

A303 Sparkford to Ilchester Dualling Scheme TR010036

6.1 Environmental Statement Chapter 2 The Scheme

APFP Regulation 5(2)(a)
Planning Act 2008

Infrastructure Planning (Applications: Prescribed
Forms and Procedure) Regulations 2009
July 2018



Infrastructure Planning

Planning Act 2008

**The Infrastructure Planning
(Applications: Prescribed Forms
and Procedure) Regulations
2009**

**A303 Sparkford to Ilchester Dualling
Scheme**

Development Consent Order 201[X]

**6.1 Environmental Statement
Chapter 2 The Scheme**

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2 The Scheme

2.1 Need for the scheme

- 2.1.1 Dualling of the A303 between Sparkford and Ilchester was announced in the *Road Investment Strategy* (RIS) for the 2015 / 16 to 2019 / 20 road period¹.
- 2.1.2 The single carriageway section of the A303 between Sparkford and Ilchester suffers from congestion and queuing, particularly during the summer months and at weekends. It also suffers from higher than national average accident rates for single-carriageway A-class trunk roads². Five at-grade junctions and accesses, 5 non-motorised user (NMU) crossing points and limited space for road workers during maintenance create hazards for user groups (both motorised users and NMUs).
- 2.1.3 Dualling of the A303 between Sparkford and Ilchester would provide an appropriate solution which would meet the objectives of the Department for Transport (DfT) (see section 2.2 Scheme objectives) and overcome the existing traffic problems on this section of road.
- 2.1.4 More information on the need for the A303 Sparkford to Ilchester Dualling scheme (hereafter referred to as ‘the scheme’) is contained within the **Case for the Scheme** (*document reference TR010036/APP/7.1*).

2.2 Scheme objectives

Department for Transport objectives

- 2.2.1 The DfT has an aspiration for the Strategic Road Network (SRN) to be smoother, smarter and sustainable by 2040 (see Part 1, Chapter 2 of the RIS³). The DfT aims to achieve this by focussing on 8 key performance areas as set out in Part 3, Chapter 1 of the RIS. These are:
- Making the network safer
 - Improving user satisfaction
 - Supporting the smooth flow of traffic
 - Encouraging economic growth
 - Delivering better environmental outcomes
 - Helping cyclists, walkers and other vulnerable users of the network

¹ Department for Transport (2015) *Road Investment Strategy*: 2015 to 2020 [online] available at: <https://www.gov.uk/government/collections/road-investment-strategy> (last accessed March 2018).

² Department for Transport (2017) Strategic Road Network Traffic (TRA41) - Table TRA4114 [online] available at: <https://www.gov.uk/government/statistical-data-sets/tra41-strategic-road-network-traffic#table-tra4112> (last accessed May 2018).

³ DfT (2015) *Road Investment Strategy*: 2015 to 2020 [online] available at: <https://www.gov.uk/government/collections/road-investment-strategy> (last accessed March 2018).

- Achieving real efficiency
- Keeping the network in good condition

2.2.2 More information is available in the RIS³.

Highways England objectives

2.2.3 The objectives of the scheme as detailed in the **Case for the Scheme (document reference TR010036/APP/7.1)** are:

- Capacity – reduce delays and queues that occur during peak hours at seasonal times of the year.
- Safety – improve safety for all users of the A303 between Sparkford and Ilchester, as well as the wider A303 / A358 corridor.
- Support economic growth – facilitate growth in jobs and housing by providing a free-flowing and reliable connection between the south east and the south west.
- Environment – avoid unacceptable impacts on the surrounding natural and historic environment and landscape and optimise opportunities for enhancement.
- Local communities – reduce community severance and promote opportunities for improving their quality of life.
- Connectivity – improve the connectivity of the south west to the rest of the UK and improve business and growth prospects.
- Resilience – improve journey time reliability and resilience, and provide extra capacity to make it easier to manage traffic when incidents occur.

2.3 Scheme location

2.3.1 The scheme would provide a dual-carriageway on the A303 between Sparkford and Ilchester in the county of Somerset and district of South Somerset, connecting the existing dual-carriageway sections to the east and west between Hazlegrove roundabout and Podimore Roundabout. The location of the scheme can be seen within Figure 1.1 of Volume 6.2. The scheme extent is also shown on the plan contained in Figure 2.1 of Volume 6.2, and is depicted by the red line (the red line boundary).

2.3.2 The landscape surrounding this section of the A303 between Sparkford and Ilchester is largely rural with field patterns and intermittent individual properties. Settlements in a rural environment lie approximately 500 metres to the south at West Camel and Queen Camel. The existing A303 runs along the top of the partially wooded ridge of Camel Hill, before descending to Sparkford. The land to the west of Sparkford is a level area drained by a series of ditches leading to the Dyke Brooke and westward to the River Cary, whilst the field pattern in this area comprises large geometric, narrow lands and thick hedgerows. Blocks of

woodland occasionally punctuate the field pattern and are partially prominent on the western section from Camel Hill to Sparkford. At Podimore, the topography comprises flat low-lying level agricultural land, with the rising ground of Annis Hill to the east of Podimore forming a minor feature which is capped, before rising towards Camel Hill which is characterised by its sloping sides and blocks of woodland.

- 2.3.3 The key environmental designations located within 2 kilometres of the scheme extents, or just outside, are shown on Figure 2.2, Volume 6.2. A description of the environmental baseline for each environmental topic is outlined within the 'Baseline conditions' section of Chapters 5 to 14 of Volume 6.1. Where necessary topic-specific constraints drawings have also been provided and are referenced within Chapters 5 to 14 of Volume 6.1.

2.4 Future baseline scenario

- 2.4.1 Regulation 14(2) of the *Infrastructure Planning (Environmental Impact Assessment) Regulations 2017* ('the EIA Regulations') requires '*a description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the development as far as natural changes from the baseline scenario can be assessed within reasonable effort on the basis of the availability of environmental information and scientific knowledge*'.
- 2.4.2 The potential changes to the existing baseline due to natural changes have been outlined below. This future baseline, known as the 'do-minimum', assumes that the dualling scheme is not constructed, and instead, the existing A303 is maintained in its current state. The future baseline scenario takes into consideration changes in 15 years' time and changes in 60 years' time. Years 15 and 60 have been used as they are the years which are forecast using the traffic model as defined in WebTAG guidance⁴ for the purposes of the cost benefit analysis for the scheme. The costs and benefits are appraised for the scheme opening year, the design year (15 years later), and 60 years after opening, aligning with the requirements of WebTAG Unit A1.1⁴, and as such, it is considered appropriate to review (where possible) the potential changes to the existing baseline due to natural changes over this period for consistency.
- 2.4.3 Future changes to the baseline without the scheme could result from both natural events and from other human activities. This could include development (residential and commercial), changes to greenhouse gas emissions (such as from changes in traffic flows) and climate change (resulting in increased flood

⁴ Department for Transport (2018) TAG Unit A1.1 Cost-Benefit Analysis [online] available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/712699/tag-unit-a1.1-cost-benefit-analysis-may-18.pdf (last accessed July 2018).

risk and severe weather). Refer to Table 2.1 for an outline of the future baseline scenario.

Table 2.1: Future baseline scenario

Environmental factor	DMRB environmental topic	Potential future changes to baseline	
		Natural events	Human activities
Population and human health	Air quality	There are not anticipated to be any baseline changes as a result of natural events that would impact air quality due its geographical location.	<p><u>Baseline change within the next 15 years</u></p> <ul style="list-style-type: none"> No significant baseline changes are anticipated within the next 15 years within the air quality study area (as defined in section 5.4, chapter 5 Air Quality, Volume 6.1), although traffic movements are likely to increase, vehicle emissions are set to improve as a result of improving technology and the uptake of electric vehicles is also likely to increase⁵, benefitting local air quality and increasing the value of the receptors. <p><u>Baseline change within the next 60 years</u></p> <ul style="list-style-type: none"> Air quality is expected to improve in the future, mainly due to reduced vehicle emissions, improved abatement technology and a shift towards cleaner energy, increasing the value of the receptors. Due to the variables such as policy changes and uptake of technology which could impact upon the baseline, a confident prediction on baseline changes in the next 60 years is not possible.
Material assets, cultural heritage, and the landscape	Cultural heritage	<p><u>Baseline changes within the next 15 years</u></p> <ul style="list-style-type: none"> No significant baseline changes are anticipated within the next 15 years. <p><u>Baseline changes within the next 60 years</u></p> <ul style="list-style-type: none"> Natural growth of trees has the potential to alter setting of heritage assets and key views. 	<p><u>Baseline changes within the next 15 years</u></p> <ul style="list-style-type: none"> Potential negative changes to setting of heritage assets and key views as a result of increased development, reducing the value of receptors. In addition, the potential removal of archaeological remains, such as those sites located at Sparkford adjacent to listed buildings and sites adjacent to Queen Camel (a Conservation Area), identified within the Housing and Economic Land Availability Assessment (HELAA)⁶ (specifically E/SPAR/0001, E/SPAR/0004, and E/SPAR/0005, which are likely to commence within 0 to 5 years' time).

⁵ Defra (2017) *Air Quality in the UK: plan to reduce nitrogen dioxide emissions* [online] available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/633270/air-quality-plan-detail.pdf (last accessed March 2018).

⁶ South Somerset District Council (2017) *Housing and Economic Land Availability Assessment (HELAA)* [online] available at: https://www.southsomerset.gov.uk/media/873236/helaa_final_report_feb_2017.pdf (last accessed April 2018).

Environmental factor	DMRB environmental topic	Potential future changes to baseline	
		Natural events	Human activities
			<u>Baseline changes within the next 60 years</u> <ul style="list-style-type: none"> Increased development has the potential to alter setting and key views, reducing the value of these receptors, as well as the potential removal of archaeological remains, such as those contained within future iterations of the HELAA⁷ or future local plans.
Material assets, cultural heritage, and the landscape	Landscape	<u>Baseline changes within the next 15 years</u> <ul style="list-style-type: none"> No significant baseline changes are anticipated within the next 15 years based on the time it takes for vegetation to develop. <u>Baseline changes within the next 60 years</u> <ul style="list-style-type: none"> Natural growth of trees has the potential to alter setting of character areas and key views. 	<u>Baseline changes within the next 15 years</u> <ul style="list-style-type: none"> Potential negative changes to character areas and key views as a result of additional developments proposed within the study area, such as those sites adjacent to Queen Camel (a Conservation Area) identified within the HELAA (specifically E/QUCA/0001A, E/QUCA/0001B and E/QUCA/0001C, which are likely to commence within 0 to 5 years' time). <u>Baseline changes within the next 60 years</u> <ul style="list-style-type: none"> Potential negative change to character areas and key views as a result of additional developments proposed within the area in the future, such as those contained within future iterations of the HELAA or future local plans.
Biodiversity	Biodiversity	<u>Baseline changes within the next 15 years</u> <ul style="list-style-type: none"> No significant baseline changes are anticipated within the next 15 years. <u>Baseline changes within the next 60 years</u> <ul style="list-style-type: none"> Potential for changes in weather patterns affecting protected species behaviour such as warmer winters preventing species to fully hibernate. 	<u>Baseline changes within the next 15 years</u> <ul style="list-style-type: none"> No significant baseline changes are anticipated within the next 15 years. <u>Baseline changes within the next 60 years</u> <ul style="list-style-type: none"> Increased development contained within future iterations of the HELAA or future local plans may lead to: <ul style="list-style-type: none"> Increased disturbance to protected species as a result of increases to baseline noise levels. Increased severance to habitats.

⁷ South Somerset District Council (2017) *Housing and Economic Land Availability Assessment (HELAA)* [online] available at: https://www.southsomerset.gov.uk/media/873236/helaa_final_report_feb_2017.pdf (last accessed April 2018).

Environmental factor	DMRB environmental topic	Potential future changes to baseline	
		Natural events	Human activities
			<ul style="list-style-type: none"> ○ Potential for changes in weather patterns and extreme weather events associated with climate change affecting protected species behaviour such as warmer winters preventing species to fully hibernate⁸.
Land, soil, water, air and climate	Geology and soils	<p><u>Baseline changes within the next 15 years</u></p> <ul style="list-style-type: none"> • No significant baseline changes are anticipated within the next 15 years. <p><u>Baseline changes within the next 60 years</u></p> <ul style="list-style-type: none"> • Possibility that extreme weather events could change the geomorphology of the areas due to erosion causing changes in near surface geology. 	<p><u>Baseline changes within next 15 years</u></p> <ul style="list-style-type: none"> • Potential for additional development may result in the remediation of isolated contaminated areas, such as the development sites identified within the HELAA⁹. However, potential for increased development (residential / industrial / commercial) may result in additional pollution incidents with the potential to affect near surface soils. <p><u>Baseline change within the next 60 years</u></p> <ul style="list-style-type: none"> • Potential for additional development may result in the remediation of isolated contaminated areas, such as development identified in future iterations of the HELAA or future local plans. However, potential for increased development (residential / industrial / commercial) may result in additional pollution incidents with the potential to affect near surface soils. • Potential for additional mineral extraction industries to be present in the area given anticipated population growth and likely increase in demand for geological resources.
Material assets, cultural heritage, and the landscape	Material Assets and Waste	There are no anticipated to be any baseline changes as a result of natural events that would impact material assets and waste.	<p><u>Baseline changes within the next 15 years</u></p> <ul style="list-style-type: none"> • Potential for increased risk of depletion of primary materials due to increased local residential and commercial development as a result of increased resource use⁹.

⁸ Intergovernmental Panel on Climate Change (2014) Fifth Assessment Report [online] available at: <http://ipcc.ch/report/ar5/> (last accessed June 2018).

⁹ South Somerset District Council (2017) *Housing and Economic Land Availability Assessment* (HELAA) [online] available at: https://www.southsomerset.gov.uk/media/873236/helaa_final_report_feb_2017.pdf (last accessed April 2018).

Environmental factor	DMRB environmental topic	Potential future changes to baseline	
		Natural events	Human activities
			<ul style="list-style-type: none"> • Provision of additional minerals development in Somerset to ensure a steady and adequate supply¹⁰. • Potential for further reduction in landfill capacity in Somerset. • Provision of additional waste management infrastructure to make further provision for managing waste in Somerset¹¹. <p><u>Baseline changes within the next 60 years</u></p> <ul style="list-style-type: none"> • Potential for increased risk of depletion of primary materials due to increased local residential and commercial development as a result of increased resource use⁹. • Provision of additional minerals development in Somerset to ensure a steady and adequate supply. • Potential for further reduction in landfill capacity in Somerset. • Provision of additional waste management infrastructure to make further provision for managing waste in Somerset¹¹.
Population and human health	Noise and Vibration	There are not anticipated to be any baseline changes as a result of natural events that would impact noise and vibration.	<p><u>Baseline changes within the next 15 years</u></p> <ul style="list-style-type: none"> • No significant baseline changes are anticipated within the next 15 years although traffic movements are likely to increase. <p><u>Baseline changes within the next 60 years</u></p> <ul style="list-style-type: none"> • Increased development may increase the baseline noise levels as a result of increased traffic.
Population and human health	People and Communities	There are not anticipated to be any baseline changes as a result of natural events that would impact people and communities.	<p><u>Baseline changes within the next 15 years</u></p> <ul style="list-style-type: none"> • Potential for increased residential developments such as those contained within the HELAA¹² to create opportunities for local employment during construction phases.

¹⁰ Somerset County Council (2015) *Somerset Minerals Plan: Development Plan Document up to 2030* [online] available at: <http://www.somerset.gov.uk/policies-and-plans/plans/somerset-minerals-plan/> (last access June 2018).

¹¹ Somerset County Council (2013) *Waste Core Strategy: Development Plan Document up to 2018* [online] available at: <http://www.somerset.gov.uk/policies-and-plans/policies/somerset-waste-core-strategy/> (last accessed June 2018).

¹² South Somerset District Council (2017) *Housing and Economic Land Availability Assessment (HELAA)* [online] available at: https://www.southsomerset.gov.uk/media/873236/helaa_final_report_feb_2017.pdf (last accessed April 2018).

Environmental factor	DMRB environmental topic	Potential future changes to baseline	
		Natural events	Human activities
			<ul style="list-style-type: none"> • Potential for continued increase in traffic due to increased residential development. <p><u>Baseline changes within the next 60 years</u></p> <ul style="list-style-type: none"> • Potential for changes in employment rates in the local area. • Potential for changes to community facilities in the local area. • Potential for changes to land use, for example changes in agricultural practice as well as land set aside for community facilities. • Potential for changes in land ownership. • Potential for loss of community facilities such as recreational playing fields as a result of increased flood events in the local area, associated with increased development and / or increased rainfall events.
Land, soil, water, air and climate	Road drainage and the water environment	<p><u>Baseline changes within the next 15 years</u></p> <ul style="list-style-type: none"> • No significant baseline changes are anticipated within the next 15 years (see Appendix 4.6 Flood Risk Assessment and Appendix 4.4 HAWRAT, Volume 6.3). <p><u>Baseline changes within the next 60 years</u></p> <ul style="list-style-type: none"> • No significant baseline changes are anticipated within the next 60 years (see Appendix 4.6 Flood Risk Assessment and Appendix 14.4 HAWRAT, Volume 6.3). 	<p><u>Baseline changes within the next 15 years</u></p> <ul style="list-style-type: none"> • Potential for additional development leading to increases in flood events and reduced water quality, such as those sites adjacent to Queen Camel identified within the Housing and Economic Land Availability Assessment (HELAA) (specifically E/QUCA/0001A, E/QUCA/0001B and E/QUCA/0001C, which are likely to commence within 0 – 5 years). <p><u>Baseline changes within the next 60 years</u></p> <ul style="list-style-type: none"> • Potential for increased flooding events due to increased development identified in future iterations of the HELAA and future local plans, and climate change. • Potential for improvements to water quality and aquatic ecology due to implementation of waterbody mitigation as listed in the River Basin Management Plan¹³.

¹³ Department for Environment Food and Rural Affairs (2016) *Part 1: South West River Basin District: River Basin Management Plan* [online] available at: <https://www.gov.uk/government/publications/south-west-river-basin-district-river-basin-management-plan> (last accessed June 2018).

Environmental factor	DMRB environmental topic	Potential future changes to baseline	
		Natural events	Human activities
Land, soil, water, air and climate	Climate	<p><u>Baseline changes within the next 15 years</u></p> <ul style="list-style-type: none"> No significant baseline changes are anticipated within the next 15 years. <p><u>Baseline changes within the next 60 years</u></p> <ul style="list-style-type: none"> Potential increased frequency of extreme weather events impacting on the other specialisms for example increase in larger flooding events increasing the impact on road drainage and the water environment. 	<p><u>Baseline changes within the next 15 years</u></p> <ul style="list-style-type: none"> No significant baseline changes are anticipated within the next 15 years. <p><u>Baseline changes within the next 60 years</u></p> <ul style="list-style-type: none"> Increased levels of greenhouse gas (GHG) emissions due to potential increased development and vehicle movements in the area¹⁴. Potential for increased frequency of extreme weather events as a result of climate change.
Interaction between the factors	Combined and Cumulative Effects	No significant baseline changes are anticipated associated with both combined and cumulative effects as a result of natural events.	<p><u>Baseline changes within the next 15 years</u></p> <ul style="list-style-type: none"> Potential for combined effects to all receptors identified above as a result of human activities, such as increased developments identified within the HELAA affecting both historic and landscape setting. Potential for cumulative effects associated with developments anticipated to come forward as part of the HELAA. <p><u>Baseline changes within the next 60 years</u></p> <ul style="list-style-type: none"> Potential for combined effects to all receptors identified above as a result of human activities, such as increased developments as part of future development affecting both historic and landscape setting. Potential for cumulative effects associated with developments anticipated to come forward as part of future developments.

¹⁴ *Intergovernmental Panel on Climate Change (2014) Fifth Assessment Report* [online] available at: <http://ipcc.ch/report/ar5/> (last accessed June 2018).

2.5 Scheme description

Introduction

- 2.5.1 The scheme would follow the existing corridor of the A303 very closely. It is generally considered to be an online solution although has been deliberately aligned just to the side of the existing carriageway along the majority of the route to allow re-use of the existing carriageway for local access, avoid property or facilitate construction. At its maximum off-set, the route is typically 100 metres either north or south of the existing A303.
- 2.5.2 The section of the scheme that is to be upgraded is 5.6 kilometres long. The footprint of the proposed red line boundary for the scheme (which includes areas required temporarily during construction) (see Figure 2.1, Volume 6.2) is 110 hectares, whilst the scheme during operation is anticipated to be approximately 62.4 hectares.
- 2.5.3 The description of the scheme (which details both the permanent and temporary aspects) provided below is supported by a number of figures embedded within the text to aid the reader's understanding. However, it should be noted that these figures are for illustrative purposes only and are not to scale. Where appropriate, additional cross references have been provided to fully scaled drawings which support the Development Consent Order (DCO) application.

Scheme design

- 2.5.4 The scheme would consist of the following permanent elements, all of which are described in more detail in the following sections of this chapter. Temporary elements are detailed within sections 2.5 and 2.6 of this chapter.
- The provision of 5.6 kilometres of new dual carriageway, including a parking layby.
 - A new junction at Camel Cross.
 - A new junction at Downhead.
 - A new junction at Hazlegrove.
 - The retention of a substantial amount of the existing A303 single carriageway as a local access road.
 - The closure of a number of local roads.
 - The provision of new local roads.
 - The closure of a number of public rights of way.
 - The creation of new rights of way, including paved verges alongside local roads.
 - A new overbridge between Downhead and Canegore Corner (Stear Hill Overbridge).
 - A new underbridge at Hazlegrove (Hazlegrove Junction Underbridge).

