

## M4 Junction 17 (Major Road Network Fund) OBC

WC\_M4J17-ATK-GEN-XX-RP-TB-000001

## Outline Business Case

26/08/22

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# Notice

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This document has 199 pages including the cover.

## Document history

Revision	Suitability	Purpose description	Originated	Checked	Reviewed	Authorised	Date
C01	A1	Outline Business Case	<b>GR</b>	<b>NW</b>	<b>SP</b>	<b>AM</b>	26/08/22

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# Executive Summary

## Purpose

Wiltshire Council is seeking £24.6m funding from central government to implement a comprehensive upgrade to M4 Junction 17 as part of a wider strategy to enhance north-south connections via the A350 corridor. Funding is sought from the Major Road Network (MRN) fund administered by the Department for Transport (DfT) and is subject to DfT's business case approval process, comprising three key approval stages. This Outline Business Case (OBC) is prepared in support of the second stage of approval and in line with relevant government guidance.

## The M4 Junction 17 investment proposal

The scheme builds upon the success of the previous improvement works undertaken in 2018, which introduced partial traffic signalisation at the M4 off-slips, primarily to address the risk of traffic queuing back onto the M4 mainline. The current proposal delivers a holistic, long-term solution providing more substantial capacity upgrade throughout the junction through widening / additional lanes on all approach arms and the circulatory, as well as completion of full signalisation.

The scheme includes an improved signage strategy for a parallel north-south route for cyclists, crossing the M4 away from the junction itself.

Wiltshire Council has developed the scheme, including consideration of a range of options, in collaboration with National Highways and with input from other key stakeholders. It forms part of a wider package of proposed transport investments on the northern section of the A350 corridor, prioritised at a regional level due to the importance of the corridor for regional transport connectivity and the performance of the economy. This package, itself, builds upon a co-ordinated investment approach in recent times to improve road, rail and local walking/cycling connections within the corridor and beyond.

## The need for the scheme

M4 junction 17 is a key junction providing access from the M4 towards the South coast. The junction provides the vital link between the motorway network and the A350 connecting the towns in west Wiltshire which form a significant economic cluster. It provides a link to Malmesbury and the A429 in the north, and also allows for local access via the B4122.

The scheme addresses increasing congestion, delays, poor journey reliability and safety, which threaten the strategic function of the MRN (A350) / SRN and further compromise limited north-south connectivity in the region; a priority issue and evidenced constraint to economic growth (and currently the subject of a National Highways M4 to South Coast connectivity study).

The scheme supports national/regional strategic priorities and local objectives through:

- improving connectivity and seamless journeys via the MRN / SRN, including freight access to international gateways on the south coast such as the Port of Poole and Bournemouth / Southampton airports;
- contributing to tackling key challenges around lower productivity and declining economic competitiveness in the Wiltshire area, contributing to rebalancing of the economy;
- facilitating the desired local spatial strategy (as per Wiltshire Council's emerging Local Plan Review to 2036) to deliver much needed local housing and associated jobs, which has a significant focus on the towns within the A350 corridor, including at Chippenham. The scheme will provide additional capacity to ensure that the transport network is able to cater for planned and future housing and jobs growth without significant adverse impacts on existing transport users.
- providing excellent access to existing and prospective employment sites within the area around Junction 17 itself, which has been identified with potential to develop into a significant economic hub for the area given its desirable strategic location.

## Consequences of no intervention

Without intervention, transport modelling evidence indicates that the current junction capacity will not be able to accommodate continued traffic growth (including that associated with planned and future development), resulting in exacerbated congestion, extended and more unreliable journey times. Key consequences include:

- Constraints to economic growth and realisation of full economic potential, particularly in relation to the A350 Growth Zone, associated with higher business costs and reduced attractiveness of the area for inward investment;
- Impacts on the viability of strategic housing sites within the A350 corridor;
- Potentially undesirable economic, social and environmental impacts associated with traffic re-routing away from J17 onto less suitable routes and/or congested routes (including, for instance, the A36/A46 route through Bath to J18).
- The lack of a co-ordinated corridor approach, meaning that the full benefits of other planned corridor improvements may become constrained.

The scheme is planned to deliver a comprehensive, holistic and long-term solution to cater for future growth and the growing significance of the A350 corridor to the region. If investment is not secured through the MRN fund, it is likely that a more piecemeal approach to junction improvement will occur associated with individual developments coming forward. This would result in increased disruption to users associated with multiple works, and also would not instil the necessary business and market confidence to maximise economic growth and housing delivery.

## Scheme benefits

The scheme is expected to generate benefits for a range of transport users and non-transport users, including:

- Road users (e.g. commuters, business trips, freight, bus/coach passengers) travelling via M4 Junction 17 will benefit from reductions in congestion and delay and less variable journey times:
  - Average delay time is predicted to reduce by 53% in the AM (8-9) and 35% in the PM (17-18), by 2036.
  - The junction is predicted to operate within capacity by 2036, with average queue lengths reduced to less than 100 metres on all arms.
  - Average journey time savings of 3 to 5 minutes on the A350 and A429 arms in the AM peak by 2036.
- Users on the wider road network will benefit from smaller delay savings due to the increased capacity and reduced delays at M4 Junction 17;
- Some communities and residents along surrounding rural routes will benefit from reductions in traffic due to the reduced likelihood of vehicles seeking alternative routes avoiding M4 Junction 17;
- Road users at M4 Junction 17, and on the wider network, will benefit from reduced risk of collisions;
- Businesses (existing and prospective) will benefit from reduced costs and access to a wider pool of potential workers; and
- Residents in Wiltshire and beyond will benefit from the contribution of the scheme to enhancing economic activity and making the area more attractive to inward investment, as well as improved access to employment opportunities.

## Value for Money

### Approach

Value for Money has been assessed in line with DfT Transport Appraisal Guidance (TAG), with a proportionate approach focussed on capturing the impacts most relevant to the M4 Junction 17 scheme. The appraisal is underpinned by predictions of the scheme impacts from traffic modelling, considering localised impacts at the junction itself (with a microsimulation model) and wider network impacts (with a strategic model).

### Overall Value for Money and uncertainty

The scheme is assessed as having a **final Value for Money (VfM) category of 'Medium-High'**.

Under the Core ('most likely') scenario, the scheme produces a **Benefit Cost Ratio (BCR) of 2.5**, based upon monetised benefits of £55m and a cost of £22m (including future maintenance) for a 60 year period. This places it in the High VfM category.

Uncertainty analysis indicates that there is a reasonable degree of certainty around a High VfM being achieved, but that there is also a possibility of the scheme VfM moving into a Medium VfM category. There are a number of uncertainties which have been considered which would have similar scales of impact on the VfM, including variations to demand growth, values of time and cost of delivery. None of these in isolation are likely to be sufficient to change the VfM category and a combination of positive or adverse variations would need to occur simultaneously for this to occur.

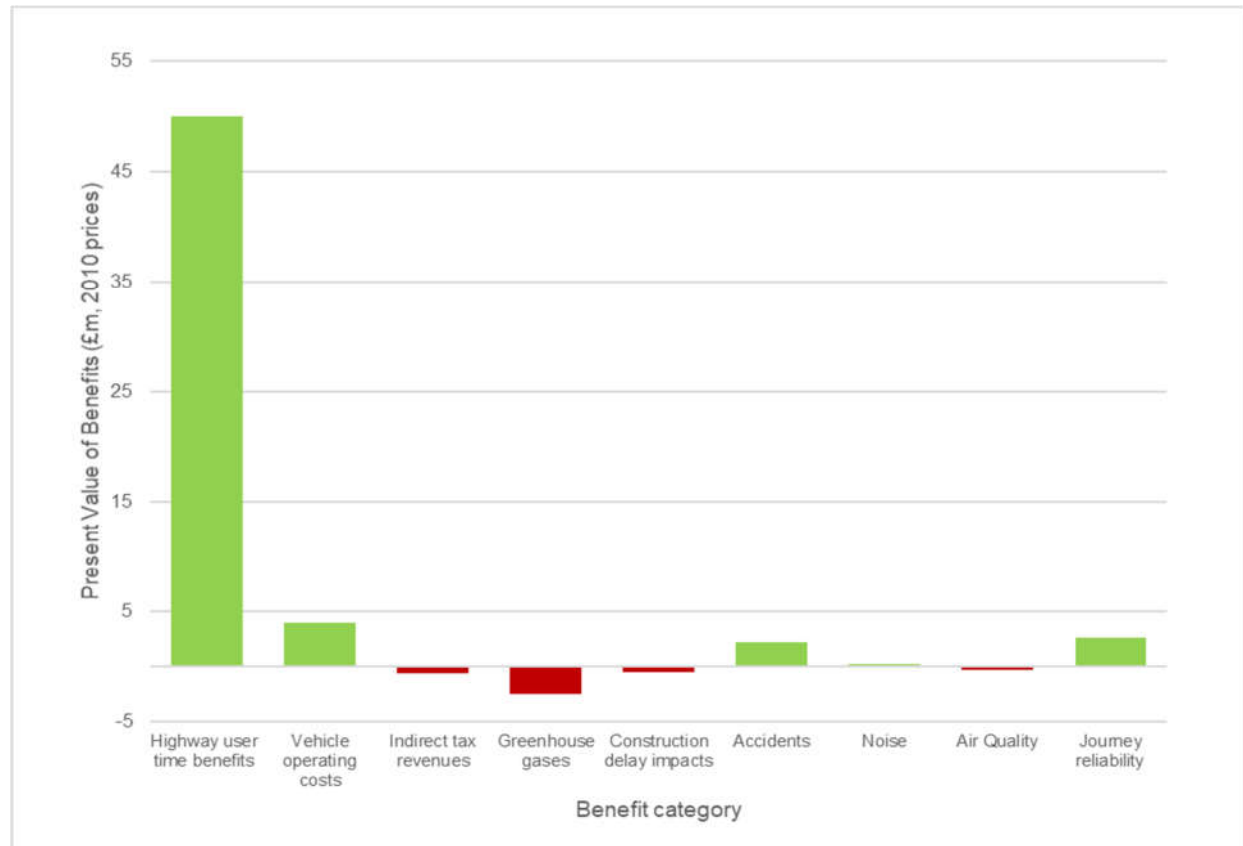
**Value for Money categorisation**

VfM category	Poor	Low	Medium	High	Very high
Likelihood	Very unlikely	Very unlikely	Possible	Very likely	Very unlikely

**Monetised impacts**

Travel time savings for business (including freight), commuting and social/leisure users are the major contributor to the BCR calculation. A modest benefit has been calculated in relation to vehicle operating costs, accidents and journey reliability, and a modest disbenefit has been calculated in relation to Greenhouse Gases (associated with a calculated increase of 33,852 tCO2e over 60 years, with fuel efficiency savings at M4 Junction 17 offset by a slight increase in overall vehicle kilometres). Other monetised impacts are marginal.

**Breakdown of monetised impacts (captured within the Benefit Cost Ratio)**



### Non-monetised impacts

Qualitative assessment of non-monetised economic, environment and social impacts indicates a modest scale of impact overall with a typical range from slight adverse to slight beneficial, with the balance generally towards neutral / slight beneficial. The wider economic impacts associated with the scheme have been assessed as moderate beneficial due to the role of the scheme in facilitating stronger connections between the cluster of businesses within the A350 corridor towns and other economic centres, such as Bristol, Swindon and Reading. Widening the catchment of potential workers, supporting new inward business investment, and facilitating the viability of new housing and employment sites further contributes to this beneficial impact.

#### Assessment of non-monetised impacts

Non-monetised impact	Qualitative assessment score (Large adverse to large beneficial)
<b>Economic</b>	
Wider economic impacts	Moderate beneficial
<b>Environment</b>	
Landscape	Slight adverse
Townscape	N/a
Historic environment	Neutral
Biodiversity	Slight adverse
Water environment	Neutral
<b>Social</b>	
Physical activity	Neutral
Security	Neutral
Severance	Slight beneficial
Journey quality	Slight beneficial
Accessibility	Slight beneficial
Personal affordability	Slight beneficial

### Distributional impacts

The distributional impacts assessment has considered how the predicted scheme impacts might affect different social groups. All distributional impacts have been assessed as having a beneficial impact, with the exception of air quality, which has been assessed as having a slight adverse impact.

### Scheme costs and funding arrangements

The total estimated outturn scheme cost is £28.9 million (including risk). This is based on the current delivery programme which assumes scheme opening in 2026.

Wiltshire Council is seeking £24.6m from the DfT Major Road Network Fund (85% of the total cost), with Wiltshire Council funding the remaining £4.3m from developer contributions and Community Infrastructure Levy (CIL).

### Budget profile and proposed funding sources (£ millions)

	Year	2022/23	2023/24	2024/25	2025/26	Total
<b>Budget</b>		<b>1.16</b>	<b>1.66</b>	<b>9.02</b>	<b>17.06</b>	<b>28.91</b>
<b>Proposed funding sources:</b>						
DfT – Major Road Network Fund		<b>0.99</b>	<b>1.41</b>	<b>7.67</b>	<b>14.50</b>	<b>24.57</b>
	%	85%	85%	85%	85%	85%
Local - Wiltshire Council		<b>0.17</b>	<b>0.25</b>	<b>1.35</b>	<b>2.56</b>	<b>4.34</b>
	%	15%	15%	15%	15%	15%
Total proposed funding		<b>1.16</b>	<b>1.66</b>	<b>9.02</b>	<b>17.06</b>	<b>28.91</b>
	%	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

Annual maintenance and capital renewals are estimated at £20.2m (2021 prices) over 60 years and are therefore expected to average approximately £0.3m per annum. Wiltshire Council and National Highways will be responsible for the maintenance of new infrastructure created by the scheme (relating to the relevant parts of the assets at M4 Junction 17 for which they are responsible). Funding arrangements between Wiltshire Council and National Highways are to be determined.

## Procurement arrangements

Wiltshire Council's preferred approach to sourcing the services required to deliver the project comprises:

- a 'traditional' delivery model whereby the preliminary and detailed design is progressed by Wiltshire Council (supported through its partnering contract with its consultant Atkins), prior to the engagement of a contractor for construction;
- a contractual model that utilises the New Engineering Contract 4 (NEC4) suite of standard contract forms, based on the Engineering and Construction Contract, Option A/B (priced contract with activity schedule or Bill of Quantities); and
- the use of the 'Restricted Procedure' under the Public Contracts Regulation 2015 – involving a pre-qualification stage to shortlist a smaller number of bidders.

The preferred approach has been identified as providing the best fit with the scheme requirements, including the balance between cost certainty, quality and time.

## Project management and delivery

### Overview

Proposed delivery arrangements have been assessed in relation to their ability to ensure timely and successful delivery of the scheme and its associated benefits.

The M4 Junction 17 scheme is a conventional highways infrastructure project comprising junction capacity improvement through carriageway widening and traffic signals installation. Wiltshire Council is designing and implementing the scheme, utilising delegated powers subject to a Section 6 Agreement with National Highways (under the Highways Act 1980).

The management approach is proportionate to the nature and scale of the scheme, the current stage of scheme development, and its delivery complexity and risk. Wiltshire Council has appropriate governance structures in place, a robust delivery programme and active risk management. Other key points include that:

- Wiltshire Council is able to demonstrate good experience of similar project delivery, including the previous improvement scheme at M4 Junction 17 delivered in 2018;
- The project is considered to be of relatively low complexity:

- The scheme is considered to be a permitted development, within the extents of the existing highway boundary, and hence no planning application or third party land acquisition would be required.
- There are few residential properties within the vicinity of the scheme.
- The scheme preferred option does not involve works to the overbridge structures.
- National Highways has been engaged throughout scheme development and suitable processes are in place for this to continue through to scheme implementation;
- Key review / approval stages are defined and reflected within the delivery programme; and
- A Carbon Management Plan is in place which assesses the carbon impacts of the project over the whole lifecycle (construction and operation) and seeks to encourage the adoption of measures during scheme development and delivery to reduce the overall carbon impact.

### Delivery programme

Scheme opening is currently scheduled for March 2026. Following approval of the OBC, the programme provides for a period of approximately 16 months to reach completion of detailed design. This includes completion of the necessary Traffic Regulation Order (TRO) processes, including statutory consultation. This milestone will also be associated with the Section 6 Agreement with National Highways, allowing the tender process to progress. Submission of the Full Business Case (FBC) is scheduled for October 2024, following the tender process and determination of the final contractor price. The contract award would follow FBC approval and the next step of the Section 6 Agreement, with construction planned to commence in April 2025 with a duration of approximately 11 months.

### Scheme implementation – key milestones

Milestone	Completion date
Outline Business Case submission	August 2022
OBC approval	October 2022
Preliminary design	August 2023
Traffic Regulation Orders process	December 2023
Detailed design	February 2024
Tender process complete (identification of preferred contractor)	September 2024
FBC submission	October 2024
FBC approval	December 2024
Award of contract	February 2025
Start construction	April 2025
Finish construction	March 2026
Scheme opening	March 2026

### Key dependencies and risks

Key dependencies and risks are reflected within the project delivery schedule and risk budget and are proactively monitored and managed. Those most relevant to the successful delivery of the scheme include:

- Design / technical approvals – including approval of Departures from Standard (a number of which have already been approved in principle by Wiltshire Council / National Highways) and confirmation of the structural capacity of the overbridges. These are planned to be addressed through the next stage of scheme design.
- Political approval – including Wiltshire Council Cabinet sign off at key milestones such as the Section 6 Agreement with National Highways and contract award.
- Confirmation of Permitted Development status – the working assumption is that Permitted Development rights apply as the scheme is within the existing highway boundary and not expected to have significant

adverse impacts on the environment. This is subject to further legal advice and determination from the local planning authority.

- Formal consents and orders – including Traffic Regulation Orders, subject to statutory consultation.
- Availability of suitable contractors – the current market is extremely competitive and there a large number of infrastructure projects within the region. This will be actively monitored during the next stages of scheme development and supported by market engagement.
- Cost increases – this includes the impacts of the current unprecedented rise in inflation. Cost estimates are based upon latest available projections at the time of preparation.

Implementation of the M4 Junction 17 scheme is not directly dependent upon any other projects or programmes. It complements other planned investments on the A350 corridor, but can be delivered independently of these.

# Introduction and business case alignment



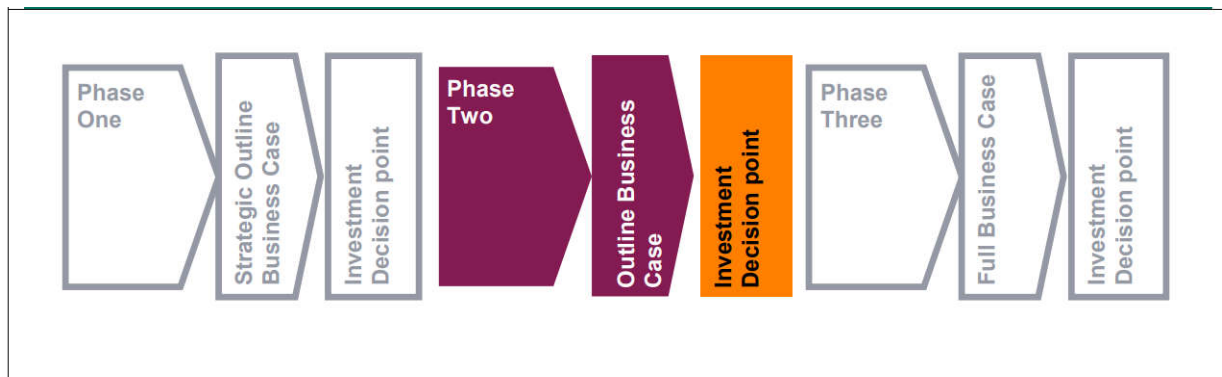


# 1. Introduction

## 1.1. Overall purpose

Wiltshire Council is promoting improvements to M4 Junction 17 as part of an application to the Major Road Network (MRN) fund administered by the Department for Transport (DfT). DfT funding support is subject to its business case approval process (**Figure 1-1**). Following approval of the Strategic Outline Business Case stage, this document forms the Outline Business Case (OBC) - the second stage in the three-stage approval process.

**Figure 1-1 - DfT transport business case approval phases**



## 1.2. Background

### 1.2.1. Evolution of the Major Road Network

In December 2017, the Government launched a consultation setting out proposals for the creation of a Major Road Network (MRN), forming a middle tier of the country's busiest and most economically important local authority 'A' roads, sitting between the national Strategic Road Network (SRN) and the rest of the local road network<sup>1</sup>. The Government established objectives for the MRN to:

- Reduce congestion;
- Support economic growth and rebalancing;
- Support housing delivery;
- Support all road users; and
- Support the Strategic Road Network.

Sub-national Transport Bodies (STBs) were tasked with developing a Regional Evidence Base to inform investment proposals and decision making in line with these objectives.

### 1.2.2. Identification of the A350 as a priority corridor

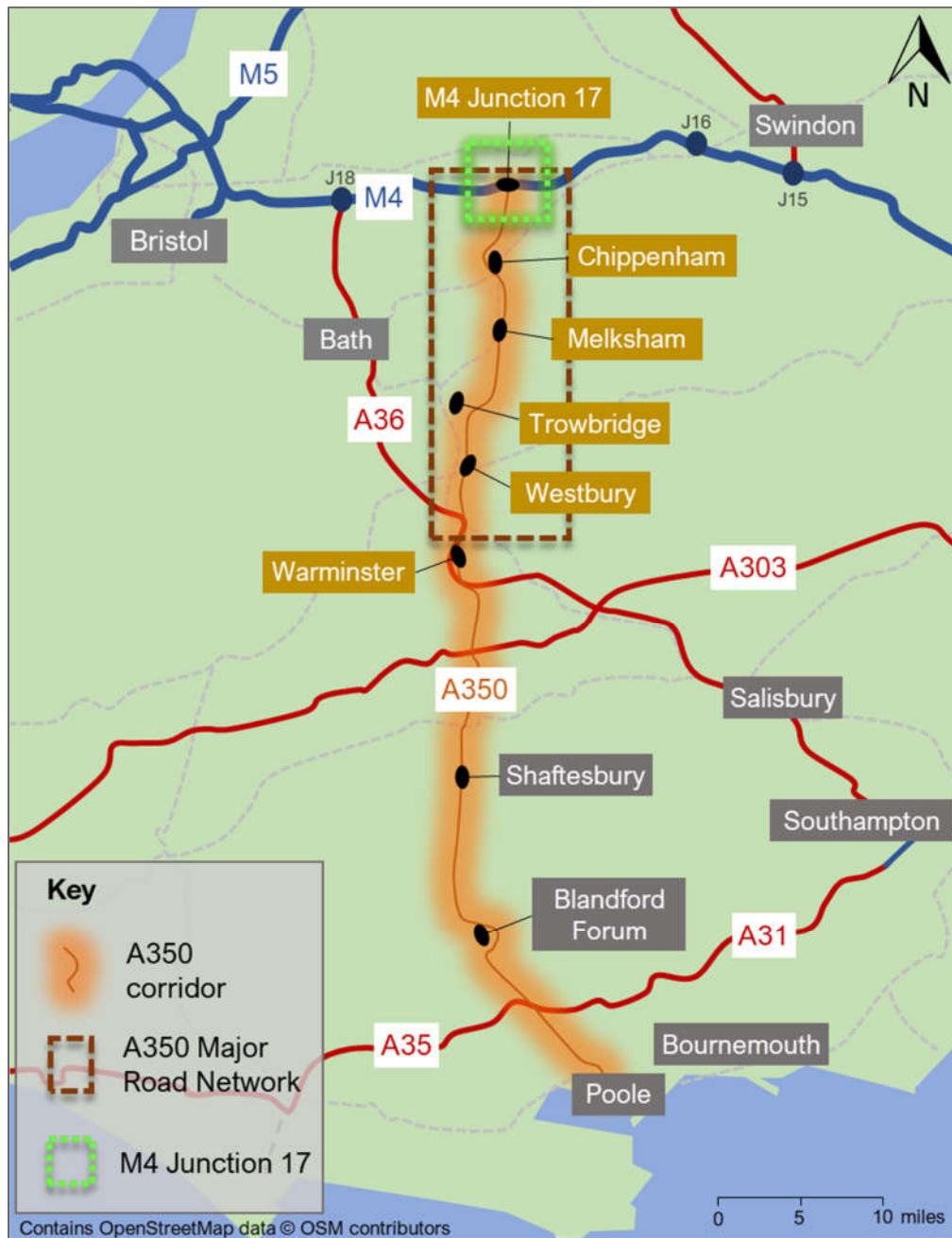
Through the development of its Regional Evidence Base, the Western Gateway STB identified several priority corridors across the region. This included the A350 corridor, running through Wiltshire and Dorset from the M4 Junction 17 to the South Coast (**Figure 1-2**), with improved north-south connectivity representing a priority theme for the STB.

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<sup>1</sup> <https://www.gov.uk/government/publications/major-road-network-and-large-local-majors-programmes-investment-planning/major-road-network-and-large-local-majors-programmes-investment-planning-guidance#mrn-objectives>

Nine priority schemes were identified by the STB, including three complementary schemes on the A350 corridor; M4 Junction 17 plus A350 improvement schemes at Chippenham and Melksham.

Figure 1-2 - The A350 corridor



### 1.2.3. The Strategic Outline Business Case

A Strategic Outline Business Case (SOBC) for the M4 Junction 17 proposal was submitted alongside the Regional Evidence Base in July 2019. This established the initial case for investment and investigated potential options.

Following DfT review of the SOBC, in March 2020 the Government awarded Wiltshire Council funding to further develop the project and progress the business case to Outline Business Case (OBC) stage.

### 1.3. Development of the Outline Business Case

The OBC builds upon the SOBC submission. It re-tests key findings from the SOBC but concentrates on detailed assessment of the options to identify the preferred solution. It presents full economic and financial appraisals in support of the preferred option and confirms the overall value for money of the proposal.

In line with government guidance and best practice<sup>2</sup> the OBC follows the five case model in order to demonstrate how the scheme:

- Is supported by a robust case for change that fits with wider public policy objectives – the **‘strategic dimension’**;
- Demonstrates value for money – the **‘economic dimension’**;
- Is commercially viable – the **‘commercial dimension’**;
- Is financially affordable – the **‘financial dimension’**; and
- Is achievable – the **‘management dimension’**.

Key activity areas supporting the development of the OBC include:

- Incorporating feedback / comments on the SOBC submission (including from DfT);
- Reviewing / refreshing the strategic context in relation to the scheme, including:
  - Reflecting on / responding to more recent policy developments;
  - Taking into account any changes in the local context, including housing and employment developments undertaken since 2019;
  - Reviewing scheme objectives to ensure they remain relevant;
- Further development of the technical evidence base, including an updated modelling/appraisal approach;
- Ongoing engagement with key stakeholders, including National Highways in particular;
- Undertaking a review of options assessment (including a refresh of the Options Assessment Report);
- Further scheme design and costing; and
- Development of programme and risk management.

Subject to OBC approval, Wiltshire Council would continue the design development of the preferred option and begin the construction procurement process. Final tender prices would be included in a Full Business Case (FBC) submission for final DfT approval.

### 1.4. The M4 Junction 17 Preferred Option

This OBC establishes a preferred option being promoted by Wiltshire Council which is based upon a highways junction capacity improvement scheme at M4 Junction 17, comprising:

- Completion of the full signalisation of all approach arms to the junction;
- Carriageway widening and additional traffic capacity on all approaches to the junction (M4 off slips, A350, A429 and B4122);
- Increase in the number of traffic lanes across the motorway bridges from two to three; and
- Widening of the circulatory carriageway and introduction of additional traffic lanes and capacity around the junction.

The main scheme proposal is illustrated in **Figure 1-3**.

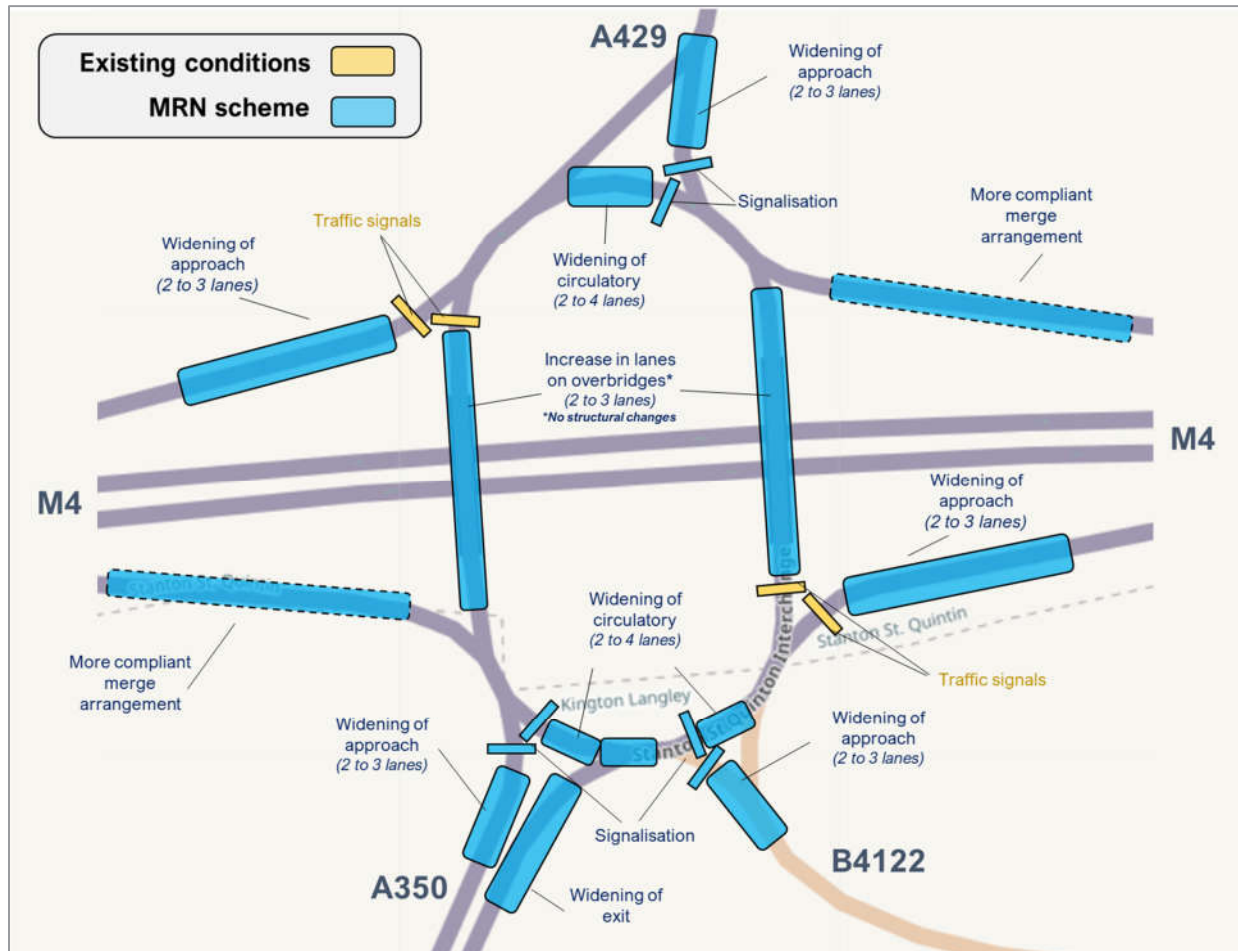
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<sup>2</sup> <https://www.gov.uk/government/publications/transport-business-case/transport-business-case-guidance>

The scheme also provides for an improved signage strategy for a cycle route providing north-south connections across the M4, away from the junction itself.

The OBC provides the supporting evidence and logic behind the overall need for the scheme, the identification of this preferred solution, a full appraisal of the expected impacts and an assessment of delivery, procurement and financial (affordability) arrangements.

**Figure 1-3 – M4 Junction 17 preferred option (illustrative)**



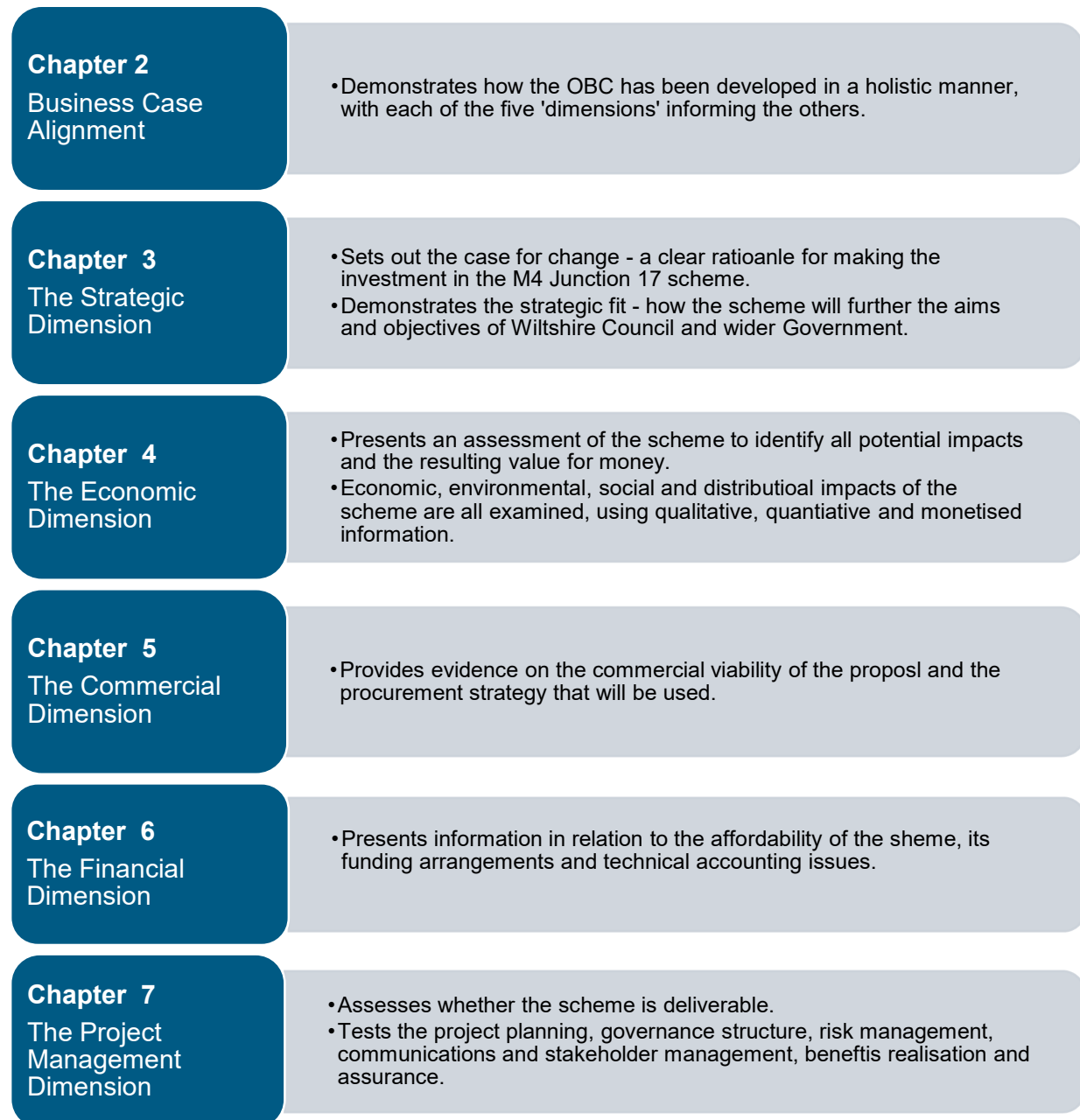
## 1.5. Document structure

This OBC presents key information in relation to the M4 Junction 17 proposal in a transparent manner in order to support evidence-based decision making. Following an update to DfT transport business case guidance in February 2022<sup>3</sup>, DfT issued a template business case structure (with supporting guidance notes) to scheme promoters. This OBC document has been prepared in line with the DfT template.

The document structure is set out in **Figure 1-4**.

<sup>3</sup> The updated DfT transport business case guidance included the outcomes of a review of the previous guidance against the 2020 HM Treasury Green Book, the Government's central guidance on the appraisal of policies, programmes and projects.

Figure 1-4 – M4 Junction 17 OBC document structure



## 2. Business case alignment

### 2.1. Overview of business case development and alignment

This OBC for the M4 Junction 17 scheme builds upon its predecessor (SOBC) from 2019. Consistency within the core project team (across Wiltshire Council and Atkins) has ensured that the OBC represents a practical and co-ordinated progression of the project, keeping the business case up to date, accurate and relevant.

A holistic approach has been taken to developing the OBC. The five dimensions are connected and inter-related. A number of working practices have been put in place to ensure a strong alignment across all parts of the business case; these include:

- Appropriate governance and a 'whole team' collaborative approach:
  - ensuring the project is governed at a business case level;
  - utilising skilled business case practitioners;
  - bringing together the relevant experts and ensuring a full appreciation of inter-relationships between different disciplines;
- Ensuring that any changes in assumptions are reflected across each of the five dimensions, such that consistency is maintained throughout;
- Adopting a common evidence base and assumptions, managed centrally, in order to maintain consistency across technical and analytical work across the different business case dimensions; and
- Ensuring feedback from key stakeholder engagement (particularly with National Highways) is fed back in a co-ordinated manner, with a review of implications across each of the five business case dimensions.

### 2.2. Principal areas of business case alignment

**Table 2-1**, presented in a matrix format, demonstrates how each of the business case dimensions informs the others. It highlights key areas of alignment and interaction across the OBC five dimensions. Throughout the OBC, specific references are also made where there are important linkages to other parts of the OBC.

**Table 2-1 – Summary of business case alignment**

	Strategic	Economic	Financial	Management	Commercial
Strategic		Scheme benefits aligned to economic appraisal impacts. Most rigour applied to the primary benefit streams. Shortlisted options demonstrate strategic fit.	Scope/ outputs as defined for preferred option inform scheme cost. Ensure all strategically aligned funding mechanisms explored	Stakeholder engagement activity in line with Stakeholder Management Plan . Defined outcomes & benefits inform Monitoring & Evaluation Plan.	Scope/ outputs as defined for preferred option informs preferred procurement strategy and output based specification.
Economic	Economic appraisal / value for money informs selection of preferred option. Quantified evidence from economic appraisal used to demonstrate scheme impacts.		Value for money considerations prompt review of scheme costs (e.g. value engineering)	Quantified economic appraisal analysis informs Benefits Realisation, Monitoring & Evaluation Plan.	N/a
Financial	Funding sources aligned to strategic context. Ensure fit with funding objectives is demonstrated.	Scheme capital and revenue costs inform the economic appraisal PVC. Financial risk cost sense-checked against optimism bias assumption for appraisal.		Risk Management Strategy identifies mitigation for key cost risks. Spend and funding profiles aligned with overall delivery programme.	Scheme cost and funding strategy informs consideration of preferred procurement strategy.
Management	Delivery programme developed in context of key inter-dependencies	Delivery timescales inform economic appraisal (profiling of costs and benefits).	Risk management process and Risk Register informs the calculation of risk cost. Delivery timescales inform scheme cost (e.g. inflation and spend profile).		Overall project delivery programme and governance arrangements taken into account in defining procurement strategy.
Commercial	Output based specification aligned with preferred option scheme scope.	N/a	Scheme cost estimate updated as procurement process advances (tender price to be adopted at FBC stage).	Procurement strategy and timescales inform overall scheme delivery programme.	

# Strategic Dimension





## 3. Strategic Dimension

The Strategic Dimension is presented in three parts:

- The **‘Strategic Context’** – demonstrates how the M4 Junction 17 proposal aligns with the strategic priorities and objectives of the principal organisations and regional / local strategies and plans.
- The **‘Case for Change’** – determines the overall need for intervention at M4 Junction 17, setting out the existing arrangements, business needs and service gaps, and the impact of not changing (assuming no intervention).
- The **‘Investment Proposal’** – provides details around the proposed M4 Junction 17 scheme and how it has developed, including: objectives and measures of success; the scheme scope; consideration of options (and selection of the preferred option); and the role of stakeholder input.

At the beginning of each of the three sections any notable updates from the SOBC are identified.

### 3.1. Strategic Context

#### 3.1.1. Key updates since SOBC

Following a review of the Strategic Context at this OBC stage, the proposal continues to demonstrate a strong alignment with strategic priorities and local / regional objectives, as set out within this chapter. Relevant updates which have been reflected include:

- The relationship with the government’s levelling up agenda;
- The evolving response to the net zero challenge;
- Generally capturing the latest version of relevant plans and strategies (where these have been updated since SOBC) – although in a number of cases key objectives and priorities remain fundamentally similar; and
- The latest status of the ongoing Wiltshire Local Plan Review (and the associated Emerging Spatial Strategy).

#### 3.1.2. Organisation overview and area of interest

##### 3.1.2.1. Responsible organisations

The principal organisations responsible for the M4 Junction 17 proposal are:

- The Department for Transport (DfT)
- Wiltshire Council; and
- National Highways.

An overview of these organisations is provided below. Further details on their strategic priorities and the alignment of the proposal with these is provided in Section 3.1.5.

#### Department for Transport

[Department for Transport](#) (DfT) is a ministerial department of the UK government under the overall responsibility of the appointed Secretary of State for Transport. Its stated purpose is to “*work with our agencies and partners to support the transport network that helps the UK’s businesses and gets people and goods travelling around the country. We plan and invest in transport infrastructure to keep the UK on the move.*”

Amongst its responsibilities, DfT provides policy, guidance, and funding to English local authorities to help them run and maintain their road networks, improve passenger and freight travel, and develop new major transport schemes.

DfT is acting as the project sponsor for the M4 Junction 17 scheme and is responsible for the Major Road Network programme within which it sits.

### **Wiltshire Council**

Wiltshire Council is a council for the unitary authority of Wiltshire in South West England. It provides local government services to approximately 435,000 Wiltshire residents. The Council establishes policy and strategy for the area, including in relation to transport, health and well-being, the economy and land use, in line with its overall Business Plan. Amongst its responsibilities, the Council is the local highway authority with responsibility for all aspects of the local highway network, including maintenance, safety and new infrastructure. This excludes the Motorway (M4) and the Trunk Roads (A303, A36 and A419).

Wiltshire Council is acting as the scheme promoter for the M4 Junction 17 scheme.

### **National Highways**

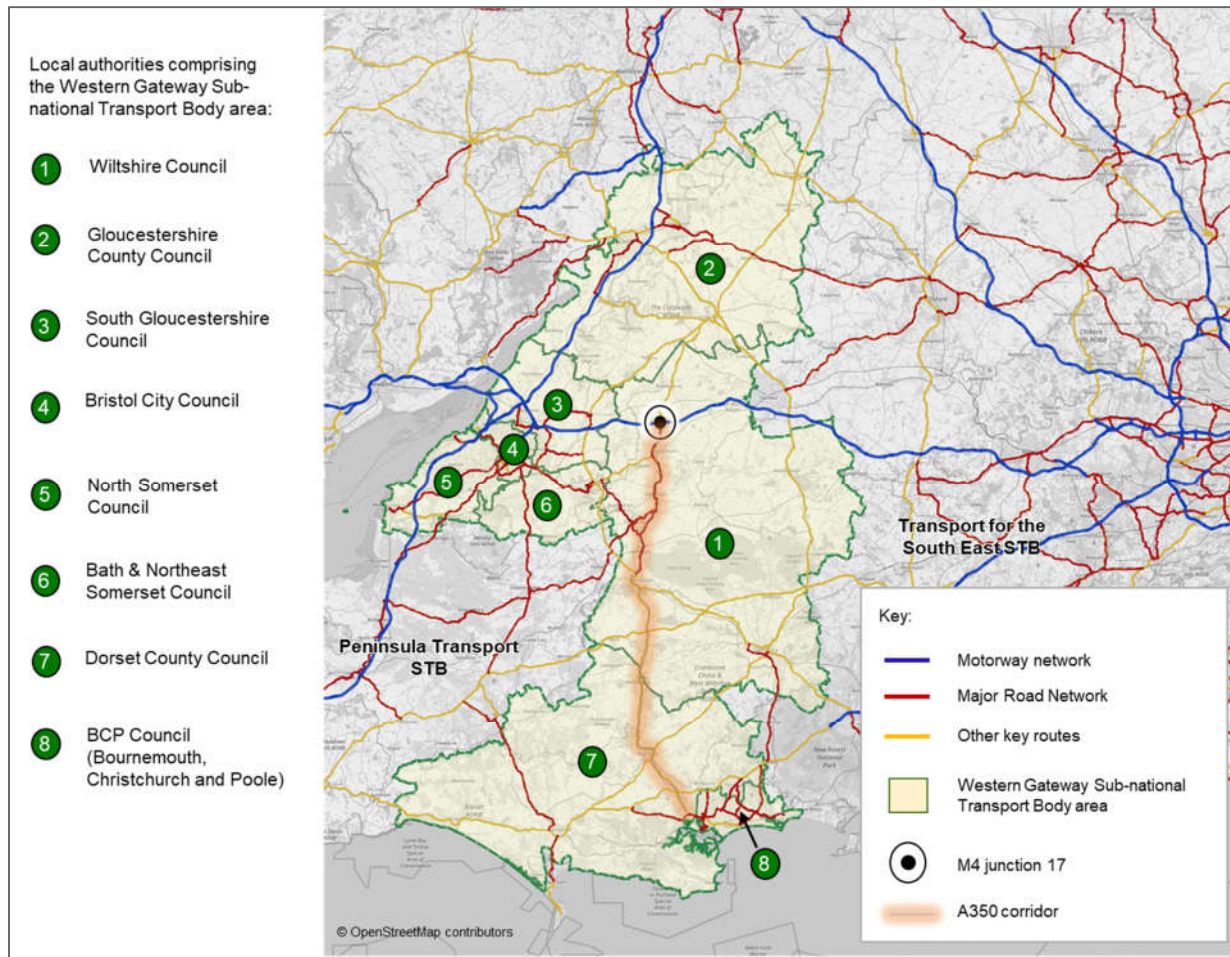
National Highways is the government-owned company charged with operating, maintaining and improving the Strategic Road Network (SRN) in England. It plans investment in the SRN for safer, smoother and more reliable journeys for its customers. Due to the interface between the SRN (M4) and MRN (A350) at M4 Junction 17, it is necessary to ensure that proposals align with its strategic priorities (within its Strategic Business Plan) and investment plans (i.e. through the Roads Investment Strategy).

In addition to those principal organisations listed above, the **Western Gateway Sub-national Transport Body** had a significant role in the identification and prioritisation of the proposal to serve the strategic connectivity needs of the sub-region (underpinned by its Regional Evidence Base). The STB does not have any formal role in the development and delivery of the scheme.

#### **3.1.2.2. Area of interest**

The scheme itself is located at Junction 17 of the M4, north of Chippenham in west Wiltshire and between Swindon and Bath. Given the nature of the proposal and its role in supporting strategic transport connectivity, it is appropriate to consider the strategic context for the scheme in relation to a broader regional area, such as the Western Gateway area (**Figure 3-1**), and at a A350 corridor level (see also Figure 1-2).

