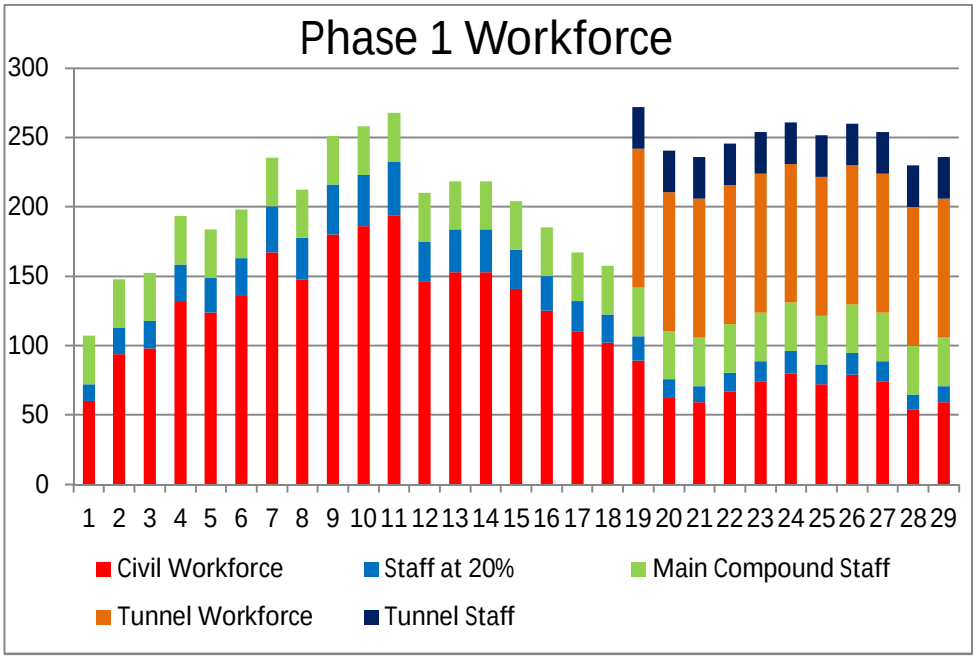
Eastern Cutting Spoil Movement

- 125,000m³ of spoil will need to be transported from eastern site to the western site compound via the existing A303.
- 15,620 HGVs in total based upon approximately 200,000m³ total excavation from the eastern portal. 75,000m³ (optimistic) into the ramps at countess. No fill going back into the portal to make up levels see Western Tunnel Approach
- Assume over 30 weeks 15,620/30 = 520 per week, 520 / 5.5 = 95 per day, 95/12 = 8 per hour
- Assume that transfer will occur between 07:00 and 19:00 means **8 HGVs per hour each way.** Phase 1.

6 Worker Demand

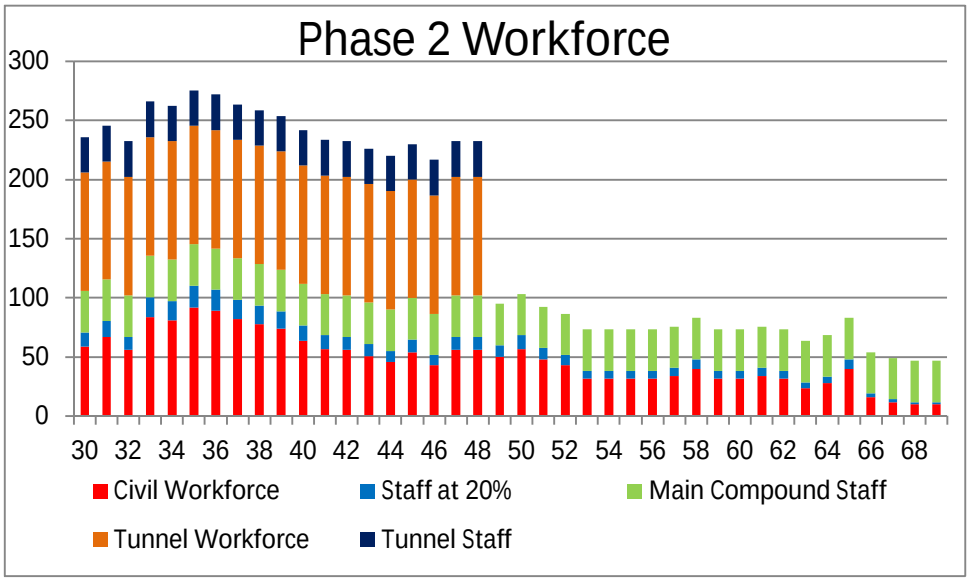
6.1 Figures below show the forecast profile of workforce for Phase 1 and Phase 2. Input assumptions have been provided by buildability and tunnels team, with the profile based on programme P10.