- The provision of road lighting.
- The provision of road markings on new carriageway and new traffic signs.
- The provision of new road restraint systems.
- Earthworks in order to establish the road foundation (including cuttings and embankments) and also to provide visual screening and noise attenuation.
- The provision of drainage systems to drain proposed carriageways and adjacent land.
- The provision of noise attenuation fencing.
- Boundary treatments such as boundary fencing, hedgerow planting and perimeter drainage ditches.
- Technology installations including emergency roadside telephones (ERTs) and traffic monitoring installations.
- Diversionary and protection works to public utilities including telephone, fibre-optics, electricity, water supply and drainage.
- The environmental design including planting and areas allocated for ecological mitigation.

2.5.5 General arrangement plans for the scheme are contained within Figure 2.3, Volume 6.2. Drawings contained within Figure 2.4 of Volume 6.2 detail the rights of way and access plans. These plans also illustrate where existing highway, private means of access and existing Public Rights of Way (PRoW) are to be stopped up. General arrangement plans for the proposed structures are contained within Figure 2.5, Volume 6.2. Lighting plans are contained in Figure 2.6, Volume 6.2.

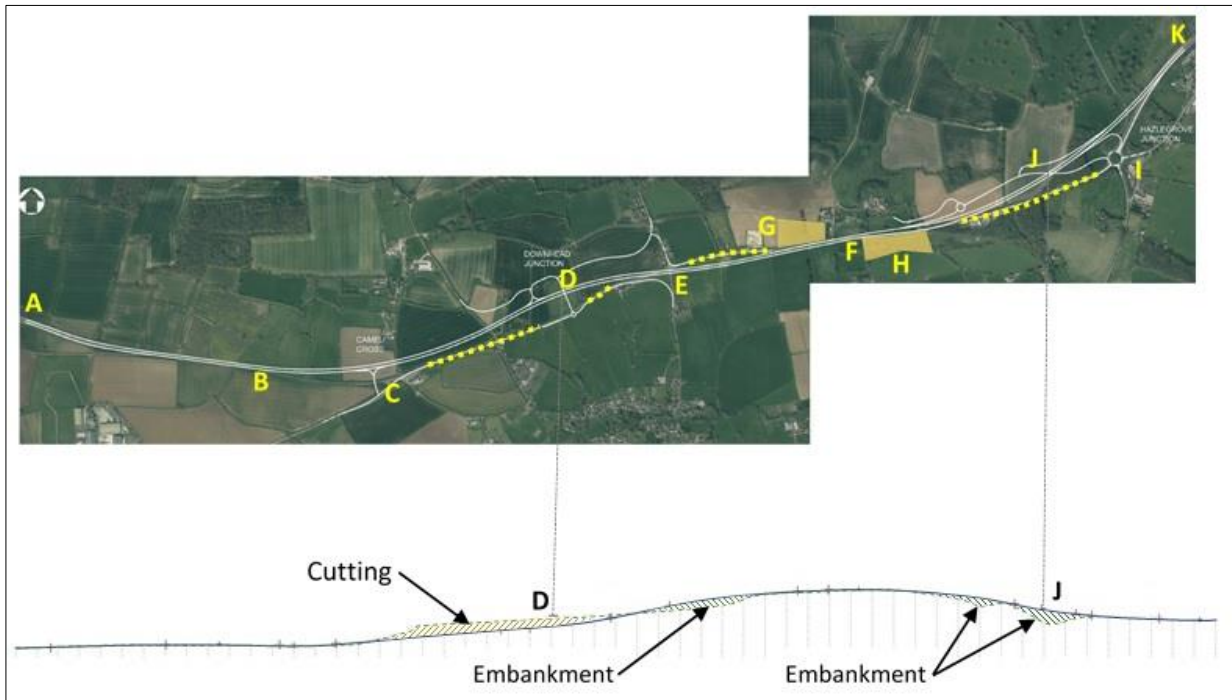
2.5.6 The scheme layout has been designed in accordance with Volume 6 of the Design Manual for Roads and Bridges (DMRB)¹⁵.

Dual carriageway

2.5.7 The dual carriageway layout and profile is shown in Figure 2.1 below.

¹⁵ Highways England (2018) Design Manual for Roads and Bridges [online] available at: <http://www.standardsforhighways.co.uk/ha/standards/dmrb/index.htm> (last accessed June 2018).

Figure 2.1: Dual carriageway layout and profile



Notes: A: Western tie in to Podimore Bypass, B: New A303 moves north of existing A303, C: Camel Cross, D: Steart Hill Overbridge, E: Canegore Corner, F: Traits Lane (Camel Hill summit), G: Camel Hill Scheduled Monument, H: Ministry of Defence site, I: Hazlegrove Roundabout, J: Hazlegrove Junction Underbridge, K: Eastern tie in to Sparkford Bypass.

- 2.5.8 At the western scheme limits, the new A303 dual carriageway would tie into the existing Podimore Bypass, approximately 500 metres west of the existing westbound diverging slip road into Podimore (see reference point A on Figure 2.1).
- 2.5.9 The new A303 would follow the approximate alignment of the existing A303 carriageway for approximately 1 kilometre, and then the proposed road alignment would move north of the existing A303 (reference point B on Figure 2.1).
- 2.5.10 The existing topography is generally flat and low lying along this section, and the profile of the proposed road is correspondingly relatively level, and just above existing ground levels in order to promote free drainage of the carriageway.
- 2.5.11 A parking layby would be provided on the eastbound carriageway 1.2 kilometres east of the tie in to Podimore Bypass.
- 2.5.12 After a further 600 metres the proposed road would pass to the north of the existing A303 / B3151 junction (Camel Cross – see reference point C on Figure 2.1), and then run to the north of the existing A303 carriageway, enabling it to be retained as a parallel local road. The former section of A303 carriageway is highlighted with a yellow dashed line in Figure 2.1.

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- 2.5.13 From Camel Cross onwards, the new A303 rises up the western slope of Camel Hill, initially at 1.7% gradient until the Downhead Junction, then increasing in gradient to 4%. The new A303 would be in cutting through this section, typically 8.5 metres deep although up to 10 metres at its maximum depth. This would enable the Steart Hill Overbridge (reference point D on Figure 2.1) to cross over the proposed dual carriageway at the same level as the existing ground, minimising its visual intrusion.
- 2.5.14 Approximately 1.4 kilometres east of Camel Cross, the new A303 reaches the junction of the existing A303 and Steart Hill / Howell Hill (Canegore Corner – reference point E on Figure 2.1). The new A303 would cross over the existing A303 carriageway at this location.
- 2.5.15 The proposed carriageway level has been designed such that it is very similar to the existing carriageway level at Canegore Corner. This would assist with traffic management during construction at this location which is also constrained by adjacent property.
- 2.5.16 To the east of Canegore Corner the new A303 would run to the south of the existing A303 carriageway along this section, enabling it to be retained as a parallel local road. The former section of A303 carriageway is highlighted with a yellow dashed line in Figure 2.1.
- 2.5.17 The new A303 would generally be above existing ground level through this section, due to the fact that the existing ground slopes to the south. The new A303 carriageway would be on a vertical crest curve, tending towards a high point where the new A303 would cross the junction between the existing A303 and Traits Lane (reference point F on Figure 2.1), approximately 900 metres east of Canegore Corner.
- 2.5.18 A parking layby would be provided on the westbound carriageway 250 metres to the east of Canegore Corner.
- 2.5.19 In terms of adjacent constraints and topography the high point of the proposed road, at Camel Hill summit, is the most challenging part of the scheme. The Camel Hill Scheduled Monument (see reference point G on Figure 2.1, Figure 2.2 Environmental Constraints Plan of Volume 6.2, and described in further detail in Chapter 6 Cultural Heritage of Volume 6.1) lies immediately to the north of the existing highway boundary, and this defines the northern limits of the scheme at this section. Land owned by the Ministry of Defence (reference point H on Figure 2.1) lies immediately to the south of the existing highway boundary east of the Scheduled Monument, and this defines the southern limits of the scheme at this section. Throughout this section the vertical alignment of the new A303 reaches a crest, and also diagonally crosses over the existing A303 carriageway again.
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- 2.5.20 To the east of Camel Hill summit, the proposed road would run to the north of the existing A303 carriageway, enabling it to be retained as a parallel local road. The former section of A303 carriageway is highlighted with a yellow dashed line in Figure 2.1.
- 2.5.21 The proposed carriageway would descend the eastern side of Camel Hill through this section, at a maximum gradient of 3%. However existing ground levels drop more rapidly and so the proposed road would be generally on an embankment. As the carriageway reaches Hazlegrove House Registered Park and Garden (shown on the general environmental constraints plan in Figure 2.2 of Volume 6.2) the gradient decreases and plateaus. The proposed road would pass to the north of the existing Hazlegrove Roundabout (reference point I on Figure 2.1) approximately 1.1 kilometres after Camel Hill summit. At this location the new A303 would pass over a proposed local road on the Hazlegrove Junction Underbridge (reference point J on Figure 2.1).
- 2.5.22 At the eastern scheme limits the proposed dual carriageway ties into the existing Sparkford Bypass approximately 600 metres east of Hazlegrove Roundabout (reference point K on Figure 2.1).

Junctions

- 2.5.23 All existing junctions and private accesses along the A303 would be closed. Access to and from the proposed dual carriageway would only be available at new, purpose built junctions that would be designed to modern geometric design standards and would provide free flowing entries and exits.
- 2.5.24 Three new junctions would be provided as part of the scheme: Camel Cross Junction, Downhead Junction and Hazlegrove Junction. These are shown on Figures 2.2, 2.3, 2.4 and 2.5 below, and are also shown on the general arrangement plans contained within Figure 2.5 of Volume 6.2.

Camel Cross Junction

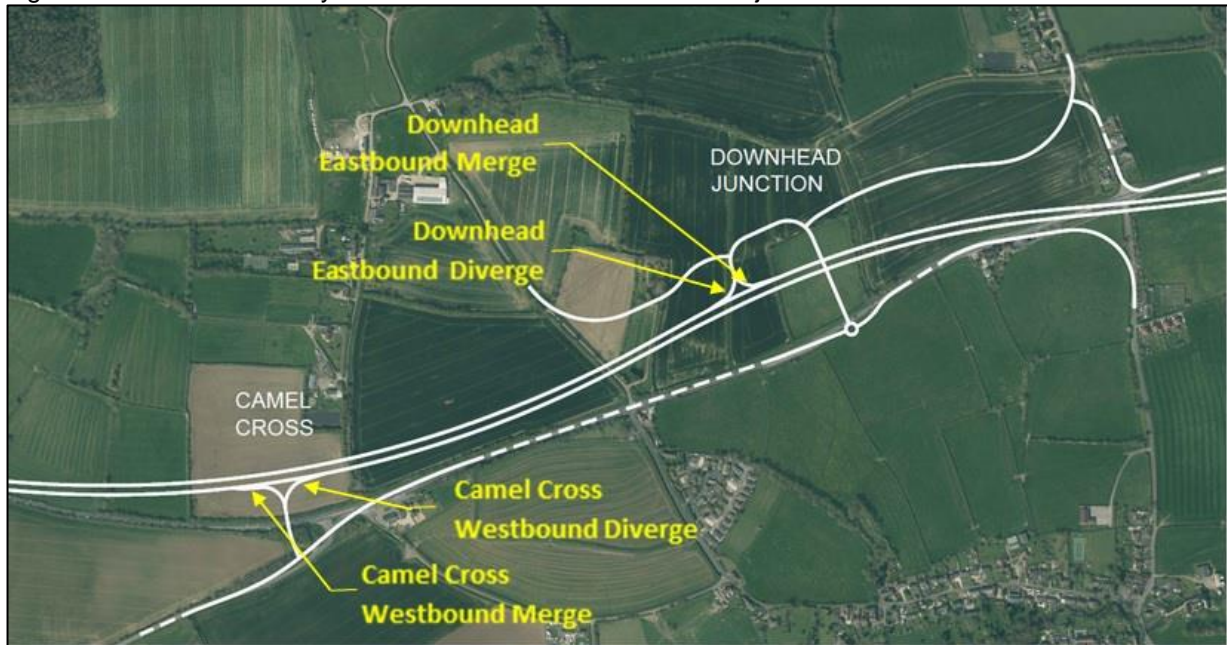
- 2.5.25 Figure 2.2 illustrates the location of Camel Cross Junction. It would provide access to the new A303 westbound carriageway only.
- 2.5.26 This junction is positioned at approximately the same location as the existing A303 / B3151 junction. The junction would therefore provide continued connection between the A303 westbound carriageway and the B3151, Royal Naval Air Station (RNAS) Yeovilton and the Fleet Air Arm Museum.
- 2.5.27 The location of Camel Cross junction has been selected to be near the existing B3151 and away from properties at Plowage.

- 2.5.28 Camel Cross Junction would be a compact 'left in-left out' junction. Its layout has been designed accordance with Highways England's geometric design standards TD40/94¹⁶ and TD42/95¹⁷.
- 2.5.29 The type of junction has been selected on the basis of forecast traffic flows which indicated that merging and diverging traffic flows would be relatively light compared to the main carriageway (<10%). Further details are contained within the **ComMA Report (document reference TR010036/APP/7.6)**.

Downhead Junction

- 2.5.30 Figure 2.2 illustrates the location of Downhead Junction. It would provide access to and from the new A303 eastbound carriageway only.
- 2.5.31 This junction has been positioned to provide continued access to the settlement of Downhead and also to Babcary via Steart Hill. It would also provide a connection, via the Steart Hill Overbridge, to the B3151, RNAS Yeovilton and the Fleet Air Arm Museum and West Camel.
- 2.5.32 The location of Downhead Junction has been selected to be roughly mid-way between Downhead and Steart Hill – 2 locations that require a connection either side of this junction.

Figure 2.2: Location and layout of Camel Cross and Downhead junctions



¹⁶ Highways England (1994) Design Manual for Roads and Bridges Volume 6 Section 2 Part 5 TD 40/94 *Layout of Compact Grade Separated Junctions* [online] available at: <http://www.standardsforhighways.co.uk/ha/standards/dmrb/vol6/section2/td4094.pdf> (last accessed June 2018).

¹⁷ Highways England (1995) Design Manual for Roads and Bridges Volume 6 Section 2 Part 6 TD 42.95 *Geometric Design of major / Minor Priority Junctions* [online] available at: <http://www.standardsforhighways.co.uk/ha/standards/dmrb/vol6/section2/td4295.pdf> (last accessed June 2018).

- 2.5.33 Downhead junction would be a compact 'left in-left out' junction. Its layout has been designed in accordance with Highways England's geometric design standards TD40/94¹⁶ and TD42/95¹⁷.
- 2.5.34 The type of junction has been selected on the basis of forecast traffic flows which indicated that merging and diverging traffic flows would be relatively light compared to the main carriageway (<10%).

Hazlegrove Junction

- 2.5.35 Figure 2.3 illustrates the location of Hazlegrove Junction.
- 2.5.36 This junction would be positioned to provide continued access to local roads associated with the existing Hazlegrove Roundabout. These roads include the A359 north through Sparkford village and on to Castle Cary, the A359 south through Queen Camel and on to Yeovil, and the accesses to Sparkford Services and Hazlegrove Preparatory School.
- 2.5.37 Local constraints have heavily influenced the layout of the junction. These include the following 3 influences which are illustrated in Figure 2.4.
- Hazlegrove House Registered Park and Garden (RPG), and associated Local Wildlife Site (LWS) (shown on the general environmental constraints plan in Figure 2.2 of Volume 6.2). In order to minimise the footprint of the junction within these sites, elements of the junction have been located as far south and west as possible.
 - The next eastbound junction downstream of the scheme limits is the A359 adjacent to Haynes Motor Museum. This has influenced the location of the proposed Hazlegrove eastbound on-slip in order to ensure the separation between this and the A359 diverge is no less than 1 kilometres (the minimum 'weaving length' permitted by Highways England's geometric design standards).
 - The requirement to provide access to residential and agricultural properties at Camel Hill Farm and Vale Farm has led to the provision of a local road (Camel Hill Link). This has provided an appropriate local link for the at-grade connections of the eastbound slip roads.

Figure 2.3: Location and layout of Hazlegrove Junction

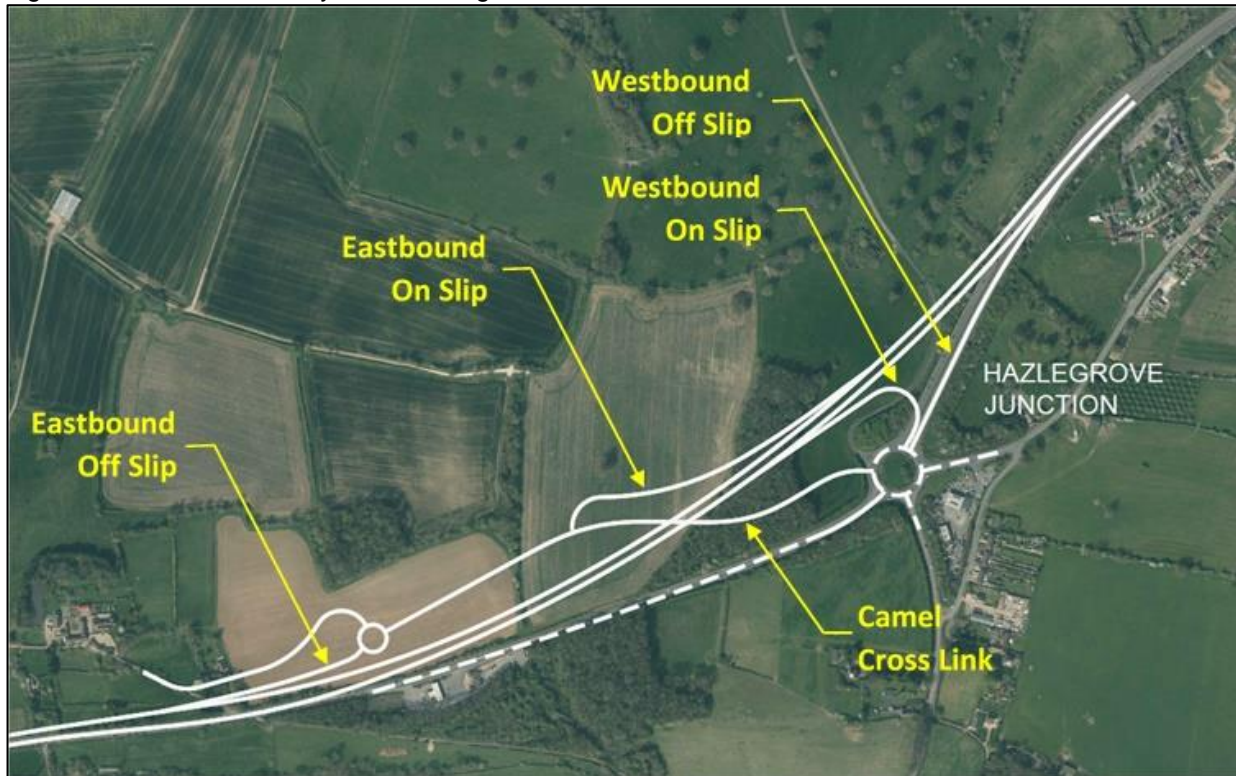


Figure 2.4: Influences on the layout of Hazlegrove Junction



2.5.38 All elements associated with the junction slip roads, merges and diverges are designed as a fully grade-separated provision in accordance with Highways England's geometric design standard TD22/06¹⁸. All 4 slip road links have at-grade connections with the local road network. This layout standard, which is a higher quality provision than compact grade separation, was selected on the

¹⁸ Highways England (2006) Design Manual for Roads and Bridges Volume 6 section 2 Part 1 TD 22/06 *Layout of Grade Separated Junctions* [online] available at: <http://www.standardsforhighways.co.uk/ha/standards/dmrb/vol6/section2/td2206.pdf> (last accessed June 2018).

basis of forecast traffic flows which indicated that merging and diverging traffic flows would be relatively high compared to the main carriageway (>10%).

- 2.5.39 Hazlegrove Junction would provide an all-movements connection between the proposed A303 dual carriageway and the local road network through the provision of 4 slip roads. Each slip road connects to the existing or proposed local road network at-grade.
- 2.5.40 The westbound off-slip would connect to the existing retained Hazlegrove Roundabout. This slip road would use the existing A303 carriageway.
- 2.5.41 The westbound on-slip would connect to the proposed dual carriageway from the existing retained Hazlegrove Roundabout.
- 2.5.42 The eastbound off-slip would connect to the proposed new local roundabout at Camel Hill. This location has been determined in order to minimise the footprint of this slip road within Hazlegrove House RPG.
- 2.5.43 The eastbound on-slip would connect to the proposed A303 eastbound carriageway from the Camel Hill Link.

Changes to local roads

- 2.5.44 Changes to highways are shown comprehensively in Figure 2.4 of Volume 6.2, and are described below.