Figure 3-1 – M4 Junction 17 and the A350 in the context of the Western Gateway STB area



The **Western Gateway is important regionally and nationally** as it is both a single area containing some of the UK's fastest-growing local economies as well as being a **crucial facilitator of improved connectivity to other parts of the country**, including the South West, the Solent area, South Wales and the West Midlands. Wiltshire occupies a particularly strategic location centrally within the STB area, acting as an **important gateway to other parts of the region**. The A350 is one of the key transport corridors which link strategically important locations across the Western Gateway area, including the main urban centres, ports and airports.

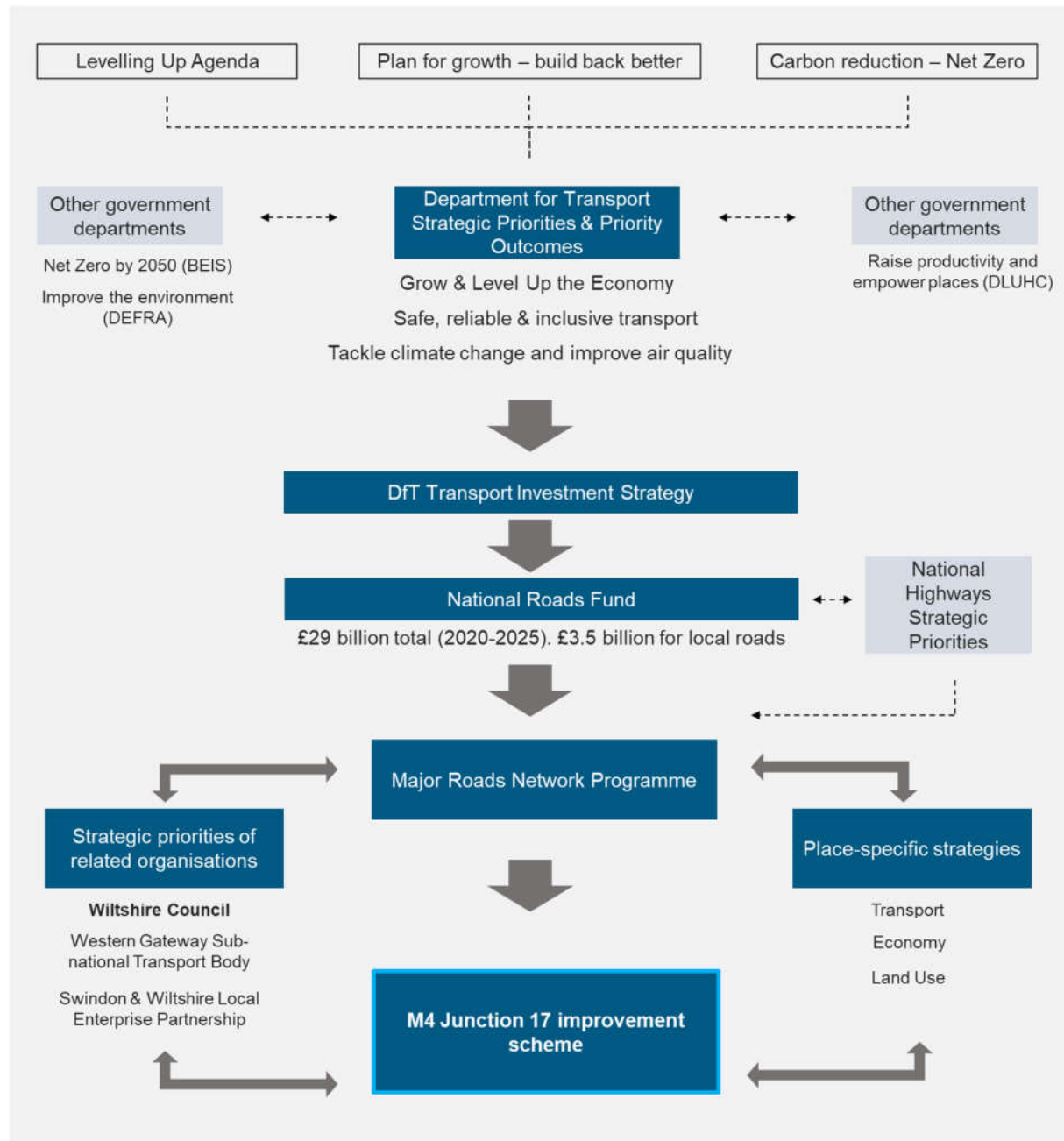
### 3.1.3. Thread of strategic alignment

The M4 Junction 17 proposal has evolved in a holistic and coherent manner within the context of compatible policies, strategies, strategic portfolios and programmes at a national, regional and local level. As such, it complements existing infrastructure and economic structures as well as planned policies and investments.

**Figure 3-2** illustrates this key thread of strategic alignment, identifying how the project sits within and contributes to: national government priorities; DfT (and other department) priority outcomes and its strategic portfolio and programme priorities for road investment; priorities of Wiltshire Council and other organisations; and place-based strategies and objectives for Wiltshire, the A350 corridor and the wider region.

Sections 3.1.5 and 3.1.6 further demonstrate the alignment of the proposal with these priorities. Section 3.1.8 provides additional detail in relation to the interdependencies between the proposal and other programmes and projects.

Figure 3-2 – Thread of strategic alignment relating to the M4 Junction 17 proposal

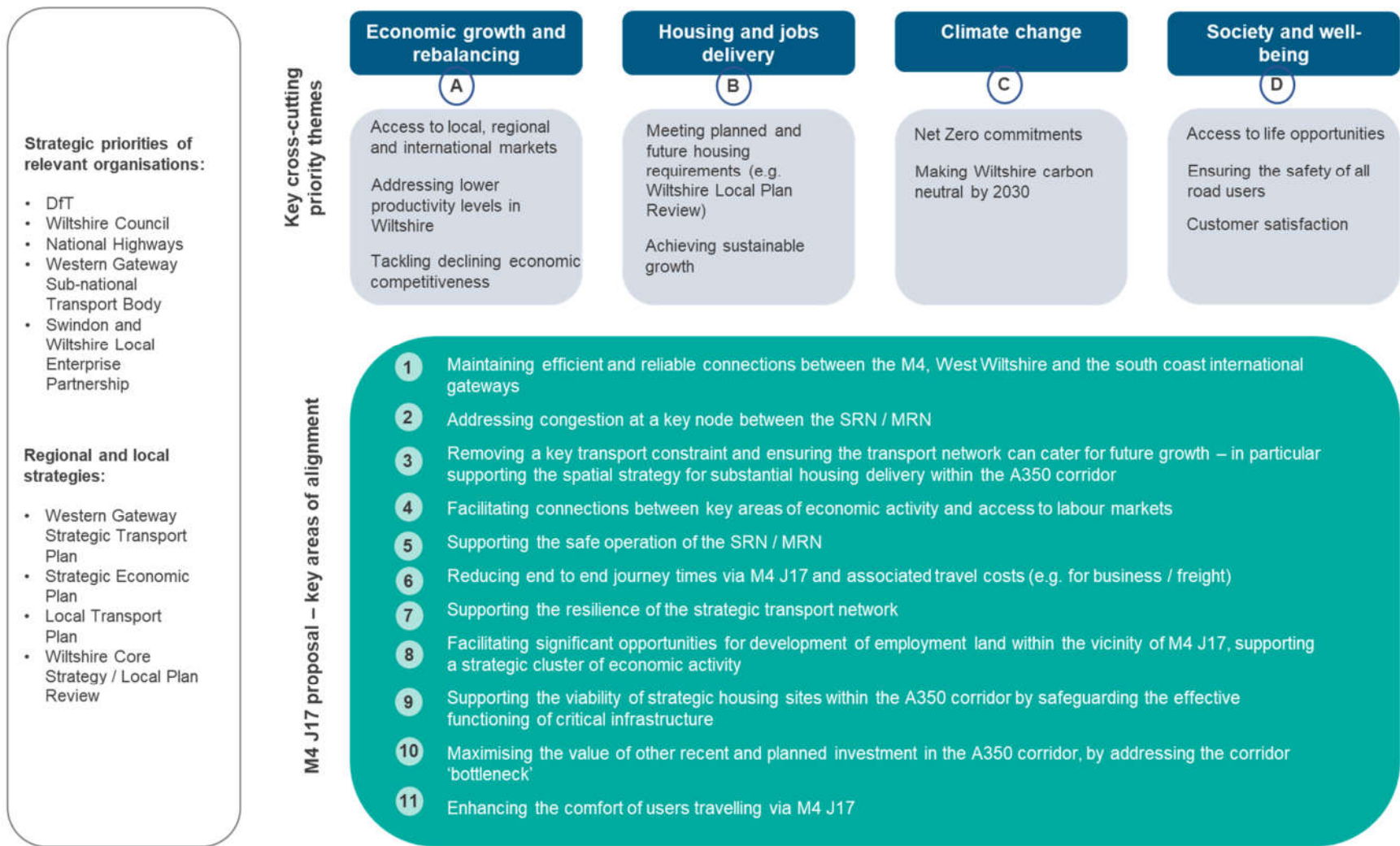


### 3.1.4. Strategic context: cross-cutting priority themes

A small number of cross-cutting priority themes have been identified which are relevant to the strategic context for the M4 Junction 17 proposal (**Figure 3-3**). These are referred to in the following sections which consider the business strategy (Section 3.1.5), place based strategies (Section 3.1.6) and wider strategies (Section 3.1.7).



Figure 3-3 – Strategic context: cross-cutting priority themes and key areas of alignment relating to the M4 Junction 17 proposal



### 3.1.5. Business strategy

The business strategy identifies the strategic priorities and goals of the principal organisations involved in the M4 Junction 17 proposal (see Section 3.1.2). It demonstrates how the proposal aligns with these priorities.

#### 3.1.5.1. Department for Transport and wider government strategic priorities

The strategic priorities of the Department for Transport (DfT) align with broader government priorities, particularly in relation to:

- its [levelling up agenda](#) – spreading opportunity more equally across the UK;
- reducing UK carbon emissions ([Net Zero Strategy](#)) – setting decarbonisation pathways to net zero<sup>4</sup> by 2050; and
- its [plan for growth \(Build Back Better\)](#) - supporting growth through significant investment in infrastructure, skills and innovation (in support of levelling up and net zero).

**Table 3-1 - Intervention alignment with strategic priorities of the Department for Transport**

Policy/strategy / key priorities	Strength of M4 J17 alignment <sup>5</sup>	Nature of alignment (cross-cutting themes)
<b>DfT Outcome Delivery Plan 2021-2022</b>		
DfT1: Improve connectivity across the UK and grow the economy by enhancing the transport network, on time and on budget.	+++	A – 1, 2, 4, 6
DfT2: Build confidence in the transport network as the country recovers from COVID-19 and improve transport users' experience, ensuring that the network is safe, reliable, and inclusive.	++	A / D – 1, 2, 5, 7, 11
DfT3: Tackle climate change and improve air quality by decarbonising transport.	+	C - 2

The government views **transport connectivity** as a key factor in levelling up and an essential element in the creation of high-performing markets, and increased agglomeration and linkages between key sectors of the economy. DfT's strategic approach is therefore around enhancing the national strategic transport network, shifting the focus of investment towards major projects that link towns, cities and left behind places outside of London and the South East. The M4 Junction 17 proposal demonstrates a strong fit with this approach, representing a strategic interface between the MRN (A350) and the SRN (M4 corridor) in the South West.

Through its [Transport Decarbonisation Plan](#) (TDP) the DfT has set out its priorities for significantly reducing emissions from transport in order to achieve net zero. The TDP reflects an increasing priority for decarbonisation of the transport network, including a greater focus on public transport and active modes (as set out in other strategies such as Gear Change and Bus Back Better). However, the TDP also states that:

*“Continued high investment in our roads is therefore, and will remain, as necessary as ever to ensure the functioning of the nation and to reduce the congestion which is a major source of carbon.”*

DfT policy therefore continues to support investment in the local road network and the M4 Junction 17 proposal is consistent with the approach to tackling key sources of congestion. It is important that possible effects of schemes on carbon, both positive and negative, are fully considered and transparent<sup>6</sup>.

<sup>4</sup> In June 2019, parliament passed legislation requiring the government to reduce the UK's net emissions of greenhouse gases by 100% relative to 1990 levels by 2050. Doing so would make the UK a 'net zero' emitter.

<sup>5</sup> Strength of alignment: +++ = greater alignment, ++ = good alignment, + = lower alignment

<sup>6</sup> This Outline Business Case is supported by a Carbon Management Plan which assesses the whole life carbon impacts of the proposal and identifies carbon reduction measures.

The concept of the [Major Road Network](#) was introduced by DfT in support of its **Transport Investment Strategy** (DfT, 2017). The M4 Junction 17 proposal is particularly well-aligned with the related objectives of these (**Table 3-2**).

**Table 3-2 - Intervention alignment with the DfT Transport Investment Strategy and Major Road Network objectives**

Policy/strategy / key priorities	Strength of M4 J17 alignment	Nature of alignment (cross-cutting themes)
<b>DfT Transport Investment Strategy</b>		
TIS1: Creating a more reliable, less congested, and better-connected transport network that works for the users who rely on it.	+++	A – 1, 2, 6, 7, 10
TIS2: Building a stronger, more balanced economy by enhancing productivity and responding to local growth priorities.	+++	A – 1, 2, 3, 4, 6, 7, 8
TIS3: Enhancing our global competitiveness by making Britain a more attractive place to trade and invest.	+++	A / B – 1, 2, 3, 4, 6, 7, 8
TIS4: Supporting the creation of new housing.	+++	B – 3, 9, 10
<b>DfT Major Road Network programme objectives</b>		
MRN1: Reducing congestion	+++	A / C – 2, 6, 11
MRN2: Supporting economic growth and rebalancing	+++	A / B - 1, 2, 3, 4, 6, 7, 8
MRN3: Supporting housing delivery	+++	B – 3, 9, 10
MRN4: Supporting all road users	++	D / A – 2, 5, 6, 11
MRN5: Supporting the Strategic Road Network	+++	A / B – 2, 5, 6, 7, 10

The MRN includes the busiest and most economically important local authority ‘A’ roads and forms a middle tier of roads sitting between the national Strategic Road Network (SRN) and the rest of the local road network. The A350 within Wiltshire has been classified as part of the MRN network owing to its critical role for Wiltshire’s economic well-being and as a major focus of recent and future housing and employment growth plans (see also Section 3.1.6.3). The proposed intervention at M4 Junction 17, at the northern end of the A350 corridor, reflects a strategic interface between the MRN and the SRN (M4 corridor).

### 3.1.5.2. Wiltshire Council strategic priorities

Wiltshire Council’s [Business Plan 2022-2032](#) sets an overall mission statement to create strong communities in Wiltshire. The key priorities in support of this are summarised in **Table 3-3**. The M4 Junction 17 proposal particularly aligns with the ambition for a thriving economy (Priority ‘WC3’), with high quality strategic transport connectivity (as well as digital infrastructure) having a key role in attracting and retaining high value businesses and investment and enabling people to access goods and services.

**Table 3-3 - Intervention alignment with strategic priorities of Wiltshire Council**

Policy/strategy / key priorities	Strength of M4 J17 alignment	Nature of alignment (cross-cutting themes)
<b>Wiltshire Council Business Plan 2022-2032</b>		
WC1: The people of Wiltshire are empowered to live full, healthy and enriched lives.	+	D – 4, 5, 6
WC2: Our communities continue to be beautiful and exciting places to live.	++	B / D – 4, 5, 9, 11
WC3: Our local economy thrives and is supported by a skilled workforce.	+++	A / B - 1, 2, 3, 4, 6, 7, 8
WC4: We lead the way in how councils and counties mitigate the climate challenges ahead.	+	C - 2

Maintaining strong north-south connectivity, by road (A350 corridor) and rail, has been a longstanding priority for Wiltshire Council and this is reflected in local strategies and recent and planned investment (see Section 3.1.6). The Business Plan specifically refers to seeking investment in major road programmes to address congestion and air quality at targeted locations, including at M4 Junction 17.

The Business Plan also highlights the need for improving housing supply and delivering the right housing, in support of building a resilient society (Priority 'WC2'). It emphasises the role of an updated Local Plan as an effective policy framework for the sustainable growth of Wiltshire, with strategic infrastructure being a critical enabling factor (see Section 3.1.6.3).

In line with national targets to achieve net zero by 2050, Wiltshire Council has also resolved to acknowledge a climate emergency (February 2019) and to seek to make the county carbon neutral by 2030<sup>7</sup>.

### 3.1.5.3. National Highways strategic priorities

Strategic priorities for National Highways are set out in its [Strategic Business Plan \(Table 3-4\)](#), which aligns with the second round of the [Road Investment Strategy \(RIS2\)](#). National Highways has been integral to the development of the M4 Junction 17 proposal to ensure that the proposal aligns with its primary objectives. In particular, the intervention supports the continued safe and reliable operation of the M4 mainline and enables a seamless transition between the SRN and MRN.

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<sup>7</sup> A Global Warming and Climate Emergency Scrutiny Task Group was set up to gather evidence and come up with recommendations on achieving net zero. A commitment was also made to make the council carbon neutral by 2030. A new climate strategy is being prepared to enable the Council to meet these commitments. The Local Transport Plan is currently under review and will seek to align with the targets relating to carbon neutrality whilst also addressing economic prosperity and growth and quality of life.



**Table 3-4 - Intervention alignment with strategic priorities of National Highways**

Policy/strategy / key priorities	Strength of M4 J17 alignment	Nature of alignment (cross-cutting themes)
<b>National Highways Strategic Business Plan 2020-2025 ('Connecting the Country')</b>		
NH1: Improving safety for all	++	D – 5, 11
NH2: Providing fast and reliable journeys	+++	A / B – 1, 2, 3, 6, 10
NH3: A well-maintained and resilient network	+++	A / B – 1, 2, 3, 7, 10
NH4: Delivering better environmental outcomes	+	C - 2
NH5: Meeting the needs of all users	++	A / B / D – 1, 3, 4, 5, 6, 11
NH6: Delivering even more value for our customers	++	A - 10

There are no other SRN proposals in RIS2 (or the current RIS3 pipeline) which have a direct relationship to M4 Junction 17. A holistic solution at M4 Junction 17 provides a better alignment with National Highway's customer focussed approach, as potential smaller piece-meal measures (e.g. through separate development mitigations) could result in greater disruption to users.

As part of RIS2, National Highways is undertaking a strategic study in relation to [M4 to Dorset Coast Connectivity](#). The study is seeking to determine whether there is an alternative strategic corridor to the current SRN (A36/A46), with the A350 corridor being one of those in scope. The study responds to regional concerns relating to poor north-south connectivity – Section 3.1.6 builds upon this context.

### 3.1.6. Place-based strategies

#### 3.1.6.1. Overview

The M4 Junction 17 proposal has an important role in delivering transport and wider objectives for the area (as defined within policies and strategy at a regional and local level). These objectives are consistent with the strategic priorities at an organisational level (Section 3.1.5). Of particular relevance are those regarding: regional connectivity; economic growth and productivity; and local housing and jobs delivery.

A major priority for the area is for the transport network to provide reliable strategic connections between its key economic centres and wider markets to prevent transport from becoming a constraint to growth. North-south connectivity is a primary focus. The investment strategy for the A350 corridor reflects the need to ensure that the A350 route can serve its strategic role efficiently whilst further enhancing overall travel choices, particularly for short to medium distance journeys within the corridor.

Key features of regional and local strategy relevant to the proposal are illustrated within **Figure 3-4**.

The proposal further complements other existing and planned interventions within the area (transport and non-transport) to enhance the contribution towards these objectives, as illustrated in **Figure 3-5**.

Figure 3-4 – Schematic illustration of the regional / local strategy

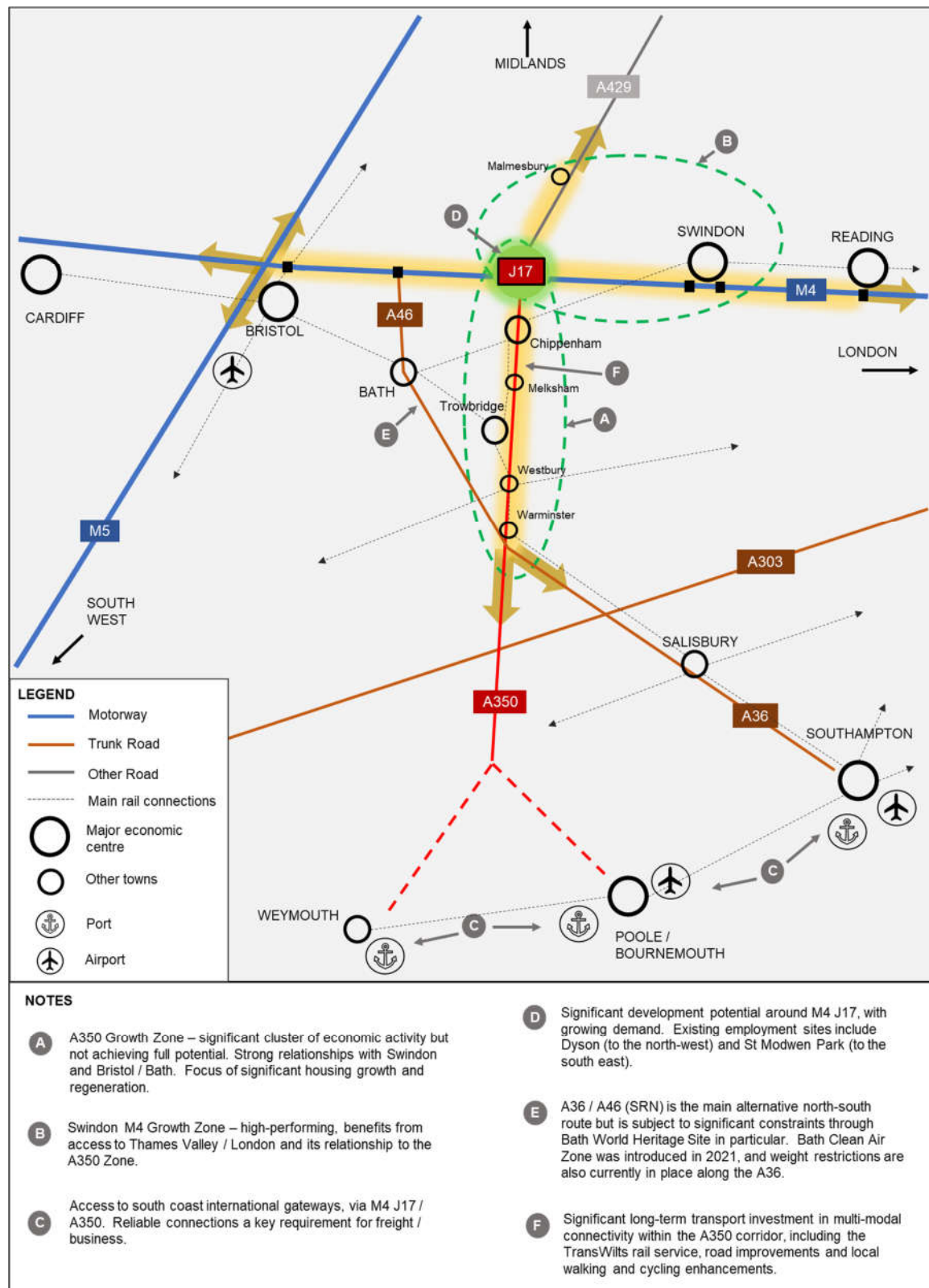
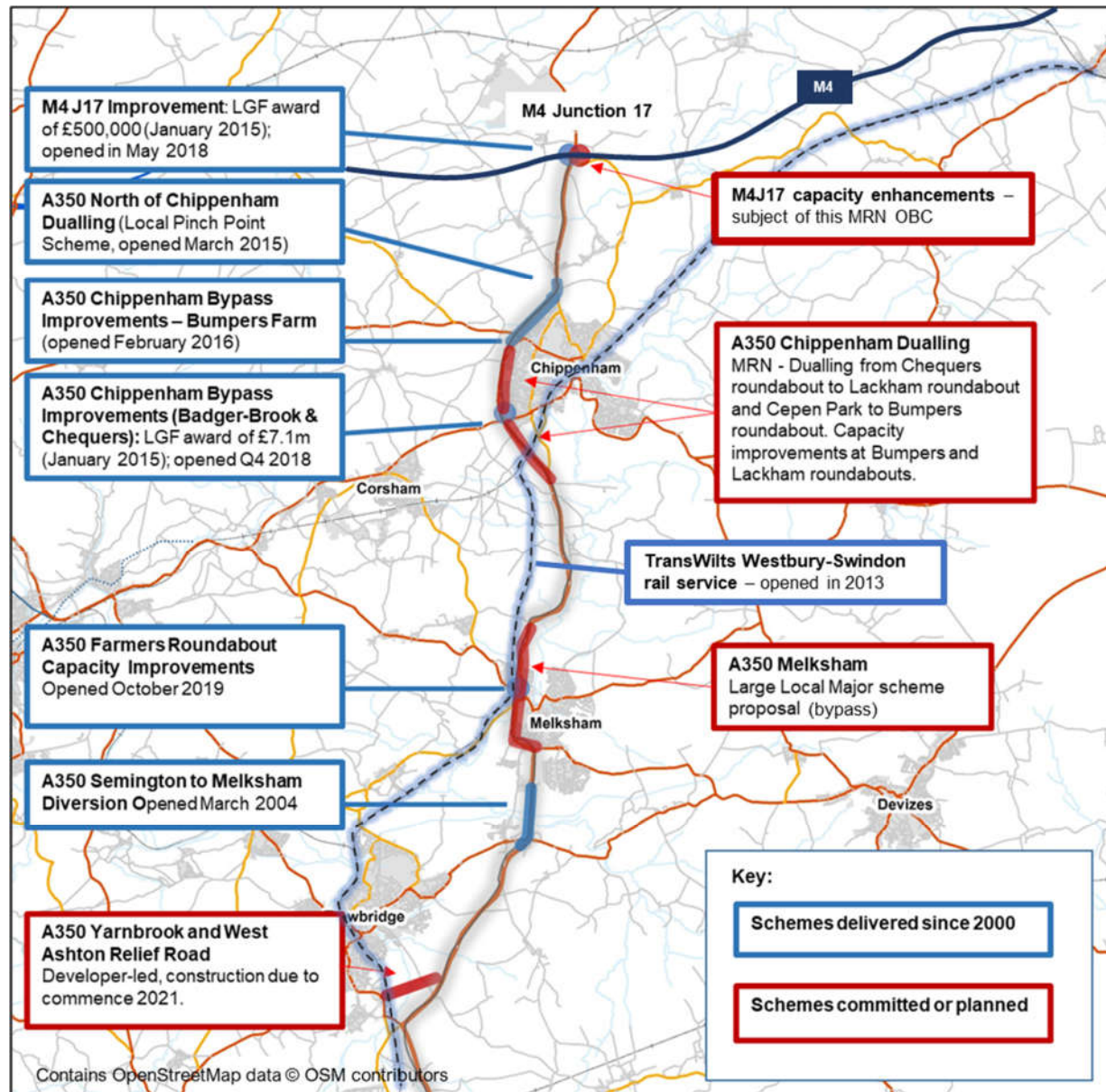


Figure 3-5 – Previously completed and planned transport improvements in the A350 corridor



### 3.1.6.2. The role of the M4 Junction 17 proposal in supporting regional strategies

At a regional level, the **Western Gateway Sub-national Transport Body (STB)** identifies good connectivity as an essential component of the Western Gateway economy within its [Strategic Transport Plan 2020 to 2025](#) (STP). The importance of the A350 corridor, and its links to the SRN, was identified within the associated Regional Evidence Base which underpinned the STP; hence the M4 Junction 17 proposal demonstrates a particularly strong fit with the STP objectives (**Table 3-5**).

**Table 3-5 - Intervention alignment with regional objectives – transport and connectivity**

Policy/strategy / key priorities	Strength of M4 J17 alignment	Nature of alignment (cross-cutting themes)
<b>Western Gateway Sub-national Transport Body Strategic Transport Plan</b>		
<i>Enable clean growth and increased use of sustainable transport through a long-term investment programme designed to deliver a well-connected, clean, reliable and resilient strategic transport system; one that closes productivity gaps, provides a better quality of life for people across the region and makes the Gateway area more competitive while respecting its world class natural and built environments.</i>		
WG1: Ensure the effective operation of labour markets.	+++	A / D – 3, 4, 6
WG2: Enable greater integration between employment clusters.	+++	A – 1, 2, 4, 6
WG3: Enhance business connectivity to international markets.	+++	A – 1, 6, 7, 10
WG4: Support growth of international gateways.	+++	A – 1, 6, 7, 10
WG5: Improve North-South connectivity.	+++	A – 1, 2, 6, 7, 10
WG6: Support the delivery of new homes and employment opportunities.	+++	B – 3, 8, 9
WG7: Support multi-modal travel options for urban travel to work areas.	+	A – 2, 4, 11
WG8: Embrace the role of technology in supporting strategic travel.	-	-
WG9: The Decarbonisation of the strategic transport network.	+	C - 2
WG10: Support the adoption of fossil-fuel-free transport.	-	-
WG11: Improve air quality.	+	C / D - 2

The Western Gateway covers some of the country's most prosperous, fastest-growing conurbations with several high-tech and high value sectors now providing a wide range of employment opportunities in the STB. Despite these concentrations of economic activity, the Western Gateway has several areas and communities that experience poor transport connectivity, especially with respect to corridor connectivity.

The M4 Junction 17 scheme (and its place in a wider A350 corridor package) is an important component of implementing the regional strategy. This includes:

- The need to **maximise the capacity and resilience of the area's strategic transport corridors**, connecting local, national and international markets. This is required to meet the area's own ambitions of delivering **productivity improvements, housing and economic growth** as well as helping other regions and STBs achieve their own objectives.
- Providing improved connectivity and accessibility to attract and retain businesses within the area to support the retention of the working age population.
- Addressing the imbalance in productivity levels within the area – lower productivity in Dorset and Wiltshire is linked to poor connectivity to the major areas of economic activity to the north, e.g. in comparison with the neighbouring authorities of Devon (connected by the M5) and Hampshire (connected by the M3 and A34):

- The A350 corridor has the potential to drive change in the Dorset and Wiltshire economies<sup>8</sup> and benefit the whole of the Western Gateway area through:
  - better access to its coastal international gateway (including for freight traffic to / from the Port of Poole);
  - providing additional strategic resilience and connectivity for north-south movements in the Western Gateway area; and
  - forging significant agglomeration benefits.

The corridor has been identified by the Western Gateway STB as the second highest priority corridor within the region (based on factors such as productivity and new housing and jobs creation). The investment strategy to fulfil its potential is based around:

- a strategic programme of interventions which balance investment in highway infrastructure with a longer-term ambition to improve connectivity by rail;
- an initial phase to upgrading the northern end of the A350 route comprising the M4 Junction 17 scheme, the further planned MRN funded scheme at Chippenham, plus the LLM scheme at Melksham; and
- subsequent improvements to the central and southern sections of the route to be prioritised within the Western Gateway STB's forthcoming **Long-term Strategic Plan**.

#### 3.1.6.3. The role of the M4 Junction 17 proposal in supporting local strategies

At a more local level, the A350 plays an important role in connecting the west Wiltshire market towns and their inter-related economies as well as providing access to the wider SRN, via M4 Junction 17. This supports local objectives and strategies for the Wiltshire area in relation to the transport network, economic growth and housing delivery (**Table 3-6**).

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<sup>8</sup> A 5% improvement in journey times across the entire A350 corridor from M4 Junction 17 to Poole (representing a scenario with no bottlenecks or restrictions) has been estimated to produce £12.2 billion of agglomeration<sup>8</sup> benefits over a 60 year period ([South of England North-South Connectivity: Economic Study](#), 2016)



**Table 3-6 - Intervention alignment with local objectives**

Policy/strategy / key priorities	Strength of M4 J17 alignment	Nature of alignment (cross-cutting themes)
<b>Swindon and Wiltshire Strategic Economic Plan</b>		
SEP2: Transport infrastructure improvements: we need a well-connected, reliable and resilient transport system to support economic and planned development growth at key locations.	+++	A / B – 1, 2, 3, 6, 7, 10
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.	+++	A / B – 2, 3, 4, 8, 9
Invest in the A350 primary route through western Wiltshire to ensure it can fulfil its north-south strategic function and support the significant economic and development growth.	+++	A / B – 1, 2, 3, 5, 6, 7, 8, 9, 10, 11
<b>Wiltshire Core Strategy</b>		
WCS1: Delivering a thriving economy	+++	A - 1, 2, 3, 6, 7, 10
WCS6: Ensuring that adequate infrastructure is in place to support our communities.	+++	A / B – 2, 3, 4, 8, 9
WCS66: Strategic Transport Network <i>The strategic transport network along the A350 corridor will be maintained, managed and selectively improved to support development growth at Chippenham, Melksham, Trowbridge, Westbury and Warminster</i>	+++	A / B – 1, 2, 3, 5, 6, 7, 8, 9, 10, 11
<b>Wiltshire Local Transport Plan 2011-2026<sup>9</sup></b>		
<i>Develop a transport system which helps support economic growth across Wiltshire's communities, giving choice and opportunity for people to access essential services.</i>		
SO1: to support and help improve the vitality, viability and resilience of Wiltshire's economy and market towns.	+++	A / B – 2, 3, 4, 6, 8, 9
SO4: to minimise traffic delays and disruption and improve journey time reliability on key routes	+++	A – 1, 2, 6, 7, 11
SO6: to make the best use of the existing infrastructure through effective design, management and maintenance	++	A / B – 2, 3
SO8: improve safety for all road users and reduce the number of casualties on Wiltshire's roads	+	D - 5
SO10: to encourage the efficient and sustainable distribution of freight in Wiltshire	+++	A – 1, 6, 7
SO12: to support planned growth in Wiltshire	+++	A / B – 2, 3, 4, 8, 9

<sup>9</sup> The Local Transport Plan is currently under review and will seek to align with the targets relating to carbon neutrality whilst also addressing economic prosperity and growth and quality of life

## Economic growth

The [Swindon and Wiltshire Local Industrial Strategy](#) cites the geographical position of the area as a distinct economic advantage, by giving excellent access to the economies in the South East, Bristol and the rest of South West, Midlands, south coast ports and South Wales. However, it recognises that this advantage, and the success of the local economy, is heavily dependent upon vital infrastructure assets: the Great Western Railway; the M4 motorway, and the A303 and A350 roads.

The A350 and M4 (to Swindon) corridors represent two of the three Growth Zones<sup>10</sup> originally identified within the [Swindon and Wiltshire Strategic Economic Plan](#) (Figure 3-4). The two Growth Zones jointly account for 74% of the total Swindon and Wiltshire population and 71% of GVA<sup>11</sup> – they reflect priority areas for local jobs and housing creation. The growth strategy seeks to enhance productivity (particularly within the A350 Growth Zone, which is not meeting its full potential) and attract new inward investment to create new local jobs in line with anticipated housing / population growth, as well as safeguarding existing jobs. This is an important factor in achieving sustainable growth. The SWLEP identifies stable and certain infrastructure as being pivotal in attracting and retaining businesses. M4 Junction 17 sits at the confluence of the two Growth Zones, enabling the movement of people and goods between them, as well as providing access to wider regional, national and international markets.

## Housing

Local planning and land use policy<sup>12</sup> sets a framework for addressing housing needs in Wiltshire in line with the Council's economic, social and environmental priorities. Achieving these policy objectives requires effective planning and delivery of strategic infrastructure, and the M4 Junction 17 proposal is well-aligned in this regard (**Table 3-7**).

Local growth plans seek to deliver approximately 30,000 new homes between 2016 to 2036 on and around the A350 corridor<sup>13</sup>. The corridor is due to take 70% of Wiltshire's total housing requirement, placing a continued **emphasis on the A350 corridor to support increasing travel demands** associated with new housing (**Figure 3-6**) and the need to maintain good connectivity, including to the SRN via M4 Junction 17 at the head of the corridor.

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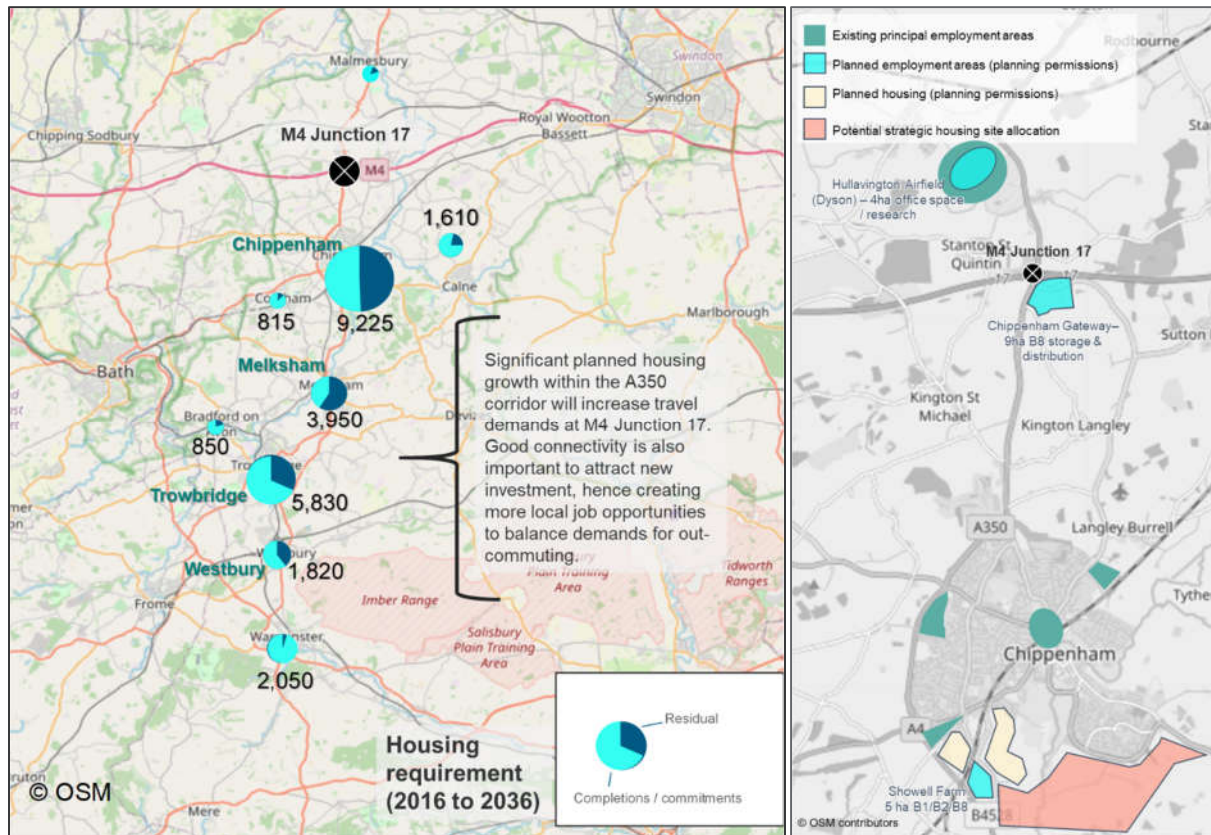
<sup>10</sup> The SWLEP defines its Growth Zones as “geographic areas with a concentration of people and business that have been shown to contribute towards improved economic performance and productivity, delivering wider economic benefits to the region as a consequence.”

<sup>11</sup> Swindon and Wiltshire Growth Zones, Swindon & Wiltshire LEP - <https://cms.wiltshire.gov.uk/documents/s111736/SEP%20Appendix%201.pdf>

<sup>12</sup> The Wiltshire Core Strategy establishes the spatial strategy and housing requirements for 2006 to 2026 and is the current Local Plan. The [Local Plan Review](#) is ongoing and assesses the future needs for new homes and employment land in Wiltshire over an extended period of 2016 to 2036. The updated Local Plan is expected to be adopted in 2023. An Emerging Spatial Strategy was consulted upon in January 2021.

<sup>13</sup> Based on the Emerging Spatial Strategy, January 2021.

Figure 3-6 – Spatial strategy for housing and employment land



Source: Wiltshire Local Plan: Emerging Spatial Strategy (January 2021)

When completions (since 2016) and existing developable commitments are taken into account, there is a residual requirement (as of April 2019) for additional sites to be identified to accommodate approximately 13,000 dwellings within the A350 corridor up to 2036 (Figure 3-6). The Emerging Spatial Strategy considers larger urban extensions to provide the greatest opportunities to maximise sustainability. Significant site allocations are expected in Chippenham, Trowbridge and Melksham. At Chippenham, the site promoted through the Housing Infrastructure Fund (under the DHLUC), known as 'Future Chippenham', is expected to meet a significant proportion of the town's residual housing requirement and is located approximately 9 kilometres south of Junction 17.

The current [transport evidence base](#) supporting the Local Plan Review<sup>14</sup> identifies enhancements at M4 Junction 17 as a necessary infrastructure improvement to support the Emerging Spatial Strategy, as part of a holistic multi-modal transport mitigation package.

### Employment land

The strategic location of M4 Junction 17 has generated demand for employment uses within its vicinity. This includes the [St Modwen Park](#) development (also known as Chippenham Gateway), currently under construction, which is providing nine hectares of distribution and logistics facilities (Figure 3-6). The Emerging Spatial Strategy identifies a strong existing supply of employment land within the A350 corridor, and hence few significant new allocations are required. However, there is scope (and likely market demand) for further development of adjoining land to M4 Junction 17, with the potential for a cluster of economic activity to develop of strategic significance to the county. The continued effective operation of the junction (and the strategic

<sup>14</sup> Wiltshire Local Plan – Transport Review (January 2021)



connections it enables) is therefore fundamental to serving existing employment sites along the A350 corridor and to unlocking strategic opportunities around M4 Junction 17 itself.

### 3.1.7. Wider strategies

The alignment of the proposal with other relevant objectives is summarised in **Table 3-7**.

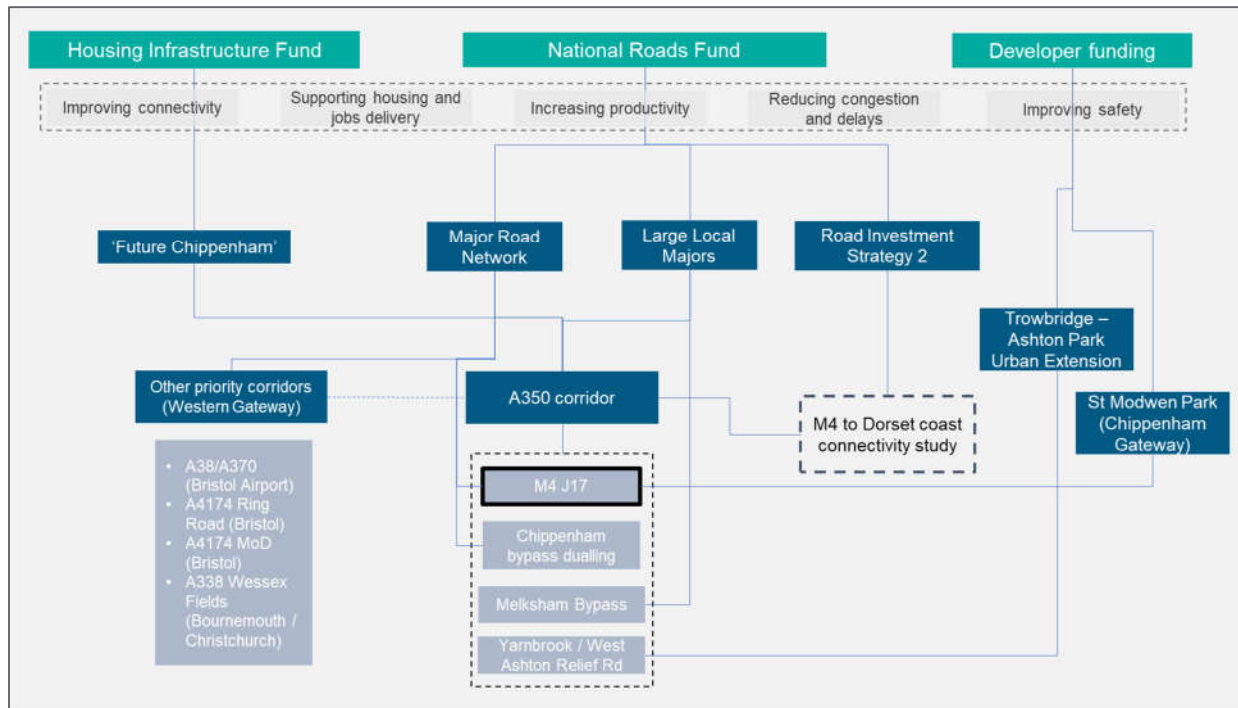
**Table 3-7 – Relationship of the proposal with wider plans and objectives**

Organisation / strategy / type of objective	Relationship with M4 Junction 17 proposal
Other surrounding local authorities- e.g. Dorset County Council, Bath & North East Somerset Council, Swindon Borough Council	Other local authorities within the region have collectively promoted enhanced north-south connectivity as a key priority (as reflected in regional strategy) – jointly lobbying government for a strategic review (which has resulted in the strategic connectivity study being undertaken by National Highways).
Active travel – DfT ‘Gear Change’, Local Cycling and Walking Implementation Plans	The proposal aims to support all road users. The proposal is supported by a Walking, Cycling and Horse-riding Assessment & Review. The scope of the proposal has been broadened since SOBC to include complementary active travel opportunities.
Biodiversity net gain – National Planning Policy Framework, Wiltshire Local Plan Review	National policy sets out that planning should provide biodiversity net gains where possible. The proposal is being developed with regard to this, including through a Preliminary Ecological Appraisal and appropriate early engagement with Statutory Environmental Bodies.

### 3.1.8. Project and programme interdependencies

The M4 Junction 17 proposal complements wider investment programmes and portfolios. A thread of strategic alignment was identified in Section 3.1.3 (see Figure 3-2). Sections 3.1.5 to 3.1.7 identified the role of the scheme in the context of regional and local strategies and associated delivery programmes (in particular through the Major Road Network and Large Local Majors funds) and how the M4 Junction 17 scheme forms part of a coherent investment package focused on the priority A350 corridor (see Figure 3-5 for instance). These relationships are illustrated in **Figure 3-7**; this highlights the synergies and how the M4 Junction 17 scheme helps to enhance wider planned investments (public and private) to maximise the contribution towards common outcomes. Due to its strategic location at the head of the A350 corridor, the scheme has a particularly important role in maximising the benefits of the other planned corridor improvement projects.

Figure 3-7 – Relationship of the M4 Junction 17 proposal with wider projects and programmes



## 3.2. The case for change

This section of the Strategic Dimension outlines the current situation and describes the rationale for intervention at M4 Junction 17. It demonstrates why it is considered necessary to change the current situation, with regard to the overall business strategy and strategic priorities established in Section 3.1.

### 3.2.1. Key updates since SOBC

The case for change is underpinned by a range of data sources. Since the SOBC, key data (e.g traffic, development, economy) has been reviewed and updated where appropriate and proportionate to ensure that it remains current. Impacts of the COVID-19 pandemic have been considered. The overall rationale for intervention remains consistent with the SOBC; it is considered to be strengthened in relation to current evidence on traffic conditions and greater insight into development prospects around M4 Junction 17.