Phase 1 – 2021 to end 2023



- Average across Phase 1 – 218 Staff
- Maximum monthly workforce Phase 1 - 268
- Assume for purpose of traffic assessment 280 staff

Phase 2 – 2024 to end 2026



- Average across Phase 2 – 154 Staff
- Average Phase 2 Months 30-48 – 244 staff
- Maximum monthly workforce Phase 2 - 275
- Assume for purpose of traffic assessment 300 staff (Includes allowance for tunnel M&E workforce)

6.2 Shift work is assumed with civil work being carried out between 7am and 7pm meaning workers would arrive and leave outside of peak hours.

6.3 During the construction of the tunnel workers are assumed to work in two 12 hour shifts 7am-7pm and 7pm-7am. This would mean there would be workers leaving the site between the AM peak (7-8am) and arriving at site in the PM peak (6-7pm).

6.4 Assume the workforce is split over the two site compounds at Longbarrow and Countess. Assume all tunnel workers will use the site at Longbarrow and that 70% of civil workers will arrive at Longbarrow, 30% at Countess.

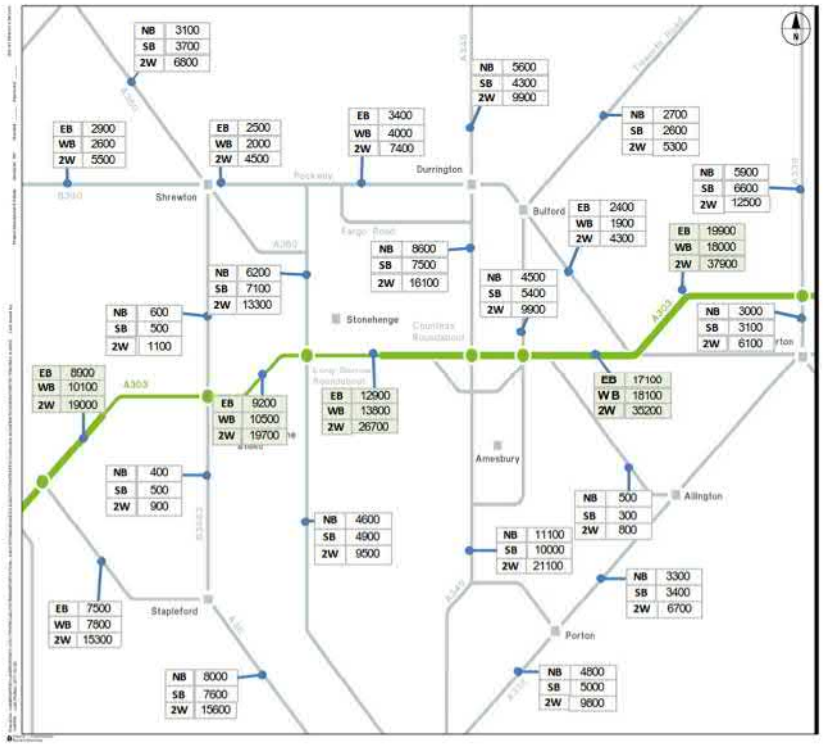
6.5 Assume travel plans are in place for the workforce so with the combination of car sharing, mini-buses and single occupancy vehicles, we assume an average vehicle occupancy of 3.

6.6 Within the strategic model, worker demand will be added to the 'Car Commuter' user-class (user-class 2) and retain standard commuter Values of Time.

