A358 Taunton to Southfields Dualling Scheme

Scheme Assessment Report

Updated July 2019

Scheme Assessment Report – List of Amendments

The following changes have been made since the version issued in June 2019.

Amendments

Version	Page	Paragraph/Table/Figure	Comment
June 2019	110	6.5.4	The text has been amended to clarify the proposed direction of widening

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0. Executive Summary

0.1. Introduction

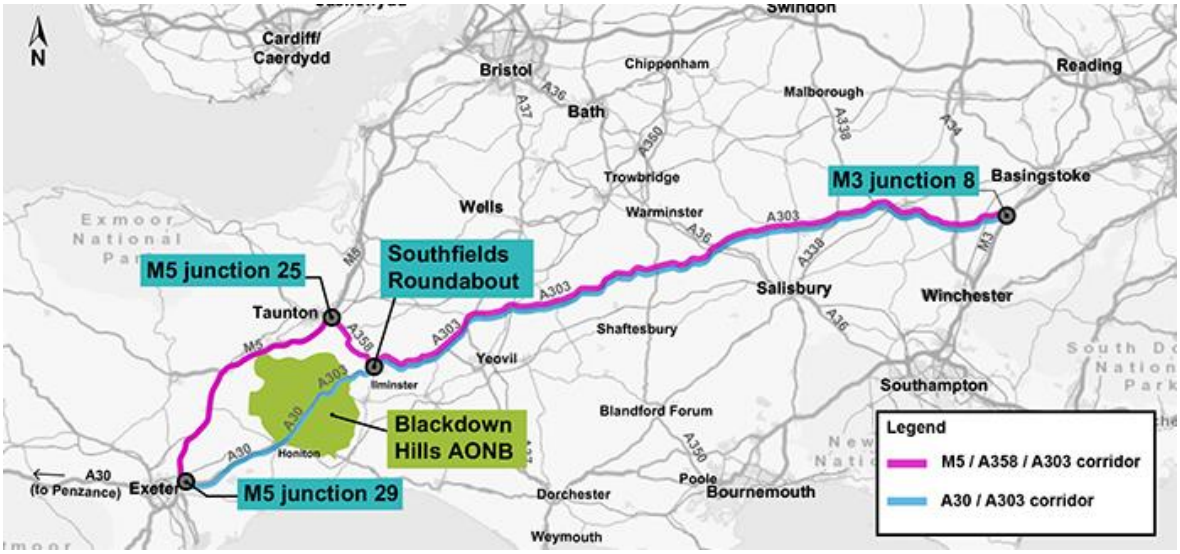
Existing A358 / A303 corridor

0.1.1. The A358 Taunton to Southfields Scheme is part of a programme of improvements planned along the A303 / A358 corridor aimed at improving connectivity between London, the south-east and the south-west. The A303, alongside the A30, forms part of the strategic road network (SRN) and together with the A358, provides the link between London, the south-east and the south-west. This is shown in Figure 0.1 below.

0.1.2. The A303 / A358 corridor is heavily used by long-distance, local business and leisure traffic. It is critical to the economy of the south-west of England and connects several local towns including Andover, Amesbury, Salisbury, Shaftesbury, Warminster, Yeovil, Honiton and Taunton.

0.1.3. The programme of improvements, as set out in the Government's *Road Investment Strategy*[1] made a commitment to, *"…upgrade all remaining sections of the A303 between the M3 and the A358 to dual carriageway standard, together with creating a dual carriageway link from M5 at Taunton to the A303, as part of a long-term commitment to creating a new Expressway to the South-West"*.

Figure 0.1: Road Corridors



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[1] Department for Transport (2015). *Road Investment Strategy*: for the 2015/16 – 2019/20 Road Period.

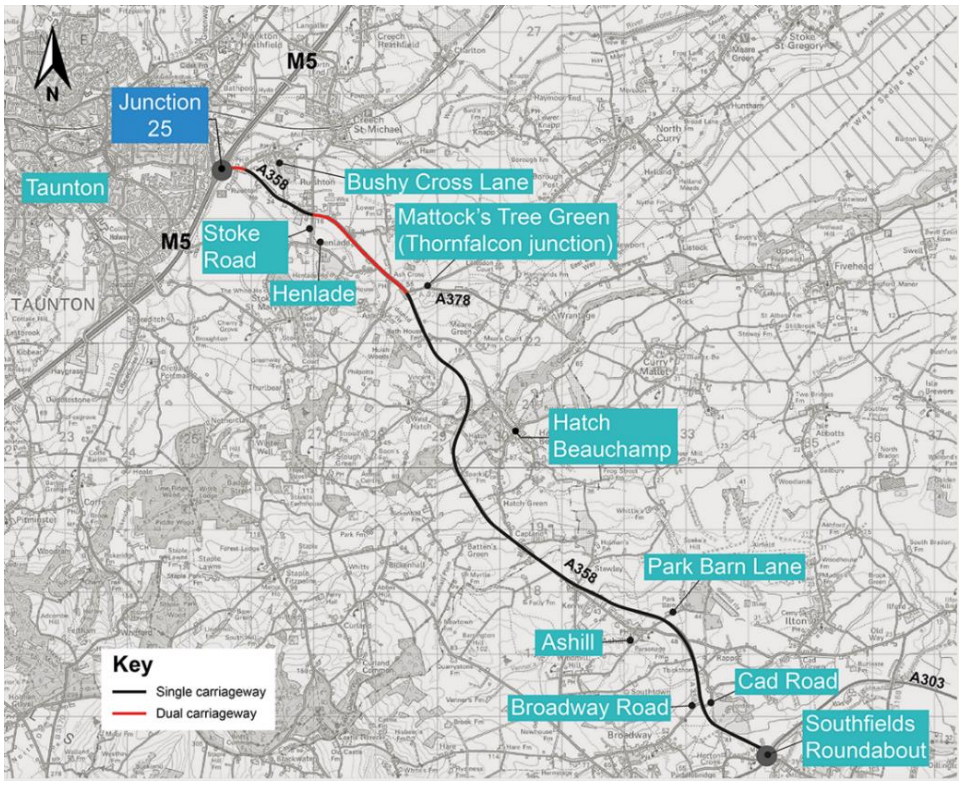
The case for A358 dualling

0.1.4. In the wider context, the existing strategic road network route to the south-west uses the A303 and the A30. It passes through the Blackdown Hills Area of Outstanding Natural Beauty (AONB), an area designated as a protected landscape. Parts of the A30 and A303 are single carriageways and not to current highway standards, with road users experiencing delays.

0.1.5. The decision to not undertake improvement on the A303 / A30 corridor from Ilminster to Honiton and Exeter, recognises that this section passes through the Blackdown Hills AONB. The impacts of large-scale road-building were deemed a challenge within this protected landscape where there is a viable alternative, that is the A358. Instead, the initial *Road Investment Strategy* recommended smaller-scale improvements are to be pursued along A303 / A30 and more significant improvements are considered along the A358.

0.1.6. The existing A358 runs between the M5 junction 25 at Taunton and the A303 at Southfields Roundabout in Ilminster. It features a mixture of short lengths of dual carriageway and single carriageway with numerous at-grade junctions and private accesses. The existing road is shown in Figure 0.2 below.

Figure 0.2: A358 Existing road layout



0.2. Scheme context and purpose of the Scheme Assessment Report

0.2.1. The A358 Taunton to Southfields Dualling Scheme (the **Scheme**) announced within the *Road Investment Strategy*[2] (RIS) will provide a high quality dual carriageway between the M5 motorway and the A303 at Southfields Roundabout, Ilminster.

0.2.2. The Scheme would be a Nationally Significant Infrastructure Project (NSIP) dealt with under the consenting regime of the *Planning Act 2008*. The relevant national policy framework would be the *National Network National Policy Statement* (NNNPS).

0.2.3. This report explains the route option selection stage, summarising key outcomes such as the traffic, economic and environmental assessments. It also includes the key findings of the public consultations held in 2017 and 2018. Based on these assessments and the consultation responses a preferred route has been identified.

0.2.4. This report is published alongside the A358 reports on the *A358 Taunton to Southfields Dualling Scheme Public Consultations,* and the *A358 Taunton to Southfields Dualling Scheme Preferred Route Announcement (PRA).* Together they mark the end of stage 2, Option Selection, a stage within Highways England's seven stage process for delivering its major road improvements.

0.2.5. The Scheme key programme dates, at the time of writing this report, are:

Preferred Route Announcement……..	Spring 2019
Statutory Public Consultation……	Winter 2019 / 2020
Application for Development Consent Order……..……	Autumn 2020
Development Consent Order Examination……..……	Spring 2021
Secretary of State Decision……...……	Spring 2022
Start of Construction…….……...…	Autumn 2022
Scheme open to Traffic…….……	Autumn 2025

0.2.6. All the assessment and appraisal work summarised in this report has been completed in accordance with the relevant standards. Where options have been compared against each other, this has been done on an equal proportional basis.

[2] Department for Transport (2015). *Road Investment Strategy*: for the 2015/16 – 2019/20 Road Period.

0.3. Existing constraints

A358 existing traffic conditions

0.3.1. The Annual Average Daily Traffic (AADT) flow along the existing A358 was calculated as 24,800 vehicles at Henlade and 21,500 vehicles just north of Southfields Roundabout, for the base year of March 2015. These flows are substantially in excess of the design flows for single carriageway roads of 13,000 vehicles per day. As a result, the road currently experiences congestion and poor journey time reliability. It is therefore considered that the current delays and queues are caused by insufficient road capacity.

0.3.2. There are four locations on the A358 where records indicate clusters of collisions: Bushy Cross Lane (Henlade village), Stoke Road (Henlade village), Park Barn Lane (Ashill) and at the Broadway Road / Cad Road crossroad junction. These collisions are predominantly shunts, collisions between vehicles turning in or out of local roads, or head-on collisions. Collision rates on this section of the A358 are comparable with the national average rates for the strategic road network A roads.

Without the Scheme consequences

0.3.3. The AADT at Henlade is forecast to increase to 33,500 by 2038 (the design year, see Section 0.5.3 below) which will further exacerbate the current performance issues. This is predicted to lead to increased queuing and congestion on an average day as well as further problems during the peak holiday periods.

0.3.4. If no improvements are made to this section of the A358, journey times between the M5 junction 26[3] and Southfields Roundabout are forecast to increase by more than 3 minutes during the AM and PM weekday peak periods by 2038. Any increase in journey times and traffic congestion may further impede investment in the region and act as a constraint to development and economic growth.

Environmental and design constraints

0.3.5. A number of environmental constraints exist within the vicinity of this section of the A358. These were key when identifying the proposed route options and identifying their viability. The constraints include:

- Local Wildlife Sites (LWS)
- Strategic development areas
- Local Geological Sites (LGS)
- Public Rights of Way (PROW)

[3] The journey time comparisons outlined use the longer distance journeys between Southfields Roundabout and junction 26 of the M5.

- Ancient Woodland (and other Biodiversity Action Plan (BAP) habitats)
- Local Nature Reserves (LNR)
- Watercourses and water bodies
- Areas susceptible to surface water flooding
- Noise Important Areas (NIAs)
- Air Quality Management Areas (AQMA)
- Registered parks and gardens
- Archaeological events and finds
- Residential properties and farm buildings
- Flood zones 2 and 3
- Conservation areas
- Scheduled monuments
- Historic landfills
- Authorised landfill
- Listed buildings
- Cycle routes
- Planning applications
- Open space
- Green wedge[4]

0.3.6. In addition to the environmental constraints outlined above, the development of the proposed route options has included preliminary considerations of bridges, culverts (and other structures), earthworks, drainage, statutory undertakers' services and lighting. At this stage the route options are not significantly different for statutory undertakers' works, drainage and lighting.

0.4. Option development

0.4.1. From our early appraisal, 28 potential route options were identified for improving the A358. These options were considered against economic, social and environmental criteria. Details on the route options identification stage and the sifting process can be found in the *A358 Taunton to Southfields Dualling Scheme: Technical Appraisal Report* (Highways England, January 2018).

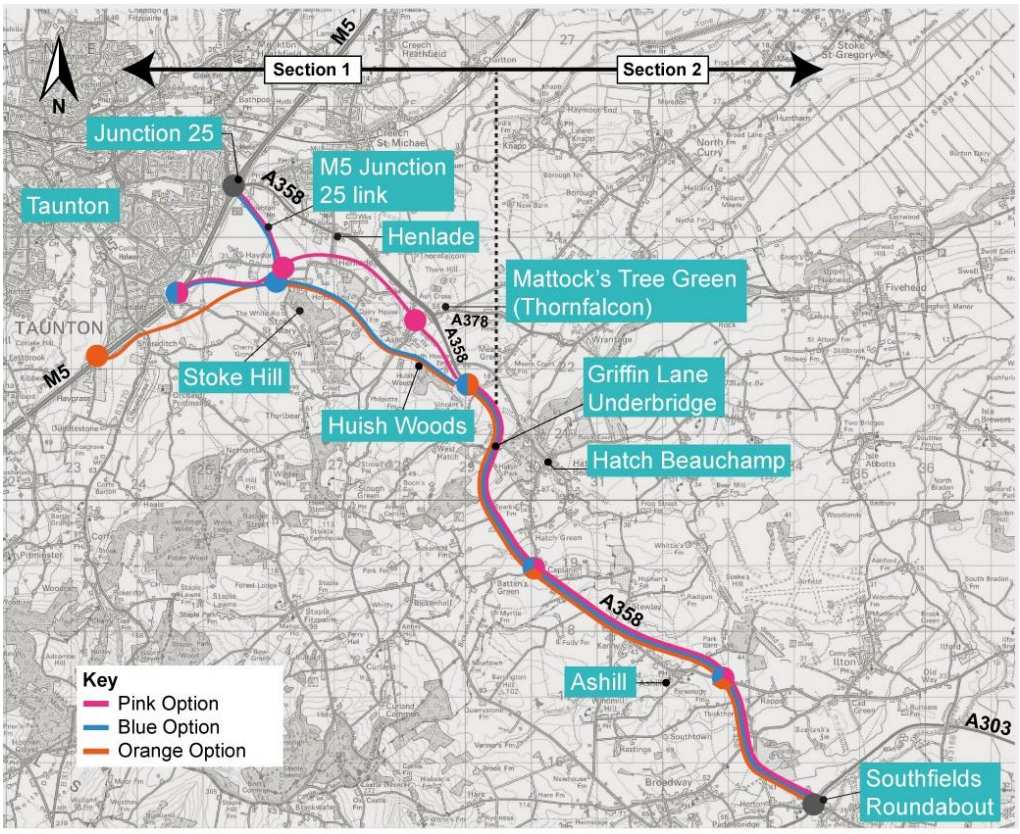
0.4.2. It is proposed that the new road would be a high-quality dual carriageway with two lanes in each direction and subject to the national speed limit. It is anticipated that all access to the new road will be via slip roads connected to grade-separated junctions. Although the junction strategy will be further developed, the expectation is that existing local roads will be diverted to connect with one of the new junctions or bridges crossing the new road.

[4] These are areas designated as '*multi-functional areas of land assisting towards a number of objectives including the protection of an area of landscape importance and visual amenity, the prevention of coalescence of settlements, the provision of a 'green lung' for the health and wellbeing of residents, and a valuable wildlife corridor and habitat*' within *Site Allocations and Development Management Plan* (Taunton Deane Borough Council, 2016)

Route options presented at the 2017 and 2018 public consultations

0.4.3. The route options presented at the 2017 and 2018 public consultations are shown in Figure 0.3. Only the Orange option was presented in 2017 as this option met the Scheme brief and was the most affordable. In 2018, all three options were presented, that is, Orange, Blue and Pink options.

Figure 0.3: Route options presented at the public consultations



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0.4.4. The three route options presented at the 2018 consultation are described below:

- The **Pink option** commences at a new junction on the M5 approximately 1.2 miles (2 kilometres) south of junction 25. South-facing slip roads from the M5 would combine to become the new dual carriageway, which runs eastwards and north of Stoke Hill. Here a limited-movement junction is proposed with east-facing slip road connections to the new road which would allow traffic to travel between the new A358 and junction 25 via a new 0.9 mile (1.5 kilometre) dual carriageway link past the planned Nexus 25 site. The proposed route would then follow the existing A358 to Southfields Roundabout enabling the existing road to be upgraded from a single to a dual carriageway. The total length of the Pink option is 9 miles

(14.6 kilometres), plus the 0.9 miles (1.5 kilometres) spur leading to M5 junction 25.

- The **Blue option** commences at the M5 approximately 1.2 miles (2 kilometres) south of junction 25 and runs eastwards on a more southerly alignment. At Stoke Hill a junction is proposed similar to that with the Pink option which would allow traffic to travel between the road and junction 25 via a new 1.2 miles (2 kilometres) dual carriageway link past the planned Nexus 25 site. The road would then continue in a south easterly direction to West Hatch Lane, where an all-movement, grade-separated junction is proposed to allow access to Hatch Beauchamp, Henlade and surrounding communities, and the A378. This option is identical to the Pink option from this point onwards to Southfields Roundabout. The total length of the Blue option is 8.7 miles (14.1 kilometres), plus the 1.2 miles (2 kilometres) spur leading to M5 junction 25.
- The **Orange option** commences at the M5 approximately 2.1 miles (3.5 kilometres) south of junction 25 at a proposed new 2-bridge roundabout which would form a new all-movements junction between the new A358 and the motorway. The proposed road initially takes a north-easterly course towards Henlade before arcing around the north of Stoke Hill. In contrast to the Blue option, there is no link to junction 25 from this location, and therefore no junction at Stoke Hill. This option is identical to the Blue option from this point onwards. The total length of the Orange option is 9.5 miles (15.3 kilometres).

Design progression

0.4.5. Outline proposals for pedestrians, cyclists and equestrians has been developed based on feedback from local user groups and Somerset County Council's Rights of Way Officers. These groups are categorised as Non-Motorised Users (NMUs) and an NMU survey and audit was undertaken during the route option identification stage. The proposals identify all known NMU routes that cross each of the proposed route options. It also identifies options for diverting the NMU route to a crossing point or maintaining the route on its existing line via a bridge or underpass. The specific provision for each NMU route requires further development at the next stage of the Scheme development.

0.4.6. At present, the Pink option would involve the least number of new structures, such as bridges, culverts and retaining walls. The Orange option would currently involve construction of the most new structures or significant modifications to existing structures.

0.4.7. The Pink option would involve the lowest volume of excavation and filling of earthworks to create cuttings and embankments, and the Blue option the most. There are a number of geotechnical challenges which would apply to all route options. These include unconfirmed ground conditions, achieving earthworks balance, known fault line near West Hatch, high groundwater levels and former landfills at Ashill. These are aspects that are routinely resolved in the next stage of the Scheme development.

0.4.8. Consideration has also been given to the land needed to build the Scheme. All route options will involve acquiring similar areas of land, but the Blue option requires the least. Each of the route options would need to develop solutions where there may be constraints restricting the design in these areas. These include:

- Blackbrook junction (Pink and Blue options)
- Stoke Road, Henlade (Pink option only)
- Hatch Beauchamp junction, Capland (all route options)
- Huish Woods / West Hatch Lane (Blue and Orange options)
- Killams Avenue junction (Orange option only)

0.5. Assessment results for the three consultation route options (Pink, Blue and Orange)

Traffic and economic assessment

0.5.1. A traffic model has been developed for the Scheme using the South-West Regional Traffic Model (SWRTM). All the traffic modelling work has been carried out in accordance with the *Design Manual for Roads and Bridges* (DMRB). The economic assessment has been carried out in line with the Department for Transport's web-based Transport Analysis Guidance (WebTAG).

0.5.2. The modelled area comprises the M4 / M5, the A358 corridor, the A303 corridor, and the surrounding areas which would be affected by the implementation of the Scheme. The detail of the modelling methodology is explained in full later in this report.

Traffic forecasts

0.5.3. Traffic forecasts have been prepared for the original Scheme opening year of 2023, and the Scheme design year of 2038. Two additional forecast years, consisting of an intermediate year of 2031 and a final forecast year of 2051, have also been used to support the economic assessment of the Scheme.

0.5.4. Forecasts have been carried out for the Do Minimum scenario (that is, without the Scheme) for the same forecast years. All route options were assessed to the same forecast years so they could be compared on an equal proportional basis.

Traffic flows through Henlade

0.5.5. The traffic flows through Henlade have been compared between the Do Minimum and the Do Something (with the Scheme) scenarios for 2023 and 2038. The traffic flows are summarised in Table 0.1 below.

Table 0.1: Change in traffic flows through Henlade (AADT's)

Year	Do Minimum (without Scheme)	Pink option	Blue option	Orange option
2015 (base year)	24,800	--	--	--
2023 (opening year)	28,100	3,100 (-89%)	6,300 (-78%)	23,700 (-16%)
2038 (design year)	33,500	3,600 (-89%)	7,600 (-77%)	24,300 (-27%)

Notes: % shown represent the difference compared to the Do Minimum scenario.

0.5.6. All route options will reduce traffic flows through Henlade in the opening and design years.

Journey times

0.5.7. The journey time changes are summarised in Table 0.2 below. These represent the averaged journey times across the routes of (i) M5 junction 24 to Southfields Roundabout, (ii) M5 junction 25 to Southfields Roundabout, and (iii) M5 junction 26 to Southfields Roundabout.

Table 0.2: Average change in journey times (2038)

Peak period	Direction	Pink option	Blue option	Orange option
AM-Peak	Eastbound	-38% (~8 min 11 sec)	-38% (~8 min 16 sec)	-30% (~6 min 38 sec)
	Westbound	-34% (~6 min 52 sec)	-34% (~6 min 50 sec)	-28% (~5 min 37 sec)
PM-Peak	Eastbound	-37% (~7 min 42 sec)	-38% (~7 min 52 sec)	-28% (~6 min 6 sec)
	Westbound	-29% (~5 min 49 sec)	-29% (~5 min 47 sec)	-23% (~4 min 35 sec)

Notes: % shown represent the difference compared to the 2038 Do Minimum scenario.

0.5.8. All route options will reduce the journey times in the design year (2038) for both the AM and PM peak periods.

Economic performance

0.5.9. The most current analysis of monetised costs and benefits are shown in Table 0.3 below. All values are given in £000's.

Table 0.3: Summary of monetised costs and benefits – All Scheme route options (£000s)

Item	Pink option	Blue option	Orange option
Present Value of Benefits (PVB)	390,246	328,425	245,738
Broad Transport Budget Present Value of Costs (PVC)	301,730	296,183	284,913
Net Present Value (NPV)	88,516	32,242	-39,175
Initial Benefit to Cost Ratio (BCR)	1.29	1.11	0.86
Reliability Benefits	22,410	19,263	14,825
Wider Economic Benefits	18,896	15,396	14.781
Adjusted Present Value of Benefits (PVB)	431,552	363,084	275,345
Adjusted BCR	1.43	1.23	0.97

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

0.5.10. The BCR figures in Table 0.4 below, are based on the updated cost estimates for each route option. The Benefit to Cost Ratio (BCR) for each option has also been updated. The BCR compares the benefits against the costs to assess the value of the project. These differ from those published in the *Technical Appraisal Report* in January 2018, as shown in Table 0.4 below.

Table 0.4: Benefit to Cost Ratios (before and after 2018 public consultation)

	BCRs presented in the *Technical Appraisal Report* (January 2018)	BCRs (April 2018)
Pink option	2.08	1.43
Blue option	1.87	1.23
Orange option	1.64	0.97

0.5.11. The Pink option continues to have the highest BCR, despite the reduction to 1.43.

0.5.12. The BCRs in the current assessment for all the options, have reduced from those reported in the *Technical Appraisal Report*, January 2018, due to:

- A switch from TEMPRO v7.0 to v7.2 was made in line with Department for Transport (DfT) guidance. TEMPRO v7.2 provided lower overall traffic growth in the south-west region compared to TEMPRO v7.0. The BCRs have been adversely affected by a combination of rising costs (that is, Present Value of Costs- PVC).
- During stage 2 of the Scheme development, the traffic model was transferred from the local model to the South-West Regional Traffic Model (SWRTM), giving differing traffic forecast flows due to the wider traffic re-assignment taking place within the stage 2 SWRTM model.

Operational assessment

0.5.13. When considering maintenance and repair activities, there was little difference between the three route options. None of the route options have significant safety or operational implications for the strategic road network.

Environmental assessment and design

0.5.14. An environmental assessment has been carried out for each route option and is detailed in full within this report. This has appropriately assessed the environmental impacts of each option to help identify the Preferred Route.

Appraisal Summary Tables

0.5.15. Appraisal Summary Tables (ASTs) have been prepared in accordance with the Department for Transport's web-based Transport Analysis Guidance (WebTAG). These summarise the economic, social, and environmental impacts for each route option. The key points within the ASTs are shown in Table 0.5 below.

Table 0.5: Key points from the ASTs

Item	Pink option	Blue option	Orange option
Noise	This option would run closer to some properties in Henlade. It will introduce a new source of traffic noise where it passes through countryside towards its connection with the M5.	This option would be further away from more properties and would produce the greatest reductions in traffic noise. It will introduce a new source of traffic noise where the route passes through countryside towards its connection with the M5.	This option would leave more traffic on the existing A358 through Henlade than the other 2 options and would provide the least degree of noise relief. It will introduce a new source of traffic noise where the route passes through countryside towards its connection with the M5.
Air quality	The differences between the options in terms of overall vehicle emissions are marginal, with no risks to human health being generated by the Scheme. All options would reduce nitrogen dioxide (NO2) concentrations in Henlade AQMA in the opening year due to the rerouting of traffic away from the A358. This has the potential to result in the removal of the AQMA.		
Greenhouse gases	All options would lead to marginal increases in greenhouse gas emissions through a slight increase in journey lengths, although the journey times are shorter and more reliable. There is no substantial difference between the options.		
Landscape	This option would remain closer to the existing A358 for longer and therefore would have less impact on open countryside.	This option would intrude on the countryside south and west of Henlade.	This option would intrude on the countryside south of Henlade and west of Stoke St Mary.
Historic environment	There is some potential for the Scheme to have impacts on buried archaeology and on heritage assets such as listed buildings. There is no substantial difference between the options.		
Biodiversity	This option has the potential for direct impacts on protected species and Local Wildlife Sites.	This option has the potential for direct impacts on protected species, Local Wildlife Sites and Ancient Woodland.	This option has the potential for direct impacts on protected species, Local Wildlife Sites, a Local Nature Reserve and Ancient Woodland.
Water environment	There is no difference between the options in terms of impacts on the water environment. The detailed drainage design will seek to avoid any adverse effects on watercourses and flood zones.		

0.6. Public consultation results

0.6.1. Highways England conducted public consultations for the A358 Taunton to Southfields Dualling Scheme in 2017 and 2018. The public consultation enabled stakeholders to view and discuss the Scheme proposals with the project team.

0.6.2. In 2017, the consultation only considered a single route option (the Orange option) as this option met the Scheme brief and was the most affordable. The feedback from this consultation indicated that stakeholders wished to see more than one option for connecting the new road with the M5 motorway. Highways England took account of these views and in 2018 three route options, the Pink, Blue and Orange options, were presented.

0.6.3. Analysis of the consultation responses identified key themes and issues. Responses to the consultation questionnaire identified that:

- a majority of respondents (61%) thought that the Pink route would best serve their regular journeys.
- a majority (59%) agreed with the proposal for Section 2 of the route, which is common to all three options.

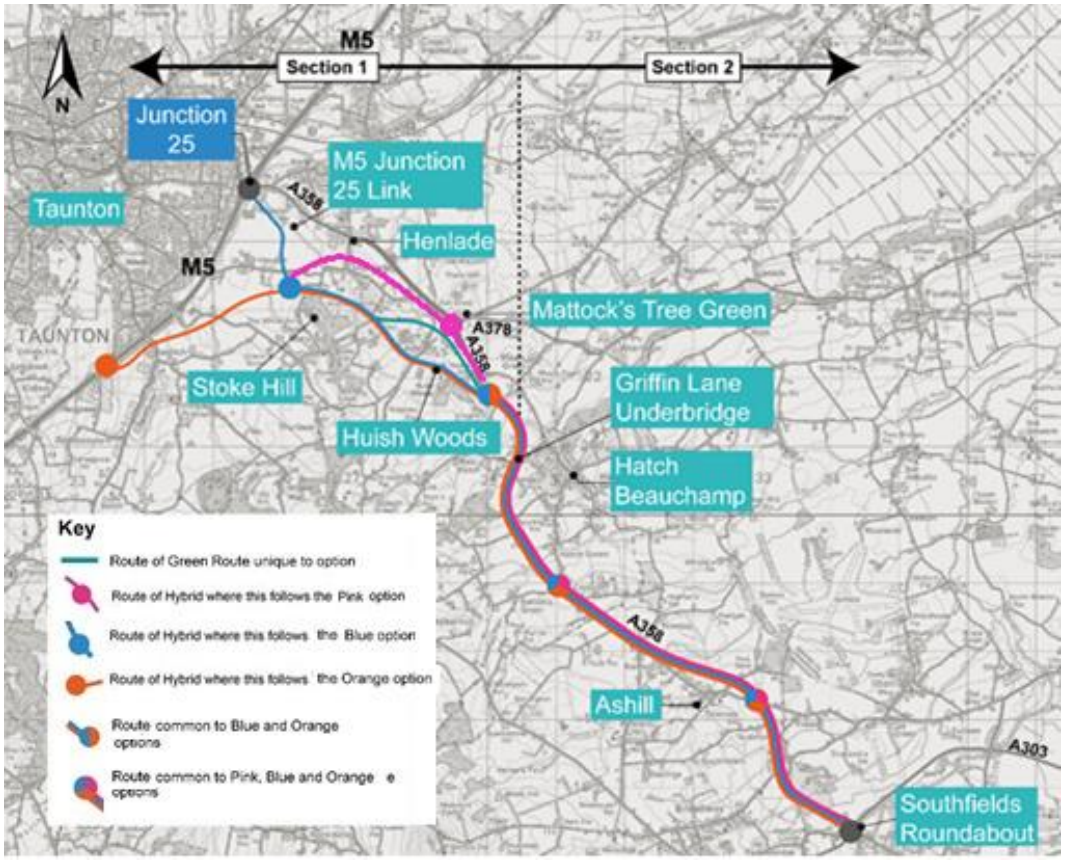
0.6.4. Other comments or observations received included concerns relating to flooding, non-motorised users, impact on local communities, environmental impact, and the junction strategy.

Alternative routes suggested at the 2018 consultation

0.6.5. Three alternative route options were proposed through the 2018 consultation by the public and a Parish Council, these were as follows:

- a combination route with elements from the Pink and Orange options (Pink / Orange)
- a combination route with elements from the Blue and Orange options (Blue / Orange)
- Ruishton and Henlade Parish Council proposed an option (referenced as the Green option). This is similar to the Orange option but does not include a junction at West Hatch Lane but instead follows the Pink option to the A378 before returning back to the alignment of the Orange option.

Figure 0.4: The alternative results suggested at the 2018 consultation



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0.7. Identifying the Preferred Route

0.7.1. The process of selecting the preferred route involves a series of eliminations carried out in line with the *Design Manual for Roads and Bridges* (DMRB). The competing options have been compared two at a time against the main categories within the Appraisal Summary Table (AST). The option with the least number of significant advantages recorded in the ASTs was eliminated. The remaining option was taken forward for comparison with the next option.

0.7.2. The route comparison process included the three route options (Pink, Blue and Orange) presented at the 2018 public consultation plus the three alternative options identified by consultees, that is, the Pink / Orange, Blue / Orange and Green options. All six route options have been considered on an equal proportional basis using the ASTs to identify the best performing route option (as described in 0.7.1).

0.7.3. Comparison of the presented route options demonstrates that the Pink option performs as the best option, as the assessment results show that it provides the best combination against the economic and environmental factors.

0.8. Development post 2018 consultation

0.8.1. To date, the Scheme website states that the Scheme range is between £250m to £500m. The three options presented at the 2018 consultation would all be within this range. However, following the 2018 consultation, the proposed route options were re-costed to include further design development and the later opening year for the Scheme. This has resulted in the increase of the Scheme costs and two of the route options now exceeding this range.

0.8.2. The previous Scheme mid-range estimates, as presented in the *Technical Appraisal Report* published in January 2018, and the Scheme mid-range estimates (prepared April 2018) for the three route options are summarised in Table 0.6 below.

Table 0.6: Scheme mid-range estimates (before and after 2018 public consultation)

	Presented in the *Technical Appraisal Report* (January 2018) at 2014 Q1 prices	Scheme estimates (prepared April 2018) at 2016 Q1 prices)
Pink option	£451,760,360	£521,298,106
Blue option	£400,820,487	£511,436,722
Orange option	£366,106,661	£490,261,113

0.8.3. The changes in Scheme estimate since January 2018, is due in part to the following reasons:

- The recent costing exercise has taken January 2016 Q1 as its baseline cost. Previous costing works had used a baseline cost of January 2014 Q1.
- Design development improved the accuracy of the construction quantities (mainly in earthworks and road construction), and the land acquisition for all of the route options in the online section.
- Further Scheme risks were identified, costed and added to the Scheme risk allocation.
- Change in the Scheme delivery programme due to the additional consultation taking place in 2018.

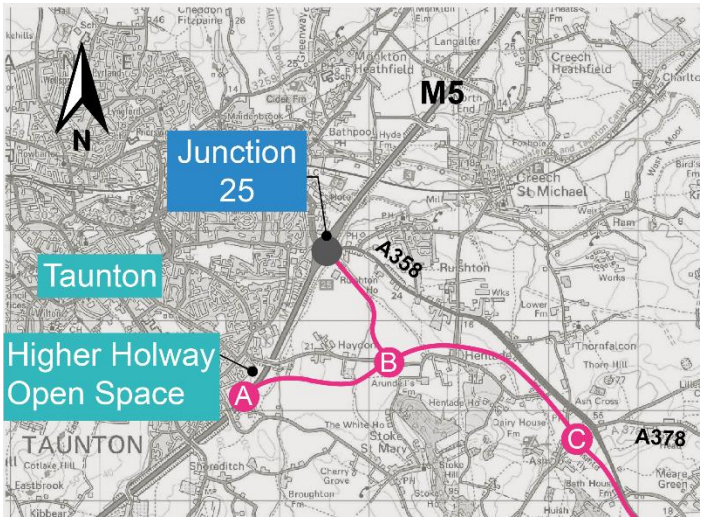
0.8.4. Since the 2018 consultation, further work has been undertaken to review the updated costs and to identify ways to deliver a solution within the £250m - £500m range, whilst still meeting the Scheme and RIS objectives.

0.8.5. The additional assessment work was undertaken to consider a modified option to bring the Scheme cost both within the range and closer to £250m. This aims to make best use of taxpayers' money whilst still delivering the Scheme and RIS objectives.

0.8.6. The Pink option is the most expensive option, but as the best performing of the three options and the option attracting strong support from the 2018 consultation, it was trialled for modification to reduce the Scheme cost. This revised option is referenced as the Pink Modified option.

0.8.7. The Pink Modified option retains the bypassing of Henlade, connects with the A378, and connects directly to junction 25 on the M5. Additional assessment work on M5 junction 25 has also been undertaken to develop the design and mitigate the impact to junction 25. Removing Junctions A and B and the road in-between, as shown in Figure 0.5 below, delivers the right balance between the Scheme objectives and cost. It also responds to the public feedback concerning the impact that these junctions and the road in-between, might have on homes, public open space and the countryside.

Figure 0.5: Junction A and B location (Pink option)



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0.8.8. Modifying the Pink option has decreased the footprint of the works and reduced the area of land impacted by a new route. This responds to concerns raised during the consultation about minimising the impact on the countryside. The removal of the link and junctions also generates a more affordable option as identified in Table 0.7 below.

Table 0.7: Pink Modified Cost Estimate compared with the Pink option

	Pink option (prepared April 2018)	Pink Modified option (Interim estimate prepared November 2018)
Cost Estimate	£521 million	£423 million

0.8.9. The assessment findings for the Pink Modified option are summarised below in Table 0.8 to Table 0.11.

Traffic flows through Henlade for Pink Modified

0.8.10. The Pink Modified option will reduce traffic flows through Henlade in the opening and design year, as shown in Table 0.8 below. This is comparable to the Pink option.

Table 0.8: Change in traffic flows through Henlade

Year	Do Minimum (without Scheme)	Pink Modified option
2015 (base year)	24,800	--
2023 (opening year)	28,100	3,400 (-88%)
2038 (design year)	33,500	4,000 (-88%)

Journey times for the Pink Modified option

0.8.11. The Pink Modified option shows an improvement of approximately 30% in journey times, as shown in Table 0.9 below.

Table 0.9: Change in journey times (2038)

Peak period	Change in journey time	
	Eastbound	Westbound
AM-Peak	-32% (~6 min 55 sec)	-30% (~6 min 8 sec)
PM-Peak	-32% (~6 min 45 sec)	-26% (~5 min 19 sec)

Economic performance for Pink Modified

0.8.12. The analysis of monetised costs and benefits for the Pink Modified option are shown in Table 0.10 below. All values are given in £000's.

Table 0.10: Summary of monetised costs and benefits – Pink Modified option (£000s)

Item	Pink Modified Option
Present Value of Benefits (PVB)	213,681
Broad Transport Budget Present Value of Costs (PVC)	245,882
Net Present Value (NPV)	-32,201
Initial Benefit to Cost Ratio (BCR)	0.87
Reliability Benefits	14,243
Wider Economic Benefits	11,543
Adjusted Present Value of Benefits (PVB)	239,466
Adjusted BCR	0.97

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

Key points from the Pink Modified AST

Table 0.11: Key points from the Pink Modified AST

Item	Pink Modified option
Noise	This option would run closer to some properties in Henlade.
Air quality	This option is expected to reduce concentrations in the Henlade AQMA due to rerouting of traffic away from the existing A358. This option would see an overall net improvement in local air quality PM10 concentrations, but there is a negative impact on regional NOx emissions.
Greenhouse gases	This option would lead to marginal increases in greenhouse gas emissions through a slight increase in journey lengths although the journey times are shorter and more reliable. There is no substantial difference between all of the options.
Landscape	This option would remain closer to the existing A358 for longer and therefore would have less impact on open countryside.
Historic environment	There is some potential for the Scheme to have impacts on buried archaeology and on heritage assets such as listed buildings. There is nothing to discriminate substantially between all of the options.
Biodiversity	This option has the potential for direct impacts on protected species and Local Wildlife Sites.
Water environment	The detailed drainage design will seek to avoid any adverse effects on watercourses and flood zones.

Further progression of the Pink Modified option

0.8.13. The BCR shown in Table 0.10 uses the cost estimate for Pink Modified received in November 2018 (as shown in Table 0.7). This uses the same cost assumptions and baseline as those used for the revised cost estimates completed in April 2018 for the Pink, Orange and Blue options.

0.8.14. In February 2019, a revised cost estimate was generated to take account of updates to the programme for construction and a Scheme opening year of 2025. This resulted in an increase in Scheme cost from the interim estimate in November 2018. The cost estimates are presented in Table 0.12 below.

Table 0.12: Pink Modified updated cost estimate

	Interim estimate (prepared November 2018)	Revised estimate (prepared February 2019)
Pink Modified option	£423 million	£457 million

0.8.15. The benefits and costs of the Pink Modified option, assessed for the November 2018 and February 2019 estimates, are presented in Table 0.13. The BCR for the Pink Modified option is 0.97 and 0.90 for the November 2018 and February 2019 estimates respectively.

Table 0.13: Updated summary of monetised costs and benefits – Pink Modified option (£000s)

Item	Interim Estimate (prepared November 2018)	Revised estimates (prepared February 2019)
Present Value of Benefits (PVB)	213,681	192,261
Broad Transport Budget Present Value of Costs (PVC)	245,882	271,967
Net Present Value (NPV)	-32,201	-79,706
Initial Benefit to Cost Ratio (BCR)	0.87	0.71
Reliability Benefits	14,243	13,020
Wider Economic Benefits	11,543	40,415
Adjusted Present Value of Benefits (PVB)	239,466	
Adjusted BCR	0.97	**0.90**

Notes: * TAG unit A3 Chapter 3, ** TAG unit A3 Chapter 2, *** COBALT, **** QUADRO, ***** TAG unit A3 version 1.9.1. All monetary values are expressed in 2010 prices discounted to 2010.

0.8.16. A new model to deliver Highways England schemes was announced in January 2018. This model, the Regional Delivery Partnership (RDP), provides the opportunity to re-evaluate the cost of the Pink Modified option.

0.8.17. The RDP contract model was developed as part of the wider Routes to Market Programme aimed at creating new procurement vehicles. It builds on the existing Collaborative Delivery Framework (CDF) which reached its headline value in 2018. Highways England chief executive Jim O'Sullivan said, "*Routes to Market represents a fundamental change in the way we deliver road projects. It will be performance rather than price based, focusing on building the right projects with the best outcomes for road users and the communities we serve. It demands a major step up in our supply chain to embrace innovation and teamwork and in their ability to deliver value*."

0.8.18. This Scheme will be delivered through the Regional Delivery Partnership arrangement implementing the new delivery arrangement from 2019.

Table 0.14: Cost estimates for Pink Modified

	Standard Estimate (prepared February 2019)	RDP cost estimate (prepared May 2019)
Pink Modified option	£457m	£397m

0.8.19. As shown above in Table 0.14, procuring the Scheme through the RDP, the Scheme cost will be in the order of £397m, a lower price than the February 2019 updated cost estimate used for the economic assessment. The saving is realised through a number of changes as a result of the RDP, these include:

- awarding schemes as part of regional packages based on programmes of work rather than individual scheme awards. This provides increased long-term certainty to the market providing a foundation for investment and productivity improvement.
- greater collaboration between all suppliers through integrated Centres of Excellence to drive regional efficiencies and performance by harnessing innovation and long-term skills strategies.
- a more streamlined procurement procedure, reducing the acquisition cost burden to the market.

0.8.20. The cost reductions achieved for the Scheme through the RDP has resulted in an improved BCR of 1.2.

Table 0.15: BCR values for Pink Modified

	BCR (interim cost estimate prepared November 2018)	BCR RDP (cost estimate prepared May 2019)
Pink Modified option	0.97	1.21

0.8.21. The adoption of the RDP for the Scheme has led to some delay with the announcement of the preferred route. However, the increase in BCR due to an improved and more affordable delivery model through the RDP, and being the lowest priced option which meets the Scheme objectives, makes the Pink Modified option the most affordable and viable option.

0.9. Summary of findings

0.9.1. The public consultation held in 2018 provided an opportunity for members of the public and stakeholders to provide their comments, and to discuss the Scheme proposals with the project team. This identified some key areas of importance including the concern about the Scheme's impact on the countryside and open space in light of the new motorway junction.

0.9.2. The consultation resulted in three alternative options being proposed by the public and stakeholders. Each was assessed and compared against the Pink, Blue and Orange option to determine their feasibility. All three costed more and performed less well than the original three options (Pink, Blue and Orange) presented at the consultation.

0.9.3. With updated Scheme cost estimates exceeding the stated range of £250m - £500m, further assessment and design work was undertaken to develop a modified option to reduce costs. The Pink Modified option emerged following substantiation that Junction A (connection to the M5 at Blackbrook), Junction B and the road in-between, could be removed from the Scheme. This made the Scheme more affordable whilst still delivering the RIS objectives. It also provided a solution that is sympathetic to the public's concern raised about impact to the countryside and the open space.

0.9.4. This Executive Summary provides an insight into the development of the Scheme and how the Preferred Route has been identified. This is the Pink Modified option, which delivers the following key benefits:

- Reduced traffic through Henlade with the potential for Somerset West and Taunton Council[5] to remove the Henlade AQMA designation.
- Improved journey time and reliability for road users.
- A reduced Scheme footprint with less impact on the countryside than the Pink option.
- Reduced impact on the open space compared with the Pink option
- Less impact on the Ancient Woodland than the Blue and Orange options.
- Lower cost solution than the Pink Option.
- Improves M5 junction 25 to better cope with the increased traffic flows.

0.10. The preferred route and the Scheme objectives

0.10.1. The **Pink Modified** option meets the Scheme objectives whilst also being more affordable and reduces the impact on the countryside. The Scheme objectives are met as follows:

- **Capacity -** The Pink Modified option will provide relief to the traffic congestion in Henlade. The average daily traffic would reduce from 33,500 vehicles to 4,000 vehicles in 2038. By reducing congestion and increasing capacity it will allow mile-a-minute travel as the norm along the new A358.
- **Safety -** The new A358 will see the existing road junctions and private accesses closed with new connections and junctions provided, making journeys safer by avoiding conflicting traffic-turning movements. The Scheme will also improve safety by encouraging road users to use the new A358, rather than seeking alternative local routes to avoid congestion into Taunton.
- **Local communities -** The Pink Modified option will allow local traffic using the A378 to connect with the upgraded A358 at Junction C (see Figure 0.5). This would improve local journeys into Taunton. The Pink Modified option will also cause less disruption to existing patterns of movement for local communities. The reduction in traffic congestion at Henlade will improve residents' quality of life.
- **Connectivity -** Connectivity to the south-west from the south-east and London will be improved, making Taunton and the south-west region more accessible. Daily travel for commuters and local traffic into Taunton will be

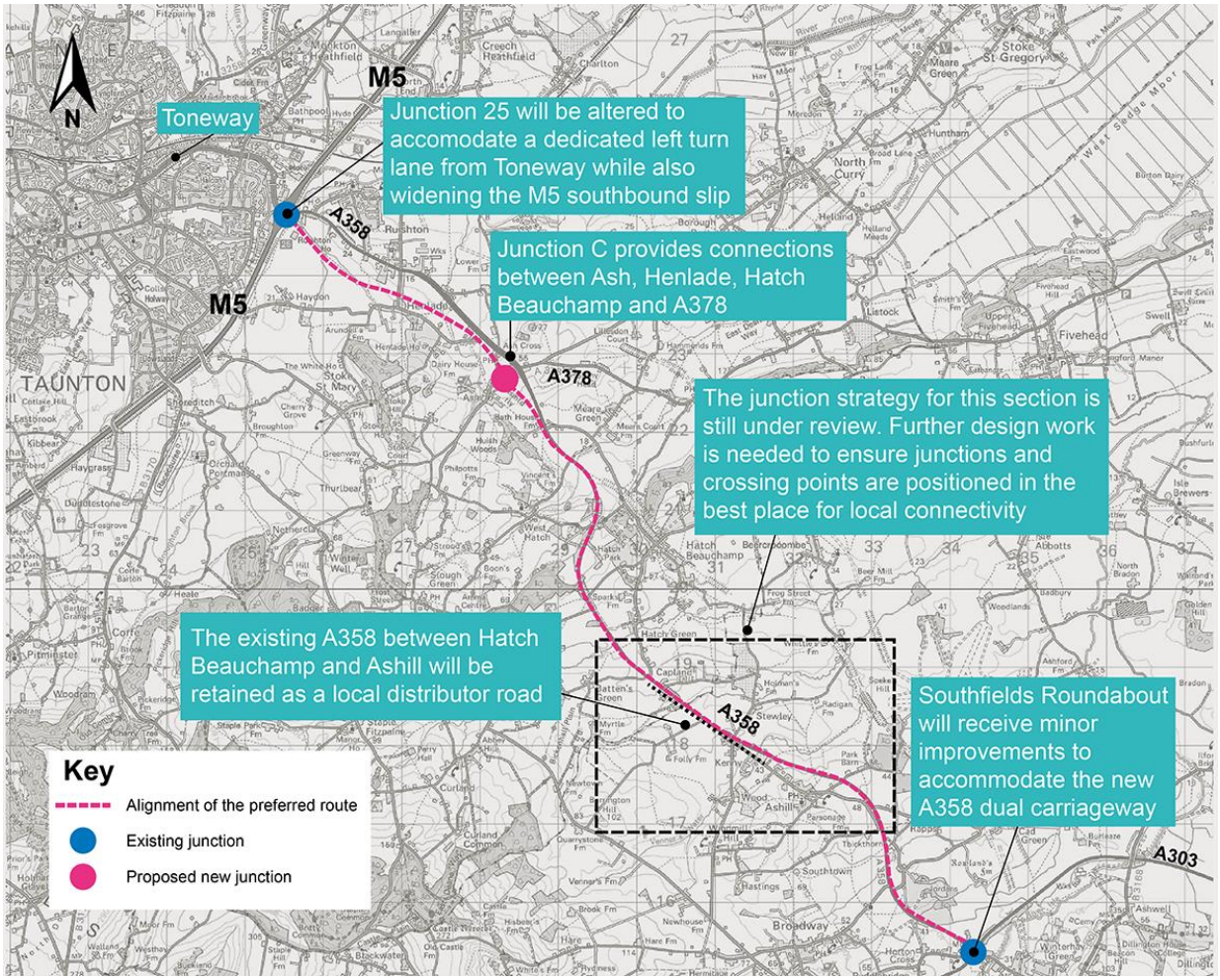
[5] Somerset West and Taunton Council is a District Council. It came into being on 1 April 2019, bringing together the former Taunton Deane Borough and West Somerset Councils. This document may refer to Taunton Deane Borough Council (TDBC) for engagement prior to 1 April 2019.

safer and more reliable, by separating local movements from traffic passing through the area.

- **Resilience -** The new road offers connection between the new A358, Nexus 25 and M5 junction 25. This will help reduce congestion between West Hatch and M5 junction 25.
- **Economic growth -** The Pink Modified option provides direct access to Nexus 25, as well as connecting to the A378. This will help Taunton to become a more attractive place to work and do business and helps facilitate growth in Somerset and the south-west.
- **Environmental impact -** The Pink Modified option avoids the Ancient Woodland at Huish Copse and at Stoke Wood, and removes the need to impact the open space.

0.10.2. A modified version of the Pink option (the **Pink Modified** option) has been identified as the preferred route as it meets the Scheme objectives, is more affordable and reduces the impact on the countryside. This route is presented in Figure 0.6 below.

Figure 0.6: The preferred route



Source: Mott MacDonald Sweco Joint Venture. This Map is based upon Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office © Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. Highways England 100030649 2016.

1. Introduction

1.1. Purpose of this report

1.1.1. This *Scheme Assessment Report* (SAR) provides a summary of:

- the Scheme's history and explains the existing conditions along the study area
- the development of route options following the 2017 and 2018 public consultations
- key findings from the public consultations
- the appraisal of route options, including policy, engineering, safety, traffic, economic, cost, operational maintenance, environmental, social and distributional impact assessments
- The preferred route

1.1.2. The findings presented within this report provide the basis for Highways England's decision on the selection of the preferred route. The next steps following announcement of the Preferred Route include:

- further refinement of the design
- further engagement through a statutory public consultation on the developed route
- submission of the refined design to the Planning Inspectorate (PINS) for a Development Consent Order (DCO)
- the application examined in detail by the Planning Inspectorate

1.2. Structure of this report

1.2.1. The *Scheme Assessment Report* has been prepared in accordance with TD37/93 *Scheme Assessment Reporting* (Highways England Design Manual for Roads and Bridges, Volume 5 Section 1 Part 2).

1.2.2. This report is structured into the following chapters:

Chapter 1	Introduction – Gives an overview of the purpose of the report.
Chapter 2	Background to the Scheme – Explains the context of the proposed Scheme as well as its history.
Chapter 3	Existing conditions – States the need for intervention and the existing conditions that influence the development of options.
Chapter 4	Planning factors – Sets out the Scheme brief from Highways England, the legislative framework and planning policies that are to be followed.

Chapter 5	Do minimum consequences – Describes the changes to traffic flow and the environmental and economic in the 'Do minimum' (without the Scheme) scenario.
Chapter 6	Summary of alternative schemes – Describes the Scheme options that have been developed and assessed. A commentary of how well each option would provide a solution to the problem described in Chapter 3.
Chapter 7	Design considerations – Describes the key points which were taken into account as part of the design process.
Chapter 8	Public consultation – Summarises the key findings of the report on public consultation produced for both the 2017 and 2018 events. Alternative options raised by stakeholders are also presented within this chapter.
Chapter 9	Traffic and economics for the Pink Modified option – Describes how traffic modelling predicts the performance of the options considered in terms of economic benefits and traffic flows.
Chapter 10	Operational assessment – Describes what difference the proposed options would have in terms of ease of maintenance and safety management.
Chapter 11	Environmental assessment and environmental design – Describes the varying environmental impacts of the options considered as well as outline proposals for the mitigation of identified disbenefits.
Chapter 12	Appraisal Summary Tables – Summarises the positive and negative aspects of the options taking into account all the assessments carried out and presents the Appraisal Summary Tables.
Chapter 13	Identification of the potential preferred route – Summarises the relative merits of each of the route options assessed after public consultation and identifies the best performing option.
Chapter 14	Development post potential route identification– Describes the additional work undertaken after the 2018 Public Consultation.
Chapter 15	Traffic and economics for the Pink Modified option – Describes how traffic modelling predicts the performance of the Pink Modified option in terms of economic benefits and traffic flows.
Chapter 16	Operational assessment – Describes what difference the proposed Pink Modified option would have in terms of ease of maintenance and safety management.

Chapter 17 Environmental assessment and environmental design for Pink Modified option – Describes the varying environmental impacts of the options considered as well as outline proposals for the mitigation of identified disbenefits.

Chapter 18 Environmental summary – Describes the varying environmental impacts of options considered as well as outline proposals for the mitigation of identified disbenefits.

Chapter 19 Appraisal Summary Table for Pink Modified option – Summarises the positive and negative aspects of the Pink Modified option taking into account all the assessments carried out and presents the Appraisal Summary Tables.

Chapter 20 Programme – Describes the timescales for the development and delivery of the Scheme.

Chapter 21 Further progression of the Pink Modified option – Describes the next steps for the Scheme and how it will be delivered .

Chapter 22 Conclusion – Confirms the route option that is considered to offer the best solution and identified the Preferred Route.

Appendix A – Lists abbreviations and acronyms used in the report.

Appendix B – Includes a plan showing the environmental constraints.

Appendix C – Provides a detailed summary of public information events held as a part of the 2017 and 2018 consultation.

Appendix D – Includes a plan showing the locations of Nitrogen dioxide receptors.

Appendix E – Includes the Appraisal Summary Tables.

Appendix F – Includes the comparison of alternative options proposed during the public consultation events by the public and stakeholders including the National Planning Policy Statement for the Pink, Orange and Blue option. This also includes the summary ASTs for the Green option, Pink / Orange options and Blue / Orange option.

Appendix G – Includes the National Planning Policy Statement for the Pink Modified option

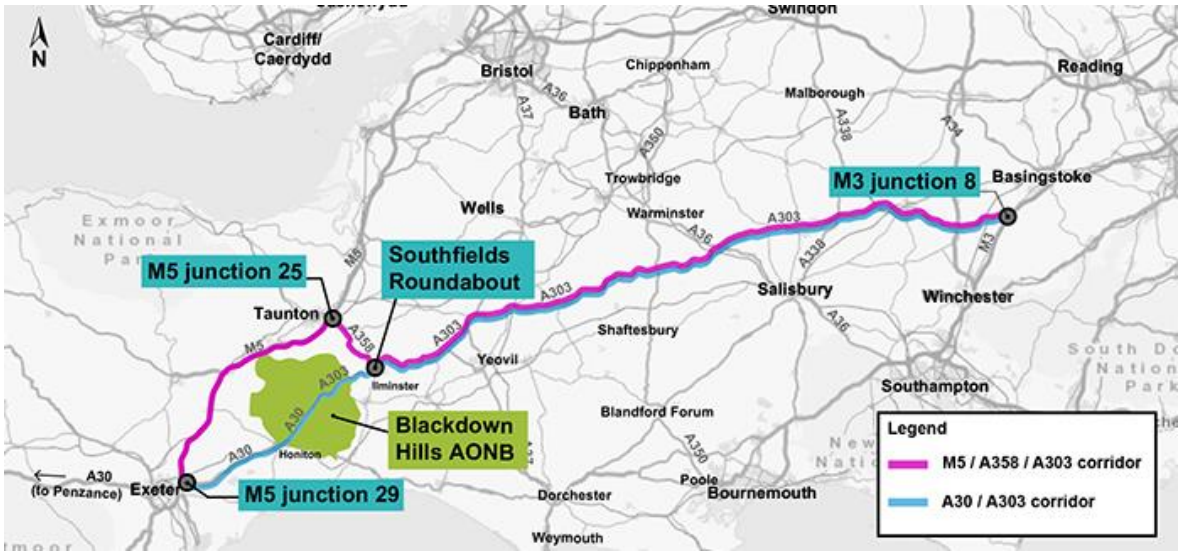
Appendix H – Includes the Appraisal Summary Table for the Pink Modified option.

2. Background to the Scheme

2.1. Wider context

2.1.1. The A303 / A358 / A30 route corridor provides vital east-west connectivity between London and the south-west as shown in Figure 2.1 below.

Figure 2.1: Road corridors



Source: Contains OS data © Crown Copyright and database right 2017.

2.1.2. The A303 runs for approximately 95 miles (153 kilometres) from junction 8 of the M3 near Basingstoke towards Taunton and Exeter. After 85 miles (137 kilometres), the A303 reaches Ilminster and the Southfields Roundabout junction with the A358. The A358 then continues for 8.7 miles (14 kilometres) to Taunton and junction 25 of the M5 from which the distance to junction 29 at Exeter is 29.5 miles (47 kilometres). The A303 continues towards Exeter, passing through the Blackdown Hills Area of Outstanding Natural Beauty (AONB). About 6.2 miles (10 kilometres) before Honiton it joins the A30 and then continues as the A30 for some 14.3 miles (23 kilometres) to junction 29 with the M5 at Exeter. From here, the A30 continues for another 112 miles (181 kilometres) to Penzance.

2.1.3. As well as serving long-distance traffic, the A303 also serves intermediate regional destinations via connecting major north-south routes, including:

- **A34 trunk road** which runs between Southampton and the Midlands, carrying considerable freight traffic to and from the port of Southampton
- **A338 principal road** which runs from Bournemouth, via Salisbury, towards Marlborough and Swindon
- **A36 trunk road** which links Southampton and Salisbury with Warminster, Trowbridge and onwards to Bath and Bristol

- **A350 principal road** which runs from Poole, via Blandford Forum, Shaftesbury and Warminster, towards Trowbridge and on to Chippenham
- **A37 principal road** which connects Weymouth, Dorchester and Yeovil to Bristol

2.1.4. The A303 also has an important local function, providing access to various small and medium sized settlements along the route.

2.1.5. The A303, and its wider network connections influence economic prosperity of the south-west by enabling the efficient movement of people and goods.

2.1.6. Although some travellers use the M4 and M5 for connectivity to the south-west, the A303 is an important tourist route to the south-west. It serves residents of London and the south-east, as well as the 2.6 million overseas visitors to the south-west (*Regional Spread of Inbound Tourism*, Visit Britain Research, January 2019[6]).

2.1.7. Current levels of service do not reflect the importance of the route as part of the strategic road network. Several single carriageway sections (totalling more than 34 miles (55 kilometres)) cause unreliable journeys, long delays and an increased risk of collisions. Congestion worsens during weekends and summer months, when over an hour can be added to a typical journey from London to Exeter.

2.1.8. The south-west region's councils and Local Enterprise Partnerships (LEPs) have been calling for improvements to be made to transport links. Somerset County Council commissioned an economic impact study for improvements to the whole A303 corridor (*A303 / A358 / A30 Corridor Improvement Programme: Economic Impact Study,* February 2013). The report estimated that upgrading the A303 / A358 / A30 to dual carriageway between Amesbury and Honiton / Taunton would attract up to more 21,400 jobs. These additional jobs would generate substantial financial benefits to the south-west region.

2.2. Scheme history

2.2.1. Work has been undertaken over many decades on the A303 / A358 / A30 corridor. Problems have been identified since the 1950s and assessments undertaken since the early 1990s.

2.2.2. Some of these studies have assessed the best alternative for the corridor at its western end. They have investigated whether upgrades to the A303 / A30 route to Honiton or the A358 / M5 route would be most beneficial.

[6] https://www.visitbritain.org/sites/default/files/vb-corporate/Documents-Library/documents/foresight_164_regional_spread_of_inbound_tourism.pdf

The A303 before 1988

2.2.3. In the early 20th century, the London to south-west route included several A and B roads, including the A30, which formed a link to Exeter. As early as the 1930s, the route suffered from congestion caused by holiday makers travelling to the south-west.

2.2.4. Recognising its importance, the government reclassified several of the roads in 1933 to form the A303. This resulted in quicker journey times and reduced congestion over the old A30. A number of schemes to upgrade the A303 were carried out between 1933 and 1988 including:

- 1958: Upgrading the route to a trunk road
- 1969: Andover and Amesbury bypasses
- 1976: Marsh bypass
- 1977: Wincanton bypass
- 1988: Ilminster bypass

1988 to 1998 – Proposals on this section of the A303 / A30

2.2.5. The Ilminster Bypass (A303) was opened in 1988. It extends from Southfields Roundabout, 1.2 miles (2 kilometres) north-west of Ilminster, eastwards to Hayes End Roundabout, which is 0.6 miles (1 kilometre) south of South Petherton. The existing bypass was constructed as a wide single two-lane concrete carriageway (10m wide with 1m wide hard-strips and 2.5m wide grass verges).

2.2.6. Soon after the bypass opened in 1988 several fatal collisions occurred. The collision rate has now reduced to national average levels for this category of road. Re-marking in 2003 to alternate overtaking sections has improved this further. Collision severity, however, remains high.

2.2.7. A scheme to widen the Ilminster Bypass was designed in the early 1990s. The proposed improvement was to widen the bypass to two 7.3m wide carriageways with a 4.5m wide central reserve and 3.5m wide verges. The proposals required work to the existing structures to accommodate the widened carriageway.

2.2.8. A modified consultation exercise was held in 1992 which did not show which side the widening would take place. Local authorities, parish councils, national, regional and local organisations, landowners and persons thought to have an interest were consulted. In general, the need to widen this section of the bypass was recognised. However, concerns were expressed regarding which side the extra carriageway would be built, noise, the effect on the environment and landscaping.

2.2.9. An environmental statement and draft orders were produced for the Scheme to widen the Ilminster Bypass in 1996. The Scheme was then suspended along with others proposed on the A303 Trunk Road, (a road that is maintained by Highways England and forms part of the strategic road network).

2.2.10. Ilminster to Marsh and Marsh to Honiton schemes were also developed and promoted in parallel. They were examined at a Public Inquiry into the Highways Act Draft Orders in 1995. Assessments were based on operational and economic quantitative data and an environmental framework that set out the various environmental impacts.

2.2.11. At the inquiry the Countryside Commission proposed an alternative to the A303 / A30 to avoid encroaching into the Blackdown Hills AONB. This involved diverting the trunk road along the A358, a local main road, to junction 25 of the M5 at Taunton. The assessment demonstrated that whilst the A358 option had less environmental impact, the A303 / A30 option performed better economically and operationally. On that basis, the Inspector subsequently recommended that the A303 / A30 alternative should proceed.

1998 – A new deal for trunk roads

2.2.12. In July 1998 the new government set out its policies for the future of transport in the UK in the white paper *A new deal for transport: better for everyone*. This heralded a radical change in transport policy with improved public transport and reduced dependence on cars. Rather than proposing new roads the policy was one of managing and maintaining the existing system. This white paper was followed by a number of 'daughter documents' setting out what it meant for different aspects of the transport policy. These identified the need for 21 multi-modal studies to be carried out in three tranches.

2.2.13. Subsequently several schemes, including the A303 / A30, were delayed pending the outcome of the multi-modal studies.

2000 – South-west area multi modal study

2.2.14. *The London to South-West and South Wales Multi Modal Study (SWARMMS)* was one of 11 multi-modal studies in the first tranche and was commissioned through the Government Office for the South-West. This study started in early 2000 and reported to the South-West Regional Assembly in 2002. The purpose of the study was to determine any alternatives to major road building where there was be a rail alternative.

2.2.15. SWARMMS covered the two major road and rail corridors from London to the south-west and south Wales. It reassessed the road schemes against the new criteria set out in a *New approach to appraisal* which had been outlined in *A new deal for transport: better for everyone*. This included M4 / M5 compared to

the Paddington to Bristol / Cardiff / Plymouth rail corridor. It also included the M3 / A303 corridor compared to the Waterloo to Exeter via Salisbury rail corridor.

2.2.16. There were seven schemes on the A303 in the National Trunk Road Improvement Programme at that time:

- A303 Amesbury to Berwick Down (Stonehenge)
- A303 Wylye to Stockton Wood
- A303 Chicklade Bottom to Mere
- A303 Sparkford to Ilchester
- A303 Ilminster Bypass Dualling
- A303 Ilminster to Marsh
- A303 / A30 Marsh to Honiton

2.2.17. In July 2000 the government published its *Ten-year plan for transport*. This set out the measures and resources needed to implement the government's integrated transport policy. The plan proposed that £180 billion should be spent over ten years on transport. Of this, £60 billion was to be on railways, £59 billion on roads (local and national) and £59 billion on local transport. A key aim of the plan was to substantially increase the use of rail for both passengers and freight.

2.2.18. Key recommendations for the London to Exeter Corridor included:

- Creation of a high quality dual carriageway route (A303 / A358) between the south-east and the south-west, with the A358 becoming part of the Trunk Road network
- A new Intelligent Transport System (technology) proposed for the A303 corridor
- New M5 junction south of junction 25

2.2.19. The final SWARMMS report was published in 2002. In an announcement in December 2002, ministers stated that:

- they accepted the overall recommendations of SWARMMS
- the A303 be improved to form a second major road corridor into the south-west
- the Highways Agency should supplement the SWARMMS work by carrying out further technical work. This would enable ministers to make a more informed decision on the A303 / A358 route choice

2.2.20. Under the Highways Agency Consultancy Framework Agreement for Design Services 2001, consultants were asked to look at the SWARMMS recommendations. They were asked to focus on the A303 / A30 route option compared with the A303 / A358 / M5 route option. The following feasibility studies were undertaken:

- Parsons Brinkerhoff – A358 dualling and A303 / A30 west of Southfields
- Mott MacDonald – A303 east of Southfields

2.2.21. The South-West Regional Assembly carried out a review of the SWARMMS findings. They recommended to the Secretary of State that both the A303 / A30 Ilminster to Honiton and the A358 Ilminster to M5 should be dualled. The Secretary of State for Transport asked in December 2002 that the feasibility of improving both routes be considered further. This further investigation aimed to determine which of the routes should subsequently be upgraded.

2.2.22. Representatives of the regional assembly and others, met ministers who confirmed they would only proceed with one of the alternatives, not both as recommended. Ministers agreed to let the regional assembly comment on the Highways Agency's further work before a decision was made.

2.2.23. A report was submitted to regional assembly comparing the advantages of the A303 / A30 and the A303 / A358 / M5 alternatives. The regional assembly recommended Southfields Roundabout to Honiton (A303 / A30) be dualled. In November 2004, against the recommendation of the regional assembly, the Secretary of State for Transport announced that the A358 alternative would be improved.

2.2.24. The main issue arising from SWARMMS was whether a feasible, economically viable connection between the A358 and the M5 at Taunton could be provided. This connection also had to be compatible with its status as a strategic route. The recommendation from SWARMMS was to minimise any new road construction through online widening and constructing a second carriageway alongside the existing single carriageway. The exception to this was at Henlade where a bypass passing across agricultural land south of the existing road was proposed. SWARMMS also recommended that the junction between the A303 and the A358 should be two level.

2004 – The targeted programme of improvements

2.2.25. A reviewed targeted programme of improvements originally announced in the *New deal for trunk roads* comprised 37 schemes. These schemes costed £1.4 billion and included improvement of the A303 / A30.

2.2.26. Following earlier work comparing the A303 / A30 Ilminster to Honiton and the A303 / A358 Ilminster to Taunton alternatives, Parsons Brinckerhoff were

commissioned by Somerset County Council. They were engaged to design dual carriageway options to improve the A303 / A358 route between South Petherton on the A303 and junction 25 of the M5. This work aimed to allow presentation of options for consideration at public consultation and determination of a single scheme.

2.2.27. Two route options were considered to improve the A358 to dual carriageway standard. These were Option A, over a length of approximately 9.9 miles (16 kilometres) and Option B, approximately 9.2 miles (14.8 kilometres) in length. Both options largely follow the same alignment, which involve online widening of the existing A358. However, they differed at the south-eastern end of the scheme, where they connected to the A303. Option A continued along the existing route of the A358 and Option B featured an offline 1.9 miles (3 kilometres) section through Rapps.

2.2.28. After a series of value engineering meetings and risk workshops, options were reduced to a single preferred option. These included a loop diverge junction providing a free-flow link with the M5. This single route was presented at the public consultation in 2007.

2.2.29. By 2007, the Amesbury to Berwick Down scheme (which included Stonehenge) was cancelled due to increasing costs. The dualling of the entire A303 / A30 route was also cancelled due to lack of regional funding. This meant that a second strategic route for the south-west was no longer a realistic prospect and the improvement of the A358 was dropped.

2.2.30. The South-West Regional Assembly advised ministers to look instead at a package of managed solutions for the A303 / A30 Corridor. The Highways Agency commissioned Balfour Beatty Mott MacDonald Area 2 in 2010 to develop options for the A303 / A30 corridor to provide an improved service.

2.2.31. Following the election of the coalition government in 2010, an increase in infrastructure investment was promised to stimulate the economy. The government recognised the importance of the A303 corridor in terms of its role in providing access to the south-west. This included facilitating the movement of goods and people and its contribution to the economic performance of locations along the corridor. However, the government did not have sufficiently developed business cases for investment proposals at the time of the 2010 Spending Review. This meant they were unable to confirm specific investment projects in the A303 corridor.

2.2.32. Because of the importance of the A303 corridor, Somerset County Council held a summit with other stakeholders in 2012. The outcome of this was a commitment for further work on the prioritisation of potential improvements and consideration of possible funding sources. The grouping of local authorities and

local enterprise partnerships produced an initial analysis and business case for future improvements to the A303 corridor. Their analysis reiterated the importance of investment in the corridor, particularly the wider economic benefits to the south-west economy. The feasibility study built on the momentum gained from this previous work. Somerset County Council employed Parsons Brinckerhoff in 2012 to assess outstanding schemes, leading a further economic study being published in April 2013.

2013 – Investing in Britain's future

2.2.33. The HM Treasury document *Investing in Britain's future* (July 2013) set out the programme of infrastructure investment. It included the tripling of annual investment on Highways Agency major roads enhancements from 2013 levels to over £3 billion by 2020 / 21. As part of that investment programme, the government announced it would identify and fund solutions. This would initially be through feasibility studies identify problems and potential solutions to tackle some of the most notorious and long-standing road hotspots.

2.2.34. CH2M was commissioned by the Highways Agency to undertake the A303 / A30 / A358 corridor feasibility study. The study, published in 2015, concluded that there were substantial benefits to be gained by improving the current single carriageway sections of the route. Benefits encompassed those for residential communities and businesses located along the A303 / A30 / A358 corridor, as well as in the south-western peninsular as a whole. The study recommended that the better performing options be taken forward for preparation of strategic outline business cases. This included Southfields Roundabout to Honiton, online and offline dualling of the A358 and improvements to the A303 / A30. The Appraisal Summary Table (AST) from this study scored the dualling of the A358 more highly than a single carriageway improvement to the A303 / A30 due to the impact to the AONB.

2015 to present – *Road Investment Strategy* (RIS)

2.2.35. The government recognise the importance of the A303 / A358 / A30 corridor and its problems. They have therefore committed in the RIS[7] to create a continuous high quality dual carriageway to the south-west via the A303 / A358. This will transform connectivity to and from the south-west, providing a consistent and dependable service to customers. A key aim is to achieve ‘mile a minute’ journey times by creating free-flowing traffic conditions along the whole route.

2.2.36. The strategy involves upgrading the entire A303 / A358 route between the M3 and the M5 at Taunton to dual carriageway standard. It also included upgrades to junctions to remove congestion bottlenecks. A series of eight major

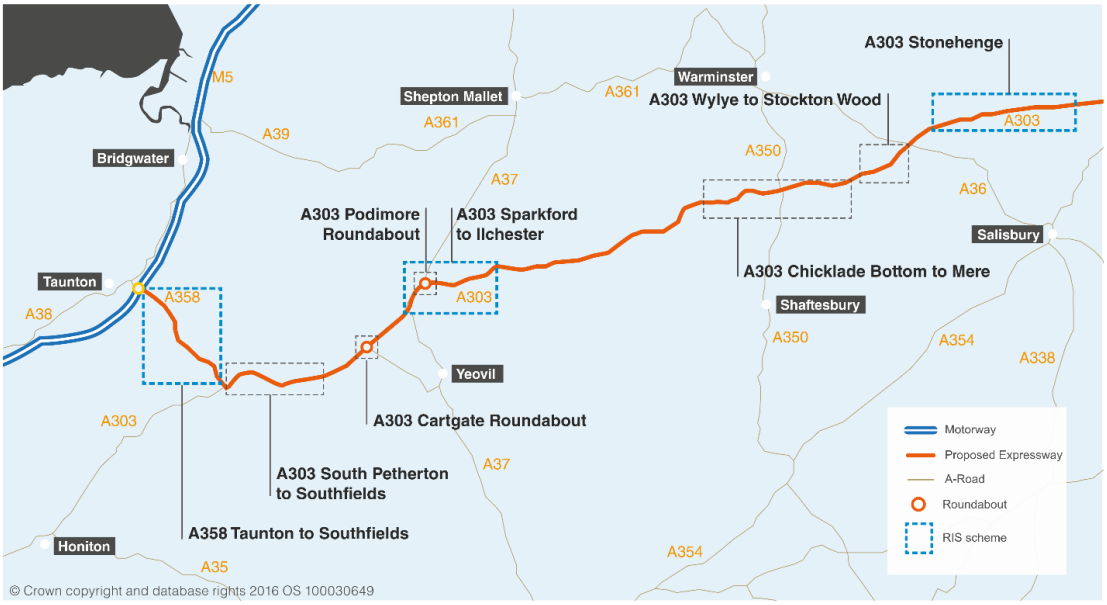
[7] https://www.gov.uk/government/publications/road-investment-strategy-for-the-2015-to-2020-road-period

improvement schemes along the A303 / A358 have been identified as part of an overall investment package for the entire corridor. These are listed below noting that the A303 Stonehenge, the A303 Sparkford to Ilchester Dualling and the A358 Taunton to Southfields Roundabout Dualling are all committed within the RIS:

- A303 Stonehenge (RIS1[8])
- A303 Sparkford to Ilchester Dualling (RIS1)
- A358 Taunton to Southfields Roundabout Dualling (RIS1)
- Wylye to Stockton Wood
- Chicklade Bottom to Mere
- A303 Podimore Roundabout
- A303 Cartgate Roundabout
- A303 South Petherton to Southfields

2.2.37. The eight schemes along the A303 / A358 route are illustrated in Figure 2.2 below.

Figure 2.2: Schemes to deliver improved connectivity to the south-west



Source: Highways England (2016). *Creating an Expressway to the south-west: The case for the A303 / A358 Corridor.*

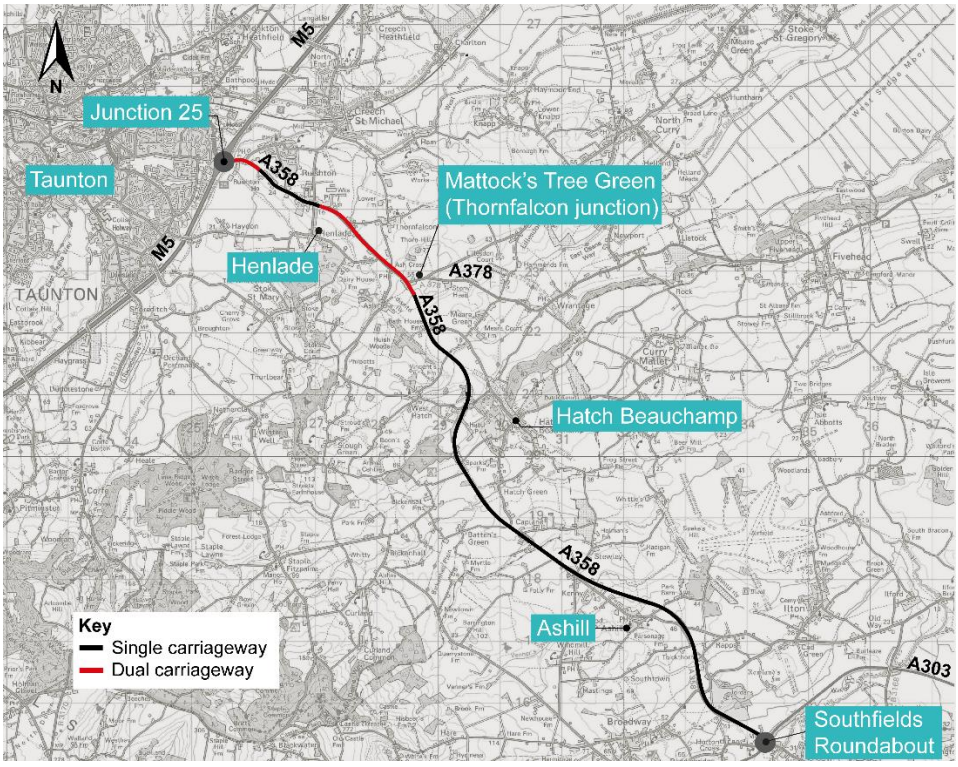
2.2.38. It should be noted that in deciding to improve the corridor to the south-west via the A358, the government decided not to extend the upgrading via the alternative A303 / A30 corridor from Ilminster to Honiton and Exeter. This recognised the impact of upgrading the A303 / A30 as it passes through the Blackdown Hills AONB. Instead the government, in RIS1, has committed to

[8] RIS1 refers to the *Road Investment Strategy* which covers the first roads period 2015 to 2020.

undertaking smaller-scale improvements along this section to improve safety and journey quality for users.

2.2.39. Figure 2.3 shows the existing A358 road layout between Taunton and Southfields Roundabout, its junction with the A303 near Ilminster. It also indicates which sections are single carriageway and which are dual carriageway.

Figure 2.3: A358 Existing road layout



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2.2.40. Dualling of the A358 between Taunton and Southfields Roundabout was identified in the RIS[1] in this period to improve the A303 / A303 / A358 corridor, the others being:

- A303 Sparkford to Ilchester Dualling
- A303 Stonehenge

2.2.41. The RIS notes the Scheme will develop a high quality dual carriageway making an essential contribution to the 'Expressway' link between the south-east and south-west. It is anticipated that future enhancements would make this section 'Expressway' compatible to support the long-term aspirations of the RIS.

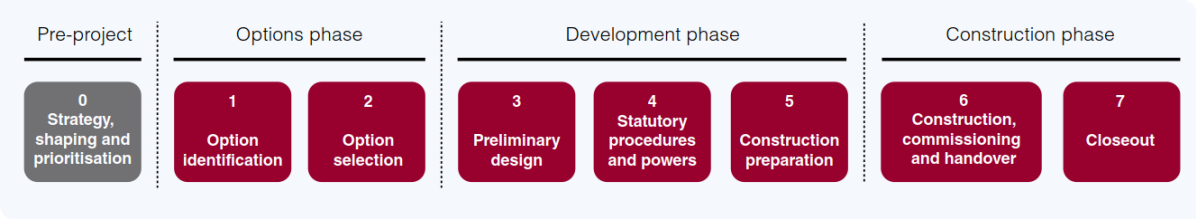
2.2.42. The specific transport objectives identified at the strategy, shaping and prioritisation stage were to:

- Support economic growth
- Reduce delays and queues
- Improve the resilience of the A303 / A358 / A30 route corridor
- Improve safety along the A303 / A358 / A30 route corridor
- Improve the connectivity of the south-west to the rest of the UK
- Avoid unacceptable environmental impacts
- Reduce severance on local communities
- Promote opportunities to improve the quality of life for local communities

2.3. Development of the Scheme

2.3.1. The development of the A358 Taunton to Southfields Dualling Scheme (the **Scheme**) has followed the process set out in Highways England's Project Control Framework (PCF). This is a structured approach to scheme development through the stages illustrated in Figure 2.4.

Figure 2.4: Highways England's Major Project Lifecycle



Source: Highways Agency (2016). *The project control framework: Handbook v3 April 2016.*

2.3.2. This report marks the end of Stage 2 (option selection).

Stage 1 – Option identification

2.3.3. A total of 28 potential options were identified for improving the A358 during the option identification stage in 2016. The options considered included routes using the existing road in part or full, as well as entirely new routes across open landscape. These were subject to a sifting process which appraised all the options against economic, social and environmental criteria. Following the initial comparison, a further value for money exercise reduced the feasible options to four routes. These four were taken forward for further assessment.

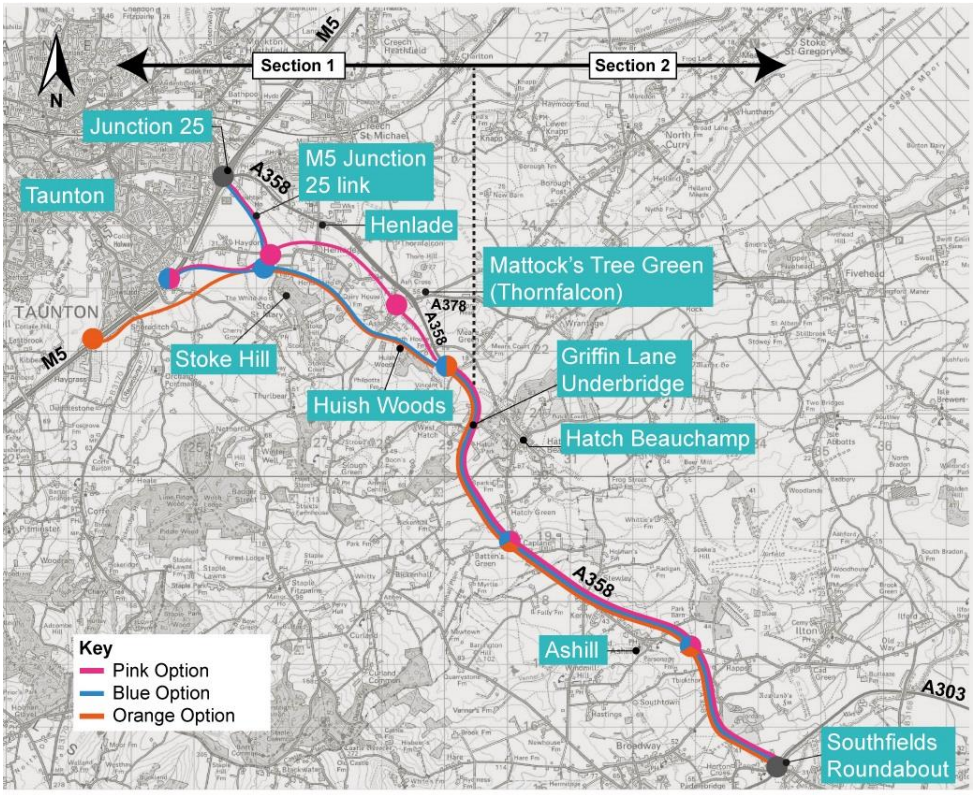
Stage 2 – Option selection

2.3.4. The four shortlisted options were appraised in greater detail as set out in the *A358 Taunton to Southfield Dualling Scheme: Technical Appraisal Report* (Highways England, January 2018). Of these four options, one route was discounted on environmental grounds as it would run west of the existing road through a tranquil area approximately 100m to the north of the Blackdown Hills

Area of Outstanding Natural Beauty (AONB). This option had the potential to impact on the AONB and a Site of Special Scientific Interest, with an increased risk of pollution indirectly affecting key characteristics.

2.3.5. Of the three remaining options, one was taken to public consultation in 2017 (presented as the Orange option in Figure 2.5). This option met the Scheme objectives and was the most affordable. However, a strong feedback theme was a wish to see more than one option which connected with the M5, providing increased traffic relief for Henlade. This would also enable the route to connect more directly with the future 'Nexus 25' development (planned in the south-east quadrant of the existing M5 junction 25).This feedback was considered and an additional non-statutory public consultation was held in early 2018 presenting three options (the Pink, Blue and Orange options as shown in Figure 2.5). Details can be found in the *A358 Taunton to Southfield Dualling Scheme: Technical Appraisal Report* (Highways England, January 2018).

Figure 2.5: Route options presented at the public consultations



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2.3.6. Analysis of the responses to the public consultation has subsequently been undertaken and the assessment of the options completed. These are presented throughout the remainder of this report.

3. Existing conditions

3.1. The problem

3.1.1. The A303 / A30 corridor forms part of the strategic road network. Together with the A358, it forms a strategic link between London and the south-east and the south-west. The corridor is used heavily by business and leisure traffic and is of critical importance to the varied economy of the south-west of England. Not only is the road important for strategic long-distance traffic, it is also locally important, connecting several towns along the corridor including Andover, Amesbury, Salisbury, Shaftesbury, Warminster, Yeovil, Honiton and Taunton.

3.1.2. Whilst much of the A303 / A30 is dual carriageway, there is approximately 35 miles of existing single carriageway and at-grade junctions where congestion occurs. Between Ilminster (Southfields Roundabout) and Honiton, the A303 / A30 passes through the Blackdown Hills Area of Outstanding Natural Beauty (AONB). In this area congestion and delays occur regularly as the corridor accommodates traffic flows in excess of available capacity.

3.1.3. Annual Average Daily Traffic (AADT) bi-directional flow on the A303 between Honiton and Ilminster (Southfields Roundabout) is approximately 16,000-18,500 vehicles. This increases by around 10% during the summer months. It is more than the design standard flow of 13,000 vehicles for a single carriageway road (Design Manual for Roads and Bridges (DMRB), TA 46/97). Only 60-70% of journeys on this section of the A303 / A30 are considered to be completed 'on time'. This is compared to 75% across all A-roads on the strategic road network[9]. In addition to this, clusters of collisions exist on the A303 / A30 corridor where two lanes merge into one at Marsh, Monkton village. Clusters of collisions also occur where traffic flows through the narrow tree-lined section at Rawridge and at the major at-grade junctions.

3.1.4. The existing A358 between junction 25 of the M5 at Taunton and A303 at Southfields Roundabout is predominantly single carriageway. It currently experiences congestion and poor journey time reliability during peak traffic periods. The AADT on the A358 of over 20,000 vehicles, exceeds the design standard flow for single carriageway roads. In March 2015, the average peak period hourly journey times between M5 junction 25 and Southfields Roundabout were observed. Results ranged between around 12 minutes for the eastbound direction in the inter peak period (10:00 to 16:00) to around 13 minutes for the westbound direction in the AM peak period (07:00 to 10:00). On the A358 route there are also four collision cluster sites located at Bushy Cross Lane (Henlade village), Stoke Road (Henlade village), Park Barn Lane (Ashill),

[9] Based on journey time reliability data collected by the Highways Agency until March 2015.

and the Broadway Road / Cad Road[10] junction. Several Public Rights of Ways, paths and cycle routes have been severed by construction of the existing road.

3.1.5. The A358 is not currently part of the strategic road network but is part of the local road network managed by Somerset County Council.

3.2. Existing conditions and constraints

Roads – locality

3.2.1. The existing A358 is located within the county of Somerset in the south-west of England. The road runs in a north-west to south-east direction between the towns of Taunton (connecting to the M5 motorway at junction 25) and Ilminster (connecting to the A303). It passes through the civil parishes of Ruishton, Thornfalcon, West Hatch, Hatch Beauchamp, Bickenhall, Ashill and Horton. The road crosses the boundary of the districts of Taunton Deane and South Somerset between Hatch Beauchamp and Ashill.

3.2.2. The existing A358 also lies to the north of the Blackdown Hills AONB and to the south of the Somerset Levels. To the west it is bounded by the M5 motorway and to the east by the A303. The terrain is undulating in sections and the road crosses several watercourses which run from south-north from the Blackdown Hills towards the Somerset Levels. Environment Agency mapping indicates that many of these watercourses exceed bank-full conditions during times of high flow, leading to flooding.

Highway network

3.2.3. The existing section of the A358 between Taunton and Ilminster is about 9 miles long (14.5 kilometres). The road is mainly single carriageway with a 0.8 mile (1.3 kilometres) section of dual carriageway between Henlade and Mattock's Tree Green. This is preceded for 0.3 miles (0.5 kilometres) to the east by a shorter section of single carriageway. This section features a climbing lane as the road rises to the crest at Mattock's Tree Hill. There is also a short section of dual carriageway on the approach to the M5 junction 25.

3.2.4. At the western end, the section of A358 to be improved connects to the M5 at a partially signal controlled five arm roundabout that forms M5 junction 25. The junction 25 roundabout also provides access to Blackbrook Business Park. The A358 continues west of the M5 into Taunton and then onto north Somerset. At the eastern end, the section of A358 to be improved connects with the A303 at the five arm Southfields Roundabout. The A358 continues to the south-east from Southfields Roundabout towards Chard via the local settlement of Horton Cross and the B3168 which serves Ilminster. Along the section of the A358 to

[10] A358 Taunton to Southfields Dualling Strategic Outline Business Case Review Report, September 2015 (section 13.6.3).

be improved, there are numerous at-grade local road junctions. The most notable is the signal controlled junction with the A378 at Mattock's Tree Green which heads east to Curry Rivel and Langport. Other local roads provide access to local villages such as Ruishton, Henlade, Thornfalcon, Bickenhall, Hatch Beauchamp, Ashill and Ilton.

3.2.5. The A358 Hatch Beauchamp Bypass crosses over Griffin Lane on a bridge which has recently been strengthened.

3.2.6. There are 12 known watercourse crossings along the route. A number of these are considered minor and therefore accommodated by piped culverts. However Back Stream, Cad Brook, Venner's Water, Fivehead River and Broughton Brook are accommodated by larger structures such as underpasses or bridges.

3.2.7. The existing A358 has been the subject of a number of upgrades. The short dualled section at Mattock's Tree Green appears to have been upgraded in the 1960s or 1970s, possibly in response to the poor vertical alignment and associated visibility. The single carriageway section around Hatch Beauchamp was constructed as a bypass in the 1980s. Similarly, the section of single carriageway around the village of Ashill was constructed as a bypass in the 1990s.

Drainage

3.2.8. The existing drainage network along the A358 varies between urban and rural sections of the route. To the western end of the Scheme the road is urban in character and therefore the carriageway is kerbed on both sides of the road with kerb inlet gullies. It is anticipated that road run-off eventually drains untreated into the River Tone via either storm-water sewers or one of the many streams and drainage channels in the area.

3.2.9. The M5 near junction 25 currently drains into the Black Brook which subsequently flows into the River Tone. The A303 near Southfields Roundabout drains into the River Isle.

3.2.10. To the east of Thornfalcon, the drainage network generally consists of splayed precast kerbs or surface water concrete channels when the road is at ground level. When the road is in cutting or embankment, filter drains are used in the verge. Intermittent gullies are located with kerbs and in the inverts of the concrete channels. There are also several drainage ponds located along this section. They are used to store and treat surface run-off water before gradually releasing it into the neighbouring watercourses, namely the Widness Rhyne, Fivehead River, Cad Brook and the River Isle.

3.2.11. Drawings obtained from Somerset County Council confirm the road drainage system was comprehensively redesigned and constructed as part of the Hatch Beauchamp and Ashill Bypass.

Utilities

3.2.12. During the options identification stage of this Scheme, enquiries were undertaken in accordance with Appendix C2 of the Code of practice *measures necessary where apparatus is affected by major works (diversionary works),* (Department for Transport, June 1992). This enabled the identification of public utility locations within the Scheme area.

3.2.13. Several statutory undertakers reported equipment in the area that may require protection or diversion for the proposed improvement Scheme. These include:

- Wessex Water
- Western Power Distribution (WPD)
- National Grid
- Scottish and Southern Energy (SSE)
- BT Openreach
- Vodafone
- Instalcom
- Wales & West Utilities

3.3. Traffic – existing conditions

3.3.1. To analyse existing traffic conditions on the A358 corridor between Taunton and Southfields Roundabout and the A303 / A30 corridor, traffic data was collected. The collected data was also used to develop, calibrate and validate a base year traffic model. This model is representative of average Monday to Friday traffic conditions for the neutral month of March 2015. It is consistent with the base time period when the South-West Regional Traffic Model (SWRTM) was developed and when most base model data was collected. It should be noted that the A358 Taunton to Southfields traffic model was developed as an adaptation of the SWRTM in terms of road network representation and demand matrices.

3.3.2. The base traffic model uses a neutral month such as March as its purpose is to replicate ‘normal’ traffic conditions that can be expected for the majority of the hours within a year. It therefore avoids periods with different traffic patterns, such as during summer holidays, bank holidays or school holidays. Traffic counts collected for months and years other than March 2015 were factored to

March 2015 by using the available long-term WebTRIS (Highways England's Traffic Information System) data.

3.3.3. The assignment traffic models cover a single average hour across four time periods listed as follows:

- AM average hour (07:00 to 10:00)
- Inter peak (IP) average hour (10:00 to 16:00)
- PM average hour (16:00 to 19:00)
- Off peak (OP) average hour (19:00 to 07:00)

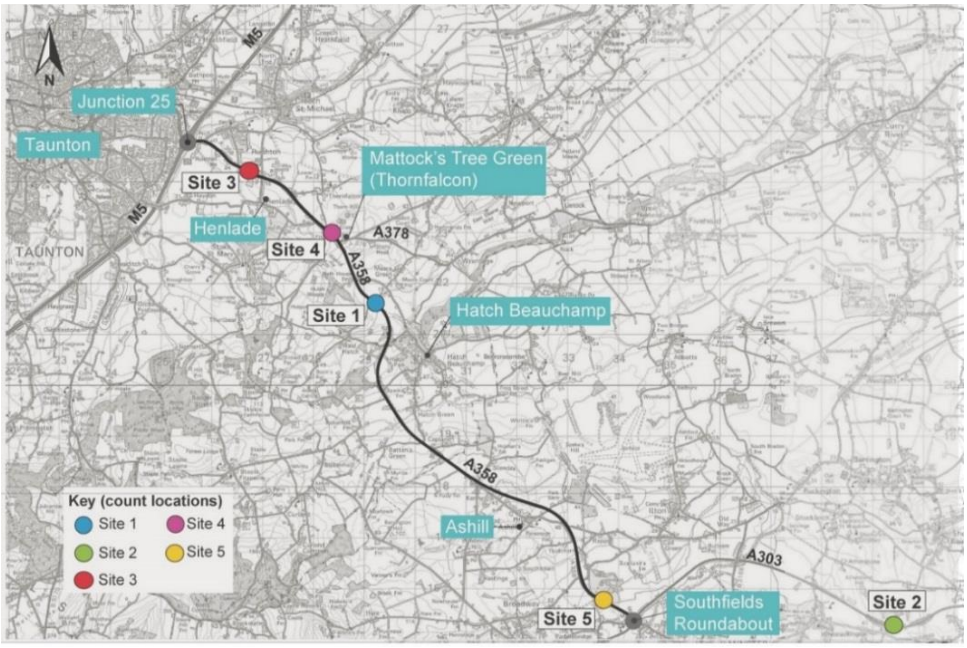
3.3.4. The following sections provide an overview of the traffic data collected in and around the A358 and the A303. Data was collected to either develop base traffic models or analyse existing traffic conditions in the areas affected by the Scheme proposal.

