Future Chippenham

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Wiltshire Council

Future Chippenham Road Design

WC_FCR-ATK-GEN-OAR_XX_ML-RP-CX-000001

Options Assessment Report

Notice

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Document history

Revision	Suitability	Purpose description	Originated	Checked	Reviewed	Authorised	Date
C02	A1	For Information	JA	PB	RB	RB	14/01/21

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Options Assessment Report Summary

In March 2019 Wiltshire Council submitted a £75 million bid to the MHCLG Housing Infrastructure Fund (HIF) for the delivery of a distributor route to the east of Chippenham and improvements to M4 junction 17. The full eastern distributor road would link to the existing highway network at the A350 Lackham roundabout to the south of the town, cross the A4 London Road and link to the A350 Malmesbury roundabout to the north of the town. The HIF bid funds delivery of the distributor road up to the proposed rail bridge over the Great Western Railway (GWR) line west of Rawlings Green, the remaining bridges and road infrastructure is funded by other developers.

The distributor road will provide access to development land to the south and east of Chippenham enabling the delivery of future growth in Chippenham over the next 30 years. Potential development areas in this location are owned by Wiltshire Council and private landowners. The council established Future Chippenham as the delivery function for this area and draws on Wiltshire's housing, major projects and highway teams and has been separated from the council's regulatory teams.

In November 2019 Wiltshire Council's successful HIF bid was announced. The authority was awarded £75 million from MHCLG to deliver the distributor road and improvements at M4 junction 17 and unlock the delivery of homes in Chippenham for the next 30 years. In order to secure the funding Wiltshire Council will need to meet a range of conditions set by Homes England. A key condition of the HIF is that the grant is spent and the road is completed by March 2024. The completion of this Options Assessment Report (OAR) is also a condition of funding set by Homes England.

The HIF bid demonstrated the need for the distributor road to unlock future growth. The Chippenham Site Allocation Plan (CSAP) adopted in 2017 included policies earmarking land for new transport proposals. Wiltshire Council is currently conducting a Local Plan Review for the plan period 2016-2036, having identified a housing need for Wiltshire in the plan period. The largest identified housing need in Wiltshire is within the Chippenham housing market area.

On the 13th January 2021 a Local Plan Review was published which considers preferred options for accommodating this housing development. The proposed options for development in the plan were not available during the consideration of alternative route alignments assessed in this report. The alignments referenced in this report allow enough flexibility to be able to serve a wide area of development and development scenarios and will require further refining, subject to consultation and a review of options against further development scenarios.

The Future Chippenham distributor road is part of a full eastern distributor route. The HIF funded road extents include a route from the A350/B4528 south of Chippenham, to a proposed bridge over the GWR line to the north. The route continues on proposed and existing network, connecting to the A350 Malmesbury Road roundabout north of Chippenham. The bridge over the GWR is delivered by the Rawlings Green developers.

The road will form the main corridor of movement for all modes of transport through the development and will act as the 'neighbourhood spine' with community facilities and higher density housing located along its route. Frontage dwellings will be accessed by parallel side roads, or rear parking courtyards.

The purpose of this Options Assessment Report (OAR) sets out the evidence supporting the distributor road scheme. It defines scheme objectives aligned with local and national policy and the process for options sifting and assessment. It demonstrates whether options are feasible and deliverable. Finally, it assesses value for money for shortlisted options. This OAR considers how the options can complement and support the Future Chippenham housing development and coordinates with the Future Chippenham spatial framework and development principles within the Draft Concept Framework report version 3 issued in April 2020.

Three distributor road options within five zones and two link roads are included in the assessment. The assessment summary presents a coordinated route combining the route options within zone and link road that are the best fit with the assessment criteria and scheme objectives. This provides a scheme with value for money, deliverable within time constraints, minimising negative impact on the environment, enabling opportunity to enhance the environment and enabling development quantum to pre and post Local Plan targets. The coordinated route will be subject to further stakeholder and public consultation.

1. Introduction

1.1. Background information

In March 2019 Wiltshire Council submitted a £75 million bid to the MHCLG Housing Infrastructure Fund (HIF) for the delivery of a distributor route to the east of Chippenham and improvements to M4 junction 17. The full eastern distributor road would link to the existing highway network at the A350 Lackham roundabout to the south of the town, cross the A4 London Road and link to the A350 Malmesbury roundabout to the north of the town. The HIF bid funds delivery of the distributor road up to the proposed rail bridge over the Great Western Railway line west of Rawlings Green, the remaining bridges and road infrastructure is funded by other developers.

The distributor road will provide access to development land to the south and east of Chippenham enabling the delivery of future growth in Chippenham. Potential development areas in this location are owned by Wiltshire Council and private landowners.

The HIF bid demonstrated the need for the distributor road to unlock future growth in the town based on current and previous evidence. This included the findings of the 2017 Strategic Housing Market Assessment (SHMA) conducted for Wiltshire Council which identified:

"The town has significant potential for economic growth. A new road linking the A4 to the A350 would help considerably toward realising it.

Housing development has been well below anticipated rates, largely because there has been no land identified for development for much of the plan period."

The conclusions in the SHMA were reflected in the Chippenham Site Allocation Plan (CSAP) adopted in 2017 and included policies earmarking land for new transport proposals. Wiltshire Council is currently conducting a Local Plan Review for the plan period 2016-2036, having identified a housing need for Wiltshire in the plan period. The largest identified housing need in Wiltshire is within the Chippenham housing market area.

On the 13th January 2021 a Local Plan Review was published which considers preferred options for accommodating this housing development. The proposed options for development in the plan were not available during the consideration of alternative route alignments assessed in this report. The alignments referenced in this report allow enough flexibility to be able to serve a wide area of development and development scenarios and will require further refining, subject to consultation and a review of options against further development scenarios.

In November 2019 Wiltshire Council's successful HIF bid was announced. The authority was awarded £75 million from MHCLG to deliver the distributor road and improvements at M4 junction 17 and unlock the delivery of homes in Chippenham. In order to secure the funding Wiltshire Council will need to meet a range of conditions set by Homes England. A key condition of the HIF is that the grant is spent and the road is completed by March 2024. The completion of this Options Assessment Report (OAR) is also a condition of funding set by Homes England.

The Future Chippenham distributor road is part of a full eastern distributor route. The HIF funded road extents include a route from the A350/B4528 south of Chippenham, to a proposed bridge over the Great Western Rail (GWR) line to the north. The route continues on proposed network delivered by developers from Parsonage Way, across Maud Heaths Causeway, connecting to the A350 Malmesbury Road roundabout north of Chippenham. The bridge over the GWR is delivered by the Rawlings Green developers. An additional road linking the proposed distributor to Pewsham Way is included in the scheme extents and HIF bid, the design concept and standards for this link road are the same as the distributor road.

The road will form the main corridor of movement for all modes of transport through the development and will act as the 'neighbourhood spine' with community facilities and higher density housing located along its route. Frontage dwellings will be accessed by parallel side roads, or rear parking courtyards.

1.2. Purpose of this report

Future Chippenham has appointed Atkins to support the delivery of the project, including the technical work required to submit a planning application for the Future Chippenham distributor road. This includes the delivery of this OAR which:

- Sets out the need for the Future Chippenham distributor road.
- Defines scheme objectives.
- Assesses route options in terms of environmental impact, deliverability, transport network impacts and value for money. to identify the most appropriate route for the road.

To ensure the route options assessed in the report can be carefully scrutinised, the project identified concept layouts for possible future development. These draft concept layouts help test road alignment options and were set out in a Draft Concept Framework that supports this report.

Prior to public and stakeholder consultation this report provides a coordinated route option best fitting the assessment criteria and scheme objectives.

Following stakeholder and public consultation this report will be updated to include a preferred road route option to progress to preliminary design and planning submission.

1.3. Abbreviations

The following list of abbreviations are used within this report:

BAP	Biodiversity Action Plan	OJEU	Official Journal of the European Union
BCIS	Building Cost Information Service	OBC	Outline Business Case
BCR	Benefit Cost Ratio	OS	Ordnance Survey
BGS	British Geological Survey	PCU	Passenger Car Unit
CIL	Community Infrastructure Levy	PEOAR	Preliminary Environment Options Assessment Report
CO2	Carbon Dioxide (Green House Gas)	PRoW	Public Right of Way
CSAP	Chippenham Site Allocations Plan	PSSR	Preliminary Sources of Study Report
CTS	Chippenham Transport Strategy	PVB	Present Value of Benefits
CWS	County Wildlife Sites	PVC	Present Value of Costs
DfT	Department for Transport	QCRA	Quantitative Cost Risk Assessment
DM	Do Minimum	REB	Regional Evidence Base
EA	Environment Agency	SEP	Strategic Economic Plan
ECI	Early Contractor Involvement	SHMA	Strategic Housing Market Assessment
EIA	Environment Impact Assessment	SPD	Supplementary Planning Document
ES	Environment Statement	SPZ	Source Protection Zone
GCN	Great Crested Newt	SRN	Strategic Road Network
GIS	Geographic Information System	SSSI	Site of Special Scientific Interest
GWR	Great Western Railway	STB	Sub Regional Transport Body
HER	Historic Environment Records	SWLEP	Swindon and Wiltshire Local Enterprise Partnership
HIF	Housing Infrastructure Fund	TAG	Transport Analysis Guidance
HMA	Housing Market Assessment	TUBA	Transport Users Benefits Appraisal
IUCN	International Union for Conservation of Nature	UXO	Unexploded Ordnance
LSTF	Local Sustainable Transport Fund	V/C	Vehicle over Capacity ratio
LTP	Local Transport Plan	VfM	Value for Money
MHCLG	Ministry of Housing, Communities & Local Government	VOC	Vehicle Operating Costs
MRN	Major Road Network	WCS	Wiltshire Core Strategy
NCN	National Cycle Network	WFD	Water Framework Directive
NERC	Natural Environmental Research Council	WSBRC	Wiltshire and Swindon Biological Records Centre
OAR	Options Assessment Report	WSHER	Wiltshire and Swindon Historic Environmental Record
OB	Optimism Bias		

1.4. Document structure

The structure of this document broadly matches the eight-step process that is recommended for the options development stage in the Department for Transport (DfT) Transport Analysis Guidance (TAG) Unit 2.1.2d. These steps have been grouped as follows:

Section 2 - sets out the **current situation** at Chippenham, outlining its policy context, current travel demands and levels of service as well as its opportunities and constraints.

Section 3 - sets out the **future situation** at Chippenham, assessing the future land-use policies, planned future changes to the local network as well as the future travel demands.

Section 4 - sets out the **need for intervention**, summarising the requirement for a scheme at Chippenham.

Section 5 - sets out the **objectives that should be met by any scheme options being considered.** Sets the geographical scope for the assessment.

Section 6 - **generates options**, reflecting a range of modes, approaches and scales of intervention.

Section 7 - **initial option sift**, a qualitive assessment against strategic scheme objectives.

Section 8 - develops the **full options assessment process** and the **road route study area.**

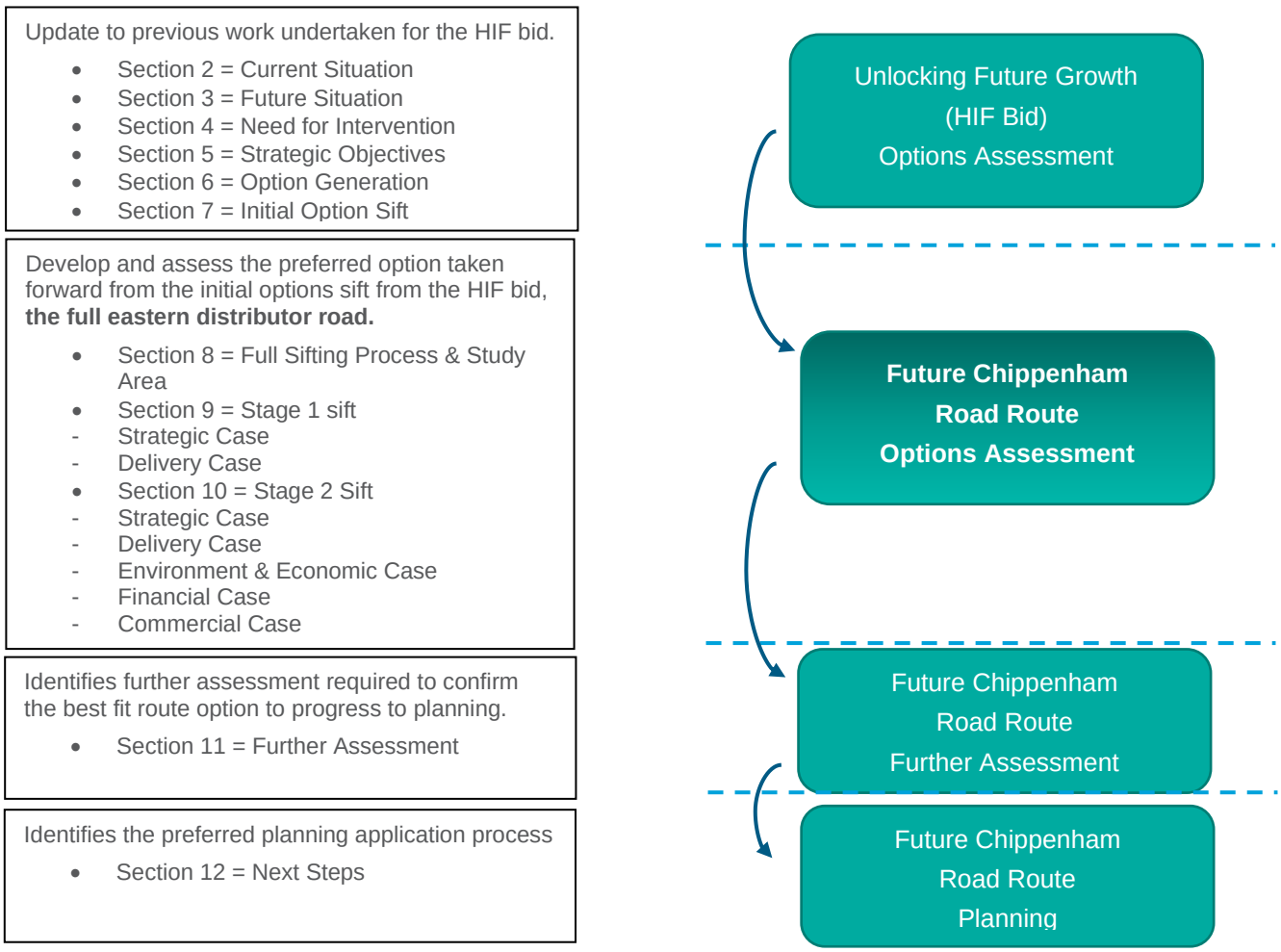
Section 9 - develops and assesses the preferred option from the initial sift. Route options are developed for the full eastern distributor road. Includes criteria for option generation, zonal assessment and assessment criteria for a **first full distributor road route options sift.**

Section 10 - develops and assesses the options progressing from the first full distributor road route sift. Includes criteria for option generation and assessment criteria for a **second full distributor road route options sift.**

Section 11 - identifies **further assessment** required to fully set out the option of best fit to progress to planning.

Section 12 - outlines the **next steps** and confirms the **planning application process**.

Figure 1-1 - Option Assessment Report structure



1.5. Previous reports

A number of previous reports have been referred to during the development of the OAR including:

- The Swindon and Wiltshire Strategic Economic Plan (SEP) published by the Swindon & Wiltshire Local Enterprise Partnership (SWLEP) in March 2014 and refreshed in March 2016.
- Wiltshire Local Transport Plan (LTP) 3 (2011-2026).
- Chippenham Transport Strategy (CTS) 2016.
- Wiltshire Core Strategy (WCS), adopted January 2015.
- Chippenham Site Allocations Plan (CSAP).
- The Strategic Housing Market Assessment (SHMA).
- Future Growth in Chippenham – Options Assessment Report, Wiltshire Council 2018.
- OAR with supporting evidence for Housing & Infrastructure Fund (HIF) bid for Future Chippenham.
- HIF bid version 1.7.

The following documents provide an evidence base for this Options Assessment Report:

- Draft Concept Framework Version 3 – April 2020; and
- Preliminary Environmental Assessment Report (PEOAR).

1.6. License and copyright data

Mapping figures within this report and appendices use data from the following suppliers and licenses:

Table 1-1 **- Data supplier licenses**

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Wiltshire Council	Data supplied by Wiltshire Council via Wiltshire and Swindon Historic Environmental Record (WSHER) and Wiltshire and Swindon Biological Records Centre (WSBRC).
Public Sector Information	Public sector information licensed under Open Government License v3.0

2. Understanding the current situation

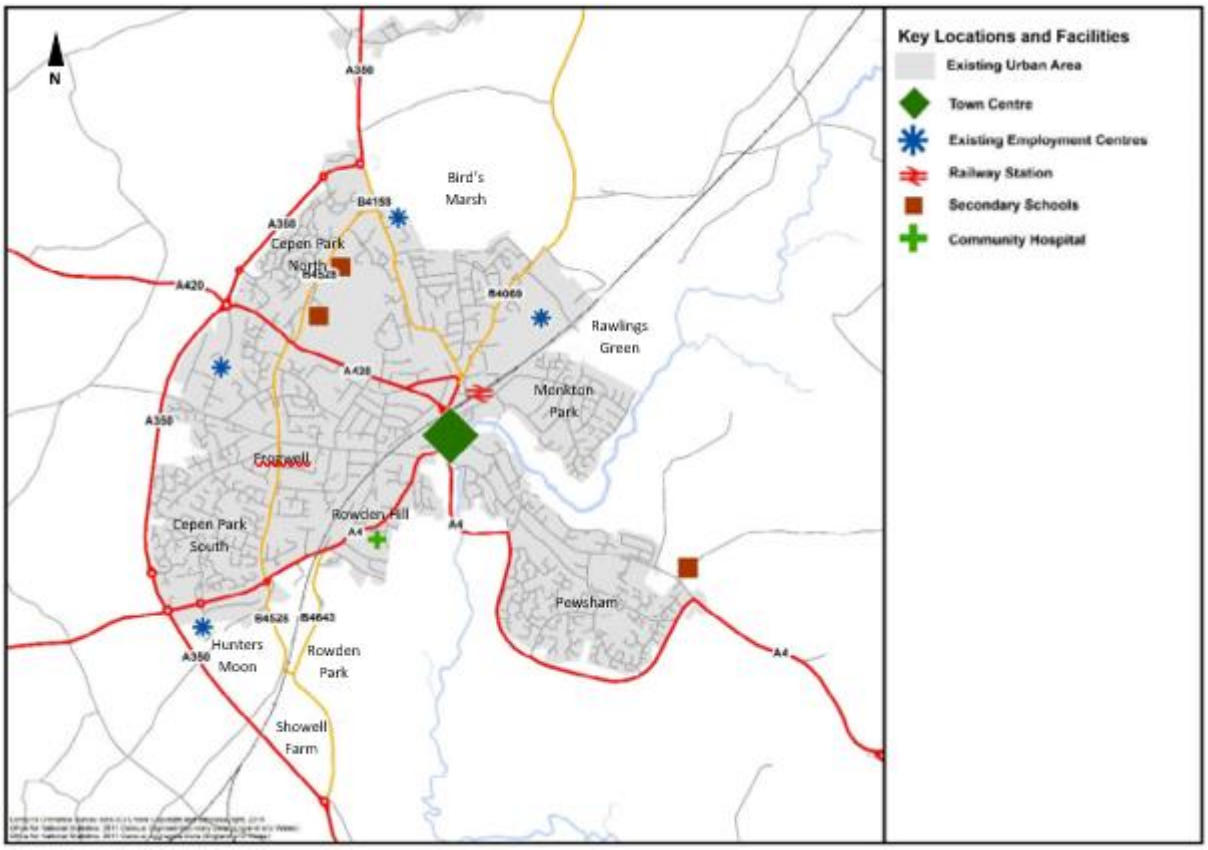
2.1. Overview

This section contributes to developing an understanding of the current situation in the study area in terms of:

- Current transport and other policies.
- Current travel demand and levels of service.
- Current opportunities and constraints.

Figure 2-1 presents the local highway distributor road network and locations of the town centre and associated retail, centres of employment, Chippenham railway station, secondary schools and Chippenham Community Hospital.

Figure 2-1 - Transport network and key destinations



Source: Chippenham Transport Strategy

2.2. Description of current transport network

Chippenham is located adjacent to the A350 primary route corridor which provides north-south links in west Wiltshire to the M4 in the north and A36 in the south. Chippenham is only four miles from the M4 motorway which provides fast access to Swindon and the Thames Valley (to the east) and Bath/Bristol (to the west). The Great Western Mainline provides fast and direct rail links to Bath, Bristol, South Wales in the west; and Swindon, Reading and London to the east. These good transport links make Chippenham well connected to employment centres in Bath, Bristol, Swindon and the Thames Valley.

The **A350 corridor** to the west of the town provides for north-south connectivity to the M4 in the north at M4 junction 17 and to the A36 in the south at Warminster.

The main highway network within the urban area consists of a number of single carriageway routes that converge on the town centre as shown in Figure 2-1, these are:

- **The A4 corridor:**
  - East-west corridor across the town from Pewsham in the east (A4 London Road/Pewsham Way/Avenue La Fleche) through the gyratory in central Chippenham to the west (A4 Bath Road).
  - Provides connectivity from east of Chippenham to central Chippenham and the A350 and A420 corridors in the west.
  - To the west of Chippenham, the A4 corridor provides connectivity to Bath.
- **The A420 corridor:**
  - In the north-west of the town it connects central Chippenham at the Bridge Centre to the A350 corridor
  - To the west of Chippenham, the A420 provides connectivity to Bristol.
- **The B4158 Malmesbury Road** provides access between central Chippenham and the A350 at Malmesbury roundabout.
- **The B4069 Langley Road/Swindon Road** corridor to the north-east – provides access to/from Chippenham and various villages including Langley Burrell and Kington Langley to the north of Chippenham.
- **The B4528/B4643** provides access to the A350 to the south of the town at Lackham roundabout.

These routes all provide access for pedestrians, cyclists, buses and vehicles to employment, social and leisure opportunities in central Chippenham and to the railway station located to the north of the town centre.

2.3. Current traffic flows and demands

2.3.1. Highway network

2.3.1.1. The A4 and A420 corridors

The A4 and A420 corridors are the primary east-west corridors in the town, providing for movement across and though the town, as well as for access to the A350 for onward journeys. Traffic count data from the DfT for the A4 and A420 corridors (see Table 2-1) shows higher volumes of traffic in central Chippenham compared to the east and west of the town. Traffic from these corridors contribute to congestion in the town centre.

Congestion on these corridors affects the performance of the town centre network, which is currently congested in peak hours and has limited network resilience to delays caused by traffic-related incidents.

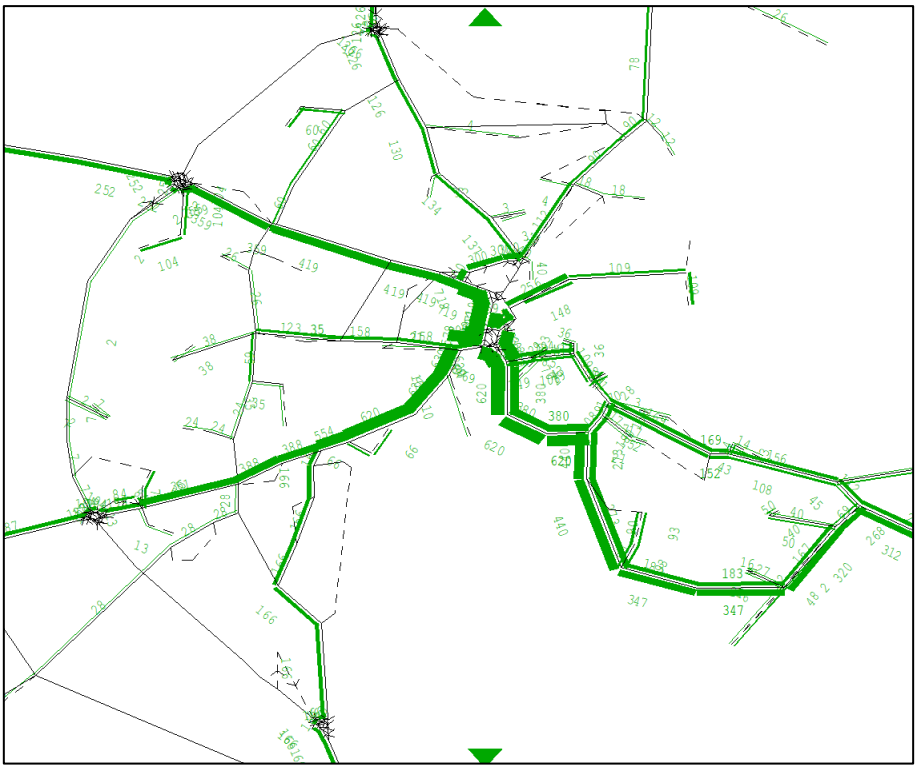
Table 2-1 - 2018 annual average daily traffic flows on the A4 and A420 corridors in Chippenham

		2018	
	Location	Annual average daily flow (all vehicles)	HGV as percentage of all vehicles
A4 corridor from east to west	A4 London Road - east of Pewsham	20,537	3%
	A4 Avenue La Fleche	25,796	2%
	A4 Bath Road east of Pheasant roundabout	20,144	1%
A420 corridor from central Chippenham to A350	A420 north of Bridge Centre gyratory	17,847	3%
	A420 Bristol Road east of A350 Bumpers roundabout	16,491	2%

Source: Department for Transport Annual Average Daily Flow (AADF) data

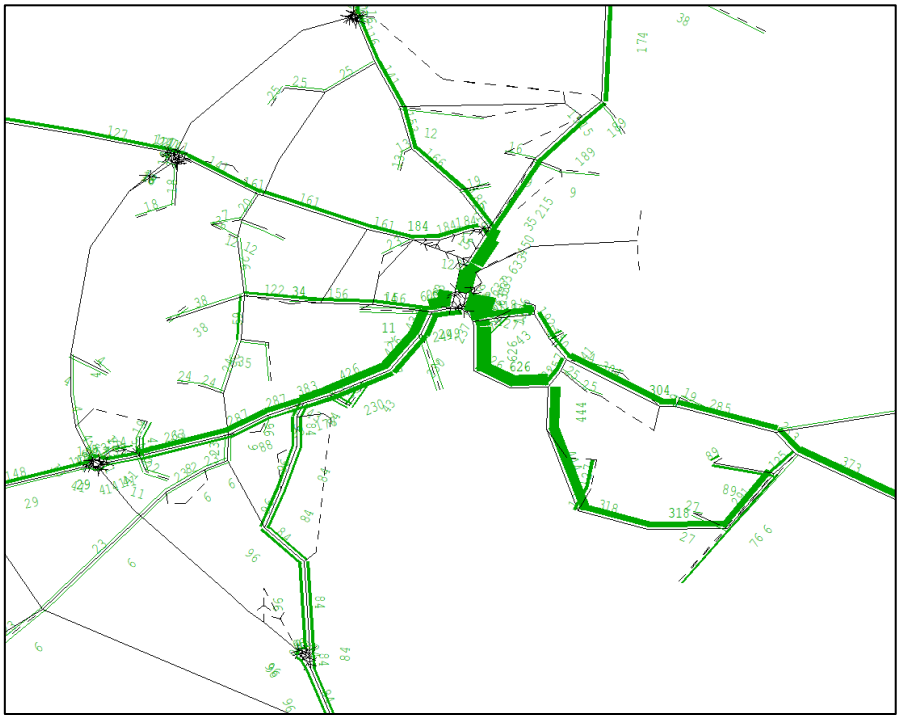
Figure 2-2 and Figure 2-3 present select link analysis from the 2018 base year at the Bridge Centre. This shows the links used by traffic travelling through the Bridge Centre, where the A4 and A420 corridor converge in the AM peak hour (0800-0900). The analysis highlights the importance of the A4 and A420 corridors providing for journeys across the town.

Figure 2-2 - Select link analysis – Bridge Centre, northbound. 2018 base model. AM peak hour (0800-0900). All vehicles



Source: Wiltshire strategic model (Saturn)

Figure 2-3 - Select link analysis – Bridge Centre, southbound. 2018 base model. AM peak hour (0800-0900). All vehicles



Source: Wiltshire strategic model (Saturn)

2.3.2. Walk and cycle network

Chippenham has an extensive network of pedestrian and cycle links as shown in **Figure 2-4**. In addition to the routes within the town Sustrans National Cycle Network, Route 403, which routes through the town provides cycle connectivity between Calne and Chippenham.

Figure 2-4 - Chippenham town - walk and cycle network

Source: Wiltshire Council, http://wiltshire.gov.uk/transport-town-cycle-networks

2.3.3. Rail

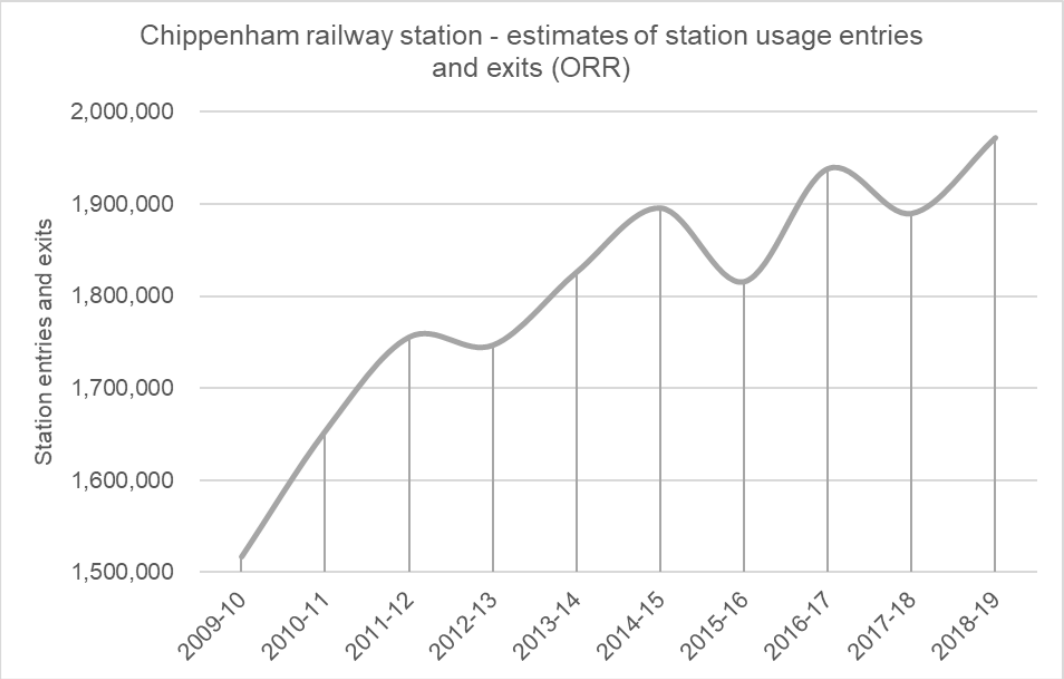
Chippenham benefits from a railway station which provides access to frequent high-speed rail services on the Great Western Mainline, with direct access to London, Reading. Swindon, Bath and Bristol, as well as the less frequent rail services on the TransWilts line to Melksham, Trowbridge and Westbury. The services operating at the station are outlined in Table 2-2.

Table 2-2 - Rail services at Chippenham rail station

Destinations	Line	AM / PM peak period frequency	Off peak frequency
London Paddington	Great Western Main Line	Every 30 mins	Every 60 mins
Didcot Parkway			
Reading			
Bristol Temple Meads			Every 30 mins
Swindon			
Bath Spa			
Trowbridge	TransWilts Line	Hourly	Hourly
Melksham			Hourly

Patronage at Chippenham railway station has increased steadily over the past 10 years as illustrated in Figure 2-5. Rail patronage on the Great Western Mainline is forecast to increase 47% by 2043, as a result of committed schemes on the route, including electrification. These schemes will mean that journey times between stations are likely to reduce and the frequency of services is likely to increase.

Figure 2-5 - Growth in passengers at Chippenham railway station 2009-10 to 2018-19



Source: Office of Rail and Road (ORR) - estimates of station usage entries

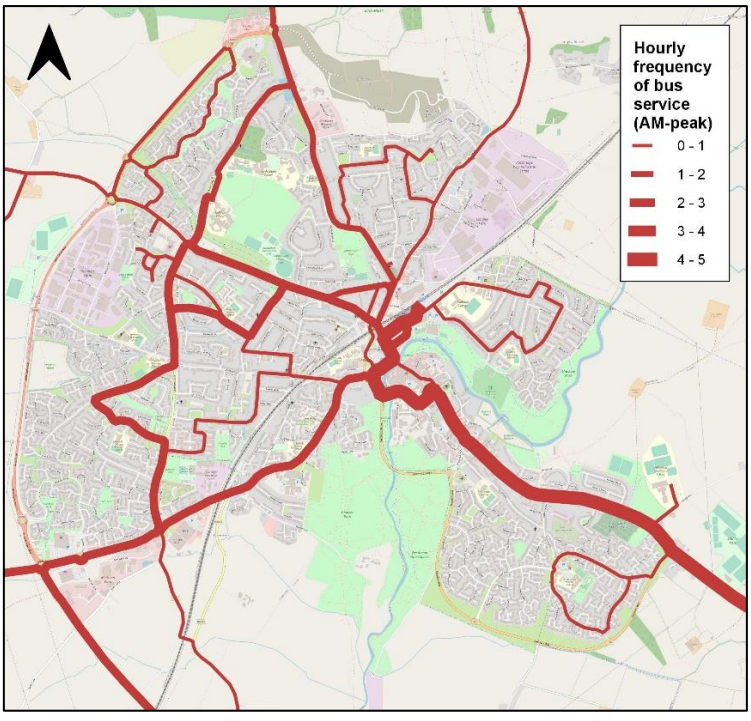
2.3.4. Bus

Chippenham's bus network provides varying levels of service across the town. The highest frequency corridors are the A4 Bath Road and London Road (through Pewsham). The services which operate on these corridors are listed in Table 2-3 and illustrated in Figure 2-6.

Table 2-3 - Highest frequency bus corridors in Chippenham

Principle corridor	Services	Maximum frequency
London Road	X55. 55/55A. 231. 33/X33.	20 minutes
A4 Bath Road	X31. 231. 44D. X34. 234	20 minutes

Figure 2-6 - Hourly frequency of bus services in Chippenham – Monday AM peak (0700-0859)



Source: Routelines – Basemap and timetable data from TNDS/NCSD

2.3.5. Journeys to work and mode share

Chippenham's location in proximity to strategic transport links, both road and rail, means that residents are able to choose to travel further afield for work. Census 2011 travel to work data presented in Table 2-4 shows that 64% of people travelling to work from Chippenham out-commute to work elsewhere in Wiltshire or further afield, while the remaining 36% of people live and work in the town.

Analysis of the Census 2011 data indicates that a high proportion of people travelling to work from Chippenham travel further afield for employment and are predominantly residents of the Cepen Park, Monkton Park and Pewsham areas of the town. Proximity to the A350 and the railway station are likely to play a key role in this pattern.

Analysis of the proportions of people who both live and work in Chippenham, indicates that areas in central Chippenham and within close proximity of the town centre have a higher proportion of people who work in the town.

It is acknowledged that travel patterns and behaviours, particularly for journeys to work, could change in the longer term due to the Covid-19 pandemic. The extent and nature of these changes and their impact on the transport network is currently unknown but is being monitored and considered by transport network operators across the UK.

Table 2-4 - Travel to work from Chippenham, Census 2011

Total travel to work trips from Chippenham			% of working age Chippenham residents
Destination (place of work)	Wiltshire	Chippenham	36%
		Rest of Wiltshire	36%
	Elsewhere	Swindon	7%
		Bath and North East Somerset	6%
		South Gloucestershire	4%
		City of Bristol	3%
		Cotswold	1%
		Remainder of South West	1%
		Remainder of UK	5%

The proportion of Chippenham residents using each mode of travel for journeys to work is shown in Table 2-5. The data indicates that whilst the car is used for the highest proportion of journeys, the higher than average proportion of resident using rail for journeys to work demonstrates the important role of Chippenham's high-quality rail links.

Table 2-5 - Travel to work mode share, Census 2011

	Chippenham	Wiltshire average	South West average	England and Wales average
Car driver	67%	70%	67%	61%
Car passenger	6%	5%	6%	5%
Taxi	0%	0%	0%	1%
Motorcycle	1%	1%	1%	1%
Train	6%	3%	2%	5%
Bus, mini-bus, coach	2%	3%	5%	8%
Bicycle	3%	3%	4%	3%
Walk	15%	14%	15%	11%
Underground, metro, light rail, tram	0%	0%	0%	4%
Other method travel to work	0%	1%	1%	1%
Total travelling to work	100%	100%	100%	100%

The mode share data shows that the majority of journeys to work are made by car. Further analysis presented in Table 2-6 highlights that 29% of journeys to work are less than 2km while 17% of journeys are between 2km and 5km. Based on average walk and cycle speeds and acceptable journey times journeys within 2km are considered an acceptable distance to walk for commuter journeys[1] whilst journeys less than 5km are considered a reasonable distance to cycle for work. The urban area of Chippenham measures approximately 5.5km (3.4 miles) north to south and 5km (3.1 miles) east-west.

Table 2-6 - Distance travelled to work, Census 2011

	Chippenham	Wiltshire average	South West average	England and Wales average
Less than 2km	29%	25%	25%	20%
2km to less than 5km	17%	14%	22%	22%
5km to less than 10km	11%	17%	19%	21%
10km to less than 20km	17%	20%	17%	19%
20km to less than 30km	12%	9%	6%	7%
30km to less than 40km	7%	6%	3%	3%
40km to less than 60km	2%	4%	3%	3%
60km and over	6%	6%	5%	4%

2.4. Current policy context

2.4.1. Wiltshire Core Strategy and Chippenham Site Allocations Plan

The Wiltshire Core Strategy 2006-2026 (adopted February 2015) identifies Chippenham as a Principal Settlement in Wiltshire and therefore a key location for future employment and residential development. The Core Strategy outlines the scale of growth in settlements, rather than identifying specific sites for development. For Chippenham, Core Policy 10 sets out a requirement for 26.5ha of new employment land and at least 2,625 new homes, to be provided at strategic site allocations by 2026.

[1] http://www.hwa.uk.com/site/wp-content/uploads/2017/09/NR.4.3F-CIHT-Guidelines-for-Providing-Journeys-on-Foot-Chapter-3.pdf

In terms of transport requirements, Core Policy 63 (Transport Strategies) states that "packages of integrated transport measures will be developed and implemented." to "support…enhanced strategic employment and service roles, and better self-containment" of the principal settlements in Wiltshire.

The Chippenham Site Allocations Plan (CSAP) Development Plan Document 2006-2026 (adopted May 2017) identifies the specific strategic development sites to support the scale of growth identified in Core Policy 10. The draft CSAP details the approach to providing for employment and residential development at strategic sites in Chippenham up to 2026. The CSAP allocated growth at two strategic sites in Chippenham:

- CH1: South West Chippenham.
- CH2: Rawlings Green.

This is an addition to committed development at the Hunters Moon and North Chippenham sites and smaller windfall sites across the town.

2.4.2. Local Plan Review

Wiltshire Council, under its Local Development Scheme, commenced a review of its Local Plan in 2017 in partnership with Swindon Borough Council. When it is adopted the Local Plan will provide a housing requirement for Chippenham for the period 2016-2036. The Strategic Housing Market Assessment (November 2017) identified the objectively assessed need using a method outlined in best practice at the time. The method also considered employment trends, the relationship between the jobs forecast and projected number of workers, and the need for affordable housing.

The SHMA identified the Full Objectively Assessed Need for Housing for the period 2016-2036 to be 29,000 dwellings in Swindon (1,450 dwellings per annum) and 44,000 dwellings in Wiltshire (2,200 dpa), an overall total of 73,000 dwellings. The need for each housing market area being:

- Chippenham HMA: 22,250 dwellings.
- Salisbury HMA: 8,250 dwellings.
- Swindon HMA: 29,000 dwellings.
- Trowbridge HMA: 13,500 dwellings.

Chippenham is the main settlement in Wiltshire's largest housing market area. Key findings of the 2017 SHMA settlement profile for Chippenham highlight the barriers and opportunities to growth in the town:

- *"The town has significant potential for economic growth. A new road linking the A4 to the A350 would help considerably toward realising it.*
- *Housing development has been well below anticipated rates, largely because there has been no land identified for development for much of the plan period."*

On the 13th January 2021 a Local Plan Review was published and considers preferred options for accommodating this housing development. The proposed options for development in the Plan were not available during the consideration of alternative route alignments assessed in this Report. The alignments referenced in this Report allow enough flexibility to be able to serve a wide area of development and development scenarios and will require further refining, subject to consultation and a review of options against further development scenarios.

To ensure the route options assessed in this OAR can be carefully scrutinised, the HIF funded scheme identified concept layouts for possible future development. These layouts help test road alignment options and were detailed in a Draft Concept Framework that supports this report

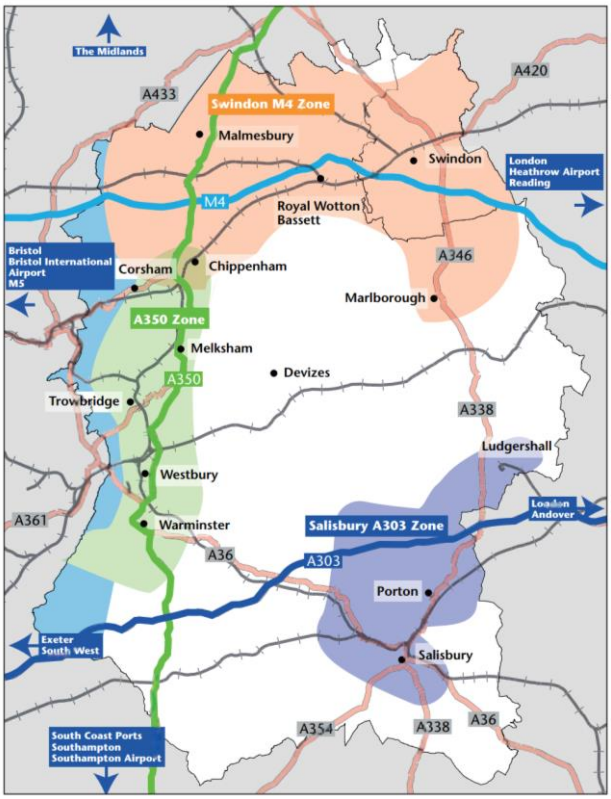
2.4.3. Swindon and Wiltshire Local Enterprise Partnership

Chippenham is at the heart of two Swindon and Wiltshire Local Enterprise Partnership (SWLEP) priority growth zones identified in the SWLEP Strategic Economic Plan (SEP): Swindon-M4 Growth Zone and the A350 Growth Zone. These growth zones are where there are currently large agglomerations of economic activity with the greatest capacity for supporting sustainable growth in the future. Chippenham offers the potential to extend growth into the area that has developed out of London through to Reading and Swindon, as well as the potential to draw in investment from the west out of Bristol and Bath through the development potential at M4 J17.