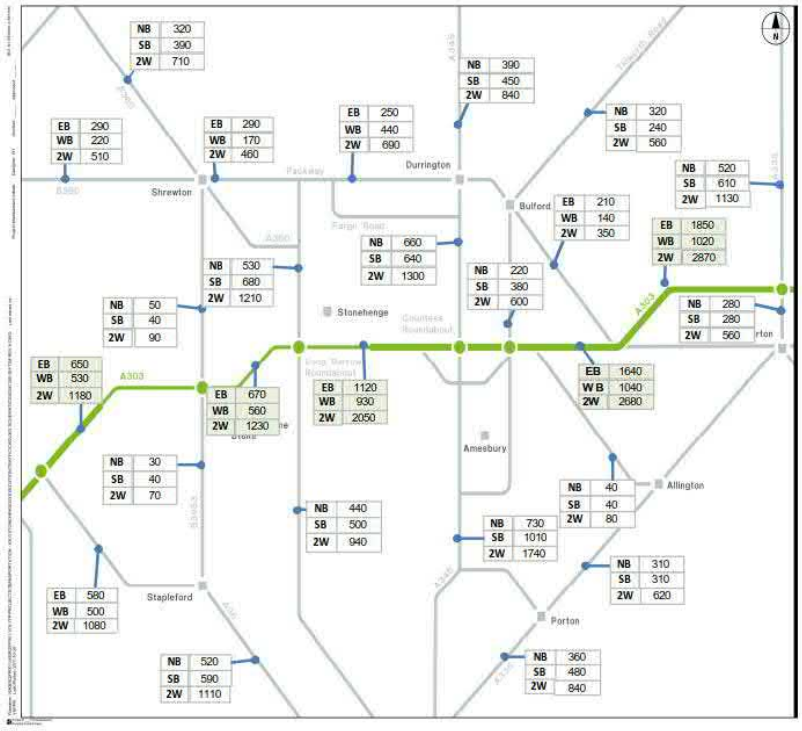
6.7 Workforce trips will be distributed across model zones within 10km radius of Longbarrow based on number of dwellings within each zone.

Appendix 9.2: Traffic flow diagrams showing the Annual Average Daily Traffic (AADT) in the construction scenarios

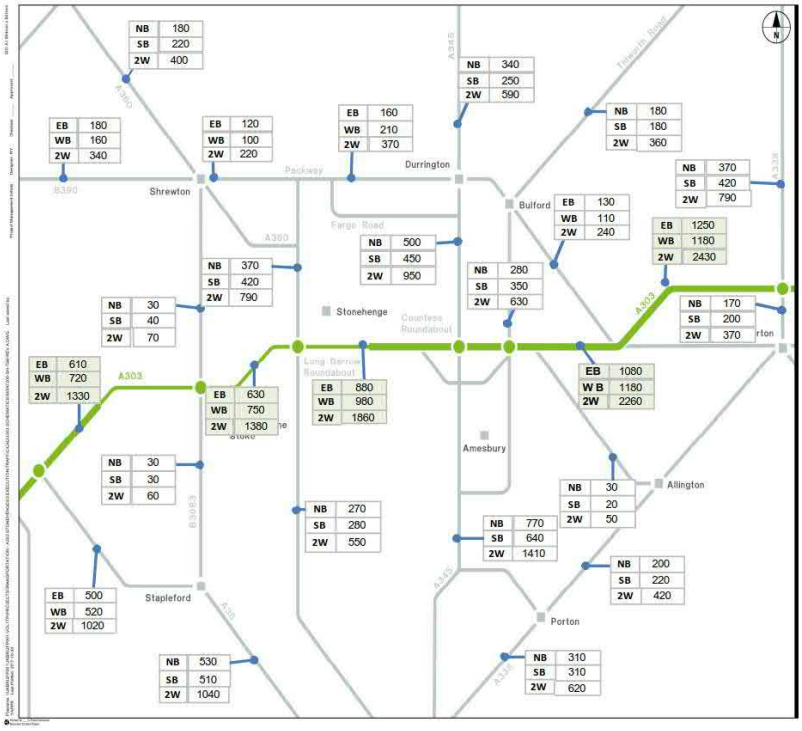
Annual Average Daily Traffic, Construction Phase 1 (Vehicles)