A358 traffic data

3.3.5. The existing traffic conditions have been assessed by analysing data from Automatic Traffic Counters (ATC) installed at the following locations (shown in Figure 3.1) for the following periods:

- South of the M5 junction 25 and west of Henlade (site 3), March 2014
- Between Southfields Roundabout and the A378 (site 1), October 2015
- West of Mattock's Tree Green (site 4) and west of Southfields Roundabout (site 5), July / August 2017 and September / October 2017

Figure 3.1: Automatic Traffic Count locations – A358 and A303



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3.3.6. Table 3.1 shows the average daily traffic flow (two-way) on the A358 for an average Monday to Thursday, Friday, Saturday, and Sunday. It represents the months of March 2014, October 2015, July / August 2017 and September / October 2017 at the four A358 count sites.

Table 3.1: A358 ATC automatic traffic counts March 2014 – October 2015 – July / August 2017 – September / October 2017 [veh]

A358 Sites between M5 junction 25 and Southfields Roundabout (daily 2-way averages)	Site 3 Mar 2014	Site 1 Oct 2015	Site 4 Jul / Aug 2017	Site 5 Aug 2017	Site 4 Sep / Oct 2017	Site 5 Sep / Oct 2017
Monday - Thursday average	28,600	23,800	31,300	25,600	32,700	25,700
Friday average	31,300	26,600	32,600	25,600	35,500	28,200
Saturday average	25,000	19,600	27,400	21,900	28,400	22,200
Sunday average	23,200	19,100	25,800	21,800	25,200	20,800
Total (sum of all days)	108,100	89,100	117,100	94,900	121,800	96,900

Note: Daily flows have been rounded to the nearest 100.

3.3.7. The analysis demonstrates that there are higher flows in March 2014 compared with October 2015 due to the different site positions north and south of the A378. Flows were around 29,000 for an average Monday to Thursday in March 2014, and above 31,000 for an average Friday.

3.3.8. For October 2015, the table shows lower daily flows at weekends (the same pattern can be observed for the March 2014 dataset) with less than 20,000

vehicles. It shows higher flows on an average Friday (26,600 vehicles) compared with an average Monday to Thursday (just below 24,000 vehicles).

3.3.9. The 2017 comparison of the summer daily flows and the September / October flows at sites 4 and 5, show higher daily flows in September / October for an average Monday to Thursday, Friday and an average Saturday, but lower for an average Sunday. For all days of the week, the 2017 September / October daily flows are about 4% higher than the summer one at site 4, and 2% at site 5. The comparison of traffic data in Table 3.1 (for the A358) and Table 3.2 (for the A303 east of Southfields Roundabout) show that the A358 is less affected by the summer traffic than the A303. The highest daily flows in July / August and September / October 2017 were recorded at site 4 for an average Friday at 32,600 and 35,500 vehicles respectively.

3.3.10. The average observed daily traffic on the A358 single carriageway sections (that is, at sites 1, 3 and 5) exceed the design standard flow of 13,000 for a single carriageway road. This indicates that congestion and delays occur at these locations during the peak hour periods.

A303 traffic data

3.3.11. Along the A303 there are a number of WebTRIS (Highways England Traffic Information System) Automatic Traffic Count sites. An analysis of this data on the A303 east of Southfields Roundabout close to the A358 was undertaken (site 2 in Figure 3.1) and the results are shown in Table 3.2 below**.**

3.3.12. Data was obtained for March, August and October 2015 to assess the traffic levels and to analyse the daily flow profiles in both neutral and peak (summer) months. During summer months the traffic flows have been observed to increase significantly.

3.3.13. The average daily flows for March, October and August 2015 at site 2 are shown in Table 2.2 for different days of the week. This shows that daily flows on a Friday in March and October are substantially higher (an additional 25% of traffic) than Monday to Thursday flows. It also shows that weekend (Saturday and Sunday) flow levels are not much lower than Monday to Thursday flows (around -16% and -7% in March 2015 and October 2015 respectively). Flows on all days of the week in August are much higher than in March (+17% on Monday to Thursday, +18% on Friday and +42% on weekends) and October (+13% on Monday to Thursday, +15% on Friday and +25% on weekends) due to holiday traffic. The highest flows in August have been recorded on an average Friday with vehicle flows of 37,600.

Table 3.2: A303 2015 ATC – East of Southfields Roundabout

Site 2 (A303 east of Southfields Roundabout) – units of vehicles	March 24 hour 2-way daily flow	August 24 hour 2-way daily flow	October 24 hour 2-way daily flow
Monday to Thursday average 2015	25,700	30,000	26,500
Friday average 2015	32,000	37,600	32,800
Saturday average 2015	21,200	32,800	24,200
Sunday average 2015	22,200	28,700	24,900

Note: Daily flows have been rounded to the nearest 100; the October data are from Thursday 1 to Friday 23 October (that is, excluding the half-term period) and they also exclude Tuesday 20 and Wednesday 21 October as there would appear to be a problem with the data recorded on these two days. All Saturdays and Sundays have been included in the analysis.

Automatic traffic counts on local roads in the A358 corridor

3.3.14. ATC data was collected in 2017 for a summer and neutral period on the local roads in the A358 corridor. The summer data was collected over a five-week period in July and August 2017, while the neutral month data during September and October was collected for a two week period. The site locations along with the Average Daily Traffic (ADT) counts are shown in Figure 3.2 and Figure 3.3. The daily summer data is shown for an average Monday to Thursday, Friday, Saturday and Sunday. The neutral month data is for Monday to Friday, Saturday and Sunday.

Figure 3.2: Automatic Traffic Counts (ATCs) on local roads in the A358 corridor – 2017 July and August

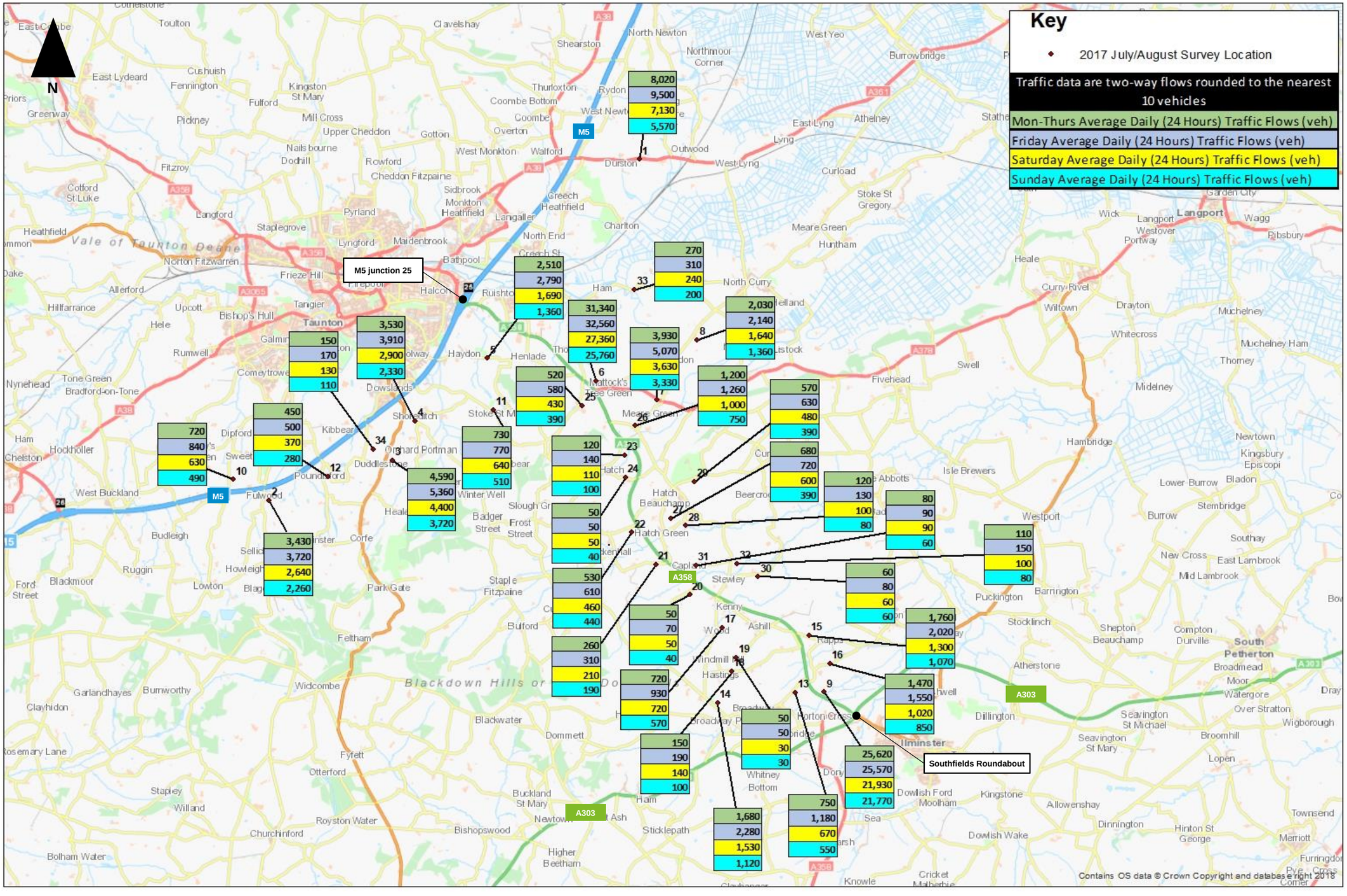

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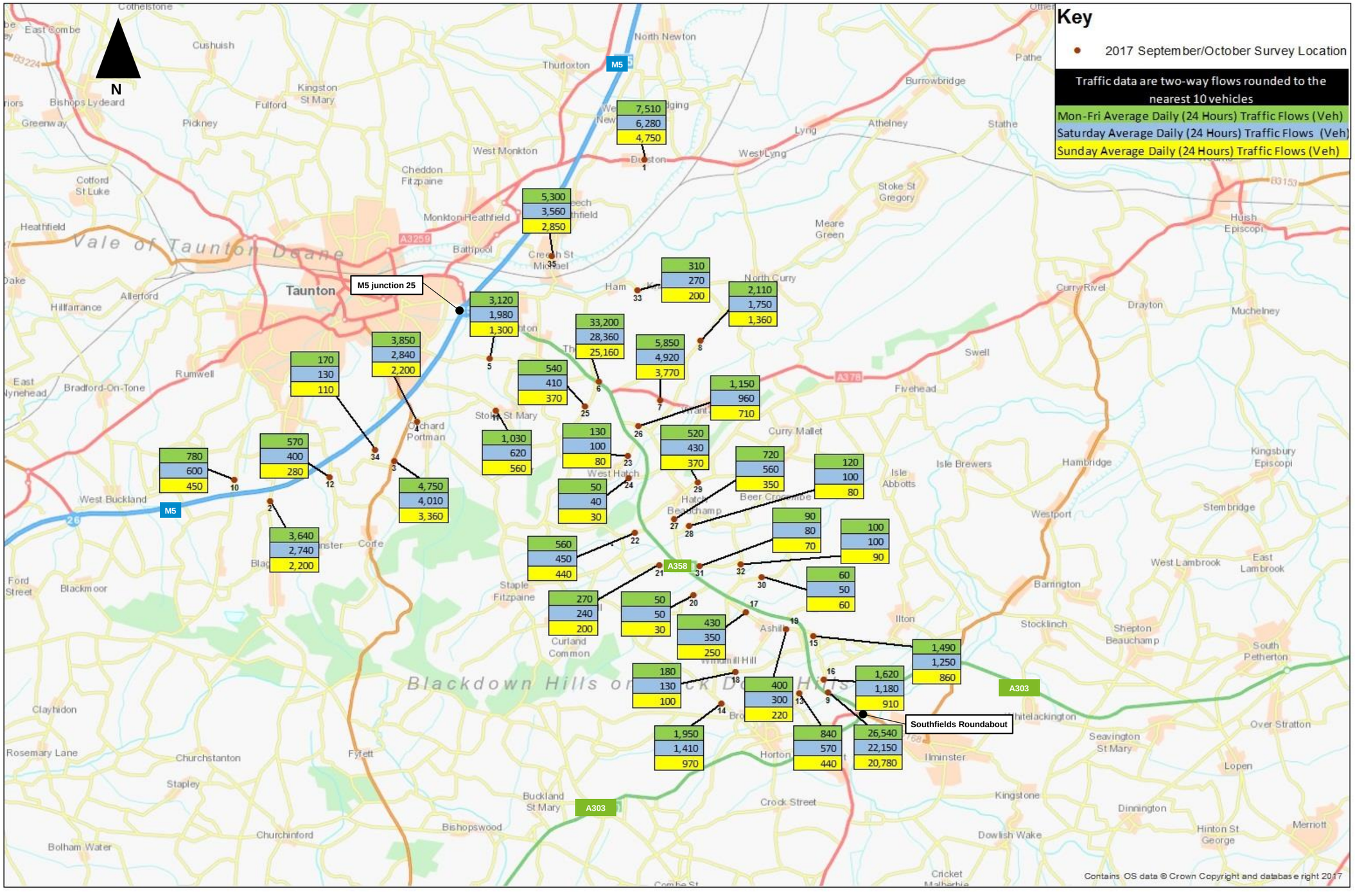
Figure 3.3: Automatic Traffic Counts (ATCs) on local roads in the A358 corridor – 2017 September and October



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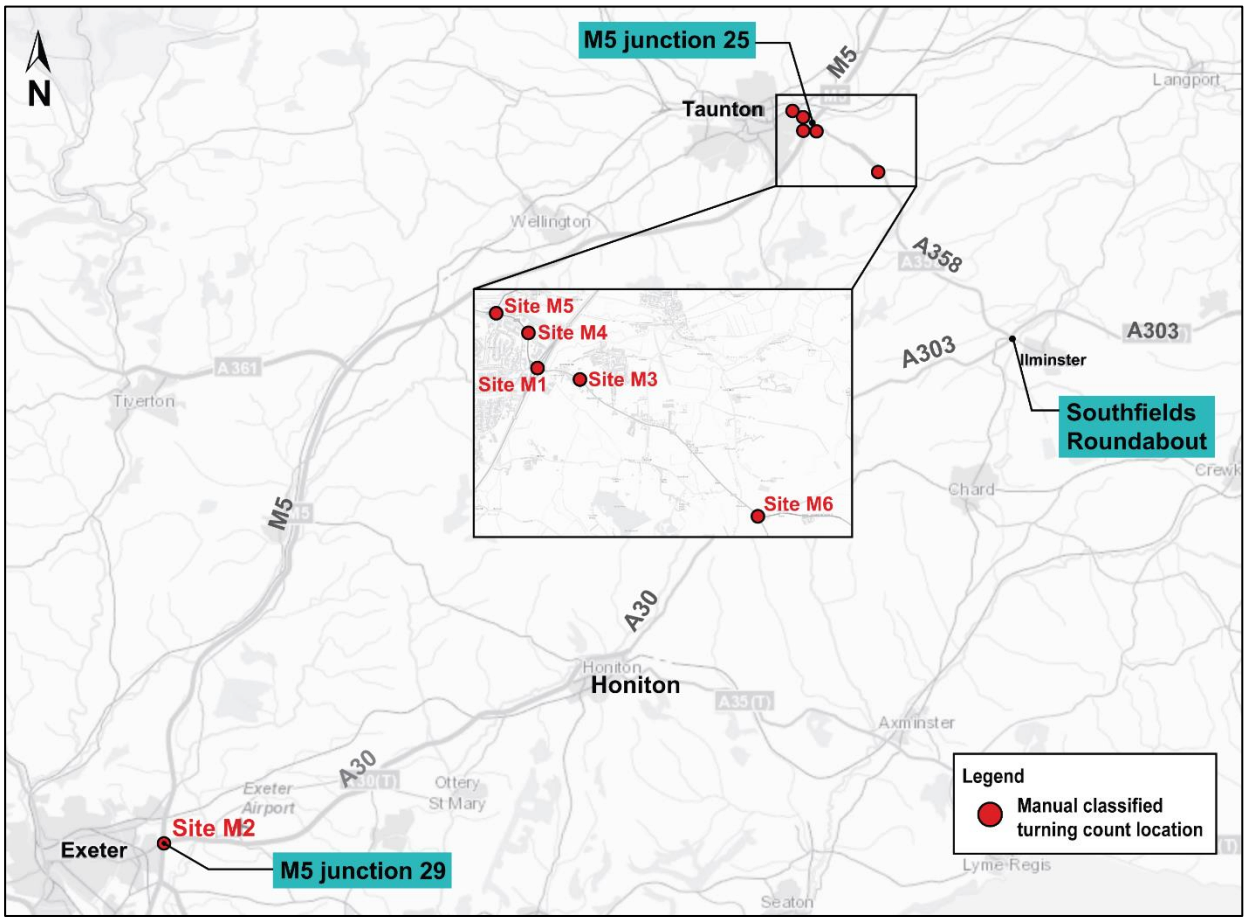
Manual classified turning counts

3.3.15. Manual classified junction turning counts were carried out on Thursday 3 November 2016 for 12 hours between 07:00 and 19:00 at the following locations:

- Site M1: M5 junction 25
- Site M2: M5 junction 29
- Site M3: A358 / Henlade Park & Ride / Ruishton Lane
- Site M4: A358 / Retail Park / Herons Gate Roundabout
- Site M5: A358 / A38
- Site M6: A358 / A378

3.3.16. These sites are displayed in Figure 3.4.

Figure 3.4: Manual classified turning count location



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Roadside interview sites

3.3.17. During the traffic model development, data from ten Roadside Interview Sites (RSI) were used as the observed origin-destination trip data set. This allowed the building of the origin-destination demand matrices and checking of the mobile phone origin-destination demand matrices developed for the SWRTM.

3.3.18. Figure 3.5 shows the ten RSIs. These RSIs are from three different sources, where some of them were existing RSIs and others obtained from surveys undertaken specifically for the traffic model development:

- Four RSIs were undertaken specifically for the A358 model in October 2015 on the A358 and the A303 (sites RSI 5, 6, 7 and 8)
- Four RSIs from Somerset County Council (SCC) were undertaken in October 2014 on the approaches to Taunton including on the A358 (sites RSI 3, 4, 9 and 10)
- Two RSIs from Devon County Council (DCC) were undertaken in July 2014 on the A30 just to the east of Honiton (sites RSI 1 and 2)

3.3.19. Table 3.3 lists the RSI sites, including sample rates. The SCC sites (RSI 3, RSI 4, RSI 9 and RSI 10) were undertaken in one direction only and required transposing of the matrices for the other direction. The DCC sites (RSI 1 and RSI 2) were undertaken in close proximity to each other on the A30 in the eastbound and westbound directions. They therefore did not require any transposing during the matrix building exercise. The RSI sites on the A358 (RSI 7 and RSI 8) and A303 (RSI 5 and RSI 6) were also undertaken close to each other on the respective roads and did not require any transposing of matrices.

3.3.20. In line with standard practice, Manual Classified Counts were undertaken in both directions at each RSI site for a 12 hours duration (07:00-19:00) with two weeks ATC at each site where feasible and safe. WebTRIS data was used for sites 1 and site 2 on the A30 as temporary ATCs are not usually allowed on the strategic road network.

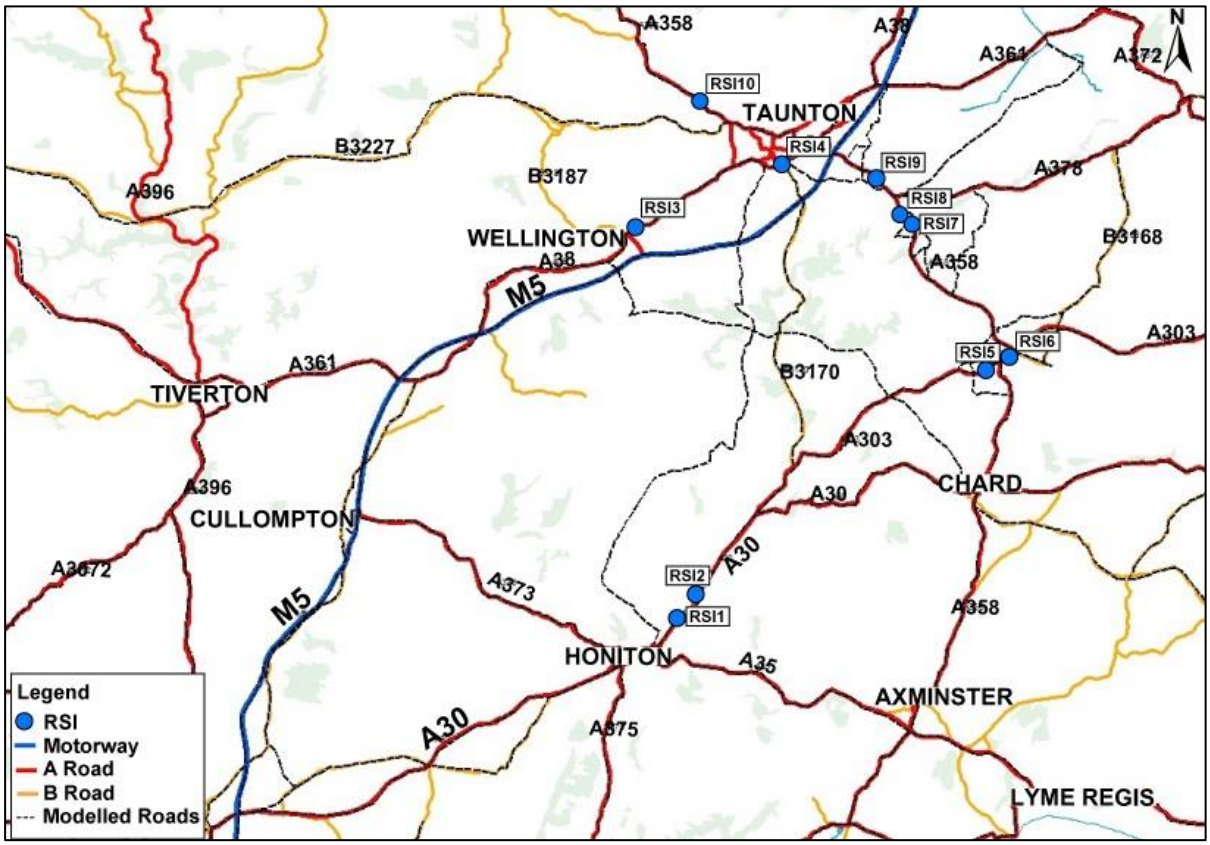
3.3.21. The overall sample rates for each of the ten sites is good, ranging from 10% at site 8 on the A358 to 24% at site 10 on the A38 to the west of Taunton towards Minehead. While the sample rates for cars met the standard criteria (Design Manual for Roads and Bridges, (DMRB): TA 11/09) this was not the case for LGVs and HGVs at all of the sites. However, freight movements data was supplemented and enhanced with data obtained from the SWRTM and used in the development of the demand matrices.

3.3.22. While the A303 / A358 surveys and SCC sites were surveyed during neutral months (October and November), the DCC sites were surveyed during July and one of them on a Friday (site 2). This approach was used to capture summer holiday traffic to / from the south-west region.

Table 3.3: A358 / A303 / A30 – RSI sites

Ref.	Location	Survey Direction	Source	Date	Sample Rates			
					Car	LGV	HGV	Total
RSI 1	A30 Monkton	Eastbound	DCC	09/07/14	15%	17%	28%	16%
RSI 2	A30 Monkton	Westbound	DCC	18/07/14	18%	14%	25%	18%
RSI 3	A38 Wellington Road	Eastbound	SCC	16/10/14	18%	7%	3%	16%
RSI 4	B3170 South Road	Northbound	SCC	15/10/14	23%	11%	9%	22%
RSI 5	A303 west of Southfields Junction	Eastbound	Stage 1 Surveys	15/10/15	12%	18%	23%	13%
RSI 6	A303 west of Southfields Junction	Westbound	Stage 1 Surveys	15/10/15	18%	22%	16%	18%
RSI 7	A358 east of West Hatch Lane	Eastbound	Stage 1 Surveys	20/10/15	13%	12%	6%	12%
RSI 8	A358 east of West Hatch Lane	Westbound	Stage 1 Surveys	20/10/15	10%	9%	12%	10%
RSI 9	A358 Henlade	Eastbound	SCC	15/10/14	15%	17%	8%	15%
RSI 10	A38 Minehead Road	Eastbound	SCC	15/10/14	24%	9%	3%	21%

Figure 3.5: RSI site locations



Source: Mott MacDonald Sweco Joint Venture. This Map is based upon Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office © Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. Highways England 100030649 2016.

Observed journey times and journey time reliability

3.3.23. Journey time data was extracted from Trafficmaster[11] for an average March 2015 weekday average (Monday to Friday). This data was used during the base year model validation to make sure that modelled journey times were a good representation of vehicle observed travel times.

3.3.24. A summary of the observed average peak period journey times is provided in Table 3.4 for the three main journey time routes:

- The A358 between M5 junction 25 and Southfields Roundabout
- A303 / A30 between M5 junction 29 to Southfields Roundabout
- M5 between M5 junction 29 and M5 junction 25, as shown in Figure 3.6

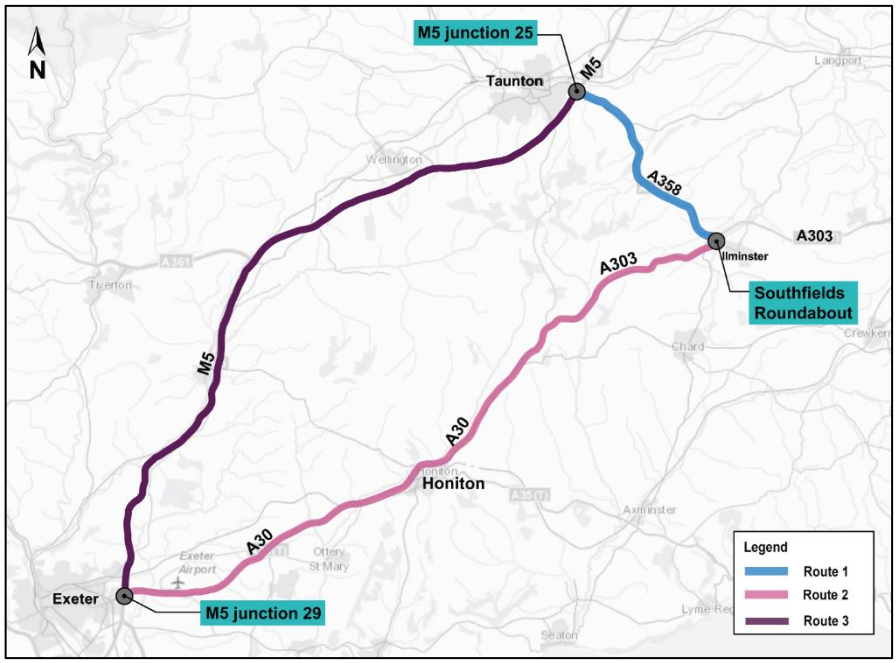
[11] Trafficmaster data is GPS-based data available from the Department for Transport

Table 3.4: Observed journey times for A358 model – March 2015

Route Number	Road	Direction	Journey time – average hour		
			AM period min:sec	IP period min:sec	PM period min:sec
1	A358	Eastbound	12:52	12:03	12:32
1	A358	Westbound	13:05	12:04	12:19
2	A303 / A30	Eastbound	31:35	32:26	31:13
2	A303 / A30	Westbound	32:19	33:14	32:25
3	M5	Eastbound	24:02	23:50	23:20
3	M5	Westbound	23:40	24:00	23:31

Source: Mott MacDonald Sweco Joint Venture.

Figure 3.6: A358 Stage 2 model – Journey time routes



Source: Contains OS data © Crown Copyright and database right 2017.

3.3.25. Table 3.4 shows journey times between M5 junction 29 and Southfields Roundabout via the A303 / A30 corridor are lower than those via the A358 and the M5 corridor (that is the sum of the journey times on routes 1 and 3). On average across all peak periods (weighting with the number of hours in each peak period), the eastbound and westbound journey times on the A303 / A30 corridor are, respectively, 4 minutes and 12 seconds and 3 minutes and 24 seconds quicker than those via the A358 / M5 corridor.

3.3.26. The stress-based approach set out in the Department for Transport's Transport *Analysis Guidance A1.3 Appendix C.5* can be used as an approximation of journey time reliability. It presents change in stress essentially a proxy for change in reliability. In October 2015, the A358 has shown stress levels of 91% for the eastbound / westbound directions

combined. In March 2015 the stress level was equal to 81%. A stress level of 91% is enough to cause delays and congestion. These stress levels are based on model outputs for an average weekday in neutral months.

3.4. Road safety

3.4.1. Personal Injury Collision data was obtained from Highways England, Devon County Council and Somerset County Council. It covered the study area for the latest full 5-year period available (January 2010 to December 2014) preceding the traffic model base year of March 2015. The collision data was analysed using *KeyAccident v7.2* (Keysoft Solutions). Raw data was processed and cleansing processes were carried out such as removing duplicates of the same collision.

3.4.2. A summary of the collisions by severity is presented in Table 3.5. Collisions at junctions are those that occurred within 20m of the junction. On the A358 between M5 junction 25 and the A303 at Southfields Roundabout a total of 63 collisions have been recorded.

Table 3.5: Collisions by severity (1 January 2010 to 31 December 2014)

Location	Fatal	Serious	Slight	Total
M5 junction 25	0	0	18	18
A358 - between M5 junction 25 and the A303	1	20	42	63
Southfields Roundabout (A358 / A303 junction)	0	4	16	20
A303 – Southfields Roundabout to A303	1	10	40	51
A30 – A303 to M5 junction 29	4	19	86	109
M5 – junction 25 to junction 29	7	15	115	137
TOTAL	**13**	**68**	**317**	**398**

3.4.3. Clusters of collisions exist on both the A358 route and the A303 / A30 corridor:

- On the A358 route there are four collision cluster sites located at Bushy Cross Lane (Henlade village), Stoke Road (Henlade village), Park Barn Lane (Ashill), Broadway Road and Cad Road
- On the A303 / A30 corridor there are cluster of collisions where two lanes merge into one at Marsh, Monkton village, where traffic flows through the narrow tree-lined section at Rawridge and at the major at-grade junctions

3.4.4. Collision rates per billion vehicle-Km travelled have been calculated for the A358 between the M5 and the A303, and these have been compared with national trends in Table 3.6 for:

- all rural A roads (they include Highways England and Local Authority roads)
- all Highways England A roads

Table 3.6: Collisions rate

A358 Collision Rate per billion vehicle-km travelled	National Collision Rate Collisions per billion vehicle-km travelled All Rural A roads (1)	National Collision Rate Collisions per billion vehicle-km travelled All Trunk A roads (2)
110	171	113

1 - National average for '2013 Rural A roads' taken from Department for *Transport statistics: RRCGB 2013*, Table RAS10002.

2 - Calculated from: Strategic Road Network Traffic Report TRA41 - Table TRA4112 *Reported Road Casualties on the Strategic Network 2013 Report* PR67/4 Table B.1.

3.4.5. Table 3.6 shows that the collision rates per billion vehicle-Km travelled on the A358 between the M5 and the A303 are comparable and in line with the national trend for the Trunk A roads (110 vs 113).

3.5. Environment – summary of constraints

3.5.1. References to Scheme options in this section relate to the Scheme options described in section 2.3 of this report.

3.5.2. Environmental constraints mapping has been undertaken and has identified the following constraints within 1 kilometre of the proposed Scheme options:

- Local Wildlife Sites (LWS)
- Ancient Woodland (and other Biodiversity Action Plan (BAP) habitats
- Local Nature Reserves (LNR)
- Watercourses and water bodies
- Areas susceptible to surface water flooding
- Noise Important Areas (NIAs)
- Air Quality Management Areas (AQMA)
- Registered parks and gardens
- Archaeological events and finds
- Strategic development areas
- Local Geological Sites (LGS)
- Public Rights of Way (PROW)
- Flood zones 2 and 3
- Conservation areas
- Scheduled monuments
- Historic landfills
- Authorised landfill
- Listed buildings
- Cycle routes
- Planning applications
- Open space

- Residential properties and farm buildings
- Green wedge[12]

3.5.3. The known environmental constraints plan can be found in Appendix B of this report. These provide an illustration of the existing A358 between Taunton and Southfields Roundabout in relation to statutory and non-statutory environmental designations within 1 kilometre of all Scheme options. A detailed description of the environmental constraints is provided below.

Air quality

3.5.4. There are a number of AQMAs in the vicinity of the Scheme, including:

- Henlade AQMA (located in Taunton Dean Borough)
- East Reach AQMA (located in Taunton Dean Borough)
- Cullompton AQMA (located in Mid Devon District)
- East Devon AQMA (located in East Devon District)
- Yeovil AQMA (located in South Somerset District)

3.5.5. Due to the lack of local authority monitoring data near to the proposed Scheme options, a six-month air quality monitoring survey was undertaken for the Scheme between December 2015 and May 2016. The results were adjusted to annual mean concentrations in accordance with Defra guidance[13]. This survey concluded that monitored nitrogen dioxide (NO_2) concentrations within the vicinity of the Scheme options were well below the annual NO_2 air quality objective. However, exceedances of the annual mean air quality objective were recorded at three of the 25 monitoring locations. One of these exceedances is in the existing Henlade AQMA and the other two are along the A358.

3.5.6. Defra uses the Pollution Climate Mapping model to report compliance with the EU limit values and provides NO_2 concentrations for a number of roads across the UK for a number of future years. Taunton Deane Borough Council has registered within their most recent air quality report[14] two exceedances of the annual mean NO_2 objective in 2010.

[12] These are areas designated as '*multi-functional areas of land assisting towards a number of objectives including the protection of an area of landscape importance and visual amenity, the prevention of coalescence of settlements, the provision of a 'green lung' for the health and wellbeing of residents, and a valuable wildlife corridor and habitat*' within *Site Allocations and Development Management Plan* (Taunton Deane Borough Council, 2016)
[13] Defra (2016) Local Air Quality Management: Technical Guidance (TG16) [online] available at: https://laqm.defra.gov.uk/documents/LAQM-TG16-April-16-v1.pdf (last accessed July 2017).
[14] Taunton Deane Borough Council (2017) 2017 Air Quality Annual Status Report (ASR) [online] available at: https://www.tauntondeane.gov.uk/media/2366/air-quality-report-2017.pdf (last accessed November 2018).

Both exceedances occurred in the East Reach AQMA, which is situated approximately 1 mile (1.8 kilometres) from the Scheme options.

Cultural heritage

3.5.7. There is one scheduled monument, Cross in St Aldhelm and St Eadburgha. There is one grade I listed building, Church of St Aldhem and Eadburgha within 1 kilometre of the Scheme options, situated approximately 350 metres west at its closest point.

3.5.8. There are numerous listed buildings within the study area of all Scheme options, consisting of grade II and grade II* listed buildings.

3.5.9. There are many records of archaeological events and finds within 1 kilometre of the Scheme options. For example, the archaeological assets include properties from medieval and roman age, a 13th century church, a 16th century mansion and a prehistoric settlement.

Landscape

3.5.10. All the proposed Scheme options sit within four National Character Areas: 140 Yeovil Scarplands (NE557), 143 Mid Somerset Hills (NE564), 146 Vale of Taunton and Quantock Fringes (NE550), and 147 Blackdowns (NE566).

3.5.11. The Blackdown Hills is located approximately 1 mile (1.7 kilometres) to the south and west of the Scheme options at its closest point and is nationally designated as an Area of Natural Outstanding Beauty (AONB). The Quantock Hills AONB is located approximately 3.5 miles (6 kilometres) to the north of the Scheme.

3.5.12. There are many visual receptors located within the Scheme's likely Zone of Theoretical Visibility, including Public Rights of Ways (PROW) and settlements such as Broadway, Ashill, Stewley, Battens Green, Slough Green, Hatch Beauchamp, Hatch Green, Haydon, Shoreditch, Stoke St Mary, Taunton, Thornfalcon, Ruishton and Henlade.

3.5.13. The landscape character within the vicinity of the existing A358 is largely rural, with a varied agricultural land use system and arrangement of villages, hamlets and scattered farms and dwellings. The landscape topography also varies along the A358 length, with two relatively flat areas (the Vale of Taunton in the north-west and the upper vale of the River Isle in the south-east). These areas are connected by the foot slopes of the Blackdown Hills. Broughton Brook and the River Tone are notable features within the Vale of Taunton landscape, both situated alongside the M5.

Biodiversity

3.5.14. There are four Special Areas of Conservation (SAC) designated for bat populations located within 30 kilometres of all Scheme options. These are Hestercombe House SAC, Bracket's coppice SAC, Exmoor & Quantock Oakwoods SAC, and Beer Quarry and Caves SAC. Somerset Levels and Moors Special Protection Area (SPA) and Ramsar is connected hydrologically to the Scheme and is located 5.8 kilometres downstream of the Scheme options. Furthermore, three Local Nature Reserves (LNR) are located within the 1 kilometre study area of the Scheme options.

3.5.15. There are 29 Local Wildlife Sites (LWS) within 1 kilometre of all Scheme options. Several of these LWS' comprise Ancient Woodland at least in part. The Blue and Orange options would also pass through Huish Copse East LWS, which is also identified as Ancient Woodland according to Natural England's Ancient Woodland inventory.

3.5.16. Various habitats have been recorded within the study area during the Extended Phase 1 Habitat Survey, undertaken between March and May 2016. This survey work in combination with the desktop study has also identified habitats suitable to support bats, breeding birds, barn owls, kingfisher, badgers, dormouse, reptiles, white-clawed crayfish, great crested newts, otters, and water voles. The full findings of the survey are reported in the Preliminary Ecological Appraisal (Highways England, May 2016). The main habitats recorded within the study area during the Phase 1 habitat survey were poor semi-improved grassland and arable fields. There were intersected by hedgerows and scattered trees with pockets of broad leaved semi-natural woodland.

3.5.17. Phase 2 protected species surveys for bats, great crested newts, common reptiles, dormice, otters, water voles, barn owls, breeding birds, badger walkover surveys, and terrestrial invertebrates are on-going. All of these species have been identified within the zone of influence. Further surveys for badger bait marking, bat hibernation, bat internal inspection, landscape scale transects and radio tracking are also required but have not yet commenced. White-clawed crayfish and aquatic invert surveys have been completed; no white-clawed crayfish and no notable aquatic species were identified. A summary of the preliminary results of the surveys to date is provided below.

3.5.18. Surveys for bats to date have identified 17 confirmed bat roosts, 68 buildings with high potential to support roosting bats, 58 buildings with moderate potential, 53 with low potential and 108 buildings with negligible bat roost potential within 100m of the option footprints. Also identified are 214 trees with moderate to high potential to supporting

roosting bats and low to high levels of bat activity across the route for transect surveys. Mist netting surveys have confirmed the presence of barbastelle and Bechstein's bats within a number of the woodlands along the Scheme corridor, including the Ancient Woodland at Huish Copse. Surveys have confirmed the presence of at least 14 species of bats including lesser horseshoe, greater horseshoe, barbastelle, Bechstein's bat, common pipistrelle, soprano pipistrelle, nathusius pipistrelle, whiskered bat, noctule, serotine, Leisler's bat, brown long eared, natterer's and Daubenton's bat.

3.5.19. To date Habitat Suitability Index assessments have been undertaken for 130 ponds. Fifty three ponds were identified to have potential to support great crested newts (GCN). Surveys to record presence or absence were undertaken for the 49 of the 53 ponds which confirmed the presence of GCN in one pond within 250m of the Scheme and one pond 500m from the Scheme. Environmental DNA (eDNA) surveys were undertaken on the remaining four ponds which returned a negative result.

3.5.20. There are 19 reptile sites across the Scheme. Fourteen of these sites were surveyed in 2017, with small populations of slow worm and grass snake identified within 100m of the Scheme options.

3.5.21. Eighteen sites out of 23 have been surveyed for dormice, and presence has been confirmed in all surveyed sites.

3.5.22. Evidence of water voles has been identified in Broughton Brook and an unnamed watercourse to the east of Broughton Brook. Evidence of otters has been identified in six watercourses across the Scheme.

3.5.23. Twenty main badger setts have been identified mainly in the western extent of the Scheme.

3.5.24. Further surveys are required to confirm the presence or absence of protected species at selected locations within the vicinity of the Scheme.

3.5.25. Biodiversity Action Plan (BAP) priority habitats are also located within 1 kilometre of all three Scheme options which include Ancient Woodland, deciduous woodland, wood-pasture and parkland, lowland calcareous grassland, coastal and floodplain grazing marsh, traditional orchards and lowland meadows.

Geology and soils

3.5.26. The Geology of Britain viewer7 indicates that superficial deposits of alluvium across the routes are variable. In many areas, no superficial deposits are shown. The alluvium comprises silt, sand and clay overlying gravel.

3.5.27. The bedrock is comprised of Triassic age Branscombe Mudstone of the Mercia Mudstone Group or Blue Anchor Formation overlying the Mercia Mudstone. There is also a region of Westbury Formation and Cotham Member (undifferentiated) partially underlying the route between Henlade and Stoke St Mary.

3.5.28. The area covered by the Scheme is underlain by formations of the Lias Group and the Mercia Mudstone Group, separated by the relatively thin Penarth Group. The Lias Group includes formations considered to be Secondary aquifers as defined in 2000 by the British Geological Survey (BGS) and the Environment Agency[15]. The Lias Group and the Mercia Mudstone Group formations outcrop in the south-east of the area, namely the Blue Lias Formation and the Charmouth Mudstone Formation.

3.5.29. The Secondary (undifferentiated) designation extending from Ilminster to Bickenhall corresponds to the Charmouth Mudstone Formation. The Secondary A designation corresponds to the Blue Lias Formation, being the oldest formation of the Lias Group in the area, and to the east of Ilminster, the Dyrham Formation.

3.5.30. Post 1988 ALC (Agricultural Land Classification) survey data is very limited within 1 kilometre of the Scheme options. ALC survey data is only available to the south of Henlade, north and west of Dowslands and south and east of Southfields Roundabout. This ALC data identifies the land surveyed as predominantly Grade 3b (moderate quality) agricultural land, with smaller amounts of Grade 3a (good quality) and Grade 2 (very good quality) agricultural land. Provisional 1976 ALC maps covering the whole area, indicate that most land is Grade 3 (Good to Moderate quality) with a small amount of Grade 2 (the Best and Most Versatile Land) and Grade 4 (Poor quality) ALC land present.

3.5.31. There are two LGS present within the vicinity of the Scheme. These are Hatch Beauchamp Cutting 900m to the east and Ilminster Old Town Walls 700m to the south-east of all Scheme options.

Material assets and waste

3.5.32. The latest data from the Environment Agency indicates that Somerset produced over 1.8 million tonnes of waste in 2016. England produced over 200 million tonnes of waste in 2016 which was managed in 6,382

[15] The physical properties of minor aquifers in England and Wales [online], Technical Report WD/00/04, http://nora.nerc.ac.uk/12663/ ,(last accessed March 2018).

permitted waste facilities[16]. With respect to construction and demolition waste, the Environment Agency recorded that 36,000 tonnes of inert construction and demolition waste was landfilled in Somerset in 2016. The ENV23 – Statistics on Waste[17] (Defra, 2016) outlines that of the 49,000 tonnes of non-hazardous construction and demolition waste generated in England in 2014, 44,900 tonnes were recovered (which is 91.4% of the total generated). It was also recorded, by the Environment Agency, that 157,000 tonnes of waste material were used in construction (under permits) in Somerset, and 703,000 tonnes were used in construction in England in 2016.

3.5.33. There are two historic landfills within close proximity of the Scheme options (Thornfalcon Refuse Tip, Ashill Bypass Site A).

3.5.34. There is a mineral safeguarding area for building stone located south of Henlade, which all proposed Scheme options would pass through. There are no peat resources within the footprint of the proposed Scheme options.

3.5.35. The Annual Monitoring Report and the Waste Core Strategy[18] notes sufficient capacity at Walpole, Dimmer and Whiscombe landfill sites to meet Somerset's requirements for non-hazardous landfilling until at least 2028. The Waste Core Strategy outlines that these three non-hazardous landfills accept waste from all three major waste streams: commercial and industrial, municipal solid waste and construction and demolition waste. However, the Annual Monitoring Report identified that the capacity of inert landfill disposal in Somerset, from two operational inert landfills, is now extremely limited and is likely to be used up within the next few years at the current disposal rates[19].

Noise and vibration

3.5.36. Baseline noise in the immediate vicinity of the existing A358 is characterised by traffic noise. As distance increases from the A358 traffic, noise levels reduce but remain audible within most of the study area. Where the alignment leaves the A358 corridor, background noise

[16] Environment Agency (2017) Waste Management for England 2015 [online] available at: https://www.gov.uk/government/statistics/waste-management-for-england-2015history (last accessed March 2018).
[17] Defra (2016) ENV23 – UK Statistics on Waste [online] available at: https://www.gov.uk/government/statistical-data-sets/env23-uk-waste-data-and-management (last accessed February 2018).
[18] Somerset County Council (2013) Waste Core Strategy Development Plan Document up to 2028 [online] available at: http://www.somerset.gov.uk/policies-and-plans/policies/minerals-and-waste/ (last accessed March 2018).
[19] Devon County Council (2016) 5th Devon Local Aggregate Assessment 2006-2015: Version 2 [online] available at: https://new.devon.gov.uk/planning/planning-policies/minerals-and-waste-policy/local-aggregate-assessment (last accessed March 2018).

levels are more dominated by local sources, although depending on weather conditions traffic noise is still audible. Towards the M5, traffic noise is again predominant.

3.5.37. Within the study area of the Scheme options there are 12 Noise Important areas (NIA). This includes eight NIA along the A358 (IA_ID 3502, IA_ID 12940, IA_ID:3501, IA_ID:3500, IA_ID:12939, IA_ID:3499, IA_ID:3498 and IA_ID: 3497) and four NIA along the M5 (IA_ID 3488, IA_ID 3487, IA_ID 3486, and IA_ID 3485).

Population and Health

3.5.38. Non-Motorised Users (NMU) counts were undertaken by Tracsis in 2016, a specialist NMU survey company, at 47 locations within the vicinity of the Scheme. NMUs are also referred to as Walkers, Cyclists and Horse riders in some design standards; however, for consistency, this document retains the acronym NMU.

3.5.39. There are several PRoWs to the north and south of all options. There are approximately 50 footpaths, five bridleways, a National Cycle Route, two long- distances paths and several footways within 1 kilometre of the Scheme options.

3.5.40. For all options, amenity is considered to be very poor for the PRoWs adjacent to the A358, due to current lack of barriers between people and existing road traffic. Amenity is considered to be good for NMU facilities that are completely separated from traffic, and acceptable for the signalised crossing at Taunton Gateway Park & Ride. Footways run alongside the A358 between junction 25 and Henlade, with no further facilities alongside the A358 until Southfields Roundabout in the south.

3.5.41. There is potential for the Scheme to encroach on to open space at Higher Holway (also known as Hawthorn Park), as identified in Taunton Deane's *Site Allocations and Development Management Plan*[20] and Core Strategy[21]. There is also potential to encroach onto Vivary and Cotlake Hill Green Wedge, which is classified as Green Infrastructure.

3.5.42. Development land has been identified within the path of the Scheme options. This includes the Somerset County Council M5 junction 25 widening development (Somerset County Council Planning Reference: SCC: 4/38/17/0205), Nexus 25 Strategic Employment Site which was

[20] Taunton Deane Borough Council (2016) Adopted *Site Allocations and Development Management Plan* [online] available at: https://www.tauntondeane.gov.uk/media/1016/sadmp-adopted-2016-without-maps.pdf (last accessed March 2018).
[21] Taunton Deane Borough Council (2012) Taunton Dean Core Strategy [online] available at: https://www.tauntondeane.gov.uk/media/1745/adopted-core-strategy-2011-2028.pdf (last accessed March 2018).

granted planning permission in 2018, and The Killams Drive development (Taunton Deane Borough Council Planning Reference: 38/12/0203). Additional development land is located within 1 kilometre of the Scheme options including Land at Coldharbour Farm (refer to Table 2.8 for further details).

3.5.43. Community facilities have been identified within 250m of the Scheme options comprising Ashe Farm Caravan and Camping Site, Somerset Progressive School and Ashill Village Hall, open space. It also includes a play area and allotments at Higher Holway, Huish Woods Scout Campsite, the Nags Head Tavern and a campsite and caravan site at Cornish Farm. Additional community facilities are located within 1 kilometre of the Scheme options. These facilities are likely to be accessed by connecting NMU routes and local roads.

3.5.44. Health profiles for the Taunton Deane and South Somerset districts are broadly in line with the national averages. However, the percentage of physically active adults in Taunton Deane (76%) is higher, compared to South Somerset and the national average (66%). The mortality rate for people aged under 75 due to cardiovascular disease is lower than the national average (73.5 per 100,000) in both Taunton Deane (62.0 per 100,000) and South Somerset (66.1 per 100,000). At 15% and 17% respectively, Taunton Deane and South Somerset have lower rates of childhood obesity than the national average of 20%.

3.5.45. There are several areas of community land, including public open space and community facilities, located within the boundaries of the Scheme options. Such areas provide space for physical activity for people living close to the Scheme and further afield.

3.5.46. Both Taunton Deane and South Somerset districts have a lower proportion of the population that fall within the most deprived quintile, compared to the national average. The national average for this quintile is 20%, whereas the averages for both districts is 7%. In terms of the least deprived quintile, Taunton Dean has a lower than average population that fall within this category (13%). South Somerset has a higher than average population that fall within this category (21%), when compared to the national average (19%).

3.5.47. The Taunton Deane local authority area has a population of 116,000, of whom 69,100 (60%) are of working age (16-64 years old). Children (aged under 16 years) make up 18% of the population, and older people (over 65 years) make up 20%. The proportion of children is slightly lower than

the national average of 19%. The proportion of older people is higher than the national average of 16%[22].

3.5.48. The proportion of economically active people in Taunton Deane is slightly higher than the national average (84% compared to 78%). Employment in Taunton Deane is slightly above the national average at 83% (compared to 75%). Unemployment is slightly lower than the national average at 3% (compared with 4%). In the south-west, the economically active population (81%) is proportionally lower than the Taunton Deane average, and the proportion of unemployed is equivalent (3%).

3.5.49. In terms of deprivation, 18.5% of the population of Taunton Deane are in the most deprived or second most deprived quintiles, significantly lower than the 40% average for England.

3.5.50. The South Somerset local authority area has a population of 166,500, of whom 96,700 (58%) are of working age (16-64 years old). Children (aged under 16 years) make up 17% of the population, and older people (over 65 years) make up 21%. The proportion of children is slightly lower than the national average of 19%. The proportion of older people is higher than the national average of 16%[23].

3.5.51. The proportion of economically active people in South Somerset is slightly higher than the national average, at 80% and 78% respectively. It also shows that employment in south Somerset is above the national average at 78% (compared to 75%). Unemployment is slightly lower than the national average at 3% (compared to 4%). In the south-west, the economically active population (81%) is proportionally higher than the south Somerset average (80%). The proportion of unemployed is in line with south Somerset (3%).

3.5.52. 21.7% of the population of South Somerset are in the most deprived or second most deprived quintiles. This is significantly lower than the 40% average for England.

Road drainage and the water environment

3.5.53. There are eight Water Framework Directives (WFD) surface waterbodies within the study area:

- Isle - Upper to conf Cad Bk
- Ding
- Isle - Cad Bk to Fivehead River

[22] Office for National Statistics (2018): 'Labour Market Profile: Taunton Deane'. Available at: https://www.nomisweb.co.uk/reports/lmp/la/1946157189/report.aspx.
[23] Office for National Statistics (2018): 'Labour Market Profile: South Somerset'. Available at: https://www.nomisweb.co.uk/reports/lmp/la/1946157311/report.aspx.

- Fivehead River
- Isle
- West Sedgemoor Main Drain
- Broughton Brook (South and West Somerset)
- Tone Ds Taunton

3.5.54. There are two WFD groundwater bodies within the study area:

- Dyrham Formation
- Tone and North Somerset Streams

3.5.55. The Scheme options cross flood zones 2 and 3, with the greatest flood risk present where the Scheme crosses the following water courses:

- Black Brook (western extents of Scheme at M5 junction)
- Broughton Brook (just north of Stoke St Mary)
- West Sedgemoor Main Drain (just north of West Hatch / West Hatch Lane)
- Fivehead River (three crossings just south of Hatch Beauchamp)
- Ding River (eastern extents of the Scheme, just north of Horton)

3.5.56. The area to the north-west of the Scheme is at risk of flooding from the Clatworthy and Luxhay reservoirs to the west of Taunton. Due to its inland location, there is no flood risk from tidal sources.

Climate

3.5.57. The UK 2015 greenhouse gas emissions decreased by 38% from 1990. In 2015, UK net carbon dioxide (CO_2) emissions were estimated at 403.8 million tonnes, a decrease of 3.8% in comparison to 2014 levels[24]. In 2015, 24% of UK greenhouse gas emissions were from the transport sector, with emissions of 120 $MtCO_2e$ (million tonnes of carbon dioxide equivalent).

3.5.58. Within the south Somerset region, the carbon emissions from A roads in 2015 was 221.1$ktCO_2e$ (kilotonnes of carbon dioxide equivalent). This represents a 13% decrease since 2005 and an 8.2% decrease in overall transport emissions[25]. There were 36.5 million vehicles licensed for use

[24] Department for Business, Energy and Industrial Strategy (2015) 2015 UK Greenhouse Gas Emissions [online] available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/589602/2015_Final_Emissions_Statistics_one_page_summary.pdf (last accessed March 2018).

[25] Department for Business, Energy and Industrial Strategy (2017) Local Authority Carbon Dioxide Emissions Estimates [online] available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/623015/2005_to_2015_UK_local_and_regional_CO_2_emissions_statistical_release.pdf (last accessed March 2018).

on roads in the UK in 2015, of which 3.2 million extra vehicles were registered in 2015 alone. However, in 2015 the percentage of ultra-low emission vehicles reached 0.9% which is an 800% increase since 2013[26].

3.5.59. High-level climate observations for the south-west of England[27] over a 30-year averaging period of 1981-2010 are presented in Table 3.7 below.

Table 3.7: Climate baseline for south-west England (1981-2010)

Climatic Conditions	Climate Observations
Temperature	Mean daily minimum temperatures in Somerset can range from 1°C to 2°C in winter, whilst summer daily maximum temperatures are in the region of 21.5°C.
Rainfall	Vigorous Atlantic depressions are the source of the majority of rain in the south-west in autumn and winter. Annual rainfall in the low-lying parts of central Somerset averages at 700mm. Monthly rainfall is variable but is highest in the autumn and winter months. The number of days with rainfall totals greater than 1mm in Somerset are 12 to13 days in winter, dropping to an average of 7 to 9 days in summer.
Wind	The south-west of England is one of the more exposed areas of the UK. The strongest winds are associated with the passage of deep depressions close to or across the British Isles. The frequency and strength of these depressions is greatest in the winter when mean speeds and gusts are strongest at approximately 15 knots.
Sunshine	The south-west of England has a favoured location with respect to the Azores high pressure when it extends its influence north-eastwards towards the UK, particularly in summer. Average annual sunshine totals are between 1,450 and 1,600 hours.
Air Frost	The first air frost in Somerset can be expected around mid-October with over 50 days per year experiencing air frost.

Combined and cumulative effects

3.5.60. For combined effects, the baseline is obtained from the preceding environmental disciplines.

3.5.61. For cumulative effects, the baseline data relating to proposed developments has been identified from the:

- Taunton Deane Borough Council Core Strategy[28],

[26] Department for Transport (2016) Vehicle Licensing Statistics: Quarter 4 (Oct-Dec) 2015 [online] available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/516429/vehicle-licensing-statistics-2015.pdf (last accessed March 2018).
[27] The Met Office (2016) South-West England: Climate [online] available at: http://www.metoffice.gov.uk/climate/uk/regional-climates/sw (last accessed March 2018).
[28] Taunton Deane Borough Council (2012) Taunton Dean Core Strategy [online] available at: https://www.tauntondeane.gov.uk/media/1745/adopted-core-strategy-2011-2028.pdf (last accessed March 2018).

- South Somerset Housing and Employment Land Availability Assessment[29]
- South Somerset Local Plan[30]
- Planning Inspectorate's Programme of Projects (although no Nationally Significant Infrastructure Projects (NSIP) are proposed within the 2 kilometres study area)

3.5.62. Further information has also been obtained directly from Somerset County Council and Highways England's Operations Directorate. The developments identified to be included within the cumulative effects assessment are contained within Table 3.8.

Table 3.8: Proposed 'other developments' within 2 kilometres of all Scheme options

Proposed 'other development'	Description of the 'other development'
SCC: 4/38/17/0205	**Other Development:** Junction 25, M5 **Site Address:** Junction 25 M5, Taunton, Somerset **Applicant:** Commissioner Somerset County Council Highways **Development Description:** Construction of a new road scheme including the widening and enlargement of junction 25 roundabout. The widening of Toneway over approx. 200m length from junction 25. Construction of a new roundabout to the south-western corner of the Gateway Park & Ride site and the construction of linking sections of road to junction 25 and the A358 / Ruishton Lane junction. Junction alterations, provision of pedestrian and cyclist facilities and associated street furniture on land at junction 25, M5, Taunton.
Local Development Order (LDO)	**Other Development:** Nexus 25 Strategic Employment Site **Site Address:** East of the M5 motorway, approximately 2.5 miles east of Taunton town centre, Somerset **Applicant:** Taunton Deane Borough Council **Development Description:** Erection of building and / or the use of land for use classes B1(a), B1(b), B2, B8, C1, C2 and D1. Also, for ancillary purposes with limited floorspace only, use classes A1, A3 and A4. In addition, use class D2 for gymnasium use only, and Sui Generis development of a motor cars showroom only.
16/05500/OUT	**Other Development:** Land at Coldharbour Farm **Site Address:** Land South of Canal Way, Ilminster, Somerset **Applicant:** Persimmon Homes SW & Somerset County Council **Development Description:** Outline application for residential development for up to 400 dwellings with associated access.

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

[30] South Somerset District Council (2015) Adopted South Somerset Local Plan [online] available at: https://www.southsomerset.gov.uk/media/707200/south_somerset_local_plan_2006-2028_adoption_version_march_2015.pdf (last accessed March 2018).

Proposed 'other development'	Description of the 'other development'
38/12/0203	**Other Development:** Killams Drive **Site Address:** Land at Killams, Taunton **Applicant:** Summerfield Homes **Development Description:** Outline planning permission with some matters reserved for the formation of access from Killams Drive and Avenue. Also for the development of up to 315 dwellings, up to five live / work units and two commercial start units (up to 50 square metres each). Provision of land (up to 1.2ha) for a primary school together with associated areas of open space (formal and informal), cycleways, footpaths and infrastructure at land off Killams, Taunton.

4. Planning factors

4.1. Introduction

4.1.1. The Scheme is identified as a Nationally Significant Infrastructure Project (NSIP) as it meets the thresholds set out in section 4.2.3 below. The Scheme will require development consent under the provisions of the *Planning Act 2008*.

4.1.2. A review of the current legislation and planning policy of relevance to the Scheme has been undertaken and is presented below.

4.2. Environmental legislation

The Environmental Impact Assessment Directive (2014/52/EU)

4.2.1. Before development consent is given, all projects likely to have significant effects on the environment due to their nature, size or location must be subject to an Environment Impact Assessment (EIA). The Scheme is likely to fall within Annex II of the EIA Directive.

The Planning Act 2008

4.2.2. The *Planning Act 2008* establishes a system to deal with Nationally Significant Infrastructure Projects (NSIPs). The Scheme is a highway-related development under section 14 (h) of the *Planning Act 2008*. Therefore, a Development Consent Order (DCO) will have to be granted by the Secretary of State (SoS), following a recommendation by the Planning Inspectorate (PINS). A decision will have to be made whether the Scheme accords with the NNNPS.

The Highway and Railway (Nationally Significant Infrastructure Project) Order 2013

4.2.3. The *Highway and Railway (Nationally Significant Infrastructure Project) Order 2013* amends section 22 of the *Planning Act 2008.* This ensures that highway-related development is only considered an NSIP where it exceeds specific limits and / or is likely to have significant effects on the environment. The relevant thresholds for highways schemes to be considered an NSIP are set out in Section 2 of the *Planning Act 2008* as amended by *The Highway and Railway NSIP Order 2013*[31] . These are:

- construction or alteration of a motorway is 15 hectares

[31] DfT, Infrastructure Planning Transport, *The Highway and Railway (Nationally Significant Infrastructure Project) Order 2013* [online] Available at: https://www.legislation.gov.uk/ukdsi/2013/9780111539408/pdfs/ukdsi_9780111539408_en.pdf.

- construction or alteration of a highway, other than a motorway, where the speed limit for any class of vehicle is expected to be 50mph or greater, is 12.5 hectares
- construction or alteration of any other highway is 7.5 hectares.

The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017

4.2.4. These regulations relate specifically to the *Planning Act 2008* and impose various procedural requirements in undertaking an EIA in relation to applications for development consent and subsequent consent. The Scheme is likely to be a Schedule 1 development. If so, it will require a Statutory EIA and the preparation of an Environment Statement (ES) . These regulations also transpose the requirements of the EIA Directive.

Air quality

The Ambient Air Quality Directive (2008/50/EC)

4.2.5. This directive sets legally binding limit values and target values for concentrations of major outdoor air pollutants that impact public health. These include particulate matter (PM_{10} and $PM_{2.5}$) and nitrogen dioxide (NO_2). The Scheme options have the potential to reduce air quality. It will need to ensure that air quality limit values are not exceeded.

The Air Quality Standards Regulations 2010 and The Air Quality Standards Regulations (Amendment) 2016

4.2.6. These regulations implement the *EU's Directive 2008/50/EC.* They transpose the Directive's limit and target values into legally binding Air Quality Standards with attainment dates in line with the Directive. The standards are based on the assessment of the effects of each pollutant on human health, including the effects on sensitive groups, and ecosystems. The Scheme will need to ensure that air quality standards are not exceeded and that sensitive receptors are not adversely affected.

Air Quality (England) Regulations 2000 and Air Quality (England) (Amendment) Regulations 2002

4.2.7. These regulations set out time-bound, air quality objectives for local authorities to deliver their air quality management duties in accordance with Part IV of the *Environment Act 1995*. Local authorities are required to monitor the air quality in their area. Where objectives are not being achieved, or are unlikely to be achieved, they designate Air Quality Management Areas (AQMAs). For each AQMA, local authorities prepare an air quality action plan which sets out measures to achieve the air quality objectives. The Scheme options have the potential to reduce air

quality, including within Henlade AQMA. The Scheme will need to comply with the requirements of relevant air quality action plans.

The Environmental Protection Act 1990, Section 79(1)(d)

4.2.8. This defines one type of statutory nuisance as 'any dust, steam, smell or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance'. Where a local authority is satisfied that a statutory nuisance exists, or is likely to occur or recur, it must serve an abatement notice. The construction stage of any of the Scheme options has the potential to cause nuisance from construction dust.

Cultural heritage

The Ancient Monuments and Archaeological Areas Act 1979 (as amended)

4.2.9. This act relates to the investigation, preservation and recording of matters of archaeological and historical interest. It provides for the protection of scheduled monuments through a designated schedule of monuments. It allows the Secretary of State to designate areas of archaeological importance. The Scheme options have the potential to impact upon the settings of scheduled monuments.

The Planning (Listed Buildings and Conservation Areas) Act 1990 (as amended)

4.2.10. This act provides for the protection of Listed Buildings and Conservation Areas. The Scheme options have the potential to impact upon the settings of listed buildings.

Landscape

Countryside and Rights of Way Act 2000

4.2.11. This act places a statutory duty on relevant authorities to have regard for conserving and enhancing the natural beauty of an Area of Outstanding Natural Beauty (AONB) when exercising or performing any functions that affect land within the AONB. The Blackdown Hills AONB lies 1.7 kilometres to the south and west of the Scheme options.

Biodiversity

The Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention)

4.2.12. This Convention has three 'pillars' of activity:

- the designation of wetlands of international importance as Ramsar sites

- the promotion of the wise-use of all wetlands in the territory of each country
- international co-operation with other countries to further the wise-use of wetlands and their resources.

There is a Ramsar Site approximately 2 miles (3.5 kilometres) to the north of the Scheme options.

Conservation of Habitats and Species Regulations 2017

4.2.13. These regulations provide for the designation and protection of European sites and the adaptation of planning and other controls for their protection. There are 4 Special Areas of Conservation (SAC) designated for their bat populations within 30 kilometres of the existing A358. These are Hestercombe House SAC, Bracket's coppice SAC, Exmoor & Quantock Oakwoods SAC, and Beer Quarry and Caves SAC.

Wildlife and Countryside Act 1981 (as amended)

4.2.14. This act protects all wild birds, certain wild animals, and certain wild plants. There are habitats and species of conservation importance within the footprint of all the Scheme options.

Countryside and Rights of Way Act 2000

4.2.15. This act places a duty on government departments to have regard for the conservation of biodiversity and maintain lists of species and habitats for which conservation steps should be taken or promoted. There are habitats and species of conservation importance within the footprint of all the Scheme options.

Natural Environment and Rural Communities Act 2006

4.2.16. This act requires public bodies, including local authorities, '*to have regard to the conservation of biodiversity in England'* when carrying out their normal functions. There are habitats and species of conservation importance within the footprint of all the Scheme options.

Noise and Vibration

The Environmental Noise (England) Regulations 2006

4.2.17. These regulations implement European legislation requiring noise action plans to be developed on a five-year rolling programme. Action plans have to be developed for the major noise sources and areas for which maps have been produced. The action plans seek to manage noise issues and effects including noise reduction if necessary, based on the results obtained through the mapping process. There are Noise Important Areas (NIAs) within the Scheme extents. Highways England

has an obligation under its Key Performance Indicators (KPI) to reduce noise levels at NIAs.

The Environmental Protection Act 1990, Part III

4.2.18. Under Part III of the act, certain matters are declared to be statutory nuisances, including *'noise that is prejudicial to health or a nuisance and is emitted from or causes by a vehicle, machinery…*'. Scheme construction activities could lead to a statutory nuisance if best practice measures are not undertaken to prevent noisy and dust-creating works.

Road drainage and the water environment

The Water Environment (England and Wales) Regulations 2017

4.2.19. These regulation implements the Water Framework Directive (WFD) into UK Legislation to ensure that the WFD objectives are met. There are eight WFD surface waterbodies and two WFD groundwater bodies close to the Scheme options.

The Flood and Water Management Act 2010

4.2.20. This act makes provisions about water, including provision for the management of risks in connection with flooding and coastal erosion. The Scheme options lie within fluvial flood zones 2 and 3.

Geology, soils and materials

The Environmental Protection Act 1990, Part II

4.2.21. This part sets out a regime for regulating and licencing the acceptable disposal of controlled waste on land. Controlled waste is any household, industrial and commercial waste. Part II stipulates that controlled waste must be treated, stored, and disposed of in a manner that is not likely to cause pollution of the environment or harm to human health. The construction of all of the Scheme options would require the disposal of some controlled waste.

The Environmental Protection Act (EPA) 1990, Part IIA – Part IIA

4.2.22. These parts deal with sites where historic contamination presents a Significant Possibility of Significant Harm (SPOSH) or a Significant Possibility of Significant Pollution to Controlled Waters (SPOSPCOW). There are a number of historic landfills and one authorised landfill in close proximity to all of the Scheme options. All have the potential for contaminated land to be present.

The Contaminated Land (England) Regulations 2006 (as amended) and The Contaminated Land (England) (Amendment) Regulations 2012

4.2.23. These regulations set out provisions relating to the identification and remediation of contaminated land under Part 2A of *the Environmental Protection Act 1990*. There are a number of historic landfills and one authorised landfill in close proximity to all of the Scheme options. All have the potential for contaminated land to be present.

Waste (England and Wales) Regulations 2011 (as amended) and The Waste (England and Wales) (Amendment) Regulations 2014

4.2.24. These regulations require organisations to confirm that they have applied the waste hierarchy. This ensures that waste is dealt with in the priority of prevention, preparation for re-use, recycling, other recovery, and disposal. Any waste generated during the construction of the Scheme is to be dealt with in line with the waste hierarchy.

The Hazardous Waste (England and Wales) Regulations 2016

4.2.25. These regulations define what constitutes hazardous waste and set out the controls for handling such wastes. The movement of hazardous waste is to be documented by a system of consignment notes. The construction of any of the Scheme options may lead to the production of some hazardous waste.

Clean Neighbourhoods and Environment Act 2005

4.2.26. This act sets out provisions for local environmental and social issues such as litter, fly-tipping and anti-social behaviour. This will be relevant during the construction of the Scheme.

Water Resources Act 1991

4.2.27. Section 161 of this act allows the Environment Agency to recover the costs of cleaning up any poisonous, noxious, or polluting matter, or any solid waste matter, that persons have caused or knowingly permitted to be present in controlled waters. There are a number of historic landfills and one authorised landfill in close proximity to all of the Scheme options with the potential for contaminated land to be present. The construction of the Scheme has the potential to affect controlled waters.

Control of Substances Hazardous to Health Regulations 2002 (COSHH) and Construction and Design Management Regulations 2015

4.2.28. Under these regulations, where a developer knows or suspects the presence of contaminated soil, provision must be made to ensure that

risks to the public and site works are controlled. There are a number of historic landfills and one authorised landfill in close proximity to all of the Scheme options with the potential for contaminated land to be present.

Climate

Climate Change Act 2008

4.2.29. This act forms part of the UK government's plan to reduce greenhouse gas emissions. It commits the government to a reduction of greenhouse gases by at least 80% of 1990 levels by 2050. This act creates a new approach to managing and responding to climate change in the UK, by:

- Setting ambitious, legally binding emission reduction targets
- Taking powers to help meet those targets
- Strengthening the institutional framework
- Enhancing the UK's ability to adapt to the impact of climate change
- Establishing clear and regular accountability to the UK Parliament and to the devolved legislatures

The Carbon Plan 2011

4.2.30. This sets out how the UK will achieve decarbonisation within the framework of the energy policy. UK local authorities and at a regional level must report on their CO_2 emissions.

4.3. National policy

National Networks National Policy Statement

4.3.1. The *National Networks National Policy Statement* (NNNPS) sets out the need for, and government's policies to deliver the development of NSIPs on the national road network in England. It sets out the primary basis for making decisions of development consent for NSIPs in England. The NNNPS recognises that some developments will have some adverse local impacts on noise, emissions, landscape / visual amenity, biodiversity, cultural heritage and water resources. The significance of these effects and the effectiveness of mitigation is uncertain at the strategic and non-locational specific level of the NNNPS. Applicants should deliver developments in accordance with government policy and in an environmentally sensitive way, including opportunities to deliver environmental benefits. However, some adverse local effects of the development may remain.

4.3.2. Evidence demonstrating compliance of the Scheme with the NNNPS will be provided within a *National Networks National Policy Statement* Accordance Table for the Scheme.

4.4. Other relevant policy and strategy

National Planning Policy Framework

4.4.1. The *National Planning Policy Framework* (NPPF) [32] and guidance within the *National Planning Practice Guidance* (NPPG) [33] forms the national planning policy guidance. The NPPF was published in March 2012 and sets out the government's planning policies for England and how these should be applied. The framework acts as guidance for local planning authorities and decision-makers, both in drawing up plans and making decisions about planning applications. The NPPG was launched in March 2014 and brings together planning guidance on various topics into one place.

Road Investment Strategy

4.4.2. The *Road Investment Strategy for the 2015/16 – 2019/20 road period*[34] (Department for Transport, March 2015) (RIS1) outlines a long-term programme to improve England's strategic road network. RIS1 has been produced in accordance with Highways England's licence (Department for Transport, April 2015). Within this, the Secretary of State outlines what they expect Highways England to achieve and how they must behave in discharging their duties. RIS1 comprises:

- A long-term vision for England's motorways and major roads, outlining how the Department for Transport will create smooth, smart, and sustainable roads
- A multi-year investment plan that will be used to improve the network and create better roads for users
- High-level objectives for the first roads period 2015 to 2020

[32] Department for Communities and Local Government (March 2012) *National Planning Policy Framework* [online] available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6077/2116950.pdf (last accessed July 2017).
[33] Department for Communities and Local Government (March 2016) *National Planning Practice Guidance* [online] available at: https://www.gov.uk/government/collections/planning-practice-guidance (last accessed July 2017).
[34] Department for Transport (2015) *National Networks National Policy Statement* [online] available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/387223/NNNPS-web.pdf (last accessed March 2017).

4.4.3. There is substantial provision within the *Road Investment Strategy* to ensure that the programme of investment is delivered in a way that minimises impact on the environment.

4.5. Local policy

4.5.1. Local planning and land-use policy of relevance to the Scheme is outlined below.

Somerset County Council's Future Transport Plan 2011-2026

4.5.2. Somerset County Council's Future Transport Plan 2011 - 2026 sets out the council's long-term strategy for getting the best from transport. It describes the challenges that the council face and the investments that will help them overcome these challenges. Improvements to the A303 and A358 are identified as initiatives within the Transport and Development part of the plan.

South Somerset District Council Local Plan 2006-2028

4.5.3. The South Somerset District Council Local Plan 2006-2028 was adopted in 2015 and defines the spatial implications of economic, social and environmental change. The local plan includes policies which set out the long-term vision and strategic context for managing and accommodating growth within South Somerset.

Taunton Deane Borough Council Adopted Core Strategy 2011-2028

4.5.4. The Adopted Core Strategy for Taunton Deane Borough Council was adopted in 2012 and sets outs their long-term strategy for development over the next 15 years. This strategy along with the Taunton Town Centre Action Plan (2008) have replaced the majority of policies within the Taunton Deane Local Plan. The status of each of the Local Plan policies is set out in Appendix 1 of the Adopted Core Strategy. The Core Strategy also includes a collection of polices which set out the council's long-term strategy for development until 2028.

Taunton Deane Borough Council Site Allocations and Development Management Plan 2016

4.5.5. In 2016 Taunton Dean Borough Council produced a Site Allocations and Development Management Plan (SADMP). This sets out detailed site allocations to meet land requirements up to 2028. It also includes specific, detailed development management policies.

5. Do minimum consequences

5.1. Do minimum scenario

5.1.1. The A358 between the M5 at Taunton and the A303 at Southfields Roundabout currently consists of about 9 miles (14.5 kilometres) of predominantly single carriageway. It has two short sections of dual carriageway between Henlade and Mattock's Tree Green and on the approach to junction 25 of the M5.

5.1.2. For this report, all assessments, including the do minimum, have been carried out with an original Scheme opening year of 2023 and design year of 2038, (15 years after Scheme opening). This is in accordance with the guidelines given in the Design Manual for Roads and Bridges (DMRB) and WebTAG.

The A303 / A30 corridor

5.1.3. The Annual Average Daily Traffic (AADT) flow was calculated from the March 2015 base year traffic model outputs and to the nearest hundred vehicles. In 2015, the AADTs were:

- 15,700 vehicles on the A303 / A30 between the A303 / A30 junction and Ilminster (Southfields Roundabout)
- 18,500 vehicles on the A30 between Honiton and the A303 / A30 junction

5.1.4. These AADTs are forecast to increase, in the Do Minimum scenario with no improvements, to:

- 18,800 vehicles in 2023 and 22,900 vehicles in 2038. On the A303 / A30 between the A303 / A30 junction and Ilminster (Southfields Roundabout)
- 21,200 vehicles in 2023 and to 25,000 vehicles in 2038 on the A30 between Honiton and the A303 / A30 junction

5.1.5. These AADTs are in excess of the design standard flow for a single carriageway road, (DMRB (TA46/97) of 13,000 vehicles.

The A358

5.1.6. The AADT flow was also calculated for the A358 from the March 2015 base year traffic model outputs and to the nearest hundred vehicles. In 2015, the AADTs were:

- 21,500 just north of Southfields Roundabout
- 24,800 at Henlade (see site 5 in the AADT plots in chapter 9)

5.1.7. This compares against a Congestion Reference Flow (CRF) of approximately 30,700 AADT and with *stress* of 81%. The CRF gives an indication of the flow level at which the route is likely to experience congestion during the peak periods on an average day.

5.1.8. The existing A358 in this location however carries higher traffic levels during Fridays (see site 3 in Table 3.1), so even though the AADT is below the CRF at present, it experiences regular occurrences of delay and congestion. The AADT at Henlade is forecast to increase, in the Do Minimum scenario with no improvements, to 28,100 in 2023 and 33,500 in 2038, which would bring the stress level to 91% in the 2023 opening year, leading to increased queuing and congestion on an average day.

5.1.9. The forecast increases in AADT are summarised in Table 5.1 below.

Table 5.1: Forecast AADT increase on the A303 / A30 corridor / A358 2015 to 2023 and 2038

Section	2015	2023		2038	
	AADT	Forecast AADT	% change from 2015	Forecast AADT	% change from 2015
A303 / A30 junction – A303 Southfields Roundabout	15,700	18,800	20%	22,900	46%
A30 Honiton – A303 / A30junction	18,500	21,200	15%	25,000	35%
A358 north-west of Southfields Roundabout	21,500	24,300	13%	28,100	31%
A358 Henlade	24,800	28,100	13%	33,500	35%

Source: Mott MacDonald Sweco Joint Venture. 'Without Scheme' (Do Minimum) modelled scenario.

5.1.10. The increase in traffic in the forecast years is due to forecast growth in trips (controlled to the forecasts in NTEM v7.2, National Trip End Model), as well as transport and development schemes which are expected to be completed. These include other transport schemes in the region as well as those in surrounding regions which could influence A358 traffic. Specific housing and employment developments planned for East Devon, Exeter, Taunton Deane, Sedgemoor, South Somerset, and Wiltshire have also been represented in the traffic forecasts as these would have more local impacts on the A358 traffic.

5.1.11. Due to the increased demand shown in Table 5.1, with traffic flows in excess of the design standard for a new single carriageway road, the following impacts are expected:

- **A considerable increase in congestion on the A303 / A30 and alternative A358 route** – particularly approaching merge points

where two lanes merge into one, on steep gradients on the A303 / A30 where slower moving vehicles will cause reduced throughput. Also at tight turns on the A303 / A30 where traffic speeds and throughput are further reduced. On the alternative route, increased delays will occur at the A358 / A378 junction at Henlade where two lanes merge into one and Taunton Gateway Park & Ride. Increased delays will also occur at M5 junction 25 signalised junctions, although these signal junctions are planned to be improved by Somerset County Council to help support the planned strategic employment site adjacent to the junction. Increased traffic on the A303 / A30 and A358 will also make accessing the network more difficult from local side roads with priority junctions and would potentially cause safety concerns.

- **Increased journey time and reduced journey time reliability** – journey times and journey time reliability are already poor on the A303 / A30 and alternative A358 route and will continue to worsen, as traffic flows increase even further beyond the design capacity. The A303 / A30 between Exeter and Wincanton will remain as one of the most unreliable sections of the corridor. Without improvements, journey times on this section of the A303 / A30 are forecast to increase, for both directions of travel and across all peak periods, by approximately 4% in 2023 and by 10% in 2038. Journey times between Exeter and Wincanton on the alternative route via the M5 and the A358 are forecast to increase, for both directions of travel and across all peak periods, by 4% in 2023 and by approximately 9% in 2038 without improvements.
- **Constraint on economic performance in south-west England** – the significant constraint that the A303 / A30 places on the economy of the south-west and particularly the far south-west counties of Cornwall and Devon, would remain. Visitors to the region, whether for leisure or business, would continue to have their journeys affected by travel conditions on the A303, reducing the attractiveness of the south-west as a place to visit or in which to invest. Constraints on economic performance are also expected for Dorset and Somerset, as the increased congestion and delays on the alternative A358 route would have a negative impact on north-south traffic movements that use this route as well as the M5. Some traffic would re-assign to this corridor to avoid the congested A358. For example, movements from the Midlands, south Wales and Bristol to Yeovil, Dorchester, Weymouth and Poole.
- **Continued higher levels of safety risk** – collision statistics show several cluster sites along the A303 / A30 between Ilminster (Southfields Roundabout) and Honiton including within Monkton

village. A total of 63 personal injury collisions along the A358 between M5 junction 25 and Southfields Roundabout have been observed from 1 January 2010 to 31 December 2014. The continued presence of a high number of at-grade priority junctions and lack of central reserve, combined with high traffic flows and slow-moving vehicles on steep gradients along the A303 / A30, certainly continues to present an increased risk of collisions occurring.

- **Increased severance for Monkton and Henlade residents** - with traffic flows on the A30 through Monkton village increasing by up to 15% in 2023 and by 35% in 2038, and on the A358 through Henlade village by 13% in 2023 and again up to 35% in 2038, in the 'Without Scheme' scenario by 2038.
- **Negative air quality impacts for residents of local settlements, with worsening air quality in the Henlade Air Quality Management Area (AQMA)[35]** – high traffic flows and increased congestion on the A30 through Monkton and the A358 through Henlade would continue to worsen air quality and affect the quality of life of local residents.

5.1.12. The single carriageway sections of the A358 act as significant bottlenecks, on weekdays and especially on Fridays, causing long queues and delays. In addition, significant delays occur on the approach to junction 25 although this is planned to be improved by Somerset County Council to help support the planned strategic employment site adjacent to the junction. Without intervention, the modelled journey times for traffic between the M5 south, M5 junction 26 and Southfields Roundabout are forecast to increase in the future. From the base year 2015 to 2038, by more than 3 minutes during the AM and PM weekday peak periods. Congestion acts as a constraint to development and has an impact on the productivity and attractiveness of the south-west as a key holiday destination. The severity of the issues highlighted above is likely to increase if no action is taken.

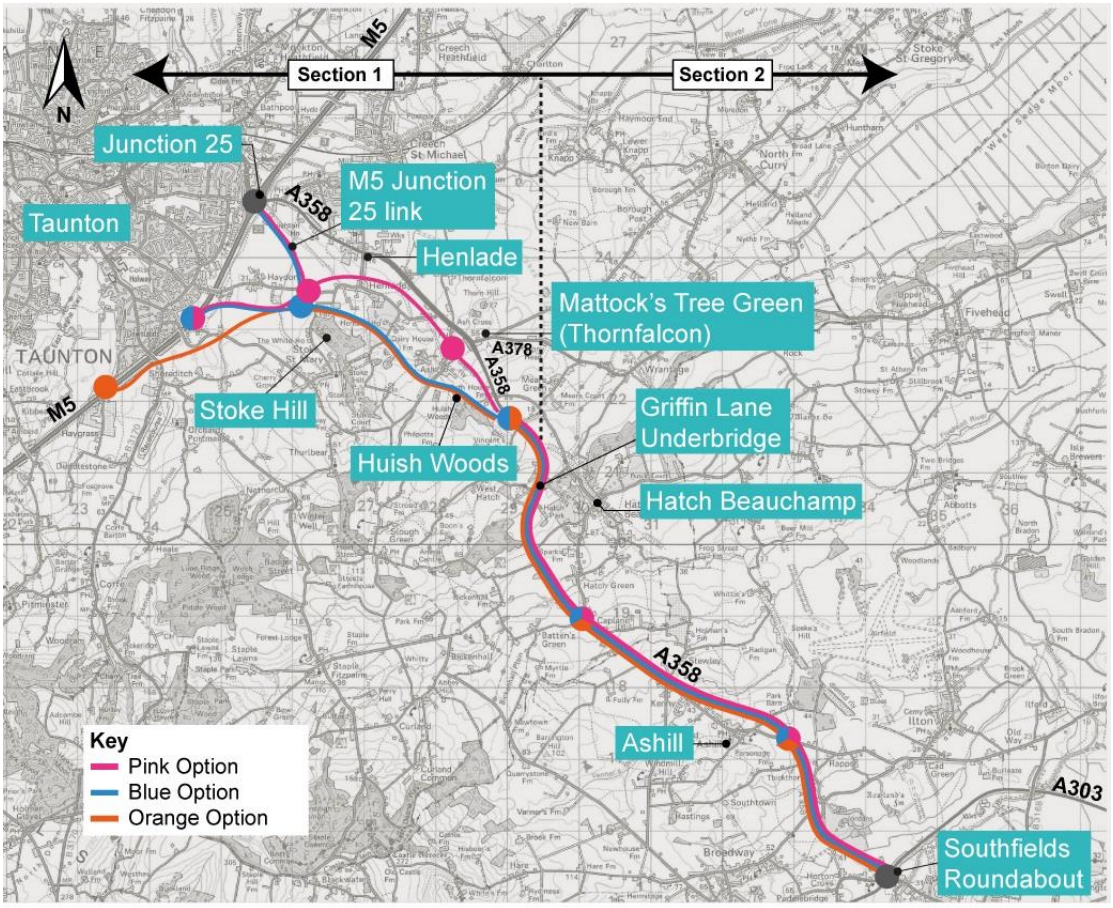
[35] Henlade AQMA was declared by Taunton Deane Borough Council in January 2003. It is defined as an area encompassing properties fronting the A358, west of the bus shelter at Henlade Crossway and extending over 100m further west. Local authorities are obliged to monitor and produce action plans to improve local air quality within AQMAs.

6. Summary of alternative schemes

6.1. Introduction

6.1.1. As discussed in section 2.3.5, three options emerged from the option identification and sifting exercise in Stage 1 (option identification). All three options follow the same corridor between the M5 motorway and Southfields Roundabout. The three options are shown in Figure 6.1.

Figure 6.1: Scheme Corridor



6.1.2. The Scheme corridor can be considered in two sections – Section 1 and Section 2, as shown in Figure 6.1. Section 1 covers the western half of the Scheme, between the M5 motorway and Hatch Beauchamp. Section 2 covers the eastern half of the Scheme, between Hatch Beauchamp and Southfields Roundabout. Section 2 is common to all three options.

6.1.3. The boundary between Sections 1 and 2 is located at the southern extent of the existing Griffin Lane Underbridge. This is located immediately west of Hatch Beauchamp on the Hatch Beauchamp Bypass.

6.1.4. The connection between Sections 1 and 2 comprises a continuous dual carriageway with no junction at this location.

6.1.5. All route options comprise a continuous dual carriageway along their entire length between the M5 and Southfields Roundabout. The central reserve of the dual carriageway will include a continuous 'vehicle restraint system' (safety barrier) preventing turning movements across the central reserve.

6.1.6. Due to the high-speed nature of the proposed road, accesses to properties and land from the existing A358 will not be maintained. These private accesses will be removed and an alternative will be provided to reduce risk to road users. Each will be considered in the detailed design phase to ensure safe, convenient access is available.

Section 1

6.1.7. All route options follow different alignments in Section 1. All comprise the establishment of an entirely new dual carriageway corridor through rural land. At the western limits of Section 1 each option connects to the M5 motorway. The arrangement of this connection differs between the options. These are described later in this section.

Section 2

6.1.8. All route options are identical throughout the length of Section 2. This section essentially comprises online widening of the existing A358 carriageway around the Hatch Beauchamp and Ashill Bypasses. Widening will be achieved asymmetrically, with the existing A358 carriageway forming one half of the proposed dual carriageway and two new lanes constructed alongside it, to form the other half. The new lanes will be to the east of the existing A358 to meet geometric design standards, move the carriageway away from residential areas around Ashill and avoid Ancient Woodland adjacent to Hatch Beauchamp Bypass. During the preliminary design stage, the design will be refined in line with the available relaxations to the design standards. This will aim to minimise the required land take to the east of the proposed alignment.

6.1.9. Between Capland and Kenny the proposed road will be entirely offline just to the north-east of the existing road. There are a number of residential accesses on to the existing A358 from the south, which would not be permitted for a high quality dual carriageway. It is proposed that the existing A358 carriageway at this location acts as a distributor road to provide access to properties and local roads.

6.1.10. At the eastern limits of the Scheme the proposed road connects to the A303 at Southfields Roundabout. The Scheme proposes to introduce a

segregated left turn lane from the A358 onto the A303, subject to satisfactory traffic modelling results in Stage 3. This will be designed to Design Manual for Roads and Bridges (DMRB) TD51/17 *Segregated Left Turn Lanes and Subsidiary Deflection Islands at Roundabouts*. Improvements to the gyratory will be limited to amendments to lane and destination markings.

Junction strategy

6.1.11. The locations of junctions along the A358 will be refined during Project Control Framework (PCF) Stage 3 (preliminary design). A junction strategy will be developed to confirm the best arrangement for junctions. It will aim to meet the objectives of the Scheme and balance comments from the consultations with the cost of delivering these junctions.

6.1.12. During detailed design stage, the footprint of junctions may be reduced to minimise the amount of land acquired by using the parameters available under DMRB TD 40/94 *Layout of Compact Grade Separated Junctions*.

Hatch Beauchamp junction

6.1.13. For the 2017 or 2018 consultation, no junction was shown on the online widening section at Hatch Beauchamp between Ashill and West Hatch. A bridge crossing was identified in the 2018 consultation material to maintain a connection between Hatch Beauchamp and other villages.

6.1.14. Feedback from the consultation questionnaire and verbally from stakeholders at the 2017 and 2018 consultations suggested that adding slip roads to this proposed bridge would improve connectivity for the village of Hatch Beauchamp. This is illustrated later in Chapter 7 (Figure 7.3) and has been included in the assessment work in the event it is introduced at a later stage.

6.1.15. It should be noted that the provision of this junction is not confirmed. The addition of slip roads to the structure provides communities to the south and west of Hatch Beauchamp access to the A358 without the need for an additional alternative junction but it does incur additional cost.

6.2. The Pink option

Alignment of the Pink option

Section 1

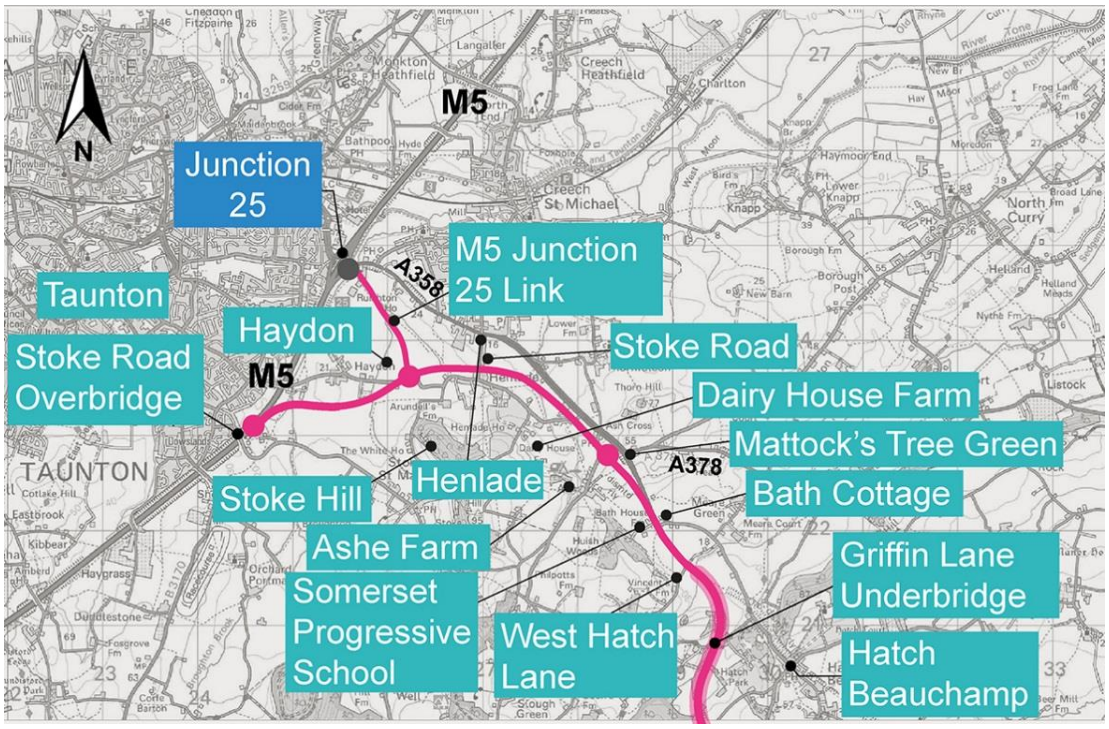
6.2.1. The Pink option would be approximately 9.1 miles (14.6 kilometres) long between its connection with the M5 and Southfields Roundabout. In addition, a 0.9mile (1.5 kilometre) section of dual carriageway (the M5

junction 25 link) would be provided to junction 25 of the M5. Section 1 of the Pink option is illustrated in Figure 6.2.

6.2.2. The road alignment will pass through deep (5-10m) cuttings at Henlade and at Mattock's Tree Green. It will cross the levels to the west of the M5 on embankments approximately 3m high, to avoid potential flooding.

6.2.3. The alignment of the Pink option takes a more northerly arc through the Scheme corridor. This takes it closer to the A358 / A378 junction at Mattock's Tree Green and closer to Henlade than Blue and Orange options.

Figure 6.2: Section 1 of the Pink option



6.2.4. From the west, the Pink option would commence at the M5 approximately 1.2 miles (2 kilometres) south of junction 25, near the existing Stoke Road Overbridge. This new junction is described in section 6.2.10 of this document. There would be no connection to Stoke Road as part of this arrangement. The junction links would bear eastwards to become the new road. This would involve the northbound diverging link rising alongside the M5 carriageway and then crossing over the motorway carriageway on a new overbridge.