The vision outlined in the SEP is: *"Swindon and Wiltshire in 2026 is world-renowned for its innovation, entrepreneurialism and great quality of life. Its blend of vibrant urban centres, busy market towns and outstanding rural landscape make it the best place in Britain to live, work and visit. A well-connected, attractive, vibrant place, our population continues to grow at a rate that out-strips many parts of the country, with more people choosing to live and work locally."*

Recent investments in the town include improvements to the A350 Chippenham bypass, the Great Western Main Line Route Modernisation, Chippenham railway station masterplan and Lackham College reinforce the role of the town as an important economic centre and will support future growth of the town.

Figure 2-7 - SWLEP Growth Zones[2]



2.4.4. Major Road Network and Western Gateway Sub-National Transport Body

On 23rd December 2017, the Government launched a consultation setting out proposals for the creation of a Major Road Network (MRN) with the intention that it formed a middle tier of the country's busiest and most economically important local authority 'A' roads, sitting between the Strategic Road Network (SRN) and the rest of the local road network. The A350 between M4 Junction 17 to the north of Chippenham and the A36 north of Warminster is designated as part of the MRN.

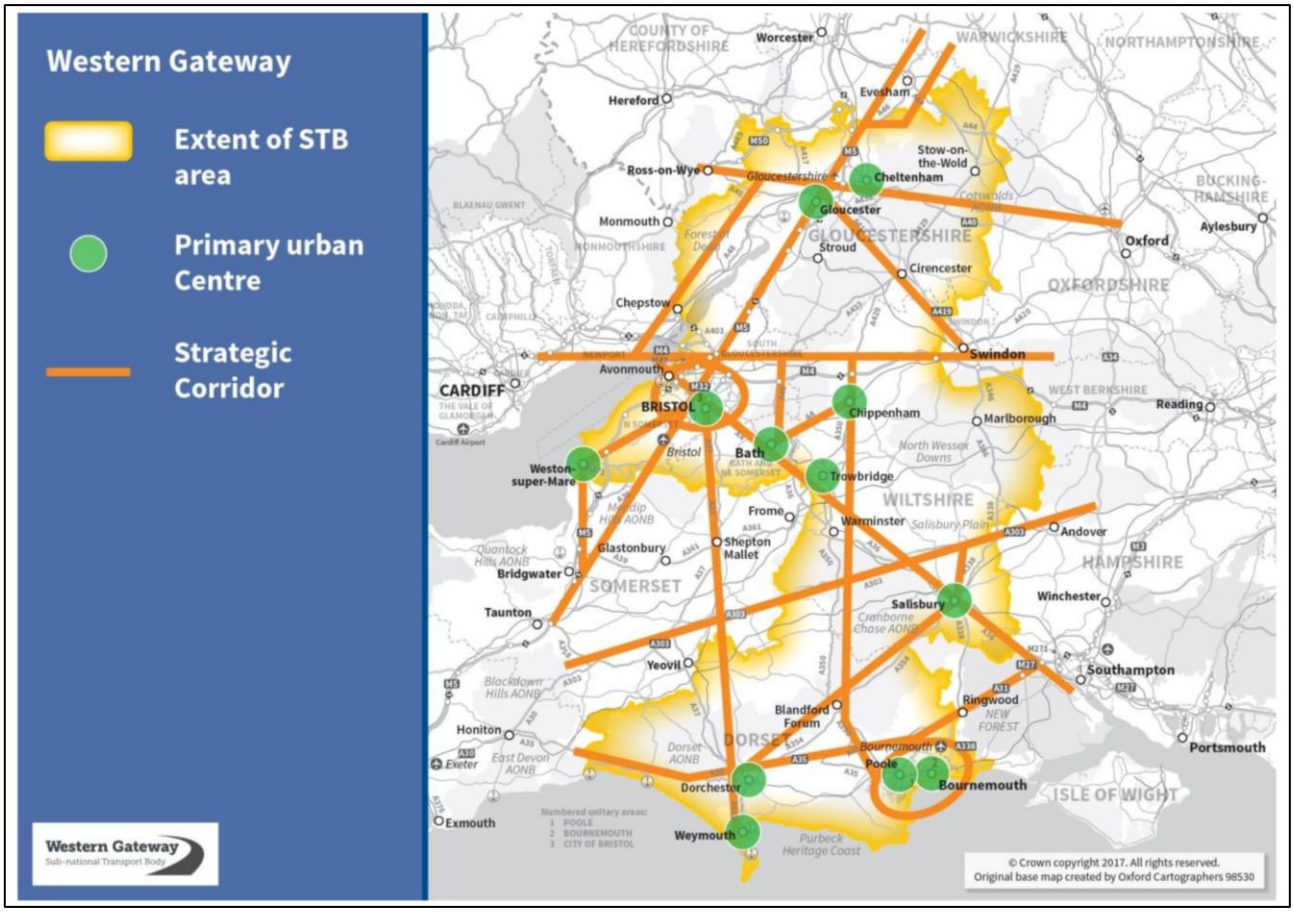
The creation of Sub-National Transport Bodies (STBs) was enabled in 2016 following legislation passed through the Cities and Local Government Act 2016. The formation of the STBs is intended to empower neighbouring local authorities to create regional oversight on strategic transport planning. As single entities, the STBs can identify and implement schemes and strategies which will have a positive impact on key routes of regional importance. The Western Gateway STB is an alliance of the Local Authorities within the STB area shown in Figure **2-8**Improving north-south connectivity in the Western Gateway area has been identified as a key challenge to overcome, the A350 is a key link to achieving this. Western Gateway have also recognised the role the A350 can play in improving the economic relationship between the West of England and Bournemouth, Christchurch and Poole city regions situated to the north and south of the area.

Improving north-south connectivity within the Western Gateway area has formed a key policy theme for investment. In February 2019, the Western Gateway STB produced its Strategy Context Document to feed into the Regional Evidence Base) REB, identifying improvements to the A350 strategic corridor as one of 15 priority areas for investment as shown in **Figure 2-8.**

In July 2019 Wiltshire Council and the Western Gateway STB submitted an Outline Business Case (OBC) to the DfT for funding the delivery of the final phases of improvements to the A350 Chippenham bypass. This submission is currently being considered by the DfT. Wiltshire Council were successful in being awarded funding to further develop schemes at M4 junction 17, A350 Melksham and A338 in Salisbury to OBC.

[2] https://swlep.co.uk/docs/default-source/strategy/industrial-strategy/emerging-lis-v0-1-master-31032020.pdf?sfvrsn=4fe0ce5e_10

Figure 2-8 - Western Gateway STB - strategic corridors[3]



2.5. Current constraints & opportunities – transport network

2.5.1. Introduction

This section draws on material and information presented in the Chippenham Transport Strategy (2016) to identify constraints and opportunities on the transport network in Chippenham This is because it remains relevant as no significant changes to the transport network have occurred in the town since its publication.

2.5.2. Congestion in central Chippenham

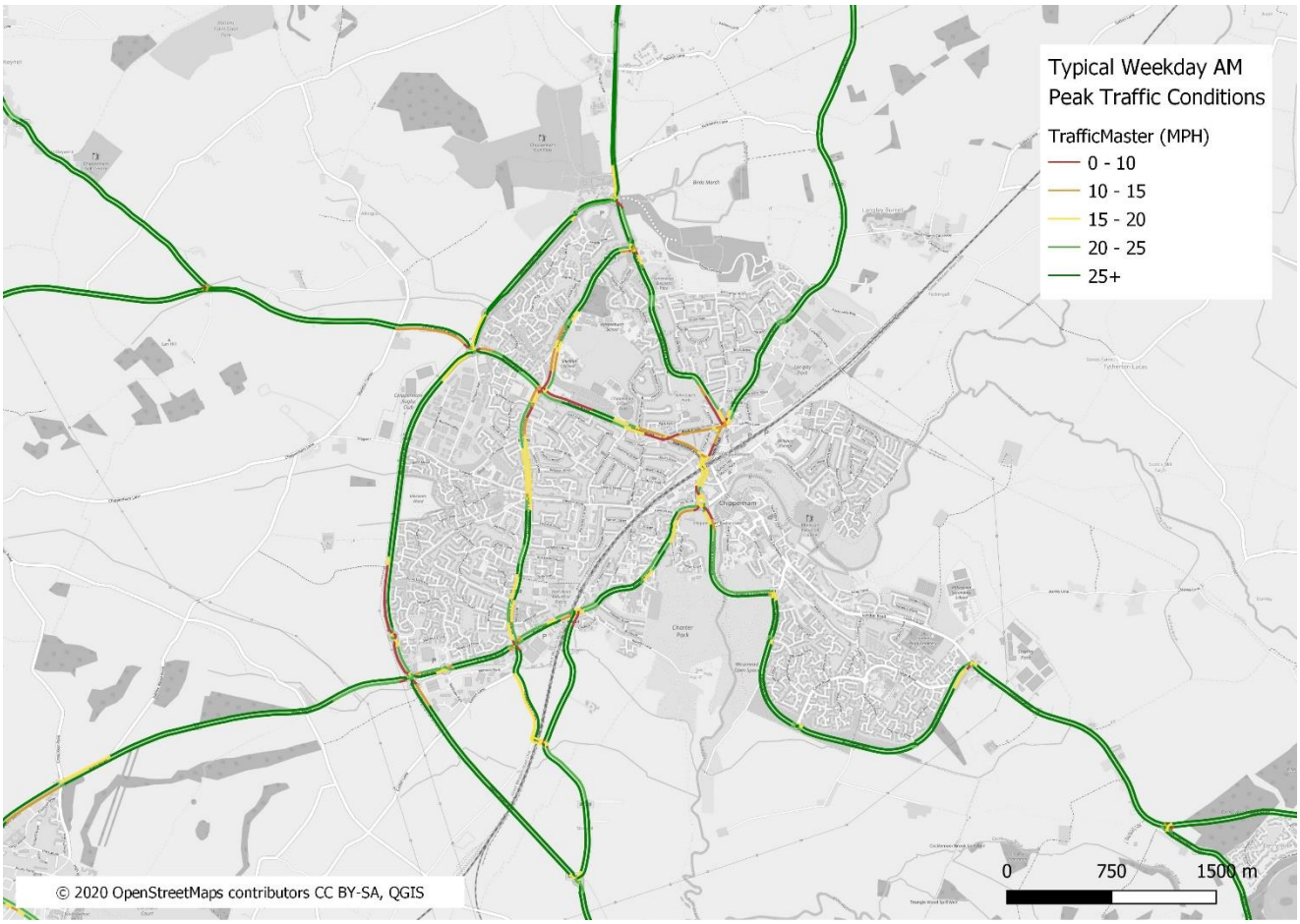
Congestion and delays on the A4 and A420 corridors and in central Chippenham leads to excessive journey times from traffic passing through the town centre to connect to the A350 via the Bridge Centre junction, A4 and A420. Slower speeds, representing congestion and delays, during the AM (0800-0900) peak hour at these locations are shown in Figure 2-9.

Delays and queuing on the A4, A420 and A350 corridors also have an impact on people's route choices for travelling within and through the town. In order to avoid delays people can choose to use less appropriate routes with consequent impacts on residential areas and routes designed for lower volumes of traffic.

Delays at key locations on the routes which converge on the town centre create a barrier to accessing the town centre, potentially making it a less attractive place to visit. Delays also impose increased transport costs on residents and businesses.

[3] https://westerngatewaystb.org.uk/media/2090917/wg-reb-part-2-strategic-corridors.pdf

Figure 2-9 - 2017-18 TrafficMaster data - average AM (0800-0900) and PM (1700-1800) speeds (mph)



Source: Department for Transport Traffic Master data

In addition to the delays and congestion on the A350, A4 and A420 corridors, congestion has been identified at the following town centre locations:

- Bridge Centre gyratory.
- Park Lane/New Road/Marshfield Road one-way system to the north of the town centre.
- Station Hill/New Road junction.

Congestion at the locations identified is also shown to lead to secondary impacts at other locations, this is where queues and delay at a primary location impact other locations, these impacts are listed in Table 2-7.

Table 2-7 - Primary and secondary congestion locations

Primary congestion location	Secondary impacts
Bridge Centre gyratory	Gladstone Road/Avenue La Fleche / Lowden Hill / Audley Road
The Park Lane/New Road/Marshfield Road one-way system to the north of the centre	Hill Corner Road/Malmesbury Rd junction Hill Corner Road/Maud Heath's Causeway junction Greenway Lane
Station Hill/New Road junction	Delays accessing the station and within the Monkton Park area

2.5.3. Central road network is constrained

There are a number of physical constraints on these main routes. The A4 Bath Road, New Road and A420 Marshfield Road are spanned by the raised Great Western Mainline whilst there is only one crossing of the River Avon on these main routes at the A4 Avenue La Fleche. These physical constraints mean that there are a number of potential pinch points on the key routes.

The town centre has a historic narrow and complex street layout. Furthermore, railway and river bridges constrain the road network at specific locations, such as at the railway arches at the junction of New Road/Marshfield Road, and along the A4 Bath Road. Together, these issues present a challenge to providing additional capacity for all modes of transport in central Chippenham.

2.5.4. Incomplete and substandard cycle and pedestrian networks

In June 2013, Sustrans conducted a review of the walk and cycle routes in Chippenham in order to identify issues on the network. The study identified issues at locations across Chippenham, the key issues identified were:

- Narrow footways and cycle routes.
- Limited crossing opportunities for pedestrians.
- Severance between key locations caused by rivers, railway lines and primary roads limiting opportunities to travel by foot and cycle.
- Speed/volume of traffic on routes.
- Sub-standard surfacing.
- Some location specific issues for pedestrians and cyclists that have been identified include:
  - Poor condition of existing crossings over the River Avon into the town centre, with a limited number of crossing opportunities.
  - High traffic volumes and busy junctions along the A420.

The Sustrans study identified that the pedestrian and cycle network doesn't necessarily provide for safe and convenient journeys by walking and cycling, which means that the car is a more attractive option for many journeys within the town.

The Census travel to work data highlights that whilst a high proportion of people drive to work in Chippenham, many people are also travelling over a short distance. This highlights the potential that exists for more trips to be made on foot or by bicycle. Short distance trips by car contribute to congestion within the town as well as having potential implications for public health due to generally lower levels of physical activity.

2.5.5. Delays to bus services

Delays and congestion on the A4 and A420 corridors impact on the reliability of bus services in the town, this is particularly important as these corridors are the primary corridors for bus services in Chippenham, offering the highest level of frequency and providing local and longer distance bus services. The limited resilience of the highway network further impacts bus service reliability and journey times.

Latest availability bus reliability surveys conducted by Wiltshire Council at Chippenham Community Hospital in the summer and autumn of 2014 recorded 25% of bus services as delayed. There are currently no significant bus priority measures in the town which means that services are affected by any congestion that occurs.

Unreliable bus services and extended journey times caused by congestion has a negative impact on people's perception of bus services and the likelihood of them choosing the bus for journeys where it is a possible alternative to the car. It also results in increased operating costs for bus service operators, which increases the price of fares for passengers, again making the bus a less attractive option.

2.6. Current constraints and opportunities – physical

2.6.1. Landscape topography and geography

Chippenham is located within the Avon Vale. The wide valley of the River Avon is the main influencing feature of this character area. The wide river corridor has an ancient pattern of flood meadows and drainage ditches, with closely associated settlements and more recent development. The Avon and its tributaries are surrounded to the west, south and east by higher land. These ridges provide panoramic views across towns, villages and the countryside edges. The south and east and north east feature open landscape to surrounding villages and hamlets, built on the surrounding hills at Derry Hill, Bencroft Hill and Bremhill which have a large view across the east side of Chippenham.

Land at Rawlings Green, to the north-east of Chippenham provides a raised foreground to the Chippenham settlement edge. To the east, the settlement edge areas visible from the east include Hardens Mead and Monkton Park, to the south, the settlement edge is partially screened by topography.

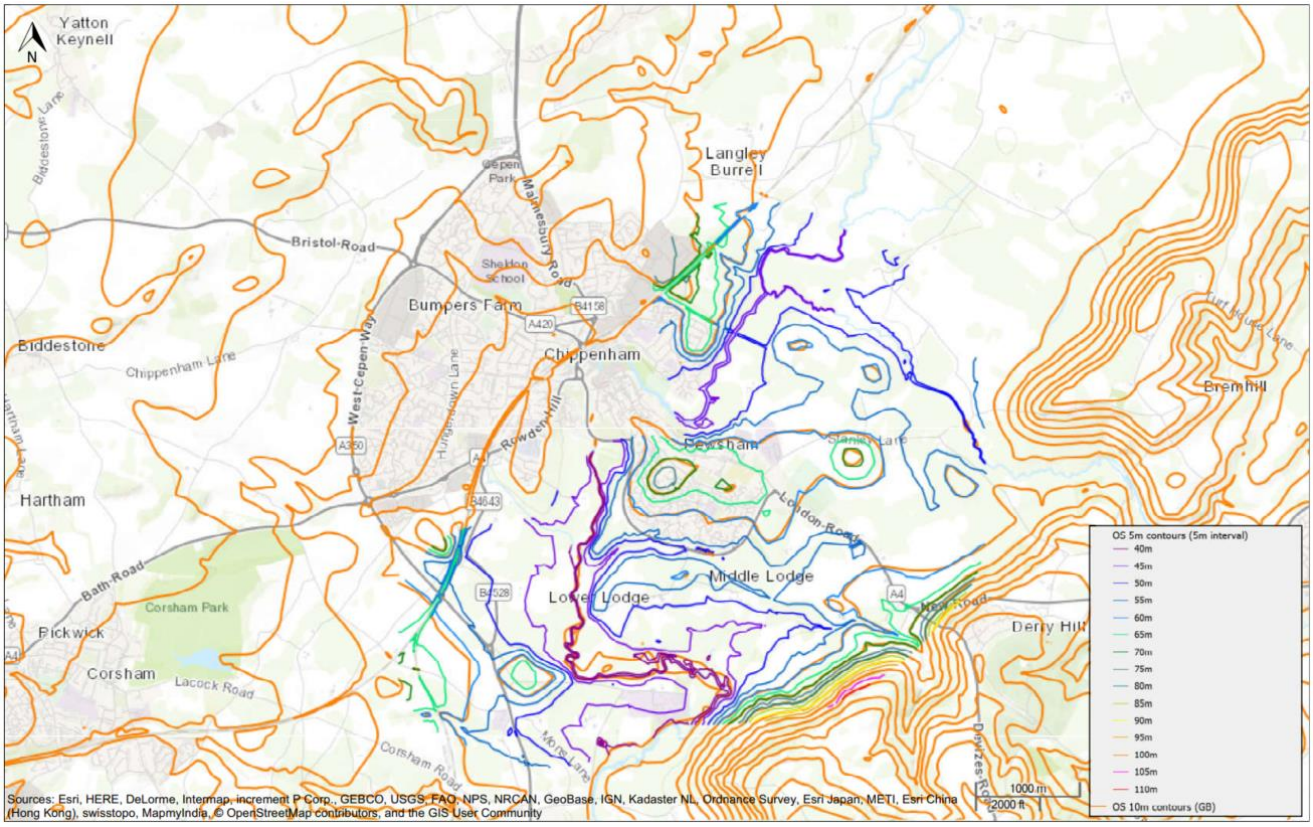
The settlement edge of Chippenham is generally two-storey with little variation in height of the roofline with built form partially screened by existing vegetation. The church spires of St Paul's and St Andrew's are important landmarks in the town and are visible from the surrounding landscape.

The west side of Chippenham is screened from the A350 by a tree lined edge to the town, the north is boarded by Birds Marsh. Land to the west is generally flat open landscape across agricultural fields towards the villages of Yatton Keynell, Biddestone, Hartham and the town of Corsham. Corsham Park located between Chippenham and Corsham is a conservation area and features a brownian landscape setting to the manor house at Corsham Court.

Rowden Hill and parts of central Chippenham are visible on higher ground from viewpoints located to the south-west of the settlement edge. It is possible to see the industrial unit at Parsonage Way on the southern edge of Chippenham.

Figure 2-10 shows the 5m contours for the study area, with 10m contours for the surrounding areas.

Figure 2-10 - Contour plan

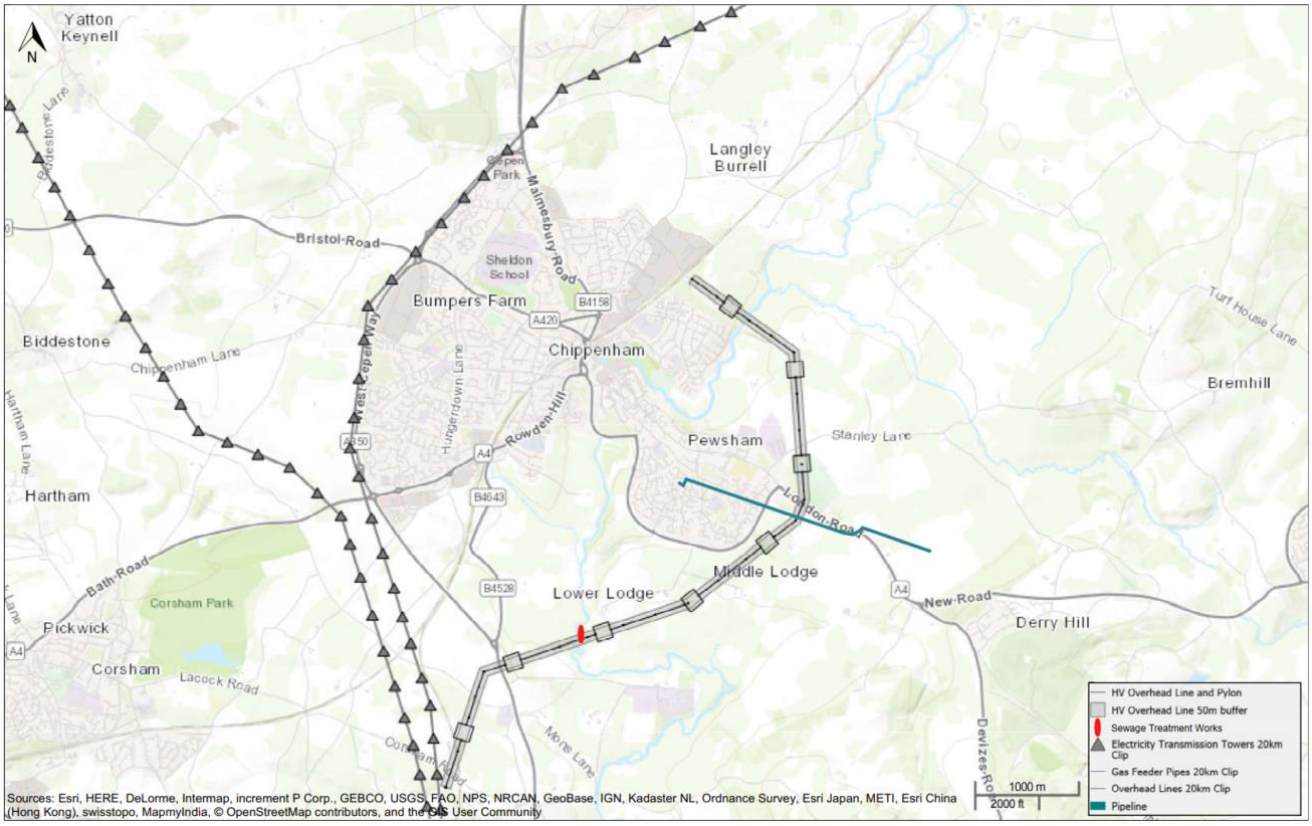


2.6.2. Utility services

There is a network of underground and overhead utility services running across Chippenham. The utilities serve Chippenham with strategic main supply corridors running along the A4. Additional strategic utilities include extra high voltage overhead electric cables running around the east and west of Chippenham. A strategic oil pipeline crosses under the A4 near the route of the Wilts and Berks canal and under Pewsham Way, crossing under Hungerdown Lane and the A350 between the A4 and A420 junctions.

A sewage treatment works is located adjacent to the River Avon, near to Lower Lodge Farm. These utility constraints have been mapped in Figure 2-11.

Figure 2-11 - Utility services



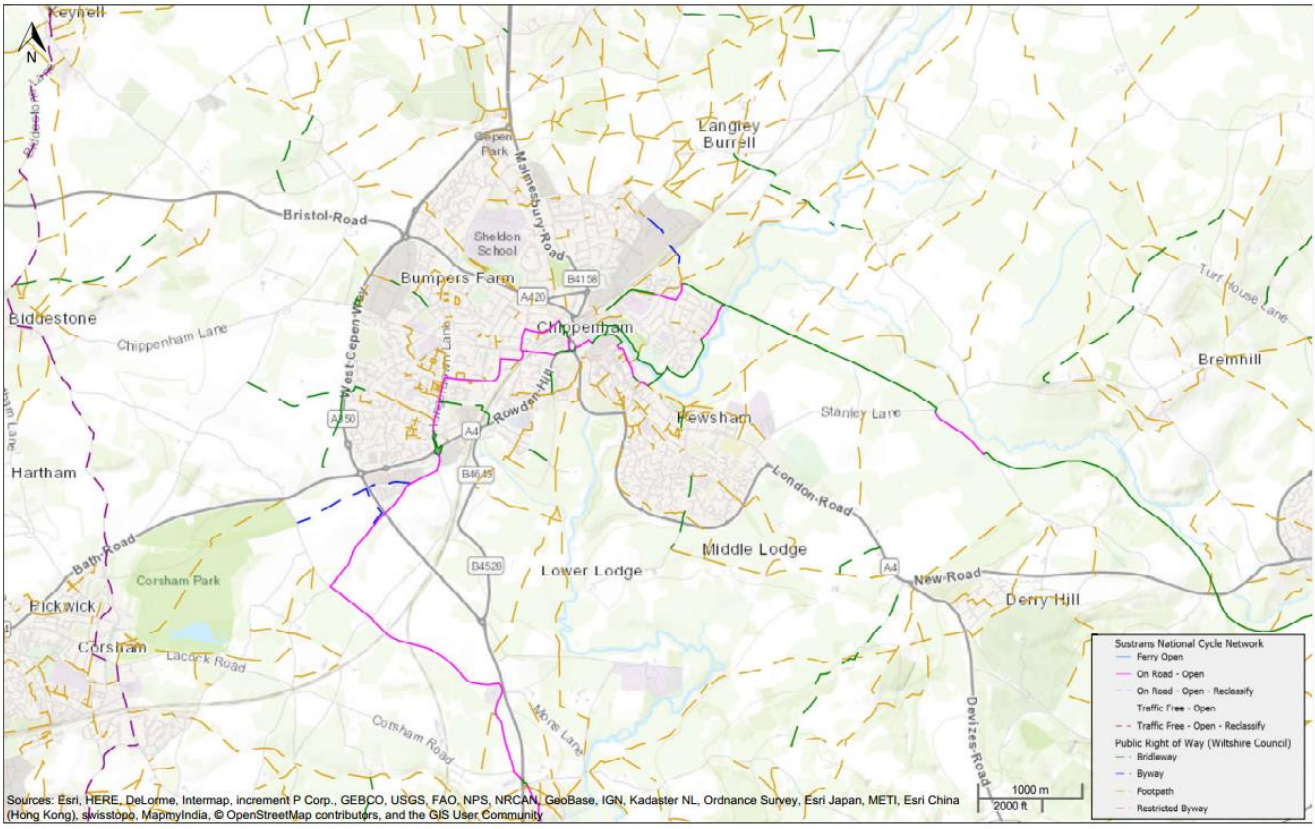
2.6.3. Transport network

Local and strategic road distribution uses the A350, running south / north to the west of Chippenham, the A4 running east to west through Chippenham and the A420 to the west of Chippenham, see Figure 2-12.

National Cycle Network, Route 403 is located to the east of Chippenham, running along the dismantled GWR Calne branch line. A network of Public Rights of Way route through and around Chippenham, route alignments and connectivity are restricted by the River Avon.

The Wilts and Berks canal is located to the south and east of Chippenham and is currently not navigable. The Wilts & Berks Canal Trust are progressing a programme of canal restoration and have plans to restore Pewsham Locks and the canal route from Chippenham to Lacock in the short to medium term. The canal route is considered to be a movement corridor.

Figure 2-12 - Transport network



2.6.4. Land ownership

Landowners, residents, tenants and developers are identified, and a strategy is in place to ensure a scheme is deliverable. A schedule and a map of landowners of all types and a process for scheme option sifting is included in the Land report.

Refer to Appendix B.

2.7. Environment constraints

Summaries of environmental conditions for Chippenham and the surrounding area are provided for each environment topic below. A description of topography and geographic locations is provided in 2.6.1, this provides a general description of landscape and visual impact.

Further details of the baseline environment for the emerging scheme options are provided in the Preliminary Environmental Assessment of Options Report (PEAOR) in Appendix A and section 10.

2.7.1. Air quality

There are no Air Quality Management Areas (AQMA) declared within the vicinity of Chippenham with the nearest AQMA located in Calne approximately 5km east of Chippenham.

2.7.2. Noise and vibration

Major roads in the area, such as the A350, A4, A420, B4528 and Pewsham Way, are expected to dominate the existing noise and vibration environment for nearby sensitive receptors. The contribution of road traffic noise to existing baseline noise and vibration levels is dependent on distance to roads, and the existing traffic flow, composition and speeds on those roads.

There are several Noise Important Areas (NIA) in Chippenham and the surrounding area that could be affected by changes to the transport network.

2.7.3. Biodiversity

Baseline biodiversity habitat data is included in this section. More detailed information relating to the emerging scheme options is available in section 10 and the PEAOR in Appendix A.

2.7.3.1. Statutory designated sites

Two Special Areas of Conservation (SACs) which are designated for bat species are located within 30km.

There is a Local Nature Reserve (LNR at Mortimore's Wood to the south of Chippenham and several Sites of Special Scientific Interest (SSSIs) including Kellaways, River Avon and Sutton Lane Meadows to the north, Bencroft Hill Meadows to the east, Spye Park to the south and Honeybrook Farm to the west.

2.7.3.2. Non-statutory designated sites

There are multiple non-statutory designated sites, County Wildlife Sites (CWS), in the Chippenham area. Records for this data are recorded in section 10 of this report.

2.7.3.3. Terrestrial habitats

The rural area surrounding Chippenham provides habitat for terrestrial species including, bats, badgers, amphibians, otters, dormice, reptiles and birds. The following habitats are present: -

- Ancient woodland.
- Priority habitats including deciduous woodland, rivers, hedgerows, arable field margins and ponds.
- Agricultural land, including both arable and grazed grassland. Farmland habitats are included in the Wiltshire Biodiversity Action Plan (BAP) but are the most abundant habitat type across Wiltshire.
- Deciduous woodland connecting to species rich and species poor hedgerows, forming a connective network.
- The River Avon, River Marden, Cocklemore Brook, Pudding Brook, and connecting ditch network.

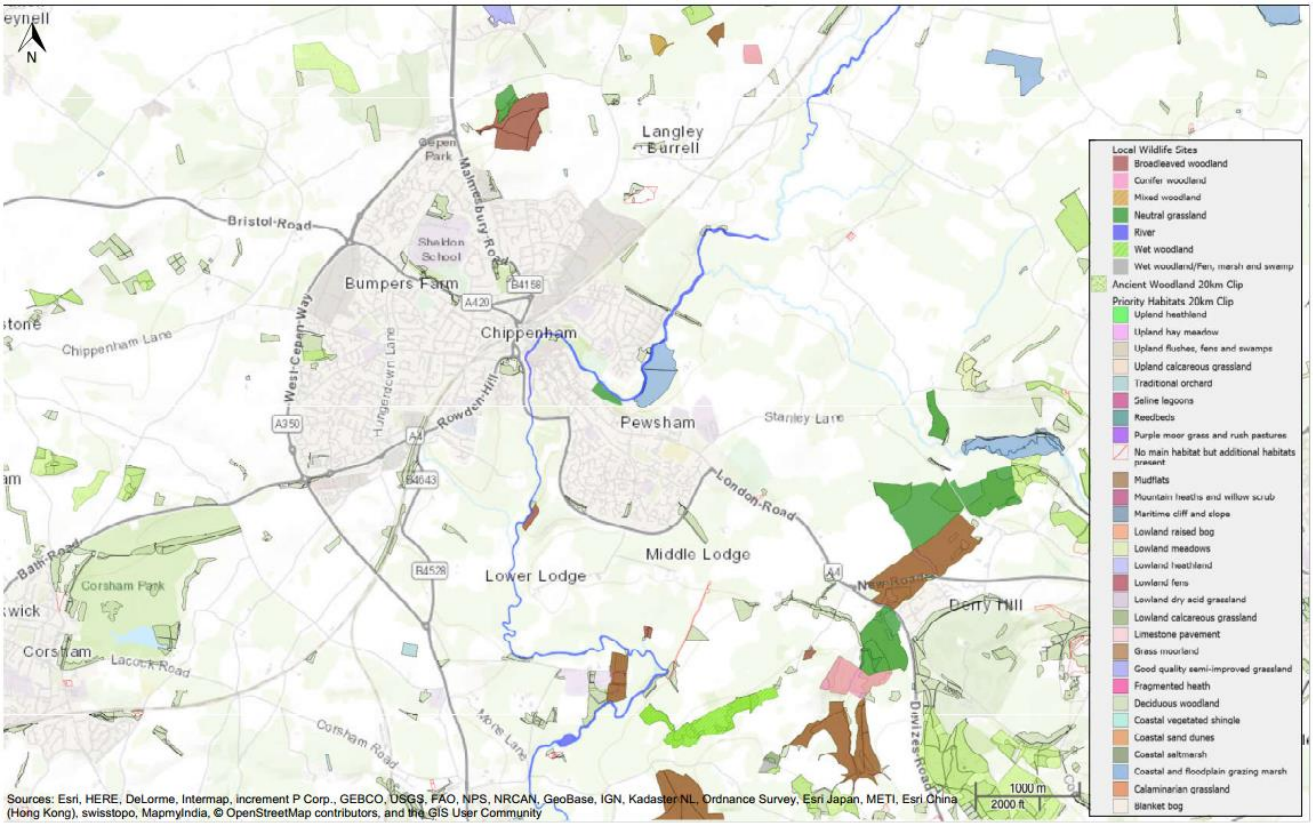
Non-native plant species are present in the Chippenham area.

Habitats locations are shown in Figure 2-13.

2.7.3.4. Aquatic habitat

The local rivers and watercourses provide habitat for aquatic species. Watercourses with potential to support aquatic species are shown in Figure 2-14.

Figure 2-13 - Habitat constraints map



Source: Environment Agency

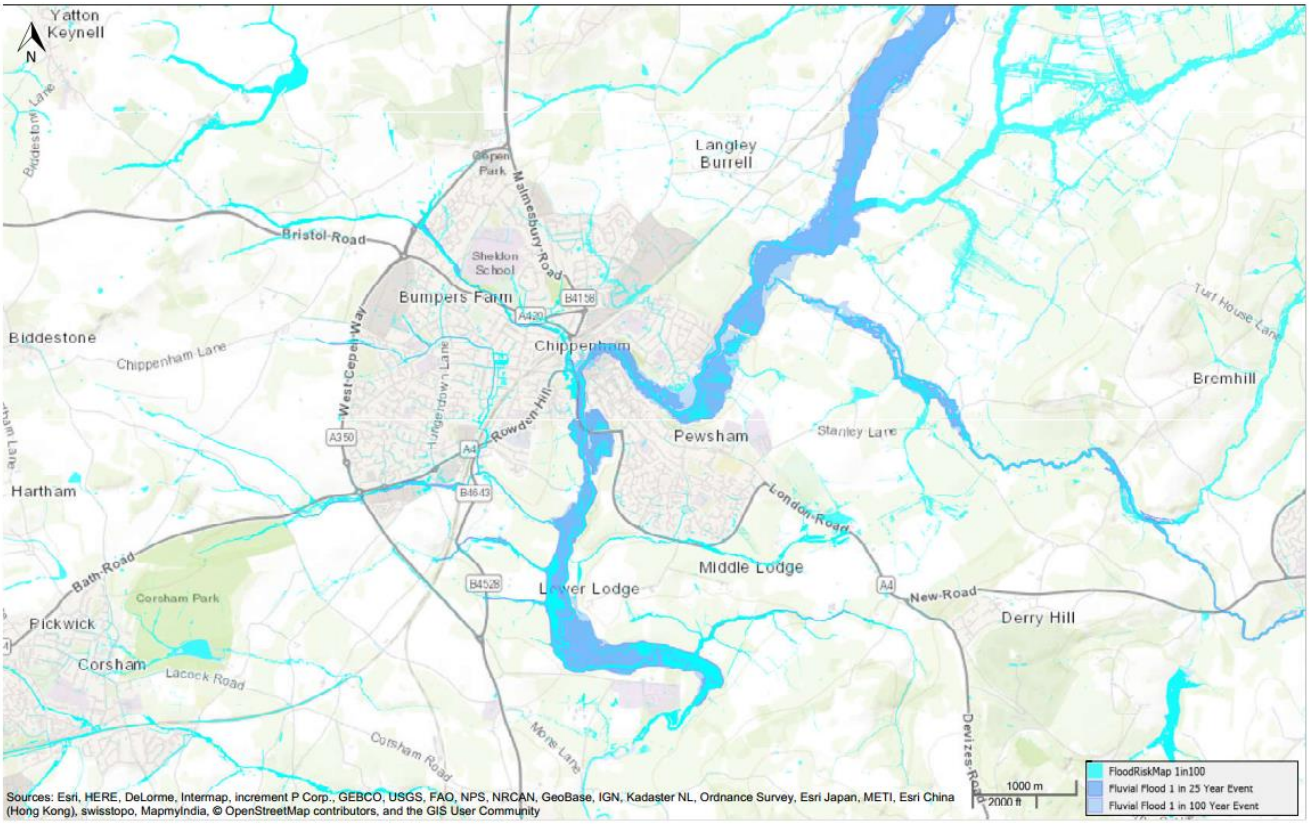
2.7.4. Water environment

The River Avon flows from north to south with an extensive floodplain. It has various tributaries within the Chippenham area. The River Marden flows into the River Avon to the northeast; Pudding Brook (Avon) to the south; and an unnamed tributary to the south connecting near the Sewage Treatment Plant and Lower Lodge. The floodplains of these tributaries are predominantly rural. There are several ordinary watercourses (including drains and ditches) that will be on hydraulic connectivity to these main rivers. The old route of the Wilts and Berks canal runs to the south and east. Refer to figure 2-14 for locations of rivers, streams and associated flooding.

The majority of the geology is designated as Unproductive Strata and this is reflected by the fact that the area is not underlain by a Water Framework Directive (WFD) groundwater body. Nonetheless, there are pockets of superficial deposits, designated as Secondary A Aquifers to the south of Chippenham. These superficial deposits continue north and east and are broadly associated with the presence of the River Avon. There is an additional area of alluvial fan deposits (typically comprising clay and silt) to the south of Chippenham.

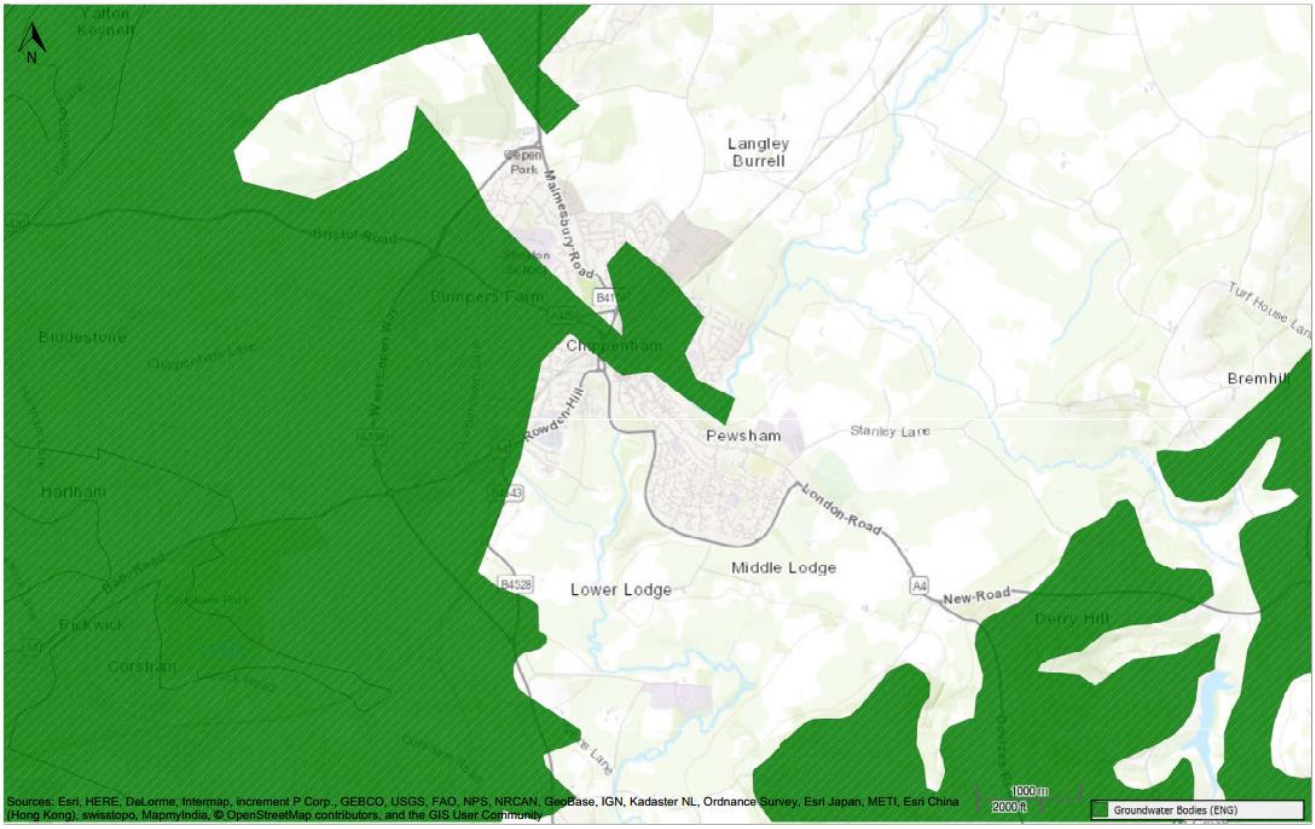
An Outer Protection Zone (Zone II) of a groundwater Source Protection Zone (SPZ) is located to the west of Chippenham. Refer to Figure 2-15 for locations of Source Protection Zones.