### 3.2.2. Existing arrangements

#### 3.2.2.1. Socio-economic context

The Western Gateway region is a highly desirable destination to live and work in, as well as for leisure / tourism. It is home to over 3 million people, supports over 1.6 million jobs and is a key area for future economic growth. The population is forecast to increase by 448,000 people by 2041, growth of 15%. This is faster than the 12% growth forecast for England over the same time period. Economic performance varies significantly within the area; there are productivity challenges, particularly in the Wiltshire and Dorset / coastal areas (where productivity is below the national average) driven by poor transport connectivity.

Within the Western Gateway area, Swindon and Wiltshire occupies a pivotal central southern location with geographic proximity to major economic centres including London, key airports, and coastal ports. Key characteristics of the area include<sup>15</sup>:

- Approximately 727,000 people live in Swindon and Wiltshire, of which 31% live in Swindon and 69% in Wiltshire (with the A350 Growth Zone having a population of approximately 190,000). The population has grown by 7% (50,000) since 2010, in line with the national average. Population growth of 9% is forecast by 2043.
- The Swindon and Wiltshire economy contributes £21bn annually to the UK economy, equating to 15% of the South West of England's and 1% of England's total output. Historically, Swindon and Wiltshire's GVA growth rates have surpassed the regional and national averages, but this has slowed since 2015, and the LEP area is now on par with growth seen at a national level. In comparison to comparator LEP areas Swindon and Wiltshire has experienced the lowest rate of growth, indicating barriers to growth.
- Swindon and Wiltshire's Growth Zones are the key drivers of the economy. The Swindon M4 Growth Zone is a significant powerhouse, accounting for 61% of total output in the LEP area with productivity above the national average. The economically active population is slightly above the national average.
- The A350 Growth Zone accounts for approximately 25% of total output and is fairly affluent, with only 6% of LSOAs in the area ranked as being within the 20% most deprived in England. However, Wiltshire has a significant productivity gap, with GVA per job in 2019 of approximately £45,000 compared to a national average of approximately £57,000. This is further compounded by slowing growth and declining economic competitiveness.
- The A350 Growth Zone has a high concentration of businesses, with approximately 10,000 businesses (30% of the total business stock in the SWLEP area) and approximately 85,000 employees. The towns along the corridor create an interlinked series of local employment hubs including business parks, trading estates, three campuses of Wiltshire College and key tourist destinations such as Longleat Safari Park and Center Parcs Resort. Manufacturing is a particular strength, and there is a growing logistics sector (transport and storage); both of which rely on good strategic transport connections.
- Other key socio-economic challenges relate to housing, an ageing population and access to services, education and skills.<sup>16</sup>
- The COVID-19 pandemic has had a significant economic impact; Swindon and Wiltshire experienced an estimated loss of £1.7bn in GVA in 2020 due to the pandemic.

Further analysis of social demographics can be found in the Social and Distributional Impacts Report (**Appendix B10**).

#### 3.2.2.2. Transport provision

An overview of transport provision within the area is provided in **Table 3-8**. The main transport network has been illustrated in the strategic context section (see Figure 3-1 for instance). Further details in relation to active modes is provided within the Walking, Cycling and Horse-riding Assessment and Review (**Appendix A2**).

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<sup>15</sup> Information sourced from Swindon and Wiltshire Local Economic Assessment, March 2022  
[https://static.swlep.co.uk/swlep/docs/default-source/strategy/economic-priorities/economic-assessment-2022/1-executive-summary-march-2022.pdf?sfvrsn=1b1b5129\\_3](https://static.swlep.co.uk/swlep/docs/default-source/strategy/economic-priorities/economic-assessment-2022/1-executive-summary-march-2022.pdf?sfvrsn=1b1b5129_3)

**Table 3-8 – Summary of existing transport provision**

	Road	Rail	Bus	Active Modes
Network services	<p>The M4 provides strategic east-west connections (e.g. between Bristol, Swindon, Reading, London).</p> <p>The A350 is a primary north-south connection between the M4 (Junction 17), the west Wiltshire towns and the South Coast. It is a single carriageway A road, of varying standard.</p> <p>The A36/46 trunk road provides the main alternative north-south route, connecting to M4 J18.</p> <p>The A429 provides access from M4 J17 to the north, connecting Malmesbury and Cirencester, as well as providing access to as Dyson's technology campus.</p> <p>The B4122 provides local access to the St Modwen Park logistics facility and villages surrounding Chippenham.</p>	<p>Chippenham is served by the Great Western Main Line providing connections to Swindon, Reading and London to the east, and Bristol and South Wales to the west.</p> <p>Trowbridge is served by the Portsmouth to Cardiff service via Bristol, Bath, Salisbury and Southampton.</p> <p>The TransWilts Line provides an hourly service connecting the west Wiltshire market towns with Swindon.</p> <p>Westbury is served by the London Waterloo – Exeter line, as well as the Portsmouth – Cardiff service.</p>	<p>Service no. 92 operates hourly between Chippenham and Malmesbury via M4 J17.</p> <p>The bus network is predominantly focussed on travel within and between the market towns on the A350 corridor.</p> <p>Some longer distance coach services (e.g. National Express Chippenham / Melksham-London) operate via M4 J17. The Chippenham-London service runs approximately every 2 hours.</p>	<p>There are no dedicated pedestrian / cyclist facilities at M4 J17 other than a footway that runs around the nearside of the circulatory, essentially for maintenance access.</p> <p>The nearest designated cycle route to M4 J17 is the Wiltshire Cycleway, an on-road route that crosses the M4 approximately 5.5km to the west of M4 J17 at an overbridge. The nearest NCN is Route 403, that runs through the centre of Chippenham approximately 6km to the south of M4 J17.</p>
Journey Times	Chippenham - London: 1hr 45 mins – 2hrs 30 mins (Dependent on traffic)	Chippenham - London: 1hr 12 mins	Chippenham to London (National Express): approx. 2hrs	-
	Chippenham – Bristol: 35 mins	Chippenham – Bristol: 25 mins	Chippenham – Bristol: 2hrs 15 mins	Chippenham – Bristol: 2 hrs 25m
	Chippenham – Cardiff: 1hr 10 mins	Chippenham – Cardiff: 1hr 19 (via Swindon) 1hr 34 mins (via Bristol)	-	-
	Trowbridge – Cardiff: 1hr 36 (using J17) / 1 hr 26 (using J18)	Trowbridge – Cardiff: 1hr 30 mins	-	-
	Chippenham – Malmesbury: 20 mins	-	Chippenham to Malmesbury: 41 mins	Chippenham to Malmesbury: 55m
	Chippenham – Swindon: 29 mins	Chippenham – Swindon: 15 mins	Chippenham – Swindon: 1hr 20 mins	Chippenham – Swindon: 1hr 50m
	Swindon – Poole: 2hrs 15 mins	Swindon – Poole: 2hrs 20 mins	-	-

	Road	Rail	Bus	Active Modes
Demand and Issues	<p>Approximate daily (12hr) traffic volumes (DfT traffic count data):</p> <p>M4 – 55,000 vehicles</p> <p>A350 (north of Chippenham) – 35,000 vehicles</p> <p>A429 – 15,000 vehicles</p> <ul style="list-style-type: none"> <li>• Pronounced AM / PM peak traffic demand.</li> <li>• High HGV flows (e.g. A350, including access to south coast ports).</li> <li>• Lack of alternative north-south connections. A36/A46 route suffers from significant constraints through Bath, including weight restrictions and Clean Air Zone.</li> <li>• New development around M4 J17.</li> </ul>	<p>Annual station entries/exits (ORR data):</p> <p>Chippenham – c.2 million</p> <p>Melksham – c.0.75 million</p> <p>Trowbridge – c. 1 million</p> <ul style="list-style-type: none"> <li>• Rail mode share (2011 Census Travel to Work) ranges from c.3 to 4% in Chippenham and Trowbridge to c.1% in Melksham. These figures will not reflect the TransWilts service, opened in 2013.</li> <li>• Service frequency is generally 2tph. TransWilts service is 1tph.</li> </ul>	<p>The bus market is predominantly intra-urban travel within the market towns, whilst also targeting some inter-urban north-south journeys.</p> <p>Longer distance services via M4 J17 are affected by the same peak demands and traffic conditions as general traffic.</p>	<p>There is currently relatively little walking / cycling demand within the vicinity of the M4 J17. The main potential demand would be related to:</p> <ul style="list-style-type: none"> <li>• trips between Chippenham and Malmesbury (c.10 miles), which requires access across the M4; and</li> <li>• trips between Chippenham / Malmesbury and existing / prospective employment uses around M4 J17 (such as the St Modwen Park development to the south-east of the junction – a distance of c. 4 to 6 miles).</li> </ul>

A notable feature of the wider transport network serving the area is that east-west connectivity by road and rail is strong, whereas **north-south connectivity is relatively weak** in comparison. This places a lot of **emphasis on the A350 corridor**, between the South Coast and M4. However, investment in the corridor has not kept pace with its increasing significance (particularly given the significant constraints associated with the main alternative route; the A36/A46). M4 Junction 17 represents a key intersection between the main east-west and north-south axis.

Rail offers a competitive travel choice for some journeys, particularly between Chippenham and Bath/Bristol, and between Chippenham and Swindon/Reading/London. But other journeys by rail are more convoluted.

### 3.2.2.3. Travel patterns

Data indicates that, overall, there is net out-commuting from Wiltshire to surrounding areas<sup>17</sup>. There is a significant flow between Wiltshire and Swindon.

The A350 Growth Zone represents a **major agglomeration of economic activity** and there is a strong relationship between settlements on the corridor generating inter-urban travel; there is therefore a relatively **high degree of self-containment** within the zone (approximately 76% of residents live and work within the zone). However, there is also an important relationship with surrounding economic centres, including Bristol and Swindon, generating in/out commuting and business-related trips. Of the 24% of the A350 Growth Zone residents working outside of the zone, almost half travel to these destinations.

Furthermore, there are longer distance travel demands through Wiltshire – in particular to/from the south coast to the M4 corridor or further north e.g. the Midlands. This includes business and leisure trips, but also freight demand associated with the south coast ports.

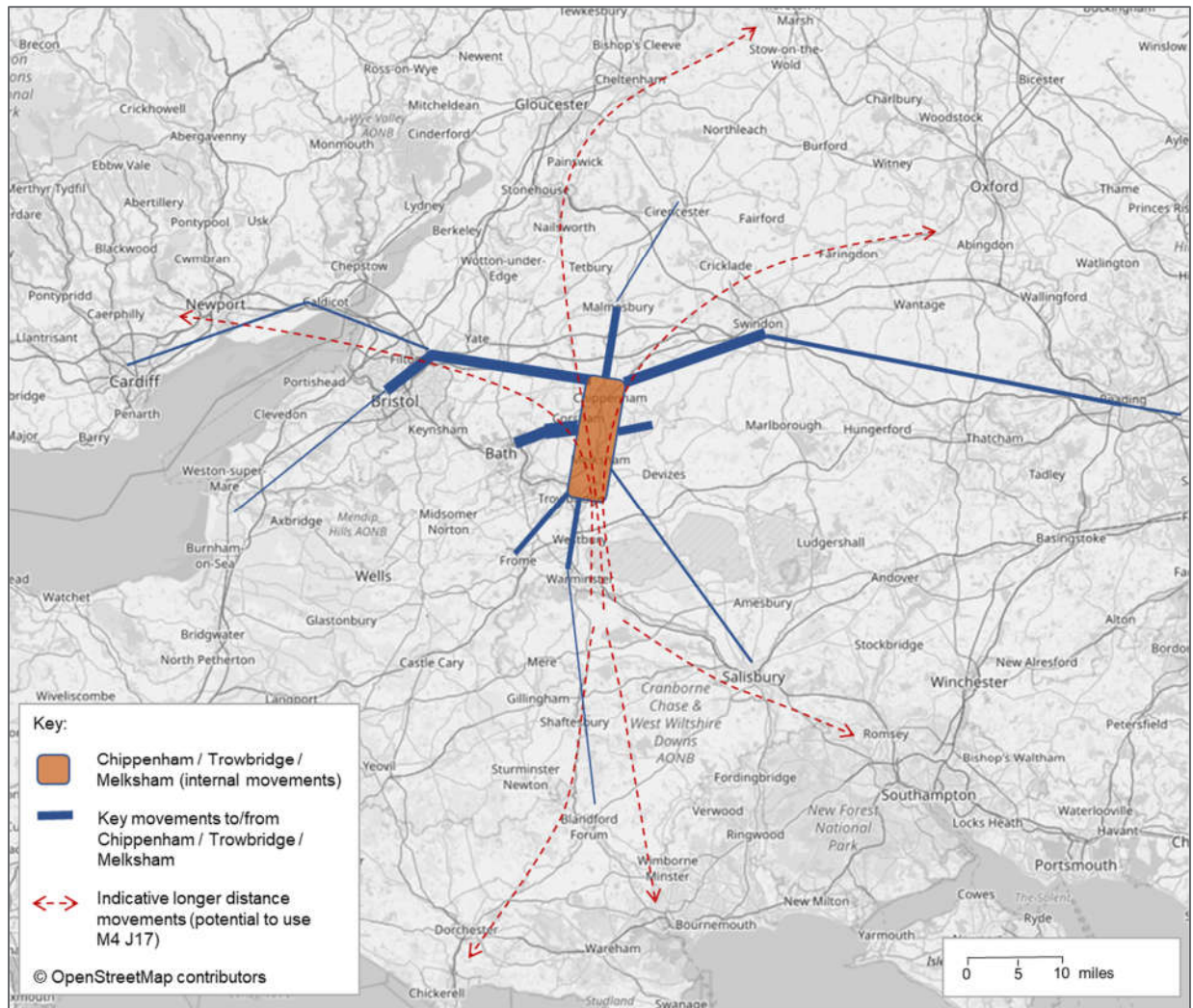
**Figure 3-8** provides an illustrative representation of key travel patterns in the context of M4 Junction 17, based on interpretation of Census journey to work data and traffic model data.

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<sup>17</sup> Based on latest available Census data (2011)



Figure 3-8 – Illustrative travel patterns



M4 Junction 17 therefore serves a range of purposes, including:

- medium to longer-distance trips between key centres such as Bristol, Swindon, Reading/London and the towns in the northern section of the A350 corridor (Chippenham, Melksham and Trowbridge);
- providing access to employment sites surrounding M4 Junction 17, including short to medium distance trips from the west Wiltshire A350 towns; and
- longer distance trips between areas such as the West/Wales, Midlands, Thames Valley and the South Coast (including the ports at Poole, Southampton and Weymouth).

As a key intersection between east-west and north-south movements, M4 Junction 17 has a pivotal role in the transport network.

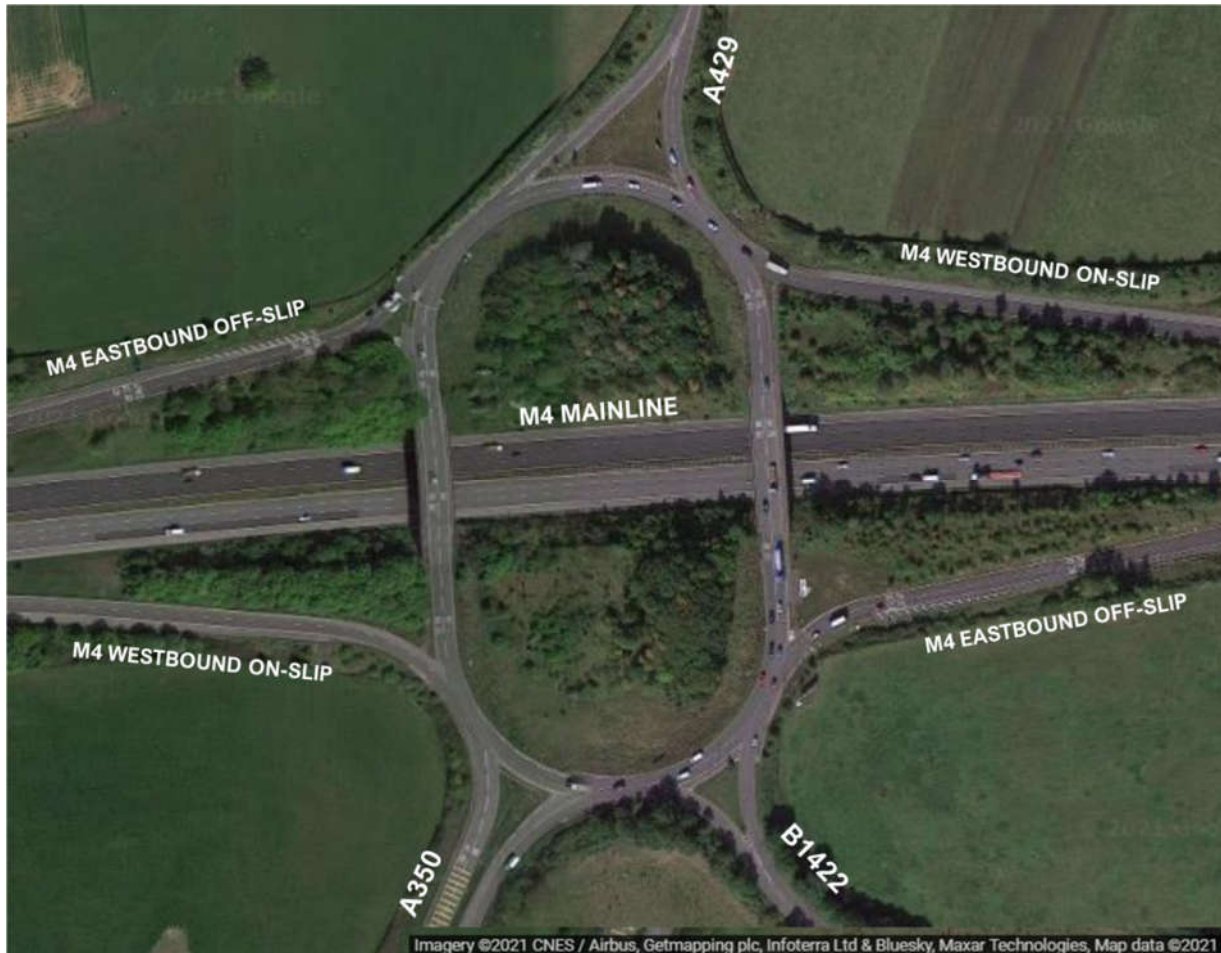
#### 3.2.2.4. Existing arrangement at M4 Junction 17

M4 Junction 17 connects the M4 to: the A350 (to west Wiltshire and the South Coast); the A429 (towards Malmesbury and Cirencester); and the B4122 (connecting rural Chippenham). The junction is located

approximately five kilometres north of Chippenham, and between Junction 18 (Bath) 16 kilometres to the west, and Junction 16 (Swindon) 20 kilometres to the east.

The current arrangement at the junction is a five-arm part-signalised, grade-separated gyratory (**Figure 3-9**).

**Figure 3-9 - Aerial photograph of M4 Junction 17**



The part-signalisation scheme implemented in 2018 introduced signals on both of the M4 off-slip approaches to the junction, as well as associated signals on the gyratory to allow traffic to exit the off-slips. That scheme primarily addressed the risk of traffic queuing back onto the M4 mainline rather than providing a notable capacity increase catering for all vehicle movements.

The rest of the junction does not currently have any signals. All approaches to the junction have two lanes at the entry, with the exception of the B4122 approach which only has a single lane (although this is a wide lane and could informally allow two smaller vehicles to pass). The entirety of the gyratory circulatory has two lanes for traffic.

#### 3.2.2.5. Existing traffic demands at M4 Junction 17

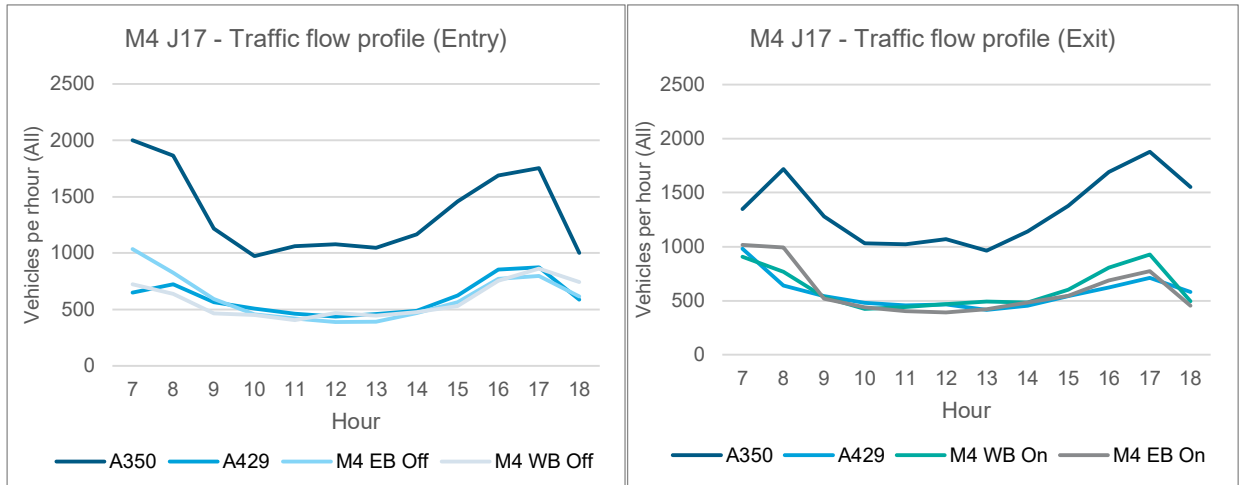
Daily traffic flow profiles and AM/PM peak hour turning movements are presented in **Figure 3-10** and **Figure 3-11** respectively.

Total hourly demand at the junction reaches approximately 4,600 vehicles (excluding M4 mainline) during the AM peak hour 07:00 to 08:00. Demand remains similar between 08:00 to 09:00 and then reduces to approximately 65% to 55% of peak hour demand during the inter-peak period. The PM peak period is similar to the AM, with the busiest hour being 16:30 to 17:30.



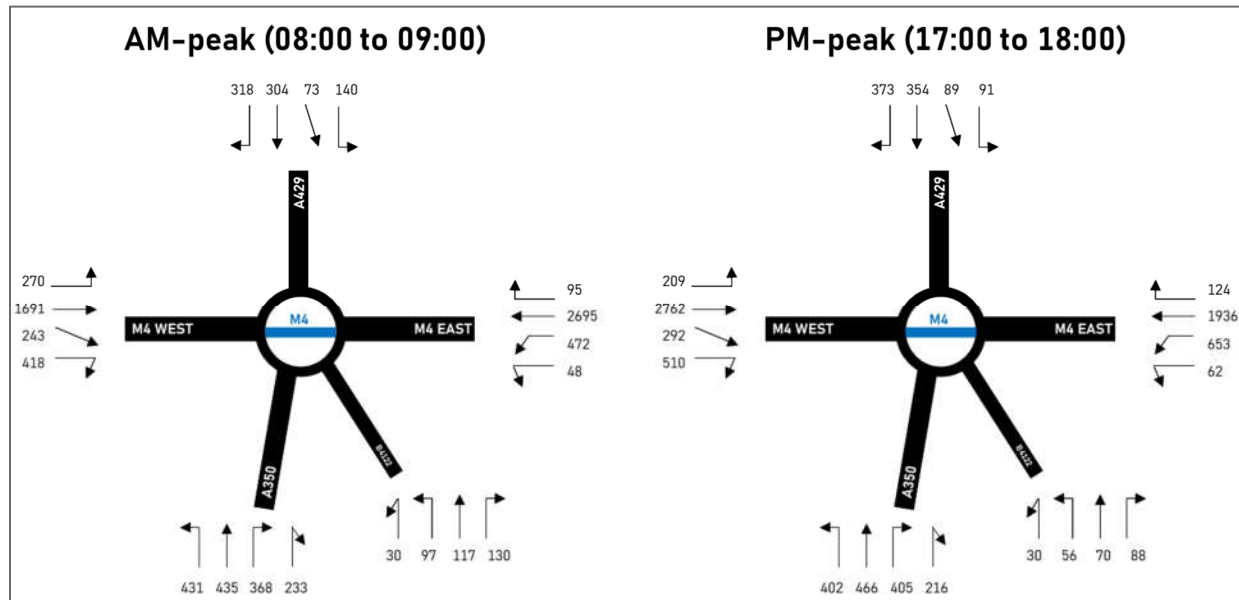
The A350 arm has the highest flows, with up to approximately 3,500 vehicles per hour (total - both directions) during peak hours. The distribution of traffic to/from the A350 is fairly evenly balanced between the M4 West, M4 East and the A429 (north), with the B4122 accounting for a lower proportion.

**Figure 3-10 – Daily traffic flow profile at M4 Junction 17 (main arms)**



Sources: DfT Traffic Count Data (March 2019), WebTRIS data (May 2019)

**Figure 3-11 - Observed turning flows at M4 Junction 17**



Source: 2019 VISSIM Base model flows

HGVs account for approximately 10% of all traffic at the junction. Around 100 HGVs per hour travel to and from the A350 (each way). This will not reflect more recent factors affecting HGV movements via the A36/A46 at Bath, including the introduction of the Bath Clean Air Zone<sup>18</sup> and also a temporary weight restriction imposed

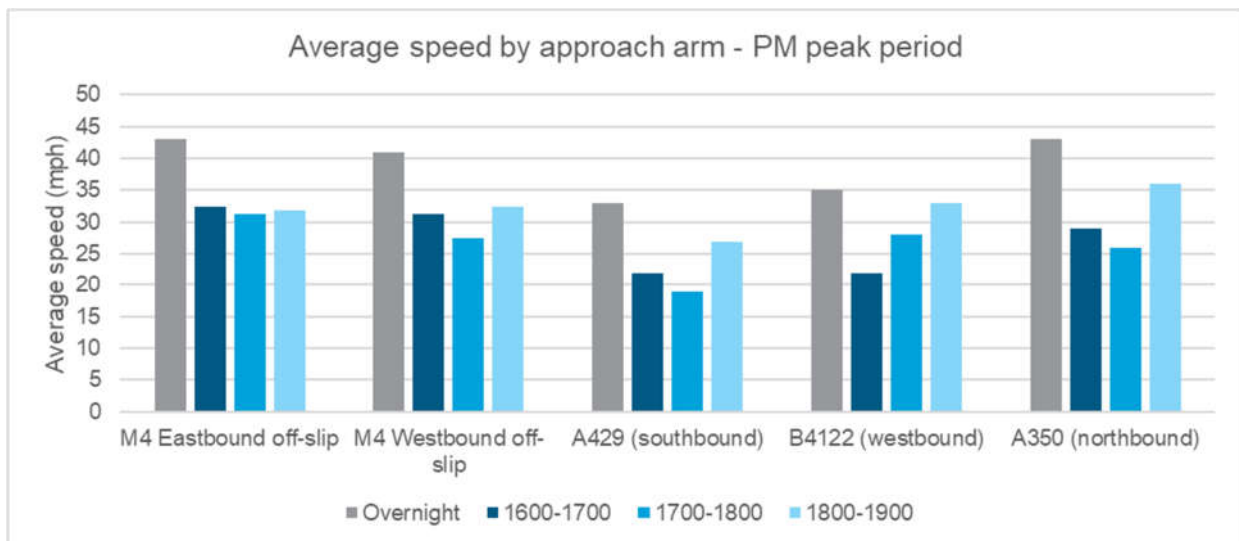
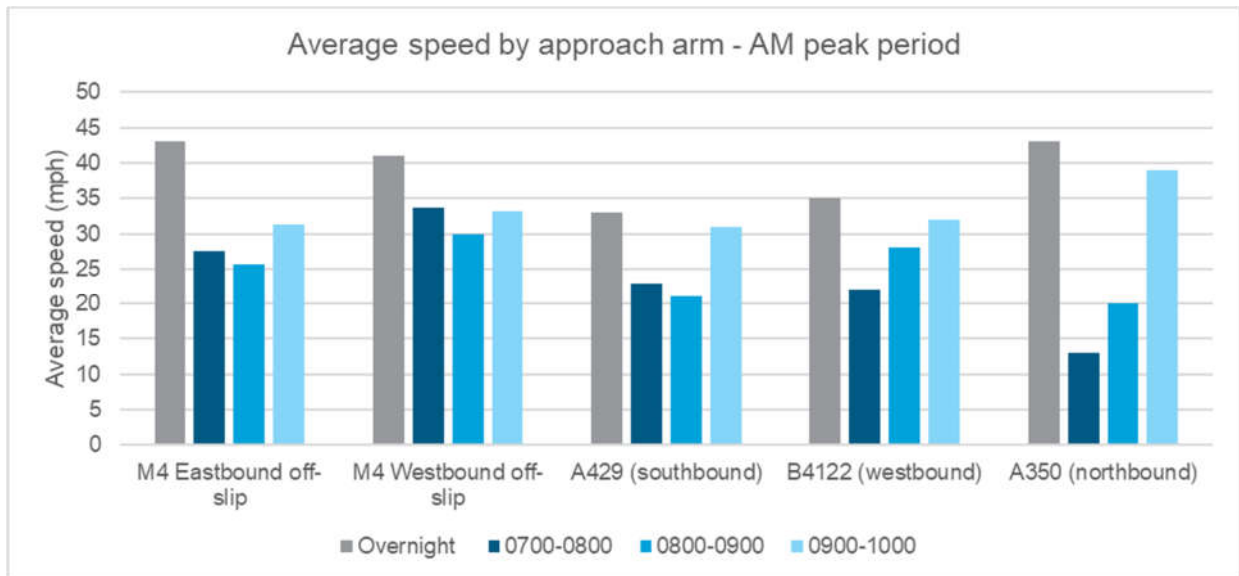
<sup>18</sup> <https://www.wiltshire.gov.uk/news/bath-clean-air-zone-correspondence>

on the Cleveland Bridge (A36). These factors are expected to be associated with an increase in HGV demand via M4 Junction 17 and the A350.

### 3.2.2.6. Congestion and delays

Observed journey time data<sup>19</sup> illustrates the impact of the increased traffic demands during the peak times on average vehicle speeds, compared to 'free-flow' (overnight) conditions (**Figure 3-12**).

**Figure 3-12 – Average speed by approach arm at M4 Junction 17**



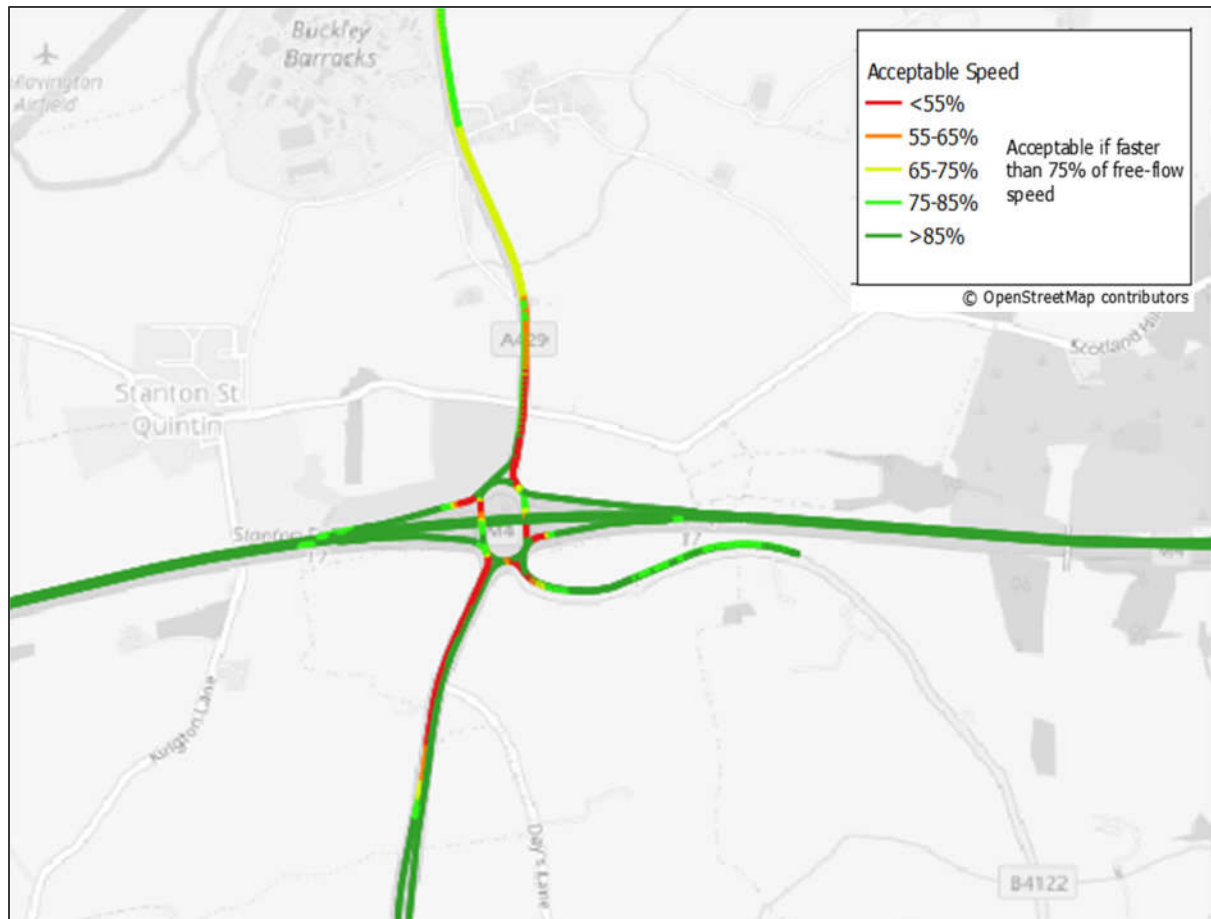
There is evidence of deterioration in journey times at M4 Junction 17 for some movements during the peak periods, and this affects all road users, including general traffic, freight, and the (relatively limited) bus and coach services operating via the junction:

<sup>19</sup> Based upon Tom Tom and WebTRIS data from May 2019.

- The A350 arm in the AM peak experiences the highest levels of delay; particularly during the hours of 07:00 to 09:00. Average speeds are approximately 30% of 'free-flow' conditions. In the PM peak period, delays are less severe, but still significant.
- The A429 and B4122 arms experience delays of a similar scale in both the AM and PM peak periods, with the first two hours in each period being most affected.
- The M4 off-slips are signalised and the changes in green signal time during peak periods (to accommodate the overall increased demands across the junction) contribute to reduced average speeds.

**Figure 3-13** further illustrates the nature of delays experienced at M4 Junction 17 in the AM peak hour, as represented in the VISSIM traffic model base year (2019). This broadly corroborates the pattern identified in Figure 3-12.

**Figure 3-13 – Analysis of 'acceptable speed' – VISSIM base model (AM peak – 08:00 to 09:00)**



The data and analysis indicates that, at peak times of the day, some arms of the junction (A350 and A429 in particular) are at or nearing their operational capacity, given the existing layout and the volumes of traffic passing through it. The priority arms are affected by the amount of circulating traffic and capacity at the entries.

#### 3.2.2.7. Journey time reliability and network resilience

The evidence of congestion and delays also relates to issues of journey time reliability and network resilience. As the junction is at or nearing operational capacity it is more sensitive to smaller changes in traffic, or network incidents. This can result in less predictable journey times, with greater variance from day to day. It also means that the overall resilience of the network is reduced.

Indicative analysis of WebTRIS data for the M4 off-slips for the month of September 2019 indicates a standard deviation<sup>20</sup> in journey time equivalent to 30% to 50% variance around the mean, during the AM and PM peak hours.

### 3.2.2.8. Safety performance

There is a trend of collisions at M4 Junction 17, with collision data indicating a higher number of incidents compared to other nearby junctions (Table 3-9 and Figure 3-14). As M4 Junction 17 is only part-signalised (and prior to May 2018 was entirely unsignalised) this is likely to be a contributing factor, with a higher incidence of collisions on the unsignalised arms.

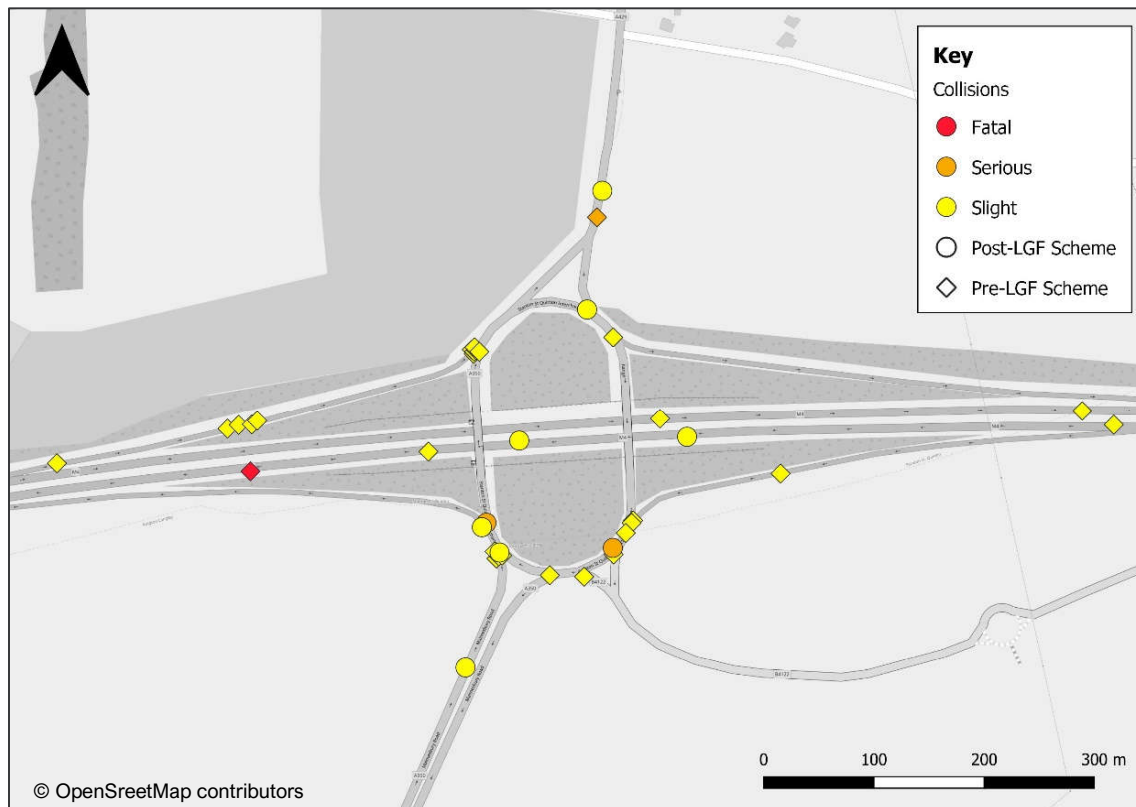
**Table 3-9 - Collision data for M4 Junction 17 (2014 to 2019)**

Junction	Collisions (Serious collisions)	
	Jan 2014 to Dec 2019	Jun 2018 to Dec 2019*
M4 Junction 16	17 (3)	3 (1)
<b>M4 Junction 17</b>	<b>31 (3)</b>	<b>5 (2)</b>
M4 Junction 18	7 (1)	2 (1)

\* LGF scheme at M4 Junction 17 completed in May 2018. Signals installed on approach arms and conflicting circulatory movement at both motorway off-slips.

Source: CrashMap (<https://www.crashmap.co.uk/>)

**Figure 3-14 - Collision locations (2014 to 2019)**



<sup>20</sup> The standard deviation measures how concentrated the data are around the mean; the more concentrated, the smaller the standard deviation.

### 3.2.2.9. Impacts of COVID-19

Available data largely pre-dates the COVID-19 pandemic. Any data from during the height of the pandemic is unlikely to be representative. Changing work and travel habits which have evolved as a result from the pandemic have potential to influence travel patterns and demands, including at M4 Junction 17. A full data collection exercise at M4 Junction 17 has not been undertaken since the end of the most significant impacts of the pandemic (including lockdowns). However, based on available WebTRIS data for the M4 on/off-slips, indicative analysis provides a representation of current traffic demands compared to pre-COVID (Table 3-10).

**Table 3-10 – Traffic demands on M4 on/off-slips – May 2022 v’s May 2019**

Junction arm	24hr AWT			AM pk			PM pk		
	2019	2022	% diff	2019	2022	% diff	2019	2022	% diff
E/b off-slip	8,702	8,116	-7%	951	838	-12%	693	624	-10%
W/b off-slip	8,501	8,146	-4%	697	693	0%	741	692	-7%
E/b on-slip	<i>Comparable data not available</i>								
W/b on-slip	8,637	8,136	-6%	838	763	-9%	790	721	-9%

Source – WebTRIS, May 2019 and May 2022 data

Table 3-10 indicates a general trend of current traffic demands being within 90% of pre-pandemic levels. This correlates well with insights from Wiltshire Council and some further spot locations on the A350, where recent counts indicate traffic levels within at least 90% of pre-pandemic levels (and in some instances more than 100%).

### 3.2.2.10. Forecast changes in travel demand

The Wiltshire Transport Model (WTM)<sup>21</sup> forecasts a **28% increase in 12-hour vehicle trips** between 2018 and 2036 for potential ‘in-scope’ demand (i.e. sector movements with higher potential to use M4 Junction 17 – see Section 3.2.2.3). This is based on a core growth scenario (population and land use assumptions)<sup>22</sup>, reflecting committed developments and in line with national population and traffic growth projections.

The forecast traffic demand growth varies between locations (**Table 3-11**). The growth in trips to/from Chippenham is of particular significance given its reliance on M4 Junction 17 to the wider network. The forecasts do not specifically take into account impacts of COVID-19 on traffic growth (Section 3.2.2.9).

<sup>21</sup> The Wiltshire Transport Model (WTM) is the current forecasting tool relevant to the A350 corridor in west Wiltshire. It is a highways model focused on the Wiltshire area, but has a national coverage. The WTM takes local planning and land use assumptions together with TEMPro inputs to predict traffic demands in future forecast years. See the Economic Dimension and Appendix B2 for more details.

<sup>22</sup> The WTM core growth scenario reflects land use or transport supply changes with a high degree of certainty (in this case mainly reflecting the current Wiltshire Core Strategy), with overall growth across the modelled area controlled to TEMPro. The WTM is used to further consider alternative growth scenarios as part of the Economic Case.

**Table 3-11 – Forecast change in ‘in-scope’ vehicle trips (2018 to 2036, 07:00 to 19:00)**

Location	Change in origin trips	% change (2036-2018)	Change in destination trips	% change (2036-2018)
Chippenham (town and rural hinterland)	5,362	+20%	5,132	+20%
Melksham	774	+23%	803	+22%
Trowbridge	1,853	+31%	1,695	+31%
Swindon (and surroundings)	2,615	+34%	3,314	+26%
Malmesbury	439	+9%	638	+11%
West of England (Bristol, Bath, North Somerset, South Gloucestershire)	7,212	+21%	6,563	+21%
Dorset	2,016	+27%	2,075	+26%
All ‘in-scope’ trips (includes additional locations to those shown above)	47,630	+28%	47,630	+28%

Source – Wiltshire Transport Model

The potential implications of further traffic growth without intervention are explored in Section 3.2.4).

### 3.2.3. Business need and service gaps

The current issues and limitations relating to M4 Junction 17 and the A350 corridor, combined with expected growth in travel demands, present a barrier to achieving local, regional and national strategic priorities (as set out in section 3.1.6). **Table 3-12** provides a summary to demonstrate these relationships, which are explored further below. Section 3.2.4 further considers the future impacts without intervention (‘business as usual’).

**Table 3-12 – Summary of business need and service gaps**

Business need / driver for change		Barrier / gap resulting from existing transport arrangements				
		M4 Junction 17				Wider
		Peak period traffic delays	Poor reliability and network resilience	Capacity constraints (increasing traffic demands)	Safety / collisions	A36/A46 subject to significant constraints
1	Increasing the economic competitiveness and productivity within the A350 Growth Zone	xxx	xxx	xxx	x	x
2	Meeting local housing / job need in line with the spatial strategy for housing and employment growth in West Wiltshire	xx	xx	xxx	x	x
3	Holistic and co-ordinated approach to improving north-south connectivity	xx	xx	xxx	x	xxx
4	Ensuring the safe and efficient operation of the SRN / MRN	xx	xx	xx	xxx	xxx
5	Maintaining user / customer satisfaction	xxx	xxx	xx	xx	xx

xxx – higher impact / xx – medium impact / x – lower impact

### 3.2.3.1. Increasing economic competitiveness and productivity within the A350 Growth Zone

The A350 is a key artery for the economic development of Wiltshire and the wider Western Gateway area. It is a critical element of the SWLEP's economic growth strategy for unlocking local growth and development and addressing the 'productivity gap' in Wiltshire. The priority is to deliver significant job growth at the strategic employment sites to help improve the self-containment within the main settlements by providing more, high quality jobs for local people. Accelerating the provision of employment growth in Chippenham is a key focus in securing the future economic prosperity of the town in the manufacturing and service sectors, including ICT and logistics.

There are major opportunities to attract new investment, with demand driven in part by businesses looking to move along the M4 from London searching for more space, relatively lower costs and the benefits of good strategic transport links.

**Congestion and delays at M4 Junction 17 impose additional costs to existing and prospective businesses and impacts access to labour markets. This presents a constraint to productivity and reduces the attractiveness of the area for new inward investment.**

### 3.2.3.2. Meeting local housing / job need in line with the spatial strategy for housing and employment growth in West Wiltshire

The spatial strategy in recent decades has directed significant housing and employment growth to the key West Wiltshire settlements along the A350 corridor. This approach is set to continue as part of the ongoing Local Plan Review, which will extend the planning horizon to 2036, with approximately 60% of Wiltshire's total housing need planned to be met within the A350 corridor (see also Section 3.1.6.3). Approximately 9,000 new dwellings are expected to be delivered between 2019 and 2036 in Chippenham alone.

**Planned and future housing and jobs growth and development in West Wiltshire, especially at the 'principal' settlement of Chippenham, will increase pressure on M4 Junction 17. The junction lacks available capacity (particularly during peak periods) to satisfactorily accommodate additional traffic demands without significant adverse impacts on existing transport users<sup>23</sup>. Further development of prospective employment land surrounding M4 Junction 17 also requires high quality access to improve the viability of development prospects.**

### 3.2.3.3. Holistic and co-ordinated approach to improving north-south connectivity

At a strategic level, efficient north-south connectivity between the south coast (including its international gateways) and M4 is a key priority for the Western Gateway STB and is subject to an ongoing study by National Highways (see Section 3.1.5.3). The current designated SRN is the A36/A46, although this route is subject to significant constraints including within the Bath area (see also Section 3.2.2.5). The A350 provides the primary alternative north-south connection, with its significance being recognised in its classification as part of the Major Road Network (including its importance for freight movements). Wiltshire Council has taken a holistic approach to improving north-south connectivity, including improved rail services and a co-ordinated approach to upgrading the A350. Past improvements to the A350 have been made at and to the south of Melksham and around Chippenham. There are further proposed improvements such as the Melksham Bypass and completion of dualling around Chippenham.