Changes to highways in the vicinity of Camel Cross Junction

- 2.5.45 Figure 2.5 below illustrates proposals in this area of the scheme. The Podimore westbound off-slip from the existing A303 would be permanently closed (see reference A in Figure 2.5 below). If this were to be left in place the distance between the Camel Cross merge and this slip road would be approximately 700 metres which is less than that permitted by Highways England's geometric design standards.
- 2.5.46 The existing A303 carriageway would effectively be closed (Reference B in Figure 2.5 below) along approximately 600 metres of its length in the vicinity of Camel Cross as a result of the proposed dual carriageway alignment, and to make way for elements associated with the proposed Camel Cross Junction.
- 2.5.47 An un-named local road at Downhead (Reference C in Figure 2.5 below) would be reduced in length by approximately 100 metres at its southern end as a result of the proposed dual carriageway.
- 2.5.48 A short section of the existing B3151 (Reference D in Figure 2.5 below) would effectively be closed along approximately 150 metres of its length in order to make way for elements associated with the proposed Camel Cross Junction.

These elements, named 'B3151 Link' and 'Camel Cross Junction Link' would be provided in order to ensure the B3151 remains connected to the local road network and both carriageways of the A303.

2.5.49 The following new local roads, which are highlighted in Figure 2.5 below, are proposed in the vicinity of Camel Cross.

- B3151 Link
- Camel Cross Junction Link

2.5.50 The purpose of the B3151 Link is to maintain the local road connection that would otherwise be severed as a result of the construction of the proposed dual carriageway and stopping up of the existing A303 / B3151 junction. It is designed as a single carriageway with a cross section broadly in accordance with Highways England's geometric design standard TD27/05¹⁹, although by agreement with the adopting highway authority the hardstrips have been removed.

2.5.51 The purpose of the Camel Cross Junction Link is to connect the merge and diverge at Camel Cross Junction to the adjacent local road network. It is designed as a 'compact connector' with a cross section in accordance with Table 6/4 of Highways England's geometric design standard TD40/94²⁰.

Figure 2.5: Changes to highways in the vicinity of Camel Cross Junction



Note: existing A303 carriageway is highlighted in grey. Unless shown as being closed this would be retained for local access

¹⁹ Highways England (2005) Design Manual for Roads and Bridges Volume 6 Section 1 Part 2 TD27/05 *Cross-Sections and Headrooms* [online] available at: <http://www.standardsforhighways.co.uk/ha/standards/dmrb/vol6/section1/td2705.pdf> (last accessed June 2018).

²⁰ Highways England (1994) Design Manual for Roads and Bridges Volume 6 Section 2 part 5 TD 40/94 *Layout of Compact Grade Separated Junctions* [online] available at: <http://www.standardsforhighways.co.uk/ha/standards/dmrb/vol6/section2/td4094.pdf> (last accessed June 2018).

Changes to highways in the vicinity of Downhead Junction

- 2.5.52 Figure 2.6 below illustrates proposals in this area of the scheme.
- 2.5.53 An un-named road (Reference A in Figure 2.6) would be closed along approximately 200 metres of its length, including its junction with the existing A303 carriageway, as a result of the proposed dual carriageway alignment. This local road provides the only link into the settlement of Downhead, and so alternative access would be provided via a new links named 'Downhead Lane' and 'Downhead Junction Link'.
- 2.5.54 The existing A303 carriageway would effectively be closed (Reference B in Figure 2.6 below) along approximately 250 metres of its length in the vicinity of Canegore Corner as a result of the proposed dual carriageway alignment.
- 2.5.55 The junction of Howell Hill with the A303 would be closed. Approximately 100 metres of Howell Hill carriageway would also be closed (Reference C in Figure 2.6 below). Howell Hill would be connected to the former A303 carriageway to the west by new links named 'Howell Hill (east)' and 'Howell Hill (west)'.
- 2.5.56 The junction of Steart Hill with the A303 would be closed (Reference D in Figure 2.6). Steart Hill would be connected to the local road network by a new link named 'Steart Hill Link' and 'Downhead Junction Link'.
- 2.5.57 A 50 metre section of Steart Hill, to the north of the scheme, would be closed in order to form a new junction between Steart Hill and Steart Hill Link (Reference E in Figure 2.6 below).
- 2.5.58 The following new local roads, which are highlighted in Figure 2.6, are proposed in the vicinity of Downhead Junction:
- Downhead Junction Link
 - Downhead Lane
 - Steart Hill Link
 - Steart Hill Roundabout
 - Steart Hill Link to existing A303
 - Howell Hill Link (west) and (east)
 - Steart Hill
- 2.5.59 The purpose of the Downhead Junction Link is to connect the merge and diverge at Downhead Junction to the adjacent local road network. It is designed as a 'compact connector' in accordance with Table 6/4 of Highways

England's geometric design standard TD40/94²¹. Downhead Junction Link crosses the new A303 via the proposed Steart Hill Overbridge.

- 2.5.60 The purpose of Downhead Lane is to reinstate the connection between the settlement of Downhead and the local road network to the south of the proposed dual carriageway via Downhead Junction Link. Downhead would otherwise be completely severed as there is no other access to and from the settlement.
- 2.5.61 Downhead Lane is designed as a single carriageway with a cross section broadly in accordance with Highways England's geometric design standard TD27/05, although by agreement with the adopting highway authority the hardstrips have been removed and the carriageway width has been reduced from 7.3 metres to 6.5 metres.
- 2.5.62 The purpose of Steart Hill Link is to reinstate the connection from the existing road known as Steart Hill with the local road network to the south of the proposed dual carriageway via Downhead Junction Link.
- 2.5.63 Steart Hill Link is designed as a single carriageway with a cross section broadly in accordance with Highways England's geometric design standard TD27/05, although by agreement with the adopting highway authority the hardstrips have been removed and the carriageway width has been reduced from 7.3 metres to 6.5 metres.
- 2.5.64 A roundabout at the location of Steart Hill Roundabout has been provided in order to control vehicle speeds, principally travelling eastbound on the former A303 carriageway prior to reaching the relatively low speed alignment at Howell Hill Link (east).
- 2.5.65 The purpose of the Steart Hill Link to existing A303 is to provide a connection between the former A303 carriageway and Steart Hill Roundabout.
- 2.5.66 Steart Hill Link to existing A303 is designed as a single carriageway with a cross section broadly in accordance with TD27/05, although by agreement with the adopting highway authority the hardstrips have been removed.
- 2.5.67 The purpose of Howell Hill Link (west) and (east) is to provide a connection between the former A303 carriageway and the existing road known as Howell Hill, which descends into the village of West Camel.

²¹ Highways England (1994) Design Manual for Roads and Bridges Volume 6 Section 2 part 5 TD 40/94 *Layout of Compact Grade Separated Junctions* [online] available at: <http://www.standardsforhighways.co.uk/ha/standards/dmrb/vol6/section2/td4094.pdf> (last accessed June 2018).

- 2.5.68 These links are designed as single carriageways with a cross section broadly in accordance with TD27/05, although by agreement with the adopting highway authority the hardstrips have been removed and the carriageway width has been reduced from 7.3 metres to 6.5 metres.
- 2.5.69 Steart Hill is an existing road forming the northern arm of the cross roads at Canegore Corner. Its junction with the A303 would be closed, and so in order to maintain connection to the residential properties along this road a connection would be provided from Steart Hill Link.
- 2.5.70 The new link would be designed as a single carriageway with a cross section broadly in accordance with TD27/05, although by agreement with the adopting highway authority the hardstrips have been removed and the carriageway width has been reduced from 7.3 metres to 6.5 metres.
- 2.5.71 A connection from the southern end of Steart Hill to a residential property known as Blue Haze and also a nearby quarry would also be provided.

Figure 2.6: Changes to highways in the vicinity of Downhead Junction



Note: existing A303 carriageway is highlighted in grey. Unless shown as being closed this would be retained for local access

Changes to highways in the vicinity of Camel Hill summit

- 2.5.72 Figure 2.7 below illustrates proposals in this area of the scheme.
- 2.5.73 The existing A303 would be closed at either end of Camel Hill summit (References A and B in Figure 2.7 below) in order to make way for the proposed dual carriageway.
- 2.5.74 The junction of Traits Lane with the existing A303 would be closed (Reference C in Figure 2.7 below). No alternative would be provided.

- 2.5.75 The junction of Gason Lane with the existing A303 would be closed (Reference D in Figure 2.7 below). No alternative would be provided.

Figure 2.7: Changes to highways in the vicinity of Camel Hill summit



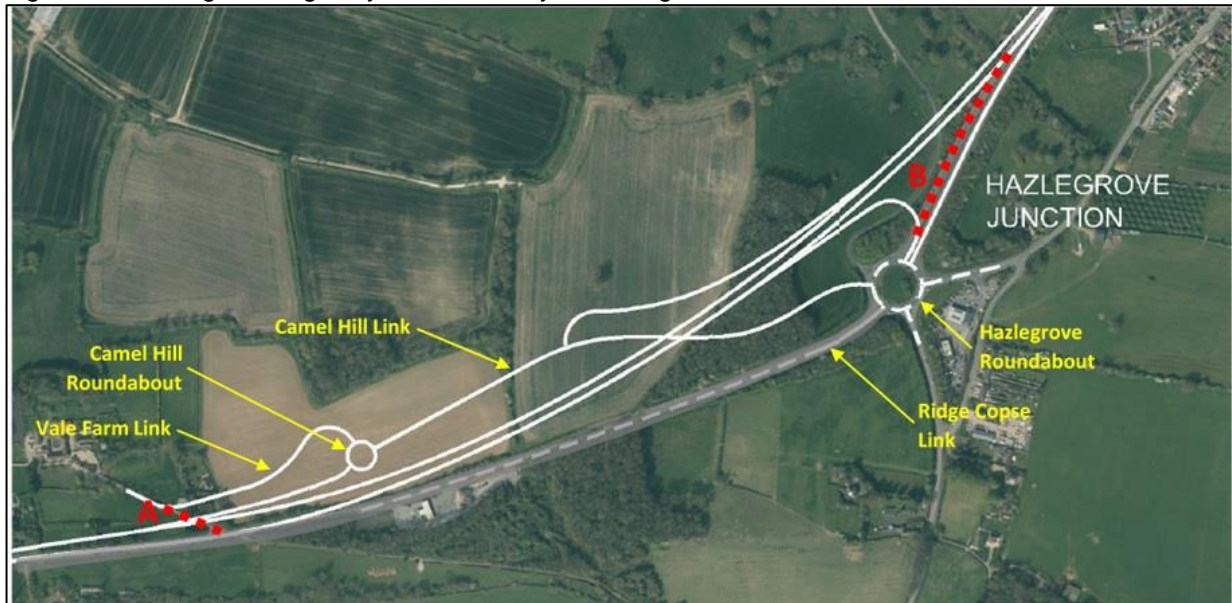
Note: existing A303 carriageway is highlighted in grey. Unless shown as being closed this would be retained for local access

Changes to highways in the vicinity of Hazlegrove Junction

- 2.5.76 Figure 2.8 below illustrates proposals in this area of the scheme.
- 2.5.77 The junction of an un-named, unclassified, cul-de-sac which provides access to properties at Camel Hill Farm and Vale Farm would be closed (Reference A in Figure 2.8 below). Approximately 75 metres of this lane would also be closed. In order to ensure continued access to the properties 2 new local roads named 'Vale Farm Link' and 'Camel Hill Link' would be provided.
- 2.5.78 The existing eastbound carriageway of the A303 Sparkford Bypass would be closed for a length of approximately 250 metres as a result of the provision of the new dual carriageway to the north of this location (Reference B in Figure 2.8 below). The corresponding section of westbound carriageway would be retained for use as the Hazlegrove Junction westbound off-slip.
- 2.5.79 The following new local roads, which are highlighted in Figure 2.8 below, are proposed in the vicinity of Hazlegrove Junction:
- Vale Farm Link
 - Camel Hill Link
 - Ridge Copse Link
 - Camel Hill Roundabout
- 2.5.80 The purpose of Vale Farm Link is to reinstate the connection from the A303 to properties at Camel Hill Farm and Vale Farm which would otherwise be severed by the closure of the existing junction.
- 2.5.81 Vale Farm Link is designed as a single carriageway with a cross section broadly in accordance with TD27/05, although by agreement with the adopting

-
- highway authority the hardstrips have been removed and the carriageway width has been reduced from 7.3 metres to 6.5 metres.
- 2.5.82 The purpose of Camel Hill Link is to provide a local road connection between Hazlegrove Roundabout and properties at Camel Hill Farm and Vale Farm. This connection would otherwise be severed as a result of the closure of the existing junction that provides these properties with direct access to the A303.
- 2.5.83 Camel Hill Link is designed as a single carriageway with a cross section broadly in accordance with TD27/05, although by agreement with the adopting highway authority the hardstrips have been removed. Camel Hill Link would pass under the new A303 at Hazlegrove Junction underbridge.
- 2.5.84 The purpose of Ridge Copse Link is to provide a modification of the retained section of A303 carriageway at Hazlegrove Roundabout. This section of carriageway is currently 3 lanes wide, and the works would involve the reduction in width of the carriageway to single carriageway standard, with a cross section broadly in accordance with TD27/05, although by agreement with the adopting highway authority the hardstrips would be removed and the carriageway cross section reduced to 6.5 metres.
- 2.5.85 Ridge Copse Link would provide continued access to the service area at Camel Hill.
- 2.5.86 A roundabout at the location of Camel Hill Roundabout is not necessary for operational capacity reasons, although it has been provided to control vehicle speeds, principally travelling eastbound on the Hazlegrove Junction Eastbound off-slip prior to encountering right turning vehicles from Camel Hill Link into Vale Farm Link.
- 2.5.87 The existing Hazlegrove Roundabout would be retained with no alternations to its geometry other than the removal of the Hazlegrove Preparatory School access, reduction in width of the proposed 'Ridge Copse Link' arm and the introduction of the 'Camel Hill Link' arm.

Figure 2.8: Changes to highways in the vicinity of Hazlegrove Junction



Note: existing A303 carriageway is highlighted in grey. Unless shown as being closed this would be retained for local access

De trunking works

2.5.88 Four sections of the existing A303 carriageway would be de-trunked and retained for use as local roads. These sections are highlighted by yellow dashed lines in Figure 2.1. The following work would be required to these sections in order to make them suitable for use as local roads:

- Reduction in carriageway width.
- Associated modifications to carriageway drainage at locations where the carriageway width has been reduced.
- Modification to road markings.
- Removal of existing road signs that are associated with the carriageway's current function as part of the strategic road network.

Changes to public rights of way

2.5.89 Changes to public rights of way are shown comprehensively in the Rights of Way and Access Plans which are contained within Figure 2.5 of Volume 6.2.

Rights of way closures

2.5.90 The new A303 would sever 10 existing rights of way. These are listed below and illustrated in Figure 2.9 and Figure 2.10 below.

- Footpath Y30/28
- Footpath Y27/21
- Footpath WN23/32
- Footpath WN23/10

- Footpath WN23/33
- Footpath Y27/29
- Footpath Y27/UN
- Footpath Y27/10
- Footpath Y27/9
- Footpath WN23/12

Figure 2.9: Rights of Way closures towards the western end of the scheme

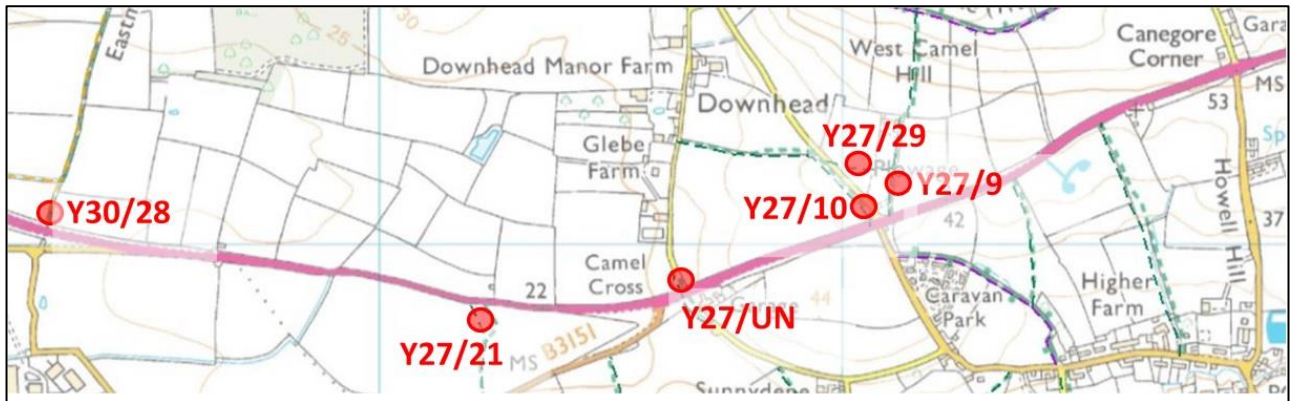
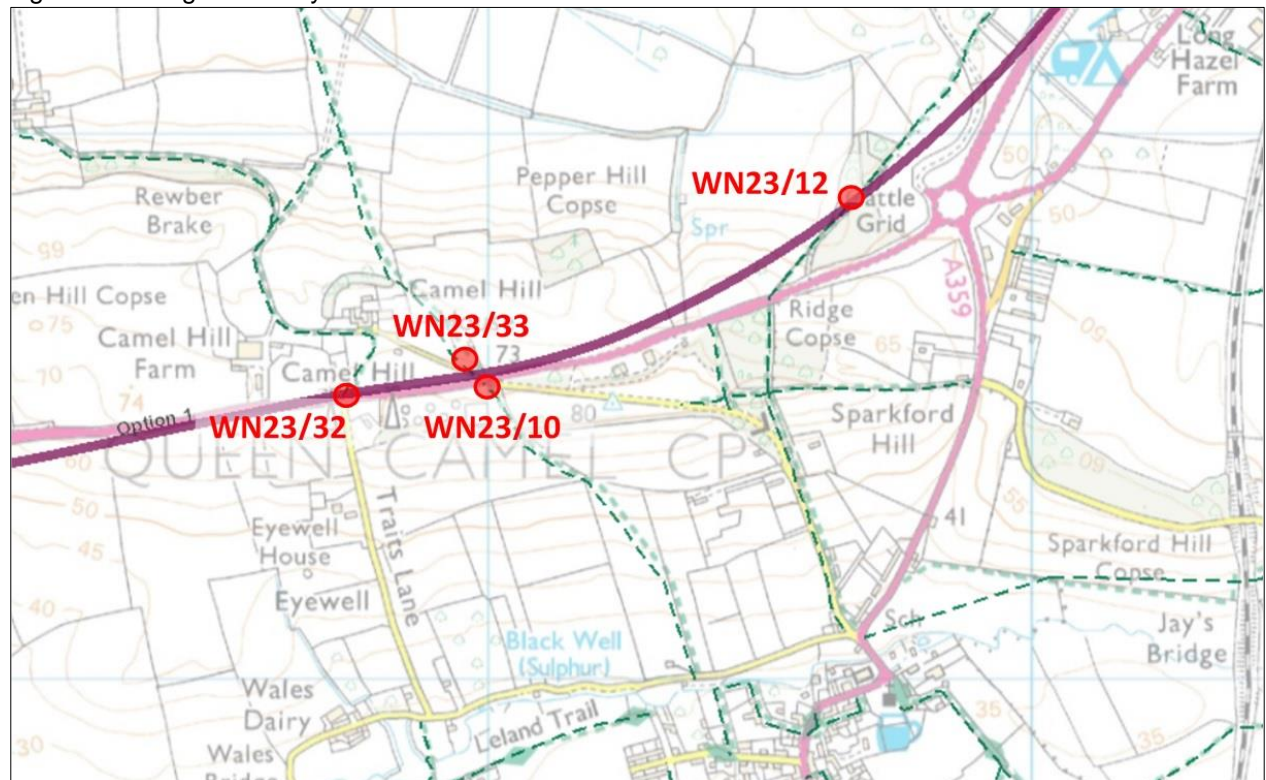


Figure 2.10: Rights of Way closures towards the western end of the scheme

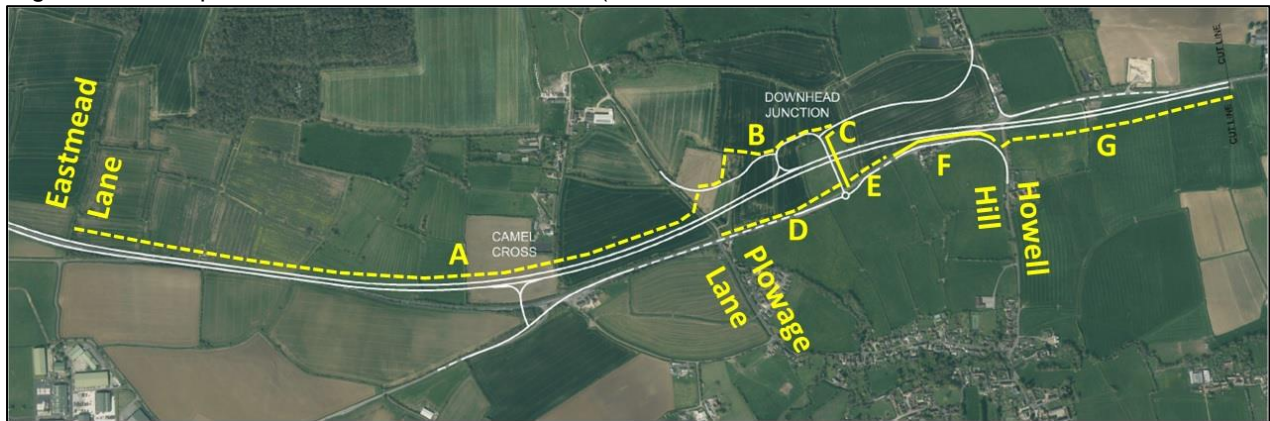


Proposed Rights of Way

2.5.91 In order to remedy the severance caused by these closures, a west to east non-motorised user link is proposed, making use of facilities already proposed for the scheme such as maintenance strips, access tracks and local roads.