6.2.5. The proposed dual carriageway would pass to the south of Haydon and to the north-west of Stoke Hill until it reaches Stoke Road, Henlade. Between the M5 and Henlade the proposed road would be 3m above ground level to sit above the flood levels of the watercourses in this area.

6.2.6. At Haydon the M5 junction 25 link leads from the proposed dual carriageway towards junction 25. It is anticipated that the M5 junction 25 link would connect to local road infrastructure provided by Somerset County Council at junction 25 to facilitate access to a proposed Strategic Employment Site (Nexus 25). The vertical profile of the M5 junction 25 link is generally at or slightly above ground level so that it is above the flood levels of the watercourses in this area.

6.2.7. The proposed dual carriageway would then pass in a cutting between residential properties along Stoke Road, Henlade. The connection between Upper and Lower Henlade will be maintained by building a bridge across the proposed carriageway along the current route of Stoke Road. Design work at a later stage will enable the impacts to Lower Henlade to be understood and mitigation to be proposed to minimise the impact. East of Henlade, the dual carriageway will run roughly parallel to the existing A358, initially at ground level but then entering a deep cutting through Mattock's Tree Hill. The proposed road would emerge from the cutting before passing at ground level through a gap between Bath Cottage and the Somerset Progressive School to reach the existing junction with West Hatch Lane.

6.2.8. Between West Hatch Lane and the existing Griffin Lane Underbridge the proposed dual carriageway would gradually adopt the horizontal and vertical alignment of the existing A358 carriageway. The existing Griffin Lane Underbridge, which carries the single carriageway A358 over Griffin Lane, would be retained to carry one half of the proposed dual carriageway. A new bridge would be constructed to carry the other half.

Section 2

6.2.9. Section 2 of the Pink option is identical to the Blue and Orange options. As such this is described later in section 6.5.

Junction strategy for the Pink option

Section 1

6.2.10. There would be three junctions along Section 1 of the Pink option to facilitate movement between the proposed dual carriageway and the adjacent road network. The locations of these have been proposed to minimise the impact to residential properties and consider environmental constraints, geometry and how the junctions will be built. These are Junction A (Blackbrook Junction), Junction B (Henlade Junction) and Junction C (Mattock's Tree Green). These are highlighted in Figure 6.3 and described in Table 6.1.

Figure 6.3: Junctions in Section 1 of the Pink option

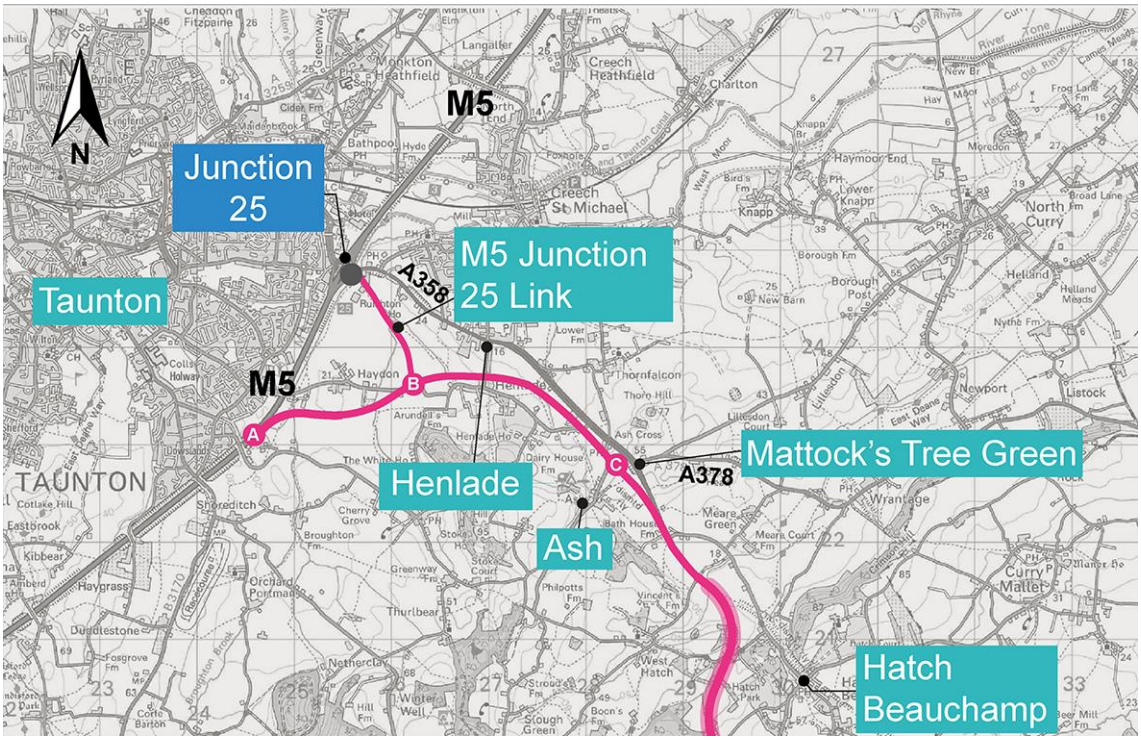


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Table 6.1: Junctions in Section 1 of the Pink option

Junction Name	Description
Junction A (Blackbrook Junction)	A limited movements free flowing junction between the M5 and the proposed dual carriageway. This would be identical to Junction A in the Blue option. This junction would comprise: • A northbound diverging link, enabling traffic to join from the northbound carriageway of the M5 to the eastbound carriageway of the proposed dual carriageway

Junction Name	Description
	• A southbound merging link, enabling traffic to join from the westbound carriageway of the proposed dual carriageway to the southbound carriageway of the M5 It is noted that: • This junction has been located far enough south to avoid the proposed Nexus 25 employment site and to ensure a wide buffer between housing and the M5 • It is not possible to fit slip roads allowing all movements to be made. It does not allow for westbound A358 traffic wishing to travel north on the M5, and southbound M5 traffic wishing to travel east on the A358. This is due to the impact of these additional slip roads on local housing and communities, existing bridges and the operation of junction 25. Such slip roads are not considered necessary due to the proposed link road to junction 25 • There would be no connection to the local road network at this junction • The extent of land required to build this option will be finalised during detailed design when further topographical and ground investigations results are known • Mitigation measures for the land used for this junction will be provided. This may include providing alternative land elsewhere
Junction B (Henlade Junction)	A limited movements free flowing junction between the proposed dual carriageway and the M5 junction 25 link. A free flow junction removes the interaction between different traffic flows and improves traffic speeds relative to alternative junction designs such as a roundabout. This would have a similar layout to Junction D in the Blue option although it would be in a slightly different location. This junction would comprise: • A westbound diverging link, enabling traffic to join from the westbound carriageway of the proposed dual carriageway to the northbound carriageway of the M5 junction 25 link • A southbound merging link, enabling traffic to join from the southbound carriageway of the M5 junction 25 link to the eastbound carriageway of the proposed dual carriageway There would be no connection to the local road network at this junction.
Junction C (Mattock's Tree Green)	An all-movements grade separated junction providing connection between the proposed dual carriageway and the adjacent local road network. This junction would be unique to the Pink option. This junction would comprise merging and diverging slip roads to and from both carriageways of the proposed dual carriageway. These slip roads would enable connection between the proposed road and: • The existing un-named local road through Ash to Thurlbear and Slough Green • The A378 via the existing traffic signal controlled junction at Mattock's Tree Green • The existing A358 carriageway at the traffic signal controlled junction, which would be retained to provide continued access to Henlade and Hatch Beauchamp

Section 2

6.2.11. Section 2 of the Pink option is identical to the Blue and Orange options. As such junctions in this section are described later in section 6.5.8.

Treatment of local roads for the Pink option

Section 1

6.2.12. The Pink option has the potential to impact 11 local roads in Section 1. These are highlighted in Figure 6.4 and proposed treatment to each road is described in Table 6.2.

Figure 6.4: Local roads affected by Section 1 of the Pink option

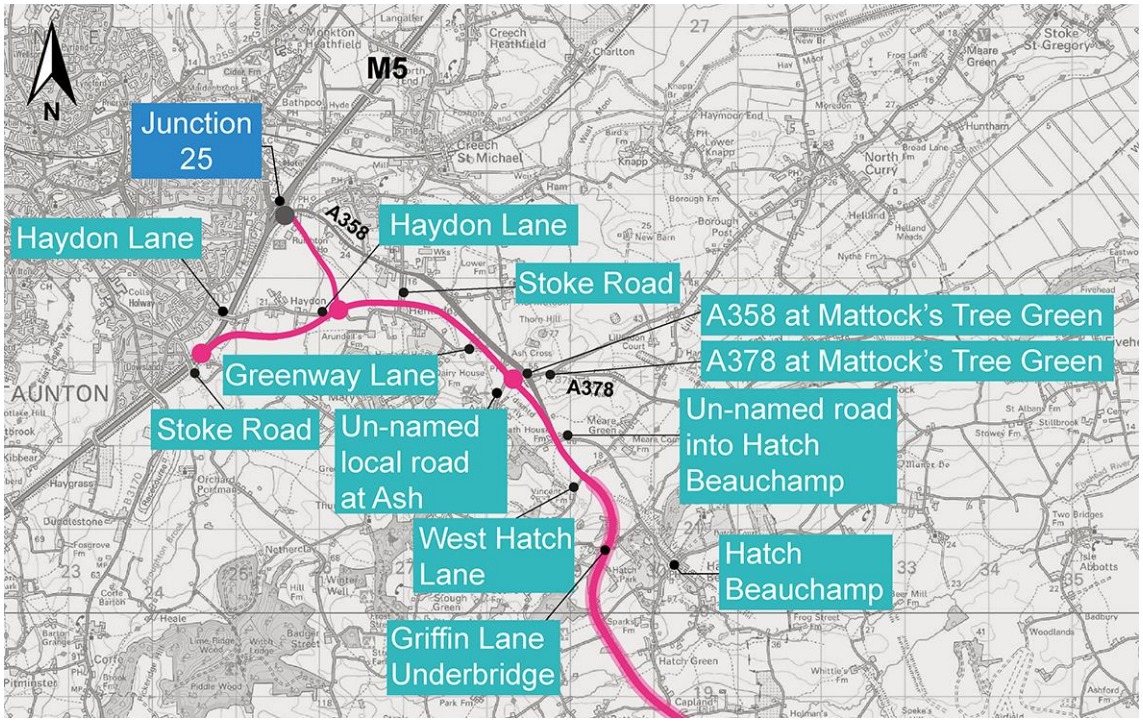

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Table 6.2: Treatment to local roads in Section 1 of the Pink option

Local Road name	Description	Proposed Treatment
Stoke Road	Local road crossing the M5 carriageway immediately to the south of Junction A.	This road would be retained.
Haydon Lane	Local road crossing the M5 carriageway immediately to the north of Junction A.	This road would be retained.
Haydon Lane	Local road connecting Lower Henlade and eastern suburbs of Taunton.	This road would be kept open by providing a new bridge crossing the proposed dual carriageway. There would be no connection with the proposed dual carriageway.

Local Road name	Description	Proposed Treatment
Stoke Road	Local road between the A358 at Henlade and Lower Henlade.	This road would be kept open by providing a new bridge crossing the proposed dual carriageway. There would be no connection with the proposed dual carriageway.
Greenway Lane	Local road between the A358 near Thornfalcon and Lower Henlade.	This road would be permanently closed at the point where the proposed dual carriageway crosses it.
Un-named local road at Ash	Local road between the A358 at Ash Cross and Slough Green / Thurlbear.	This road would be connected to Junction C.
A358 at Mattock's Tree Green	Existing A358 which provides access to Henlade and Hatch Beauchamp.	This road would be connected to Junction C.
A378 at Mattock's Tree Green	This connects to the A358 at the existing traffic signal controlled junction at Mattock's Tree Green.	This road would be connected to Junction C.
Un-named road into Hatch Beauchamp	Local road with a junction to the existing A358 which provides access into Hatch Beauchamp.	The existing junction of this road would be closed. The road would be connected to Junction C via a new local link road.
West Hatch Lane	Local road between the A358 and West Hatch.	The existing junction of this road would be closed. The road would be connected to Junction C via a new local link road.
Griffin Lane	Local road that currently passes underneath the existing A358, providing connection between West Hatch and Hatch Beauchamp.	This road will be kept open.

Section 2

6.2.13. Section 2 of the Pink option is identical to the Blue and Orange options. As such the treatment of local roads in Section 2 is described in section 6.5.9.

Existing non-motorised user facilities

6.2.14. Existing non-motorised user (NMU) routes that are likely to be affected by the Pink option in Section 1 are shown in Figure 6.5 and the details are summarised in Table 6.3.

Figure 6.5: Pink option Section 1 existing rights of way

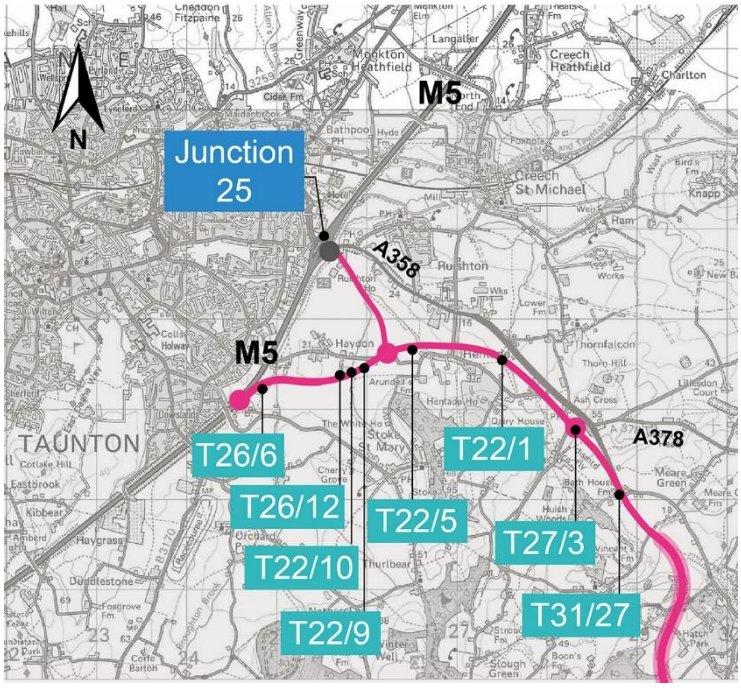

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Table 6.3: Section 1 Pink option - Existing Public Rights of Way

Footpath Ref	Description
T22/1	A north-south footpath linking Thornfalcon and Henlade.
T22/10	A north-south footpath linking Haydon and Stoke St Mary.
T22/5	A north-south footpath linking Greenway Lane (Henlade) to various points along the A358 towards Ruishton.
T22/9	A footpath from Stoke Road, near Arundell's Farm, linking to footpath between Haydon and Stoke St Mary.
T26/6	A footpath linking Haydon Lane to Stoke Road to the south of the M5. This path continues to provide a link between the hamlets of Shoreditch and Haydon.
T26/12	A footpath linking Lower Henlade to area immediately to the south of M5 junction 25.
T27/3	An east-west footpath providing a link between Ashe Farm and Mattocks Tree Green.
T31/27	Two north-south footpaths linking Bath House Farm and surrounding properties along West Hatch Lane.

6.2.15. Recommendations by user groups and local council rights of way officers have been used to develop the NMU provision. These have been

considered along with an NMU audit and NMU surveys undertaken as a part of the development of the Scheme.

6.2.16. The majority of footpaths or bridleways severed will be diverted across the nearest available road bridge. It is proposed to close a small number of rights of way where alternative routes offer similar connections.

6.2.17. The alignment of the Pink option is the furthest north of the proposed offline sections and will dissect Public Rights of Way and bridleways to the north of Lower Henlade and Ashe Farm.

6.2.18. The only dedicated NMU bridge on this section will be to the west of the river Tone and will provide access for equestrian riders travelling between Thorn Lane and Greenway Lane. This overbridge would have raised parapets to ensure horses are not alarmed by traffic passing underneath.

6.2.19. Diversions being provided across the proposed dual carriageway are described in Table 6.4.

Table 6.4: Proposed treatment to Public Rights of Way for Pink option

Footpath Ref	Proposed treatment
T22/1	To be diverted over the proposed dual carriageway via the River Tone Bridleway (NMU overbridge).
T22/10	To be diverted via overbridge between Haydon Lane and Stoke Road.
T22/5	To be diverted via Stoke Road Overbridge between Henlade and Lower Henlade.
T22/9	To be diverted via overbridge between Haydon Lane and Stoke Road.
T26/6	To be closed.
T26/12	To be closed.
T27/3	To be diverted via Mattock's Tree Green junction.
T31/28 and T31/27	To be closed between Bath Cottage and Bath Farm House and diverted via overbridge at West Hatch Lane.

6.3. The Blue option

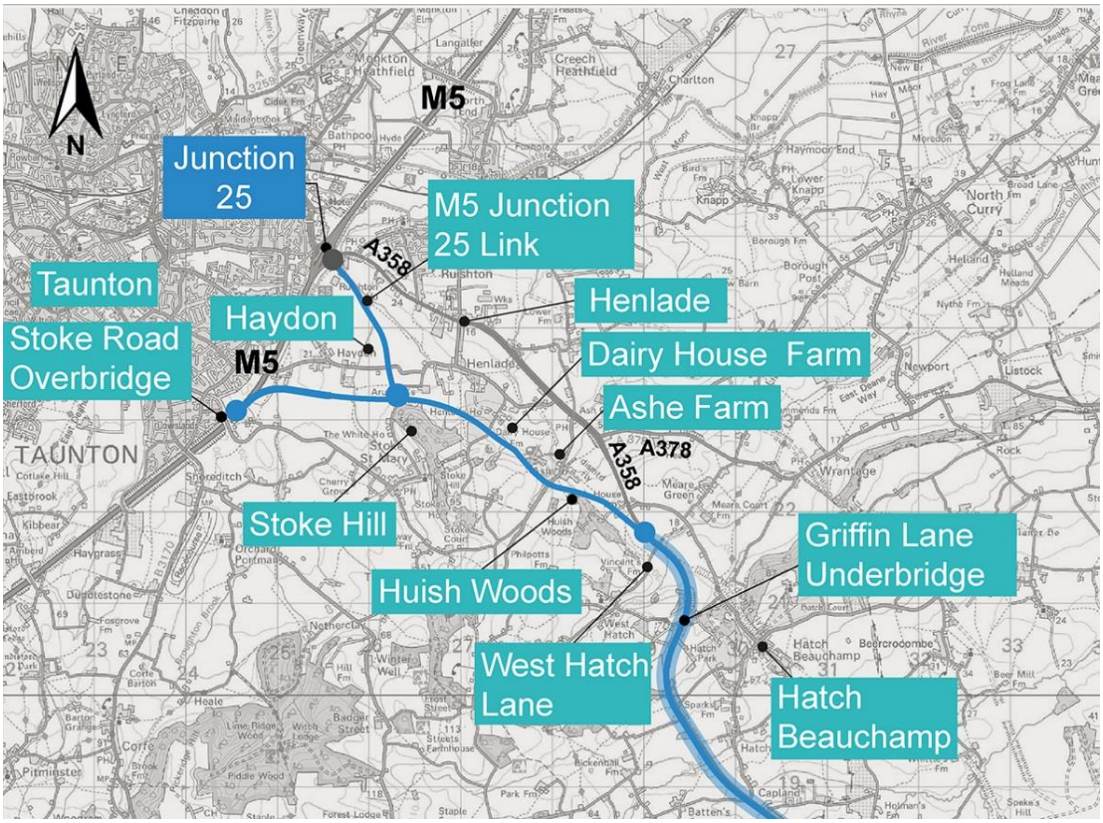
Alignment of the Blue option

Section 1

6.3.1. The Blue option would be approximately 8.8 miles (14.1 kilometres) long between its connection with the M5 and Southfields Roundabout. In addition, a 1.2 miles (2.0 kilometres) section of dual carriageway link (the M5 junction 25 link) would be provided to junction 25 of the M5. Section 1 of the Blue option is illustrated in Figure 6.6.

6.3.2. In comparison with Pink, the Blue option takes a more southerly alignment through Section 1, moving it away from residential properties at Henlade but closer to environmentally sensitive areas at Huish Woods and Stoke Hill.

Figure 6.6: Section 1 of the Blue option



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6.3.3. From the west, the Blue option commences at the M5 approximately 1.2 miles (2 kilometres) south of junction 25, near the existing Stoke Road Overbridge. There would be no connection to Stoke Road as part of this arrangement. The junction links would bear eastwards to become the

new road. This would involve the northbound diverging link rising alongside the M5 carriageway and then crossing over the motorway carriageway on a new overbridge.

6.3.4. From the junction with the M5, the proposed dual carriageway passes to the south of Haydon and to the north-west of Stoke Hill, until reaching the north-west corner of Stoke Hill. Between the M5 and Stoke Hill the proposed road would be at or above ground level due to the flood levels of the watercourses in this area.

6.3.5. To the north-west of Stoke Hill, the M5 junction 25 link would lead from the proposed dual carriageway towards junction 25. It is anticipated that the M5 junction 25 link would connect to local road infrastructure being provided by Somerset County Council at junction 25 to facilitate access to a proposed Strategic Employment Site (Nexus 25). The vertical profile of the M5 junction 25 link is generally at or slightly above ground level due to the flood levels of the watercourses in this area.

6.3.6. From the junction with the M5 junction 25 link, the proposed dual carriageway continues on a south-easterly course around the northern edges of Stoke Hill and Huish Woods and south of Dairy House Farm and Ashe Farm. It links to the western end of the existing A358 Hatch Beauchamp Bypass at West Hatch Lane. The existing ground profile through this section undulates considerably and as such the proposed road would be partly in cutting and partly on embankment.

6.3.7. Between West Hatch Lane and the existing Griffin Lane Underbridge the proposed dual carriageway would gradually adopt the horizontal and vertical alignment of the existing A358 carriageway. The existing Griffin Lane Underbridge, which carries the single carriageway A358 over Griffin Lane, would be retained to carry one half of the proposed dual carriageway. A new bridge would be constructed to carry the other half.

Section 2

6.3.8. Section 2 of the Blue option is identical to the Pink and Orange options. As such this is described separately in section 6.5.

Junction strategy for the Blue option

Section 1

6.3.9. There would be three junctions along Section 1 of the Blue option to facilitate movement between the proposed dual carriageway and the adjacent road network. The locations of these have been proposed to minimise the impact to residential properties and consider environmental constraints, geometry and how the junction will be built. These are Junction A (Blackbrook Junction), Junction D (Henlade Junction) and Junction E (West Hatch Lane). These are highlighted in Figure 6.7 and described in Table 6.5.

Figure 6.7: Junctions in Section 1 of the Blue option

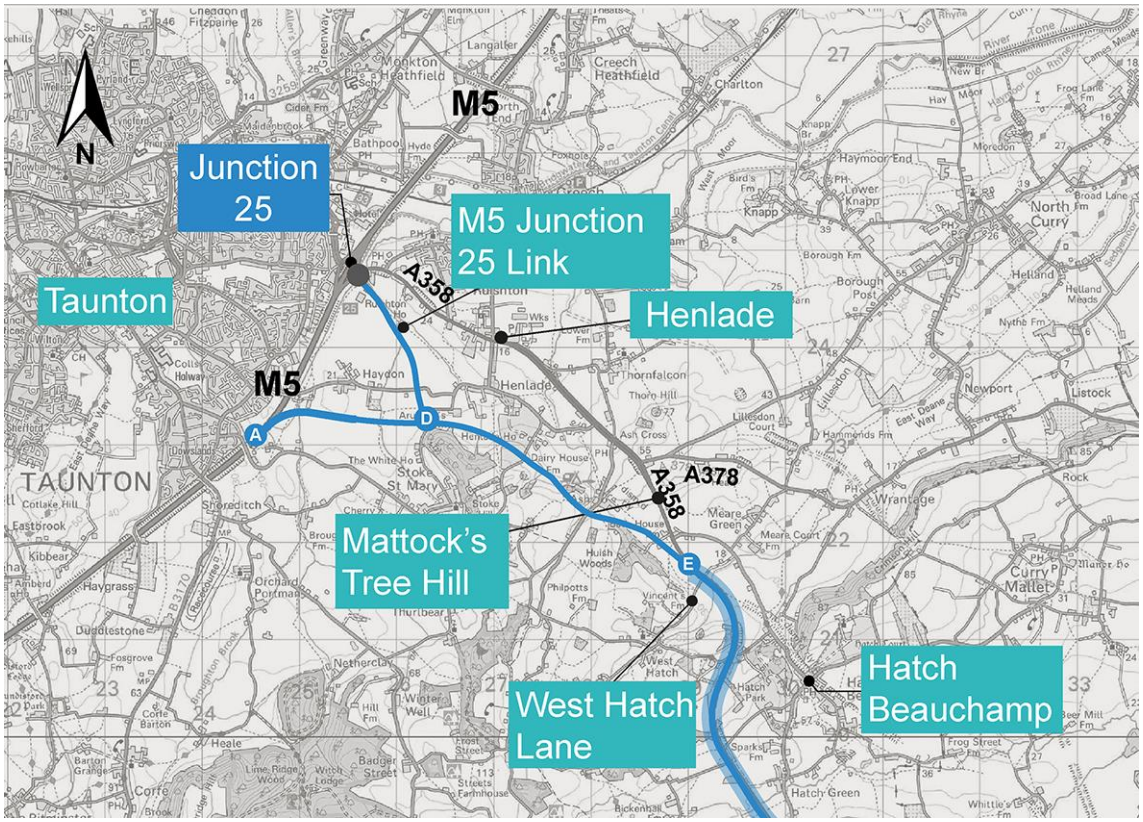

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Table 6.5: Junctions in Section 1 of the Blue option

Junction Name	Description
Junction A (Blackbrook Junction)	A limited movements free flowing junction between the M5 and the proposed dual carriageway. This is identical to Junction A in the Pink option. This junction would comprise:

Junction Name	Description
	• A northbound diverging link, enabling traffic to join from the northbound carriageway of the M5 to the eastbound carriageway of the proposed dual carriageway • A southbound merging link, enabling traffic to join from the westbound carriageway of the proposed dual carriageway to the southbound carriageway of the M5 It should be noted that: • This junction has been located far enough south to avoid the proposed Nexus 25 employment site and to ensure a wide buffer between housing and the M5 • It is not possible to fit slip roads allowing all movements to be made. It does not allow for westbound A358 traffic wishing to travel north on the M5, and southbound M5 traffic wishing to travel east on the A358. This is due to the impact of these additional slip roads on local housing and communities, existing bridges and the operation of junction 25. Such slip roads are not considered necessary due to the proposed link road to junction 25 • There would be no connection to the local road network at this junction.
Junction D (Henlade Junction)	A limited movements free flowing junction between the proposed dual carriageway and the proposed M5 junction 25 link. This would have a similar layout to Junction B in the Pink option although it is in a slightly different location. This junction would comprise: • A westbound diverging link, enabling traffic to join from the westbound carriageway of the proposed dual carriageway to the northbound carriageway of the M5 junction 25 link • A southbound merging link, enabling traffic to join from the southbound carriageway of the M5 junction 25 link to the eastbound carriageway of the proposed dual carriageway • The free-flow arrangement will promote faster traffic flows, safer journeys and less congestion than alternative junction designs such as a roundabout There would be no connection to the local road network at this junction.
Junction E (West Hatch Lane)	An all-movements grade separated junction providing connection between the proposed dual carriageway and the adjacent local road network. This would be identical to Junction E in the Orange option. This junction would comprise merging and diverging slip roads to and from both carriageways of the proposed dual carriageway. These slip roads would enable connection between the proposed road and: • West Hatch Lane • the existing A358 carriageway at the bottom of Mattock's Tree Hill, which would be retained to provide continued access to Henlade, the A378 and Hatch Beauchamp.

Section 2

6.3.10. Section 2 of the Blue option is identical to the Pink and Orange options. As such junctions in this section are described separately in section 6.5.8.

Treatment of local roads for the Blue option

Section 1

6.3.11. The Blue option has the potential to impact ten local roads in Section 1. These are highlighted in Figure 6.8 and proposed treatment to each road is described in Table 6.6.

Figure 6.8: Local roads affected by Section 1 of the Blue option

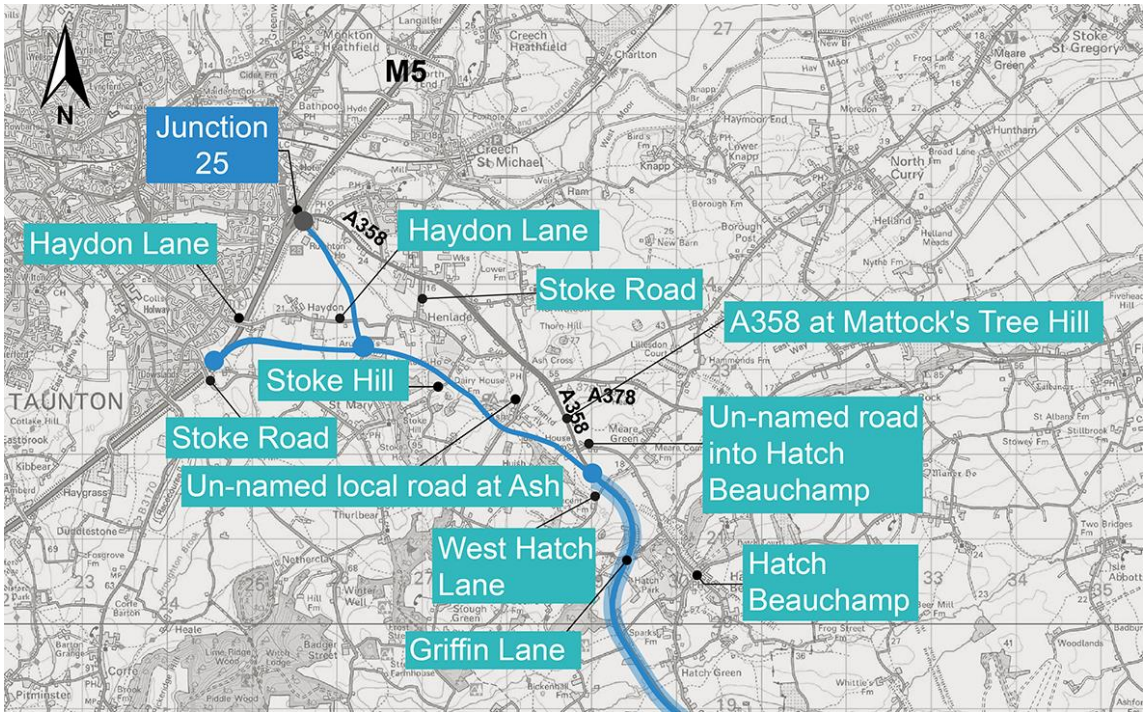

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Table 6.6: Treatment to local roads in Section 1 of the Blue option

Local Road name	Description	Proposed Treatment
Stoke Road	Local road crossing the M5 carriageway immediately to the south of Junction A.	This road would be retained.
Haydon Lane	Local road crossing the M5 carriageway immediately to the north of Junction A.	This road would be retained.
Haydon Lane	Local road connecting Lower Henlade and eastern suburbs of Taunton.	This road would be kept open by providing a new bridge crossing the proposed dual carriageway. There would be no connection with the proposed dual carriageway.

Local Road name	Description	Proposed Treatment
Stoke Road	Local road between Lower Henlade and Stoke St Mary.	This road would be kept open by providing a new bridge crossing the proposed dual carriageway. There would be no connection with the proposed dual carriageway.
Stoke Hill	Local road between Lower Henlade and Slough Green and Thurlbear.	This road would be kept open by providing a new bridge crossing the proposed dual carriageway. There would be no connection with the proposed dual carriageway.
Un-named local road at Ash	Local road between the A358 at Ash Cross and Slough Green / Thurlbear.	This road would be kept open by providing a new bridge crossing the proposed dual carriageway. There would be no connection with the proposed dual carriageway.
A358 at Mattock's Tree Hill	Existing A358 which provides access to Henlade, the A378 and Hatch Beauchamp.	This road would be connected to Junction E.
Un-named road into Hatch Beauchamp	Local road with a junction to the existing A358 which provides access into Hatch Beauchamp.	This road would be connected to Junction E.
West Hatch Lane	Local road between the A358 and West Hatch.	This road would be connected to Junction E.
Griffin Lane	Local road passing underneath the existing A358, providing connection between West Hatch and Hatch Beauchamp.	This road would be kept open.

Section 2

6.3.12. Section 2 of the Blue option is identical to the Pink and Orange options. As such the treatment of local roads in this section are described in section 6.5.9.

Existing non-motorised users facilities

6.3.13. Existing NMU routes that are likely to be affected by the Blue option in Section 1 are shown in Figure 6.9 and the details are summarised in Table 6.7.

Figure 6.9: Blue option Section 1 existing rights of way

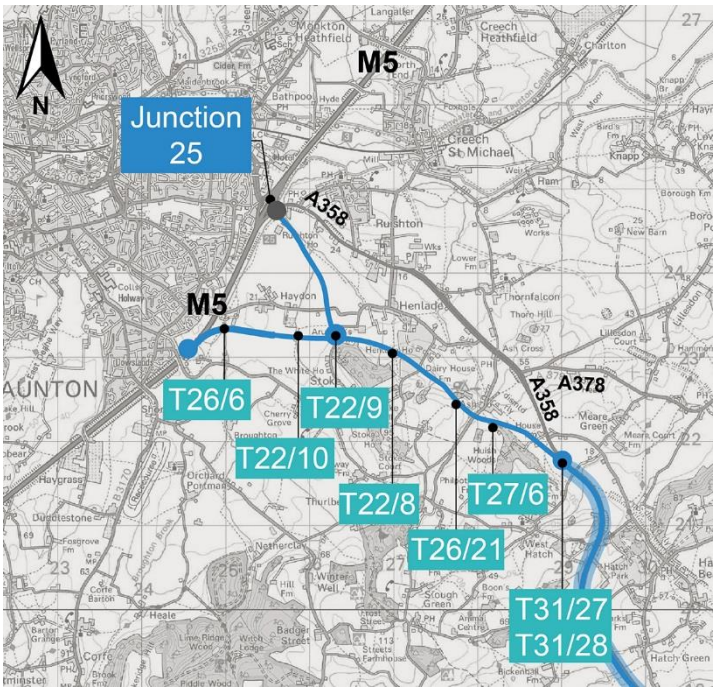

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Table 6.7: Section 1 Blue option - Existing Public Rights of Way

Footpath Ref	Description
T22/10	A north south footpath linking Haydon and Stoke St Mary.
T22/8	A footpath linking Lower Henlade to Stoke Hill.
T22/9	A footpath from Stoke Road, near Arundell's Farm, linking to footpath between Haydon and Stoke St Mary.
T26/21	A footpath through Stoke Hill Farm to Ashe Farm.
T26/6	A footpath linking Shoreditch Road to Stoke Road to the south of the M5. This path continues to provide a link between the hamlets of Shoreditch and Haydon.
T27/6	A footpath linking Ashe Farm to West Hatch.
T31/27 and T31/28	Two north-south footpaths linking Bath House Farm and surrounding properties along West Hatch Lane.

6.3.14. Recommendations by user groups and local council rights of way officers have been used to develop the NMU provision. These have been

considered along with an NMU audit and NMU surveys undertaken as a part of the development of the Scheme.

6.3.15. The majority of footpaths or bridleways severed will be diverted across the nearest available road bridge. It is proposed to close a small number of rights of way where alternative routes offer similar connections.

6.3.16. The alignment of the Blue option will pass to the south of Ashe Farm and Lower Henlade. There are no dedicated NMU bridges for the offline section of this option with diversions across the proposed dual carriageway being provided at the locations described in Table 6.8.

Table 6.8: Proposed treatment to Public Rights of Way for Blue option

Footpath Ref	Proposed treatment
T22/10	To be diverted via an overbridge linking Stoke Road to Haydon Lane then west along Haydon Lane where a new overbridge is provided to cross the link to junction 25.
T22/8	To be diverted via proposed Stoke Hill Overbridge.
T22/9	To be diverted via overbridge.
T26/21	To be diverted via Ashe Farm Underbridge.
T26/6	To be diverted via proposed Shoreditch Road Overbridge.
T27/6	To be diverted via Ashe Farm Underbridge.
T31/28 and T31/27	To be diverted via Huish Woods Underpass.

6.4. The Orange option

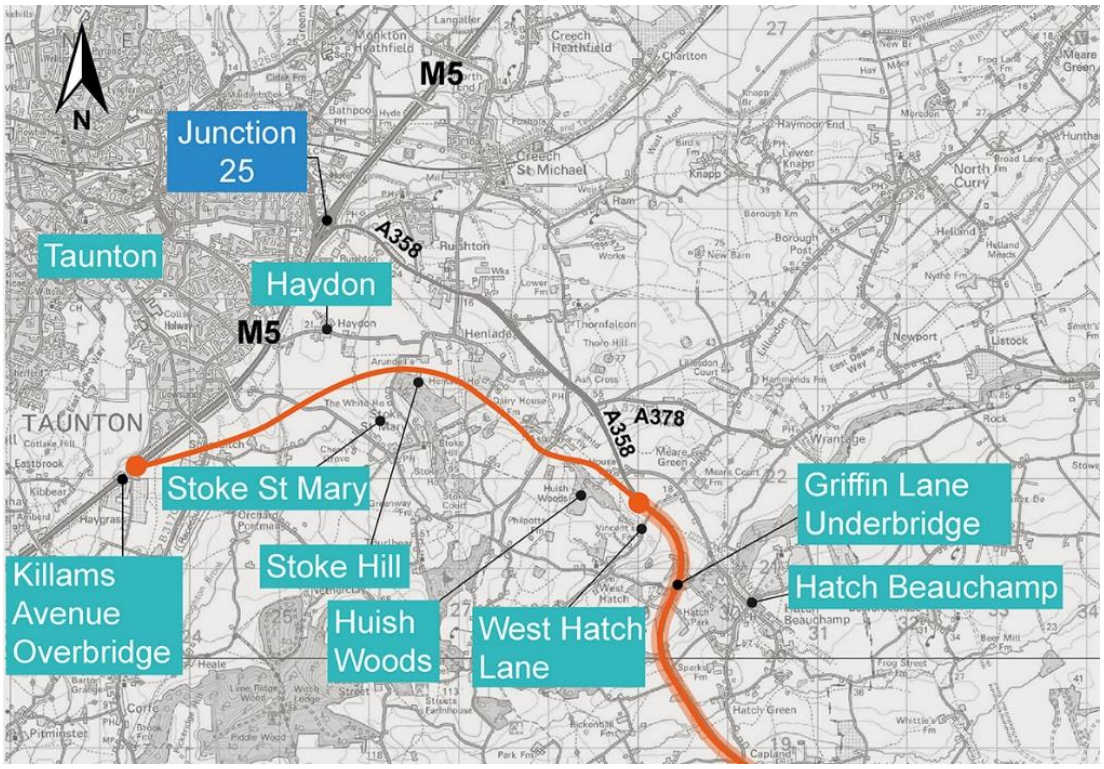
Alignment of the Orange option

Section 1

6.4.1. The Orange option would be approximately 9.5 miles (15.3 kilometres) long between its connection with the M5 and Southfields Roundabout. Section 1 of the Orange option is illustrated in Figure 6.10.

6.4.2. The Orange option does not include the M5 junction 25 link and starts to the south-west of the existing Taunton conurbation bordering the M5.

Figure 6.10: Section 1 of the Orange option



6.4.3. From the west, the Orange option would commence at the M5 approximately 2.1 miles (3.5 kilometres) south of junction 25, in the vicinity of the existing Killams Avenue overbridge. There would be no connection to Killams Avenue as part of this arrangement.

6.4.4. From this junction with the M5, the proposed dual carriageway would take a north-easterly course towards Stoke Hill. It will begin in a cutting past Shoreditch but then emerging to be at or slightly above ground level to be above the flood levels of the watercourses in this area. It would

pass to the north of Stoke St Mary and south of Haydon. From Stoke Hill, the Orange option would follow the same alignment as the Blue option, although the Orange option does not include the M5 junction 25 link.

6.4.5. The proposed dual carriageway would bear south-east around the northern edges of Stoke Hill and Huish Woods before meeting up with the western end of the existing A358 Hatch Beauchamp Bypass at West Hatch Lane. The existing ground profile through this section undulates considerably and as such the proposed road would be partly in cutting and partly on embankment.

6.4.6. Between West Hatch Lane and the existing Griffin Lane Underbridge the proposed dual carriageway would gradually adopt the horizontal and vertical alignment of the existing A358 carriageway. The existing Griffin Lane Underbridge, which carries the single carriageway A358 over Griffin Lane, would be retained to carry one half of the proposed dual carriageway. A new bridge would be constructed to carry the other half.

Alignment of the Orange option through Section 2

6.4.7. Section 2 of the Orange option is identical to the Pink and Blue options. As such this is described separately in section 6.5.

Junction strategy for the Orange option

Section 1

6.4.8. There would be two junctions along Section 1 of the Orange option to facilitate movement between the proposed dual carriageway and the adjacent road network. The locations of these have been proposed to minimise the impact to residential properties and consider environmental constraints, geometry and how the junction will be built. These are Junction F (Killams) and Junction E (West Hatch Lane). These are highlighted in Figure 6.11 and described in Table 6.9.

Figure 6.11: Junctions in Section 1 of the Orange option

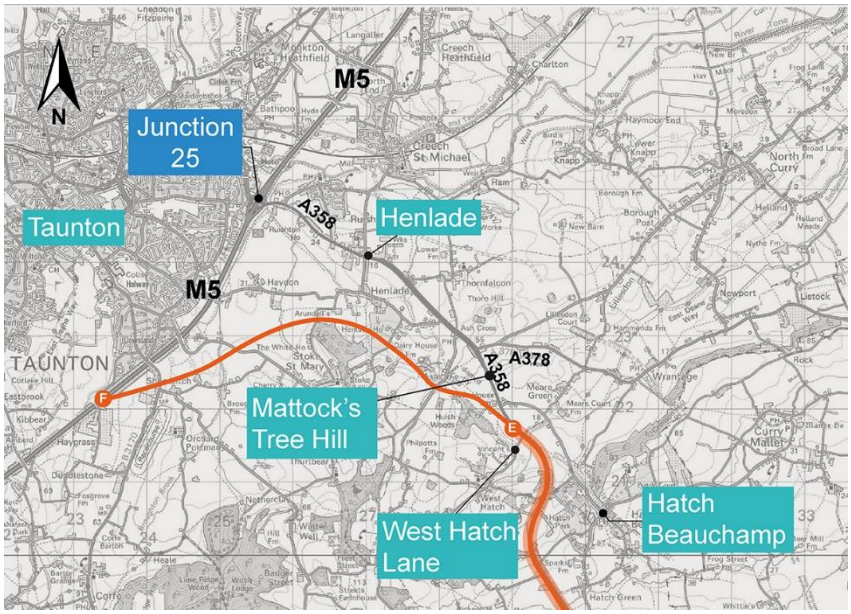


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Table 6.9: Junctions in Section 1 of the Orange option

Junction Name	Description
Junction F (Killams Junction)	An all-movements grade separated junction between the proposed dual carriageway and the M5 motorway. This junction would be unique to the Orange option. This junction would comprise merging and diverging slip roads to and from both carriageways of the M5. These slip roads would enable connection between the M5 and the proposed road only. There would be no connection to the local road network at this junction. The surrounding local road network is not suitable to provide a connection into Taunton from this junction.
Junction E (West Hatch Lane)	An all-movements grade separated junction providing connection between the proposed dual carriageway and the adjacent local road network. This would be identical to Junction E in the Blue option. This junction would comprise merging and diverging slip roads to and from both carriageways of the proposed dual carriageway. These slip roads would enable connection between the proposed road and: • West Hatch Lane • the existing A358 carriageway at the bottom of Mattock's Tree Hill, which would be retained to provide continued access to Henlade, the A378 and Hatch Beauchamp.

Section 2

6.4.9. Section 2 of the Orange option is identical to the Pink and Blue options. As such junctions in this section are described separately in section 6.5.8.

Treatment of local roads for the Orange option

Section 1

6.4.10. The Orange option has the potential to impact ten local roads in Section 1. These are highlighted in Figure 6.12 and proposed treatment to each road is described in Table 6.10.

Figure 6.12: Local roads affected by Section 1 of the Orange option

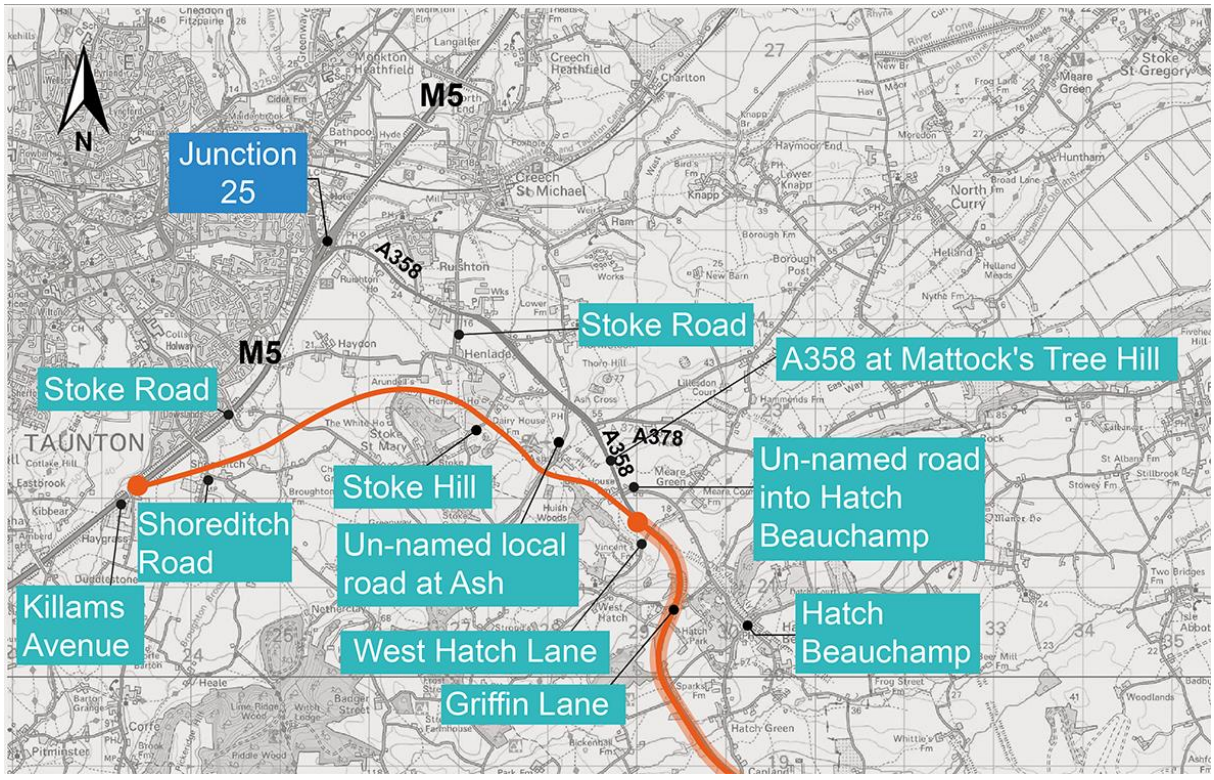

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Table 6.10: Treatment to local roads in Section 1 of the Orange option

Local Road name	Description	Proposed Treatment
Killams Avenue	Local road crossing the M5 carriageway immediately to the south of Junction A.	This road would be reconstructed on a new overbridge, making way for Junction F. It would not be connected to Junction F.

Local Road name	Description	Proposed Treatment
Shoreditch Road	B3170 running south from Taunton, across the M5 motorway and through the Blackdown Hills to meet the A303 near its junction with the A30.	This road would be kept open by providing a new bridge crossing the proposed dual carriageway. There would be no connection with the proposed dual carriageway.
Stoke Road	Local road between Lower Henlade and the suburbs of Taunton.	This road would be kept open by providing a new bridge crossing the proposed dual carriageway. There would be no connection with the proposed dual carriageway.
Stoke Road	Local road between Lower Henlade and Stoke St Mary.	This road would be kept open by providing a new bridge crossing the proposed dual carriageway. There would be no connection with the proposed dual carriageway.
Stoke Hill	Local road between Lower Henlade and Slough Green and Thurlbear.	This road would be kept open by providing a new bridge crossing the proposed dual carriageway. There would be no connection with the proposed dual carriageway.
Un-named local road at Ash	Local road between the A358 at Ash Cross and Slough Green / Thurlbear.	This road would be kept open by providing a new bridge crossing of the proposed dual carriageway. There would be no connection with the proposed dual carriageway.
A358 at Mattock's Tree Hill	Existing A358 which provides access to Henlade, the A378 and Hatch Beauchamp.	This road would be connected to Junction E.
Un-named road into Hatch Beauchamp	Local road with a junction to the existing A358 which provides access into Hatch Beauchamp.	This road would be connected to Junction E.
West Hatch Lane	Local road between the A358 and West Hatch.	This road would be connected to Junction E.
Griffin Lane	Local road passing underneath the existing A358, providing connection between West Hatch and Hatch Beauchamp.	This road would be kept open.

Section 2

6.4.11. Section 2 of the Orange option is identical to the Pink and Blue options. As such the treatment of local roads in this section are described in section 6.5.9.

Existing NMU facilities

6.4.12. Existing NMU routes that are likely to be affected by the Orange option in Section 1 are shown in Figure 6.13 and the details are summarised in Table 6.11.

Figure 6.13: Orange option Section 1 existing rights of way

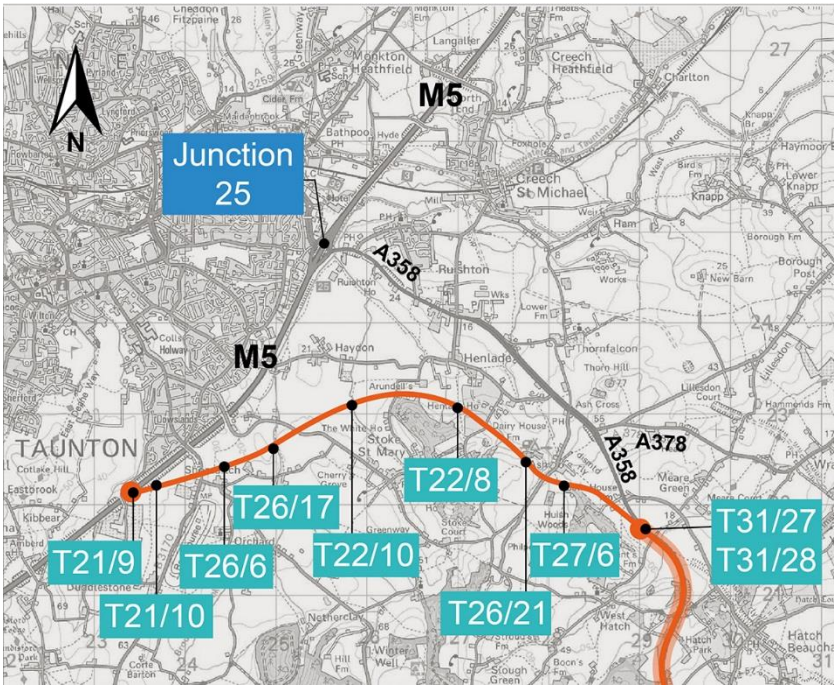

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Table 6.11: Section 1 Orange option - Existing Public Rights of Way

Footpath Ref	Description
T21/9	A footpath running parallel to M5 on the western side linking two roads on the housing estate.
T21/10	A historical footpath which would have provided a link from the Dowslands suburb of Taunton to various villages south of the M5. It is understood that this footpath was stopped up where it crosses the M5 and is not likely to be well used as there is no way of crossing the M5 on foot at this location.
T26/6	A footpath linking Shoreditch Road to Stoke Road to the south of the M5. This path continues to provide a link between the hamlets of Shoreditch and Haydon.
T26/17	A footpath linking Broughton Lane to Stoke Road which runs adjacent to Broughton Brook.
T22/10	A north-south footpath linking Haydon and Stoke St Mary.
T22/8	A footpath linking Lower Henlade to Stoke Hill.
T26/21	A footpath through Stoke Hill Farm to Ashe Farm.
T27/6	A footpath linking Ashe Farm to West Hatch.
T31/27 and T31/28	Two north-south footpaths linking Bath House Farm and surrounding properties along West Hatch Lane.

6.4.13. Recommendations by user groups and local council rights of way officers have been used to develop the NMU provision. These have been considered along with an NMU audit and NMU surveys undertaken as part of the development of the Scheme.

6.4.14. The majority of footpaths or bridleways severed will be diverted across the nearest available road bridge. It is proposed to close a small number of rights of way where alternative routes offer similar connections.

6.4.15. The alignment of the Orange option follows the same path as the Blue option but continues further south along the M5 linking in to the M5 with a fully grade separated junction. There are no dedicated NMU bridges for the offline section of this option with diversion across the proposed dual carriageway being provided at the locations described in Table 6.12.

Table 6.12: Proposed treatment to Public Rights of Way for Orange option

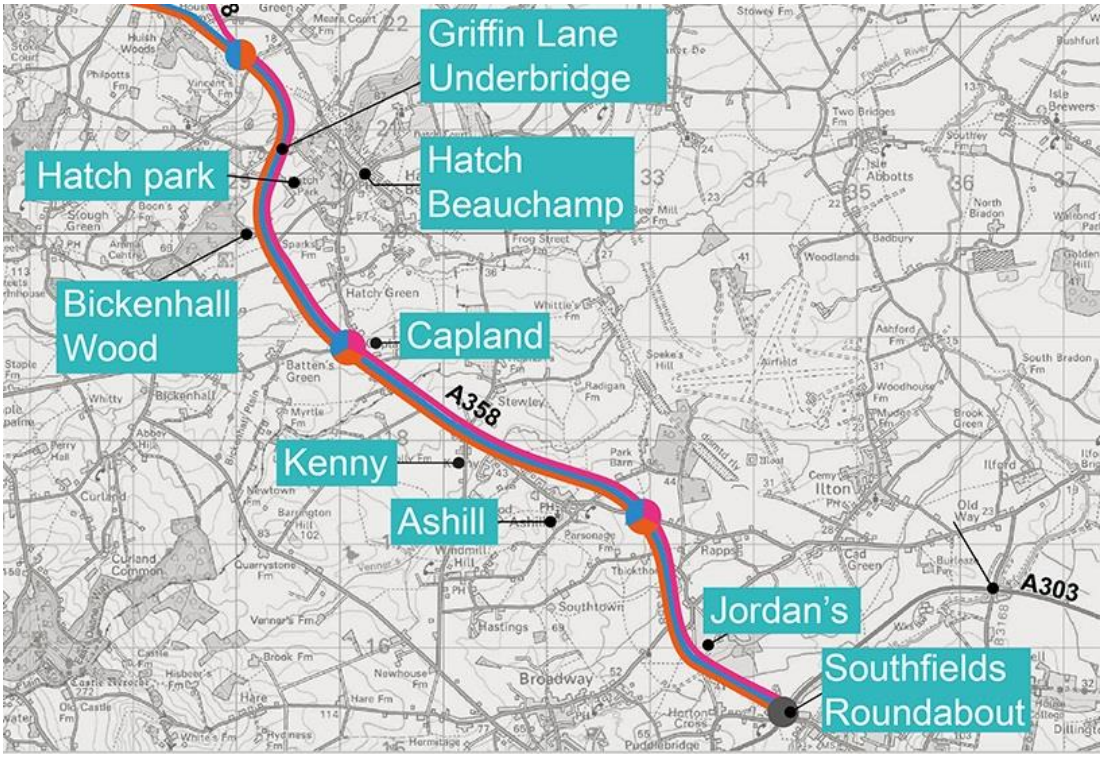
Footpath Ref	Proposed treatment
T21/10	To be closed.
T26/6	To be diverted via proposed Shoreditch Road Overbridge.
T26/17	To be diverted via proposed Stoke Road Overbridge.
T22/10	To be diverted via proposed Stoke Road Overbridge.
T22/8	To be diverted via proposed Stoke Hill Overbridge.
T26/21	To be diverted via Ashe Farm Underbridge.
T27/6	To be diverted via Ashe Farm Underbridge.
T31/27 and T31/28	To be diverted via Huish Woods Underpass.

6.5. Section 2

Alignment of Section 2 (all options)

6.5.1. Section 2 is the same for all of the proposed options and is illustrated in Figure 6.14.

Figure 6.14: Section 2



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6.5.2. The vertical profile of Section 2 would generally follow the profile of the existing carriageway which is either at ground level or just above ground level, in order to be above local watercourse flooding levels. Some excavation, particularly to the east of Ashill, may be necessary.

6.5.3. From the western end of Section 2, the proposed dual carriageway would initially follow the alignment of the existing A358 Hatch Beauchamp Bypass using asymmetrical widening until reaching Capland. The side to which the new lanes would be constructed through this section would be dependent upon an assessment of the potential impacts on adjacent land plots, particularly at Hatch Park and Bickenhall Wood.

6.5.4. The online widening needs to ensure that a safe alignment is adopted in line with design standards and with impacts on properties and environmentally sensitive areas, such as Ancient Woodland, kept to a

minimum. As explained in 6.1.8, widening to the east of the existing alignment is proposed to avoid the Ancient Woodland. This aspect will be refined in later stages of the design.

6.5.5. Between Capland and Kenny the proposed dual carriageway would be entirely offline to the north-east of the existing road. This would enable the existing road to be retained as a local route between Ashill and Hatch Beauchamp and provide access to existing properties along the route.

6.5.6. From Kenny, the line of the existing road would be followed with a dual carriageway being created through asymmetrical widening around the Ashill Bypass through to Southfields Roundabout. The side to which the new carriageway would be constructed through this section is dependent upon an assessment of the potential impacts on adjacent land plots. This is of particular note to the north of Ashill and at Jordan's crossroads, (between Southfields and Ashill).

6.5.7. At the eastern limits of the Scheme, the proposed dual carriageway would connect to the existing Southfields Roundabout. It is likely that the roundabout carriageway and most of the entry arms would need to be widened to provide sufficient capacity. The A358 southbound entry would be widened from single carriageway to dual carriageway standard. It is also anticipated that the A303 eastbound exit would need to be widened.

Junctions along Section 2 (all options)

6.5.8. There would be three junctions along Section 2 to facilitate movement between the proposed dual carriageway and the adjacent road network. These are at Hatch Beauchamp, Junction G (Ashill) and Junction H (Southfields Roundabout). These are highlighted in Figure 6.15 and described in Table 6.13.

Figure 6.15: Junctions in Section 2 (all options)

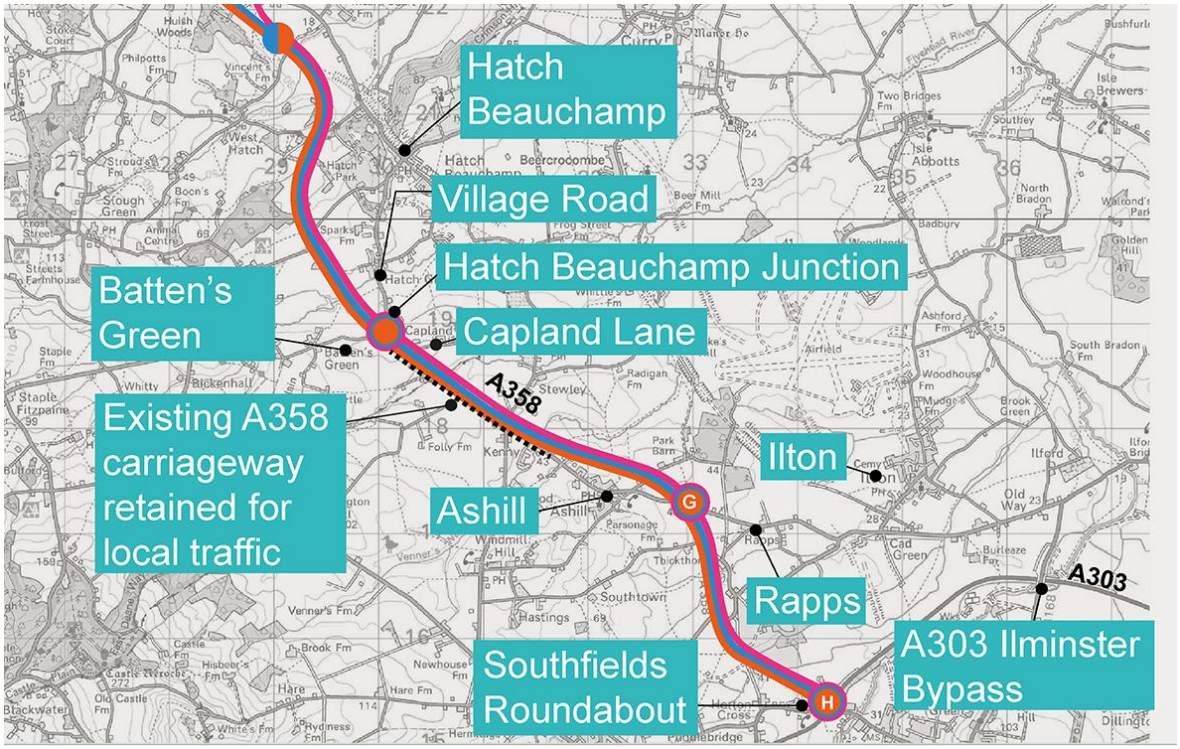

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Table 6.13: Junctions in Section 2 (all options)

Junction Name	Description
Hatch Beauchamp	A limited movements grade separated junction between the proposed dual carriageway and the local road network has been considered as a part of the assessment presented within this report. This junction was not presented at the non-statutory consultation events; however, was considered following feedback from the various stakeholders and to provide communities to the south and west of Hatch Beauchamp access to the A358, improve connectivity on the local road network and to reduce the flow of traffic through Hatch Beauchamp. This junction, if introduced, would comprise a merging slip road from the local road network to the eastbound carriageway of the proposed dual carriageway, and a diverging slip road from the westbound carriageway of the proposed dual carriageway to the local road network. These slip roads would enable connection between the proposed dual carriageway and: • Village Road, to and from Hatch Beauchamp • Capland Lane (via a new link between Village Road and Capland Lane) • An un-named local road leading south to Batten's Green • A retained section of A358 carriageway which would run alongside the proposed dual carriageway southwards to Ashill

Junction Name	Description
Junction G (Ashill)	An all-movements grade separated junction between the proposed dual carriageway and the local road network. This junction would comprise merging and diverging slip roads to and from both carriageways of the proposed dual carriageway. These slip roads would enable connection between the proposed road and: • The existing un-named local road into Ashill • The local road known as Rapps, which leads to Ilton
Junction H (Southfields Roundabout)	The existing Southfields Roundabout between the A358 and A303. The existing roundabout would be retained. The A358 arm would be widened from single to dual carriageway. The circulatory carriageway would be widened to accommodate additional traffic and road markings would be upgraded to assist circulating traffic with lane discipline. A number of the other entry arms would be widened in order to provide sufficient capacity. The A303 eastbound exit (Ilminster Bypass) would also be widened in order to provide sufficient capacity.

Treatment of local roads along Section 2 (all options)

6.5.9. Section 2 has the potential to impact 16 local roads. These are highlighted in Figure 6.16. Proposed treatment to each road is described in Table 6.14.

Figure 6.16: Local roads affected by Section 2 (all options)

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Table 6.14: Treatment to local roads in Section 2

Local Road name	Description	Proposed Treatment
Bickenhall Lane	Local road which leads to Hatch Beauchamp from a junction on the existing A358.	The assessed design considers this road to be permanently closed. There would be no connection to the proposed dual carriageway. Traffic may reroute through Bickenhall to join the A358 at a possible Hatch Beauchamp Junction. Following the responses received during the public consultation, diversion routes will be assessed for agricultural vehicle suitability in PCF Stage 3.
Bickenhall Lane	Local road which leads to Bickenhall from a junction on the existing A358.	The assessed design considers this road to be permanently closed. There would be no connection to the proposed dual carriageway. Traffic would reroute through Hatch Beauchamp village to join the A358 elsewhere. Following the responses received during the public consultation, diversion routes will be assessed for agricultural vehicle suitability in PCF Stage 3.
Village Road	Local road which leads to Hatch Beauchamp from a junction on the existing A358.	The existing junction with the A358 would be permanently closed, although a limited movements connection to the A358 may be provided via a possible Hatch Beauchamp Junction.
Un-named road between the A358 and Batten's Green	Local road which leads to Batten's Green from a junction on the existing A358.	The existing junction with the A358 would be permanently closed, although a limited movements connection to the A358 may be provided via a possible Hatch Beauchamp Junction.
Capland Lane	Local road which leads to the east from a junction on the existing A358.	The existing junction with the A358 would be permanently closed. Capland Lane would be connected to Village Road via a new local link road.
Folly Drove	Local road which leads to the west from a junction on the existing A358.	The existing junction is located along the section of A358 carriageway that will be retained as a parallel local road. This junction will therefore be retained, although there would no longer be a direct connection to the proposed A358 dual carriageway.
Stock's Lane / Radigan Lane	Local road which leads to the north from a junction on the existing A358.	The existing junction with the A358 would be permanently closed. However, a new link would connect this road to the 'Ashill Straight' via a new overbridge.
Wood Road	Local road which leads to the south from a junction on the existing A358.	The junction with the A358 would be permanently closed.

Local Road name	Description	Proposed Treatment
'Ashill Straight'	Local road which leads into Ashill from a junction on the existing A358 at Wood Road.	The junction with the A358 would be permanently closed.
Park Barn Lane	Local road with a junction on the existing A358. This provides access to a small number of properties and serves as an emergency access to the Merryfield Airfield.	The junction with the A358 will be permanently closed. Access to Park Barn Lane would be provided by upgrading a nearby track (Copse Lane).
Park Barn Lane	Local road with a junction on the existing A358.	The junction with the A358 would be permanently closed.
Rapps	Local road with a junction on the existing A358. This provides access to the settlements of Rapps and Ilton.	This road would be connected to Junction G.
Un-named local road to east Ashill from the A358	Local road with a junction on the existing A358. This provides access to Ashill.	This road would be connected to Junction G.
Un-named local road at Thickthorn Cross	Local road which runs parallel to the A358 and provides access to properties to south of Ashill.	This road would be closed permanently to make way for Junction G.
Cad Road	Local road with a junction on the existing A358. This provides access to Ilton.	The junction with the A358 would be permanently closed.
Un-named local road to Broadway	Local road with a junction on the existing A358. This provides access to Horton and Broadway.	The junction with the A358 would be permanently closed.

6.5.10. Fields are accessed directly via the A358, and a number of farms have footprints on both sides of the A358. Direct access to fields will be sealed off and alternative accommodation accesses established in PCF Stage 3.

Treatment of non-motorised user facilities along Section 2

6.5.11. Existing NMU routes that are likely to be affected by Section 2 are shown in Figure 6.17 and the details are summarised in Table 6.15. In addition, direct access to private properties will be closed and alternative accommodation accesses will be established during PCF Stage 3.

Figure 6.17: Section 2 - Existing rights of way (all options)

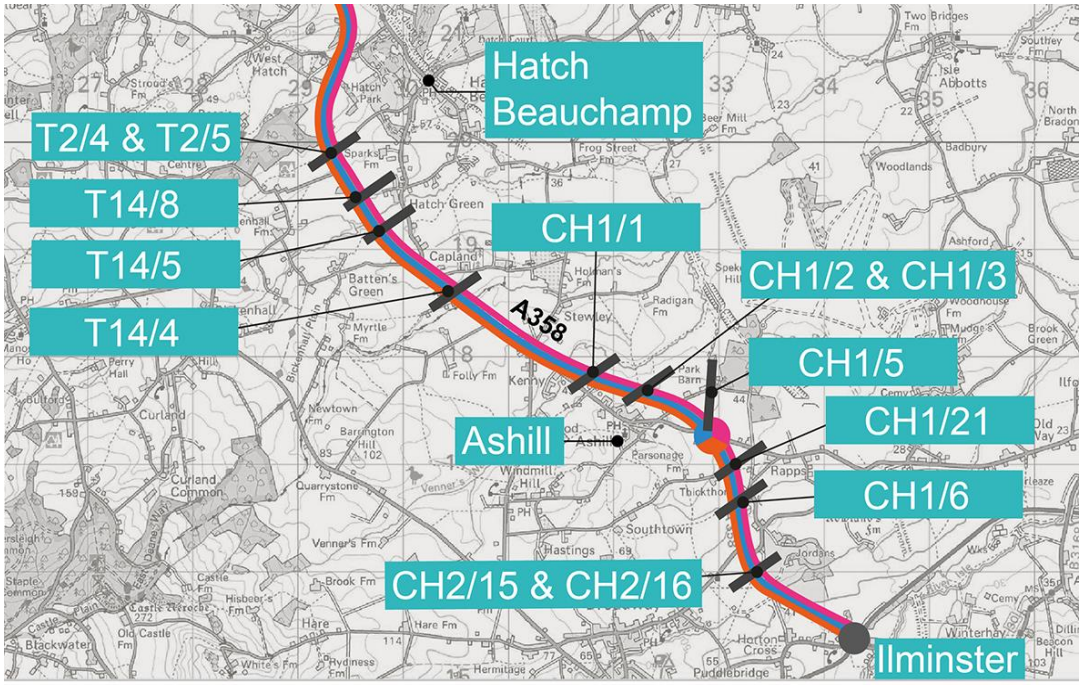

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Table 6.15: Section 2 existing public rights of way (all options)

Footpath Ref	Description
T2/4 and T2/5	Two footpaths to the east of the existing A358 Hatch Beauchamp Bypass which appear to have been severed from land to the east of the A358 because of the original construction of the road in the 1980s.
T14/8	A bridleway which is likely to have provided a connection between Hatch Green and Bickenhall Lane before it was severed during construction of the Hatch Beauchamp Bypass.
T14/5	A footpath which connects Hatch Green to the west of the A358 via an underpass (anecdotally this crossing may be a result of a permissive right of way).
T14/4	A footpath heading south through Windsor Farm from the side of the existing A358
CH1/1	A historical footpath which runs north from Kenny (near Ashill). Whilst this appears to be continuous on the mapping, it is likely to have been severed by the construction of the Ashill Bypass in the 1990s.
CH1/2 and CH1/3	Historical footpaths running north from Ashill Farm which are also likely to have been severed by the Ashill Bypass.
CH1/5	A footpath which runs northwards from the 'Three Oaks Cross' junction towards Beercrocombe.
CH1/21	A footpath which would have crossed the original A358 carriageway at Thickthorn Cross but has been severed by the construction of the Ashill Bypass.
CH1/6	A footpath which would have crossed the original A358 carriageway providing a connection between Southdown and Rapps but has been severed by the construction of the Ashill Bypass.
CH2/15 and CH2/16	Two footpaths which would have crossed the original A358 carriageway providing a connection between Broadway and Jordan's estate but have been severed by the construction of the Ashill Bypass.

Section 2 (all options) NMU Strategy

6.5.12. Where the proposed road severs a right of way, the majority of these will be retained by diverting across the nearest available road bridge. It is proposed to close a small number of rights of way that would appear to provide no obvious through route as described in Table 6.16.

6.5.13. Two locations have been identified where dedicated NMU crossings could be installed. These are as follows:

- Bickenhall Lane
- Jordan's. This crossing would reconnect the original A358 carriageway either side of the online section, enabling the establishment of a continuous cycle route from Ilminster to Taunton away from the trunk road

6.5.14. It is proposed that offline NMU facilities will be designed in the next stage of the Scheme development, along with finalising NMU crossing locations.

6.5.15. It is proposed to retain Griffin Lane as this is one of the few locations along the existing A358 where NMUs and local traffic can cross without interacting with the A358 traffic. Griffin Lane is also known to be a local cycle route.

6.5.16. The concept of a continuous cycle route is proposed between Ilminster and Taunton. This makes use of a significant amount of the existing and proposed local road network. The cycle route requires further development in the next stage, but it is envisaged to be an on-road route, with cycle signage and possible integration into the National Cycle Network.

Table 6.16: Proposed treatment to Public Rights of Way for Section 2 (all options)

Footpath Ref	Proposed treatment
T 21/10	To be closed.
T26/6	To be diverted via proposed Shoreditch Road Overbridge.
T26/17	To be diverted via proposed Stoke Road Overbridge.
T22/10	To be diverted via proposed Stoke Road Overbridge.
T22/8	To be diverted via proposed Stoke Hill Overbridge.
T26/21	To be diverted via Ashe Farm Underbridge.
T27/6	To be diverted via Ashe Farm Underbridge.
T31/27 and T31/28	To be diverted via Huish Woods Underpass.
T2/4 and T2/5	To be connected to Bickenhall Lane (north) via proposed Bickenhall Lane NMU Bridge.
T14/8	To be connected to Bickenhall Lane along northern edge of proposed dual carriageway.
T14/5	To be diverted via Fivehead River Underbridge.

Footpath Ref	Proposed treatment
T14/4	No change. Existing A358 carriageway to be retained as local access road at this location.
CH1/1	Diverted across Kenny Overbridge.
CH1/2 and CH1/3	To be closed.
CH1/5	To be diverted across Ashill Junction Overbridge.
CH1/21	To be closed.
CH1/6	To be closed.
CH2/15 and CH2/16	To be diverted through proposed Jordan's NMU Underpass.

7. Design considerations

7.1. Highway alignment and compliance with standards

Standards used

7.1.1. The geometric design of the proposed A358 main carriageway and associated junction connector roads was developed in accordance with the Design Manual for Roads and Bridges (DMRB) Volume 6. The following design standards have been used:

- TD9/93 *Highway Link Design* (DMRB 6.1.1)
- TD27/05 *Cross Sections and Headroom* (DMRB 6.1.2)
- TD22/06 *Layout of Grade Separated Junctions* (DMRB 6.2.1)
- TD16/07 *Geometric design of Roundabouts* (DMRB 6.2.3)

7.1.2. Principles of DMRB Volume 6 would also be applied to the design of local roads. However, this approach is subject to agreement with the local highway authority, Somerset County Council. Relaxations from requirements of the DMRB may be necessary along local roads to ensure works are appropriate to the standard and character of adjacent existing roads.

Design speed

7.1.3. The mainline A358 is proposed to be a dual carriageway. It will be subject to the national speed limit, with a design speed of 120kph in accordance with Figure 1 of TD 9/93. It is proposed that slip roads have a design speed of 70 kph as per Table 4/1 of TD22/06. The link roads at Blackbrook Junction will have an 85 kph design speed (Pink and Blue options).

7.1.4. Design speeds for local roads would be subject to agreement with the local highway authority.

Cross sections

7.1.5. Dual carriageway sections have been designed as dual 2-lane all-purpose (D2AP) carriageways as detailed in Figure 4-3a in TD27/05. A road restraint system with H1 containment level is proposed in the central reserve with sufficient space in the central reserve to accommodate a rigid concrete barrier at a later date, if required.

7.1.6. Local roads sections will generally be single carriageway (S2) standard as detailed in Figure 4-3a in TD27/05. However, in many cases these cross-sectional standards may be relaxed by agreement with Somerset County Council. This will ensure works to local roads are appropriate to the standard and character of adjacent existing roads.

Junction design

7.1.7. It is currently proposed that all junctions would be designed as fully grade separated junctions in accordance with TD22/06. However, these types of junctions generally occupy a large area and are sometimes inappropriate for lightly trafficked rural junctions. The approach would therefore be reviewed during Stage 3 (design development) to determine if design optimisations are possible. For PCF stage 2, all options presented at the 2018 consultation have assumed the same junction provision and have been assessed on an equal proportional basis.

7.1.8. The junction design may be further refined based on the traffic forecasts for the design year (2038). The traffic modelling shows that the merging and diverging traffic, at several junctions on the Scheme, would be sufficiently low to justify applying TD40/94 to reduce the footprint of each junction. However, in line with the RIS, once an Expressway standard is applied, the compact grade separated junction would not be permissible for a high quality dual carriageway environment. As such, compact grade separated junctions have not been used for any junction designs to date.

Departures from standard

7.1.9. A single alignment departure from standard has been identified following the initial development of the proposed route options. This departure is common to the Pink, Blue and Orange options. This alignment departure is a combination of relaxations (relating to sight distances, and horizontal and vertical geometry) around the Hatch Beauchamp Bypass between ch.6+140 and 6+360. This departure would be required to maintain the existing carriageway alignment as part of the proposed Scheme. Alignment would be investigated further during the preliminary design phase to determine if the departure can be removed. If not, approval for the departure would be sought.

7.1.10. A summary of the proposed relaxations and departures is included within Table 7.1, Table 7.2 and Table 7.3.

Table 7.1: Proposed relaxations and departures for the Pink option

Pink option - Horizontal Relaxations and Departures					
Location	Design Speed (kph)	Ch. From (m)	Ch. To (m)	Achieved Radius (m)	No. Steps / Departure
Mainline	85	320	720	360	1 Step
Mainline	120	1200	1520	720	1 Step
Mainline	120	5740	6500	647	2 Steps - Departure when combined with vertical crest
Mainline	120	6900	7500	730	1 Step

Mainline	120	8420	8600	900	1 Step
Mainline	120	8600	8740	900	1 Step
Mainline	120	11590	11900	760	1 Step
Mainline	120	12120	12300	720	1 Step
Mainline	120	12300	12500	720	1 Step
Mainline	120	13300	13680	510	2 Step
Mainline	120	14380	14520	510	2 Step
J25 Link	70	430	580	255	1 Step
J25 Link	70	740	1120	255	1 Step

Pink option Vertical Relaxations and Departures					
	Design Speed (kph)	Ch. From (m)	Ch. To (m)	Achieved K Value (m)	No. Steps / Departure
Mainline	120	6140	6360	58	Departure
Mainline	120	7300	7720	100	1 Step

Table 7.2: Proposed relaxations and departures for the Blue option

Blue option Horizontal Relaxations and Departures					
Location	Design Speed (kph)	Ch. From (m)	Ch. To (m)	Achieved Radius (m)	No. Steps / Departure
Mainline	85	320	720	360	1 Step
Mainline	120	3920	4280	720	1 Step
Mainline	120	4540	4740	720	1 Step
Mainline	120	5550	6500	647	2 Steps - Departure when combined with vertical crest
Mainline	120	6900	7500	730	1 Step
Mainline	120	8420	8600	900	1 Step
Mainline	120	8600	8740	900	1 Step
Mainline	120	11590	11900	760	1 Step
Mainline	120	12120	12300	720	1 Step
Mainline	120	12300	12500	720	1 Step
Mainline	120	13300	13680	510	2 Step
Mainline	120	14380	14520	510	2 Step
J25 Link	70	430	530	255	1 Step

Blue option Vertical Relaxations and Departures					
Location	Design Speed (kph)	Ch. From (m)	Ch. To (m)	Achieved K Value (m)	No. Steps / Departure
Mainline	120	6150	6360	58	Departure
Mainline	120	7300	7720	100	1 Step

Table 7.3: Proposed relaxations and departures for the Orange option

Orange option Horizontal Relaxations and Departures					
Location	Design Speed (kph)	Ch. From (m)	Ch. To (m)	Achieved Radius (m)	No. Steps / Departure
Mainline	120	-846	-580	360	1 Step
Mainline	120	-360	-150	720	1 Step
Mainline	120	3920	4280	720	1 Step
Mainline	120	4560	4740	720	1 Step

Mainline	120	5550	6500	647	2 Steps - Departure when combined with vertical crest
Mainline	120	6900	7500	730	1 Step
Mainline	120	8420	8600	900	1 Step
Mainline	120	8600	8740	900	1 Step
Mainline	120	11590	11900	760	1 Step
Mainline	120	12120	12300	720	1 Step
Mainline	120	12300	12500	720	1 Step
Mainline	120	13300	13680	510	2 Step
Mainline	120	14380	14520	510	2 Step
Orange option Vertical Relaxations and Departures					
Location	Design Speed (kph)	Ch. From (m)	Ch. To (m)	Achieved K Value (m)	No. Steps / Departure
Mainline	120	6140	6360	58	Departure

7.2. Structures

Existing structures

7.2.1. There are 14 existing structures within the limits of the three route options proposed for the alignment of the A358. They range between small piped culverts to multi-span reinforced concrete bridges. All these structures are owned and maintained by the Somerset County Council. An inspection of all structures has been undertaken and all have been found to be in generally good condition with no significant defects. The existing structures were assessed during earlier design input to the Scheme or as part of the on-going bridge management regime. The assessments will be validated against current design standard and bridge condition during PCF Stage 3.

7.2.2. A list of the structures affected by the Scheme which are common to all route options can be found in Table 7.4. The most significant structure is Griffin Lane Underbridge, a five-span reinforced concrete slab structure spanning a minor local road and a small stream. The structure has been subject to strengthening following an earlier assessment. Two sets of piers have been added to reduce the imposed shear forces on the central span (reinforced concrete voided slab). It is proposed for the existing structure to be retained in its current arrangement and a new underbridge to be built by its side.

Table 7.4: Existing structures common to all options

Name	Structural form	Assessment	Main span & overall length	Overall bridge width	Proposed works
Culvert 1611 (Existing structure ref 2280301)	Masonry arch	Not assessed - less than 1.8m	∅0.9m - 12m long	12.0m	No works anticipated to existing structure. Extension with RC pipe.

Name	Structural form	Assessment	Main span & overall length	Overall bridge width	Proposed works
Culvert 1783 (Existing structure ref 2290601)	Masonry arch	Not assessed - less than 1.8m	∅0.9m - 25m long	25.0m	No works anticipated to existing structure. Extension with concrete pipe.
Meare Stream culvert Culvert 1928 (Existing structure ref 2290501)	Masonry arch	Not assessed - less than 1.8m	1m - 25m long	25.0m	No works anticipated to existing structure. Extension with concrete pipe.
Griffin Lane Underbridge (Existing structure ref 2290201)	Five span in-situ reinforced slab	Strengthened 2007 - design load Full HA + 45HB	19.6m, overall length 65.7m (45° skew)	13.0m	No works to existing structure. New independent structure alongside existing.
Hatch Park Cattle Creep (Existing structure ref 2290101)	Reinforced concrete box underpass	Assessed capacity Full HA + 45HB	3.3m	25.0m	Demolish or backfill.
Fivehead River Underbridge (Existing structure ref 2190301)	Precast concrete beam and slab	Assessed capacity Full HA + 42HB	12.0m	13.5m	No works anticipated to existing structure. New structure adjacent.
High Bridge Underbridge (Existing structure ref 310091)	Twin RC box	Assessed Capacity Full HA + 45HB	2.9m (8° skew)	27.2m	No works anticipated to existing culvert. Extend with precast box culvert.
Folly Main Culvert (Existing structure ref 3100801)	Single span brick arch strengthened with GRP pipe	Not assessed - less than 1.8m	0.8m	12.0m	No works anticipated to existing structure. Extend with concrete pipe.
Venner's Bridge (Existing structure ref 3111301)	RC box	Assessed Capacity Full HA + 45HB	8.2m	13.0m	No works anticipated to existing structure. Extend with precast portal culvert.
Sunnyside Underpass (Existing structure ref 3111401)	RC box	Assessed Capacity Full HA + 45HB	3.4m	13.0m	No works anticipated to existing structure. Extend with precast box culvert.
Cad Brook Bridge (Existing structure ref 3131401)	RC box	Assessed Capacity Full HA + 45HB	6.5m	13.0m	No works anticipated to existing structure. Extend with precast box culvert.
Jordan's Pipe Culvert (Existing structure ref 3122101)	Precast concrete pipe	Not assessed - less than 1.8m	∅0.9m	26.0m	No works anticipated to existing structure. Extend with concrete pipe.
Ding Mill Culvert (Existing structure ref 3131501)	In-situ RC box	Assessed Capacity Full HA + 45HB	1.8m	22.0m	No works anticipated to existing structure. Extend with precast box culvert.
Ding Bridge (Existing structure ref 3131601)	In-situ RC box	Assessed Capacity Full HA + 45HB	8.2m	13.0m	No works anticipated to existing structure. New structure adjacent.

Existing structures common to Pink and Blue options

7.2.3. In the case of the Pink and Blue options, the new offline section of the A358 will be connected to the M5 motorway via a new junction and a spur to the existing junction 25. The new junction will serve the A358 westbound traffic heading south on the M5 and northbound traffic on the M5 heading east on the A358. The southbound traffic on the M5 heading east on the A358 and westbound traffic on the A358 heading north on the M5 will use the new spur to junction 25.

7.2.4. The construction of the new Blackbrook Junction would require the widening of the M5 carriageway south of its location to cater for slip roads. The highway alignment design would be developed so that the existing Stoke Road Overbridge can be retained. The existing structure is owned and maintained by Highways England.

7.2.5. The existing structure that is common to the Pink and Blue options is listed in Table 7.5. No works are anticipated to this structure.

Table 7.5: Existing structures specific to Pink and Blue options

Name	Structural form	Assessment	Main span & overall length	Overall bridge width	Proposed works
Stoke Road Overbridge (Existing structure ref 1860)	Four span in-situ RC slab	40t HA, 45 units HB, 34 units HB + HA All	19.9m, overall length 64.5m	10.6m	No works anticipated to existing structure.

Existing structures specific to the Orange option

7.2.6. The existing structures that are specific to the Orange option are listed in Table 7.6. The connection between the new section of the A358 and the M5 motorway in the Orange option will be provided by a new junction near Killams Lane. The existing Killams Lane Overbridge will need to be demolished and replaced by a new structure. This would enable the construction of the slip roads for the new motorway junction. To allow for the construction of the junction slip roads, the existing Box Culvert No.10 will need to be extended. The existing structures are owned and maintained by Highways England.

Table 7.6: Existing structures specific to the Orange option

Name	Structural form	Assessment	Main span & overall length	Overall bridge width	Proposed works
Box Culvert No. 10 (Existing structure ref 1863)	RC box	TBC	5.0m	40.0m	No works anticipated to existing structure. Extend with precast portal culvert.
Killams Lane Overbridge (Existing structure ref 1862)	Four span in-situ RC slab	38 Tonnes	19.4m, overall length 60.8m	9.9m	Demolish and replace in box for Killams Lane.

New structures

New structures common to all options

7.2.7. There are 18 new structures or significant modifications to existing structures that are proposed which are common to all three options. These are listed in Table 7.7 below. Option specific structures to Pink, Blue and Orange options are listed in Table 7.8, Table 7.9 and Table 7.10 respectively.

Table 7.7: Proposed new structures common to all options

Name	Deck cross-section
New Griffin Lane Underbridge	Single 2-lane all-purpose carriageway
New Hatch Park Cattle Creep	Dual 2-lane all-purpose carriageway
Bickenhall NMU Bridge	Bridleway
New Fivehead River Underbridge	Dual 2-lane all-purpose carriageway
Hatch Beauchamp Junction Overbridge	Local road standard single 2-lane carriageway
Capland Retaining Wall	-
New High Bridge Underbridge	Dual 2-lane all-purpose carriageway
New Folly Main Culvert	Dual 2-lane all-purpose carriageway
New Venner's Bridge (A)	Dual 2-lane all-purpose carriageway
New Venner's Bridge (B)	Local road standard single 2-lane carriageway
Kenny Overbridge	Local road standard single 2-lane carriageway
New Sunnyside Underpass	Dual 2-lane all-purpose carriageway
Ashill Junction Overbridge	Local road standard single 2-lane carriageway
New Cad Brook Bridge	Dual 2-lane all-purpose carriageway
New Jordan's Pipe Culvert	Dual 2-lane all-purpose carriageway
Jordan's NMU Bridge	Bridleway
New Ding Mill Culvert	Dual 2-lane all-purpose carriageway
New Ding Bridge	Single 2-lane all-purpose carriageway

New structures specific to the Pink option

7.2.8. A total of 19 new constructions or extensions to existing structures are specific to the Pink option. These structures are listed in Table 7.8.

Table 7.8: Proposed structures specific to the Pink option

Name	Deck cross-section
Blackbrook Retaining Walls	-
Blackbrook Junction	Single 2-lane all-purpose carriageway
Broughton Brook Bridge (A)	Single 2-lane all-purpose carriageway
Broughton Brook Bridge (B)	Single 2-lane all-purpose carriageway
Broughton Brook Culvert (A)	Dual 2-lane all-purpose carriageway
Haydon Lane Overbridge	Local road standard single 2-lane carriageway
Henlade Junction Overbridge	Single 2-lane all-purpose carriageway
Broughton Brook Culvert (B)	Dual 2-lane all-purpose carriageway
Broughton Brook Culvert (C)	Dual 2-lane all-purpose carriageway
Broughton Brook Culvert (D)	Local road standard single 2-lane carriageway
Stoke Road (Henlade) Retaining Walls	-
Stoke Road (Henlade) Overbridge	Local road standard single 2-lane carriageway
River Tone NMU Bridge	Bridleway
River Tone Culvert	Dual 2-lane all-purpose carriageway
Mattock's Tree Green Junction Overbridge	Single 2-lane all-purpose carriageway
New Culvert 1611	Dual 2-lane all-purpose carriageway
New Culvert 1783	Dual 2-lane all-purpose carriageway
West Hatch Lane Junction Overbridge	Local road standard single 2-lane carriageway
New Culvert 1928	Dual 2-lane all-purpose carriageway

New structures specific to the Blue option

7.2.9. A total of 23 new constructions or extensions to existing structures are specific to the Blue option. These structures are listed in Table 7.9.

Table 7.9: Proposed structures specific to the Blue option

Name	Deck cross-section
Blackbrook Retaining Walls	-
Blackbrook Junction	Single 2-lane all-purpose carriageway
Broughton Brook Bridge (A)	Single 2-lane all-purpose carriageway
Broughton Brook Bridge (B)	Single 2-lane all-purpose carriageway
Broughton Brook Culvert (A)	Dual 2-lane all-purpose carriageway
Henlade Junction Overbridge	Single 2-lane all-purpose carriageway
Haydon Lane Overbridge	Local road standard single 2-lane carriageway

Name	Deck cross-section
Haydon Retaining Walls	-
Broughton Brook Culvert (B)	Dual 2-lane all-purpose carriageway
Broughton Brook Culvert (C)	Local road standard single 2-lane carriageway
Stoke Road (Henlade) Overbridge	Local road standard single 2-lane carriageway
Stoke Hill Overbridge	Local road standard single 2-lane carriageway
Dairy House Farm Culvert	Dual 2-lane all-purpose carriageway
Ashe Farm Culvert	Dual 2-lane all-purpose carriageway
Ashe Farm Underbridge	Dual 2-lane all-purpose carriageway
Ashe Farm Retaining Wall	-
Huish Woods Underpass	Dual 2-lane all-purpose carriageway
West Hatch Retaining Wall	-
Bath House Retaining Wall	-
West Hatch Lane Junction Underbridge	Dual 2-lane all-purpose carriageway
New Culvert 1611	Dual 2-lane all-purpose carriageway
New Culvert 1783	Dual 2-lane all-purpose carriageway and off-slip
New Culvert 1928	Dual 2-lane all-purpose carriageway

New structures specific to the Orange option

7.2.10. A total of 25 new constructions or extensions to existing structures are specific to the Orange option. These structures are listed in Table 7.10.

Table 7.10: Proposed structures specific to the Orange option

Name	Deck Cross section
New Box Culvert No. 10	Dual 3-lane all-purpose carriageway
New Killams Lane Overbridge	Local road standard single 2-lane carriageway
Killams Avenue Junction Overbridge (A)	Single 2-lane all-purpose carriageway
Killams Avenue Junction Overbridge (B)	Single 2-lane all-purpose carriageway
Killams Avenue Junction Culvert	Dual 2-lane all-purpose carriageway
Killams Avenue Retaining Wall (A)	-
Killams Avenue Retaining Wall (A)	-
Killams Green Retaining Wall	-
Shoreditch Road Overbridge	Local road standard single 2-lane carriageway
Broughton Brook Culvert (A)	Dual 2-lane all-purpose carriageway
Stoke Road (Haydon) Overbridge	Local road standard single 2-lane carriageway
Broughton Brook Culvert (B)	Dual 2-lane all-purpose carriageway
Stoke Road (Henlade) Overbridge	Local road standard single 2-lane carriageway
Stoke Hill Overbridge	Local road standard single 2-lane carriageway
Dairy House Farm Culvert	Dual 2-lane all-purpose carriageway
Ashe Farm Culvert	Dual 2-lane all-purpose carriageway
Ashe Farm Underbridge	Dual 2-lane all-purpose carriageway
Ashe Farm Retaining Wall	-
Huish Woods Underpass	Dual 2-lane all-purpose carriageway

Name	Deck Cross section
West Hatch Retaining Wall	-
Bath House Retaining Wall	-
West Hatch Lane Junction Underbridge	Dual 2-lane all-purpose carriageway
New Culvert 1611	Single 2-lane all-purpose carriageway
New Culvert 1783	Dual 2-lane all-purpose carriageway and on-slip
New Culvert 1928	Dual 2-lane all-purpose carriageway and off-slip

7.3. Earthworks and geotechnics

Earthworks volumes

7.3.1. The layout design has been developed in MX modelling software. This enables the quantification of bulk excavation and deposition that will be required to establish the road formation levels. The results are set out for each option in Table 7.10 to Table 7.13. A primary objective of the design of all route options is to ensure there would be an overall surplus of material (that is, more excavation than deposition). The quantity of surplus has been deliberately engineered according to the anticipated requirement for landscaping fill. Although not assessed yet, this approach may be required to mitigate visual and acoustic impacts.

7.3.2. Modelling has assumed slopes of 1:3 throughout the Scheme. This approach will be refined during development of the preliminary design following ground investigation.

Table 7.11: Estimated Bulk Earthworks quantities for Pink option (figures are in m^3)

Section	Description	Cut	Fill to embankments	Available fill for landscaping
Offline	M5 to Griffin Lane	879,825	678,507	201,317
Online	Griffin Lane to Southfields	534,938	504,938	30,000
TOTAL		1,414,763	1,183,445	231,317

Table 7.12: Estimated Bulk Earthworks quantities for Blue option (figures are in m^3)

Section	Description	Cut	Fill to embankments	Available fill for landscaping
Offline	M5 to Griffin Lane	1,251,676	1,182,676	69,000
Online	Griffin Lane to Southfields	534,938	504,938	30,000
TOTAL		1,786,614	1,687,614	99,000

Table 7.13: Estimated Bulk Earthworks quantities for Orange option (figures are in m^3)

Section	Description	Cut	Fill to embankments	Available fill for landscaping
Offline	M5 to Griffin Lane	1,079,417	1,015,417	64,000
Online	Griffin Lane to Southfields	534,938	504,938	30,000
TOTAL		1,614,355	1,520,355	94,000

Geotechnical

7.3.3. The geotechnical (below ground) risks, implications and feasibility of the Scheme have been reviewed during this stage. A geotechnical site investigation is planned for PCF Stage 3 (preliminary design). In the interim, knowledge of the properties and risks associated with in-situ material on the site is limited.