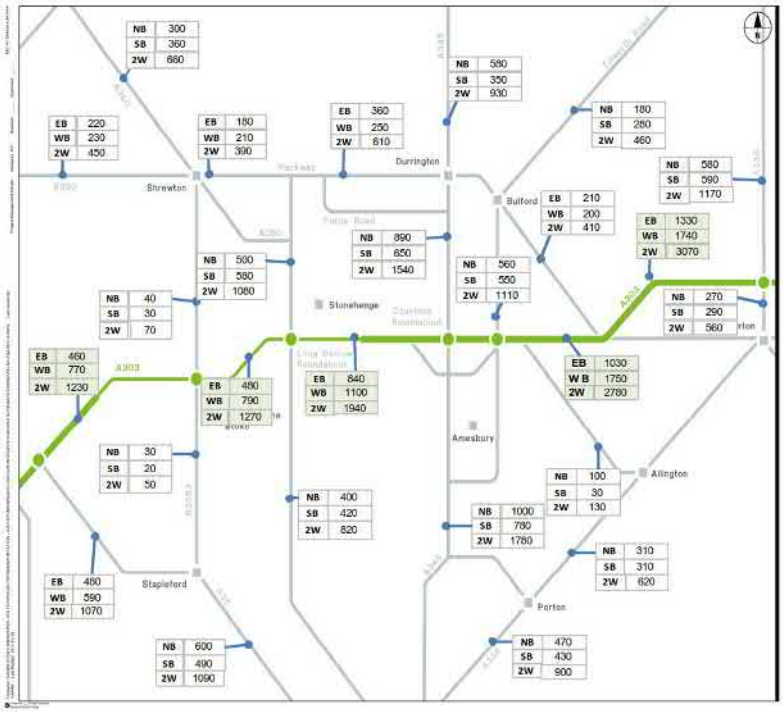
AM Peak Flows, Construction Phase 1 (Vehicles)



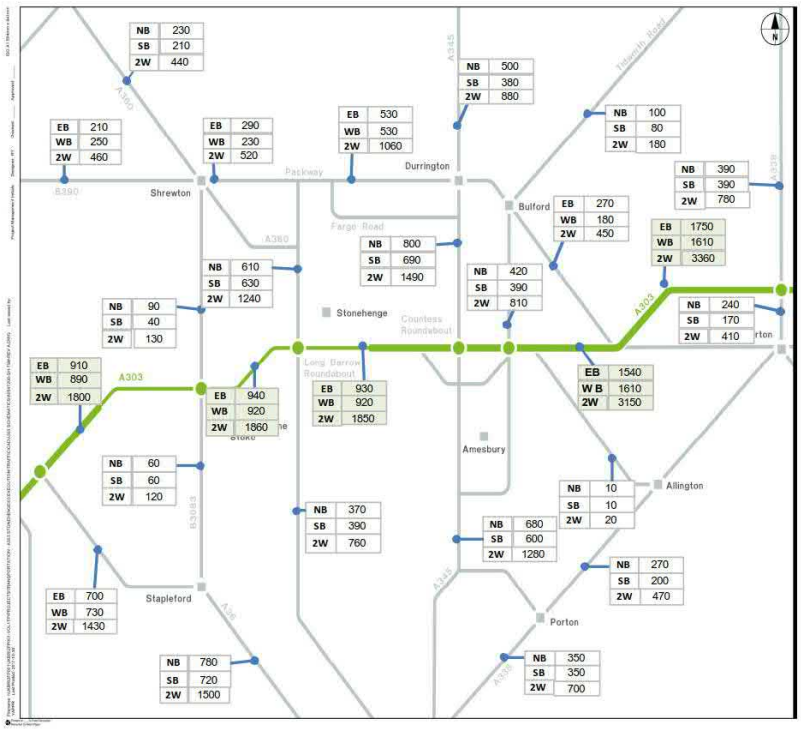
Interpeak, Construction Phase 1 (Vehicles)



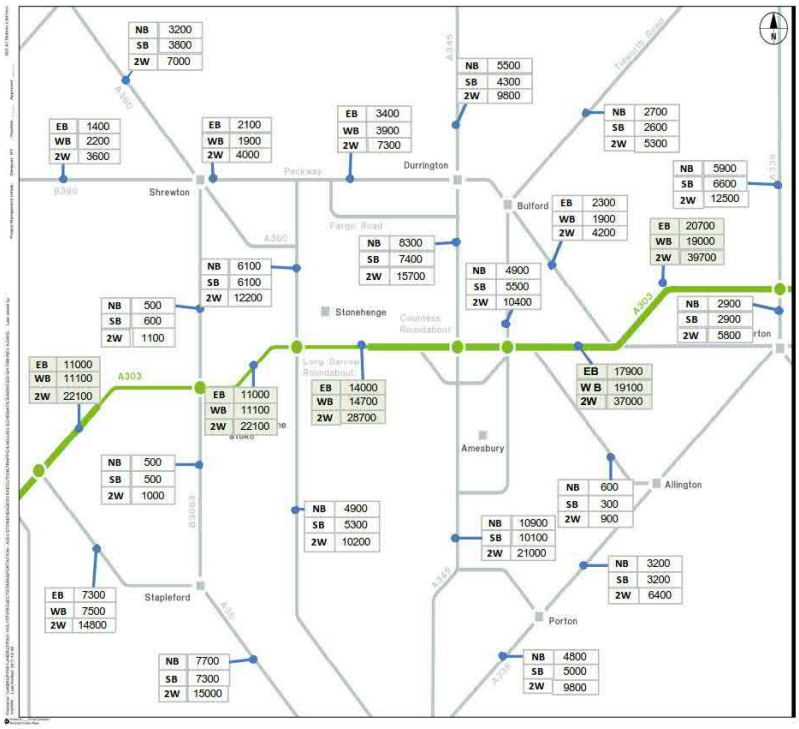
PM Peak Flows, Construction Phase 1 (Vehicles)