- 2.5.92 The 2 proposed road bridges would each provide a grade separated north-south crossing of the new A303 which intersect the west-east route.
- 2.5.93 It is proposed that the majority of new rights of way are created as bridleways in order that pedestrians, equestrians and cyclists can legally make use of them.
- 2.5.94 The west to east and north to south links are illustrated in Figure 2.11 and Figure 2.12.

Figure 2.11: Proposed non-motorised user routes (west



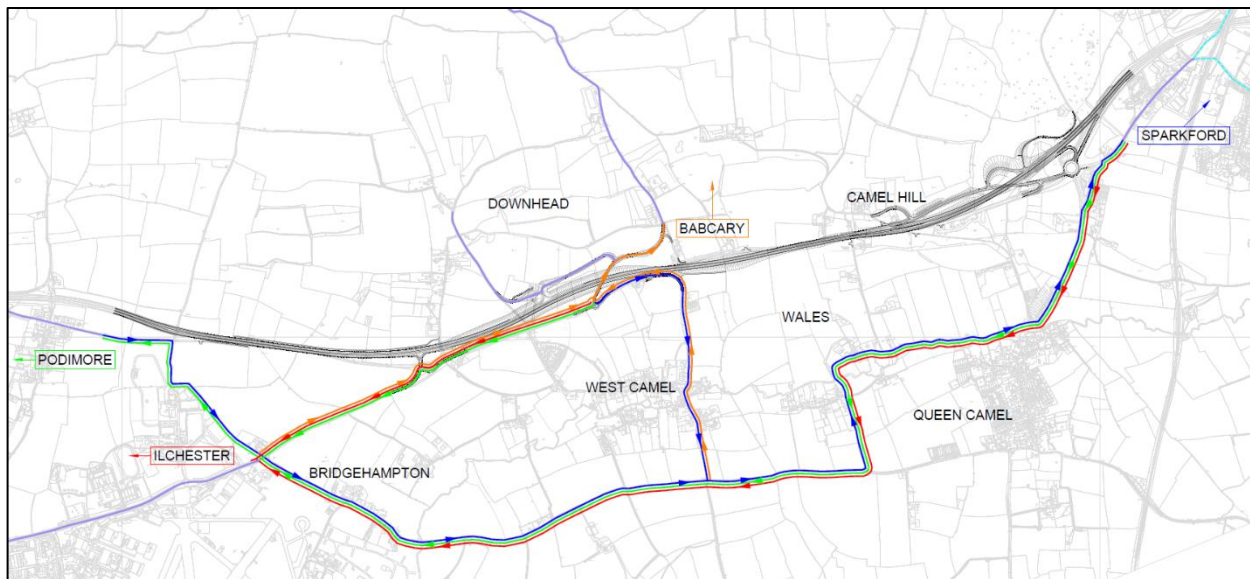
- 2.5.95 Starting from the west, a new right of way is proposed in the berm (Reference A in Figure 2.11), making use of maintenance / accommodation tracks along the northern edge of the scheme between Eastmead Lane and the new 'Downhead Lane' link.
- 2.5.96 The proposed route then crosses Downhead Lane and passes to the north of The Spinney (Reference B in Figure 2.11) before crossing Steart Hill Link and crossing the A303 dual carriageway on the eastern verge of Steart Hill Overbridge (Reference C in Figure 2.11). This verge would be 4 metres wide to accommodate non-motorised users.
- 2.5.97 At the southern end of Steart Hill overbridge the route divides. To the west, the route crosses Downhead Junction Link and travels alongside the former A303 (Reference D in Figure 2.11). Upon reaching Plowage Lane, the route crosses the former A303 to join existing links including an existing footpath along the southern verge.
- 2.5.98 To the east of Steart Hill Overbridge, the route travels alongside the northern verge of the former A303 at Howell Hill (Reference E in Figure 2.11) then using the northern verge (Reference F in Figure 2.11) and travelling along proposed maintenance / accommodation tracks along the southern edge of the scheme to meet up with Traits Lane (Reference G on Figures 2.11 and 2.12).

Figure 2.12: Proposed non-motorised user routes (east)



- 2.5.99 The route then crosses Traits Lane to travel along the southern boundary of the Ministry of Defence site (reference H on Figure 2.12) to meet up with Gason Lane, and then through a small copse of trees to reach the truncated A303 carriageway adjacent to Camel Hill Services. The route then runs along the northern verge of the former A303 carriageway (reference I on Figure 2.12) to meet Camel Hill Link, where a 4 metre wide southern verge is provided as this passes under Hazlegrove Junction underbridge (reference J on Figure 2.12).
- 2.5.100 The route then crosses Camel Hill Link at straight section of carriageway and divides. To the east, the route descends alongside the access to Hazlegrove Preparatory School before passing through Hazlegrove House Registered Park and Garden (Reference L on Figure 2.12) to meet up with the existing rights of way network. To the west, the route continues alongside the northern verge of Camel Hill Link (Reference M on Figure 2.12) and then onto Vale Farm Link (Reference N on Figure 2.12) to meet up with the existing rights of way network.
- 2.5.101 A footpath is also provided from the existing footpath at Sparkford Services to link up with the proposed facilities (Reference O on Figure 2.12).
- 2.5.102 A signed cycle route, making use of existing local roads to the south of the scheme, is also proposed. A drawing has been prepared which illustrates this, and an extract of this can be seen in Figure 2.13 below.

Figure 2.13: Signed cycle route



Changes to private means of access

2.5.103 There are currently numerous direct accesses from the A303 carriageway to adjacent property such as fields, residential, commercial and agricultural premises. Once completed, there would be no direct access available to the new dual carriageway other than at the formal junctions – Camel Cross, Downhead and Hazlegrove – and so where existing access cannot be retained alternative means of access would need to be provided. See Figure 2.4 of Volume 6.2 for further details.

2.5.104 Where the existing A303 carriageway is being retained as a local road any such direct accesses would be left in place. This applies to the following:

- Wayne’s Diner and Hawk House at Camel Cross.
- The row of properties near Canegore Corner including the West Camel Methodist Church, the bakery and three residential properties known as Lamorna, Crusty Cottage and Hill View.
- Camel Hill Quarry and a residential property known as Blue Haze to the east of Canegore Corner.
- Camel Hill Service Area (comprising the Mattia Diner and a Shell filling station).

2.5.105 Between the western scheme limits and Camel Cross, the proposed dual carriageway follows the corridor of the existing A303. There are 7 existing field accesses from the northern and southern verges of the A303, all of which would be closed as part of the scheme. Alternative means of access to land to the north and south of the A303 along this section would be achieved via parallel access tracks. The parallel access tracks to the north of the new dual carriageway would connect to the local road network at the existing Higher

Farm Lane at the west and proposed Downhead Lane at the east. The parallel access track to the south would connect to the Camel Cross Link at the east.

2.5.106 Between Camel Cross and Canegore Corner the existing A303 carriageway is being retained as a local road, and direct accesses along this section of carriageway would be left in place. This applies to the following:

- Wayne's Diner and Hawk House at Camel Cross.
- The row of properties near Canegore Corner including the West Camel Methodist Church, the bakery and three residential properties known as Lamorna, Crusty Cottage and Hill View (although the access to Hill View will require minor reconfiguration).

2.5.107 The alignment of the new dual carriageway to the north along this section would result in severance of some plots and their associated accesses. This applies to:

- The residential property known as The Spinney
- Agricultural land adjacent to The Spinney.

2.5.108 Access to The Spinney and the adjacent land would be provided from the proposed Downhead Lane link.

2.5.109 At Canegore Corner the new dual carriageway passes close to properties on Steart Hill. Access to these properties is unlikely to be directly affected although the access to the property known as Bromar would need minor modification.

2.5.110 Between Canegore Corner and Camel Hill summit the existing A303 carriageway would be retained as a local road, and direct accesses along this section of carriageway would be left in place. This applies to the following:

- The residential property known as Blue Haze.
- Camel Hill Quarry

2.5.111 The alignment of the new dual carriageway to the south along this section would result in severance of some plots and their associated accesses. Access to this land would be re-provided via parallel tracks which connect to the local road network at Howell Hill at the west and Traits Lane at the east.

2.5.112 At Camel Hill summit the new dual carriageway crosses the existing carriageway and passes close to properties to the north at Camel Hill Farm and to the south at the MOD signal station. A direct access to the MOD site from the existing A303 would be closed with no substitute being provided. A direct access to Camel Hill Farm from the A303 would be closed with alternative access being provided to the rear of the property from Hazlegrove Roundabout via the proposed network of local roads (Camel Hill Link and Vale Farm Link).

- 2.5.113 HGV access to Blackwell Farm (located approximately half way along Traits Lane) is currently only available from the A303 junction with Traits Lane, to the north. The junction at the southern end of Traits Lane is not suitable for HGV access. As a result of this loss of connection a new access would be provided to Blackwell Farm from the local road at the southern boundary of the property, Blackwell Lane.
- 2.5.114 Access to a residential property known as Pepper Hill Cottage would be severed by the new dual carriageway at this location. Alternative access would be provided to this property from Hazlegrove Roundabout via the proposed network of local roads (Camel Hill Link and Vale Farm Link).
- 2.5.115 The existing access to Hazlegrove School, which currently connects directly to Hazlegrove Roundabout, would be severed by the construction of the new dual carriageway. An alternative access would be provided from the roundabout via Camel Hill Link.

Structures

- 2.5.116 Two substantial structures are proposed. These are Steart Hill Overbridge and Hazlegrove Underbridge. The locations of these structures are shown in Figure 2.14 and Figure 2.15 below and are also shown in Figure 2.5, Volume 6.2.

Figure 2.14: Location of Steart Hill Overbridge

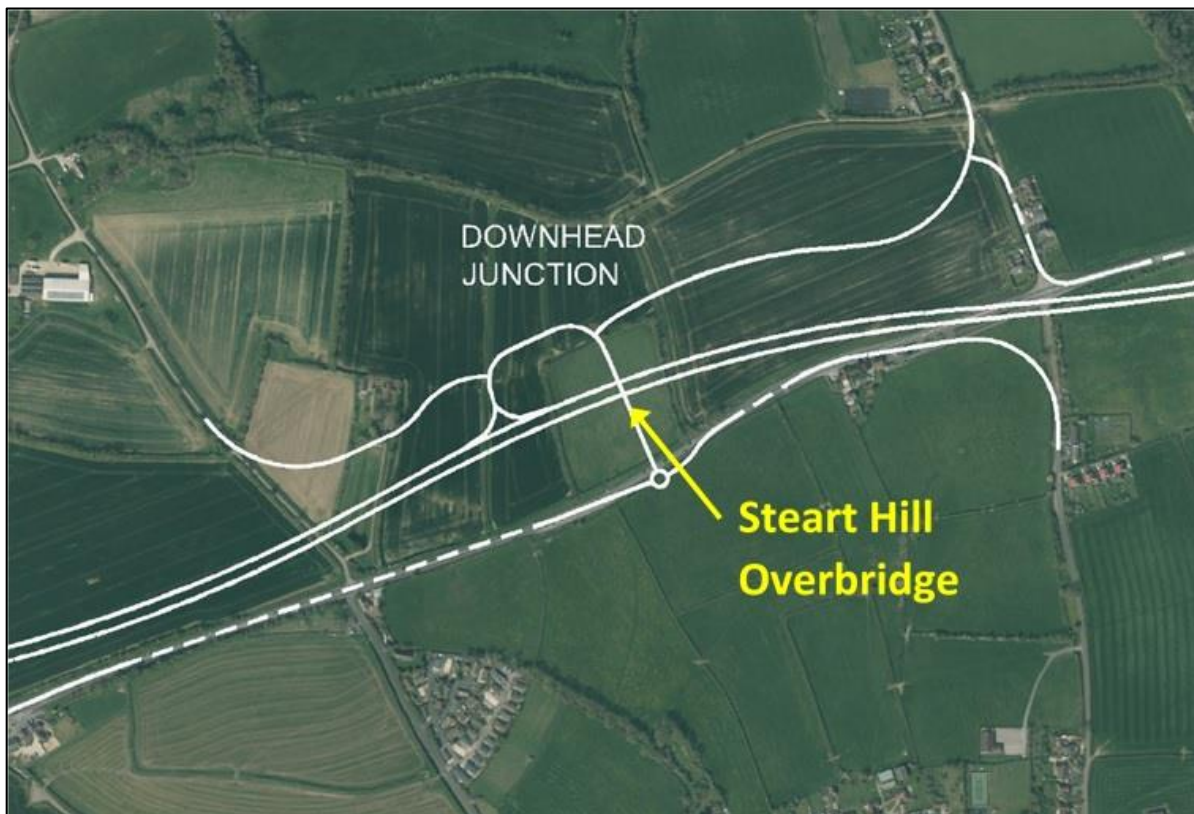
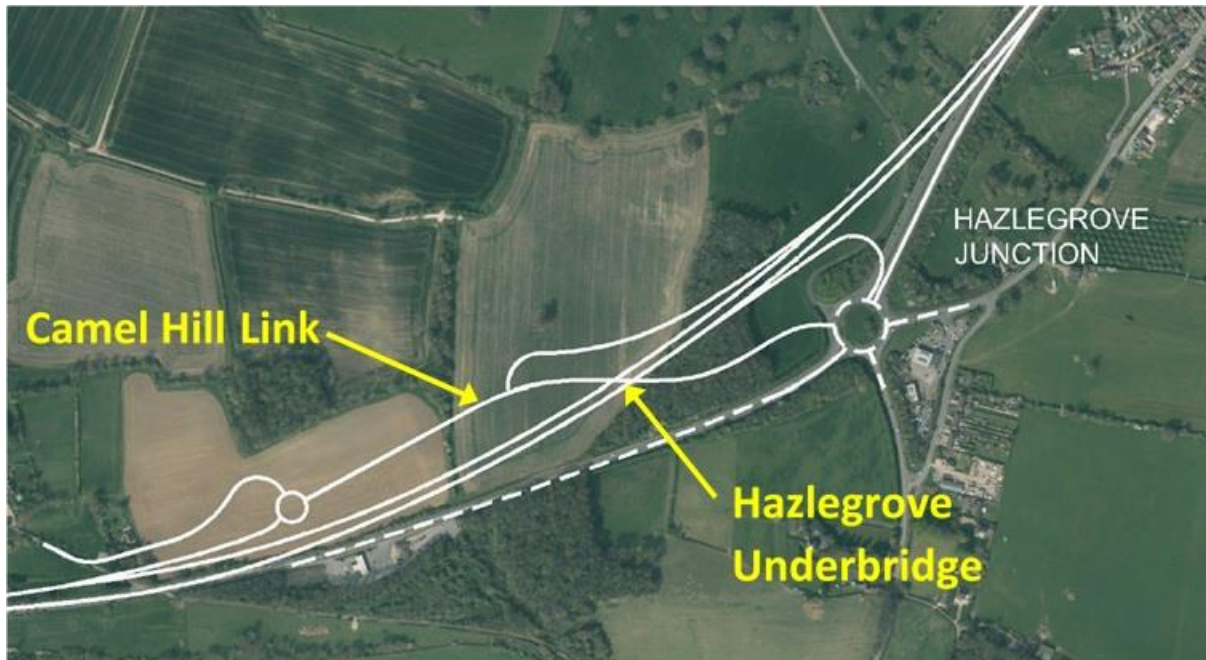


Figure 2.15: Location of Hazlegrove Underbridge



Stear Hill Overbridge

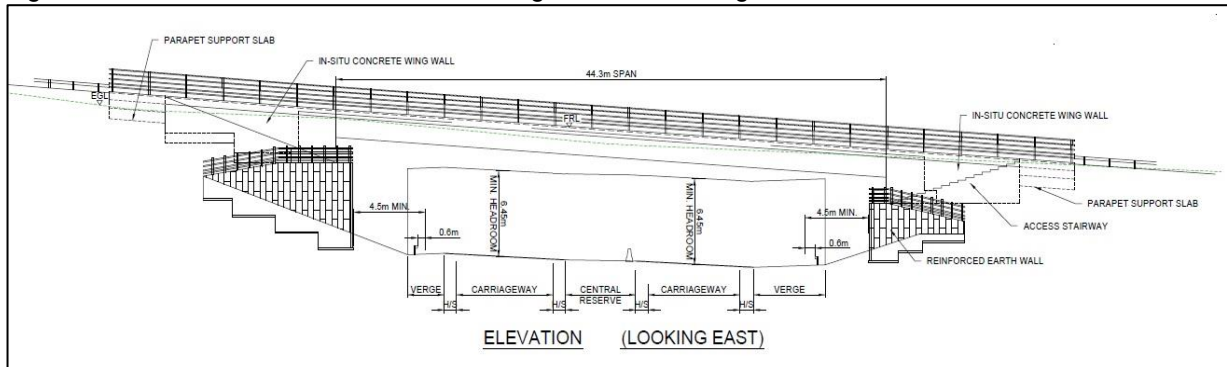
2.5.117 The proposed overbridge would span square to the newly aligned A303 between and connects the former A303 with the new A303 eastbound carriageway and the local road network to the north of the A303. It has been located to the north of the existing A303 enabling it to be constructed without substantial impact on traffic flows along the existing A303 carriageway.

2.5.118 The bridge would have a single span of approximately 44.3 metres length. Its deck would be 14.8 metres wide and incorporate the carriageway of the Downhead Junction Link and associated non-motorised user provision in the eastern verge. A minimum headroom of 6.45 metres would be provided between the A303 carriageway beneath and the underside of the bridge deck. The new A303 would be in a cutting approximately 8.5 metres deep at this location and therefore the carriageway surface level of the bridge deck would be at roughly the same level as the existing ground.

2.5.119 The bridge would be a fully integral structure with the abutments (avoiding the need for movement joints and bearings) seated on spread footing abutments on reinforced earth walls. The superstructure would be a steel concrete composite deck comprised of steel I-girders topped with a reinforced concrete slab.

2.5.120 An extract from the General Arrangement drawing for Steart Hill Overbridge can be seen in Figure 2.16. For further information see Figure 2.5 in Volume 6.2.

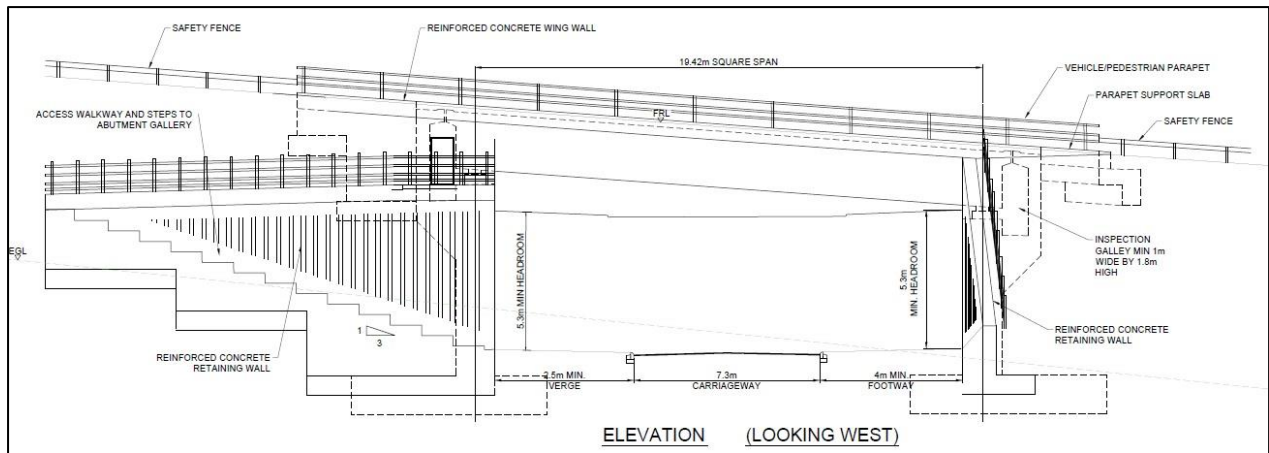
Figure 2.16: Extract from Steart Hill Overbridge General Arrangement



Hazlegrove Underbridge

- 2.5.121 The proposed underbridge would be located on the realigned A303 and would span diagonally across Camel Hill Link. It has been located to the north of the existing A303 enabling it to be constructed without substantial impact on traffic flows along the existing A303 carriageway.
- 2.5.122 The bridge would have a single diagonal span of 44.3 metres and a square span of 19.4 metres. The local road underneath (Camel Cross Link) would include a non-motorised user route in the south-western verge. A minimum headroom of 5.3 metres would be provided between Camel Hill Link and the underside of the bridge deck. The bridge deck would be approximately 2 metres deep.
- 2.5.123 The superstructure would be a steel concrete composite deck comprised of steel welded I-girders topped with a reinforced concrete slab. Reinforced concrete abutments with inspection galleries (to facilitate inspection and maintenance works on bearings and expansion joints) would be founded on spread footings. The bridge deck would be supported by pot bearings sitting on the abutments.
- 2.5.124 The bridge would support the A303 dual carriageway with verges either side and a central reserve. The bridge would incorporate vehicle / pedestrian parapets on both sides of the deck together with a central reserve concrete safety barrier.
- 2.5.125 An extract from the General Arrangement drawing for Hazlegrove Underbridge can be seen in Figure 2.17. For further information see Figure 2.5 in Volume 6.2.