**Without intervention, the capacity and safety issues at M4 Junction 17 are likely to present a 'bottleneck' to the A350 corridor, with a risk that wider investment along the corridor is not fully maximised. Addressing the issues at M4 Junction 17 is therefore key to a 'whole corridor' strategy approach.**

### 3.2.3.4. Ensuring the safe and efficient operation of the SRN / MRN

Safety is paramount and a key operational objective. Wiltshire Council and National Highways have targets relating to collision reduction, in line with Central Government policy around Vision Zero.

**Evidence indicates a higher collision rate at M4 Junction 17 compared to other similar junctions. The existing junction layout (with three of the arms unsignalised) and the high volumes of traffic are contributing factors.**

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<sup>23</sup> The current [transport evidence base](#) supporting the Local Plan Review identifies a number of necessary transport infrastructure improvements to support proposed Local Plan growth, including at M4 Junction 17.



Collisions and other network incidents (planned and unplanned) cause disruption to users. The lack of alternative north-south routes results in the network being sensitive to such incidents. The efficient operation of the A350 corridor, including M4 Junction 17, is therefore important to overall network resilience and network management.

#### 3.2.3.5. Maintaining user / customer satisfaction

Wiltshire Council and National Highways are accountable to users of the local and strategic highway network respectively. Both organisations use satisfaction levels to inform transparent reporting of performance against business objectives<sup>24</sup>. Stakeholder feedback, particularly from the business community<sup>25</sup>, suggests that there is growing concern with regards to north-south connectivity via the A350.

### 3.2.4. Impact of not changing

Failure to address the problems arising from the existing arrangements at M4 Junction 17 (presently, and in future years) would result in adverse consequences for the MRN/SRN, affecting transport users, businesses and wider society.

#### 3.2.4.1. 'Business as Usual' scenario

The 'Business as Usual' scenario from the SOBC has been reviewed and is assumed to comprise:

- Regular asset maintenance related activities at and around M4 Junction 17;
- No other significant changes to the transport network or transport services (which would have a significant bearing on the problems);
- Transport mitigation associated with new developments (of sufficient size/impact) determined on a case by case basis (in accordance with planning regulations) – this could include further development in the vicinity of M4 Junction 17 and/or development farther away (e.g. A350 corridor) but of a sufficient scale that its impacts require mitigation.

At the time of writing there is one known development with planning consent and a related, approved mitigation scheme at M4 Junction 17. This relates to the St Modwen Park development (see Section 3.1.6.3) and the mitigation scheme is due to be implemented in Summer/Autumn 2022.

#### 3.2.4.2. Forecast traffic impacts – no intervention

Traffic modelling helps to demonstrate the predicted future impacts on the transport network assuming no intervention at M4 Junction 17, based on standard assumptions for traffic demand growth (see Section 3.2.2.10 for instance).

The traffic modelling outputs<sup>26</sup> suggest that a significant deterioration in traffic conditions at M4 Junction 17 could be expected between 2018 (the base year) and 2036 (forecast year) in a 'without scheme' scenario. **Figure 3-15** illustrates the change in modelled average queue lengths for the AM and PM peak hours for each approach arm plus the gyratory. Substantial increases in queuing are predicted on the A350, A429 and B4122 arms. Overall, the extent of queues is predicted to be most severe in the AM peak hour by 2036, with the A350 arm the most affected.

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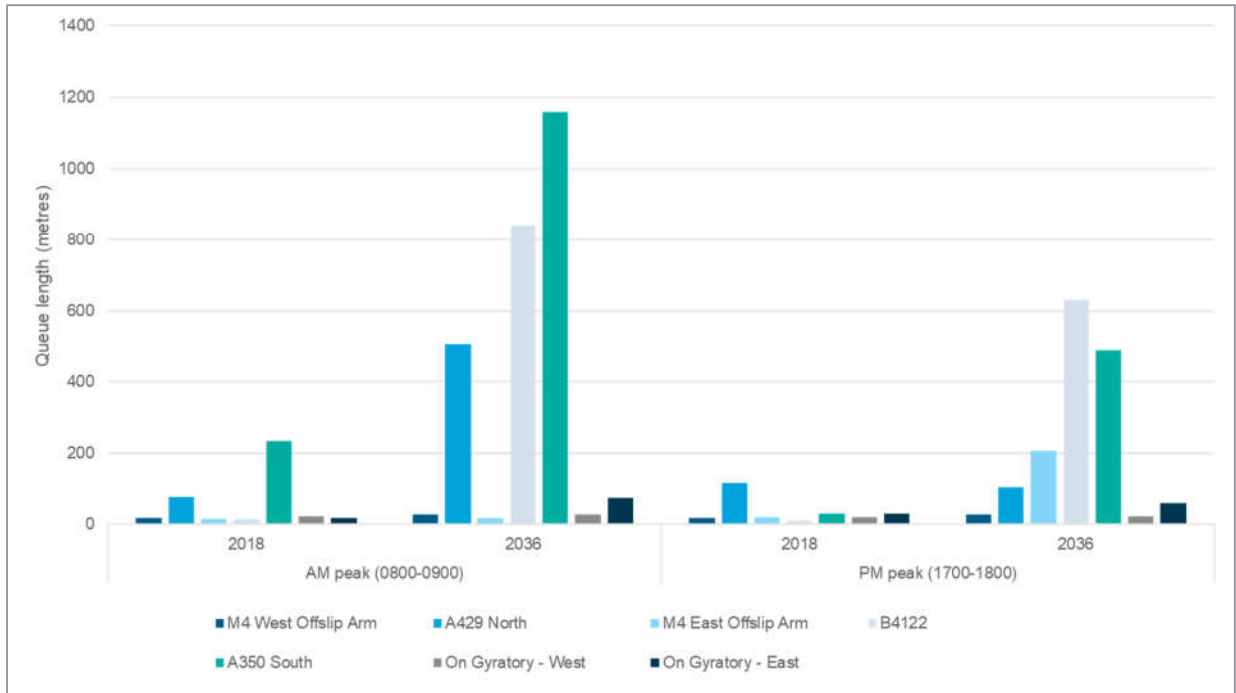
<sup>24</sup> This is typically at a broader level (i.e. not specific to M4 Junction 17), but impacts on specific parts of the network can affect overall user perceptions.

<sup>25</sup> For example, engagement with the Business Forum undertaken by the Western Gateway STB to inform the Regional Evidence Base.

<sup>26</sup> For full details of forecast traffic modelling refer to the Wiltshire Transport Model Forecasting Report (Appendix B2) and the M4 Junction 17 VISSIM Forecasting Report (Appendix B4).



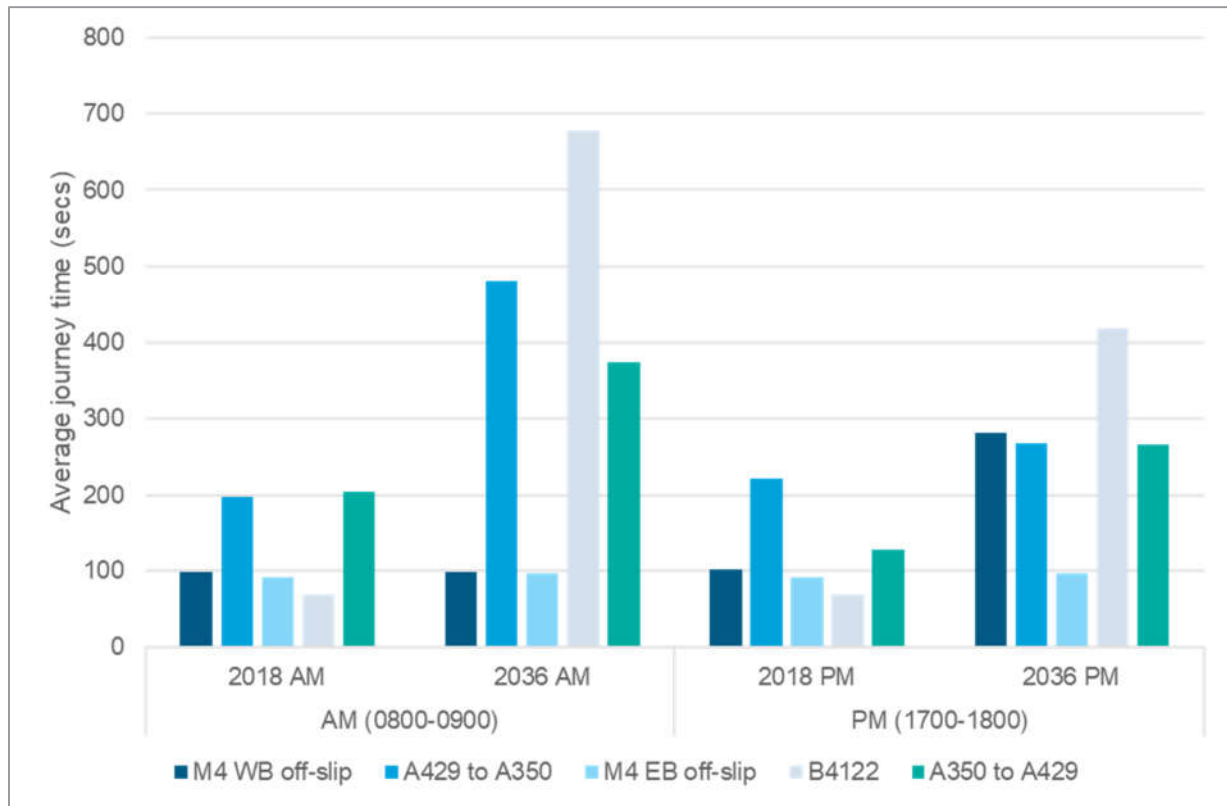
**Figure 3-15 – Modelled average queue lengths at M4 Junction 17 in 2018 and 2036, AM/PM**



Source: VISSIM M4 Junction 17 microsimulation model

**Figure 3-16** presents additional modelled outputs for the predicted change in average journey times at M4 Junction 17 between 2018 and 2036 in the AM and PM peak hours. AM peak hour journey times across the junction from the A350 are predicted to almost double by 2036; equivalent to approximately three minutes additional journey time (per vehicle, on average). Significant increases in journey time are also predicted from the A429 arm (AM peak) and the B4122 arm (AM and PM peaks).

Figure 3-16 – Modelled average journey times at M4 Junction 17 in 2018 and 2036, AM/PM



Source: VISSIM M4 Junction 17 microsimulation model

Further related impacts identified through the traffic modelling include the predicted traffic response to the longer journey times via M4 Junction 17, which results in traffic seeking alternative routes. This indicates wider network impacts, beyond M4 Junction 17 itself, including increased pressure on other congested parts of the network (such as the A36/A46 via Bath and M4 Junction 18) and the use of less suitable routes through rural communities.

### 3.2.4.3. Summary of consequences of not addressing the issues at M4 Junction 17

Under the 'Business as Usual' scenario the issues relating to the existing situation are expected to become more pronounced, leading to a range of direct transport impacts and related consequences. These are summarised in **Table 3-13** and relate the business need and service gaps identified in Section 3.2.3.

Whilst the St Modwen Park mitigation scheme is expected to provide some short-term improvement at M4 Junction 17, it is designed to address the impact of that development only. Evidence from traffic modelling demonstrates that a significant deterioration in junction performance is expected by 2036, before taking into account the more intensive growth strategy associated with the emerging Local Plan Review.

**Table 3-13 – Summary of impacts of no intervention**

Issues / causes (existing)	Transport impacts (left unaddressed)	Related consequences
Traffic demand – existing / background growth / new development	<ul style="list-style-type: none"> <li>Traffic demand continues to grow:                             <ul style="list-style-type: none"> <li>- approx. 28% increase 2018-2036.</li> </ul> </li> <li>Traffic delays and queuing increase:                             <ul style="list-style-type: none"> <li>- approx. 35% increase in AM peak total delay hours at M4 J17 2018-2036.</li> <li>- Approximate doubling of journey times via the A350 arm (on average) during the AM peak</li> <li>- Increased queue lengths have a greater likelihood of impacting other parts of the road network (including the M4 mainline).</li> <li>- Stop/start traffic for longer periods.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>The strategic role of the A350 (MRN) is compromised, with potential negative connectivity and economic impacts for West Wiltshire and the wider region.</li> <li>Economic relationships between the north and south of the area are hindered.</li> </ul>
Congestion – high demands / restricted capacity	<ul style="list-style-type: none"> <li>- Approximate doubling of journey times via the A350 arm (on average) during the AM peak</li> <li>- Increased queue lengths have a greater likelihood of impacting other parts of the road network (including the M4 mainline).</li> <li>- Stop/start traffic for longer periods.</li> </ul>	<ul style="list-style-type: none"> <li>Local economic strategy (focused on the A350 / Swindon Growth Zones) is threatened:                             <ul style="list-style-type: none"> <li>- Increased business costs / loss of business confidence.</li> <li>- It becomes more difficult to attract inward investment.</li> <li>- Business retention may decline.</li> </ul> </li> </ul>
Network resilience	<ul style="list-style-type: none"> <li>Journey times become more variable, with more frequent disruption and incidents.</li> <li>Traffic increasingly uses alternative routes to avoid delays at M4 J17:                             <ul style="list-style-type: none"> <li>- Increase in average vehicle trip lengths / fuel consumption.</li> <li>- Traffic increases on other (potentially less suitable) routes and increased pressure on adjacent M4 junctions (i.e. J18 and J16).</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>The operational resilience and safety performance of the SRN comes under threat.</li> <li>Potential decline in customer satisfaction levels.</li> </ul>
Collisions – high demand / uncontrolled operation	<ul style="list-style-type: none"> <li>Traffic increasingly uses alternative routes to avoid delays at M4 J17:                             <ul style="list-style-type: none"> <li>- Increase in average vehicle trip lengths / fuel consumption.</li> <li>- Traffic increases on other (potentially less suitable) routes and increased pressure on adjacent M4 junctions (i.e. J18 and J16).</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>M4 J17 becomes a constraint to Wiltshire’s Emerging Spatial Strategy (with a significant focus on future housing and employment delivery in the Chippenham area and the A350 corridor).</li> <li>Local communities (within Wiltshire and beyond) are increasingly affected by the impacts of traffic diversion (including noise / air quality impacts).</li> <li>Increase in carbon emissions.</li> </ul>

#### 3.2.4.4. The need for government intervention

A strategic and holistic intervention at M4 Junction 17 is required to fully meet the identified business needs of Wiltshire Council, National Highways and DfT. The ‘Business as Usual’ scenario would result in a reactive, piecemeal approach to mitigating the impacts of individual development sites on M4 Junction 17 over time. This has a number of limitations and undesirable outcomes, including:

- greater disruption to users, due to multiple construction / works phases;
- not fully addressing the problems (in particular as new development is only required to mitigate the specific development impact); and
- a lack of strategic planning and certainty, which would adversely impact business confidence and inward investment and could impact the viability of the preferred growth strategy for Wiltshire (through the Local Plan Review process).

Wiltshire Council is not able to fully fund a strategic intervention from its own resources (including existing / anticipated developer contributions). As demonstrated within the Strategic Context (Section 3.1) the proposal

presents a strong alignment with the DfT's MRN fund and complements other MRN / LLM scheme proposals on the A350 corridor. Intervention is required now to avoid the 'Business as Usual' issues identified above and to ensure that upgrades to the A350 are delivered in a co-ordinated manner which provides the best overall value against investment.

### 3.3. The investment proposal

This section sets out the scheme objectives, the scope of the scheme and its expected benefits. It provides an overview of how the preferred scheme option has been determined, including the role of stakeholder input. It also highlights some of the key considerations associated with implementation of the scheme, including key risks, constraints and inter-dependencies.

#### 3.3.1. SMART spending objectives

##### 3.3.1.1. Development of scheme objectives

The M4 Junction 17 scheme objectives define what the investment seeks to achieve and what success looks like. The objectives have been developed in order that:

- they **address the transport problems and issues** identified in Section 3.2.2; and
- they **relate to the relevant strategic objectives and business strategy / needs** (Sections 3.1 and 3.2.3) - including those of DfT, Wiltshire Council, National Highways, Western Gateway STB and Swindon and Wiltshire Local Enterprise Partnership).

A hierarchy of objectives has been developed, including high-level objectives, specific transport objectives and related measurable outcomes.

##### 3.3.1.2. High-level and transport objectives

Five linked high-level objectives and transport objectives have been identified (**Table 3-14**). The table demonstrates the relationship to particular strategic objectives (as detailed within the Strategic Context – Section 3.1) and the overall business need in the context of the problems and issues associated with the existing arrangements (Section 3.2.3). This helps to illustrate a thread of strategic alignment between the M4 Junction 17 scheme and wider strategic priorities.

**Table 3-14 - Objectives and measures of success**

High-level objectives	Transport scheme objectives	Business need addressed <sup>27</sup>	Primary contribution to strategic objectives <sup>28</sup>	Measures of success (indicative)
Reduce congestion	Reduce delay and improve journey time reliability at M4 Junction 17, supporting journeys on the SRN / MRN.	1, 4, 5	DfT: 1 / TIS: 1 / MRN: 1 NH: 2 / SEP: 2 / LTP: 4 / WG: 5	Change in peak period (AM/PM) journey times via M4 J17 (average by each arm)
Support the SRN	Enhance the wider package of MRN/LLM improvements for the A350, which would be most effective when delivered in combination.	3	DfT: 1 / NH: 2 / SEP: 2 / LTP: 4 / WG: 5	Change in day to day variability of peak period journey times  Change in average / maximum queue lengths, by approach arm
Support economic growth and rebalancing	Improve north-south connectivity on the A350 through improvements to M4 Junction 17, the gateway to the A350 / South Coast from the SRN.	1, 3, 4, 5	DfT: 2 / TIS: 2, 3 / MRN: 2 / SEP: 2,4 / LTP: 10 / WG: 1, 2,3,5 / WCS: 1 / WBP: 1 / WC: 3	Changes in the number and severity of collisions at, and on the approaches to, M4 J17
Support housing delivery	Ensure that M4 Junction 17 has the capacity to accommodate planned and future growth in the A350 Corridor and in the A350 and Swindon M4 SWLEP Growth Zones, including the Wiltshire Local Plan Review.	1, 2	DfT: 3 / TIS: 4 / MRN: 3 / NH: 2 / SEP: 2,4 / LTP: 12 / WG: 6 / WCS: 3 / WBP: 1	Approval of Wiltshire Local Plan Review  Progress of strategic sites in the A350 and M4 Swindon Growth Zones
Support all road users	Increase safety levels at M4 Junction 17, taking into account forecast traffic growth.	4, 5	DfT: 1 / MRN: 4 / NH: 1,5 / LTP: 8 / WC: 1	New / expanded businesses and significance of M4 J17 to investment decisions

<sup>27</sup> Numbering refers to Table 3-12.

<sup>28</sup> Numbering refers to various tables in Section 3.1.5 and Section 3.1.6.

### 3.3.1.3. Measures of success

The transport objectives have been considered in a 'SMART' context (i.e. Specific, Measurable, Agreed upon, Realistic and Time-bound). The identification of measures of success (Table 3-14) helps to define a more tangible outcome and informs the approach to future monitoring and evaluation of the scheme, as set out in the Management Dimension (Section 7) and the outline Benefits Realisation, Monitoring and Evaluation Plan (Appendix E7). Further development of the Plan will include the identification of targets and associated timescales.

### 3.3.2. Scope

The overall core scope of investment to deliver the spending objectives constitutes highways improvement works focussed on M4 Junction 17 to provide additional capacity and enhanced junction performance. This remains consistent with the core scope within the SOBC.

During the development of this OBC, the scope has been broadened slightly to further encompass complementary measures for cyclists. This is considered to be justified on the basis of alignment with relevant strategic objectives for supporting all users.

Further details of the specific scope, based on the preferred scheme option, are provided below.

#### 3.3.2.1. Core investment scope – M4 Junction 17 improvement

Based on the preferred scheme option<sup>29</sup> for M4 Junction 17, the scope of investment comprises:

- Introduction of traffic signals to all approaches to the roundabout (i.e. completion of the full signalisation of the junction);
- Carriageway widening and additional traffic capacity on all approaches to the junction (M4 off slips, A350, A429 and B4122);
- Increase in the number of traffic lanes across the motorway bridges from two to three (with no physical changes to the structures);
- Widening of the circulatory carriageway and introduction of additional traffic lanes and capacity around the junction; and
- Repositioning of the layby along the A350 to allow for carriageway widening work.

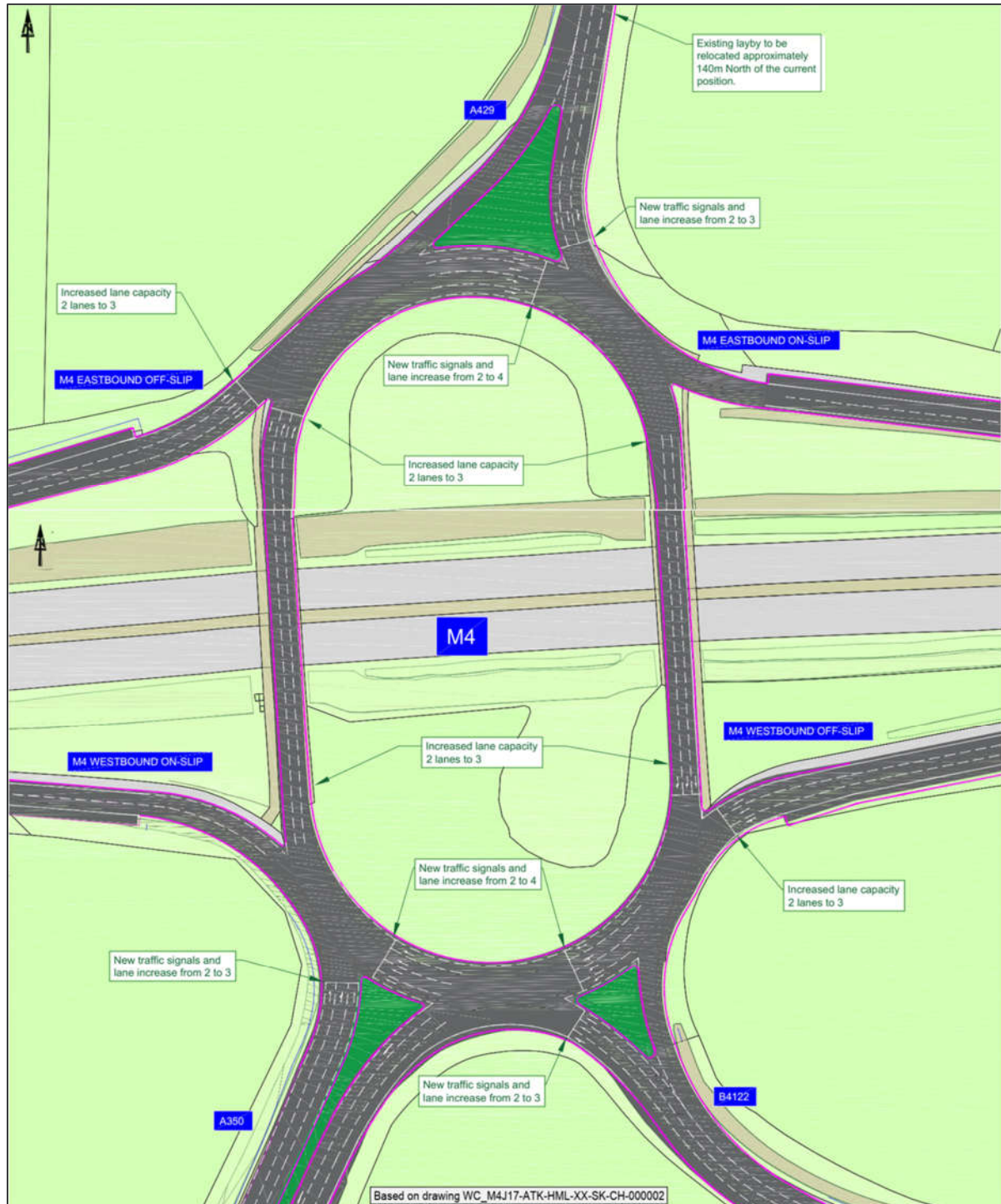
The preferred scheme option is illustrated in **Figure 3-17**. More detailed design drawings are provided in **Appendix A3**.

The preferred scheme option does not involve any physical structural changes to the two circulatory overbridges. Additional capacity is to be provided by increasing the number of lanes from two to three through the use of narrow lanes.

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<sup>29</sup> See Section 3.3.5 and the Economic Dimension for details on the identification of the preferred option.

Figure 3-17 - Proposed improvement scheme at M4 Junction 17



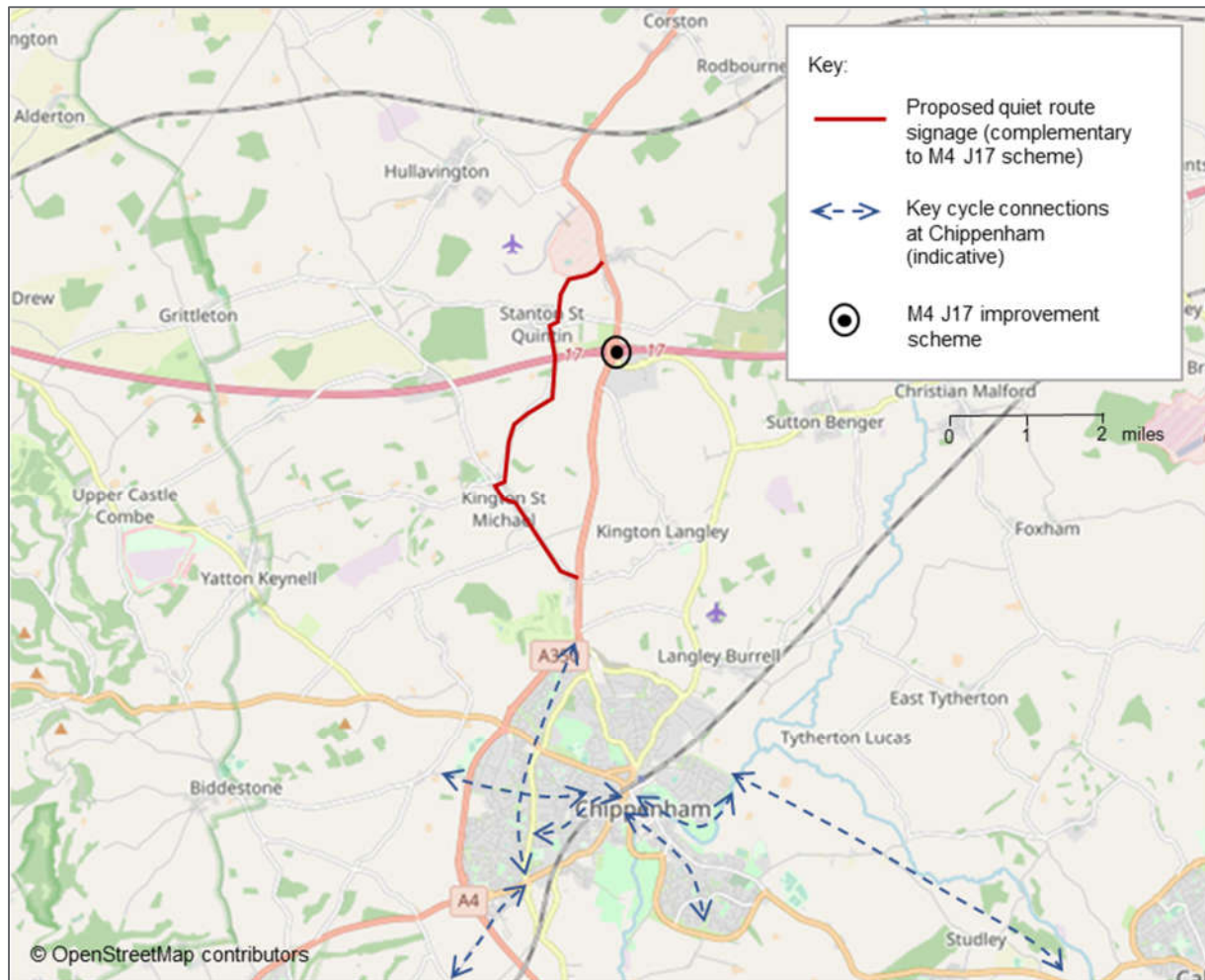


### 3.3.2.2. Supplementary investment scope – quiet cycle route

To complement the improvement at M4 Junction 17, included in scope is a signage strategy for a north-south quiet cycle route, providing access across the M4 between Chippenham and Lower Stanton St Quintin (**Figure 3-18**). This will support access to the Hullavington Airfield area, the site of the Dyson technology campus, with scope for further development/expansion.

A more detailed drawing is provided in **Appendix A3**.

**Figure 3-18 – Supplementary cycle route signage proposal**





### 3.3.3. Strategic Benefits

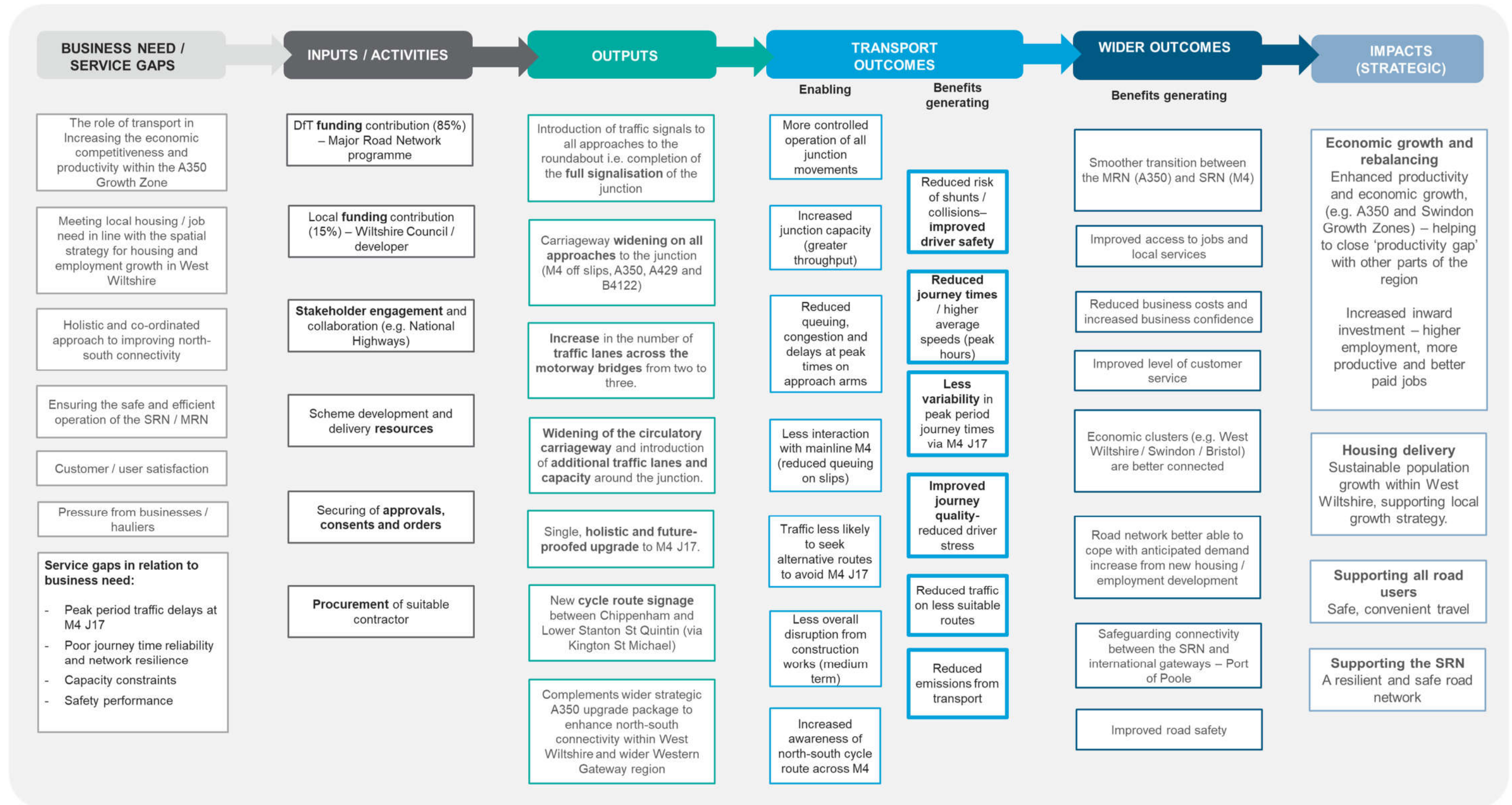
The anticipated outcomes and benefits resulting from the M4 Junction 17 investment have been reviewed and updated from the SOBC, using the latest evidence base developed for the OBC. The scheme is shown to be effective in addressing the spending objectives (as identified in Section 3.3.1), leading to further outcomes and benefits making a positive contribution towards strategic priorities (as identified within the Strategic Context).

This section draws upon evidence which is consistent with the Economic Dimension. Full analysis of the scheme impacts, and assessment of its value for money, is addressed within the Economic Dimension.

#### 3.3.3.1. Theory of change

A clear causal chain has been established linking: business need / service gaps (problems); project inputs (resources and activities); project outputs (specific deliverables); transport outcomes; intermediate outcomes; and strategic impacts. This is illustrated in **Figure 3-19** in the form of a logic map.

Figure 3-19 – M4 Junction 17 logic map



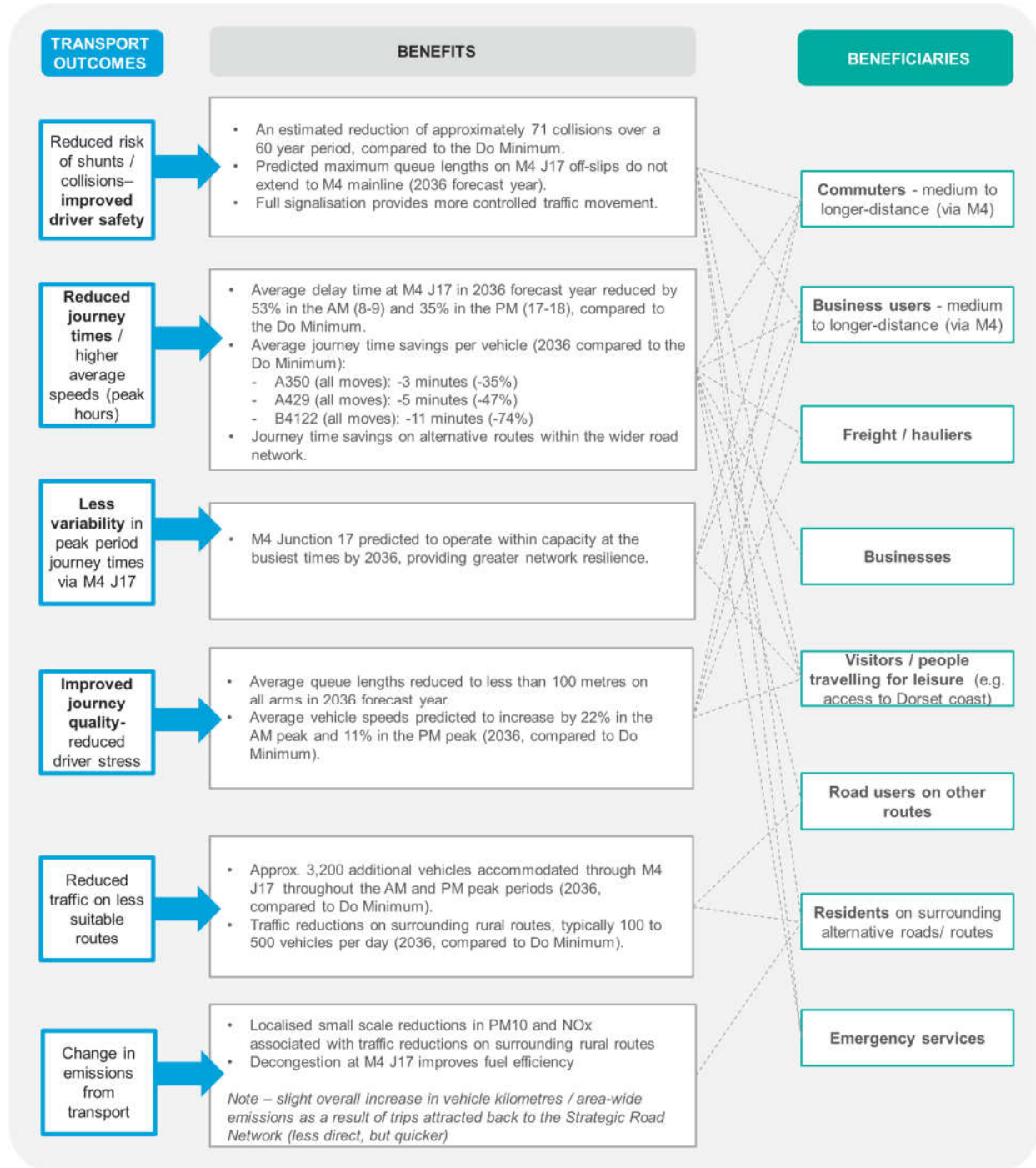
At a simplified level, the primary logic flow can be summarised as follows:

- The scheme will deliver **changes to the junction layout at M4 Junction 17** to directly address current and future issues related to **congestion, journey time delays / reliability and collisions** (safety) at a key node between the SRN and MRN.
- The **outputs** delivered through the investment will **overcome the problems** by providing **additional capacity** (approach arm and circulatory widening) and introducing **full signal control**.
- This will allow the junction to **cope better with expected demands** (particularly in the peak periods), allow **greater traffic throughput** and also **regulate traffic flows**.
- This supports a range of directly related transport outcomes, including: **reduced delay** (less congestion); **more comfortable and reliable journeys**; **reduction in collisions**; and changes in traffic flows.
- In combination with the wider portfolio of A350 schemes promoted by Wiltshire Council (at Chippenham and Melksham) this section of the A350 would be substantially upgraded to a standard more compatible with its strategic function.
- Faster and more reliable journey times between the A350 / A429 and the M4 corridor (SRN) will provide **improved north-south connectivity** for West Wiltshire and the wider Western Gateway region - a key priority Wiltshire Council, the Western Gateway STB and other local authorities within the region.
- This facilitates **increased economic activity** and interaction, **better connecting people and businesses to markets and international gateways** (e.g. Port of Poole), better connecting the two key Growth Zones in Wiltshire, thus **boosting economic productivity**. In turn, this makes the area more attractive to businesses and people, encouraging further investment.
- Improved capacity at M4 Junction 17 also means that the network is more able to **cater for the additional demand from new housing** within the A350 corridor (as per Wiltshire Council's emerging Local Plan Review), without significant adverse impacts on existing users.

#### 3.3.3.2. Outcomes and benefits

The scheme outcomes will deliver a range of benefits across transport users and non-transport users. **Figure 3-20** focuses on the transport outcomes and demonstrates the nature of the benefits (using quantified evidence where applicable) and the expected beneficiaries.

Figure 3-20 – M4 Junction 17 primary scheme benefits

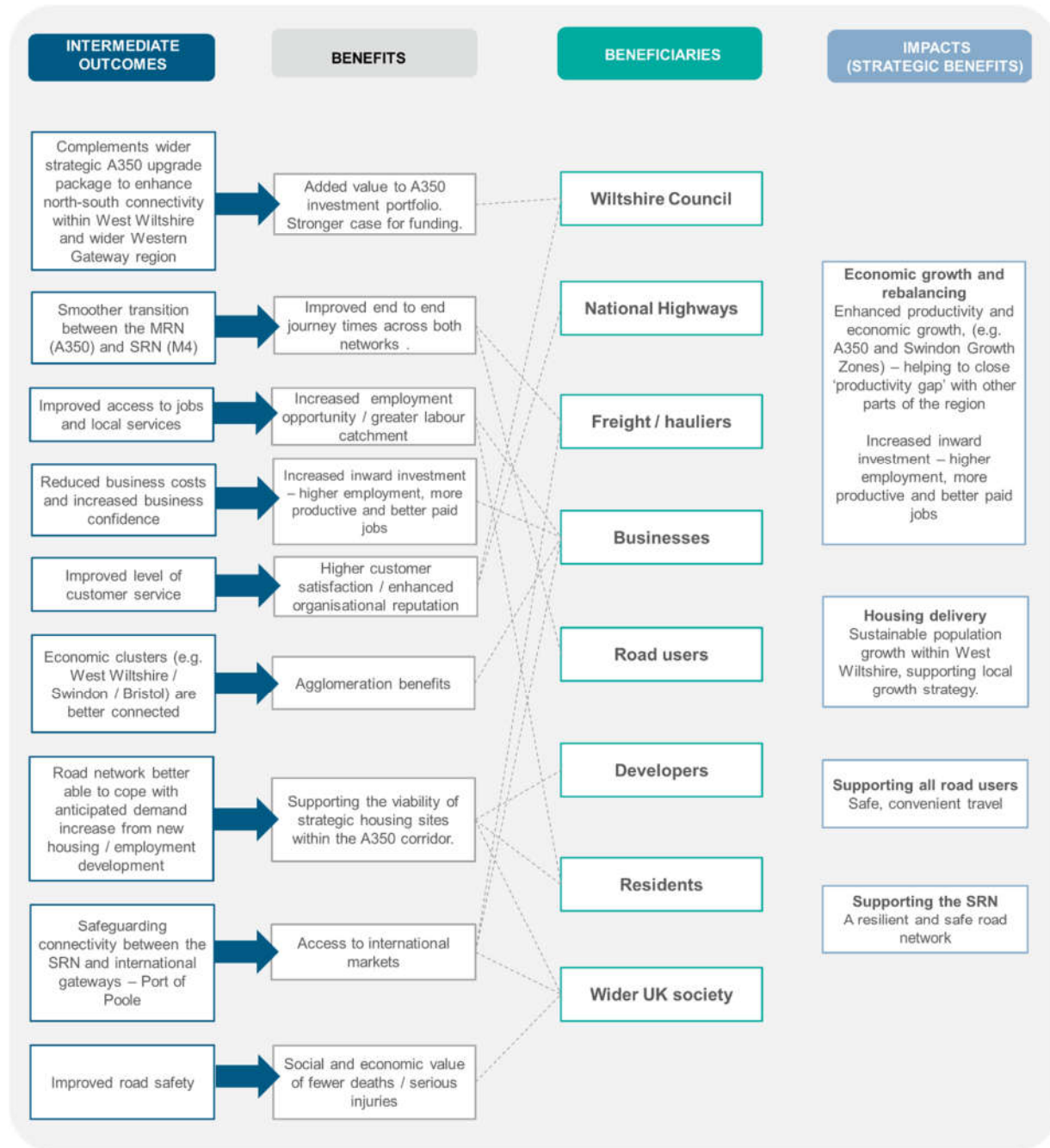


There is a broad range of expected beneficiaries. Furthermore, benefits are not expected to be limited to users of M4 Junction 17. For instance, reducing the likelihood of traffic re-routing away from M4 Junction 17 (see also Section 3.2.4.2) will provide benefits to other users across the wider network and potential residents / businesses on those routes.



Figure 3-21 provides a similar analysis of the intermediate outcomes (extending from the transport outcomes) and the resultant impacts. This demonstrates how the transport outcomes facilitate wider economic and social outcomes and benefits, ultimately contributing to the strategic priorities for Wiltshire Council, DfT and National Highways.

Figure 3-21 – M4 Junction 17 wider scheme benefits



At this level, there are benefits of a more strategic nature, falling to wider society or at an organisational level. For instance, improved connections between the SRN / MRN and greater network resilience is expected to contribute positively on customer satisfaction levels, which is a key performance metric for National Highways.

### 3.3.4. Key stakeholder views and requirements

#### 3.3.4.1. Key stakeholders / stakeholder groups

Key stakeholder groups and their involvement or interest in relation to the M4 Junction 17 scheme are summarised in **Table 3-15**. Further details are provided in the Stakeholder Engagement and Communications Plan (**Appendix E3**). Wiltshire Council seeks to manage the different stakeholder needs and expectations in a balanced manner, alongside the need to ensure that the scheme will also continue to meet its primary objectives.

**Table 3-15 - Key stakeholder groups**

Stakeholder group	Key stakeholders	Involvement / interest
Network operator	National Highways	Operates the signals, slip roads and, overbridges at M4 Junction 17. Responsible for ensuring the safe and efficient operation of the SRN. Regulates scheme design (e.g. sign off of departures from standard).
General public	Residents in Chippenham, Malmesbury and local villages Residents in Wiltshire A350 / M4 users	Potential beneficiaries of the scheme. Potential for positive / adverse impacts resulting from the scheme – either directly or indirectly, e.g. localised noise impacts.
Businesses	Businesses in Chippenham and the surrounding area. Business Forum Wiltshire Chamber of Commerce Hauliers	Potential beneficiaries of the scheme – in terms of reduced business costs and / or improved employee and customer access. Potential for positive / adverse impacts resulting from the scheme – either directly or indirectly.
Developers	Future Chippenham St Modwen	Promoters of development with expected impacts on M4 J17. Potential financial contribution towards the scheme.
Statutory and non-statutory environmental bodies (SEB)	Historic England Natural England Environment Agency	Appropriate early engagement will be had with SEBs regarding any potential adverse environmental effects. Specifically, Natural England will be consulted regarding any potential impacts on the geological SSSI.
Town and parish councils	Chippenham Town Council Kington Langley Parish Council Stanton St. Quintin Parish Council Sutton Benger Parish Council.	Representing the views and interests of local residents and businesses
Landowners	Local farmer / landowner	Additional land is only needed for a temporary easement (access) for construction. This will need to be negotiated with the landowner.

Stakeholder group	Key stakeholders	Involvement / interest
Walking / cycling / horse-riding groups	Wiltshire Council's Public Rights of Way Officer, Head of Rights of Way and Countryside, Definitive Map and Highway Records Manager and Countryside Access Officer. British Horse Society. The Ramblers. Sustrans. Local cycling / walking groups.	Interest in the provision for pedestrians, cyclists and horse-riders and impacts of the scheme on existing Public Rights of Way Provision of inputs to specific scheme design aspects.
Regional bodies	Western Gateway Sub-national Transport Body Swindon and Wiltshire Local Enterprise Partnership	Interest in the role of the M4 Junction Improvements scheme in supporting regional transport and economic priorities.
Local media	Wiltshire Times Gazette and Herald BBC Wiltshire BBC Points West ITV West Country	Dissemination of information in relation to the M4 Junction 17 Improvement proposals. The media is an important means of raising awareness / interest and encouraging participation in consultation and engagement activities.
Political representatives	Local MP, Michelle Donelan Wiltshire Council members Chippenham and Villages Area Board	Represent the interests of local constituents
Neighbouring local authorities	Swindon Borough Council Bath and North East Somerset Council	Interest in direct or indirect impacts of the scheme (beneficial or adverse) on their local authority areas and residents / businesses.
Funding approval	Department for Transport	Considers the overall strength of the business case (including value for money) in making recommendations to ministers with regards to central government funding for the scheme.