7.3.4. Challenges associated with the route are listed below:

- Unforeseen ground conditions – potential issues regarding insufficient bearing capacity, excessive settlements, slope instability for cuttings and embankments, groundwater control and temporary works
- Achieving earthworks mass balance across cut and fill operations on site
- Ensuring a suitable volume of fill is generated to facilitate embankment construction – potential requirement to import large quantities of replacement fill if insufficient material can be obtained on site
- High concentration of pyrites in natural strata and sulphates in made ground – potential for thaumasite sulphate attack on buried concrete affecting the integrity of concrete structures
- A fault line is known to strike roughly north-west to south-east affecting the proposed route around the location of the West Hatch Lane Junction
- Compressible ground causing intolerable movements
- Limestone bands and interbeds causing obstructions and creating permeable pathways - potential constructability issues (for example, piling though limestone beds)
- Potential for variable ground conditions underlying highway structures leading to foundation design and serviceability issues
- High groundwater levels leading to:
  - potential issues surrounding elevated pore pressures driving slope instability

  - hydrostatic uplift effects on structures during and post construction
  - ingress into excavations leading to collapse and delays
  - periodic softening of formation strata where shallow groundwater persists during heavy rainfall
- Stability of cut slopes within the Lower Lias deposits meaning that target design slope angles may not be achievable. Relic shear surfaces and propensity for slope instability leading to potential for remobilisation of pre-existing slope failures during construction of earthworks
- Former landfills at Ashill Bypass (east of the Ashill Sewage Treatment Works) and along the cutting of the former Great Western Railway through Ash containing extensive deposits of potentially contaminated and highly compressible material
- Remnants of former Great Western Railway embankment and track drainage of unknown construction, close to the proposed West Hatch Lane Junction. Potential for weak embankment fill material and presence of contaminated ground
- Existing ground instability at Griffin Lane Underbridge which has the potential for mobilisation of existing slip surfaces in embankment slope
- Potential sources of contamination including existing and former fuel storage sites identified close to the proposed alignment at Kenny and Ashill and an operational timber products factory at West Hatch Lane Junction
- Potential for deleterious ground conditions which may require extensive remediation of potentially contaminated land
- Localised infilled ponds containing unknown fill material which may be highly compressible
- Severely limited existing ground investigation data across most of the proposed option alignment. High risk associated with unknown ground conditions

7.4. Drainage

7.4.1. Highway drainage systems will be selected in accordance with the DMRB Volume 4, HD33/16 (DMRB 4.2.3) *Design of highway drainage systems*. This approach is likely to lead to a mixture of solutions such as surface water concrete channels, filter drains and kerbs / gullies. This depends on the location, road type and whether the road is in cutting or embankment.

7.4.2. A risk assessment will be undertaken in accordance with HD45/09 *Road drainage and the water environment* (DMRB 11.3.10) to establish the

potential for run-off from the proposed road to cause pollution to receiving watercourses. This risk assessment will inform the selection of treatment measures to address the pollution risk.

7.4.3. Although the preferred destination for run-off water is normally via infiltration to ground, it is expected that ground conditions in this area are not suitable for infiltration systems. However, the potential for infiltration will be reviewed following acquisition of data from ground investigation studies.

7.4.4. It is proposed that carriageway drainage systems will connect to new detention basins which will provide attenuation prior to outfalling into the receiving watercourses. These basins will be sized to accommodate the run-off from a 1:100-year storm. This will ensure that flood risk to surrounding property does not increase as a result of the proposed road drainage. Where highway catchment areas are considered too small to justify a detention basin, ditches or oversized pipes will be used to achieve the correct level of attenuation.

7.5. Statutory undertakers

Existing utilities

7.5.1. Enquiries have been undertaken to determine the location of public utilities within the Scheme area. These enquiries have been conducted in accordance with *SA 10/05 The New Roads and Street Works Act 1991 - Diversionary Works* (Manual of contract documents for highway works 6.2.2).

7.5.2. The results of these preliminary enquiries highlight that several undertakers have equipment that may require protection or diversion as a result of the proposed option. These are described below.

BT Openreach

7.5.3. BT Openreach own a mixture of overhead and underground cables that supply residents and businesses. Most of their apparatus appears to be between Kenny and Hatch Green. There are also a number of their cables in the vicinity of West Hatch and Meare Green.

7.5.4. As well as these main locations, BT Openreach also own several other relatively minor crossings along the route.

CenturyLink (Instalcom)

7.5.5. CenturyLink own a duct route and cable which is currently managed and maintained on their behalf by Instalcom. This cable is understood to be

part of the trans-Atlantic cable network. The service runs within the verge of the existing A303 and A358 until it reaches Greenway. It then runs in the verge of Greenway Lane, Stoke Road and Haydon Lane into the centre of Taunton. The route crosses the M5 motorway in the deck of the existing Stoke Road overbridge.

National Grid

7.5.6. National Grid own two National High Pressure (NHP) gas mains that are within the site extents that supply gas to the south-west of England. One NHP main is located near the village of Rapps with the pipe running underneath the existing A358 approximately 1.2 miles north of Southfields Roundabout. The second NHP main passes underneath the A303 Ilminster Bypass approximately 500m to the east of Southfields Roundabout.

SSE Telecoms

7.5.7. SSE Telecoms own one cable within the Scheme extents, at Southfields Roundabout. The cable runs along the existing A303 Ilminster Bypass and then crosses the roundabout and travels along the A358 towards Chard. Any works to Southfields Roundabout or the A303 Ilminster Bypass will affect this cable.

Vodafone

7.5.8. Vodafone have a cable which runs in the A358 verge between M5 junction 25 and Ashill. It will be significantly affected by any work undertaken to this section of the existing A358.

Wales and West Utilities

7.5.9. Wales and West Utilities are the local gas supplier in Taunton and have an extensive network within the urban area of the town. However, their network does not extend significantly to the east of the M5. There is only one conflict between the Scheme and their low pressure network which runs along Shoreditch Road.

Wessex Water

7.5.10. Wessex Water own two significant installations in the vicinity of the route. The first is a recently constructed pumping station near to the Killams Avenue Junction. The second is a sewage treatment works alongside the Ashill Bypass.

7.5.11. Wessex Water have a mixture of potable water distribution mains and foul sewers within the Scheme extents.

7.5.12. Wessex Water's network is mainly located in the areas surrounding the villages of Henlade, Hatch Beauchamp, Kenny and Hatch Green. These services are all mainly distribution mains.

7.5.13. Wessex Water sewage pipes are located at the sewage plant in Ashill, around the village of Henlade and at some of the properties along Stoke Road near Taunton.

Western Power

7.5.14. Western Power are the local power supplier in the area. Their apparatus is predominantly low voltage underground and overhead cables, although there are some high voltage cables. There are no extra high voltage lines within the Scheme area.

7.5.15. Western Power's network is mainly located at Stoke Road near Taunton, Henlade, Stoke St Mary, Ashe Farm, Meare Green and Ashill. At these locations, there are a mixture of interaction between Western Power's services and the proposed mainline and local roads.

Diversionary works

7.5.16. The latest Statutory Undertakers Estimate currently only considers the Orange option. The majority of interfaces with statutory undertakers takes place within the online widening section. It is therefore expected that they will all incur similar statutory undertakers costs. As such the same budget estimate has been used for all options. The estimates are summarised in Table 7.14 and exclude VAT.

Table 7.14: Orange route statutory undertakers' estimates

Statutory Undertaker	Estimate
BT	£1,521,664
Instalcom	£857,084
National Grid	£3,000,000
SSE	£9,749
Vodafone	£717,726
Wessex Water	£1,472,876
Western Power Distribution	£416,667
Total (excluding VAT)	**£7,995,766**
Total (including VAT)	**£9,594,919**

7.5.17. Where statutory undertakers have provided estimated detail design fees separately, these total an additional £79,761 (including VAT).

7.5.18. In view of the complexities surrounding planning of the diversionary works for the fibre optic services and high pressure gas mains, Instalcom and National Grid will be engaged early in the Project Control Framework (PCF) Stage 3 (preliminary design process). This will ensure their requirements and influence over the project programme are fully understood.

7.6. Land acquisition and pinch-points

7.6.1. The current design will require permanent and temporary land acquisition, referred to as land-take, for construction. An estimate of the likely requirement for permanent land acquisition is given in Table 7.15. An allowance has been provided for flood attenuation and will be developed further at a later stage. A pinch-point is a location where the existing topography, or other existing features, create constraints that require additional consideration to develop the design.

Table 7.15: Permanent land acquisition requirements (figures in hectares)

	Pink option	Blue option	Orange option
Total area of Scheme footprint measured from the engineering model	145.99	146.78	152.32
Additional allowance for landscaping, drainage outfall works and surplus material	20.74	14.14	13.00
Deductions			
Total area of land already registered to Secretary of State for Transport within the Scheme footprint	10.00	10.00	10.00
Total Area of third-party land requiring acquisition	**156.73**	**150.92**	**155.32**

7.6.2. This estimate includes allowances for all works within a permanent highway boundary which will either be maintained by Highways England or by Somerset County Council. It excludes allowances for temporary works. This includes compounds, lay down areas, haulage routes, land required for wayleaves / easements, rights of way dedications and accommodation works such as access tracks. These items will be developed as part of the preliminary design.

7.6.3. The online section of the route would maximise use of the footprint of the existing A358 corridor, currently owned by Somerset County Council. Some agricultural land would need to be acquired adjacent to the existing road. Areas of Jordan's Park Local Wildlife Site and Hatch Park estate may need to be acquired along the online section of the route. The Scheme would run close to Bickenhall Wood and Saltfield Copse areas of Ancient Woodland. Preliminary design will progress with the objective of avoiding acquisition of these sites. However, there is a risk that areas of these sites may need to be acquired for permanent and / or temporary works.

7.6.4. The majority of land required for the offline section of the route is agricultural farmland.

7.6.5. Of particular concern, in respect of ease of construction and impact on adjacent interests, are sections of the Scheme where available corridor for road construction appears to be limited. Further investigation will be carried out during the preliminary design stage to determine if route improvements at relevant locations could reduce impacts on local adjacent sites.

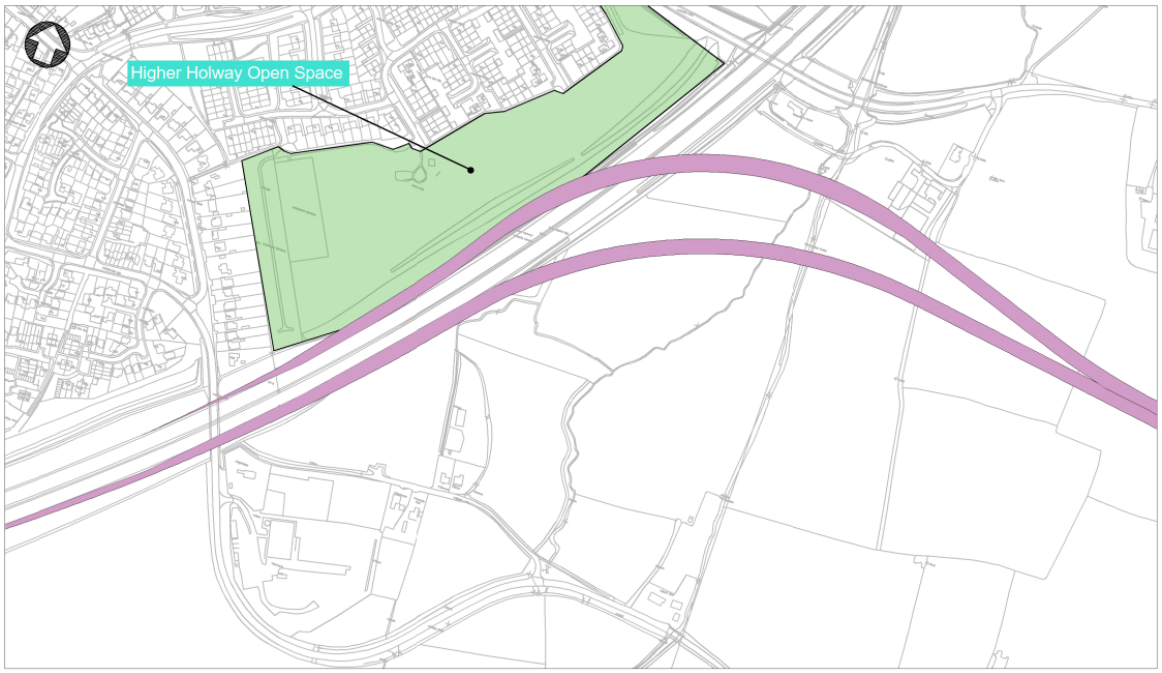
Pink option

7.6.6. There are three primary locations where there are constraints that may restrict the design for the Pink option. These constrained locations are referred to as pinch-points.

Blackbrook junction

7.6.7. The first pinch-point is at the proposed Blackbrook Junction where the A358 would join the M5 as shown in Figure 7.1. The available land within the vicinity of the existing M5, alongside the existing structures, limits the space for any new junction.

Figure 7.1: Blackbrook Junction pinch-point



Note: It should be noted that the design is not final and subject to further refinements in the next stage.

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7.6.8. The road alignment cuts into the Higher Holway Open Space which is a well-used municipal area. It is expected that the height of this junction would be no higher than the existing M5 overbridges (Haydon Lane and

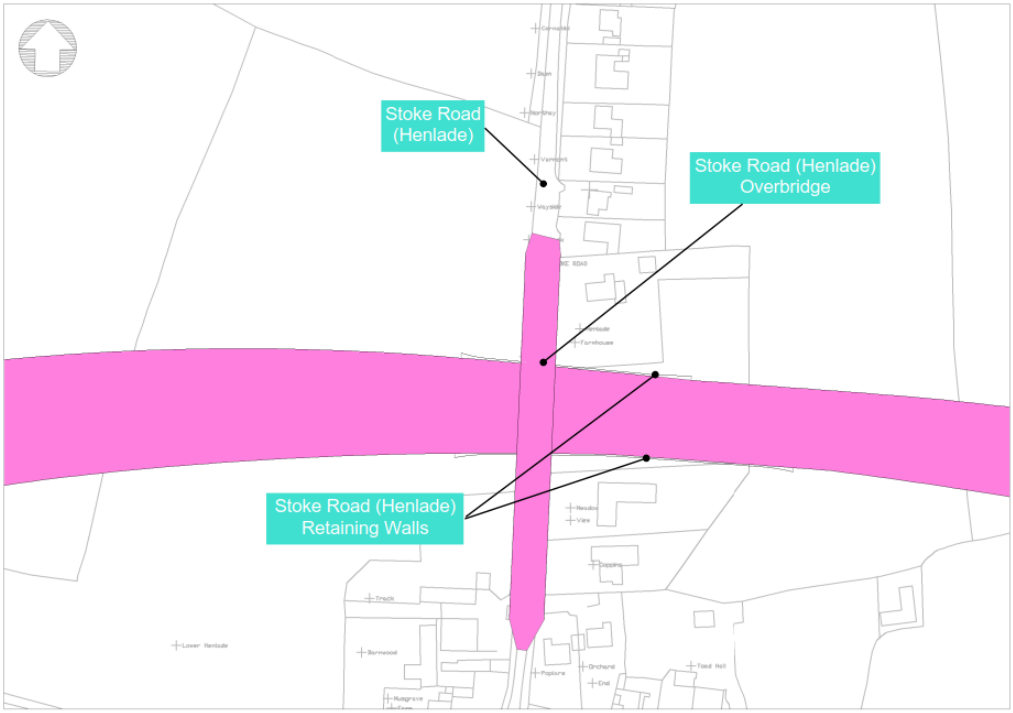
Stock Road). However, it would be higher than the existing bunds at this location. The proposed junction would therefore require some land-take from the eastern side of the open space. There is a possibility the Scheme could require a small amount of additional land to accommodate bunds, acoustic barriers and compensatory landscaping.

7.6.9. Topographical and further environmental assessments will take place to further inform the design refinement. This would keep the impact of the junction on Higher Holway Open Space to a minimum. This information will feed into the development of a mitigation strategy, which will be fully integrated into the Scheme design to avoid or reduce effects.

Stoke Road, Henlade

7.6.10. The second pinch-point is at the crossing of Stoke Road, Henlade and is shown in Figure 7.2. The proposed dual carriageway would pass through a reserved corridor between properties. However, to retain the connection between Upper and Lower Henlade Stoke Road it would remain in its current elevation, with the new road passing beneath in a cutting. The reserved corridor is not wide enough to accommodate the cutting slope so earth retaining structures would be required to minimise direct impact to the existing properties.

Figure 7.2: Stoke Road, Henlade pinch-point



Note: It should be noted that the design is not final and subject to further refinements in the next stage.

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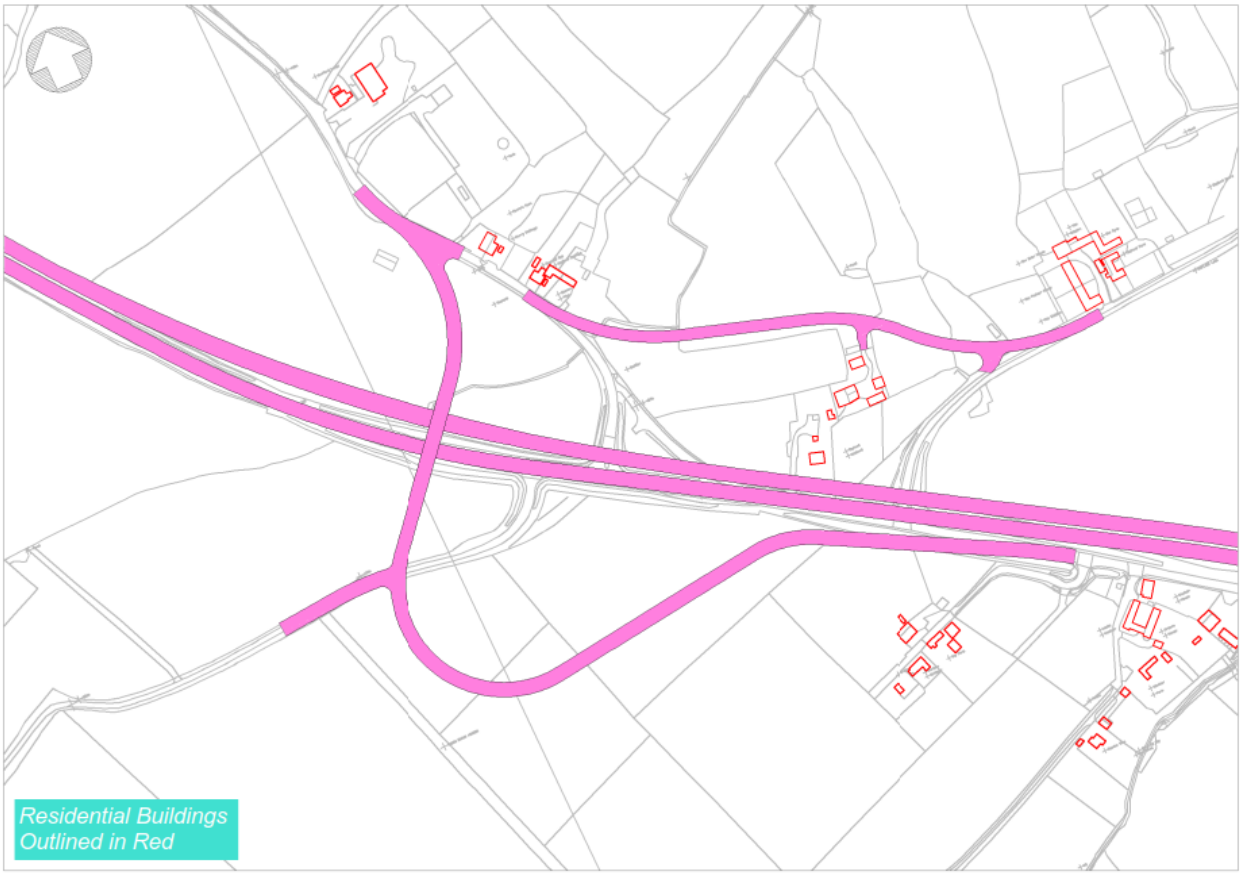
Hatch Beauchamp junction, Capland

7.6.11. The final pinch-point is at Capland, just south of Hatch Beauchamp junction as shown in Figure 7.3. At this location, the proposed dual carriageway would run parallel to a proposed single carriageway local road, with residential properties immediately north and south. As explained in 6.1.13, this location has been identified for a potential junction. If provided, it is proposed to be to the west of Hatch Beauchamp and the associated slip roads are likely to widen the overall corridor required. Retaining solutions may be required to minimise acquisition of these residential plots.

Figure 7.3: Capland pinch-point (Hatch Beauchamp junction)



Note: It should be noted this junction is not a feature of the preferred route. Analysis of the technical assessments will confirm if a junction in Capland will feature as part of the route presented at the statutory consultation. Refer to sections 6.1.13 - 6.1.15 for information on this junction.

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Blue option

7.6.12. There are three primary pinch-points along the Blue option.

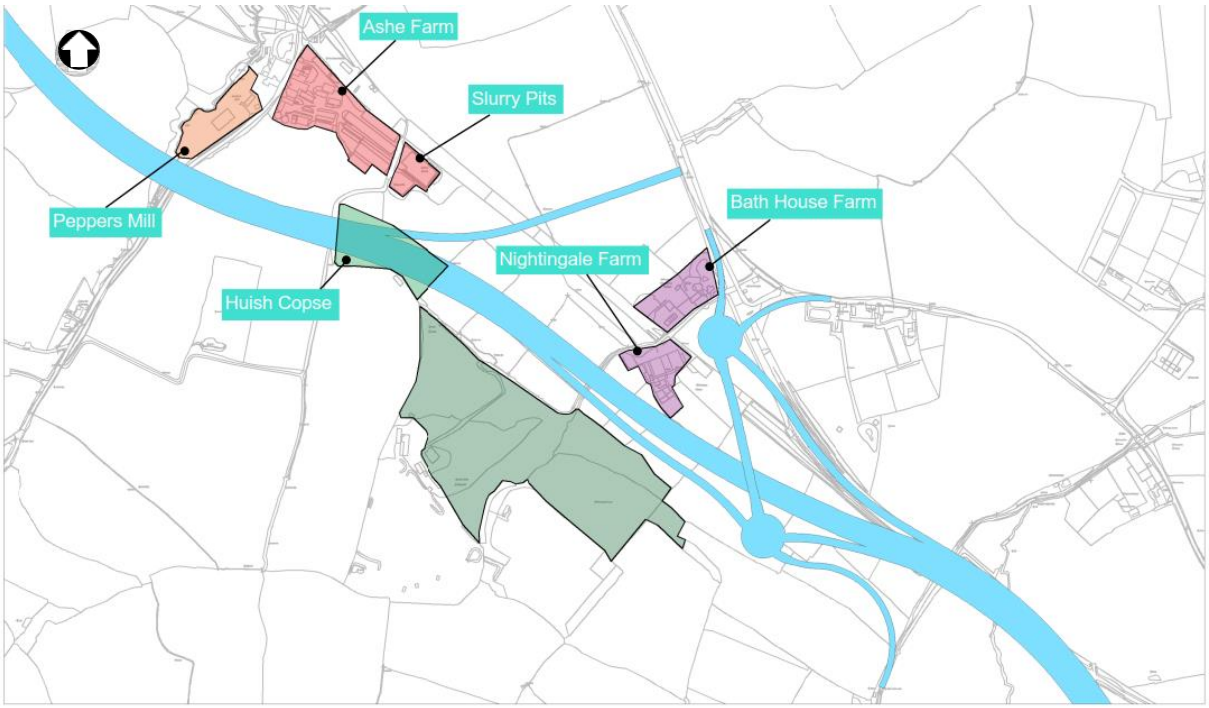
Blackbrook junction

7.6.13. The first location is at the Blackbrook junction as described above for the Pink option (see section 7.6.7).

Huish Woods / West Hatch Lane

7.6.14. The second pinch-point is in the area of Huish Woods and the proposed junction at West Hatch Lane shown in Figure 7.4. There are several constraints in this area including Ashe Farm, Nightingale Farm, Huish Copse, Huish Woods and Strangways Copse Ancient Woodlands. The proposed route threads between Huish Woods and Nightingale Farm before skirting Huish Copse and to the south of Ashe Farm. As such, the current design would require the acquisition of land within Huish Copse area of Ancient Woodland.

Figure 7.4: Huish Woods / West Hatch Lane pinch-point



Note: It should be noted that the design is not final and subject to further refinements in the next stage.

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7.6.15. Safe access to the Huish Woods scout camp will be integral to the design development in the next stage of the design. The scout camp will not

directly access the main A358 carriageway to eliminate the need to join the high-speed road from standstill.

Hatch Beauchamp junction, Capland

7.6.16. The final pinch-point is at the Hatch Beauchamp junction as described above for the Pink option (see section 7.6.11).

Orange route

7.6.17. There are three primary pinch-points along the Orange option.

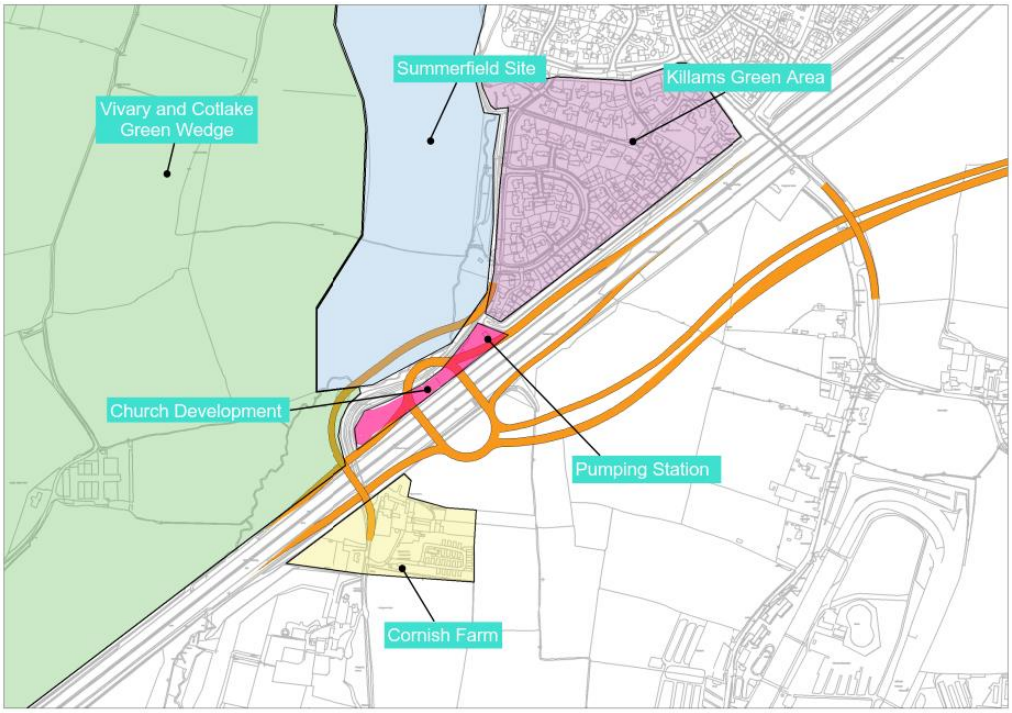
Killams Avenue junction

7.6.18. The first is at the location of Killams Avenue Junction (see Figure 7.5). Land immediately surrounding the proposed junction includes:

- existing residential properties at Killams Green and Cornish Farm
- proposed residential properties (an on-going development by Summerfield)
- a proposed development by a church
- a camping site at Cornish Farm
- watercourses
- a public highway which crosses the motorway (Killams Lane)
- the Vivary and Cotlake Green Wedge
- a recently constructed Wessex Water pumping station

7.6.19. The proposed junction is likely to require retaining solutions to minimise acquisition of these plots.

Figure 7.5: Killams Avenue Junction pinch-point



Note: It should be noted that the Orange option has been discounted; therefore, this junction will not be a feature of the preferred route.

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Huish Woods / West Hatch Lane

7.6.20. The second pinch-point is in the area of Huish Woods as described above for the Blue option (see section 7.6.14).

Hatch Beauchamp junction, Capland

7.6.21. The third pinch-point is at Hatch Beauchamp junction as described above for the Pink option (see section 7.6.11).

7.7. Buildability

7.7.1. The services of a delivery partner were commissioned during the option selection stage to provide advice regarding the buildability of the Orange route. The buildability of the Blue and Pink options is expected to face similar issues. Aspects considered included:

- construction schedule
- risk and opportunity
- previous lessons learned
- buildability
- temporary land and construction compounds

- traffic management arrangements
- winter maintenance
- efficiency opportunities

7.7.2. Principal findings from this work are summarised below.

7.7.3. The critical path in the current Scheme programme is generally confined to the online section between West Hatch and Southfields Roundabout. The offline section between the M5 and West Hatch is largely free from the critical path. However, this is heavily dependent on the timely resolution of land and access issues which are likely to be more prevalent on this section.

- Early surveys and identification of the ecological constraints would be advantageous and ensure the earliest possible commencement on site. This will provide a good opportunity for successful delivery of the project.
- Two phases of traffic management are proposed for the construction of works at the new grade separated junction on the M5. Full closure of both carriageways of the M5 would be required for the installation of bridge beams.
- The new offline section would require a number of local road diversions or closures to allow new structures to be constructed.
- The online section is to be constructed in two phases, maintaining a 1+1 configuration during construction by utilising the new southbound carriageway and existing A358. Existing local road junctions will be generally maintained as works progress in temporary layouts. Full closure of the A358 for bridge beam installation will present difficulties in terms of viable diversion routes as there are no obvious diversion routes using 'A' class roads. Full road closures will therefore need to be minimised or, if possible, avoided.
- Due to the Scheme length, multiple compounds are recommended at the M5 Junction, West Hatch Junction and Ashill Junction.
- Haul routes will typically utilise space within permanent land-take boundaries. Where obstructions prevent linear access, adjacent haul routes around the obstructions will be required which may require temporary land-take.

7.8. Lighting

7.8.1. All junctions have been assessed to determine if lighting is required in accordance with TA49/07 *Appraisal of new and replacement lighting on the strategic motorway and all-purpose trunk road network* (DMRB 8.3).

This assessment concluded that there is justification to provide lighting at West Hatch Lane Junction and at Southfields Roundabout, which are common to all route options. Furthermore, the proposed junction between the proposed Kenny Link and the main road through Ashill would require lighting for all route options.

7.8.2. No other junctions would justify lighting. In particular the assessment concluded that Killams Avenue Junction which features in the Orange option would not require lighting.

7.8.3. The proposed lighting is expected to be LED lanterns mounted on either 8m, 10m or 12m columns. The extent of lighting for each junction and the associated connecting roads approaching / leaving these links would be expected to follow guidance in the Institution of Lighting Professionals (ILP) document PLG02 *The application of conflict areas on the highway*.

7.9. Intelligent Transport Systems (Technology)

7.9.1. An assessment of the Intelligent Transport Systems (ITS) (technology) requirements for the Scheme has been undertaken. The *Road Investment Strategy* commits to the A303 / A358 becoming an Expressway corridor from London to Exeter via the M5 by 2029. The Scheme will be designed to accommodate placeholders in the highway cross-section for any potential future upgrade to Expressway standards, including the provision of technology.

7.9.2. Proposals for preliminary design of technology currently only include installations required to provide levels of service consistent with similar dual 2-lane all-purpose carriageways along the corridor. Proposals do not currently include any additional features that would constitute 'future-proofing' for anticipated Expressway standards. Further assessment work may be undertaken during the preliminary design stage. This may include adoption of any technical Expressway standards that are formally published during this stage.

7.9.3. Proposals for this Scheme predominantly affect the A358, but they also impact connections with the M5 and the A303.

A358 requirements

7.9.4. Proposals for preliminary design of this Scheme involve the minimum technology required for a dual 2-lane all-purpose carriageway. This is likely to involve the provision of National Traffic Information Service (NTIS) vehicle counting sites and Emergency Roadside Telephones (ERT) only. This will include any ducting and cabling routes within the proposed verge to accommodate these installations.

M5 requirements

7.9.5. To cater for the creation of a new motorway junction the preliminary design proposals involve the provision of minimum technology required for a motorway. They also allow for existing motorway technology in the area. This is likely to include two pairs of strategic Variable Message Signs (VMS) and a series of radar MIDAS sites covering approaches to the junction. Closed circuit television (CCTV) coverage of the junction and the northbound approach to the junction would also be included. Also included would be any ducting and cabling routes within the verge to accommodate these installations.

A303 requirements

7.9.6. The upgrading of the A358 from single carriageway to dual 2-lane all-purpose carriageway is expected to see traffic re-route from the A303 / A30 Blackdown Hills to the A358 and Southfields Roundabout. The road will become a key node on Highways England's strategic road network. The indicative design proposals for this Scheme therefore include the provision of a pair of VMS on the A303 westbound approach to Southfields Roundabout. The VMS would display journey times as well as strategic messages and CCTV coverage of the roundabout. Also included would be any ducting and cabling routes within the verge to accommodate these installations.

7.10. Cost estimates

7.10.1. Following the 2018 route options consultation, the proposed options were costed again in April 2018 to capture the design refinements and anticipated programme changes. The previous Scheme mid-range estimates, presented in the *Technical Appraisal Report* published in January 2018, and the April 2018 mid-range estimates for the three options are summarised in the Table 7.16 below.

Table 7.16: Scheme mid-range estimates (before and after 2018 public consultation)

	Estimates presented in the *Technical Appraisal Report* (January 2018) at 2014 Q1 prices	Scheme estimates (prepared April 2018) at 2016 Q1 prices
Pink option	£451,760,360	£521,298,106
Blue option	£400,820,487	£511,436,722
Orange option	£366,106,661	£490,261,113

Note: Scheme opening year assumed as 2023 for the estimates presented in the *Technical Appraisal Report* and 2024 for current Scheme estimates. The current Scheme estimates were carried out in April 2018

7.10.2. The increase in Scheme estimates between since January 2018 is due to the following reasons:

- The recent costing exercise had taken January 2016 Q1 as its baseline cost, whereas previous costing works had used a baseline cost of January 2014 Q1
- Design development allowed more accuracy to determine the construction quantities (mainly earthworks and pavement) and land acquisition for all route options in the online section
- Further Scheme risks were identified and costed and added to the risk register
- Change in programme due to the additional consultation taking place in 2018

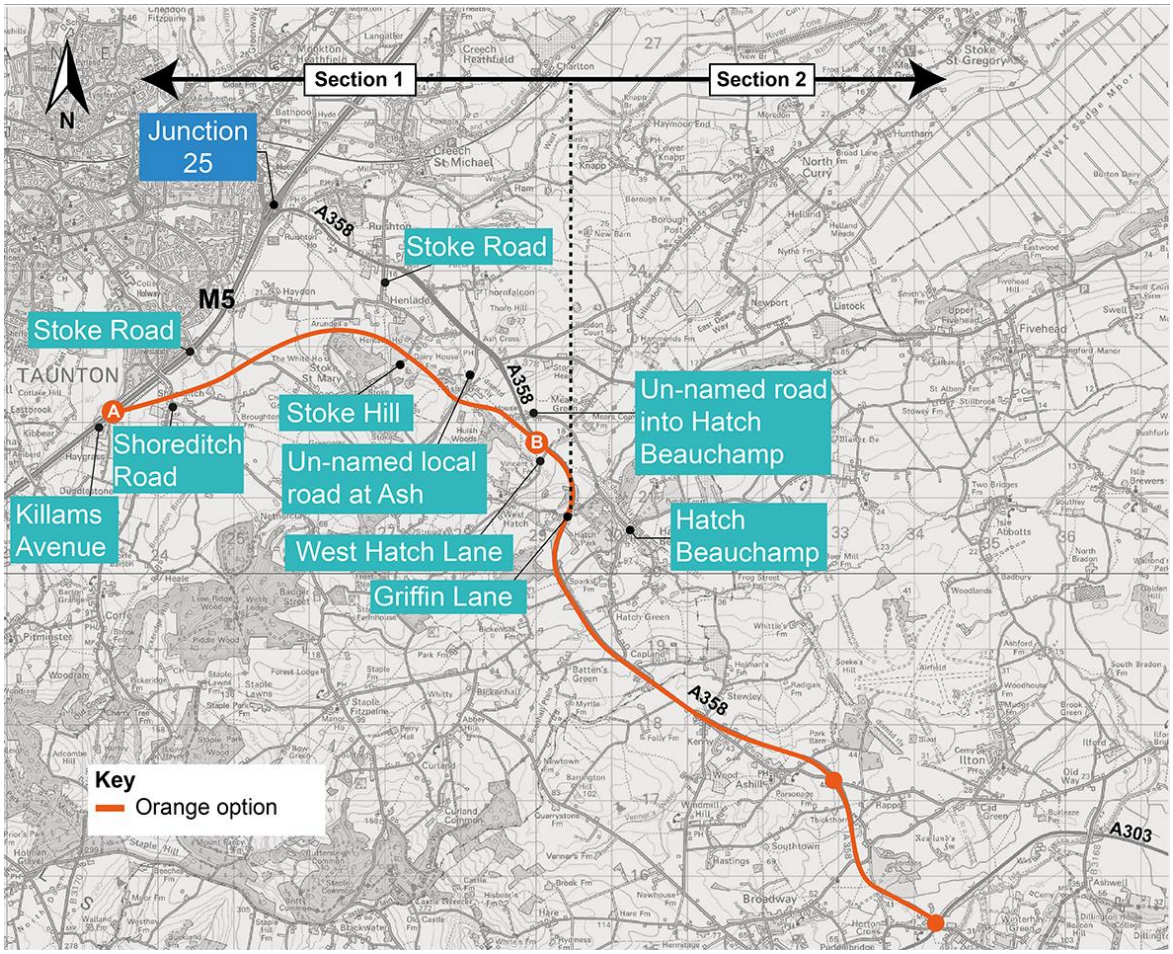
8. Public consultation

8.1. 2017 public consultation

8.1.1. The initial public consultation was held between 28 March and 16 July 2017. The consultation was briefly paused in May 2017 and subsequently extended to July 2017 to observe pre-election rules, following the government's decision to call a general election in May 2017.

8.1.2. The Orange option, shown in Figure 8.1 was presented at the public consultation as the proposed route option. The route was presented as below.

Figure 8.1: Option presented at the 2017 consultation



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8.1.3. The consultation gave statutory bodies, key stakeholders, members of the local community and landowners the opportunity to discuss the Scheme proposal with the project team. The results of the 2017 consultation events is summarised in sections 0 and 8.2.

8.1.4. Following the outcome of the 2017 public consultation, where a general request for further options to be considered was made (see sections 0 to 8.2), a second public consultation was held in 2018. The 2018 public consultation events were held between 16 January and 27 February 2018. The results of the 2018 consultation events are summarised in sections 8.3 and 8.4.

8.1.5. All matters raised by stakeholders through written responses have been collated and recorded in the *A358 Taunton to Southfields Dualling: Report on public consultation (16 January 2018 – 27 February 2018)*. This section provides an overview of the key findings from this report.

2017 public information events

8.1.6. The following public information events were held as a part of the 2017 consultation and the meetings dates are detailed in Appendix C (Table C.1 to Table C.3).

- **Consultation launch event** – an evening event was held for invited local elected representatives and representatives from parish councils and the community in the vicinity of the Scheme.
- **Landowner events** – landowner events were held to allow stakeholders owning land within 150m of the proposed Scheme, or land which the Scheme would intersect to review the proposed Scheme details. These events were appointment only sessions where stakeholders could discuss their land titles with specialists from the project team. Issues and concerns were brought to the attention of Highways England.
- **Public information events** – the public events provided valuable insight into how the local community felt about the Scheme and how they use the existing road network. There were five public information events held at venues within the vicinity of the Scheme, with a total number of 1,670 stakeholders visiting the events.

8.1.7. Additional presentations were undertaken at the request of local parish councils and community groups. The meetings are detailed in the Table C.4.

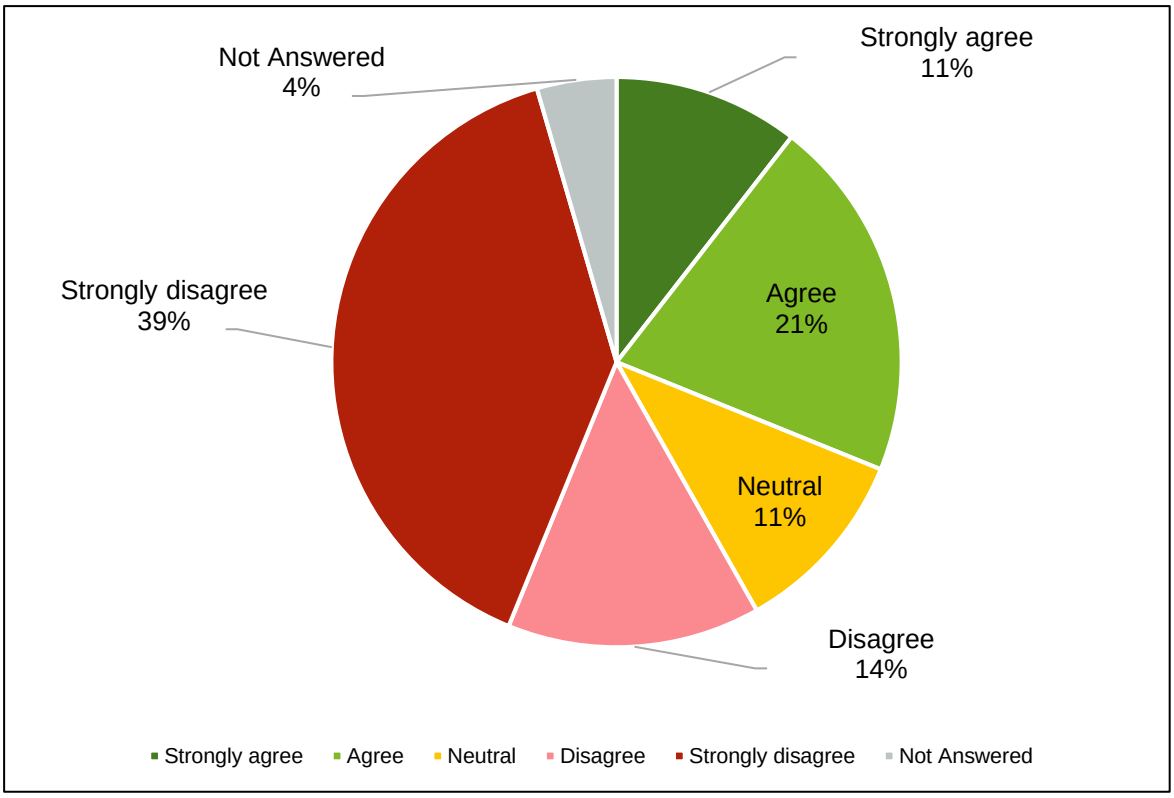
Overview of 2017 consultation questionnaire responses

8.1.8. The consultation period closed on 16 July 2017 with a total of 1,198 responses received from stakeholders. Responses were analysed to understand the views of local and key stakeholders to help inform the preferred route selection.

2017 Question 1
The objectives of this Scheme are detailed in the consultation brochure. To what degree do you believe the Scheme proposal has achieved the objectives?

8.1.9. The response to this question is shown in Figure 8.2.

Figure 8.2: Response to 2017 Question 1



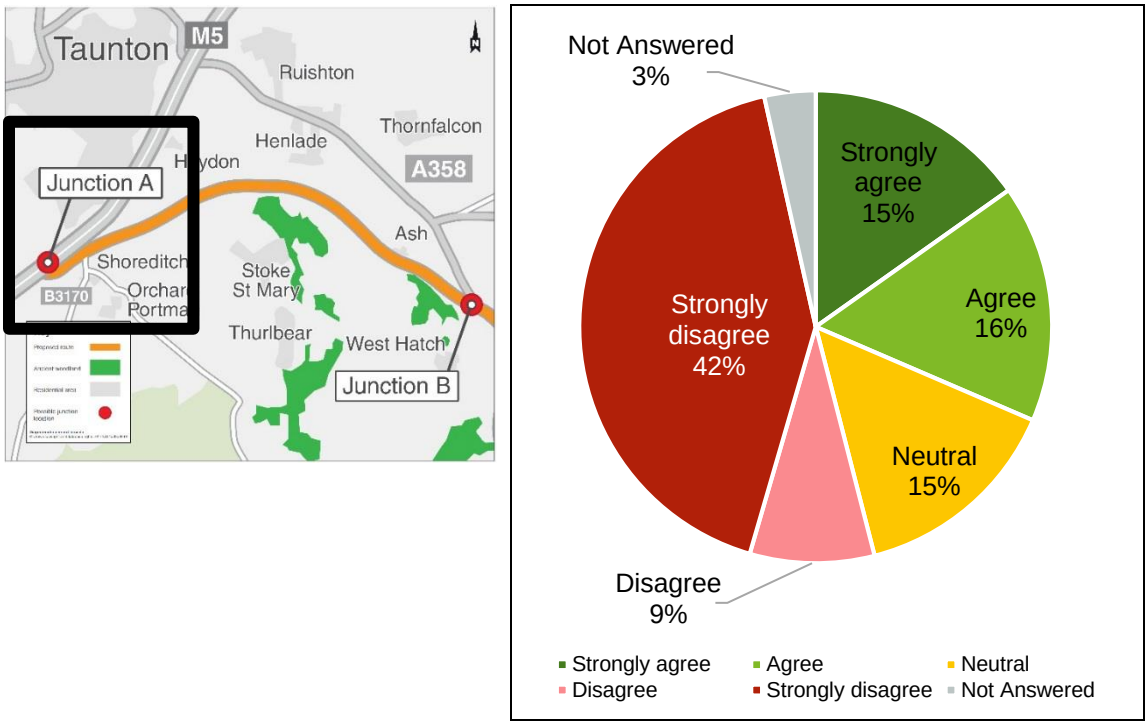
Source: A358 Taunton to Southfields: Report on public consultation (16 January – 27 February 2018).

8.1.10. Of those who responded, 32% agreed that the proposed Scheme would achieve the objectives set out in the consultation brochure whilst 53% of respondents disagreed.

2017 Question 3
A new roundabout motorway junction (Junction A) is proposed allowing all movements between the M5 and A358. To what extent do you agree with the proposed new junction at this location?

8.1.11. The response to this question is shown in Figure 8.3.

Figure 8.3: Response to 2017 Question 3 (all respondents)



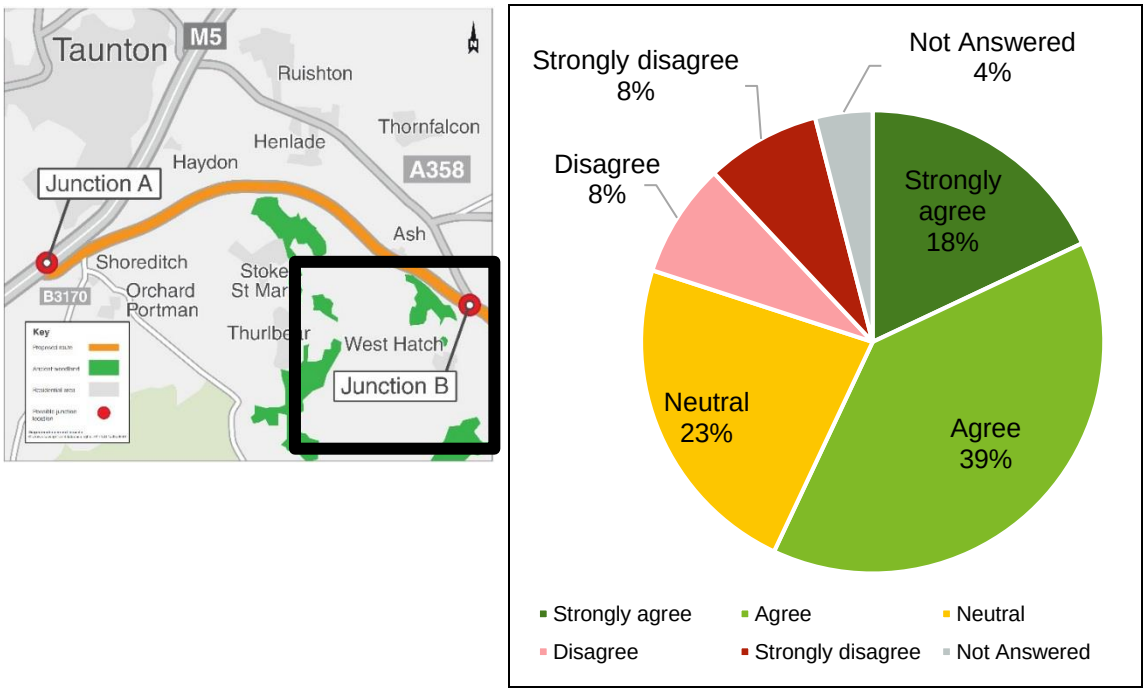
Source: A358 Taunton to Southfields: Report on public consultation (16 January – 27 February 2018).

8.1.12. Of those who responded, 31% agreed with the location of the proposed new motorway junction whilst 51% of respondents disagreed.

2017 Question 4
A new junction which allows traffic to leave and join the new road using slip roads without hindering traffic remaining on the road, is proposed to connect to the existing A358 near West Hatch (Junction B). To what extent do you agree with the proposed junction and its location?

8.1.13. The response to this question is shown in Figure 8.4.

Figure 8.4: Response to 2017 Question 4



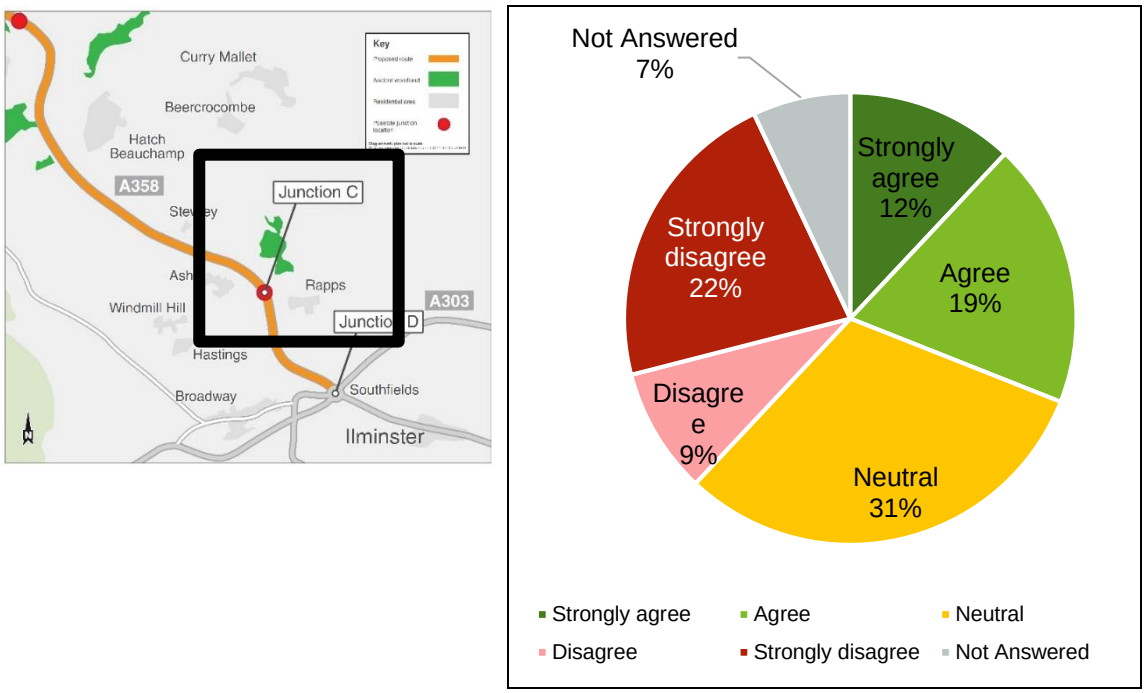
Source: A358 Taunton to Southfields: Report on public consultation (16 January – 27 February 2018).

8.1.14. Of those who responded, 57% agreed with the proposals for a new junction on the A358 near west Hatch whilst 16% of respondents disagreed.

2017 Question 5
A new junction which allows traffic to leave and join the new road using slip roads without hindering traffic remaining on the road, is proposed at Park Barn Lane (Junction C) east of Ashill. To what extent do you agree with the proposed junction and its location?

8.1.15. The response to this question is shown in Figure 8.5.

Figure 8.5: Response to 2017 Question 5



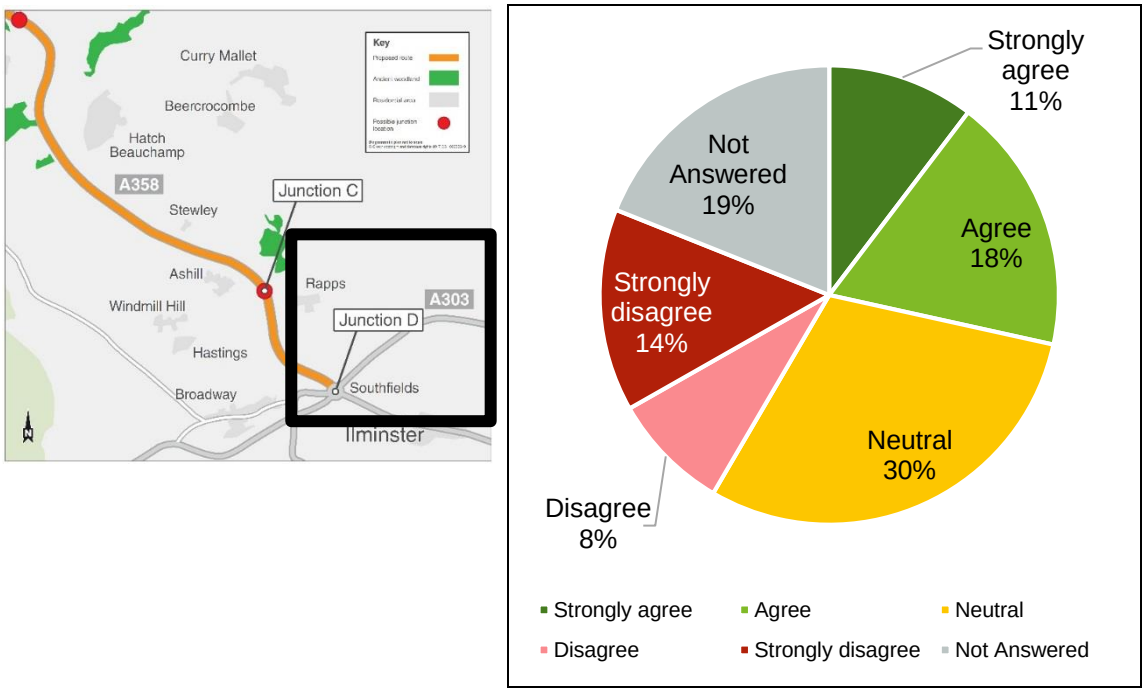
Source: A358 Taunton to Southfields: Report on public consultation (16 January – 27 February 2018).

8.1.16. Of those who responded, 31% agreed with the proposals for a new junction at Park Barn Lane whilst 31% of respondents disagreed.

2017 Question 6
Junction D is the existing Southfields Roundabout which will be upgraded to accommodate a new dual carriageway connection. To what extent do you agree with the proposed junction?

8.1.17. The response to this question is shown in Figure 8.6.

Figure 8.6: Response to 2017 Question 6



Source: A358 Taunton to Southfields: Report on public consultation (16 January – 27 February 2018).

8.1.18. Of those who responded, 29% agreed with the proposed upgrades to Southfields Roundabout whilst 22% of respondents disagreed.

8.2. Common 2017 response themes

Environmental impact

8.2.1. Respondents highlighted a need to protect the environment, particularly the countryside. Environmental concerns highlighted by respondents can be broken down into noise and air pollution and concern for local wildlife and forestry.

Flooding

8.2.2. Feedback identified that the route suffers from flooding. Respondents living close to the A358 believe the road currently contributes to flooding difficulties in nearby villages due to water run-off. They have identified areas, including Stoke Hill, Greenway Lane and Lower Henlade, as being of concern, some of which are marked flood plains.

Design development and junction positioning

8.2.3. Many respondents commented that there is a need to ensure local connectivity between communities is retained following a road upgrade.

8.2.4. There were many comments concerning Southfields Roundabout and the need for this junction to be upgraded in conjunction with the proposed A358 improvements.

8.2.5. Some respondents from the local community expressed a view that the Scheme only caters for the needs of individuals wishing to travel from London and the south-east to the south-west. Their concern was that this would create more traffic that adversely affects their communities.

8.2.6. A substantial number of respondents identified concerns about local connectivity. Respondents also stated that it is important the new road does not cause rat-running through the villages located close to the route.

Non-motorised users

8.2.7. A number of comments identified the importance of maintaining and improving pedestrian, cycle and equestrian routes in the area. The safety of these routes and crossings was also highlighted.

Construction impact

8.2.8. A number of comments identified the importance of reducing disruption to road users during any proposed improvement works. Many respondents commented on the possibility of road users avoiding the A358 during the construction works and adding to local rat-running.

Traffic

8.2.9. Some respondents outlined concerns over the route option's effectiveness in reducing congestion.

8.2.10. Other respondents noted that some businesses rely on the current flow of traffic on the A358 and that aiming to reduce this flow negatively impacts some businesses along the route.

8.2.11. Respondents noted that access onto the offline section from local roads will be slower and more challenging than the current section of the A358.

Consultation

8.2.12. Some respondents criticised the lack of route options presented and felt the proposed option was not the best route, lacked detail and did not enable informed comments to be made.

8.2.13. In line with this feedback, respondents also suggested that another consultation was held with more than the proposed option, as noted within in the *Technical Appraisal Report* (Highways England, January 2018).

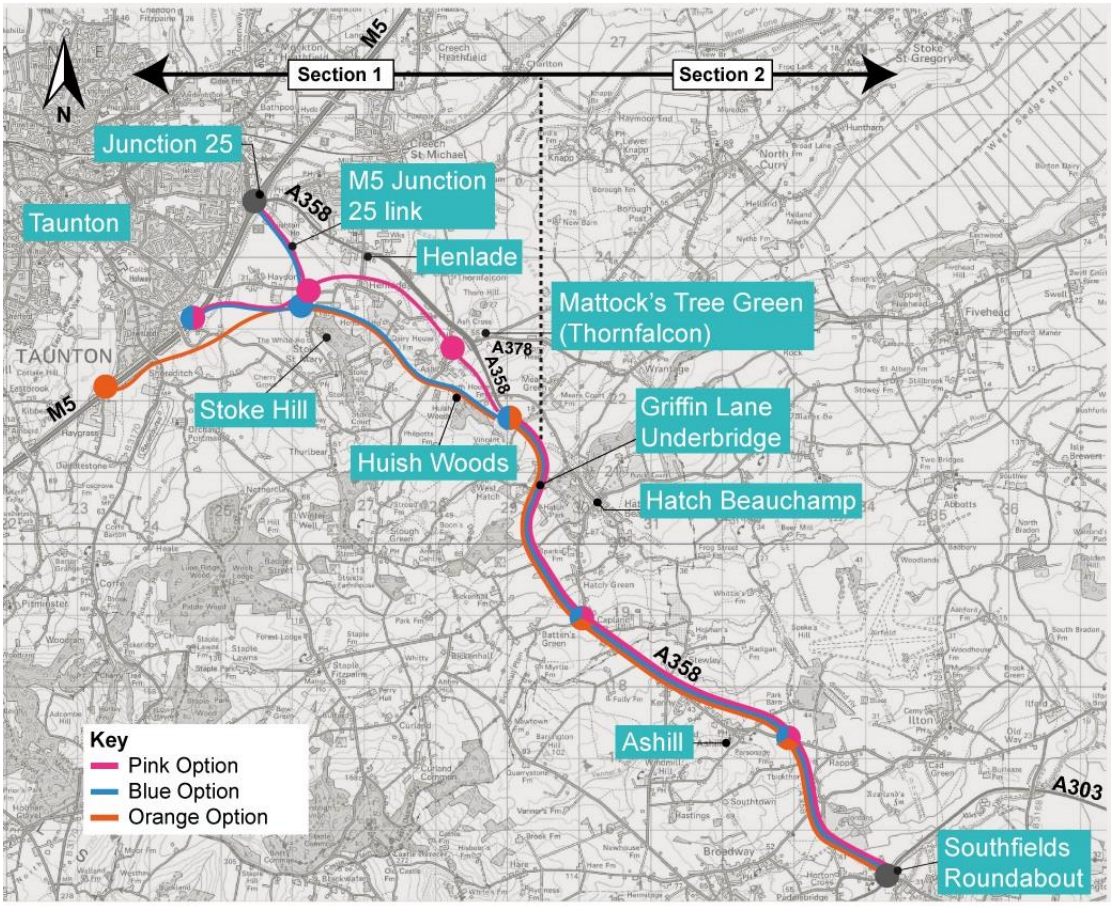
8.2.14. In response to this feedback, Highways England carried out an additional non-statutory consultation with three route options (options Pink, Blue and Orange). That was presented over a six-week period from 16 January to 27 February 2018.

8.3. 2018 public consultation

8.3.1. The Pink, Blue and Orange options, shown in Figure 8.7 were presented at the 2018 public consultation. Similar to the 2017

consultation, the proposed routes were presented in two separate sections (that is, offline and online sections).

Figure 8.7: Options presented at the 2018 consultation



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2018 public information events

8.3.2. An overview of the public consultation events held in 2018 is set out below. Meeting dates are detailed in Appendix C (Table C.5 to Table C.7). The routes referred to are described further in section 6 of this report.

- **Consultation launch event** – an evening event was held for invited local elected representatives, representatives from parish councils and the community in the vicinity of the Scheme.
- **Landholder events** – events were held for landholders and tenants with land interests who were newly affected by the Scheme. This group was made of 120 landholders and tenants with interests in land. They had not been affected by the proposals published during the previous non-statutory consultation as set out

in the report in Appendix K of the *A358 Taunton to Southfields: Report on public consultation (16 January 2018 – 27 February 2018)*, but were affected by the proposals published as part of this consultation. These events were by appointment only, to allow landholders to discuss concerns with specialists from the project team.

- **Public information events** – the public events provided valuable insight into views held by the local community and how they use the existing road network. There were seven public events, with 1,772 people attending overall.

8.3.3. Additional presentations were undertaken at the request of local parish councils and community groups. The meetings are detailed in Appendix C.

Overview of 2018 consultation questionnaire responses

8.3.4. The consultation period closed on 27 February 2018 with 1,469 questionnaire responses received. These were primarily from members of the local community, with a number of statutory and non-statutory bodies submitting formal reports and letters in place of a questionnaire. The matters raised by submitted reports and letters have been reviewed and considered along with the free-text comments provided via the questionnaire responses.

8.3.5. Analysis of the questionnaire feedback identified six broad themes most commonly arising from views expressed by respondents. The themes were:

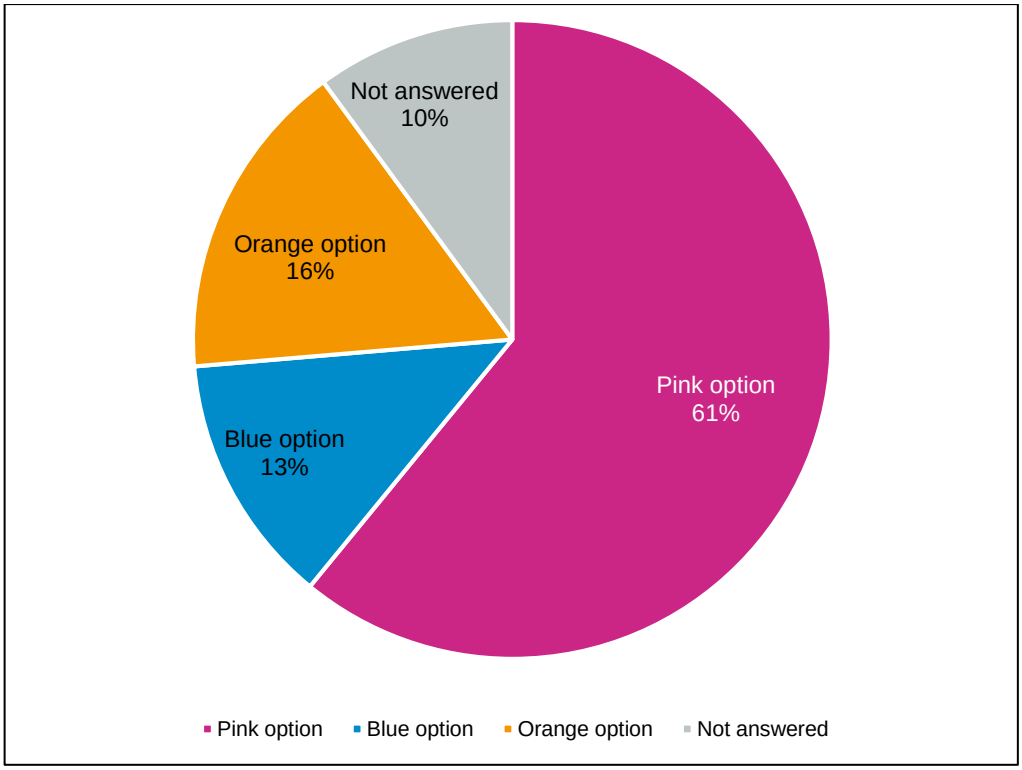
- Junction proposals
- Alternative routes
- Highways design
- Local community considerations
- Environmental effects
- Views on the consultation

2018 Question 1
Which of the Section 1 route options would best serve your regular journeys?

8.3.6. This question offered respondents a series of tick-box options, and a free-text box to provide comments in support of their answer.

Responses from the tick-box options, from all respondents, are shown in Figure 8.8.

Figure 8.8: Response to 2018 Question 1



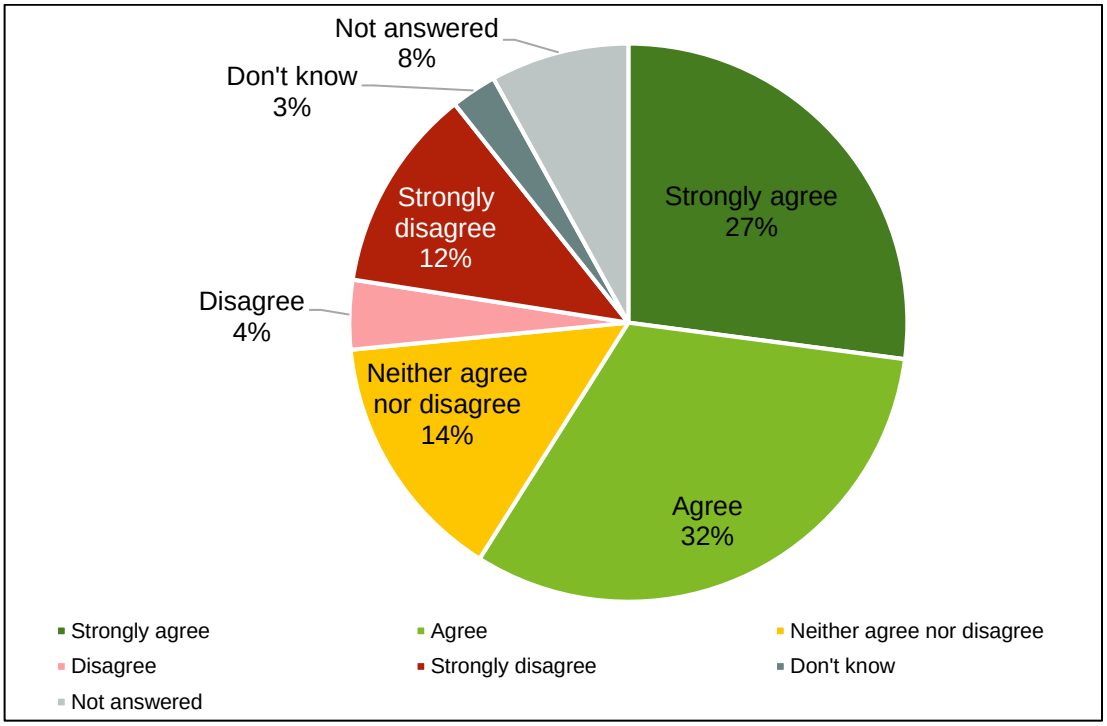
Source: A358 Taunton to Southfields: Report on public consultation (16 January – 27 February 2018)

8.3.7. Figure 8.8 shows that 61% of respondents thought that the Pink route would best serve their regular journeys. 16% of respondents thought the Orange route and 13% of respondents thought the Blue route would best serve their regular journeys.

2018 Question 5:
To what extent do you agree with our proposal for improving the A358 along the line of the existing road past Hatch Beauchamp to Southfields Roundabout (shown in the map as Section 2)?

8.3.8. This question offered respondents a series of tick-box options and a free-text box to provide comments in support of their answer. Responses from the tick-box options, from all respondents, are shown in Figure 8.9.

Figure 8.9: 2018 Section 2 proposals



Source: A358 Taunton to Southfields: Report on public consultation (16 January – 27 February 2018).

8.3.9. This question included a free-text box for respondents to provide their comments. Typical examples are recorded in the *A358 Taunton to Southfields: Report on public consultation (16 January 2018 – 27 February 2018).*

8.3.10. Of those who responded, 59% agreed with the proposals for Section 2 (online widening) whilst 16% of respondents disagreed.

8.4. Common 2018 response themes

Junction proposals

8.4.1. Respondents commented on proposals for new junctions with the M5 as follows:

- **Junction A (Blue and Pink option)** – several respondents who commented on junction A were concerned about the impact to Holway Open Space. Respondents queried how much land the junction would take and reiterated the junction's proximity to residential development. Respondents also raised that the junction would promote good access to the motorway without using junction 25.
- **Junction B (Pink option)** – several respondents felt that this junction would be the best for accessing Nexus 25 and junction 25 while avoiding areas of Ancient Woodland. Respondents also raised that Junction B is further away from residential areas and Stoke Hill than Junction D.
- **Junction C (Pink option)** – a number of respondents said that Junction C will help attract traffic from the A378 onto the new road, helping to relieve congestion at Henlade. Some respondents felt that this junction is too large and will take up a large amount of rural landscape.
- **Junction D (Blue option)** – respondents highlighted the junction's proximity to Stoke Wood and that the large land- take required. Respondents raised that Junction D will help relieve congestion at Henlade by providing a link into junction 25.
- **Junction E (Blue and Orange options)** – some respondents commented on the simplicity of Junction E compared to C and that this would be better for traffic flow. Some respondents thought that Junction E would serve traffic from local roads well, including the A378 and Hatch Beauchamp.
- **Junction F (Orange option)** – some respondents commented that Junction F will relieve congestion at junction 25 by providing a second all-movements motorway junction near Taunton. However, some respondents also stated that the junction would have an impact on the environment near Killams and open up the area for future development.
- **Junction G (Section 2)** – some respondents stated that the junction will help promote safe crossings for the A358 for local and through traffic. However, other responses in relation to this junction varied and respondents felt that:

  - there is not enough local road access and an additional junction was required at Hatch Beauchamp
  - the junction should be moved further south to facilitate a connection between Broadway and Ilton / Rapps
  - this junction should be moved further west towards Stewley
  - a junction is not required at this location
- **Junction H (Section 2)** – many respondents stated that they are happy to see the junction improved but it will not help solve the congestion currently experienced. Some respondents suggested that the junction should be bypassed altogether with a slip road connecting the A358 and A303.

8.5. Alternative routes identified at the 2018 consultation

8.5.1. The consultation material stated that the preferred route could contain elements of each of the three options presented at the consultation. Several responses identified alternative routes being considered for connecting with the M5. These individuals often advocated a different combination of sections of the offline options, which use either the Pink or Blue option and connect it to the M5 using Junction F (as per Orange option). The responses that clearly identified a preference for an alternative option, from the 1,496 consultation responses, are summarised in Table 8.1 below.

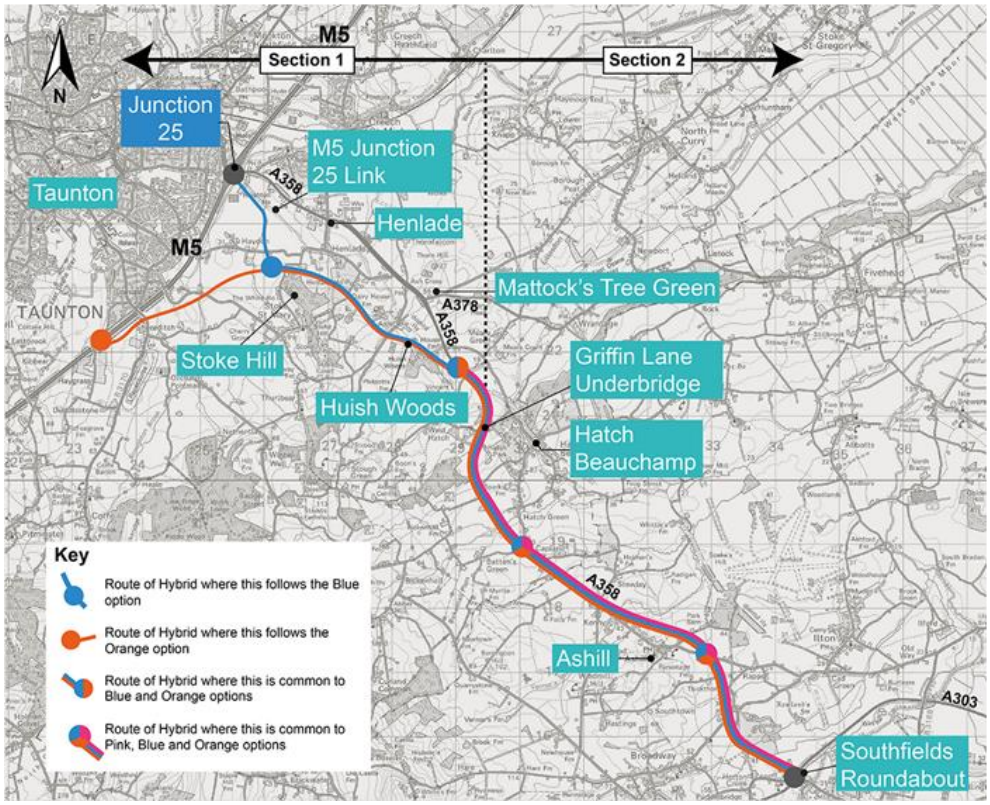
Table 8.1: Number of responses suggesting a different combination of the offline sections

Option name	No. of responses suggesting this variant
Blue / Orange	16 (1.06%)
Pink / Orange	12 (0.80%)

Blue / Orange option

8.5.2. This option is a combination of the Blue option with the Orange option connection to the M5, presented in Figure 8.10 below.

Figure 8.10: Blue and Orange option



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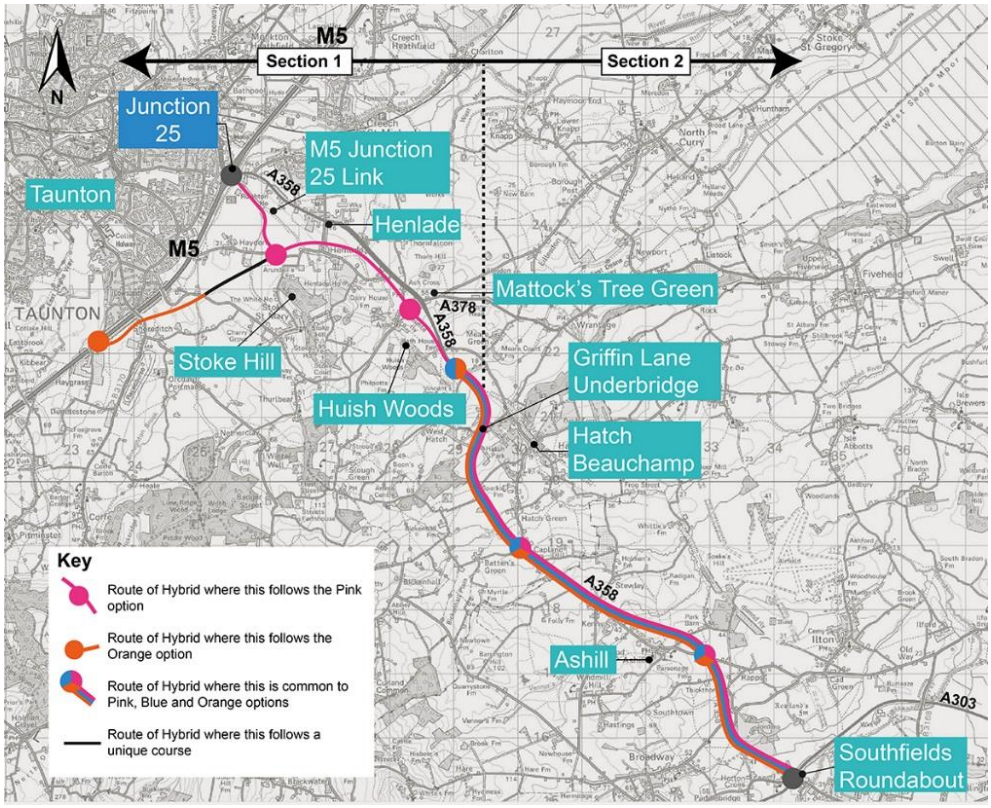
8.5.3. The Blue / Orange option is approximately 15.3 kilometres long between its connection with the M5 and Southfields Roundabout. Additionally a 2.0 kilometres section of dual carriageway (the M5 junction 25 link) would be provided between the proposed dual carriageway and junction 25 of the M5.

8.5.4. The Blue / Orange option has been assessed as part of identifying the preferred route. The selection process of the preferred route is outlined in Chapter 13.

Pink / Orange option

8.5.5. This option is a combination of the Pink option with the Orange option connection to the M5, presented in Figure 8.11 below.

Figure 8.11: Pink and Orange option



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8.5.6. The Pink / Orange option would be approximately 16.0 kilometres long between its connection with the M5 and Southfields Roundabout. It would have an additional 1.5 kilometres section of dual carriageway (the M5 junction 25 link) between the proposed dual carriageway and junction 25 of the M5.

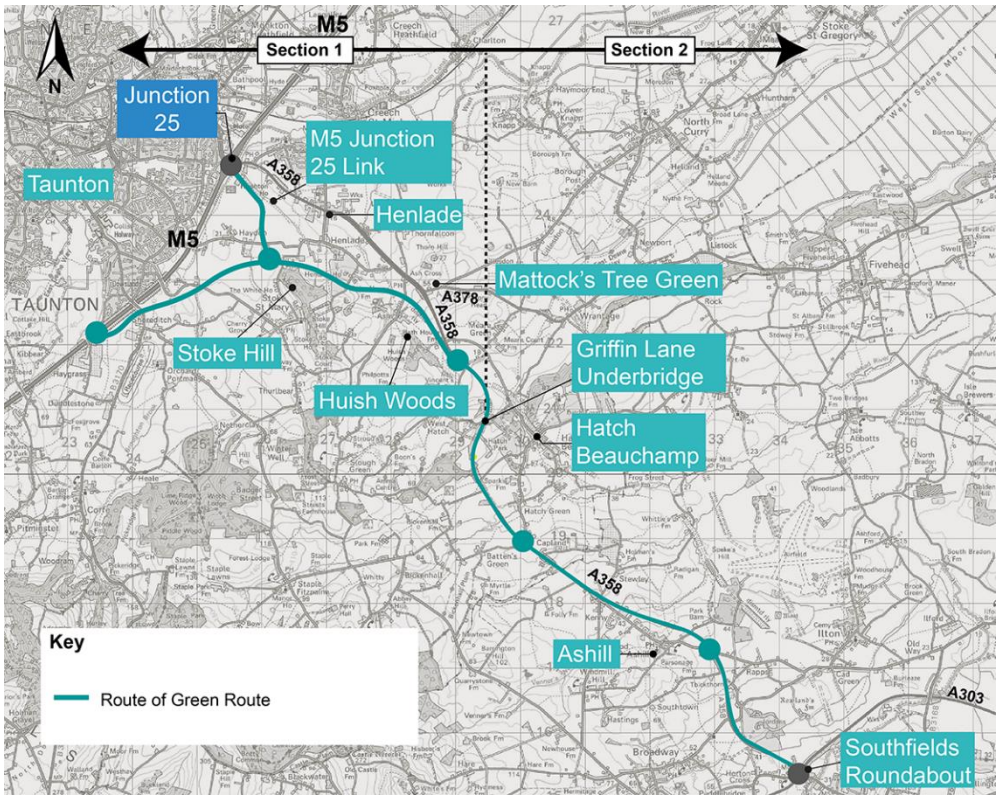
8.5.7. The Pink / Orange option has been assessed as part of identifying the preferred route. The selection process of the preferred route is outlined in Chapter 13.

The Green option

8.5.8. During the 2018 consultation Ruishton, Henlade and Thornfalcon Parish Council presented an alternative option titled the 'Green option'. As this option was provided as part of a response to the consultation, it has been assessed and compared to the three options shown at the consultation. This process identified any additional benefits provided by the Green option.

8.5.9. The Green option has elements from the Pink and Orange options, with a novel element between the A358 / A378 junction at Mattock's Tree Green and the Mount Somerset Hotel. It follows roughly the same corridor between the M5 motorway at the western limits to Southfields Roundabout at the eastern limits, as the other options. The Green option is shown in Figure 8.12 below.

Figure 8.12: Green option



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8.5.10. There would be three junctions along Section 1 of the Green option which would facilitate movement between the proposed dual carriageway and the adjacent road network. These are Junction F (Killams), Junction D (Henlade) and Junction C (Mattock's Tree Green).

8.5.11. The Green option has been assessed as part of identifying the preferred route. The selection process of the preferred route is outlined in Chapter 13.

Highways design

8.5.12. Responses on highways design included an emphasis on the need to consider and accommodate non-motorised users safely and conveniently. There were also comments about flooding, safety and on the need to reduce traffic congestion.

8.5.13. Many respondents sought assurance that safe connectivity for non-motorised users would be maintained or improved. Some respondents called for a cycle path that runs the length of the new A358.

8.5.14. Respondents highlighted the need for the design of junctions to accommodate safe movements by all users, motorised and non-motorised.

8.5.15. Some respondents outlined concerns over whether the Scheme as proposed would be effective in reducing congestion.

8.5.16. Respondents also suggested that journeys for local residents could be worsened as access onto the new A358 is restricted. This would lead to longer routes.

Local community considerations

8.5.17. Respondents expressed concern about the potential impact of the proposals on local communities. They highlighted in particular that some communities are located across the A358 and that connectivity is very important.

8.5.18. Many respondents raised the importance of public open space to the local community, particularly Holway Open Space (officially known as Hawthorn Park).

8.5.19. Respondents sought assurance that local connectivity between communities would be retained safely and efficiently.

8.5.20. Some respondents stated that they felt the proposals would have a negative economic impact on Taunton by enabling traffic to bypass the town.

8.5.21. Other respondents noted that some local businesses rely on passing trade from traffic on the A358 and raised concerns about the consequences of reducing traffic on the existing road.

Environmental effects

8.5.22. Respondents highlighted their concerns about wanting to see the countryside protected. Other issues raised included concerns about noise and light pollution, air quality, wildlife and habitats, drainage, cultural heritage and landscape. Respondents raised in particular concerns regarding Stoke Wood and Huish Woods and that any land required for the Scheme should be minimised where possible.

Views on the consultation

8.5.23. Respondents made a number of comments on the consultation process. Most respondents noted that they were glad to be presented different options alongside more detail on each option. Many respondents welcomed the number and locations of the public information events across the route.

Findings of the consultation

8.5.24. Responses to tick-box elements of the consultation questionnaire show that majority of respondents (61%) prefer the Pink option for Section 1 when considering their regular journeys. A majority (59%) agree with Highways England's proposal for Section 2.

8.5.25. All matters raised by individual members of the public through written comments have been collated and summarised. Matters raised by statutory and non-statutory bodies have been separated out and are recorded in the *A358 Taunton to Southfields Dualling: Report on public consultation (16 January – 27 February 2018)*.

Assessment of the options identified at the consultation

8.5.26. The Pink / Orange, Blue / Orange and Green options have been duly considered and are compared as potential Preferred Route options as part of the analysis explained in Chapter 13. The assessment findings of these options are not detailed within this document, however are included as excerpts in Appendix F Comparison of route options (including National *Networks National Policy Statement)*.

9. Traffic and economics

9.1. Traffic modelling

9.1.1. The proposed A303 dual carriageway scheme between Sparkford and Ilchester and the proposed A358 dual carriageway Scheme between Taunton and Southfields Roundabout in Somerset, would be relatively close to each other. Therefore, a base year traffic model has been developed and used in the appraisal of both schemes. This model has been prepared by adapting the South-West Regional Traffic Model (SWRTM)[36] to reflect additional network details in the A303 and A358 areas. The calibrated / validated base year traffic model representing an average weekday in March 2015.

9.1.2. The traffic model has been developed using SATURN, a traffic modelling software tool. It represents three weekday time periods that are consistent with the SWRTM model time periods. These are:

- an average AM peak period hour (07:00–10:00)
- an average hour in the inter-peak period (10:00–16:00)
- an average PM peak period hour (16:00–19:00) for an average Monday to Friday weekday in March 2015 (excluding school holidays and bank holidays)

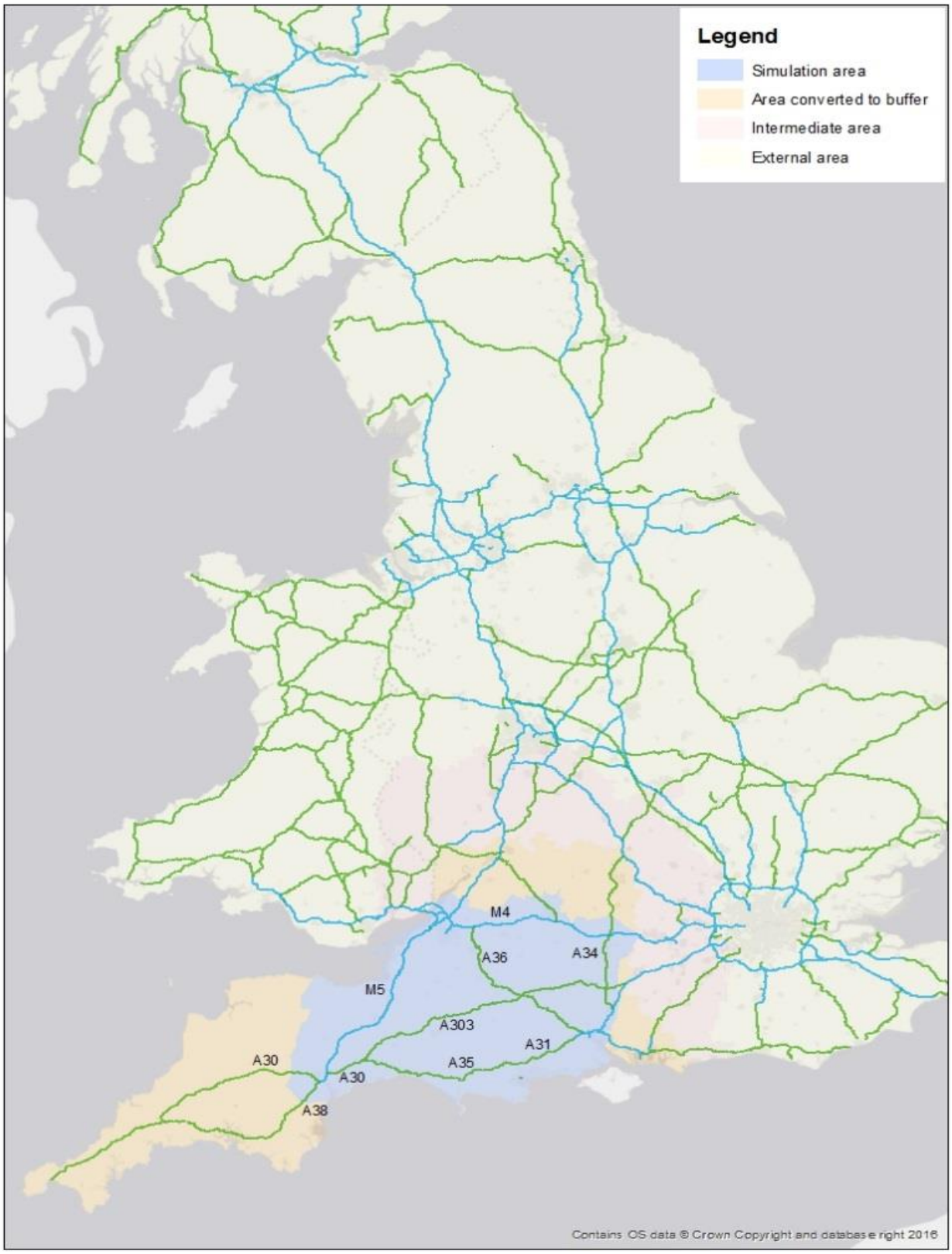
9.1.3. To represent in the economic appraisal the higher traffic flows and peak traffic periods that occur at weekends and during holiday periods, a separate factor-based highway traffic model was also developed.

9.1.4. The development of the traffic model relied on the data used in the SWRTM. It also relied on the A303 and A358 models created at option identification stage (PCF Stage 1) as well as additional surveys carried out in autumn 2016 for the development of the Stage 2 traffic model.

9.1.5. The definition of the study area has considered the area which would be affected by the implementation of the Scheme. In this sense, the study area was defined for both the A303 Sparkford to Ilchester and A358 schemes with both schemes assessed using one model. The study area comprised the A303 corridor, the A358 corridor, the M4 / M5, and the surrounding areas. The SATURN simulation area is shown below in Figure 9.1.

[36] This is documented in the *South-West Regional Traffic Model (SWRTM) Validation Report* (Highways England, March 2017).

Figure 9.1: Areas of coverage



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9.1.6. The SATURN model comprised of 1,933 zones and a sub-regional road network. The simulation area covers the majority of the SWRTM simulation area; namely the area between Exeter to the south-west, the M4 to the north and the A34 / M3 to the east. It was decided that it was unnecessary for the remainder of the SWRTM simulation area to be fully simulated in the option selection stage model. Therefore, the area has been converted into buffer coding and combined with the SWRTM buffer network. This formed the modelled buffer network which allowed movements into, out of and through the study area to be correctly allocated. The detailed local network has been added surrounding each of the proposed schemes. This included the network between Taunton and Southfields Roundabout and close to Sparkford and Podimore and also near Exeter and between Honiton and Taunton.

9.1.7. The developed SWRTM trip matrices have been adapted for the creation of the A303 / A358 Stage 2 base year traffic demand. Additional local zones have been added to better represent the distribution and loading of local trips to the proposed schemes. A matrix estimation process was also carried out in the 2015 base year calibration process.

9.1.8. The SATURN base model assignment convergence meets Department for Transport's web-based Transport Analysis Guidance (WebTAG) criteria in all time periods. The model achieves a good level of flow calibration with results indicating a close match to observations on the calibration screenlines and for individual link counts. The required WebTAG criteria is met in all time periods.

9.1.9. Flow validation has been undertaken against independent data not used in the calibration process or for the matrix building exercise. An assessment of the validation process shows that the model achieves link flow validation in line with the WebTAG criteria. It also shows that screenline flow validation is close to the WebTAG criteria.

9.1.10. The journey time validation is considered to be good in all time periods with the model recreating journey times that are representative on key routes in the modelled area. The journey time route validation meets WebTAG criteria and the journey time segment validation meets or nearly meets the WebTAG criteria across all time periods.

9.1.11. It is considered that the Stage 2 2015 base year traffic assignment model developed for the A303 Sparkford to Ilchester Dualling and A358 Taunton to Southfields Dualling schemes during the option selection stage calibrates and validates within acceptable margins of the WebTAG criteria. It therefore demonstrates a good representation of traffic

behaviour in the study area. The developed base year traffic model forms a robust basis from which future year forecasts and option testing can be developed.

9.2. Traffic forecasting

9.2.1. As described in section 5.1.2, all assessments reported within this document have been carried out with an original Scheme opening year of 2023 and design year of 2038 (15 years after Scheme opening).

9.2.2. Two additional forecast years, consisting of an intermediate year of 2031 and a final forecast year of 2051, have also been developed to support the economic appraisal of the Scheme. The forecasts have used NTEM / TEMPRO v7.2 and Road Traffic Forecasts (RTF) 2015 forecasting data. They have also accounted for local developments which have been assessed in an uncertainty log in accordance with WebTAG unit M4. These include schemes under development or have a near-certain or more than likely prospect of proceeding.

9.2.3. The traffic forecasts have been undertaken using a variable demand modelling (VDM) approach that is consistent with that applied in the development of the SWRTM. This represents redistribution, mode choice and time period choice in response to changes in travel costs.

9.2.4. Traffic forecasts have been prepared for a scenario without the Scheme (Do Minimum) and for the Pink, Blue and Orange options (Do Something options) that include the dualling of the A358 between Taunton and Southfields Roundabout.

9.2.5. The Do Minimum scenario includes all transport schemes and local developments included in the uncertainty log (as per WebTAG unit M4) with a likelihood of at least 'Near Certain' or 'More than Likely'. It should be noted that although recent guidance indicates inclusion of the other proposed *Road Investment Strategy* (RIS) schemes in the Do Minimum scenario, the A303 Sparkford to Ilchester Dualling scheme or the A303 Stonehenge scheme have not been included in the current Do Minimum scenario. This is because forecasting work predated that guidance.

9.2.6. The Pink, Blue and Orange options have been assessed as the Do Something scenario to allow comparison between the options.

9.2.7. Since the completion of the forecasting work the government has announced the removal of the toll charges from the Severn Crossing in 2018. This is likely to have a very small impact on the forecast traffic in the local area. These changes would occur both with and without the Scheme so that the differences for economic and environmental appraisal would be limited. This should therefore have no impact on the

choice between options. It is proposed that the impact of the removal of the tolls is assessed for the preferred route in the next stage of Scheme development (Stage 3).