Figure 2.17: Extract from Hazlegrove Underbridge General Arrangement

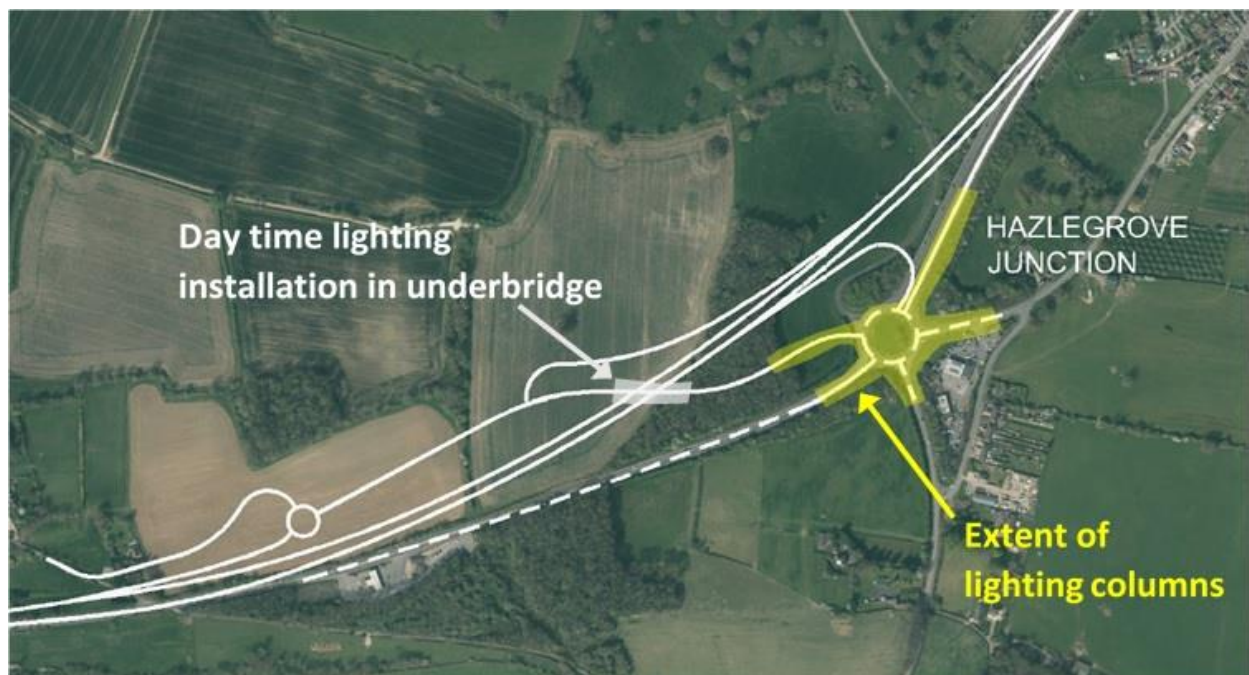


Road lighting

2.5.126 The main A303 carriageway would not be lit. No local roads would be lit except for the existing Hazlegrove Roundabout and its approaches (this roundabout is currently lit). Each column shall be fitted with an LED P850 lantern. Each lantern shall be luminous intensity class G6, tilted at zero degrees, to limit the environmental impact. Where required, lighting columns would be 10 metres high and at nominal spacings of 40 metres.

2.5.127 Hazlegrove Underbridge would be lit during the day-time only. Figure 2.18 below illustrates the sections of the scheme that would be lit. Further details are shown on Figure 2.6 of Volume 6.2.

Figure 2.18: Sections of the scheme that would be lit



Road signs and markings

2.5.128 The scheme signing strategy has been prepared and agreed with Somerset County Council. The locations can be seen on the general arrangement drawings contained within Figure 2.3 of Volume 6.2.

2.5.129 As a result of the proposed junction strategy the signing strategy generally adheres to the existing arrangements, and there would be no need for any substantial changes to strategic, regional or local signed routes.

2.5.130 The location and dimensions of all permanent traffic signs would be designed in accordance with The Traffic Signs Regulations and General Directions 2016 and Traffic Signs Manual Chapter 3²² and 4²³ and Local Transport Note 1/94²⁴, and are shown in Table 2.2 below. The location and dimensions of all permanent road markings and studs would be specified in accordance with The Traffic Signs Regulations and General Directions 2016 and Traffic Signs Manual Chapter 5: Road Markings²⁵.

Table 2.2: Sign dimensions

Sign reference (as shown on Figure 2.3, Volume 6.2)	Width (mm)	Height (mm)	Area (m ²)	Mounting height (mm)	Total height (mm)
ADS-ML-EB-001	3875	3830	14.84	1500	5330
DS-ML-EB-001	2895	2350	6.8	1500	3850
DS-ML-WB-003	2895	2350	6.8	1500	3850
DS-ML-EB-002	2865	1550	4.44	2750	4300
	2865	1150	3.29	1500	
DS-ML-WB-004	2865	1550	4.44	2750	4300
	2865	1150	3.29	1500	
ADS-ML-EB-003	3770	3830	14.44	1500	5330
ADS-ML-EB-004	6665	6700	44.66	1500	8200
DS-ML-EB-003	3315	2150	7.13	3250	5400
	5000	1650	8.25	1500	
RCS-ML-EB-001	3050	2055	6.27	1500	3555
RCS-ML-EB-002	3120	2055	6.41	1500	3555

²² Department for Transport (2008) *Traffic Signs Manual - Chapter 3 Regulatory Signs* [online] available at:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/223943/traffic-signs-manual-chapter-03.pdf (last accessed April 2018).

²³ Department for Transport (2013) *Traffic Signs Manual – Chapter 4 Warning Signs* [online] available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/226765/traffic-signs-manual-chapter-04.pdf (last accessed April 2018).

²⁴ Department for Transport (1994) *The Design and Use of Directional Informatory Signs: Local Transport Note 1/94* [online] available at:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/330323/ltn-1-94_design-directional-signs.pdf (last accessed April 2018).

²⁵ Department for Transport (2003) *Traffic Signs Manual – Chapter 5 Road Markings* [online] available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/223667/traffic-signs-manual-chapter-05.pdf (last accessed April 2018).

Sign reference (as shown on Figure 2.3, Volume 6.2)	Width (mm)	Height (mm)	Area (m ²)	Mounting height (mm)	Total height (mm)
ADS-ML-WB-003	3875	3830	14.84	1500	5330
ADS-ML-EB-002	4835	6205	30	1500	7705
ADS-ML-WB-004	4790	6330	30.32	1500	7830
ADS-CC-EB-001	3020	1840	5.56	1500	3340
ADS-CC-WB-001	2455	1690	4.15	1500	3190
ADS-CC-WB-002	3020	1840	5.56	1500	3340
DS-CC-EB-001	2320	780	1.72	2000	2970
	1830	970	1.64	2000	
	1245	470	0.55	1530	
	1250	690	0.79	840	
DS-DH-EB-001	1370	375	0.49	1500	1875
	1370	375	0.49	1500	
ADS-DH-EB-001	2025	1720	3.48	1500	3220
	1335	690	0.92	810	
	1080	750	0.81	750	
DS-DH-EB-002	1400	770	0.99	1900	2670
	745	280	0.2	1620	
	650	415	0.24	1205	
	1380	470	0.62	1900	
	705	225	0.15	2300	
	705	225	0.15	2300	
ADS-DH-WB-001	2605	2190	5.7	1500	3690
ADS-HH-EB-001	2895	2595	7.51	1500	4095
ADS-HH-WB-001	1305	690	0.9	2350	7060
	1080	750	0.81	1500	
	2895	3920	11.35	3140	
ADS-HH-SB-001	1305	690	0.9	2350	5220
	1080	750	0.81	1500	
	3335	2080	6.94	3140	
DS-HH-WB-001	2180	905	1.85	2850	3755
	1045	550	0.57	2200	
	865	600	0.52	1500	
DS-HH-EB-001	1085	575	0.58	1500	2075
DS-HH-NB-001	1960	875	1.6	1500	2375
ADS-CH-EB-001	3290	1165	3.83	2200	3365
DS-CH-NB-001	845	430	0.34	2600	3030
	845	430	0.34		
	1150	430	0.47		
	1150	430	0.47		
ADS-CH-WB-001	3290	1990	6.55	2175	4165
DS-HG-WB-001	2705	1405	3.52	2175	3580

Sign reference (as shown on Figure 2.3, Volume 6.2)	Width (mm)	Height (mm)	Area (m ²)	Mounting height (mm)	Total height (mm)
DS-HG-SB-001	2870	1345	3.6	1500	2845
DS-HG-EB-001	1625	815	1.23	1500	4420
	2180	875	1.8	2415	
	2445	1030	2.37	3390	
DS-HG-NB-001	1085	690	0.68	1500	3600
	3155	1310	3.89	2290	
ADS-HG-WB-001	6070	5355	32.5	1500	6855
ADS-A359-NB-001	7435	5480	40.74	1500	6980
DS-CHR-EB-001	865	580	0.45	1500	2080
DS-CHR-EB-002	1290	770	0.91	1700	2470
	1130	415	0.44	1200	
ADS-CHR-WB-001	1460	1455	2.12	1500	2955
ADS-ML-WB-001	3105	3175	9.86	1500	4675
	3390	1265	4.29	1500	
ADS-A359-NB-002	2980	2540	7.57	1500	4040
RCS-ML-WB-001	2780	2425	6.74	1500	3925
DS-ML-WB-002	3315	2150	7.13	3250	5400
RCS-ML-WB-002	2785	2425	6.75	1500	3925
ADS-HG-EB-001	6495	4400	28.58	1500	5900
DS-HG-WB-002	2700	720	1.87	1500	2750
	1535	575	0.83	2175	
ADS-HG-EB-002	3780	2155	8.15	1500	3655
DS-CH-EB-001	2340	720	1.61	1500	2220
	2340	720	1.61	1500	
ADS-A359-WB-001	4125	2295	9.47	1500	3795
ADS-A359-WB-002	4125	2295	9.47	1500	3795

2.5.131 Advance direction signs would be provided at appropriate distances ahead of junctions to provide drivers with information about road layout ahead. These would be supplemented with direction signs placed at the junctions. The locations of advance direction and direction signs are shown on Figure 2.3 General Arrangement Plans, Volume 6.2.

2.5.132 Existing advance direction and direction signs along the existing A303 which is to remain in place as a local road would be removed or modified to suit the new road layout.

2.5.133 'No through road' signs would be placed at the southern ends of Traits Lane and Gason Lane to reflect the closure of the junctions of these roads with the A303.

2.5.134 Local 'finger signage' in the vicinity of West Camel would be modified where scheme proposals would influence local journey routes and distances.

Road restraint systems

2.5.135 The proposed dual carriageway would include a continuous rigid (concrete) barrier throughout the length of the central reserve, therefore preventing any right turning manoeuvres between the dual carriageway and local roads.

2.5.136 The central reserve concrete barrier would be 900 millimetres high, and approximately 550 millimetres wide at its base.

2.5.137 Where required, road restraint systems in the verge would be flexible (steel) systems. Indicative locations where this is required are contained in Figure 2.3 General Arrangement Plans, Volume 6.2.

Earthworks

2.5.138 Throughout the development of the design attention has been paid to the earthworks balance (that is the relative cut and fill quantities). The objective of this exercise has been to:

- Minimise the amount of earthworks required across the scheme.
- Ensure the quantities of excavation and deposition are equitable, so that import or export of general earthworks material is either eliminated or minimised.

2.5.139 A principal theme of this strategy has been the consideration of the scheme earthworks in 3 broad sections:

- West: This is generally in cutting contributing to a large earthworks surplus.
- Centre: This is generally on embankment and therefore has a large earthworks deficit.
- East: This is generally on embankment and therefore has a large earthworks deficit.

2.5.140 The area of cutting and 2 areas of embankment are illustrated in Figure 2.19. This figure also illustrates the strategy for hauling material from the cutting to the 2 areas of embankment without interacting with traffic on the existing A303.

Figure 2.19: Main earthworks areas of the scheme



2.5.141 Various acoustic earth bunds are proposed across the scheme. These are described in paragraphs 2.5.159 - 2.5.167 of this chapter.

Drainage

2.5.142 The scheme is located within the catchments of the River Cary and River Cam. The topography of the scheme area is such that there is a single high point of the proposed road at Camel Hill summit.

2.5.143 To the east of the high point, the scheme would outfall north through Hazlegrove RPG to the Dyke Brook, a tributary of the River Cary. To the west of the high point, the scheme would outfall south to the Park Brook, also a tributary of the River Cary.

2.5.144 A retained section of the A303 carriageway and adjacent local road network would outfall south into the River Cam via an existing outfall.

2.5.145 Drainage proposals are illustrated in more detail on drawings contained within Figure 2.7 of Volume 6.3. The Drainage Strategy Report (Appendix 4.7, Volume 6.3) includes a summary of the stakeholder consultation undertaken, overview of the existing drainage system, proposed highway and exterior catchment and water quality management.

2.5.146 All new highway drainage would be designed and constructed to meet the requirements of DMRB Volume 4, Section 2, Part 3, HD 33/16 Surface and Sub-Surface Drainage Systems for Highways²⁶. This standard requires that sealed carrier drains must be designed for a 100% Annual Exceedance Probability (AEP). The design is also checked against a 20% AEP to ensure surcharge levels do not exceed the levels of chamber covers. During the 1%

²⁶ Highways England (1994) Design Manual for Roads and Bridges Volume 6 Section 2, Part 3, HD 33/16 Surface and Sub-Surface Drainage Systems for Highways [online] available at: <http://www.standardsforhighways.co.uk/ha/standards/dmrb/vol6/section2/td2206.pdf> (last accessed June 2018).

AEP event design exceedance routing is managed to alleviate flood risk downstream.

2.5.147 The rainfall intensities used to calculate the design storms include an allowance for the effects of climate change by allowing for a 40% increase²⁷.

2.5.148 Surface water run-off to the highway drainage system is derived from the road cross section; the road surface, verges and adjacent embankments. The following drainage assets have been proposed to effectively drain the highway whilst considering the wider flood risk and environmental impacts such as water quality and biodiversity improvements;

2.5.149 Central reserve drainage is required where the carriageway is super-elevated. Runoff from the carriageway will be collected and conveyed in concrete v-channels (approximately 1,200 millimetres wide and 120 millimetres deep), drained via in-line grated covered catchpits. Within the central reserve, the channels would be constructed from concrete to avoid introducing more onerous maintenance regimes associated with grass-lined channels in an area of risk for maintenance staff.

2.5.150 Within the verges runoff would also be collected and conveyed via v-channels. Their size would vary depending upon the length of road drained and longitudinal profile of the road, ranging from 1,200 millimetres to 500 millimetres wide, 120 to 150 millimetres deep with 1:5 side slopes. Within a cutting, the channels would be grass lined features reducing the velocity of runoff, improving infiltration potential and water quality of discharge. Where the carriageway is on embankment, it is proposed to utilise concrete v-channels to mitigate the risk of slope failure due to infiltration through the granular embankments.

2.5.151 Sub-surface drainage is proposed to ensure the longevity of the pavement caused by washout of the sub-base. Fin drains are proposed adjacent to the pavement, with connectivity into the positive drainage system.

2.5.152 Filter drains are proposed at the embankment toe, within the verge, where the carriageway is in cutting. These would comprise of granular trenches, with perforated pipework to collect and convey runoff into the positive drainage system. Where the carriageway is on embankment, ditches have been proposed at the toe parallel to the highway boundary and maintenance strip.

2.5.153 The bridge decks would be fitted with bridge deck gully units. Utilising the camber and longitudinal falls it is proposed to shed water to the channel line with outlets located just prior to the expansion joints at the lower end of the deck. The bridge deck gully units and associated pipework would be cast

²⁷ Environment Agency Flood risk assessments: climate change allowances, Environment Agency.

through the deck slab. Pipework would convey discharge down the rear face of the bridge piers and branch into longitudinal carrier drains below in the mainline. The bituminous surfacing materials proposed on the bridge deck are permeable (to a degree) and as a result water would collect above the water proofing system for the concrete deck. The falls are such that water would shed to the expansion joint where water would become trapped. In these locations water can be collected and conveyed to the gully units via perforated pipes (nominally 40 millimetres within the surfacing) to provide positive sub-surface drainage.

2.5.154 At Hazlegrove underpass the longitudinal profile of the road creates a basin. At this location, oversized pipework is required (DN900 millimetres) to mitigate the risk of ponding during design exceedance events.

2.5.155 Attenuation ponds are proposed to limit offsite discharge to the mean annual maximum flow rate (Q_{bar}). An existing attenuation pond located at Hazlegrove would be utilised, alongside 5 proposed ponds. The proposed ponds consist of:

- A permanent pool of water that would allow the suspended sediments to settle out and prevent resuspension. To aid maintenance of the ponds a sediment forebay has been proposed to allow for targeted monitoring and subsequent removal of sediment within a smaller area. The shapes of the pools have been designed to encourage plug flows, displacing the permanent pool during storm events.
- An attenuation storage volume, above the permanent pool, that would fill with storm water during storm events. Water levels will vary depending upon the severity of the storm. An aquatic bench has been proposed for the larger ponds at the foot of Camel Hill and near Hazlegrove Preparatory School to support wetland planting within the marginal zone.
- A liner, to ensure the effective storage capacity is not diminished during times of high groundwater. This is proposed to be a 500 millimetres thick cohesive material (such as clay), however an impermeable geotextile could also be provided.
- Flow control devices are required to limit offsite discharge, maximising the effective storage volume. It is proposed to utilise vortex flow control devices to reduce the risk of blockages. Penstocks are proposed at all outlets into watercourses to isolate the positive drainage system in the event of a spillage. These are to be marked as 'Pollution Control Devices'.

2.5.156 In accordance with DMRB HA106/04²⁸ the drainage from natural catchments has been considered. The exterior catchment runoff (where the proposed highway corridor intercepts a natural catchment) will be managed via an independent network of cut-off ditches and culverts, conveying to existing ordinary watercourses. Culverts (no greater than 900 millimetres in diameter) have been proposed to convey natural catchment runoff beneath the highway and other access features such as Public Rights of Way and access tracks.

2.5.157 Proposed local roads are to adopt the existing strategy and to be drained via kerb and gully with outfalls into adjacent conveyance ditches. In locations of cutting piped systems are required. New sections of full depth carriageway would receive sub-surface drainage.

2.5.158 Where existing stretches of the A303 are to be retained (approximately 1.6 kilometres) and de-trunked the existing drainage network is to be retained, and subject to a rehabilitation plan following the undertaking of a CCTV condition survey assessment.

Acoustic barriers, noise bunds and thin surface courses

2.5.159 The proposed locations of noise mitigation fencing and acoustic earth bunds are indicated in Figure 2.20. These features are also shown in the context of other design elements in the General Arrangement Plans (Figure 2.3, Volume 6.2).

2.5.160 Two noise bunds, each 2 metres high (labelled as Bunds 1 and 2 in Figure 2.20), would be provided towards the western end of the scheme, where the B3151 joins the A303 near Hawk House. The bunds would follow the alignment of the A303 on the north side of the carriageway for approximately 380 metres. It would be necessary to construct an access track through these bunds. This would be aligned at a skewed angle so that the effect on the bunds is minimised.

2.5.161 A 2 metre high acoustic barrier (Barrier 1) would be provided opposite the property known as The Spinney, approximately 150 metres long located to the north of the scheme.

2.5.162 A 2 metre noise bund (Bund 3) would be located to the east of Downhead Junction where the existing A303 meets Steart Hill, at the north side of the scheme. At Steart Hill this would be continued as a 3 metre high acoustic

²⁸ Highways England (2004) DMRB Volume 4 Section 2 Part 1 HA106/04 *Drainage of Runoff from Natural Catchments* [online] available at: <http://www.standardsforhighways.co.uk/ha/standards/dmrb/vol4/section2/ha10604.pdf> (last accessed July 2018).

barrier (Barrier 2), located at the top of the embankment where the new A303 begins to rise above the existing ground level.

- 2.5.163 Between Howell Hill and Traits Lane, along the southern perimeter of the scheme, a 'false cutting' (Bund 4) would be provided for approximately 420 metres. The top of this false cutting will be 2 metres above the proposed level of the adjacent verge.
- 2.5.164 Near Camel Hill, 2 barriers (Barriers 3 and 4) would be provided following the scheme alignment on the north side of the carriageway. Both would be 2 metres high, with 1 being located opposite Traits Lane and the other being located opposite where Gason Lane currently meets the A303.
- 2.5.165 At Hazlegrove Junction, 3 false cuttings would be provided. Bund 5 would be approximately 300 metres long and would be a minimum of 2 metres and a maximum of 4 metres above the adjacent verge. The other 2 bunds (Bunds 6 and 7) would be provided along the north side of the scheme, providing screening to Hazlegrove House Registered Park and Garden. These 2 bunds would be approximately 180 metres in length and 2 metres in height relative to the proposed verge. would be provided along the north side of the scheme, providing screening to Hazlegrove House RPG.
- 2.5.166 The acoustic barriers would be constructed of timber panels with absorptive material on each side on painted, galvanised steel posts. The absorptive infill will be finished with half-round pales. All bunds would be earth mounds planted with trees and shrubs.
- 2.5.167 A thin surface course (which would reduce noise and spray) would be applied to the new dual carriageway associated with the scheme.