#### 3.3.4.2. Stakeholder activity undertaken

Stakeholder engagement is undertaken in line with the project Stakeholder Engagement and Communications Plan (Appendix E3). The principal stakeholder engagement activities informing the scheme development to date and the OBC include:

- Focussed stakeholder meetings, briefings and liaison – including with National Highways, DfT, and political representatives;
- Development of a web-based scheme information portal – providing updates on scheme progress, key scheme details and FAQs, with the opportunity to submit feedback / comments; and
- Engagement with walking, cycling and horse-riding groups as part of the WCHAR process (see Appendix A2).

Future engagement and consultation activity to support the full project lifecycle is addressed within the Management Dimension (Section 7) and set out in full in the Stakeholder Engagement and Communications Plan.



### Engagement with National Highways

A principal focus of stakeholder engagement to date has been with National Highways to ensure that the preferred scheme option is acceptable from an operational, safety and design perspective. Wiltshire Council and National Highways have adopted a collaborative approach to the development of the M4 Junction 17 scheme and meet regularly to maintain a consistent interaction. National Highways has been integral to the assessment of options and the development of the preferred scheme design, with participation at key decision points.

Key aspects of the engagement between Wiltshire Council and National Highways to date include:

- Development of the evidence base for options assessment – including development of a microsimulation traffic model and traffic forecasting via the strategic transport model;
- Information exchange – sharing of asset information and records to inform the design process; and
- Regulatory function – formal determination of requested departures from standard as part of the design process.

### Other stakeholder feedback / input

A limited amount of feedback has been received by Wiltshire Council in response to the material provided on the scheme web page. Due to the location of M4 Junction 17, there are few properties within the immediate vicinity of the scheme and this is likely to be a contributing factor to the response rate. Over an approximate two month period (June 2022 to August 2022), a total of 24 responses were received; 15 from the general public, 5 from town/parish councils, 3 from voluntary groups and 1 from a business. Of the limited number of responses received, a number of these identified that the immediate need for the scheme did not appear to be clear. Wiltshire Council is currently considering the feedback; it is expected that additional material will be made available on the web page in relation to the strategic need for the scheme and its role in supporting the A350 corridor strategy, local economic growth and the spatial strategy for medium to longer-term housing and jobs delivery, as set out in the Strategic Context.

## 3.3.5. Options

A robust process has been undertaken to identify the preferred scheme option. This is documented within the Options Assessment Report (OAR), which has been refreshed as part of the OBC – see **Appendix A1**.

### 3.3.5.1. Longlist of options

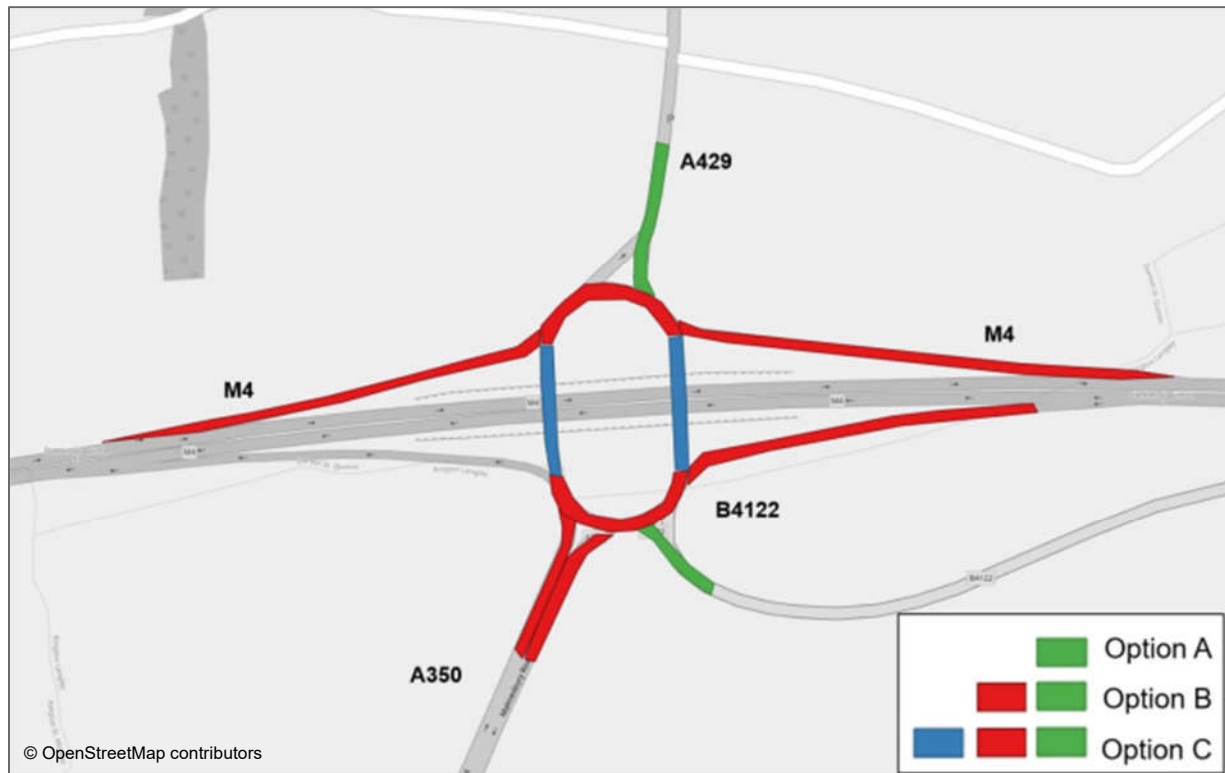
At the SOBC stage an initial longlist of potential options to address the investment objectives was assessed. This has also been reviewed as part of the OAR refresh. The full range of options included highway capacity improvements as well as alternative modes and policy measures to reduce highway demand.

A sifting process determined that only the capacity improvement options demonstrated a sufficiently strong alignment to the spending objectives and the potential to deliver the necessary scale of impact. However, walking and cycling measures were identified as an additional component and would help to ensure that the scheme considers all users.

A small number of capacity improvement options were identified to be subject to further assessment (Figure 3-22). These predominantly reflected an incremental scale of intervention:

- Option A - widening the A429 and B4122 approaches to M4 Junction 17 and delivering full signalisation;
- Option B – Widen all approaches to M4 Junction 17 and M4 slip roads, and deliver full signalisation (remains 2 lanes on the gyratory); and
- Option C – Widen overbridges at M4 Junction 17 and deliver an upgrade to 3 lanes on the gyratory. Widen approaches to M4 Junction 17 and deliver full signalisation.

Figure 3-22 - M4 Junction 17 highway options



### 3.3.5.2. Further assessment

All three options demonstrated a strong strategic fit. The initial assessment included traffic modelling (Linsig) and consideration of other criteria in line with business case requirements, such as cost/affordability, deliverability and overall value for money.

The initial assessment indicated that:

- Option A would have a lower scale of impact and was unlikely to fully address the future forecast traffic issues;
- Option C performed strongest from an operational perspective, although the need for major structural work to the overbridges resulted in a significantly higher cost and increased delivery risk; and
- Option B provided a balance between improved capacity, technical complexity and cost – hence it was considered to provide the best overall value for money.

### 3.3.5.3. Shortlist assessment and identification of the preferred option

Further development and assessment of the options focussed on Option B and Option C. As part of this process a new hybrid option (Option B+) was identified. Option B+ replicated Option B, but introduced a third lane on the circulatory overbridges through the use of narrow lanes. This option was conceived as a means of gaining some of the additional operational benefit from Option C but without the significant additional cost.

Further traffic modelling (including LinSig and microsimulation modelling), assessment of the options against business case criteria, and input from National Highways identified Option B+ as the best performing option overall. There are some additional safety considerations associated with the narrow lanes operation, but this option provides greater operational capacity than Option B, and is a far more deliverable and affordable option compared to Option C. Option B+ aligns with National Highway's desire for a long-term holistic solution at M4 Junction 17.

Option B+ was subsequently subject to some further design refinement and optimisation to arrive at the current preferred option, as set out in Section 3.3.2.

### 3.3.6. Risks

Project risks have been reviewed and updated from the SOBC stage as part of the risk management strategy (see Management dimension, Section 7.11). The Risk Register (**Appendix E6**) provides a full record of identified risks (including risk owners), assessment of impact (including cost / programme) and likelihood, and control measures.

A summary of some of the most significant risks to achieving the scheme objectives is provided in **Table 3-16**, with risks categorised as business, service or external risks.

**Table 3-16 - Key risks associated with scheme implementation**

Risk	Detail / potential impact	Likelihood / assumptions
<b>Business risks – within or impacting the principal organisations (Wiltshire Council / DfT)</b>		
Loss of political support / significant change in strategic priorities	Project termination or significant changes. Possible reputational damage.	Low – strong commitment at national, regional and local levels.
Negative stakeholder feedback	Possible reputational damage.	Low – early and regular engagement with the primary stakeholders, including National Highways.
<b>Service risks - associated with the design, build and financing of the project</b>		
Land agreements	Difficulties in acquiring necessary land – delays and increased costs.	Low – temporary land easement for construction works only.
Unexpected ground conditions	Additional site surveys and/or re-design resulting in possible delay and increased costs.	Medium – no site specific ground investigations available at this stage of design. To be completed soon after OBC approval.
Proximity to (and potential impact on) geological SSSI <sup>30</sup>	Potential additional work/design change if the impact on SSSI can not be reduced to acceptable levels	Medium
Design approval -e.g. agreement of departures from standard and relaxations	Potential changes to scheme design. Increased cost / complexity and potential impact on the effectiveness of the scheme.	Low – key departures have been approved by National Highways. Regular liaison with NH. Further departures require approval from the local highway authority (Wiltshire Council).
Inadequate structural capacity of overbridges	Compromises the viability of the preferred scheme option.	Low – overall carriageway width is not increasing. Structural assessments to be completed soon after OBC approval.
Power supply to additional signalling	Existing power supply may have limited capacity resulting in the need for a revised design for the electrical supply for the traffic signals – increased costs.	Medium – engagement with the Distribution Network Operator (DNO) is planned at the outset of the next stage of scheme design.

<sup>30</sup> The Stanton St Quinton Quarry and Motorway Cutting Site of Special Scientific Interest (SSSI) crosses both carriageways of the M4 at Junction 17.

Risk	Detail / potential impact	Likelihood / assumptions
Availability / shortage of suitable contractors	Multiple schemes running at the same period of time in a relatively small geographical area. Market factors (Brexit, Conflicts, Energy prices etc). Potential for programme delay / increased cost.	High – the preferred procurement approach has been determined (see Commercial Dimension) and market engagement activity is expected to take place during the next stage of scheme development.
Actual future traffic demands vary significantly from forecast	Potential reduced effectiveness against investment objectives.	Low – operational assessment of the scheme demonstrates it remains effective under high growth traffic conditions. Impacts of higher / lower traffic on overall Value for Money are considered in the Economic Dimension.
Unable to meet local funding contribution	DfT requires a 15% local contribution. Potential impact on scheme affordability / viability if not met.	Low – 15% local contribution is expected to be met from S106 developer contributions and Community Infrastructure Levy funds (see Financial Dimension).
<b>External risks - risks that affect all society, and are not connected directly to the programme or project</b>		
Cost inflation	General inflation results in increased price of materials and labour, beyond current inflation assumptions for scheme costing. Potential impact on affordability.	High – the UK is currently experiencing a period of rapid increase in inflation. Potential implications can be tested, and impacts on overall VfM assessed (Economic Dimension), but not possible to fully mitigate.
Significant policy / regulatory shift	Major change in policy stance delays or disrupts progress, or leads to curtailment - e.g. Welsh Government review of road projects in light of Net Zero agenda.	Medium – no current indications of major policy changes which could disrupt the project.
Covid-19 pandemic resurgence (or similar)	Potential delays to delivery / construction (e.g. periods of 'lockdown').	Medium – increased preparedness for based on recent experience, but not possible to fully mitigate.

### 3.3.7. Constraints

Constraints are the internal / external conditions and agreed parameters within which the programme must be delivered, over which the M4 Junction 17 project has little or no control. **Table 3-17** identifies high level constraints with potential to affect the project, including in terms of influencing the identification and development of the proposed scheme and its successful implementation.

**Table 3-17 – High-level constraints associated with scheme implementation**

High level constraint	Type	Potential project considerations / implications
Major Road Network fund eligibility criteria	External - funding	Typical DfT contribution of £20m to £50m. Alignment with MRN fund objectives. Requirement for minimum local funding contribution of c.15%.
Compliance with planning legislation (under the Town & Country Planning Act)	External - regulations	Potential need for planning consent (although the preferred option falls under Permitted Development). Potential need for Environmental Impact Assessment (subject to EIA scoping). Delivery programme must accommodate necessary planning processes
Compliance with regulations for works affecting the SRN	External - regulations	Section 6 (Highways Act) agreement and Detailed Local Operations Agreement (DLOA) required with National Highways.
Requirements for project assurance	Internal / External – due diligence	Approval required via 3 stage DfT business case process Wiltshire Council project assurance processes apply. Potential need to adhere to National Highways Project Control Framework (PCF). Delivery programme must accommodate necessary assurance processes.
Availability and capacity of Wiltshire Council staff resources	Internal - resourcing	Resources split across several major projects. Atkins providing additional resource capacity and expertise.
Procurement regulations which apply to local authority project delivery	External / internal - procurement	The need to adhere to Public Contracts Regulations 2015, and Procurement Policy Note 08/20. Procurement strategy developed in compliance (Commercial Dimension) and programme reflects procurement timescales.
Land, environmental and infrastructure features	External - physical	Presence of a geological SSSI and the need to avoid impacts Existing highway boundary. Extent and condition of existing infrastructure (in particular the M4 J17 overbridge structures).
Requirements to demonstrate carbon impacts	External - due diligence	The need to consider and assess the whole life carbon impacts of the project, including development of the Carbon Management Plan.
Requirement for 10% biodiversity net gain (Environment Act) <sup>31</sup>	External - regulations	Habitat creation / enhancement to be accommodated either on site or off site.

### 3.3.8. Key assumptions

The key assumptions which underpin the evaluation and assessment of the M4 Junction 17 investment proposal include that:

- The St Modwen Park mitigation scheme at M4 Junction 17 is assumed to be delivered as currently planned, with completion by Autumn 2022;

<sup>31</sup> Mandatory biodiversity net gain as set out in the [Environment Act](#) applies in England only by amending the Town & Country Planning Act (TCPA) and is likely to become law in 2023.

- Potential housing/employment sites associated with the emerging Wiltshire Local Plan Review are not accounted for within the central growth assumptions.
- Potential medium to longer-term impacts of the COVID-19 pandemic on travel patterns are not reflected within central growth forecasts;
- The preferred scheme option is assumed to fall under permitted development rights (with no planning consent required); and
- Further structural assessment of the M4 Junction 17 overbridges is assumed to confirm their suitability to carry the proposed three narrow lanes of traffic.

### 3.3.9. Inter-dependencies

Successful delivery of the scheme will depend upon some factors which are outside of the immediate control of the project environment. **Table 3-18** provides a summary of the key dependencies identified. Although these are ultimately beyond the control of the project team, they are reflected in project planning and will be managed to minimise the project exposure.

**Table 3-18 – Internal and external dependencies for successful scheme implementation**

Key dependency	Type	Details	Key project delivery interactions
Design approval	Internal / External	All approvals and agreements from NH / WC required	Securing funding; political approval; commencement of construction
Political approval	Internal	Approval at gateway decision points – Wiltshire Council and DfT / Central Government	Scheme development (gateway decision points); funding; commencement of construction
Securing funding	Internal / External	DfT / ministerial approval for Central Government funding, plus local contribution (developer / WC)	Scheme development; business case; commencement of construction
All relevant formal consents and orders in place	External	Including traffic regulation orders in connection with installing traffic signals or other traffic management measures connected to the scheme.	Commencement of construction
Successful procurement of suitable contractor	Internal / External	Prior approval from WC Commercial Board. Compliant procurement process to identify preferred contractor- must meet appropriate capability, delivery timescale and pricing requirements.	Full Business Case approval; funding; commencement of construction

The interactions between the M4 Junction 17 scheme and other projects (particularly other MRN/LLM proposals on the A350) have been identified and considered within Section 3.1. Whilst there is a high degree of synergy between these projects, delivery of the M4 Junction 17 project (and its associated objectives) is not critically dependent upon the successful delivery of these other projects. Similarly, the scheme would build upon the developer-led mitigation associated with Chippenham Gateway, but it is not dependent upon it<sup>32</sup>.

<sup>32</sup> In the event that the MRN scheme comes forward prior to the Chippenham Gateway scheme, the MRN scheme would deliver all improvements associated with the gateway scheme; A Section 106 contribution towards the MRN delivery from the Chippenham Gateway developer would be included in this scenario.

### 3.3.10. Recommendation

#### 3.3.10.1. Strategic context and case for change

Section 3.1 demonstrated that the M4 Junction 17 proposal has a strong alignment with strategic priorities and strategies at a local, regional and national level. In particular, it has an important role in facilitating improved north-south connectivity via the A350 corridor, promoting enhanced productivity and agglomeration and contributing to economic growth and delivery of housing. The proposal complements wider investment plans relating to a coordinated and holistic approach to enhancing the A350 corridor.

Section 3.2 demonstrated a clear and robust case for change; why the proposal is necessary to overcome the specific transport barriers (such as peak period congestion, reliability and safety) which are limiting the attainment of the strategic priorities.

#### 3.3.10.2. Identification of the preferred option

Building upon the strategic context and case for change, specific investment objectives have been identified, supported by measures of success (representing key desired outcomes). Assessment of alternative options has identified a preferred option for capacity improvements at M4 Junction 17 which represents the optimal balance between: fit with strategic priorities and investment objectives; affordability (Financial Dimension); deliverability (Management Dimension and Commercial Dimension); and overall value for money (Economic Dimension). National Highways (as one of the primary stakeholders) has had an integral role in the development and identification of the preferred option.

#### 3.3.10.3. Implementation of the preferred option

Risks, constraints and dependencies associated with delivery of the preferred option have been examined. Wiltshire Council will act as the lead delivery organisation, working closely with National Highways due to the interactions with the SRN. Key dependencies include necessary technical approvals, political approval and funding (including local contribution). Otherwise, no major delivery obstacles have been identified although external factors such as price inflation and availability of contractors will need to be closely monitored. The scheme is expected to be implemented through Permitted Development rights and land requirements are minimal (temporary easement only).



# Economic Dimension



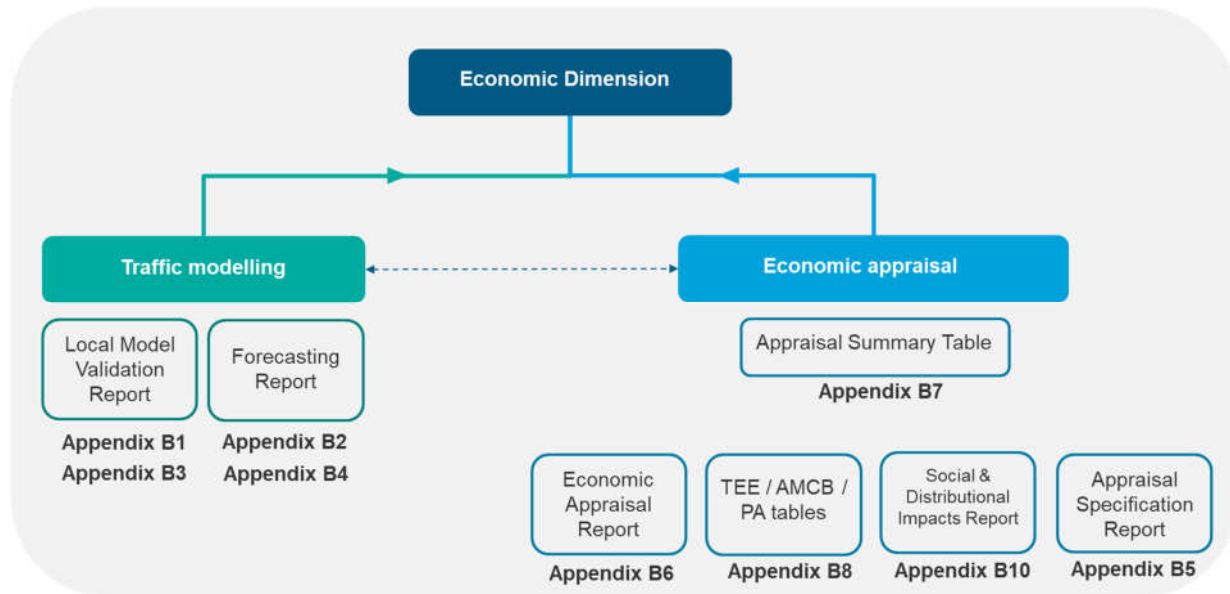
## 4. Economic Dimension

### 4.1. Introduction

The Economic Dimension assesses scheme options for the M4 Junction 17 project and determines overall Value for Money, taking into account economic, environmental, social and distributional impacts. It confirms the preferred option for implementation which meets the business need identified in the Strategic Dimension.

The Economic Dimension is supported by a suite of related documents which provide full technical details in support of the key content and outputs contained within this chapter (**Figure 4-1**).

**Figure 4-1 - Key documents supporting the Economic Dimension**



The Economic Dimension directly relates to other parts of the OBC:

- The overall need for the scheme and the expected outcomes and benefits identified within the **Strategic Dimension** are evidenced through the economic appraisal (in monetary terms, or otherwise quantitatively / qualitatively);
- The scheme costs and funding information presented within the **Financial Dimension** are an important input to the value for money assessment; and
- The scheme delivery timescales set out in the **Management Dimension** define the profile of benefits and costs for the economic appraisal.

### 4.2. Key updates since SOBC

The SOBC identified a shortlist of potential options and presented an initial appraisal of these. The current OBC stage has reviewed the shortlist and a comprehensive appraisal has been completed, underpinned by an enhanced evidence base. It confirms the preferred scheme option to be progressed to FBC and the overall Value for Money of the proposal.

### 4.3. Longlist analysis

The **Options Assessment Report** (in line with the TAG Transport Appraisal Process) provides a full account of the background to the identification and assessment of potential options, supporting the identification of the shortlist subject to full appraisal. A brief overview is provided here.

### 4.3.1. Longlist assessment

An initial longlist of options included alternative transport interventions such as improved rail, bus and walking/cycling, in addition to highway improvements. A summary of the initial assessment is provided in **Table 4-1**.

**Table 4-1 – Longlist initial assessment summary**

Strategic option	Strategic	Economic	Financial / Commercial	Management	Overall assessment
Rail service / infrastructure improvements	Fail	Pass	Fail	Fail	<b>Fail</b>
Bus service / infrastructure improvements	Fail	Fail	Fail	Pass	<b>Fail</b>
Improved walking / cycling routes	Fail	Fail	Fail	Pass	<b>Fail</b>
Highway improvement to M4 Junction 17	Pass	Pass	Pass	Pass	<b>Pass</b>

A highway improvement was identified as the only suitable type of option to progress. Other options did not demonstrate a strong enough fit with the specific investment objectives, and some were also deemed to be unviable in relation to affordability and deliverability. It should be noted that a general highway improvement option was identified as having benefits to bus users as well as general traffic (although bus services via M4 Junction 17 are relatively limited). Furthermore, whilst walking/cycling as a standalone option was discounted, it has been considered as a potential complementary component to a highways based solution.

Three main highway options (Options A, B and C) were initially identified, representing different scales of intervention at M4 Junction 17:

- 'Option A' - Widen the A429 and B4122 approaches to M4 Junction 17 and delivering full signalisation;
- 'Option B' - Widen all approaches to M4 Junction 17 and M4 slip roads, and deliver full signalisation (remains 2 lanes on the gyratory); and
- 'Option C' - Widen overbridges at M4 Junction 17 and deliver an upgrade to 3 lanes on the gyratory. Widen approaches to M4 Junction 17 and deliver full signalisation.

These options were subject to initial appraisal within the SOBC, with Option B identified as the preferred way forward.

### 4.3.2. Review of short list for OBC

In line with best practice, the initial short list was revisited at the outset of the OBC stage, including with input from National Highways. A key outcome of this review was that, based upon evidence already available from SOBC, Option A was discounted as it was not considered to provide an acceptable level of performance at the junction.

Further option development therefore focussed on Options B and C. During this process, and in conjunction with National Highways, a new hybrid option was identified:

- 'Option B+' - As Option C, but the 3 lanes on the gyratory are achieved by 3 narrow lanes on the overbridges, without any structural changes.

A summary of an initial assessment of the revised shortlist (Options B, C and B+) is provided in **Table 4-2**.

**Table 4-2 – Summary of initial shortlist assessment**

Option	Weighted Score (max. = 60)	Unweighted scores by case (maximum = 60)				
		Strategic	Economic	Commercial	Financial	Management
<b>Option B:</b> Widen all approaches and M4 slips to M4 Junction with full signalisation (2 lanes circulatory)	<b>42.6</b>	56.7	32.5	30.0	54.0	40.0
<b>Option C:</b> Widen overbridges. Widen approaches and M4 slips to M4 Junction 17 with full signalisation (3 lanes circulatory)	<b>25.4</b>	60.0	28.8	0.0	18.0	20.0
<b>Option B+:</b> Widen all approaches and M4 slips to M4 Junction with full signalisation (3 lanes circulatory without overbridge widening)	<b>42.8</b>	60.0	30.0	30.0	54.0	40.0

Based on traffic modelling evidence, Options C and B+ are expected to achieve similar transport outcomes, but Option C has a significantly higher cost (associated with the overbridges structural works), and would therefore deliver lower VfM. It also has more significant deliverability challenges. Option B has a similar cost to Option B+, but it provides less capacity and therefore is not expected to perform as well as Option B+ in the medium to longer term; a concern expressed by National Highways. It would have similar impacts to Option B+ in other regards (e.g. environmental and social impacts), but would overall deliver lower VfM.

### 4.3.3. Options appraised at OBC

The full appraisal and VfM assessment presented in this OBC Economic Dimension focusses on Option B+, presented in relation to a 'Do Minimum' which includes the planned mitigation scheme at M4 Junction 17 associated with the Chippenham Gateway development.

The 'Do Minimum' includes:

- Introduction of traffic signals to the B4122 and A350 arms (and corresponding circulatory); and.
- Minor widening on the B4122 arm to formalise two lanes on the approach.

'Option B+' comprises:

- Signalisation of all approaches to the roundabout (i.e. completion of the full signalisation of the junction);
- Carriageway widening and additional traffic capacity on all approaches to the junction (M4 off slips, A350, A429 and B4122);
- Increase in the number of traffic lanes across the motorway bridges from two to three; and
- Widening of the circulatory carriageway and introduction of additional traffic lanes and capacity around the junction.

## 4.4. Methodologies, assumptions and data

### 4.4.1. Defining the methodology - scheme rationale and scope of impacts

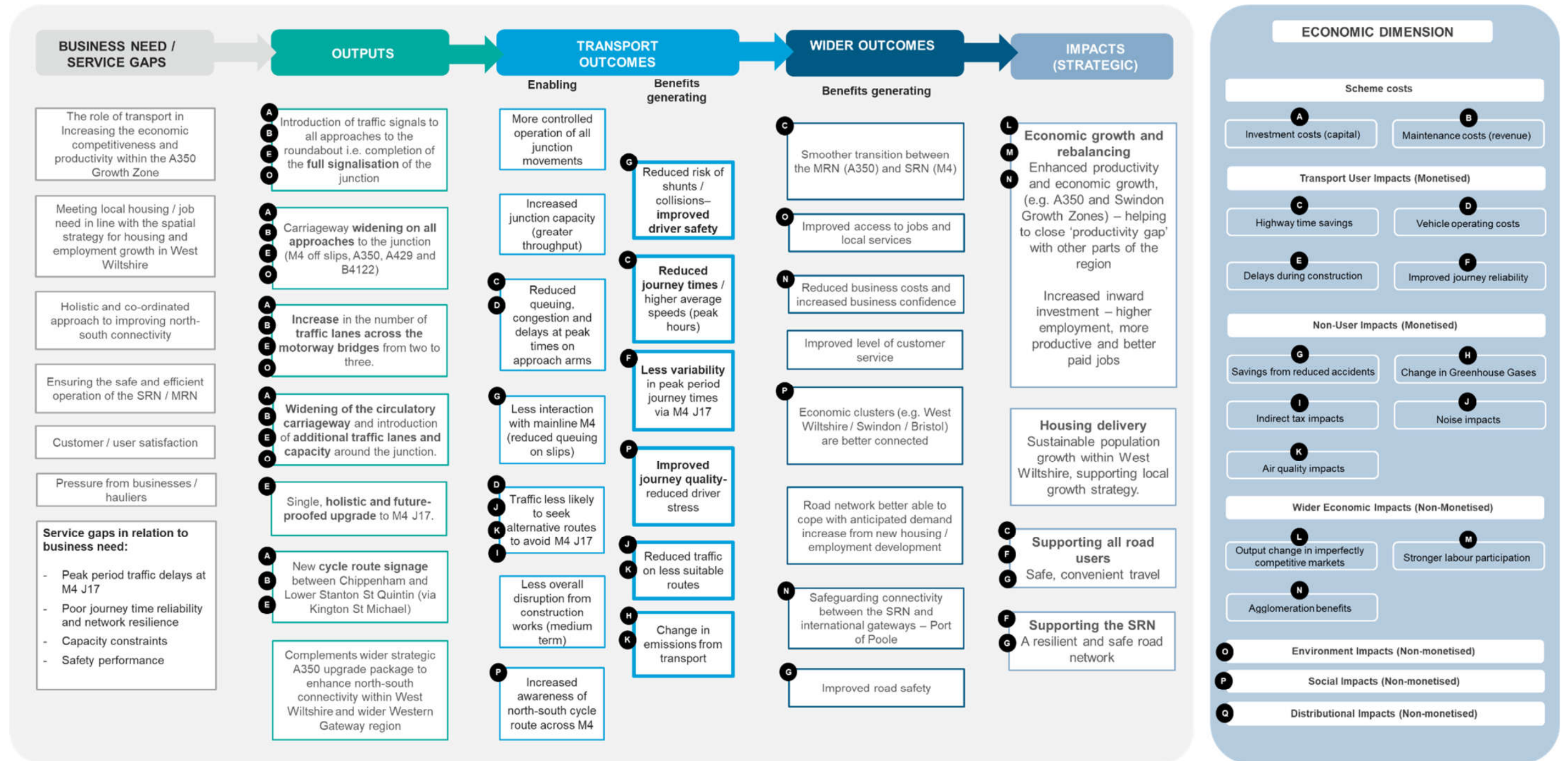
The overall approach to transport modelling and appraisal has been developed in line with the context of the DfT Transport Appraisal Guidance (TAG). TAG promotes a proportionate and flexible approach. In

determining an appropriate methodology for the M4 Junction 17 project, the nature of the scheme and its expected impacts have been taken into account.

**Figure 4-2** extends the logic map presented within the Strategic Dimension to illustrate the linkages between the scheme inputs, outcomes and impacts and the relevant parts of the economic appraisal (based on the typical TAG appraisal criteria). This ensures that the scope of the Economic Dimension is clearly informed by the Strategic Case.

Indicators have been used within this logic map to set out how each of the each of the outputs, outcomes and impacts have been represented within the different sections of appraisal throughout the Economic Dimension.

Figure 4-2 – Alignment between the logic map and the Economic Dimension





The following key factors are relevant to the modelling and appraisal methodology and influence the approach applied (as summarised in Sections 4.4.2 to 4.4.4):

- The scheme addresses existing and future congestion issues (primarily during peak periods) at a key node between the SRN (M4) and the MRN (A350), through the provision of increased capacity.
- The extent of the scheme is therefore localised and the changes to the highway network involve specific and detailed amendments to the junction layout and operation.
- Immediate effects (particularly congestion reduction and reduced delays) will be experienced at the junction itself. However, due to the location and strategic function of M4 Junction 17 the potential impacts on users are more widespread, including north-south regional connections between the M4, West Wiltshire and beyond to the south coast.
- Furthermore, journey times via M4 Junction 17 could affect travel patterns, including traffic routing decisions across the wider network.

Journey time savings to highway users are expected to account for the primary benefits source.

#### 4.4.2. Transport modelling and appraisal overview

Two principal modelling tools are available to inform the economic appraisal:

- A strategic SATURN highways model with a focus on the Wiltshire area (Wiltshire Transport Model), representing an average hour for each of the AM, inter-peak and PM periods; and
- A VISSIM microsimulation model of M4 Junction 17, originally developed by National Highways, representing three hour AM and PM peak periods with demand inputs by 15 minute intervals.

Following initial investigations, it was recognised that neither the SATURN modelling nor VISSIM modelling alone could be developed in such a way as to provide a robust assessment of user benefits for the M4 Junction 17 scheme; in isolation each has its limitations. Therefore, an alternative 'hybrid' method, making use of information from both models has been considered the most reliable approach.

The 'hybrid' method draws on VISSIM's ability to accurately reflect the performance of traffic as it passes across M4 Junction 17 and its detailed time profile of flows, while building in SATURN's ability to represent rerouting options across the wider network and the effects of this rerouting on other traffic. This approach aligns with the nature of the scheme and its expected impacts, as described in Section 4.4.1. Full details of the 'hybrid' modelling approach are set out in the Economic Appraisal Report. The approach was discussed and agreed in principle with DfT in December 2021.

The 'hybrid' approach has predominantly been applied to the appraisal of user benefits, as the most significant source of benefits. Other parts of the appraisal, for which specific delay impacts at the junction are of less significance, use SATURN only (see also Section 4.4.5 for further details).

#### 4.4.3. Key parameters and assumptions

##### 4.4.3.1. Forecast years

Two forecast model years inform the assessment of scheme impacts:

- **2024** – representing the scheme opening year<sup>33</sup>.
- **2036** – representing the design year (and aligning with the planning horizon for the emerging Wiltshire Local Plan Review).

##### 4.4.3.2. Scenarios

Scenarios tested are summarised in **Table 4-3**. The economic appraisal is predominantly based on a Core scenario, reflecting land use and transport supply changes with the greatest certainty. Alternative scenarios assist with uncertainty and sensitivity analysis. Each scenario is tested without the M4 Junction 17 scheme ('Do minimum') and with the scheme ('Do something') in order to allow an assessment of the impacts attributable to the scheme (see also Section 4.3.3).

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<sup>33</sup> Since the modelling was undertaken the scheme opening year has changed to (early) 2026. This is not considered to have a significant impact on the Economic Dimension and a conservative approach has been taken to account for this within the appraisal (see section **Error! Reference source not found.**).



**Table 4-3 – Transport modelling scenarios**

Scenario	Key demand assumptions	Key supply assumptions
<b>‘Core’</b>	<p>Committed or near certain developments (as per the Uncertainty Log), with overall growth constrained to TEMPro (Version 7.2).</p> <p>Includes:</p> <ul style="list-style-type: none"> <li>- full build out of the Chippenham Gateway development adjacent to M4 Junction 17;</li> <li>- committed development in the A350 corridor, at Chippenham and Trowbridge in particular.</li> </ul> <p>Excludes:</p> <ul style="list-style-type: none"> <li>- any prospective Local Plan Review development sites, including Future Chippenham.</li> </ul>	<p>Committed or near certain transport network changes (as per the Uncertainty Log).</p> <p>Includes:</p> <ul style="list-style-type: none"> <li>- Mitigation scheme at M4 Junction 17 associated with the Chippenham Gateway development.</li> </ul> <p>Excludes:</p> <ul style="list-style-type: none"> <li>- A350 Chippenham Bypass Phases 4 &amp; 5 (proposed MRN scheme).</li> <li>- A350 Melksham Bypass (proposed LLM scheme).</li> </ul>
<b>‘High Growth’</b>	<p>To reflect uncertainty around annual forecasts from the National Transport Model, tested in accordance with TAG guidance<sup>34</sup>.</p> <p>% of base demand added to core forecast) – 2024: +6% / 2036: +11%.</p>	Same as ‘core’.

#### 4.4.3.3. Appraisal period

Impacts and costs arising from implementation of the scheme are monetised across a **standard 60-year appraisal period** in line with TAG Unit A1.1. The planned scheme opening year is 2026, hence the **appraisal period runs from 2026 to 2085**.

The first modelled forecast year is 2024. For any benefits calculated via TUBA, a conservative approach has been taken by using the 2024 modelled year to reflect the scheme opening year for the appraisal period (2026).

#### 4.4.3.4. Modelled time periods and annualisation

The SATURN model covers three time-periods to represent a week-day average with: an AM average peak hour (07:00-10:00), inter-peak average hour (10:00-16:00) and PM average peak hour (16:00-19:00).

The VISSIM model covers the AM peak period (07:00-10:00) and PM peak period (16:00-19:00) at 15 minute intervals. Flows during the inter-peak have been examined and found to be well represented by the flow in the final 15-minute interval of the AM peak period and the first 15-minute interval of the PM peak period. The inter-peak period (10:00-16:00) is therefore represented by the (dis)benefits from these intervals (assumed to apply across the inter-peak period).

Therefore, both VISSIM and SATURN will provide benefits for weekdays covering the 07:00 to 19:00 period. No benefits are assumed for off-peak, weekend or bank holidays, so a simple daily to annual factor of 253 is applied.

#### 4.4.3.5. TAG data book

The TAG data book provides the primary reference source of standard modelling and appraisal values. At the time of model development to inform the economic appraisal, the prevailing version of TAG Databook was V1.14 (May 2020). To ensure consistency between modelling and appraisal this version of the TAG Databook forms the basis for the appraisal of benefits and costs which have been derived from the transport model unless otherwise stated.

Sensitivity testing using the most recent TAG Databook at the time of writing this OBC (Databook v1.18, August 2022) has been performed to indicate the impacts of changes to underlying assumptions over this period on that group of benefits. The modelling itself has not been rerun to reflect these changes however.

<sup>34</sup> TAG Unit M4, Section 4.2, using a p-value of 2.5%

Assessment of impacts which are not derived from the transport model have been based on Databook v1.18 throughout.

#### 4.4.3.6. Discounting and price base

All benefits and costs have been assessed over a 60-year project lifetime and then discounted back to a common base year (2010). Discount rates of 3.5% and 3.0% have been applied to standard benefits and costs for years 1 to 30 and 31 to 60 from the current year (2022) respectively. Discount rates for life and health-related impacts starting at 1.5% have been applied within the available appraisal tools as applicable. The price base is also 2010. All prices in the appraisal have been adjusted for inflation to be shown in 2010 prices. All benefits and costs are therefore shown in present values for a 2010 base year, at 2010 prices.

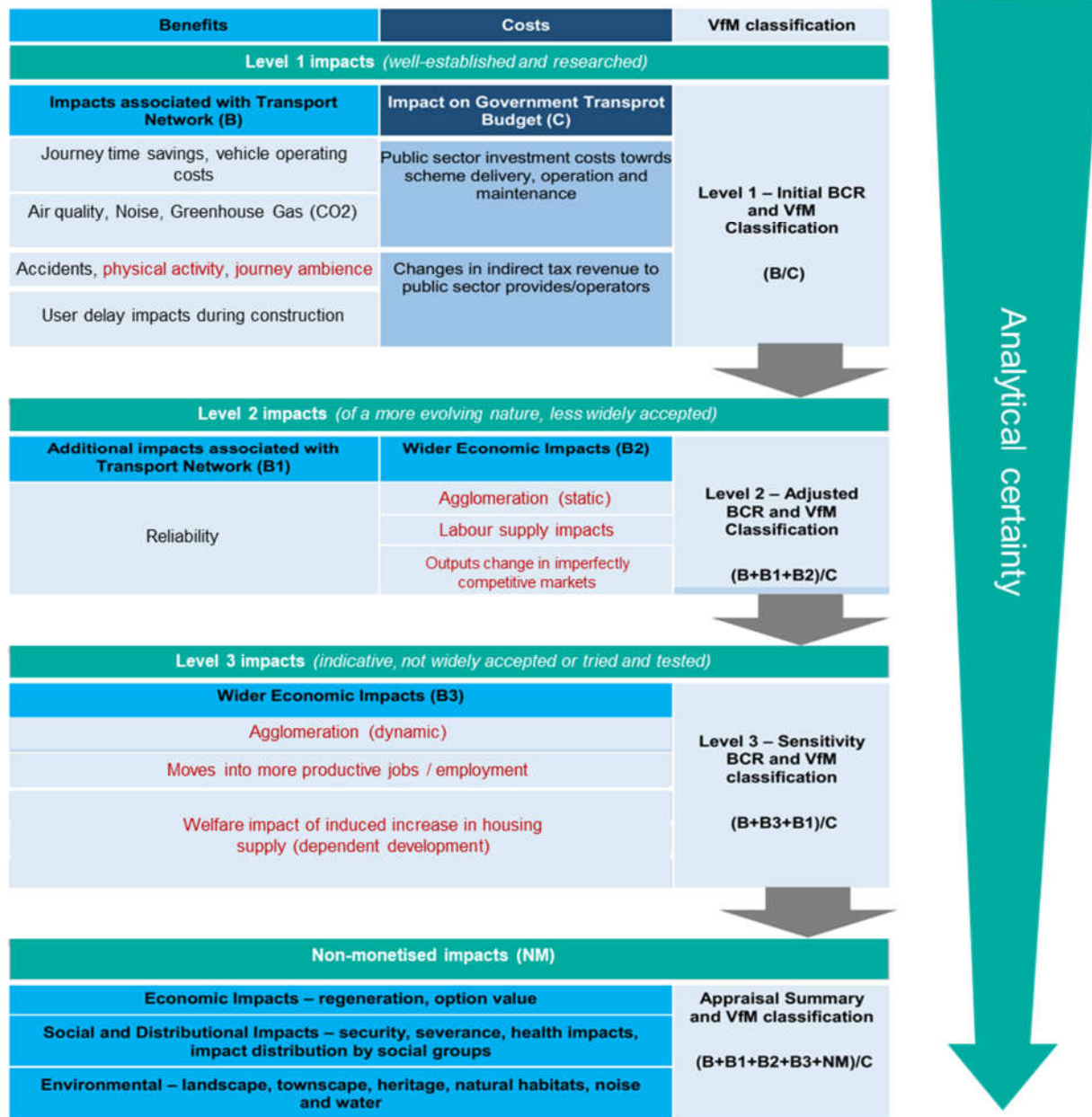
#### 4.4.3.7. Annual Average Daily Traffic flows

24-hour AADT values are required for the COBA-LT, distributional impacts, noise and air quality assessments. These have been derived from the modelled hours using calculated expansion factors established for the WTM. Details of the relevant factors for conversion to AADT can be found within the Traffic Forecasting Report.

#### 4.4.4. Appraisal of monetised and non-monetised impacts

The overall Value for Money (VfM) assessment is based on a tiered approach to considering appraised economic, environmental and social impacts (benefits and costs), reflecting different levels of analytical certainty (**Figure 4-3**). These are subsequently considered alongside uncertainty and other remaining factors to derive the final VfM category.

Figure 4-3 - Approach to Value for Money assessment



Note- includes all typical monetised and non-monetised impacts. Those in red are not monetised for the M4 Junction 17 scheme.

The appraisal approach for the M4 Junction 17 scheme focuses on a robust assessment of the Level 1 monetised impacts, expected to account for the large majority of benefits.

- All Level 1 impacts are monetised, with the exception of physical activity and journey ambience which are of less relevance to the scheme and are assessed qualitatively.
- Level 2 impacts for reliability are monetised.
- Wider economic impacts (Level 2 and 3) are not monetised. Wider economic impacts are assessed qualitatively.

- All relevant non-monetised impacts are assessed qualitatively.

Sections 4.4.5 and 4.4.6 summarise the key tools and approaches used to appraise these monetised and non-monetised impacts.

#### 4.4.5. Monetised impacts - appraisal tools and approach

The key methods and tools employed for monetising impacts are summarised in **Table 4-4**. Supporting documentation providing further details is signposted, which much of this being available within the Economic Appraisal Report (**Appendix B6**).

**Table 4-4 – Summary of appraisal approach and tools (Level 1 and Level 2 monetised impacts)**

Monetised impact (Level 1)	Nature of impact		Primary tool(s)	Comments / notes on approach	Further information
<b>Highway user impacts:</b> Travel-time benefits Vehicle operating costs (fuel and non-fuel)	Level 1	Changes in journey times, average speeds and total vehicle kilometres  Business / commuting / other users	<ul style="list-style-type: none"> <li>Hybrid SATURN &amp; VISSIM</li> <li>TUBA</li> </ul>	Transport User Benefit Analysis (TUBA) <sup>35</sup> software v1.9.14 with Economics v1.9.14 file July 2020 (Sensitivity Test: TUBA v1.17 with TAG Data Book v1.18 August 2022).  Time cost and distance skims input from SATURN and VISSIM. Full SATURN and cordoned SATURN. Cordoned SATURN outputs (around M4 J17) subtracted from full SATURN network outputs, with VISSIM outputs then added. Limited masking of benefits applied to address model noise in the full SATURN network. Annualisation factors used in the TUBA analysis are provided in section 4.4.3.4.	Economic Appraisal Report – Section 5.5
<b>Collision impacts</b>	Level 1	Change in collisions by severity and associated costs - 'with' and 'without' scheme. A function of traffic demand, distance travelled and changes in the risk or likelihood of an accident occurring.	<ul style="list-style-type: none"> <li>COBA-LT                             <ul style="list-style-type: none"> <li>(Cost and Benefit to Accidents – Light Touch)</li> </ul> </li> </ul>	COBA-LT, version 2.3 (published July 2022). Inputs from SATURN – traffic flows (AADT) and link classification. Combined links and junction approach was adopted. Default accident rates used for all links across the affected road network.	Economic Appraisal Report – Section 5.6
<b>Impacts on indirect taxation revenue</b>	Level 1	Incurred by transport users and providers, in the form of fuel duty and other user charges. Linked to changes in traffic demand and vehicle kilometres.	<ul style="list-style-type: none"> <li>Hybrid SATURN &amp; VISSIM</li> <li>TUBA</li> </ul>	Direct output from TUBA (approach as per highway user impacts)	Economic Appraisal Report – Section 5.5

<sup>35</sup> TUBA is an industry-recognised software package, recommended by the DfT for the appraisal of highway and public transport schemes. TUBA provides a complete set of default economic parameters in its standard economics file, including values for variables such as values of time, vehicle operating cost data, tax rates and economic growth rates.