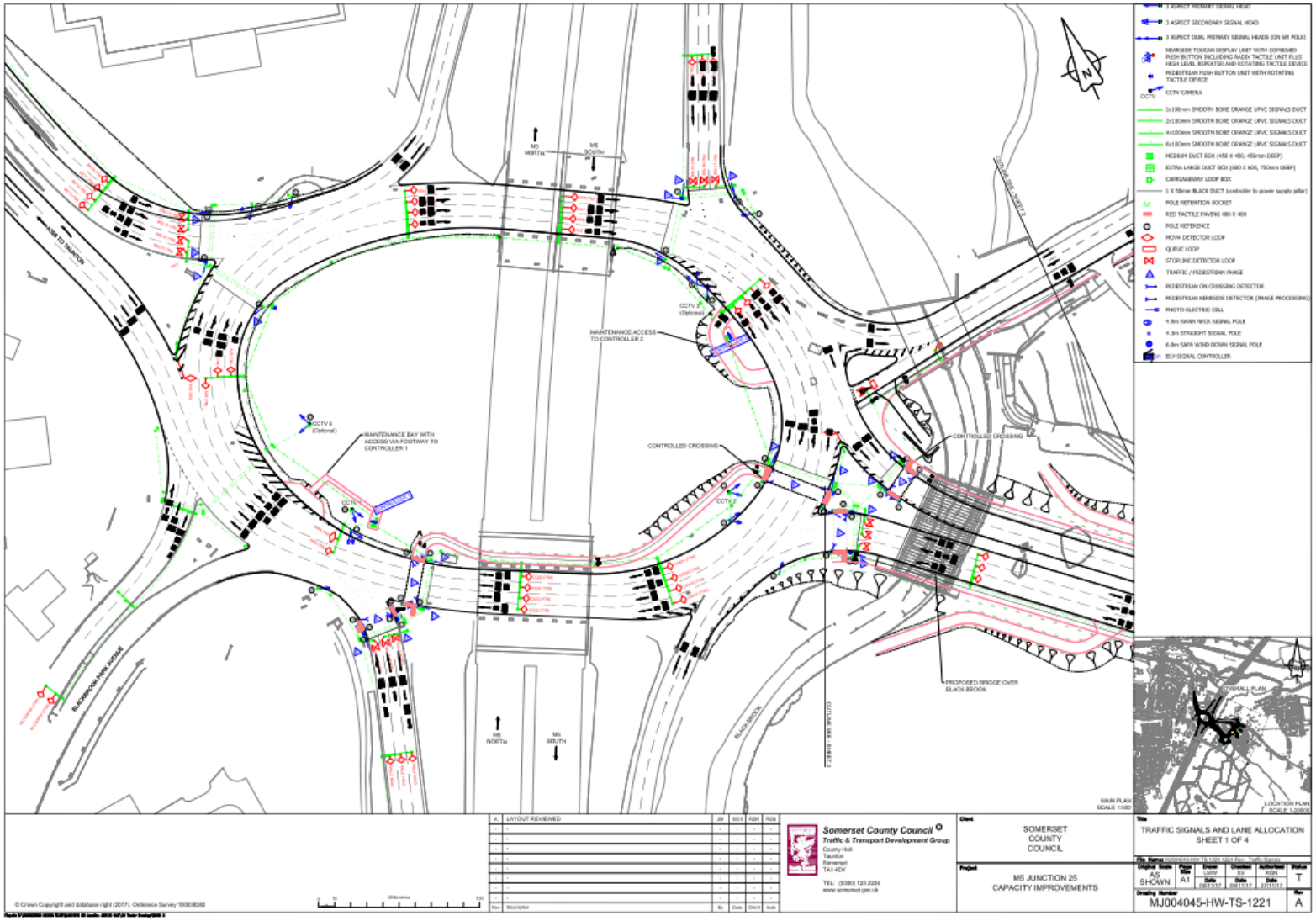
9.3. M5 junction 25 scheme and Nexus 25 employment site at Henlade

9.3.1. An improvement scheme to the M5 junction 25 is proposed by Somerset County Council. The work included are as follows:

- Extension and widening of the circulatory carriageway to four lanes
- Construction of a new signal controlled approach between the existing A358 approach and the M5 southbound on-slip
- Signalisation of the Toneway approach

9.3.2. Of the network schemes included in the uncertainty log, the M5 junction 25 scheme is of a particular importance, given the connection of this Scheme with the proposed improvement of the A358. The M5 junction 25 scheme, proposed by Somerset County Council, has been included in the forecasting both in the Do Minimum and Do Something scenarios. It is shown in Figure 9.2 below as per the March 2018 layout.

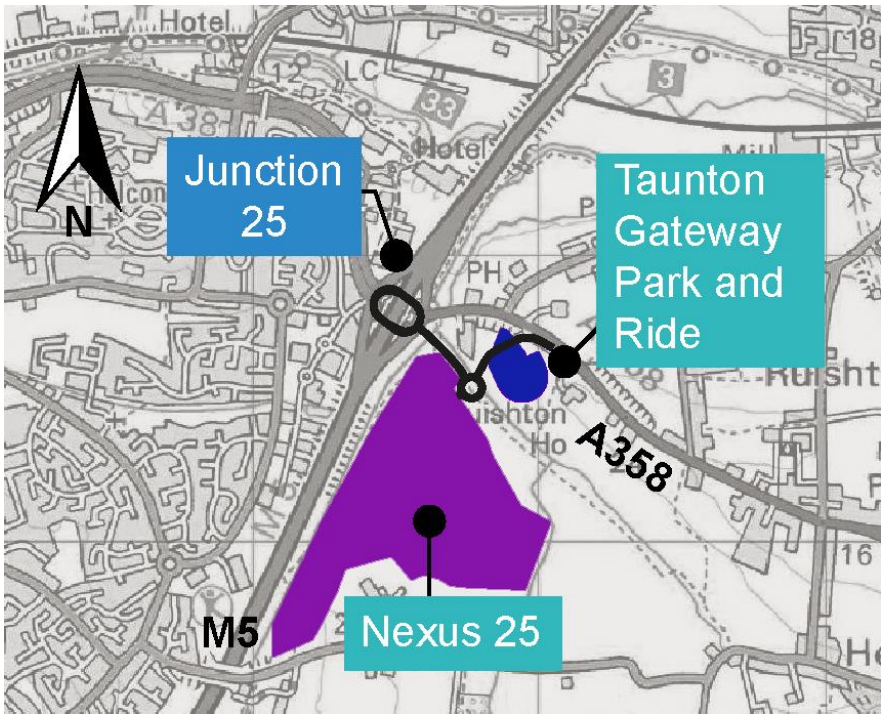
Figure 9.2: M5 junction 25 scheme proposed by Somerset County Council (March 2018)



Source: Somerset County Council

9.3.3. The M5 junction 25 scheme is designed to support the proposed Nexus 25 strategic employment site located near M5 junction 25 (see Figure 9.3). This development has been included in both the Do Minimum and Do Something scenarios. The site is a proposed mix of office and industrial units over a site of 25 hectares with approximately 70,000sqm of business park and 17,500sqm of industrial units.

Figure 9.3: Nexus 25 employment site



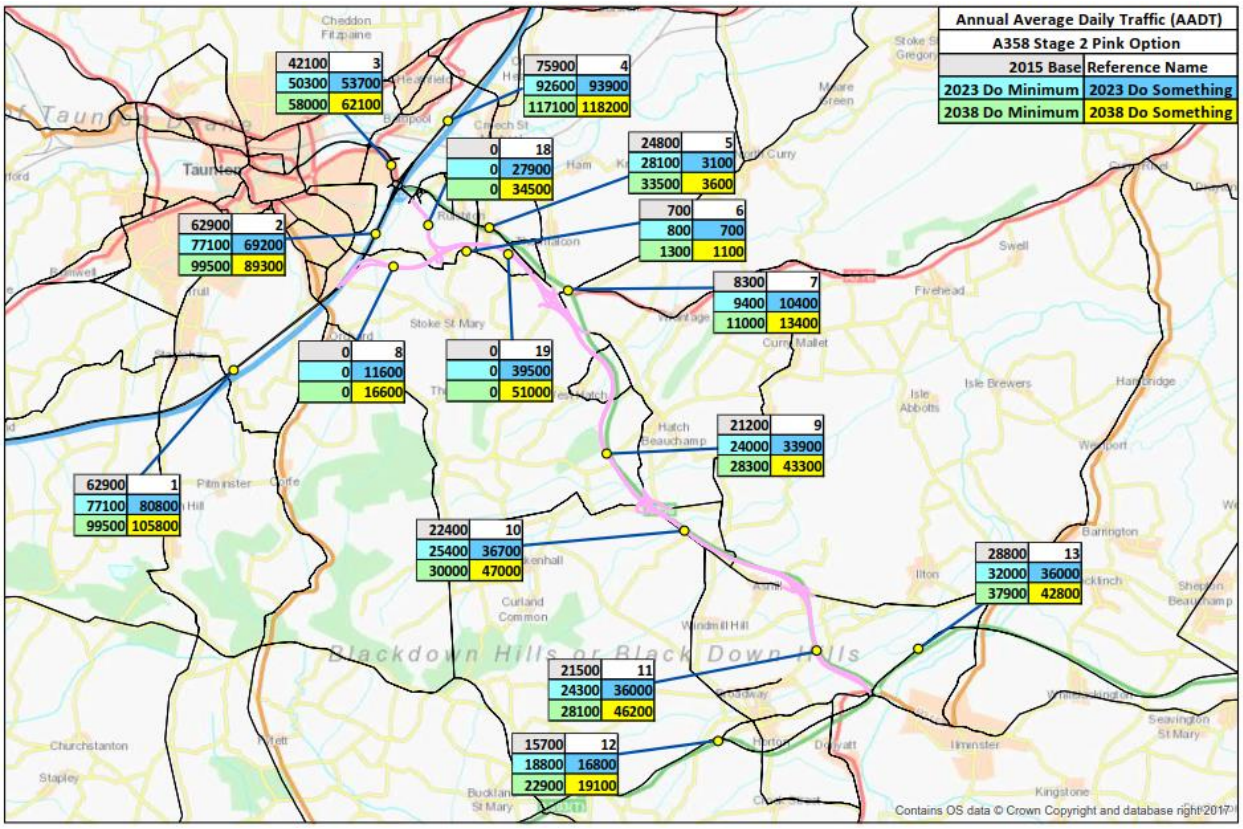
9.4. Traffic impacts of Pink option

Traffic flows

9.4.1. The link flows on the network have been compared between the Do Minimum scenario without the Scheme and the Do Something for the Pink option for 2023 (opening year) and 2038. The Pink option was forecast to increase annual average daily traffic (AADT) along the dualled A358 between M5 junction 25 and Southfields Roundabout compared to the Do Minimum scenario. It was also forecasted to decrease AADTs on the existing A358 through Henlade.

9.4.2. Figure 9.4 shows the AADTs in the local area of the A358 for the 2015 base year, 2023 and 2038 Do Minimum and Do Something (Pink option) scenarios.

Figure 9.4: Pink option - A358 AADTs – Local area



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9.4.3. The AADT flows on the main A358 carriageway on the online section (site reference 10) are forecast to increase from 22,400 in the base scenario (2015) to 25,400 in the opening year (2023) and 30,000 in 2038 in the Do Minimum scenario.

9.4.4. For the Do Something scenario, these flows are expected to increase to 36,700 in 2023 and 47,000 in 2038. This indicates 44% and 57% increases over the Do Minimum flows respectively.

9.4.5. In comparison, the flows on the existing A358 at Henlade (site reference 5) indicate 24,800 in the base year, 28,100 in the 2023 Do Minimum and 33,500 in the 2038 Do Minimum. In the Do Something scenario, the traffic model shows AADTs of 3,100 in 2023 and 3,600 in 2038. This represents an 89% decrease in traffic for both 2023 and 2038.

9.4.6. The offline section of the proposed Scheme, east of the link connecting to M5 junction 25 (site reference 19), has AADTs of 39,500 and 51,000 vehicles in the 2023 and 2038 Do Something scenarios. West of the link connecting to M5

junction 25 (site reference 8), traffic flows are 11,600 and 16,600 in the 2023 and 2038 Do Something respectively.

9.4.7. The traffic flows on the new link connecting to M5 junction 25 (site reference 18) are forecast to be 27,900 in 2023 and 34,500 in 2038 with the Pink option.

9.4.8. Figure 9.4 also shows that some of the additional traffic using the Scheme is local traffic. As the difference in flows between the Do Something and the Do Minimum on the southern part of the Scheme (site reference 10) is 17,000 in 2038 (the design year). Further north (site reference 9) at Hatch Beauchamp the difference is 15,000. This local re-routeing is due to local traffic from the nearby villages to the south of the A358 now using the new Scheme (and the provided new junctions) rather than the local roads.

9.4.9. From the A303 flows at site reference 13 (east of Southfields Roundabout), the AADTs are forecast to increase from 37,900 vehicles in 2038 DM to 42,800 in 2038 DS. This shows that the Scheme makes the A303 / A30 corridor more attractive to traffic travelling between the south-east and south-west.

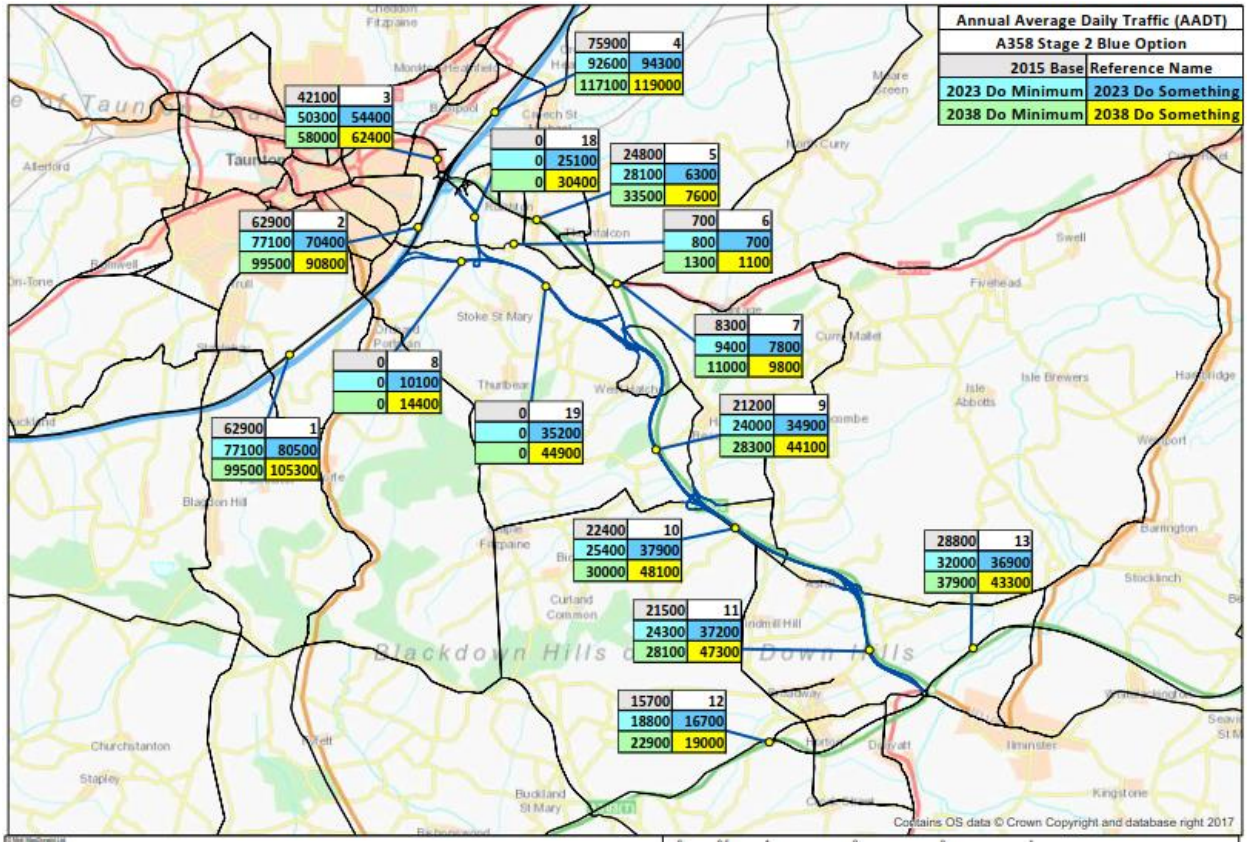
9.4.10. In 2038, at site reference 12 (west of Southfields Roundabout), AADTs are forecast to reduce from 22,900 vehicles in Do Minimum to 19,100 vehicles in Do Something. At site reference 1 (M5 south of the new Junction A) AADTs are forecast to increase from 99,500 vehicles in the Do Minimum scenario to 105,800 vehicles in the Do Something scenario. This increase in AADTs at site reference 1 is a combined effect of local and strategic reassignment from the A303 / A30 corridor through the Blackdown Hills to the A358 / M5 corridor.

9.5. Traffic impacts of Blue option

Traffic flows

9.5.1. Figure 9.5 shows the AADTs in the local area of the A358 for the 2015 base year, 2023 and 2038 Do Minimum and Do Something (Blue option) scenarios.

Figure 9.5: Blue option - A358 AADTs – Local area



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9.5.2. The AADT flows on the main A358 carriageway on the online section (site reference 10) for the Do Something scenario are expected to increase to 37,900 in 2023 and 48,100 in 2038 over the Do Minimum. This indicates 49% and 60% increases over the Do Minimum flows respectively.

9.5.3. The traffic model shows flows on the existing A358 at Henlade (site reference 5) in the Do Something scenario of 6,300 in 2023 and 7,600 in 2038. This represents a 78% decrease in traffic in 2023 and 77% in 2038.

9.5.4. The offline section of the proposed Scheme, east of the link connecting to M5 junction 25 (site reference 19), has flows of 35,200 and 44,900 vehicles in the

2023 and 2038 Do Something scenarios. West of the link connecting to M5 junction 25 (site reference 8), traffic flows are 10,100 and 14,400 in the 2023 and 2038 Do Something respectively.

9.5.5. The traffic flows on the new link connecting to M5 junction 25 (site reference 18) are forecast to be 25,100 in 2023 and 30,400 in 2038 with the Blue option.

9.5.6. Figure 9.5 shows that some additional traffic is local, as the difference in flows between the Do Something and the Do Minimum on the southern part of the Scheme (site reference 10) is 18,100 in the 2038 (the design year) whereas further north (site reference 9) at Hatch Beauchamp the difference is 15,800. This local re-routeing is due to local traffic from the nearby villages to the south of the A358 now using the new Scheme (and the provided new junctions) rather than the local roads.

9.5.7. From the A303 flows at site reference 13 (east of Southfields Roundabout), the AADTs are forecast to increase from 37,900 vehicles in 2038 Do Minimum to 43,300 in 2038 Do Something. This shows that the Scheme makes the A303 / A30 corridor more attractive to traffic travelling between the south-east and south-west.

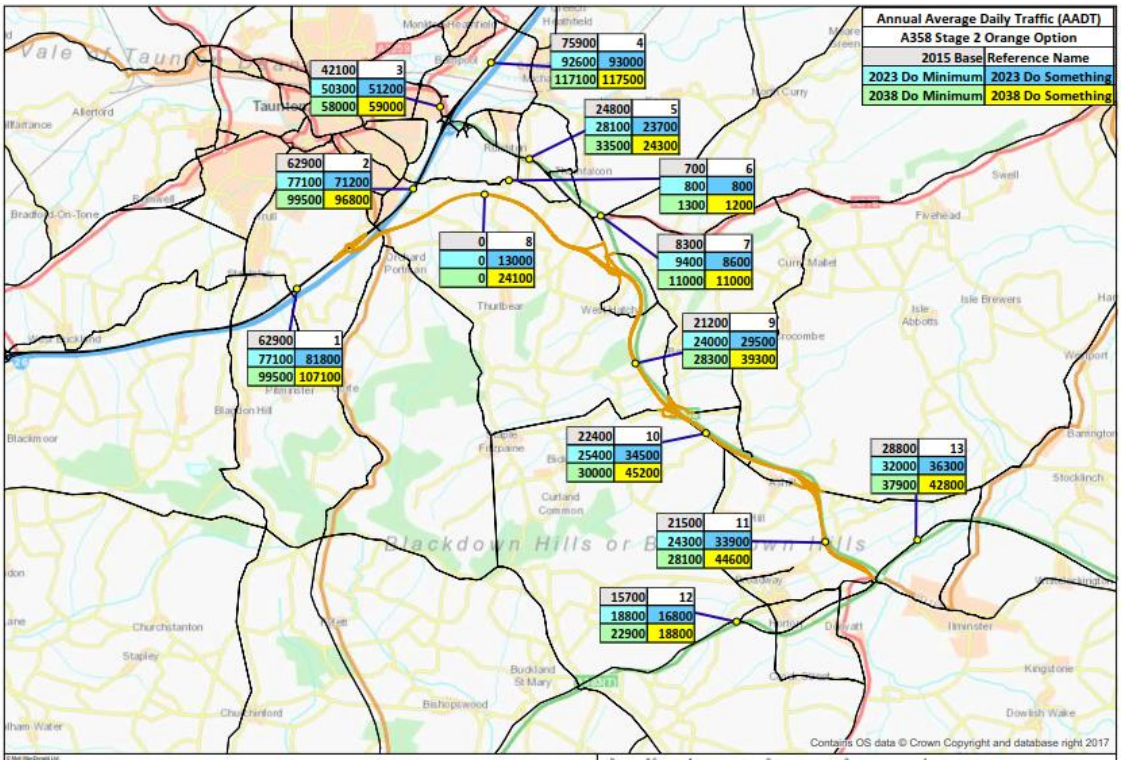
9.5.8. In 2038, at site reference 12 (west of Southfields Roundabout), AADTs are forecast to reduce from 22,900 vehicles in Do Minimum to 19,000 vehicles in Do Something. At site reference 1 (M5 south of the new Junction A) AADTs are forecast to increase from 99,500 vehicles in the Do Minimum scenario to 105,300 vehicles in the Do Something scenario. This increase in AADTs at site reference 1 is a combined effect of local and strategic reassignment from the A303 / A30 corridor through the Blackdown Hills to the A358 / M5 corridor.

9.6. Traffic impacts of Orange option

Traffic flows

9.6.1. Figure 9.6 shows the AADTs in the local area of the A358 for the 2015 base year, 2023 and 2038 Do Minimum and Do Something (Orange option) scenarios.

Figure 9.6: Orange option - A358 AADTs – Local area



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9.6.2. The AADT flows on the main A358 carriageway on the online section (site reference 10) for the Do Something scenario are expected to increase to 34,500 in 2023 and 45,200 in 2038 over the Do Minimum. This indicates 36% and 51% increases over the Do Minimum flows respectively.

9.6.3. The traffic model shows flows on the existing A358 at Henlade (site reference 5) in the Do Something scenario of 23,700 in 2023 and 24,300 in 2038. This represents a 16% decrease in traffic in 2023 and 27% in 2038.

9.6.4. The offline section of the proposed Scheme (site reference 8) has traffic flows of 13,000 and 24,100 vehicles in the 2023 and 2038 Do Something respectively.

9.6.5. Figure 9.6 shows that some additional traffic local, as the difference in flows between the Do Something and the Do Minimum on the southern part of the Scheme (site reference 10) is 15,200 in the 2038 (the design year) whereas further north (site reference 9) at Hatch Beauchamp the difference is 11,000. This local re-routeing is due to local traffic from the nearby villages to the south of the A358 now using the new Scheme (and the provided new junctions) rather than the local roads.

9.6.6. From the A303 flows at site reference 13 (east of Southfields Roundabout), the AADTs are forecast to increase from 37,900 vehicles in 2038 Do Minimum to 42,800 in 2038 Do Something. This shows that the Scheme makes the A303 / A30 corridor more attractive to traffic travelling between the south-east and south-west.

9.6.7. In 2038, at site reference 12 (west of Southfields Roundabout), AADTs are forecast to reduce from 22,900 vehicles in Do Minimum to 18,800 vehicles in Do Something. At site reference 1 (M5 south of the new Junction F) AADTs are forecast to increase from 99,500 vehicles in the Do Minimum scenario to 107,100 vehicles in the Do Something scenario. This increase in AADTs at site reference 1 is a combined effect of local and strategic reassignment from the A303 / A30 corridor through the Blackdown Hills to the A358 / M5 corridor.

9.7. Journey times

9.7.1. Journey times along the existing and new A358 between Southfields Roundabout and the M5 are summarised in Table 9.1. This shows average peak period journey times for three shorter routes between Southfields Roundabout and M5 junction 26 (to the south of junction 25), Taunton (M5 junction 25) and M5 junction 24 (north of junction 25). The times are shown for the Do Minimum (without Scheme) and 2038 (the design year) taken from the traffic model.

9.7.2. All journeys between Southfields Roundabout and the M5 show journey time savings for the Scheme options when compared to the journey times in the Do Minimum scenario.

9.7.3. The journey times between the options would be similar. The changes are summarised below, averaged across the three routes.

- In the AM Peak period
  - The Pink option showed a 38% (~8 min 11 sec) and 34% (~6 min 52 sec) improvement in journey time in the eastbound and westbound directions respectively

  - The Blue option showed a 38% (~8 min 16 sec) and 34% (~7 min 10 sec) improvement in journey time in the eastbound and westbound directions respectively
  - The Orange option (via the new all-movement junction) showed a 30% (~7 min 58 sec) and 28% (~7 min 17 sec) improvement in journey time in the eastbound and westbound directions respectively

- In the PM Peak period:
  - The Pink option showed 37% (~7 min 42 sec) and 29% (~5 min 48 sec) improvement in journey time in the eastbound and westbound directions respectively
  - The Blue option showed a 38% (~7 min 52 sec) and 29% (~5 min 47 sec) improvement in journey time in the eastbound and westbound directions respectively
  - The Orange option (via the new all-movement junction) showed a 28% (~7 min 46 sec) and 23% (~6 min 15 sec) improvement in journey time in the eastbound and westbound directions respectively

9.7.4. The figures indicate that for the Orange option, journey times are shorter travelling through the new proposed all-movement junction than through Henlade.

Table 9.1: Summary of journey times and changes in journey times between Southfields Roundabout and M5 junction 26, junction 25 (Taunton) and junction 24 in 2038

Route			Do Minimum (without Scheme)	Pink option			Blue option			Orange option (via Henlade)			Orange option (via J25A)		
				Journey Time (min:sec)	Difference (min:sec)	% change	Journey Time (min:sec)	Difference (min:sec)	% change	Journey Time (min:sec)	Difference (min:sec)	% change	Journey Time (min:sec)	Difference (min:sec)	% change
Eastbound	M5 J26 to Southfields	AM-Peak	24:40	14:03	-10:37	-43%	14:04	-10:36	-43%	-	-	-	13:37	-11:03	-45%
		PM-Peak	24:03	13:52	-10:10	-42%	13:49	-10:14	-43%	-	-	-	13:27	-10:36	-44%
	M5 J25 to Southfields	AM-Peak	18:09	10:56	-07:12	-40%	10:49	-07:19	-40%	13:45	-04:23	-24%	13:31	-04:38	-25%
		PM-Peak	17:08	10:29	-06:39	-39%	10:16	-06:52	-40%	13:07	-04:01	-23%	13:06	-04:02	-24%
	M5 J24 to Southfields	AM-Peak	22:27	15:42	-06:45	-30%	15:34	-06:53	-31%	18:29	-03:58	-18%	18:15	-04:12	-19%
		PM-Peak	21:31	15:14	-06:17	-29%	15:01	-06:30	-30%	17:53	-03:39	-17%	17:51	-03:40	-17%
Westbound	Southfields to M5 J26	AM-Peak	21:49	13:46	-08:03	-37%	13:51	-07:58	-37%	-	-	-	13:08	-08:41	-40%
		PM-Peak	20:58	13:50	-07:08	-34%	13:55	-07:02	-34%	-	-	-	13:16	-07:42	-37%
	Southfields to M5 J25	AM-Peak	16:53	10:36	-06:17	-37%	10:36	-06:17	-37%	13:05	-03:48	-23%	12:32	-04:21	-26%
		PM-Peak	17:13	12:04	-05:09	-30%	12:02	-05:11	-30%	14:19	-02:54	-17%	14:01	-03:12	-19%
	Southfields to M5 J24	AM-Peak	22:17	16:01	-06:16	-28%	16:01	-06:16	-28%	17:57	-04:20	-19%	18:30	-03:48	-17%
		PM-Peak	22:54	17:46	-05:08	-22%	17:44	-05:09	-23%	19:44	-03:10	-14%	20:02	-02:51	-12%

9.8. Collision (accident) savings

9.8.1. The COBALT (Cost and Benefit of Accidents – Light Touch) software was used to derive the cost of collisions in monetary form for the 60-year appraisal period. Table 9.2 summarises the results of the COBALT collision (accident) assessment. It shows observed collision rates in the local area for a 60-year appraisal period.

Table 9.2: Predicted collision savings based on local collision rates (£000s)

		60 Year Appraisal Period
		Do-Minimum
Number of Personal Injury Collisions		
Casualties	Fatal	1,352.0
	Serious	12,739.5
	Slight	138,359.1
Collision Costs (£000s in 2010 prices discounted to 2010)	**Total**	**4,875,060**

		Pink option	Blue option	Orange option
Number of Personal Injury Collisions				
Casualties	Fatal	1,343.1	1,343.1	1,348.6
	Serious	12,643.4	12,633.3	12,699.2
	Slight	137,783.7	137,688.3	138,290.2
Collision Savings (£000s in 2010 prices discounted to 2010)	**Total**	**4,848,814**	**4,845,324**	**4,867,207.5**
Number of Personal Injury Collisions savings				
Casualties	Fatal	8.9	8.9	3.3
	Serious	96.1	106.2	40.3
	Slight	575.4	670.7	68.9
Collision Savings (£000s in 2010 prices discounted to 2010)	**Total**	**26,246.1**	**29,736.4**	**7,852.5**

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

9.8.2. The benefits are generated by traffic flows shifting from poorer quality links and junctions to higher quality, and therefore safer, links and junctions. These occur in the fully assessed area, predominantly around the option proposals. There is a net benefit at Southfields Roundabout with the proposed Scheme despite the increase in traffic flows from the Do Minimum. This is due to the application of the default collision rates as the roundabout has been treated as a 'new'

junction in the COBALT Do Something model following the design improvements in the Scheme options.

9.8.3. When compared with the Do Minimum scenario, all options result in a lower number of fatal and serious personal injury collisions (for the Pink and Blue options a decrease of nine fatal and around 100 serious personal injury collisions). The Orange option shows the least reduction for fatal, serious and slight personal injury collisions when compared with the Do Minimum scenario, but the Scheme still reduces the number of fatal collisions by three. The AADT flows in Figure 9.4, Figure 9.5 and Figure 9.6 show that the Orange option, without the link connecting to M5 junction 25, is the one to maintain the highest level of traffic on the existing A358 through Henlade. This traffic, therefore, does not benefit from the reduced collision rates on the new offline dual carriageway section of the A358. By travelling on the single carriageway section through the Henlade at-grade give way / signalised junctions, retains the higher collision rates of the existing road.

9.8.4. The net collision savings range between £29.7 million for the Blue option to £7.9 million for the Orange option. The Pink option results in £26.2 million savings.

9.9. Economic performance of options

9.9.1. Economic assessment has been carried out in a manner consistent with TAG unit A1.1 Cost Benefit Analysis using the latest (at the time of analysis) available TUBA v1.9.10. TUBA calculates user benefits using trip and cost matrices output from the traffic models for each option (including the Do Minimum). Model noise caused unexpected flow changes far away from the Scheme area and were mainly due to model convergence that could affect the economic assessment and produce unrealistic benefits or disbenefits. A masking methodology has been implemented to overcome the observed model noise. This masks out benefits or disbenefits at locations far away from the Scheme which could not be attributed to the Scheme. Therefore, the benefits reported are only for the traffic movements using or affected by the Scheme options. However, despite the application of the masking methodology, it has not been possible to completely eliminate the model noise. This issue will be looked at again in the next stage of the Scheme development (Project Control Framework (PCF) Stage 3) where a reduced modelled simulation area would help in reducing the model noise even further.

9.9.2. In addition to the four weekday time periods, the economic assessment made use of a model for a summer weekend to capture the full extent of benefits associated with the Scheme options during the summer period.

9.9.3. As well as TUBA, COBALT (version 2013.02 with a 2017.1 parameter file) and QUADRO2017 (QUeues And Delays at ROadworks, V4 R15) have been used for the collision assessment and assessment of impacts during construction respectively. The environmental impact assessment has been carried out for air quality (in accordance with TAG unit A3 Chapter 3), noise (in accordance with TAG unit A3 Chapter 2) and greenhouse gases, where TUBA emissions were used in the Greenhouse Gases Workbook TAG unit A3 version 1.9.1. In addition to these, journey time reliability and wider economic impacts have also been assessed.

9.9.4. Scheme costs for all options are presented in Table 9.3. Changes in maintenance costs have not been included in the economic assessment at this stage (PCF Stage 2 option selection). However, they will be included in the next stage of the Scheme development (PCF Stage 3 preliminary design) when they become available.

9.9.5. The Scheme costs in Table 9.3 are expressed in 2010 prices and are undiscounted. They range from £384.1 million for the Pink option to £361.7 million for the Orange option. The Blue option costs are set at £376.9 million.

Table 9.3: Scheme costs summary – Pink, Blue and Orange options

Cost type	Pink option	Blue option	Orange option
Preparation	£26,171,360	£25,060,385	£25,457,640
Supervision	£3,341,050	£3,341,050	£3,340,739
Works	£333,774,744	£326,094,352	£305,058,581
Land	£20,849,623	£22,410,774	£27,831,626
Total Costs (Undiscounted)	**£384,136,777**	**£376,906,562**	**£361,688,586**

Source: Highways England options Estimates (April 2018). Values are expressed in 2010 prices, undiscounted.

9.9.6. The benefits and costs of all options are presented in Table 9.4, which shows both the initial Benefit to Cost Ratio (BCR) and the adjusted BCR which also considers the wider economic and journey time reliability benefits. The wider economic impact shown below is related to output change in imperfectly competitive markets as a result of the Scheme. It has been assessed using a simplified approach based on recommendation set out in WebTAG 2.1 section 4.1. Journey time reliability benefits have been assessed using a method set out in WebTAG A1.3 Appendix C.5. The figures in this table are in 2010 prices and are discounted to 2010.

Table 9.4: Analysis of monetised costs and benefits – All Scheme options (£000s)

Item	Pink option	Blue option	Orange option
Air quality (not assessed by TUBA) *	330	508	733
Noise (not assessed by TUBA) **	-2,335	-2,248	-2,396
Collisions (not assessed by TUBA) ***	26,246	29,736	7,853
Roadworks (not assessed by TUBA) ****	-23,628	-19,894	-21,812
Greenhouse Gases (not assessed by TUBA) *****	-25,880	-24,189	-22,521
Economic efficiency: consumer users (Commuting)	78,153	67,091	46,861
Economic efficiency: consumer users (Other)	94,629	71,961	41,773
Economic efficiency: business users and providers	188,958	153,958	147,813
Wider public finances (indirect taxation revenues)	53,774	51,502	47,435
Present Value of Benefits (PVB)	**390,246**	**328,425**	**245,738**
Broad Transport Budget - Present Value of Costs (PVC)	301,730	296,183	284,913
OVERALL IMPACTS			
Net Present Value (NPV)	88,516	32,242	-39,175
Initial Benefit to Cost Ratio (BCR)	**1.29**	**1.11**	**0.86**
Reliability benefits	22,410	19,263	14,825
Wider economic benefits	18,896	15,396	14,781
Adjusted BCR	**1.43**	**1.23**	**0.97**

Notes: * TAG unit A3 Chapter 3, ** TAG unit A3 Chapter 2, *** COBALT, **** QUADRO, ***** TAG unit A3 version *1.9.1*
All monetary values are expressed in 2010 prices discounted to 2010.

9.9.7. The BCR value is used to assess the value of a transport project by weighing the benefits against the costs to indicate whether it is value for money (VfM). In doing this a wide spectrum of impacts is considered in a detailed appraisal, including various impacts on the economy, the environment and social welfare.

9.9.8. The initial BCRs range between 0.86 for the Orange option to 1.29 for the Pink option. The adjusted BCRs, which consider the additional benefits due to the journey time reliability and the wider economic benefits, bring the BCRs up to 0.97 for the Orange option, 1.23 for the Blue option and 1.43 for the Pink option.

9.9.9. The previous BCRs, as presented in the *Technical Appraisal Report* published in January 2018 and current BCRs for the three options are compared in Table 9.5 below.

Table 9.5: Benefit to Cost Ratios (before and after 2018 public consultation)

	BCRs presented in the *Technical Appraisal Report* (January 2018)	BCRs (April 2018)
Pink option	2.08	1.43
Blue option	1.87	1.23
Orange option	1.64	0.97

9.9.10. The BCRs in the current assessment have reduced for the following reasons:

- During PCF stage 2, the traffic model was transferred from the local model to south-west regional model. A switch from TEMPRO v7.0 to v7.2 was also made in line with Department for Transport (DfT) guidance. TEMPRO v7.2 provided lower overall traffic growth in the south-west region compared to TEMPRO v7.0. The BCRs have been adversely affected by a combination of rising costs and reducing benefits as a result of the above.
- During PCF stage 2, the traffic model was transferred from the local model to south-west regional model. The SATURN (Simulation and Assignment of Traffic in Urban Road Networks) simulated area (up to Bristol to the north) was too extended and created convergence noise in the model's iterative process. This can cause large discrepancies in the economic appraisal, which become apparent during the forecasting exercise. This negatively affected the TUBA economic assessment. The issue was mitigated by adopting a masking methodology in TUBA. However, this will require further investigation during PCF stage 3. It is anticipated that the PCF stage 3 modelling work will reduce the area simulated by the SATURN model to address the convergence issue.

9.9.11. However, in the overall value for money assessment of the options, the sources of analytical uncertainty and the potential scale of adverse impacts on the environment are considered. Based on this assessment the Pink option is expected to represent between low and medium value for money. The Blue and Orange options are likely to deliver low and poor value for money respectively.

9.9.12. Somerset County Council commissioned an economic impact study for improvements to the whole A303 corridor (*A303 A358 A30 corridor improvement programme: Economic impact study February 2013*). This has estimated that upgrading the A303 / A358 / A30 to dual carriageway standard throughout its length between Amesbury and Honiton / Taunton would lead to a

net attraction of up to 21,400 jobs to the south-west region with substantial Gross Value Added (GVA) benefits in the region.

9.9.13. A specific land use and economic development benefit assessment has been undertaken for dualling the A358 between the M5 near Taunton and Southfields (*A358 Taunton to Southfields Dualling Land Use and Economic Development Report, Mott MacDonald Sweco Joint Venture, July 2016*). This assessment concludes that approximately 630 jobs and £38 million of annual GVA would be attracted to the local district authority areas of South Somerset and Taunton Deane. This is attributed directly to dualling the A358 between the M5 near Taunton and Southfields.

10. Operational assessment

10.1. Maintenance and repair strategy

10.1.1. The key maintenance issues for the proposed options were reviewed. It has been assumed at this stage that the following assets will be maintained by Highways England:

- The length of the A358 taken into Highways England's ownership
- The A303
- Existing / upgraded Southfields Junction
- Potential new junction on the M5
- New structures including overbridges, underpasses and footbridges along the line of the preferred route

10.1.2. It is assumed that the following assets will be maintained by Somerset County Council:

- Road pavement and drainage for county roads and footpaths passing beneath underbridges on the A358
- Litter picking and gritting of highways on overbridges

10.1.3. New assets requiring long-term maintenance and existing assets that will need to be repaired or replaced to bring them up to an acceptable standard at opening of the proposed Scheme were also considered. These include:

- Drainage
- Road pavement
- Safety barriers and fences
- Street lighting and other electrical assets
- Structures

10.1.4. Requirements for future ease of maintenance of all the Scheme assets are among the factors driving the design. Current considerations include:

- Minimising equipment in the central reserve
- Passively safe street furniture
- Use of concrete barrier in central reserve which would not require repair following an incident
- Provision of maintenance laybys at key locations
- Use of integral bridges eliminating the need to maintain and replace bearings
- Drainage features including drainage ponds and oil interceptors which can be accessed safely off the carriageway

- Access arrangements and slope gradients will be taken into account for the soft estate

10.2. Safety management

10.2.1. Interim Advice Note (IAN) 191/16, *Safety governance for Highways England*, provides guidance on the selection and implementation of the appropriate Safety Management System (SMS) for a scheme based on several criteria[37].

10.2.2. The types of Safety Management System referred to in IAN 191/16 are:

- Type A – Basic. This is likely to apply to projects / interventions that are routine, familiar and without operational implications. As such, these will be largely satisfied by the application of existing standards and guidance
- Type B – Moderate. This is likely to apply to:
  - Projects / interventions that could have some significant operational impacts
  - Those which may lead to an increased level of stakeholder interest (specifically in terms of how safety will be addressed or managed)
  - This will include the application of existing standards and guidance
- Type C – Complex. This is likely to apply to:
  - Complex, infrequent projects / interventions which may have major implications for the strategic road network
  - This will include the application of existing standards and guidance

10.2.3. The result of the classification process deems that this Scheme should be subject to a Type A SMS with two Type B features. The reasoning for this classification is summarised in Table 10.1 below.

Table 10.1: Reasoning for classification decisions

Feature	Results for Scheme	Explanation
1.Stakeholder interest	**Type B**	Whilst there are three primary stakeholders; Highways England, Somerset County Council and Taunton Deane Borough Council, there are also the emergency services, recovery organisations and road safety groups, together with several local stakeholders such as various non-motorised user groups, as well as landowners. It is considered that adequate levels of consultation with the interested parties should satisfy this requirement
2.Operational experience	**Type A**	There is UK operational experience of all the main component parts of the Scheme and there is extensive UK experience in the planning, design, construction, operation and maintenance of schemes of this nature.

[37] The authors recognise that IAN191/16 was superseded in June 2018 and superseded by GG104 (*Requirements for safety risk assessment).* GG104 will be implemented in subsequent stages of the Scheme.

Feature	Results for Scheme	Explanation
3.Technology and infrastructure	**Type A**	There is likely to be minimal application of technology within the proposed Scheme and the Scheme is not considered to be technology-led. The technology and infrastructure utilised within the Scheme will be common throughout the UK.
4.Standards and legislation	**Type A**	Design standards covering all the features of the proposed road upgrade are contained in the industry-standard Design Manual for Roads and Bridges. Departures from standard are likely to be minimal.
5.Impact on organisation	**Type B**	The road upgrade will have some impact upon the operation of the road network as it consists of the upgrade of an existing section of local authority maintained road which will then be trunked and become the responsibility of Highways England.
6.Project scale	**Type A**	A significant section of the existing A358 will be upgraded (albeit it is not currently a trunk road) and this can therefore be classified as a 'major location', though the upgrade is addressing a localised section of highway which is not to current standards and with a collision problem and is unlikely to be rolled out elsewhere. Whilst elements of this feature are categorised as Type B, on balance this feature is considered to be a Type A.

10.2.4. The A358 Taunton to Southfields Dualling Scheme will satisfy the road user safety objective if it is demonstrated from the Post Opening Performance period of three years after becoming fully operational that:

- The average number of Fatalities and Weighted Injuries (FWI) casualties per year is less than the safety baseline, where the safety baseline is based on data for a national 'average' dual 2-lane all-purpose (D2AP) road
- The rate of FWI per billion vehicle-miles per annum is no more than the safety baseline, where the safety baseline is based on data for a national 'average' D2AP road
- For each link, no population (for example, car drivers, pedestrians, HGV drivers and motorcyclists) is disproportionately adversely affected in terms of safety and risk to each population remains tolerable

10.2.5. There is no numerical objective or target for road worker collisions for major schemes. The risk must be managed in accordance with the as low as is reasonably practicable (ALARP) principle. This is a legal requirement. Highways England's *Health and Safety 5-Year Plan* states that:

> *"no one should be harmed when travelling or working on the strategic road network" must be applied for further positive action to reduce the risk to road workers during maintenance and operation. Amongst other items it has sought "to develop supply chain guidance which provides minimum standards for safe systems of work for high risk activities (for example, working at height, night working and the role of Principal Designer in*

assuming 'as built is as designed'). This action will enable contractors to achieve the same level of 'as low as is reasonably practicable'".

10.3. Operational assessment of M5 junction 25

10.3.1. The operational performance of the connections between the Scheme options and the M5 is considered very important. This is due to the known existing operational problems at junction 25 and the plans for an improvement to the junction to help accommodate traffic growth and development traffic.

10.3.2. The operational assessment of M5 junction 25 was carried out using the Linear Signal Analysis (LinSig) software, for the weekday AM and PM peak hours, for the forecast years of 2023, 2031 and 2038. The findings are summarised for the Pink, Blue and Orange options below.

Pink option

10.3.3. In the PM peak hour, M5 junction 25 operates within capacity and without queueing issues in 2023, 2031 and 2038.

10.3.4. In 2023, during the AM peak hour, M5 junction 25 operates within the desirable degree of saturation (90%).

10.3.5. In the 2031, during the AM peak hour, the degree of saturation on the M5 north approach nearside lane is 91%. The circulatory lane opposite the new A358 east entry approach has queuing traffic which is just over the storage link capacity, potentially blocking upstream traffic. However, it should be noted that the queues will be contained within the slip roads and cleared within each green cycle.

10.3.6. In the 2038, during the AM peak hour, the assessment shows a degree of saturation higher than the desired 90% on the:

- M5 north approach (100% for the nearside lane)
- new A358 east approach (91%)
- Toneway approach (97%)

10.3.7. Queuing traffic on the circulatory lane opposite the new A358 east entry approach will exceed the storage link capacity, potentially blocking upstream traffic. However, queuing traffic can be accommodated within the link stacking capacity and cleared within each green cycle for links that are over the desired degree of saturation of 90%.

Blue option

10.3.8. In the PM peak hour, M5 junction 25 operates within capacity and without queueing issues in 2023, 2031 and 2038.

10.3.9. In the 2023 and 2031 AM peak hour the junction operates within the desirable degree of saturation (90%).

10.3.10. For the 2038 AM peak hour the assessment shows a degree of saturation higher than the desired 90% on the:

- M5 north approach (100% for the nearside lane)
- new A358 east approach (91%)
- Toneway approach (95%)

10.3.11. Queuing traffic can be accommodated within the link stacking capacity and cleared within each green cycle for links that are over the desired degree of saturation of 90%.

Orange option

10.3.12. M5 junction 25 operates within capacity for both the AM and PM peak hours in 2023, 2031 and 2038

Summary of results

10.3.13. Based on the LinSig analysis carried out, M5 junction 25 would perform within capacity for all the options analysed, for both the AM and PM peak hours, with the A358 Taunton to Southfields Dualling Scheme in place for the opening year of 2023 and up to 2031. However, the Pink and Blue options are likely to be in excess of the capacity provided in the AM peak hour in 2038.

10.3.14. The Orange option would perform satisfactorily, for both AM and PM peak hours, up to 2038 (the design year). It provides a greater reduction in traffic on the junction compared with the Pink and Blue options.

10.4. Operational assessment of Southfields Roundabout and other Scheme junctions

10.4.1. Junction operational assessments have also been carried out at the other key junctions on the new A358 corridor:

- Southfields Roundabout
- Ashill priority junctions. This junction comprises two staggered priority junctions
- Hatch Beauchamp junction. This junction comprises one staggered priority junction and one T-junction
- West Hatch dumbbell roundabout
- West Hatch priority junction
- A358 / A378 dumbbell roundabout (only present in the Pink option)

- Roundabout on M5 at the western end of the new A358 (only present in the Orange option)
- M5 junction 25 signalised roundabout (discussed in the previous section)

10.4.2. For the assessment of the roundabouts and the priority junctions, Junctions 9 software version 9.0.2.5947 was used. It comprises the modules Assessment of Roundabout Capacity And Delay (ARCADY) and Priority Junction Capacity and Delay (PICADY).

10.4.3. The Ratio of Flow to Capacity (RFC) is an output from Junctions 9 and is the primary measure of an arm's performance for roundabouts and priority junctions. An RFC below 0.85 suggests a junction will operate within capacity. An RFC between 0.85 and 1.0 suggests the junction is over its desired capacity but below theoretical capacity. An RFC in excess of 1.0 suggests a junction will be in excess of its theoretical capacity.

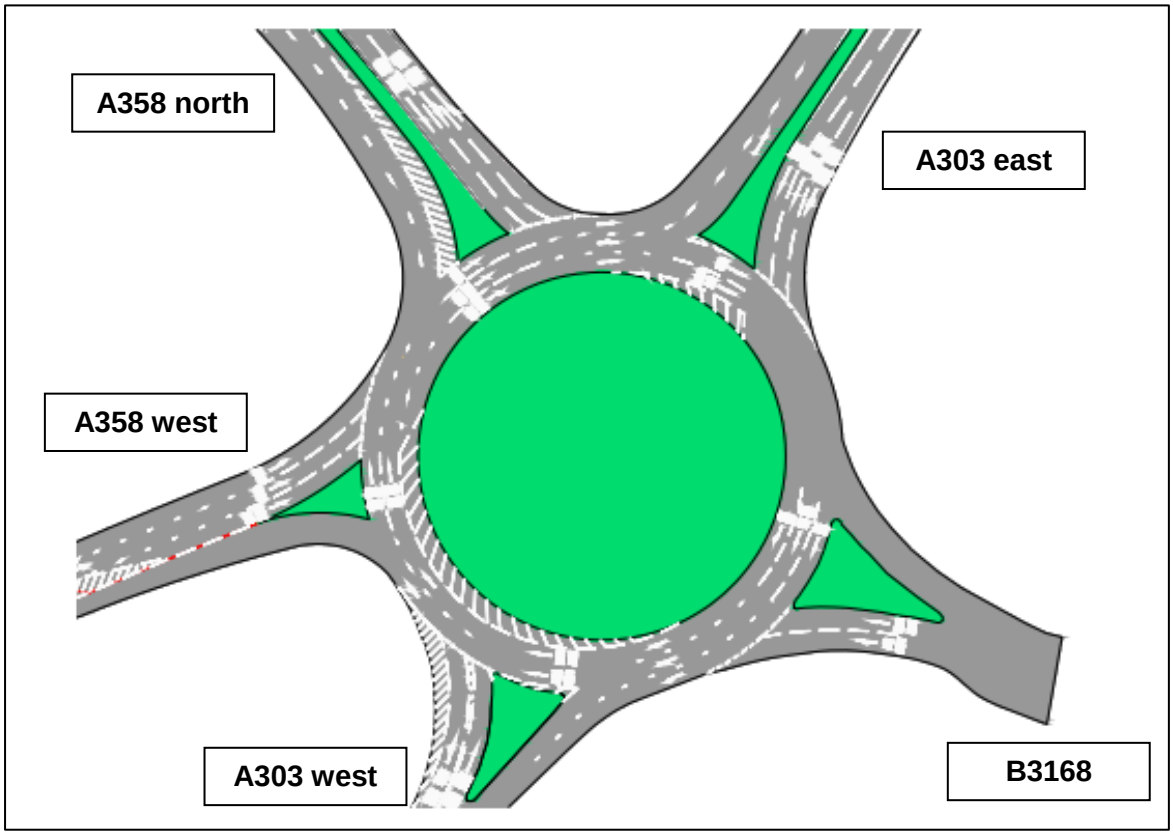
10.4.4. Traffic model data for the forecast AM and PM peak periods in 2038 were used in the assessments. Only the Scheme option which has the highest peak period flow in 2038 (the design year) has been assessed. For Southfields Roundabout the extracted average peak period traffic flows have been factored to represent peak hour flows for the AM peak and PM peak assessments. This 'stress testing' approach represents the worst situation investigated by the assessment models given its importance in providing access to the new A358.

Southfields Roundabout

10.4.5. Southfields Roundabout is going to be improved as part of the A358 Taunton to Southfields Dualling Project Control Framework (PCF) Stage 2 Scheme. The improvements (shown in Figure 10.1), which will be included in all the three options (that is the Pink option, the Blue option and the Orange option) comprise:

- Increase of the number of the gyratory lanes to three
- Widening of the roundabout entry approaches from the A358 north, the A303 east and the A358 west
- Widening of the roundabout exit approaches on the A358 north, the A303 east and the A303 west approaches

Figure 10.1: Southfields Roundabout layout in the Do Something Scheme



Source: Mott MacDonald Sweco Joint Venture.

10.4.6. The ARCADY analysis (run with the 'lane allocation' feature) shows that with the improvements in place as part of the A358 Scheme, the A358 north approach (in the AM and PM), the B3168 (in the PM) and the A358 west approach (in the AM and PM) show RFCs higher than the desired 0.85 thresholds. However RFCs are all below 0.95 and delays per vehicle are all below 55 seconds on all approaches for the AM and PM peak hours.

Ashill junction

10.4.7. The PICADY analysis for the Ashill junctions show that they operate well and within capacity for both 2038 AM and PM peak periods.

Hatch Beauchamp junction

10.4.8. Hatch Beauchamp junction PICADY analysis shows that the junctions will operate well and within capacity in 2038 AM and PM peak periods.

West Hatch dumbbell roundabouts

10.4.9. The West Hatch dumbbell roundabout comprises two individual linked roundabouts in the Blue and Orange options only. The ARCADY roundabout analysis shows that both roundabouts operate well within capacity in 2038 AM and PM peak periods.

West Hatch priority junction

10.4.10. The operational assessment of the West Hatch priority junction using PICADY shows that the junction operates well within capacity in 2038 AM and PM peak periods.

A358 / A378 dumbbell roundabout (Pink option only)

10.4.11. The A358 / A378 dumbbell roundabout comprises two individual linked roundabouts in the Pink option only. The ARCADY roundabout analysis shows that both junctions operate well within capacity in 2038 AM and PM peak periods.

New roundabout south of M5 junction 25 (Orange option only)

10.4.12. The ARCADY operational assessment of the new M5 junction located south of the M5 junction 25 in the Orange option shows that the roundabout operates within capacity for both the 2038 AM and PM peak periods.

11. Environmental assessment and environmental design

11.1. Introduction

11.1.1. This chapter summarises the results of the environmental assessment undertaken for the Pink, Blue and Orange Scheme options for the construction and operational phases. This environmental assessment is compliant with requirements and level of assessment expected at this stage, set out in the Design Manual for Roads and Bridges (DMRB) Volume 11.

11.1.2. This environmental assessment reports the likely significance of environmental effects. It uses established significance criteria, as presented within DMRB Volume 11, Section 2, Part 5. This includes an assessment of a receptor or resource's environmental value and the magnitude of the project's impact. For the purpose of this assessment, impacts that are Moderate, Large or Very Large, Beneficial or Adverse, are considered to be significant.

11.2. Air quality

Construction

11.2.1. The construction phase is expected to last approximately three years. Impacts to local air quality could occur through the generation and deposition of construction dust from construction activities and vehicle movements. With the implementation of mitigation measures, such as avoiding double handling of materials and minimising height of stockpiles, air quality effects from the construction phase of all options are expected to be Slight Adverse.

Operation

11.2.2. For the operational assessment of each option, nitrogen dioxide (NO_2) concentrations have been predicted at selected sensitive human health receptors. Levels have also been predicted at all designated ecological sites within 200m of the affected road network. These sites have features sensitive to air pollutants directly or indirectly for the Do Minimum and Do Something scenarios in the opening year (in 2023). The locations of the receptors are identified in Appendix D of this report. The Pink, Blue and Orange options included the same receptors for their respective assessments.

11.2.3. With regard for human health receptors in the opening year of the Pink option, the highest predicted annual mean NO_2 concentrations would occur at Receptor 24. However this concentration decreases by 18.4µg/m^3 to 20.3µg/m^3 in the Do Something scenario from 38.7µg/m^3 in the Do Minimum. The greatest increase in annual mean NO_2 is predicted at Receptor 23, where an increase of 5.8µg/m^3 from 7.1µg/m^3 in the Do Minimum to 12.9µg/m^3 in the Do Something scenario is predicted due to the Pink option. The greatest reduction in predicted

annual mean NO_2 concentrations would occur at Receptor 7. This receptor is located in the Henlade Air Quality Management Area (AQMA), where a decrease of 29.8µg/m^3 is predicted from 45.4µg/m^3 in the Do Minimum to 15.6µg/m^3 in the Do Something.

11.2.4. During operation for the Blue option with regard for human health receptors in the opening year for the Scheme, the highest predicted annual mean NO_2 concentrations would occur at Receptor 22. Here, concentrations increase by 2.4µg/m^3 from 17.5µg/m^3 in the Do Minimum scenario to 19.9µg/m^3 in the Do Something scenario. The greatest increase in annual mean NO_2 is predicted at Receptor 10, with a predicted increase of 4.5µg/m^3 from 8.6µg/m^3 in the Do Minimum to 13.1µg/m^3 in the Do Something scenario. The greatest reduction in predicted annual mean NO_2 concentrations for the Blue option would occur at Receptor 7. Here, a decrease of 26.5µg/m^3 is predicted from 45.4µg/m^3 in the Do Minimum to 18.9µg/m^3 in the Do Something.

11.2.5. During operation for the Orange option with regard for human health receptors in the opening year for the Scheme, the highest predicted annual mean NO_2 concentrations would occur at Receptor 7. However, concentrations would decrease by 9.1µg/m^3 from 45.4µg/m^3 in the Do Minimum scenario to 36.3µg/m^3 in the Do Something scenario with this option in place. The greatest reduction in predicted annual mean NO_2 concentrations for the Orange option would occur at Receptor 7. The greatest increase in annual mean NO_2 for the Orange option is predicted at Receptor 10 for the Orange option. Here, an increase of 4.0µg/m^3 from 8.6µg/m^3 in the Do Minimum to 12.6µg/m^3 in the Do Something scenario is predicted.

11.2.6. For the three options in the opening year, the predicted annual mean concentrations of NO_2 are well below 40µg/m^3. Therefore no exceedances of the one-hour NO_2 objective are expected. As such, an overall Slight Adverse effect on human health is anticipated for all options. All options are expected to reduce concentrations in the Henlade AQMA due to the rerouting of traffic away from the A358. There is therefore the potential for Somerset West and Taunton Council to remove the Henlade AQMA designation.

11.2.7. Imperceptible impacts are predicted on ecological designated sites (including Special Areas of Conservation (SACs), Special Protection Areas (SPAs), Sites of Special Scientific Interest (SSSIs) and Ramsar sites) in the opening year. Annual mean Nitrogen Oxide (NO_x) concentrations at receptor E6 (Maiden Down SSSI) are predicted to exceed the critical level of 30µg/m^3 at the closest point to the road for the Pink and Orange options. The change in NO_x at this location is predicted to be 0.3µg/m^3 for the Pink option and 0.4µg/m^3 for the Orange option. These levels are considered ‘imperceptible’ in accordance with Interim Advice Note (IAN) 174/13 and as such has not been considered further within the environmental assessment.

11.2.8. Predicted NO_x concentrations at the remaining ecological receptors at designated sites are below 30µg/m^3 for all options, including the Blue option, in their respective study areas in the opening year. In addition, all annual mean NO_x concentrations reduce or stay the same for all options, apart from at E7 (Curry and Hays Moor SSSI) for the Pink option. This receptor has a NO_x Do Something concentration of 8.2µg/m^3 which is well below the critical level of 30µg/m^3.

Summary

11.2.9. Effects on air quality at human health and designated ecological site receptors are predicted to be Slight Adverse. Effects will not be significant during construction and operation for the three options after consideration of best practice mitigation. All options perform similarly with regard for air quality effects.

11.2.10. There is a low risk of non-compliance with the *National Networks National Policy Statement* (NNNPS) with regard for air quality, for the three options, as detailed in the NNNPS risk table in Appendix F.

11.3. Cultural heritage

Construction

11.3.1. The three Scheme options all have the potential to result in adverse effects on heritage assets and buried archaeology during construction. Previous archaeological surveys and investigations, as well as the archaeological aerial survey and appraisal were undertaken at the previous stage of Scheme design. The investigations demonstrated a high potential for multi-period archaeological remains spanning the prehistoric period to WWII within the study area. These remains have the potential to be permanently affected during construction.

11.3.2. During construction, there is the potential for Large Adverse effects on buried archaeology for all three route options. Construction of the Pink and Blue options has a greater potential to affect archaeological remains than for the Orange option. This is primarily because the more northerly junction with the M5 would be situated in close proximity to a recorded Roman settlement. In addition, the Park & Ride connection road and junction are situated in an area with possible Iron Age or Roman cropmarks, and a possible Roman building has been recorded at the northern extent of the road. The Orange option would not pass through these areas and therefore has the least potential to affect archaeological remains of high value.

Operation

11.3.3. During operation there would be no impacts on sub-surface archaeological remains. Therefore the overall significance of effects on buried archaeology would be neutral for all three route options.

11.3.4. In terms of the built heritage, there is the potential for either Moderate or Large Adverse effects during the operation of all three options. All options are considered to have a Moderate Adverse effect upon one grade I listed building (Church of St Aldhem and Eadburgha) and one scheduled monument (Cross in St Aldhelm and St Eadburgha). All three options are considered to have a Large Adverse effect upon the same number of, but different, grade II* listed buildings. The Pink option would have a Large Adverse effect on Musgrave Farmhouse and Outbuilding with wall adjoining south-east corner of Haydon House. The Blue and Orange options would have a Large Adverse effect on Henlade House and Outbuilding with wall adjoining south-east corner of Haydon House. All options also have the potential to result in a Moderate Adverse effect on a number of grade II listed buildings.

11.3.5. Mitigation measures will be developed for the preferred route and will seek to reduce adverse effects as far as possible during construction and operation. Best practice measures will be employed during construction including the implementation of a Construction Environmental Management Plan (CEMP). For setting effects this may include planting, screening, noise attenuation and appropriate lighting. Both physical and setting effects could be mitigated through alteration to the Scheme design or elements of it. Preserving archaeological remains in-situ would also be explored during the design process.

11.3.6. Further investigation through geophysical surveys and potentially trial trenching will be required to fully understand the archaeological potential for the preferred route.

Summary

11.3.7. With consideration of best practice mitigation measures, effects on built heritage are predicted to be similar for all options during construction and operation. The settings of high value assets such as grade I and II* listed buildings and a scheduled monument are likely to be significantly affected, with Moderate or Large Adverse effects predicted respectively. The Orange option is predicted to have the least effect on archaeology. This is because it does not include a link road to junction 25 where there is the greatest archaeological potential. Nonetheless, there is still potential for Moderate adverse and significant effects to occur to buried archaeology as for the other two options.

Therefore, the three options have the potential to result in a Large Adverse and significant effect on cultural heritage.

11.3.8. All three options have a moderate risk of non-compliance with the NNNPS with respect for the historic environment, as detailed in NNNPS risk table in Appendix F.

11.4. Landscape and visual effects

Construction

11.4.1. During construction, effects on landscape character are anticipated to be adverse for all three proposed options. Impacted landscapes include national character areas (NCA) 140 NCA Yeovil Scarplands, 143 Mid Somerset Hills, 146 Vale of Taunton and Quantock Fringes and 147 Blackdowns and local landscape character. Impacts are due to, for example, the presence of construction traffic, plant and equipment and the introduction and removal of built structures and earthworks. The presence of construction compounds and the removal of mature trees and vegetation will also effect landscapes. There would also be a notable reduction in audible and visual tranquillity.

11.4.2. From a visual perspective, the construction works for all three proposed options would bring about a large change in views for numerous visual receptors. This includes highly sensitive receptors such as residential properties and Public Rights of Way (PRoW). Local isolated farmsteads and more populated villages would be affected by the Scheme as it traverses this rural landscape. The villages of Henlade, Holway, Haydon and Hatch Green would be particularly affected due to their close proximity to mainline works and proposed junctions. As such, a Large Adverse effect is predicted on landscape for all options during construction.

Operation

11.4.3. During operation, all options would introduce a widened existing A358 between West Hatch Lane and Southfields Roundabout and a new offline dual carriageway. These would improve on an otherwise rural and little developed setting, although the Blue and Orange options would be in a more rural setting than the Pink option. Tranquillity levels would decrease as a result of the operation of all options, with audible and visual tranquillity affected.

11.4.4. All options would require the removal of vegetation during construction, which would be replaced and reconnected through green corridors if severed and where possible. The planting of trees, shrubs, woodland plots, areas of species rich grassland and hedgerows would help mitigate the loss of landscape and ecological features. It would also aid the settlement of the Scheme into the landscape and reduce its visual prominence over time. For all options, whilst

mitigation planting would take time to establish, over time, as plants mature, their form and function would become more defined. Planting will form new landscape features in their own right and will replicate local landscape scale and patterns wherever possible.

11.4.5. From a visual perspective, all options would bring a change in view for a number of receptors. Given the high sensitivity to change of these receptors, there is the potential for large adverse effects. This would occur particularly prior to mitigation planting establishing in the early years of operation. As mitigation planting matures, greater screening would reduce the visual effect upon many receptors. However, a Moderate Adverse effect is still predicted in the long-term for the Pink option. For the Blue and Orange options, receptors are located further away from the mainline than the Pink option. They therefore have a lower capability to accept change in the landscape, so a long-term large adverse effect is predicted.

11.4.6. Mitigation measures will be developed for the preferred route, including the provision of an environmental design during operation which is likely to include planting, false cuttings and landscape bunds. This will integrate the Scheme into the landscape as far as possible and reduce adverse effects. During construction, best practice measures such as keeping stockpiles to a minimum would be applied.

Summary

11.4.7. With consideration of best practice mitigation measures, effects on landscape are predicted to be large adverse and significant for all options during construction. During operation, a large adverse and significant effect is predicted on landscape as a result of the Blue and Orange options. A Moderate Adverse and significant effect is predicted for the Pink option as this option is located closer to the A358.

11.4.8. There is a low risk of non-compliance with the NNNPS with regard for landscape, for all three options, as detailed in the NNNPS risk table in Appendix F.

11.5. Biodiversity

Construction

11.5.1. During construction, all options have the potential to result in the temporary and permanent disturbance to the qualifying species for Natura 2000 sites. These include Hestercombe House SAC, Exmoor and Quantock Woods SAC and Beer and Quarry Caves SAC with a Moderate Adverse effect predicted. For Somerset Moors and Levels SPA and Ramsar there is potential for

contaminating materials to be released into the groundwater pathway through polluted surface run-off and a Slight Adverse effect during construction.

11.5.2. For the Blue and Orange options, a large adverse effect is anticipated on Huish Copse East Local Wildlife Site (LWS) with the loss of Ancient Woodland habitat. It should be noted that protected species including rare barbastelle and Bechstein's bats have been identified in Huish Copse East LWS and Ancient Woodland. A Slight Adverse effect is anticipated on Huish Woods LWS for the Blue and Orange options, with the potential for pollution events to occur and changes in airborne pollutants. The Pink option would have a Neutral effect on Huish Copse East and Huish Woods LWSs.

11.5.3. The Orange option would result in a temporary Slight Adverse effect on South Taunton Streams Local Nature Reserve, through the diversion of Black Brook. All options would result in a Moderate Adverse effect during construction on road verges west of Hatch Beauchamp LWS and Jordans Park LWS due to the loss of habitat. A Slight Adverse effect is predicted on Bickenhall Wood LWS, Saltfield Copse LWS, Stoke Wood LWS and River Rag LWS for all options.

11.5.4. For the Blue and Orange options, a large adverse effect is anticipated on bats. This is due to the fragmentation of foraging and commuting routes, vegetation clearance, lighting, noise disturbance and the potential for disturbance, damage to or loss of bat roosts. These two options would result in the loss of Ancient Woodland at Huish Copse where two Annex II bat species (Bechstein's and barbastelles) have been identified. The Pink option would result in a Moderate Adverse effect on bats. This is because although fragmentation of suitable habitat, vegetation clearance, lighting and noise disturbance would occur, Ancient Woodland would not be directly impacted. A Slight Adverse effect is predicted on barn owls, dormice, badgers, otters, water voles, great crested newts and white-clawed crayfish for all options, with direct impacts to protected species including the loss, disturbance and fragmentation of habitat. A neutral or Slight Adverse effect is also predicted on breeding birds, reptiles and invertebrates.

11.5.5. With regard to Ancient Woodland, the Blue and Orange options would result in a Large Adverse effect with the loss of irreplaceable woodland, although woodland compensation planting would be required. The Pink option would have a Slight Adverse effect on Ancient Woodland. All options would result in the temporary and permanent loss of priority habitats including hedgerows, broadleaved semi-natural woodland, parkland, ditches and ponds, coastal and flood plain grazing marsh, traditional orchards, rivers and streams. This would result in a Slight Adverse effect.

Operation

11.5.6. All options have the potential to result in the temporary and permanent disturbance to the qualifying species for Natura 2000 sites as explained in section 11.5.1, with a Slight Adverse effect predicted. No permanent impacts are anticipated on Somerset Moors and Levels SPA and Ramsar during operation and a neutral effect is predicted.

11.5.7. For the Blue and Orange options, a Moderate Adverse effect is anticipated on Huish Copse East LWS, for the same reasons as outlined in section 11.5.2. The Orange option would result in a neutral effect on South Taunton Streams Local Nature Reserve, due to the distance from the option. All options would result in a Slight Adverse effect on road verges West of Hatch Beauchamp LWS. They would also have a Moderate Adverse effect on Jordans Park LWS with the loss of habitat. A neutral effect is predicted on Huish Woods LWS, Bickenhall Wood LWS, Stoke Wood LWS, Saltfield Copse LWS and River Rag LWS for all options.

11.5.8. For all options, a Moderate Adverse effect is anticipated on bats during operation and a Slight Adverse effect on barn owls, dormice, badgers, otters, water voles, great crested newts and white-clawed crayfish, as described in section 11.5.4. A neutral or Slight Adverse effect is also predicted on breeding birds, reptiles and invertebrates.

11.5.9. During operation, the Blue and Orange options would result in a Moderate to Large Adverse effect due to the permanent loss of the Ancient Woodland. This is because compensation planting would take a considerable length of time to establish due to the size of area which would need replacing. The Pink option would have a Slight Adverse effect on Ancient Woodland. All options would result in temporary and permanent loss of priority habitats as described in section 11.5.5.

11.5.10. Mitigation measures will be developed for the preferred route, including the provision of an Ecological Mitigation Strategy. This will reduce adverse effects on ecological receptors resulting from the Scheme. To reduce adverse effects on biodiversity, several measures could be required, including the replanting of native species-rich hedgerows and trees. Measures could also include creation of new areas of native broadleaved woodland, species-rich grassland, mosaics of habitats with varied topography and areas of bare ground for invertebrates and the provision of nesting and roosting opportunities for bats and birds.

Summary

11.5.11. With consideration of best practice measures, although a Slight adverse effect is anticipated for the majority of ecological receptors, an overall worst-case

Moderate Adverse and significant effect is anticipated on biodiversity as a result of the Pink option during construction and operation. This takes into account effects on protected species, designations and habitats. For the Blue and Orange options, although a Slight Adverse effect is anticipated for the majority of ecological receptors, an overall worst-case Large Adverse and significant effect is anticipated on biodiversity during construction and operation. This takes into account effects on protected species, particularly in relation to bats, designations, including potential effects on Ancient Woodland and habitats.

11.5.12. The overall effects on biodiversity as presented above do differ to the scores presented in the Appraisal Summary Table (ASTs) (Appendix E). The reason for this is the different guidance used for the assessments and appraisal. The assessment presented in Chapter 12 has been undertaken in accordance with the DMRB Volume 11 Section 3 Part 4 'Ecology and Nature Conservation'[38], Interim Advice Note (IAN) 130/10[39] and the guidelines for Preliminary Ecological Impact Assessment (EcIA)[40]. The ASTs have been completed in accordance with WebTAG guidance[41]. The DMRB approach allows for more mitigation to be considered in the assessment at this stage than the WebTAG assessment. The guidance for overall assessment scores also differs slightly.

11.5.13. If the Blue or Orange option were to be carried forward as the preferred route, the Development Consent Order (DCO) application would need to clearly demonstrate no viable alternatives in the location of Ancient Woodland at Huish Copse. This would be required to comply with the requirements of the NNNPS, due to effects on irreplaceable Ancient Woodland and protected species such as bats. Refer to the NNNPS risk table in Appendix F. The current alignments of the Blue and Orange options pass through the Ancient Woodland at Huish Copse. This is to reduce effects on the human environment, as this is a key objective of the Scheme. The Pink option would not directly affect Ancient Woodland and would therefore not have to demonstrate alternatives to the loss of Ancient Woodland at Huish Copse.

11.6. Geology and soils

Construction

11.6.1. All route options would require a range of construction activities which have the potential to result in adverse effects on geology and soils. These would include:

- Permanent removal and sterilisation of site soils and superficial deposits
- Impacts on agricultural soils

38 Highways England, DMRB Volume 11, Section 3, Part 4 'Ecology and Nature Conservation'.
39 Highways England (2010) IAN 130/10: Ecology and Nature Conservation Criteria for Impact Assessment.
40 Chartered Institute of Ecology and Environmental Management (CIEEM) (2016) Guidelines for Ecological Impact Assessment in the UK and Ireland.
41 Department for Transport (2015), TAG unit A3 environmental impact appraisal

- Excess (waste) materials generated requiring off-site disposal or transport
- Soil deterioration and consolidation due to poor storage and handling
- Effects on controlled waters
- Encountering contaminated materials (within landfills and made ground, mobilisation of contaminants and generation of contaminant transport pathways from site activities)
- Effects on construction workers
- Degradation of construction materials such as thaumasite concrete attack

11.6.2. During construction, best practice mitigation measures will be implemented through construction documents including CEMP, Site Waste Management Plan (SWMP), Materials Management Plan and Soil Management Plan. With mitigation measures in place, effects on identified receptors are not considered likely to be significant adverse for the Pink, Blue or Orange options. An on-balance Slight Adverse effect is predicted for all options.

Operation

11.6.3. The completed and operational Scheme is not expected to result in any adverse effects on geology or soils.

Summary

11.6.4. Effects on geology and soils are predicted to be Slight Adverse and not significant during construction with consideration of best practice measures and neutral during operation for all options. All options perform similarly with regard for geology and soil effects.

11.6.5. There is a low risk of non-compliance with the NNNPS with regard for geology and soils, for all three options, as detailed in the NNNPS risk table in Appendix F.

11.7. Material assets and waste

Construction

11.7.1. The construction of a new carriageway and associated structures, including roundabouts, culverts, and bridges, will require the use of material resources. This has the potential for significant adverse effects associated with the extraction, processing and transport of material resources. Other impact may arise from the manufacture of construction products, and their subsequent transport to and use on construction sites. It is anticipated that the quantity of materials required for all Scheme options would be considerable, especially steel, concrete and materials required for pavement construction. Best practice mitigation measures within construction documents including the CEMP and SWMP will reduce the effect on material resources. However, due to the uncertainty at this stage regarding the exact material quantities required, it is

concluded that there is potential for significant effects on material resources during construction for all options.

11.7.2. There is anticipated to be a large amount of green waste generated during site clearance. However, this will be chipped and re-used on-site within the landscaping, or, if this is not possible, would be chipped and re-used on site for composting. All excavated / cut material would be re-used as fill material within the embankments and the landscaping. There is minimal demolition required. Therefore, quantities of waste arisings are not expected to result in significant effects. Specific quantities of waste, including that arising from redundant pavements, road planings and metals from existing signage, have not been quantified at this stage. However, this waste will be reduced as far as possible through re-use on-site. If properly managed through the implementation of a SWMP, the construction phase has the potential to produce minimal waste.

11.7.3. A carbon assessment undertaken for the Scheme identified that the Blue option would produce the largest quantity of carbon emissions. This is because the Blue option contains the overbridges at Stoke Road and Henlade, which collectively result in 2,499tCO_2e. The carbon assessment also identified that concrete would have the largest contribution to the total carbon emissions of the materials required, closely followed by aggregates.

11.7.4. The assessment presented within this chapter has concluded that for all Scheme options, there is not likely to be significant effects from material resource use. However, Large Adverse effects from the sterilisation of a mineral safeguarding area for building stone are possible for the Blue and Orange options. This is attributed to the limited remaining capacity of inert landfill in Somerset. A neutral effect is predicted on mineral safeguarding areas for the Pink option.

Operation

11.7.5. The scoping exercise carried out at the previous stage of Scheme design determined that further assessment for materials was not required for operational phase effects. This was because effects were not anticipated to be significant for any of the Scheme options.

Summary

11.7.6. With consideration of best practice measures, the assessment for material assets and waste has concluded a non-significant effect on material resource use is likely for all options. However, the Blue and Orange options do have the potential to result in Moderate or Large Significant Adverse effects during construction. This is due to sterilisation of a mineral safeguarding area, which would not be affected by the Pink option. A neutral effect on material assets and waste is predicted during the operation of all options. All options perform

similarly with regard to material assets and waste effects. However, the Blue and Orange options have the potential affect a mineral safeguarding area, so perform slightly worse than the Pink option. There is a low risk of non-compliance with the NNNPS with regard for materials, for all three options, as detailed in the NNNPS risk table in Appendix F.

11.8. Noise and vibration

Construction

11.8.1. For all Scheme options, there is the potential for construction activities to result in adverse effects through the noise levels likely to be generated. Mitigation would be necessary at some locations to reduce the noise and vibration levels. However, with suitable mitigation, significant adverse effects are not anticipated, and a Slight Adverse effect is predicted. These mitigation measures include shielding of noisy items of plant, appropriate siting of haul routes, enclosures, screening and monitoring. This conclusion will need to be confirmed when a construction method statement becomes available at a later stage.

Operation

11.8.2. The effect of noise in terms of human health can be assessed by considering the number of receptors subject to noise levels above Significant Observed Adverse Effect Level (SOAEL). This is the level above which significant adverse effects on health occur.

11.8.3. During operation, the noise assessment shows a decrease in the total net number of receptors exposed to noise levels above SOAEL in the short-term for all three options. In terms of short-term noise decreases, the Pink option would result in the greatest number of net decreases in short-term noise of the three options and most benefits. This is followed by the Orange and then the Blue options.

11.8.4. The noise assessment shows an increase in the total number of receptors exposed to noise levels above SOAEL in the long-term for all options. The Orange option would have the least net number of receptors experiencing increases in long-term noise, followed by the Pink and Blue options.

11.8.5. All three options are predicted to result in significant adverse and beneficial effects at different receptors due to changes in noise at this stage. Further work will be undertaken for noise and vibration at the next stage of design. This will include the completion of baseline noise surveys. Mitigation measures will be developed for the preferred route which will seek to reduce adverse effects as far as possible. Measures could for example include thin surface courses, acoustic barriers and bunds.

Summary

11.8.6. All options are predicted to result in Slight Adverse and not significant adverse effects during construction with best practice mitigation in place. Significant adverse and beneficial effects are predicted for all options in operation, without the development of mitigation measures. At this stage the Blue option performs the worst with respect to both short-term and long-term noise. the Pink and Orange option would result in a similar number of short-term and long-term net changes to each other.

11.8.7. All three options have a moderate risk of non-compliance with the NNNPS with respect for noise and vibration, as detailed in the NNNPS risk table in Appendix F.

11.9. Population and health

Construction

11.9.1. For all options, journey length and journey times are likely to temporarily increase for a number of non-motorised user (NMU) facilities during construction. This will result in a Slight Adverse effect for NMUs. In terms of amenity, existing barriers between people and traffic would change for all options, which would result in a Slight Adverse effect. For community severance, a number of NMU routes connecting to community facilities will experience Slight Adverse effects to journey time and quality. This will subsequently result in increased severance for all options.

11.9.2. The Pink and Blue options are both anticipated to result in direct impacts upon Higher Holway Open Space (also known as Hawthorn Park), identified as community land, during construction. The total area of this open space is approximately 64,430m^2. The total land-take required according to the footprint of the Pink and Blue options is approximately 5,790m^2. This represents a 9% loss of the open space. However, the total land-take of open space likely to be used for recreational purposes would be 830m^2, which constitutes a 1% loss of the open space. Land-take required for the Pink and Blue options does not mean that this community resource can no longer be used. This coupled with the resource already being parallel to the M5, means a Slight Adverse and not significant effect is predicted for these two options. Compensatory measures including exchange land will be developed at the next stage of design should either of these Scheme options be selected as the preferred route. A neutral effect on community land is anticipated for the Orange option.

11.9.3. For all options, a Slight Adverse effect is predicted on driver stress due to the temporary presence of traffic management which will cause increases in driver frustration and fear of collisions. However the provision of a Traffic Management Plan will reduce effects on vehicle travellers.

11.9.4. There is potential for all options to result in temporary and permanent journey length and time increases. Should diversion routes result in people being less likely to use NMU routes for physical activity or recreational purposes, this could impact their health. Higher Holway play area and Higher Holway Open Space have been identified within 250m of the Pink and Blue options and are likely to be used for physical activity and recreational purposes. Should the Scheme impact access to these facilities or reduce their recreational resource value, a Slight Adverse effect could be apparent in terms of human health.

11.9.5. All options may include the implementation of a new cycle route between Taunton and Southfields and the altering of two bridleways to become cycle routes. Evidence has shown that cycling is beneficial to physical health. For example, cycling to work has been associated with a 45% lower risk of developing cancer and a 46% lower risk of developing cardiovascular disease. The introduction of new cycle routes is likely to be slight beneficial and therefore not significant. However, altering two bridleways would mean the loss of routes currently used by equestrians for physical activity. Research has found that horse riding is beneficial for both physical and mental health, with horse riders suggesting that riding makes them feel happy, active and relaxed. The loss of two equestrian routes has the potential to have an adverse and significant effect.

11.9.6. The construction phase could affect local air quality through the generation of construction dust arising from construction activities and vehicle movements. A reduction in local air quality throughout the construction phase could disproportionately impact vulnerable receptors, including children, older people and disabled people. However further assessment is needed to confirm this.

11.9.7. Older people are more likely to have heart and lung conditions and the proportion of older people in both Taunton Deane Borough Council and South Somerset District Council is higher than the national average. Air pollution is harmful to those with Chronic Obstructive Pulmonary Disease (COPD) and certain types of dust and chemicals can damage lungs and increase the risk of COPD. It can exacerbate the condition for those who already have it. The estimated prevalence of COPD (all ages) is the same in both Taunton Deane and South Somerset as nationally. Air pollution is also linked to cardiovascular disease and high levels of air pollution can make existing heart conditions worse and increase the risk of heart attacks and stroke. However, the under 75 mortality rate is lower in both Taunton Deane and South Somerset than nationally.

11.9.8. During construction, the Scheme has the potential to directly alter the noise and vibration baseline for sensitive receptors for a temporary period. Research

published by the World Health Organisation[42] shows that noise can negatively affect children. Therefore they are more likely to be impacted by any potential changes in noise levels compared with other people groups. However, the proportion of children in both Taunton Deane Borough Council and South Somerset District Council is slightly lower than the national average.

11.9.9. As the Scheme would require a new construction workforce, this could have a beneficial effect on employment rates in the local area, should the contractor source a local labour supply. In addition, for the duration of the construction phase, there would be construction workers on-site. It is anticipated that there would be a slight and indirect temporary beneficial effect on the local economy. This is because workers will use local facilities, for example hospitality and catering establishments.

Operation

11.9.10. During operation, some benefits and adverse effects are predicted to occur for all options with respect to NMU journey length and times, with increases and decreases in journey length predicted for individual routes. However, the provision of new facilities would reduce effects on NMUs. On balance, a Slight Adverse effect for NMUs is predicted for the Blue option. This is because permanent diversions of NMU routes will likely to result in a greater number of journey length and time increases than decreases. A neutral effect is anticipated for the Pink and Orange options. For these options the permanent diversion of NMU routes will result in a similar number of journey length and time increases and decreases.

11.9.11. Amenity would alter in several ways, with changes to barriers between people and traffic, flows and provision of new facilities. Overall, a slight beneficial effect on amenity is anticipated for the Pink, Blue and Orange options. For community severance, a number of NMU routes connecting to community facilities will experience changes to journey time and quality. This will result in a Slight Adverse effect for all options.

11.9.12. All options are predicted to result in a Slight Adverse effect in terms of demolition of private property and land-take. This is due to a small number of assumed derelict buildings, and agricultural outbuildings likely to be affected by the options. In addition a water works building has the potential to be affected by the Orange option. All options would experience a Slight Adverse effect due to potential land take on areas of parking or private land.

11.9.13. The Pink and Blue options have the potential to result in Large Beneficial effects on development land. These two options will improve access to this

[42] World Health Organisation (2011): 'Burden of disease from environmental noise Quantification of healthy life years lost in Europe'. See: http://www.euro.who.int/__data/assets/pdf_file/0008/136466/e94888.pdf

land and increase the likelihood of this development coming forward. Effects cannot be deduced at this stage for the Orange option.

11.9.14. All options would be likely to result in some new views from the road for vehicle travellers. However, the establishment of vegetation alongside the new road during Year 1 of operation would gradually and partially screen open views to the wider area. An overall slight beneficial effect is anticipated for the Pink option. A Moderate Beneficial effect is predicted for the Blue and Orange options with new views from the road.

11.9.15. During operation, a Moderate Beneficial effect is predicted on driver stress for the Pink, Blue and Orange options. This is because vehicle travellers able to drive along the road at a more consistent speed, with improved journey time reliability.

11.9.16. Effects on human health would be the same as described in sections 11.9.4 to 11.9.8. However, the operational phase of the Scheme also has the potential to affect air quality due to a difference in vehicular emissions and pollutants. Such change would arise because of changes to traffic flows on the road and because of a change in road layout. This will lead to a decrease in the distance between receptors and vehicular traffic. A reduction in local air quality throughout operation would disproportionately impact vulnerable receptors.

11.9.17. Direct operational employment is not expected to be created due to the Scheme. However, there are likely to be increased indirect employment opportunities related to reduced congestion and improved journey times. This would be beneficial to those within the districts of Taunton Deane and South Somerset.

Summary

11.9.18. With consideration of best practice measures, effects on population and health would be similar for all options during construction with an overall Slight Adverse and not significant effect predicted. During operation, all options perform similarly with some adverse and beneficial effects predicted for each sub-topic.

11.9.19. As detailed in the NNNPS risk table in Appendix F, the risk of non-compliance with the NNNPS is higher for the Pink and Blue options (moderate) than the Orange option, which has a low risk (green) of non-compliance. This is because the Pink and Blue options would directly impact open space.

11.10. Road drainage and the water environment

Construction

11.10.1. The construction of highways can have a range of effects on the water environment, including the contamination of surface or ground waters with sediments or pollutants, thereby impacting on their ecological or fishery value or their value as a source of water for human use. Other potential impacts include contamination as a result of construction site run-off associated with contaminated land and spillages during construction. There will also be an increased flood risk as a result of increased areas of impermeable ground surfaces, loss of flood plain land, or changes in road drainage.

11.10.2. Standard mitigation measures will be included in the CEMP and sustainable drainage systems (SuDS) will be implemented to:

- Avoid attenuating surface water run-off
- Prevent pollution within surface water discharge
- Reduce physical effects from new structures such as piling, outfalls and embankments
- Ensure no increase in flood risk

11.10.3. The only significant impact anticipated on the water environment for the Scheme is the realignment causing a permanent diversion of the River Ding which is required under all options. Also the realignment of Black Brook, required for the Orange option only. However, the overall significance of effects on the water environment as a result of the three options on-balance (taking into consideration both neutral and moderate impacts identified) would be Slight Adverse and not significant during construction. This is primarily due to the high sensitivity of watercourses within the study area, meaning they are vulnerable to nearby construction activities.

11.10.4. During detailed design, groundwater levels and flow will be considered and piling would be reduced where possible. There is potential for effects on the road drainage and water environment to be reduced during operation for the preferred route. This will be via:

- The implementation of an appropriate drainage design
- The incorporation of SuDS and pollution control measures
- Designing embankments to separate the Scheme from flood plains
- Ensuring the design does not increase run-off rates in accordance with national policy and Environment Agency guidance

These measures will ensure that the risk of flooding is not made worse by the Scheme locally. A Water Framework Directive (WFD) compliance assessment will also be undertaken during detailed design. This will ensure that all

watercourse crossings and other Scheme elements are compliant with the requirements of the WFD.

Operation

11.10.5. The operation of highways can have a range of effects on the water environment, including the contamination of surface or ground waters with sediments or pollutants, thereby affecting their ecological or fishery value or their value as a source of water for human use, routine run-off during operation, or spillages during operation (usually following road collisions), and increased flood risk as a result of increased areas of impermeable ground surfaces, loss of flood plain land, or changes in road drainage.

11.10.6. The effects on the road drainage and water environment would be the same as for the construction stage for the three options.

Summary

11.10.7. A Not Significant Adverse effect is predicted on the road drainage and water environment for all options with consideration of best practice mitigation. All options perform similarly with regard for road drainage and the water environment effects.

11.10.8. All three options have a low risk of non-compliance with the NNNPS with respect for the road drainage and water environment, as detailed in the NNNPS risk table in Appendix F.

11.11. Climate

11.11.1. The carbon assessment encompasses two sub-topics. The first is the effects on climate (effects of the Scheme on climate change in terms of greenhouse gas emissions from the Scheme and mitigation potential). The second is vulnerability of the Scheme to climate change (effects relevant to climate resilience and adaptation including the effects of climate change on the Scheme and the contribution of the Scheme to wider resilience).

Construction

11.11.2. Based on the current designs and against the 3rd carbon budget period, during construction, the carbon assessment has indicated that the Pink option would release approximately 47,512 tonnes of carbon dioxide equivalent (tCO_2e). The carbon output specifically from the materials required for the Pink option would be 42,323 tCO_2e. The Blue option would release approximately 48,692 tCO_2e. The carbon output specifically from the materials required for the Blue option would be 42,778 tCO_2e. The carbon assessment has indicated that the Orange option would release approximately 47,996 tCO_2e. The carbon output

specifically from the materials required for the Orange option would be 42,033 tCO_2e.

11.11.3. The Blue option would have the highest overall total of CO_2e emitted of the options. This is because the Blue option would contain the Henlade and the Blackbrook junction overbridge, as would the Pink option, which would collectively result in 2,499tCO_2e. The Blue option would also require approximately 370,000m^3 more total cut for earthworks than the Pink option. Whilst the total cut would be lower than for the Orange option, collectively the total CO_2e for the Blue option would be the greatest of the options.

11.11.4. In the absence of established assessment criteria for the effects on climate it is predicted that during the construction stage none of the proposed route options would have an effect on climate. This is due to the relatively low quantity of emissions in comparison to the overall UK emissions from construction.

11.11.5. It is not expected that climate change would result in a change in the risk of severe weather by the end of the three-year construction period. However, construction site may be vulnerable to extremes of weather, leading to the risk of delay in activities. Adaptation measures included in the CEMP, such as ensuring construction materials are covered when stored and pro-active planning, would reduce adverse effects. Therefore, changes in climate are not expected to significantly affect Scheme construction, for any of the route options.

Operation

11.11.6. During operation, all options would affect climate due to increased traffic flows and maintenance work required for the proposed Scheme. Further analysis of the operational carbon emissions is required at the next stage of design.

11.11.7. There is also potential for Scheme assets and environmental receptors to be affected by changes in climate, for example, increases in winter precipitation could result in increased sub-surface moisture content, decreasing the strength of the pavement foundations. Overall, a Neutral effect is anticipated for all Scheme options.

Summary

11.11.8. No effects on climate are predicted for the three options during construction and a Neutral effect is predicted for all options during operation. All options perform similarly with regard for climate effects.

11.11.9. All three options have a low risk of non-compliance with the NNNPS with respect for climate, as detailed in the NNNPS risk table in Appendix F.

11.12. Combined and cumulative effects

Combined effects

11.12.1. The assessment for combined effects involved the identification of effect interactions associated with all Scheme options upon separate environmental receptors.

Construction

11.12.2. As a result of the combined assessment for the Scheme, the following effects are anticipated for the all options during construction, taking into account effects associated with each option on the below receptors:

- A not significant adverse effect on human health
- A significant adverse effect on heritage features
- A significant adverse effect on the landscape
- A significant adverse effect on ecological receptors
- A not significant adverse effect on geology and soils
- A significant adverse effect on material resources
- A not significant adverse effect on communities
- A not significant adverse effect on vehicle travellers
- A not significant adverse effect on the water environment
- A not significant adverse effect on climate

Operation

11.12.3. As a result of the combined assessment for the Scheme, the following effects are anticipated all options during operation, taking into account effects associated with each option on the below receptors:

- A significant adverse effect on human health
- A significant adverse effect on heritage features
- A significant adverse effect on the landscape
- A significant adverse effect on ecological receptors
- A significant adverse effect on geology and soils
- A not significant adverse effect on material resources
- A significant adverse effect on communities
- A significant beneficial effect on vehicle travellers
- A not significant adverse effect on the water environment
- A not significant adverse effect on climate

Cumulative effects

11.12.4. The assessment of cumulative effects involved the identification of incremental changes likely to be caused by four 'other developments' together with all options. Other developments include:

- Junction 25, M5 (Somerset County Council planning ref 4/38/17/0205)
- Nexus 25 Strategic Employment Site (Local Development Order LDO))
- Killams Drive (Taunton Deane Borough Council: 38/12/0203)
- Land at Coldharbour Farm (South Somerset District Council: 16/05500/OUT)

Construction

11.12.5. As a result of the cumulative assessment, during construction it is anticipated that there would be an overall Significant Adverse cumulative effect as a result of the 'other developments' with the Pink, Blue and Orange options. This is due to the likely cumulative effects of these 'other developments' together with the Scheme upon receptors that fall within the cumulative zone of influence (specifically where the study areas for the 'other developments' and the Scheme overlap). This includes effects upon cultural heritage resources, landscape and visual receptors, and ecological receptors, where potentially significant effects have been recorded. However, Significant Adverse effects reported for different topics do not consider mitigation measures at this stage, except for best practice measures which would be implemented. As such, mitigation measures will be identified and developed during the next stage of design to reduce these significant adverse effects.