Figure 2.20: Locations of acoustic barriers, bunds and false cuttings



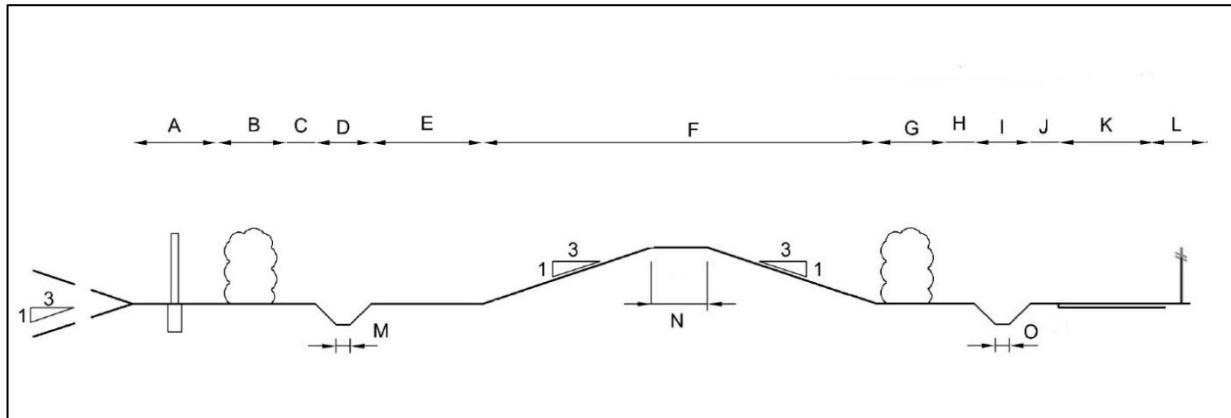
Boundary treatments

2.5.168 The scheme footprint would be sufficiently wide to accommodate the following elements at the site boundary:

- Planting such as hedgerows and trees.
- Highway drainage ditches, ponds and outfall works.
- Strips to enable maintenance of highway ditches.
- Formal access tracks for maintenance of drainage outfall works.
- Landscape earthworks such as false cuttings and bunds.
- External drainage catchment ditches.
- Boundary fences and gates.
- Rights of way.
- Accommodation works.

2.5.169 Figure 2.21 illustrates the typical space allowed for each of these elements in a theoretical cross section. It should be noted that there are no locations along the scheme where all these elements are required.

Figure 2.21: Possible elements at the highway boundary



Key:

A	3 metres	Allowance for acoustic barrier (1.5 metres either side for maint / inspection)
B	2.5 metres	Hedgerow
C	1 metres	Nominal strip
D	2 metres	Highway drainage ditch
E	4 metres	Strip for maintenance access where highway ditch or hedgerow are provided
F	Landscape bund or false cutting, nominally 2 metres high above verge level	
G	2.5 metres	Hedgerow
H	1 metres	Nominal strip
I	2 metres	External catchment ditch
J	1 metres	Nominal strip
K	4 metres	Access / accommodation track / right of way
L	1 metre	Allowance for boundary fence
M	1 metre	Assumed ditch invert
N	3 metres	Top of bund / false cutting
O	1 metre	Assumed ditch invert

2.5.170 The layout of these elements in the cross section along the full length of the scheme is indicated in Figure 2.3 General Arrangement Plans, Volume 6.2.

Technology installations

2.5.171 The scheme proposals include the following technology installations, the locations of which are shown on Figure 2.3 General Arrangement Plans, Volume 6.2:

- Emergency Roadside Telephones (ERTs).
- Automatic Number Plate Recognition (ANPR) cameras.
- Traffic Monitoring Units (TMU).

2.5.172 ERTs would be provided in each of the proposed laybys to be consistent with provision along the existing corridor either side of the scheme limits. These would be solar powered and connected to the Regional Control Centre (RCC) via the Global System for Mobile communications (GSM).

2.5.173 An existing ANPR camera is located along the existing single carriageway. Liaison with Avon and Somerset Police has confirmed that they wish to retain

this facility. One camera is proposed for each carriageway. These would be connected to the local power supply at Steart Hill, and connected to the communications network via GSM.

- 2.5.174 A TMU would be installed to replace the existing unit that would need to be removed as part of the works.
- 2.5.175 A duct route would be installed along the full length of the scheme, along with cross carriageway ducts at approximate intervals of 500 metres. This duct route is intended for cabling associated with future technology installations that may be required as part of any future technology upgrade scheme.

Associated development for areas of ecological mitigation and a private means of access

- 2.5.176 In addition to the integral works associated with the scheme as described above, there would also be 3 locations of works classified as associated development. Associated development is defined in the *Planning Act 2008* as development which is associated with the principal development. Sub-sections (2) to (4) of 115 of the *Planning Act 2008* set out other requirements relating to associated development. The associated development related to this scheme fall within sub-section (3) of 115 as the development would be within England.

- 2.5.177 These locations are as follows:

Construction of an accommodation track for Blackwell Farm

- 2.5.178 An area of private means of access includes the construction of an accommodation track for Blackwell Farm, as shown on *Sheet 3 of the Works Plans (document reference TR010036/APP/2.3)*. This accommodation track is to accommodate access to Blackwell Farm for lorries as their current access from the existing A303 via Traits Lane would be revoked as a result of the scheme. Access via Blackwell Road to the south would remain, however the existing junction with Traits Lane is not large enough to accommodate agricultural vehicles required for then operation of the farm.

Reptile mitigation at Downhead

- 2.5.179 During the construction of the scheme, a reptile capture and translocation period is required so as to move reptiles out of the area of works. A reptile receptor site has been identified for captured individuals, and is located greater than 400 metres to the north of the A303. It is located north east of Downhead Manor Farm, and comprises tussocky calcareous grassland, scrub, hedgerows and grazed grassland, forming a mosaic of habitats. This location is labelled as work numbers 39 and 40 on the *Works Plans (document reference TR010036/APP/2.3)*. The receptor site would be enhanced through:

- The installation of 2 hibernacula, one to the north and one to the south
- Fencing off the northern area from sheep.

Construction of a hibernacula at Hazlegrove

2.5.180 The construction of the scheme would result in the loss of terrestrial habitat for great crested newts (GCN). As part of the mitigation required for great crested newt, a hibernacula would be created for great crested newt mitigation at Hazlegrove (work number 99) as shown on the **Works Plans (document reference TR010036/APP/2.3)**.

Environmental design

2.5.181 The environmental design is shown on the Environmental Masterplan contained within Figure 2.8 of Volume 6.2. The Environmental Masterplan incorporates mitigation measures identified as part of the environmental assessment process. Existing vegetation would be retained where practicable. Proposed planting would mainly consist of native tree and shrub species appropriate to the study area.

2.5.182 Environmental mitigation measures shown on Figure 2.8 Environmental Masterplan, Volume 6.2 and described in the ES are considered to be essential.

Landscape design

2.5.183 The landscape design has been prepared to address mitigation requirements for both ecology and landscape assets.

2.5.184 Where vegetation removal is required to accommodate construction, local native species would be introduced as reinstatement vegetation, with the purpose of maintaining and restoring natural ecological diversity and improving the aesthetic value of the planting areas. The proposed planting types would comprise areas of woodland, linear belts of trees and shrubs, individual specimen trees, hedgerows and hedgerows with trees along the highway boundary, as specified on Figure 2.8 Environmental Masterplan, Volume 6.2. Over time, this vegetation would mature to offer effective screening where required as well as general landscape integration, with the aim of reducing the visual impact of the scheme on residential receptors and users of PRowS.

2.5.185 Taking into account the sensitivity of Hazlegrove House RPG, the design in this locality aims to retain as much existing vegetation as possible as well as replacing any vegetation loss with linear tree and shrub planting. Scattered individual native trees have also been proposed within this area to maintain the existing landscape character. It has also been proposed to improve the existing arable land to a wildflower and species rich grassland and introduce a wildlife

pond with associated wet grassland and marginal planting. This would increase the biodiversity and visual amenity of Hazlegrove House RPG.

Biodiversity mitigation

- 2.5.186 The Environmental Masterplan (Figure 2.8, Volume 6.2) incorporates habitat replacement for both protected and notable species as appropriate and as follows.
- 2.5.187 For great crested newts, 2 receptor areas would be established. For the population of great crested newts near to the proposed Downhead Junction, a hibernacula would be created within the receptor area located at grid reference ST561250; the area allocated for this mitigation is approximately 5.43 hectares. For the Hazlegrove population, the receptor area and hibernacula to be created would be located at grid reference ST601265; the area allocated for this mitigation is approximately 0.08 hectares in area. These locations are shown in Appendix H of Appendix 8.7 Reptile Technical Report, Volume 6.3.
- 2.5.188 For reptiles, 1 receptor area has been identified and is located north east of Downhead Manor Farm, comprising tussocky calcareous grassland, scrub, hedgerows and grazed grassland, forming a mosaic of habitats. The receptor site would be enhanced as described in paragraph 2.5.179, and the area allocated for this mitigation is approximately 1.9 hectares in area.
- 2.5.189 Approximately 100 bird boxes and approximately 220 bat boxes would be installed within the red line boundary for the scheme.
- 2.5.190 One badger tunnel near Camel Hill would be installed under the A303 to provide connectivity and safe passage to foraging areas. Additionally, badger fencing would be installed either side of the badger tunnel. The tunnel and fencing would be designed in accordance with DMRB²⁹. Further information
- 2.5.191 Landscape planting has been tailored to enhance biodiversity through the provision of hedgerows, trees, shrubs and woodland vegetation, as well as species rich grassland and a wildlife pond, as specified on the Environmental Masterplan (Figure 2.8, Volume 6.2).

Land use requirements during construction and operation

- 2.5.192 The extent of land use requirements during construction are anticipated to be a total of 110 hectares. Once the scheme is operational, the land requirements are anticipated to be a total of 62.4 hectares.

²⁹ Highways England (1992) Design Manual for Roads and Bridges Volume 10 Section 4 Part 2 (HA 59/92) *Mitigating against effects on badgers* [online] available at: <http://www.standardsforhighways.co.uk/ha/standards/dmr/vol10/section4/ha5992.pdf> (last accessed April 2018).

Design uncertainties and limits of deviation

2.5.193 Where there are specific areas of uncertainty associated within the construction of the scheme, these have been identified within the construction strategy (section 2.6 of this chapter).

2.5.194 The design for the scheme would continue up until construction, but would remain within the assessed limits of deviation.

Lateral limits of deviation

2.5.195 The lateral limits of deviation are the extent of the land to be acquired permanently. This is indicated on the ***Works Plans (document reference TR010036/APP/2.3)***.

Vertical limits of deviation

2.5.196 In general, a 1 metre (plus or minus) limit of deviation for vertical alignment, relative to the levels shown on the ***Engineering Sections (document reference TR010036/APP/2.17)***, has been incorporated into the assessment. However, in respect of Works 80, 84 and 91 (shown on sheet 4 of the ***Works Plans, document reference TR010036/APP/2.3)*** the vertical limits of deviation shall be 1 metre upwards and 5 metres downwards.

2.5.197 All members of the environment team were briefed on the horizontal and vertical limits of deviation and the design uncertainties before beginning their assessment work, and these factors have been taken into account throughout the assessment to ensure that the ES has been based on a reasonable worst case scenario. Chapters 5 to 14 of Volume 6.1 explain how the limits of deviation outlined in this section have been taken into account within each of the individual assessments.

Temporary works to facilitate the construction of the scheme

2.5.198 Temporary works required to facilitate the construction of the scheme would include:

- Establishment of 4 temporary site compounds to accommodate the management of resources necessary to deliver the works.
- The establishment of temporary soil storage areas to facilitate the earth moving operations
- The establishment of 2 haul routes to facilitate the earth moving operations (to be removed soon after the completion of earthworks activities)

- A temporary bridge over the existing A303 to transfer site won material from the north to the south to create new levels for the new A303 (to be removed soon after the completion of earthworks activities).

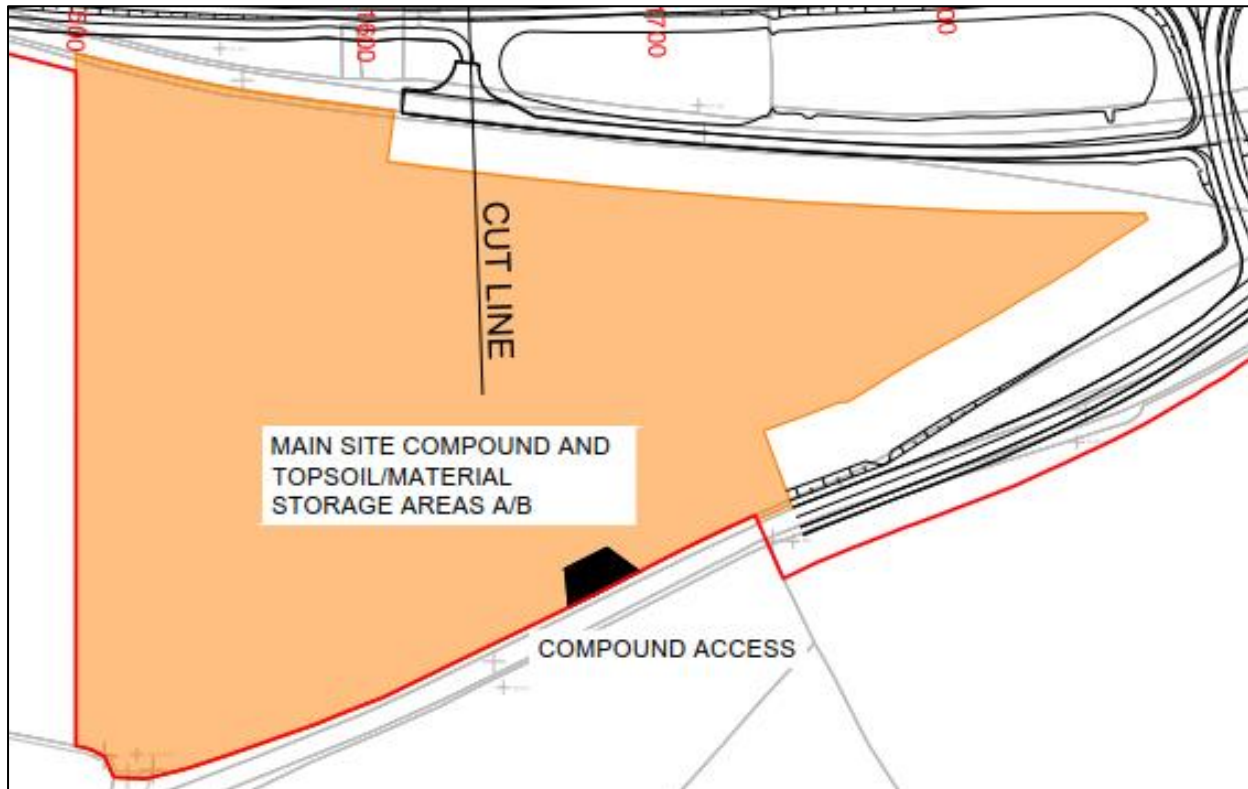
Temporary site compounds

- 2.5.199 Four temporary site compounds would be established to support the construction of the scheme. The locations are identified on Figure 2.9 Temporary Works Plans, within Volume 6.2. They would generally comprise mobile porta cabin office units, welfare facilities, storage areas for construction materials, maintenance areas and parking areas for the workforce.
- 2.5.200 The temporary site compounds would be prepared by the removal of vegetation and overlaying with geotextile membrane prior to placement of temporary granular fill material. For the main site compound and the section of the haul route that runs adjacent to the Camel Hill Schedule Monument, the ground would be raised through the installation of geotextile over the existing ground (with no vegetation clearance proposed in these areas), prior to the placement of temporary granular fill material. Car parking and pedestrian areas within the compounds would be bolstered with asphalt surfacing. On completion of the scheme, these compound areas would be restored to their original condition, before being returned to the landowner or incorporated into the environmental mitigation proposals in accordance with the environmental masterplan (Figure 2.8, Volume 6.2).
- 2.5.201 Boundary fencing or timber hoarding would be erected around all compounds and material storage areas. Wheel washing facilities would be installed at all compounds and material storage areas to mitigate the risk of construction material fouling the local network.

Temporary main site compound

2.5.202 An area of land between the existing A303 and the B3151 has been identified for the main site compound (Figure 2.22 below). The main site compound would be approximately 5 hectares in size.

Figure 2.22: Main site compound



2.5.203 A new access point to the proposed main site compound would be constructed from the B3151 (as shown on Figure 2.22). The position and arrangement of the junction would conform with DMRB Volume 6³⁰ and would be constructed in accordance with the Specification for Highway Works³¹. The access would be temporary and would be restored to the previous land-use after use.

2.5.204 The compound would accommodate the site offices and would be the first port of call for all staff, the workforce, and visitors. Typically, therefore, the facilities found at the main site compound would include:

- reception area
- induction room

³⁰ Highways England (2018) Design Manual for Roads and Bridges Volume 6: Road Geometry [online] available at: <http://www.standardsforhighways.co.uk/ha/standards/dmrb/vol6/index.htm> (last accessed July 2018).

³¹ Highways England (2018) Manual of Contract Documents for Highway Works: Volume 1 – Specification for Highway Works [online] available at: <http://www.standardsforhighways.co.uk/ha/standards/mchw/vol1/index.htm> (last accessed July 2018).

- quiet room
- office space
- welfare facilities
- canteen
- car parking

2.5.205 The main site compound would facilitate the storage of construction plant and material. Topsoil removed in the construction of the main site compound would be stored locally in 2 metre high bunds around the perimeter of the compound.

2.5.206 Designated areas within the main site compound would include:

- small tools and materials stores
- fabrication area for temporary works
- pre-fabrication area for reinforcement
- drainage materials storage
- ducting storage
- allocated areas for specialist sub-contractors

2.5.207 Deliveries to the main site compound would take place between the normal working hours of 07.00 to 18.00, Monday to Friday. These would be managed such that directions to the delivery points are included within formal supply chain orders and included within the site rules. This process manages the risk of vehicles travelling through local villages unnecessarily, and allows enforcement measures to be taken wherever necessary. Deliveries to site would take place daily from the onset of construction through to completion. Deliveries would be broad ranging, to include items from packages delivered by courier, to aggregates and materials for construction. Materials for the scheme would be transported via the existing A303.

2.5.208 Material deliveries would be programmed on an 'as required' basis to avoid temporary storage and double handling, in line with mitigation measures detailed within Annex B.1 Outline Site Waste Management Plan and Annex B.2 Outline Materials Management Plan of the ***Outline Environmental Management Plan (OEMP) (document reference TR010036/APP/6.7)***. Deliveries would be made to the relevant site compound before being taken through the site on the internal haul route direct to their point of use. Materials required for these operations include fill material, cement, sand, gravel and bituminous pavement material for road surfacing.

2.5.209 Staff, operatives and visitors would be encouraged to share vehicles, which is established good practice on major construction projects. Crew buses would be used to take gangs onto the site and minimise the number of private vehicle movements. Welfare facilities and mobile site canteens would also reduce the amount of travelling through the site. More information on Traffic Management

during construction is contained within Annex B.6 Outline Traffic Management Plan in the **OEMP (document reference TR010036/APP/6.7)**.

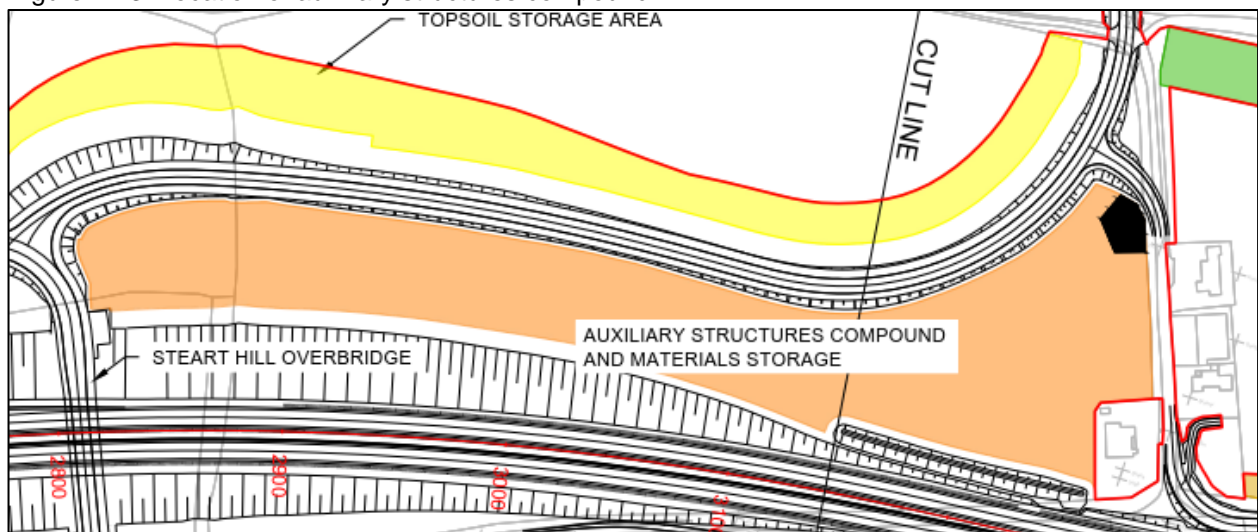
2.5.210 The main site compound would be occupied at all times either by designated store person or out of working hours (refer to section 2.6.8 for working hours) security personnel for the security of the plant, equipment, and materials within it.