Figure 2-14 – Local watercourse habitat including flood extents



Source: Environment Agency

Figure 2-15 - Source Protection Zones



Source: Environment Agency

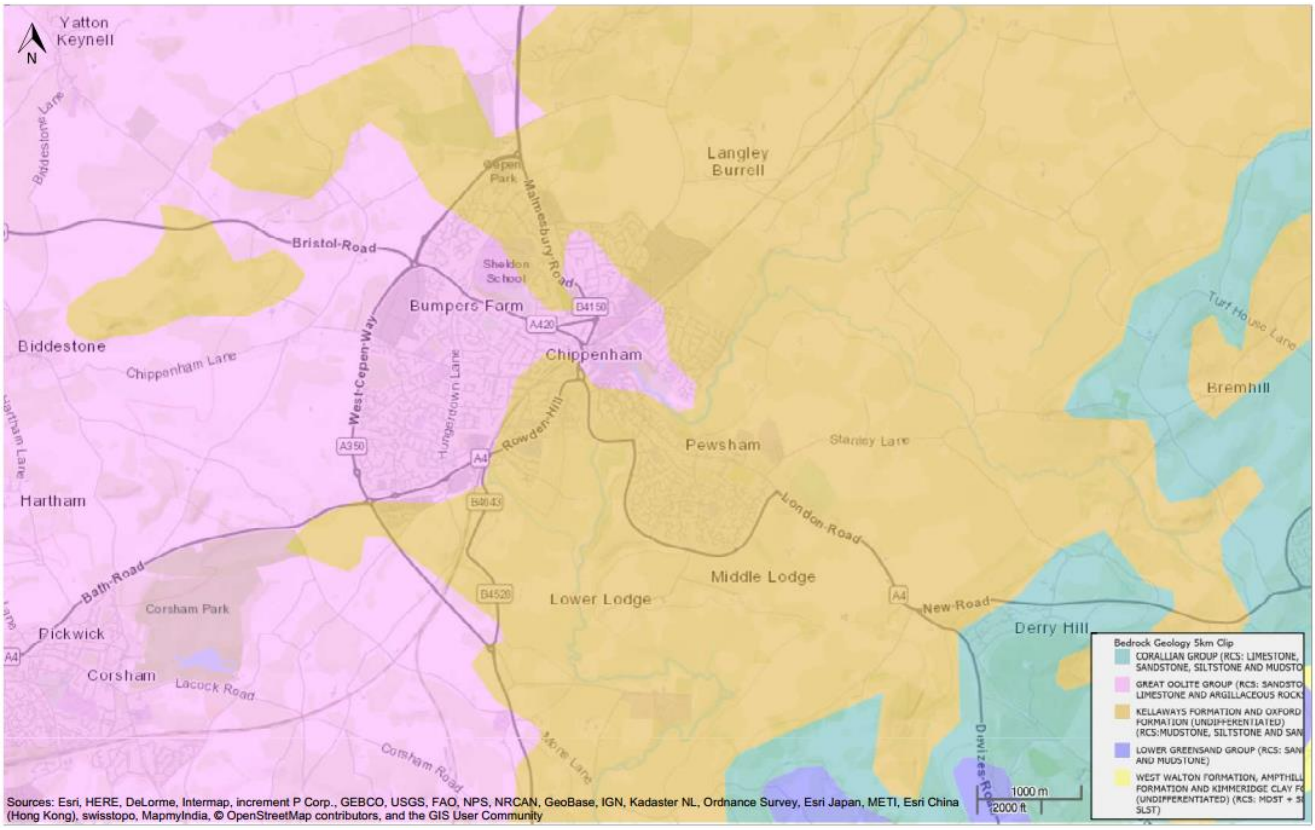
2.7.5. Soils and geology

In the scheme area, the bedrock comprises of sandstone, siltstone and mudstone of the Kellaways Formation, to the north, south and east, and Oxford Clay further south and east and Great Oolite to the west. Locations of bedrock formation are presented in Figure 2-16. Superficial deposits are absent in the study area, except in the locations in proximity to the River Avon and River Marden.

Soils are generally assumed to be soft compressible and cohesive (clay), arisings may be suitable for landscaping works particularly around ponds; Ground bearing capacity for road and structure design is likely to be low and require large foundations to achieve adequate road and structure strength and longevity.

Refer to Appendix D, Preliminary Sources of Study Report (PSSR) for further detail for the emerging options.

Figure 2-16 - Soils and geology



Source: British Geological Society (BGS)

2.7.6. Cultural heritage

The study area includes designated assets including conservation areas, scheduled monuments and listed buildings, many of which are within the town centre of Chippenham. Refer to Figure 2-17.

2.7.6.1. Conservation Areas

The following conservation areas have been identified:

- Chippenham Conservation Area to the north of Chippenham
- Langley Burrel to the northeast of Chippenham
- Tytherton Lucas to the north east of Chippenham
- Rowden Park to the south of Chippenham
- Lacock to the south of Chippenham.

2.7.6.2. Scheduled Monuments

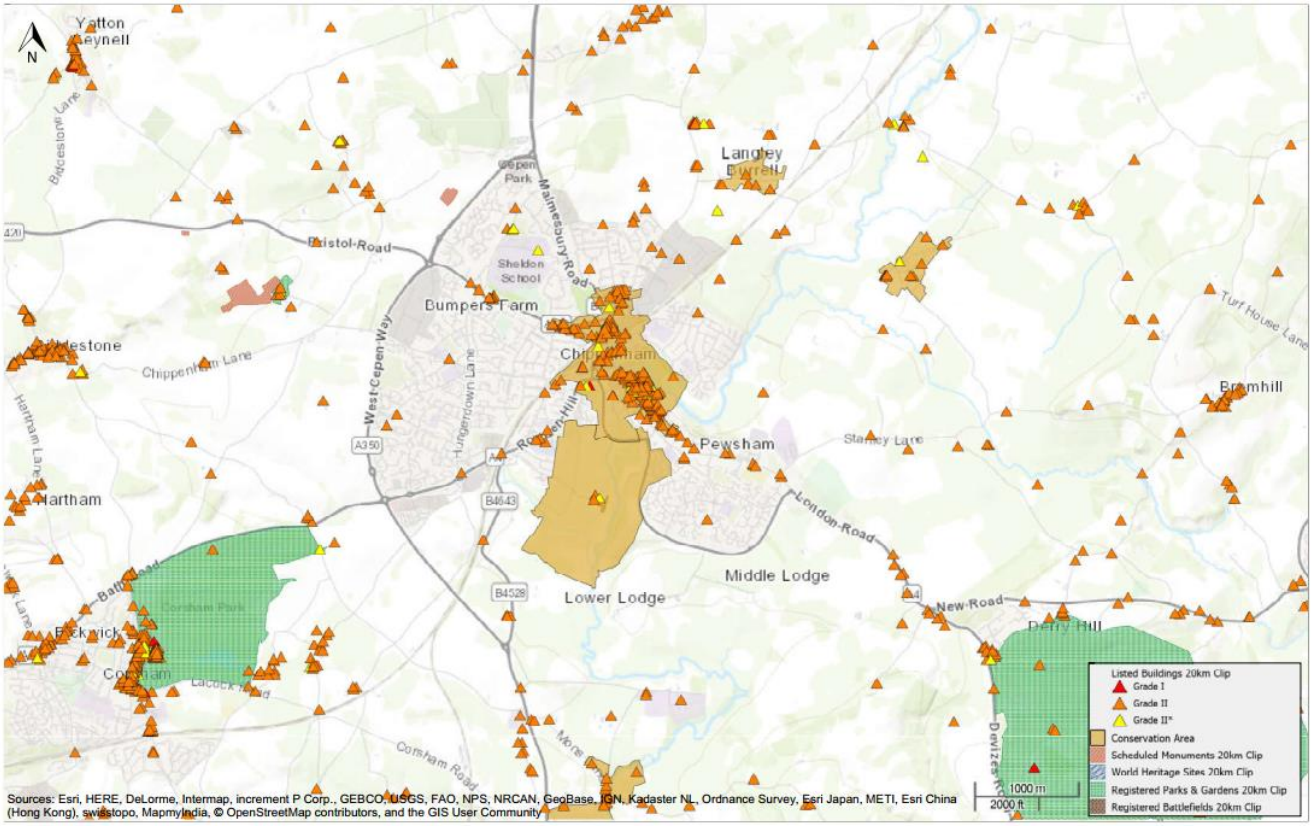
The following Scheduled Monuments have been identified:

- Roman site at Manor Farm to the northwest of Chippenham
- Rowden Manor to the south of Chippenham
- Medieval settlement of Sheldon to the West of Chippenham and the A350.

2.7.6.3. Listed buildings

There are located within the study area including grade I, II and II*. These include country houses, farmhouses and associated buildings, churchyards and cemeteries, mills, an old brewery, bridges, cottages and milestones.

Figure 2-17 - Heritage



Source: Historic England

2.7.7. Population

The population baseline is comprised of the following receptor sub-groups:

- Private property and housing.
- Community land and assets.
- Development land and local businesses.
- Agricultural land holdings.
- Walkers, cyclists and horse-riders (WCH).

Key community assets and land, as well as key community walking routes and WCH facilities within the study area include:

- Schools.
- Parks and woodland.
- Sports and recreation facilities.
- Public Rights of Way and footpaths.
- Cycle routes.

The agricultural land holdings baseline predominantly consists of grass for beef production and dairying. Most grassland farms also grow maize and barley and other forage crops.

2.7.8. Climate change

Wiltshire Council declared a Climate Emergency in 2019, and thus reiterated their commitment to working towards zero carbon.

As climate change is a global issue, the baseline is therefore set at a greater level than Chippenham. Global greenhouse gas emissions, from all sources, currently amount to approximately 50 billion tonnes of CO2e per year. The UK is the world's eighth largest emitter of CO2e, with the total background UK emissions for 2017 (the last reported year at time of assessment) being 460 million tonnes of CO2e . The transport sector was the largest emitting sector of UK greenhouse gas emissions in 2017, emitting 27% of all emissions. Of all sectors, it has also shown the least reduction since the 1990 baseline, at only 2%. For comparison, the next smallest reductions are seen in the residential and agriculture sectors at 16%.

The UK has in place carbon budgets for five-year periods up to 2032. The construction of the Proposed Scheme will occur across the third (2018 to 2022) and fourth (2023 to 2027) carbon budget periods. With an Opening Year of 2024, operation of the Scheme will fall in the fourth budget period and beyond. The budget for the fourth budgetary period is 1,950 Mt CO2e and it is in this context the scheme will be operated.

The need for a new road detailed in the emerging options has been considered against both the likely impact of the road in the wider context of Wiltshire and the UK's climate change targets and the need to provide transport benefits outlined elsewhere in this OAR.

3. Understanding the future situation

3.1. Future opportunities

With significant housing and employment growth planned for Chippenham in the coming years, there is an opportunity to deliver multi modal transport improvements within and surrounding Chippenham. Delivering transport improvements will maximise the potential for economic growth in the town and to address potential capacity issues on the transport network before developments are fully built out.

Significant stakeholder support for improvements to be made to the highway network around Chippenham has existed for a number of years, MRN funding has been received for both M4 Junction 17 and A350. In 2008, the Chippenham Vision document produced by the Chippenham Vision partnership group, stated that Chippenham requires 'a more integrated and accessible transport system in place with better, more efficient linkages between public and private transport [and] a reduction in traffic bottlenecks'[4]. The continued existence of such stakeholder support presents an opportunity to deliver the transport improvements required in Chippenham.

The Future Chippenham Draft Concept Framework report (April 2020) provides further information for the development that could be unlocked by the delivery of the distributor road.

3.2. Future traffic forecasts

3.2.1. Chippenham Site Allocations Plan transport evidence

The Chippenham Site Allocations Plan (CSAP) (adopted May 2017) supports the delivery of the Wiltshire Core Strategy (adopted February 2015) by allocating specific sites which together deliver the quantum of housing and employment need specified in Core Policy 10 of the Core Strategy. The CSAP included a detailed evidence base for transport & accessibility which in conjunction with other evidence informed the site selection process.

The adopted CSAP scenario (ADS41 shown in Figure 3-1) allocated development at two strategic sites in Chippenham: CH1 - South West Chippenham and CH2 - Rawlings Green. The transport evidence also considered several scenarios in relation to location and size of development, and provision of different levels of transport infrastructure (see Figure 3-1 and Table 3-1). The Alternative Development Strategies (ADS) presented in the evidence and in Figure 3-1 and Table 3-1 were:

- Strategy 1 – Eastern: Comprises further development to the east of the town, at Strategic Site Options B1 and C4 (ADS11, with wider highway improvements).
- Strategy 2 – Southern: Comprises further development to the south of the town, at Strategic Site Options D7 and E5 (ADS21, with wider highway improvements).
- Strategy 3 – Submitted: Further development as previously proposed at the start of the Examination in Public in 2015, at Strategic Site Options B1, C1 and E2 (ADS31, with wider highway improvements).
- Strategy 4 – Mixed: Further development at Strategic Site Options B1 to the east of the town and E5 to the south (ADS41, with wider highway improvements).

These included committed development at the North Chippenham (NC) and Hunters Moon (HM) sites.

In order to deliver levels of growth beyond the adopted CSAP, the transport evidence demonstrated that major new transport infrastructure (the eastern or southern link roads) would be required, depending upon the spatial distribution of growth. Without the eastern or southern link roads the local highway network could not accommodate the level of demand generated without compromising acceptable levels of service.

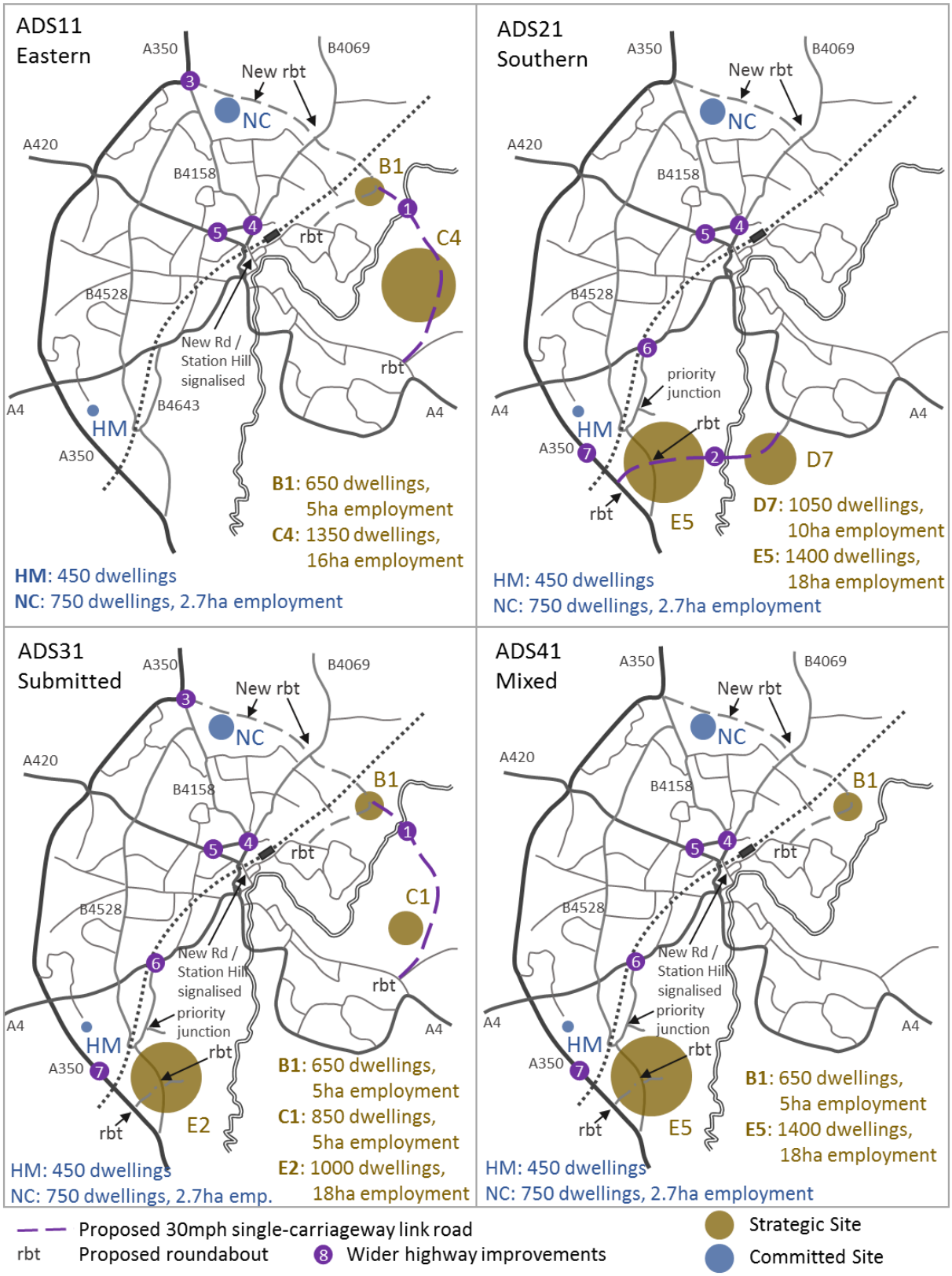
A summary of the evidence from the CSAP Transport Accessibility evidence Part 2a is shown in Table 3-1 (Table 4-1 from the evidence paper). The evidence paper tested and considered the impacts of different spatial distributions and transport infrastructure needed to support them.

The paper concluded that:

"A strategy that includes an Eastern Link Road remains preferable in terms of highway network performance, with Alternative Development Strategies 1 and 3 (including an Eastern Link Road) also likely to provide a more resilient highway network post 2026. Alternative Development Strategy 2 (including a Southern Link Road) is least preferable as it is clear that further substantial highway measures would be required to mitigate both the impacts of traffic growth and the traffic re-routeing impacts of a Southern Link Road."

[4] See Chippenham Transport Strategy, 2016,

Figure 3-1 - CSAP Part 2 Alternative Development Strategies (Figure 2-1 from evidence paper)



[4] CSAP Transport Accessibility evidence Part 2a

Table 3-1 - Table 4-1 from CSAP Accessibility and Transport Evidence Part 2a: Alternative Development Strategies, forecast highway network impacts summary

Alternative Development Strategy	Without wider highway improvements			With wider highway improvements			
	Average peak period journey times	Geographic extent of increased delay	Peak hour traffic flow through town centre	Average peak period journey times	Geographic extent of increased delay	Peak hour traffic flow through town centre	Comments on completed link roads
1. Eastern (Strategic Site Options B1, C4)	+45%	Large: town centre & entire Pewsham area including A4 and local distributor roads	+4%	-5%	Delays reduced on A4 Pewsham corridor & junctions close to town centre	-13%	Eastern Link Rd provides traffic relief to town centre & Pewsham areas, but does not address increased flows on A4 Bath Road. Traffic flow conflict at Malmesbury Rd Rbt
2. Southern (Strategic Site Options D7, E5)	+63%	Large: A4 Bath Rd corridor (Rowden Hill to town centre), A4 towards Pewsham, and areas to the N and W of town centre including A420	+9%	+42%	Large: town centre and areas to the W. A350 / B4528 to the SW of the town.	-14%	Southern Link Rd provides traffic relief to town centre & A4 Bath Rd, but leads to increased flows on the B4528 through the residential areas to the west of town. Traffic flow conflict at southern end of A350 Chippenham Bypass.
3. Submitted (Strategic Site Options B1, C1, E2)	+28%	Large: A4 Bath Rd corridor (Rowden Hill to town centre), A4 around Pewsham, and areas to the W of the town centre	+5%	+2%	Delays reduced on A4 Pewsham corridor & junctions close to town centre	-13%	Eastern Link Rd provides traffic relief to town centre & Pewsham areas, but does not address increased flows on A4 Bath Road. Traffic flow conflict at Malmesbury Rd Rbt.
4. Mixed (Strategic Site Options B1, E5)	+10%	Moderate: focused on A4 Bath Rd corridor (Rowden Hill to town centre) & A4 towards Pewsham	+1%	+10%	Moderate: A4 towards Pewsham	-6%	N/A

3.2.2. Chippenham Transport Strategy Refresh 2016

The Chippenham Transport Strategy was developed to support and mitigate the transport impacts of the growth planned for the in the CSAP. Traffic modelling completed for the Chippenham Transport Strategy reported that without supporting transport measures average journey times were forecast to increase by more than 10% in 2026 with CSAP planned development[5] and without mitigation. This was compared to 2015 levels, across the Chippenham highway network[6]. This could result in delays for people accessing the town centre and employment in the town, and could impose increased transport costs on residents, businesses and visitors.

Increased delays on the key routes in Chippenham (A350, A4 and A420) could also mean that an increasing number of vehicles, including freight, may use less appropriate minor roads and residential streets to avoid delays on the more congested routes, for example B4528 Hungerdown Lane / Hardenhuish Lane which are parallel roads to the A350[6].

The Chippenham Transport Strategy identified a package of measures to support the planned growth and mitigate the transport impacts of the development sites allocated in the CSAP. Compared to the 'Without Strategy' scenario, forecasts suggest that the transport strategy will provide the following quantifiable benefits to users of the Chippenham highway network:

- 8% reduction in average journey times across the Chippenham highway network in the morning peak hour.
- Time spent queueing in traffic is forecast to reduce by 25% in the morning peak hour and 5% in the evening peak hour.
- Overall traffic flow reductions through the town centre.

The transport strategy identified the approach to addressing transport issues in Chippenham and takes into account the forecast impact of development sites allocated in the CSAP up to 2026. The strategy document concluded that development which is additional to that planned for in the CSAP and beyond 2026 will need to be assessed in relation to its impact on the transport network and appropriate mitigation measures identified.

3.2.3. Traffic forecasts for 2019 Housing Infrastructure Fund (HIF) submission

Recent strategic modelling of traffic flows in 2041 completed for the 2019 Wiltshire Council HIF submission for the Chippenham Urban Expansion Distributor Road suggests that development beyond that allocated in the CSAP creates an unacceptable level of strain on the road network in the Chippenham area.

The assessment identified that once 1,050 houses are constructed (650 at Rawlings Green and 400 accessing the A4 London Road), the level of strain on the road network in 2041 in the Chippenham area becomes unacceptable. At this point multiple key junctions in the Chippenham area are either close to reaching capacity or over capacity. Key points of the network at or over capacity at this point are:

- AM peak hour (0800-0900):
  - Station Hill/New Road junction has a volume over capacity ratio (V/C) of 107.0%.
  - Rowden Hill/Bath Road junction has a volume over capacity ratio (V/C) of 98.1%.
- PM peak hour (1700-1800):
  - Bumpers roundabout has a V/C ratio of 94.7%.
  - Chequers roundabout has a V/C ratio of 92.1%.

At the deadweight point of 1,050 houses, as identified in the CSAP evidence only the delivery of the distributor road and other mitigation can help remove issues resulting from congestion and support the delivery of the urban expansion. Once the mitigation is in place none of the identified key junctions in Chippenham are over capacity, and far fewer are approaching capacity.In both the AM and PM peak Station Hill / New Road junction and the Bridge Centre junction no longer have any approach arms greater than 70% V/C, and Rowden Hill/Bath Road junction and Marshfield Road/Park Lane junction experience a 6.9% and 13.8% decrease in V/C respectively.

The wider benefits of the distributor road to the north west Wiltshire area are clear, with an 8% decrease in average network delay in the AM peak, and 7% in the PM peak, and a decrease in average network travel time of 2% across all time periods.

[5] Chippenham Site Allocations Plan: Incorporating proposed changes approved by Council May 2016 (May 2016).
[6] Chippenham Site Allocations Plan Supplementary Transport & Accessibility Evidence: Part 2a - Assessing Alternative Development Strategies, Wiltshire Council, April 2016.

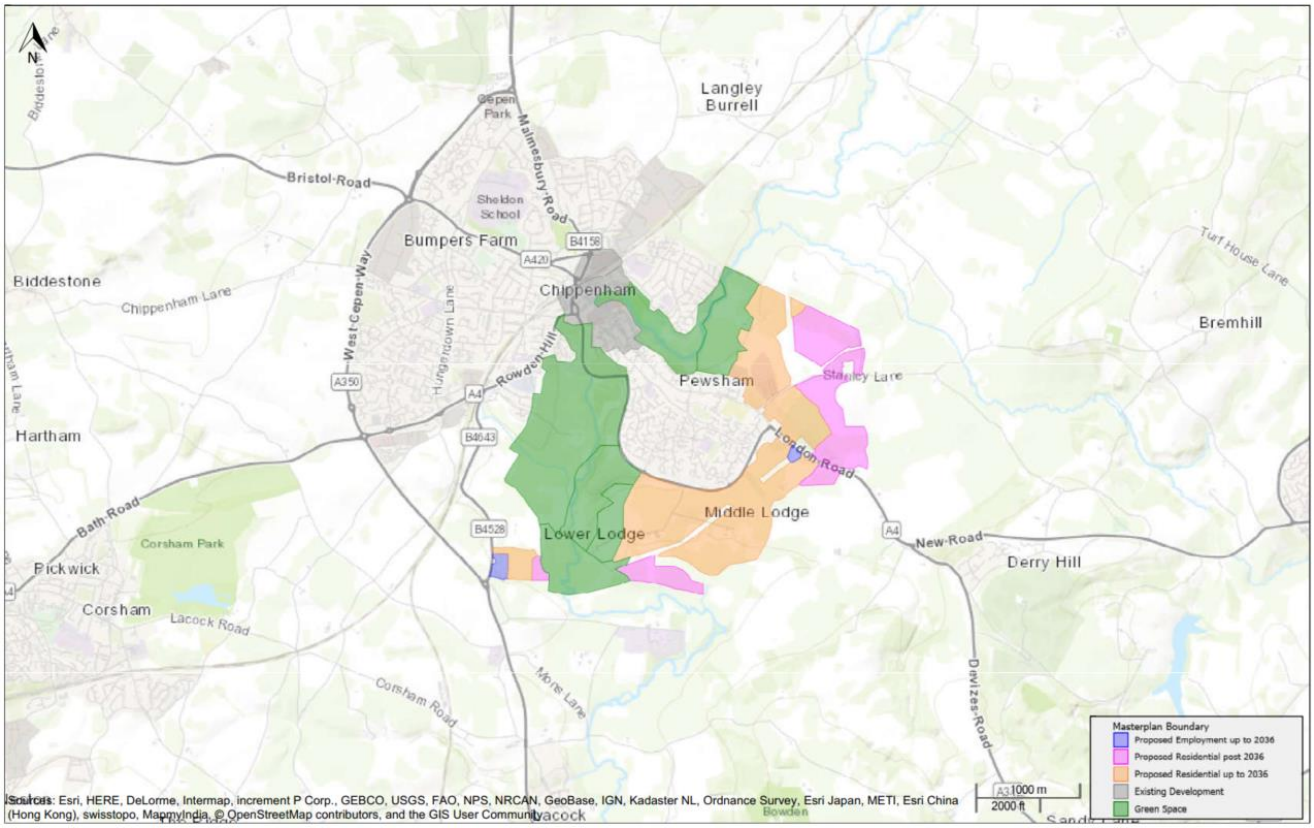
3.7.3 Future Chippenham Draft Concept Framework

On the 13th January 2021 a Local Plan Review was published for consultation and considers preferred options for accommodating proposed housing development. The proposed options for development in the Plan were not available during the consideration of alternative route alignments assessed in this report. The alignments referenced in this report allow enough flexibility to be able to serve a wide area of development and development scenarios and will require further refining, subject to consultation and a review of options against further development scenarios.

To ensure the route options assessed in the report can be carefully scrutinised, the project identified concept layouts for possible future development. These layouts help test road alignment options and were detailed in a Draft Concept Framework dated April 2020 and that supports this report.

The Spatial Framework for Future Chippenham requires transport network connectivity to serve the development and resolve traffic congestion within the town centre; transport improvement options shall coordinate with the proposed development. Figure 3-2 shows the Future Chippenham Spatial Framework.

Figure 3-2 - Future Chippenham Spatial Framework



4. Establishing the need for intervention

4.1. Transport challenges in Chippenham

The evidence presented indicates that there are four key transport challenges facing Chippenham which are summarised in Table 4-1.

Table 4-1 - Transport challenges in Chippenham

Transport challenge	Description
Congestion and delays on A4 and A420 corridors	The A4 and A420 corridors carry high volumes of traffic, particularly for journeys through Chippenham. Coupled with physical constraints on the highway network this results in peak hour congestion and delays along these corridors.
Physical constraints and congestion in central Chippenham	Physical constraints on the highway network and the convergence of the key corridors in the centre of town. This results in congestion and delays in the heart of the town but also impacts the wider Chippenham transport network.
Impact of traffic volumes and delays on other modes in the town	Congestion and delays on the key corridors and in central Chippenham present challenges for other modes of travel in the town: • People choosing less appropriate routes to avoid delays and queues. These routes are more appropriate for pedestrians and cyclists however the environment is negatively impacted when used by inappropriate volumes of traffic. • Physical constraints and competing demands on the highway network in central Chippenham and the key corridors limits the available space for improving pedestrian and cycle provision. • Congestion and delays impacts the reliability of bus services in the town, particularly on the higher frequency A4 corridor.
The forecast impact of future growth on the transport network	Transport evidence to support the CSAP identified that the future growth beyond the growth planned in the CSAP would have unacceptable impacts on the transport network. The assessment concluded that future growth in the town could only be supported in highway network terms with the delivery of significant transport infrastructure. The 2017 SHMA identified that: *"The town has significant potential for economic growth. A new road linking the A4 to the A350 would help considerably toward realising it."*

The challenges presented and previous evidence considering the need for transport infrastructure in the town demonstrates the need to deliver significant highway infrastructure in the town in the form of the previously termed eastern and southern link roads.

4.2. Opportunities presented by intervention

Analysis of current constraints and opportunities has identified the performance of the A4 and A420 corridors being crucial to the functioning of the Chippenham transport network. Delays, congestion and traffic volumes on these corridors and in central Chippenham have consequential impacts on all modes.

The delivery of the distributor road will enable the full completion of a link from the A350 Lackham roundabout in the south to the A350 Malmesbury roundabout in the north. This will provide opportunities for traffic travelling to/from Pewsham, Calne and areas to the east of the town to access the A350 without having to travel through the town centre and as such reduce the volumes of traffic travelling on the A4 and A420 corridors and central Chippenham. This would contribute towards achieving the following outcomes for transport in Chippenham:

- Increased walking and cycling for journey within Chippenham with the provision of safe and convenient pedestrian and cycle routes and a reduction in traffic.
- Improved reliability of bus services on across the town but particularly on the higher frequency A4 and A420 corridors.
- Reduced traffic on less appropriate routes with traffic using more suitable routes, this will help improve conditions for pedestrians and cyclists and the operation of bus services.
- Supporting the successful delivery of future growth in the town.

The objectives and scope of the scheme are presented in the next section.

5. Identifying objectives and geographical scope

5.1. Introduction

The definition of objectives is an essential part of any option development process, as it provides a clear set of outcomes which scheme investment should meet to address current challenges and deliver the future vision.

Furthermore, defining objectives in terms of 'spatial units' – such as areas or corridors - ensures that schemes also focus on wider outcomes and not those simply related to transport infrastructure or services. It is essential that potential beneficiaries of schemes – transport users and local communities in particular - are explicitly recognised in the option objectives.

The approach undertaken for this study follows the Department for Transport (DfT) Transport Appraisal Guidance (TAG) in establishing a hierarchy of objectives, including strategic outcomes, high-level and transport objectives, along with the identification of measures of success that will be used to appraise the Strategic Case for each transport option.

5.2. Identifying objectives

5.2.1. Objectives from key policy documents

In formulating the hierarchy of objectives, attention has been paid to ensure that they:

- Address the transport problems identified in Chapter 4.
- Relate to the strategic objectives of the key policy documents[7] reviewed in Chapter 2.

The strategic objectives relevant to the A350 corridor contained in these policy documents are presented in Table 5-1. Several consistent themes are evident across these objectives:

- Supporting economic growth (DfT2, DfT3, SEP2, WCS1), including new housing developments (DfT4, WCS3, LTP12) and town centre regeneration (SEP4, WCS4, LTP1, LTP7).
- Improving transport connectivity, reliability and resilience (DfT1, SEP2, WCS6, LTP4, LTP10, LTP18).

Table 5-1 - Strategic objectives

Document	Summary of relevant strategic objectives
DfT Transport Investment Strategy	DfT1: Creating a more reliable, less congested, and better-connected transport network that works for the users who rely on it. DfT2: Building a stronger, more balanced economy by enhancing productivity and responding to local growth priorities. DfT3: Enhancing our global competitiveness by making Britain a more attractive place to trade and invest. DfT4: Supporting the creation of new housing.
Swindon and Wiltshire Strategic Economic Plan	SEP2: Transport infrastructure improvements - we need a well-connected, reliable and resilient transport system to support economic and planned development growth at key locations. SEP4: Place shaping - we need to deliver the infrastructure required to deliver our planned growth and regenerate our City and town centres, and improve our visitor and cultural offer.
Wiltshire Core Strategy	WCS1: Delivering a thriving economy. WCS3: Providing everyone with access to a decent, affordable home. WCS4: Helping to build resilient communities. WCS6: Ensuring that adequate infrastructure is in place to support our communities.

[7] Comprising the DfT Transport Investment Strategy, Swindon and Wiltshire Local Economic Plan, Wiltshire Core Strategy and Local Transport Plan

Document	Summary of relevant strategic objectives
Wiltshire Local Transport Plan	Goal: Support Economic Growth • LTP1: Support and help improve the vitality, viability and resilience of Wiltshire's economy and market towns. • LTP4: Minimise traffic delays and disruption and improve journey time reliability on key routes. • LTP10: Encourage the efficient and sustainable distribution of freight in Wiltshire. • LTP12: Support planned growth in Wiltshire and ensure that new developments adequately provide for their sustainable transport requirements and mitigate their traffic impacts. Goal: Reduce Carbon Emissions • LTP2: Provide, support and promote a choice of sustainable transport alternatives. • LTP11: Reduce the level of air pollutant and climate change emissions from transport. • LTP13: Reduce the need to travel, particularly by private car. Goal: Contribute to Better Safety, Security and Health • LTP8: Improve safety for all road users and reduce the number of casualties on Wiltshire's roads. • LTP9: Reduce the impact of traffic speeds in towns and villages. • LTP14: Promote travel modes that are beneficial to health. Goal: Promote Equality of Opportunity • LTP5: Improve sustainable access to a full range of opportunities particularly for those people without access to a car. Goal: Improve Quality of Life and a Healthy Natural Environment • LTP3: Reduce the impact of traffic on people's quality of life and Wiltshire's built and natural environment. • LTP7: Enhance Wiltshire's public realm and street scene. • LTP18: Enhance the journey experience of transport users.

5.2.2. Strategic outcomes

Transport problems identified in section 4.1 restrict regional / national economic growth and local economic prospects; employment, education, social, recreation, sports and retail growth stagnates and limits opportunities for the local population which has a negative impact on physical and mental wellbeing. The strategic outcomes for this scheme therefore seek to promote economic growth and improve opportunities for the local population of Chippenham. The strategic outcomes are:

- Sustainable economic growth in the A350 Corridor and M4-Swindon SWLEP Growth Zones with positive impact on regional and national economic productivity.
- Sustainable population and economic growth around Chippenham supporting a revitalised town centre.
- Improved physical and mental wellbeing for existing and future residents of Chippenham.

5.3. Scheme objectives

5.3.1. Strategic objectives

Three high-level objectives are proposed. These support the strategic outcomes, draw on the themes identified from existing policy documents and aim to specifically address the transport problems identified in Chapter 4. The strategic objectives for the scheme are:

1. Enable the delivery of high-quality housing developments by unlocking development land, meeting pre 2036 (Local Plan) and post 2036 (HIF) housing quantum.
2. Improve traffic congestion and flow across the existing road network, ensuring the transport network has the capacity to accommodate growth.
3. Provide good connectivity for multi-modal users at new centres and into Chippenham town centre, improving journey times and journey time reliability.

5.3.2. Delivery objectives

The following objectives have been developed in relation to scheme deliverability and are taken into account in the first and second option sifts:

i) **Environmental risk:** Mitigate negative impact on existing environment and maximise, where possible, opportunities to enhance the environment.

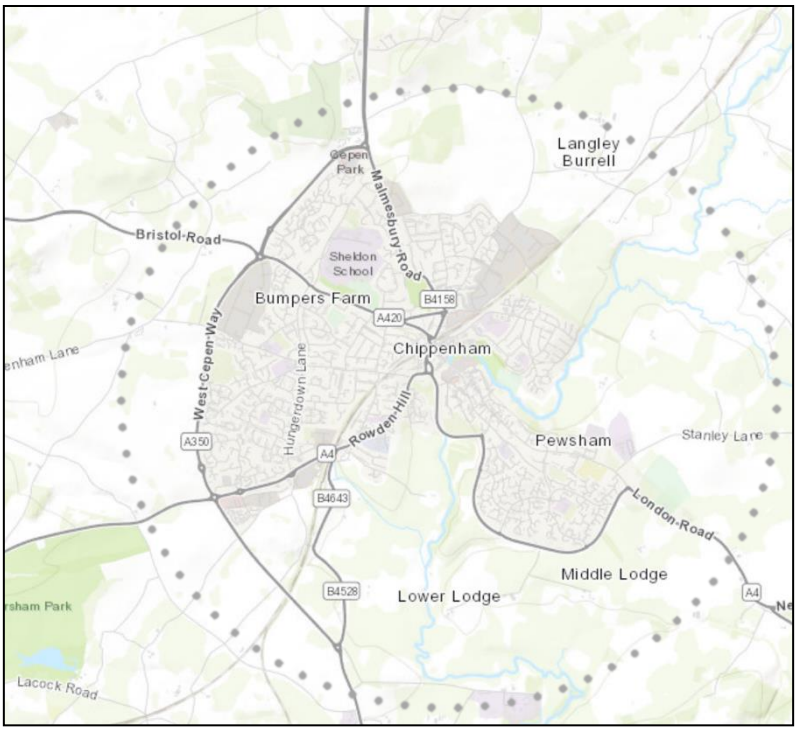
ii) **Engineering risk:** Minimise proposed highways and structures infrastructure. Minimise disruption to existing highway network during construction.

iii) **Land risk:** with land in multiple ownership, route options need to minimise impacts affecting multiple owners by utilising existing Wiltshire Council land and making land agreements.

5.3.3. Geographic area of impact

Given the problems identified in Table 4-1 and the strategic objectives identified in Table 5-1, any interventions should aim to have a beneficial impact on both the Chippenham urban area as a whole and the wider A350 corridor. Figure 5-1 shows the expected geographic area of impact.

Figure 5-1 - Geographic area of impact



6. Generating options

6.1. Initial options

The purpose of option generation is to develop a range of transport measures or interventions that could achieve the strategic objectives set out in Chapter 5.

Congestion in Chippenham caused by high volumes of traffic and constraints on the transport network, as identified in Chapter 4, have been identified as key transport challenges in the town. As such potential solutions would need to address this by achieving either a) reduced demand, b) increased capacity or c) a combination of both. For example, investment on the public transport network can reduce highway demand through modal shift and targeted highway improvements may also relocate traffic from the congested area.

An initial options list was generated under four themes:

- Demand management.
- Public transport, pedestrian and cycle network improvements.
- Upgrades to the existing highway network.
- Additions to the highway network.

From these themes five broad transport options for transport measures in Chippenham were identified:

- Option A – Chippenham Transport Strategy package of pedestrian, cycle, public transport and highway measures.
- Option B – Northern distributor road.
- Option C – Southern distributor road.
- Option D – Full eastern distributor road (B&C).
- Option E – Walking, cycling, bus and rail improvements.