Operation

11.12.6. An overall Slight Adverse and Not Significant Adverse cumulative effect is anticipated as a result of all of the 'other developments' with all options during operation. A Neutral effect on geology and soils and population and health and a Not Significant Adverse effect on the road drainage and water environment are also expected. Additionally Significant Adverse effects are expected on cultural heritage, landscape and biodiversity.

Summary

11.12.7. Effects on combined and cumulative effects are predicted to be Significant Adverse during construction and Not Significant Adverse during operation for all options. This does not consider mitigation for the Scheme beyond best practice. All options perform similarly with regard for combined and cumulative effects.

11.12.8. All three options have a low risk of non-compliance with the NNNPS with respect for combined and cumulative effects, as detailed in the NNNPS risk table in Appendix F.

12. Appraisal Summary Tables

12.1.1. Appraisal Summary Tables have been prepared in accordance with the Department for Transport's web-based Transport Analysis Guidance (WebTAG). These are included in Appendix E of this report.

13. Identification of the potential preferred route

13.1. Overall comparison of options

13.1.1. This section presents the methodology and initial results obtained in identifying the emerging preferred route. This provides an overview of the performance of the options and enables a discussion of the preferred route.

13.2. Route options considered

13.2.1. The proposed dualling of the entire length of this section of the A358 was announced in the *Road Investment Strategy: for the 2015/16 – 2019/20 Road Period* (Department for Transport 2014, update March 2015). Three possible route options were taken to public consultation in January and February 2018. These were Pink, Blue and Orange and are described in sections 6.2 to 6.4.

13.2.2. As mentioned in section 8.5, three alternative variants on the above routes options came through the 2018 consultation. Two variants from the consultation are combinations on the consulted route options (these being a combination of Pink / Orange and Blue / Orange route options), and a third, which was proposed by Ruishton, Henlade and Thornfalcon Parish Councils. This is effectively a combination of the Pink / Orange route options with a diversion in the area of the A378 – this has been named Green option.

13.2.3. The options comparison is restricted to Section 1 of the route (see Figure 6.1), as the options follow a common line through Section 2 between Hatch Beauchamp and the A303.

13.2.4. The methodology employed has been based on the *Design Manual for Roads and Bridges* (DMRB) Volume 5, Section 1, Part 4 – Technical Advice Note (TA) 30/82 – *Choice Between options for Trunk Road Schemes.*

13.3. Appraisal methodology

13.3.1. The approach recommended in TA 30/82 is to adopt an Appraisal Framework that focuses upon the differences in economic, social, and environmental factors of each route / option. Since this Advice Note was issued, the Department for Transport introduced the Appraisal Summary Tables (ASTs) through the Transport Analysis Guidance (TAG) documents as common practice tools used to assess design options. As such, the ASTs have been used as the Appraisal Framework to compare the advantages of the three route options presented at the public consultation. All advantages are considered weighted equally, so no criterion has been considered to be more important than another.

13.3.2. The process of selecting the emerging preferred route is presented as a series of eliminations of the least performing options. The competing options have then been compared two at a time and against each other, one being eliminated after

each comparison. The process has then been repeated until only one option remained. Before each comparison is made, the significant advantages of each option from the ASTs have been summarised.

13.4. Comparison process

13.4.1. The comparison process includes the three route options presented at the public consultation, plus the three alternative variants identified in section 8.5.8. All six options have been considered equally with key aspects of the AST used to identify each option that can be discounted and the best performing option then compared against the next option. The option remaining after the comparison process is therefore considered to be the best performing option. Table 13.1 sets out the first comparison.

Comparison 1 (Pink vs Blue option)

Table 13.1: Comparison 1 Pink option and Blue option

Key comparison factors	Pink option	Blue option
'Business users & transport providers' value within the AST	£189.0m NPV (Net Present Value)	£154.0m NPV
Wider economic impacts within the AST	£18.9m NPV	£15.4m NPV
Impact to landscape	Moderate Adverse	Large Adverse
Noise impacts in the forecast year	- £2.3m NPV	- £2.2m NPV
Air quality (Local Air Quality Assessment Score in 2023)	NO_2: -1005.9, PM_{10}: -356.5 Henlade AQMA will be removed (£0.3m NPV)	NO_2: -1,229.3, PM_{10}: -383.3 Henlade AQMA will be removed (£0.5m NPV)
Greenhouse gases – changes in carbon over 60 years (CO2e)	- £25.880m NPV	- £24.189m NPV
Impact to Ancient Woodland	Avoids Huish Copse	Would potentially require permanent loss of Ancient Woodland at Huish Copse
Impact to Higher Holway Open Space	Proposed junction at M5 would require permanent land-take of this land.	Proposed junction at M5 would require permanent land-take of this land.
Traffic reduction through Henlade in 2038 (design year)	From 33,500 vehicles to 3,100 vehicles per day (-91%)	From 33,500 vehicles to 7,600 vehicles per day (-77%)
Journey time benefits (from Southfields Roundabout to M5 J26)	7 min 28 sec saving	7 min 23 sec saving
Collisions (reduction in casualties)	Fatal = 8.9 Serious = 96.1 Slight = 575.4	Fatal = 8.9 Serious = 106.2 Slight = 670.7
Severance	Neutral	Slight Adverse
Benefit to Cost Ratio (BCR)	1.43	1.23
Scheme cost	£521m	£511m
All other criteria within the AST and other comparators through assessments undertaken are either the same or similar.		

Comparison 1 result

13.4.2. The Pink option performs better than the Blue option from an economic perspective, with a better return on investment having a BCR of 1.43 compared with 1.23 for the Blue option and higher wider economic impacts as noted within the ASTs.

13.4.3. Both options show a net disbenefit in terms of noise impacts, with the Blue option performing marginally better (-£2.3 million NPV) than the Pink option (-£2.2 million NPV).

13.4.4. Both options show a net improvement in terms of air quality, with the Blue option performing marginally better (£0.5 million NPV) than the Pink option (£0.3 million NPV). Both options remove the Air Quality Management Area (AQMA) at Henlade.

13.4.5. Both options show a reduction in traffic through Henlade in the Scheme opening year, with the Pink option performing better (-91%) than the Blue option (-77%).

13.4.6. There are minor but important benefits for the Pink option in terms of landscape, severance and Ancient Woodland and both have similar impacts on the Higher Holway Open Space.

13.4.7. The Blue option offers little advantage over the Pink option with the exception of it being slightly cheaper in terms of capital cost (2%) and offers a little more in terms of collision savings. In all other respects the Pink option is preferred.

13.4.8. Overall, the Pink option performs better than the Blue option in terms of economics and the landscape. The Pink option also has no impact on Huish Copse (Ancient Woodland) whereas the Blue option would have direct impacts. Where the Blue option does perform better than the Pink option (noise, air quality and capital cost) these differences are marginal and do not outweigh the economic and landscape advantages of the Pink option or compensate for the impact on the Ancient Woodland. The Pink option is therefore taken forward in the assessment.

Comparison 2 (Pink vs Orange option)

Table 13.2: Comparison 2 Pink option with Orange option

Key comparison factors	Pink option	Orange option
'Business users & transport providers' value within the AST	£189.0m NPV	£147.8m NPV
Wider economic impacts within the AST	£18.9m NPV	£14.8m NPV
Impact to landscape	Moderate Adverse	Large Adverse
Noise impacts in the forecast year	- £2.3m NPV	- £2.4m NPV
Air quality (Local Air Quality Assessment Score in 2023)	NO_2: -1005.9, PM_{10}: -356.5 Henlade AQMA will be removed (£0.3m NPV)	NO_2: -1,601.9, PM_{10}: -499.2 Henlade AQMA will be removed (£0.7m NPV)
Greenhouse gases – changes in carbon over 60 years (CO2e)	- £25.880m NPV	- £22.521m NPV
Impact to Ancient Woodland	Avoids Huish Copse	Would potentially require permanent loss of Ancient Woodland at Huish Copse
Impact to Higher Holway Open Space	Proposed junction at M5 would require permanent land-take of this land.	No land-take required at Higher Holway Open Space
Traffic reduction through Henlade in 2038 (design year)	From 33,500 vehicles to 3,100 vehicles per day (-91%)	From 33,500 vehicles to 24,300 vehicles per day (-27%)
Journey time benefits (from Southfields Roundabout to M5 J26)	7 min 28 sec saving	8 min 5 sec saving
Collisions (reduction in casualties)	Fatal = 8.9 Serious = 96.1 Slight = 575.4	Fatal = 3.3 Serious = 40.3 Slight = 68.9
Severance	Neutral	Slight Adverse
BCR	1.43	0.97
Scheme cost	£521m	£490m
All other criteria within the AST and other comparators through assessments undertaken are either the same or similar.		

Comparison 2 result

13.4.9. The Pink option performs better than the Orange option from an economic perspective, with a better return on investment having a BCR of 1.43 compared with 0.97 for Orange option, and higher wider economic impacts as noted within the ASTs.

13.4.10. Both Pink and Orange options show a net disbenefit in terms of noise impacts, with the Pink option performing slightly better (-£2.3 million NPV) than the Orange option (-£2.4 million NPV).

13.4.11. Both Pink and Orange options show a net improvement in terms of air quality, with the Orange option performing slightly better (£0.7 million NPV) than the Pink option (£0.3 million NPV). Both options remove the AQMA at Henlade.

13.4.12. Both options show a reduction in traffic through Henlade in the Scheme opening year, with the Pink option performing significantly better (-91%) than the Orange option (-27%).

13.4.13. The number of collisions saved is greater for the Pink option due to more traffic being diverted from the existing A358 through Henlade.

13.4.14. There are minor but important benefits for the Pink option in terms of landscape, severance and Ancient Woodland.

13.4.15. The one significant advantage the Orange option has is the avoidance of the Higher Holway Open Space.

13.4.16. At a cost of £491m, the Orange option is cheaper than the Pink option (£521m).

13.4.17. The Pink option offers a direct connection with the A378 that is favoured by the public and stakeholders and is considered to be the one that best serves regular journeys locally.

13.4.18. Despite the lower cost for the Orange option and the open space issue (which would be mitigated), the overall benefits associated with the Pink option are considered greater. The all movement junction with the M5 for the Orange option has some advantage to providing additional resilience to the road network.

13.4.19. The Pink option performs better than the Orange option in terms of economics and the landscape. The Pink option also has no impact on Huish Copse (Ancient Woodland) whereas the Orange option would have direct impacts. Where the Orange option does perform better than the Pink option (noise, air quality and capital cost) these differences are marginal and do not outweigh the economic and landscape advantages of the Pink option or compensate for the impact on the Ancient Woodland. The Pink option is therefore taken forward in the assessment.

13.4.20. All other options identified through the consultation process will be compared to the Pink option to establish if the options identified as part of the consultation process, offer benefits greater than the best performing Pink option.

Comparison 3: Pink option and Blue / Orange option

Table 13.3: Comparison 4: Pink option with Blue / Orange option

Key comparison factors	Pink option	Blue / Orange option
'Business users & transport providers' value within the AST	£189.0m NPV	£164.2m
Wider economic impacts within the AST	£18.9m NPV	£16.4m
Impact to landscape	Moderate Adverse	Large Adverse
Noise impacts in the forecast year	- £2.3m NPV	£0.6m
Air quality (Local Air Quality Assessment Score in 2023)	PM10 NPV: £0.9m NOX NPV: -£0.5m Total value of change in air quality: £0.3m	PM10 NPV: £1.3m NOX NPV: -£0.5m Total value of change in air quality: £0.8m
Greenhouse gases – changes in carbon over 60 years (CO2e)	- £25.880m NPV	- £24.189m NPV
Impact to Ancient Woodland	Avoids Huish Copse	Would potentially require permanent loss of Ancient Woodland at Huish Copse
Impact to Higher Holway open space	Proposed junction at M5 would require permanent land-take of this land.	No land-take required at Higher Holway open space
Traffic reduction through Henlade in 2038 (design year)	From 33,500 vehicles to 3,100 vehicles per day (-91%)	From 33,500 vehicles to 7,700 vehicles per day (-77%)
Journey time benefits (from Southfields Roundabout to M5 J26)	7 min 28 sec saving	Approximately 8minute saving
Collisions (reduction in casualties)	Fatal = 8.9 Serious = 96.1 Slight = 575.4	Fatal = 5.0 Serious = 75.9 Slight = 324.2
Severance	Neutral	Slight Adverse
BCR	1.43	1.10
Scheme cost	£521m	534.1m
All other criteria within the AST and other comparators through assessments undertaken are either the same or similar.		

Comparison 3 result

13.4.21. Both options show a reduction in traffic through Henlade in the Scheme opening year, with the Pink option performing significantly better (-91%) than the Blue / Orange option.

13.4.22. The number of collisions saved is greater for the Pink option due to more traffic being diverted from the existing A358 through Henlade.

13.4.23. There are minor but important benefits for the Pink option in terms of landscape, severance and Ancient Woodland.

13.4.24. The one significant advantage the Blue / Orange option has is the avoidance of the Higher Holway Open Space.

13.4.25. At a cost of £534.1 million the Blue / Orange option is more expensive than the Pink option (£521 million).

13.4.26. The Pink option offers a direct connection with the A378 that is favoured by the public and stakeholders and is considered to be the one that best serves regular journeys locally.

13.4.27. The all movement junction with the M5 for the Blue / Orange option has some advantage to providing additional resilience to the road network.

13.4.28. The Pink option performs better than the Blue / Orange option in terms of economics and the landscape. The Pink option also has no impact on Huish Copse (Ancient Woodland) whereas the Blue / Orange option would have direct impacts (although mitigated). Where the Blue / Orange option does perform better than the Pink option (noise, air quality) these differences are marginal and do not outweigh the economic and landscape advantages of the Pink option or compensate for the impact on the Ancient Woodland. The Pink option is therefore taken forward in the assessment.

Comparison 4: Pink option and Pink / Orange option

Table 13.4: Comparison 4: Pink option with Pink / Orange option

Key comparison factors	Pink option	Pink / Orange option
'Business users & transport providers' value within the AST	£189.0m NPV	£190.8m NPV
Wider economic impacts within the AST	£18.9m NPV	£19.1m NPV
Impact to landscape	Moderate Adverse	Large Adverse
Noise impacts in the forecast year	- £2.3m NPV	£0.2m NPV
Air quality (Local Air Quality Assessment Score in 2023)	NO_2: -1005.9, PM_{10}: -356.5 Henlade AQMA will be removed (£0.3m NPV)	NO_2: -1022.0, PM_{10}: -483.7 Henlade AQMA will be removed (£0.6m NPV)
Greenhouse gases – changes in carbon over 60 years (CO2e)	- £25.880m NPV	- £28.2m NPV
Impact to Ancient Woodland	Avoids Huish Copse	Avoids Huish Copse
Impact to Higher Holway open space	Proposed junction at M5 would require permanent land-take of this land.	No land-take required at Higher Holway open space
Traffic reduction through Henlade in 2038 (design year)	From 33,500 vehicles to 3,100 vehicles per day (-91%)	From 33,500 vehicles to 3,500 vehicles per day (-90%)
Journey time benefits (from Southfields Roundabout to M5 J26)	7 min 28 sec saving	7 min 40 sec saving
Collisions (reduction in casualties)	Fatal = 8.9 Serious = 96.1 Slight = 575.4	Fatal = 4.8 Serious = 62.8 Slight = 199.3
Severance	Neutral	Slight Adverse
BCR	1.43	1.28
Scheme cost	£521m	£533m
All other criteria within the AST and other comparators through assessments undertaken are either the same or similar.		

Comparison 4 result

13.4.29. The Pink option performs better than the Pink / Orange option from an economic perspective, with a better return on investment having a BCR of 1.43 compared with 1.28 for the Pink / Orange option. The Pink / Orange option performs marginally better with respect to wider economic impacts (£19.1 million) than the Pink option (£18.9 million).

13.4.30. The Pink / Orange option shows a benefit in terms of noise impacts (£0.2 million NPV), whereas the Pink option shows a net disbenefit (-£2.3 million NPV).

13.4.31. Both Pink and Pink / Orange options show a net improvement in terms of air quality, with the Pink / Orange option performing marginally better (£0.6 million NPV) than the Pink option (£0.3 million NPV). Both options remove the AQMA at Henlade.

13.4.32. Both options show a reduction in traffic through Henlade in the Scheme opening year, with the Pink option performing marginally better (-91%) than the Pink / Orange option (-90%).

13.4.33. The number of collisions saved is greater for the Pink option due to more traffic being diverted from the existing A358 through Henlade.

13.4.34. There are minor but important benefits for the Pink option in terms of landscape and severance.

13.4.35. Both options offer a direct connection with the A378 that is favoured by the public and stakeholders. They also avoid Huish Copse (Ancient Woodland) and Higher Holway Open Space.

13.4.36. At a cost of £521 million, the Pink option is cheaper than the Pink / Orange option (£533 million).

13.4.37. For the Pink / Orange option, the all movement junction with the M5 as per Orange option, has some advantage to providing additional resilience to the road network.

13.4.38. The Pink option performs better than the Pink / Orange option in terms of economics and the landscape. Where the Pink / Orange option performs better than the Pink option (noise, air quality and collisions) these differences are marginal and do not outweigh the economic and landscape advantages of the Pink option. The Pink option is therefore taken forward in the assessment.

Comparison 5: Pink option with Green Option

Table 13.5: Comparison 5: Pink option with Green option

Key comparison factors	Pink option	Green option
'Business users & transport providers' value within the AST	£189.0m NPV	£185.2m NPV
Wider economic impacts within the AST	£18.9m NPV	£18.5m NPV
Impact to landscape	Moderate Adverse	Large Adverse
Noise impacts in the forecast year	- £2.3m NPV	£0.5m NPV
Air quality (Local Air Quality Assessment Score in 2023)	NO_2: -1005.9, PM_{10}: -356.5 Henlade AQMA will be removed (£0.3m NPV)	NO_2: -1069.7, PM_{10}: -459.9 Henlade AQMA will be removed (£0.5m NPV)
Greenhouse gases – changes in carbon over 60 years (CO2e)	- £25.880m NPV	- £28.9m NPV
Impact to Ancient Woodland	Avoids Huish Copse	Avoids Huish Copse
Impact to Higher Holway open space	Proposed junction at M5 would require permanent land-take of this land.	No land-take required at Higher Holway open space
Traffic reduction through Henlade in 2038 (design year)	From 33,500 vehicles to 3,100 vehicles per day (-91%)	From 33,500 vehicles to 4,500 vehicles per day (-87%)
Journey time benefits (from Southfields Roundabout to M5 J26)	7 min 28 sec saving	7 min 35 sec saving
Collisions (reduction in casualties)	Fatal = 8.9 Serious = 96.1 Slight = 575.4	Fatal = 4.4 Serious = 59.6 Slight = 180.0
Severance	Neutral	Slight Adverse
BCR	1.43	1.20
Scheme cost	£521m	£550m
All other criteria within the AST and other comparators through assessments undertaken are either the same or similar.		

Comparison 5 result

13.4.39. The Pink option performs better than the Green option from an economic perspective, with a better return on investment having a BCR of 1.43 compared with 1.20 for Green option and higher wider economic impacts.

13.4.40. The Green option shows a benefit in terms of noise impacts (£0.5 million NPV), whereas the Pink option shows a net disbenefit (-£2.3 million NPV).

13.4.41. Both options show a net improvement in terms of air quality, with the Green option performing marginally better (£0.5 million NPV) than the Pink option (£0.3 million NPV). Both options remove the AQMA at Henlade.

13.4.42. Both options show a reduction in traffic through Henlade in the Scheme opening year, with the Pink option performing marginally better (-91%) than the Green option (-87%).

13.4.43. The number of collisions saved is greater for the Pink option due to more traffic being diverted from the existing A358 through Henlade.

13.4.44. There are minor but important benefits for the Pink option in terms of landscape and severance.

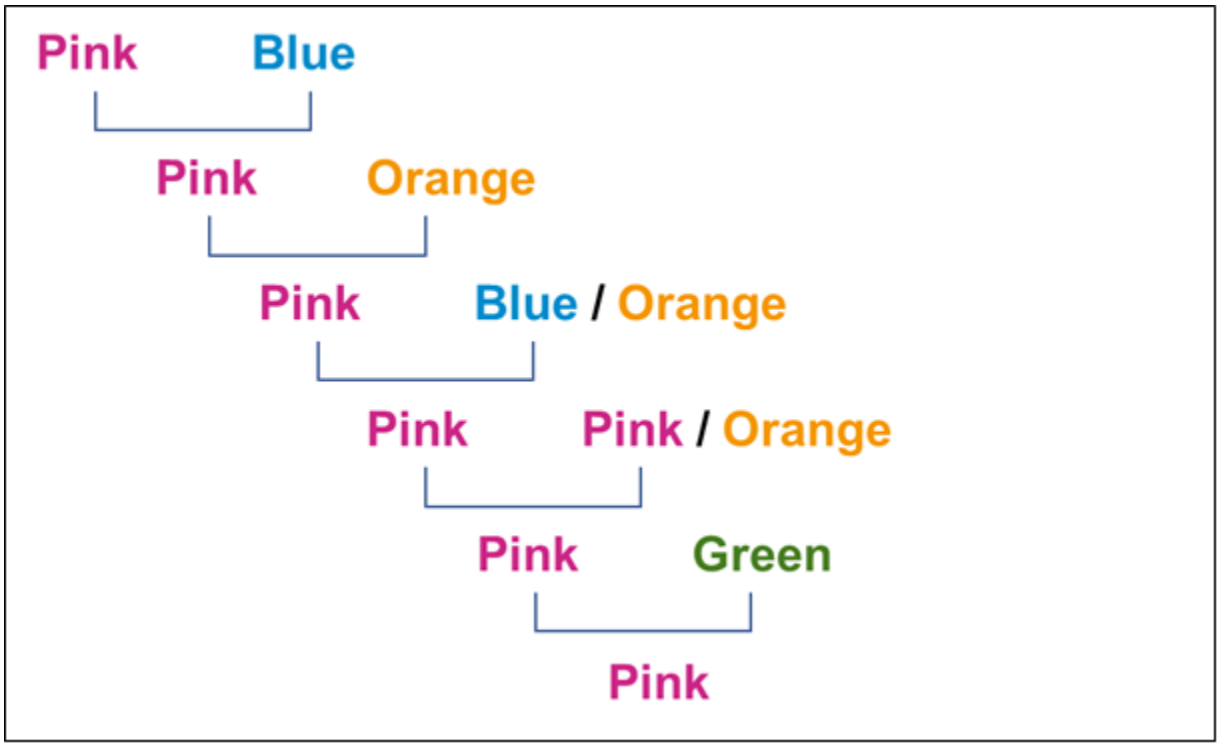
13.4.45. Both options offer a direct connection with the A378 that is favoured by the public and stakeholders. They also avoid Huish Copse (Ancient Woodland) and Higher Holway Open Space.

13.4.46. At a cost of £521 million, the Pink option is cheaper than the Green option (£550 million).

13.4.47. For the Green option, the all movement junction with the M5 as per Orange option has some advantage to providing additional resilience to the road network.

13.4.48. The Pink option performs better than the Green option in terms of economics and the landscape. Where Green option does perform better than the Pink option (noise, air quality) these differences do not outweigh the economic and landscape advantages of the Pink option. The Pink option is therefore taken forward in the assessment. Figure 13.1 summarises the comparison findings.

Figure 13.1: Summary of comparison process



Junction G

13.4.49. At the non-statutory public consultation Junction G was presented in the Ashill area. As part of the consultation we sought feedback from stakeholders about the junction, where it was identified the location should to be further assessed. At the next development stage, additional traffic analysis, environmental assessment and design refinements of the local road network is required to confirm the position of this junction (see section 8.4.1).

Substantiation of findings

13.4.50. A comparison of the three consulted route options was also checked against the aspects as detailed below, to provide confidence of the recommendation and are presented in Appendix F. Due to the similarities between the Blue / Orange, Pink / Orange and Green options and the options presented at the public consultation, the results for these options have not been identified separately:

- The Appraisal Summary Tables (AST) output comparison
- Highways England Delivery Plan 2015-2020 - Key Performance Indicators
- Scheme Objectives comparison (*Client Scheme Requirements*)
- *National Networks National Policy Statement* (NNNPS) Risk Table
- Public Consultation Results

The Appraisal Summary Table output comparison

13.4.51. The ASTs have been compiled into a simplified summary table to allow a direct comparison of each option. They have been ranked in order of best performance for each of the categories within the AST. This summary table is shown in Appendix F (F1) and demonstrates that, when ranked alongside the other options, the Pink option performs best overall. Some of the key advantages of the Pink option within the AST are:

- Economic
- Landscape
- Commuting and other users section of the AST
- Collisions

Delivery plan performance specifications analysis

13.4.52. An assessment of the options' performance against *Highways England Delivery Plan* 2015-*2020* - Key Performance Indicators, was undertaken. The outcome is presented in Appendix F (F2) and indicates that the Pink option performs marginally better against these parameters than the other two options.

Client Scheme Requirements (project objectives) analysis

13.4.53. The objectives of the Scheme were used to confirm that the same emerging route is identified when using these objectives for comparison against all options. This comparison is shown in Appendix F. The overall outcome of the comparison shows that the Pink option best meets the Scheme objectives. This confirms the other comparisons undertaken at this stage.

National Networks National Policy Statement Risk Table

13.4.54. The NNNPS table (*National Networks National Policy Statement*) provides a summary of how the options compare to specific criteria outlined in National Policy. A RAG status (Red, Amber and Green) has been applied to this table to clearly identify if an option complies with the Policy (Green status), the option will conflict with the Policy (Amber status) or certainty if the option conflicts with the Policy (Red status). The table is shown in Appendix F. It identifies that for the majority of the parameters, all three options have the same rating applied. There are two key areas where the ratings differ. Both the Blue option and Orange option trigger a Red' rating for 'irreplaceable habitats including Ancient Woodland and veteran trees'. The other variant in this table is 'Land use: open space / sports and recreational buildings and land'. This is identified as 'Amber' for both the Pink option and the Blue option (Orange option is 'Green') because of the connection to the M5 and the impact to Higher Holway Open Space (also known as Hawthorn Park). The Blue option incurs greater impact to both open space and Ancient Woodland so whilst having some strengths, comparatively, it conflicts with the NNNPS more so than the Pink option.

Public consultation feedback

13.4.55. A summary of the responses received from the two non-statutory rounds of public consultation together with a brief discussion around the interpretation of the responses received is presented below.

13.4.56. The written feedback from the residents and stakeholders indicated preference or support in various degrees for the three options that were presented, but also shows some support for an alternative solution as described more fully in section 8.5.1. The Green option came through the consultation process as a formal response from Ruishton, Henlade and Thornfalcon Parish Council Parish Council (see section 8.5.1). A summary of the responses is included in Table 13.6. It should be noted that the response below relates to the question - "Which of the Section 1 route options would best serve your regular journeys?"

Table 13.6: Key messages for each option

Option	% preference	Summary typical comments noted for each option
Pink option	61%	• This option removes the need for an all movement junction at Killams. • It is beneficial to have a junction that connects to the A378. • Would reduce the quantity of open space. • Has the biggest decrease in traffic through Henlade. • It is the most expensive option. • It has the best BCR.
Blue option	13%	• Removes the need for an all movement junction at Killams. • Concern over the impact on Ancient Woodland (Huish Copse). • Would reduce the quantity of open space.
Orange option	16%	• Concerns around the large footprint the all movement junction may require. • Concern over the impact on the Ancient Woodland (Huish Copse). • The Orange option has less impact on the open space. • It is the cheapest option. • It has the smallest journey time saving and smallest decrease of traffic through Henlade when compared to the other options.
No Response	10%	• Would prefer to see the A303 / A30 improved rather than the A358.

13.4.57. Table 13.7 to Table 13.9 summarises the feedback and views of Local Authorities, Statutory and Non-Statutory Bodies and Parish Councils obtained through the Consultation and on-going engagement.

Table 13.7: Feedback from Local Authorities

Statutory Body	Any preference for specific route?	Comments
Somerset County Council	Supports Scheme principle	The Council is extremely keen to ensure that the Scheme provides strong connectivity between the new road and Taunton as an economic growth hub. Concerned that two of the three options (Pink and Blue) propose that land at Hawthorn Park is lost to create the on-off slip roads to the M5. Hawthorn Park is both a Recreation Space and Wildlife Site as categorised by Policy CP8 of the Core Strategy and so mitigation will be required. If a link into junction 25 is not provided, the precise location of the new M5 junction will be key to ensuring that the new route provides improved journey times to Taunton and supports the economic growth of the area.
Taunton Deane Borough Council	Supports Scheme principle	From an economic growth perspective, it is considered that the 'Pink' and 'Blue' have the best potential to unlock the Nexus 25 employment site. Of the two, the Pink option is preferred from an 'economic impact' point of view, because it delivers better 'wider' economic growth benefits than the Blue option. Also, natural assets are very important to the local economy in Taunton, therefore by reducing the impact on local Ancient Woodland, the Pink option supports many key sectors, such as tourism, leisure, education and health. The Orange route addresses none of these key considerations. Concern about Section 2 junctions locations and the impact this may have on local route use. Pink avoids Ancient Woodland.
South Somerset District Council	Pink for the economic benefits	Wants a connection to A378. Primary concerns relate to the need to ensure that Ashill does not suffer an increase in traffic caused by vehicles needing to travel through the village to access the A358 and that any proposed junction G does not stymie the potential for future growth of the Ilton Business Parks. Concerned about access.

Table 13.8: Feedback from Statutory and non-statutory Environmental Bodies

Statutory Body	Any preference for specific route?	Comments
Natural England	Supports Scheme principles	
Environment Agency	Clear preference for the 'Pink' option	Concerns about flooding but not expressed a preference. Concerned about flooding.
Historic England	No preference	
CPRE	No preference	Objects to Orange, considers Pink option to be least disruptive.

Statutory Body	Any preference for specific route?	Comments
Woodland Trust	No response	Concerned about impact to Huish Woods, but Section 2 would also result in loss or damage to Ancient Woodland .
Heart of the south-west LEP	Pink	The LEP strongly supports the need for the A358 between Taunton and Southfields to be upgraded to dual carriageway. As a member of the partnership of Local Enterprise Partnerships and Local Authorities which includes Dorset and Swindon and Wiltshire LEPs, and the Councils of Devon, Somerset, Dorset and Wiltshire, we are pleased that the government is following through on its commitments within the *Road Investment Strategy*. • create 21,400 jobs and deliver a £41.6bn boost to the economy • deliver £21.2bn of taxation, welfare savings, disposable income and tourism benefits • create £1.9bn in transport benefits from reduced journey times and greater resilience • reduce carbon emissions by 9%. Supports connection to A378 with Pink. Supports interface between Local Growth Fund enhancement for M5 junction 25.

13.4.58. The responses from the Statutory Stakeholders shows there is a preference to the Pink option. However, there is concern outlined regarding Hawthorn Park (Higher Holway Open Space) and the land required to provide the connection to the M5 for both the Blue and Pink options.

Table 13.9: Feedback from Parish Councils

Parish Council	Any preference for specific route?	Comments
Ruishton, Henlade and Thornfalcon Parish Council	Green	The chosen route must provide Henlade with a bypass and provide an 'all movement' junction to access the M5 to travel north or south. Any option without these two provisions will result in the residents of Henlade continuing to suffer with traffic congestion and poor air quality.
Stoke St Mary Parish Council	Pink	The "Orange" route was unsatisfactory at the end of the last consultation and we can see no reason for that decision to change.
West Hatch Parish Council	No preference – object need for whole Scheme	Traffic through Creech St Michael. Retention of the existing carriageway from Capland to Bickenhall Lane with a single on-ramp north at Bickenhall Lane and an off-ramp south at Capland as a solution to retaining as near as possible current traffic flows. West Hatch Parish Council maintains its objection to the concept of an Expressway from Southfields to Taunton as a solution to improving traffic flow into the south-west of England (M3 / A303 corridor) on the basis that the restrictions of the Southfields Roundabout, Ilminster Bypass and M5 Junction 25, are not alleviated by any of Highways England's proposals.

Parish Council	Any preference for specific route?	Comments
Hatch Beauchamp Parish Council	No preference given	We recommend that Highways England conduct and publish separate value-for-money analysis of Section 2 both from the perspective of through traffic and local journeys. Worries about alignments and access for local traffic.
Ashill Parish Council	Blue	Ashill Parish Council is only agreeable to the proposal for improving the A358 along the line of the existing road past Hatch Beauchamp to Southfields Roundabout as long as a number of Junctions are to be placed strategically along the route, it is considered to be not acceptable for the parishes of Ashill and Hatch Beauchamp to become busy thoroughfares for traffic, causing concern regarding the safety and amenity for pedestrians, cyclists and horse riders in this rural area. It is also disappointing that there is extremely limited mention of the impact of the proposals on Southfields Roundabout at Ilminster. There are major concerns regarding how pedestrians, cyclists and horse riders who currently cross the existing A358 using the built-in footpaths and bridleways are going to be able to cross the proposed new dual carriageway.
Broadway Parish Council	No preference given	Local connectivity and non-motorised user crossing the road concerns.
Ilminster Town Council	No preference given	Want improved wayfinding to the town.
Horton Parish Council	Orange	Junction G needs to be moved to Ashill / Stewley. The current proposal only serves Ilton and Ashill is a bigger community and needs priority access. The community of Horton and Broadway often avoid the Southfields Roundabout as often a lot of congestion, so result in going to Ashill to join the A358. The sizes of Horton, Broadway and Ashill is far larger than Ilton.
Bickenhall Parish Council	No formal Response	
Trull Parish Council	Strongly against Orange	The proposed junction F is very close to residential properties and impacts on the designated Vivary Green Wedge which forms a vital “Green lung” that Trull Parish Council has sought to protect from development. The Parish Council would not wish to see a motorway junction on this Green Wedge or in any proximity which would directly affect it. It also has concerns about the future possibility of this proposed junction being opened to local traffic and creating a rat-run through the parish on single track lanes.
Neroche Parish Council	No formal response	
Pitminster Parish Council	Pink / Orange option	The Parish Council prefer the Pink route but with a link from the roundabout B onto the Orange route to roundabout F.
Creech St Michael Parish Council	Pink / Orange option	The Parish Council preferred an alternative option, where the Pink route from C-B / D – junction 25 but with the last section (that joining the motorway from B / D shown as F) following the Orange route. More screening natural planting rewired to screen village.

Parish Council	Any preference for specific route?	Comments
Corfe Parish Council	Pink	Junction C is likely to provide maximum relief to existing roads, especially through Henlade, and is less likely to generate new traffic rat-runs. The design appears over-engineered and complicated and should be re-examined in the light of the latest traffic survey data for the A378.

13.5. Overall conclusion

13.5.1. The options vary in level and magnitude of intervention as well as impacts and benefits. They therefore contribute to meeting the Scheme objectives in various degrees and require different mitigations. However, considering that the Pink option performs better when compared against all the competing options, it is identified as the best option. The key benefits of the Pink option are:

- it reduces the traffic through Henlade the most
- the journey time shows the greatest reduction compared to the other options
- has less impact on the Ancient Woodland than the Blue and Orange options
- offers an alternative connection to the M5 than junction 25

13.5.2. Although the comparison process has identified the Pink option is the best performing option from those presented or identified through the 2018 consultation, the next chapter outlines the need to develop this option to make the Scheme more affordable.

14. Development post potential route identification

14.1. Introduction

14.1.1. The assessment findings outlined in Chapter 13 identifies that the Pink option performs the best, however it is the most expensive of the three options presented at the 2018 consultation.

14.1.2. In April 2018, revised cost estimates were received and showed that the costs have increased for all options presented at the consultation (see Table 7.16). The maximum cost of the Scheme presented in the 2018 consultation was the Pink option at £452 million, however the April 2018 estimates increased the Pink option to £521 million. The Blue and Orange options revised April 2018 estimates are also above £452 million.

14.1.3. As a result of the revised cost estimates received in April 2018, we revisited the options to identify whether these could be modified to balance the Scheme's objectives, cost and public feedback.

14.1.4. The decision to revisit the options, as presented at the consultation, required the need to carry out further assessment work and to determine their suitability against the Scheme and the first *Road Investment Strategy* (RIS1) objectives.

14.1.5. An additional benefit in developing a modified option provided the opportunity to investigate the overall footprint of the Scheme and to reduce the area of land impacted. The feedback received from the 2017 and 2018 consultations identified concerns about the potential impact of our proposals on public open space to the local community, particularly Holway Open Space (officially known as Hawthorn Park). Concerns were also raised around the quantity of countryside impacted by the Scheme in general. The feedback also showed that there is strong support for the Pink option.

14.1.6. The Pink option, being the best performing option, was used as the basis for a modified option, principally by removing the link and new junction to the M5 at Blackbrook. This has been named the Pink Modified option.

14.1.7. A modified version of the Blue option (similar to the Pink Modified option by removing the Blackbrook link and junction with the M5) would not perform as well as a Pink Modified option. A modified Blue option would have less benefits as it does not connect to the A378 junction and has a greater environmental impact in relation to the Ancient Woodland. The single connection to the M5 and route of the Orange option cannot be further modified in a similar way considered for Pink and Blue options. However, an alternative for this option would be to reduce the overall length by moving the new proposed junction (at Killams) to junction 25; in this arrangement this would be very comparable to a modified Blue option.

14.1.8. Revisiting the design for the modified options also provided an opportunity for consultation feedback to be considered and incorporated into the design at an earlier stage of the Scheme development.

14.1.9. To complete the assessment work for the Pink Modified option, a cost estimate was obtained in November 2018. The costs assume that construction is expected to start in 2021 and last until 2024 when the Scheme would be open to traffic. The same assumption made for the appraisal of the Pink, Blue and Orange options. This estimate indicated that the Pink Modified cost is significantly lower than the Pink option cost from April 2018.

Table 14.1: Pink Modified Cost Estimate compared with Pink option

	Pink option (April 2018)	Pink Modified option (Interim November 2018)
Cost Estimate	£521 million	£423 million

14.1.10. The assessment work undertaken for the Pink Modified option has identified that the road link connecting to the M5 at Blackbrook and Junction A can be removed. This would help deliver the right balance between Scheme objectives and cost. It also responds to the public feedback regarding the impact that this link and junction might have on homes, public open space and the countryside.

14.1.11. Part of the further assessment has analysed the operational performance of the M5 junction 25 to enable an understanding of how the removal of Junction A may impact the M5 junction 25. The development of the Pink Modified option has confirmed that with some improvement measures to the existing junction 25, the Scheme performs safely and operationally. The further assessment and the M5 junction 25 operational assessment findings are outlined in Chapter 15 and Chapter 16 respectively.

14.2. Pink Modified option Scheme description

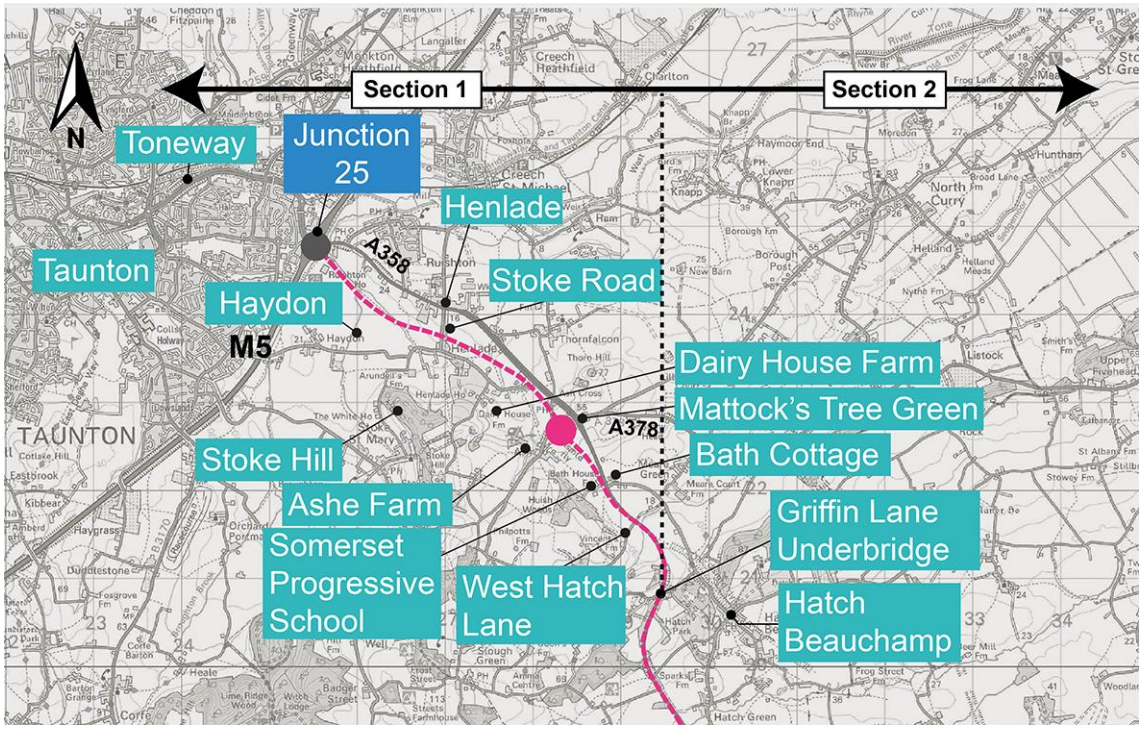
Alignment of the Pink Modified option

14.2.1. The new route option has been titled ‘Pink Modified’ and in Section 1 follows a single alignment to connect into the gyratory at M5 junction 25. This option would be approximately 8.5 miles (13.6 kilometres) long between its connection with junction 25 of the M5 and Southfields Roundabout.

Section 1

14.2.2. The alignment of the Pink Modified option takes a similar route to the Pink option through Section 1. This follows a more northerly arc through the Scheme corridor, taking it closer to the A358 / A378 junction at Mattock’s Tree Green and closer to Henlade than the Blue and Orange options. This route is illustrated in Figure 14.1.

Figure 14.1: Section 1 of the Pink Modified option



Source: Mott MacDonald Sweco Joint Venture. This Map is based upon Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office © Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. Highways England 100030649 2016.

14.2.3. From the west, the Pink Modified option would commence at junction 25 of the M5. Modifications to junction 25 are included as part of the Pink Modified option. It is anticipated that it would connect to the local road infrastructure being provided by Somerset County Council at junction 25 to facilitate access to a proposed Strategic Employment Site (Nexus 25).

14.2.4. Travelling east from this point, the vertical profile of the proposed dual carriageway is slightly above ground level to remain above local flood levels. This would continue until the proposed road crosses Broughton Brook. It would then continue in a cutting through a gap between residential properties along Stoke Road in Henlade.

14.2.5. East of Henlade, the proposed road would run roughly parallel to the existing A358, initially at ground level but then entering a deep cutting through Mattock's Tree Hill. The proposed road would emerge from the cutting before it reaches the River Tone. It will continue at ground level through a gap between Bath Cottage and the Somerset Progressive School until it reaches West Hatch Lane.

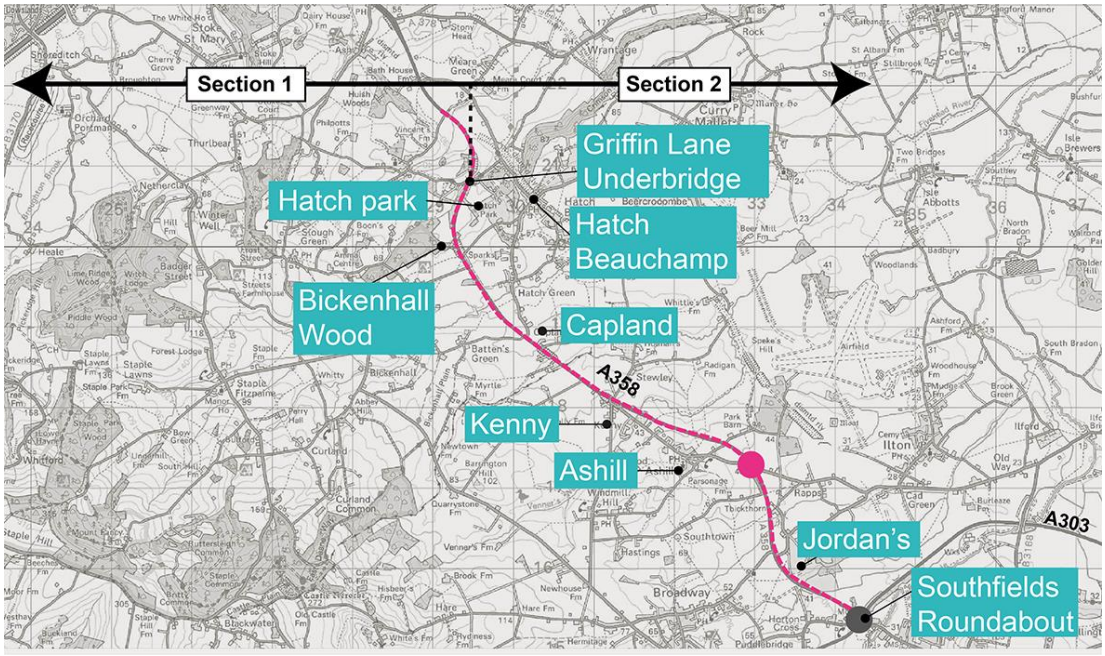
14.2.6. Between West Hatch Lane and the existing Griffin Lane Underbridge, the proposed dual carriageway would gradually adopt the horizontal and vertical alignment of the existing A358 carriageway. The existing Griffin Lane Underbridge, which carries the single carriageway A358 over the top of Griffin

Lane, would be retained to carry one half of the proposed dual carriageway. A new bridge would be constructed to carry the other half.

Section 2

14.2.7. The alignment of Section 2 of the Pink Modified option is illustrated in Figure 14.2 and is identical to the Pink, Blue and Orange options.

Figure 14.2: Section 2 of the Pink Modified option



14.2.8. The vertical profile of Section 2 would generally follow the profile of the existing carriageway which is either at ground level or just above ground level, to be above watercourse levels. Some excavation, particularly to the east of Ashill, may be necessary.

14.2.9. From the western end of Section 2, the proposed dual carriageway would initially follow the alignment of the existing A358 Hatch Beauchamp Bypass using asymmetrical widening until reaching Capland. The side which the new lanes would be constructed through this section would be dependent upon an assessment of potential impacts of adjacent land plots on either side of the road, particularly at Hatch Park and Bickenhall Wood.

14.2.10. Between Capland and Kenny the proposed road would take an entirely offline route just to the north-east of the existing road. This would enable the existing road to be retained as a local route between Ashill and Hatch Beauchamp and provide access to existing properties along the route.

14.2.11. From Kenny, the line of the existing road would be followed with a dual carriageway being created through asymmetrical widening around the Ashill

Bypass through to Southfields Roundabout. The side which the new carriageway would be constructed through this section would be dependent upon an assessment of potential impacts of adjacent land plots on either side of the road, particularly to the north of Ashill and at Jordan's crossroads, (between Southfields and Ashill).

14.2.12. At the eastern limits of the Scheme, the proposed dual carriageway would connect to the existing Southfields Roundabout. It is likely that the roundabout carriageway and most of the entry arms would need to be widened to provide sufficient capacity. The A358 southbound entry would be widened from single carriageway to dual carriageway standard. It is also anticipated that the A303 eastbound exit would need to be widened.

Junction strategy for the Pink Modified option

Section 1

14.2.13. There would be one junction along Section 1 of the Pink Modified option which would facilitate movement between the proposed dual carriageway and the adjacent road network. This is Junction C (Mattock's Tree Green) which is highlighted in Figure 14.3 and described in Table 14.2. The alignment would then route into the Nexus 25 development and then onto M5 junction 25.

Figure 14.3: Junctions in Section 1 of the Pink Modified option

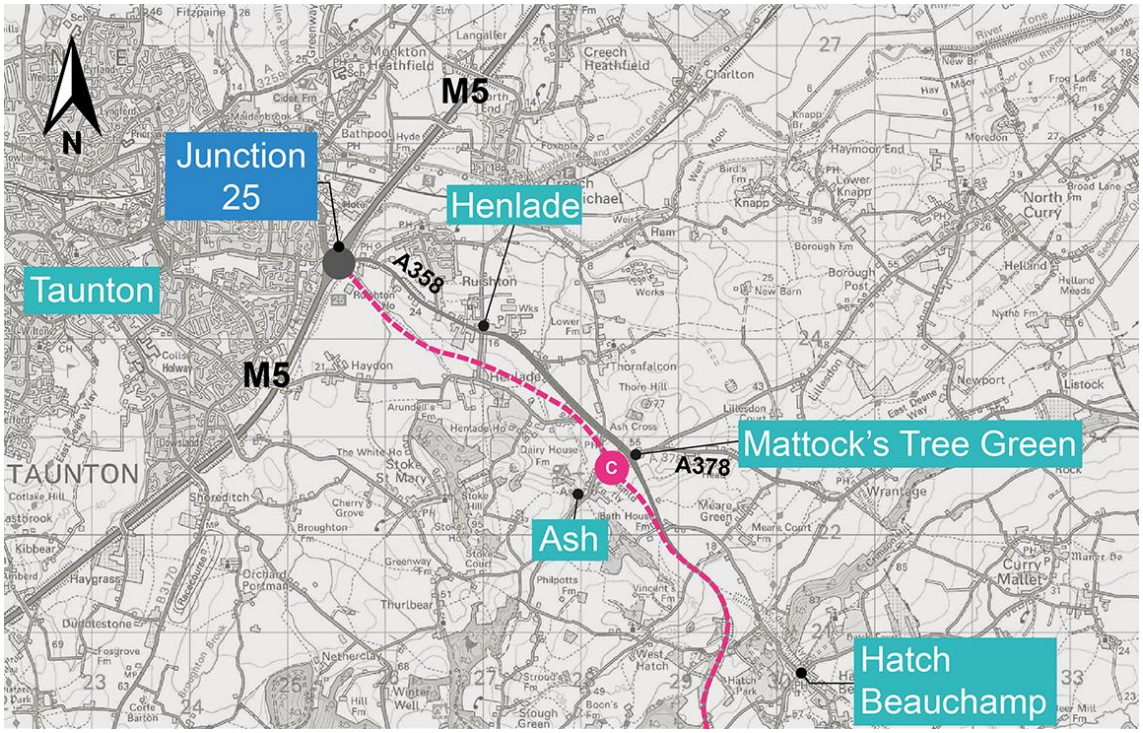


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Table 14.2: Junctions in Section 1 of the Pink Modified option

Junction Name	Description
Junction 25	A designated left turn lane is proposed from Toneway (Taunton access) onto the M5 northbound. This left turn lane will enable an improved connection from Taunton onto the northbound motorway. Widening is also proposed to the southbound M5 off-slip. This will enable an improved connection from the M5 southbound approaching the roundabout at junction 25.
Junction C (Mattock's Tree Green)	An all movements grade separated junction providing connection between the proposed dual carriageway and the adjacent local road network. This junction is also present in the Pink option. This junction would comprise merging and diverging slip roads to and from both carriageways of the proposed road. These slip roads would enable connection between the proposed road and: • The existing un-named local road through Ash to Thurlbear and Slough Green • The A378 via the existing traffic signal-controlled junction at Mattock's Tree Green • The existing A358 carriageway at the traffic signal-controlled junction, which would be retained to provide continued access to Henlade and Hatch Beauchamp

Section 2

14.2.14. There would be two junctions along Section 2 of the Pink Modified option which would facilitate movement between the proposed dual carriageway and the adjacent road network. These are at Junction G (Ashill) and Junction H (Southfields Roundabout). These are highlighted in Figure 14.4 and described in Table 14.3.

Figure 14.4: Junctions in Section 2 of the Pink Modified option

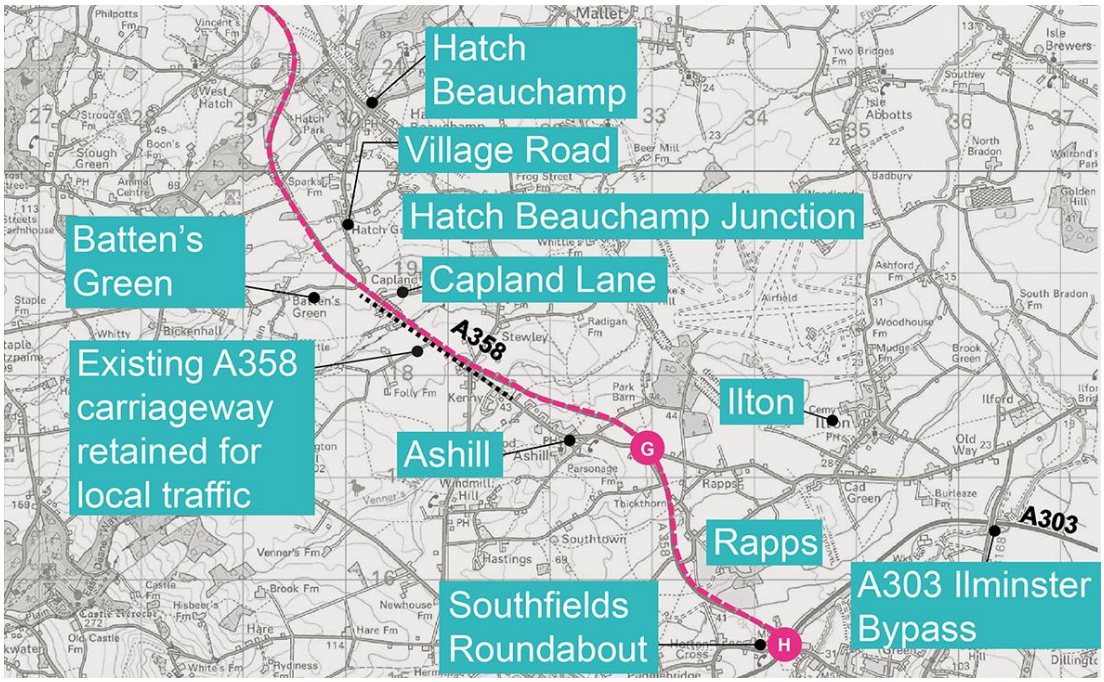

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Table 14.3: Junctions in Section 2 of the Pink Modified option

Junction Name	Description
Junction G (Ashill)	An all movements grade separated junction between the proposed dual carriageway and the local road network. This junction would comprise merging and diverging slip roads to and from both carriageways of the proposed road. These slip roads would enable connection between the proposed road and: • The existing un-named local road into Ashill • The local road known as Rapps, which leads to Ilton
Junction H (Southfields Roundabout)	The existing Southfields Roundabout between the A358 and A303. The existing roundabout would be retained. The A358 arm would be widened from single to dual carriageway. The circulatory carriageway would be widened to accommodate additional traffic and road markings would be upgraded to assist circulating traffic with lane discipline. A number of the other entry arms would be widened in order to provide sufficient capacity. The A303 eastbound exit (Ilminster Bypass) would also be widened in order to provide sufficient capacity.

Treatment of local roads for the Pink Modified option

Section 1

14.2.15. The Pink Modified option has the potential to impact nine local roads in Section 1. These are highlighted in Figure 14.5 and proposed treatment to each road is described in Table 14.4.

Figure 14.5: Local roads affected by Section 1 of the Pink Modified option

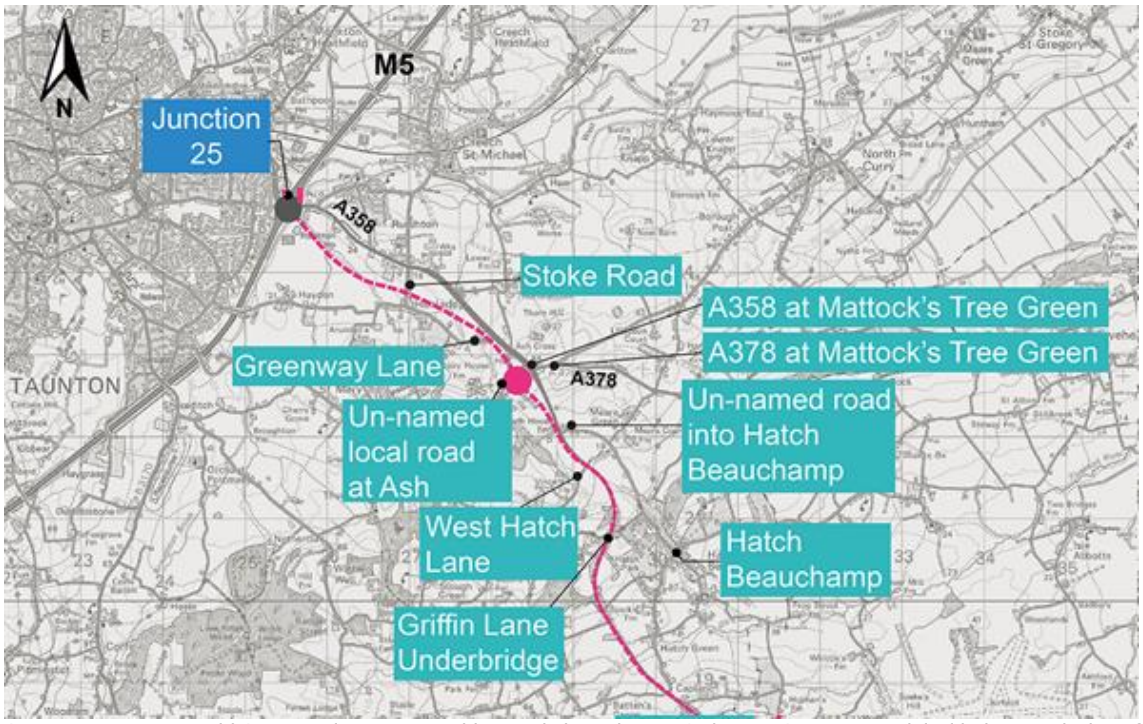

Table 14.4: Treatment to local roads in Section 1 of the Pink Modified option

Local Road name	Description	Proposed Treatment
Stoke Road	Local road between the A358 at Henlade and Lower Henlade.	This road would be kept open by providing a new bridge crossing of the proposed dual carriageway. There would be no connection with the proposed dual carriageway.
Greenway Lane	Local road between the A358 near Thornfalcon and Lower Henlade.	This road would be permanently closed at the point where the proposed dual carriageway crosses it.
Un-named local road at Ash	Local road between the A358 at Ash Cross and Slough Green / Thurlbear.	This road would be connected to Junction C.
A358 at Mattock's Tree Green	Existing A358 which provides access to Henlade and Hatch Beauchamp.	This road would be connected to Junction C.
A378 at Mattock's Tree Green	This connects to the A358 at the existing traffic signal controlled junction at Mattock's Tree Green.	This road would be connected to Junction C.
Un-named road into Hatch Beauchamp	Local road with a junction to the existing A358 which provides access into Hatch Beauchamp.	The existing junction of this road would be closed. The road would be connected to Junction C via a new local link road.

Local Road name	Description	Proposed Treatment
West Hatch Lane	Local road between the A358 and West Hatch.	This road would be permanently closed at the point where the proposed dual carriageway crosses it.
Griffin Lane	Local road that currently passes underneath the existing A358, providing connection between West Hatch and Hatch Beauchamp.	This road will be kept open.

Section 2

14.2.16. Section 2 has the potential to impact 16 local roads. These are highlighted in Figure 14.6. Proposed treatment to each road is described in Figure 14.4.

Figure 14.6: Local roads affected by Section 2 of the Pink Modified option

Table 14.5: Treatment to local roads in Section 2 of the Pink Modified Option

Local Road name	Description	Proposed Treatment
Bickenhall Lane	Local road which leads to Hatch Beauchamp from a junction on the existing A358.	The assessed design considers this road to be permanently closed. There would be no connection to the proposed dual carriageway. Traffic would reroute to join the A358 at either Junction C (Mattock's Tree Green) or Junction G (Ashill). Following the responses from the public consultation, diversion routes to be assessed for

Local Road name	Description	Proposed Treatment
		agricultural vehicle suitability in Stage 3.
Bickenhall Lane	Local road which leads to Bickenhall from a junction on the existing A358.	The assessed design considers this road to be permanently closed. There would be no connection to the proposed dual carriageway. Traffic would reroute to join the A358 at either Junction C (Mattock's Tree Green) or Junction G (Ashill). Following the responses from the public consultation, diversion routes to be assessed for agricultural vehicle suitability in Stage 3.
Village Road	Local road which leads to Hatch Beauchamp from a junction on the existing A358.	The existing junction with the A358 would be permanently closed, although an overbridge would be provided so traffic could access Ashill / Bickenhall or join the A358 via the proposed junction G (Ashill).
Un-named road between the A358 and Batten's Green	Local road which leads to Batten's Green from a junction on the existing A358.	The existing junction with the A358 would be permanently closed, although an overbridge would be provided so traffic could access Ashill / Hatch Beauchamp or join the A358 via the proposed junction G (Ashill).
Capland Lane	Local road which leads to the east from a junction on the existing A358.	The existing junction with the A358 would be permanently closed. Traffic from Capland would be required to pass through Stewley or Hatch Beauchamp to join the A358.
Folly Drove	Local road which leads to the west from a junction on the existing A358.	The existing junction is located along the section of A358 carriageway that will be retained as a parallel local road. It will therefore be retained, although there would no longer be a direct connection to the proposed A358 dual carriageway.
Stock's Lane / Radigan Lane	Local road which leads to the north from a junction on the existing A358.	The existing junction with the A358 would be permanently closed. However, a new link would connect this road to the 'Ashill Straight' via a new overbridge.
Wood Road	Local road which leads to the south from a junction on the existing A358.	The junction with the A358 would be permanently closed.
'Ashill Straight'	Local road which leads into Ashill from a junction on the existing A358 near Wood Road.	The junction with the A358 would be permanently closed, however the road through Ashill will be retained.

Local Road name	Description	Proposed Treatment
Park Barn Lane	Local road with a junction on the existing A358. This provides access to a small number of properties and serves as an emergency access to the Merryfield Airfield.	The junction with the A358 will be permanently closed. Access to Park Barn Lane would be provided by upgrading a nearby track (Copse Lane).
Park Barn Lane	Local road with a junction on the existing A358.	The junction with the A358 would be permanently closed.
Rapps	Local road with a junction on the existing A358. This provides access to the settlements of Rapps and Ilton.	This road to be connected to Junction G.
Un-named local road to east Ashill from the A358	Local road with a junction on the existing A358. This provides access to Ashill.	This road to be connected to Junction G.
Un-named local road at Thickthorn Cross	Local road which runs parallel to the A358 and provides access to properties to south of Ashill.	This road would be closed permanently to make way for Junction G.
Cad Road	Local road with a junction on the existing A358. This provides access to Ilton.	The junction with the A358 would be permanently closed.
Un-named local road to Broadway	Local road with a junction on the existing A358. This provides access to Horton and Broadway.	The junction with the A358 would be permanently closed.

Treatment of NMU facilities for the Pink Modified option

Section 1

Existing NMU routes on Section 1

14.2.17. Existing Non-motorised user (NMU) routes that are likely to be affected by the Pink Modified option in Section 1 are shown in Figure 14.7 and details summarised in Table 14.6.

Figure 14.7: Existing Public Rights of Way for Section 1 of the Pink Modified option

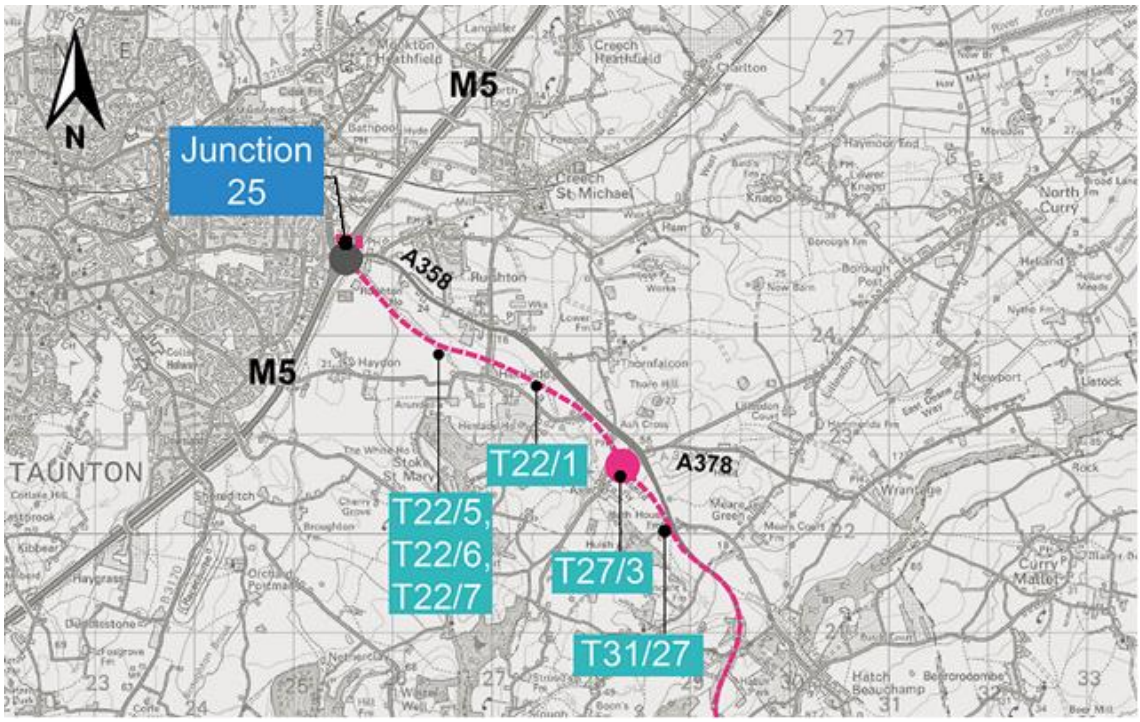

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Table 14.6: Existing Public Rights of Way for Section 1 of the Pink Modified option

Footpath Ref	Description
T 22/1	A north-south footpath linking Thornfalcon and Henlade.
T 22/5	A north-south footpath linking Greenway Lane (Henlade) to various points along the A358 towards Ruishton.
T 22/6	A north-south footpath linking Greenway Lane (Henlade) to the A358 near Ruishton.
T 22/7	An east-west footpath linking Greenway Lane (Henlade) to M5 junction 25.
T 27/3	An east-west footpath providing a link between Ashe Farm and Mattock's Tree Green.
T 31/27	Two north-south footpaths linking Bath House Farm and surrounding properties along West Hatch Lane.

NMU Strategy for Section 1 of the Pink Modified option

14.2.18. NMU proposals have been developed following recommendations by user groups and local council rights of way officers, alongside an NMU audit and NMU surveys undertaken as a part of the Scheme development.

14.2.19. The alignment of the Pink Modified option is similar to that of the Pink option. Therefore the proposed offline section will mainly dissect Public Rights of Way (PROW)s to the north of Lower Henlade and Ashe Farm. Removing the south facing links to the M5 avoids dissecting Public Rights of Ways between Haydon House Farm and Arundell's Farm.

14.2.20. The majority of footpaths or bridleways severed will be diverted across the nearest available road bridge. It is proposed to close a small number of rights of way that would appear to provide no obvious through route. There will be no dedicated NMU bridges on this section. Details of the diversions being proposed across the proposed dual carriageway can be found in Table 14.7.

Table 14.7: Proposed treatment to Public Rights of Way for Section 1 of the Pink Modified option

Footpath Ref	Proposed treatment
T 22/1	To be diverted via Stoke Road overbridge between Henlade and Lower Henlade.
T 22/5	To be diverted via Stoke Road overbridge between Henlade and Lower Henlade.
T 22/6	To be diverted via Stoke Road overbridge between Henlade and Lower Henlade.
T 22/7	To be diverted via Stoke Road overbridge between Henlade and Lower Henlade.
T 27/3	To be diverted via Mattock's Tree Green junction.
T 31/27	Crossing of the A358 to be closed. Diversion to Hatch Beauchamp will be provided via Griffin Lane Underbridge and to Thornfalcon via Mattock's Tree Green junction.

Section 2

Existing NMU routes on Section 2

14.2.21. Existing NMU routes that are likely to be affected by the Pink Modified option in Section 2 are shown in Figure 14.8 and details summarised in Table 14.8.

Figure 14.8: Existing Public Rights of Way for Section 2 of the Pink Modified option

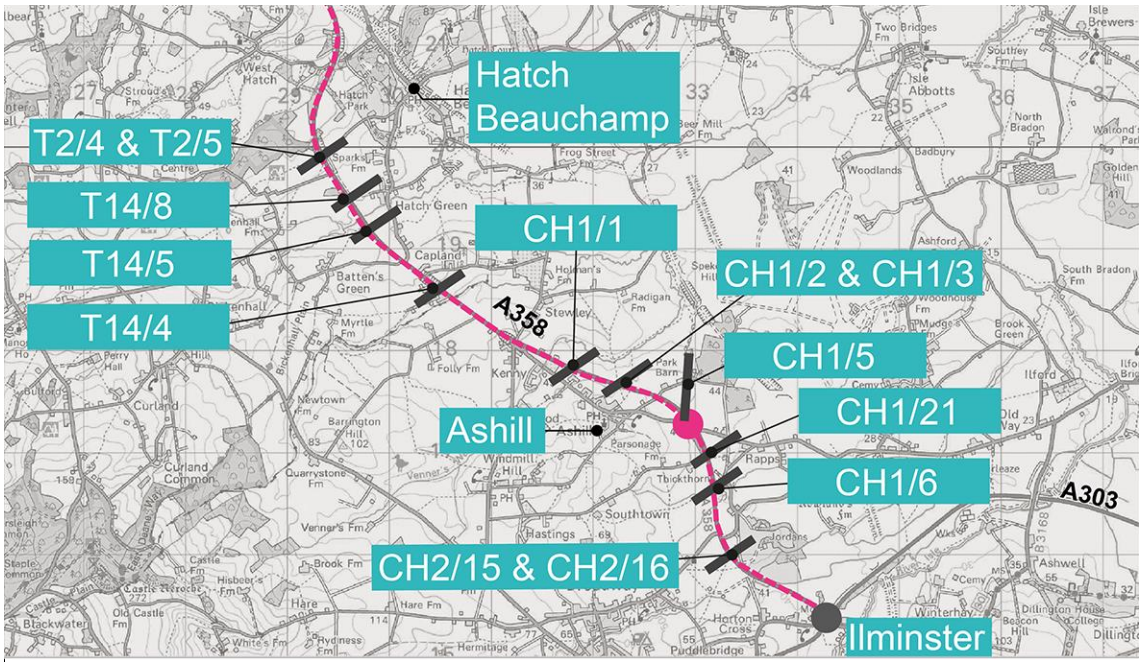

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Table 14.8: Existing Public Rights of Way for Section 2 of the Pink Modified option

Footpath Ref	Description
T2/4 and T2/5	Two footpaths to the east of the existing A358 Hatch Beauchamp Bypass which appear to have been severed from land to the east of the A358 because of the original construction of the road in the 1980s.
T14/8	A bridleway which, originally, is likely to have provided a connection between Hatch Green and Bickenhall Lane before it was severed during construction of the Hatch Beauchamp Bypass.
T14/5	A footpath which connects Hatch Green to the west of the A358 via an underpass (anecdotally this crossing may be a result of a permissive right of way).
T14/4	A footpath heading south through Windsor Farm from the side of the existing A358.
CH1/1	A historical footpath which runs north from Kenny (near Ashill) which, although still appears to be continuous on the mapping, is likely to have been severed by the construction of the Ashill Bypass in the 1990s.
CH1/2 and CH1/3	Historical footpaths running north from Ashill Farm which are also likely to have been severed by the Ashill Bypass.
CH1/5	A footpath which runs northwards from the 'Three Oaks Cross' junction towards Beercrocombe.
CH1/21	A footpath which would have crossed the original A358 carriageway at Thickthorn Cross but has been severed by the construction of the Ashill Bypass.
CH1/6	A footpath which would have crossed the original A358 carriageway providing a connection between Southdown and Rapps but has been severed by the construction of the Ashill Bypass.

Footpath Ref	Description
CH2/15 and CH2/16	Two footpaths which would have crossed the original A358 carriageway providing a connection between Broadway and Jordan's estate but have been severed by the construction of the Ashill Bypass.

NMU Strategy for Section 2 of the Pink Modified option

14.2.22. NMU proposals have been developed following recommendations by user groups and local council rights of way officers, alongside an NMU audit and NMU surveys undertaken as a part of the Scheme development.

14.2.23. Where the proposed road severs a right of way, the majority will be retained by diverting across the nearest available road bridge. It is proposed to close a small number of rights of way that appear to provide no obvious through route as described in Table 14.9. There will be no dedicated NMU bridges on this section.

14.2.24. It is proposed to retain Griffin Lane as this is one of the few locations along the existing A358 where NMUs and local traffic can cross without interacting with the A358 traffic. Griffin Lane is also known to be a local cycle route.

Table 14.9: Proposed treatment to public rights of way for Section 2 of the Pink Modified option

Footpath Ref	Proposed treatment
T2/4 and T2/5	To be diverted through Griffin Lane Underbridge.
T14/8	To be diverted via Fivehead River Underbridge.
T14/5	To be diverted via Fivehead River Underbridge.
T14/4	No change. Existing A358 carriageway to be retained as local access road at this location.
CH1/1	Diverted across Kenny Overbridge.
CH1/2 and CH1/3	To be closed.
CH1/5	To be diverted across Ashill Junction Overbridge.
CH1/21	To be closed.
CH1/6	To be closed.
CH2/15 and CH2/16	To be closed.

14.3. Key differences with the Pink option in Section 2 / Design features

14.3.1. The key difference between the Pink option and the Pink Modified option is that the latter deletes the separate free flow junction for traffic travelling on the A358 / M5 corridor between the south-west and the south-east. The removal of this junction contributes to the modified option having a lower cost than the Pink option shown at the 2018 Consultation.

14.3.2. The Pink Modified option alignment will route the mainline alignment to M5 junction 25, whereas the Pink option linked into the south facing junction onto the M5. In the Pink option, junction 25 was served by a spur road off the main alignment of the A358.

14.3.3. The Pink Modified option alignment passes marginally closer to the southern side of Henlade. Both options pass beneath Stoke Road at the same location, with the Pink Modified option alignment turning through a 120kph design speed 1,030m radius to tie into junction 25. The Pink option alignment takes M5 junction 25 traffic through a junction, where a 360m radius is used. The smaller radius is compliant but would require junction 25 traffic to slow and diverge from the mainline of the A358.

14.3.4. The geometric differences highlighted above have resulted in the Pink Modified option alignment being a shorter route. This results in a smaller footprint for the Scheme and a subsequent decrease in the quantity of countryside affected.

15. Traffic and economics for the Pink Modified option

15.1. Traffic modelling

15.1.1. This chapter solely outlines the findings of the Pink Modified assessment. It should be read in conjunction with the modelling methodology and background outlined in Chapter 9.

15.2. Traffic forecasting

15.2.1. All assessments for Pink Modified have been carried out with an original Scheme opening year of 2023 and design year of 2038 (15 years after Scheme opening).

15.3. M5 junction 25 scheme and Nexus 25 employment site at Henlade

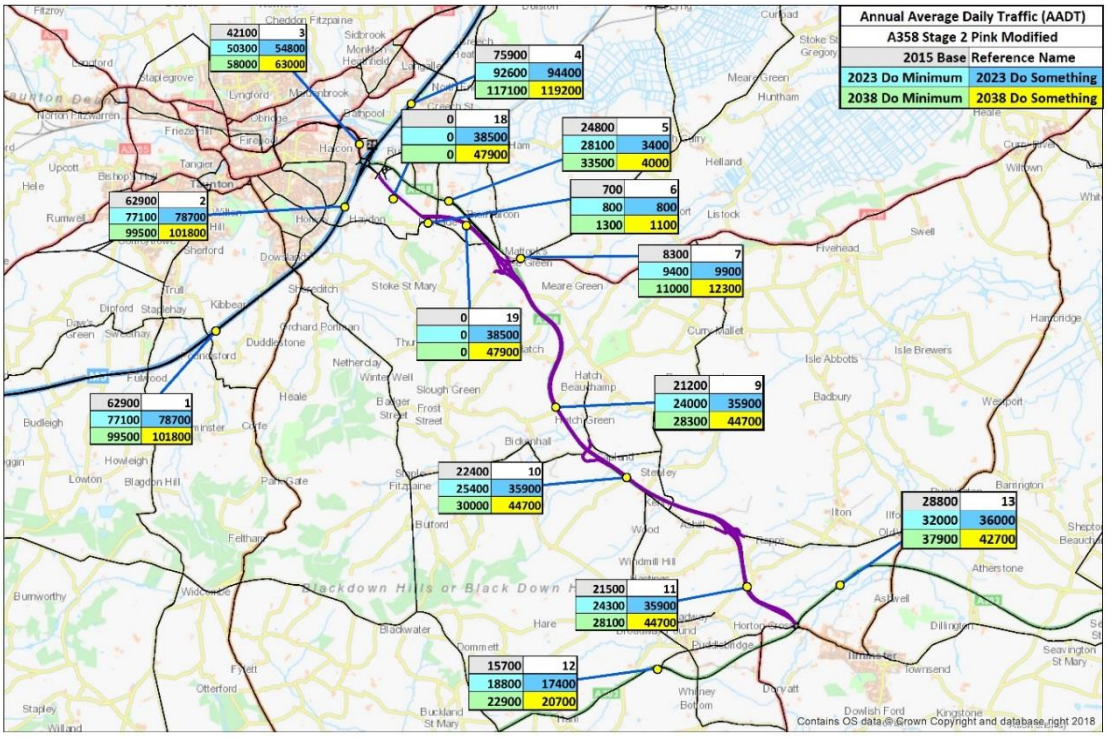
15.3.1. Of the network schemes included in the uncertainty log, the M5 junction 25 scheme is of a particular importance, given the connection of this Scheme with the proposed improvement of the A358, particularly for the Pink Modified option where a direct connection to the M5 south of junction 25 is not considered. The M5 junction 25 scheme, proposed by Somerset County Council, has been included in the forecasting both in the Do Minimum and Do Something scenarios for Pink Modified. The Somerset County Council improvements are outlined in Figure 9.2.

15.4. Traffic impacts of Pink Modified option

Traffic flows

15.4.1. The Annual Average Daily Traffic (AADT) flows for the Pink Modified are shown in Figure 15.1.

Figure 15.1: AADT in the local area – Pink Modified option



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15.4.2. On the main A358 carriageway on the online (site 10) flows are forecast to increase from 22,400 vehicles in the base year (2015) to 25,400 in 2023 and 30,000 in 2038 without the Scheme - Do Minimum (DM), and to 35,900 in 2023 and 44,700 in 2038 with the Scheme in place - Do Something (DS), indicating 41% and 49% increases respectively from the DM scenario.

15.4.3. In comparison, the current A358 main carriageway flows around Henlade (site 5) indicate 24,800 vehicles in the base year (2015), 28,100 in 2023 and 33,500 in 2038 DM. With the Pink Modified option in place AADT are forecast at 3,400 vehicles in 2023 and 4,000 in 2038. This represents an 88% decrease in traffic both in 2023 and 2038 compared with the DM.

15.4.4. The offline section of the proposed Scheme, east of the link connecting to the M5 junction 25 (site 19) has AADTs of 38,500 vehicles in 2023 and 47,900 in 2038. The traffic flows on the new link connecting to M5 junction 25 (site 18) are forecast to be 38,500 in 2023 and 47,900 in 2038.

15.4.5. At site 2, south of M5 junction 25, AADTs are forecast to increase from 77,100 vehicles in the DM to 78,700 vehicles in 2023 DS, and from 99,500 vehicles to 101,800 in 2038. These increases are due to the lack of the direct offline connection to / from the M5, which forces traffic to travel via M5 junction 25 to / from the M5 south.

15.4.6. Some of the traffic using the Scheme is local traffic that is forced to be rerouted via the Scheme. This is due to the exclusion (in comparison with the other options), of some local connections and slip roads at Hatch Beauchamp in the Pink Modified option. For instance, with the exclusion of the West Hatch Lane overbridge in the Pink Modified option along with the local connections, trips from West Hatch to Hatch Beauchamp now have to travel southbound on the new A358, leave it at the newly provided Ashill junction before heading back northbound on local roads to get to Hatch Beauchamp. In the other options assessed (that is the Pink, Blue and Orange options) this journey could have been carried out directly using the West Hatch Lane overbridge and the local roads without the need to travel on the newly provided A358.

15.5. Journey times

15.5.1. The journey times for the Pink Modified option are summarised below:

- In the AM Peak period
  - The Pink Modified option showed a 32% (~6 min 55 sec) and 30% (~6 min 7 sec) improvement in journey time in the eastbound and westbound directions respectively
- In the PM Peak period:
  - The Pink Modified option showed 33% (~6 min 45 sec) and 26% (~5 min 18 sec) improvement in journey time in the eastbound and westbound directions respectively

Table 15.1: Summary of journey times and changes in journey times between Southfields Roundabout and M5 junction 26, junction 25 (Taunton) and junction 24 in 2038

Route			Do Minimum (without Scheme)	Pink Modified option		
				Journey Time (min:sec)	Difference (min:sec)	% change
Eastbound	M5 j26 to Southfields	AM-Peak	24:40	18:27	-06:13	-25%
		PM-Peak	24:03	17:26	-06:37	-28%
	M5 j25 to Southfields	AM-Peak	18:09	10:42	-07:27	-41%
		PM-Peak	17:08	10:09	-06:59	-41%
	M5 j24 to Southfields	AM-Peak	22:27	15:21	-07:06	-32%
		PM-Peak	21:31	14:52	-06:39	-31%

Route			Do Minimum (without Scheme)	Pink Modified option		
				Journey Time (min:sec)	Difference (min:sec)	% change
Westbound	Southfields to M5 j26	AM-Peak	21:49	15:37	-06:12	-28%
		PM-Peak	20:58	15:03	-05:55	-28%
	Southfields to M5 j25	AM-Peak	16:53	10:47	-06:06	-36%
		PM-Peak	17:13	12:13	-05:00	-29%
	Southfields to M5 j24	AM-Peak	22:17	16:12	-06:05	-27%
		PM-Peak	22:54	17:54	-05:00	-22%

15.6. Collision (accident) savings

15.6.1. The COBALT (Cost and Benefit of Accidents – Light Touch) software was used to derive the cost of collisions in monetary form for the 60-year appraisal period. Table 15.2 summarises the results of the COBALT collision (accident) assessment with observed collision rates in the local area for a 60-year appraisal period.

Table 15.2: Predicted collision savings based on local collision rates (£000s)

60 Year Appraisal Period		
		Do Minimum
Number of Personal Injury Collisions		
Casualties	Fatal	1,352.0
	Serious	12,739.5
	Slight	138,359.1
Collision Costs (£000s in 2010 prices discounted to 2010)	**Total**	**4,875,060**

		Pink Modified option
Number of Personal Injury Collisions		
Casualties	Fatal	1,345.5
	Serious	12,667.4
	Slight	138,237.9
Collision Costs (£000s in 2010 prices discounted to 2010)	**Total**	**4,861,559.5**
Number of Personal Injury Collisions savings		
Casualties	Fatal	6.5
	Serious	72.1
	Slight	121.1
Collision Savings (£000s in 2010 prices discounted to 2010)	**Total**	**13,500.9**

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

15.6.2. The Pink Modified option does not provide as much reduction in collisions as the Pink and Blue options, but it is better than the Orange option resulting in a reduction of 7 fatal and around 70 serious personal injury collisions when compared with the Do Minimum.

15.6.3. The Pink Modified option has net collision savings of £13.5 million.

15.7. Economic performance of options

15.7.1. Economic assessment has been carried out in a manner consistent with TAG unit A1.1 Cost Benefit Analysis using the latest available TUBA v1.9.10. TUBA calculates user benefits using trip and cost matrices output from the traffic models for each option (including the Do Minimum) where a masking methodology has been implemented to overcome the observed model noise that would have, otherwise, affected the economic assessment.

15.7.2. In addition to the four weekday time periods, the economic assessment made use of a model for a summer weekend to capture the full extent of benefits associated with the Scheme options during the summer period. As mentioned, the assessment masked model noise at locations far away from the Scheme, and therefore the benefits reported are only for the traffic movements using or affected by the Scheme options. However, despite the application of the masking methodology, it has not been possible to completely eliminate the model noise. This issue will be looked at again in the next stage of the Scheme development (PCF Stage 3) where a reduced modelled simulation area would help in reducing the model noise even further.

15.7.3. As well as TUBA, COBALT (version 2013.02 with a 2017.1 parameter file) and QUADRO2017 (QUeues And Delays at ROadworks, V4 R15) have been used for the collision assessment and assessment of impacts during construction respectively. The environmental impact assessment has been carried out for air quality (in accordance with TAG unit A3 Chapter 3), noise (in accordance with TAG unit A3 Chapter 2) and greenhouse gases, where TUBA emissions were used in the Greenhouse Gases Workbook TAG unit A3 version 1.9.1. In addition to these, journey time reliability benefits and wider economic impacts for imperfectly competitive market conditions have also been assessed.

15.7.4. The Scheme costs for the Pink Modified option are presented in Table 15.3. Changes in maintenance costs have not been included in the economic assessment at this stage (Project Control Framework (PCF) Stage 2 option selection) but will be included in the next stage of the Scheme development (PCF Stage 3 preliminary design) when they become available.

15.7.5. The Scheme costs in Table 15.3 expressed in 2010 prices and undiscounted, shows that the Pink Modified option cost is £312 million.

Table 15.3: Scheme cost summary – Pink Modified option

Cost type	Pink Modified option
Preparation	£25,466,661
Supervision	£3,129,084
Works	£262,516,471
Land	£20,849,623
Total Costs (Undiscounted)	**£311,961,839**

Source: Highways England options Estimates (November 2018). Values are expressed in 2010 prices, undiscounted.

15.7.6. The benefits and costs of the Pink Modified option are presented in Table 15.4. The figures in this table are in 2010 prices and are discounted to 2010.

Table 15.4: Analysis of monetised costs and benefits – Pink Modified (£000s)

Item	Pink Modified option
Air quality (not assessed by TUBA) *	-242
Noise (not assessed by TUBA) **	-2,188
Collisions (not assessed by TUBA) ***	13,501
Roadworks (not assessed by TUBA) ****	-21,404
Greenhouse Gases (not assessed by TUBA) *****	-23,060
Economic efficiency: consumer users (Commuting)	50,131
Economic efficiency: consumer users (Other)	33,189
Economic efficiency: business users and providers	115,426
Wider public finances (indirect taxation revenues)	48,327
Present Value of Benefits (PVB)	**213,681**
Broad Transport Budget - Present Value of Costs (PVC)	245,882
OVERALL IMPACTS	
Net Present Value (NPV)	-32,201
Initial Benefit to Cost Ratio (BCR)	**0.87**
Reliability benefits	14,243
Wider economic benefits	11,543
Adjusted BCR	**0.97**

Notes: * TAG unit A3 Chapter 3, ** TAG unit A3 Chapter 2, *** COBALT, **** QUADRO, ***** TAG unit A3 version *1.9.1*
All monetary values are expressed in 2010 prices discounted to 2010.

15.7.7. The BCR value is used to assess the value of a transport project by weighing the benefits against the costs to indicate whether it is value for money (VfM), and in doing this a wide spectrum of impacts is considered in a detailed appraisal, including various impacts on the economy, the environment and social welfare.

15.7.8. The adjusted BCR, which considers the additional benefits due to the journey time reliability and the wider economic benefits, brings the BCRs up to 0.97 for the Pink Modified option.

15.7.9. However, in the overall VfM assessment, the sources of analytical uncertainty and the potential scale of adverse impacts on the environment are taken into account. Based on this assessment, the Pink Modified option is likely to deliver low and poor value for money.

15.8. Pink Modified option sensitivity tests

15.8.1. The Pink Modified option has undergone the following sensitivity testing:

- Value of Time 2018 (VOT18) following the issue of the May 2018 Databook and the issue, in September 2018, of the Road Traffic Forecasts 2018 (RTF18) for the growth of Light Good Vehicles (LGVs) and Heavy Good Vehicles (HGVs), both issued by the Department for Transport (DfT).
- Low and high sensitivity tests, based on the VOT18 and RTF18 scenario.

15.8.2. The VOT18 / RTF18, low and high sensitivity tests carried out on the Pink Modified option have been run through variable demand modelling (both for the Do Minimum and Scheme option scenarios) and traffic forecasts obtained accordingly.

VOT18 and RTF18 sensitivity test

15.8.3. A sensitivity test has been developed with updated pence per minute (PPM) and pence per kilometre (PPK) parameters derived from WebTAG Databook May 2018.

15.8.4. Trip-end growth factors for LGVs and HGVs have been derived using 2018 RTF18 data, which is based on output from the DfT's National Transport Model. The RTF18 data only extends to year 2050, so for the 2051 forecast year the growth has been extrapolated from the forecast 2045 to 2050 growth rates. In the absence of RTF18 forecasts for Scotland, growth factors for the north-east region have been adopted as a proxy for Scotland.

Wider economic impacts

15.8.5. For the VOT18 / RTF18 sensitivity test of the Pink Modified option full wider economic impacts have been assessed using the WITA (version 1.2.1.2 Beta) software. This estimates the wider impacts of transport schemes that are not

part of conventional transport user benefit appraisals and the method follows the guidelines set out in WebTAG unit A2.1. The appraisal takes consideration of benefits (or dis-benefits) derived from additional impact from transport improvement. There are four types of wider impacts which are assessed:

- Agglomeration impact – this relates to the concentration of economic activity over an area. Transport schemes can deliver increases in GDP by improving the accessibility of an area to a greater number of firms and workers. Agglomeration impacts are primarily determined by changes in travel costs, the number and location of workers, and the productivity of those workers
- Increased or decreased output in imperfectly competitive markets – this relates to the changes in the output of goods that use transport. Reductions in transport costs to business and / or freight allows for an increase in the production or output of goods or service markets, which is derived from the increase of GDP. This is estimated by 10% uplift factor to the business and freight user benefits calculated by TUBA, and it is the only wider economic benefit that has been considered for the Pink, Blue and Orange options
- Labour market impacts from more / less people working – this is the impact of a transport scheme on labour supply and is based mainly on changes in commuting travel costs
- Labour market impacts from move to more / less productive jobs – a transport scheme may lead to a change in where people choose to work. Some jobs are more productive than others which can lead to changes in GDP. In the current WITA work this impact is assumed to not take place as the interaction between the methodology to forecast land use change and the transport model is missing and employment relocation is, therefore, not considered

15.8.6. In order to overcome the WITA version 1.2.1.2 Beta software memory limitations, which cannot handle the large number of zones in the SATURN traffic model, a methodology has been derived which aggregates transport model zonal data (both demand and skim costs) to 158 zones using correspondence between 406 Local Authority Districts (LADs) and the 1,933 SATURN model zones, and WITA has been run at this level of aggregation, using an average weighted approach for aggregating model skim costs.

15.8.7. In order to not overestimate the benefits produced by the WITA software, a filtering process has been adopted which captured just the wider economic benefits on the local area that is thought to be mainly affected by the presence of the Pink Modified option. This area comprises seven LADs as described in Table 15.5.

Table 15.5: LADs description – A303 / A30 / A303 / M5 area

LAD number	Description
1	Taunton Deane
2	South Somerset
3	Sedgemoor
4	West Somerset
5	Mid Devon
6	East Devon
11	Exeter

Low and high forecast growth based on the VOT18 / RTF18

15.8.8. As per WebTAG Unit M4, uncertainty around the core VOT18 / RTF18 scenario was tested using 'low' and 'high' growth sensitivity tests. These sensitivity tests reflect uncertainty around annual forecasts from the national transport model.

15.8.9. Low and high growth reference case matrices were derived by adding / subtracting a proportion of base demand from the future year core VOT18 / RTF18 scenario highway and public transport reference matrices. The proportion of base demand to be added / subtracted was calculated using 2.5%*SQRT (forecast year - base year) for both highway and public transport (PT). The percentage of 2.5% was used for both highway and PT in order not to underestimate uncertainty in forecasts.

Economic assessment of the VOT18 / RTF18, low and high sensitivity tests

15.8.10. Table 15.6 below shows the analysis of monetised costs and benefits for the VOT18 / RTF18, low and high growth scenarios sensitivity tests carried out on the Pink Modified option. These include:

- Economic assessment results from TUBA (version 1.9.11, which incorporates the May 2018 Databook), COBALT (version 2013.2 but with the 2018.1 parameter file), QUADRO2018 version V4 R16 (released in October 2018), WITA v1.2 and reliability for the VOT18 / RTF18 sensitivity test
- TUBA (version 1.9.11) results for the low and high scenarios. For these scenarios the wider economic impact due to the imperfectly competitive markets item has been estimated as a 10% of the TUBA business user benefits, while all other wider economic impacts, COBALT, QUADRO, air quality / noise assessments have been assumed to be the same as the VOT18 / RTF18 test, and the reliability assessment has been assumed to be 5% of the total journey time savings calculated by TUBA
- Greenhouse gasses estimated by TUBA for all the sensitivity tests

15.8.11. As per WebTAG, all costs and benefits reported in this section are in 2010 prices discounted to 2010.

Table 15.6: Analysis of monetised costs and benefits (£000s) – Pink Modified option VOT18 / RTF18, low and high growth

Item	Pink Modified option VOT18 / RTF18	Pink Modified option VOT18 / RTF18 Low growth	Pink Modified option VOT18 / RTF18 High growth
Air quality (not assessed by TUBA) *	-242	-242	-242
Noise (not assessed by TUBA) **	-2,188	-2,188	-2,188
Collisions (not assessed by TUBA) ***	7,906	7,906	7,906
Roadworks (not assessed by TUBA) ****	-16,120	-16,120	-16,120
Greenhouse Gases (not assessed by TUBA) *****	-24,651	-24,472	-24,965
Economic efficiency: consumer users (Commuting)	45,384	41,800	51,659
Economic efficiency: consumer users (Other)	26,865	25,071	31,695
Economic efficiency: business users and providers	101,862	96,686	111,274
Wider public finances (indirect taxation revenues)	55,934	54,695	56,733
Present Value of Benefits (PVB)	**194,751**	**183,137**	**215,753**
Broad Transport Budget - Present Value of Costs (PVC)	245,713	245,784	245,688
OVERALL IMPACTS			
Net Present Value (NPV)	-50,962	-62,647	-29,935
Initial Benefit to Cost Ratio (BCR)	**0.79**	**0.75**	**0.88**
Reliability benefits	13,181	12,528	14,230
Wider economic benefits	40,906	40,388	41,847
Adjusted BCR	**1.01**	**0.96**	**1.11**

Notes: * TAG unit A3 Chapter 3, ** TAG unit A3 Chapter 2, *** COBALT, **** QUADRO, ***** TAG unit A3 version 1.9.1
All monetary values are expressed in 2010 prices discounted to 2010.