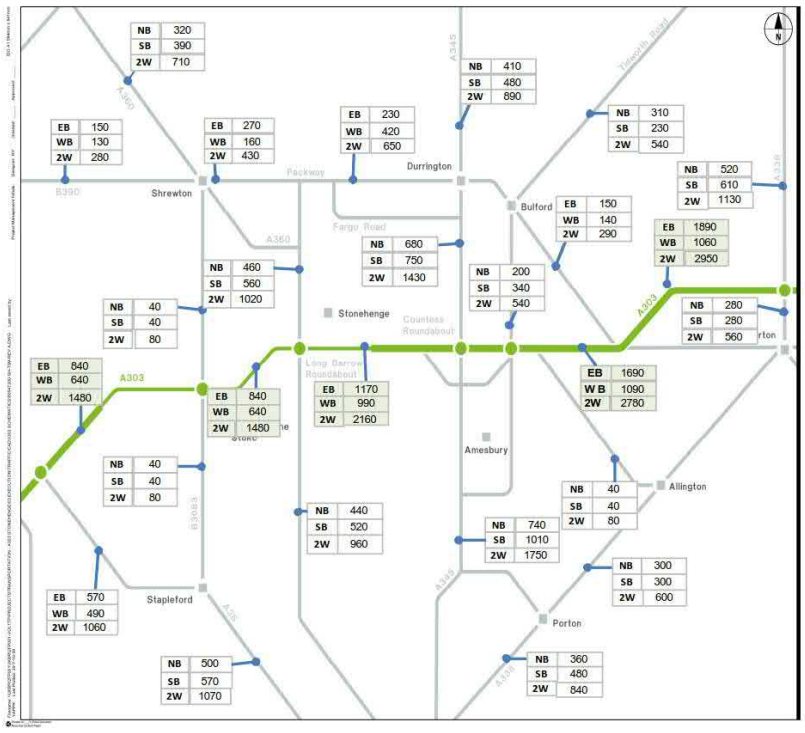
Busy Period Flows, Construction Phase 1 (Vehicles)



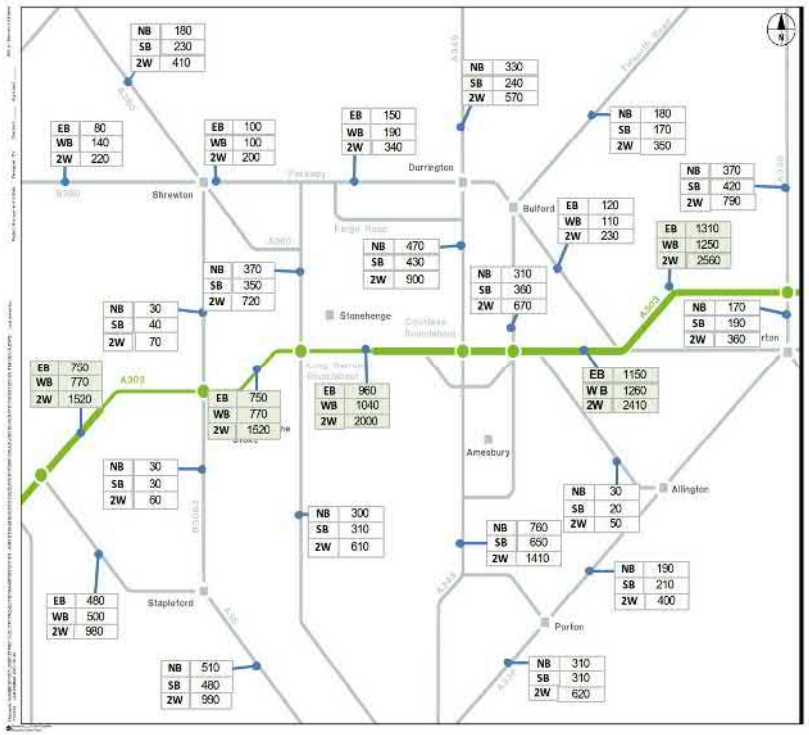
Annual Average Daily Traffic, Construction Phase 2 (Vehicles)