6.2. Option A – Chippenham transport strategy scheme package

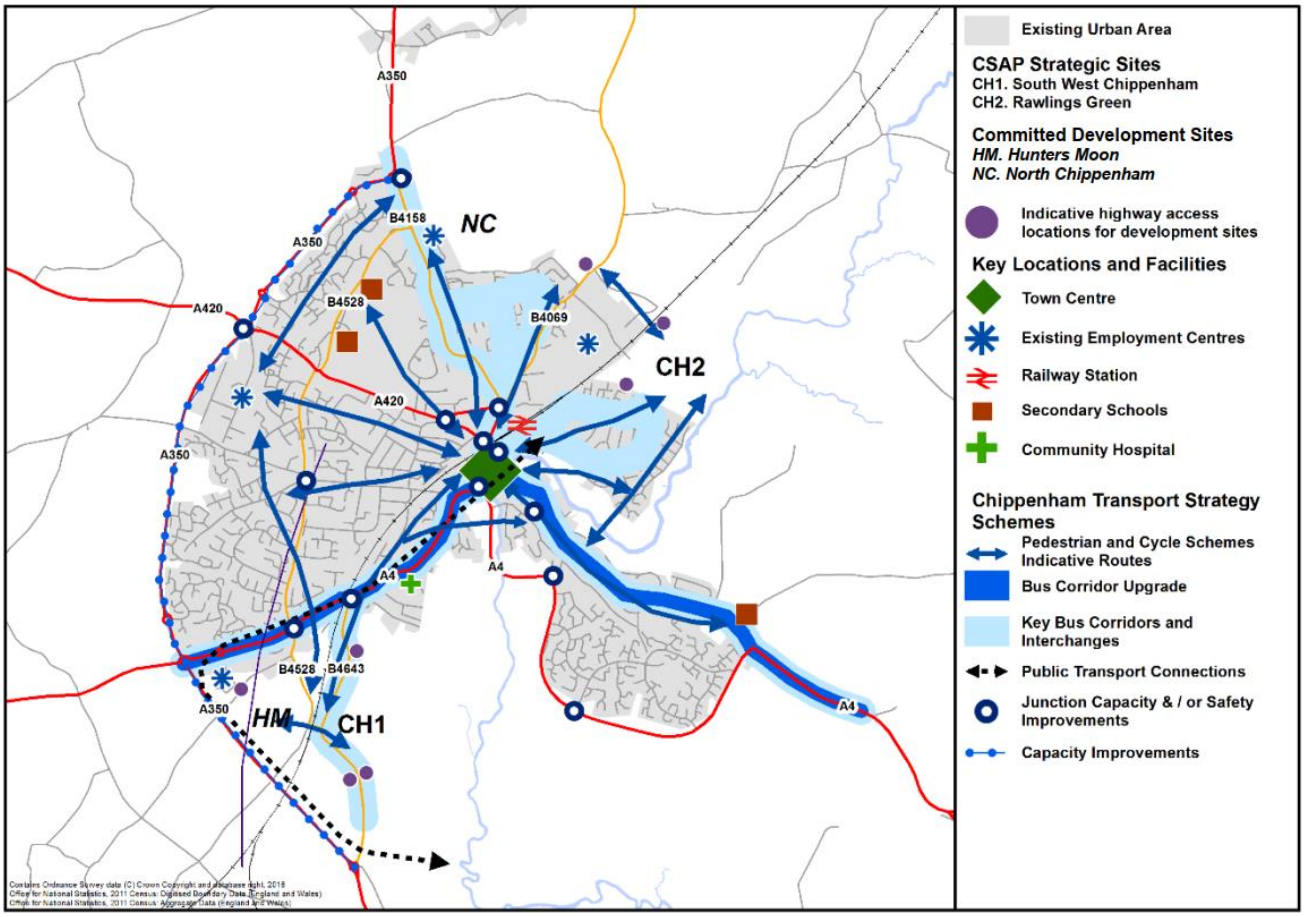
The schemes identified in the Chippenham Transport Strategy (CTS) represent a high-level approach to addressing the transport issues identified, and to meet the transport objectives for the town based on growth in the Core Strategy. The schemes in the transport strategy are shown in Figure 6-1 and comprise:

- Smarter Choices Measures – residential and workplace travel planning at development sites;
- Pedestrian and Cycle Network Improvements – improvements to the network at 14 locations to create specific cycle and pedestrian corridors;
- Public Transport Network Improvements – upgrading the bus networks and corridors, including improvements to Chippenham Station, and providing new bus services to South West Chippenham and Rawlings Green; and
- Highway and Parking Schemes – 22 specific highway schemes to improve capacity on the network, such as dualling of the A350, and upgrading key junctions, and providing alternative car parking outside of the town centre.

The overall transport strategy was assessed against the desired strategy outcomes using the Chippenham Transport Model. Compared to the ‘Without Strategy’ scenario, forecasts suggest that the transport strategy will provide the following quantifiable benefits to users of the Chippenham highway network:

- 8% reduction in average journey times across the Chippenham highway network in the morning peak hour;
- Time spent queueing in traffic is forecast to reduce by 25% in the morning peak hour and 5% in the evening peak hour; and
- Overall traffic flow reductions through the town centre.

Figure 6-1 - Chippenham Transport Strategy scheme package



6.3. Option B – Northern distributor road

The Northern Distributor Road option comprises the following broad alignment:

- A new rail bridge connecting from Parsonage Way to the new distributor road through Rawlings Green.
- A river bridge over the River Avon adjacent to Rawlings Green.
- The route will then continue south to connect to the A4 at a new roundabout.
- The route includes a pedestrian and cycle route alongside the road for its entirety.

Option B is highlighted in the green and orange sections up to the A4 on Figure 6-2.

6.4. Option C – Southern distributor road

The Southern Distributor Road option comprises the following broad alignment:

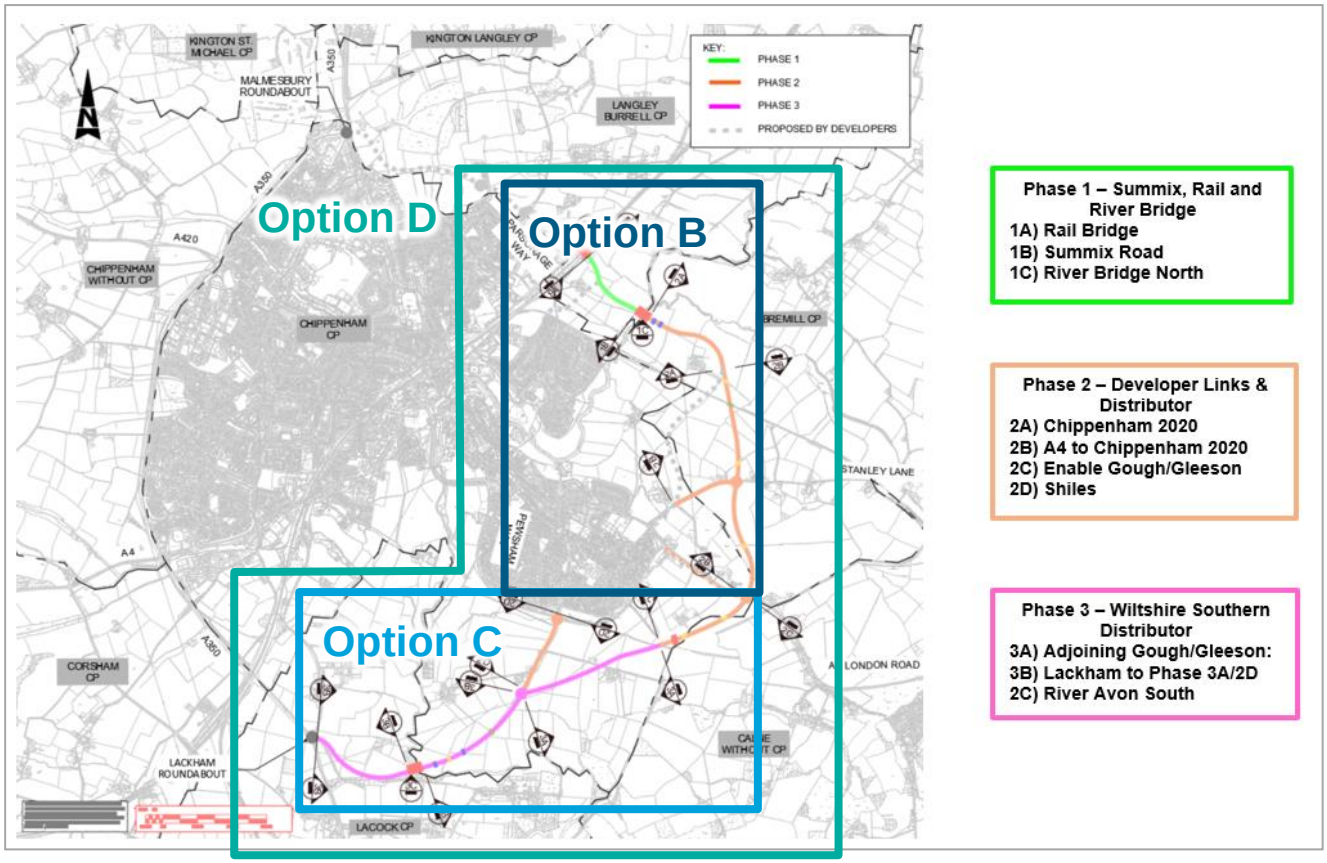
- Begins at a new junction with the A4 before continuing south west towards Lackham College.
- A junction will be created to link north to Pewsham Way.
- The road will continue south west via a new river bridge over the River Avon to connect to the A350 at Lackham roundabout.
- The route includes a pedestrian and cycle route alongside the road for its entirety.

Option C is highlighted from the A4 to Lackham Roundabout in orange and pink on Figure 6-2.

6.5. Option D – Full eastern distributor road (option B & C) distributor road (option B & C)

The full eastern distributor road will encompass both the northern and southern options to create a new southern and eastern link road around Chippenham, as shown on Figure 6-2. As with Options B and C separately, this option also includes a pedestrian and cycle route adjacent to the road.

Figure 6-2 - Distributor road options



6.6. Option E – Walking cycling, bus and rail improvements

Public transport options have been separated into rail, bus and walking/cycling improvements as highlighted in Table 6-1.

Table 6-1 - Rail, bus and walking/cycling improvements

Option	Sub-option	Description
i)	Rail service/infrastructure improvements - i.e. hourly frequency on the Trans Wilts via Chippenham and/or additional commuter services in AM/PM peak hours	Additional rail services on the TransWilts line could provide a more attractive alternative for journeys in the A350 corridor (including those to/from Trowbridge, Melksham), and connections for longer distance journeys along the Great Western Main Line.
ii)	Bus service/infrastructure improvements on the A350 corridor	Additional bus services or infrastructure improvements would aim to make bus services more attractive for journeys within the A350 corridor and locally around Chippenham.
iii)	Improved walking/cycling routes	New cycle and pedestrian routes to enable these modes of travel to be more convenient and safer for travel in Chippenham.

7. Initial option sifting

7.1. Assessment against strategic objectives

Options A to E have all been assessed against the strategic scheme objectives in order to identify which options have the best fit. This is a qualitative assessment which considers the extent to which each option contributes towards achieving each objective. This assessment is summarised in Table 7-1. The full scheme option sifting process is shown in Figure 8-1. These are broad options with more detailed options developed for the shortlisted option in Chapter 9.

Table 7-1 - Assessment of broad options against objectives

Scheme objectives	Option A CTS	Option B Northern distributor road	Option C Southern distributor road	Option D Full eastern distributor road (B&C)	Option E Walking cycling, bus and rail improvements
Enable the delivery of high-quality housing developments by unlocking development land, meeting pre 2036 (Local Plan) and post 2036 (HIF) housing quantum.	✓	✓✓	✓✓	✓✓✓	✓
Improve traffic congestion and flow across the existing road network, ensuring the transport network has the capacity to accommodate growth.	✓	✓	✓	✓✓✓	✓
Provide good connectivity for multi-modal users at new centres and into Chippenham Town, improving journey times and journey time reliability.	✓✓	✓✓	✓✓	✓✓✓	✓
Contribution towards achieving scheme objectives					
✓✓✓ Strong contribution ✓✓ Moderate contribution ✓ Limited contribution ✕ No contribution					

7.2. Summary of assessment

The assessment indicates that **Option D** strongly supports the objectives of the scheme because it strongly addresses the scheme objectives in Table 7-7, while:

- Unlocking development land by providing a road through land that is otherwise inaccessible for development;
- Helping to improving the performance of the transport network in Chippenham will mean that it can better support future increases in travel demand from planned housing and employment growth; and
- Helps relieve problems with congestion and delays in Chippenham town centre and surrounding road network by providing an alternative route avoiding the town centre.

The contribution of Option B towards achieving the objectives is almost identical to Option C (northern and southern options). The contribution of Options A and E are considerably lower since they were not aimed at supporting the HIF quantum of development. Option A, as the do minimum, will enable only the growth allocated in the CSAP, and the success of the option requires a significant mode shift to sustainable modes, as does Option E. It is important that Option A is delivered to provide the necessary foundation for further growth in the town and provide sustainable transport options.

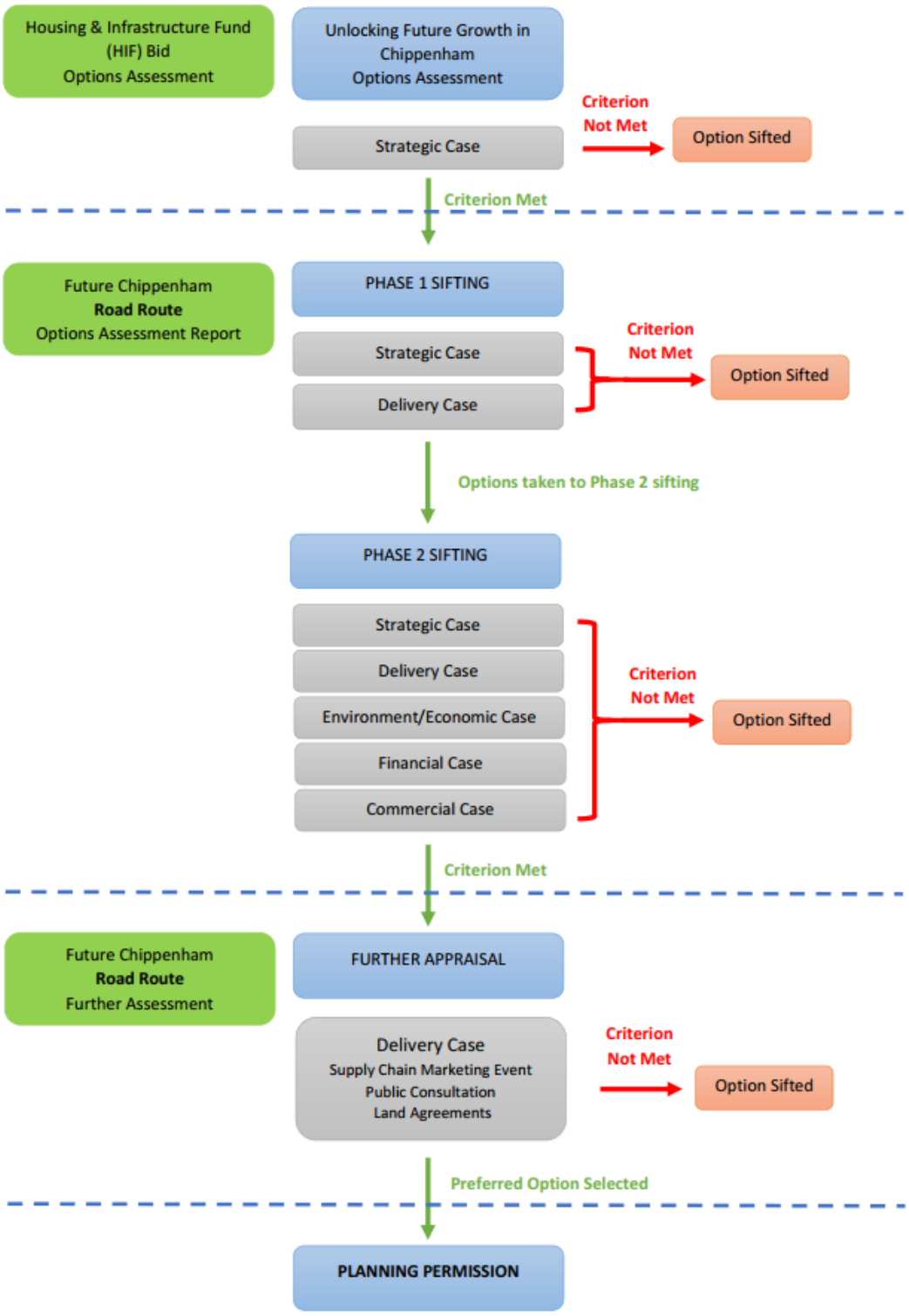
Option D – A full Eastern Distributor Road is taken forward for further development and assessment.

8. Options assessment – full sifting process

8.1. Overview

The Future Chippenham full eastern distributor road route options are further developed and assessed. Refer to Figure 8-1 for a full process summary from project inception through to planning application.

Figure 8-1 - Distributor road option sifting process



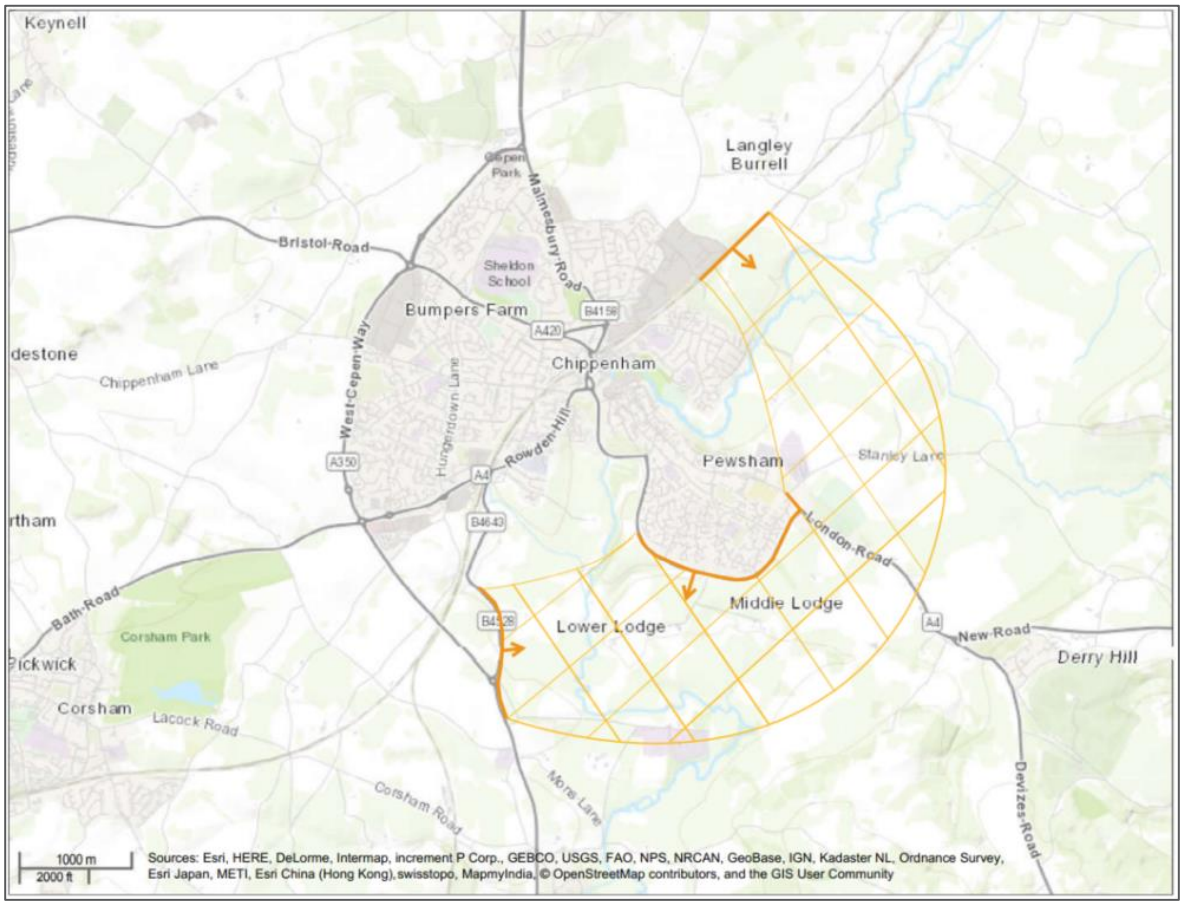
9. Eastern distributor road – options assessment - first sift

9.1. Full eastern distributor road – study area

Route options for the Future Chippenham distributor road are part of a full eastern distributor route. The HIF funded road extents extend from the A350 / B4528 south of Chippenham, over the A4 London Road, to a proposed bridge over the Great Western Rail (GWR) Line to the north. The route continues on proposed and existing network, connecting to the A350 Malmesbury Road Roundabout north of Chippenham. The bridge over the GWR is proposed by the Rawlings Green developers.

An additional road linking the proposed distributor at South Chippenham to Pewsham Way is included in the scheme extents and HIF bid. The study area for the road and the development is shown in Figure 9-1.

Figure 9-1 - Route study area



Note that the PEAOR considers a wider extents than shown above to assess necessary environmental receptors.

9.2. Eastern distributor road – first option sift

9.2.1. First sift option generation

The approach to option generation considered the scheme objectives and the following parameters:

- Completion of a full eastern distributor route for transport network improvements.
- Improvement of multi-modal transport connectivity.
- Options to affect a range of alternative landowners.
- Applying other developers plans and planning conditions, in part or in full, where appropriate (Chippenham 2020, Gough, Rowden Park, Summix and Chippenham Town Council).
- Planning conditions of approved planning applications reserved Highway Corridor for eastern distributor road.
- Existing residents of the site (farm tenancies remaining and other residents).
- Reviewed physical and environmental constraints.

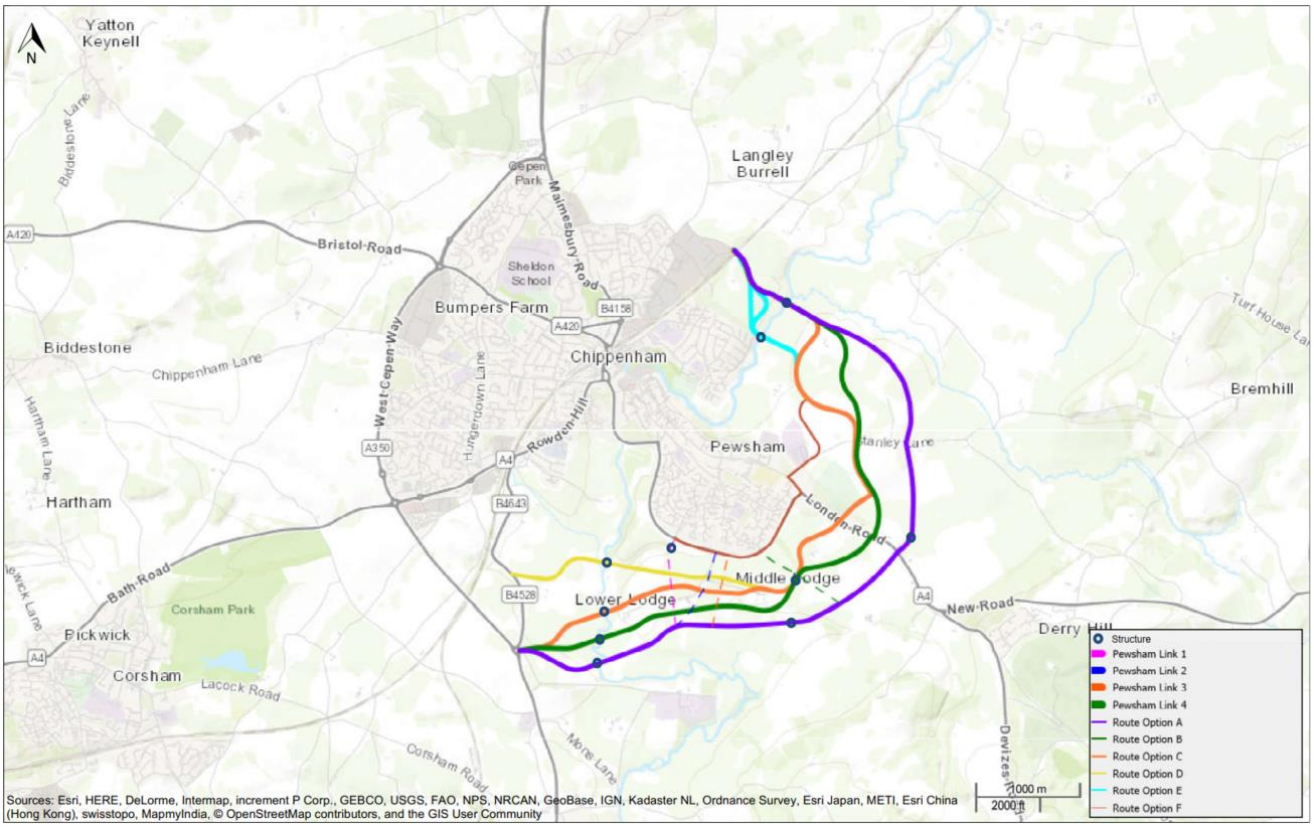
9.2.2. First sift options

Seven distributor road options and four Pewsham Link Road options were developed for the first sift:

- Distributor road options:
  - Option A - Outer Route.
  - Option B - Middle Route.
  - Option C - Inner Route.
  - Option D - Inner Route.
  - Option E - Inner Route. (this incorporates two alternative routes through the Rawlings Green development site)
  - Option F - Inner Route.
- Pewsham Link Road Options:
  - Pewsham Link Option 1.
  - Pewsham Link Option 2.
  - Pewsham Link Option 3.
  - Pewsham Link Option 4.

The first sift options are presented in Figure 9-2.

Figure 9-2 - First sift options



9.2.2.1. Distributor road options:

Option A - Outer Route

The distributor road connects to the A350 Lackham roundabout, proceeds southeast and crosses the River Avon, remains south of the farmhouses accessed via Forest Lane, crosses the Wilts and Berks canal south of Pewsham Locks and the A4 between Forest Gate and the Motorcar dealership; the road crosses the Wilts & Berks canal again just north of the A4 at Green Lane Farm. Continuing north crossing Stanley Lane at grade between Hither Farm and Middle Farm, and 380m north of Stanley Lane crosses National Cycle Network, Route 403 (former rail line). Routing in a westerly direction parallel to the cycle route (offset by 380m) and River Marden (offset by 200m), 100m north of Newleaze Farm and crossing the River Avon again 100m southwest the River Avon / River Marden confluence.

The route is connected to the planned alignment for the Rawlings Green development site 150m west of the River Avon and connects to a proposed crossing of the Great Western Main Rail Line at the eastern end of Parsonage Way.

Option B - Middle Route

The distributor road connects to the A350 Lackham roundabout, proceeds east and crosses the River Avon, remains south of the farmhouses accessed via Forest Lane, crossing the access track between Middle Lodge Farm and Pewsham Locks and crosses Avon Valley Walk and the historical route of the Wilts & Berks Canal near existing woodland and proceeds east 100m south of Forest Farm. The route crosses the A4 between Wedmore Farm and the Motorcar dealership and continues north crossing Stanley Lane at grade between Hither Farm and Gate Farm. 700m north of Stanley Lane crosses National Cycle Network, Route 403 (former rail line). Realigning in a westerly direction parallel to the cycle route (offset by 380m) and River Marden (offset by 200m), 100m north of Newleaze Farm and crossing the River Avon again 100m southwest the River Avon / River Marden confluence.

The route is connected to the planned alignment for the Rawlings Green development site 150m west of the River Avon and connects to a proposed crossing of the Great Western Main Rail Line at the eastern end of Parsonage Way.

Option C - Inner Route

The distributor road connects to the A350 Lackham roundabout, proceeds east and crosses the River Avon, routes between Lower Lodge Farm and the sewage treatment works, runs parallel with Forest Lane and crosses between Lodge Farm House and Middle Lodge Cottages, crosses Forest Lane again, routes north of Middle Lodge Farm, crossing the historical route of the Wilts & Berks Canal near existing woodland and routes north of Forest Farm to cross the A4 and run through the east side of Stanley Park Sports Ground. The route continues north crossing Stanley Lane at grade between Hither Farm and Gate Farm and realigns in a north westerly direction to cross the National Cycle Network, Route 403 (former rail line) 350m north east of Hardens Farm. The Route proceeds north and is offset 75m west of Newleaze Farm. Realigning in a westerly direction to cross the River Avon again, 100m southwest of the confluence of River Avon and River Marden.

The route is connected to the planned alignment for the Rawlings Green development site 150m west of the River Avon and connects to a proposed crossing of the Great Western Main Rail Line at the eastern end of Parsonage Way.

Option D - Inner Route

The distributor road connects to the B4528, north of Showell Nurseries, following the corridor reserved for a southern distributor road as part of the planning conditions of the Redcliffe Homes, Rowden Park Housing development. The route runs through the Rowden Park conservation area to cross the River Avon 150m north of the sewage treatment works. Crossing Forest Lane 25m north of Middle Lodge Cottages and aligning with Option C 50m north of Middle Lodge Farm. Option D is only assessed in Zone 1 as the remainder of the route connects to other distributor road options and is assessed accordingly.

Option E - Inner Route

The distributor road aligns with Option C until a point 300m north of Hardens Farm, where the road follows the route of NCN, Route 403, replaces the existing cycleway / pedestrian footbridge with a Road and Shared Use Path bridging the River Avon 500m southwest of the confluence with the River Marden. The option provides two alternative routes through the Rawlings Green development site to realigns with other route options and the Rawlings Green developer proposals 150m east of Rawlings Farm. Option E is only assessed in Zone 4 and 5 as the remainder of the route connects to other distributor road options and is assessed accordingly.

Option F - Inner Route

The distributor road aligns with Option C from the A350 Lackham roundabout to Lower Lodge Farm. The Route uses Pewsham Way from Canal roundabout, London Road and Stanley Lane to a point 100m north of Abbeyfields School. The route proceeds north for 700m and realigns with option C 250m east of Hardens Farm. Option F is only assessed in Zone 2 and 3 as the remainder of the route connects to other distributor road options and is assessed accordingly.

9.2.2.2. Pewsham Link Road Options

Pewsham Link Option 1

Option 1 provides a link road from the proposed distributor road near Lower Lodge Farm to Pewsham Way at Canal roundabout.

Pewsham Link Option 2

Option 2 provides a link road from the proposed distributor road near Middle Lodge Farm Lower Lodge Farm to Pewsham Way at a point 100m east of the Pewsham Way / Forest Lane junction.

Pewsham Link Option 3

Option 2 provides a link road from the proposed distributor road near Middle Lodge Farm Lower Lodge Farm to Pewsham Way at a point 100m east of the Pewsham Way / Forest Lane junction.

Pewsham Link Option 4

Linking the distributor road to Pewsham Way from a point 650m east of Middle Lodge Farm to the Pewsham Way junction at King’s roundabout.

9.2.3. Assessment via zones

The distributor road route options have been split into five zones to provide appropriate focus and limits for fair option comparison for the assessment. Route options within each zone have different characteristics for environment, engineering, transport and land ownership. In order to provide the same focus and identify specific characteristics as noted above for the zones, link road options to Pewsham Way are assessed separately from the zones and use the same assessment criteria.

Assessment zone boundaries are defined by connections to:

- Existing transport networks (road and cycle networks).
- Geographical locations development centres shown within the spatial framework layout in the Draft Concept Framework report Version 3 (April 2020).
- Boundaries with landowners / developers (Chippenham 2020 & Rawlings Green).

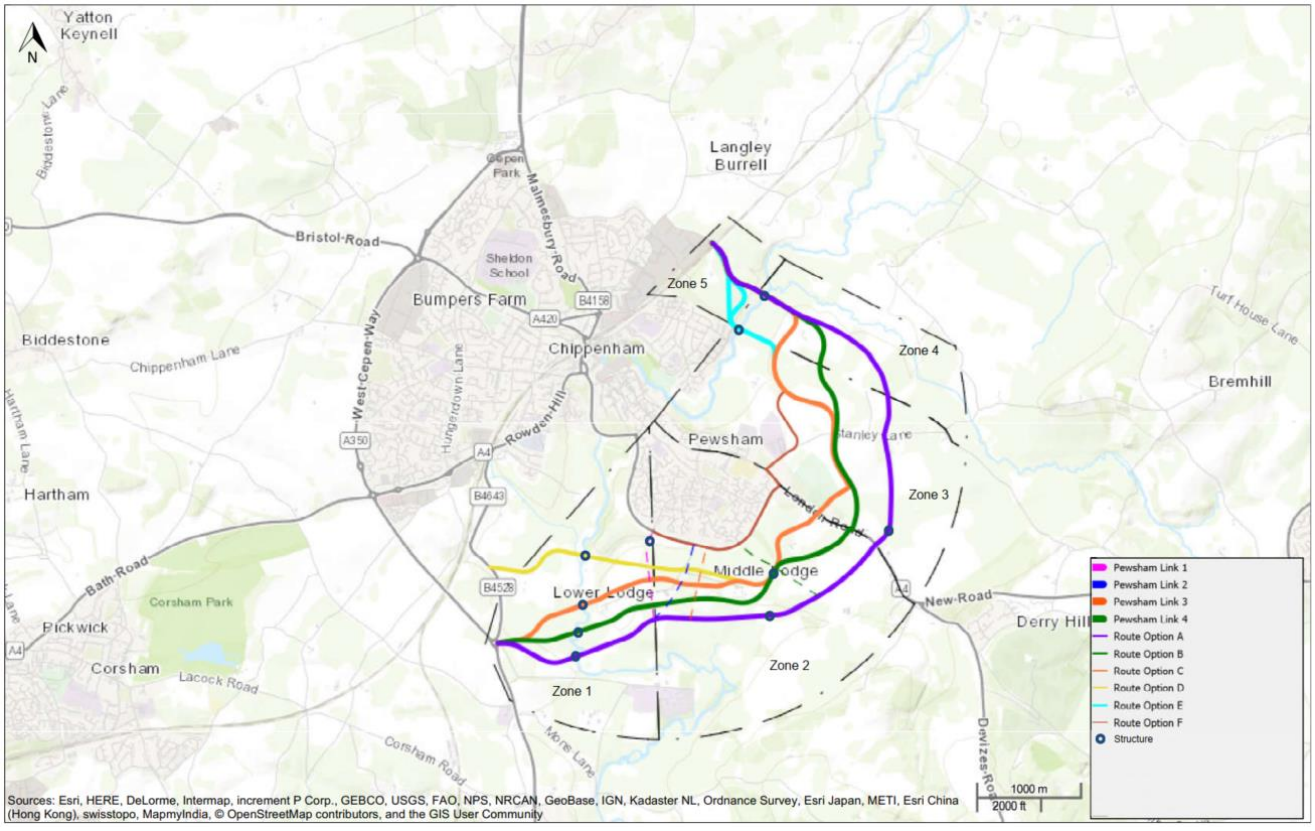
The section of distributor road bounded by Zone 5 at Rawlings Green is subject to a planning application by a private developer. This section of road was included in the HIF bid and is included in road route option cost estimates within this report, refer to Section 10. The PEAOR does not include Zone 5, the environmental assessment is covered by the Environmental Impact Assessment of the private developer planning application. Zone 5 has one road route option which mirrors the planning application and therefore does not further influence the option selection process.

Each stage of the options sifting process takes forward routes within each zone meeting the assessment criteria to pass to the next stage; the route options are realigned following each sift to take account for additional input information. The zones comprise:

- Zone 1: From Lackham Roundabout/B4528 south of the scheme to Forest Lane.
- Zone 2: From Forest Lane to the A4.
- Zone 3: From the A4 to NCN403.
- Zone 4: From NCN403 to River Avon.
- Zone 5: From River Avon to Rail Bridge.
- Pewsham Link Road Option 1 to 4.

The assessment zones are presented in Figure 9-3.

Figure 9-3 - Zone plan



9.3. First sift input data

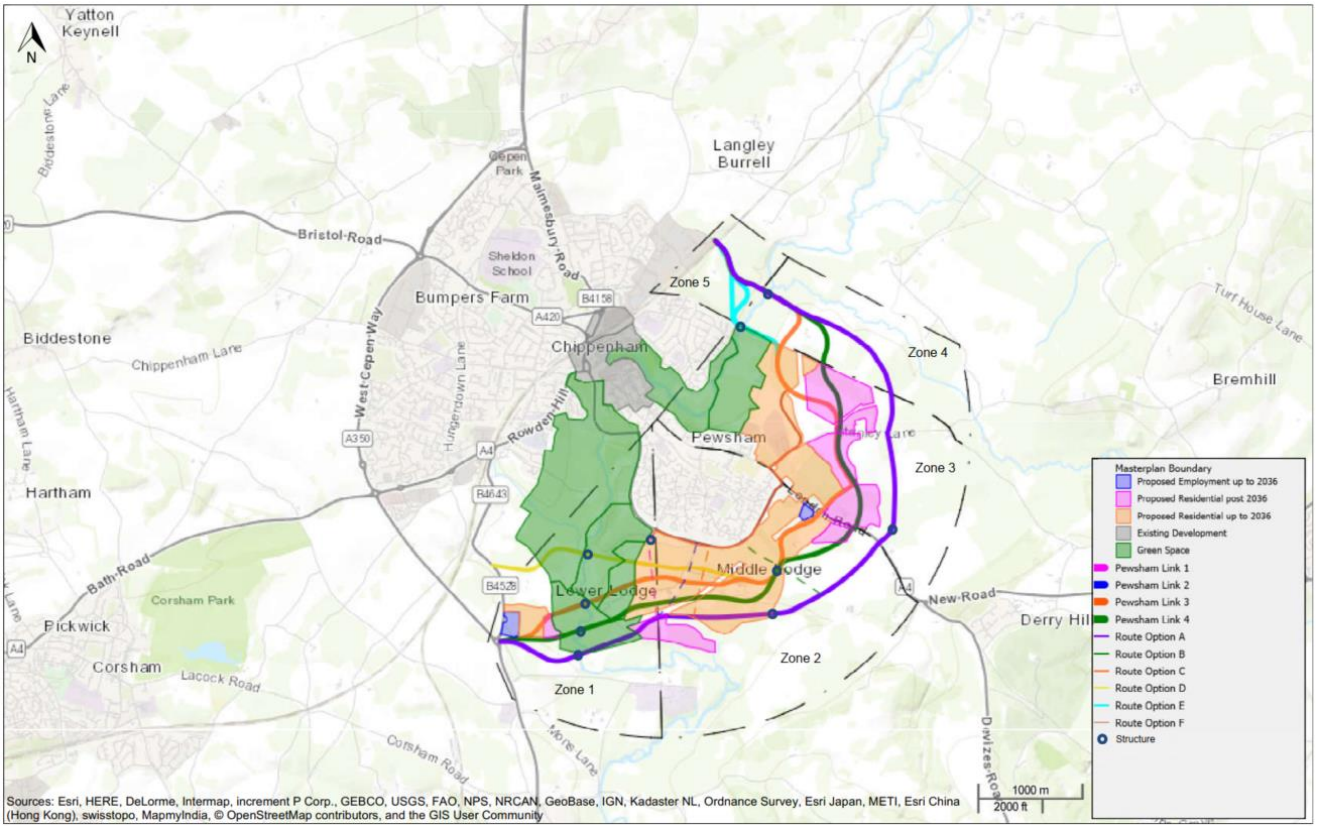
The first option sift assesses alignment with strategic objectives and deliverability. The following input data provides evidence for the first option sift.

9.3.1. Strategic data

Strategic data was obtained from the following reports and figures:

- HIF bid options assessment (updated in sections 2 to 7 of this report).
- Concept Framework development quantum.
- Future Chippenham Spatial Framework in Figure 9-4.

Figure 9-4 - Option sift 1 - Future Chippenham spatial framework



9.3.2. Deliverability data

A review of the following data and mapping was undertaken to assess option deliverability using the following data sources:

- Environment
  - Flood data – Figure 9-5.
  - Ecology biodiversity reviews location of known habitat – Figure 9-6.
  - Heritage – Figure 9-7.
- Engineering
  - Refer to flood data – Figure 9-5. The area of the flood zone is important for determining the size of structure required to cross the zone.
- Land ownership
  - Majority landowners/developers (June 2020) – Figure 9-8.