15.8.12. The Net Present Value (NPV) results indicate that for the Pink Modified option core growth VOT18 / RTF18 and for the low / high growth scenarios, the costs exceed the benefits. The initial BCRs are 0.75 for the low growth, 0.79 for the core growth and 0.88 for the high growth. The adjusted BCRs, which consider the additional benefits due to the journey time reliability and the wider economic benefits calculated with WITA (as well as the 10% uplift for the imperfectly competitive market), bring the BCRs up to 0.96 for the low growth scenario, 1.01 for the core growth and 1.11 for the high growth scenario.

16. Operational assessment for Pink Modified option

16.1. Maintenance and repair strategy

16.1.1. The key maintenance issues for the proposed options were reviewed. It has been assumed at this stage that the following assets will be maintained by Highways England:

- The length of the A358 taken into Highways England's ownership
- The A303
- Existing / upgraded Southfields Junction
- Potential new junction on the M5
- New structures including overbridges, underpasses and footbridges along the line of the preferred route

16.1.2. It is assumed that the following assets will be maintained by Somerset County Council:

- Road pavement and drainage for county roads and footpaths passing beneath underbridges on the A358
- Litter picking and gritting of highways on overbridges

16.1.3. New assets that will require long-term maintenance and existing assets needing to be repaired or replaced to bring them up to an acceptable standard at opening of the proposed Scheme were also considered. These include:

- Drainage
- Road pavement
- Safety barriers and fences
- Street lighting and other electrical assets
- Structures

16.1.4. Requirements for future ease of maintenance of all the Scheme assets are among the factors driving the design. Current considerations include:

- Minimising equipment in the central reserve
- Passively safe street furniture
- Use of concrete barrier in central reserve which would not require repair following an incident
- Provision of maintenance laybys at key locations
- Use of integral bridges eliminating the need to maintain and replace bearings

- Drainage features including drainage ponds and oil interceptors which can be accessed safely off the carriageway
- Access arrangements and slope gradients will be taken into account for the soft estate

16.2. Safety management

16.2.1. Interim Advice Note (IAN) 191/16, *Safety Governance for Highways England*, provides guidance on the selection and implementation of the appropriate Safety Management System (SMS) for a scheme based on several criteria[43].

16.2.2. The types of SMS referred to in IAN 191/16 are:

- Type A – Basic. This is likely to apply to projects / interventions that are routine, familiar and without operational implications. As such, these will be largely satisfied by the application of existing standards and guidance
- Type B – Moderate. This is likely to apply to:
  - Projects / interventions that could have some significant operational impacts
  - Those which may lead to an increased level of stakeholder interest (specifically in terms of how safety will be addressed or managed)
  - This will include the application of existing standards and guidance
- Type C – Complex. This is likely to apply to:
  - Complex, infrequent projects / interventions which may have major implications for the strategic road network
  - This will include the application of existing standards and guidance

16.2.3. The result of the classification process deems that this Scheme should be subject to a Type A SMS with two Type B features. The reasoning for this classification is summarised in Table 16.1 below.

Table 16.1: Reasoning for classification decisions

Feature	Results for Scheme	Explanation
1.Stakeholder interest	**Type B**	Whilst there are three primary stakeholders; Highways England, Somerset County Council and Taunton Deane Borough Council, there are also the emergency services, recovery organisations and road safety groups, together with several local stakeholders such as various non-motorised user groups, as well as landowners. It is considered that adequate levels of consultation with the interested parties should satisfy this requirement.
2.Operational experience	**Type A**	There is UK operational experience of all the main component parts of the Scheme and there is extensive UK experience in the planning,

[43] The authors recognise that IAN191/16 was superseded in June 2018 and superseded by GG104 (*Requirements for safety risk assessment).* GG104 will be implemented in subsequent stages of the Scheme.

Feature	Results for Scheme	Explanation
		design, construction, operation and maintenance of schemes of this nature.
3.Technology and infrastructure	**Type A**	There is likely to be minimal application of technology within the proposed Scheme and the Scheme is not considered to be technology-led. The technology and infrastructure utilised within the Scheme will be common throughout the UK.
4.Standards and legislation	**Type A**	Design standards covering all the features of the proposed road upgrade are contained in the industry-standard Design Manual for Roads and Bridges. Departures from standard are likely to be minimal.
5.Impact on organisation	**Type B**	The road upgrade will have some impact upon the operation of the road network as it consists of the upgrade of an existing section of local authority maintained road which will then be trunked and become the responsibility of Highways England.
6.Project scale	**Type A**	A significant section of the existing A358 will be upgraded (albeit it is not currently a trunk road) and this can therefore be classified as a 'major location', though the upgrade is addressing a localised section of highway which is not to current standards and with a collision problem and is unlikely to be rolled out elsewhere. Whilst elements of this feature are categorised as Type B, on balance this feature is considered to be a Type A.

16.2.4. The A358 Taunton to Southfields Dualling Scheme will satisfy the road user safety objective if it is demonstrated from the Post Opening Performance period of three years after becoming fully operational that:

- The average number of Fatalities and Weighted Injuries (FWI) casualties per year is less than the safety baseline, where the safety baseline is based on data for a national 'average' dual 2-lane all-purpose (D2AP) road
- The rate of FWI per billion vehicle-miles per annum is no more than the safety baseline, where the safety baseline is based on data for a national 'average' D2AP road
- For each link, no population (for example, car drivers, pedestrians, HGV drivers and motorcyclists) is disproportionately adversely affected in terms of safety and risk to each population remains tolerable

16.2.5. There is no numerical objective or target for road worker collisions for major schemes and the risk must be managed in accordance with the as low as is reasonably practicable (ALARP) principle. This is a legal requirement. Highways England's *Health and Safety 5-Year Plan* states that:

> *"no one should be harmed when travelling or working on the strategic road network" must be applied for further positive action to reduce the risk to road workers during maintenance and operation. Amongst other items it has sought "to develop supply chain guidance which provides minimum standards for safe systems of work for high risk activities (for example,*

working at height, night working and the role of Principal Designer in assuming 'as built is as designed'). This action will enable contractors to achieve the same level of 'as low as is reasonably practicable'".

16.3. Operational assessment of M5 junction 25

16.3.1. The operational performance of the connections between the Scheme options and the M5 is considered very important. This is due to known existing operational problems at junction 25 and the plans for an improvement to the junction to help accommodate traffic growth and development traffic. This aspect is particularly important for the Pink Modified where this is the only route to junction 25.

16.3.2. The operational assessment of M5 junction 25 was carried out using the Linear Signal Analysis (LinSig) software. It covered the weekday AM and PM peak hours, for the forecast years of 2023, 2031 and 2038. The findings are summarised for the Pink Modified option below.

Pink Modified option

16.3.3. The forecasting approach and corresponding traffic growth through the variable demand modelling mechanism is constrained by the National Trip End Model (NTEM and corresponding TEMPRO software version 7.2) for cars and Road Traffic Forecasts (RTF) 2015 for light good vehicles and heavy good vehicles. In doing so, the forecasting mechanism has the effect of reducing development trips to match the growth predicted by NTEM and RTF15, including the Nexus 25 proposed employment site.

16.3.4. For the other options assessed (Pink, Blue and Orange options) this effect on the Nexus 25 development trips is not crucial for assessing the operation of M5 junction 25. This is because the presence of a direct link to the M5 south of M5 junction 25, which takes traffic away through both junctions. However, it is important that for the Pink Modified option the reduction in the development trips at the Nexus 25 employment site is considered for the operational assessment. Therefore, the operational assessment of M5 junction 25 accounts for the 'full' demand from / to the Nexus 25 employment site, without any suppression of development trips due to the forecast capping mechanism. The Nexus 25 development trips are based on trip rates derived from NTEM version 7.2 for cars using the 'alternative forecasting scenario' available in the TEMPRO software, and from TRICS for the expected generation of light good vehicles and heavy good vehicles.

16.3.5. An initial LinSig assessment of M5 junction 25 for the Pink Modified option in 2023 indicated that the junction, in the AM peak hour, would be over capacity on the M5 north entry approach (the M5 southbound off-slip) and the Toneway offside lanes. The circulatory lanes opposite the Toneway and M5 north entry

approaches would also have a mean max queue (MMQ) above the available link stacking capacities, potentially blocking the upstream traffic and affecting the junction operation. Similar capacity problems would appear for the 2023 PM peak hour operation on the M5 north and Toneway offside lanes. MMQs would also exceed the link stacking capacities on the circulatory lanes opposite the Toneway, M5 north entry and the new A358 east approaches.

16.3.6. Capacity problems highlighted by the LinSig assessment for the Pink Modified option with the assumed 'full' Nexus 25 development demand in 2023 (which would escalate in future years but noting that this demand may not materialise in 2023 given that the development may not be fully occupied by that time) required further analysis. After discussion with Highways England regarding this matter, mitigation measures were sought to try to overcome the capacity issues. The layout improvements for M5 junction 25 comprised a dedicated left turn lane between the A358 eastbound entry and the M5 northbound on-slip. Improvements also included an additional lane on the M5 southbound off-slip entry, increasing the number of lanes from three to four.

16.3.7. The analysis for 2023 showed a satisfactory operational performance on all approaches for both the AM and PM peak hours with DoS (Degree of Saturation) that do not exceed the 90% recommended threshold. Analysis also showed queues on the gyratory lanes that can be accommodated within the available link stacking capacities.

16.3.8. The assessment for 2031 showed a satisfactory operational performance on all approaches for both the AM and PM peak hours with DoS that do not exceed the 90% recommended threshold. However, there are queues on the gyratory lanes opposite the Toneway approach and the M5 southbound off-slip approach that are above the available link stacking capacities. These possibly impact the overall junction performance.

16.3.9. The LinSig analysis for 2038 shows DoS on the Toneway approach up to 91.5% which is just above the 90% recommended threshold, but with queues that can be accommodated within the link stacking capacity and with a delay per Passenger Car Unit (PCU) below of one minute. The queues that would develop on the gyratory lanes opposite the Toneway approach, the new A358 east approach and the M5 northbound off-slip exceed the link stacking capacities in the AM peak hour (and also in the PM peak hour with the exception of the gyratory lanes opposite the M5 northbound off-slip). These queues have the possibility of blocking upstream junctions and therefore affecting the overall operation of the roundabout.

Summary of results

16.3.10. For the Pink Modified option, under the mitigation measures and assuming ‘full uncapped’ demand from the Nexus 25 development site, M5 junction 25

operates satisfactorily up to 2038 on all entry approaches (with the Toneway approach having a DoS of 91.5%). However, there are some lanes within the gyratory where queues would exceed the available link stacking capacity. The performance of the gyratory lanes might be further improved and mitigated with a more detailed signal analysis in later stages of the Scheme development (that is Project Control Framework (PCF) Stage 3).

16.4. Operational assessment of Southfields Roundabout and other Scheme junctions

16.4.1. Junction operational assessments have also been carried for the following:

- Nexus 25 Roundabout (Pink Modified option only) with full Nexus 25 demand (as used for assessing M5 junction 25 in the Pink Modified option)

Nexus 25 Roundabout (Pink Modified option only) with full Nexus 25 demand

16.4.2. An initial ARCADY assessment was undertaken of the Nexus 25 Roundabout using the Somerset County Council's (SCC's) proposed layout and the 'full' demand from the Nexus 25 development. It showed that the roundabout would not operate satisfactorily in the 2023 AM and PM peak hours for the Pink Modified option scenario, with delays up to 17 minutes on the exit approach from the development in the PM peak hour, and with a worsening operational performance in future years.

16.4.3. Mitigation measures were tested to the roundabout to overcome the capacity issues. This comprised a three-lane solution to each entry / exit approach of the roundabout to ease the capacity issues observed with the SCC’s layout.

16.4.4. In 2038, for the Pink Modified option, the new A358 west entry approach from M5 junction 25 would operate almost at capacity with a Reference Flow / Capacity (RFC) of 0.963 in the AM peak hour. For the 2038 PM peak hour, the Nexus 25 entry approach to the roundabout exceeds capacity, reaching an RFC of 1.082, with delays of approximately 2 minutes / PCU and queues of around 40 PCUs. However, it should be noted that the capacity issues highlighted by ARCADY on the Nexus 25 approach are likely to be overcome by a more recent SCC's layout of the roundabout. This layout shows a dedicated left turn from the Nexus 25 approach feeding directly onto the link connecting to M5 junction 25. The revised layout should be further considered in subsequent development work (that is PCF Stage 3).

17. Environmental assessment and environmental design for Pink Modified option

17.1. Introduction

17.1.1. This chapter presents a summary of the environmental assessment undertaken for the Pink Modified option. This has been completed to the same level of detail and in line with the same guidance as for the Pink, Blue and Orange options, as described in section 11.1.1. The environmental constraints presented in section 3.5 would be the same for the Pink Modified option as for the Pink, Blue and Orange options.

17.2. Air quality

Construction

17.2.1. During construction, effects on air quality as a result of the Pink Modified option are predicted to be the same those for the Pink, Blue and Orange options, as described in section 11.2.1.

Operation

17.2.2. For the Pink Modified option, NO_2 concentrations have been predicted at select sensitive human health receptors and all designated ecological sites within 200m of the Affected Road Network with features directly or indirectly sensitive to air pollutants. These predictions have been done for the Do Minimum and Do Something scenarios in the opening year. The locations of the receptors are identified in Appendix D of this report. The Pink, Blue and Orange options included the same receptors for their respective assessments. One additional human health receptor was introduced for the Pink Modified option assessment.

17.2.3. During the operation of the Pink Modified option, with regard to human health, Receptor 30 would have the highest predicted annual mean NO_2 concentrations in the opening year for the Scheme. Concentrations at this receptor would increase by 0.6µg/m^3 from 27.3µg/m^3 in the Do Minimum to 27.9µg/m^3 in the Do Something scenario. The greatest increase in annual mean NO_2 is predicted at Receptor 23, where an increase of 5.7µg/m^3 is predicted, from 7.1µg/m^3 in the Do Minimum to 12.8µg/m^3 in the Do Something scenario. The greatest reduction in predicted annual mean NO_2 concentrations would occur at Receptor 7, where a decrease of 29.7µg/m^3 is predicted from 45.4µg/m^3 in the Do Minimum to 15.7µg/m^3 in the Do Something.

17.2.4. For the Pink Modified option in the opening year, the predicted annual mean concentrations of NO_2 are well below 40µg/m^3 and no exceedances of the on-hour NO_2 objective are expected. As such, an overall Slight Adverse effect on human health is anticipated for the Pink Modified option, which is the same as for the other three options. The Pink Modified option is expected to reduce

concentrations in the Henlade Air Quality Management Area (AQMA) due to the rerouting of traffic away from the A358. This is the same as the Pink, Blue and Orange options. There is therefore the potential for Somerset West and Taunton Council to remove the Henlade AQMA designation.

17.2.5. Predicted NO_x concentrations at the ecological receptor locations within the Pink Modified option study area are below 30µg/m^3 at all locations in the opening year. This is the same as the Blue option. In addition, all annual mean NO_x concentrations reduce or stay the same for the Pink Modified option.

Summary

17.2.6. Effects on air quality at human health and designated ecological site receptors are predicted to be Slight Adverse at worst. With the application of best practice mitigation, the effects during construction and operation for the Pink Modified option are considered not significant. The Pink Modified option performs similarly to the Pink, Blue and Orange options with regard for air quality effects.

17.2.7. For all four options there is a low risk of non-compliance with the *National Networks National Policy Statement* (NNNPS) with regard for air quality. This is detailed in the NNNPS risk table in Appendix F.

17.3. Cultural heritage

Construction

17.3.1. The Pink Modified option has the potential to result in adverse effects on heritage assets and buried archaeology during construction. This is the same as the other three options and is described in section 11.3.1.

17.3.2. The construction of the Pink Modified option has greater potential to affect archaeological remains than the Orange option, due to its junction with the M5 being in closer proximity to a recorded Roman settlement. Also, the Park & Ride connection road and junction are situated in an area with possible Iron Age or Roman cropmarks and a possible Roman building has been recorded at the northern extent of the road. The Orange option would not pass through these areas and therefore has the least potential of all options to affect archaeological remains of high value. The Pink Modified option has lower potential to affect archaeological remains in comparison with the Pink and Blue options as it requires the shortest length of new road construction, but still passes through areas containing possible high value Roman remains.

Operation

17.3.3. During operation there would be no impacts on sub-surface archaeological remains and therefore the overall significance of effects on buried archaeology would be Neutral for the Pink Modified option and other three Scheme options.

17.3.4. In terms of the built heritage, there is the potential for either Moderate or Large Adverse effects during the construction of the Pink Modified option. This is the same as the other three options. The Pink Modified option is considered to have a Moderate adverse effect upon one grade I listed building (Church of St Aldhem and Eadburgha) and one scheduled monument (Cross in St Aldhelm and St Eadburgha) as with the other three options. The Pink Modified option would have a Large Adverse effect on 'Musgrave Farmhouse and Outbuilding with wall adjoining south-east corner of Haydon House'. This is the same as the other three options. All options also have the potential to result in a Moderate Adverse effect on a number of grade II listed buildings.

Summary

17.3.5. With the application of best practice mitigation measures, effects on built heritage are predicted to be similar for the Pink Modified option and other three options during construction and operation. The settings of high value assets such as grade I and II* listed buildings and a scheduled monument are likely to be significantly affected with Moderate or Large Adverse effects predicted respectively. The Orange option is predicted to have the least effect on archaeology of the four options, followed by the Pink Modified option. There is still potential for Moderate Adverse and significant effects to occur to buried archaeology for all four options. All options have the potential to result in a Large Adverse and significant effect on cultural heritage.

17.3.6. All four options have a moderate risk of non-compliance with the NNNPS with respect for the historic environment. This is detailed in the NNNPS risk table in Appendix F.

17.4. Landscape and visual effects

Construction

17.4.1. During construction, effects on landscape character are predicted to be the same for the Pink Modified option and Pink, Blue and Orange options. Visual effects would be similar, although the Pink Modified option would have less of a visual effect on the surrounding landscape because there is no link between Henlade and the M5 at Blackbrook. This means that no haul routes, construction compounds and works areas would be needed here. Nonetheless, a Large Adverse effect is predicted on landscape for the Pink Modified option during construction, which is the same as for the other three options.

Operation

17.4.2. During operation, all options would introduce a widened existing A358 between West Hatch Lane and Southfields Roundabout and a new offline dual carriageway into an otherwise rural and little developed setting. The Blue and Orange options would be in a more rural setting than the Pink and Pink Modified

options. Tranquillity levels would decrease as a result of the operation of all options, with audible and visual tranquillity affected. The Pink Modified option would provide an overbridge at Capland instead of a grade-separated junction as for the other three options. This would slightly reduce the impacts on landscape character and nearby high sensitivity residential receptors.

17.4.3. All options would require the removal of vegetation during construction. This would be replaced and reconnected through green corridors if severed and where possible. Measures described in section 11.4.4 would aid the settlement of the Pink Modified option into the landscape.

17.4.4. From a visual perspective, all options would bring a change in view for a number of receptors. Given the high sensitivity to change of these receptors, there is the potential for Large Adverse effects. This would be particularly felt in the early years of operation prior to mitigation planting becoming established. As mitigation planting matures, greater screening would reduce the visual effect upon many receptors. A Moderate Adverse effect is still predicted in the long-term for Pink Modified option.

17.4.5. The offline section of the Pink Modified option would be situated closer to the existing A358 than the other three options. Being situated no more than 450m from the existing A358, it would be less at odds with the surrounding landscape. It would cause a change in view for slightly fewer receptors than the other Scheme options.

Summary

17.4.6. With the application of best practice mitigation measures, effects on landscape are predicted to be Large Adverse and significant for the Pink Modified option. This is the same as for the other three Scheme options during construction. During operation, a Moderate Adverse and significant effect for the Pink Modified option is predicted.

17.4.7. There is a low risk of non-compliance with the NNNPS with regard for landscape, for all four options. This is detailed in the NNNPS risk table in Appendix F.

17.5. Biodiversity

Construction

17.5.1. The Pink Modified option and Pink, Blue and Orange options have the potential to result in the temporary and permanent disturbance to the qualifying species for Natura 2000 sites. This is described in section 11.5.1.

17.5.2. The Pink Modified option would have a Neutral effect on Huish Copse East and Huish Woods Local Wildlife Sites (LWSs). This is the same as the Pink option.

The Blue and Orange options would have a Moderate to Large Adverse effect on Huish Copse East LWS and Slight Adverse effect on Huish Woods LWS.

17.5.3. The Pink Modified option would result in a Moderate Adverse effect during construction on road verges west of Hatch Beauchamp LWS and a Moderate Adverse effect on Jordans Park LWS due to the loss of habitat. A Slight Adverse effect is predicted on Bickenhall Wood LWS, Saltfield Copse LWS and River Rag LWS for the Pink Modified option. All effects are the same for the other three options. The Pink Modified option would be at a sufficient distance to not affect Stoke Wood LWS and Ancient Woodland, resulting in a Neutral effect during construction. The other three options would result in a Slight Adverse effect to Stoke Wood LWS.

17.5.4. The Pink Modified option would result in a Moderate Adverse effect on bats during construction. This is the same as for the Pink option but the Blue and Orange options have a Large Adverse effect. For the Pink Modified and Pink options, although fragmentation of suitable habitat, vegetation clearance, lighting and noise disturbance would occur, Ancient Woodland would not be directly impacted. For all options, a Slight Adverse effect is predicted on barn owls, dormice, badgers, otters, water voles, great crested newts and white-clawed crayfish. The direct impacts to these protected species include the loss, disturbance and fragmentation of habitat. A Neutral or Slight Adverse effect is predicted on breeding birds, reptiles and invertebrates for the Pink Modified and the other three options.

17.5.5. The Pink Modified option would have a Slight Adverse effect on Ancient Woodland. This is the same as for the Pink option and compares with a Large Adverse effect for the Blue and Orange options. The Pink Modified option would result in the temporary and permanent loss of priority habitats including hedgerows, coastal and flood plain grazing marsh, traditional orchards, broadleaved semi-natural woodland, parkland, ditches and ponds and rivers and streams. This results in a Slight Adverse effect, which is the same as the other options. Fewer orchards and watercourses would be impacted by the Pink Modified option compared with the other three options. A slightly greater amount of coastal and flood plain grazing marsh would be affected than the other options. However, this would not alter the significance of effects on these receptors.

Operation

17.5.6. The Pink Modified option has the potential to result in the temporary and permanent disturbance to the qualifying species for Natura 2000 sites. This is explained in section 11.5.6 and is the same as the other three options. No permanent impacts are anticipated on Somerset Moors and Levels Special Protection Area (SPA) during operation.

17.5.7. A Neutral effect is anticipated on Huish Woods LWS for the Pink Modified option. This is the same as the other three options. In operation, the Pink Modified option would result in a Slight Adverse effect for road verges west of Hatch Beauchamp LWS and a Moderate Adverse effect on Jordans Park LWS. This is the same as the other three options. A Neutral effect is predicted during operation for Bickenhall Wood LWS, Stoke Wood LWS, Saltfield Copse LWS and River Rag LWS for the Pink Modified and the other three options.

17.5.8. During operation, all options have a predicted Moderate effect on bats and a predicted Slight Adverse effect for barn owls, dormice, badgers, otters, water voles, great crested newts and white-clawed crayfish. This is explained in section 11.5.8. Breeding birds, reptiles and invertebrates would also be affected by all options with a Neutral or Slight Adverse effect anticipated.

17.5.9. The Pink Modified option would have a Slight Adverse effect on Ancient Woodland. This is the same as the Pink option, compared with a Moderate Adverse effect during operation for the Blue and Orange options. The Pink Modified option would result in the temporary and permanent loss of priority habitats as explained in section 11.5.9. This is the same for the other three options.

Summary

17.5.10. With the application of best practice measures, a Slight Adverse effect is anticipated for the majority of ecological receptors with an overall worst case Moderate Adverse and significant effect anticipated on biodiversity. This is the same for the Pink Modified and Pink options during construction and operation and takes into account effects on protected species, designations and habitats. This compares with an overall worst case Large Adverse and significant effect for the Blue and Orange options.

17.5.11. The overall effects on biodiversity presented above are different to the scores presented in the Appraisal Summary Tables (ASTs) (Appendix E), as described in section 11.5.12. The Pink Modified option would not directly affect Ancient Woodland so would not have to demonstrate alternatives to the loss at Huish Copse that would result due to the Blue and Orange option This is described in section 11.5.13. Refer to the NNNPS risk table in Appendix F.

17.6. Geology and soils

Construction

17.6.1. The Pink Modified option would require a range of construction activities which have the potential to result in adverse effects on geology and soils. This is described in section 11.6.1. During construction, best practice mitigation measures would be implemented to ensure a Slight Adverse and not significant

effect is predicted for the Pink modified and other three options These are described in section 11.6.2,

Operation

17.6.2. The completed and operational Scheme is not expected to result in any adverse effects on geology or soils.

Summary

17.6.3. With the application of best practice measures, the effects on geology and soils are predicted to be Slight Adverse and not significant during construction for all options. They are predicted to be Neutral during operation for all options.

17.6.4. There is a low risk of non-compliance with the NNNPS with regard for geology and soils for all options. This is detailed in the NNNPS risk table in Appendix F.

17.7. Material assets and waste

Construction

17.7.1. The construction of new infrastructure for the Pink Modified option would require the use of material resources. Best practice measures would reduce the effect on material resources as described in section 11.7.1. A large amount of green waste is expected to be generated during site clearance for the Pink Modified option. Effects relating to this are described in section 11.7.2. The assessment for material assets and waste has concluded that the Pink Modified option is not likely to have significant effects on material resource use. This is the same as the other three options. A Neutral effect is predicted on mineral safeguarding areas for the Pink Modified option which is the same as for the Pink option. This compares with a Large Adverse effect for the Blue and Orange options.

Operation

17.7.2. For all options significant effects on material assets and waste are not predicted during operation.

Summary

17.7.3. The assessment for material assets and waste predicts a not significant effect on material resource use for all four options. A Neutral effect on material assets and waste is predicted during the operation of all options. The Pink Modified option performs similarly to the other three Scheme options, although the Blue and Orange options have the potential to perform worse in relation to construction effects on a mineral safeguarding area. There is a low risk of non-compliance with the NNNPS with regard for materials, for all four options. This is detailed in the NNNPS risk table in Appendix F.

17.8. Noise and vibration

Construction

17.8.1. For all options there is the potential for construction activities to result in adverse effects through the noise levels likely to be generated. Mitigation would be necessary at some locations as described in section 11.8.1.

Operation

17.8.2. The effect of noise in terms of human health can be assessed by considering the number of receptors subject to noise levels above Significant Observable Adverse Effect Level (SOAEL). This is the level above which significant adverse effects on health occur.

17.8.3. During operation, the noise assessment shows a decrease in the total net number of receptors exposed to noise levels above SOAEL in the short-term for all options. In terms of short-term noise decreases, the Pink Modified option would result in the greatest number of net decreases in short-term noise and the most benefits. This is followed by the Pink, Orange and then the Blue options.

17.8.4. The noise assessment shows an increase in the total number of receptors exposed to noise levels above SOAEL in the long-term for all options. The Pink Modified option would have the least net number of receptors experiencing increases in long-term noise. This is followed by the Orange option then the Pink and Blue.

17.8.5. The Pink Modified option is predicted to result in significant adverse and beneficial effects at different receptors due to changes in noise at this stage in the design. This is the same as the other three options. Further work will be undertaken for noise and vibration at the next stage of design, which will include the completion of baseline noise surveys.

Summary

17.8.6. With best practice mitigation in place, all options are predicted to result in Slight Adverse and not significant effect during construction.. Significant adverse and beneficial effects are predicted for the Pink Modified option in operation, without the development of mitigation measures. This is the same for the other three options. At this stage the Pink Modified option performs the best out of the four options with respect to noise.

17.8.7. The Pink Modified and other options have a moderate risk of non-compliance with the NNNPS with respect for noise and vibration. This is detailed in the NNNPS risk table in Appendix F.

17.9. Population and health

Construction

17.9.1. Effects on journey length and journey times, amenity and community severance are predicted to be the same for the Pink Modified option and the three other options during construction. This is described in section 11.9.1. A Neutral effect on community land is anticipated for the Pink Modified and Orange options. The Pink and Blue options would result in direct effects on High Holway Open Space resulting in a Slight Adverse effect on this community resource. Effects on driver stress, human health and the local economy would be the same for all four options. This is described in sections 11.9.3 and 11.9.4 to 11.9.9 respectively.

Operation

17.9.2. During operation, the Pink Modified option will result in some benefits and adverse effects on non-motorised users (NMU) journey length and times. This is the same as the other three options. The provision of new facilities would reduce the effects on NMUs. A Slight Adverse effect for NMUs is predicted for the Pink Modified option because the permanent diversion of NMU routes is likely to result in a greater number of journey length and time increases than decreases. This is the same for the Blue option. A Neutral effect is anticipated for the Pink and Orange options, with the permanent diversion of NMU routes resulting in a similar number of journey length and time increases and decreases.

17.9.3. Amenity would alter in several ways with changes to barriers between people and traffic, flows and provision of new facilities. Overall, a Slight Beneficial effect on amenity is anticipated for the Pink, Blue and Orange options. A Slight Adverse effect on amenity is predicted for the Pink Modified option. This is because crossings of the A358 would not be provided at several locations, for example at Jordans and Bickenhall, and a number of Public Rights of Way (PRoW) are likely to be extinguished.

17.9.4. For community severance, a number of NMU routes connecting to community facilities would experience changes to journey time and quality, resulting in a Slight Adverse effect for the Pink Modified option. This is the same as for the other three options. Effects on community severance are predicted to be the same for all options, although the Pink Modified option would be more detrimental for those travelling to Somerset Progressive School with a lengthy permanent diversion required to travel to the eastern side of the A358.

17.9.5. The Pink Modified option is predicted to result in a Slight Adverse effect in terms of demolition of private property and land-take. This is described in section 11.9.12 and is the same for the other three options. The Pink Modified, Pink and Blue options have the potential to result in Large Beneficial effects on development land by improving access and increasing the likelihood of this development being progressed.

17.9.6. The Pink Modified and other options would result in new views from the road for vehicle travellers. The establishment of vegetation alongside the new road during operation would gradually and partially screen open views to the wider area. An overall Slight Beneficial effect is anticipated for the Pink Modified and Pink options. A Moderate Beneficial effect is anticipated for the Blue and Orange options.

17.9.7. During operation, a Moderate Beneficial effect is predicted on driver stress for the Pink, Blue and Orange options with vehicle travellers able to drive along the road at a more consistent speed and with improved journey time reliability. A Neutral effect is predicted for the Pink Modified option in operation. This is because several design elements to reduce driver frustration and the fear of potential collisions would not be provided for this option.

17.9.8. Effects on human health and the local economy during the operation of the Pink Modified option would be the same as for the other options. This is described in sections 11.9.16 and 11.9.17.

Summary

17.9.9. With the application of best practice mitigation, overall effects on population and health for all options during construction is predicted to be Slight Adverse and not significant. During operation, the Pink Modified option has the least benefits of the options and performs worst with respect to journey length and time, amenity and driver stress.

17.9.10. As detailed in the NNNPS risk table in Appendix F, the risk of non-compliance with the NNNPS is higher for the Pink and Blue options (moderate) than the Pink Modified and Orange options, which have a low risk (green) of non-compliance. This is because the Pink and Blue options would directly impact open space.

17.10. Road drainage and the water environment

Construction

17.10.1. The construction of highways can have a range of effects on the water environment. This is described in section 11.10.1, with potential mitigation measures detailed in section 11.10.2.

17.10.2. The only significant impact anticipated on the water environment for the Pink Modified option is the realignment causing a permanent diversion of the River Ding. This is also required for the other three options. As described in section 11.10.3, the overall effect on the water environment as a result of the Pink Modified option would be Slight Adverse and not significant during construction and operation. This is the same as the Pink, Blue and Orange options. The lack of a link to Blackbrook in the design for the Pink Modified option means that the

effects of the Pink Modified option on the water environment would be reduced slightly compared to those described for the other options.

17.10.3. Consideration of groundwater levels and flow would be considered during detailed design, as described in section 11.10.4. A Water Framework Directive (WFD) compliance assessment would also be undertaken during detailed design to ensure that all watercourse crossings and other Scheme elements are compliant with the requirements of the WFD.

Operation

17.10.4. The operation of highways can have a range of effects on the water environment, as described in section 11.10.5. The effects on the road drainage and water environment in operation would be the same as for construction for all options.

Summary

17.10.5. With the application of best practice mitigation, a not significant adverse effect is predicted on the road drainage and water environment for the Pink Modified option and the other three options. The Pink Modified option performs similarly to the other three options with regard for road drainage and the water environment effects.

17.10.6. All four options have a low risk of non-compliance with the NNNPS with respect for the road drainage and water environment. This is detailed in the NNNPS risk table in Appendix F.

17.11. Climate

17.11.1. The carbon assessment encompasses two sub-topics: the effects on climate and vulnerability of a scheme to climate change. This is described in section 11.11.1.

Construction

17.11.2. Based on the current design of the Pink Modified option and against the third carbon budget period, the carbon assessment has indicated that the Pink Modified option would release approximately 36,823 tonnes of carbon dioxide equivalent (tCO_2e) during construction. The carbon output specifically from the materials required for the Pink Modified option would be 32,144 tCO2e. In comparison with the other three options, the Pink Modified option would result in the least emissions during construction. This is due to the reduced length and number of structures included resulting in lower emissions than the other three options.

17.11.3. In the absence of established assessment criteria for the effects on climate it is predicted that the Pink Modified option would not have an effect on climate

during construction. This is due to the relatively low quantity of emissions in comparison to the overall UK emissions from construction. This is the same as for the other three options. It is not expected that climate change would result in a change in the risk of severe weather by the end of the three-year construction period. This is described in section 11.11.4.

Operation

17.11.4. During operation, the Pink Modified option would affect climate due to increased traffic flows and maintenance work required for the proposed Scheme. This is the same as the other three options. Further analysis of the operational carbon emissions is required at the next stage of design. As with the other three options, for the Pink Modified option there would be the potential for Scheme assets and environmental receptors to be affected by changes in climate. This is described in section 11.11.7.

Summary

17.11.5. No effects on climate are predicted for the four options (Pink, Orange, Blue and Pink Modified) during construction and a Neutral effect is predicted for all options during operation.

17.11.6. All four options have a low risk of non-compliance with the NNNPS with respect for climate, as detailed in the NNNPS risk table in Appendix F.

17.12. Combined and cumulative effects

Combined effects

17.12.1. The combined assessment has predicted that the Pink Modified option would result in the same effects as the other three options during construction and operation as described in sections 11.12.2 and 11.12.3.

Cumulative effects

17.12.2. The cumulative assessment for the Pink Modified option together with the other developments outlined in section 11.12.4 has predicted that the Pink Modified option would result in the same effects as the other three Scheme options during construction and operation. This is described in sections 11.12.5 and 11.12.6.

Summary

17.12.3. Combined and cumulative effects are predicted to be significant adverse during construction and not significant adverse during operation for the Pink Modified option. This is without consideration of mitigation for the Scheme beyond best practice. This is the same as for all the options.

17.12.4. All four options have a low risk of non-compliance with the NNNPS with respect for combined and cumulative effects. This is detailed in the NNNPS risk table in Appendix F.

18. Environmental summary

18.1. Conclusions

18.1.1. Table 18.1 overleaf provides a summary of the potential environmental effects for each of the environment topics, for the Pink, Pink Modified, Blue and Orange options.

Table 18.1: Summary of Residual Environmental Effects

Environmental topic	Subtopic	Effect during construction	Effect during operation
Air quality	Human health	Pink, Pink Modified, Blue and Orange options: Slight Adverse and not significant	Pink, Pink Modified, Blue and Orange options: Slight Adverse and not significant
	Ecological effects		
Cultural heritage	Heritage assets	Pink, Pink Modified, Blue and Orange options: Large Adverse and significant	Pink, Pink Modified, Blue and Orange options: Large Adverse and significant
	Sub-surface archaeological remains		Pink, Pink Modified, Blue and Orange options: Neutral (no effects anticipated)
Landscape	Landscape character	Pink, Pink Modified, Blue and Orange options: Large Adverse and significant	Pink and Pink Modified options: Moderate Adverse and Significant Blue and Orange options Large Adverse and significant
	Visual amenity		
Biodiversity	Qualifying species for Natura 2000 sites	Pink, Pink Modified, Blue and Orange options: Slight Adverse and not significant	Pink, Pink Modified, Blue and Orange options: Slight Adverse and not significant
	Nationally designated sites	Pink, Pink Modified, Blue and Orange options: Slight Adverse and not significant	Pink, Pink Modified, Blue and Orange options: Neutral
	Locally designated sites	Pink, Pink Modified, Blue and Orange options: Moderate Adverse and significant	Pink, Pink Modified, Blue and Orange options: Moderate Adverse and significant
	Priority habitats	Pink and Pink Modified options: Slight Adverse and not significant Blue and Orange options: Large Adverse and significant (due to impacts on Ancient Woodland)	Pink and Pink Modified options: Slight Adverse and not significant Blue and Orange options: Large Adverse and significant (due to impacts on Ancient Woodland)
	Protected and notable species	Blue and Orange options: Large Adverse and significant Pink and Pink Modified: Moderate Adverse and significant	Pink, Pink Modified, Blue and Orange options: Moderate Adverse and significant
Geology and soils	Geology, soils, surface water, groundwater, human receptors, buildings, structures and utilities, and flora	Pink, Pink Modified, Blue and Orange options: Slight Adverse and not significant	Pink, Pink Modified, Blue and Orange options: Scoped out of assessment as effects would be Neutral

Environmental topic	Subtopic	Effect during construction	Effect during operation
Material assets and waste	Material resource use	Pink, Pink Modified, Blue and Orange options: Large Adverse and significant	Pink, Pink Modified, Blue and Orange options: Scoped out of assessment as effects would be Neutral
	Waste generation	Pink, Pink Modified, Blue and Orange options: Slight Adverse and not significant	Pink, Pink Modified, Blue and Orange options: Scoped out of assessment as effects would be Neutral
Noise and vibration	N/A	Pink, Pink Modified, Blue and Orange options: Slight Adverse and not significant	Pink, Pink Modified, Blue and Orange options: Significant (Beneficial and Adverse)
Population and health	Land use: private property and associated land take	Pink, Pink Modified, Blue and Orange options: Unknown at this stage	Pink, Pink Modified, Blue and Orange options: Slight Adverse and not significant
	Land use: Community land and community resources	Pink, and Blue and options: Slight Adverse and not significant Pink Modified and Orange options: Neutral	Pink, Pink Modified, Blue and Orange options: Neutral
	Land use: Development land	Pink, Pink Modified, Blue and Orange options: Unknown at this stage	Pink, Pink Modified, Blue and Orange options: Large Beneficial and significant
	Severance: community severance	Pink, Pink Modified, Blue and Orange options: Slight Adverse and not significant	Pink, Pink Modified, Blue and Orange options: Slight Adverse and not significant
	Severance: journey length and time	Pink, Pink Modified, Blue and Orange options: Slight Adverse and not significant	Pink and Orange options: Neutral Blue and Pink Modified options: Slight Adverse and not significant
	Travellers: amenity	Pink, Pink Modified, Blue and Orange options: Slight Adverse and not significant	Pink, Blue and Orange options: Slight Beneficial and not significant Pink Modified option: Slight Adverse and not significant
	Travellers: driver stress	Pink, Pink Modified, Blue and Orange options: Slight Adverse and not significant	Pink, Blue and Orange options: Moderate Beneficial and not significant Pink Modified option: Neutral
	Travellers: view from the road	Pink, Pink Modified, Blue and Orange options: Scoped out of assessment as effects would be Neutral	Pink and Pink Modified option: Slight Beneficial and not significant Blue and Orange options: Moderate Beneficial and significant

Environmental topic	Subtopic	Effect during construction	Effect during operation
	Local economy	Pink, Pink Modified, Blue and Orange options: Unknown at this stage	Pink, Pink Modified, Blue and Orange options: Unknown at this stage
	Human health	Pink, Pink Modified, Blue and Orange options: Unknown at this stage	Pink, Pink Modified, Blue and Orange options: Unknown at this stage
Road drainage and the water environment	Surface water, groundwater, and floodplain	Pink, Pink Modified, Blue and Orange options: Slight Adverse and not significant	Pink, Pink Modified, Blue and Orange options: Slight Adverse and not significant
Climate	Effects on climate	Pink, Pink Modified, Blue and Orange options: Not applicable	Pink, Pink Modified, Blue and Orange options: Not applicable
	Vulnerability to climate	Pink, Pink Modified, Blue and Orange options: Neutral (no effects anticipated)	Pink, Pink Modified, Blue and Orange options: Slight Adverse and not significant
Combined and cumulative effects	Combined effects	Pink, Pink Modified, Blue and Orange options: Significant Adverse	Pink, Pink Modified, Blue and Orange options: Slight Adverse and not significant
	Cumulative effects	Pink, Pink Modified, Blue and Orange options: Significant Adverse	Pink, Pink Modified, Blue and Orange options: Slight Adverse and not significant

18.2. Environmental objectives

18.2.1. One of the transport and operation objectives identified from the *Client Scheme Requirements* (Highways England, June 2018) is to 'improve safety along the A358 Taunton to Southfields route for non-motorised users (NMUs)'. This includes the goal of 'providing new and upgraded crossings for cyclists, walkers and other vulnerable road users'. A Key Performance Indicator (KPI) has also been set: 'The number of new and upgraded crossings – Full consideration and the development of facilities for NMUs will be an integral part of the Scheme.' Refer to Appendix F for further analysis of how the options meet the Scheme objectives.

18.2.2. Outline proposals have been produced for the Scheme which sets out proposals for changes to NMU routes. These include the locations for diversions of existing NMU routes, new crossings, potential cycle routes and Public Rights of Way (PROW) to be extinguished. The proposals aim to ensure that NMU routes are not significantly adversely affected as part of any of the route options and that safety is improved.

18.2.3. The environmental assessment concluded that journey length and times are likely to temporarily increase for a number of NMU facilities for all options, resulting in a Slight Adverse effect for NMUs. During operation, some beneficial and adverse effects are predicted to occur for all options, with increases and decreases in journey length predicted for individual routes. However, the provision of new facilities would reduce effects on NMUs and a Slight Adverse effect for NMUs is predicted during operation for the Blue and Pink Modified options. A Neutral effect is predicted for the Pink and Orange options. At this stage it is considered that the Scheme meets the requirements. New and upgraded crossing for cyclists, walkers and other vulnerable road users, and other proposed mitigation measures will be considered in the next design stage.

18.2.4. Another of the transport and operation objectives identified from the Client Scheme Requirements, is to 'avoid unacceptable impacts on the surrounding natural environment and landscape and optimise the environmental opportunities and mitigation that the intervention could bring'. There are two goals for meeting this objective, the first being 'mitigating noise important areas'. Within the study area of the four options there are 12 Noise Important areas (NIA), as described in section 3.4.36.

18.2.5. The Pink, Pink Modified, Blue and Orange options are all predicted to result in significant adverse effects at this stage, but this does not consider mitigation measures. Mitigation in the form of acoustic barriers and bunds will be investigated at the next stage of environmental assessment, in particular with respect to NIAs. This will help achieve the goal of mitigating NIAs.

18.2.6. The second goal for the meeting the ‘avoid unacceptable impacts on the surrounding natural environment and landscape and optimise the environmental opportunities and mitigation that the intervention could bring’ objective is ‘Delivery of improved biodiversity, as set out in our Biodiversity action plan’. A related KPI has been set: ‘Biodiversity: Delivery of improved biodiversity as set out in the Company’s Biodiversity Action Plan (BAP) – Target Publish Biodiversity Action Plan by 30 June 2015 and report annually against the Plan to reduce net biodiversity loss on an annual on-going basis’. The development of the Scheme will fully embrace the BAP as it progresses.

18.2.7. Biodiversity is required to be fully considered during the building of any new roads and opportunities should be sought to work with stakeholders and enhance the network for wildlife. In order to ensure there would be no net loss of biodiversity as part of the preferred option, an Ecological Mitigation Strategy would be prepared as part of the preliminary design. This will detail the proposals to manage and mitigate for ecological effects associated with the Scheme, including planting on a net-gain basis. This document would be a live document that would be updated as and when required during Scheme design, and as protected species information is updated. This document would also be used to inform the Construction Environmental Management Plan (CEMP) for the Scheme, which would be prepared by the contractor prior to construction. A Site Waste Management Plan (SWMP) will also be prepared outlining the correct handling, transport, and disposal of waste.

18.2.8. At this design stage, although a Slight Adverse effect is anticipated for the majority of ecological receptors, the overall effect on biodiversity as a result of the Pink and Pink Modified options is anticipated to be Moderate Adverse during construction. This is due to the loss of road verges west of Hatch Beauchamp Local Wildlife Site (LWS) and part of Jordan’s LWS. The effect of the Pink and Pink Modified options will be Moderate Adverse during operation due to the potential loss of veteran trees from Jordan’s LWS.

18.2.9. For the Blue and the Orange options, a Slight Adverse effect is anticipated for the majority of ecological receptors. The overall significance of effects on biodiversity as a result of the Blue option is anticipated to be Large Adverse during construction and operation due to the loss of Huish Copse East LWS, Ancient Woodland used by two rare species of bat (barbastelle and Bechstein's bat).

18.2.10. Biodiversity enhancement measures will also be explored as the proposed Scheme is developed further. Potential measures could include replanting of native species-rich hedgerows and trees, provision of green bridges, creation of species-rich grassland and the provision of nesting and roosting opportunities for bats and birds. New planting should be connected to existing habitat within the landscape to compensate for the loss of wildlife corridors and reduce fragmentation of habitats caused by the Scheme. The species composition of any

new planting would take account of the habitats lost and those within the surrounding area. It is considered that the Scheme design and proposed mitigation measures meet the requirements of the goal: ‘Delivery of improved biodiversity, as set out in our ‘Biodiversity action plan’.

19. Appraisal Summary Table for Pink Modified option

19.1.1. Appraisal Summary Tables (ASTs) have been prepared in accordance with the Department for Transport's web-based Transport Analysis Guidance (WebTAG). The AST for the Pink Modified option is included in Appendix H of this report.

20. Programme

20.1.1. The timeline for this Scheme is currently being reviewed. The intention is to build the Scheme as close to the original start date as possible. This may include some preparatory works in advance of the start of works and main construction, assuming the Scheme has successfully received development consent. For this reason, all assessments presented within this report have been carried out with an original Scheme opening year of 2023 and design year of 2038 (15 years after Scheme opening).

20.1.2. During the initial consultation on the Project Control Framework (PCF) Stage 1 (option identification) in 2017, it was expected that the Scheme would be open to traffic by 2023. Traffic forecasts were developed for this opening year and 15 years later in 2038 and were used in the Scheme design and appraisal. Additional traffic forecasts were prepared for an interim year of 2031 and a horizon year of 2051 for the purposes of the economic appraisal.

20.1.3. Further traffic modelling and forecasting work commenced after the initial consultation in 2017 for PCF Stage 2 (option identification). This used the same forecast years with the South-West Regional Model being adapted for the Scheme during this stage. A further public consultation was undertaken in early 2018 and as a result, the Scheme opening year was deferred firstly to 2024 and more recently 2025.

20.1.4. As the traffic forecasting work during Stage 2 had been undertaken prior to these changes in the Scheme opening year, the appraisal work was carried out assuming the original Scheme opening year of 2023. The exception is for the economic appraisal for which the Scheme costs were produced for a Scheme opening year of 2024. Applying a later opening year of 2025 would increase opening year forecast traffic by about 3% compared with 2023. This is unlikely to substantially affect the results of the appraisal work carried out. For noise and vibration, the appraisal already identifies the potential for significant effects for all options, and a different opening year is likely to result in the same findings. Air quality assessment is also unlikely to change.

20.1.5. As a result of the above, the appraisal work has not been revised as the conclusions would be the same.

20.1.6. Key programme dates, at the time of writing, are:

Preferred Route Announcement……..	Spring 2019
Statutory Public Consultation……	Winter 2019 / 2020
Application for Development Consent Order…….	Autumn 2020
Development Consent Order Examination……	Spring 2021
Secretary of State Decision……..……	Spring 2022
Start of Construction…….……..…	Autumn 2022
Scheme open to Traffic…….	Autumn 2025

21. Further progression of the Pink Modified option

21.1. Cost estimates for the Pink Modified option

21.1.1. The assessments completed, as detailed in Chapter 15, uses the same cost baseline and assumptions to generate the costs used for the economic appraisal. This is based on cost estimates from November 2018 as reported in section 14.1.9. This same baseline was used to directly compare the assessment results for the Pink Modified option to those completed for the three options presented at the 2018 public consultation and the three alternative options identified as a result of the consultation responses.

21.1.2. In February 2019, revised costs were generated to take account of further revisions to the programme for construction with a revised Scheme opening year of 2025. As part of this, the forecast model data for 2023 was used to represent the 2025 opening year and shows that the Scheme cost in February 2019 has increased from the estimate completed in November 2018.

Table 21.1: Pink Modified updated cost

	Interim estimate (November 2018)	Revised estimates (February 2019)
Pink Modified option	£423 million	£457 million

21.1.3. The benefits and costs of the Pink Modified option, assessed for the November 2018 and February 2019 estimates, are presented in Table 21.2. The BCR for the Pink Modified option is expected to be 0.97 and 0.90 for the November 2018 and February 2019 estimates respectively.

Table 21.2: Analysis of monetised costs and benefits – Pink Modified option

Item	November 2018 Interim Estimate (£423m)	February 2019 Estimate (£457m)
Air quality (not assessed by TUBA) *	-242	-242
Noise (not assessed by TUBA) **	-2,188	-2,188
Collisions (not assessed by TUBA) ***	13,501	7,380
Roadworks (not assessed by TUBA) ****	-21,404	-16,347
Greenhouse Gases (not assessed by TUBA) *****	-23,060	-24,380
Economic efficiency: consumer users (Commuting)	50,131	45,134
Economic efficiency: consumer users (Other)	33,189	27,824
Economic efficiency: business users and providers	115,426	100,957
Wider public finances (indirect taxation revenues)	48,327	54,123
Present Value of Benefits (PVB)	213,681	192,261
Broad Transport Budget - Present Value of Costs (PVC)	245,882	271,967
OVERALL IMPACTS		
Net Present Value (NPV)	-32,201	-79,706
Initial Benefit to Cost Ratio (BCR)	**0.87**	**0.71**
Reliability benefits	14,243	13,020
Wider economic benefits	11,543	40,415
Adjusted BCR	**0.97**	**0.90**

Notes: * TAG unit A3 Chapter 3, ** TAG unit A3 Chapter 2, *** COBALT, **** QUADRO, ***** TAG unit A3 version 1.9.1. All monetary values are expressed in 2010 prices discounted to 2010.

21.1.4. A new model to deliver Highways England schemes was announced in January 2018. This model, the Regional Delivery Partnership (RDP), provides the opportunity to re-evaluate the cost of the Pink Modified option.

21.1.5. The RDP contract model was developed as part of the wider Routes to Market programme aimed at creating new procurement vehicles. It builds on the existing Collaborative Delivery Framework (CDF) which reached its headline value in 2018. Highways England chief executive Jim O'Sullivan said, "*Routes to Market represents a fundamental change in the way we deliver road projects. It will be performance rather than price based, focusing on building the right projects with*

the best outcomes for road users and the communities we serve. It demands a major step up in our supply chain to embrace innovation and teamwork and in their ability to deliver value."

21.1.6. This Scheme would be delivered through the Regional Delivery Partnership arrangement.

Table 21.3: Analysis of monetised costs and benefits – Pink Modified option (RDP)

Item	May 2019 (RDP)
Air quality (not assessed by TUBA) *	-242
Noise (not assessed by TUBA) **	-2,188
Collisions (not assessed by TUBA) ***	7,380
Roadworks (not assessed by TUBA) ****	-16,347
Greenhouse Gases (not assessed by TUBA) *****	-24,380
Economic efficiency: consumer users (Commuting)	45,134
Economic efficiency: consumer users (Other)	27,824
Economic efficiency: business users and providers	100,957
Wider public finances (indirect taxation revenues)	54,123
Present Value of Benefits (PVB)	192,261
Broad Transport Budget - Present Value of Costs (PVC)	203,481
OVERALL IMPACTS	
Net Present Value (NPV)	-11,220
Unadjusted Benefit to Cost Ratio (BCR)	**0.94**
Reliability benefits	13,020
Wider economic benefits	40,415
Adjusted Present Value of Benefits (PVB)	245,696
Adjusted BCR	**1.21**

Notes: * TAG unit A3 Chapter 3, ** TAG unit A3 Chapter 2, *** COBALT, **** QUADRO, ***** TAG unit A3 version 1.9.1. All monetary values are expressed in 2010 prices discounted to 2010.

21.1.7. As shown above in Table 21.3, procuring the Scheme through the RDP, the Scheme cost will be in the order of £397m, a lower price than the February 2019 updated cost used for the economic assessment. The saving is realised through a number of changes as a result of the RDP. These include:

- awarding schemes as part of regional packages based on programmes of work rather than individual scheme awards. This provides increased long-term certainty to the market providing a foundation for investment and productivity improvement.
- greater collaboration between all suppliers through integrated Centres of Excellence to drive regional efficiencies and performance by harnessing innovation and long-term skills strategies.
- a more streamlined procurement procedure, reducing the acquisition cost burden to the market.

21.1.8. The cost reductions achieved for the Scheme through the RDP has resulted in an improved BCR of 1.2.

Table 21.4: BCR values for Pink Modified

	BCR (interim cost estimate prepared November 2018)	BCR RDP (cost estimate prepared May 2019)
Pink Modified option	0.97	1.21

21.1.9. The adoption of the RDP for the Scheme has led to some delay with the announcement of the preferred route. However, the improved BCR due to a more affordable delivery model providing greater benefits and a reduced cost to the public, makes the Pink Modified option the most affordable and viable option.

22. Conclusion

22.1.1. All three options presented at public consultation and the three options arising as a result of that public consultation are consistent, when compared to the requirements of:

- *Appraisal summary tables*
- *Highways England Delivery Plan 2015-2020* - Key Performance Indicators
- Scheme Objectives comparison (*Client Scheme Requirements*)
- *National Networks National Policy Statement (NNNPS) Risk Table*
- Public consultation results

22.1.2. Comparison of the options in line with the relevant standard and assessment methodologies, as presented in this report, demonstrates that the Pink option provides the best combination of economic and environmental factors of the options considered. However, the Pink option is the most expensive option presented at the 2018 consultation. The increase of Scheme cost estimates in April 2018 identified that the costs were significantly more than the estimates presented in the 2018 consultation (from January 2018). This has led to the need to consider how the option can be modified to still meet the objectives of the Scheme, whilst making it more affordable.

22.1.3. A modified version of the Pink option, when compared against the existing situation, provides the following benefits:

- reduces the traffic through Henlade
- improves the journey time for traffic
- delivers works on junction 25 that enables this junction to cope with the increased traffic flows

22.1.4. The Pink Modified option, when compared against the options presented at the 2018 consultation:

- reduces the footprint of the Pink option and the impact on the countryside
- has less impact on the Ancient Woodland than the Blue and Orange option
- offers a lower cost solution than the Pink option

22.1.5. The Pink Modified option delivers the Scheme objectives as follows:

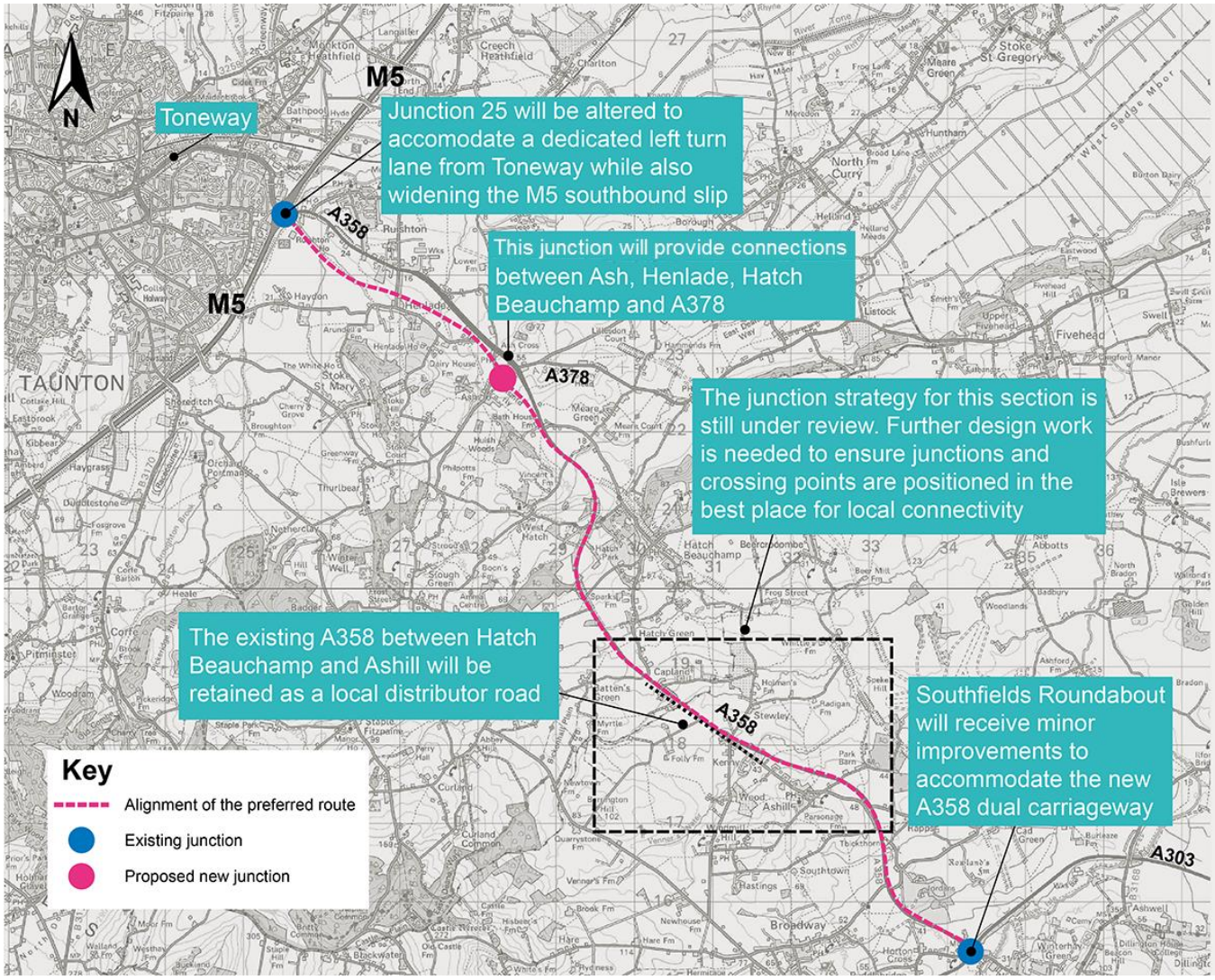
- **Capacity -** The Pink Modified option will provide relief to the traffic congestion in Henlade. The average daily traffic would reduce from 33,500 vehicles to 4000 vehicles in 2038. By reducing congestion and increasing capacity it will allow mile a minute travel as the norm along the new A358.
- **Safety -** The new A358 would see the existing road junctions and private accesses closed with new connections and junctions provided, making

journeys safer by avoiding conflicting traffic-turning movements. The Scheme will also improve safety by encouraging road users to use the new A358, rather the seeking alternative local routes to avoid congestion into Taunton.

- **Local communities -** The Pink Modified option would allow local traffic using the A378 to connect with the upgraded A358 (Junction C). This would improve local journeys into Taunton. The Pink Modified option will also cause less disruption to existing patterns of movement for local communities. The reduction in congestion in Henlade will improve residents' quality of life.
- **Connectivity -** Connectivity to the south-west from the south-east and London will be improved, making Taunton and the south-west region more accessible. Daily travel for commuters and local traffic into Taunton will be safer and more reliable, by separating local movements from traffic passing through the area.
- **Resilience -** Connecting the new A358, Nexus 25 and M5 junction 25 will help reduce congestion between West Hatch and M5 junction 25.
- **Economic growth -** The Pink Modified option provides direct access to Nexus 25, as well as connecting to the A378. This will help Taunton to become a more attractive place to work and do business and help facilitate growth in Somerset and the south-west.
- **Environmental impact -** The Pink Modified option avoids the Ancient Woodland at Huish Wood and Stoke Wood and removes the need to impact the open space.

22.1.6. After detailed consideration of the options to improve the A358 between Taunton and Southfields the Pink option was assessed to provide the best combination of benefits compared to impacts. However, after further consideration Highways England found the Pink option to be unaffordable and the Pink Modified option was developed to satisfy the affordability concerns. The Pink Modified option, the preferred route, is shown in Figure 22.1.

Figure 22.1: The preferred route (Pink Modified option)



Source: Mott MacDonald Sweco Joint Venture. This Map is based upon Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office © Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. Highways England 100030649 2016.

Appendix A Glossary and abbreviations

AADT	Annual Average Daily Traffic
ADT	Average Daily Traffic
ALARP	As Low As is Reasonably Practicable
ALC	Agricultural Land Classification
AONB	Area of Outstanding Natural Beauty
AQMA	Air Quality Management Area
ARCADY	Assessment of Roundabout Capacity
AST	Appraisal Summary Table
ATC	Automatic Traffic Count
BAP	Biodiversity Action Plan
BCR	Benefit to Cost Ratio - a ratio used by the Department for Transport to determine value for money of a scheme
CCTV	Closed Circuit Television
CDM	Construction and Design Management
CEMP	Construction Environmental Management Plan
CFADS	Consultancy Framework Agreement for Design Services
CO2	Carbon dioxide
COBALT	COst and Benefit to Accidents – Light Touch)
COPD	Chronic Obstructive Pulmonary Disease
COSHH	Control of Substances Hazard to Health
CRF	Congestion Reference Flow
CROW	Countryside and Rights of Way
D2AP	Dual 2-lane all purpose (a high quality all-purpose dual carriageway)
DCC	Devon County Council
DCO	Development Consent Order
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DM	Do Minimum
DMRB	Design Manual for Roads and Bridges
DS	Do Something
eDNA	Environmental DNA
EIA	Environmental Impact Assessment
EPA	Environmental Protection Act
ERT	Emergency Roadside Telephones
FWI	Fatalities and Weighted Injuries

GCN	Great Crested Newts
GVA	Gross Value Added
HA	Highways Agency
HELAA	Housing and Economic Land Availability Assessment
HGV	Heavy Goods Vehicles
HSI	Habitat suitability Index
IAN	Interim Advice Note
ILP	Institution of Lighting Professionals
ITS	Intelligent Transport Systems
KPI	Key performance indicator
ktCO2e	Kilotonnes of carbon dioxide equivalent
LEPs	Local Enterprise Partnerships
LAD	Local Authority Districts
LGV	Light Goods Vehicles
LGS	Local Geological Site(s)
LinSig	Linear Signal Analysis
LNS	Local Nature Reserve(s)
LWS	Local Wildlife Site(s)
MAFF	Ministry of Agriculture, Fisheries, and Food (now part of Defra but MAFF ALC mapping is still in use)
MCC	Manual Classified Counts
MCTC	Manual Classified Turning Counts
MIDAS	Motorway Incident Detection and Automatic Signalling
MMQ	Mean Max Queue
MtCO2e	Million tonnes of carbon dioxide equivalent
NATA	New Approach to Appraisal
NCA	National Character Area
NERC	Natural Environment and Rural Communities
NHP	National High Pressure
NIA	Noise Important Area(s)
NO2	Nitrogen dioxide
NOx	Nitrogen Oxide
NMU	Non-Motorised User(s)
NNNPS	National Networks National Policy Statement
NPPF	National Planning Policy Framework
NPPG	National Planning Practice Guidance
NPV	Net Present Value

NSIP	Nationally Significant Infrastructure Project(s)
NTEM	National Trip End Model
NTIS	National Traffic Information Service
PCF	Project Control Framework
PCM	Pollution Climate Mapping
PIC	Personal Injury Collision
PICADY	Priority Junction capacity and Delay
PM	Particulate Matter
PRA	Preferred Route Announcement
PROW	Public Right(s) of Way
PT	Public Transport
PVB	Present Value of Benefits
PVC	Present Value of Costs
QUADRO	QUeues And Delays at ROadworks
Ramsar	The Convention on Wetlands, known as the Ramsar Convention, is an intergovernmental environmental treaty established in 1971 by UNESCO
RC	Reinforced Concrete
RFC	Ratio of Flow to Capacity
RTF	Road Traffic Forecasts
RIGS	Regionally Important Geological Sites
RIS	Road Investment Strategy
RSI	Roadside Interview Site(s)
S2	Single 2 lane carriageway
SAC	Special Area(s) of Conservation
SADMP	Site Allocations and Development Management Plan
SATURN	Simulation and Assignment of Traffic in Urban Road Networks
SCC	Somerset County Council
SERC	Somerset Environmental Records Centre
SINC	Sites of Importance for Nature Conservation
SMS	Safety Management System
SOAEL	Significant Observed Adverse Effect Level
SOBC	Strategic Outline Business Case
SoS	Secretary of State
SPA	Special Protection Area
SRN	Strategic Road Network
SSDC	South Somerset District Council
SSE	Scottish and Southern Energy

SSSI	Site of Special Scientific Interest
SuDS	Sustainable Drainage Systems
SWARMMS	South-West and South Wales Multi Modal Study
SWMP	Site Waste Management Plan
SWRA	South-West Regional Assembly
SWRTM	Highways England's South-West Regional Traffic Model
TAG	Transport Analysis Guidance
TAR	Technical Appraisal Report
TDBC	Taunton Deane Borough Council
TEMPRO	Trip End Model Presentation Programme
TPI	Targeted Programme of Improvements
TUBA	Transport Users Benefits Appraisal
VDM	Variable Demand Modelling
VMS	Variable Message Sign
VOT	Value of Time
WITA	Wider Impact in Transport Appraisal
WebTAG	Department for Transport's web-based Transport Analysis Guidance
WebTRIS	Highways England's Traffic Information System
WFD	Water Framework Directive
WPD	Western Power Distribution

Appendix B Known environmental constraints

Creech St Michael
Ruishton
Henlade
Junction 25
M5
A358
Mattock's Tree Green
A378
Huish Woods
Stoke Hill
West Hatch
Hatch Beauchamp
A358
A358
Ashill
Ilton
A303
Southfields Roundabout
A303
Broadway
Horton
M5
Blackdown Hills AONB

Not To Scale

CLIENT

highways england

DISCLAIMERS

KEY TO SYMBOLS

- Pink Modified option
- Pink option
- Blue option
- Orange option
- Footpaths
- Bridleways
- Restricted Byway
- Rivers
- On-Road National Cycle Network
- Registered Common Land
- Authorised Landfill
- Historic Landfill
- Listed Building
- Scheduled Monument
- Registered Parks and Gardens
- Area of Outstanding Natural Beauty
- Air Quality Management Area
- Local Geological Site
- Noise Important Area
- Flood Zone 3
- Flood Zone 2
- Higher Holway Open Space
- Vivary Green Wedge
- Local Wildlife Site
- Site of Special Scientific Interest
- Conservation Area
- Local Nature Reserve
- National Nature Reserve
- Ancient Woodland identified by Somerset Environmental Records Centre
- Ancient Woodland
- Woodand Trust Wood
- Special Protection Areas
- Ramsar

PROJECT TITLE

A358 Taunton to Southfields Dualling

DRAWING TITLE

Known Environmental Constraints

Appendix C Summary of public consultation events

Events held as a part of the 2017 public consultation events

Table C.1: 2017 Consultation launch event

Date	Venue	Time
Tuesday 28 March 2017	Museum of Somerset (Great Hall) Taunton Castle, Castle Green Taunton TA1 4AA	6:30pm to 8:30pm welcome event at 7:00pm

Table C.2: 2017 Landowner events

Date	Venue	Time
Thursday 30 March 2017	Hatch Beauchamp Village Hall Village Road, Hatch Beauchamp Taunton< TA3 6SG	11:00am to 8:00pm
Friday 31 March 2017	The Wyvern Club Mountfields Road Taunton, TA1 3BJ	11:00am to 8:00pm
Monday 3 April 2017	Monks Yard (Conference Room) Horton Cross Farm, Horton Cross Ilminster, Somerset, TA19 9PT	11:00am to 8:00pm
Tuesday 4 April 2017	Holiday Inn Taunton M5 junction25 (Priory Suite 3 and 4), Deane Gate Avenue Taunton, TA1 2UA	11:00am to 8:00pm

Table C.3: 2017 Public information events

Date	Venue	Time
Friday 7 April 2017	Hatch Beauchamp Village Hall Village Road, Hatch Beauchamp Taunton, TA3 6SG	10:00am to 6:00pm
Saturday 8 April 2017	Taunton Racecourse (Owners and Trainers Paddock Stand) Orchard Portman, Taunton, TA3 7BL	10:00am to 6:00pm
Monday 10 April 2017	Holiday Inn Taunton M5 junction 25 (Blackdown Suite), Deane Gate Avenue Taunton, TA1 2UA	12:00 noon to 8:00pm
Tuesday 11 April 2017	Monks Yard (Conference Room) Horton Cross Farm, Horton Cross Ilminster, Somerset, TA19 9PT	12:00 noon to 8:00pm
Friday 30 June 2017 (originally scheduled for 8 May 2017 but postponed due to purdah)	Holiday Inn Taunton M5 junction 25 (Blackdown Suite), Deane Gate Avenue Taunton, TA1 2UA	10:00am to 7:00pm

Table C.4: 2017 Additional Presentations

Date	Stakeholders
Wednesday 14 June 2017	Hatch Beauchamp Parish Council
Monday 19 June 2017	Stoke St Mary Parish Council
Wednesday 21 June 2017	Heart of the South-West Local Enterprise Partnership
Wednesday 21 June 2017	Ruishton Parish Council
Tuesday 27 June 2017	Killams and Mountfields Ward, Taunton
Monday 3 July 2017	Ashill Parish Council
Tuesday 4 July 2017	University of the Third Age
Tuesday 4 July 2017	Broadway Parish Council
Thursday 6 July 2017	West Hatch Parish Council

Events held as a part of the 2018 public consultation events

Table C.5: 2018 Consultation launch event

Date	Venue	Time
Tuesday 16 January 2018	Museum of Somerset, Taunton Castle, Castle Green, Taunton, Somerset, TA1 4AA	6.30pm – 8.30pm

Table C.6: 2018 Landholder events

Date	Venue	Time
Wednesday 17 January 2018	Holiday Inn Taunton, Deane Gate Avenue, Taunton, Somerset, TA1 2UA	10.00am – 6.00pm
Thursday 18 January 2018	Taunton Racecourse, Orchard Portman, Taunton, TA3 7BL	10.00am – 6.00pm
Friday 19 January 2018	Holiday Inn Taunton, Deane Gate Avenue, Taunton, Somerset, TA1 2UA	10.00am – 6.00pm
Monday 22 January 2018	Holiday Inn Taunton, Deane Gate Avenue, Taunton, Somerset, TA1 2UA	10.00am – 6.00pm

Table C.7: 2018 Public information events

Date	Venue	Time
Saturday 20 January 2018	Holiday Inn Taunton, Deane Gate Avenue, Taunton, Somerset, TA1 2UA	Midday – 8.00pm
Tuesday 23 January 2018	The Monk's Yard, Horton Cross Farm, Horton Cross, Ilminster, Somerset, TA19 9PT	Midday – 8.00pm
Wednesday 24 January 2018	Hatch Beauchamp Village Hall, Village Road, Hatch Beauchamp, Taunton, TA3 6SG	Midday – 8.00pm

Date	Venue	Time
Friday 26 January 2018	Holiday Inn Taunton, Deane Gate Avenue, Taunton, Somerset, TA1 2UA	Midday – 8.00pm
Monday 1 February 2018	The Wyvern Club, Mountfields Road, Taunton, TA1 3BJ	Midday – 8.00pm
Wednesday 21 February 2018	Stoke St Mary Village Hall, Stoke St Mary, Taunton, TA3 5BY	9.30am – Midday
Wednesday 21 February 2018	Ruishton Village Hall, Ruishton, Taunton, Somerset, TA3 5JD	2.00pm – 5.30pm

Table C.8: 2018 Additional presentations

Date	Attendees
Monday 29 January 2018	Ruishton, Thornfalcon and Henlade Parish Council
Thursday 1 February 2018	Holway and Blackbrook (unparished) –representatives including Taunton Deane Borough Council and Somerset County Council members and chair of the Holway Local Action Team
Tuesday 6 February 2018	North Curry Parish Council
Wednesday 7 February 2018	Hatch Beauchamp Parish Council and Neroche Parish Council
Thursday 8 February 2018	Horton Parish Council
Monday 12 February 2018	Creech St Michael Parish Council
Tuesday 13 February 2018	Pitminster Parish Council and Corfe Parish Council
Wednesday 14 February 2018	Stoke St Mary Parish Council
Friday 16 February 2018	Ashill Parish Council and Broadway Parish Council
Monday 19 February 2018	Trull Parish Council
Tuesday 20 February 2018 (am)	West Hatch Parish Council
Tuesday 20 February 2018 (pm)	Killams and Mountfield (unparished) –representatives included the Taunton Deane Borough Council member and ward residents
Thursday 22 February 2018	Ilminster Town Council

Appendix D Nitrogen dioxide (NO_2) receptors

King's Sedgemoor

Curry and Hays Moor

Fiveheads Woods and Meadow (S of A378)

Fiveheads Woods and Meadow (N of A378)

Quants

Maiden Down

Deadman

Ruttersleigh

Not To Scale

CLIENT

highways england

KEY TO SYMBOLS

Ecological Receptors

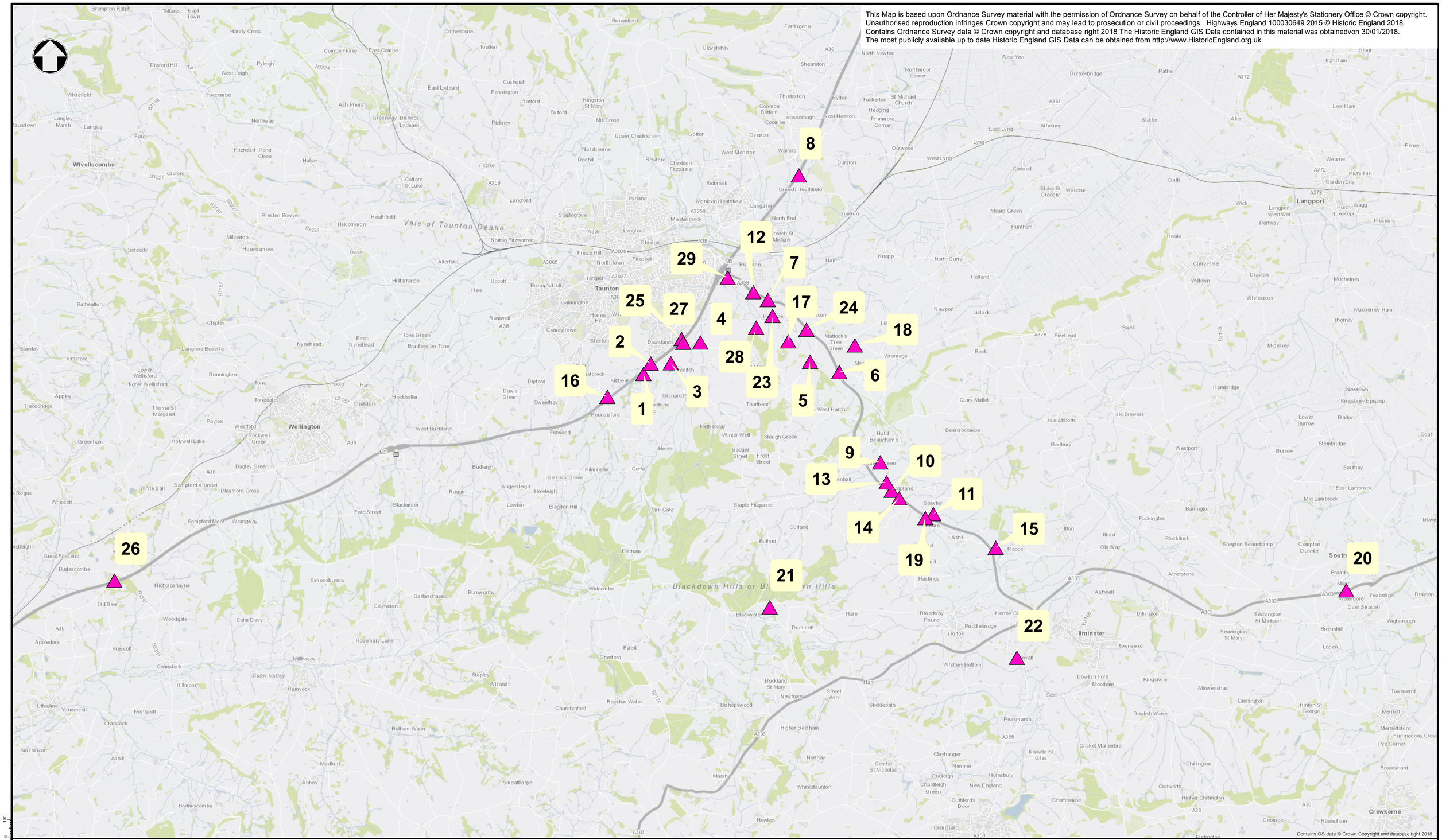
Site of Special Scientific Interest

PROJECT TITLE

A358 Taunton to Southfields Dualling

DRAWING TITLE

Air Quality - Modelled Ecological Receptor Locations for all options



Not To Scale

CLIENT

highways england

KEY TO SYMBOLS

▲ Human Health Receptors

PROJECT TITLE

A358 Taunton to Southfields Dualling

DRAWING TITLE

Air Quality - Modelled Human Health Receptor Locations for the Pink, Blue and Orange options

Appendix E Appraisal Summary Tables

Appraisal Summary Table

Date produced:	Aug-18

Contact:	
Name	David Stock
Organisation	Highways England
Role	Promoter/Official

Name of scheme:	A358 Taunton to Southfields Dualling - Pink option
Description of scheme:	The Pink option would be approximately 14.6 kilometres long between its connection with the M5 and Southfields Roundabout. In addition to this a 1.5 kilometre section of dual carriageway (the M5 junction 25 link) would be provided between the proposed dual carriageway and junction 25 of the M5. The unique aspect of the Pink option in comparison with Blue and Orange is that its alignment through Section 1 takes a more northerly arc through the scheme corridor. This takes it closer to the A358 / A378 junction at Mattock's Tree Green and closer to Henlade than Blue and Orange.

Impacts		Summary of key impacts	Assessment			
			Quantitative	Qualitative	Monetary £(NPV)	Distributional 7-pt scale/ vulnerable grp
Economy	Business users & transport providers	Journey time benefits by converting old single carriageway sections to modern dual carriageway with associated junction improvements. Net journey time changes is the net of positive and negatives in a given time band. Monetary (NPV) includes journey times, vehicle operating cost and user charges impacts.	**Value of journey time changes(£)** £208.3m **Net journey time changes (£)** 0 to 2min: -£4.0m; 2 to 5min: £98.2m; > 5min: £114.0m	Not applicable	£189.0m	N/A
	Reliability impact on Business users	Reliability benefits by converting old single carriageway section to modern dual carriageway with associated junction improvements.	Stress-based approach set out in TAG A1.3 Appendix C.5 used to quantify benefits	Not applicable	£10.4m	
	Regeneration	The Pink option does not lie within or close to regeneration areas.	Not applicable	Not applicable	Not applicable	
	Wider Impacts	Wider economic benefits (output change in imperfectly competitive markets) by converting an old single carriageway section to modern dual carriageway with associated junction improvements.	Estimated from a 10% uplift in business benefits	Not applicable	£18.9m	
Environmental	Noise	Results indicate an overall disbenefit owing to the widening of road to a dual carriageway both online and offline, increases in road traffic, and the introduction of new junctions that bring roads closer to residences. Residential properties located within close proximity to the new alignment have not been mitigated with noise barriers or bunds. In the forecast year, there are 432 properties that are calculated to experience significant adverse effects due to noise in the daytime and 877 properties in the night time.	Households experiencing increased daytime noise in forecast year: 892 Households experiencing reduced daytime noise in forecast year: 360 Households experiencing increased night time noise in forecast year: 601 Households experiencing reduced night time noise in forecast year: 272	Not applicable	-£2.3m	Distributional impact assessment to be undertaken in PCF Stage 3
	Air Quality	Overall, there is a net improvement in local air quality PM_{10} concentrations with the scheme, but there is a negative impact on regional NO_x emissions. The increase in regional emissions can be attributed to the rerouting of vehicles and increased traffic in the study area. There would be no new exceedances as a result of the scheme. The scheme is expected to reduce concentrations in the Henlade AQMA due to rerouting of traffic away from the existing A358. Overall, the total change in NPV is positive indicating a net improvement in air quality when considering both local and regional effects. The Distributional Impacts (DI) Screening Matrix concluded that the study area in the opening year does not exhibit large disparities in terms of the Indices of Multiple Deprivation. Therefore, it can be concluded that the impacts of the scheme would be sufficiently minor and spatially dispersed such that a detailed DI appraisal is not required.	Local Air Quality Assessment Score in Year of Opening:2023: NO_2: -1005.9 PM_{10}: -356.5 Regional Emissions (Over 60 year appraisal period) NO_x: +1,100 tonnes Local Air Quality Effects at Properties (Improvements / No Change / Deterioration) NO_2 2023 (7743 / 513 / 4237) PM_{10} 2023 (4790 / 5254 / 2449)	Not applicable	PM_{10} NPV: £0.9m NO_x NPV: £0.5m Total value of change in air quality: £0.3m	N/A
	Greenhouse gases	There is an overall increase in greenhouse gases as a result of the scheme. The reason for the increase is because of an increase in fuel consumption associated with an overall increase in road traffic with the scheme in place.	Change in non-traded carbon over 60y (CO2e): 582415 Change in traded carbon over 60y (CO2e): 3549	585964	-£25.9m	
	Landscape	Tranquility levels are likely to be degraded to varying degrees as a result of the scheme. Large scale junctions such as at Hatch Beauchamp, Mattock's Green and north of Stoke Wood where the scheme would split north and west, would have a larger footprint in the rural landscape than the mainline route and would be a detracting feature, at odds with the rural surroundings and also potentially be more difficult to mitigate for. Loss of key landscape features such as tree and shrub plots and hedgerows, particularly associated with offline sections, would have a detrimental effect upon land use, pattern and overall landscape character of National Character Areas 140 Yeovil Scarplands, 143 Mid Somerset Hills and 146 Vale of Taunton and Quantock Fringes. Proposed soft landscape mitigation would include replacing native hedgerows, hedgerows with trees and linear woodland planting, which would be designed to complement the existing landscape character and reduce the visibility of the scheme. However, the implementation of effective mitigation planting would help to aid the settlement of the scheme as a whole within the surrounding landscape to varying degrees, albeit over a number of years. Exploration of opportunities for landscape bunds and earthworks may also be beneficial in reducing impacts further, however these have not been considered in this assessment. The online and near online alignment of this option limits wider landscape impacts due to it remaining in close proximity to the existing A358 which is of great benefit, however there would still be an overall worsening for landscape as a result of the Pink option.	Not applicable	Moderate Adverse	Not applicable	
	Townscape	Not applicable	Not applicable	Not applicable	Not applicable	
	Historic Environment	For the purposes of the historic environment assessment construction and operational effects have been assessed. This is because permanent impacts to the historic environment would occur during construction, for example removal of archaeological or historic remains. There would be a major adverse impact to numerous sites of known buried archaeological remains including a possible Roman building, a possible prehistoric burial site (extent of which is unknown) and a medieval settlement site. The Pink option would have a major adverse impact on one grade II* listed building (Musgrave Farmhouse). The new road would be situated in close proximity to the asset intruding upon its visual setting and introducing increased noise to the rural context during construction and operation, even with mitigation screening in place. Further construction impacts include a moderate adverse impact to the grade II* listed "Outbuilding with wall on south-east corner of Haydon House" as it would intrude upon the visual setting of the asset and would introduce increased noise to its rural setting during operation. Several other grade II* listed buildings would be impacted to a minor extent by the construction and operation of the scheme (detailed in the accompanying worksheets). There would be a minor adverse impact on one scheduled monument (Cross in St Aldhelm and St Eadburgha Church) and one grade I listed building (Church of Aldhelm and Eadburgha) due to slightly increased noise levels during the construction and operation of the scheme. There would be an overall worsening for the historic environment as a result of the Pink option.	Not applicable	Large Adverse	Not applicable	
	Biodiversity	In the absence of detailed ecological survey data, detailed design and detailed mitigation proposals, there would be an anticipated overall Large Adverse effect on biodiversity as a result of the Pink option. Large Adverse effects are anticipated on bats and dormice due to loss and fragmentation of habitat. Slight Adverse effects are anticipated on otter, water vole, reptiles, badgers, barn owls, white clawed crayfish, great crested newts, fish, invertebrates and nesting birds through the loss, fragmentation and isolation of habitats. This option presents a Moderate Adverse effect to Jordans Park Local Wildlife Site and Road Verges West of Hatch Beauchamp Local Wildlife Site. A Slight Adverse effect is anticipated to the four Special Areas of Conservation designated for bat conservation and Somerset Level Moors Special Protection Area / Ramsar. The loss of habitats and the diversion of the River Ding is likely to result in a Slight Adverse effect on priority habitats and watercourses. There would be an overall worsening for biodiversity as a result of the Pink option. Standard mitigation has been included in the assessment of likely impacts including a sensitive lighting design, roost replacement, habitat replacement and sensitive timing of works. However, bespoke mitigation such as mitigation structures for bats and dormice have not yet been developed and therefore is not considered at this stage.	Not applicable	Large Adverse	Not applicable	
	Water Environment	The Pink option would include standard mitigation measures in the Construction Environmental Management Plan, and sustainable drainage systems and pollution control measures would be incorporated in the drainage design. These would prevent adverse effects from pollutants or increased surface water run-off reaching the downstream waterbodies during construction or operation. Physical impacts caused by the creation of new culverts / extension of existing culverts to accommodate the wider carriageway would cause a Slight Adverse Impact on drainage ditches, the River Ding and the West Sedgemoor Main Drain. Physical impacts caused by the creation of new bridges/extensions to existing bridges to accommodate would cause a Slight Adverse Impact on the River Ding, Venner's Water, the Fivehead River and Broughton Brook. Physical impacts caused by channel diversion / re-alignment during construction would cause a Moderate Adverse Impact on the River Ding. Below ground structures (such as piles or foundations) would cause a Slight Adverse Impact on the Tone and North Somerset Stream groundwater body, but the impact would be localised and not compromise the waterbody as a whole. Physical impacts from infilling during construction / operation would cause a Moderate Adverse Impact on drainage ditches and ponds. It is intended that some new drainage ditches and ponds would be created to replace any losses caused by infilling to accommodate the new carriageway - this would be confirmed at the detailed design stage. The Pink option is located mainly outside of Flood Zones 2 and 3, but does cross the flood zones in some places. New embankments would be located within Flood Zones 3 and 2, therefore compensatory flood storage would be provided elsewhere, if required, to ensure that there is no increase in flood risk as a result of the scheme. There would be an overall worsening for the water environment as a result of the Pink option. A Slight Adverse impact has been assigned to this option, as it reflects an overall balance of the likely impacts on the water environment once the proposed mitigation measures have been implemented.	Not applicable	Slight Adverse	Not applicable	
Social	Commuting and Other users	Journey time benefits by converting old single carriageway sections to modern dual carriageway with associated junction improvements. Net journey time changes is the net of positive and negatives in a given time band. Monetary (NPV) includes journey times, vehicle operating cost and user charges impacts.	**Value of journey time changes(£)** £239.9m **Net journey time changes (£)** 0 to 2min: £14.2m; 2 to 5min: £115.9m; > 5min: £109.80	Not applicable	£172.8m	Distributional impact assessment to be undertaken in PCF Stage 3
	Reliability impact on Commuting and Other users	Reliability benefits by converting old single carriageway section to modern dual carriageway with associated junction improvements.	Stress-based approach set out in TAG A1.3 Appendix C.5 used to quantify benefits	Not applicable	£12.0m	
	Physical activity	This option would result in the severance of some non-motorised user (NMU) routes, however the provision of diversions for affected routes and new crossings would reduce changes to journey times and lengths for NMUs. The installation of new and improved NMU facilities for pedestrians, cyclists and equestrians has potential to encourage people to make more journeys using non-motorised forms of transport rather than mechanised transport modes. However on the whole a Neutral effect is predicted on NMUs as a result of the proposed option.	Not applicable	Neutral	Not applicable	
	Journey quality	The Pink option is anticipated to improve traveller care through the provision of new signage, gantries. Laybys would also provide safe areas for vehicles to stop and for drivers to rest. Traveller views would be largely enclosed by mitigation planting and would include new infrastructure including signs and gantries, and therefore changes to views from the road are likely to be minimal. Traveller stress is anticipated to significantly reduce on the whole, with the inclusion of new safety related infrastructure such as new lane markings, cat's eyes and road studs, as well as adequate NMU provisions ensuring the likelihood of encroachment onto the main road is reduced. The Pink option would also provide a link to junction 25 of the M5 which would further reduce frustration for motorists. There would be an overall improvement for journey quality as a result of the Pink option.	Not applicable	Moderate Beneficial	Not applicable	
	Accidents	Reduction in the number of Personal Injury Accidents (PIAs) and casualties by converting old single carriageway sections to modern dual carriageway with associated junction improvements.	Reduction in casualties Fatal = 8.9 Serious = 96.1 Slight = 575.4	Not applicable	£26.2m	Distributional impact assessment to be undertaken in PCF Stage 3
	Security	Effects to security as a result of the Pink option are likely to be Neutral as there are not anticipated to be any changes to security indicators as a result of this proposed option.	Not applicable	Neutral	Not applicable	Distributional impact assessment to be undertaken in PCF stage 3
	Access to services	Access to services within the area are unlikely to be affected by the Pink option. As such, no change is expected and a Neutral effect is predicted as a result of the Pink option.	Not applicable	Neutral	Not applicable	N/A
	Affordability	Changes to vehicle operating costs and therefore changes to affordability as a result of the Pink option.	Vehicle Operating Costs (VOCs): Commuting = -£16,385,000 Other = -£50,756,000 Business = -£19,308,000	Not applicable	Not applicable	Distributional impact assessment to be undertaken in PCF stage 3
	Severance	The Pink option would result in the severance of NMU routes within 250m of the scheme, however the provision of diversions for affected routes and new crossings would reduce changes to journey times and lengths for NMUs. Nonetheless, there is potential for several public rights of way (PRoW) to be affected that are used to access nearby community facilities including Ashe Farm Caravan and Camping Site, Somerset Progressive School and Ashill Village Hall. There is also potential for the Pink option to directly affect community land at Higher Holway Open Space, and at this stage there is potential for Moderate Adverse effects relating to the loss of land for people. A total of 288 NMUs were counted across 40 PRoW within the vicinity of the A358 during 10hr periods within the summer holidays on two days (on 31st August and 1st September 2016) and 234 during 10hr periods within term time on 4 days (13th, 14th, 15th or 16th September 2016) in the 2016 NMU surveys which indicates that some routes are widely used in the area. On balance, a Neutral effect is predicted on severance as a result of the Pink option, taking into account mitigation that is likely to be provided.	Not applicable	Neutral	Not applicable	Distributional impact assessment to be undertaken in PCF Stage 3
	Option and non-use values	The Pink option is expected to have little or no impact on option and non-use values.	Not applicable	Neutral	Not applicable	
Public Account	Cost to Broad Transport Budget	The scheme will be funded through Central Government Funds.	Central Government Funding: £301.7m	Not applicable	£301.7m	
	Indirect Tax Revenues	There would be some increase in the tax being paid to the Exchequer.	Central Government Funding: Wider Public Finances = £53.8m	Not applicable	-£53.8m	

Appraisal Summary Table

Date produced:	Aug-18

Contact:	
Name	David Stock
Organisation	Highways England
Role	Promoter/Official

Name of scheme:	A358 Taunton to Southfields Duelling - Blue option
Description of scheme:	The Blue option would be approximately 14.1 kilometres long between its connection with the M5 and Southfields Roundabout. In addition to this a 2.0 kilometre section of dual carriageway (the M5 junction 25 Link) would be provided between the proposed dual carriageway and junction 25 of the M5. The unique aspect of the Blue option, in comparison with Pink, is that it takes a more southerly alignment through Section 1 which takes it away from residential properties at Henlade, but closer to environmentally sensitive areas at Huish Woods and Stoke Hill.