Monetised impact (Level 1)	Nature of impact		Primary tool(s)	Comments / notes on approach	Further information
<b>Delays during construction</b>	Level 1	User delays from disruption during construction works.	<ul style="list-style-type: none"> <li>SATURN</li> <li>TUBA</li> </ul>	Indicative traffic management restrictions during construction defined and modelled in SATURN based on reduced speeds at the junction (single phase, 11 months duration). Journey time impacts assessed through TUBA, with annualisation applied reflecting the duration.	Economic Appraisal Report – Section 5.7
<b>Impacts on greenhouse gases</b>	Level 1	Change in CO2E emissions, associated with changes in vehicle kilometres and average speeds.	<ul style="list-style-type: none"> <li>DEFRA Emission Factors Toolkit v11.0</li> <li>NH air quality spreadsheet model v9</li> </ul>	The assessment has been based on Defra vehicle emission factor toolkit (EFT v11.0). AADT link data (flows and speeds) derived from SATURN model, with the study area covering the Area of Detailed Modelling (the traffic reliability area). The change in CO2e emissions by link as a result of the scheme was calculated in the opening (2026) and future forecast (2036) years. Emissions have been calculated for 24 hours a day, 365 days a year. The Core assessment has used central values of CO2e emissions, with sensitivity testing performed for low and high values of carbon.	Environment Appraisal Report – Section 2.2
<b>Air quality</b>	Level 1	Changes in traffic levels / composition resulting from the scheme operation giving rise to changes in concentration of NOx and PM10.	<ul style="list-style-type: none"> <li>Damage costs approach</li> <li>NH air quality spreadsheet model v9</li> </ul>	A proportionate damage costs approach has been applied (in line with TAG Unit A3). AADT link data derived from SATURN model, with the study area covering the Area of Detailed Modelling (the traffic reliability area). The change in pollutant emissions by link as a result of the scheme was calculated in the opening (2026) and future forecast (2036) years.	Environment Appraisal Report – Section 2.1
<b>Noise</b>	Level 1	Changes in traffic levels / speeds / composition resulting from the scheme operation giving rise to changes in noise levels.	<ul style="list-style-type: none"> <li>Noise model (NoiseMap v5.2)</li> <li>TAG Noise Workbook</li> </ul>	Assessed in line with TAG Unit A3. Calculations undertaken based on DMRB LA111 and CRTN methodology. AADT link data derived from SATURN model, with the study area defined based on traffic flow change criteria. Short and long-term change in noise has been calculated at each of the receptors in the study area using a 2D noise model (local terrain is not reflected).	Environment Appraisal Report – Section 2.3
<b>Journey reliability</b>	Level 2	More reliable journey times and greater resilience to network incidents.	<ul style="list-style-type: none"> <li>Bespoke spreadsheet tool</li> </ul>	Assessed in line with TAG Unit A1.3, Section 6.3 (Reliability – urban roads) and based on the calculation of the standard deviation of journey times and distance for each O-D (origin-destination) pair.	Economic Appraisal Report – Section 5.8



#### 4.4.6. Non-monetised impacts approach

Where there is no established method for monetising impacts, or it is not considered proportionate to do so, the impact has been assessed using a seven-point scale to denote the magnitude and nature of the impacts, ranging from large adverse to large beneficial (as per TAG). This is informed by a variety of evidence sources and analytical judgement.

The non-monetised impacts assessed qualitatively for the M4 Junction 17 scheme are:

- Wider economic impacts;
- Physical activity;
- Journey ambience;
- Security;
- Severance;
- Accessibility;
- Affordability;
- Townscape;
- Historic environment;
- Landscape;
- Biodiversity; and
- Water environment.

Option and non-use values<sup>36</sup> is not considered relevant in the context of the M4 Junction 17 scheme.

The overall consideration of the appraisal (as part of the Value for Money Statement) determines whether these impacts, either individually or collectively, are likely to materially alter the overall value for money of the scheme.

### 4.5. Social Cost-Benefit Analysis

#### 4.5.1. Monetised impacts

This section presents the key outcomes of the appraisal of monetised impacts (Level 1 and Level 2) for the M4 Junction 17 scheme, from a UK social welfare perspective. It presents an overall summary, and then considers each impact in turn. Impacts are presented for the core scenario (see Section 4.4.3.2); alternative scenarios are considered through the uncertainty analysis (Section 4.6). The scope of this analysis is consistent with the impacts identified in the extended logic map in Figure 4-2. Further details can be found in the Economic Appraisal Report (**Appendix B6**).

##### 4.5.1.1. Summary of monetised impacts

The total Present Value of Benefits (PVB) of all monetised impacts is **£55.3m**. The breakdown across the various impacts is summarised in **Table 4-5**. Level 1 impacts contribute **£52.6m** (95.2%), and Level 2 impacts contribute **£2.6m** (4.8%). The largest individual contributor to the total PVB is travel time benefits, accounting for 90.5% of the total.

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<sup>36</sup> Option values and non-use values relate to the implementation or withdrawal of a public transport service and should only be assessed if the scheme includes measures that will substantially change the availability of transport services within the study area.

**Table 4-5 – Summary of PVB (Core scenario)**

Impact / measure	Core scenario PV (£m)	% Total PVB
Highway user time benefits	50.0	90.5%
Vehicle operating costs	4.0	7.2%
Indirect tax revenues	-0.6	-1.1%
Greenhouse gases	-2.5	-4.4%
Construction impacts	-0.5	-0.8%
Accidents	2.2	4.0%
Noise	0.2	0.4%
Air Quality	-0.3	-0.5%
<b>Present Value of Benefits (Level 1 impacts)</b>	<b>52.6</b>	<b>95.2%</b>
Reliability	2.6	4.8%
<b>Present Value of Benefits (Level 2 impacts)</b>	<b>2.6</b>	<b>4.8%</b>
<b>Total PVB (Level 1 &amp; Level 2)</b>	<b>55.3</b>	<b>100%</b>

All monetised values in 2010 prices discounted to 2010

#### 4.5.1.2. Travel time benefits (Level 1)

##### Monetised impacts – key outputs

The calculated travel time benefits for the Core scenario, broken down by journey purpose, are presented in **Table 4-6**.

**Table 4-6 – Present value of highway user travel time benefits (Core scenario)**

Travel time benefits	PV (£m)
TUBA - business	19.3
TUBA - commuting	17.6
TUBA - other	13.1
<b>Total travel time benefits</b>	<b>50.0</b>

All entries are discounted present values, in 2010 prices and values.

- Travel time benefits are spread relatively evenly between different user groups. Business users (including freight) account for the greatest proportion of travel time benefits (approximately 38% of total benefits), with commuting only slightly lower; whilst 'other' users (e.g. social and leisure) account for 26% of the total.
- Benefits are generated in the AM and PM peak periods. The appraisal accounts for a modest disbenefit during the inter-peak period, when forecast congestion is not such an issue and the additional signals introduce a slight delay. This does not reflect the scope for a more dynamic 'on the ground' signal operation which could result in a more optimised junction performance during inter-peak conditions.

##### Appraisal certainty / risk / limitations

- Various checks of TUBA outputs have been undertaken to ensure that results are logical, including analysis of benefits by time period, journey distance and size of time saving, in addition to a review of TUBA warning messages (see Economic Appraisal Report – **Appendix B6**).
- Sensitivity in relation to values of time applied to time savings is considered in Section 4.6.

#### Further information

- Further details and analysis in relation to travel time benefits can be found in of the Economic Appraisal Report (Appendix B6, Section 5.5). This assessment of benefits has also been used to inform the distributional impact assessment in Section 4.7 and place-based analysis in Section 4.8.

#### 4.5.1.3. Vehicle operating costs (Level 1)

##### Monetised impacts – key outputs

Impacts on vehicle operating costs result in an overall benefit for the Core scenario of £4.0m (Table 4-7).

**Table 4-7 – Present Value of vehicle operating costs**

Vehicle operating costs	PV (£m)
Fuel operating costs	3.0
Non-fuel operating costs	1.0
<b>Total</b>	<b>4.0</b>

All entries are present values discounted to 2010, in 2010 prices.

- A benefit to users is calculated in terms of fuel operating costs. Benefits are forecast to be generated in the vicinity of M4 Junction 17 itself associated with reduced time spent in traffic queues and congestion. Some trips will change routes as a result of the scheme to use the M4 and either A350 or A429 which would otherwise have typically used slower but more direct routes resulting in slightly lower fuel consumption. The positive impacts around the junction are the greater of these effects resulting in a net benefit.
- Non-fuel operating costs result in a benefit to users. This is associated with higher speeds of travel for business trips resulting from use of higher standard roads with less requirements to stop and start at junctions. This results in lower levels of vehicle ‘wear and tear’.

#### Further information

- See Section 5.5 of the Economic Appraisal Report.

#### 4.5.1.4. Indirect tax revenues (Level 1)

##### Monetised impacts – key outputs

- Indirect tax revenues fall to central government and are generated through fuel duty and other charges incurred by transport users and providers. These are calculated to represent a PV of -£0.6m under the Core scenario (Table 4-8).

**Table 4-8 – Present Value of indirect taxation revenues**

Indirect tax revenue	PV (£m)
Indirect taxation revenues	-0.6
<b>Total</b>	<b>-0.6</b>

All entries are present values discounted to 2010, in 2010 prices.

#### 4.5.1.5. Greenhouse Gases (Level 1)

##### Monetised impacts – key outputs

- An increase in carbon dioxide equivalent emissions (CO<sub>2</sub>E) of approximately 34,000 tonnes is predicted over the 60-year period in the Core scenario (**Table 4-9**). This produces a NPV of -£2.5m.

**Table 4-9 – Present Value of greenhouse gas impacts (2010 prices)**

Greenhouse gas impacts	Core
Change in CO <sub>2</sub> E: non- traded (tonnes, 60 yrs)	33,843
Change in CO <sub>2</sub> E: traded (tonnes, 60 yrs)	557
<b>NPV (£m) - total</b>	<b>-2.5</b>

All entries are present values discounted to 2010, in 2010 prices

- The predicted increase in emissions is considered to be associated with an increase in total vehicle kilometres, predominantly as a result of slightly longer journeys via the M4 and Junction 17. This is considered to off-set benefits of a smaller scale associated with improvements to fuel efficiency linked to reduced congestion and delays accessing the M4.

##### Appraisal certainty / risk / limitations

- The assessment does not take into account potential for any carbon off-setting measures (such as tree planting as part of the scheme).
- The core assessment is based on the DEFRA Emissions Factors Toolkit (EFT v11.0) approach<sup>37</sup> (see also Section 4.4.5). Sensitivity testing around the central CO<sub>2</sub>e values is set out in Section 4.6.

##### Further information

- Environment Appraisal Report - Section 2.2.
- Appendix E8** - Carbon Management Plan, provides a whole-life carbon assessment of the scheme (including construction and operation) and considers actions and strategies to mitigate the overall carbon impact.

#### 4.5.1.6. Construction impacts (Level 1)

##### Monetised impacts – key outputs

The overall monetised impacts of construction delays result in a modest disbenefit of -£0.5m.

**Table 4-10 – Present Value of indirect construction impacts (Core scenario)**

Impact	PV (£m)
Time benefits	-0.50
Fuel vehicle operating costs	0.05
Non-fuel vehicle operating costs	0.01
Indirect taxation revenues	-0.03
Greenhouse gases	0.01
<b>TOTAL</b>	<b>-0.47</b>

All values are in 2010 prices and values

##### Appraisal certainty / risk / limitations

- At this stage of scheme development there is not a detailed construction plan, hence the traffic management assumptions are high-level only in order to provide a representative basis for estimating the monetised impact.

<sup>37</sup> <https://laqm.defra.gov.uk/air-quality/air-quality-assessment/emissions-factors-toolkit/>

- The construction impacts assessment would be updated at FBC stage and based on a more detailed Construction Management Plan.
- By delivering a comprehensive upgrade solution at M4 Junction 17, the implementation of the scheme avoids a more piecemeal approach to improvements, involving multiple phases of works with each resulting in construction disruption. This benefit is not captured within the assessment.

#### Further information

- Economic Appraisal Report – Section 5.7.

#### 4.5.1.7. Accidents (Level 1)

#### Monetised impacts – key outputs

Overall accident benefits for the Core scenario are calculated as **£2.2 million** over 60-years (**Table 4-11**).

**Table 4-11 – Present Value of accident benefits (Core Scenario)**

	Core assessment
<b>COBA-LT Personal Injury Accidents</b>	
Total without-scheme (PIA)	84,843
Total with-scheme (PIA)	84,772
<b>Total change in Personal Injury Accidents</b>	<b>70.8</b>
<b>COBA-LT Economic Summary</b>	
Total without-scheme costs (£m)	3,755
Total with-scheme costs (£m)	3,753
<b>Total collision benefits (£m)</b>	<b>2.2</b>

All monetised values in 2010 prices discounted to 2010

- The calculated benefit is associated with a predicted reduction in Personal Injury Accidents of 70.8 over the appraisal period. This assessment has considered the effects of rerouting across the Affected Road Network, as well as variations at Junction 17 itself.
- Due to the predicted redistribution of traffic resulting from the scheme, a greater proportion of travel will be made using the higher standard M4 and A350 routes, rather than using local roads.

#### Appraisal certainty / risk / limitations

- The use of default accident rates has been considered appropriate as the scheme will affect not only traffic around Junction 17 itself, but also over a much wider area as traffic will reroute to benefit from the shorter journey times. Use of local accident data over the whole affected road network has not been considered proportionate.
- The full signalisation of Junction 17 is also very likely to result in safety benefits, though this has not been monetised due to the limitations of COBA-LT to represent a junction of this complexity.

#### Further information

- Further details on the approach and outputs relating to the COBA-LT assessment can be found in the Economic Appraisal Report – Section 5.6.

#### 4.5.1.8. Noise impacts (Level 1)

##### Monetised impacts – key outputs

The change in noise impacts has been calculated as a **net benefit of £0.2m**, representing an overall reduction in noise impacts from the scheme (**Table 4-12**).

**Table 4-12 – Present Value of noise impacts (Core scenario)**

Noise impact	PV (£m)
Sleep disturbance	0.1
Amenity	0.1
Acute myocardial infarction (AMI)	0.0
Stroke	0.0
Dementia	0.0
<b>Total</b>	<b>0.2</b>

Monetised values in 2010 prices discounted to 2010

- The slight positive noise benefits are driven by the impact of the junction improvement drawing traffic away from properties in surrounding villages and onto the primary routes, including the motorway network (e.g. M4) and the A350, where there are generally fewer properties.
- The predicted noise change at most receptors is assessed as negligible.

##### Further information

- Full details of the noise assessment can be found in the Environment Appraisal Report (Appendix B11 – Section 2.3).
- Distributional impacts of noise are considered in Section 4.7.

#### 4.5.1.9. Air quality impacts (Level 1)

##### Monetised impacts – key outputs

The overall monetised air quality impact for the Core scenario is assessed as **-£0.3m** (**Table 4-13**).

**Table 4-13 – Present Value of air quality impacts (Core scenario)**

Air quality impact	Absolute change (tonnes)	PV (central value) (£m)
Change in PM10 concentrations	+8	-0.2
Change in NOx concentrations	+18	-0.1
<b>Total PV (£m)</b>		<b>-0.3</b>

All monetised values in 2010 prices discounted to 2010

- The air quality benefits are driven by small increases in the assessment score for NOx and PM10 concentrations over the 60-year appraisal period. There is a predicted increase in emissions associated with the primary M4, A350 and A429 routes on each side of Junction 17, due to traffic being drawn back to these routes with less delay at M4 Junction 17. Most of this increase in emissions is offset by reductions in traffic on alternative routes. However, the primary routes used are typically less direct, resulting in increased vehicle kilometres across the network (and a modest net increase in NOx and PM10 emissions).

##### Appraisal certainty / risk / limitations

- Due to the relatively low expected impact of the scheme on air quality, a proportionately simple approach has been used to quantify the effects on emissions. The 'Damage Cost Approach' set out in TAG A.3 has therefore been applied. This method of assessing air quality considers only how much of the harmful emissions will be generated and not to what extent exposure to these emissions will be affected. The effect



of the scheme on rerouting of traffic will be that more trips are made using the M4, A350 and A429 away from areas of population, which would otherwise pass through a number of towns or villages.

- Therefore, while the scheme is likely to result in a small increase in emissions of PM10 and NOx, the exposure of the population to these harmful particles is likely to be reduced.

#### Further information

- Full details of the air quality assessment can be found in the Environment Appraisal Report (Appendix B11 – Section 2.1).
- Distributional impacts of air quality are considered in Section 4.7.

#### 4.5.1.10. Reliability (Level 2)

##### Monetised impacts – key outputs

- The masked reliability impact of the scheme is calculated as a benefit of £2.6m (**Table 4-14**).

**Table 4-14 – Present Value of reliability benefits (Core Scenario)**

Journey purpose	PV (£m)
Business	0.9
Commuting	0.8
Other	0.9
<b>TOTAL</b>	<b>2.6</b>

All monetised values in 2010 prices discounted to 2010.

##### Appraisal certainty / risk / limitations

- A minimum trip distance cap of 0.5km has been used within the reliability assessment to avoid over-estimation of benefits for particularly short journeys.
- The reliability assessment has been undertaken on the Core scenario. This benefit has not been included in other scenarios, with sensitivity testing focussing on the Level 1 BCR, as reliability impacts are likely to be significantly impacted by certain alternative assumptions which have been tested.

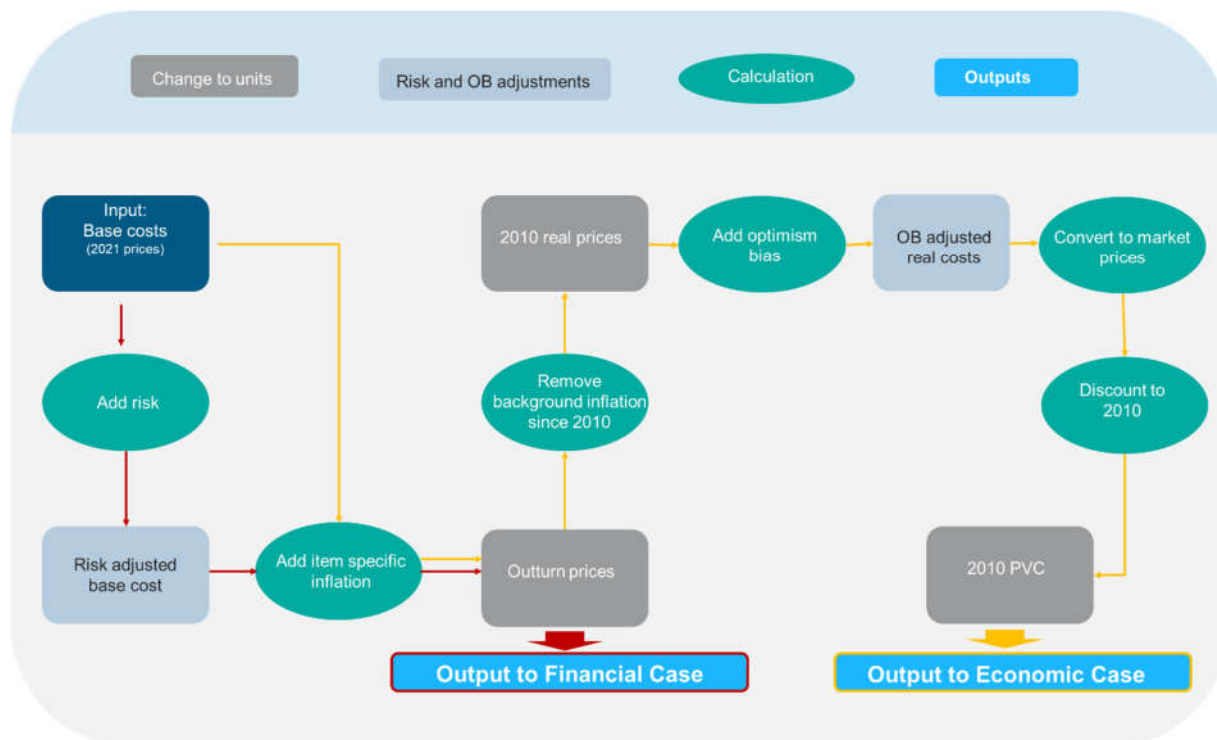
#### Further information

- Economic Appraisal Report – Section 5.8.

#### 4.5.2. Scheme costs

Details of the scheme base costs are provided in the Financial Case. The derivation of the Present Value Cost (PVC) of the scheme (for use within the economic appraisal) follows TAG Unit A1.2. The process is summarised in **Figure 4-4**, including the conversion to 2010 real prices; application of optimism bias; conversion to market prices; and discounting to 2010.

Figure 4-4 - Overview of the calculation of scheme costs



The forecast construction cost is £18.66 million in 2021Q1 prices, with a further £20.19 million required for maintenance and renewals<sup>38</sup> over the 60-year appraisal period. This translates into a total PVC (inclusive of construction, maintenance and renewal costs over a 60-year period) of **£21.8 million**. The breakdown of the PVC calculation is presented within **Table 4-15**.

Table 4-15 – M4 Junction 17 PVC calculation (£ millions)

Stage of Cost Preparation	Capital cost	Maintenance cost	Total cost
Base cost totals over 60-years (2021 Q1 prices)	18.66	20.19	38.85
Outturn costs	22.69	123.67	146.35
Rebased to 2010 real prices	16.80	32.37	49.16
Optimism bias contribution	3.86	7.44	11.31
Optimism bias adjusted cost	20.66	39.81	60.47
Uplifted to market prices	24.58	47.38	71.96
Discounted to 2010 values			
<b>PVC (scheme costs)</b>	<b>14.97</b>	<b>6.87</b>	<b>21.84</b>

Further details of derivation of the PVC are presented in the Economic Appraisal Report (**Appendix B6**), including the PVC cost proforma and Public Accounts table.

This is a central forecast for the PVC, but includes uncertainties related to delivery of the scheme and to the wider economy. Sensitivity testing around this central estimate is set out in Section 4.6.

<sup>38</sup> Maintenance and renewal costs are additional to any costs which would be required should the M4 Junction 17 scheme not go ahead.

### 4.5.3. Benefit Cost Ratio

The scheme cost (in terms of PVC – Section 4.5.2) and the monetised impacts (in terms of PVB – Section 4.5.1) are compared to determine the Benefit Cost Ratio (BCR), as presented in **Table 4-16**.

Consideration of the PVB from Level 1 monetised impacts only, against the PVC, provides the Initial BCR. The PVB from Level 2 monetised impacts is subsequently added to provide the Adjusted BCR.

**Table 4-16 – Summary of Benefit Cost Ratio (Core scenario)**

Impact / measure	Core Scenario
Highway user time benefits, £m	50.0
Vehicle operating costs, £m	4.0
Indirect tax revenues, £m	-0.6
Greenhouse gases, £m	-2.5
Construction impacts, £m	-0.5
Accidents, £m	2.2
Noise, £m	0.2
Air Quality, £m	-0.3
<b>PVB (Level 1 impacts), £m</b>	<b>52.6</b>
Present Value of Costs (PVC), £m	21.8
Net Present Value (NPV), £m	30.8
<b>Initial BCR</b>	<b>2.4</b>
Reliability, £m	2.6
<b>PVB (Level 1 and 2 impacts), £m</b>	<b>55.3</b>
Present Value of Costs (PVC), £m	21.8
Net Present Value (NPV), £m	33.4
<b>Adjusted BCR</b>	<b>2.5</b>

The **Initial BCR for the Core scenario is 2.4**, associated with a NPV of £30.8m. With Level 2 monetised impacts included, the **Adjusted BCR is 2.5**, associated with a NPV of £33.4m.

### 4.5.4. Non-monetised impacts – economic

#### 4.5.4.1. Wider Economic Impacts

TAG defines Wider Economic Impacts as a set of impacts, which are additional to conventional transport economic impacts, that can arise when the economy is not functioning efficiently. As a result, additional benefits (or disbenefits) will arise as the impact of transport improvements is transmitted into the wider economy.

These impacts include productivity gains resulting from improvements in how well businesses are connected to each other as well as potential employees, and benefits arising from structural changes as businesses and households relocate.

These are not captured in the conventional economic appraisal based on journey time savings and so need to be captured separately using a defined set of calculations drawing on travel cost and trip matrices and additional economic data and parameters.

The M4 Junction 17 scheme is expected to generate positive wider economic impacts, by reducing journey times for business trips, freight and commuters. This will bring down costs to businesses enabling increased competitiveness, greater agglomeration impacts and provide access to a wider labour market enabling increased productivity. Individuals will also benefit from access to jobs which are better paid or more suited to their individual requirements.

The improved capacity of the junction may help to enable increased levels of development as the network becomes more congested in the future, but the scheme does not directly enable any currently planned development.

These benefits however are expected to contribute a relatively low proportion of the total value of the scheme's impacts and so, given the complexity of assessing the wider economic impacts, it has not been considered proportionate to monetise them. A qualitative assessment score of **moderate beneficial** has been determined for wider economic impacts.

#### 4.5.5. Non-monetised impacts - environment

The assessment of non-monetised environmental impacts follows TAG Unit A3 and applies the qualitative environmental capital approach<sup>39</sup>:

- Step 1 – consider potential impacts and the area of impact
- Step 2 – identify key environmental resources with potential to be impacted by the scheme and identify their features
- Step 3 – for each resource, define the scale, significance, and value
- Step 4 – estimate the magnitude of impact and provide an assessment score for each feature.
- Step 5 – derive an overall assessment using a seven-point scale (large adverse to large beneficial)

This approach is common for each environmental topic, with specific considerations taken into account for each in line with TAG.

The proposed scheme will facilitate the upgrade of the junction along with widening of approaches. The majority of the proposed scheme area is within existing highway boundaries. However, there are small pockets of land which will require land easement, which will require agreement with landowners.

The presence of a Site of Special Scientific Interest (SSSI) has informed the design of the scheme, and the potential impacts of the scheme on the SSSI will continue to be monitored.

High-level assessments of environmental impacts which have not been monetised above have been undertaken to provide a qualitative assessment of the likely environmental effects from the proposed development.

Monetised assessments have also been made of local air quality, noise impacts and greenhouse gas emissions based on the transport model forecasts for changes in vehicle flows resulting from the scheme.

Qualitative assessments have been performed for the impacts of the scheme on landscape, historic environment, biodiversity and water environment. While there are certain impacts within this range which have potential to result in moderate to large adverse effects, mitigation measures have been identified which can be put in place to bring these ratings down to no worse than a slight adverse impact.

**Table 4-17** provides a summary of the assessment scores and the subsequent sections consider each impact in turn.

**Table 4-17 – Non-monetised impacts summary - Environment**

Non-monetised impact - Environment	Qualitative assessment score
Landscape	Slight adverse
Townscape	N/a – not assessed
Historic environment	Neutral
Biodiversity	Slight adverse
Water environment	Neutral

<sup>39</sup> The environmental capital approach was developed by the statutory environmental bodies Natural England (formerly the Countryside Agency and English Nature), English Heritage and the Environment Agency in co-operation with DfT

Further details on the findings of the individual assessments are set out in the Appraisal Summary Table (**Appendix B7**) and full assessment details are set out in the Environment Appraisal Report (**Appendix B11**).

#### 4.5.6. Non-monetised impacts - social

Non-monetised social impacts have been assessed qualitatively, in line with TAG A4.1, using a seven-point scale (large beneficial to large adverse).

The results of the social impacts appraisal are summarised in **Table 4-18**. Full details can be found within **Appendix B10 – Social and Distributional Impacts Report**.

**Table 4-18 - Non-monetised impacts summary - Social**

Non-monetised impact - Social	Qualitative assessment score
Physical Activity	Neutral
Journey Quality	Slight beneficial
Security	Neutral
Affordability	Neutral
Severance	Slight beneficial
Accessibility	Slight beneficial
Personal affordability	Slight beneficial

The assessment of non-monetised social impacts identifies a modest scale of impact across the criteria considered, with three of the impacts assessed as neutral, and the remaining four assessed as slight beneficial. The role of the scheme in facilitating a more free-flowing network (transition between the SRN / MRN) contributes to a slight beneficial impact through reduction in diver stress / frustration. The forecast reduction in vehicle operating costs contributes to a slight beneficial impact for personal affordability, with only a minor impact at an individual user level. The forecast traffic redistribution resulting from the scheme has the effect of drawing traffic from surrounding routes back to the primary routes via M4 Junction 17. This is assessed as resulting in a range of impacts (beneficial and adverse), but overall the distribution of forecast traffic flow changes is assessed as having a slight beneficial impact.

## 4.6. Uncertainty analysis

### 4.6.1. Approach to considering uncertainty

Uncertainty is inherent within the appraisal of any transport scheme. There are many 'what ifs' in relation to how the transport system will evolve in the future, particularly with the potential for emerging trends in behaviour and technology to drive significant change over time. The use of transport models, a fundamental aspect of scheme appraisal, can also introduce uncertainty to transport analysis, through the data, assumptions and model specifications required.

In order to consider uncertainty within the appraisal of the M4 Junction 17 scheme, a proportionate approach has been taken reflecting key principles within TAG and the DfT Uncertainty Toolkit<sup>40</sup> (TAG Supplementary Guidance).

The Uncertainty Toolkit recommends consideration of the overall level / significance of uncertainty associated with the scheme. Based on the categorisation guidance provided in the Uncertainty Toolkit, the M4 J17 scheme is considered to fall within the 'medium' to 'low' categories (**Table 4-19**).

<sup>40</sup> It should be noted that a key component of the Uncertainty Toolkit - the Common Analytical Scenarios – was released in August 2022. Due to the timing, the Common Analytical Scenarios have been considered in a qualitative manner. Other key principles from the Uncertainty Toolkit are applied in a proportionate manner.

**Table 4-19 – Uncertainty impact categorisation**

	Indicative impact		
	Low	Medium	High
<b>Impact on public finances through budget cost or revenue risk</b>	Tier 3 e.g. < £50m	Tier 2 e.g. £50 - £500m	Tier 1 e.g. > £500m
<b>Corporate risk</b>	Limited / risk of minor embarrassment	Risk of minor loss in confidence	Risk of major loss in confidence
<b>Value for Money</b>	Solidly within a value for money category	Close to a value for money category boundary	Bordering two value for money categories
<b>Level of uncertainty</b>	Input assumptions low range of uncertainty. Short lifetime, e.g. <5 years	Input assumptions medium range of uncertainty. Medium lifetimes, e.g. 5 – 50 years	Input assumptions high range of uncertainty. Long lifetimes, e.g. > 50 years

#### 4.6.2. Assessing uncertainty

The uncertainty impact categorisation helps to inform the type and proportionality of the approach to considering uncertainty. The approach adopted for the M4 Junction 17 scheme applies elements of the following techniques (as covered in the Uncertainty Toolkit) in a proportionate manner:

- Judgement-based;
- Scenarios;
- Sensitivity testing; and
- Switching values analysis.

Two key areas of uncertainty in transport modelling and appraisal have been considered:

- **input uncertainty** (e.g. relating to potential variance around demand and supply assumptions, at a local and national level); and
- **modelling and appraisal specification uncertainty** (e.g. relating to uncertainty around specific values or parameters which may influence model forecasting and / or appraisal calculations).

**Table 4-20** provides a summary of the assessment of uncertainty. For each type of uncertainty, the technique used to assess the uncertainty is recorded and the assessed impact on the BCR is presented. This should be considered in terms of the relative change to the Core Adjusted BCR of 2.53 (see Section 4.5.3). Where available, the sensitivity BCR is presented and qualitative comments on the assessment are made where relevant.

The uncertainties are intended to be objective and balanced, with representation of both ‘pessimistic’ and ‘optimistic’ elements.

Table 4-20 – Summary of assessment uncertainty

Uncertainty	Description	Considered via	Assumptions	Impact on BCR category					Sensitivity BCR	Qualitative comments
				Poor	Low	Medium	High	Very High		
Scheme cost	The PVC includes a 23% optimism bias uplift, using the P(mean) value from the appropriate reference class. Further sensitivity testing is undertaken to consider the impact of higher and lower scheme costs.  This variation may encompass all causes of change relative to the central cost forecast, including for example changes to rates of inflation or conditions on site requiring variations to works.	'High Cost' sensitivity test	PVC increase based on P(80) optimism bias.				■		2.02	This indicates more than an 80% chance that the BCR will not fall below 2 (into Medium VfM) as a result of cost increases.
		'Low Cost' sensitivity test	PVC decrease based on P(20) optimism bias.				■		3.05	This indicates an 80% chance that the BCR will not rise much above 3 as a result of cost savings. The chance of the BCR increasing to 4 (Very High VfM) based only on cost changes is therefore very low.
Change to scheme scope / design	Potential changes to design in relation to structural capacity of overbridges or departures from standards.	Judgement based	Reduced capacity of overbridges.			■			-	Potential adverse impacts on benefits but risks are currently low and can be closed out before FBC.
Demand growth	High growth, in line with TAG Unit M4	High growth sensitivity	Up to 15% of base year demand added after 36 years.				■		2.87	
	Low growth, in line with TAG Unit M4	Low growth sensitivity	Up to 15% of base year demand subtracted after 36 years.			■			1.69	
Local development	Wiltshire Council is currently undertaking its Local Plan Review to 2036. This can only provide an emerging position at this stage, but there is a key focus for housing sites within the A350 corridor, including at Chippenham, Melksham and Trowbridge.	Judgement based	Traffic growth on A350 expected to be higher compared to 2036 Core scenario assumptions.				■		-	The scheme has been subject to operational assessment using emerging LPR assumptions and shown to have sufficient capacity to operate effectively with this higher demand. The results of the high growth sensitivity further supports this.
Regional growth*	People leave London and the South East in search of a higher standard of living and more affordable housing. As a result, there is lower employment and population growth in these regions relative to the rest of the country. Areas outside of the South increase their relative level of competitiveness through an increase in productivity	Judgement based	Lower demand growth in London / SE. Higher demand growth elsewhere.				■		-	Low proportion of scheme benefits associated with London / south-east, so unlikely to adversely impact VfM. Potential higher traffic growth associated with improved economic performance driving increased benefits (in line with 'high demand growth').
Behavioural change*	People embrace new ways of working, shopping and travelling. Important behavioural trends which have emerged in recent years accelerate, in part because of the Covid-19 pandemic, which include: changes in the travel behaviour of young people; increased flexible working; and increased online shopping.	Judgement based	Potential peak spreading, lower levels of overall traffic growth, potential increase in delivery / goods vehicle demand.			■			-	Journey time savings and benefits are heavily dependent on peak levels of traffic. Spreading this peak demand is likely to result in reductions delay in the DM scenario and so lower benefits.
Technology*	Road travel becomes far more attractive and accessible to road users because of a high take-up of connected autonomous vehicles (CAVs), which enter the fleet in the 2020s and make up to 50% of it by 2040.  This scenario results in an increase in trip numbers but with a reduction in values of time as travel time can be put to alternative use.	Judgement based	Assumed increase in traffic demand.  Reduced values of time for CAV users.				■		-	Increased traffic demand associated with increased benefits, but values of time for CAV users are expected to be around 20% lower which is likely to result in a net reduction in benefits.  BCR is likely to fall, but not below 2.



Uncertainty	Description	Considered via	Assumptions	Impact on BCR category			Sensitivity BCR	Qualitative comments
Other planned local transport schemes	Reflecting the additional MRN scheme for the A350 at Chippenham and the Melksham Bypass scheme (LLM) promoted by Wiltshire Council - considering the effect of the M4 J17 scheme 'in combination' with these other prospective improvements.	Judgement based	Modest increase in traffic demand via M4 J17 related to improved traffic conditions on the A350 corridor.			■	-	The scheme has been subject to operational assessment using traffic forecasts including prospective Local Plan Review growth plus associated transport mitigation (including the MRN/LLM schemes). The scheme has been shown to have sufficient capacity to operate effectively under this scenario.
Values of Time (work)**	Work time savings account for a significant proportion of the scheme benefits. Standard assumptions are used, but TAG recognises a degree of uncertainty around the values, and advises sensitivity testing to be undertaken.	'High VoT' sensitivity	+25% business user benefit			■	2.75	The vast majority of benefits of the scheme are generated through time savings and so any variation to the monetisation of these benefits will have a sizeable impact.  There is a strong evidence base for the central forecast, but due to the long-term nature of the benefits there is nevertheless wide scope for variations either side of this central point.  Benefits are forecast to mostly accrue to business and commuting users, with a reduced level of benefit for other trips, but the level of uncertainty in values of time for other trips is larger.
		'Low VoT' sensitivity	-25% business user benefit			■	2.31	
Values of Time (non-work)**	Non-work time savings account for a significant proportion of the scheme benefits. Standard assumptions are used, but TAG recognises a degree of uncertainty around the values, and advises sensitivity testing to be undertaken.	'High VoT' sensitivity	+25% commuter benefit / +60% other user benefit			■	3.09	Benefits are forecast to mostly accrue to business and commuting users, with a reduced level of benefit for other trips, but the level of uncertainty in values of time for other trips is larger.
		'Low VoT' sensitivity	-25% commuter benefit / -60% other user benefit		■	■	1.97	
TAG Databook values (modelling)	Modelling is based on TAG Databook v1.14. Since modelling was completed, TAG Databook has been updated to v1.18 (May 2022).	Sensitivity test	n/a			■	2.66	Comparison of key values / parameters between versions suggests unlikely to materially impact the BCR.
Carbon values	Greenhouse gas impacts have been calculated based on central carbon values from DfT's TAG Databook released in May 2022 (v1.18).	High carbon sensitivity	High carbon values			■	2.48	The carbon impacts of the scheme are relatively low and form only a small portion of the PVB. The impact of variations to the unit cost of CO2e emissions on the BCR is therefore small
		Low carbon sensitivity	Low carbon values			■	2.59	

\* Common Analytical Scenarios from TAG Uncertainty Toolkit

\*\* These value of time ranges represent a 95% confidence interval based on latest research

Impact on VfM category:

- No change
- Improvement
- Worsening

### 4.6.3. Implications of uncertainty on Value for Money assessment

The assessment of uncertainty is used to inform whether any adjustment to the Value for Money category may be appropriate. This is one element of determining the final VfM category (Section 4.11). This part of the assessment focuses on uncertainties in the benefits and costs which have been monetised.

It is helpful to first consider the impact of the sensitivity test performed to apply parameters from the latest version of the TAG Databook to TUBA results, as this has been applied as a stand-alone test and all other sensitivity tests have been applied around the Core results. This most recent Databook shows slightly increased forecasts of values of time over the long-term resulting in a small increase to the BCR of +5% compared to the Core scenario. While there are advantages to use of either of these methods of assessment, this indicates that the approach taken for the Core scenario and all other sensitivity tests may be considered conservative.

Following these findings, an assessment has been prepared of how different types of uncertainty, when considered together, may contribute to variations from the central BCR.

**Table 4-21** sets out a probability analysis of outturn costs for the scheme. This has been informed by the TAG optimism bias work, drawing on values such as the P(20), P(mean) and P(80) in the probability distribution for the relevant reference class to determine key points within the range. The P(mean) value includes the central assumption of 23% optimism bias.

**Table 4-21 – Likelihood of Outturn Cost**

Probability Band	Very Unlikely	Unlikely	Possible	Likely	Most Likely	Likely	Possible	Unlikely	Very Unlikely
Probability within optimism bias distribution	P(10)	P(20)	P(33)	P(50)	P(mean)	P(66)	P(75)	P(80)	P(90)
Optimism Bias	-9%	2%	11%	18%	23%	26%	44%	58%	70%
Impact on cost (£m PV)	14.6	17.2	19.0	20.9	21.8	22.2	25.5	27.9	32.9
Percentage change to PVC	-33%	-21%	-13%	-4%	0%	2%	17%	28%	51%

Whereas specific levels of probability of different outturn costs have been identified, using the distribution formed by a large sample of previous projects, the assessment of likelihoods of benefits has been more qualitative. A range of sensitivity tests have been performed on different areas of benefits generated by the scheme, which have been considered together to give an indicative range of benefits.

**Table 4-22** sets out an indicative range of benefits centred around the core assessment. The probability bands have been largely based on individual sensitivity tests ranging from the lowest<sup>41</sup> to highest impact in both positive and negative directions. The very unlikely outcomes have calculated as the combined impacts of two sensitivity tests, assuming no direct dependency in the variables.

<sup>41</sup> The carbon pricing sensitivity tests have been excluded from this range as the carbon benefits form such a small proportion of the overall scheme benefit. The TAG Databook sensitivity test has also been excluded as this is a measure of the impact of the appraisal assumptions on the BCR, rather than of uncertainty in scheme performance.

**Table 4-22 – Likelihood of Benefit**

Probability Band	Very Unlikely	Unlikely	Possible	Likely	Most Likely	Likely	Possible	Unlikely	Very Unlikely
Derivation	Combine two most adverse sensitivity tests	Most adverse sensitivity test	Intermediate adverse sensitivity test	Least adverse sensitivity test		Least beneficial sensitivity test	Intermediate beneficial sensitivity test	Most beneficial sensitivity test	Combine two most beneficial sensitivity tests
Sensitivity Test(s)	Low demand and non-business VOT	Low demand growth	Low non-business VOT	Low business VOT		High business VOT	High demand growth	High non-business VOT	High demand and non-business VOT
Impact on benefit (£m PV)	28.7	36.9	43.0	50.5	55.3	60.1	62.6	67.6	76.5
Percentage change to PVB	-48%	-33%	-22%	-9%	0%	9%	13%	22%	38%

As benefits are more dependent than costs on longer-term areas of uncertainty the range of potential outcomes is considered to be wider than that of the cost forecasts.

These ranges of PVB and PVC have been used to inform a combined analysis of the likelihood of varying BCRs being achieved.

Variations to the BCR will depend on uncertainties in both the benefits and costs together, with the chance of a significant change to the BCR as likely to come from moderate changes to both, as from a large change in either one. This relationship is set out in **Table 4-23**.

The chances of both costs and benefits experiencing a very large change at once in a given direction is very low. However, there is a range of different combinations of change to benefits and costs which can result in similar outcomes for the BCR. This means that while an individual set of circumstances may be unlikely the number of routes to a certain result when summed together may make that BCR a moderate possibility.

Considering the results set out in this figure, the most likely BCR appears to be in the range of 2.0 to 2.9, within the green area. This is supported by a range of additional cells within the orange and red areas producing BCRs in the same range, where benefits and costs experience larger changes, but both move in the same direction.

The next less likely BCRs would appear to fall in the range of 1.7 to 3.2, while a BCR of between 1.3 and 3.8 is unlikely. Anything outside of this range is very unlikely and would depend on very low probability impacts on both benefits and costs, which would need to move in opposite directions, i.e. a very large increase in cost and very large decrease in benefits, or vice versa.

**Table 4-23 – Potential impacts of uncertainty on the Value for Money assessment**

Uncertainty around central BCR				Cost (£m, 2010 PV)								
				Very Unlikely	Unlikely	Possible	Likely	Most Likely	Likely	Possible	Unlikely	Very Unlikely
				-33%	-21%	-13%	-4%	Forecast	+2%	+17%	+28%	+51%
				14.6	17.2	19.0	20.9	21.8	22.2	25.5	27.9	32.9
Benefit (£m, 2010 PV)	Very Unlikely	-54%	26.8	2.0	1.7	1.5	1.4	1.3	1.3	1.1	1.0	0.9
	Unlikely	-35%	37.8	2.5	2.1	1.9	1.8	1.7	1.7	1.4	1.3	1.1
	Possible	-29%	41.1	2.9	2.5	2.3	2.1	2.0	1.9	1.7	1.5	1.3
	Likely	-13%	50.5	3.5	2.9	2.7	2.4	2.3	2.3	2.0	1.8	1.5
	Most Likely	Forecast	58.0	3.8	3.2	2.9	2.6	2.5	2.5	2.2	2.0	1.7
	Likely	+6%	61.5	4.1	3.5	3.2	2.9	2.8	2.7	2.4	2.2	1.8
	Possible	+14%	66.0	4.3	3.6	3.3	3.0	2.9	2.8	2.5	2.2	1.9
	Unlikely	+28%	74.3	4.6	3.9	3.6	3.2	3.1	3.0	2.6	2.4	2.1
	Very Unlikely	+46%	84.5	5.2	4.4	4.0	3.7	3.5	3.4	3.0	2.7	2.3

Based on the outcomes of this uncertainty analysis, an overall switching values assessment has been used to present the likelihood of changes to the Core VfM category resulting from increases or reductions in costs and benefits (Table 4-24).

**Table 4-24 – Summary of the impacts of uncertainty on the Value for Money assessment**

VfM category (BCR)	Likelihood
Poor (0-1)	Very Unlikely
Low (1-1.5)	Unlikely
Medium (1.5-2)	Possible
High (2-4)	Very Likely
Very high (>4)	Very Unlikely

Considering the scale of change required from either benefits or costs in isolation to result in a change in value for money categorisation, based only on the monetised benefits of the scheme, Table 4-25 sets out a switching value analysis. This indicates that for the VfM to drop from High to Medium either the benefits would need to fall by 25% or the costs rise by 33%. For the VfM to change to Very High the benefits would need to rise by 50% or the costs fall by 33%.

**Table 4-25 – Switching Value Analysis**

VfM category (BCR)	PVB	PVC	BCR	VfM
Core	55.3	21.8	2.5	High
Minimum Variation to Benefits	43.6 (-21%)	21.8	<2	Medium
	87.2 (+58%)	21.8	>4	Very High
Minimum Variation to Costs	55.3	27.6 (+27%)	<2	Medium
	55.3	13.8 (-37%)	>4	Very High

Taking into account the consideration of uncertainty, this indicates that there is a reasonable degree of certainty around the Core Adjusted BCR (and resultant High VfM category), but that there is also a possibility of the scheme VfM moving into a Medium VfM category. There is a small chance of returning a Low VfM, which would require both low levels of background demand growth and very low values of time to occur together, as well as a large increase in costs.

There are a number of uncertainties which have been considered which would have similar scales of impact on the VfM of the scheme, including variations to demand growth, values of time and cost of delivery. None of these in isolation are likely to be sufficient to change the VfM category and a combination of positive or adverse variations would need to occur simultaneously for this to occur.

## 4.7. Distributional analysis

### 4.7.1. Approach

A distributional impacts appraisal has been carried out to understand the transport impacts of the scheme and their effects in relation to individual social groups. The appraisal has been conducted in line with the three-stage process defined in TAG A4.2:

- Step 1: Screening – determining the relevance of impacts in relation to the scheme;
- Step 2: Assessment – defining the social groups and amenities affected within the scheme impact area; and
- Step 3: Appraisal – core analysis of the impacts to derive appraisal scores.

Impacts on security and accessibility were screened out as part of Step 1. A full appraisal (Steps 2 and 3) has been undertaken for user benefits, air quality, noise, severance, personal affordability and accidents.

The Social and Distributional Impacts Report (**Appendix B10**) provides full details of the methodology and outputs.

### 4.7.2. Key outcomes

The results of the distributional impacts appraisal are summarised in **Table 4-26**. The assessment scores have been included in the AST.