Figure 9-5 - Option sift 1 - flood data

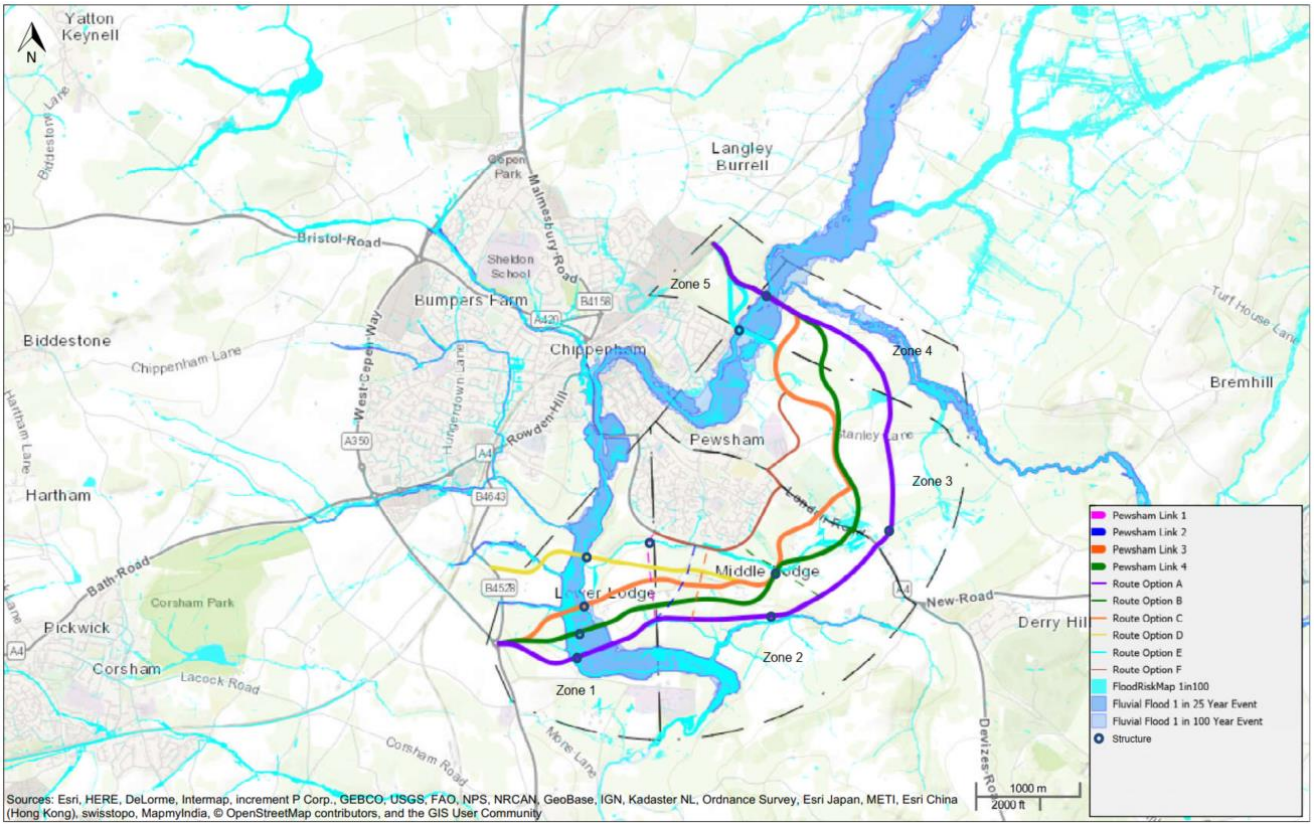


Figure 9-6 - Option sift 1 - biodiversity data

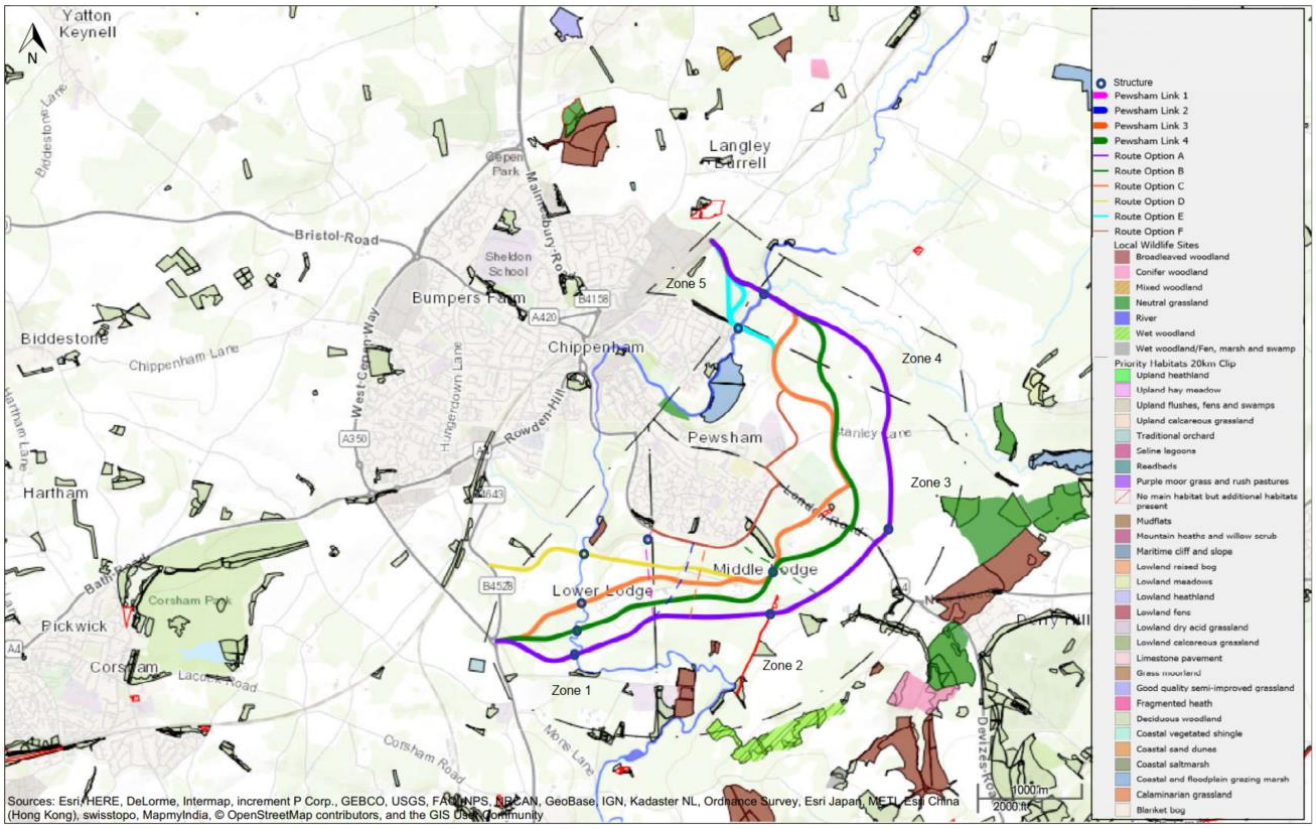


Figure 9-7 - Option Sift 1 - Heritage Data

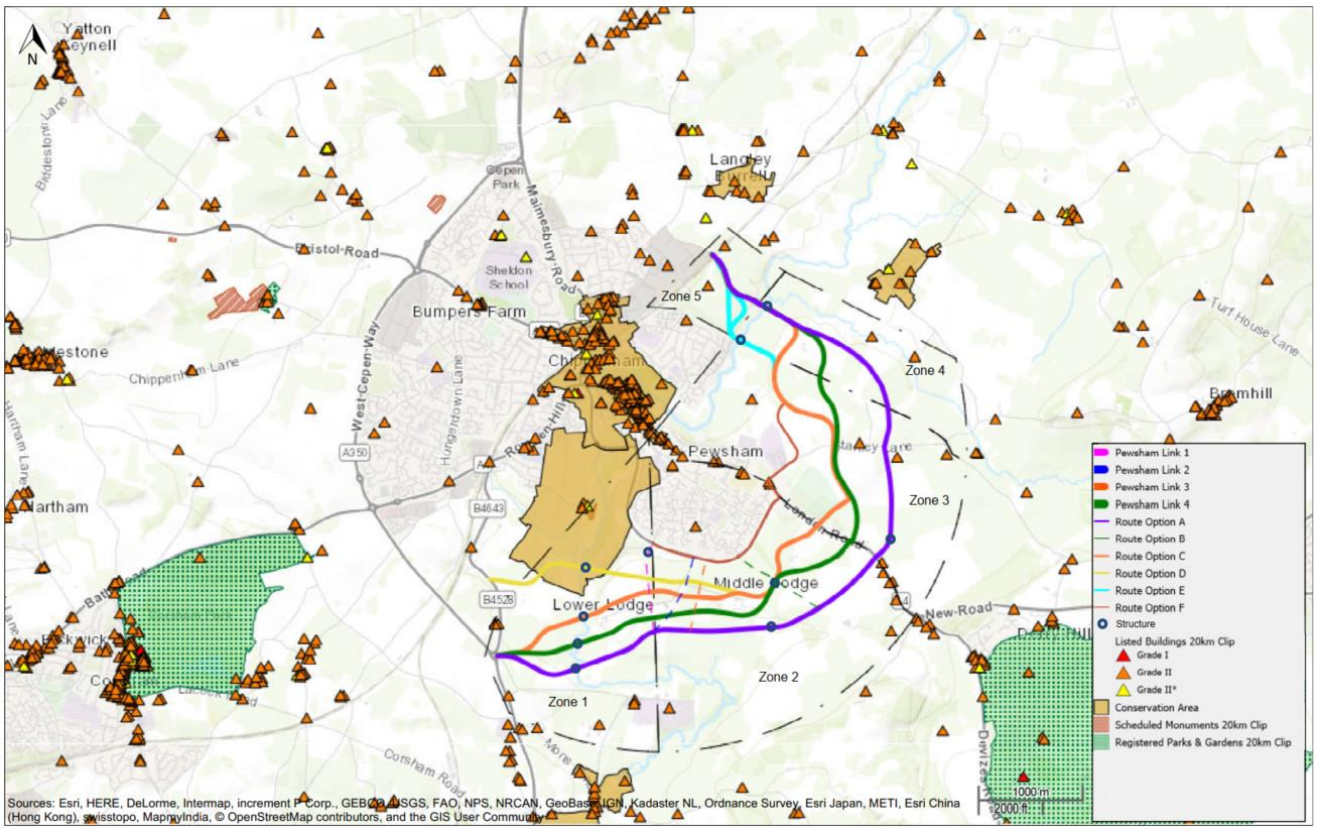
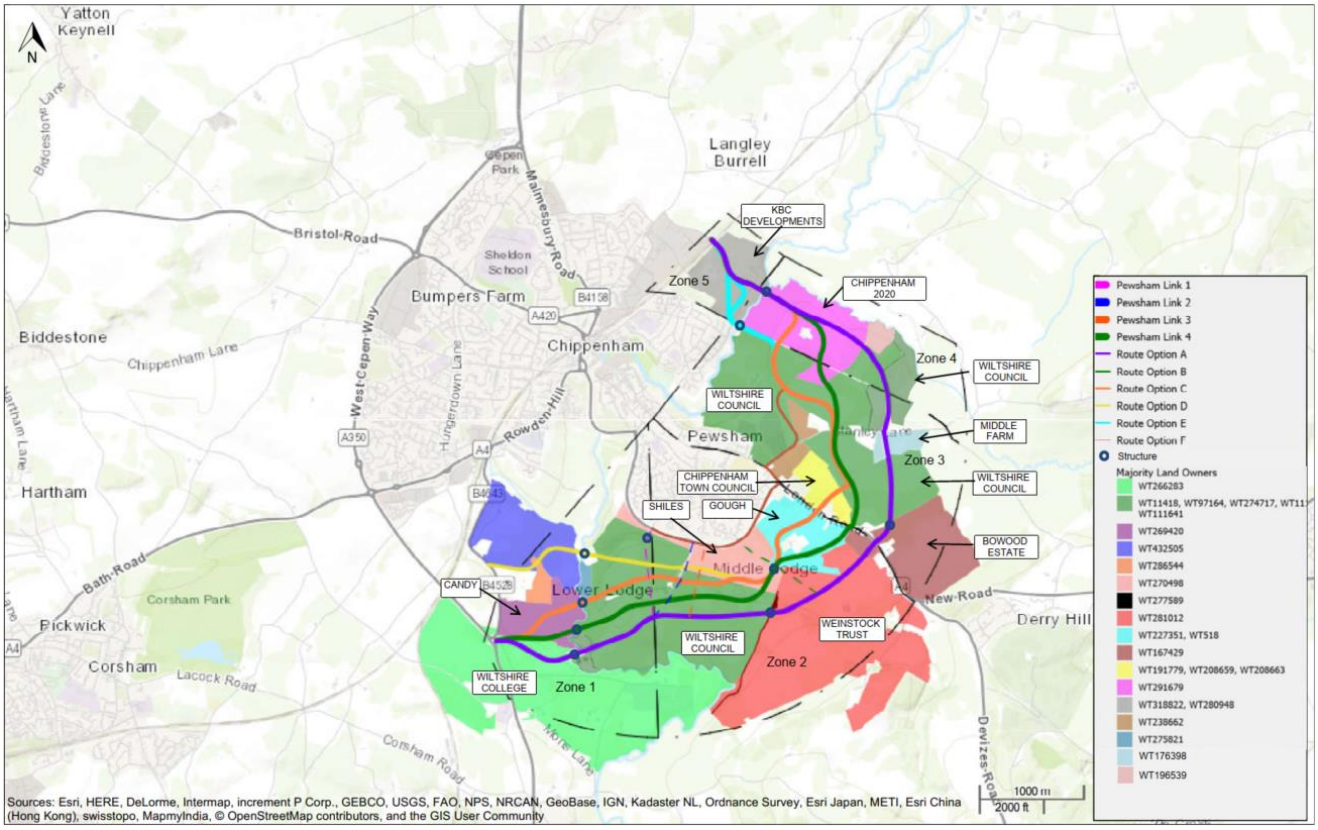


Figure 9-8 - Option Sift 1 - majority landowner/developers June 2020



9.4. First sift assessment criteria

The first option sift criteria provides a qualitative assessment of option alignment with strategic objectives and deliverability. Appendix E contains the full Option Sift 1 assessment scoring, this is summarised in Table 9-1.

9.4.1. Objective fit

All objectives must be at least partially satisfied in order to progress through each stage of option assessment sifting. If any option received a neutral / adverse assessment against any of the objectives for the first stage of option sifting, the option will not be progressed to the next stage, to ensure each option taken forward has at least partial suitability. A qualitive assessment was made on a three-point scale:

- 3 = Fully meets objective.
- 2 = Partially meets objective.
- 1 = Neutral/negative impact.

9.4.2. Strategic Case

Geographic data mapping, spatial frameworks and quantum from the HIF bid transport modelling and emerging Draft Concept Framework were reviewed to provide a qualitive assessment of the strategic scheme objectives:

1. Enable the delivery of high-quality housing developments by unlocking development land, meeting pre 2036 (Local Plan) and post 2036 (HIF) housing quantum.
2. Improve traffic congestion and flow across the existing road network, ensuring the transport network has the capacity to accommodate growth.
3. Provide good connectivity for multi-modal users at new centres and into Chippenham town centre, improving journey times and journey time reliability.

9.4.3. Deliverability Case

A review of the following data and mapping was undertaken to assess option deliverability:

- Environment review.
- Engineering assessment.
- Land strategy.

9.4.3.1. Environment Review

A qualitative assessment was made using desktop information and mapping for the following categories:

- Flood risk and drainage:
  - Flood Zone crossing up to 250m. Score = 3.
  - Flood Zone crossing between 250m and 500m. Score = 2.
  - Flood Zone crossing greater than 500m. Score = 1.
- Ecological impact:
  - Greater than 100m from national designated site / habitat records. Score = 3.
  - Within 100m of local or national designated site / habitat records. Score = 2.
  - Direct conflict with local or national designated site. Score = 1.
- Heritage & archaeology:
  - Greater than 100m from conservation area / listed buildings / heritage records. Score = 3.
  - Within 100m of conservation area / listed buildings / heritage records. Score = 2.
  - Direct conflict with conservation area / within 500m of scheduled ancient monument. Score = 1.

9.4.3.2. Engineering assessment

A qualitive assessment of engineering complexity was undertaken based on the length of structures required:

- Total structure length up to 250m. Score = 3.
- Total structure length between 250m and 500m. Score = 2.
- Total structure length greater than 500m. Score = 1.

9.4.3.3. Land Strategy

A qualitive assessment of Land Strategy was undertaken with the following scoring criteria:

- Full Wiltshire Council land ownership/land allocated in Chippenham Site Allocation Plan/planning permission approved. Score = 3.

  Landowner/developer letter of support to HIF bid, *and / or*

  Land put forward for future development within the Strategic Housing Land Availability Assessment (SHLAA). Score = 2.
- Objection to scheme/route option. Score = 1.

9.5. First sift assessment summary

Table 9-1 provides a summary of options taken forward or discounted from the optioneering process based on Strategic and Deliverability criteria set out in Section 9.4. Figure 10-1 presents the routes taken forward to the second option sift.

Table 9-1 - First sift summary

Zone Reference	Strategic Case	Delivery Case	Taken forward to 2nd Phase?	Justification for option continuation or rejection
	Overall Assessment	Overall Assessment		
ZONE 1: Option A	2, Partially satisfies objectives	2, Deliverable but high complexity/risk	Yes	Taken forward as this option meets the strategic objectives and although brings medium risk, should be viable in delivery.
ZONE 1: Option B	3, Strongly satisfies objectives	2, Deliverable but high complexity/risk	Yes	Taken forward as this option fully meets the strategic objectives and although brings medium risk, should be viable in delivery.
ZONE 1: Option C	3, Strongly satisfies objectives	2, Deliverable but high complexity/risk	Yes	Taken forward as this option fully meets the strategic objectives and although brings medium risk, should be viable in delivery.
ZONE 1: Option D	3, Strongly satisfies objectives	1, Unlikely to be deliverable	No	Not taken forward due to failure in deliverability. Option Scores 1 in Ecology and Heritage where the route affects the setting of the site of Rowden Park Manor and is likley to disturb the ancient woodland
ZONE 2: Option A	2, Partially satisfies objectives	2, Deliverable but high complexity/risk	Yes	Taken forward as this option meets the strategic objectives and although brings medium risk, should be viable in delivery.
ZONE 2: Option B and C	3, Strongly satisfies objectives	2, Deliverable but high complexity/risk	Yes	Taken forward as this option fully meets the strategic objectives and although brings medium risk, should be viable in delivery.
ZONE 2: Option F	1, Neutral / adverse	2, Deliverable but high complexity/risk	No	Not taken forward due to failure in Strategic case. Option fails to satify Objecive 1 which is crucial in retaining full funding. The Option does not provide the required quantum for post-2036 housing development.
ZONE 3: Option A	2, Partially satisfies objectives	2, Deliverable but high complexity/risk	Yes	Taken forward as this option meets the strategic objectives although further consideration will be required during the second sifts as this route is a long distance from the Town Centre. This option is also medium risk in delivery.
ZONE 3: Option B and C	3, Strongly satisfies objectives	2, Deliverable but high complexity/risk	Yes	Taken forward as this option fully meets the strategic objectives and although brings medium risk, should be viable in delivery.
ZONE 3: Option F	1, Neutral / adverse	2, Deliverable but high complexity/risk	No	Not taken forward due to failure in Strategic case. Option fails to satify Objecive 1 which is crucial in retaining full funding. The Option does not provide the required quantum for post-2036 housing development.
ZONE 4: Option A	2, Partially satisfies objectives	2, Deliverable but high complexity/risk	Yes	Taken forward as this option meets the strategic objectives although further consideration will be required during the second sifts as this route is a long distance from the Town Centre. This option is also medium risk in delivery.
ZONE 4: Option B and C	2, Partially satisfies objectives	2, Deliverable but high complexity/risk	Yes	Taken forward as this option meets the strategic objectives and although brings medium risk, should be viable in delivery.
ZONE 4: Option E	2, Partially satisfies objectives	1, Unlikely to be deliverable	No	Not taken forward due to failure with respec to Ecological impact. This options impact on the heaviliy vegitated embankment of the NCR403 would result in large ammounts of habitat lost.
ZONE 5: Option A	3, Strongly satisfies objectives	2, Deliverable but high complexity/risk	Yes	Taken forward as this option meets the strategic objectives and although brings medium risk, should be viable in delivery following dicussions with the developer.
ZONE 5: Option E	2, Partially satisfies objectives	1, Unlikely to be deliverable	No	Not taken forward as this option conflicts with the planning application and desires of the land developer.
PEWSHAM LINK: Option 1	3, Strongly satisfies objectives	2, Deliverable but high complexity/risk	Yes	Taken forward as this option meets the strategic objectives and although brings medium risk, should be viable in delivery. Further cosnideration to ensure large areas of habitat and ecology are not damaged by this option.
PEWSHAM LINK: Option 2	3, Strongly satisfies objectives	2, Deliverable but high complexity/risk	No	Option not ruled out in Strategic or Delivery Case directly but as this option is similar to Pewsham Link option 3 this has been removed as the impact on the ecology is largest of the two options.
PEWSHAM LINK: Option 3	3, Strongly satisfies objectives	2, Deliverable but high complexity/risk	Yes	Taken forward as this option fully meets the strategic objectives and although brings medium risk, should be viable in delivery.
PEWSHAM LINK: Option 4	1, Neutral / adverse	2, Deliverable but high complexity/risk	No	Not taken forward, although deliverable, this option restricts the masterplanning development if used as the distributor. Option may be used as local housing link.

10. Eastern distributor road: Options assessment - second sift

10.1. Second sift option generation

Options from each zone which passed the first assessment have then been linked together to form three routes, inner, middle and outer. Preliminary road geometry designs were produced based on a topographic datum survey, forming the basis for scheme measures and cost estimates.

In addition, the routes were further refined to:

- Provide alternative routes to support land agreement strategy and mitigate risk of ransom. Landowner options need to be considered at this stage because at present no land agreements are in place; and
- Reduce impact on physical and environmental constraints.

A coordinated road route option has been produced based on the best fit options within each zone, this takes into account the assessment criteria and scheme objectives and is presented in Figure 10-15.

10.2. Second sift options

10.2.1. Outer Route – Option A

The distributor road generally follows the same alignment as sift 1 with some minor amendments to horizontal alignment identified during 3D design.

10.2.2. Middle Route – Option B

The distributor road generally follows the same alignment as sift 1 with some minor amendments to horizontal alignment identified during 3D design.

10.2.3. Inner Route – Option C

The distributor commences at a new junction with the B4528, north of Lackham roundabout and south of Showell Nurseries. With the exception of some other minor amendments to horizontal alignment identified during 3D design the road generally follows the same alignment as sift 1 for the remainder of the route.

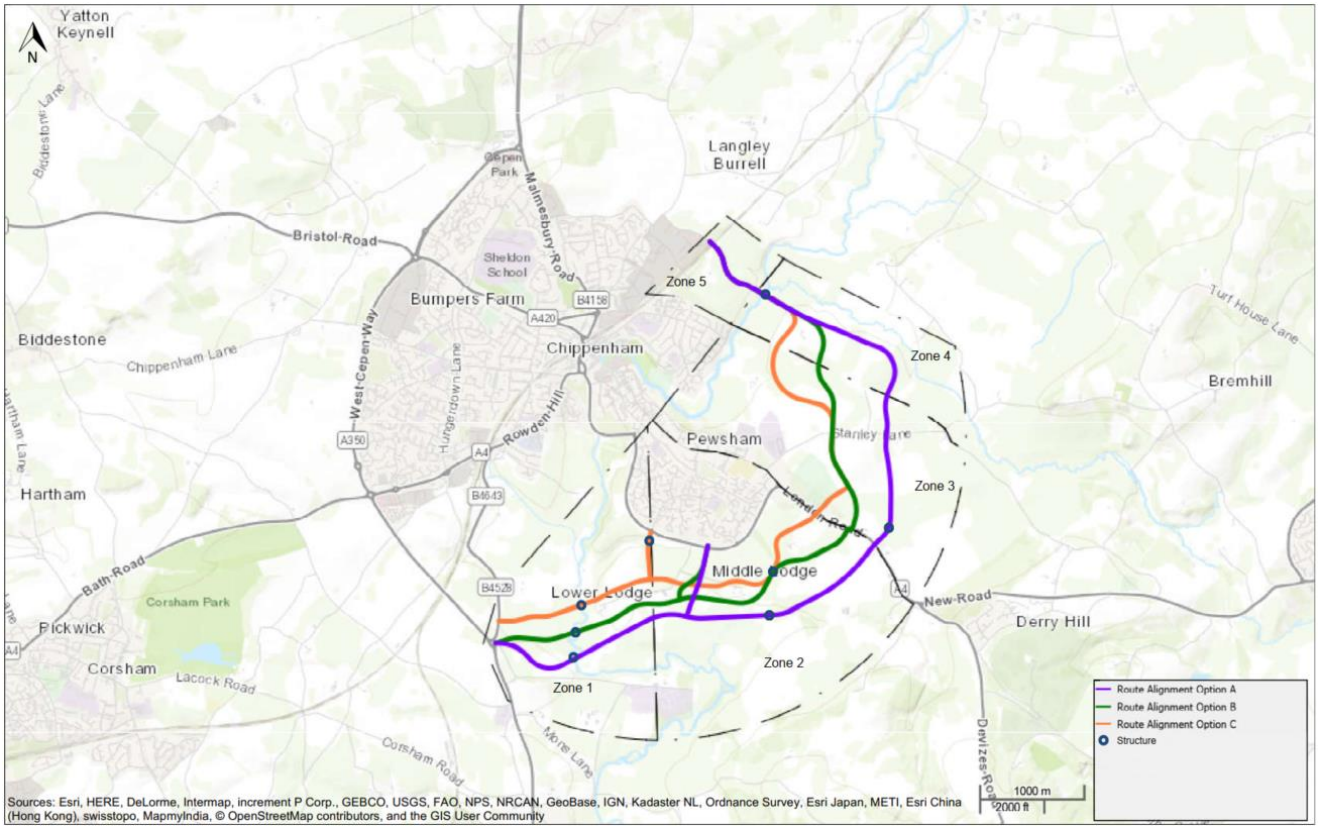
10.2.4. Pewsham Link Option 1

This Pewsham Link Road option generally follows the same alignment as sift 1 with some minor amendments to horizontal alignment identified during 3D design.

10.2.5. Pewsham Link Option 3

This Pewsham Link Road option is realigned during 3D design to follow the contours around a peak in the topography and form a new junction with Pewsham Way 150m east of Forest Lane.

Figure 10-1 - Second sift summary options



10.3. Assessment via zones

The assessment zones from the first option sift are carried forward to the second option sift.

10.4. Second sift input data

The second options assessment follows a five-case model, including the following sections:

- Strategic Case.
- Environmental Assessment.
- Delivery Case.
- Financial Case.
- Commercial Case.

The Economic Case comparing the transport benefits and balancing these against the Environmental Case for each option is not included in the option sifting by zone, refer to section 11.8.

The following data has been referred to for the second option sifting:

10.4.1. Strategic Case data

Strategic data including the following reports and figures were reviewed:

- The evidence base to support the options sifting for objective 1, development quantum and objective 2, transport improvements refers to the transport modelling summary in section 10.8 and the Future Chippenham Spatial Framework – Figure 10-2, more detailed maps are available in the Draft Concept Framework report in Appendix G.
- The evidence base to support option sifting for objective 3, connectivity, refers to Future Chippenham – 10-minute walking zones – Figure 10-3

Figure 10-2 - Option sift 2 - Future Chippenham spatial framework

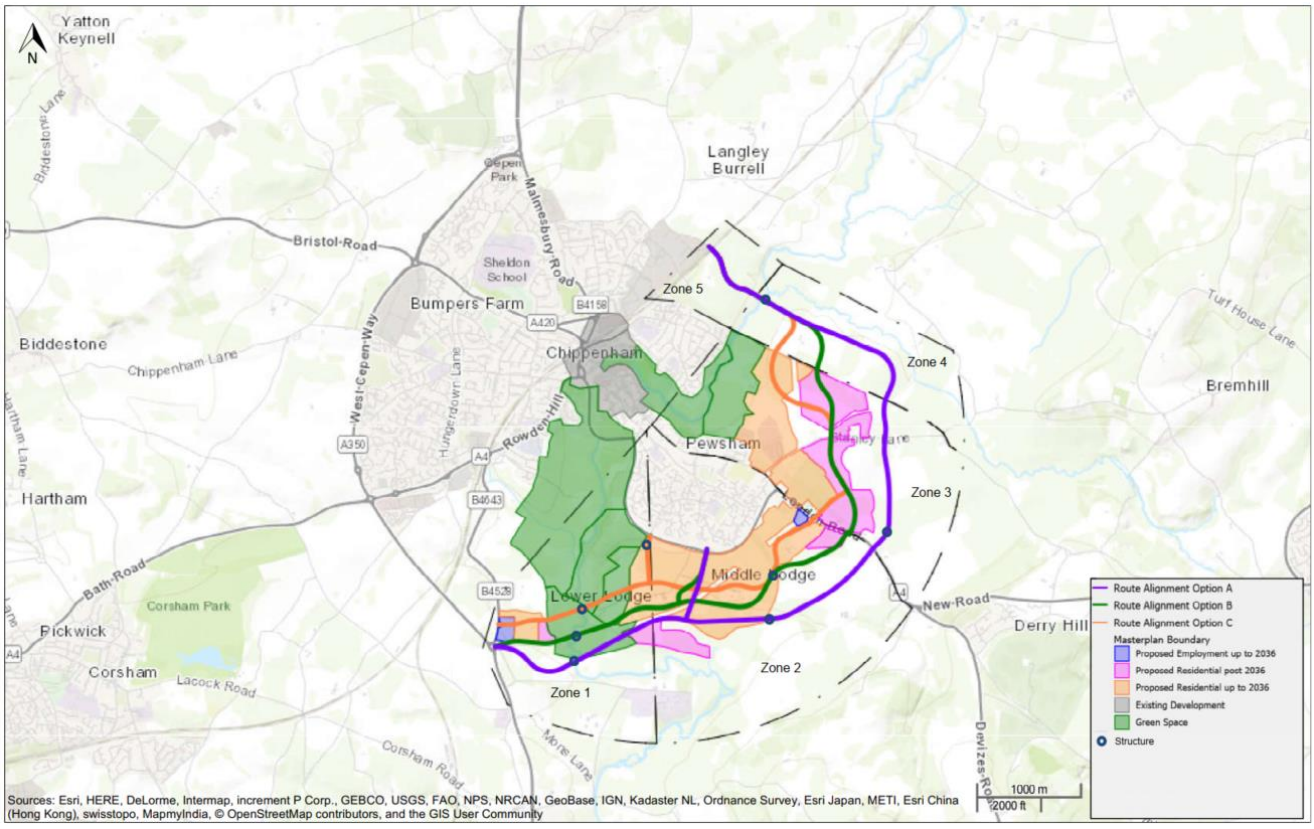
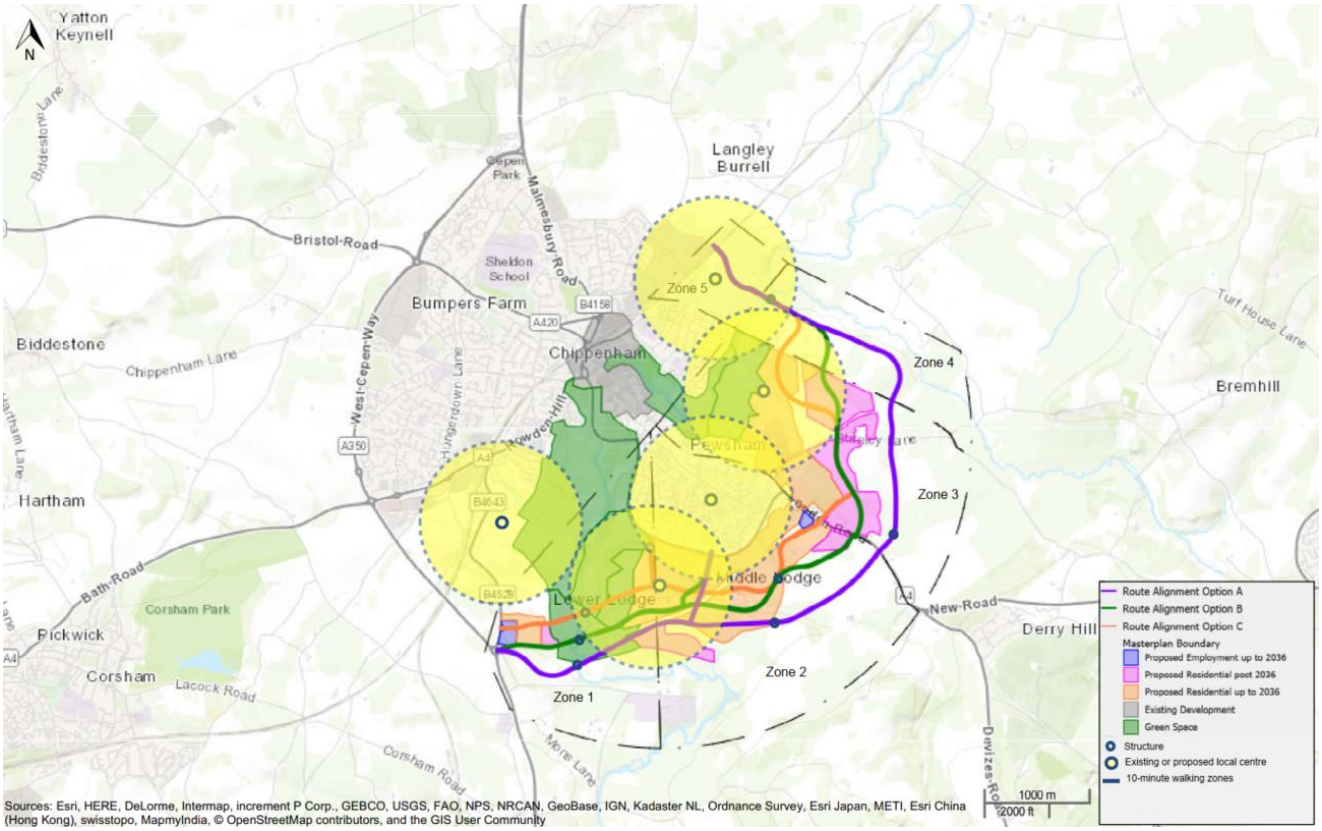


Figure 10-3 - Option Sift 2 - Future Chippenham – 10 minute Walking Zones



10.4.2. Environmental Assessment data

There are numerous environmental constraints that a new road to the south of Chippenham would need to overcome. A Preliminary Environmental Assessment of Options Report (PEAOR) was undertaken to investigate the current environmental conditions in proximity to Chippenham to both shape initial option identification and then assist the option selection process. This PEAOR forms the first step in the environmental impact assessment for the scheme. As such, it identifies the baseline conditions (including outlining environmental constraints) by each environmental topic area.

The following environmental topics have been assessed within the PEAOR:

- Air quality.
- Noise and vibration.
- Biodiversity.
- Water.
- Landscape and visual amenity.
- Geology and soils.
- Cultural heritage.
- Materials and waste.
- Population and health.
- Climate change and sustainability.
- Vulnerability of the scheme to climate change.

Sections 10.4.2.1 to 10.4.2.11 outline key findings from these baseline studies. A summary of the environmental assessment of options is included within chapter 10.7 as part of the OAR process. For further detail regarding the environmental baseline and the Options assessment see Appendix A.

10.4.2.1. Air quality

There are no Air Quality Management Areas (AQMAs) declared within the vicinity of Chippenham. The closest AQMA is located approximately 4.6km to the southeast of the Scheme in Calne. Due to this distance, it is not anticipated the Scheme would directly affect this sensitive area or be affected by poor air quality from the AQMA, however this will be investigated during the detailed assessment undertaken as part of the EIA process..

Air quality monitoring is undertaken Wiltshire Council and is a key component of local air quality management. There are five diffusion tubes located in Chippenham with the closest monitoring location to the Scheme being situated approximately 300m from the A4 at Rowde Mead (P18/105) which is classified as an 'urban background' site. At this closest location to the scheme, the most recent publicised annual NO_2 was 12 µg/m^3, which is significantly under the Annual Air Quality Objective (AQO) of 40 µg/m^3.

DEFRA background mapping suggests that indicatively across the zones for assessment, levels of air pollutants are very low (see Table 10-1).

Table 10-1 - DEFRA mapped background concentrations at Chippenham sites, 2018 and 2024 (µg/m^3)

Concentration	2018			2024		
	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$
Minimum	8.1	12.7	8.3	6.5	12.0	7.7
Maximum	10.6	13.4	9.1	8.3	12.6	8.4
AQS objective	*40*	*40*	*25*	*40*	*40*	*25*

DEFRA's PCM Modelling indicates that levels of NO_2 are higher than those found during local air quality modelling by Wiltshire Council. However, it still indicates that levels are well within the annual AQO, finding roadside annual NO_2 levels in 2018 to be 25.5 µg/m^3.

10.4.2.2. Noise and vibration

The proposed options pass through predominantly rural areas. Therefore, for areas remote from existing road network, existing baseline noise and vibration levels are expected to be relatively low. Existing noise within the options locality is likely to be associated with distant traffic noise from the existing road network and the activity of local farms.

Major roads in the area, such as the A4, Pewsham Way, A350 and Swindon Road (B4065), are expected to dominate the existing noise and vibration environment for nearby sensitive receptors. The contribution of road traffic noise to existing baseline noise and vibration levels is dependent on distance to roads, and the existing traffic flow, composition and speeds on those roads. This is demonstrated by Noise Important Area designations following these major routes through Chippenham.

There are two Noise Important Areas in close proximity to the scheme on London Road (NIA ID:3736) and the A4 near Forest Gate Business Park (NIA ID: 3737). Re-distribution of traffic may also have the potential to reduce noise at three other NIAs located within Chippenham.

The majority of noise sensitive receptors are residential properties and are not distributed evenly throughout the study area. These are largely focused on the population centre in Pewsham, the various farms across site and some individual residential houses along the A4 and Stanley Lane.

10.4.2.3. Biodiversity

Base line data is included in this section. More detailed information is available in the PEAOR.

Statutory designated sites

There are two Special Areas of Conservation (SAC) designated for bat species within 30 km of the Scheme. A Special Area of Conservation (SAC) is a European designation set-up to protect one or more special habitats and/or species – terrestrial or marine – listed in the Habitats Directive.

There are six other statutory designated sites within 5 km of the Scheme, including five SSSIs and one Local Nature Reserve (LNR). These are shown in Table 10-2.

Table 10-2 - Designated Sites within 5km

	Distance from Designated Sites	Reasons for designation
Bath and Bradford-on-Avon Bats SAC	6.6 km west of Route Option A in Zone 1	This SAC comprises thirteen individual parcels of land. A primary reason for designation is for populations of greater horseshoe, as the site contains 15% of the hibernation sites of the species' UK population. It is also primarily designated for populations of Bechstein's bat, as a small number of individuals hibernate in abandoned mines within the site. Although not a primary reason for designation, populations of lesser horseshoe are also present as a qualifying feature.
Mells Valley SAC	26.6 km south-west of Route Option A in Zone 1	This SAC is made up of two parcels of land. The primary reason for the designation is for an exceptional breeding population of greater horseshoe bats. The site contains maternity roosts which are used by 12% of the UK population. There are a small number of individuals which hibernate at the site.
Bencroft Hill Meadows SSSI	1.3 km east of Route Option A in Zone 4	The site is an unimproved pasture of exceptional botanical quality. Clay soils have created wet flushes on the lower meadows which support plant communities characteristic of damp and marshy ground. The meadows are bounded by species-rich hedgerows. Typical grassland butterflies have been recorded.
Spye Park SSSI	2.7 km south of Route Option A south of Zone 2	The site is a large habitat mosaic with undisturbed alderwoods, oakwood, parkland and dry acidic grassland. There are large communities of lichens, bryophytes and vascular plants. It has predominantly wet soil conditions with many wet flushes and streams. There is a neglected coppice of hazel. Species uncommon in Wiltshire – marsh violet, smooth-stalked sedge, thin-spiked wood sedge and scaly male-fern – occur in the site. It is important for breeding woodland birds e.g. buzzard, redstart, nightingale and tree pipit. There is also a diverse invertebrate community.

	Distance from Designated Sites	Reasons for designation
Sutton Lane Meadows SSSI	3.7 km north-east of Route Option A, B and C in Zone 4	The site is primarily unimproved neutral grassland and is botanically diverse. There are two herb-rich meadows which are hay-cut in summer and then grazed in autumn. It supports populations of two locally uncommon plant species. There are also small wetland areas with a permanent pond and winter stream. Ancient hedgerows are also present, which attract yellowhammer and lesser whitethroat.
Corsham Railway Cutting SSSI	4.3 km west of Route Option A in Zone 4	1 km length of railway which is designated primarily for geological interest.
Kellaways – West Thyterton, River Avon SSSI	670 m north-east of Route Option A in Zone 4	The site consists of a 1.2 km long stretch of the River Avon which is designated primarily for geological interest.
Mortimore's Wood Local Nature Reserve	460 m west of Route Option C in Zone 1	The habitats within the site include woodland, woodland edge and riverbank, which support a large bluebell community in spring.

Non-statutory designated sites

There are seventeen non-statutory designated sites, County Wildlife Sites (CWS), within 2 km of the Scheme. Only the River Avon is intersected by the route options, with all other CWSs 200m or more away from the scheme at their closest point. Further information about these sites is provided in the PEAOR.

Terrestrial habitats

Habitats for terrestrial species for this part of Wiltshire include:

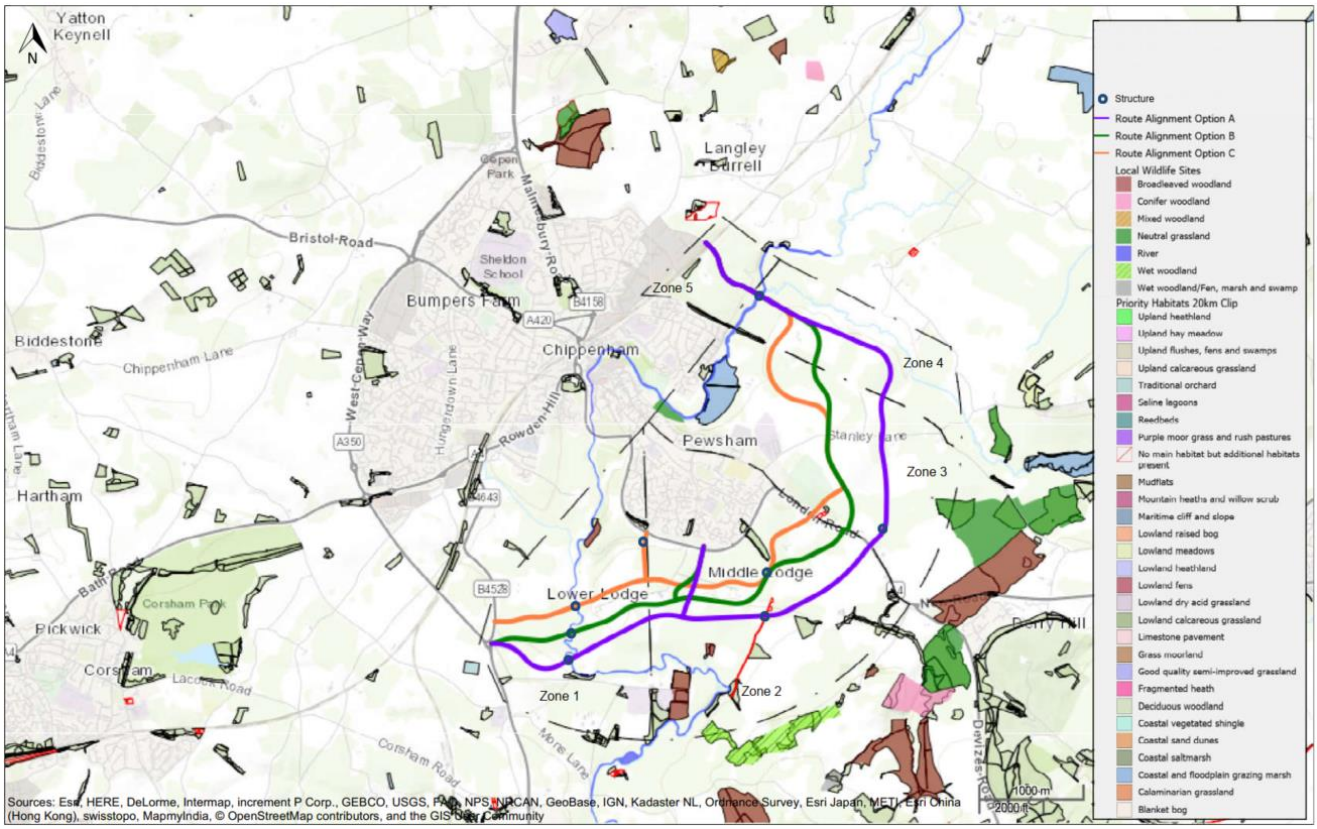
- Ancient woodland.
- Priority habitats including deciduous woodland, rivers, hedgerows, arable field margins and ponds.
- Agricultural land, including both arable and grazed grassland. Farmland habitats are included in the Wiltshire Biodiversity Action Plan (BAP) but are the most abundant habitat type across Wiltshire.
- Deciduous woodland connecting to species rich and species poor hedgerows, forming a connective network.
- The River Avon, River Marden, Cocklemore Brook, Pudding Brook, and connecting ditch network.