Impacts		Summary of key impacts	Assessment				
			Quantitative			Qualitative	Monetary £(NPV)	Distributional 7-pt scale/ vulnerable grp
Economy	Business users & transport providers	Journey time benefits by converting old single carriageway sections to modern dual carriageway with associated junction improvements. Net journey time changes is the net of positive and negatives in a given time band. Monetary (NPV) includes journey times, vehicle operating cost and user charges impacts.	Value of journey time changes(£): £180.1m Net journey time changes (£): 0 to 2min: -£13.4m 2 to 5min: £90.1m > 5min: £103.5m			Not applicable	£154.0m	N/A
	Reliability impact on Business users	Reliability benefits by converting old single carriageway section to modern dual carriageway with associated junction improvements.	Stress-based approach set out in TAG A1.3 Appendix C.5 used to quantify benefits			Not applicable	£9.0m	
	Regeneration	The Blue option does not lie within or close to regeneration areas.	Not applicable			Not applicable	Not applicable	
	Wider Impacts	Wider economic benefits (output change in imperfectly competitive markets) by converting an old single carriageway section to modern dual carriageway with associated junction improvements.	Estimated from a 10% uplift in business benefits			Not applicable	£15.4m	
Environmental	Noise	Results indicate an overall disbenefit owing to the widening of road to a dual carriageway both online and offline, increases in road traffic, and the introduction of new junctions that bring roads closer to residences. Residential properties located within close proximity to the new alignment have not been mitigated with noise barriers or bunds. In the forecast year, there are 428 properties that are calculated to experience significant adverse effects due to noise in the daytime and 885 properties in the night time.	Households experiencing increased daytime noise in forecast year: 842 Households experiencing reduced daytime noise in forecast year: 370 Households experiencing increased night time noise in forecast year: 555 Households experiencing reduced night time noise in forecast year: 277			Not applicable	-£2.2m	Distributional impact assessment to be undertaken in PCF stage 3
	Air Quality	Overall, there is a net improvement in local air quality PM_{10} concentrations with the scheme, but there is a negative impact on regional NQ emissions. The increase in regional emissions can be attributed to the rerouting of vehicles and increased traffic in the study area. There would be no new exceedances as a result of the scheme. The scheme is expected to reduce concentrations in the Henlade AQMA due to rerouting of traffic away from the existing A358. Overall, the total change in NPV is positive indicating a net improvement in air quality when considering both local and regional effects. The Distributional Impacts (DI) Screening Matrix concluded that the study area in the opening year does not exhibit large disparities in terms of the Indices of Multiple Deprivation. Therefore, it can be concluded that the impacts of the scheme would be sufficiently minor and spatially dispersed such that a detailed DI appraisal is not required.	Local Air Quality Assessment Score in Year of Opening:2023: NO_2: -1,229.3 PM_{10}: -383.3 Regional Emissions (Over 60 year appraisal period) NQ: +939 tonnes Local Air Quality Effects at Properties (Improvements / No Change / Deterioration) NO_2 2023 (8198 / 332 / 4550) PM_{10} 2023 (5114 / 5683 / 2283)			Not applicable	PM_{10} NPV: £1.0m NO_x NPV: £0.5m Total value of change in air quality: £0.5m	N/A
	Greenhouse gases	There is an overall increase in greenhouse gases as a result of the scheme. The reason for the increase is because of an increase in fuel consumption associated with an overall increase in road traffic with the scheme in place.	Change in non-traded carbon over 60y (CO_2e): 545604 Change in traded carbon over 60y (CO_2e): 3318			548922	-£24.2m	
	Landscape	This agricultural landscape characterised by arable and pastoral fields, punctuated by farms and village settlements, affords a relatively high level of tranquillity. The M5 in the west forms a detracting feature and is associated with a more urban influence as it forms the eastern boundary to the settlement of Taunton in the far west of the study area. Large scale junctions at Hatch Beauchamp West Hatch and north of Stoke Wood where the scheme would split north and west, would have a larger footprint in the rural landscape than the mainline route and would be at greater odds with the surrounding landscape as well as being potentially more difficult to mitigate for. Proposed soft landscape mitigation including replacing native hedgerows, replacing hedgerows with trees, and planting of trees and shrubs, would be designed to complement the existing landscape character and reduce the visibility of the scheme. Given the extent of off-line route across an otherwise rural and relatively tranquil landscape, away from detracting features such as the existing A358, and the loss of landscape pattern, land cover and reduction in tranquillity in National Character Areas 140 Yeovil Scarplands, 143 Mid Somerset Hills and 146 Vale of Taunton and Quantock Fringes, the overall impact is considered to be Large Adverse. Exploration of opportunities for landscape bunds and earthworks may be beneficial in reducing impacts, however these have not been considered in this assessment. There would be an overall worsening for landscape as a result of the Blue option.	Not applicable			Large Adverse	Not applicable	
	Townscape	Not applicable	Not applicable			Not applicable	Not applicable	
	Historic Environment	For the purposes of the historic environment assessment construction and operational effects have been assessed. This is because permanent impacts to the historic environment would occur during construction, for example removal of archaeological or historic remains. There would be a major adverse impact to a number of sites of known buried archaeological remains including a possible Roman building, a possible prehistoric burial site (extent of which is unknown) and a medieval settlement site. The Blue option would have a major adverse impact during construction on one grade II* listed Henlade House. The new road would be situated in close proximity to the asset intruding upon its visual setting and introducing increased noise to the rural context during construction and operation, even with mitigation screening in place. Further construction impacts include a moderate adverse impact to the grade II* listed "Outbuilding with wall on south-east corner of Haydon House" as it would intrude upon the visual setting of the asset and would introduce increased noise to its rural setting during operation. Several other grade II* listed buildings would be impacted to a minor extent by the construction and operation of the scheme (detailed in the accompanying worksheets).There would be a minor adverse impact on one scheduled monument (Cross in St Aldhelm and St Eadburgha Church) and one grade I listed building (Church of Aldhelm and Eadburgha) due to slightly increased noise levels during the construction and operation of the scheme. There would be an overall worsening for the historic environment as a result of the Blue option.	Not applicable			Large adverse	Not applicable	
	Biodiversity	In the absence of detailed ecological survey data, detailed design and detailed mitigation proposals, there would be an anticipated overall Large Adverse effect on biodiversity as a result of the Blue option. Large Adverse effects are anticipated on bats and dormice due to loss and fragmentation of habitat. Slight Adverse effects are anticipated on otter, water vole, reptiles, badgers, white clawed crayfish barn owls, great crested newts, fish, invertebrates and nesting birds through the loss, fragmentation and isolation of habitats. This option presents a Moderate Adverse effect to Huish Copse East Local Wildlife Site, Jordans Park Local Wildlife Site and Road Verges West of Hatch Beauchamp Local Wildlife Site. A Slight Adverse effect is anticipated to the four Special Areas of Conservation designated for bat conservation and Somerset Levels and Moors Special Protection Area / Ramsar. Moderate Adverse effects are anticipated on ancient woodland due to the impacts on Huish Copse. The loss of habitats and the diversion of the River Ding is likely to result in a Slight Adverse effect on priority habitats and watercourses. There would be an overall worsening for biodiversity as a result of the Blue option. Standard mitigation has been included in the assessment of likely impacts including a sensitive lighting design, roost replacement, habitat replacement and sensitive timing of works. However, bespoke mitigation such as mitigation structures for bats and dormice has not yet been developed and therefore is not considered at this stage.	Not applicable			Large Adverse	Not applicable	
	Water Environment	The Blue option would include standard mitigation measures in the Construction Environmental Management Plan, and sustainable drainage systems and pollution control measures would be incorporated in the drainage design. These would prevent adverse effects from pollutants or increased surface water run-off reaching the downstream waterbodies during construction or operation. Physical impacts caused by the creation of new culverts / extension of existing culverts to accommodate the wider carriageway would cause a Slight Adverse Impact on drainage ditches, the River Ding and the West Sedgemoor Main Drain. Physical impacts caused by the creation of new bridges/extensions to existing bridges to accommodate would cause a Slight Adverse Impact on the River Ding, Venner's Water, the Fivehead River and Broughton Brook. Physical impacts caused by channel diversion / re-alignment during construction would cause a Moderate Adverse Impact on the River Ding. Below ground structures (such as piles or foundations) would cause a Slight Adverse Impact on the Tone and North Somerset Stream groundwater body, but the impact would be localised and not compromise the waterbody as a whole. Physical impacts from infilling during construction / operation would cause a Moderate Adverse Impact on drainage ditches and ponds. It is intended that some new drainage ditches and ponds would be created to replace any losses caused by infilling to accommodate the new carriageway - this would be confirmed at the detailed design stage. The Blue option is located mainly outside of Flood Zones 2 and 3, but does cross the flood zones in some places. New embankments would be located within Flood Zones 3 and 2, therefore compensatory flood storage would be provided elsewhere, if required, to ensure that there is no increase in flood risk as a result of the scheme. There would be an overall worsening for the water environment as a result of the Blue option. A Slight Adverse impact has been assigned to this option, as it reflects an overall balance of the likely impacts on the water environment once the proposed mitigation measures have been implemented.	Not applicable			Slight Adverse	Not applicable	
Social	Commuting and Other users	Journey time benefits by converting old single carriageway sections to modern dual carriageway with associated junction improvements. Net journey time changes is the net of positive and negatives in a given time band. Monetary (NPV) includes journey times, vehicle operating cost and user charges impacts.	Value of journey time changes(£): £205.1m Net journey time changes (£): 0 to 2min: £7.0m 2 to 5min: £106.7m > 5min: £91.5m			Not applicable	£139.1m	Distributional impact assessment to be undertaken in PCF Stage 3
	Reliability impact on Commuting and Other users	Reliability benefits by converting old single carriageway section to modern dual carriageway with associated junction improvements.	Stress-based approach set out in TAG A1.3 Appendix C.5 used to quantify benefits			Not applicable	£10.3m	
	Physical activity	This option would result in the severance of some non-motorised user (NMU) routes, however the provision of diversions for affected routes and new crossings would reduce changes to journey time and lengths for NMUs. The installation of new and improved NMU facilities for pedestrians, cyclists and equestrians has potential to encourage people to make more journeys using non-motorised forms of transport rather than mechanised transport modes. However on the whole a Neutral effect is predicted on NMUs as a result of the proposed option.	Not applicable			Neutral	Not applicable	
	Journey quality	The Blue option is anticipated to improve traveller care through the provision of new signage, gantries. Layboys would also provide safe areas for vehicles to stop and for drivers to rest. Traveller views would be largely enclosed by mitigation planting and would include new infrastructure including signs and gantries, and therefore changes to views from the road are likely to be minimal. Traveller stress is anticipated to significantly reduce on the whole, with the inclusion of new safety related infrastructure such as new lane markings, cat's eyes and road studs, as well as adequate NMU provisions ensuring the likelihood of encroachment onto the main road is reduced. The Blue option would also provide a link to junction 25 of the M5 which would further reduce frustration for motorists. There would be an overall improvement for journey quality as a result of the Blue option.	Not applicable			Moderate Beneficial	Not applicable	
	Accidents	Reduction in the number of Personal Injury Accidents (PIAs) and casualties by converting old single carriageway sections to modern dual carriageway with associated junction improvements.	Reduction in casualties Fatal = 8.9 Serious = 106.2 Slight = 670.7			Not applicable	£29.7m	Distributional impact assessment to be undertaken in PCF stage 3
	Security	Effects to security as a result of the Blue option are likely to be Neutral as there are not anticipated to be any changes to security indicators as a result of this proposed option.	Not applicable			Neutral	Not applicable	Distributional impact assessment to be undertaken in PCF Stage 3
	Access to services	Access to services within the area are unlikely to be affected by the Blue option. As such, no change is expected and a Neutral effect is predicted as a result of the proposed option.	Not applicable			Neutral	Not applicable	N/A
	Affordability	Changes to vehicle operating costs and therefore changes to affordability as a result of the Blue option.	Vehicle Operating Costs (VOCs): Commuting = -£16,241,000 Other = -£49,855,000 Business = -£26,145,000			Not applicable	Not applicable	Distributional impact assessment to be undertaken in PCF Stage 3
	Severance	The Blue option would result in the severance of NMU routes within 250m of the scheme, however the provision of diversions for affected routes and new crossings would reduce changes to journey times and lengths for NMUs. Nonetheless, there is potential for several public rights of way (PRoW) to be affected that allow access to nearby community facilities including Ashe Farm Caravan and Camping Site, Somerset Progressive School, Huish Woods Scout Campsite and Ashill Village Hall. There is also potential for the Blue option to directly affect community land at Higher Holway Open Space, and at this stage thereis potential for Moderate Adverse effects relating to the loss of land for people. A total of 288 NMUs were counted across 40 PRoW within the vicinity of the A358 during 10hr periods within the summer holidays on two days (on 31st August and 1st September 2016) and a total of 234 counted during 10hr periods within term time on 4 days (13th, 14th, 15th or 16th September 2016) in the 2016 NMU surveys which indicates that some routes are widely used in the area. On balance, a Slight Adverse effect is predicted on severance as a result of the Blue option, taking into account mitigation that is likely to be provided.	Not applicable			Slight Adverse	Not applicable	Distributional impact assessment to be undertaken in PCF Stage 3
	Option and non-use values	The Blue option is expected to have little or no impact on option and non-use values.	Not applicable			Neutral	Not applicable	
Public Accounts	Cost to Broad Transport Budget	The scheme will be funded through Central Government Funds.	Central Government Funding: £296.2m			Not applicable	£296.2m	
	Indirect Tax Revenues	There would be some increase in the tax being paid to the Exchequer.	Central Government Funding: Wider Public Finances = -£51.5m			Not applicable	-£51.5m	

Appraisal Summary Table

Date produced:	Aug-18

Contact:	
Name	David Stock
Organisation	Highways England
Role	Promoter/Official

Name of scheme:	A358 Taunton to Southfields Dualling - Orange option
Description of scheme:	The Orange option would be approximately 15.3 kilometres long between its connection with the M5 and Southfields Roundabout. The unique aspect of the Orange option in comparison with the Pink and Blue options is that it does not include the M5 junction 25 link. The connection with the M5 is further south than for the Pink and Blue options, and involves a different layout.

Impacts		Summary of key impacts	Assessment			
			Quantitative	Qualitative	Monetary £(NPV)	Distributional 7-pt scale/ vulnerable grp
Economy	Business users & transport providers	Journey time benefits by converting old single carriageway sections to modern dual carriageway with associated junction improvements. Net journey time changes is the net of positive and negatives in a given time band. Monetary (NPV) includes journey times, vehicle operating cost and user charges impacts.	Value of journey time changes(£) £135.2m Net journey time changes (£) 0 to 2min: -£7.3m; 2 to 5min: £71.0m; > 5min: £71.4m	Not applicable	£147.8m	Not applicable
	Reliability impact on Business users	Reliability benefits by converting old single carriageway section to modern dual carriageway with associated junction improvements.	Stress-based approach set out in TAG A1.3 Appendix C.5 used to quantify benefits	Not applicable	£6.8m	
	Regeneration	The Orange option does not lie within or close to regeneration areas.	Not applicable	Not applicable	Not applicable	
	Wider Impacts	Wider economic benefits (output change in imperfectly competitive markets) by converting an old single carriageway section to modern dual carriageway with associated junction improvements.	Estimated from a 10% uplift in business benefits	Not applicable	£14.8m	
Environmental	Noise	Results indicate an overall disbenefit owing to the widening of road to a dual carriageway both online and offline, increases in road traffic, and the introduction of new junctions that bring roads closer to residences. Residential properties located within close proximity to the new alignment have not been mitigated with noise barriers or bunds. In the forecast year, there are 378 properties that are calculated to experience significant adverse effects due to noise in the daytime and 738 properties in the night time.	Households experiencing increased daytime noise in forecast year: 632 Households experiencing reduced daytime noise in forecast year:115 Households experiencing increased night time noise in forecast year: 331 Households experiencing reduced night time noise in forecast year: 158	Not applicable	-£2.4m	Distributional impact assessment to be undertaken in PCF stage 3
	Air Quality	Overall, there is a net improvement in local air quality PM_{10} concentrations with the scheme, but there is a negative impact on regional NO_x emissions. The increase in regional emissions can be attributed to the rerouting of vehicles and increased traffic in the study area. There would be no new exceedances as a result of the scheme. The scheme is expected to reduce concentrations in the Henlade AQMA due to rerouting of traffic away from the existing A358. Overall, the total change in NPV is positive indicating a net improvement in air quality when considering both local and regional effects. The Distributional Impacts (DI) Screening Matrix concluded that the study area in the opening year does not exhibit large disparities in terms of the Indices of Multiple Deprivation. Therefore, it can be concluded that the impacts of the scheme would be sufficiently minor and spatially dispersed such that a detailed DI appraisal is not required.	Local Air Quality Assessment Score in Year of Opening:2023: NO_2: -1,601.9 PM_{10}: -499.2 Regional Emissions (Over 60 year appraisal period) NO_x: +944 tonnes Local Air Quality Effects at Properties (Improvements / No Change / Deterioration) NO_2 2023 (4703 / 819 / 4203) PM_{10} 2023 (2858 / 5677 / 1190)	Not applicable	PM_{10} NPV: £1.2m NO_x NPV: -£0.4m Total value of change in air quality: £0.7m	Not applicable
	Greenhouse gases	There is an overall increase in greenhouse gases as a result of the scheme. The reason for the increase is because of an increase in fuel consumption associated with an overall increase in road traffic with the scheme in place.	Change in non-traded carbon over 60y (CO2e): 505,488 Change in traded carbon over 60y (CO2e): 4,145	509,633	-£22.5m	
	Landscape	The scheme would create a new linear feature traversing the landscape. Around two thirds of the proposed option would be online, thereby limiting the impact upon landcover in these areas. However, where the route diverges away from the existing A358, it does so across a rural agricultural landscape. The introduction of a new road of this scale would be at odds with the surrounding landscape and form a detracting feature. Large scale junctions such as those at West Hatch would have a larger footprint in the rural landscape than the mainline route and would potentially be more difficult to mitigate. Loss of key landscape features such as woodland plots and hedgerows would have a detrimental effect upon landscape character as a whole. Proposed soft landscape mitigation would include replacing native hedgerows, replacing hedgerows with trees and linear tree and shrub planting, which would be designed to complement the existing landscape character and reduce the visibility of the scheme. The implementation of effective mitigation planting would help to aid the settlement of the scheme as a wh ole within the surrounding landscape to varying degrees, albeit over a number of years. The off-line section of the Orange option is the longest of all options and the furthest from the existing A358 resulting in the biggest likely impact upon landcover, pattern and tranquillity of National Character Areas 140 Yeovil Scarplands, 143 Mid Somerset Hills and 146 Vale of Taunton and Quantock Fringes and result in a large adverse effect overall. Exploration of opportunities for landscape bunds and earthworks may be beneficial in reducing impacts, however these have not been considered in this assessment. There would be an overall worsening for landscape as a result of Orange option.	Not applicable	Large Adverse	Not applicable	
	Townscape	Not applicable	Not applicable	Not applicable	Not applicable	
	Historic Environment	For the purposes of the historic environment assessment construction and operational effects have been assessed. This is because permanent impacts to the historic environment would occur during construction, for example removal of archaeological or historic remains. There would be a major impact to a number of sites of known buried archaeological remains including a possible prehistoric burial site (extent of which is unknown) and a medieval settlement site. The Orange option would have a major impact on one grade II* listed building (Henlade House). The new road would be situated in close proximity to the asset intruding upon its visual setting and introducing increased noise to the rural context during construction and operation, even with mitigation screening in place. Further construction impacts include a moderate adverse impact to the grade II* listed "Outbuilding with wall on south-east corner of Haydon House" as it would intrude upon the visual setting of the asset and would introduce increased noise to its rural setting during operation. Several other grade II* listed buildings would be impacted to a minor extent by the construction and operation of the scheme (detailed in the accompanying worksheets). There would be a minor adverse construction impact on one scheduled monument (Cross in St Aldhelm and St Eadburgha Church) and one grade I listed building (Church of Aldhelm and Eadburgha) due to slightly increased noise levels during the construction of the scheme. There would be an overall worsening for the historic environment as a result of the Orange option.	Not applicable	Large adverse	Not applicable	
	Biodiversity	In the absence of detailed ecological survey data, detailed design and detailed mitigation proposals, there would be an anticipated overall Large Adverse effect on biodiversity as a result of the Orange option. Large Adverse effects are anticipated on bats and dormice due to loss and fragmentation of habitat. Slight Adverse effects are anticipated on otter, water vole, reptiles, badgers, barn owls, white clawed crayfish, great crested newts, fish, invertebrates and nesting birds through the loss, fragmentation and isolation of habitats. The option presents a Moderate Adverse effect to South Taunton Streams Local Nature Reserve, River Tone and Tributaries Local Wildlife Site, Jordans Park Local Wildlife Site, Huish Copse East Local Wildlife Site, Road Verges West of Hatch Beauchamp Local Wildlife Site. A Slight Adverse effect is anticipated to the four Special Areas of Conservation designated for bat conservation and for Somerset Levels Special Protection Area / Ramsar. Moderate Adverse effects are anticipated on ancient woodland due to the impacts on Huish Copse and on watercourses due to the diversion of sections of Black Brook and the River Ding. There would be an overall worsening for biodiversity as a result of the Orange option. Standard mitigation has been included in the assessment of likely impacts including a sensitive lighting design, roost replacement, habitat replacement and sensitive timing of works. However, bespoke mitigation such as mitigation structures for bats and dormice have not yet been developed and therefore is not considered at this stage.	Not applicable	Large Adverse	Not applicable	
	Water Environment	The Orange option would include standard mitigation measures in the Construction Environmental Management Plan, and sustainable drainage systems and pollution control measures would be incorporated in the drainage design. These would prevent adverse effects from pollutants or increased surface water run-off reaching the downstream waterbodies during construction or operation. Physical impacts caused by the creation of new culverts / extension of existing culverts to accommodate the wider carriageway would cause a Slight Adverse Impact on drainage ditches, the River Ding and the West Sedgemoor Main Drain. Physical impacts caused by the creation of new bridges/extensions to existing bridges to accommodate would cause a Slight Adverse Impact on the River Ding, Venner's Water, the Fivehead River and Broughton Brook. Physical impacts caused by channel diversion / re-alignment during construction would cause a Moderate Adverse Impact on the River Ding and on Black Brook. Below ground structures (such as piles or foundations) would cause a Slight Adverse Impact on the Tone and North Somerset Stream groundwater body, but the impact would be localised and not compromise the waterbody as a whole. Physical impacts from infilling during construction / operation would cause a Moderate Adverse Impact on drainage ditches and ponds. It is intended that some new drainage ditches and ponds would be created to replace any losses caused by infilling to accommodate the new carriageway - this would be confirmed at the detailed design stage. The Orange option is located mainly outside of Flood Zones 2 and 3, but does cross the flood zones in some places. New embankments would be located within Flood Zones 3 and 2, therefore compensatory flood storage would be provided elsewhere, if required, to ensure that there is no increase in flood risk as a result of the scheme. There would be an overall worsening for the water environment as a result of the Orange option. A Slight Adverse impact has been assigned to this option, as it reflects an overall balance of the likely impacts on the water environment once the proposed mitigation measures have been implemented.	Not applicable	Slight Adverse	Not applicable	
Social	Commuting and Other users	Journey time benefits by converting old single carriageway sections to modern dual carriageway with associated junction improvements. Net journey time changes is the net of positive and negatives in a given time band. Monetary (NPV) includes journey times, vehicle operating cost and user charges impacts.	Value of journey time changes(£) £161.3m Net journey time changes (£) 0 to 2min: £26.1m; 2 to 5min: £75.5m; > 5min: £59.7m	Not applicable	£88.6m	Distributional impact assessment to be undertaken in PCF Stage 3
	Reliability impact on Commuting and Other users	Reliability benefits by converting old single carriageway section to modern dual carriageway with associated junction improvements.	Stress-based approach set out in TAG A1.3 Appendix C.5 used to quantify benefits	Not applicable	£8.1m	
	Physical activity	This option would result in the severance of some non-motorised user (NMU) routes, however the provision of diversions for affected routes and new crossings would reduce changes to journey times and lengths for NMUs. The installation of new and improved NMU facilities for pedestrians, cyclists and equestrians has potential to encourage people to make more journeys using non-motorised forms of transport rather than mechanised transport modes. However on the whole a Neutral effect is predicted on NMUs as a result of the proposed option.	Not applicable	Neutral	Not applicable	
	Journey quality	The Orange option is anticipated to improve traveller care through the provision of new signage, gantries. Laybys would also provide safe areas for vehicles to stop and for drivers to rest. Traveller views would be largely enclosed by mitigation planting and would include new infrastructure including signs and gantries, and therefore changes to views from the road are likely to be minimal. Traveller stress is anticipated to significantly reduce on the whole, with the inclusion of new safety related infrastructure such as new lane markings, cat's eyes and road studs, as well as adequate NMU provisions ensuring the likelihood of encroachment onto the main road is reduced. There would be an overall improvement for journey quality as a result of the Orange option.	Not applicable	Moderate Beneficial	Not applicable	
	Accidents	Reduction in the number of Personal Injury Accidents (PIAs) and casualties by converting old single carriageway sections to modern dual carriageway with associated junction improvements.	Reduction in casualties Fatal = 3.3 Serious = 40.3 Slight = 68.9	Not applicable	£7.9m	Distributional impact assessment to be undertaken in PCF stage 3
	Security	Effects to security as a result of Orange option are likely to be Neutral as there are not anticipated to be any changes to security indicators as a result of this proposed option.	Not applicable	Neutral	Not applicable	Distributional impact assessment to be undertaken in PCF stage 3
	Access to services	Access to services within the area are unlikely to be affected by the Orange option. As such, no change is expected and a Neutral effect is predicted as a result of the proposed option.	Not applicable	Neutral	Not applicable	Not applicable
	Affordability	Changes to vehicle operating costs and therefore changes to affordability as a result of Orange option.	Vehicle Operating Costs (VOCs): Commuting = -£14,594,000 Other = -£58,082,000 Business = £12,605,000	Not applicable	Not applicable	Distributional impact assessment to be undertaken in PCF stage 3
	Severance	The Orange option would result in the severance of NMU routes within 250m of the scheme, however the provision of diversions for affected routes and new crossings would reduc e changes to journey times and lengths for NMUs. Nonetheless, there is potential for several public rights of way (PRoW) to be affected that are used to access nearby community facilities including Ashe Farm Caravan and Camping Site, Somerset Progressive School, Huish Woods Scout Campsite and Ashill Village Hall. A total of 288 NMUs were counted across 40 PRoW within the vicinity of the A358 during 10hr periods within the summer holidays on two days (on 31st August and 1st September 2016) and 234 during 10hr periods within term time on 4 days (13th, 14th, 15th or 16th September 2016) in the 2016 NMU surveys which indicates that some routes are widely used in the area. On balance, a Slight Adverse effect is predicted on severance as a result of the Orange option, taking into account mitigation that is likely to be provided.	Not applicable	Slight Adverse	Not applicable	Distributional impact assessment to be undertaken in PCF stage 3
	Option and non-use values	The Orange option is expected to have little or no impact on option and non-use values.	Not applicable	Neutral	Not applicable	
Public Accounts	Cost to Broad Transport Budget	The scheme will be funded through Central Government Funds.	Central Government Funding: £284.9m	Not applicable	£284.9m	
	Indirect Tax Revenues	There would be some increase in the tax being paid to the Exchequer.	Central Government Funding: Wider Public Finances = -£47.4m	Not applicable	-£47.4m	

Appendix F Comparison of route options (including *National Networks National Policy Statement*)

F.1 Comparison of Appraisal Summary Tables for all options presented at the 2018 consultation

Impacts		Pink option			Blue option			Orange option		
		Qualitative	Monetary £(NPV)		Qualitative	Monetary £(NPV)		Qualitative	Monetary £(NPV)	
Economy	Business users & transport providers	Not applicable	£189.0m		Not applicable	£154.0m		Not applicable	£147.8m	
	Reliability impact on Business users	Not applicable	£10.4m		Not applicable	£9.0m		Not applicable	£6.8m	
	Regeneration	Not applicable	Not applicable		Not applicable	Not applicable		Not applicable	Not applicable	
	Wider impacts	Not applicable	£18.9m		Not applicable	£15.4m		Not applicable	£14.8m	
Environmental	Noise	Not applicable	'-£2.3m		Not applicable	'-£2.2m		Not applicable	-£2.4m	
	Air quality	Not applicable	PM10 NPV: £0.9m NO_X NPV: -£0.5m Total value of change in air quality: £0.3m		Not applicable	PM10 NPV: £1.0m NO_X NPV: -£0.5m Total value of change in air quality: £0.5m		Not applicable	PM10 NPV: £1.2m NO_X NPV: -£0.4m Total value of change in air quality: £0.7m	
	Greenhouse gases	585,964	-£25.9m		548,922	-£24.2m		509,633	-£22.5m	
	Landscape	Moderate Adverse	Not applicable		Large Adverse	Not applicable		Large Adverse	Not applicable	
	Townscape	Not applicable	Not applicable		Not applicable	Not applicable		Not applicable	Not applicable	
	Historic environment	Large Adverse	Not applicable		Large adverse	Not applicable		Large adverse	Not applicable	
	Biodiversity	Large Adverse	Not applicable		Large Adverse	Not applicable		Large Adverse	Not applicable	
	Water environment	Slight Adverse	Not applicable		Slight Adverse	Not applicable		Slight Adverse	Not applicable	

Impacts		Pink option			Blue option			Orange option		
		Qualitative	Monetary £(NPV)		Qualitative	Monetary £(NPV)		Qualitative	Monetary £(NPV)	
Social	Commuting and other users	Not applicable	£172.8m		Not applicable	£139.1m		Not applicable	£88.6m	
	Reliability impact on commuting and other users	Not applicable	£12.0m		Not applicable	£10.3m		Not applicable	£8.1m	
	Physical activity	Neutral	Not applicable		Neutral	Not applicable		Neutral	Not applicable	
	Journey quality	Moderate Beneficial	Not applicable		Moderate Beneficial	Not applicable		Moderate Beneficial	Not applicable	
	Accidents (collisions)	Not applicable	£26.2m		Not applicable	£29.7m		Not applicable	£7.9m	
	Security	Neutral	Not applicable		Neutral	Not applicable		Neutral	Not applicable	
	Access to services	Neutral	Not applicable		Neutral	Not applicable		Neutral	Not applicable	
	Affordability	Neutral	Not applicable		Neutral	Not applicable		Neutral	Not applicable	
	Severance	Neutral	Not applicable		Slight Adverse	Not applicable		Slight Adverse	Not applicable	
	option and non-use values	Neutral	Not applicable		Neutral	Not applicable		Neutral	Not applicable	
Public Accounts	Cost to Broad Transport Budget	Not applicable	£301.7m		Not applicable	£296.2m		Not applicable	£284.9m	
	Indirect Tax Revenues	Not applicable	-£53.8m		Not applicable	-£51.5m		Not applicable	-£47.4m	
Ranking (lowest is best)			20			21			24	

F.2 Delivery Plan 2015 - 2020 Key Performance Indicators Analysis

Highways England Delivery Plan 2015-2020 - Key Performance Indicators		Options					
Topic	**Measure**	**Pink option**		**Blue option**		**Orange option**	
Making the network safer	The number of Killed or Seriously Injured (KSIs) on the strategic road network		Collision savings (£26k)		Collision savings (£30k)		Collision savings (£8k)
Improving user satisfaction	The % or National road users' satisfaction survey (NRUSS) respondents who are Very or Fairly Satisfied		Reliability indicator 5% Reliability benefits (£22k)		Reliability indicator 5% Reliability benefits (£19k)		Reliability indicator 5% Reliability benefits (£15k)
Supporting the smooth flow of traffic	Improved network availability						
Encouraging economic growth	Average Delay (time lost per vehicle)						
	Commuting and other users		£172.8m		£139.10		£88.60
Delivery of better environmental outcomes	Noise: Number of Noise Important Areas mitigated						
	Biodiversity: Delivery of improved biodiversity, as set out in the Company's Biodiversity Action Plan		Large adverse Mitigation and enhancement measures cannot be confirmed until Stage 3.		Large adverse Mitigation and enhancement measures cannot be confirmed until Stage 3.		Large Adverse Mitigation and enhancement measures cannot be confirmed until Stage 3.
	Landscape		Moderate Adverse Mitigation and enhancement measures cannot be confirmed until Stage 3.		Large Adverse Mitigation and enhancement measures cannot be confirmed until Stage 3.		Large Adverse Mitigation and enhancement measures cannot be confirmed until Stage 3.
Helping Cyclists, walkers, and other vulnerable users	The number of new and upgraded crossings						
Achieving real efficiency	Cost savings: savings on capital expenditure		£521m Significantly outside of the Scheme budget		£511m Significantly outside of the Scheme budget		£490m Significantly outside of the Scheme budget
	Delivery Plan progress: progress of work, relative to forecasts set out in the Delivery Plan, and annual updates to the Plan, and expectations at the start of RP1		Start: Q1 2022 End: Q1 2025		Start: Q1 2022 End: Q1 2025		Start: Q1 2022 End: Q1 2025
Keeping the Network in good condition	% of pavement asset that does not require further investigation for possible maintenance						
	Ranking	11		12		15	

F.3 Scheme objectives analysis

Options:	Pink option	Blue option	Orange option
Project Objective: Facilitate growth in employment at key locations and centres along the A303 / A358 / A30 corridor and to the South-West Region			
Project Objective: Facilitate growth in housing at key development hotspots along the corridor			
Wider economic benefit	£18,896	£19,263	£14,825
Ranking	2	1	3
Economic efficiency (Consumer Users)	£78,153	£67,091	£46,861
Ranking	1	2	3
Project Objective: Reduce delays and queues that occur during peak hours and at seasonal times of the year			
Journey times (Journey time from Southfields Roundabout to M5 junction 26 (via A358) AM 2038	7 min 28 sec saving	7 min 23 sec saving	8 min 5 sec saving
Ranking	2	3	1
Improvements – Reliability benefits (TUBA)	22,410	19,263	14,825
Ranking	1	2	3
Project Objective: Improve the resilience of the A303 / A358 / A30 route corridor			
Stress level	13.3	28.3	78.8
Ranking	1	2	3
Project Objective: Improve safety along the A303 / A358 / A30 route corridor			
Project Objective: Improve safety along the A358 Taunton to Southfields route for NMU's			
The number of KSIs on the strategic road network	Collision savings (£26k)	Collision savings (£30k)	Collision savings (£8k)
Ranking	2	1	3
Project Objective: Improve the connectivity of the south-west to the rest of the UK, to reduce peripherality and improve business and growth prospects			
Journey time Exeter to Wincanton (Westbound, 2038)	8.96 minutes saving	8.52 minutes saving	8.92 minutes saving
Ranking	1	3	2
Commuting and other users	£172.80	£139.10	£88.6m
Ranking	1	2	3
Reliability impact on Commuting and other users	£12.0m	£10.3m	£8.1m
Ranking	1	2	3
Project Objective: Avoid unacceptable impacts on the surrounding natural environment and landscape and optimise the environmental opportunities and mitigation that the intervention could bring			
Qualitative assessment – AST Historic Environment	Large Adverse	Large Adverse	Large Adverse
Ranking	1	1	1
AST Landscape	Moderate Adverse	Large Adverse	Large Adverse
Ranking	1	2	2
Green House Gases	£NPV -25.880	£NPV -24.189	£NPV -22.521
Ranking	3	2	1
Biodiversity	Large Adverse	Large Adverse	Large Adverse
Ranking	1	1	1
Project Objective: Reduce severance on local communities			
Qualitative assessment – AST Severance designation	Neutral	Slight Adverse	Slight Adverse

Options:	Pink option	Blue option	Orange option
Project Objective: Facilitate growth in employment at key locations and centres along the A303 / A358 / A30 corridor and to the South-West Region			
Ranking	1	1	1
Project Objective: Promote opportunities to improve the quality of life for locals			
AST – Air Quality	PM10 NPV: £0.9m NO_X NPV: -£0.5m Total value of change in air quality: £0.3m	PM10 NPV: £0.9m NO_X NPV: -£0.5m Total value of change in air quality: £0.5m	PM10 NPV: £0.9m NO_X NPV: -£0.5m Total value of change in air quality: £0.7m
Ranking	3	2	1
AST - Noise	'-£2.3m	-£2.2m	-£2.4m
Ranking	2	1	3
AST – Commuting and Other Users	£172.8m	£139.1m	£88.6m
	1	2	3
AST - Reliability impact on Commuting and Other users	£12.0m	£10.3m	£8.1m
	1	2	3
AST - Physical activity	Neutral	Neutral	Neutral
	1	1	1
AST - Journey quality	Moderate Beneficial	Moderate Beneficial	Moderate Beneficial
	1	1	1
AST – accidents (collisions)	£26.2m	£29.7m	£7.9m
	2	1	3
AST - Security	Neutral	Neutral	Neutral
	1	1	1
AST - Access to services	Neutral	Neutral	Neutral
	1	1	1
AST - Affordability	Neutral	Neutral	Neutral
	1	1	1
AST - Severance	Neutral	Slight Adverse	Slight Adverse
	1	2	2
AST – Option and non-use values	Neutral	Neutral	Neutral
	1	1	1
Less traffic (through Henlade in 2038)	From 33,500 vehicles to 3,600 vehicles	From 33,500 to 7,600	From 33,500 to 24,300
Ranking	1	2	3
Total ranking (lowest is best)	24	31	37

F.4 *National Networks National Policy Statement* (NNNPS) risk table

No	Topic:	NN NPS Para:	Text in the NN NPS:	RAG Status Options Pink	Blue	Orange
1	Safety	4.66	The Secretary of State should not grant development consent unless satisfied that all reasonable steps have been taken and will be taken to: • minimise the risk of road casualties arising from the Scheme • contribute to an overall improvement in the safety of the strategic road network	The design process for the Scheme is considering the safety of road users, operations staff, and road workers and suppliers. There will be a reduction in the number of casualties due to the Scheme. Fatalities will decrease by 8.9, serious injuries by 96.1 and slight injuries by 575.4[44]. A Safety Plan has been produced at Project Control Framework (PCF) Stage 2[45]. The purpose of this document is to describe how the Safety Management System (SMS) has been selected, describe the SMS and corresponding safety activities, define the Scheme's safety objectives and how these should be achieved, and to describe the Scheme organisation, how responsibility for safety activities has been devolved, and the associated programme management and control processes. Evidence to demonstrate that the Scheme is capable of being operated in an acceptably safe manner will be reported in the Scheme's 'Combined Safety and Hazard Log Report', which will be produced at PCF Stage 3.	The design process for the Scheme is considering the safety of road users, operations staff, and road workers and suppliers. There will be a reduction in the number of casualties due to the Scheme. Fatalities will decrease by 8.9, serious injuries by 106.2 and slight injuries by 670.7. A Safety Plan has been produced at PCF Stage 2. The purpose of this document is to describe how the SMS has been selected, describe the SMS and corresponding safety activities, define the Scheme's safety objectives and how these should be achieved, and to describe the Scheme organisation, how responsibility for safety activities has been devolved, and the associated programme management and control processes. Evidence to demonstrate that the Scheme is capable of being operated in an acceptably safe manner will be reported in the Scheme's 'Combined Safety and Hazard Log Report', which will be produced at PCF Stage 3.	The design process for the Scheme is considering the safety of road users, operations staff, and road workers and suppliers. There will be a reduction in the number of casualties due to the Scheme. Fatalities will decrease by 3.3, serious injuries by 40.3 and slight injuries by 68.9. A Safety Plan has been produced at PCF Stage 2. The purpose of this document is to describe how the SMS has been selected, describe the SMS and corresponding safety activities, define the Scheme's safety objectives and how these should be achieved, and to describe the Scheme organisation, how responsibility for safety activities has been devolved, and the associated programme management and control processes. Evidence to demonstrate that the Scheme is capable of being operated in an acceptably safe manner will be reported in the Scheme's 'Combined Safety and Hazard Log Report', which will be produced at PCF Stage 3.
2	Air quality	5.13	The Secretary of State should refuse consent where, after taking into account mitigation, the air quality impacts of the Scheme will: • result in a zone / agglomeration which is currently reported as being compliant with the Air Quality Directive becoming non-compliant • affect the ability of a non-compliant area to achieve compliance within the most recent timescales reported to the European Commission at the time of the decision	The change to road alignment and in traffic flows and speeds as a result of the Scheme has the potential to affect local air quality. No exceedances of air quality objectives are predicted at human receptors whilst an exceedance within the Henlade Air Quality Management Area (AQMA) will be removed due to a large improvement in annual mean NO_2 concentrations, with the greatest decrease of 29.8µg/m^3 being experienced within the AQMA. There is a predicted low compliance risk rating and therefore the Pink option is unlikely to cause a non-compliance with the EU Directive 2008/50/EC. Considering the wider effects of the Pink option, the overall significance has the potential to be described as significant beneficial.	The change to road alignment and in traffic flows and speeds as a result of the Scheme has the potential to affect local air quality. No exceedances of air quality objectives are predicted at human receptors whilst an exceedance within the Henlade AQMA will be removed due to a large improvement in annual mean NO_2 concentrations, with the greatest decrease of 26.5µg/m^3 being experienced within the AQMA. There is a predicted low compliance risk rating and therefore the Blue option is unlikely to cause a non-compliance with the EU Directive 2008/50/EC. Considering the wider effects of the Blue option, the overall significance has the potential to be described as significant beneficial.	The change to road alignment and in traffic flows and speeds as a result of the Scheme has the potential to affect local air quality. No exceedances of air quality objectives are predicted at human receptors whilst an exceedance within the Henlade AQMA will be removed due to a large improvement in annual mean NO_2 concentrations, with the greatest decrease of 9.1µg/m^3 being experienced within the AQMA. There is a predicted low compliance risk rating and therefore the Orange option is unlikely to cause a non-compliance with the EU Directive 2008/50/EC. Considering the wider effects of the Orange option, the overall significance has the potential to be described as significant beneficial.
3	Internationally designated sites and Sites of Special Scientific Interest (includes	5.27 – 5.29	Where a proposed development on land within or outside [an internationally designated site and / or] a SSSI is likely to have an adverse effect on an [internationally designated site and / or] a Sites of Special Scientific Interest (SSSI) (either individually or in combination with other developments), development consent should not normally be granted. Where an adverse effect on	Four Special Areas of Conservation (SACs) designated with bat species as a qualifying feature are within 30km of the Scheme. These are Hestercombe House SAC 4.5km north, Exmoor and Quantock Oakwoods SAC 16.7km north-west, Bracket's Coppice SAC 18.4km south-east and Beer and Quarry Caves SAC 28.5km south. The Somerset	Four SACs designated with bat species as a qualifying feature are within 30km of the Scheme. These are Hestercombe House SAC 4.5km north, Exmoor and Quantock Oakwoods SAC 16.7km north-west, Bracket's Coppice SAC 18.4km south-east and Beer and Quarry Caves SAC 28.5km south. The Somerset Moors and Levels SPA and Ramsar 5.8km	Four SACs designated with bat species as a qualifying feature are within 30km of the Scheme. These are Hestercombe House SAC 4.5km north, Exmoor and Quantock Oakwoods SAC 16.7km north-west, Bracket's Coppice SAC 18.4km south-east and Beer and Quarry Caves SAC 28.5km south. The Somerset Moors and Levels SPA and Ramsar 5.8km downstream of the Scheme has

[44] Detailed within the Appraisal Summary Tables for the Pink, Blue and Orange options (HE551508-MMSJV-EGN-000-RP-UU-0013)
[45] Safety Plan - HE551508-MMSJV-HRS-000-RP-TS-0001

No	Topic:	NN NPS Para:	Text in the NN NPS:	RAG Status Options Pink	Blue	Orange
	National Nature Reserves)		the site's notified special interest features is likely, an exception should be made only where the benefits of the development at this site clearly outweigh both the impacts that it is likely to have on the features of the site that make it of special scientific interest, and any broader impacts on the national network of SSSIs. Please be aware that paragraph 5.29 refers specifically to SSSIs, but paragraph 5.27 demonstrated that the Government places equal if not more weight on the protection of internationally designated sites. This therefore extends paragraph 5.29 to apply also to listed and candidate proposed Special Areas of Conservation, Special Protection Areas, Sites of Community Importance and Ramsar sites.	Moors and Levels SPA and Ramsar 5.8km downstream of the Scheme has the potential to be adversely affected due to pollution events and hydrological changes through construction. There are no SSSIs within the Scheme extents or within 2km of the Scheme that are anticipated to experience adverse effects. However, there are seven SSSIs within 200m of the Affected Road Network (ARN) with the potential to be adversely affected. There are no increases in NO_x anticipated at five of the SSSIs. There are increases in NO_x concentrations of 0.3µg/m^3 within Maiden Down SSSI and 1.3µg/m^3 within Curry and Hays Moor SSSI, however these are considered imperceptible, so no significant effects are anticipated.	downstream of the Scheme has the potential to be adversely affected due to pollution events and hydrological changes through construction. There are no SSSIs within the Scheme extents or within 2km of the Scheme that are anticipated to experience adverse effects. There are seven SSSIs within 200m of the ARN, however there are no increases in NO_x concentrations anticipated and therefore the effects on these are not considered to be significant.	the potential to be adversely affected due to pollution events and hydrological changes through construction. There are no SSSIs within the Scheme extents or within 2km of the Scheme that are anticipated to experience adverse effects. However, there are seven SSSIs within 200m of the ARN with the potential to be adversely affected. There are no increases in NO_x anticipated at five of the SSSIs. There is an increase in NO_x concentrations of 0.4µg/m^3 within Maiden Down SSSI, however this is considered imperceptible, so no significant effects are anticipated.
4	Irreplaceable habitats including Ancient Woodland and veteran trees	5.32	The Secretary of State should not grant development consent for any development that would result in the loss or deterioration of irreplaceable habitats including Ancient Woodland and the loss of aged or veteran trees found outside Ancient Woodland, unless the national need for and benefits of the development, in that location, clearly outweigh the loss.	The Pink option does not require the removal of any Ancient Woodland. There is the potential for pollution during construction to indirectly affect Ancient Woodland, which would be mitigated through best practice measures as required in a Construction Environmental Management Plan (CEMP) such as switching off engines when stationary, to mitigate air pollution and noise and vibration disturbance. Negligible effects on Ancient Woodland are predicted for the Pink option in the long-term.	The Blue option would require the permanent loss of 1.4ha of Ancient Woodland at Huish Copse. In addition, there is the potential for pollution during construction to indirectly affect Ancient Woodland, which would be mitigated through best practice measures as required in a CEMP such as switching off engines when stationary, to mitigate air pollution and noise and vibration disturbance. Due to the direct impacts on Ancient Woodland and permanent losses, compensatory woodland planting is likely to be required on a 10 to 1 basis.	The Orange option would require the permanent loss of 1.4ha of Ancient Woodland at Huish Copse. In addition, there is the potential for pollution during construction to indirectly affect Ancient Woodland, which would be mitigated through best practice measures as required in a CEMP such as switching off engines when stationary, to mitigate air pollution and noise and vibration disturbance. Due to the direct impacts on Ancient Woodland and permanent losses, compensatory woodland planting is likely to be required on a 10 to 1 basis.
5	Protection of other habitats and species[46]	5.35 (& 4.22–4.25 & 5.27)	The Secretary of State should refuse consent where harm to the habitats or species and their habitats would result, unless the benefits of the development (including need) clearly outweigh that harm.	The Pink option has the potential to directly reduce and fragment terrestrial habitats for species such as badgers, barn owls, reptiles, bats, great crested newts (GCN), otters and dormice. Additionally, construction works are likely to disturb protected species, such as GCN, water voles, badgers and bats, due to the physical, noise and lighting disturbance of the construction works.	The Blue option has the potential to directly reduce and fragment terrestrial habitats for species such as badgers, barn owls, reptiles, GCN, otters and dormice. Additionally, construction works are likely to disturb protected species, such as GCN, water voles, badgers and bats, from changes in drainage and any night-time works. The Blue option would result in the removal of Huish Copse Ancient Woodland that supports Annex II bat species.	The Orange option has the potential to directly reduce and fragment terrestrial habitats for species such as badgers, barn owls, reptiles, GCN, otters and dormice. Additionally, construction works are likely to disturb protected species, such as GCN, water voles, badgers and bats, from changes in drainage and any night-time works. The Orange option would result in the removal of Huish Copse Ancient Woodland that supports Annex II bat species.
6	Civil and military aviation and defence interests	5.62	Where, after reasonable mitigation, operational changes and planning obligations and requirements have been proposed, development consent should not be granted if the Secretary of State considers that: • a development would prevent a licensed aerodrome from maintaining its licence • the benefits of the proposed development are outweighed by the harm to aerodromes	This is uncertain at this stage, as this is dependent on the Stage 3 design. Further consultation is required during Stage 3 with the Ministry of Defence and the Civil Aviation Authority (CAA) following the Preferred Route Announcement in order to determine requirements for safeguarding of airspace during construction. Royal Air Force Merryfield Airfield is 1.1km northeast of the Scheme.	This is uncertain at this stage, as this is dependent on the Stage 3 design. Further consultation is required during Stage 3 with the Ministry of Defence and the CAA following the Preferred Route Announcement in order to determine requirements for safeguarding of airspace during construction. Royal Air Force Merryfield Airfield is 1.1km northeast of the Scheme. However, it is anticipated that the	This is uncertain at this stage, as this is dependent on the Stage 3 design. Further consultation is required during Stage 3 with the Ministry of Defence and the CAA following the Preferred Route Announcement in order to determine requirements for safeguarding of airspace during construction. Royal Air Force Merryfield Airfield is 1.1km northeast of the Scheme. However, it is anticipated that the

[46] Protection of other habitats and species: Lists of habitats and species of principal importance for the conservation of biological diversity in England published in response to Section 41 of the Natural Environment and Rural Communities Act 2006 are available from the Biodiversity Action Reporting System website. For ease, this section also should be used to accommodate consideration of European / International sites identified through international conventions and European Directives and given protection under the Habitats Regulations, for example, Ramsar sites, Special Areas of Conservation, Sites of Community Importance, Special Areas of Conservation and Special Protection Areas. See paragraphs 4.22 – 4.25 and 5.27 of the NN NPS.

No	Topic:	NN NPS Para:	Text in the NN NPS:	RAG Status Options Pink	Blue	Orange
			serving business, training or emergency service needs • the development would significantly impede or compromise the safe and effective use of defence assets or significantly limit military training	However, it is anticipated that the Scheme will not impact upon the operation of the airfield.	Scheme will not impact upon the operation of the airfield.	Scheme will not impact upon the operation of the airfield.
7	Coastal change	5.75	When assessing applications in a CCMA, [Coastal Change Management Area], the Secretary of State should not grant development consent unless it is demonstrated that the development: • will be safe over its planned lifetime and will not have an unacceptable impact on coastal change • will not compromise the character of the coast covered by designations • provides wider sustainability benefits • does not hinder the creation and maintenance of a continuous signed and managed route around the coast	The Scheme is not located in a Coastal Change Management Area.	The Scheme is not located in a Coastal Change Management Area.	The Scheme is not located in a Coastal Change Management Area.
8	Flood risk	5.99 & 5.108	When determining an application, the Secretary of State should be satisfied that flood risk will not be increased elsewhere and only consider development appropriate in areas at risk of flooding where (informed by a flood risk assessment, following the Sequential Test and, if required, the Exception Test), it can be demonstrated that: • within the site, the most vulnerable development is located in areas of lowest flood risk unless there are overriding reasons to prefer a different location • development is appropriately flood resilient and resistant, including safe access and escape routes where required, and that any residual risk can be safely managed, including by emergency planning; and priority is given to the use of sustainable drainage systems • Both elements of the test will have to be passed for development to be consented. For the Exception Test to be passed: — it must be demonstrated that the project provides wider sustainability benefits to the community that outweigh flood risk — a Flood Risk Assessment (FRA) must demonstrate that the project will be safe for its lifetime, without increasing flood risk elsewhere and, where possible, will reduce flood risk overall	The impact of the Scheme on flood risk is uncertain at this stage, as this is dependent on the Stage 3 design. The Pink option would result in additional impermeable areas from the new road, which would generate additional surface runoff. If not attenuated this could increase flood risk. The design of the drainage for the Scheme would ensure no increase in run-off rates, in accordance with the provisions of the *National Planning Policy Framework* (NPPF) and *National Networks National Policy Statement* (NNNPS), however comprehensive mitigation is likely to be required including compensatory flood storage. A Flood Risk Assessment will be undertaken in Stage 3 for the preferred option, which will determine whether the Scheme would impact on flood risk.	The impact of the Scheme on flood risk is uncertain at this stage, as this is dependent on the Stage 3 design. The Blue option would result in additional impermeable areas from the new road, which would generate additional surface runoff. If not attenuated this could increase flood risk. The design of the drainage for the Scheme would ensure no increase in run-off rates, in accordance with the provisions of the NPPF and NNNPS, however comprehensive mitigation is likely to be required including compensatory flood storage. A Flood Risk Assessment will be undertaken in Stage 3 for the preferred option, which will determine whether the Scheme would impact on flood risk.	The impact of the Scheme on flood risk is uncertain at this stage, as this is dependent on the Stage 3 design. The Orange option would result in additional impermeable areas from the new road, which would generate additional surface runoff. If not attenuated this could increase flood risk. The design of the drainage for the Scheme would ensure no increase in run-off rates, in accordance with the provisions of the NPPF and NNNPS, however comprehensive mitigation is likely to be required including compensatory flood storage. A Flood Risk Assessment will be undertaken in Stage 3 for the preferred option, which will determine whether the Scheme would impact on flood risk.
9	The historic environment (designated	5.133	Where the proposed development will lead to substantial harm to or total loss of significance of a designated heritage asset, the Secretary of State should refuse consent unless it can be	The setting of a scheduled monument, the Cross in St Aldhelm and St Eadburgha, has the potential to be adversely affected by the Pink option. The Pink option is considered to	The setting of a scheduled monument, the Cross in St Aldhelm and St Eadburgha, has the potential to be adversely affected by the Blue option. The Blue option is considered to	The setting of a scheduled monument, the Cross in St Aldhelm and St Eadburgha, has the potential to be adversely affected by the Orange option. The Orange option is considered to have a large

No	Topic:	NN NPS Para:	Text in the NN NPS:	RAG Status Options Pink	Blue	Orange
	heritage assets)[47]		demonstrated that the substantial harm or loss of significance is necessary in order to deliver substantial public benefits that outweigh that loss or harm, or alternatively that all of the following apply: • the nature of the heritage asset prevents all reasonable uses of the site • no viable use of the heritage asset itself can be found in the medium term through appropriate marketing that will enable its conservation • conservation by grant-funding or some form of charitable or public ownership is demonstrably not possible • the harm or loss is outweighed by the benefit of bringing the site back into use	have a large adverse effect upon the setting of two grade II* listed buildings and a moderate adverse effect upon the setting of a grade I listed building. There is a high potential for multi-period archaeological remains spanning the prehistoric period to WWII within the study area. In addition, the Pink option passes through areas close to a recorded Roman settlement and possible Iron Age or Roman cropmarks. Mitigation and enhancement measures will include preserving the setting through planting, screening, noise attenuation and appropriate lighting.	have a large adverse effect upon the setting of two grade II* listed buildings and a moderate adverse effect upon the setting of a grade I listed building. There is a high potential for multi-period archaeological remains spanning the prehistoric period to WWII within the study area. In addition, the Blue option passes through areas close to a recorded Roman settlement and possible Iron Age or Roman cropmarks. Mitigation and enhancement measures will include preserving the setting through planting, screening, noise attenuation and appropriate lighting.	adverse effect upon the setting of two grade II* listed buildings and a moderate adverse effect upon the setting of a grade I listed building. There is a high potential for multi-period archaeological remains spanning the prehistoric period to WWII within the study area. Mitigation and enhancement measures will include preserving the setting through planting, screening, noise attenuation and appropriate lighting.
10	Nationally designated areas: National Parks, the Broads & Areas of Outstanding Natural Beauty	5.151 & 5.152	The Secretary of State should refuse development consent in these areas except in exceptional circumstances and where it can be demonstrated that it is in the public interest. Consideration of such applications should include an assessment of: • the need for the development, including in terms of any national considerations, and the impact of consenting, or not consenting it, upon the local economy • the cost of, and scope for, developing elsewhere, outside the designated area, or meeting the need for it in some other way • any detrimental effect on the environment, the landscape and recreational opportunities, and the extent to which that could be moderated There is a strong presumption against any significant road widening or the building of new roads and strategic rail freight interchanges in a National Park, the Broads and Areas of Outstanding Natural Beauty, unless it can be shown there are compelling reasons for the new or enhanced capacity and with any benefits outweighing the costs vary significantly. Planning of the strategic road network should encourage routes that avoid National Parks, the Broads and Areas of Outstanding Natural Beauty.	The Pink option is not located in or close to any National Parks, the Broads or an Area of Outstanding Natural Beauty. However, the Pink option is likely to result in adverse effects on both landscape character and visual amenity and a Landscape and Visual Impact Assessment will be completed in Stage 3. For the Pink option, it is anticipated that there would be a greater effect due to the route being a greater distance from the existing alignment of the A358 in comparison to the Pink Modified option, therefore traversing a less disturbed landscape.	The Blue option is not located in or close to any National Parks, the Broads or an Area of Outstanding Natural Beauty. However, the Blue option is likely to result in adverse effects on both landscape character and visual amenity and a Landscape and Visual Impact Assessment will be completed in Stage 3. For the Blue option, it is anticipated that there would be a greater effect due to the route being a greater distance from the existing A358 and traversing a less disturbed landscape.	The Orange option is not located in or close to any National Parks, the Broads or an Area of Outstanding Natural Beauty. However, the Orange option is likely to result in adverse effects on both landscape character and visual amenity and a Landscape and Visual Impact Assessment will be completed in Stage 3. For the Orange option, it is anticipated that there would be a greater effect due to the route being a greater distance from the existing A358 and traversing a less disturbed landscape.
11	Land use: Green Belt	5.170 & 5.178	Metropolitan Open Land, and land designated as Local Green Space in a local or neighbourhood plan, are subject to the same policies of protection as Green Belt, and inappropriate development should not be approved except in very special circumstances.	The Pink option is not located within the Green Belt.	The Blue option is not located within the Green Belt.	The Orange option is not located within the Green Belt.

[47] Designated heritage assets categories: World Heritage Sites; Scheduled Monuments; Listed Buildings; Protected Wreck Sites; Protected Military Remains; Registered Parks and Gardens; and Registered Battlefields; Conservation Areas. Non-designated heritage assets of archaeological interest that are demonstrably of equivalent significance to Scheduled Monuments, should be considered subject to the policies for designated heritage assets. The absence of designation for such heritage assets does not indicate lower significance.

No	Topic:	NN NPS Para:	Text in the NN NPS:	RAG Status Options Pink	Blue	Orange
			When located in the Green Belt national networks infrastructure projects may comprise inappropriate development. Inappropriate development is, by definition, harmful to the Green Belt and there is a presumption against it except in very special circumstances. The Secretary of State will need to assess whether there are very special circumstances to justify inappropriate development. Very special circumstances will not exist unless the potential harm to the Green Belt by reason of inappropriateness, and any other harm, is clearly outweighed by other considerations. In view of the presumption against inappropriate development, the Secretary of State will attach substantial weight to the harm to the Green Belt, when considering any application for such development.			
12	Land use: open space / sports and recreational buildings and land	5.174	The Secretary of State should not grant consent for development on existing open space, sports and recreational buildings and land, including playing fields, unless an assessment has been undertaken either by the local authority or independently, which has shown the open space or the buildings and land to be surplus to requirements, or the Secretary of State determines that the benefits of the project (including need) outweigh the potential loss of such facilities, taking into account any positive proposals made by the applicant to provide new, improved or compensatory land or facilities.	The Pink option has the potential to directly affect Higher Holway Open Space, with this option potentially requiring permanent land-take of this community land. Further consideration of the potential effects of this option on the land and mitigation requirements which could require replacement community land would be explored during PCF Stage 3.	The Blue option has the potential to directly affect Higher Holway Open Space, with this option potentially requiring permanent land-take of this community land. Further consideration of the potential effects of this option on the land and mitigation requirements which could require replacement community land would be explored during PCF Stage 3.	The acquisition of open space is not required for the Orange option and land or buildings used for sports or for recreational purposes is also unlikely to be required. Part of the Vivary Green Wedge will be required for the Orange option, and although this is not open space it is, however, worth consideration.
13	Noise and vibration	5.195	The Secretary of State should not grant development consent unless satisfied that the proposals will meet, the following aims, within the context of Government policy on sustainable development: • avoid significant adverse impacts on health and quality of life from noise as a result of the new development • mitigate and minimise other adverse impacts on health and quality of life from noise from the new development • contribute to improvements to health and quality of life through the effective management and control of noise, where possible	Analysis shows a net decrease of 46 in the total number of receptors exposed to noise levels above Significant Observed Adverse Effect Level (SOAEL) during day-time and a net increase of 11 during night-time in the short-term for the Pink option. Analysis shows a net increase of 68 in the total number of receptors exposed to noise levels above SOAEL during day-time and net increase of 232 during night-time in the long-term for the Pink option.	Analysis shows a net decrease of 38 in the total number of receptors exposed to noise levels above SOAEL during day-time and a net increase of 24 during night-time in the short-term for the Blue option. Analysis shows an increase of 71 in the total number of receptors exposed to noise levels above SOAEL during day-time and a net increase of 251 during night-time in the long-term for the Blue option.	Analysis shows a net decrease of two in the total number of receptors exposed to noise levels above SOAEL during day-time and a net decrease of 24 during night-time in the short-term for the Orange option. Analysis shows a net increase of 87 in the total number of receptors exposed to noise levels above SOAEL during day-time and a net increase of 159 during night-time in the long-term for the Orange option.
14	Water quality and resources	5.227	If the Environment Agency continues to have concerns and objects to the grant of development consent on the grounds of impacts on water quality / resources, the Secretary of State can grant consent, but will need to be satisfied before deciding whether or not to do so that all reasonable steps have been taken by the applicant and the Environment Agency to try to resolve the concerns, and that the Environment Agency is satisfied with the outcome.	The permanent diversion of the River Ding has the potential to have significant effects. The additional watercourses within the study area are of high sensitivity meaning they are vulnerable to both construction and operational effects. Consultation will be required with the Environment Agency during Stage 3 to ascertain any concerns they have over the Scheme.	The permanent diversion of the River Ding has the potential to have significant effects. The additional watercourses within the study area are of high sensitivity meaning they are vulnerable to both construction and operational effects. Consultation will be required with the Environment Agency during Stage 3 to ascertain any concerns they have over the Scheme.	The permanent diversion of the River Ding and the Black Brook has the potential to have significant effects. The additional watercourses within the study area are of high sensitivity meaning they are vulnerable to both construction and operational effects. Consultation will be required with the Environment Agency during Stage 3 to ascertain any concerns they have over the Scheme.

No	Topic:	NN NPS Para:	Text in the NN NPS:	RAG Status Options Pink	Blue	Orange
15	Other	N/A	Opportunity for the project team to raise any other areas of concern following their review of the NNNPS. For example, if not covered in the table already, risks around legislative compliance could be raised here. See section 'Legal Tests' below.			

*RAG Status:

- Green = This option will comply with the Policy as the topic is not relevant, or the topic is relevant but there is confidence that the existing settled design and / or mitigation remove any risk of non-compliance
- Amber = There is a risk that this option will conflict with the Policy, however there is possibility of it complying through detailed design and / or mitigation. Uncertainty can be in either or both areas: (1) impact occurring and / or (2) compliance with the Policy
- Red = There is certainty that this option conflicts with the Policy and there isn't any possibility of it complying through detailed design and / or mitigation
-

Legal Tests

In developing our schemes, Highways England also must take into account the need to satisfy various legal tests, many of which stem from European legislation. References to these are provided in the appropriate areas of the NNNPS. These include (amongst others) the pieces of legislation commonly referred to as:

- The Environmental Impact Assessment Directive (transposed through updated EIA Regulations 2017)
- The Habitats Directive
- The Water Framework Directive
- The Air Quality Directive

Moreover, legislation also gives protection to species and habitats, for example, the *National Parks and Access to Countryside Act 1949* and the *Countryside and Rights of Way Act 2000*

F.5 Comparison of Appraisal Summary Tables for the options identified at the 2018 consultation

Impacts		Blue / Orange option			Pink / Orange option			Green option		
		Qualitative	Monetary £(NPV)		Qualitative	Monetary £(NPV)		Qualitative	Monetary £(NPV)	
Economy	Business users & transport providers	Not applicable	£164.2m		Not applicable	£190.8m		Not applicable	£190.8m*	
	Reliability impact on Business users	Not applicable	£8m		Not applicable	£9.2m		Not applicable	£9.2m*	
	Regeneration	Not applicable	Not applicable		Not applicable	Not applicable		Not applicable	Not applicable	
	Wider impacts	Not applicable	£16.4m		Not applicable	£19.1m		Not applicable	£19.1m*	
Environmental	Air quality	Not applicable	PM10 NPV: £1,312,763 NOX NPV: -£539,858 Total value of change in air quality: £772,905		Not applicable	PM10 NPV: £1,173,798 NOX NPV: -£600,014 Total value of change in air quality: £573,785		Not applicable	PM10 NPV: £1,126,324 NOX NPV: -£582,662 Total value of change in air quality: £543,658	
	Greenhouse gases	660,554	-£29,085,491.00		638,317	-£ 28,155,879.00		638,317	-£28,155,879.00*	
	Landscape	Large Adverse	N/A		Large Adverse	N/A		Large Adverse	N/A	
	Townscape	Not applicable	Not applicable		Not applicable	Not applicable		Not applicable	Not applicable	
	Historic environment	Large adverse	Not applicable		Large adverse	Not applicable		Large adverse	Not applicable	
	Biodiversity	Large Adverse	Not applicable		Large Adverse	Not applicable		Large Adverse	Not applicable	
	Water environment	Slight Adverse	Not applicable		Slight Adverse	Not applicable		Slight Adverse	Not applicable	

Impacts		Blue / Orange option			Pink / Orange option			Green option		
		Qualitative	Monetary £(NPV)		Qualitative	Monetary £(NPV)		Qualitative	Monetary £(NPV)	
Social	Commuting and other users	Not applicable	£112.5m		Not applicable	£142.4m		Not applicable	£142.4m*	
	Reliability impact on commuting and other users	Not applicable	£9.9m		Not applicable	£11.3m		Not applicable	£11.3m*	
	Physical activity	Neutral	Not applicable		Neutral	Not applicable		Neutral	Not applicable	
	Journey quality	Moderate Beneficial	Not applicable		Moderate Beneficial	Not applicable		Moderate Beneficial	Not applicable	
	Accidents (collisions)	Not applicable	£17.8m		Not applicable	£13.2m		Not applicable	£13.2m	
	Security	Neutral	Not applicable		Neutral	Not applicable		Neutral	Not applicable	
	Access to services	Neutral	Not applicable		Neutral	Not applicable		Neutral	Not applicable	
	Affordability	Neutral	Not applicable		Neutral	Not applicable		Neutral	Not applicable	
	Severance	Slight Adverse	Not applicable		Slight Adverse	Not applicable		Slight Adverse	Not applicable	
	option and non-use values	Neutral	Not applicable		Neutral	Not applicable		Neutral	Not applicable	
Public Accounts	Cost to Broad Transport Budget	Not applicable	£310.1m		Not applicable	£308.9m		Not applicable	£308.9m*	
	Indirect Tax Revenues	Not applicable	-£62.7m		Not applicable	-£60.4m		Not applicable	-£60.4m*	

** The Green option has been assessed for comparison based on assumptions that several aspects of it perform similarly to the Pink Orange option so where specific figures are not available, the data from Pink Orange has been used.*

Appendix G *National Networks National Policy Statement* (NNNPS) risk table for Pink Modified option

No	Topic:	NN NPS Para:	Text in the NN NPS:	RAG status Pink Modified
1	Safety	4.66	The Secretary of State should not grant development consent unless satisfied that all reasonable steps have been taken and will be taken to: • minimise the risk of road casualties arising from the Scheme • contribute to an overall improvement in the safety of the strategic road network	The design process for the Scheme is considering the safety of road users, operations staff, and road workers and suppliers. There will be a reduction in the number of casualties due to the Scheme. Fatalities will decrease by 6.5, serious injuries by 72.1 and slight injuries by 121.1[48]. A Safety Plan has been produced at PCF Stage 2[2]. The purpose of this document is to describe how the SMS has been selected, describe the SMS and corresponding safety activities, define the Scheme's safety objectives and how these should be achieved, and to describe the Scheme organisation, how responsibility for safety activities has been devolved, and the associated programme management and control processes. Evidence to demonstrate that the Scheme is capable of being operated in an acceptably safe manner will be reported in the Scheme's 'Combined Safety and Hazard Log Report', which will be produced at PCF Stage 3.
2	Air quality	5.13	The Secretary of State should refuse consent where, after taking into account mitigation, the air quality impacts of the Scheme will: • result in a zone / agglomeration which is currently reported as being compliant with the Air Quality Directive becoming non-compliant • affect the ability of a non-compliant area to achieve compliance within the most recent timescales reported to the European Commission at the time of the decision	The change to road alignment and in traffic flows and speeds as a result of the Scheme has the potential to affect local air quality. No exceedances of air quality objectives are predicted at human receptors whilst an exceedance within the Henlade AQMA will be removed due to a large improvement in annual mean NO_2 concentrations, with the greatest decrease of 29.7µg/m^3 being experienced within the AQMA. There is a predicted low compliance risk rating and therefore the Pink Modified option is unlikely to cause a non-compliance with the EU Directive 2008/50/EC. Considering the wider effects of the Pink Modified option, the overall significance has the potential to be described as significant beneficial.
3	Internationally designated sites and Sites of Special Scientific Interest (includes National Nature Reserves)	5.27 – 5.29	Where a proposed development on land within or outside [an internationally designated site and / or] a SSSI is likely to have an adverse effect on an [internationally designated site and / or] a Sites of Special Scientific Interest (SSSI) (either individually or in combination with other developments), development consent should not normally be granted. Where an adverse effect on the site's notified special interest features is likely, an exception should be made only where the benefits of the development at this site clearly outweigh both the impacts that it is likely to have on the features of the site that make it of special scientific interest, and any broader impacts on the national network of SSSIs. Please be aware that paragraph 5.29 refers specifically to SSSIs, but paragraph 5.27 demonstrated that the Government places equal if not more weight on the protection of internationally designated sites. This therefore extends paragraph 5.29 to apply also to listed and candidate proposed Special Areas of Conservation, Special Protection Areas, Sites of Community Importance and Ramsar sites.	Four SACs designated with bat species as a qualifying feature are within 30km of the Scheme. These are Hestercombe House SAC 3.8km north, Exmoor and Quantock Oakwoods SAC 16.7km north-west, Bracket's Coppice SAC 18.4km south-east, and Beer and Quarry Caves SAC 28.5km south. The Somerset Moors and Levels SPA and Ramsar 5.8km downstream of the Scheme has the potential to be adversely affected due to pollution events and hydrological changes through construction. There are no SSSIs within the Scheme extents or within 2km of the Scheme that are anticipated to experience adverse effects. However, there are seven SSSIs within 200m of the ARN. There are no increases in NO_x concentrations anticipated and therefore the effects on these SSSIs are not considered to be significant.
4	Irreplaceable habitats including Ancient Woodland and veteran trees	5.32	The Secretary of State should not grant development consent for any development that would result in the loss or deterioration of irreplaceable habitats including Ancient Woodland and the loss of aged or veteran trees found outside Ancient Woodland, unless the national need for and benefits of the development, in that location, clearly outweigh the loss.	The Pink Modified option does not require the removal of any Ancient Woodland. There is the potential for pollution during construction to indirectly affect Ancient Woodland, which would be mitigated through best practice measures as required in a CEMP such as switching off engines when stationary, to mitigate air pollution and noise and vibration disturbance. Negligible effects on Ancient Woodland are predicted for the Pink Modified option in the long-term.
5	Protection of other habitats and species[49]	5.35 (& 4.22–4.25 & 5.27)	The Secretary of State should refuse consent where harm to the habitats or species and their habitats would result, unless the benefits of the development (including need) clearly outweigh that harm.	The Pink Modified option has the potential to directly reduce and fragment terrestrial habitats for species such as badgers, barn owls, reptiles, bats, GCN, otters and dormice. Additionally, construction works are likely to disturb protected species, such as GCN, water voles, badgers and bats, due to the physical, noise and lighting disturbance of the construction works.
6	Civil and military aviation and defence interests	5.62	Where, after reasonable mitigation, operational changes and planning obligations and requirements have been proposed, development consent should not be granted if the Secretary of State considers that: • a development would prevent a licensed aerodrome from maintaining its licence • the benefits of the proposed development are outweighed by the harm to aerodromes serving business, training or emergency service needs • the development would significantly impede or compromise the safe and effective use of defence assets or significantly limit military training	This is uncertain at this stage, as this is dependent on the Stage 3 design. Further consultation is required during Stage 3 with the Ministry of Defence and the CAA following the Preferred Route Announcement in order to determine requirements for safeguarding of airspace during construction. Royal Air Force Merryfield Airfield is 1.1km northeast of the Scheme. However, it is anticipated that the Scheme will not impact upon the operation of the airfield.

[48] Detailed within the Appraisal Summary Table for the Pink Modified option (HE551508-MMSJV-EGN-000-RP-UU-0029)

[49] Protection of other habitats and species: Lists of habitats and species of principal importance for the conservation of biological diversity in England published in response to Section 41 of the Natural Environment and Rural Communities Act 2006 are available from the Biodiversity Action Reporting System website. For ease, this section also should be used to accommodate consideration of European / International sites identified through international conventions and European Directives and given protection under the Habitats Regulations, for example, Ramsar sites, Special Areas of Conservation, Sites of Community Importance, Special Areas of Conservation and Special Protection Areas. See paragraphs 4.22 – 4.25 and 5.27 of the NN NPS.

No	Topic:	NN NPS Para:	Text in the NN NPS:	RAG status Pink Modified
7	Coastal change	5.75	When assessing applications in a CCMA, [Coastal Change Management Area], the Secretary of State should not grant development consent unless it is demonstrated that the development: • will be safe over its planned lifetime and will not have an unacceptable impact on coastal change • will not compromise the character of the coast covered by designations • provides wider sustainability benefits • does not hinder the creation and maintenance of a continuous signed and managed route around the coast	The Scheme is not located in a Coastal Change Management Area.
8	Flood risk	5.99 & 5.108	When determining an application, the Secretary of State should be satisfied that flood risk will not be increased elsewhere and only consider development appropriate in areas at risk of flooding where (informed by a flood risk assessment, following the Sequential Test and, if required, the Exception Test), it can be demonstrated that: • within the site, the most vulnerable development is located in areas of lowest flood risk unless there are overriding reasons to prefer a different location • development is appropriately flood resilient and resistant, including safe access and escape routes where required, and that any residual risk can be safely managed, including by emergency planning; and priority is given to the use of sustainable drainage systems • Both elements of the test will have to be passed for development to be consented. For the Exception Test to be passed: — it must be demonstrated that the project provides wider sustainability benefits to the community that outweigh flood risk — a Flood Risk Assessment (FRA) must demonstrate that the project will be safe for its lifetime, without increasing flood risk elsewhere and, where possible, will reduce flood risk overall	The impact of the Scheme on flood risk is uncertain at this stage, as this is dependent on the Stage 3 design. The Pink Modified option would result in additional impermeable areas from the new road, which would generate additional surface runoff. If not attenuated this could increase flood risk. The design of the drainage for the Scheme would ensure no increase in run-off rates, in accordance with the provisions of the NPPF and NNNPS, however comprehensive mitigation is likely to be required including compensatory flood storage. A Flood Risk Assessment will be undertaken in Stage 3 for the preferred option, which will determine whether the Scheme would impact on flood risk.
9	The historic environment (designated heritage assets)[50]	5.133	Where the proposed development will lead to substantial harm to or total loss of significance of a designated heritage asset, the Secretary of State should refuse consent unless it can be demonstrated that the substantial harm or loss of significance is necessary in order to deliver substantial public benefits that outweigh that loss or harm, or alternatively that all of the following apply: • the nature of the heritage asset prevents all reasonable uses of the site • no viable use of the heritage asset itself can be found in the medium term through appropriate marketing that will enable its conservation • conservation by grant-funding or some form of charitable or public ownership is demonstrably not possible • the harm or loss is outweighed by the benefit of bringing the site back into use	The setting of a scheduled monument, the Cross in St Aldhelm and St Eadburgha, has the potential to be adversely affected by the Pink Modified option. The Pink Modified option is considered to have a large adverse effect upon the setting of one grade ll* listed buildings and a moderate adverse effect upon the setting of a grade l listed building. There is a high potential for multi-period archaeological remains spanning the prehistoric period to WWII within the study area. In addition, the Pink Modified option passes through areas close to a recorded Roman settlement and possible Iron Age or Roman cropmarks. Mitigation and enhancement measures will include preserving the setting through planting, screening, noise attenuation and appropriate lighting.
10	Nationally designated areas: National Parks, the Broads & Areas of Outstanding Natural Beauty	5.151 & 5.152	The Secretary of State should refuse development consent in these areas except in exceptional circumstances and where it can be demonstrated that it is in the public interest. Consideration of such applications should include an assessment of: • the need for the development, including in terms of any national considerations, and the impact of consenting, or not consenting it, upon the local economy • the cost of, and scope for, developing elsewhere, outside the designated area, or meeting the need for it in some other way • any detrimental effect on the environment, the landscape and recreational opportunities, and the extent to which that could be moderated There is a strong presumption against any significant road widening or the building of new roads and strategic rail freight interchanges in a National Park, the Broads and Areas of Outstanding Natural Beauty, unless it can be shown there are compelling reasons for the new or enhanced capacity and with any benefits outweighing the costs vary significantly. Planning of the strategic road network should encourage routes that avoid National Parks, the Broads and Areas of Outstanding Natural Beauty.	The Pink Modified option is not located in or close to any National Parks, the Broads or an Area of Outstanding Natural Beauty. However, the Pink Modified option is likely to result in adverse effects on both landscape character and visual amenity and a Landscape and Visual Impact Assessment will be completed in Stage 3. The Pink Modified option is closest to the existing alignment of the A358 and therefore the effects are anticipated to be less than for the other three options.

[50] Designated heritage assets categories: World Heritage Sites; Scheduled Monuments; Listed Buildings; Protected Wreck Sites; Protected Military Remains; Registered Parks and Gardens; and Registered Battlefields; Conservation Areas. Non-designated heritage assets of archaeological interest that are demonstrably of equivalent significance to Scheduled Monuments, should be considered subject to the policies for designated heritage assets. The absence of designation for such heritage assets does not indicate lower significance.

No	Topic:	NN NPS Para:	Text in the NN NPS:	RAG status Pink Modified
11	Land use: Green Belt	5.170 & 5.178	Metropolitan Open Land, and land designated as Local Green Space in a local or neighbourhood plan, are subject to the same policies of protection as Green Belt, and inappropriate development should not be approved except in very special circumstances. When located in the Green Belt national networks infrastructure projects may comprise inappropriate development. Inappropriate development is, by definition, harmful to the Green Belt and there is a presumption against it except in very special circumstances. The Secretary of State will need to assess whether there are very special circumstances to justify inappropriate development. Very special circumstances will not exist unless the potential harm to the Green Belt by reason of inappropriateness, and any other harm, is clearly outweighed by other considerations. In view of the presumption against inappropriate development, the Secretary of State will attach substantial weight to the harm to the Green Belt, when considering any application for such development.	The Pink Modified option is not located within the Green Belt.
12	Land use: open space / sports and recreational buildings and land	5.174	The Secretary of State should not grant consent for development on existing open space, sports and recreational buildings and land, including playing fields, unless an assessment has been undertaken either by the local authority or independently, which has shown the open space or the buildings and land to be surplus to requirements, or the Secretary of State determines that the benefits of the project (including need) outweigh the potential loss of such facilities, taking into account any positive proposals made by the applicant to provide new, improved or compensatory land or facilities.	The acquisition of open space is not required for the Pink Modified option and land or buildings used for sports or for recreational purposes is also unlikely to be required.
13	Noise and vibration	5.195	The Secretary of State should not grant development consent unless satisfied that the proposals will meet, the following aims, within the context of Government policy on sustainable development: • avoid significant adverse impacts on health and quality of life from noise as a result of the new development • mitigate and minimise other adverse impacts on health and quality of life from noise from the new development • contribute to improvements to health and quality of life through the effective management and control of noise, where possible	Analysis shows a net decrease of 38 in the total number of receptors exposed to noise levels above SOAEL during day-time and a net decrease of 23 during night-time in the short-term for the Pink Modified option. Analysis shows a net decrease of 13 in the total number of receptors exposed to noise levels above SOAEL during day-time and a net increase of 48 during night-time in the long-term for the Pink Modified option.
14	Water quality and resources	5.227	If the Environment Agency continues to have concerns and objects to the grant of development consent on the grounds of impacts on water quality / resources, the Secretary of State can grant consent, but will need to be satisfied before deciding whether or not to do so that all reasonable steps have been taken by the applicant and the Environment Agency to try to resolve the concerns, and that the Environment Agency is satisfied with the outcome.	The permanent diversion of the River Ding has the potential to have significant effects. The additional watercourses within the study area are of high sensitivity meaning they are vulnerable to both construction and operational effects. Consultation will be required with the Environment Agency during Stage 3 to ascertain any concerns they have over the Scheme.
15	Other	N/A	Opportunity for the project team to raise any other areas of concern following their review of the NNNPS. For example, if not covered in the table already, risks around legislative compliance could be raised here. See section 'Legal Tests' below.	

Appendix H Appraisal Summary Table for Pink Modified

Appraisal Summary Table

Date produced:	Jan-19

Contact:	
Name	David Stock
Organisation	Highways England
Role	Promoter / Official

Name of scheme:	A358 Taunton to Southfields Dualling - Pink Modified option
Description of scheme:	The Pink Modified option would be approximately 13.6 kilometres long between its connection with the M5 and Southfields Roundabout. The alignment of the Pink Modified option takes a similar route to the Pink option through Section 1. This follows a more northerly arc through the scheme corridor, taking it closer to the A358 / A378 junction at Mattock's Tree Green and closer to Henlade than the Blue and Orange options.

Impacts		Summary of key impacts	Assessment			
			Quantitative	Qualitative	Monetary £(NPV)	Distributional 7-pt scale / vulnerable grp
Economy	Business users & transport providers	Journey time benefits by converting old single carriageway sections to modern dual carriageway with associated junction improvements. Net journey time changes is the net of positive and negatives in a given time band. Monetary (NPV) includes journey times, vehicle operating cost and user charges impacts.	**Value of journey time changes(£)** £141.7m **Net journey time changes (£)** 0 to 2min: -£22.7m; 2 to 5min: £81.3m; > 5min: £83.1m	Not applicable	£115.4m	N/A
	Reliability impact on Business users	Reliability benefits by converting old single carriageway section to modern dual carriageway with associated junction improvements.	Stress-based approach set out in TAG A1.3 Appendix C.5 used to quantify benefits	Not applicable	£7.1m	
	Regeneration	The Pink Modified option does not lie within or close to regeneration areas.	Not applicable	Not applicable	Not applicable	
	Wider Impacts	Wider economic benefits (output change in imperfectly competitive markets) by converting an old single carriageway section to modern dual carriageway with associated junction improvements.	Estimated from a 10% uplift in business benefits	Not applicable	£11.5m	
Environmental	Noise	Results indicate an overall disbenefit owing to the widening of road to a dual carriageway both online and offline, increases in road traffic, and the introduction of new junctions that bring roads closer to residences. Residential properties located within close proximity to the new alignment have not been mitigated with noise barriers or bunds. In the forecast year, there are 82 properties that are calculated to experience significant adverse effects (exceed SOAEL) due to noise in the daytime and 188 properties in the night time.	Households experiencing increased daytime noise in forecast year: 611 Households experiencing reduced daytime noise in forecast year: 123 Households experiencing increased night time noise in forecast year: 330 Households experiencing reduced night time noise in forecast year: 128	Not applicable	-£2.2m	Distributional impact assessment to be undertaken in PCF stage 3
	Air Quality	Overall, there is a net improvement in local air quality PM_{10} concentrations with the scheme, but there is a negative impact on regional NO_x emissions. The increase in regional emissions can be attributed to the rerouting of vehicles and increased traffic in the study area. There would be no new exceedances as a result of the scheme. The scheme is expected to reduce concentrations in the Henlade AQMA due to rerouting of traffic away from the existing A358. Overall, the total change in NPV is negative indicating a net worsening in air quality when considering both local and regional effects.	Local Air Quality Assessment Score in Year of Opening:2023: NO_2: -844.7 PM_{10}: -227.5 Regional Emissions (Over 60 year appraisal period) NO_x: +1,208 tonnes Local Air Quality Effects at Properties (Improvements / No Change / Deterioration) NO_2 2023 (6173 / 11 / 6149) PM_{10} 2023 (4282 / 3422 / 4629)	Not applicable	PM_{10} NPV: £0.3m NO_x NPV: -£0.6m Total value of change in air quality: -£0.2m	Not applicable
	Greenhouse gases	Not applicable.	Change in non-traded carbon over 60y (CO2e): 519,889 Change in traded carbon over 60y (CO2e): 3,062	522,951	-£23.1m	
	Landscape	This agricultural landscape is characterised by arable and pastoral fields, punctuated by farms and village settlements, and it affords a relatively high level of tranquillity. Important historic features such as historic field boundaries and listed buildings would be affected by the proposed scheme to varying degrees. Large scale junctions such as at Mattock's Green would have a larger footprint in the rural landscape than the mainline route and form a detracting feature. Loss of key landscape features such as tree and shrub plots and hedgerows, particularly associated with offline sections, would have a detrimental effect upon land use, pattern and the overall landscape character of NCAs 140 Yeovil Scarplands, 143 Mid Somerset Hills and 146 Vale of Taunton and Quantock Fringes. However, the implementation of effective mitigation planting would help to aid the settlement of the scheme as a whole within the surrounding landscape to varying degrees, albeit over a number of years. Exploration of opportunities for landscape bunds and earthworks may also be beneficial in reducing impacts further, however these have not been considered in this assessment. The online and near online alignment of this option limits wider landscape impacts due to it remaining in close proximity, no further than 450m from the existing A358. Nonetheless there would still be an overall worsening for landscape as a result of the Pink Modified option.	Not applicable	Moderate Adverse	Not applicable	
	Townscape	Not applicable	Not applicable	Not applicable	Not applicable	
	Historic Environment	For the purposes of the historic environment assessment construction and operational effects have been assessed. This is because permanent impacts to the historic environment would occur during construction, for example removal of archaeological or historic remains. There would be a Major Adverse impact to a number of sites of known buried archaeological remains including a possible Roman building, a possible prehistoric burial site (extent of which is unknown) and a medieval settlement site. The Pink Modified option would have a Major Adverse impact on one grade II* listed building (Musgrave Farmhouse). The new road would be situated in close proximity to the asset intruding upon its visual setting and introducing increased noise to the rural context during construction and operation, even with mitigation screening in place. Further construction impacts include several other grade II* listed buildings would be impacted to a minor extent by the construction and operation of the scheme (detailed in the accompanying worksheets). A Negligible Adverse impact to the grade II* listed "Outbuilding with wall on south-east corner of Haydon House" is predicted as it would slightly increase noise within its rural setting during operation. There would be a minor adverse impact on one scheduled monument (Cross in St Aldhelm and St Eadburgha Church) and one grade I listed building (Church of Aldhelm and Eadburgha) due to impacts on the setting of these assets during the construction and operation of the scheme. There would be an overall worsening for the historic environment as a result of the Pink Modified option.	Not applicable	Large Adverse	Not applicable	
	Biodiversity	In the absence of detailed ecological survey data, detailed design and detailed mitigation proposals, there would be an overall Large Adverse effect on biodiversity as a result of the Pink Modified option. Large Adverse effects are anticipated on bats and dormice due to loss and fragmentation of habitat. Slight Adverse effects are anticipated on otter, water vole, reptiles, badgers, barn owls, white clawed crayfish, great crested newts, fish, invertebrates and nesting birds through the loss, fragmentation and isolation of habitats. The option presents a Moderate Adverse effect to Jordans Park LWS and Road Verges West of Hatch Beauchamp LWS. A Slight Adverse effect is anticipated to the four SAC's designated for bat conservation and Somerset Level Moors SPA/Ramsar. The loss of habitats and the diversion of the River Ding is likely to result in a Slight Adverse effect on priority habitats and watercourses. There would be an overall worsening for biodiversity as a result of the Pink Modified option. Standard mitigation has been included in the assessment of likely impacts including a sensitive lighting design, roost replacement, habitat replacement and sensitive timing of works. However, bespoke mitigation such as mitigation structures for bats and dormouse have not yet been developed and therefore is not considered at this stage.	Not applicable	Large Adverse	Not applicable	
	Water Environment	The Pink Modified option would include standard mitigation measures in the Construction Environmental Management Plan, and sustainable urban drainage systems and pollution control measures would be incorporated in the drainage design. These would prevent adverse effects from pollutants or increased surface water run-off reaching the downstream waterbodies during construction or operation. Physical impacts caused by the creation of new culverts / extension of existing culverts to accommodate the wider carriageway would cause a Slight Adverse impact on drainage ditches, the River Ding and the West Sedgemoor Main Drain. Physical impacts caused by the creation of new bridges / extensions to existing bridges would cause a Slight Adverse impact on the River Ding, Venner's Water, the Fivehead River and Broughton Brook. Physical impacts caused by channel diversion / re-alignment during construction would cause a Moderate Adverse impact on the River Ding. Below ground structures (such as piles or foundations) would cause a localised Slight Adverse impact on the Tone and North Somerset Stream groundwater body, but would not compromise the entire waterbody. Physical impacts from infilling during construction / operation would cause a Moderate Adverse impact on drainage ditches and ponds. It is intended that some new drainage ditches and ponds would be created to replace any losses caused by infilling to accommodate the new carriageway - this would be confirmed at the detailed design stage. The Pink Modified option is located mainly outside of Flood Zones 2 and 3, but does cross the flood zones in some places. New embankments would be located within Flood Zones 3 and 2, therefore compensatory flood storage would be provided elsewhere, if required, to ensure that there is no increase in flood risk as a result of the scheme. A Slight Adverse impact has been assigned to this option, as it reflects an overall balance of the likely impacts on road drainage and the water environment, once the proposed mitigation measures have been implemented.	Not applicable	Slight Adverse	Not applicable	
Social	Commuting and Other users	Journey time benefits by converting old single carriageway sections to modern dual carriageway with associated junction improvements. Net journey time changes is the net of positive and negatives in a given time band. Monetary (NPV) includes journey times, vehicle operating cost and user charges impacts.	**Value of journey time changes(£)** £143.1m **Net journey time changes (£)** 0 to 2min: -£15.7m; 2 to 5min: £93.7m; > 5min: £65.2	Not applicable	£83.3m	Distributional impact assessment to be undertaken in PCF Stage 3
	Reliability impact on Commuting and Other users	Reliability benefits by converting old single carriageway section to modern dual carriageway with associated junction improvements.	Stress-based approach set out in TAG A1.3 Appendix C.5 used to quantify benefits	Not applicable	£7.2m	
	Physical activity	The Pink Modified option would result in the severance of some non-motorised user (NMU) routes, however the provision of diversions for affected routes and new crossings would minimise changes to journey times and lengths for NMUs. The installation of new and improved NMU facilities for pedestrians, cyclists and equestrians has the potential to encourage people to make more journeys using non-motorised forms of transport rather than mechanised transport modes. However on the whole a Neutral effect is predicted on NMUs as a result of the proposed option.	Not applicable	Neutral	Not applicable	
	Journey quality	The Pink Modified option is anticipated to result in an overall Slight Adverse effect on journey quality for travellers utilising roads between Taunton and the Southfields Roundabout, once in operation. A slight improvement has been predicted to traveller care through the anticipated provision of new signage. Impacts to traveller views are anticipated to be Neutral once the Pink Modified option is in place. Driver stress is anticipated to reduce for some journeys along the A358 through the provision of a high quality free flowing dual carriageway and grade separated junctions, although congestion is predicted at junction 25 during AM peak hours in operation, even with some minor improvements to junction 25. A Slight Adverse effect on driver frustration and fear of potential accidents is predicted as a result of the Pink Modified option as although road lighting, clear road markings with cat's eyes and studs, hard-strips of varying widths for the mainline and slip roads would be provided, NMU crossings would not be provided at several locations along the route, whilst queueing onto the M5 at junction 25 would further increase driver frustration for travellers at that location. Route uncertainty is unlikely to change as the new junction would require the provision of route signage along the A358.	Not applicable	Slight Adverse	Not applicable	
	Accidents	Reduction in the number of Personal Injury Accidents (PIAs) and casualties by converting old single carriageway sections to modern dual carriageway with associated junction improvements.	Reduction in casualties Fatal = 6.5 Serious = 72.1 Slight = 121.1	Not applicable	£13.5m	Distributional impact assessment to be undertaken in PCF Stage 3
	Security	Effects to security as a result of the Pink Modified option are likely to be Neutral as there are not anticipated to be any changes to security indicators as a result of this option.	Not applicable	Neutral	Not applicable	Distributional impact assessment to be undertaken in PCF stage 3.
	Access to services	Access to services within the area are unlikely to be affected by the Pink Modified option. As such, no change is expected and a Neutral effect is predicted as a result of the option.	Not applicable	Neutral	Not applicable	Not applicable
	Affordability	Changes to vehicle operating costs and therefore changes to affordability as a result of the Pink Modified option.	Vehicle Operating Costs (VOCs): Commuting = -£15,552,000 Other = -£44,285,000 Business = -£26,306,000	Not applicable	Not applicable	Distributional impact assessment to be undertaken in PCF stage 3
	Severance	The Pink Modified option would result in the severance of NMU routes within 250 metres of the scheme, however the provision of diversions for affected routes and new crossings at proposed locations would reduce changes to journey times and lengths for NMUs to an extent. Nonetheless, there is the potential for several PRoW to be affected that allow access to nearby community facilities including Ashe Farm Caravan and Camping Site, Huish Woods Scout Campsite and Ashill Village Hall. There is also potential for severance to occur for those travelling to Somerset Progressive School, with a lengthily diversion required to access this service from the eastern side of the A358. A total of 288 NMUs were counted across 40 PRoW within the vicinity of the A358 during 10hr periods within the summer holidays on 2 days (on 31 August and 1 September 2016) and 234 during 10hr periods within term time on 4 days (13, 14, 15 or 16 September 2016) in the 2016 NMU surveys which indicates that some routes are widely used in the area. On balance, a Slight Adverse effect is predicted on severance as a result of the Pink Modified option, taking into account mitigation that is likely to be provided.	Not applicable	Slight Adverse	Not applicable	Distributional impact assessment to be undertaken in PCF stage 3.
	Option and non-use values	The Pink Modified option is expected to have little or no impact on option and non-use values.	Not applicable	Neutral	Not applicable	
Public Accounts	Cost to Broad Transport Budget	The scheme will be funded through Central Government Funds.	Central Government Funding: £245.9m	Not applicable	£245.9m	
	Indirect Tax Revenues	There would be some increase in the tax being paid to the Exchequer.	Central Government Funding: Wider Public Finances = -£48.3m	Not applicable	-£48.3m	