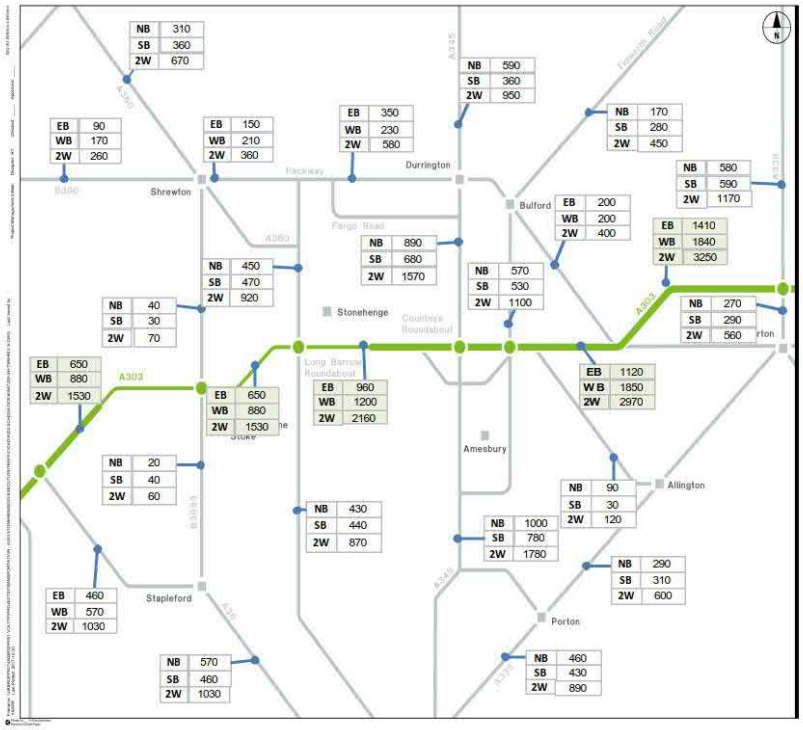
AM Peak Flows, Construction Phase 2 (Vehicles)



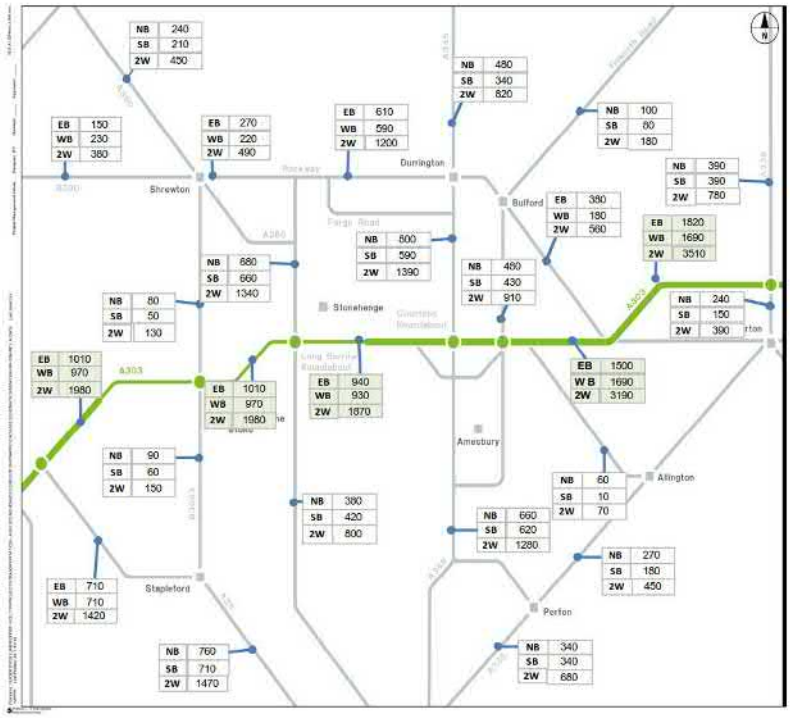
Interpeak, Construction Phase 2 (Vehicles)



PM Peak Flows, Construction Phase 2 (Vehicles)



Busy Period Flows, Construction Phase 2 (Vehicles)



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