There are two parcels of ancient woodland within 1 km of the Scheme, located 515m south of Option A at Lackham Wood and 720m south of Close Wood respectively.

There are nine priority habitats identified within 1 km of the Scheme although only: deciduous woodland, rivers, hedgerows, arable field margins and ponds lie within the 250m Zone of Influence of the proposed options.

The 250m study area around the Proposed Scheme options is dominated by agricultural land, including both arable and grazed grassland. The grassland habitats vary in condition and species richness, from improved to poor semi-improved and neutral semi-improved grasslands. There are small parcels of deciduous woodland within the study area, connecting to species rich and species poor hedgerows, forming a connective network across much of the study area. The River Avon runs through the study area in the southern third and northern boundary and connects to streams and ditches across the study area. In addition to priority river habitats, the Wiltshire BAP includes streams and their associated habitat, which are present in Cocklemore Brook (OW6) and likely to be present along the more permanent flowing drains within the study area. Habitat constraints have been mapped in Figure 2-13.

Figure 10-4 - Habitat Constraints Map



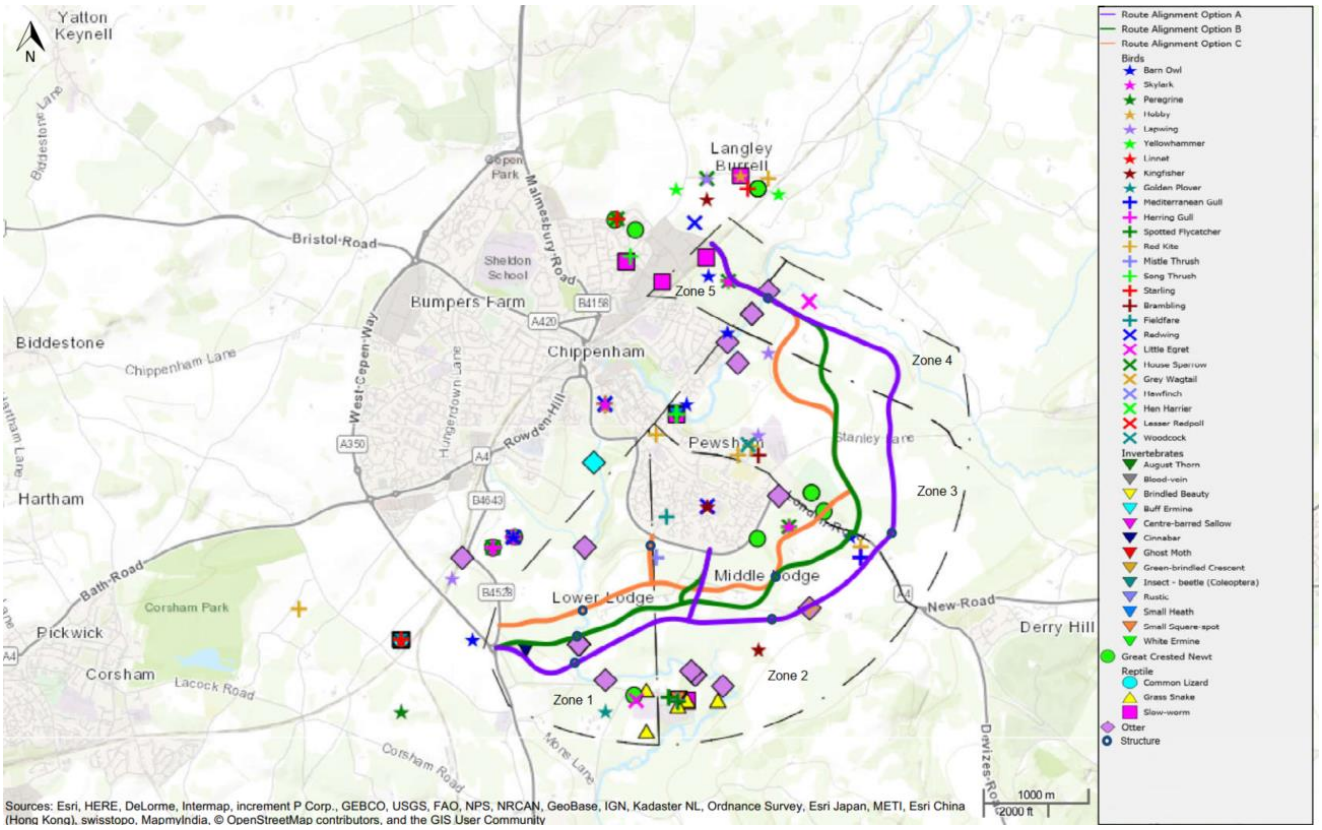
Terrestrial species

There are well-connected hedgerows, mature treelines, rivers and woodland patches, that could provide suitable foraging and commuting habitat for bats across Chippenham. There are also buildings with bat roost potential. The Wiltshire and Swindon Biological Records Centre (WSBRC) provided 647 records of 14 species of bats within 5km of the scheme. Figure 10-5 maps these terrestrial species.

The Wiltshire and Swindon Biological Records Centre (WSBRC) also provided information related to the following protected or notable species within the study area including:

- Badgers: WSBRC provided 39 recent records of badger within 1 km, the most recent of which was from 2018.
- Amphibians: WSBRC provided ten records of amphibians (8 Great Crested Newt and 2 common Toad) within 1 km.
- Otters: WSBRC provided 18 recent records of otter within 1 km. of the Scheme and 1 record of Water Vole. Most records are associated with the River Avon, with the others associated with Cocklemore Brook (OW6) and the other within a densely vegetated embankment adjacent to the railway.
- Hazel Dormice: WSBRC returned no records, recent or otherwise of hazel dormice within 1 km. However, some mature hedgerows connected to parcels of woodland do offer a variety of food sources and a layered structure preferred by dormice.
- Notable Bird Species: WSBRC provided 62 recent records of notable bird species within 1 km. There are a large number of records associated with Lackham Wood CWS and ancient woodland and Baydons Meadows CWS.
- Reptiles: WSBRC provided 20 recent records of reptiles within 1 km. These records consist of ten slow-worm, nine grass snake and one common lizard.
- Non-Native Plant Species: WSBRC provided no records of non-native plant species within 1 km.

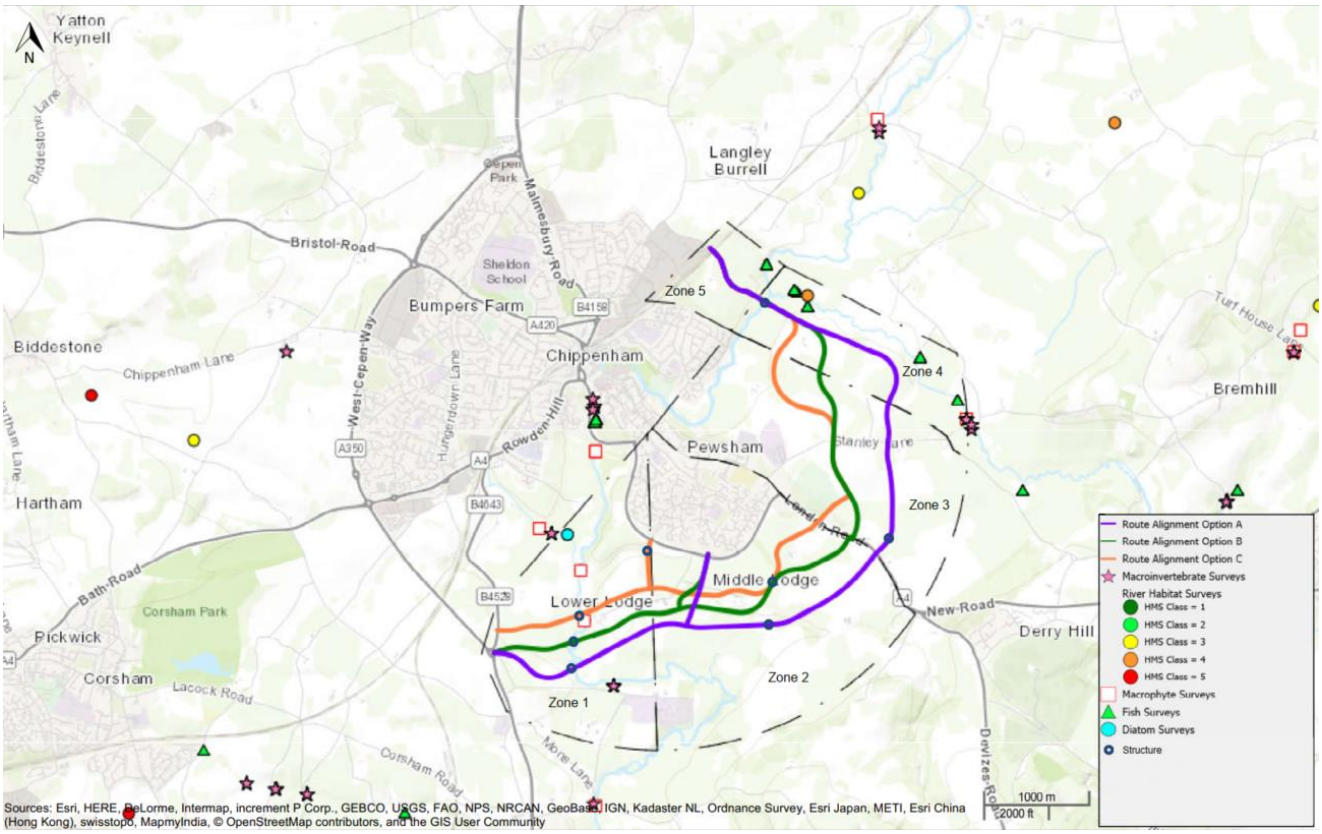
Figure 10-5 - Terrestrial species



Aquatic species

The desk study identified that numerous Environment Agency Monitoring sites for Fish, Aquatic Macrophytes and Aquatic Macroinvertebrates are present in the River Avon and the River Marden. Both rivers were found to support relatively diverse aquatic macro-invertebrate populations. A monitoring site on the River Avon also recorded a single sample containing European Eel, a species Critically Endangered on the International Union for Conservation of Nature (IUCN) Red List of threatened species and therefore of note. The desk study findings can be found on Figure 10-6.

Figure 10-6 - Aquatic species



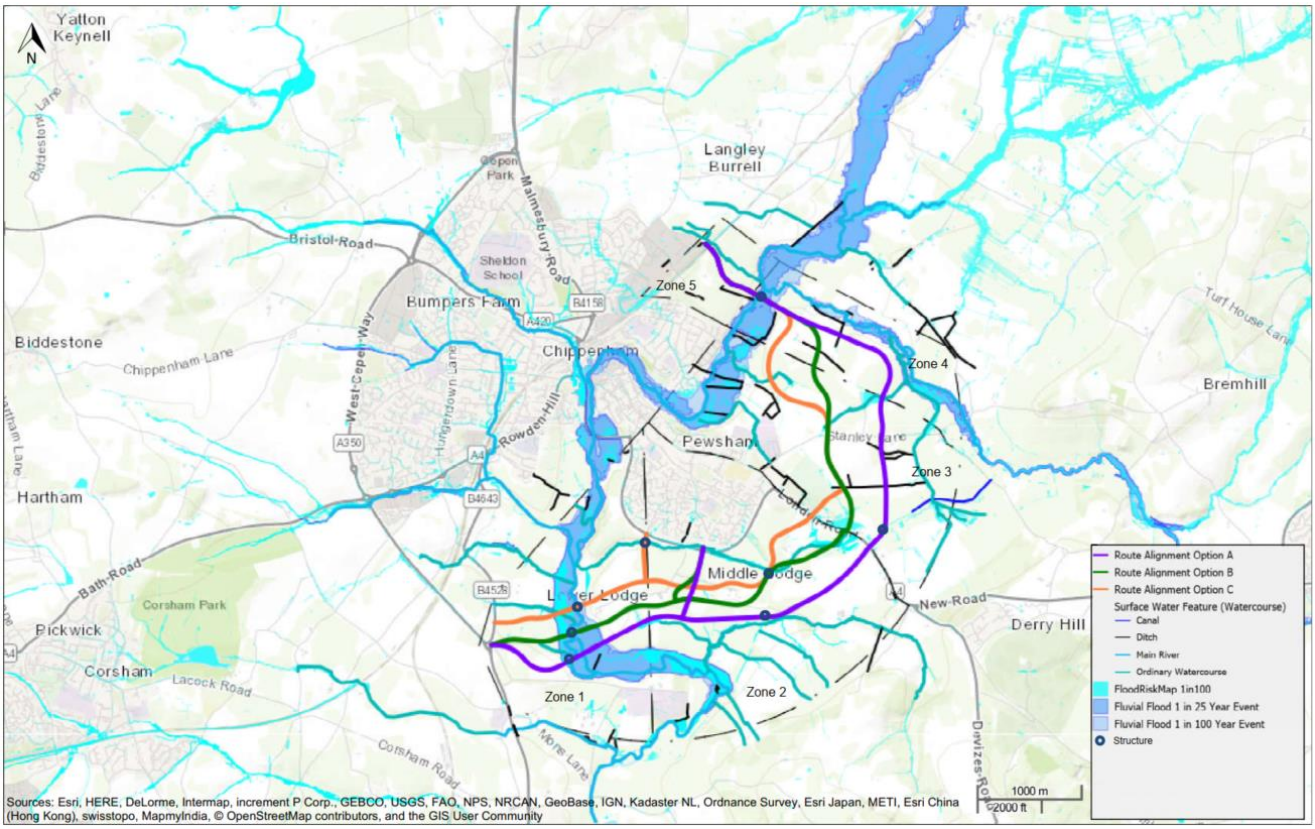
Source: Environment Agency

10.4.2.4. Water environment

The main surface watercourse in the study area is the River Avon, which flows from north to south with an extensive floodplain. It has various tributaries that join along this stretch. The River Marden flows into the River Avon at the northern end of the study area; the Pudding Book (Avon) at the western edge of study area; and an unnamed Tributary at the southern extent of the study area. The floodplains of these tributaries are predominantly rural. These are shown in Figure 10-7. There are several Ordinary Watercourses (including drains and ditches) throughout the study area that will be on hydraulic connectivity to these Main Rivers. The old route of the Wilts and Berks Canal also runs through the south of the study area.

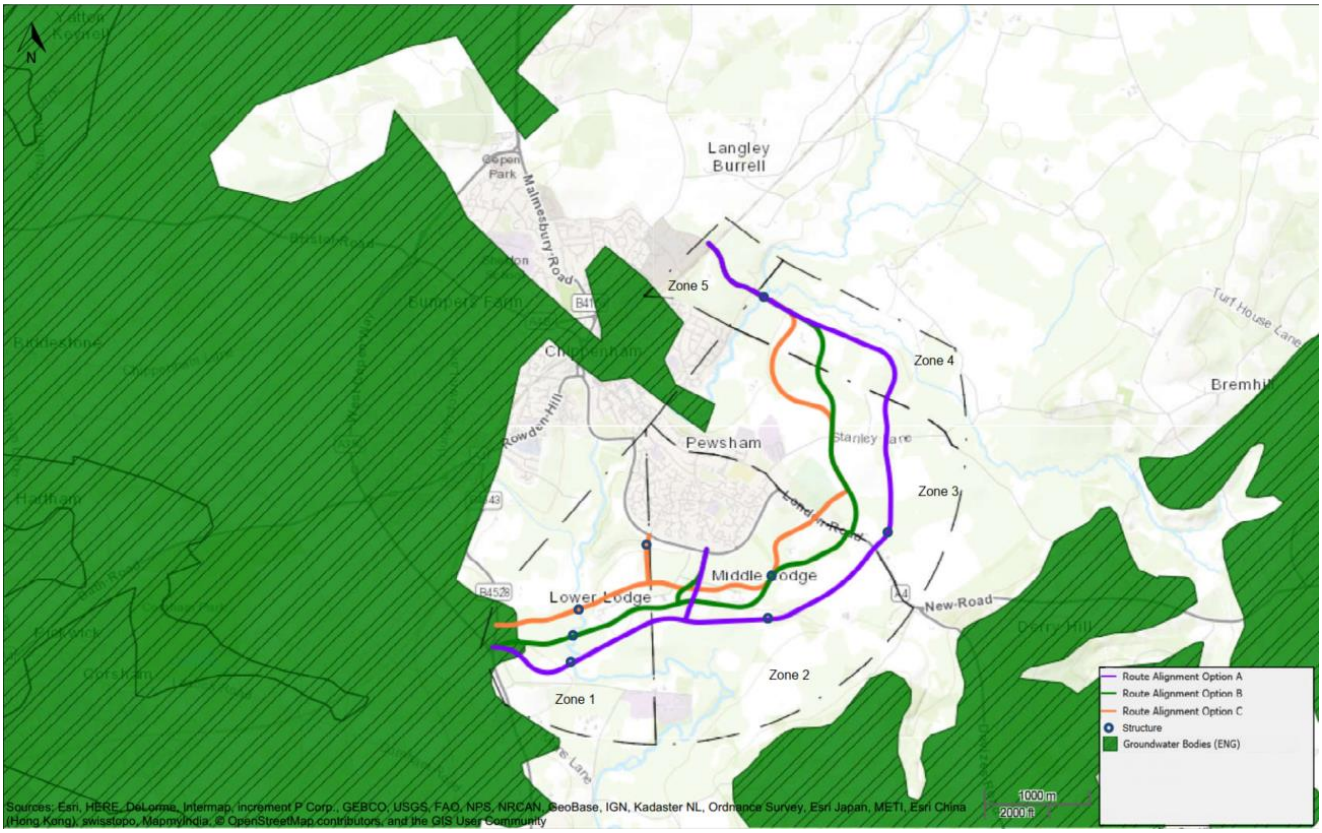
The majority of the geology within the study area is designated as Unproductive Strata, layers of low permeability, and this is reflected by the fact that the area is not underlain by a Water Framework Directive (WFD) Groundwater body, see Figure 10-8. Nonetheless, there are pockets of superficial deposits, designated as Secondary A Aquifers underlying the southern and western part of the study area. These superficial deposits continue north east within the study area, broadly associated with the presence of the River Avon. There is an additional area of Alluvial fan deposits (typically comprising clay and silt) in the southern part of the study area. An Outer Protection Zone (Zone II) of a groundwater Source Protection Zone (SPZ) is within the western section of the study area. The SPZ is related to water abstraction from the river terrace deposits, which is located outside of the study area.

Figure 10-7 - Flood data



Source: Environment Agency

Figure 10-8 - Source Protection Zones



Source: Environment Agency

10.4.2.5. Landscape and visual

The site lies within NCA 117: Avon Vales. The wide valley of the River Avon is the main influencing feature of this character area. The wide river corridor has an ancient pattern of flood meadows and drainage ditches, with closely associated settlements and more recent development. The Avon and its tributaries are surrounded to the west, south and east by higher land. These ridges provide panoramic views across towns, villages and the countryside edges. In respect of the site, this description is accurate, with high points such as Derry Hill to the south and Bencroft Hill to the east having a large view across the site.

The North Wiltshire Landscape Character Assessment was completed in 2004 classifying the landscape type as 'Lowland River Farmland' and the character area of the 'Avon Valley Lowland'. This description is characterised by a wide, flat, low lying river landscape between 30 - 70m AOD, with minor undulations where the land rises to higher ground. There is a dominant presence of water through rivers, streams and ditches with associated riparian vegetation, damp meadow and pasture along watercourses and the valley floor.

The settlement edge of Chippenham is generally two-storey with little variation in height of the roofline with built form partially screened by existing vegetation. The church spires of St Paul's and St Andrew's are important landmarks in the town and are visible from the surrounding landscape.

Land at Rawlings Green, to the north-east of Chippenham provides a raised foreground to the Chippenham settlement edge. To the east, the settlement edge areas visible from the study area include Hardens Mead and Monkton Park, to the south, the settlement edge is partially screened by topography. Rowden Hill and parts of central Chippenham are visible on higher ground from viewpoints located to the south-west of the settlement edge. It is possible to see the industrial unit at Parsonage Way on the southern edge of Chippenham.

There are approach views or a progression of views along route corridors such as A4/London Road or NCR 403 over the proposed site. Pewsham and Rowden Hill settlement edge are visible in views generally from the south of Chippenham along approach roads and from footpaths within the River Avon corridor. There are views from approach roads such as the A4, which descends from Derry Hill eastwards and also from Patterdown, a southerly approach road connecting from the A350 to the south.

Views from outlying viewpoints at Peckingell, Tytherton Lucas and Lackham Agricultural College. There are views across the study area as a generally semi-open landscape; however, the extents of views are contained by subtle changes in landform, localised hillocks or ridges to the east of Chippenham. There are some prominent ridges and intervening woodland to the south of Chippenham and particularly around the edges of Pewsham.

From the south, the settlement edge of Chippenham is elevated. Rowden Manor provides a local landmark. There are glimpses of disused market garden and green houses near Showell Farm.

Long distance views are possible from the slopes of the Limestone Ridge from rural roads and footpaths at Derry Hill, Snaith Hill and Bencroft Hill. Generally, these views include the settlement of Chippenham and the countryside edge to the east and south. In some instances, both the eastern and southern countryside edges are visible. It is possible to see the local landmarks of the St Paul's and St Andrew's Church spires as well as the modern built form of the new Wiltshire College campus near Chippenham station.

10.4.2.6. Soils and geology

In the scheme area, the bedrock comprises of sandstone, siltstone and mudstone of the Kellaways Formation in the west and the Oxford Clay formation to the east, see Figure 10-910-9. Superficial deposits are absent in the study area, except in the locations in proximity to the River Avon and River Marden.

Soils are generally assumed to be soft compressible and cohesive (clay), arisings may be suitable for landscaping works particularly around ponds; Ground bearing capacity for road and structure design is likely to be low and require large foundations to achieve adequate road and structure strength and longevity.

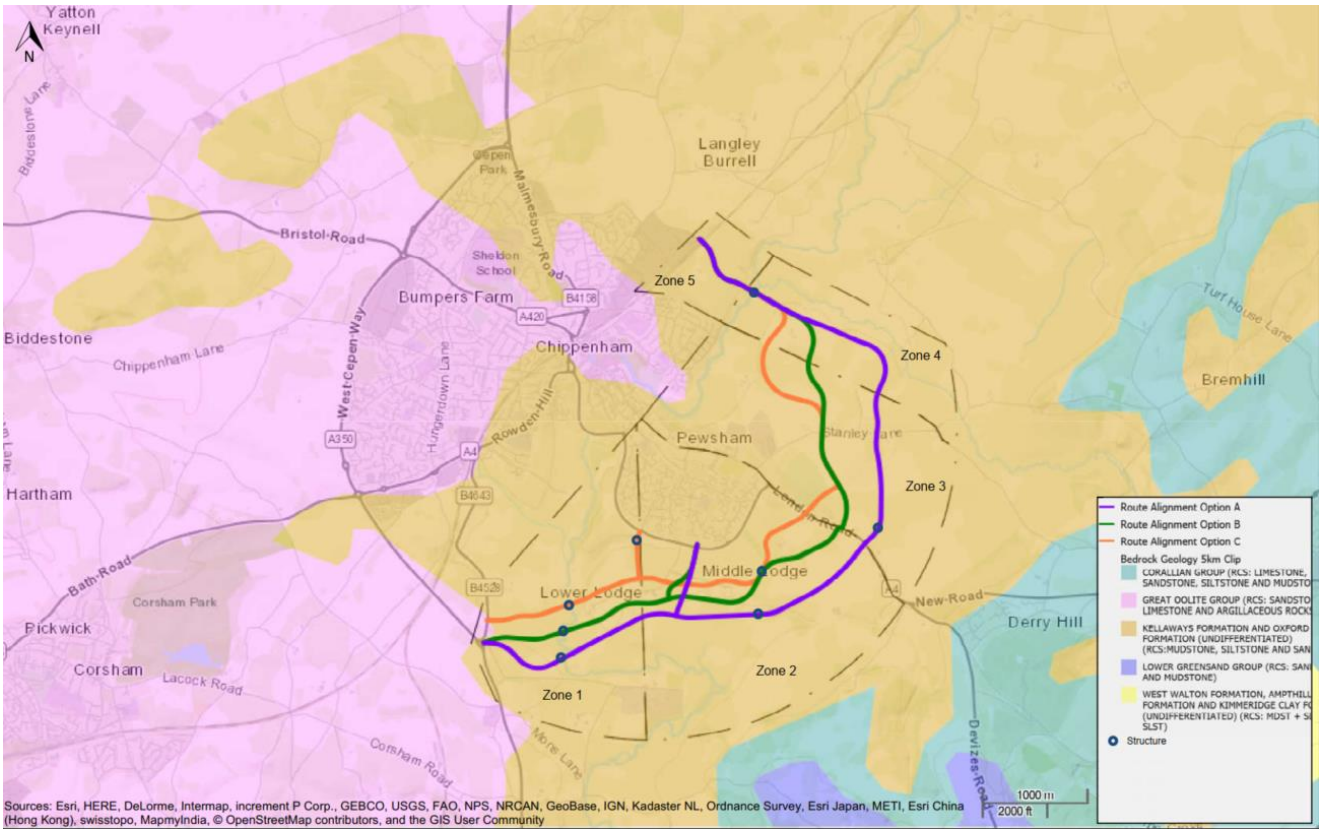
Published geology indicates in addition for road and rail infrastructure, small areas of made ground at Lower Lodge, Near the STW entrance at Pewsham Way and backfill to the former brick quarry adjacent to Pewsham Way.

Zetica Unexploded Ordnance (UXO) mapping classifies the site area as a low risk of air dropped World War Two UXO to be present. Public Health England's UK Radon assessment indicates that the area is at very low risk of high Radon levels.

There are no recorded on-site groundwater abstraction licences. There are four recorded groundwater abstractions within the study area related to irrigation at Showell Farm Nurseries. Information provided by Wiltshire Council[8] has confirmed that there are no unlicensed private abstractions (<20 m^3/day).

Refer to Appendix D, Preliminary Sources of Study Report (PSSR) for further detail.

Figure 10-9 - Soils and Geology



Source: British Geological Society (BGS)

10.4.2.7. Cultural heritage

Designated heritage assets

The study area includes a total of 71 designated assets, including four conservation areas, one scheduled monument and 60 listed buildings, many of which are within the town centre of Chippenham. Figure 10-10 shows the heritage assets within the study area.

Conservation Areas

The following conservation areas have been identified:

- Rowden Park to the south of Chippenham.
- Tytherton Lucas to the north east of Chippenham.
- Chippenham Conservation Area to the north of Chippenham.
- Lacock to the south of Chippenham.

Scheduled Ancient Monuments

The following Scheduled Ancient Monuments have been identified:

- Rowden Manor to the south of Chippenham.
- Medieval settlement of Sheldon to the West of Chippenham and the A350.
- Roman site at Manor Farm to the north of Chippenham

[8] Wiltshire Council, Environmental Health/ Public Protection Services, publicprotectionwest@wiltshire.gov.uk, email dated 16/03/20

Listed buildings

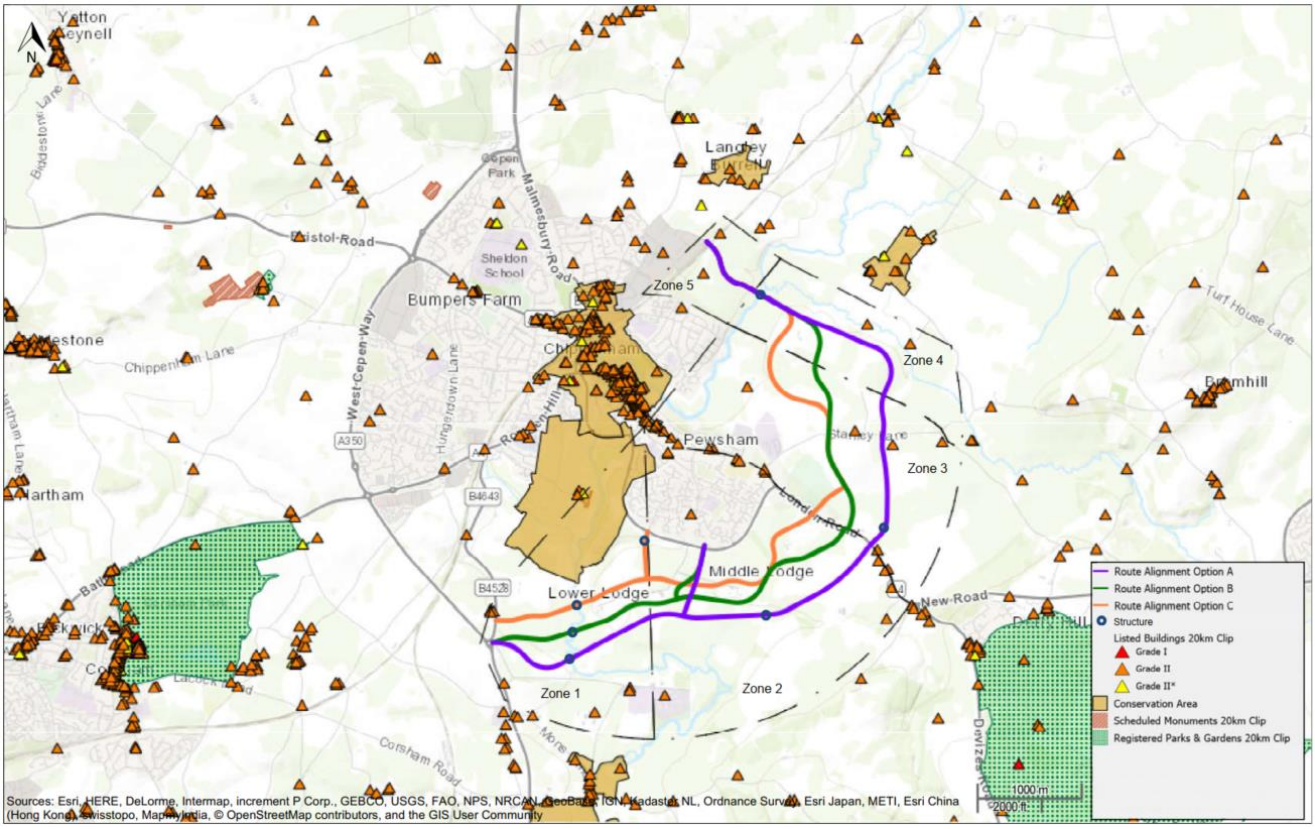
There are three II* listed buildings located at Rowden Park, Tytherton Lucas and Langley Burrell respectively. The rest of the listed buildings are grade II and comprise country houses, farmhouses and associated buildings, churchyards and cemeteries, mills, an old brewery, bridges, cottages and milestones.

Non-Designated Heritage Assets

The Wiltshire and Swindon Historic Environment Records (HER) includes a variety of heritage resources that contribute to the understanding of the historic environment. Non-designated assets include, but are not limited to, monuments, archaeological sites and buildings which are not recorded as designated listed buildings, including:

- There is plenty of evidence of pre-historic activity in the area, with finds including: broken polished axes, flint finds, scraping tools, arrowheads, piercers and blades.
- Romano-British settlements are within the Chippenham area.
- There is some historical evidence for a Royal Saxon hunting landscape within and around the Study Area.
- A Royal Medieval Forest was located to the south and east of Chippenham.
- Historic hedgerows are thought to be present in the study area although further analysis of historic mapping is required to confirm this.

Figure 10-10 - Heritage



Source: Historic England

10.4.2.8. Materials and waste

Construction Demolition and Excavation Waste generated by the Scheme during construction and operation will predominantly be non-hazardous and inert, with small quantities of hazardous waste (e.g. paints, solvents and contaminated soil). It is likely that the majority of arisings from earthworks will be retained within the surrounding area and used for landscaping purposes.

10.4.2.9. Population

The population baseline is comprised of the following receptor sub-groups:

- Private property and housing.
- Community land and assets.
- Development land and local businesses.
- Agricultural land holdings.
- Walkers, cyclists and horse-riders (WCH).
- Key community assets and land, as well as key community walking routes and WCH facilities within the study area include:
- Kings Lodge Primary School.
- Abbeyfield School.
- Pewsham Park.
- Woodland located along Cocklemore Brook towards Old Derry Hill.
- Stanley Park Youth Football Club and Stanley Park Sports Ground.
- Avon Valley Walk.
- North Wiltshire Rivers Route cycle path.

The agricultural land holdings baseline predominantly consists of grass for beef production and dairying. Most grassland farms also grow maize and barley and other forage crops. Harden's Farm, Forest Farm, Cottage Farm and Lower Lodge Farm 5 are dairy farms.

10.4.2.10. Health

The health baseline is comprised of the following sub-groups:

Health profiles of the affected communities.

Access to community assets and employment sites.

Green space and land blight.

Air pollution.

Noise pollution and vibration.

Soil and water pollution.

Risk of injuries and death.

Table 10-3 and Table 10-4 outline the health baseline for all wards which fall within the study area. The tables 10-3 and 10-4 portray a population which is generally above the national average in terms of general health and the ability to undertake day-to-day activities.

Table 10-3 - General Health of Residents

Location	Very good health	Good health	Fair health	Bad health	Very bad health
Corsham Without and Box Hill	53.5%	33.9%	9.7%	2.1%	0.8%
Chippenham Pewsham	53.8%	35.6%	8%	2%	0.6%
Calne Rural	52.6%	32.2%	11.4%	3%	0.8%
Chippenham Hardens and England	48.5%	33.3%	13.6%	3.6%	1%
Kington	55.6%	30.7%	10.4%	2.5%	0.8%
England and Wales	47.1%	34.1%	13.2%	4.3%	1.3%

Table 10-4 - Health Limited Activity

Location	Day-to-day activities limited a lot	Day-to-day activities limited a little	Day-to-day activities not limited
Corsham Without and Box Hill	4.6%	8.9%	86.5%
Chippenham Pewsham	3.6%	5.9%	90.5%
Calne Rural	6.6%	9.4%	84%
Chippenham Hardens and England	7.6%	9.4%	83%
Kington	5.9%	8.1%	86%
England and Wales	8.5%	9.4%	82.1%

The majority of community assets and employment sites within the study area are located in and around Pewsham, including Abbeyfield School and Pewsham Park. The A4 (London Road) provides a key access point for those wishing to access key healthcare facilities outside the study area.

There is very little public green space in the study area, with much of the agricultural land being privately owned. However, woodland and riverside areas can be accessed via public rights of way linking Pewsham to green space assets in the south of the study area, including woodland towards Old Derry Hill.

The health baseline also includes a number of identified communities which are taken forward into the assessment of potential impacts. The definition of sub-communities is based on a qualitative judgement that evaluates known characteristics of identified receptors, in terms of their geographical location, function, likely user groups and their susceptibility to experiencing impacts from the Options.

10.4.2.11. Climate Change

Wiltshire Council declared a Climate Emergency in 2019, and thus reiterated their commitment to working towards zero carbon. The need for a new road therefore has been considered against both the likely impact of the road in the wider context of Wiltshire and the UK's climate change targets and the need to provide transport benefits outlined elsewhere in this OAR.

As climate change is a global issue, the baseline is therefore set at a greater level than Chippenham. Global greenhouse gas emissions, from all sources, currently amount to approximately 50 billion tonnes of CO2e per year. The UK is the world's eighth largest emitter of CO2e, with the total background UK emissions for 2017 (the last reported year at time of assessment) being 460 million tonnes of CO2e . The transport sector was the largest emitting sector of UK greenhouse gas emissions in 2017, emitting 27% of all emissions. Of all sectors, it has also shown the least reduction since the 1990 baseline, at only 2%. For comparison, the next smallest reductions are seen in the residential and agriculture sectors at 16%.

The UK has in place carbon budgets for five-year periods up to 2032. The construction of the Proposed Scheme will occur across the third (2018 to 2022) and fourth (2023 to 2027) carbon budget periods. With an Opening Year of 2024, operation of the Scheme will fall in the fourth budget period and beyond. The budget for the fourth budgetary period is 1,950 Mt CO2e and it is in this context the scheme will be operated.

10.4.3. Delivery Case data

Acceptability

The evidence base for option acceptability would be based on Public and Stakeholder consultation. This consultation had not taken place at the time of writing this report. This OAR informs the options for consultation and will be updated following consultation feedback and a preferred option presented to the public in Summer 2021.

Land Viability

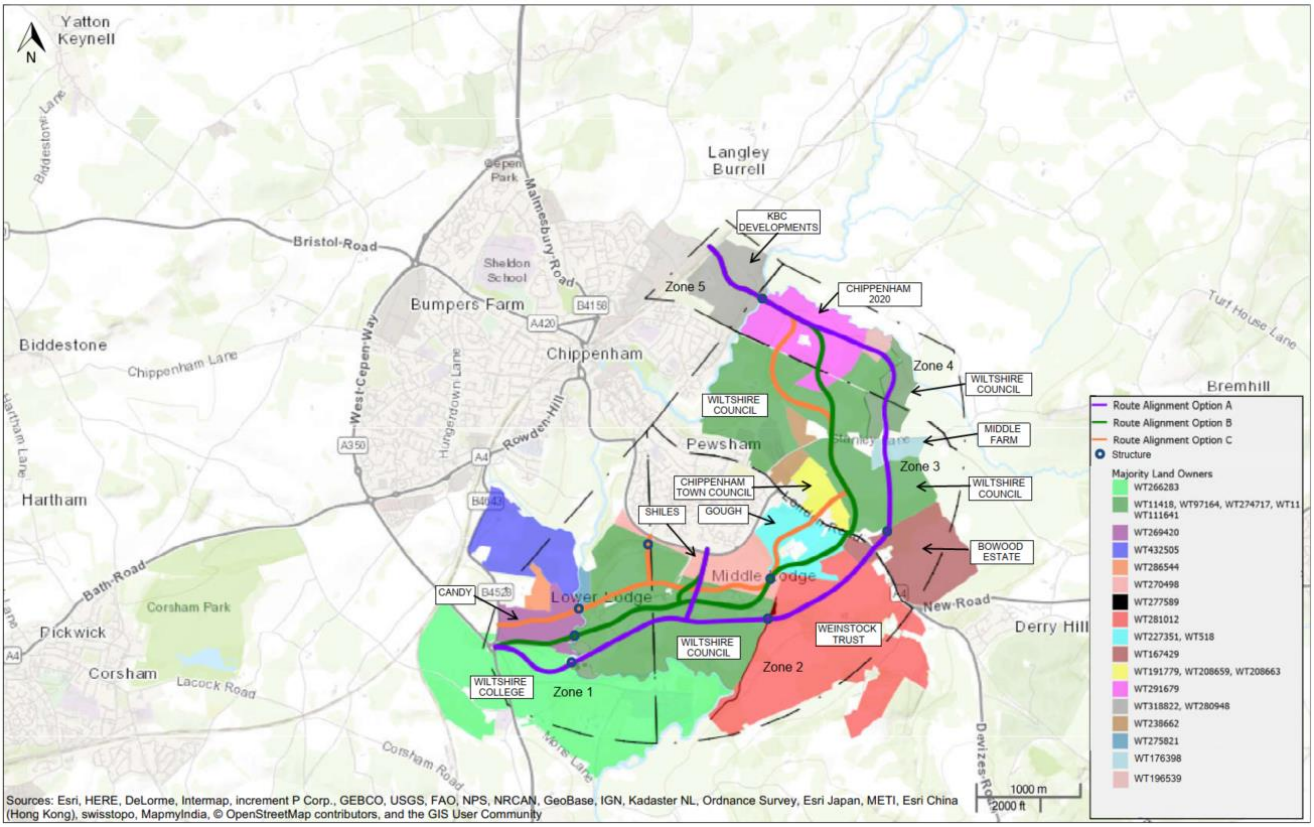
The evidence base to support the land viability assessment includes:

- Majority Landowners / Developers June 2020 – Figure 10-11; and
- Land report - Refer to Appendix B.

Practical Feasibility / Engineering

The evidence base for option practical feasibility would be based on supply chain marketing and Early Contractor Involvement (ECI). This consultation had not taken place at the time of writing this report. Supply chain marketing and ECI will be undertaken in Spring 2021 to inform an update to the OAR and provide further evidence to support selection of a preferred option. It is likely that the supply chain marketing and ECI will provide greater surety of contractor and supply chain availability and inform an update to the scheme delivery programme.

Figure 10-11 - Option Sift 2 - Majority Landowners / Developers June 2020



10.4.4. Financial Case data

The evidence base to support the financial assessment includes:

- The Highways and Structures report providing the basis for design standards and assumptions used to inform the scheme cost estimates. Refer to Appendix C.
- The Option Risk Registers providing evidence for overall option risk for scheme funding review. Refer to Appendix F.

10.4.5. Commercial Case data

The evidence base for commercial case assessment would be based on Supply Chain Marketing and Early Contractor Involvement (ECI). This consultation had not taken place at the time of writing this report. Note that this would not make a material difference between the options.

Although the Supply chain marketing and ECI will be undertaken in Spring 2021, the data provided from these processes is unlikely to present a material difference between the options; the scope of works is the same for the three options presented for public consultation.