**Table 4-26 – Distributional impacts summary**

Indicator	Key impacts - qualitative statements	Overall assessment
<b>User Benefits</b>	User benefits impacts favour the least deprived income quintiles as large beneficial versus slight beneficial for the most income deprived quintiles. However, all income quintiles are appraised as beneficial.	Moderate beneficial
<b>Air Quality</b>	A slight adverse assessment was outlined for children as there are more links with increases than decreases for PM10 and NOx levels in areas with the 20% highest proportions of children. Income quintiles 4 and 5 (less deprived) are assessed as slight to moderate adverse impact.	Slight adverse
<b>Noise</b>	Noise impacts favour the least deprived income quintiles (slight to moderate beneficial), with neutral impacts for other quintiles.  Since there are more properties with decreased noise levels in proximity to schools within the noise impact area, the impact has been assessed as slight beneficial. The population of elderly residents and daytime population of children is greater than national average - therefore, impacts on both of these vulnerable groups are assessed as slight beneficial.	Slight beneficial
<b>Severance</b>	Forecast changes in the distribution of traffic flows resulting from the scheme leads to an assessment of a slight beneficial impact for older people and a slight adverse impact for children. Disabled residents and no car households were appraised as neutral due to the minimal presence of these vulnerable groups in the study area.	Neutral
<b>Accidents</b>	Slightly more links are forecast to experience an increase in collision rates than those experiencing a decrease. However, detailed analysis of existing collision data demonstrates that collisions involving the vulnerable groups are generally not significantly different between the affected links and are minimal compared to the wider impact area. Therefore, the impacts on the majority of vulnerable groups is assessed as neutral.	Neutral
<b>Personal affordability</b>	Assessed impacts mostly favour residents in income quintile 1, 2, 3 and 5, with a slight adverse impact appraised for income quintile 4.  Therefore, the impact is mainly beneficial, but is distributed relatively unevenly.	Slight beneficial

## 4.8. Place-based analysis

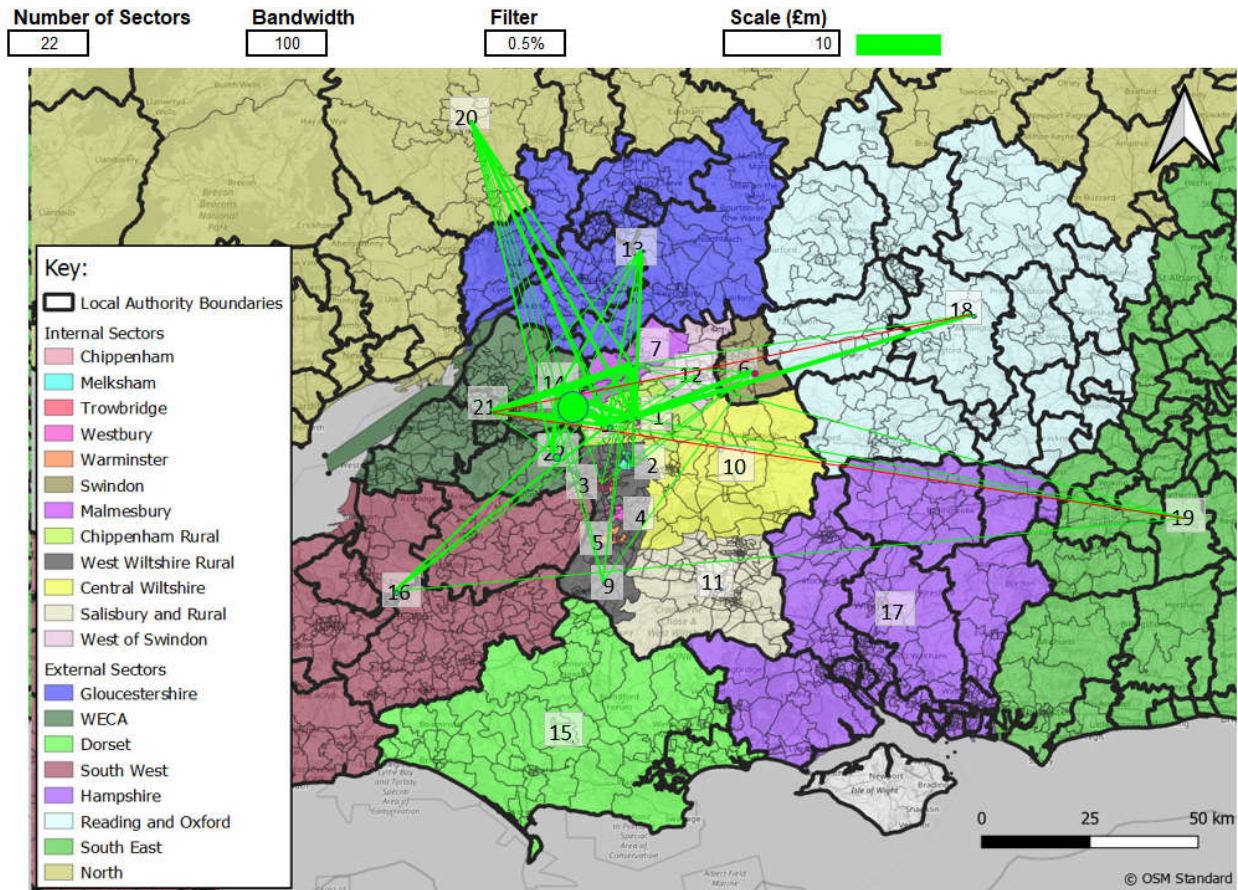
As set out in the Strategic Dimension, the M4 Junction 17 scheme is part of a holistic strategy to enhancing north-south connectivity, including a series of upgrades to the principal A350 corridor (part of the Major Road Network) between the M4 and the South Coast. At a spatial level, the appraisal of the scheme demonstrates benefits to the west Wiltshire towns (i.e. comprising the A350 Growth Zone) and the wider Western Gateway region.

### 4.8.1. User benefits and traffic related impacts

Section 4.5.1.2 demonstrates that user travel time benefits represent a significant proportion of the overall social welfare benefit. Analysis of the spatial distribution of these benefits (**Figure 4-5**, for instance) identifies that the greatest concentration of benefits falls to areas to the north and south of M4 Junction 17, including towns on / around the A350 corridor (including Chippenham and Melksham) and on the A429 (including Malmesbury). Approximately 50% of total travel time benefits relate to trips to/from the towns of Chippenham, Melksham and Trowbridge.



Figure 4-5 – Spatial distribution of travel time benefits (60 year appraisal period)



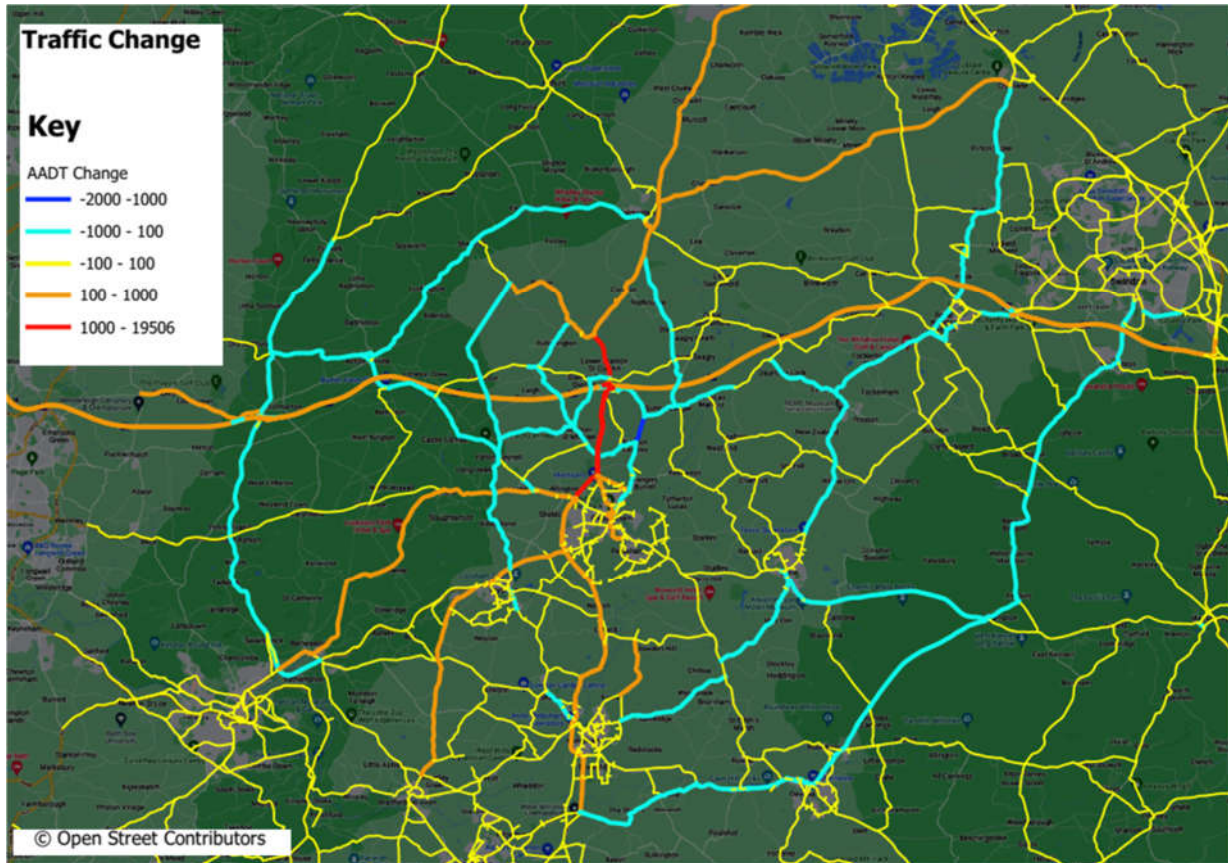
The largest benefits calculated are for relatively short distance movements in the vicinity of Junction 17, particularly for movements on the north-south axis following the A350 and A429. This is followed by movements between Malmesbury and WECA (north and west of Junction 17 respectively) or Swindon and Chippenham (East and South of Junction 17). A range of longer distance movements passing through the scheme or surrounding area are also forecast to experience time savings.

The impacts of the scheme are also expected to be experienced more broadly within the area, due to the potential to affect travel patterns within the area and the routing of traffic. This is largely a factor of the ways in which traffic could be expected to respond to the increasing delays at M4 Junction 17 in the forecast Do Minimum (without scheme) scenario. The improved capacity and performance of the junction resulting from scheme implementation would minimise this potential rerouting effect being realised. Therefore, benefits are not constrained to movements directly through Junction 17 of the M4, but trips passing through Junction 16 and Junction 18 will also benefit, as the extra capacity at Junction 17 will reduce trip numbers using these alternative routes.

Based upon the traffic modelling predictions, the traffic rerouting effects are expected to provide some beneficial impacts for surrounding rural routes and communities associated with changes in traffic volumes, delays and localised noise and air quality effects. The other implication of this effect is higher traffic levels on the main routes feeding M4 Junction 17 (i.e. the M4, A350 and A429). **Figure 4-6** provides an illustrative representation of this in terms of the predicted changes in traffic flows (AADT) as a result of the scheme in the 2036 forecast year.



Figure 4-6 – Forecast change in traffic flows with scheme (Annual Average Daily Traffic), 2036

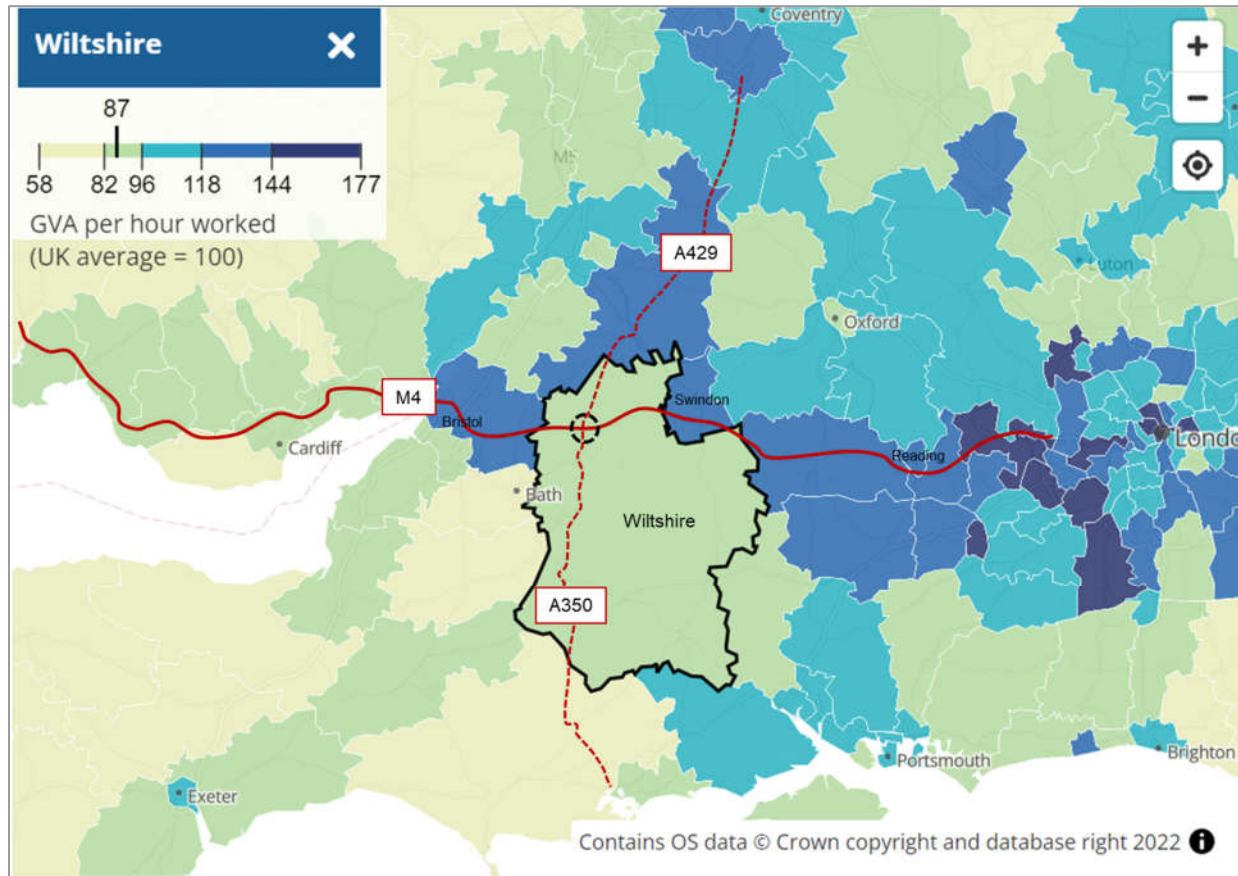


Some marginal disbenefits are calculated for some trips using the M4, but not passing through junctions 16, 17 or 18, as additional traffic is able to access the M4 rather than using local roads. Due to the large number of trips using the M4 between WECA and the South-East or Reading and Oxford this marginal disbenefit is evident in Figure 4-5, while many of the smaller local benefits resulting from reduced traffic on local roads are not shown due to the minimum filter value applied.

#### 4.8.2. Closing the productivity gap

A key challenge for the Western Gateway region is closing the productivity gaps affecting parts of the region, including Wiltshire. **Figure 4-7** illustrates this through mapping a GVA index, and highlights the significance of the M4 Junction 17 scheme for maintaining high quality strategic connections between Wiltshire (particularly the west Wiltshire towns) and surrounding areas of higher productivity.

Figure 4-7 – Sub-regional productivity (Index of GVA per hour worked, 2019, UK =100)



**Faster and more reliable journey times** resulting from the scheme (compared to the 'Do Minimum') will support **enhanced connectivity** between Wiltshire and key economic centres, including surrounding Functional Urban Regions<sup>42</sup> such as Swindon, Bristol and Bournemouth / Poole on the south coast, and those farther afield with primary access via the M4, such as the Thames Valley area, Heathrow and London.

**Table 4-27** illustrates predicted journey time savings during the busiest part of the AM peak period, based on the 2036 forecast year comparing the Do Something and Do Minimum scenarios.

**Table 4-27 – Average journey time savings at M4 Junction 17 by approach arm (2036, AM)**

Approach arm (all movements across J17)	Weighted average journey time saving (0700 – 0900), 2036 DS-DM
A350	3 minutes
A429	3 minutes
B4122	8 minutes
M4 West off-slip	Minimal change
M4 East off-slip	Minimal change

<sup>42</sup> Functional Urban Regions (FUR) comprising a core and a surrounding hinterland, are defined areas of concentrated economic activity and are identified within TAG (e.g. A2.4) as areas more likely to be associated with agglomeration benefits.

The scheme is therefore expected to drive **agglomeration-based productivity improvements** for Wiltshire and the wider Western Gateway region in particular; serving to effectively bring workers and employment opportunities closer together. Workers would have access to a greater range of employment opportunities, whilst employers would have greater access to a more diverse pool of labour (and a greater range of skills). As a result, an associated increase in economic activity would be expected, accompanied by higher levels of output per worker.

These beneficial impacts for the area are particularly relevant when considered in the context of the broader improvement strategy for the corridor, but the M4 Junction 17 scheme is a key component and will prevent the junction becoming a bottleneck and thus a constraint to realising the full wider benefits of other investment in the A350 corridor. As a point of reference, the Western Gateway connectivity study<sup>43</sup> estimated potential total agglomeration benefits of approximately £350 million (over 60 years) associated with enhancement to the A350 corridor as a whole.

### 4.8.3. Delivery of local housing and jobs

#### 4.8.3.1. Facilitating new housing sites in the A350 corridor

The significance of the A350 corridor to the spatial strategy for Wiltshire was identified in the Strategic Dimension and effective connections to the M4 SRN are an important factor in the viability of new housing and employment sites within the area. The ongoing Wiltshire Local Plan Review identifies a requirement of approximately 24,000 new homes within the A350 corridor between 2016 to 2036, with a need to identify new site allocations to deliver approximately 10,000 of these. Chippenham has been identified as a key growth area; its convenient access to the M4 (via Junction 17) is a particular strength in terms of attractiveness in the housing market.

The appraisal of the M4 Junction 17 scheme demonstrates its effectiveness in catering for planned and future growth and the associated additional traffic demands.

The scheme has been shown to operate within capacity, with minimal levels of delay, in a 2036 forecast year core scenario and a 2036 high growth scenario. Additional operational assessment undertaken in conjunction with National Highways has also further 'stress tested' the scheme in the context of the Local Plan Review and found it to operate satisfactorily.

Facilitating new local housing sites would generate economic benefit for the area through Land Value Gain. At a full corridor-wide level, the Western Gateway connectivity study estimated potential Land Value Gain of £156 million associated with enhancement of the A350. The benefit directly attributable to the M4 Junction 17 scheme would be substantially lower than this.

#### 4.8.3.2. Economic competitiveness and inward business investment

The Strategic Dimension identified a strong supply of employment land within Wiltshire, and the A350 corridor in particular. As part of the development of its Regional Evidence Base, the Western Gateway STB identified (through business surveys and engagement) transport connectivity as an important factor in business investment decisions within the area. This is due to the impacts of accessibility, reliability and delays on firms' costs, and ultimately their competitiveness. The Swindon and Wiltshire Local Enterprise Partnership also identifies significant potential for the area around M4 Junction 17 itself to develop as a major economic hub, given its desirable strategic location.

The beneficial impacts of the M4 Junction 17 scheme on access to the SRN (with reduced congestion and more reliable journey times – as demonstrated through the scheme modelling and appraisal), will therefore deliver positive effects for the corridor in relation to inward business investment (and retention), job creation and associated economic value. This may involve some displacement of economic activity from elsewhere, either within the Western Gateway region or beyond.

As with productivity (agglomeration) and Land Value Gain benefits, the value of the scheme is most usefully considered in relation to its contribution to the wider corridor strategy. The Western Gateway connectivity study estimated the potential for over 8,600 new jobs (direct employment) associated with enhancement to the whole A350 corridor, equating to additional GVA for the area of £2.3 billion over 10 years (with an additionality assumption of 25%). Adjusting this for employment opportunities within the Wiltshire section of the corridor only

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<sup>43</sup> Western Gateway STB Economic Connectivity Study (WSP, 2019) - <https://westerngatewaystb.org.uk/wp-content/uploads/2020/08/wg-reb-appendix-a-Economic-Connectivity-Study.pdf>

provides a value of approximately £1.5 billion. The benefit directly attributable to the M4 Junction 17 scheme alone would be substantially lower than this.

#### 4.8.4. Other local economic benefits

The scheme is expected to contribute to other economic benefits for the area, including:

- Enhanced connectivity to the region’s international gateways, including the Port of Poole and Bournemouth / Southampton airports; and
- Generating tourism benefits, with improved connectivity via the M4/A350 enhancing the area’s visitor economy including access to the South Coast and major tourist attractions such as Longleat Safari Park (off the A350 at Warminster).

### 4.9. Performance against objectives

This section presents the scheme’s performance against the objectives outlined in the Strategic Dimension. Model outputs and qualitative commentary has been provided to assess how well the scheme performs against the objectives. This is presented in **Table 4-28**.

**Table 4-28 – Performance against objectives**

Objective	Performance against objective	Source	Commentary
<b>Reducing delay and improve journey time reliability</b> at M4 Junction 17, supporting journeys on the SRN / MRN	Meets objective	Sections 4.5.1.2 and 4.5.1.10  Vissim Forecasting Report	Modelling indicates that the M4 Junction 17 Improvements scheme will operate with lower delay compared to the Do-Minimum situation (2036 Core Scenario). <ul style="list-style-type: none"> <li>• Average delay time at M4 J17 in 2036 forecast year reduced by 53% in the AM (8-9) and 35% in the PM (17-18).</li> <li>• Average vehicle speeds predicted to increase by 22% in the AM peak and 11% in the PM peak.</li> <li>• Delays significantly reduced for traffic entering the gyratory from the A350 and A429.</li> <li>• Some small delay increase could be experienced during quieter periods of the day, such as the interpeak, as a result of the full signalisation of the junction.</li> </ul>
<b>Ensuring that M4 Junction 17 has the capacity to accommodate planned and future growth</b> in the A350 Corridor and in the A350 and Swindon M4 SWLEP Growth Zones, including the Wiltshire Local Plan Review	Meets objective	EAR section 5.5  Vissim Forecasting Report	Operational modelling indicates that, even at the busiest times of day in 2036 the improved junction will provide sufficient capacity to support the levels of forecast demand, resulting in low levels of delay.  The combined modelling approach indicates significant increases in benefits between 2026 and 2036.
<b>Improving north-south connectivity on the A350</b> through improvements to M4 Junction 17, the gateway to the A350 / South Coast from the SRN	Meets objective	EAR Section 5.5	Key movements on M4 Junction 17 benefitting from the improvement are forecast to be: <ul style="list-style-type: none"> <li>• In the AM peak, trips travelling north on the A350 and turning west onto the M4</li> <li>• In the PM peak, trips travelling west on the M4 and turning south onto the A350</li> </ul>



Objective	Performance against objective	Source	Commentary
			This demonstrates a clear connectivity improvement between the south coast and more productive areas to the east and west. Access to these areas will otherwise become increasingly dependent on the local road network and put increased pressure on alternative junctions on the M4.
<b>Enhancing the wider package of MRN/LLM improvements</b> for the A350, which would be most effective when delivered in combination.	Meets objective	Qualitative	The scheme addresses a potential bottleneck at the head of the A350 corridor to complement the planned A350 improvements at Chippenham and Melksham. Without addressing this, the A350 route would become less attractive and would not maximise the investment on these other parts of the corridor.
<b>Increase safety levels at M4 Junction 17</b> , taking into account forecast traffic growth	Meets objective	Section 4.5.1.7	Safety assessment performed using COBA-LT indicates that accident numbers across the network will be reduced, leading to an economic benefit. Full signalisation of M4 Junction 17 itself would be expected to result in a further safety benefit.

#### 4.10. Appraisal Summary Table

An Appraisal Summary Table (AST) has been produced in line with TAG guidance. The AST collates the key economic, social, environmental and distributional impacts and costs. The completed AST is provided in **Appendix B7**.

#### 4.11. Value for Money

The overall value for money statement provides the key information from the economic appraisal for the M4 J17 scheme presented within the OBC. Evidence is presented in relation to whether the expected costs of the scheme are justified by its expected benefits to the UK public as a whole, including both positive and negative impacts on the economy, society, environment, and public accounts. Monetised, quantitative and qualitative information is used in preparing the statement.

In line with DfT's 'Value for Money Framework' and 'Supplementary Guidance on Categories', the determination of the final VfM category begins with the Adjusted BCR and then considers other monetised and non-monetised impacts and risks / uncertainties, and the likelihood of these resulting in a change to the VfM category (**Figure 4-8**). This draws upon, and should be considered alongside, relevant sections of the Economic Case, as indicated.

Figure 4-8 - Determining the final Value for Money category

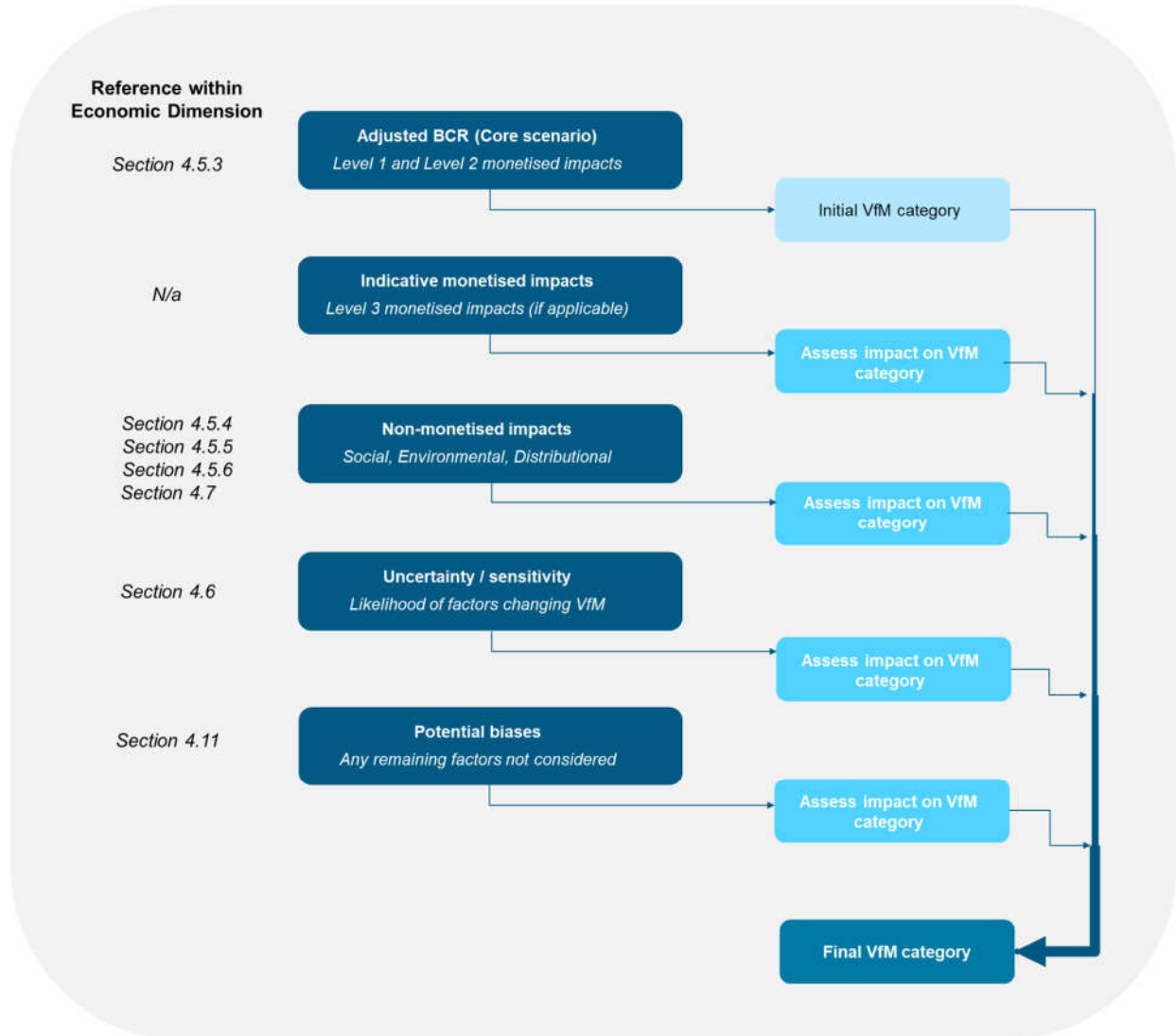


Table 4-29 presents the final Value for Money statement for the M4 Junction 17 scheme.

Table 4-29 – Value for Money Statement

Impact / measure	Core Scenario	High demand growth	Low demand growth	High Cost	Low Cost	High Business VOT	Low Business VOT	High Non-business VOT	Low Non-business VOT	TAG 1.18	Notes
<b>Adjusted BCR</b>											
Present Value of Benefits (PVB)	£55.3m	£62.6m	£36.9m	£55.3m	£55.3m	£60.1m	£50.5m	£67.6m	£43.0m	£58.0m	Notes: Includes travel time benefits, vehicle operating costs, indirect tax revenues, accidents, noise, air quality, greenhouse gas. Adjusted to include reliability benefits. Benefits captured associated with the junction. Impacts of complementary cycling measures have not been monetised. Standard 60-year appraisal period. Scheme opening in 2026. Costs (PVC) covers investment cost, maintenance and renewals and includes 23% optimism bias.
Present Value of Costs (PVC)	£21.8m	£21.8m	£21.8m	£27.3m	£18.1m	£21.8m	£21.8m	£21.8m	£21.8m	£21.8m	
Net Present Value (NPV)	£33.5m	£40.8m	£15.1m	£28.0m	£37.2m	£38.3m	£28.6m	£45.7m	£21.2m	£36.2m	
<b>Adjusted BCR</b>	<b>2.53</b>	2.87	1.69	2.02	3.05	2.75	2.31	3.09	1.97	2.66	
<b>VfM Category</b>	<b>High</b>	High	Medium	High	High	High	High	High	Medium	High	
<b>Indicative monetised impacts</b>											
<b>VfM Category adjustment</b>	<b>High</b>	No adjustment									
<b>Non-monetised impacts</b>											
Wider Economic Impacts	Moderate beneficial	The scheme will generate positive wider economic impacts, by reducing costs to businesses enabling increased competitiveness, greater agglomeration impacts and provide access to a wider labour market enabling increased productivity. It may help to enable increased levels of development in the region.									
Social Impacts	Slight beneficial	Social impacts have been individually assessed as being slight beneficial or neutral, with the most positive impacts on journey quality and severance. Benefits to cyclists have not been monetised and neither have safety benefits for traffic within the M4 Junction 17 circulatory. These will both be positive but are unlikely to significantly improve the overall VfM.									
Environmental Impacts	Neutral to slight adverse	The assessment identifies a relatively modest scale of overall impact related to the non-monetised environment impacts. Water environment and historic environment are assessed as neutral impact. Landscape and biodiversity are assessed as slight adverse impact, although there is opportunity to embed further mitigation and enhancement measures in the scheme design.									
Distributional Impacts	Slight adverse to moderate beneficial	Distributional impacts have been assessed as being mostly neutral or beneficial. Air quality has been assessed as slight adverse.									
<b>VfM Category adjustment</b>	<b>High</b>	Adjustment to reflect the potential for wider impacts to improve the overall VfM with limited variation from other elements of non-monetised impacts. While this may increase performance it is unlikely to change the VfM category.									
<b>Uncertainty / sensitivity</b>											
Key Risks, Sensitivities	BCR range 1.69 to 3.09	High non-business value of time and low demand growth scenarios provide the greatest variation to the Core. Uncertainty / sensitivity testing shows High VfM category is likely in most cases, with some potential for a move to Medium VfM (e.g., under low growth and lower non-business value of time assumptions).									
<b>VfM Category adjustment</b>	<b>Medium-High</b>	Medium VfM is a possibility if future VOTs are substantially lower than the central forecast or if costs exceed the P(90) value. This will only result in a reduced VfM category if wider economic impacts are low. These scales of change are individually unlikely but a combination of smaller variations may result in the BCR falling below 2. It is therefore considered appropriate to adjust the VfM category to Medium-High.									
<b>Potential bias</b>											
Other factors	-	Certain additional costs may be required for mitigation of environmental impacts which are not yet fully assessed, but these are not expected to be sufficient to change value for money assessment.									
<b>VfM Category adjustment</b>	<b>Medium-High</b>	Medium-High is considered to remain appropriate.									
VfM category		<b>Poor</b>		<b>Low</b>			<b>Medium</b>		<b>High</b>		<b>Very high</b>
Likelihood		Very unlikely		Very unlikely			Possible		Very Likely		Very unlikely
<b>FINAL VfM CATEGORY</b>		<b>Medium-High</b>									



## 4.12. Key findings and recommendations

The Economic Dimension identifies the optimal solution to meet the strategic requirements identified in the Strategic Dimension, including:

- the overall need to address congestion, delays, reliability and safety at the key intersection between the motorway network and the strategic A350 corridor;
- improving north-south connectivity on a priority transport corridor within the Western Gateway sub-region (linkages between west Wiltshire / South Coast to the M4 / Midlands);
- enhancing productivity and economic competitiveness to realise economic potential; and
- facilitating planned and emerging housing and jobs growth within Wiltshire.

The Economic Dimension demonstrates that:

- A range of potential strategic options have been considered and a highways based solution identified based on alignment with the investment objectives and wider deliverability factors;
- Potentially viable junction improvement options reflecting different scales of intervention have been assessed, with input from National Highways. Based on the relatively limited range of options available, a clear case has been identified around Option B+ providing the best balance between scale of impact (in terms of travel time benefits) and cost. Other environmental and social impacts are broadly comparable between the options;
- Typical monetised impacts have been appraised using industry standard methods and generate an adjusted BCR of 2.5 under a core scenario, with a NPPV of £33.5m. This reflects the social welfare benefits at a UK wide level. Travel time benefits account for 90.5% of PVB. The core BCR equates to a High VfM category.
- There is potential for additional value to be added through contribution to wider economic impacts, with increased capacity at the junction providing scope for higher levels of development and improved journey times for businesses and commuters providing efficiency and agglomeration gains, while also improving access to a wider labour market.
- Other non-monetised social and environmental impacts have been assessed to be of generally neutral or slight impact (beneficial/adverse) and not significant enough to materially impact the VfM category.
- The potential implications of appraisal uncertainty have been assessed and demonstrates that a High VfM category remains the most likely outcome under most circumstances tested, but with the possibility of Medium VfM, for instance related to lower than expected levels of traffic growth.
- From a more local, place-based perspective, the scheme delivers benefits to the inter-connected West Wiltshire towns along the A350 corridor by safeguarding and strengthening their linkages with other economic centres and helping to cater for the delivery of planned and future housing / employment growth. Approximately 50% of total travel time benefits relate to trips to/from the towns of Chippenham, Melksham and Trowbridge within the northern section of the A350 corridor. M4 Junction 17 users are predicted to benefit from approximate journey time savings by 2036 of up to 7 mins per trip (A350 to M4 westbound, AM peak hour) compared to the Do Minimum (without scheme).
- At a broader sub-regional level the scheme also supports the strategic role of the A350 corridor in providing north-south connectivity between the South Coast, M4 and beyond, particularly when considered in the context of the broader strategy for the corridor and other planned improvements on the A350 at Chippenham and Melksham.

# Commercial Dimension



## 5. Commercial Dimension

### 5.1. Purpose

The Commercial Dimension sets out the **commercial viability** of the M4 Junction 17 scheme, and the **procurement strategy** that will be used to engage the market. It considers the preferred scheme option for implementation, as presented within the Strategic Dimension (Section 3.3.2).

The design and construction of the scheme requires a robust procurement strategy to deliver the constituent parts in a **timely, efficient, safe and cost-effective** manner. The Commercial Dimension assesses:

- The aims and objectives of the procurement process;
- The output based specification;
- The procurement strategy, including details of how different options have been assessed;
- The proposed procurement approach;
- The proposed contract type and form;
- Arrangements for risk allocation and transfer; and
- Details of the procurement and contracting timescales.

Scheme design and construction will be procured by Wiltshire Council. The overall purpose of the procurement approach is to provide a framework to obtain both **value and social capital** through the delivery of the project. This includes:

- Identifying and delivering efficiencies, but not at the expense of quality; and
- Developing and embracing the principles of sustainable procurement.

The procurement approach is **developed in line with best practice**, making use of such tools and guidance as the Cabinet Office's Construction Playbook<sup>44</sup>, HM Treasury Business Case guidance, and internal Wiltshire Council guidance. These tools and guidance are, importantly, utilised within the specific context of the scheme and its intended objectives and outcomes. The primary focus is the development of the right Delivery Model, and in turn the commercialisation of that Delivery Model into the right Contracting Model.

A full Procurement Strategy is provided in **Appendix C1**; this chapter provides a summary of the main points.

### 5.2. Key updates since SOBC

At SOBC stage, early consideration of the potential procurement stage was indicative only. Following further scheme development and selection of the preferred option through the OBC process, this has enabled development of the procurement strategy. The information presented within this chapter is based on initial assessments of the procurement approach, commensurate with the current stage of scheme development for the OBC. The approach will continue to evolve during further scheme development.

### 5.3. Output specification

The M4 Junction 17 project is a relatively typical **highways infrastructure** project, comprising key elements of scheme preparation and construction works. An overview of the key project outputs for scheme development and implementation is provided in **Table 5-1**. The specification will be developed in full to support the procurement process for the main construction works.

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<sup>44</sup> [The Construction Playbook – December 2020 \(publishing.service.gov.uk\)](https://www.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/531212/construction-playbook-december-2020.pdf)

**Table 5-1 - M4 Junction 17 summary output-based specification**

Stage of scheme development	Key outputs
Preparation	Provision of project management services
	Construction Design and Management (CDM) requirements
	Completion of highways preliminary and detailed design
	Completion of drainage preliminary and detailed design
	Completion of lighting preliminary and detailed design
	Provision of site surveys to facilitate preliminary and detailed design
	Provision of safety audit advice
	Completion of mandated environmental reports, assessments and surveys. Liaison with relevant statutory environmental bodies.
	Approach for procurement of construction and operation of scheme as set out below
	Support with relevant regulatory processes / consents, such as TRO's
	Provision of land negotiation for easement during construction phase
Construction works	Construction Phase Plan (CDM)
	Construction Management Plan / Construction Environmental Management Plan
	Traffic Management Plan
	Site preparation and clearance
	Traffic management during construction (to safely allow construction and the movement of traffic on the M4 mainline, Junction 17 gyratory and its approaches)
	Works involved with carriageway widening on all approaches to the gyratory (A350, B4122, A429)
	Works involved with carriageway widening on the eastbound off-slip; westbound on-slip; and westbound off-slip.
	Works involved with carriageway widening on the gyratory (an additional lane on the entirety of the gyratory)
	Works involved with converting the existing 2-lane arrangement on the overbridges to 3 narrow lanes
Works involved with implementation of traffic signalisation of the A429 arm (completing full signalisation of the junction)	

The site around the gyratory and slip roads is limited by the existing highway boundary. The two overbridges which span the M4 mainline will not be modified as part of the preferred scheme option. The works do not involve any major structures or new sections of road through greenfield areas. These constraints provide little to no scope for major design alterations and the highway geometry is likely to be fixed from the preliminary design stage and purely refined during the detailed design stage.

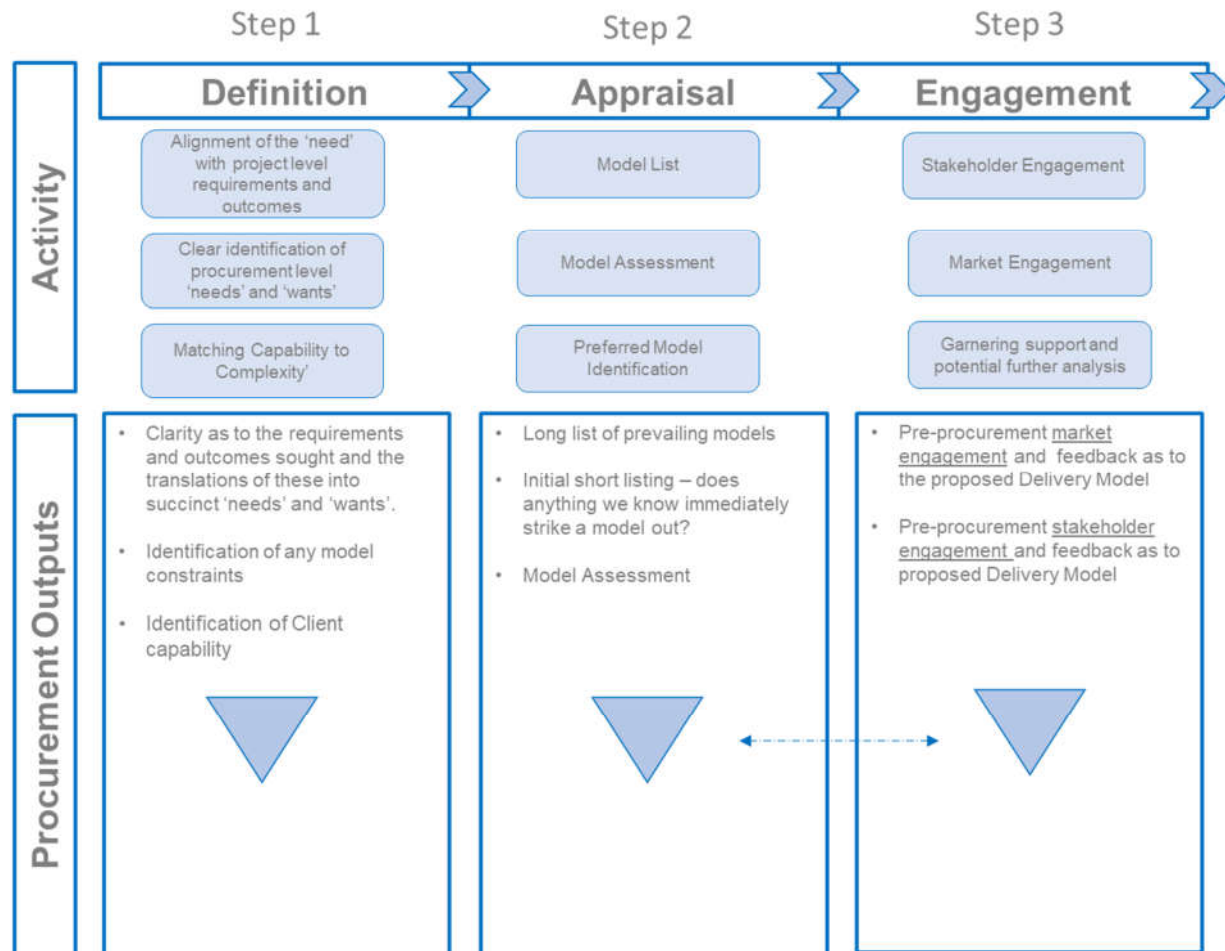
The **estimated procurement value of the scheme is approximately £19.6 million** (outturn prices for construction and preliminaries elements only). However, costs which are currently included in the risk budget may be transferred across into the construction costs as the scheme is developed, leading to an increase in the actual value to be procured. Preparatory and site supervision aspects are assumed to be led by Wiltshire Council, either directly, or indirectly through an existing term contract. Preparatory and site supervision costs are therefore excluded from the value to be procured.

## 5.4. Procurement strategy

### 5.4.1. Approach to developing the procurement strategy

An overview of the general **process and main principles** for identifying the optimal procurement approach is illustrated in **Figure 5-1**. This ensures that decisions are based upon **evidence and analysis specific to the project requirements**.

**Figure 5-1 – Overview of approach to developing the procurement strategy**



### 5.4.2. Procurement objectives

The consideration of the procurement approach is based on a sound understanding of the specific 'needs' and 'wants' in relation to the scheme following consultation with Wiltshire Council. The key drivers are generally based around issues of **cost, quality and time**.

Key objectives for the procurement approach for the M4 Junction 17 scheme include that it should:

- Deliver the scheme within the available funding (cost certainty);
- Enable Wiltshire Council to commit to the project in full;
- Maximise the likelihood of the project objectives being delivered;
- Ensure 'Best Value' is delivered;
- Ensure that appropriate quality is delivered to both Wiltshire Council and Highways England on their respective networks;
- Offer an affordable whole life cost solution;

- Reduce risk to a level that is 'As Low As Reasonably Practicable' (ALARP);
- Offer affordable opportunities for change throughout the project life-cycle;
- Offer the opportunity to engage contractors in the early planning stage development of the scheme;
- Provide contractor input to the design, risk assessment and delivery programme;
- Be deliverable in respect to the capacity and capability available; and
- Be attractive to the market.

### 5.4.3. Other considerations

The strategy seeks to realise **cost and process efficiencies**, take account of economic, social and environmental factors, and manage quality and risk. It also aims to deliver consistent quality standards that would result in successful scheme delivery. Further considerations relevant to the procurement of the scheme include:

- The project's objectives;
- The project's construction (and other) constraints;
- The project's risks;
- Health and safety requirements;
- The project's likely position and attractiveness in the market; and
- The capacity and capability of Wiltshire Council to deliver the project.

Specific points of relevance include:

- There is the possibility there will be specific **time constraints** on the project – e.g. due to funding requirements;
- The need for implementing **safe systems of work on the SRN**;
- Consideration for **traffic management arrangements** during construction – the M4 Junction 17 construction works will require various phases of traffic management to ensure network resilience and eliminate the potential for queuing on the M4 mainline;
- Specific site constraints:
  - Geological **Site of Special Scientific Interest (SSSI)** – there is an SSSI located between the M4 mainline and eastbound on-slip / westbound off-slip. Although the proposed works do not fall within the footprint of the SSSI, there will be a need to control construction activities so that the SSSI is not impacted.
  - Highway boundary – the scope for the scheme does not allow for the footprint of the new improvements to be constructed outside of the existing highway boundary. The scheme is therefore assumed to be a permitted development with no land purchase required.
- Supplier **environmental credentials**;
- Evaluation of **social and environmental considerations** in procurement process, e.g. use of sustainable materials, disposal of waste materials, use of local sub-contractors and human resources;
- Economic considerations in terms of **value for money** of suppliers.

### 5.4.4. Procurement options considered

**Table 5-2** identifies possible procurement options available as potentially viable procurement routes for a scheme of this size and type. Procurement options have been identified within the context of resources available to Wiltshire Council, together with required timescales, procurement regulations and the key parameters / constraints of the project.