Temporary auxiliary compounds

2.5.211 In addition to the main site compound, 3 other compound location areas would be utilised to facilitate the works, as identified on Figure 2.9 Temporary works plans, Volume 6.2. These smaller, auxiliary compound areas are described in turn below. Access points at each of the temporary compounds would be gated and either locked or attended by security personnel. Access points would be temporary and would be reinstated after use.

2.5.212 An auxiliary structures compound would be created to facilitate construction of the Downhead overbridge (see Figure 2.23 below). This compound would be located to the north east of the new overbridge with access via a new opening from Steart Hill and would be approximately 2.7 hectares in size.

Figure 2.23: Location of auxiliary structures compound

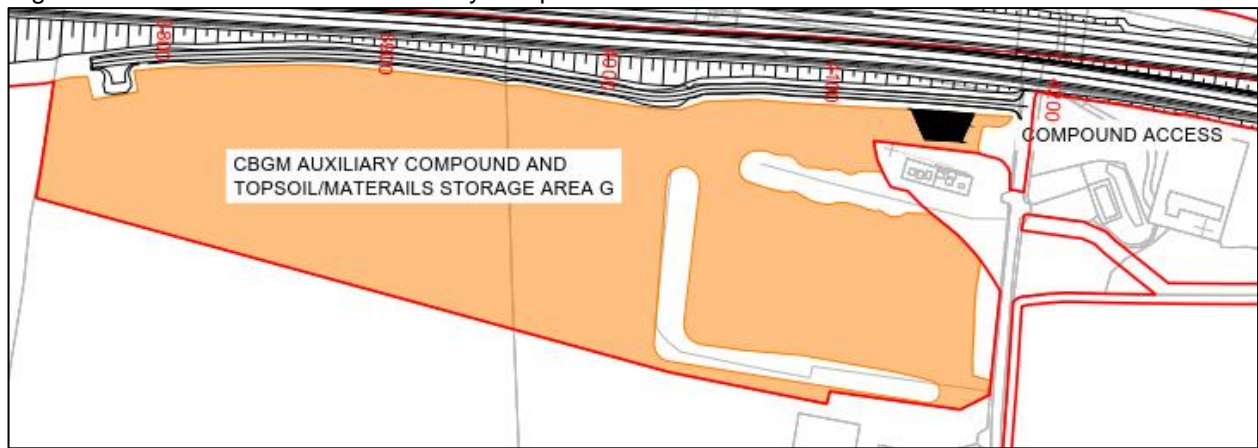


2.5.213 Further east, an auxiliary compound would be created along the southern verge of the existing A303 and west of Traits Lane for the batching of cement bound granular material (CBGM), and would be complete with testing laboratory for ensuring quality control of imported aggregate and product verification (see Figure 2.24 below). The area would be approximately 4.3 hectares in size. Generators would be located more than 20 metres from the Grade II listed Eyewell house, and temporary noise screening should be included around this compound to ensure adverse effects are minimised to the Grade II listed Eyewell House.

2.5.214 The auxiliary compound would be complete with testing laboratory for ensuring quality control of imported aggregate and product verification. The size of the testing laboratory would be dependent on how much testing the Contractor decides to carry out on site. For the purposes of this ES it has been assumed that the testing laboratory would be a similar size to a single-story site office and would include basic welfare and office facilities.

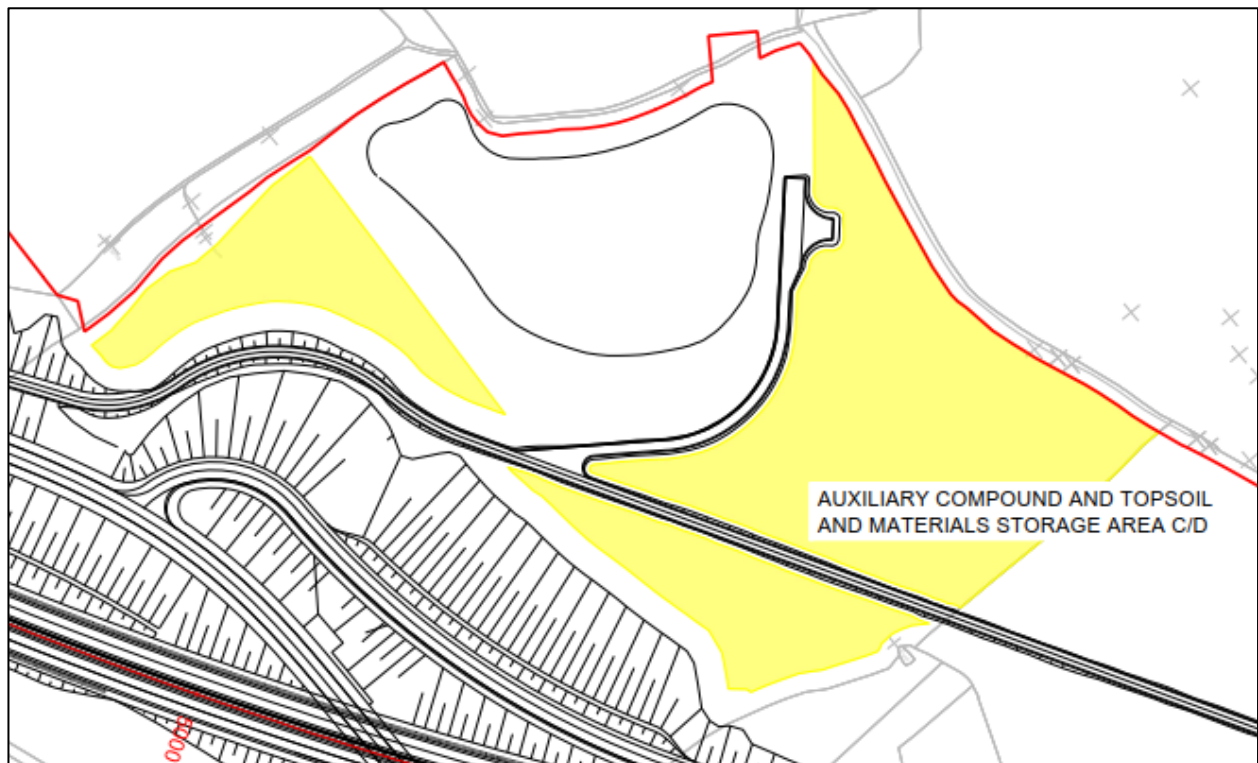
2.5.215 Due to its location in the middle of the scheme, the area is in the optimum location for distribution of CBGM throughout the site. The area could also be utilised as an alternative to the main site compound for the storage of plant and materials to supply the eastern sections of the scheme, if required. Both locations of the main site compound have been assessed within the relevant topic chapters (Chapters 5 to 14, Volume 6.1) of this ES.

Figure 2.24: Location of CBGM auxiliary compound



2.5.216 An auxiliary compound at Hazlegrove has also been identified as an area of land required to facilitate both the construction of Hazlegrove Underpass and remodelling of Hazlegrove Roundabout (see Figure 2.25 below). The area would be located within the southern portion of the Hazlegrove House RPG and would be approximately 1 hectares in size.

Figure 2.25: Location of auxiliary compound at Hazlegrove



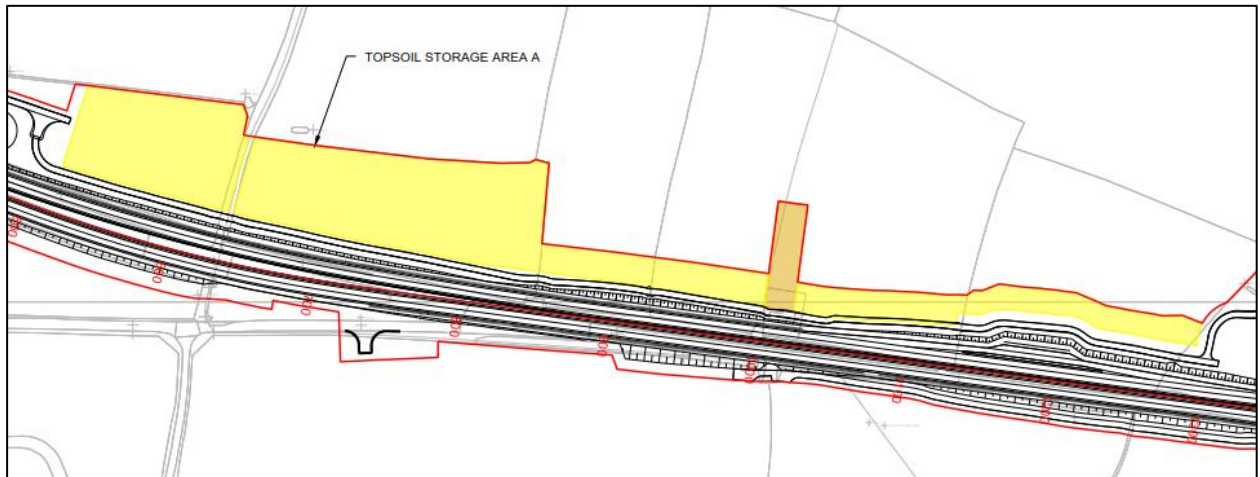
Temporary storage areas

2.5.217 Earthworks storage areas would be needed at approximately 800 metre intervals along the length of the scheme. Proposed earthworks storage sites are shown on Figure 2.9 Temporary works plans in Volume 6.2 (and in Figures 2.22, 2.23, 2.24, 2.25 and 2.26 in this chapter) and have been selected based on meeting the following criteria:

- Topography to be at grade or where embankments / cuttings are minimal.
- Direct access to / from the main works with 40 tonne dump trucks is possible.
- The area would not be inaccessible once the new A303 alignment is open to traffic. This would allow the completion of site re-establishment of the storage areas themselves and the completion of any offline planting required.

2.5.218 Storage Area A is located to the north of the existing A303 immediately to the east of Eastmead Lane (Track) (see Figure 2.26 below). Topsoil Storage Area B is located between Downhead Lane and the un-named road to the west (see Figure 2.22). An area of land lying to the east of Plowage Lane and to the north of the existing A303 has been identified for topsoil storage (see Figure 2.23). Storage Area C / D is located to the north-west of Hazlegrove Junction (see Figure 2.25).

Figure 2.25: Topsoil storage area



2.5.219 The stored material would be reused either to restore compound areas to their original use or as part of the environmental design as detailed in Figure 2.8 Environmental Masterplan of Volume 6.2.

Temporary earthworks haul routes

2.5.220 The temporary works requirements for the scheme include 2 haul routes (a northern earthworks haul route and a southern earthworks haul route, not along existing roads). The locations of these are indicated on Figure 2.9 of Volume 6.2, and are also shown in Figures 2.27 and 2.28 below. These features are fundamental to the earthworks strategy in facilitating the transportation of excavated material from the western section of the site to the east during construction.

Figure 2.27: Location of northern earthworks haul route

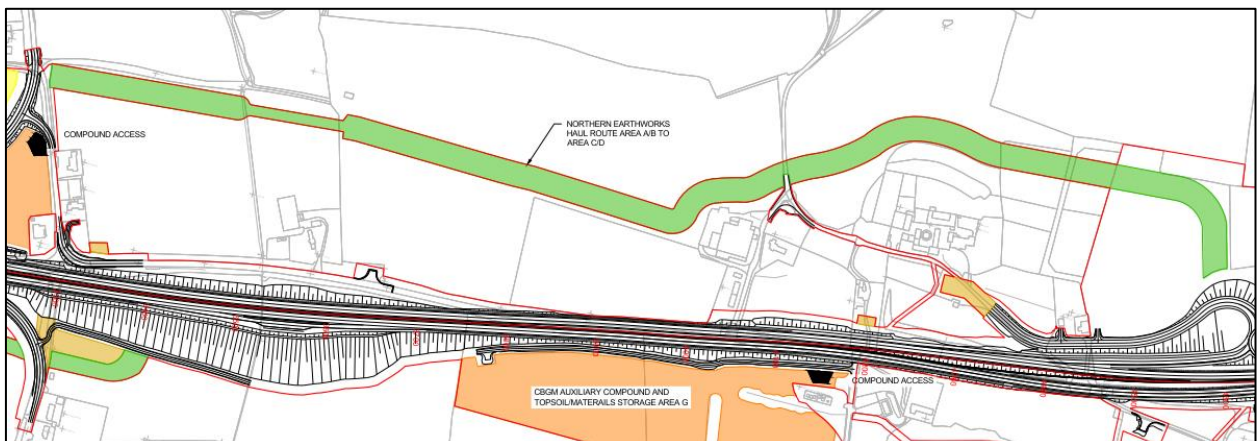
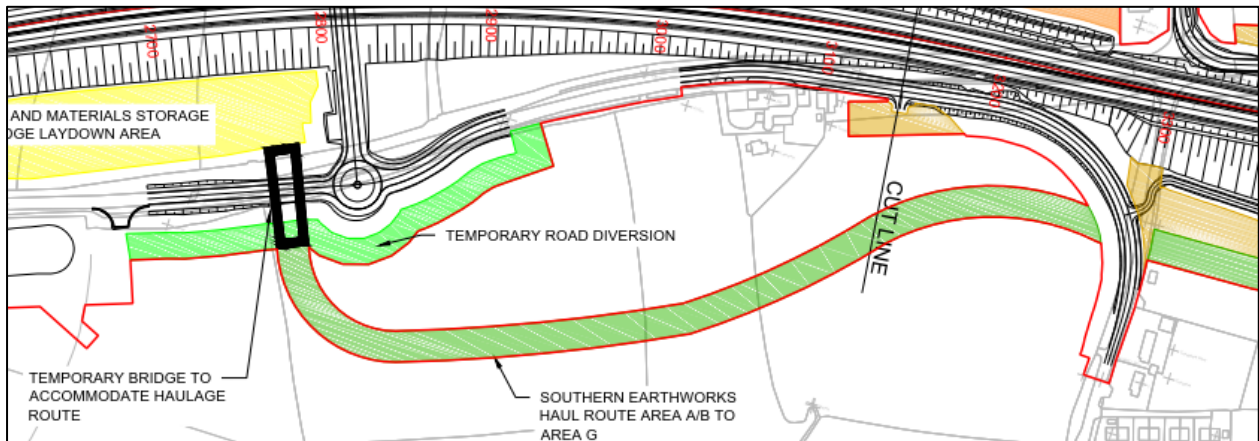


Figure 2.28: Location of southern earthworks haul route



2.5.221 Typically, the haul routes would be 12 metres wide to allow for the efficient running of dump trucks, with a further 3 metres required alongside the route for the temporary storage of topsoil excavated from the haul route itself, in bunds not exceeding 2 metres high. This would minimise plant movements during haul route construction and reinstatement, would ensure that the reinstated materials are from source, and would reduce the land take needed in other storage areas.

2.5.222 Haul routes would be constructed from imported granular fill, placed on geotextile. Ground conditions would dictate the depth of fill required, however, the design of the temporary roads could incorporate geogrid or lime stabilisation methods to reduce the amount of granular fill required. On completion of the scheme, the temporary haul routes would be restored and the areas returned to their original condition.

2.5.223 The proposed northern haul route, between Steart Hill and Camel Hill, would be approximately 2 kilometres in length. The route would begin at Steart Hill and follow a course to the south of Steart Wood. From here, the route would head in the direction of Pepper Hill Copse before returning to the earthworks footprint west of Hazlegrove underpass.

2.5.224 The southern haul route would sit between Plowage Lane and Howell Hill and link the temporary bridge (see section below) to the embankment construction 1 kilometre east of Howell Hill. The southern haul route would be approximately 700 metres in length. A temporary traffic light system would be installed at the point where the southern haul route crosses Howell Hill. The system would be set to ensure priority is afforded to the public highway rather than construction traffic.

Temporary bridge

2.5.225 The incorporation of a temporary pre-engineered modular steel bridge system spanning the existing A303 would provide the means for excavated material from the north of the existing road to be transported to the south directly,

negating any reliance on local road networks. The temporary bridge would be positioned west of the Downhead overbridge roundabout beyond the extent of the proposed permanent works (see Figure 2.27 above and also Figure 2.6 in Volume 6.2).

2.5.226 Modular steel bridge systems are pre-designed for delivery to site on conventional transport. The system would be procured to bridge the existing A303 in a single span. Temporary concrete abutments would be prepared either side of the A303 without disruption to traffic. The bridge beams complete with preassembled deck would be lifted into place over a single night time road closure. The bridge deck dimensions would be approximately 4.5 metres running width and a clear span approximately 25 metres.

Temporary site lighting

2.5.227 Temporary site lighting would be provided to enable the safety and security of the construction sites. The main site compound and the auxiliary compounds (shown on Figure 2.9 of Volume 6.2) would need to be lit during hours of darkness.

2.5.228 The temporary site lighting would be directional and positioned sympathetically to minimise light spill and disturbance for sensitive receptors. Lighting would be at the minimum luminosity necessary (but would have to be adequate enough for people / plant / vehicles to move safely around the compound) and use low energy consumption fittings. Where appropriate, lighting would be activated by motion sensors to prevent unnecessary usage. It would comply with the Institute of Lighting Professionals Guidance Notes for the Reduction of Obtrusive Light GN01³² and the provisions of BS 5489, Code of practice for the design of road lighting³³, where applicable.

2.5.229 Lighting columns would be positioned no higher than 10 metres above ground level.

2.6 Construction, operation and long term management

Construction strategy

2.6.1 The construction strategy detailed below describes the main elements associated with the development of the scheme. These include:

- hours of working

³² Institute of Lighting Professionals (2011) Guidance notes for the reduction of obtrusive lights [online] available at: <https://www.theilp.org.uk/documents/obtrusive-light/> (last accessed May 2018).

³³ British Standards Institution (2013) BS 5489, Code of practice for the design of road lighting. Lighting of roads and public amenity areas [online] available at: <https://shop.bsigroup.com/ProductDetail/?pid=00000000030217237> (last accessed May 2018).

- key construction plant
- site establishment
- Public Rights of Way
- site clearance
- statutory undertakes diversions
- drainage
- the earthworks strategy
- the roadworks strategy
- pinch points and tie-ins
- the structures strategy
- additional measures

2.6.2 The construction phase is due to begin in Spring 2020 and is expected to take 2.5 years to complete. Key programme dates are provided in Table 2.3. Durations of key construction stage elements are detailed within Table 2.4 below.

Table 2.3: Key programme dates

Key programme element	Date
Contract award	January 2019
Agree advanced works order	October 2019
DCO granted by the Secretary of State	November 2019
Notice to proceed (and construction begins)	March 2020
Open to traffic	July 2022
Completion (construction ends)	December 2022

Table 2.4: Durations of key construction stage elements

Construction element	Duration (representing the worst case)
Enabling works	
Tree / hedgerow clearance	4 months
Site clearance	2 months
Compound set up	4 months
Batching Plant set up	2 months
Haul Routes (construction to removal)	18 months
Main works	
Statutory diversions	32 months
Drainage	29 months
Bulk earthworks	12 months
Structures	9 months
Mainline road box / capping	17 months
CBGM / surfacing & road markings	18 months
Finishes (for example VRS / landscaping / street furniture)	17 months
De-trunking works	3 months

2.6.3 The contract award in January 2019 triggers the appointment and subsequent services of the chosen contractor. Early contractor involvement is important to ensure sufficient time is allocated for pre-construction planning and procurement activities.

-
- 2.6.4 The programme has made an allowance for an advanced works package required to support the planning process and facilitate the procurement of items such as consents, licences, temporary works design, road orders, and survey works, that would be required in advance of the DCO being granted by the Secretary of State. Further details are contained within the **Consents and Agreements Position Statement (document reference TR010036/APP/3.7)**.
- 2.6.5 The notice to proceed would trigger critical path activities which initially run through the establishment of site compounds to facilitate site clearance operations which in turn allow earthworks to begin as early as possible in the 2020 earthworks season (April to October).
- 2.6.6 The earthworks would remain the critical activity whilst structures, drainage, utilities, and roadworks works are undertaken concurrently to ensure the open to traffic date of July 2022 is met.
- 2.6.7 Once the scheme is open to traffic, additional works associated with the environmental masterplan (Figure 2.8, Volume 6.2) such as vegetation planting would be undertaken.

Hours of working

- 2.6.8 Construction work would take place between 07.00 and 18.00 on weekdays and from 07.30 to 13.00 on Saturdays, with no working on Sundays, Bank and Public Holidays. There may be exceptions to these hours to accommodate elements such as oversize deliveries and tie-in works. Exceptions to working hours detailed above will be agreed in writing with the Local Planning Authority. Assumptions and the worst case scenario regarding these exceptions are detailed in Table 2.5 below.

Key construction plant

- 2.6.9 A wide variety of plant and equipment is expected to be deployed for the scheme. Table 2.5 below provides a summary of the key items and the activities they would be involved with. Further details are provided within Appendix 11.5, Volume 6.3 to inform the assessment of noise and vibration (Chapter 11 Noise and Vibration, Volume 6.1).