The extent of work and in particular the scale of bridge structures is does present a difference between the options, however this is considered within the delivery case and financial case.

10.5. Assessment criteria - approach to second sifting

The Options Assessment Framework follows a five-case model. Scoring matrices are refined to provide a 5-point qualitative scale. Scales are set to sufficiently distinguish relative impacts of different options. Refer to section 10.5.1.

A separate Environmental Case by zone is included in the assessment since the options can be assessed by zone segment.

It was not possible to meaningfully conduct traffic modelling for individual segments of routes; therefore, **the Economic Case is not included in the option sifting by zone.** Traffic modelling has been completed for each of the three route options and is reported in section 10.8.

10.5.1. Scoring by Case

Each case will have its overall impact assessed by the assessment categories, Table 10-5.

Table 10-5 - Scoring System by Case

Score	Overall Strategic Case	Overall Environmental Case	Overall Delivery Case	Overall Financial Case	Overall Commercial Case
1	**Poor Fit**	**Major adverse impact**	**Un-deliverable**	**Very Unlikely to be affordable / high financial risk**	**Low level of flexibility**
2	**Low Fit**	**Moderate adverse impact**	**Unlikely to be deliverable**	**Unlikely to be affordable / high financial risk**	**Poor level of flexibility**
3	**Reasonable Fit**	Minor adverse impact	Deliverable with medium / high risk	Affordable, but medium costs + high financial risk	Reasonable level of flexibility
4	Good Fit	No beneficial or adverse impact	Deliverable with medium risk	Affordable, but medium costs + financial risk	Good level of flexibility
5	Excellent Fit	Reasonable beneficial impact	Deliverable with low complexity/risk	Affordable with relatively low costs + financial risk	High level of flexibility

Zone options attributing a red summary score for any of the assessment cases are discounted.

10.5.2. The Strategic Case

A qualitative assessment of each strategic scheme objective based on the poor to excellent fit range presented in the scoring by case in Section 10.5.1. The strategic scheme objectives are carried forward from the first option sift; the evidence base for each strategic case objective is presented below;

1. Enable the delivery of high-quality housing developments by unlocking development land, meeting pre 2036 (Local Plan) and post 2036 (HIF) housing quantum.

2. Improve traffic congestion and flow across the existing road network, ensuring the transport network has the capacity to accommodate growth.

The evidence base to support the options sifting for objective 1, development quantum and objective 2, transport improvements refers to the Transport modelling summary in Section 10.8 and the Future Chippenham Spatial Framework – Figure 10-2, more detailed maps are available in the Draft Concept Framework report in Appendix G.

3. Provide good connectivity for multi-modal users at new centres and into Chippenham town centre, improving journey times and journey time reliability.

The evidence base to support option sifting for objective 3, connectivity, refers to Future Chippenham – 10 minute walking zones – Figure 10-3.

10.5.3. Environmental Assessment Case

The PEAOR provides full detail for the environmental assessment methodology and defines environmental: -

- Study area
- Baseline conditions.
- Potential impacts.
- Potential mitigation measures.
- Potential residual effects.
- Environmental Summary.

The environmental assessment case includes a qualitive assessment of the potential impact of each option on the following environmental categories:

Air quality

- Location of route in relation to existing residential areas.

Noise and vibration

- Location of route in relation to existing residential areas.

Biodiversity

- Location of the route in relation to the location of known habitat and protected species.

Water environment

- Potential impact of road and bridge infrastructure on existing rivers, brooks, streams and groundwater.
- Scale of impermeable area (length of each road option) and potential to pollute rivers, brooks, streams and groundwater.

Landscape and visual

- Location of route in proximity to landscape setting of listed buildings, conservation areas and scheduled monuments.
- Capacity route to alter landscape character.
- Visual impact of route from viewpoints throughout the study area including views from residential areas, Public Rights of Way, prominent high points and ridge lines.

Soils and geology

- Location and scale of route options, potential for land contamination, impact on loss of agricultural soils.

Cultural heritage

- Location of route in proximity to conservation areas, scheduled monuments, listed buildings and known archaeological records.

Materials and waste

- Length of road and bridge structures influencing quantities of construction materials and construction waste.

Population and health

- Location of route in proximity to residential, social, sports and recreation areas.
- Capacity to influence human health of local population.

Climate change

- Potential to generate construction greenhouse gas emissions.
- Operational emissions.

The PEAOR, supported by figures in section 10.4.2, provides evidence for categories to the following scoring criteria: -

- 5 = Reasonable beneficial impacts overall, improving the current environmental setting.
- 4 = No beneficial or adverse impacts would occur.
- 3 = Minor adverse impacts where the scheme will require some mitigation to progress.
- 2 = Moderate adverse impacts where the scheme could not progress due to the impact on this receptor without significant delay and/or expense to the scheme.
- 1 = Major adverse impact where the scheme could not progress due to the impact on this receptor.

10.5.4. Delivery Case

The delivery case includes a qualitative assessment of three categories to compare deliverability of each road option within the scheme programme. The scheme programme used for the options assessment report assumes a scheme opening of the end of March 2024, which aligns with the HIF funding deadline.

Stakeholder / public acceptability

Public consultation had not taken place at the time of writing this report; the scope of works for each option is broadly similar, all options will currently score neutral and will be updated following consultation feedback.

Land viability

A qualitative assessment of land viability was undertaken using the evidence base presented in section 10.4.3 which includes HIF letters of support, land registry data and planning application data. The following scoring criteria has been used:

- 5 = High viability:

  Supporting evidence = Land completely owned by Wiltshire Council and allocated to local plan and approved planning application.
- 4 = Good viability:

  Supporting evidence = Land completely owned by Wiltshire Council or road route corridor reserved within approved planning application for land parcel.
- 3 = Reasonable viability:

  Supporting evidence = Neutral & letter of support from HIF bid.
- 2 = Poor viability:

  Supporting evidence = No contact / liaison with landowner / tenant.
- 1 = Low viability:

  Supporting evidence = Landowner has made a Legal objection to the scheme.

Where a zone contains multiple landowners with different evidence, the lowest applicable score has been used for the assessment.

Practical feasibility

The scope of works across all options are broadly similar, the scheme programme is fixed for all options with a key milestone to be met to retain the full HIF grant.

For the purposes of practical feasibility assessment all options will currently score neutral.

A further update to the scoring could be included following a Supply Chain Marketing Event Early Contractor Involvement and to inform an update to the scheme programme.

10.5.5. Financial Case

Financial Case with the following categories for option sifting:

Capital Costs

All-inclusive costs per zone have been produced at 2019Q1 rates for comparison. A range of cost per zone with the following benchmarks for option scores:

- 5 = < £ 10m - Small portion of budget.
- 4 = £ 10-15m - Reasonable portion of budget.
- 3 = £ 15-20m - Large portion of overall budget.
- 2 = £ 20-25m - Very large portion of overall budget.
- 1 = > £ 25m – Excessive portion of overall available budget (essentially discounting the option).

Affordability & risk

A range of cost per zone with the following benchmarks for option scores, applied using the benchmarking from the capital costs and a qualitive review of risks:

- 5 = Affordable with relatively low capital cost, and low financial risk. Where a capital cost rating 5 has been given.
- 4 = Likely to be affordable, but with medium capital cost and medium financial risks. Where a capital cost rating 4 has been given.
- 3 = Likely to be affordable, but with medium capital cost and high financial risks. Where a capital cost rating 3 has been given.
- 2 = Unlikely to be affordable, due to high capital cost and high financial risks. Where a capital cost rating 2 has been given.
- 1 = Very unlikely to be affordable, due to very high capital cost and high financial risks. Where a capital cost rating 1 has been given.

Outturn cost to implement option & affordability against funding allocation has also been considered.

10.5.6. Commercial Case

Supply chain marketing and Early Contractor Involvement (ECI) have not taken place at the time of writing this report. The scheme programme milestones are the same for all options and scope of works for each option is broadly similar, all options will currently score neutral.

10.6. Strategic Case Summary – alignment with objectives

Objective 1 – Enabling housing quantum

All distributor and Pewsham Link Road options have a good fit with enabling assumed housing development quantum for the next Local Plan period up to 2036 and provide additional capacity for further development that would meet / exceed the HIF quantum.

Objective 2 – Connectivity

Distributor road options

Option C provides the best connectivity for multi modal transport networks. The centre of Pewsham is located within a 10 minute walking distance. The town centre is an acceptable walking distance from Zone 3 via Hardens Lane / National Cycle Network, Route 403 and a short cycle distance from any part of the route.

Option B is the second best option with a reasonable fit in all zones except zone 4. Pewsham and the town centre are within an acceptable cycle distance but outside the 10minute walking area.

Option A is likely to operate like a traditional ring road around the edge of the Future Chippenham development, without further road corridor running through the development this option is a low / poor fit for connectivity.

Pewsham Link Road options

The Pewsham link connect to the distributor road options at locations that align with the Draft Concept Framework report and also with geometry standards. The point of connection also seeks to avoid direct views to overhead electricity pylons as people travel from Pewsham Way towards the distributor road.
Pewsham Link option 1 provides a good fit with the connectivity objective, providing a closer alignment for connecting multi modal transport networks to the town centre than option 3. The route is directly linked to the centre of Pewsham via Canal Road.

Pewsham Link Option 3 provides a reasonable / good fit with the connectivity objective and is directly linked to the centre of Pewsham via Forest Lane. Option 3 has a more direct link to the centre of Pewsham than option 1.

Both links connect to Public Rights of Way including Forest Lane and Avon Valley Walk that lead to the town centre.

Objective 3 – Improving traffic congestion

All distributor and Pewsham Link Road options are a good fit with Objective 3, improving traffic congestion in the town centre. Option C reduces traffic flows within the town centre by the greatest amount. It should be noted that the transport models have applied Pewsham Link option 1 to distributor option C and Pewsham Link option 3 to distributor options A and B. Refer to section 10.8 for further detail.

10.7. Environmental Case Summary

Options A, B and C were assessed on a preliminary basis for their environmental impact to assist the options assessment process. The PEAOR holds the methodology for assessment, the potential effects without mitigation, potential mitigation for the scheme to incorporate to reduce effects, and the potential residual effect with standard uptake of these mitigation procedures. The summaries in the topic headings below give some detail as to why the preferences of each option have been suggested, but further information about the potential effects of each highway option are provided in the PEAOR.

A ranking of '1st' indicates that a particular option is best fit in the relevant zone, whereas a ranking of '3rd' indicates the worst fit option.

Zone 5, Rawlings green is the same route for all options, it ties in with the Rawlings Green planning application. The developer has provided an Environmental Impact Assessment (EIA) as part of the planning application.

Table 10-6 - Overall environment best fit options ranked per zone

	Option A	Option B	Option C
Zone 1	3rd	1st*	2nd
Zone 2	2nd	3rd	1st
Zone 3	3rd	1st	2nd
Zone 4	3rd	2nd	1st

Summaries by zone are provided below from selected topics from the PEAOR. Refer to figures in 10.4.2.

Zone 1

Biodiversity – Option B was selected as the best fit as it contained fewer watercourse crossings and less existing habitat disturbance and removal than Option A and C. **Option C effects were higher than B due to the inclusion of Pewsham Link option 1 in this zone, removing the effects of this link would achieve parity with option B.**

Water environment – Option B was selected as the best fit as it had the lowest overall length, width of channel affected, number of watercourses crossed (equal with Option C) and lowest impermeable area in Zone 1 with the second shortest floodplain distance crossed. Option A would cause potentially permanent hydromorphological change on the River Avon, constituting a significant adverse effect. **Option C effects were higher due to the inclusion of Pewsham Link option 1 in this zone, removing the effects of this link would achieve parity with option B and also enable a shorter distance of highway crossing the floodplain.**

Landscape and visual – Option B was the best fit option in Zone 1 despite Option C being the best fit option in absence of mitigation. Option B is easier to integrate into the surrounding landscape than Option C. Option A is the worst option and is likely to have significant residual effects despite mitigation.

Cultural heritage – Option B is further from Rowden Park Conservation Area and identified recorded remains than Option C. Option B is further from Heritage Assets to the south of the site than Option A.

Zone 2

Biodiversity – Option A was the best fit. This route passes the least number of potential bat roosts, by avoiding the farmyards. Route Option A passes close to Cocklemore Brook (OW6); however, it is considered to result in the least impact on watercourses and their associated species in this zone, this is due to Options B and Options C requiring new watercourse crossings. Both Options B and C run within close proximity to great crested newt records and additional waterbodies.

Water environment – Option C has the smallest impermeable surface area and was the best fit option.

Landscape and Visual – Option C was the best fit as it can be more easily integrated into the existing landscape with planting mitigation. Option A would impact the landscape character of Lackham College.

Cultural heritage – Option A was the best fit. All options will have significant effects within this Zone. Option A avoids an archaeological site of significance at Forest Farm which Options B and C directly affect.

Zone 3

Biodiversity – Options A and B are considered to have similar impacts and benefits, in comparison to Option C. Route Option C runs through P10, a pond with great crested newt records in it, as well as running close to other ponds and bisecting two drains. Route Options A and B do run either side of the Hither Farm West & East receptor, but do not run through it and therefore are the best fit.

Water environment – Option B was the best fit as it contained the fewest watercourse crossings and length of channel impacted. Option A had a much shorter route through Zone 3 than B or C, and therefore had a smaller impermeable surface area but fewer watercourse interactions meant Option B was the best fit.

Landscape and visual – Option B and C were quite equal in effect, with Option C the best fit as there is more opportunity to integrate the route alignment into the landscape owing to its lower elevation. The alignment of Option A has potential significant adverse residual effects.

Cultural heritage – topic area displayed no preference in any options in this zone. All options have potentially significant effects on various receptors including medieval settlements, the 'outfarm', former settlement at New Leaze Farm, Ridge and Furrow earthworks, Important hedgerows under the Hedgerow Regulations 1997 and upon the setting of existing Listed Buildings in the area.

Population and health – Option B was the best fit option, it avoids the requirement for permanent land take at Stanley Park Sports Ground (as does Option A) and avoids the potentially adverse effects that Option A would convey to properties close to the A4 London Road. Option B has no significant residual effects relating to the agricultural land holdings assessment.

Zone 4

Biodiversity – Option B was the best fit over Option C. Option B requires an additional crossing of an unnamed ditch (D4), but passes through a lower number of potential tree roosts for bats than Option C. Option A would see the greatest loss of overall habitat including the highest number of hedgerows fragmented.

Water environment – Option C had the lowest impermeable area, width of channel affected, fewest number of watercourse crossings and the shortest route length in Zone 4. Option B is the best fit. Option A is the second best fit as it has a lower width of watercourse crossed.

Landscape and visual – Option C was the best fit, it is the shortest route and avoids high ground. All routes in Zone 4 are in a high sensitivity area, meaning that Option A is the worst fit due to its much greater distance travelled in this zone. Option A is likely to have a significant residual effects in this zone due to the nature of surrounding views, and its location within the existing landscape.

Cultural heritage – Option A and B will both have a direct impact upon potentially complex known settlement remains at New Leaze Farm. Option C has less known heritage constraints in this Zone, although all three options are associated with potential significant effects.

Pewsham Links

Pewsham Link Roads are assessed within the following zones and options:

- Pewsham Link option 1 – Canal roundabout, option C, zone 1.
- Pewsham Link option 3 – East of Forest Lane, option A & B, zone 2.

Following public and stakeholder consultation and completion of the options assessment the preferred link will be combined with preferred distributor in zone 1 or 2 to form the recommended Future Chippenham distributor road network.

Biodiversity – Both links have moderate adverse biodiversity impacts.

Water environment – Option 3 is the best fit and has no beneficial or adverse impacts. Option 1 has minor adverse impacts and crosses the valley / surface water flooding of Avon Valley Walk.

Landscape and visual – Option 3 is the best fit and has minor adverse visual impact and generally follows the proposed ground profile along a lower alignment of the landscape than option 1. Option 1 has moderate adverse impacts, and follows the landscape profile over the ridge line, bridging Avon Valley Walk before connecting to Pewsham Way at Canal roundabout.

Cultural heritage - Option 3 is the best fit and has minor adverse visual impact and generally follows the proposed ground profile along a lower alignment of the landscape than option 1. Option 1 has moderate adverse impacts, and follows the landscape profile over the ridge line, bridging Avon Valley Walk before connecting to Pewsham Way at Canal roundabout.

10.7.1. Environment recommendations

An option meeting the strategic objectives, delivered by the shortest possible route will minimise construction materials, scheme costs and associated impact on climate change during construction. The overall findings of the assessment in the PEAOR found that a combination of distributor road options C and B is the best fit to minimise environmental impact.

Pewsham Link option 3 is the best fit to minimise environmental impact.

The environment recommendations will be considered as part of the overall assessment to form the preferred road route option.

10.8. Economic Case

10.8.1. Transport modelling - testing the options

The Wiltshire strategic model has been used to assess the impacts of route options A, B and C as per the specifications and housing quantum provided in March 2020. The assessment was conducted using 2024 (opening year), 2036 (Local Plan year) and 2051 (full HIF quantum) forecast years. The scenarios summarised in Table 10-7 were created for 2024, 2036 and 2051 forecast years for the purpose of this study. The scenarios are summarised as:

- **P:** the core model transport network with planned growth, without the Future Chippenham distributor road and only deadweight housing:
  - 2024: 205 dwellings in Rawlings Green.
  - 2036: 650 dwellings in Rawlings Green and 400 in Stanley Lane.
  - This represents the Do Minimum (DM) for the purposes of analysis.
- **S:** the core model transport network with planned growth, with the Future Chippenham distributor road options added and only deadweight housing numbers (see above).
- **R:** the core model transport network with planned growth along with the Future Chippenham distributor road options and Future Chippenham housing numbers added (deadweight plus further development).

Deadweight housing is the technical term for the number of dwellings that can be delivered in the eastern and southern areas of Chippenham before the distributor road is required. The deadweight and Future Chippenham housing assumptions for each forecast year are provided in Table 10-8.

Table 10-7 - Option testing - model scenarios

Model scenarios		Highway infrastructure mitigation	
		Future Chippenham distributor road, M4 J17 and other identified mitigation	Core (Uncertainty Log)
Housing	Deadweight & Future Chippenham	R	Q
	Core (planned growth) and deadweight	S	P

Typically, a Q model is also developed in line with DfT Transport Appraisal Guidance. This would represent a scenario without the Future Chippenham distributor road but with the Future Chippenham housing quantum. Due to the degree of dependence on the Future Chippenham distributor road to provide access to and enable the delivery of the housing it was considered that creating Q was unnecessary at this stage of analysis.

Table 10-8 - Housing quantum for each forecast year (dwellings)

	2024	2036	2051
Deadweight (dwellings)	205 - Rawlings Green	650 – Rawlings Green 400 – Stanley Lane/A4	650 – Rawlings Green 400 – Stanley Lane/A4
Future Chippenham (dwellings). Excludes deadweight.	-	2,570	6,450
Total	**205**	**3,620**	**7,500**

The analysis presented below compares scenarios P and R, which have different levels of demand but represent scenarios where development would occur in the area. The P scenario is considered the Do Minimum (DM) for the purposes of analysis as this represents the identified deadweight quantum of housing. This is the number of dwellings that can be delivered in this part of Chippenham before the distributor road is required and does not include further mitigation, for example the recent Major Road Network (MRN) submissions from Wiltshire Council to the Department for Transport (DfT).The R scenario considers the performance of the transport network with the Future Chippenham housing quantum and the distributor road and enables comparison of the performance of each route option.

Although the P and R models are not directly comparable, they are considered in this analysis because it provides an indication of how the Chippenham transport network could perform with minimum amount of development (P) against future growth (R).

Analysis is presented for the AM peak hour (0800-0900) and PM peak hour (1700-1800) forecast model data for the Local Plan period quantum of housing (2036) and full HIF quantum of housing (2051). The following statistics are provided:

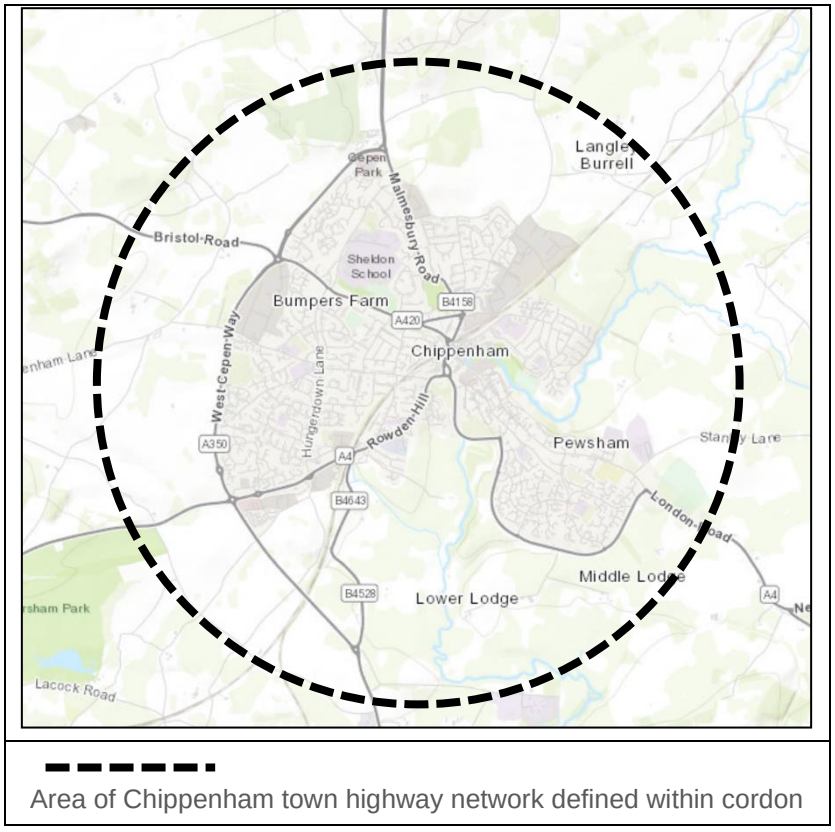
- Chippenham town network statistics;
- Town centre cordon traffic flows; and
- Junction volume over capacity analysis.

The traffic modelling presented here was conducted to help inform the option assessment process. Further assessments of traffic impacts would be conducted in a Transport Assessment as part of the planning application process.

10.8.2. Chippenham town network statistics

This section presents the network statistics for the Chippenham town network for the 2036 and 2051 forecast years, these statistics are provided in Table 10-9. For the purposes of this analysis the Chippenham town highway network was defined within the cordon as shown in Figure 10-12.

Figure 10-12 - Scope of Chippenham town highway network (defined by dashed cordon)



The data for 2036 forecast year, with partial build out of the Future Chippenham site, indicates that:

- Compared to the Do Minimum all options are forecast to result in improved network performance with reduced delays, queuing and increases in speeds even with the additional housing from the Future Chippenham site;
- Compared to the Do Minimum the total travel time and distance for all options would be expected to increase as the distributor road would mean that some journeys are longer as they take the new route;
- The best performing option is Option C, with the greatest reductions in network delay and queuing;
- The differences between option A and B are marginal, with option B forecast to result in a marginal improvement to delays and queuing in the PM peak hour; and
- Overall, all three options are forecast to improve network performance even with the additional demand

The data for 2051 forecast year, with partial build out of the Future Chippenham site, indicates that:

- Compared to 2036, the additional demand from the Future Chippenham site is forecast to increase delays and queuing on the network.
- Compared to the Do Minimum option C is forecast to reduce delays and queuing to the greatest extent of all the options in the AM peak hour. This is reflected in the PM peak hour.
- Overall, the 2051 forecast highlights that across the network queueing and delays could increase as would be expected with the additional demand generated from the Future Chippenham site. However, option C is forecast to lessen the impact the most compared to all three route options.

It should be noted that the network statistics provide an indication of overall network performance, more detailed analysis presented below provides further information on the performance of each option in 2036 and 2051.

Table 10-9 - Comparison of Chippenham town network statistics for P vs. R model (with road and housing) options – 2036 and 2051 forecasts

	Statistic		Total delay (pcu.hrs)	Total travel time (pcu.hrs)	Travel distance (pcu-kms)	Average speed (km/h)	Over-capacity queues (pcus)
2036 AM	DM (P)	Absolute	478	1,664	60,388	36	73
	Option A (R)	Absolute	448	1,722	65,801	38	64
		% diff to DM	-6%	4%	9%	6%	-12%
	Option B (R)	Absolute	451	1,708	65,140	38	62
		% diff to DM	-6%	3%	8%	6%	-15%
	Option C (R)	Absolute	433	1,685	65,569	39	53
		% diff to DM	-9%	1%	9%	8%	-27%
2036 PM	DM (P)	Absolute	576	1,811	61,895	34	155
	Option A (R)	Absolute	541	1,873	67,858	36	135
		% diff to DM	-6%	3%	10%	6%	-13%
	Option B (R)	Absolute	576	1,893	67,487	36	152
		% diff to DM	0%	5%	9%	4%	-2%
	Option C (R)	Absolute	530	1,848	67,706	37	128
		% diff to DM	-8%	2%	9%	7%	-17%
2051 AM	DM (P)	Absolute	660	1,955	64,513	33	173
	Option A (R)	Absolute	651	2,170	75,229	35	145
		% diff to DM	-1%	11%	17%	5%	-16%
	Option B (R)	Absolute	666	2,163	74,582	35	144
		% diff to DM	1%	11%	16%	5%	-17%
	Option C (R)	Absolute	604	2,109	75,238	36	114
		% diff to DM	-8%	8%	17%	8%	-34%
2051 PM	DM (P)	Absolute	799	2,138	66,126	31	298
	Option A (R)	Absolute	968	2,582	79,189	31	388
		% diff to DM	21%	21%	20%	-1%	30%
	Option B (R)	Absolute	1,001	2,600	78,864	30	386
		% diff to DM	25%	22%	19%	-2%	30%
	Option C (R)	Absolute	862	2,470	78,776	32	293
		% diff to DM	8%	16%	19%	3%	-2%

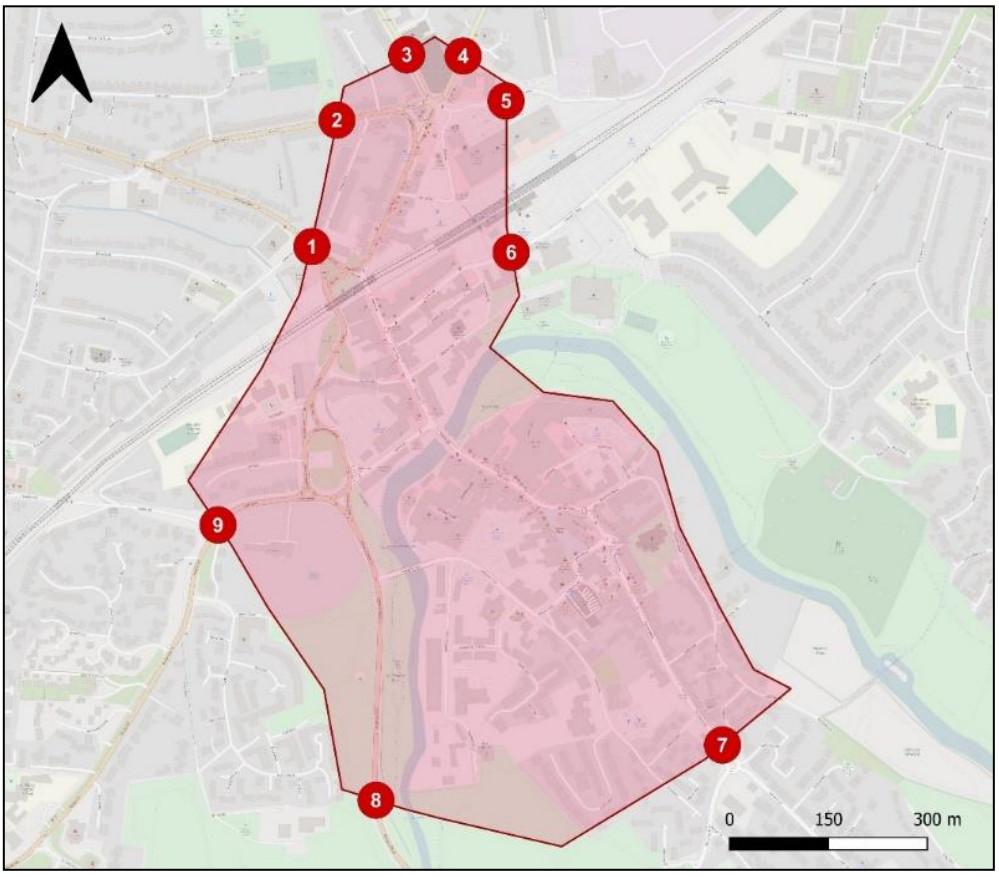
10.8.3. Traffic flows – town centre cordon

Traffic flow data was extracted from the strategic model for the town centre cordon shown in Figure 10-13. The analysis considers changes in traffic flows in the town centre because it is a useful indicator for:

- Understanding the function of the distributor road for reducing cross town traffic; and
- Demonstrating whether opportunities to improve provision for pedestrians, cyclists and buses in central Chippenham can be achieved.

The total inbound and outbound flows from this cordon shown in Fig 10-9 are provided in Table 10-10.

Figure 10-13 - Town centre cordon



The data shows that:

- All options are forecast to reduce inbound and outbound traffic flows at the town centre.
- Option C is forecast to reduce traffic flows by the greatest amount compared to the Do Minimum, in both forecast years: in 2036 with reductions between 28 and 31% and in 2051 with reductions between 19 and 23%.
- In both 2036 and 2051 forecast years options A and B are also forecast to results in reduced traffic flows (inbound and outbound) at the town centre, however these are not as great as option C.
- Option A is forecast to have the least impact for reducing town centre traffic flows of the three options when compared to the Do Minimum.

Table 10-10 - Total town centre cordon traffic flows - AM (0800-0900) and PM (1700-1800) 2036 P vs R model

	Period		Inbound		Outbound	
			AM peak hour	PM peak hour	AM peak hour	PM peak hour
2036	DM (P)	pcu	5,471	5,547	5,446	5,521
	A (R)	pcu	4,045	4,135	4,033	4,225
		% diff to DM	-26%	-25%	-26%	-23%
	B (R)	pcu	3,890	4,103	3,880	4,090
		% diff to DM	-29%	-26%	-29%	-26%
	C (R)	pcu	3,782	3,986	3,774	3,978
		% diff to DM	-31%	-28%	-31%	-28%
2051	DM (P)	pcu	5,821	5,835	5,737	5,777
	A (R)	Pcu	4,727	5,031	4,704	5,006
		% diff to DM	-19%	-14%	-18%	-13%
	B (R)	pcu	4,490	4,902	4,475	4,880
		% diff to DM	-23%	-16%	-22%	-16%
	C (R)	pcu	4,490	4,696	4,475	4,681
		% diff to DM	-23%	-20%	-22%	-19%

10.8.4. Junction volume over capacity analysis

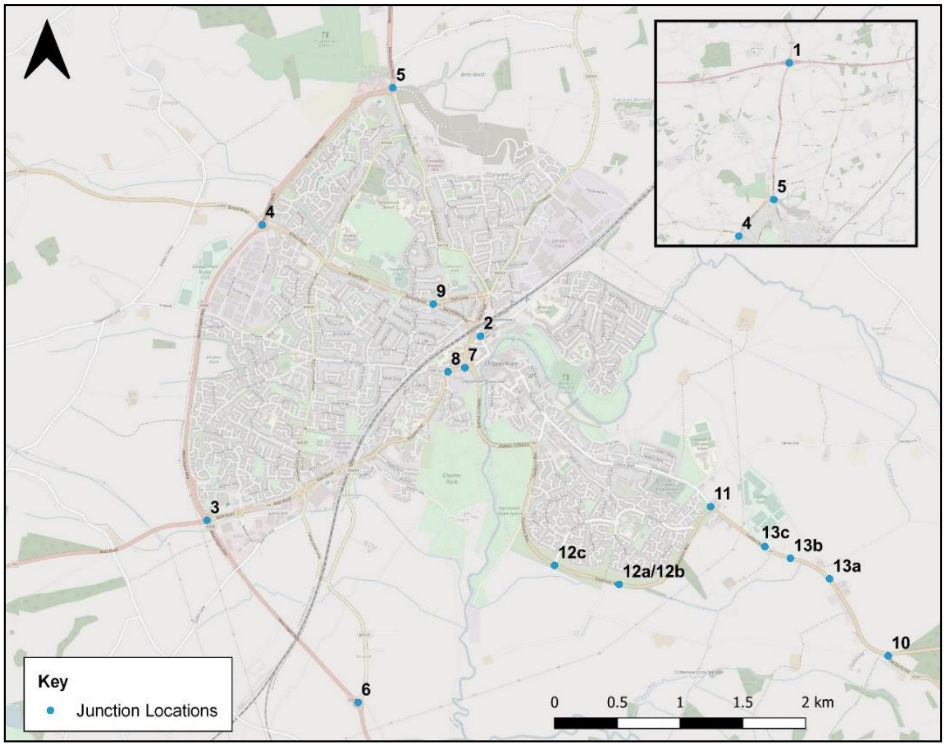
In order to assess the likely impact on capacity at junctions in the town volume over capacity (V/C) analysis was conducted for a number of key junctions in Chippenham for the P and R scenarios. The V/C analysis compares the forecast flows (volume) against the capacity of the junction. V/C analysis is presented for the following junctions shown in Figure 10-14:

4. M4 Junction 17.
5. Station Hill/New Road.
6. Chequers roundabout.
7. Malmesbury roundabout.
8. Bumpers roundabout.
9. Lackham roundabout.
10. The Bridge Centre.
11. Lowden Hill/Bath Road.
12. Marshfield Road/Park Lane.
13. A4/Old Derry Hill.
14. Pewsham Way/London Road.
15. Distributor Road/Pewsham Way - location of junction is different for Option C.
16. Distributor Road/A4 - Location of junction varies between all three options. Option B use a staggered priority junction layout, whereas options A & C use a roundabout.

Analysis has been conducted at these junctions because of their strategic importance, or their importance as key nodes in the Chippenham town highway network. The analysis for 2036 and 2051 is provided in Table 10-11 and Source: analysis of outputs from the Wiltshire strategic model

Table 10-12 respectively. The values provided represent the average V/C for all approach arms at each junction under each of the various model scenarios.

Figure 10-14 - Location of key junctions in Chippenham for V/C analysis



The analysis indicates that for the 2036 forecast year

- Overall, each route option is forecast to reduce the V/C ratio at the majority of key junctions in the town.
- The greatest impact for all options is on the Malmesbury roundabout where an increase in the V/C ratio is forecast. This is where the distributor road joins the A350 to the north of the town. This scheme has been identified as requiring mitigation and is listed in the Wiltshire Council Community Infrastructure Levy (CIL) Regulation 123 list. Feasibility studies were conducted in 2019.
- There are small differences between the options, the most significant difference is for option C at the distributor road junction with Pewsham Way. This junction will need to be considered in further detail as the scheme progresses. Further work includes junction modelling to define the layout for this junction.

The 2051 analysis which includes the full HIF quantum at the Future Chippenham site in the R model shows that:

- Overall, there are small differences between the options in terms of impact on junction capacity.
- Each option is forecast to results in less of an impact at junctions in the town centre, with the exception of the Marshfield Road/Park Lane junction in the AM and PM peak hours and the Lowden Hill junction in the PM peak hour.
- The greatest impact is on the A350 roundabouts, notably Malmesbury roundabout in the north, Bumpers and Chequers and Lackham roundabouts.
- As noted previously Malmesbury roundabout is identified in the CIL Regulation 123 list, whilst Bumpers and Lackham roundabouts are subject to a recent bid for funding from the Major Road Network (MRN) fund as part of the A350 Chippenham phase 4 & 5 Outline Business Case submission to the DfT.

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Table 10-11 - Weighted volume over capacity (%) at key junctions - AM and PM peak hour - 2036

		AM peak hour (0800-0900)				PM peak hour (1700-1800)			
No.	Junction	P (DM)	A (R)	B (R)	C (R)	P (DM)	A (R)	B (R)	C (R)
1	M4 Junction 17	79%	68%	68%	68%	69%	65%	65%	65%
2	Station Hill/New Road	75%	49%	48%	48%	82%	49%	49%	49%
3	Chequers roundabout	74%	69%	69%	69%	73%	68%	68%	68%
4	Malmesbury roundabout	99%	99%	101%	98%	99%	99%	101%	98%
5	Bumpers roundabout	72%	65%	65%	65%	68%	64%	63%	63%
6	Lackham roundabout	43%	51%	52%	56%	44%	55%	56%	62%
7	The Bridge Centre	66%	45%	43%	42%	73%	47%	45%	44%
8	Lowden Hill/Bath Road	67%	57%	55%	51%	72%	66%	63%	60%
9	Marshfield Road/Park Lane	65%	63%	62%	57%	66%	64%	64%	59%
10	A4/Old Derry Hill	59%	51%	51%	50%	79%	56%	55%	55%
11	Pewsham Way/London Road	68%	35%	37%	58%	71%	34%	38%	59%
12	Distributor Road/Pewsham Way	63%	24%	28%	78%	77%	31%	35%	85%
13	Distributor Road/A4	57%	56%	47%	59%	83%	55%	50%	59%

Source: analysis of outputs from the Wiltshire strategic model

Table 10-12 - Weighted volume over capacity (%) at key junctions - AM and PM peak hour - 2051

		AM peak hour (0800-0900)				PM peak hour (1700-1800)			
No.	Junction	P (DM)	A (R)	B (R)	C (R)	P (DM)	A (R)	B (R)	C (R)
1	M4 Junction 17	84%	74%	74%	75%	77%	72%	72%	72%
2	Station Hill/New Road	76%	57%	57%	55%	76%	59%	59%	58%
3	Chequers roundabout	81%	74%	74%	72%	80%	74%	74%	74%
4	Malmesbury roundabout	106%	109%	109%	108%	106%	109%	109%	108%
5	Bumpers roundabout	74%	67%	67%	68%	70%	71%	71%	71%
6	Lackham roundabout	47%	64%	65%	70%	48%	69%	70%	75%
7	The Bridge Centre	73%	53%	51%	48%	79%	57%	55%	51%
8	Lowden Hill/Bath Road	68%	64%	63%	58%	74%	76%	75%	71%
9	Marshfield Road/Park Lane	71%	75%	73%	70%	70%	77%	76%	73%
10	A4/Old Derry Hill	67%	58%	58%	55%	86%	65%	64%	62%
11	Pewsham Way/London Road	73%	41%	66%	66%	74%	43%	68%	68%
12	Distributor Road/Pewsham Way	68%	31%	40%	92%	80%	41%	48%	99%
13	Distributor Road/A4	64%	62%	59%	61%	87%	64%	63%	65%

Source: analysis of outputs from the Wiltshire strategic model

10.8.5. Summary of traffic modelling

10.8.5.1. Comparison of options

The analysis of outputs from the strategic transport modelling indicates that each route option is forecast to have marginally different impacts on the Chippenham town highway network and at specific junctions. Overall, the analysis presented can be summarised as:

- In 2036 all options are forecast to result in reduced delays and queuing across the town network, even with the additional demand generated from the Future Chippenham site.
- In 2036 and 2051 all options are forecast to reduce traffic flows in the town centre compared to the Do Minimum.
- Option C is forecast to reduce delays, queueing and traffic flows in the town centre to a marginally greater extent than Option B and C.
- Option B has a marginally lesser impact than option C on delays and queues, however compared to the Do Minimum it still has an impact on reducing queues and delays. Similarly, for option A, which does not worsen the traffic impacts, its benefits are not as great as option C.

Whilst option C generally performs best in reducing traffic in the town and reducing pressure on existing junctions, there is increased pressure on junctions along Pewsham Way. Mitigation for this impact will need to be further considered as the scheme develops.

10.8.5.2. Future demand

The strategic modelling indicates that the Future Chippenham distributor road is forecast to provide additional highway capacity and support the Local Plan quantum of housing at the Future Chippenham site in the 2036 forecast year. The 2051 forecasts indicate that the additional demand generated from the full HIF quantum (7,500 dwellings) could increase delays and queuing in the town. This would be expected with the additional number of dwellings associated with the Future Chippenham site and finite capacity of the Chippenham highway network (excluding the new distributor road). The testing of options has not considered the changes in mode share that could be achieved from the opportunities unlocked by the distributor road for reduced traffic flows in the town centre and introducing complementary measures to improve provision for pedestrian, cyclists and buses.

A package of multi-modal transport measures across Chippenham, particularly in central Chippenham, equivalent to the Chippenham Transport Strategy produced to support the CSAP would be needed to minimise the impact of future growth.

The traffic modelling indicates that in 2051 the Future Chippenham distributor road will help reduce delays and queueing in the AM peak hour compared to the Do Minimum, particularly for option C. However issues of congestion and delays remain in the PM peak hours. Residual capacity issues at key locations including Malmesbury, Bumpers, Chequers and Lackham roundabouts on the A350 will need to be considered alongside Marshfield Road/Park Lane and Lowden Hill junctions in central Chippenham. In addition to making provision for pedestrians, cyclists and buses the design of the distributor road will need to consider the capacity of the junctions where the distributor road links to the existing highway network. These issues will be considered in further detail through the planning process and the Transport Assessment supporting the planning application.

10.8.6. Transport economic appraisal – initial benefit: cost ratio (BCR) for route options

10.8.6.1. Assessment approach

The economic assessment has been conducted using standard procedures and economic parameters as defined within the “Appraisal of transport schemes and polices” guidance of Department for Transport (DfT) Transport Appraisal Guidance (TAG). The transport economic appraisal was conducted using the Wiltshire strategic model.

The economic appraisal provides an initial benefit cost ratio (BCR) and DfT Value for Money (VfM) category for each route option. The calculation of an initial BCR is commensurate with the development of an OAR, as such it does not include the full analysis that would be included in a business case, for example the HIF submission.

The impacts of each scenario on travel times and vehicle operating costs for trips using the model after scheme opening were assessed using the DfT’s Transport Users Benefits Appraisal (TUBA) software program (v1.9.10). TUBA is a bespoke software package developed on behalf of the DfT to estimate the impacts of transport schemes in terms of the costs and benefits experienced by users and providers of the transport system, and the associated indirect taxation impacts. All impacts are considered in monetary terms.

TUBA estimates costs and benefits experienced by users and providers of the transport system by comparing transport conditions in different scenarios by:

- Calculating user benefits by vehicle type and for each element of journey cost (i.e. travel time and vehicle operating costs - fuel and non-fuel).
- Calculate the changes in the indirect tax income received by the government (for highway schemes this primarily reflects the levels of indirect taxation incurred on fuel cost).
- Calculate the changes in the greenhouse gases emissions.

The economic appraisal of transport schemes can be completed for three levels of impact depending upon the scope of the scheme. For the purposes of this OAR level 1 and 2 impacts have been considered as this is most appropriate for the consideration of the differences between the options. The Level 1 and 2 impacts assessed are:

- Level 1:
  - User impacts - travel times.
  - Vehicle Operating Costs (VOC).
  - Indirect tax.
  - Greenhouse gas (CO2).
- Level 2:
  - Increased economic output in imperfect competitive market.

For the purposes of this OAR the following impacts are not quantified: increased physical activity, disruption impacts during construction and maintenance, journey quality, static and dynamic agglomeration[9], more people working impact or moves into more productive jobs.

The approach to transport economic appraisal of the three route options followed that set out in section 3.3.3 of TAG A2.2 – "Valuing the transport scheme". In this assessment it means that user impacts associated with dependent development housing (Future Chippenham housing above the deadweight housing) are not included. This assessment focusses on the transport impacts without the Future Chippenham housing in line with the environment assessment.

The appraisal of the scheme's impacts was therefore undertaken by comparing:

- Scenario P (Do Minimum, without distributor road and dependent development) vs S (with distributor road and without dependent development).

10.8.6.2. Assumptions

This section provides a high-level summary of the economic assumptions:

- All benefits and costs were assessed over a 60-year appraisal period, beginning in 2019/20, then discounted to a common base year of 2010.
- Discount rates of 3.5% were applied to benefits and costs for the initial 30 years from the current year and rates of 3.0% were applied to subsequent years. All present values are quoted in the market price unit of account unless otherwise stated.
- The price base was also 2010 and therefore all prices were adjusted for inflation to be presented in 2010 prices, after allowing for real growth above standard inflation.

Analysis years - no further growth in traffic or benefits was assumed beyond 2051 (apart from an allowance from continued growth in the real value of time, in line with TAG). The TUBA assessment parameters are provided in Table 10-13.

[9] Paragraph 2.2, Department for Transport, TAG Unit A2.4: *An agglomeration economy is a particular type of placed based effect, in which individuals and firms derive productivity benefits from locating in close proximity to other individuals and firms. These benefits arise as a result of individuals and firms interacting with one another and are an important factor in the formation of clusters.* https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/554790/webtag-productivity-impacts-tag-unit-a24.pdf

Table 10-13 - TUBA assessment parameters

Forecast years	First year – 2024 (scheme opening year). Last year – 2083 (60 years from opening year). Modelled years – 2024, 2036 and 2051. Current (appraisal) year – 2020.
Time-periods	AM (weekday 08:00 to 09:00). IP (weekday 10:00 to 16:00). PM (weekday 17:00 to 18:00).
Annualisation factors	AM: 652. IP: 1,518. PM: 709.

10.8.6.3. Cost for economic appraisal

Derivation of the Present Value of Costs (PVC) of the options follows the guidance in TAG Unit A1.2. A base cost was prepared, which was then adjusted to take account of risk allowance, optimism bias, profiled to the expenditure year and then discounted back to 2010.

Base capital costs have been estimated and include preliminary, development and construction costs. Risk has been included based on the quantified risk register. The standard uplift, in TAG, for Optimism Bias (OB) to apply for a road scheme at this stage is 15%.

Costs were inflated to the year of expenditure using inflation rates given by TAG and the discounted and deflated to 2010 prices and values (also using TAG values). These costs are developed for the purpose of economic appraisal and as such are different to those included in a financial case.

10.8.6.4. Department for Transport Value for Money Framework

The aim of a Value for Money assessment is to help decision makers judge whether the expected cost of the transport intervention is justified by monetising the expected benefits to the public and society. The VfM Framework by the DfT gives six categories dependent on the benefit cost ratio (BCR), as shown in Table 10-14.

Table 10-14 - Value for Money categories

Value for Money category	Implies
Very High	BCR greater than or equal to 4
High	BCR between 2 and 4
Medium	BCR between 1.5 and 2
Low	BCR between 1 and 1.5
Poor	BCR between 0 and 1
Very Poor	BCR less than or equal to 0

10.8.6.5. Initial BCR for route options

For the initial BCR for this OAR the VfM assessment is based on level 1 and 2 impacts relating to journey times, operating cost savings and Increased economic output in imperfect competitive markets. It does not include other monetised and non-monetised impacts that would typically be included in a business case, such as the HIF submission. These could include collisions impacts or land value uplift (assessed as a level 3 impact). It would be expected that should land value uplift and external costs associated with Future Chippenham housing be included, as per the HIF submission, that a higher BCR would be forecast for each option.

Table 10-15 and Table 10-16 present the initial benefits and compares these to the costs discussed above to obtain an initial BCR and VfM category for each option for 2036 and 2051 forecast years respectively. The testing of the route options for level 1 and 2 impacts forecasts High VfM for each option. Option C is forecast to have the highest initial BCR, option B the second highest and option A the lowest. This is consistent with the overall findings from the traffic modelling which identified that overall option C had the greatest impact of the three options on reducing traffic flows in the town centre, network delays and queueing.

Table 10-15 - Scheme benefits and costs, initial VfM – P vs S scenario – 2036 forecast year

Levels	Benefit/costs	Option A	Option B	Option C
		£ (million)	£ (million)	£ (million)
Level 1 impact	Journey time and operating costs savings, greenhouse gases and indirect taxation (a)	£165.98	£157.60	£175.39
Level 2 impact	Increased economic output in imperfect competitive market (b)	£5.78	£5.47	£5.89
Present Value of Benefits (PVB)	Level 1 PVB (a)	£165.98	£157.60	£175.39
	Level 2 PVB (a + b)	£171.76	£163.06	£181.29
Present Value of Costs (PVC) (c)		£68.31	£67.10	£62.88
BCR	BCR (Level 1)	2.47	2.51	2.75
	Adjusted (Level 2) BCR	2.56	2.59	2.85
Initial VM category		**High**	**High**	**High**

Table 10-16 - Scheme benefits and costs, initial VfM – P vs S scenario – 2051 forecast year

Levels	Benefit/costs	Option A	Option B	Option C
		£ (million)	£ (million)	£ (million)
Level 1 impact	Journey time and operating costs savings, greenhouse gases and indirect taxation (a)	£221.74	£216.41	£237.30
Level 2 impact	Increased economic output in imperfect competitive market (b)	£7.70	£7.50	£7.98
Present Value of Benefits (PVB)	Level 1 PVB (a)	£221.74	£216.41	£237.30
	Level 2 PVB (a + b)	£229.44	£223.91	£245.28
Present Value of Costs (PVC) (c)		£67.10	£62.88	£63.69
BCR	BCR (Level 1)	3.2	3.4	3.7
	Adjusted (Level 2) BCR	3.4	3.5	3.8
Initial VM category		**High**	**High**	**High**

10.9. Delivery Case

Preferred options depend on progress of land agreements. All options are deemed viable in terms of delivery however the other assessment cases form a best fit option that will focus land agreement discussions; in addition, land allocation from the local plan and a planning application for the development and road may support evidence for land value and provide further evidence for land agreement.

Acceptability

To be considered following public consultation.

Land viability

Available data shows that all options are equally deliverable in zones 1, 4 and 5.

Option A is deemed less deliverable in zones 2 & 3 because there is no letter of support from the respective private landowners; it is possible that these landowners would be in favour of a scheme following further discussions. See Appendix B for Land information.

Practical feasibility

All options are considered to be practically feasible. Supply Chain Marketing and Early Contractor Involvement (ECI) will provide further information and seek to mitigate risks to delivery.

10.10. Financial Case – costs & affordability

10.10.1. Future Chippenham road network scheme costs

The scheme summary costs for each option by zone and Pewsham Link are provided for in Table 10-18 to Table 10-23.

The outturn cost estimates are based on fixed programme milestones and constraints. A 2-year construction period is assumed. Scheme opening of end of March 2024 is assumed. Inflation is based on BCIS All Civil Engineering Index May 27th 2020. Refer to the Highways and Structures report for further detail for the basis of cost estimates, in Appendix C.

Indicative costs for an additional link have been applied to options A and B to cater for connectivity to the development centre at East Chippenham; the alignment of this link can be reviewed in the Draft Concept Framework report version 3, April 2020. Option C does not require an additional link because the proposed distributor runs through the East Chippenham centre. Further assessment is recommended to confirm the costs, benefits and disbenefits of this link and apply them to the assessment for options A and B in zone 3. Table 10-17 provides the totals for zone 3 including the East Chippenham Link considered for the options assessment financial case.

A separate Covid-19 inflation of 3.525% has been applied to all cost estimates. This percent was calculated based on predicted trends due to the impact of Covid-19 on the industry.

Refer to 10.10.3 for details of risk analysis, including definitions of P50 and P80.

Table 10-17 - Zone 3 cost summary for assessment

Option	P50			P80		
	Zone 3	East Chippenham Link	Total	Zone 3	East Chippenham Link	Total
Option A	£10,778,808	£5,398,421	£16,177,229	£12,384,236	£6,202,478	£18,586,714
Option B	£8,423,486	£4,639,584	£13,063,070	£9,765,505	£5,378,756	£15,144,261
Option C	£11,097,944	£0	£11,097,944	£12,907,702	£0	£12,907,702

Table 10-18 - Option A - Scheme cost summary table (P50)

Options A - Outer Route								
	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Pewsham Link - O3	East Chippenham Link	Total
Construction cost	£ 27,382,000	£ 11,007,000	£ 7,358,000	£ 16,269,000	£ 2,146,000	£ 4,387,000	£ 4,066,000	£ 72,615,000
Preparatory, Supervision & Land	£ 2,886,000	£ 1,286,000	£ 1,010,000	£ 1,903,000	£ 299,000	£ 1,030,000	£ 125,000	£ 8,539,000
Base Cost	£ 30,268,000	£ 12,293,000	£ 8,368,000	£ 18,172,000	£ 2,445,000	£ 5,417,000	£ 4,191,000	£ 81,154,000
Risk	£ 2,399,451	£ 974,509	£ 663,361	£ 1,440,558	£ 193,824	£ 429,425	£ 332,235	£ 6,433,363
Inflation	£ 5,253,768	£ 2,133,757	£ 1,452,476	£ 3,154,205	£ 424,391	£ 940,256	£ 727,453	£ 14,086,305
Inflation - Covid 19	£ 1,066,947	£ 433,328	£ 294,972	£ 640,563	£ 86,186	£ 190,949	£ 147,733	£ 2,860,679
Total	**£ 38,988,166**	**£ 15,834,595**	**£ 10,778,808**	**£ 23,407,326**	**£ 3,149,401**	**£ 6,977,630**	**£ 5,398,421**	**£ 104,534,347**

Table 10-19 - Option B - Scheme cost summary table (P50)

Option B - Middle Route								
	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Pewsham Link - O3	East Chippenham Link	Total
Construction cost	£ 25,798,000	£ 10,252,000	£ 5,497,000	£ 14,494,000	£ 2,195,000	£ 4,563,000	£ 3,459,000	£ 66,258,000
Preparatory, Supervision & Land	£ 2,886,000	£ 1,286,000	£ 1,010,000	£ 1,903,000	£ 299,000	£ 1,030,000	£ 125,000	£ 8,539,000
Base Cost	£ 28,684,000	£ 11,538,000	£ 6,507,000	£ 16,397,000	£ 2,494,000	£ 5,593,000	£ 3,584,000	£ 74,797,000
Risk	£ 2,450,347	£ 985,640	£ 555,864	£ 1,400,723	£ 213,051	£ 477,785	£ 306,165	£ 6,389,576
Inflation	£ 4,986,750	£ 2,005,896	£ 1,131,250	£ 2,850,639	£ 433,585	£ 972,350	£ 623,083	£ 13,003,553
Inflation - Covid 19	£ 1,011,111	£ 406,715	£ 229,372	£ 577,994	£ 87,914	£ 197,153	£ 126,336	£ 2,636,594
Total	**£ 37,132,208**	**£ 14,936,251**	**£ 8,423,486**	**£ 21,226,356**	**£ 3,228,550**	**£ 7,240,289**	**£ 4,639,584**	**£ 96,826,723**

Table 10-20 - Option C - Scheme cost summary table (P50)

Option C - Inner Route								
	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Pewsham Link - O1	East Chippenham Link	Total
Construction cost	£ 21,797,000	£ 10,151,000	£ 7,588,000	£ 14,056,000	£ 2,242,000	£ 8,070,000	£ -	£ 63,904,000
Preparatory, Supervision & Land	£ 2,886,000	£ 1,286,000	£ 1,010,000	£ 1,903,000	£ 299,000	£ 1,030,000	£ -	£ 8,414,000
Base Cost	£ 24,683,000	£ 11,437,000	£ 8,598,000	£ 15,959,000	£ 2,541,000	£ 9,100,000	£ -	£ 72,318,000
Risk	£ 2,032,901	£ 941,956	£ 708,135	£ 1,314,389	£ 209,278	£ 749,479	£ -	£ 5,956,138
Inflation	£ 4,273,823	£ 1,980,299	£ 1,488,730	£ 2,763,276	£ 439,970	£ 1,575,651	£ -	£ 12,521,748
Inflation - Covid 19	£ 870,076	£ 403,154	£ 303,080	£ 562,555	£ 89,570	£ 320,775	£ -	£ 2,549,210
Total	**£ 31,859,800**	**£ 14,762,408**	**£ 11,097,944**	**£ 20,599,220**	**£ 3,279,818**	**£ 11,745,905**	**£ -**	**£ 93,345,096**

Table 10-21 - Option A - Scheme cost summary table (P80)

Options A - Outer Route								
	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Pewsham Link - O3	East Chippenham Link	Total
Construction cost	£ 27,382,000	£ 11,007,000	£ 7,358,000	£ 16,269,000	£ 2,146,000	£ 4,387,000	£ 4,066,000	£ 72,615,000
Preparatory, Supervision & Land	£ 2,886,000	£ 1,286,000	£ 1,010,000	£ 1,903,000	£ 299,000	£ 1,030,000	£ 125,000	£ 8,539,000
Base Cost	£ 30,268,000	£ 12,293,000	£ 8,368,000	£ 18,172,000	£ 2,445,000	£ 5,417,000	£ 4,191,000	£ 81,154,000
Risk	£ 7,366,501	£ 2,991,820	£ 2,036,569	£ 4,422,627	£ 595,054	£ 1,318,367	£ 1,019,988	£ 19,750,927
Inflation	£ 6,093,730	£ 2,474,899	£ 1,684,695	£ 3,658,493	£ 492,242	£ 1,090,582	£ 843,757	£ 16,338,397
Inflation - Covid 19	£ 1,066,947	£ 433,328	£ 294,972	£ 640,563	£ 86,186	£ 190,949	£ 147,733	£ 2,860,679
Total	**£ 44,795,179**	**£ 18,193,047**	**£ 12,384,236**	**£ 26,893,683**	**£ 3,618,482**	**£ 8,016,899**	**£ 6,202,478**	**£ 120,104,003**

Table 10-22 - Option B - Scheme cost summary table (P80)

Option B - Middle Route								
	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Pewsham Link - O3	East Chippenham Link	Total
Construction cost	£ 25,798,000	£ 10,252,000	£ 5,497,000	£ 14,494,000	£ 2,195,000	£ 4,563,000	£ 3,459,000	£ 66,258,000
Preparatory, Supervision & Land	£ 2,886,000	£ 1,286,000	£ 1,010,000	£ 1,903,000	£ 299,000	£ 1,030,000	£ 125,000	£ 8,539,000
Base Cost	£ 28,684,000	£ 11,538,000	£ 6,507,000	£ 16,397,000	£ 2,494,000	£ 5,593,000	£ 3,584,000	£ 74,797,000
Risk	£ 7,510,351	£ 3,021,002	£ 1,703,732	£ 4,293,238	£ 653,006	£ 1,464,419	£ 938,401	£ 19,584,149
Inflation	£ 5,842,599	£ 2,350,157	£ 1,325,401	£ 3,339,879	£ 507,999	£ 1,139,229	£ 730,019	£ 15,235,283
Inflation - Covid 19	£ 1,011,111	£ 406,715	£ 229,372	£ 577,994	£ 87,914	£ 197,153	£ 126,336	£ 2,636,594
Total	**£ 43,048,061**	**£ 17,315,874**	**£ 9,765,505**	**£ 24,608,111**	**£ 3,742,918**	**£ 8,393,802**	**£ 5,378,756**	**£ 112,253,026**

Table 10-23 - Option C - Scheme cost summary table (P80)

Option C - Inner Route								
	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Pewsham Link - O1	East Chippenham Link	Total
Construction cost	£ 21,797,000	£ 10,151,000	£ 7,588,000	£ 14,056,000	£ 2,242,000	£ 8,070,000	£ -	£ 63,904,000
Preparatory, Supervision & Land	£ 2,886,000	£ 1,286,000	£ 1,010,000	£ 1,903,000	£ 299,000	£ 1,030,000	£ -	£ 8,414,000
Base Cost	£ 24,683,000	£ 11,437,000	£ 8,598,000	£ 15,959,000	£ 2,541,000	£ 9,100,000	£ -	£ 72,318,000
Risk	£ 6,476,786	£ 3,001,053	£ 2,256,104	£ 4,187,620	£ 666,755	£ 2,387,828	£ -	£ 18,976,146
Inflation	£ 5,025,360	£ 2,328,528	£ 1,750,518	£ 3,249,189	£ 517,337	£ 1,852,724	£ -	£ 14,723,656
Inflation - Covid 19	£ 870,076	£ 403,154	£ 303,080	£ 562,555	£ 89,570	£ 320,775	£ -	£ 2,549,210
Total	**£ 37,055,222**	**£ 17,169,735**	**£ 12,907,702**	**£ 23,958,364**	**£ 3,814,663**	**£ 13,661,326**	**£ -**	**£ 108,567,012**

10.10.2. Transport network mitigation – M4 Junction 17

The Future Chippenham bid for Housing and Infrastructure Funding requires delivery of an improvements scheme at junction 17 of the M4 to mitigate the effect of additional traffic associated with the Future Chippenham development housing. Table 10-24 and Table 10-25 provides a summary of associated costs for delivering the M4 junction 17 scheme with P50 and P80 risk cost, respectively. The improvement works at M4 Junction 17 may contribute to a larger scheme delivered under Major Road Network improvements and funded by the Department

for Transport (DfT). The MRN scheme is currently progressing to OBC and is programmed to open by December 2023.

Table 10-24 - M4 Junction 17 - Scheme cost summary table (P50)

	M4 J17
Construction cost	£ 3,157,000
Preparatory, Supervision & Land	£ 516,000
Base Cost	£ 3,673,000
Risk	£ 331,166
Inflation	£ 639,350
Inflation - Covid 19	£ 129,473
Total	**£ 4,772,989**

Table 10-25 - M4 Junction 17 - Scheme cost summary table (P80)

	M4 J17
Construction cost	£ 3,157,000
Preparatory, Supervision & Land	£ 516,000
Base Cost	£ 3,673,000
Risk	£ 1,046,327
Inflation	£ 760,288
Inflation - Covid 19	£ 129,473
Total	**£ 5,609,088**

Note: these total have minor differences from M4 J17 estimates shown in tables 10-18 to 10-23. The total risk estimate, which was undertaken as a total option length i.e. not by zone, was proportionally distributed across the zones and link roads.

10.10.3. Risk costs

A scheme risk register has been compiled for each option and includes threats and opportunities affecting scheme delivery costs. Refer to Appendix F for Option Risk Registers.

Quantitative Cost Risk Analysis (QCRA) has been undertaken to inform the likelihood of threats and opportunities being incurred, this identifies scheme risk budgets.

Two forecast scenarios have been undertaken a P50 and P80 analysis. P50 and P80 refer to a confidence level regarding the probability of the cost not being exceeded, and does not indicate a quantum of cost or proximity to the actual cost realised i.e. P80 is not a cost plus/minus 20% but instead it is a cost that will not be exceeded 80% of the time. P50 is a risk cost that will not be exceeded 50% of the time.

P50 and P80 risk values have been applied in the scheme cost summary tables in section 10.10.1.

The values are adjusted within the summary tables to cater for additional work for the East Chippenham Link; the values also adjust following prorating of the total risk value to distribute the risk across each zone and link.

The risk value for each option varies slightly where additional risk is incurred on the longer route.

The P50 risk costs are provided in Table 10-26. The P80 risk costs are provided in Table 10-27.

Table 10-26 - Option Risk Cost Estimates – P50

	Option A	Option B	Option C
Risk	£6,433,363	£6,389,576	£5,956,138

The risk costs provided below in Table 10-27 (P80) are target risk costs with an 80% likelihood of being incurred.

Table 10-27 - Option Risk Cost Estimates – P80

	Option A	Option B	Option C
Risk	£19,750,927	£19,584,149	£18,976,146

10.10.4. Affordability

The updated scheme costs and programme are subject to review by Wiltshire Council and Homes England. Pre and post contract conditions for the Housing and Infrastructure Funding currently set at £75M are scheduled to be agreed in the coming months and a shortfall in funding may need to be met by other funding mechanisms. Another possibility would be a phased approach for the delivery of the road route, this would need to be agreed with Homes England.

A Local Plan Review for Wiltshire was published on 13th January 2021 and identifies preferred locations for the Housing Allocations. The Future Chippenham area is a preferred location and a phased approach, meeting the required quantum and Homes benefit ratio in the next plan period, would be a logical next step. Planning for the full road route may be sought to future proof Housing growth in the next plan period and beyond.

A coordinated route utilising the route options with the best fit to the assessment criteria in each zone and link is presented and costed in section 10.13.

10.11. Commercial Case – market capacity assessment

Flexibility of option

To be considered following Supply Chain Marketing and Early Contractor Involvement (ECI).

10.12. Second sift assessment summary

Tables 10-28 shows the results of the second sift process. Option C provides the best fit through each zone. Some improvements can be found within Zone 3 to improve its environmental benefits. Table 10-29 summaries the best route through each section. Section 10.13 expands upon the coordinated best fit option.

Table 10-28 - Second Sift All Options Summary

TRANSPORT OPTION	Strategic Case	Delivery Case	Environmental Assessment Case	Financial Case	Commercial Case	Taken forward?
	Overall Strategic impact (1 to 5)	Overall Deliverability (1 to 5)	Overall environmental impact (1 to 5)	Affordability and overall cost risk	Flexibility of option	
ZONE 1: Option A	3.3	3.0	2.8	1, Very High Cost + Risk	3, Reasonable level of flexibility	No
ZONE 1: Option B	3.7	3.0	2.9	1, Very High Cost + Risk	3, Reasonable level of flexibility	No
ZONE 1: Option C	4.0	3.0	2.8	2, High Cost + Risk	3, Reasonable level of flexibility	Yes
ZONE 2: Option A	3.3	2.7	2.8	4, Medium Cost + Risk	3, Reasonable level of flexibility	No
ZONE 2: Option B	4.0	3.0	2.8	4, Medium Cost + Risk	3, Reasonable level of flexibility	No
ZONE 2: Option C	4.0	3.0	2.8	4, Medium Cost + Risk	3, Reasonable level of flexibility	Yes
ZONE 3: Option A	3.3	2.7	2.7	4, Medium Cost + Risk	3, Reasonable level of flexibility	No
ZONE 3: Option B	3.7	3.0	2.9	4, Medium Cost + Risk	3, Reasonable level of flexibility	Yes
ZONE 3: Option C	4.0	3.0	2.8	5, Low Cost + Risk	3, Reasonable level of flexibility	Yes
ZONE 4: Option A	3.3	3.0	2.7	3, Medium Cost + High Risk	3, Reasonable level of flexibility	No
ZONE 4: Option B	3.3	3.0	2.7	3, Medium Cost + High Risk	3, Reasonable level of flexibility	No
ZONE 4: Option C	4.0	3.0	3	3, Medium Cost + High Risk	3, Reasonable level of flexibility	Yes
ZONE 5: All Options	4.0	3.0		5, Low Cost + Risk	3, Reasonable level of flexibility	Yes
Pewsham Link 1	4.0	3.0	2.6	5, Low Cost + Risk	3, Reasonable level of flexibility	No
Pewsham Link 3	3.7	3.0	2.9	5, Low Cost + Risk	3, Reasonable level of flexibility	Yes

Table 10-29 - Second Sift Best Fit Options Summary

TRANSPORT OPTION	Strategic Case	Delivery Case	Environmental Assessment Case	Financial Case	Commercial Case	Taken forward?
	Overall Strategic impact (1 to 5)	Overall Deliverability (1 to 5)	Overall environmental impact (1 to 5)	Affordability and overall cost risk	Flexibility of option	
ZONE 1: Option C	4.0	3.0	2.8	2, High Cost + Risk	3, Reasonable level of flexibility	Yes
ZONE 2: Option C	4.0	3.0	2.8	4, Medium Cost + Risk	3, Reasonable level of flexibility	Yes
ZONE 3: Option B & C Hybrid	3.8	3.0	3.0	4, Medium Cost + Risk	3, Reasonable level of flexibility	Yes
ZONE 4: Option C	4.0	3.0	3	3, Medium Cost + High Risk	3, Reasonable level of flexibility	Yes
ZONE 5: All Options	4.0	3.0		5, Low Cost + Risk	3, Reasonable level of flexibility	Yes
Pewsham Link 3	3.7	3.0	2.9	5, Low Cost + Risk	3, Reasonable level of flexibility	Yes

10.13. Coordinated best fit route option

Subject to further assessment to complete land agreements and achieve full scheme funding the route shown in

Figure 10-15 provides the best fit with the scheme assessment criteria and objectives.

Following an assessment on each zone, the most suitable route through each zone can be selected to form an option which best fits the objectives. The route predominately follows option C, inner route with the exception of a minor variation in zone 3.

This best fit option avoids conflict with Stanley Park sports ground, the adjacent Great Crested Newt (GCN) habitat, reduces the number of landowners and to impact on residents near the A4. Table 10-30 shows the assessment of the coordinated route in zone 3. In zone 2 the best fit route follows the alignment of option C as it has better connectivity.

The best fit route includes the alignment of Pewsham link option 3, this option provides greater value for money, lower environmental impact and similar transport benefits when compared to Pewsham link option 1.

This provides a route alignment with the following attributes:

- Good and best fit with the strategic scheme objectives including connectivity and congestion mitigation.
- Coordinates with the Future Chippenham development Draft Concept Framework design principles, including the most suitable location to connect sustainable transport networks with the town.
- Reasonable level of deliverability, subject to land agreements and consultation.
- Lowest overall environmental impact.
- An outturn cost estimate for the Coordinated Best Fit Route with P50 risk of **£88.56M + £4.77M for M4 J17 = £93.33M.** (See table 10-31)
- An additional £16.26M for **P80 Risk for a total outturn estimate = £109.59M.** (See table 10-32)

Table 10-30 - Best Fit Route assessment – Zone 3

TRANSPORT OPTION	Strategic Case	Delivery Case	Environmental Assessment Case	Financial Case	Commercial Case	Taken forward?
	Overall Strategic impact (1 to 5)	Overall Deliverability (1 to 5)	Overall environmental impact (1 to 5)	Affordability and overall cost risk	Flexibility of option	
ZONE 3: Option B & C Hybrid	3.8	3.0	3.0	4, Medium Cost + Risk	3, Reasonable level of flexibility	Yes

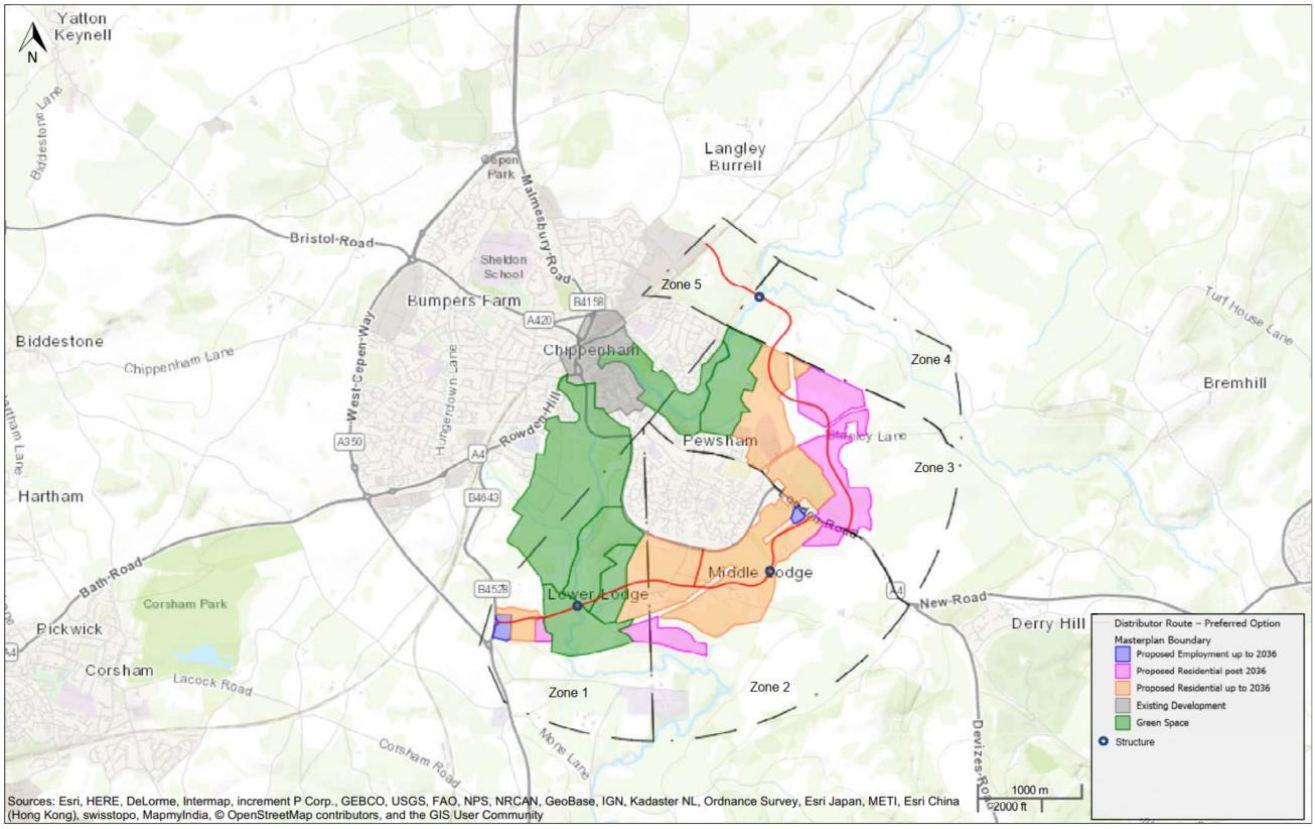
Table 10-31 - Coordinated Best Fit Route cost estimate (P50)

Best Fit Option								
	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Pewsham Link - O3 (amend)	East Chippenham Link	Total
Construction cost	£ 21,797,000	£ 10,151,000	£ 7,588,000	£ 14,056,000	£ 2,242,000	£ 3,944,000	£ -	£ 59,778,000
Preparatory, Supervision & Land	£ 2,886,000	£ 1,286,000	£ 1,010,000	£ 1,903,000	£ 299,000	£ 1,030,000	£ -	£ 8,414,000
Base Cost	£ 24,683,000	£ 11,437,000	£ 8,598,000	£ 15,959,000	£ 2,541,000	£ 4,974,000	£ -	£ 68,192,000
Risk	£ 2,211,604	£ 1,024,759	£ 770,383	£ 1,429,931	£ 227,674	£ 445,672	£ -	£ 6,110,024
Inflation	£ 4,289,363	£ 1,987,499	£ 1,494,143	£ 2,773,323	£ 441,570	£ 864,372	£ -	£ 11,850,271
Inflation - Covid 19	£ 870,076	£ 403,154	£ 303,080	£ 562,555	£ 89,570	£ 175,334	£ -	£ 2,403,768
Total	**£ 32,054,043**	**£ 14,852,412**	**£ 11,165,606**	**£ 20,724,809**	**£ 3,299,815**	**£ 6,459,377**	**£ -**	**£ 88,556,063**

Table 10-32 - Coordinated Best Fit Route cost estimate (P80)

Best Fit Option								
	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Pewsham Link - O3 (amend)	East Chippenham Link	Total
Construction cost	£ 21,797,000	£ 10,151,000	£ 7,588,000	£ 14,056,000	£ 2,242,000	£ 3,944,000	£ -	£ 59,778,000
Preparatory, Supervision & Land	£ 2,886,000	£ 1,286,000	£ 1,010,000	£ 1,903,000	£ 299,000	£ 1,030,000	£ -	£ 8,414,000
Base Cost	£ 24,683,000	£ 11,437,000	£ 8,598,000	£ 15,959,000	£ 2,541,000	£ 4,974,000	£ -	£ 68,192,000
Risk	£ 6,987,555	£ 3,237,721	£ 2,434,023	£ 4,517,862	£ 719,336	£ 1,408,099	£ -	£ 19,304,597
Inflation	£ 5,096,950	£ 2,361,699	£ 1,775,456	£ 3,295,476	£ 524,707	£ 1,027,113	£ -	£ 14,081,401
Inflation - Covid 19	£ 870,076	£ 403,154	£ 303,080	£ 562,555	£ 89,570	£ 175,334	£ -	£ 2,403,768
Total	**£ 37,637,581**	**£ 17,439,574**	**£ 13,110,559**	**£ 24,334,893**	**£ 3,874,614**	**£ 7,584,545**	**£ -**	**£ 103,981,766**

Figure 10-15 - Coordinated Best Fit Route alignment



11. Further assessment

11.1. Assessment updates

A number of items have been identified to update the current version of this Options Assessment Report including:

- Full assessment of east Chippenham Link Road for Options A and B.
- Funding review.
- Programme review.
- Construction phasing.
- Survey input to update evidence and assessment scoring.

11.2. Delivery Case

Final option selection may be further influenced by public consultation and the land negotiation/acquisition process.

11.2.1. Supply chain marketing

The scheme should be presented to the construction sector market at the earliest opportunity. An update to the OJEU register or equivalent construction market project notification portal is recommended as part of this process. Early engagement with the supply chain will assist with scheme resource planning. Early Contractor Involvement (ECI) will provide valuable feedback and assist with managing the risk budget to minimise cost and programme increases.

11.2.2. Public and stakeholder consultation

Public consultation should progress as soon as possible to identify relevant feedback that may influence the preferred route to progress to planning. A thorough public consultation process supported by this report and appendices will provide useful information for the public and stakeholders and should assist with allaying any concerns and promote the benefits of the scheme to the people of Chippenham and the surrounding area.

11.2.3. Land agreements

Land agreements should be in place as soon as possible. The recommendations from this report will assist by focusing the process on the route that fits best with the options assessment criteria.

A land strategy is in place to progress agreements/acquisition where appropriate following public consultation and selection of the preferred road option for planning.

12. Next steps – planning application

12.1. Securing consent for the distributor road and housing

The strategy for securing planning permission is still emerging. At the present time it is proposed to make two applications for planning permission, submitted at the same time:

- An application for full planning permission for the road, incorporating strategic cycle infrastructure; with the environmental (and wider sustainability) assessment for the road using the outline masterplan to assess the impact of the land it unlocks (i.e. using the outline application identified below and emerging policy to frame the development that needs assessing).A Draft Concept Framework for the whole area i.e. 7,500 homes, showing up to 3,900 homes to be delivered in the Local Plan period to 2036, would be submitted as illustrative material; and,
- An outline application for planning permission for a first phase of homes and selection of employment/community development, plus broader green and blue infrastructure.

Determination of these applications will need to be aligned with the publication of the draft Local Plan.

The initial tasks will be set via discussions with the Wiltshire Council Spatial Planning Team to progress further policy support and desired Local Plan allocation; and Wiltshire Council Development Management Team to progress the proposed structure and content of the two planning applications.

As part of these discussions further investigations with Wiltshire Council Spatial Planning and Development Management Teams will seek agreement on requiring a design led Supplementary Planning Document (SPD).

12.2. Securing detailed consent for the distributor road

As a large new highway, the project will be required to gain planning permission through a Town and Country Planning Act to Wiltshire Council. The Planning and Consents Strategy has been developed on the assumption that the local planning authority will consider the Scheme to be Schedule 2 Environment Impact Assessment (EIA) development, therefore requiring an EIA to be undertaken and reported in an Environment Statement (ES). The validity of this assumption will be tested at the pre-application stage through a request for an EIA screening opinion.

The compilation of elements of the planning application submission for the distributor road have commenced and will continue as the road designs are consulted on and refined. The final requirement for information could include:

- Drafting the planning application forms.
- Co-ordinating production and checking first drafts of the planning application drawings, to include specifications of printing page sizes for scales; suitable title and file name conventions and dating:
  - Location plan (1:10,000 / 1:50,000 for large scale development; or 1:1250 / 1:2500 if appropriate). Must be titled, dated and given a unique reference number. Should show at least two named roads and surrounding buildings. Application Site to be edged in a solid red line; and a solid blue line should delineate any other land owned by the applicant close to or adjoining the application site
  - Site plan (1:500 or 1:200 for development that the council itself proposes to carry out). Must include a compass point, scale bar and specification of page size for printing. Must also include:
    - All buildings, road and footpaths on land adjoining the site including access arrangements.
    - All PRoW crossing or adjoining the application site.
    - The position of all trees on the application site and those on adjacent land.
    - The extent and type of hard surfacing; and
    - Boundary treatment including any walls or fencing.
  - Proposed landscaping plans, showing contours, illustrating the landscaping scheme and, if appropriate, the lighting scheme. Should reflect the design principles and be informed by tree survey and arboricultural statement (in accordance with the methodology set out in British Standard BS5837 Trees in relation to design, demolition and construction – recommendations'), Package incorporates:
    - Proposed finished ground levels or contours.
    - Means of enclosure.
    - Car parking layouts.
    - Pedestrian access/PRoW.
    - Hard surfacing materials, structures and ancillary objects.

  - Planting plans (written specifications, including cultivation and other operations associated with plant and grass establishment; schedules of plants, noting species, plant sizes and proposed numbers/planting densities; show existing vegetation to be retained together with construction protection measures); and
  - Details of external lighting and proposed hours of operation. To include beam orientation and a schedule of equipment in the design.
- General Arrangement scheme drawings (1:5 /1:100).
- Longitudinal section drawings (1:50/1:100).
- Topographical survey drawings.
- Calculating the planning application fee and confirming payment arrangements; and
- Confirmation of affected landowners and preparation of landowner notifications, any agricultural land declarations and ownership certificates.
- Environmental Statement.
- Flood Risk Assessment.
- Parking provision.
- Photographs or photomontages.
- Rights of Way.
- Statement of Community Engagement or Consultation.
- Supporting Planning Statement.
- Surface Water Drainage Strategy.
- Sustainability Appraisal.
- Transport Assessment.
- Travel Plan.
- Tree Survey/Arboricultural Statement.
- Water Framework Directive Compliance Assessment.

12.3. Securing outline consent for up to 2,970-3,240 homes

The outline planning application for planning permission, including the masterplanning deliverables, will need to be finalised over the coming months and following consultation. The masterplan deliverables prepared would provide the basis of the Design and Access Statement and the Parameter Plans which are required as a formal part of the application material. These would be accompanied by the required suite of supporting documents, including Transport Assessment, Flood Risk Assessment and Environmental Statement.

To deliver a comprehensive package of work suitable to submit an application for outline planning permission and supporting material covering all elements of Future Chippenham, excluding the distributor road, the following key stages have been identified:

Initial consultation on Future Chippenham - Either in line with distributor road or as a separate consultation, work will be required to prepare for attend and summarise a consultation event for the masterplan.

Complete screening and scoping for proposed application – complete EIA screening and scoping

Formal consultation - A second round of formal consultation is proposed to ensure the emerging scheme for the Future Chippenham residential development is transparent and details of the masterplan and environmental impacts are clearly set out and mitigation/ changes discussed.

Delivery of application for planning permission summer 2021 - The planning applications will require further documentation to be prepared that may include:

- Drafting the planning application forms.
- Co-ordinating production and checking first drafts of the planning application drawings, to include specifications of printing page sizes for scales; suitable title and file name conventions and dating.
- Design and Access Statement including masterplan and parameter plans.
- Plans and illustrative material for the wider project,
- Planning Statement.
- Design and Access Statement.

- Environmental Statement.
- Flood Risk Assessment.
- Parking provision.
- Photographs or photomontages.
- Rights of Way.
- Statement of Community Engagement or Consultation.
- Supporting Planning Statement.
- Surface Water Drainage Strategy.
- Sustainability Appraisal.
- Transport Assessment.
- Travel Plan.
- Tree Survey/Arboricultural Statement.
- Water Framework Directive Compliance Assessment.

Appendices

Appendix A. Preliminary Environmental Assessment Options Report

Appendix B. Future Chippenham Land Report

Appendix C. Future Chippenham Highways and Structures Principles

Appendix D. Geotechnical/Geo-Environmental Preliminary Sources of Study Report (PSSR)

Appendix E. Option Sifting

- Assessment Guidance
- Option Sift 1 Assessment
- Option Sift 2 Assessment

Appendix F. Risk Estimates

- Option A – Risk Register
- Option A – Quantitative Cost Risk Analysis (QCRA)
- Option B – Risk Register
- Option B – Quantitative Cost Risk Analysis (QCRA)
- Option C – Risk Register
- Option C – Quantitative Cost Risk Analysis (QCRA)

Appendix G. Draft Concept Framework

- Draft Concept Framework Version 3 – April 2020