Table 2.5: Key construction plant and associated activities

Plant description	Activity			
	earthworks	Drainage	Structures	General
5t to 10t Excavator		X		x
10t to 30t Excavator		x	x	X
20t to 50t Excavator	X			
D6 Dozer	X			
40t Dump Truck	X			
16t Roller	X			
6t Dumper		x	x	X
36m concrete pump			X	
40t to 750t mobile crane			X	x
CFA Piling rig			X	

Traffic Management Plan and road closures

2.6.10 An Outline Traffic Management Plan (TMP) has been produced and is contained within Annex B.5 of the **OEMP (document reference TR010036/APP/6.7)**. A full Traffic Management Plan (TMP) would be implemented during the construction phase of the scheme to ensure there is a safe environment for those travelling along the route, and for those delivering the construction works. Traffic management would also be the main measure for minimising effects on vehicle travellers during construction and would comprise the following elements:

- Local road and A303 closures, although specific dates for closures would be developed during the DCO stage in consultation with Somerset County Council and emergency services when discharging the requirements.
- A reduction in speed limits to 40mph on the departure from Podimore Roundabout taking into account a 1 + 1 contraflow.
- A reduction in speed limit to 50mph for approximately 1,100 metres on the western approach to the A303 works.
- Employment of average speed cameras to enforce limits.
- Temporary speed limits on local roads.
- Closures to the A303 between Podimore Roundabout, Sparkford Roundabout and the A371 Wincanton and a diversion route via the A359 from Sparkford Roundabout to Yeovil, and the A37 to the A303.
- Closures to local roads, although access would be maintained to adjacent villages and businesses at all times.

2.6.11 Table 2.6 below provides the expected durations of road closures.

Table 2.6: Durations of road closures

Location	Duration of closures (representing the worst case)
Diversion routes	
Traits Lane / Gason Lane	Permanent closures as part of works from start of construction (March 2020)
Stear Hill	18 months
Howell Hill	18 months
Plowage Lane	6 months
Downhead Lane	18 months
B3151 – Yeovilton Road	8 months
A303 exit slip road	Permanent closure as part of works from start of west bound (south) carriageway construction.
A303 Sparkford to Podimore	It will be necessary to close the A303 between Podimore Roundabout and Sparkford Roundabout and between Sparkford Roundabout and the A371 Wincanton Interchange for various items of permanent and temporary works. These include installation of traffic management e.g. contraflows and temporary road markings, installation and removal of the temporary earthworks Bailey bridge, surfacing and construction of tie-ins to existing carriageways. The majority of carriageway closures will be overnight (typically 21:00hrs or 22:00hrs to 05:00hrs).
A303 Wincanton to Sparkford	
Pinch points	
Pinch point A	2 full weekend (22:00hr Friday to 05:00 Monday) or 3 weeks of overnight closures (concurrent with Pinch Point B). The worst case would be 2 full weekend closures and this has therefore been assessed in the ES.
Pinch point B	2 full weekend (22:00hr Friday to 05:00 Monday) or 3 weeks of overnight closures (concurrent with Pinch Point A). The worst case would be 2 full weekend closures and this has therefore been assessed in the ES.

Public Rights of Way

2.6.12 Ten Public Rights of Way (PRoW) would be affected by the scheme. PRoWs that are scheduled to be permanently closed (with no permanent alternative) as part of the works would be closed in March 2020 to facilitate construction works with diversions in place along alternative routes. This applies to 6 of the affected PRoWs (references Y30/28, Y27/29, Y27/21, WN23/32, WN23/10 and WN23/33).

2.6.13 PRoWs that are scheduled to be permanently diverted would, if possible, be diverted onto their new permanent route early in the construction process. However, if this is not possible temporary diversions would be required until the permanent route has been established. This applies to the remaining 4 PRoWs (references Y27/UN, Y27/10, Y27/9 and WN23/12).

Site establishment

2.6.14 In order to achieve a construction programme duration of 2.5 years it would be necessary to make optimum use of the 2020 and 2021 summer earthworks seasons. A substantial amount of earthworks would need to be undertaken in summer 2020 in order to enable other civil engineering works such as

structures and drainage to take place in 2020. This would require early site clearance and vegetation clearance so that earthworks haul routes can be established and earthworks can commence as soon as the weather and ground conditions are suitable for earth moving operations. This would be undertaken in line with the ecological mitigation requirements detailed within the **OEMP (document reference TR010036/APP/6.7)**.

Statutory undertakers diversions

2.6.15 In order to facilitate the construction of the new A303 dual carriageway section between the Hazlegrove Roundabout and Podimore Roundabout, there are a number of existing services which would require diversion works. These diversion works are split into 3 categories:

- Pre-earthworks diversions
 - These diversions would be carried out early in the construction phase to allow the bulk earthworks operations to commence by diverting existing Statutory Undertakers Equipment that clash with the new earthworks outline.
- Diversions required during the construction phase to allow the main works to be constructed.
- Remaining permanent diversions along the new route to ensure safe access for Statutory Undertakers to maintain their equipment along the new alignment.

2.6.16 Statutory undertakers diversions comprise of the following activities:

- Excavate trial holes to determine the exact alignment and depth of the existing utility and the desired connection points.
- Lay the new statutory undertakers equipment along the new designed alignment.
- Connect the new statutory undertakers equipment to the existing equipment at the located connection points.
- Test and commission the new equipment.
- Decommission and remove the existing equipment.

Drainage

2.6.17 The construction works would focus on completing key elements of the drainage network as early in the construction phase programme as possible in order to take advantage of the network improvements during the construction phase. Further information is contained within the Drainage Strategy Report (Appendix 4.7, Volume 6.3).

2.6.18 Drainage Highways works would be installed in line with the scheme design as detailed in section 2.5 of this chapter:

- Construction of the newly designed outfalls and / or ponds or connections into existing highways drainage outfall would be carried out first to provide a suitable outfall point for the network and drainage installation works.
- Each individual drainage run and its associated chambers (manholes) would be excavated, installed, backfilled and tested in accordance with the design requirements and *Series 500 of the Specification for Highways Works*³⁴.
- Installation of drainage runs and chambers would be completed by working from the outfall to the head of the network including the installation of any connecting runs required to new / existing surface drainage assets such as road gullies and sub formation drainage.
- Surface drainage assets and sub formation drainage installation and connections to the new drainage network would be carried out in line with the carriageway road box construction works ahead of surfacing.

Earthworks strategy

2.6.19 A strategy has been developed to minimise, insofar as is practicable, the environmental effects as a result of the earthworks operations and also any vehicle movements associated with earthworks activities on the local road network. This would be achieved by utilising the temporary haul routes described in section 2.5 for the majority of earthmoving operations. At peak it is expected that there would be a maximum of 64 vehicle movements (consisting of 50 tonne articulated dump trucks) per day using the haul routes associated with the earthworks to transport excavated material from the west to the east of the scheme for placement in the earthwork fill areas and for landscaping.

2.6.20 Where required in the design as shown in Figure 2.7 of Volume 6.2, permanent pre-earthworks drainage ditches would be installed along the periphery of excavation slopes and at the crests of newly formed embankments. These would ensure that any surface run-off entering the site and any land drainage that is encountered, is directed away from the construction operations to suitable discharge points where it could be allowed to discharge to the adjacent local environment. Any requirements for environmental permits or consents are detailed within Chapter 4 of the **OEMP (document reference TR010036/APP/6.7)**.

³⁴ Highways England (2009) *Manual of Contract Documents for Highways Works – Volume 2 Notes for Guidance on the Specification for Highways Works. Series 500 Drainage and Service Ducts* [online] available at: http://www.standardsforhighways.co.uk/ha/standards/mchw/vol2/pdfs/series_ng_0500.pdf (last accessed July 2018).

- 2.6.21 Soils would be stripped using a combination of excavators, dump trucks and graders and would be transported directly to areas of fill or to temporary topsoil stockpile locations.
- 2.6.22 Fill from the excavated cut areas would be removed by articulated dump truck and placed using conventional earthworks plant, comprising bulldozers and compaction plant (compactors and vibrating rollers) which would place the material in layers in accordance with the *Series 600 of the Specification for Highway Works*³⁵.
- 2.6.23 The temporary stockpiling of fill materials prior to incorporation in the permanent works would be avoided wherever possible so that double handling of stockpiled material is minimised. All suitable excavated material would be re-used in the construction of the permanent works and in landscaping features, further reducing the requirement to import materials for construction and vastly reducing the need to remove surplus material from site. For example, it is envisaged that approximately 400,000m³ of bulk earthworks fill material required between Howell Hill and Hazlegrove Roundabout would be directly sourced from material excavated between Podimore and Downhead as described below. The majority of excavated material from the western section of the scheme between the Podimore tie in and Downhead would be transported for re-use via the temporary bridge and southern haul route to the area of fill east of Howell Hill. Material from the cut operation between Downhead and Steart Hill would be relocated via the northern haul route to the embankment works associated with Hazlegrove Underpass. It is envisaged that this approach would best support a balanced cut to fill ratio resulting in minimal volumes of material having to be sent off site.
- 2.6.24 Backfill to structures (granular fill) would be imported to site along main roads and the local road network to access the structures at Steart Hill and Hazlegrove. Material meeting the required specification is not expected to be won from within the site. On completion of the areas for embankment construction and backfilling, the balance of the excavated material would be used to form the landscape fill areas to the designed profile. These areas would then be top soiled.

Roadworks strategy

- 2.6.25 The objective of the roadworks strategy for the scheme is to meet the programme for the construction of the permanent works whilst causing minimum disruption to the local road network.

³⁵ Highways England (2016) Design Manual for Roads and Bridges (DMRB) Volume 1 – *Specification for Highways Works, Series 0600 Earthworks* [online] available at: <http://www.standardsforhighways.co.uk/ha/standards/mchw/vol1/pdfs/600.pdf> (last accessed May 2018).

- 2.6.26 The design for the pavement would comprise a number of layers. The lowermost layer of capping material would be either laid onto the prepared ground surface where the road is in embankment or would be placed onto the existing surface where the road is in cut. The depth of this layer would vary depending on the condition of the ground in the immediate area. Above this, a layer of more granular aggregate is placed, the sub-base, typically 200 millimetres in depth. A layer of CBGM at 150 millimetres would then be placed. Above these, 3 bituminous layers would be placed; base; binder course, and the Thin Surface Course System (low noise), to a combined depth of 360 millimetres. In total, the depth of road construction would be around 1 metre.
- 2.6.27 It is unlikely that suitable material for road construction would be available from site won material, as such, capping material and sub-base would need to be imported. The volumes of imported material would depend greatly on the characteristics of the existing ground and the subsequent carriageway design but are anticipated to be approximately 60,000m³.
- 2.6.28 The layer of CBGM would be batched on site and delivered to the workface via 20 tonne road wagons. The volume of CBGM would be approximately 20,000m³. The 3 bituminous layers would be delivered to site by asphalt contractors via the local road network. The volume of material required to construct these elements of the road pavement would be approximately 50,000m³.
- 2.6.29 Road construction would take 9 months to complete and would require 20,000 material deliveries over the construction period to maintain the programme. Materials would be delivered to site via road wagon where they would be tipped in close proximity to their permanent position. Wherever possible, the new A303 would be used to accommodate the delivery wagons therefore minimising the impact on the local network.
- 2.6.30 Roadwork activities would be undertaken using conventional dump trucks, bulldozers and compactors. Road pavement construction would be by means of conventional road paving equipment and vibrating smooth drum rollers, serviced by ancillary plant.
- 2.6.31 White lining of the finished road would be undertaken.

Pinch points and tie-ins

- 2.6.32 In 2 locations the interface of the new dual carriageway with the existing A303 is such that the footprint of the 2 roads overlap. These locations are referred to as pinch points. At these locations the construction of the new A303 would need to be managed to minimise the impact of the work on the traffic flows along the A303. A finalised pinch point strategy would therefore be developed by the appointed contractor in association with relevant stakeholders.

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- 2.6.33 The strategy would be to keep traffic on the existing A303 whilst the off-line works are constructed. The sections of completed westbound carriageway would then be used to maintain traffic flows temporarily during construction.
- 2.6.34 To facilitate this temporary state, the construction of temporary carriageway link roads would be required in order to transition from the new A303 to the existing A303 at the pinch points. Temporary roads would be constructed to the same specification as the new pavement utilising the same construction techniques as those described above in the 'Roadworks strategy' section.
- 2.6.35 Whilst traffic flows are maintained in this way, the remaining sections of the new eastbound carriageway would be built. Once the eastbound carriageway is complete, the traffic would be switched to allow the completion of the westbound side at the pinch points and removal of the temporary links.
- 2.6.36 Given the level differences at the pinch points, it is envisaged that the connection of the temporary link roads to the old and new carriageways would require full closures of the A303. The temporary works could be undertaken by either working 3 8-hour shifts each day, over a single weekend, starting on Friday night and running through until the following Monday morning, or during a 2 2-week period of overnight closures.
- 2.6.37 The diversion route for the closure of the A303 between Sparkford and Podimore is via the A359 from Sparkford Roundabout to Yeovil and the A37 to the A303 at Ilchester, as identified within Annex B.5 Outline TMP of the **OEMP (document reference TR010036/APP/6.7)**. This is Highways England Asset Support Contractor's diversion route and uses the A359 through Queen Camel.
- 2.6.38 The weekend closure is the most efficient, cost effective and safest method of delivery, however, as previously stated, another option would be to carry out the pinch point construction works over 2 weeks of consecutive night time closures depending upon the perceived impact to the road user when balanced with cost and safety implications. For the purposes of this ES, the worst case scenario has been assessed in the discipline-specific chapters (Chapters 5 to 14, Volume 6.1) which is considered to be full weekend closures.

Structures strategy

- 2.6.39 Structures to be built as part of the scheme include the Downhead overbridge and the underpass at Hazlegrove only. A description of these structures designed can be found in section 2.5 of this chapter. The description of construction works below is applicable to both structures.
- 2.6.40 It is anticipated at this stage that each structure would take a maximum of 9 months to construct. Structures activities would be undertaken at any point in the year, as they are not adversely affected by wet winter weather in the same
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way as the earthworks operations. However, periods of freezing or near freezing weather would disrupt the programme as this would hamper the placing of concrete. Work-specific method statements include the need for inspections prior to placing concrete to ensure conditions are suitable and all necessary control measures have been implemented.

- 2.6.41 A 360 degree excavator would excavate the formation for the reinforced concrete foundations for the bridge abutments, placing the material into dump trucks for removal to fill areas within the scheme boundary. Dewatering and temporary shoring support would be used if required. The Local Planning Authority would be consulted well in advance of any dewatering activity so that appropriate authorisation for abstraction and discharge is obtained. An abstraction licence is not required when dewatering or pumping water from an excavation providing the anticipated volume is below 20 metres cubed. In order to control pumping and discharge of water on site, a permit to pump system would be used.
- 2.6.42 Discreet areas of concrete would be placed at formation level at the abutment locations to create a clean and level working area to facilitate the assembly of formwork and reinforcement cages. The specified concrete would be delivered to site by ready mix truck, placed using a concrete pump, and compacted with vibrating pokers.
- 2.6.43 Currently the structures foundations are designed with spread footings. However, piling to facilitate construction of Steart Hill overbridge may be necessary (until the geotechnical investigation has verified confirmed ground conditions) and so it has been assumed for the purposes of this ES. Where piling activities would be required the rig is likely to be used for around 60 – 70% of the day and manoeuvring / lifting / idling for the remaining 30 – 40% of the day.
- 2.6.44 Task specific activity plans would be developed to describe the processes and control measures. These will be outlined in the CEMP and the commitment and minimum measures will be defined in the **OEMP (document reference TR010036/APP/6.7)**.
- 2.6.45 On completion of the foundation works the bridge abutments would be cast in-situ using ready mix concrete and placed using a concrete pump or from hoppers.
- 2.6.46 Steel girders or precast concrete beams, fabricated off-site, that span the abutments would be delivered by low loader and lifted into position by a large mobile crane. The deck would be cast in-situ using a concrete pump fed by ready mix concrete trucks. The parapet beams would either be cast in-situ or

precast offsite. For the purposes of this assessment it has been assumed that parapet beams would be cast in-situ, representing a worst case scenario.

- 2.6.47 Once all concreting works are complete, the deck would be waterproofed. Combined kerb drainage units are normally used to carry surface water away from the bridge deck. These would be installed creating a pedestrian route along the bridge into which ducting for services can be incorporated. The bituminous road surfacing would then be laid between the kerbs and in the footpath. Fixing of vehicle restraint barriers, deck joints, painting and finishing works would complete the bridge structures.

Road restraint system - Concrete barrier (central reserve)

- 2.6.1 The construction of the 900 millimetre high by 550 millimetre wide central reserve concrete barrier would either be via casting in situ or installation of pre-cast sections. Either option would be installed following completion of surfacing works of the new A303 carriageway and prior to opening for traffic.
- 2.6.2 For a precast solution the sections of barrier would be delivered directly to the worksite along the new alignment and lifted directly into place. For the cast in situ solution, ready mix concrete would be delivered to the worksite via the new alignment in concrete wagons. The concrete would be placed directly into the bespoke slipforming plant and cast in situ. For the purposes of this ES, the worst case scenario has been assessed within Chapter 10 Material Assets and Waste (Volume 6.1) which would be pre-cast in situ.

Demolition during construction

- 2.6.3 To facilitate the construction of the scheme, during the early site clearance phase, the demolition of 1 small farm building adjacent to the A303 approximately 850 metres to the east of Podimore, would be required. This can be seen within the extents of the red line boundary, south east of the Eastmead Lane (track) label, as identified on the environmental constraints plan contained within Figure 2.2 of Volume 6.2. It is anticipated that the demolition and associated clearance of the area would take a maximum of 1 week.

Community relations

- 2.6.4 Prior to construction, the contractor would register with the National Considerate Constructor's Scheme and establish a forum to disseminate construction information to the statutory authorities, advisory bodies, landowners, parish councils, local interest groups and the general public, in line with the stakeholder communications plan. A Community Relations Officer would be appointed who would be responsible for these specific tasks. A Community Relations Strategy would also be produced by the Contractor prior to

construction; an indicative contents is included within Annex B.6 of the **OEMP (document reference TR010036/APP/6.7)**

- 2.6.5 In cases where the construction works have an impact on neighbouring properties, businesses and buildings for example, as identified within Chapters 5 to 14 of Volume 6.1, the occupants of these premises would be advised of these works prior to their occurrence.
- 2.6.6 Regular liaison meetings would be held to keep all stakeholders advised of progress and of forthcoming construction works to try and minimise any complaints. Further details of the additional measures required during construction in relation to community engagement and environmental management are detailed within the **OEMP (document reference TR010036/APP/6.7)**.
- 2.6.7 The scheme would require a new construction workforce to deliver it which would be sourced locally where practicable.

Long term management

- 2.6.8 The maintenance responsibility for the new A303 dual carriageway and associated slip roads, shown as trunk roads in the **Classification of Roads Plans (document reference TR010036/APP/2.7)** and **Schedule 3 of the DCO (document reference TR010036/APP/3.1)**, would rest with Highways England.
- 2.6.9 The maintenance responsibility for the de-trunked existing A303 and all proposed classified and unclassified local roads, as shown in the **Classification of Roads Plans (document reference TR010036/APP/2.7)** and **Schedule 3 of the DCO (document reference TR010036/APP/3.1)**, would rest with Somerset County Council.
- 2.6.10 The majority of the areas of essential environmental mitigation would also be retained and maintained by Highways England, including the area of land to the east of Glebe Farm, where a hibernacula and new pond would be created for GCN. Management requirements for areas of mitigation proposed at Downhead and Hazlegrove have been agreed with the respective landowners.
- 2.6.11 Short-term maintenance and repair activities are likely to comprise inspections on the new works and installed assets, and any unplanned works due to damage to assets in events such as road traffic incidents.
- 2.6.12 Longer term maintenance and repair works are likely to be required for the following scheme assets, such as:
- Road restraint systems
 - Traffic signs and road markings

- Drainage facilities such as balancing ponds, slip-formed channels, slot drains and combined kerb drainage units.
- Penstocks and pollution control devices (in accordance with the South West Area Maintenance and Response Contractor's Maintenance Requirement Plan)
- Technology equipment such as speed enforcement cameras (if required) supported by ducting, chambers, access infrastructure, cabling, power supplies and control cabinets
- Earthworks (embankments and cuttings)
- Pavement and paved areas
- Lighting equipment
- Structures
- Off-network access-points
- Verge planting and landscaping
- Fences and gates (security and boundary)
- Badger tunnels

2.6.13 Liaison would be required with the South West Area Maintenance and Response Contractor to determine maintenance requirements such as likely number of inspections.

2.6.14 There would also be on-going (annual) inspections and general routine maintenance works such as grass cutting, sign cleaning, and litter picking.

2.6.15 In the longer term, expected planned maintenance would include activities such as resurfacing the road and replacement of assets when they become life expired.

2.7 Demolition (Phase)

2.6.16 The traffic and economic assessment (as detailed in the **ComMA Report, (document reference TR010036/APP/7.6)** demonstrates that the improvements would operate adequately for the 15 year design life of the scheme until 2038. Typically, most assets in highway schemes are designed to have a material life-span of between 20 and 40 years before upgrading is required dependant on material properties, maintenance and usage. Assets including structural concrete and steelwork have extended design lives of up to 120 years.

2.6.17 It is considered highly unlikely that the scheme would be demolished / decommissioned after the various design lives listed above expire, as the road is likely to have become an integral part of the infrastructure in the area. Demolition would not be either feasible or desirable, and is therefore not considered further within this ES.