**Table 5-2 - Procurement options considered**

Option	Description
Option 1: Traditional	<ul style="list-style-type: none"> <li>• Tender based on drawings, schedules, specifications, and bills of quantities.</li> <li>• Contractor is not responsible for the design, only temporary works as required.</li> <li>• Traditional contracts are predominantly lump sum.</li> </ul>
Option 2a: Design and Build Contract	<ul style="list-style-type: none"> <li>• Tender for the design and construction of the main works by a single contractor.</li> <li>• Contractor is responsible for the design, planning, coordination, and construction of the works. Design risk is carried by the contractor.</li> </ul>
Option 2b: Design, Develop and Construct	<ul style="list-style-type: none"> <li>• The client submits for tender an outline design together with performance criteria for the asset together with other design and logistical constraints. The successful contractor then becomes responsible for the outline design that it has inherited and completes the detailed design and construction in accordance with that outline design modified as necessary to comply with all the contract requirements.</li> </ul>
Option 3: Integrated / Partnering	<ul style="list-style-type: none"> <li>• A series of providers (e.g. designer, contractor, consultants, ECI / constructability consultant) would be brought together to help deliver the scheme</li> <li>• Each contractor would have its own contractual relationship with the client. In turn, all those appointed would have an arrangement between them – potentially a memorandum of understanding round a series of programme objectives or a more complex performance arrangement - where they would look to share any pain or gain when it comes to delivery.</li> </ul>
Option 4a: Management Contracting	<ul style="list-style-type: none"> <li>• A 'fast track' strategy which overlaps the design and construction stages and enables contracts for early work packages.</li> <li>• A management contractor is appointed early to let elements of work progressively by trade or package contracts ('works packages'). The contracts are between the management contractor and the works contractors. The final cost can only be forecast with reasonable certainty when the last package has been let.</li> </ul>
Option 4b: Construction Management	<ul style="list-style-type: none"> <li>• Similar to Management Contracting, but the contracts for the works packages are placed directly between the client and the trade contractors.</li> </ul>
Option 5: Revenue financed (e.g. PPI / PPF)	<ul style="list-style-type: none"> <li>• Services tendered with defined outputs from the private sector on a long-term basis, typically for 25 years.</li> <li>• Involves maintaining or constructing and maintaining the asset, and the supplier is incentivised to consider whole-life costing as it will benefit directly from reduced spending on maintenance.</li> </ul>
Option 6: Local Framework Contract	<ul style="list-style-type: none"> <li>• Allows the client to procure services via tendering on a call-off basis as required</li> <li>• Pricing mechanisms can vary from project to project</li> </ul>

#### 5.4.5. Identification of the preferred procurement approach

Initial sifting of the alternative procurement options identified those most suitable to the context and requirements of the M4 Junction 17 project. Further assessment has been undertaken against the procurement objectives and key criteria (Sections 5.4.2 and 5.4.3). Based upon this, the **preferred procurement approach for Wiltshire Council identified at this stage is Option 1: Traditional**. It is anticipated that this would involve design work being undertaken through Wiltshire Council's partnering consultant arrangements (presently Atkins) and the separate tender of the main construction contract.

#### 5.4.5.1. Reasons for selection of Option 1: Traditional procurement route

The M4 Junction 17 project is considered to lend itself to the Traditional procurement route. Key factors include:

- Traditional procurement is well established and understood by Wiltshire Council, consultants, and highway contractors, and therefore this option should attract a high level of interest and increase the competitiveness of the bids.
- The scheme is well defined with little scope for ambiguity or design changes in future stages of the project. The type of work and associated quality standards are well understood by competent contractors.
- Tender pricing can be achieved based on a comprehensive bill of quantities which is attractive to the contracting market
- Price certainty and transfer of risk to the main contractor is achieved at contract award, provided no subsequent changes are instructed to the design, and no client held risk events occur
- A high level of quality in design and construction is achievable as the scope of the work is prescribed on an input specification basis by consultants reporting directly to Wiltshire Council.
- The types of risks associated with this form of contract would be well defined and be understood by potential bidders, removing the need for them to include additional risk allowances in their prices.
- Changes to the works can be simply instructed and then evaluated on the basis of known prices obtained in competition without necessarily excessive cost or time implications.
- Wiltshire Council retains individual direct contractual relationships with the design team, cost consultant and main contractor.
- The strategy is satisfactory in terms of public accountability.

A Traditional approach can be used on a lump sum or target cost basis. In this case, a lump sum approach is anticipated – this is considered further in Section 5.6.

#### 5.4.5.2. Reasons for discounting other options

Other options are not considered to offer a comparable fit with the project requirements and/or do not provide any additional benefits compared to the Traditional route. There is little scope for innovation or significant modifications that a contractor would bring through involvement in the design stage due to site constraints. The use of Design and Build and Integrated / Partnering options are therefore unlikely to deliver any significant benefits, and their use could unnecessarily increase the risk of increased outturn costs. Wiltshire Council would also have less control and influence over the design process.

## 5.5. Sourcing options

Despite the UK leaving the EU on the 31st of December 2020, the historic regime as set out in the PCR 2015 should (for now) be those that are considered from a procurement perspective<sup>45</sup>. These regulations implement EU Directive 2014/25/EU in England and Wales.

Potential procedures under the PCR 2015 include:

- Open;
- Restricted;
- Competitive dialogue; and
- Competitive procedure with negotiation.

An initial assessment of these procedures is provided within the Procurement Strategy (**Appendix C1**).

It is anticipated that design services will continue to be procured through Wiltshire Council's partnering contract with its consultant Atkins.

It is currently anticipated that the main construction works will be procured using the **Restricted Procedure**. This means that a **prequalification exercise** would apply and through this competition would be limited to

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<sup>45</sup> The UK is still subject to the World Trade Organization's Government Procurement Agreement (GPA). The GPA requires the majority of contracts to be open to the EU and other trading partners, with transparent award procedures and remedies being available.

shortlisted tenderers. This will ensure that all shortlisted suppliers have the required knowledge and expertise to deliver the works, as well as requiring demonstrable evidence of delivering similar schemes. The other main advantage of the Restricted Procedure is that it helps to keep the tender process more manageable.

Upon arriving at the shortlist of suppliers the individual work packages and tender documentation will be developed. Wiltshire Council has previously used a 70:30 ratio for price/quality, however a 60:40 ratio will be considered during the detailed design and construction preparation stage. It is envisaged that the quality element will be used to assess the sustainability proposals from the tenderers, with regards to carbon measurements, monitoring and reduction. It will also be used to assess social value brought by suppliers in terms of local training and upskilling, community engagement as necessary and interaction with educational establishments.

The procurement process would be run in strict accordance with the legislative framework set out within the Wiltshire Council Corporate Procurement Strategy (2012). In addition, the process will be governed by the Council's own constitutional Contract Procedure Rules (2012) and will be subject to the Council's Procurement Gateway Process.

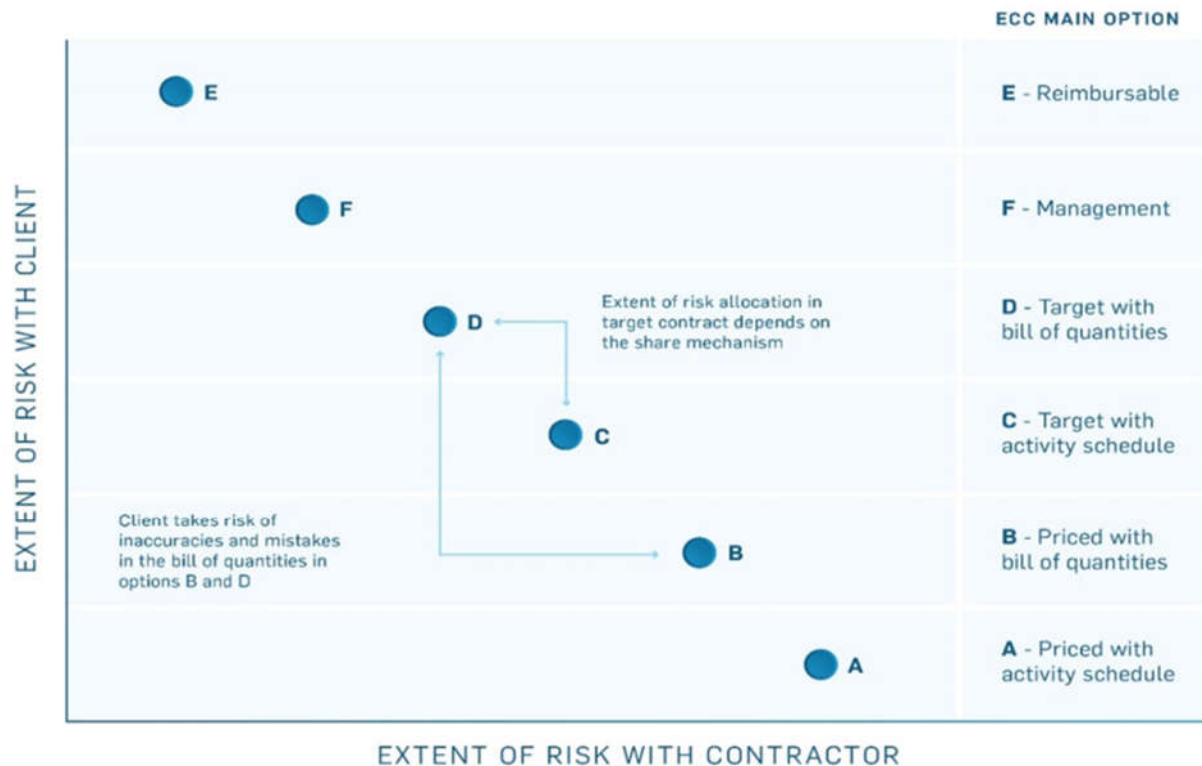
Under the Procurement Gateway Process, the strategy will be subject to review by the Council's Procurement Manager, senior Legal officer and senior officers from across the Council who are highly experienced in strategic procurement and contract management. Express approval must be gained from the Procurement Gateway Board in two stages, firstly to enable the tender documentation to be released and secondly to enable the procurement to move to the award procedure stage following review of the award recommendation.

## 5.6. Pricing framework and charging mechanisms

### 5.6.1. Contractual forms – main construction works

The contractual forms considered as part of the M4 Junction 17 procurement strategy are based on the NEC suite. The NEC4 Engineering and Construction Contract (ECC) form is the most appropriate. Selection of the specific pricing mechanism considers the balance of risk in terms of time, cost, and quality (**Figure 5-2**).

**Figure 5-2 - ECC Payment Options**



Based on the proposed Traditional procurement route with single stage tender (see Section 5.4.5), NEC4 options such as C and E which are more suited early contractor involvement have not been assessed. Wiltshire Council has identified pricing Options A and B as the most suitable for use in the M4 Junction 17 project. Both of these options involve a lump sum (fixed price) approach, as opposed to a target cost (with pain share / gain share mechanism).

Option A relates to a project programme whereby each construction activity is allocated a fixed price. Interim payments are made by the employer upon completion of each activity. The contractor bears the risk of undertaking the works at the agreed prices, therefore this would attract greater risk premiums increasing the schemes outturn costs.

Under Option B, a bill of quantities (BoQ) is prepared by a cost consultant. The BoQ provides project specific measured quantities for the items of work identified in the scheme drawings, specifications and other reports. From the employers specified quantities the contractor prices the work accordingly usually via a list of rates. The contractor takes on the risk of delivering the works to the agreed price in the BoQ.

### 5.6.2. Proposed pricing framework – NEC4 ECC Option B

The preferred pricing option identified at this stage is the use of NEC4 ECC Option B, Priced Contract with Bill of Quantities. The M4 Junction 17 works will be well defined at the completion of the detailed design and construction preparation stages, giving the contractor confidence in the quantities provided in the BoQ, whereby the use of an activity schedule may attract higher risk premiums. Any variations can be priced at the tendered rates, making the variations easy to understand. As there is little ambiguity in the proposed works the lowest price tender will usually present the best value for money, as the contractors will be pricing against identical works with little to no scope for change. The use of a BoQ will mean there will be no need for the contractor to build in a risk premium which would artificially inflate the contract price.

## 5.7. Risk allocation and transfer

The standard NEC4 ECC approach to risk will be utilised as part of the contract - this ensures a collaborative approach between client and supplier, and this standard approach allows for consistency between supply chain, internal processes, staff and performance. The identification of the NEC4 ECC Option B contract (Section 5.6.2) influences the risk allocation and transfer – in this instance, Wiltshire Council will retain the risk of quantities.

NEC4 allocates risk through early warnings and compensation events, where a contractor can potentially claim for additional unforeseen work at Wiltshire Council's risk. The NEC4 contract operates an early warning system where any changes to the agreed scope or specification for the works, will translate to compensation events, positively or negatively, as appropriate. The Contractor must notify the Wiltshire Council Project Manager within eight weeks of becoming aware of an event that it considers will constitute a compensation event.

Cost overruns arising through the procurement and construction process will be managed by Wiltshire Council. The M4 Junction 17 project team has significant experience of managing and supervising these types of contract and the risks involved. Mitigations identified through the risk management process will be used to influence the design of the works, or inform the content of the Instructions to Tenderers, the Bills of Quantities and the Specification documents. Standard industry risk probability analysis software will be used in this process.

Further details of risk allocation and transfer will be available at the contracting stage and reported in the FBC.

## 5.8. Implementation (contract) timescales

The key milestones for the procurement of the M4 Junction 17 project are set out in **Table 5-3**, based upon the current project delivery programme (as per the Management Dimension).

**Table 5-3 - M4 Junction 17 procurement milestones**

Milestone	Estimated completion date
OBC approval	October 2022
Start prelim and detailed design	January 2023
Review / confirm Procurement Strategy	June 2023
Expressions of Interest - PQQ issued	January 2024
Complete detailed design	February 2024
Shortlisted suppliers confirmed	March 2024
Completion of ITT documentation (including Contractor's Bill of Quantities)	April 2024
Stage 2 - Invitation To Tender issued	May 2024
ITT responses received	July 2024
Tender evaluation complete – preferred supplier identified	September 2024
Standstill period elapsed	October 2024
FBC approval	December 2024
Contract Award	February 2025
Contract mobilisation	February / March 2025
Start construction	April 2025
Finish construction	February 2026
Contract completion	May 2026

The Restricted Procedure is a two stage process; the initial stage involving shortlisting of suppliers and the second stage involving the invitation to tender and tender submission / evaluation. The second stage can not commence until the tender documentation has been fully prepared. Once all tenders from shortlisted suppliers have been received and evaluated the preferred supplier will be identified. A standstill period (typically 10 days) will then apply. Formal contract award is anticipated following approval of the FBC.

## 5.9. Contract management approach

Specific contract management proposals are relatively undeveloped at this stage of the project and will be set out in further detail at FBC stage. It is anticipated that a dedicated contract management team will be established by Wiltshire Council that will be in place before, during and after the scheme contract. This contract management team is expected to comprise:

- Contracts Manager;
- NEC4 Supervisor (site based);
- Clerk of Works; and
- Quantity Surveyor (QS).

The dedicated team would remain in place during mobilisation, throughout the works and until full closure of the project once all contractual matters are fully completed (i.e., not just during construction). The team would be responsible for completion of all as-built information and the health and safety file. It would be desirable for the same QS team and advisors who have been involved throughout the project to stay involved during the works, ensuring continuity of the knowledge built up during the development of the scheme.

The contractor's performance against the accepted programme and agreed compensation events will be regularly checked, reported and discussed at regular progress meetings between the Wiltshire Council project team and the contractor.

## 5.10. Best Value

Best Value is achieved through considering overall value, including economic, environmental and social value, through service provision. The commercial approach for the M4 Junction 17 scheme, as identified within this chapter, will allow due consideration to be given to delivering Best Value. This includes through the determination of assessment criteria for tenders reflecting both quality and price. The quality submission is expected to include questions relating to the delivery of social value.



# Financial Dimension



## 6. Financial Dimension

### 6.1. Introduction

The financial viability of the M4 Junction 17 project has been assessed in relation to:

- The expected implementation cost of the scheme, including the base cost and risk allowance in outturn prices;
- The planned budget profile year on year and the proposed funding arrangements, including different funding sources;
- An assessment of key financial risks (including any risk allowance quantification); and
- Consideration of the long-term financial implications of the scheme, including ongoing costs for operation, maintenance and capital renewals.

The Financial Dimension is prepared in the context of the preferred scheme option.

### 6.2. Key updates since SOBC

The Financial Dimension is generally updated from SOBC reflecting the further development of the project and identification of the preferred option. The OBC therefore reflects a more current, refined and comprehensive cost estimation and is based on latest financial assumptions and projections (including inflation assumptions, for instance). Budget profiles have been updated in line with the latest scheme delivery programme (as documented in the Management Dimension) and funding arrangements have been reviewed.

### 6.3. Budget and funding cover

#### 6.3.1. Overview

The total budget for scheme delivery is £28.9m, based on latest projected cost estimates (Section 6.4). The planned budget profile and funding arrangements are summarised in **Table 6-1**.

£24.6m (85%) funding is sought from central government (Department for Transport), The remaining 15% (£4.3m) is to be met from Wiltshire Council local funding sources.

Budget and funding for ongoing maintenance and renewal costs is covered in Section 6.6.

**Table 6-1 - Budget profile and proposed funding sources (£ millions)**

Year	2022/23	2023/24	2024/25	2025/26	Total
<b>Budget</b>	<b>1.16</b>	<b>1.66</b>	<b>9.02</b>	<b>17.06</b>	<b>28.91</b>
<b>Proposed funding sources:</b>					
DfT – Major Road Network Fund	<b>0.99</b>	<b>1.41</b>	<b>7.67</b>	<b>14.50</b>	<b>24.57</b>
%	85%	85%	85%	85%	85%
Local - Wiltshire Council	<b>0.17</b>	<b>0.25</b>	<b>1.35</b>	<b>2.56</b>	<b>4.34</b>
%	15%	15%	15%	15%	15%
<b>Total proposed funding</b>	<b>1.16</b>	<b>1.66</b>	<b>9.02</b>	<b>17.06</b>	<b>28.91</b>
%	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

#### 6.3.2. Central government funding

Project funding is provisionally allocated within the DfT's Major Road Network Fund programme, which is part of the National Roads Fund (raised from Vehicle Excise Duty). MRN funding is subject to approval of the DfT

business case process (OBC / FBC); this includes assurance undertaken by DfT Centres of Excellence and final approval at a ministerial level. On approval of the OBC it is anticipated that DfT would make a funding offer, with the ability for Wiltshire Council to draw down funding to progress scheme preparation. Release of full funding for construction would be subject to full approval being provided following FBC.

### 6.3.3. Local funding

Wiltshire Council has identified funds from its Community Infrastructure Levy and Section 106 planning obligations as its local funding contribution.

As part of the OBC submission to DfT, Wiltshire Council's Section 151 officer is to provide a declaration which confirms that:

- Sufficient budget has been allocated to deliver the scheme on the basis of the proposed local funding contribution;
- Wiltshire Council accepts responsibility for meeting any costs over and above the DfT contribution identified, including potential cost overruns; and
- Wiltshire Council accepts responsibility for meeting any ongoing revenue requirements in relation to the scheme.

## 6.4. Scheme costs

### 6.4.1. Implementation cost summary

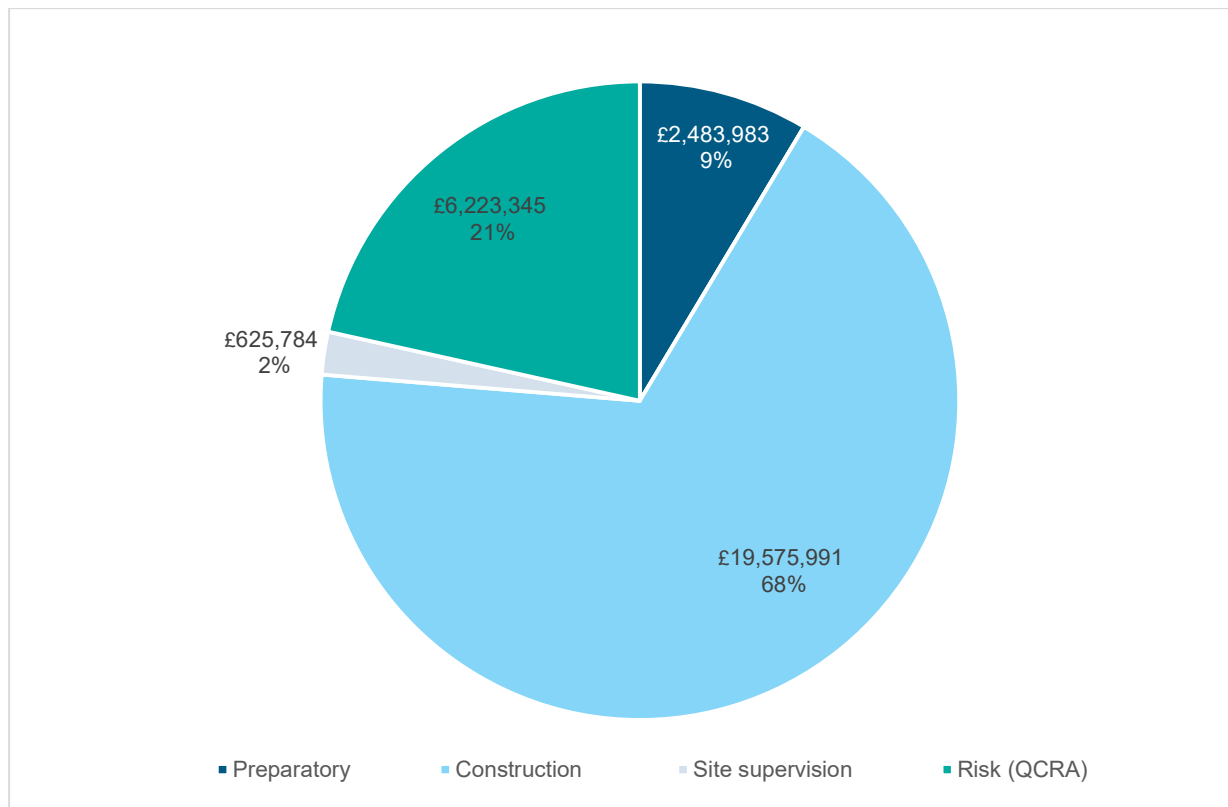
The overall scheme outturn cost estimate (allowing for inflation) is **£28,909,102**.

The scheme cost estimate has been developed by Faithful & Gould based on the latest scheme scope and design specification for the preferred option, as presented within the Strategic Dimension. The estimate has been prepared in a 2021 (Q4) price base, with inflation applied accordingly (assuming scheme completion in 2026) to generate the final outturn cost (see also Section 6.4.6). A summary of scheme implementation costs for the main cost categories is shown in **Table 6-2** and **Figure 6-1**.

**Table 6-2 – M4 Junction 17 scheme cost estimate (2021 Q4 prices and outturn cost)**

Cost category	Cost (£) 2021 prices	%	Cost (£) Outturn	%
Preparatory	2,130,000	8.91%	2,483,983	8.59%
Land and property	0	0.00%	0	0.00%
Construction (including preliminaries and statutory undertakings)	16,021,095	67.01%	19,575,991	67.72%
Site supervision	510,000	2.13%	625,784	2.16%
<b>Sub-total – base cost, excluding risk</b>	<b>18,661,095</b>	<b>-</b>	<b>22,685,757</b>	<b>-</b>
Risk (QCRA)	5,246,555	21.95%	6,223,345	21.53%
<b>TOTAL</b>	<b>23,907,650</b>	<b>100%</b>	<b>28,909,102</b>	<b>100%</b>

Figure 6-1 - M4 Junction 17 scheme outturn cost breakdown



#### 6.4.2. Preparatory costs

The **preparatory cost estimate of £2,130,000** (2021 prices) has been developed based upon the scheme development activities and programme. A breakdown is provided in **Table 6-3**. Costs have been benchmarked from other similar schemes and against recent Wiltshire Council scheme delivery. This is assumed to cover:

- Scheme design and appraisal costs for preparing the Outline and Full Business Cases,
- Topographical, geotechnical, drainage and environmental surveys required to implement the scheme;
- Road Safety Audits;
- Non-statutory and statutory stakeholder consultation;
- Procurement process costs, monitoring and evaluation; and
- Principal Designer.

**Table 6-3 – Preparatory costs breakdown (2021 prices)**

Preparatory cost element	Cost (£) 2021 prices
Preliminary design	£720,000
Environmental assessment (including surveys)	£300,000
Public consultation (statutory / non-statutory)	£70,000
Statutory processes	£160,000
Detailed design / FBC	£720,000
Other	£160,000
<b>TOTAL</b>	<b>£2,130,000</b>

### 6.4.3. Main construction costs

The **construction cost estimate of £16,021,095** (2021 prices) is generated from itemised quantities produced from the design information for the scheme. These quantity measurements are based on the principals of the Highways Method of Measurement, following the series and item classification commensurate with the stage of design. A summary breakdown of construction costs is provided in **Table 6-4**.

**Table 6-4 – Construction costs breakdown (2021 prices)**

Construction cost element	Cost (£) 2021 prices
Preliminaries	5,338,412
Site clearance	122,103
Fencing	34,060
Road restraint systems	353,290
Drainage	1,682,735
Earthworks	2,157,485
Pavements	2,861,814
Kerbs, footways and paved areas	144,260
Traffic signs and road markings	408,979
Road lighting columns	108,000
Electrical work for road lighting	256,991
Motorway communications	91,875
Landscape and ecology	57,844
Direct fees	953,249
Statutory costs	1,450,000
<b>TOTAL</b>	<b>16,021,096</b>

The bulk earthworks quantities have been produced from a 3D design model, whilst the majority of other quantities are calculated from chainage lengths and feature widths, or from assumed spacing centres or the like. Input from the relevant design specialisms has identified the estimated scope of street lighting and other

features. For structures, measurements of the indicative structure designs were produced and subsequently priced, with the resulting totals then converted into m<sup>2</sup> of total deck area.

Unit rates have been applied utilising cost data drawn from recent comparable infrastructure projects sourced from within the region. Where it has not been possible to source comparable cost data, alternative published cost data, such as Spon's price books, have been used as reference.

The cost estimate of preliminaries (including traffic management, site mobilisation and dismantling) are calculated from estimated project resources (e.g. for staffing, plant) for the programmed duration. Additional costs are incorporated for specific task items such as haul road construction from first principles based on assumed design parameters. An assumed construction methodology envisages all sections of the scheme to proceed without any major phasing or other constraints.

Service utilities have been estimated where potential clashes occur with the proposed alignment. Services have been identified from C2 returns from the providers. The nature of the returned information does not contain detailed line and level information and as such it is not feasible to accurately predict the extent of potential diversion or protection works. Estimated values are therefore order of magnitude costing based on benchmarked service diversion or protection data.

#### 6.4.4. Site supervision

The **site supervision cost estimate of £510,000** (2021 prices) is calculated from estimated staff resources for supervision and design support prior to and during the construction period.

#### 6.4.5. Risk budget

The approach to risk cost allowance has regard to relevant guidance:

- Department for Transport TAG UNIT A1.2 – Scheme Costs, July 2017; and
- HM Treasury's The Green Book – Central Government Guidance on Appraisal and Evaluation, 2020. The 'Supplementary Green Book Guidance' on Optimism bias produced by HM Treasury was also used.

The project **Risk Register** is the primary means of identifying, assessing and monitoring risks and mitigation (see the Management Dimension, Section 7.11.2). The risk budget provides a cost allowance within the total estimated scheme cost to cover any increased costs that may materialise associated with the identified risks within the Risk Register. Costs may be directly associated with risks, or indirectly associated (as a result of scheme delays for instance). The risk cost allowance has been determined through **Quantitative Cost Risk Analysis**.

##### Quantitative Cost Risk Analysis

The QCRA uses quantitative scoring of risks as inputs, such as likelihood percentages and three point estimates for the cost and schedule impacts. The EZRisk tool<sup>46</sup> has been used to build and run the QCRA models. Monte Carlo simulation (based upon 2,000 iterations) has produced probability distributions (probability-cost impact S-curve).

Based on the 80<sup>th</sup> percentile of the QCRA risk cost, the **total risk cost allowance is £5,246,555** (2021 prices). This also includes allowance for estimating uncertainty.

**Table 6-5** identifies the top 8 risks in terms of cost impact (80<sup>th</sup> percentile) from the QCRA. Further details on the QCRA process can be found in **Appendix D1**. Further information on risk management throughout scheme development and implementation is provided in Section 7.11 of the Management Dimension.

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<sup>46</sup> EZRisk is a Microsoft Excel based tool developed by Faithful & Gould that lets you analyse risk using Monte Carlo simulation. A random-number generator picks a random value for each variable within the constraints set by the model. It then produces a probability distribution for all possible outcomes, indicating how likely they are to occur.



**Table 6-5 – Top 8 risks by cost impact (P80)**

Risk ID	Risk Title	Probability	Risk cost (£'s)
R25	Increased prices of materials	80%	1,665,000
R19	Availability / shortage in contractors	50%	592,000
R8)	Utilities diversion/protection for existing and future services	50%	114,000
R62	Power supply to additional signalling	50%	64,000
R26	Pandemic risk	10%	49,000
R47	Archology found during construction	10%	46,000
R16	Environment (4): Impact on SSSI	25%	28,000
R9	Unexpected ground conditions on site	5%	14,000

#### 6.4.6. Inflation assumptions

Investment, operating and maintenance costs have all been estimated in 2021 (Q4) prices and subsequently inflated to the point of expenditure (in line with the current scheme delivery programme).

For the Financial Dimension, the full rate of inflation has been included in cost forecasts to present outturn costs (as opposed to the Economic Dimension, for which the appraisal considers only real inflation; i.e. the rate of inflation of costs above the rate of background inflation).

The inflation rates used within the outturn scheme cost estimate are summarised in **Table 6-6**.

**Table 6-6 - Inflation rates used in cost calculations**

Cost Category	2022	2023	2024	2025	2026
BACKGROUND INFLATION	4.05%	2.41%	1.85%	1.95%	2.00%
Construction	8.05%	4.07%	3.58%	3.97%	3.75%
Land	8.05%	4.07%	3.58%	3.97%	3.75%
Preparatory	10.27%	3.62%	2.38%	2.60%	2.73%
Supervision	10.27%	3.62%	2.38%	2.60%	2.73%
Risk	8.05%	4.07%	3.58%	3.97%	3.75%
Operating	10.27%	3.62%	2.38%	2.60%	2.73%
Traffic related maintenance	8.05%	4.07%	3.58%	3.97%	3.75%
Non-traffic related maintenance	8.05%	4.07%	3.58%	3.97%	3.75%

Sources:

TAG Databook v1.19 – Table A5.3.1 (May 2022)

Tender Price Index – BCIS (March 2022)

Retail Price Index – ONS (May 2022)

The total scheme cost in 2021 prices is **£23,907,650**. The total outturn scheme cost (with inflation) is **£28,909,102**. Inflation therefore accounts for **£5,001,452**.

## 6.5. Cost profile

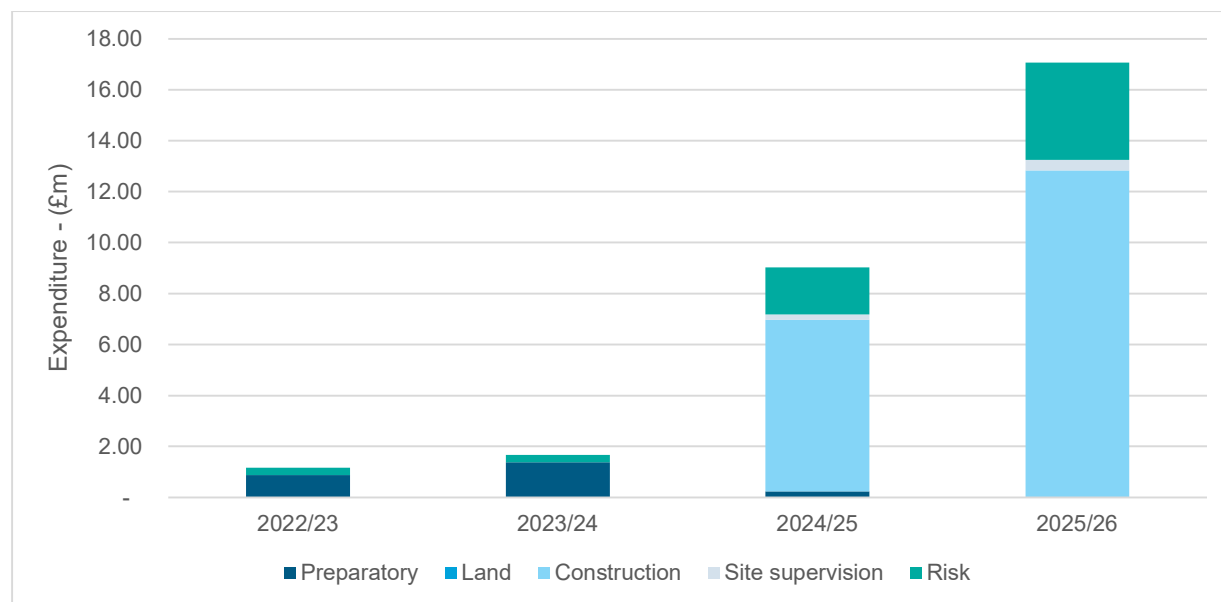
A cost profile has been developed from the current scheme delivery programme, as detailed within the Management Dimension (Section 7.5). This assumes preparation (post OBC) starting in late 2022 and construction from late 2024 to early 2026 – see **Table 6-7**.

**Table 6-7 – M4 Junction 17 expenditure profile (£ millions)**

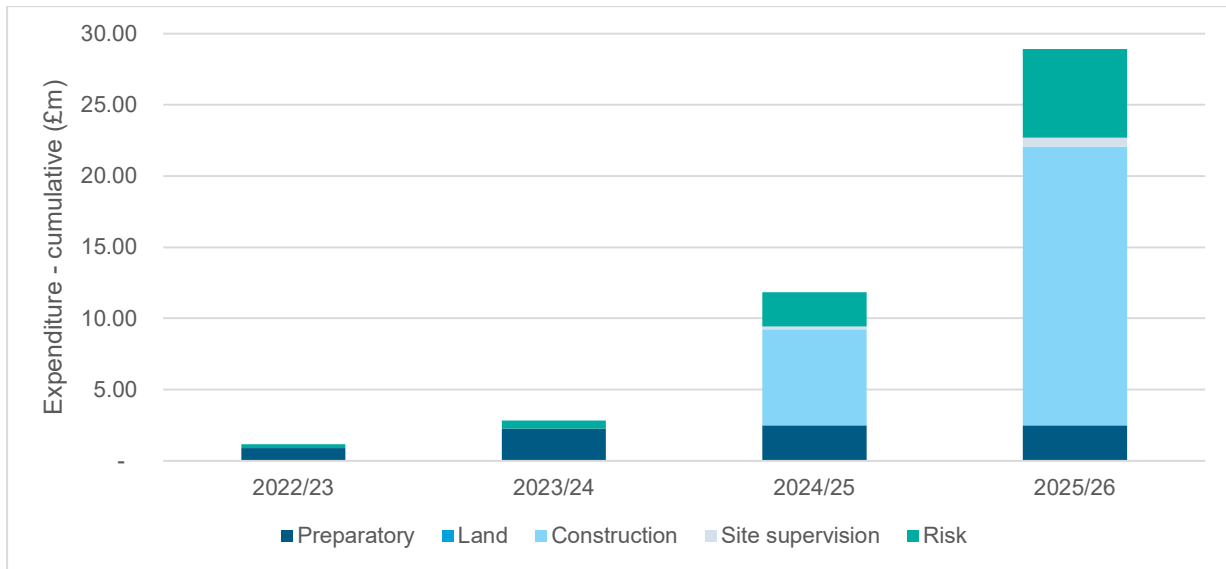
Year	2022/23	2023/24	2024/25	2025/26	Total
Preparatory	0.88	1.37	0.23	-	<b>2.48</b>
Land	-	-	-	-	-
Construction	-	-	6.74	12.84	<b>19.58</b>
Site supervision	-	-	0.22	0.41	<b>0.63</b>
Risk	0.28	0.29	1.83	3.81	<b>6.22</b>
<i>Total</i>	<b>1.16</b>	<b>1.66</b>	<b>9.02</b>	<b>17.06</b>	<b>28.91</b>

**Figure 6-2** and **Figure 6-3** illustrate the expenditure profile year-on-year and cumulatively.

**Figure 6-2 – Expenditure profile (year on year)**



**Figure 6-3 – Expenditure profile (cumulative)**



## 6.6. Whole life costs and funding

The additional revenue liability for capital renewals and ongoing maintenance associated with the new scheme infrastructure has been estimated for a 60 year period (**Table 6-8**).

These whole life costs total **£20.2m** (2021 prices) and include:

- **Yearly cyclical / routine maintenance:** e.g. gully cleaning, street cleaning, grass cutting, winter maintenance, reactive maintenance;
- **Minor maintenance:** including road pavement and footway surfacing; drainage cleansing; and CCTV; and
- **Major maintenance:** including full depth road pavement and full depth footway surfacing; drainage cleansing; CCTV; and pipe remedials.

**Table 6-8 - Estimated maintenance and renewal costs over 60 years (2021 prices)**

Maintenance type	Frequency	60 year cost
Yearly cyclical maintenance	Annual	133,712
Minor maintenance intervention	10 years	9,983,589
Major maintenance intervention	30 years	10,074,592
<b>GRAND TOTAL</b>		<b>£20,191,894</b>

Wiltshire Council and National Highways will be responsible for the maintenance of new infrastructure created by the scheme (relating to the relevant parts of the assets at M4 Junction 17 for which they are responsible). It is expected that arrangements for commuted sums to National Highways will be agreed via the Section 6 Agreement (see also Section 7.9.4). Wiltshire Council would meet ongoing maintenance liabilities through its general annual maintenance budgets.

Whole life costs are also represented within the economic appraisal (Section 4.5.2) and are therefore reflected within the BCR and NPV.

## 6.7. Accounting implications: cash flow statement

The M4 Junction 17 scheme is expected to have the following implications on public accounts:

- DfT Major Road Network Fund is proposed to fund £24.6m (85%) of the total scheme implementation costs; £1.0 million in 2022/23 financial year; £1.4 million in 2023/24; £7.7 million in 2024/25; and £14.5 million in 2025/26.
- Local contributions from Wiltshire Council will fund £4.3m (15%) of the total scheme implementation costs, sourced from Community Infrastructure Levy and Section 106 planning obligations.
- Whole life maintenance and renewal costs over 60 years are expected to average approximately £0.3m per annum (2021 prices), funded from future WC highway maintenance budgets.

# Management Dimension



## 7. Management Dimension

### 7.1. Introduction and objectives

The Management Dimension sets out how the M4 Junction 17 MRN project will be managed in order to ensure successful delivery of the scheme and its associated benefits.

#### 7.1.1. Overview of the proposed delivery approach

This is a relatively conventional highways infrastructure project comprising junction capacity improvement through carriageway widening and traffic signals installation, within the extents of the existing highway boundary. The main distinguishing factor influencing the project delivery approach is the interaction with the Strategic Road Network (SRN), which is under the responsibility of National Highways. Wiltshire Council is designing and implementing the scheme, utilising delegated powers subject to a Section 6 Agreement with National Highways<sup>47</sup>.

Wiltshire Council has a strong track record of successful delivery of projects of a similar nature and scale – see **Appendix E1** for full details. This includes the previous improvement scheme at M4 Junction 17, delivered in 2018 under similar delivery arrangements with National Highways (then known as Highways England).

#### 7.1.2. Assessment of project delivery – management objectives

In assessing whether the project is deliverable, the Management Dimension considers the extent to which the proposed project delivery:

- Is based upon realistic and achievable timescales, taking into account any key project / programme dependencies and available resources;
- Is underpinned by clear, transparent governance and lines of accountability and reporting;
- Takes appropriate account of project risks, with robust mechanisms for risk reporting and management;
- Reflects the needs of relevant stakeholders, throughout the whole project lifecycle;
- Ensures the project is subject to appropriate levels of assurance and review (from inception to post implementation), which are integrated into the delivery approach; and
- Demonstrates the process of how stated benefits (as per the Strategic and Economic Dimensions) will be achieved and that there is a clear plan for monitoring and evaluating project outcomes.

### 7.2. Key updates since SOBC

This Management Dimension builds substantially upon the SOBC. In addition to reviewing and updating core project management information from SOBC, it further develops areas such as: the project delivery programme; work package implementation; risk management; and stakeholder engagement - in line with the current stage of scheme development.

DfT guidance suggests that the Management Dimension should be approximately 50% complete at the OBC stage. All areas will be subject to general update at FBC, but those areas due to be developed more specifically at FBC stage are noted where relevant.

### 7.3. Programme/project dependencies

The M4 Junction 17 project is considered to be a **stand-alone scheme** and its delivery is not directly dependent upon the implementation of other projects or programmes. The main interactions with other projects and programmes include:

- The scheme is one of three major schemes on the A350 being promoted through the MRN / LLM funds (as detailed within the Strategic Dimension) - the schemes are complementary but are not inter-dependent.
- National Highways is undertaking a north-south connectivity study between the M4 and the Dorset coast. The M4 Junction 17 project is not dependent upon the outcomes of this study. However, should the outcome of this study support the upgrading of the A350 to be part of the SRN then the M4 Junction 17 scheme would be considered to be a necessary element of a comprehensive programme of improvements

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<sup>47</sup> Section 6 Highways Act 1980

to upgrade the route to the appropriate standard. This would further enhance the overall case for the scheme.

- The Chippenham Gateway developer mitigation scheme at M4 Junction 17 is due to be implemented in Summer/Autumn 2022. The MRN project is not dependent upon this and could be readily adapted either way. It is intended to build upon the Chippenham Gateway scheme, on the basis that that scheme is implemented as planned. The MRN project benefits are currently considered in the context of the Chippenham Gateway scheme being implemented first.
- Wiltshire Council's Local Plan Review is ongoing (see Section 3.1.6.3) – based on the Emerging Spatial Strategy (January 2021) the M4 Junction 17 scheme has been identified as necessary strategic infrastructure (as part of a holistic multi-modal transport package) to mitigate the transport impacts of the proposed housing delivery strategy.

## 7.4. Programme/project governance, organisation structure and roles

### 7.4.1. Governance

The M4 Junction 17 scheme **will be delivered by Wiltshire Council**. The Council has assembled a **qualified and experienced team** of individuals to steer the project which will continue to evolve as the project progresses. The alliancing contract arrangement between Wiltshire Council and its term consultant Atkins enables Wiltshire Council to augment its own skills and experience in-house with Atkins' vast expertise in delivering schemes of this nature and scale for other major clients across the UK.

The project governance builds upon arrangements successfully used in the delivery of previous major projects. It is designed to encourage **collaborative working** between all parties involved in project delivery, whilst backed by **robust contractual and management arrangements**, with the **full involvement of the Council's Cabinet in carrying out Gateway Reviews** at key stages.

An overview of the scheme governance structure is provided in **Figure 7-1**. A full organogram can be found in **Appendix E2**.



Figure 7-1 - Overview of scheme governance



Project governance is provided through a **tiered reporting and management structure** that ultimately reports to Wiltshire Council's **Lead Cabinet Member**. The team will also include the Council's (client side) Project Director and Project Manager.

## 7.4.2. Roles and Responsibilities

### 7.4.2.1. Wiltshire Council Cabinet

The Cabinet is the Council's principal decision-making body. It comprises the Leader of the Council and up to nine Cabinet Members. The Leader is appointed for a four-year term by Full Council, and then selects their Cabinet Members. Each Cabinet Member has responsibility for a defined service area or 'portfolio', which is set by the Leader. Collectively the Cabinet has responsibility for taking the day-to-day decisions within the Council. Cabinet meetings are open to the public, unless exempt or confidential information is being considered. The Cabinet usually meet every month.

### 7.4.2.2. Cabinet Member for Transport, Waste, Street Scene and Flooding

The A350 Melksham Bypass Scheme falls within the service area for Transport, Waste, Street Scene and Flooding. The Cabinet Member responsible for this service area is Cllr Dr Mark McClelland whose responsibilities include highway improvements, road maintenance, bridges, traffic management, traffic signals, street lighting, drainage, passenger transport and waste management. Individual cabinet Members have powers within the scheme of delegation determined by the Leader in accordance with the constitution. The Cabinet Member is supported by the Portfolio Holder for Passenger Transport and Streetscene - Cllr Kevin Daley.

### 7.4.2.3. Place, Performance and Outcomes Board

Following a recent reorganisation within the Council a Directorate of Place has been established. In order to manage a wide range of projects in development across the directorate a Place Performance and Outcomes Board has been established. The Board is chaired by the Corporate Director for Place or the Corporate Director for Resources.

Membership of the Board comprises:

- Corporate Director for Place
- Corporate Director of Resources
- Directors for Highways and Transport, Communities and Neighbourhoods and Housing and Commercial Development

The Place Performance and Outcomes Board has oversight of the projects to monitor and challenge performance and includes the MRN and LLM schemes within its remit, as well as the Housing Infrastructure Fund and Future High Streets Fund schemes.

### 7.4.2.4. Senior Responsible Owner

The Senior Responsible Owner (SRO) is **Parvis Khansari, Director Highways and Transport** who is a Chartered Engineer and Fellow of the Institution of Civil Engineers. He has many years' experience at a senior level in local government in connection with highways and the environment. He is currently responsible for highways asset management, highways maintenance, sustainable transport and passenger transport, as well as for implementing major highway schemes in Wiltshire. The SRO chairs the Project Board and is responsible for providing **guidance and direction** to the Project Director and Project Manager. The SRO ensures that the project team is progressing the scheme in line with the Scheme Implementation Programme and that outputs and milestones agreed by the Project Board are achieved.

### 7.4.2.5. M4 Junction 17 Project Board

The M4 Junction 17 scheme has a Project Board chaired by the Senior Responsible Owner, and attended by the Project Director and the Project Manager, plus the Section 151 Officer. The Cabinet Member for Transport, Waste, Street Scene and Flooding, Cllr Dr Mark McClelland and others would be invited to attend depending on the stage of the project and any developing issues or risks.

The Project Board provides a consistent approach to project governance and the coordination with other projects. It has a key focus on ensuring project outputs and objectives are met, ensuring that the project remains on target in terms of business, user and technical objectives. It also has overall responsibility for ensuring the scheme is delivered to the agreed budget and programme. Meetings of the Project Board take place at least monthly but will also be linked to key milestones. The Board considers progress through Highlight and Exception Reports (provided by the Project Manager), changes to the risk register, and changes to the Scheme Implementation Programme.

#### 7.4.2.6. Project Director / Project Manager

The Project Director is **Peter Binley, Head of Major Highway Projects** who is a Chartered Engineer and Member of the Institution of Civil Engineers with extensive experience of highway projects with consultants and local government, both in the UK and abroad. His experience in Wiltshire includes the project management and delivery of previous substantial improvements on the A350 at Chippenham, Semington and Upton Scudamore. He currently leads a team focused primarily on the delivery of schemes on the Major Road Network with the support of Atkins as term highway consultants to the council.

The Project Manager is **Steve Wilson, Major Highways Project Engineer**, who has over 30 years post graduate experience in the fields of civil engineering construction, highway engineering, design and contract management, highway maintenance and transport planning. His wide-ranging and extensive experience includes working in the private and public sector, and within the Client, Consultancy and Contracting disciplines. This includes the initial and detailed design, procurement, planning, and the 'buildability' of major projects as well as the management and implementation of highway network maintenance activities. In recent years Steve has played a significant role in the delivery of various major capital highway schemes at Wiltshire Council, including improvement works at M4 Junction 17, the delivery of dualling projects at A350 Chippenham Bypass, and the A350 Farmers Roundabout enhancements at Melksham.

They are responsible for delivering the scheme in line with the agreed controls and procedures set out in the Project Plan. They will report to, and be accountable to, the SRO and the Project Board and provide the interface between the Service Delivery Team and the Project Board. The primary focus of the Project Manager is to ensure that the scheme is delivered on time, within budget and to specification, working under the guidance of the Project Director. The Project Manager is also responsible for preparing Highlight and Exception Reports.

#### 7.4.2.7. M4 Junction 17 Service Delivery Team

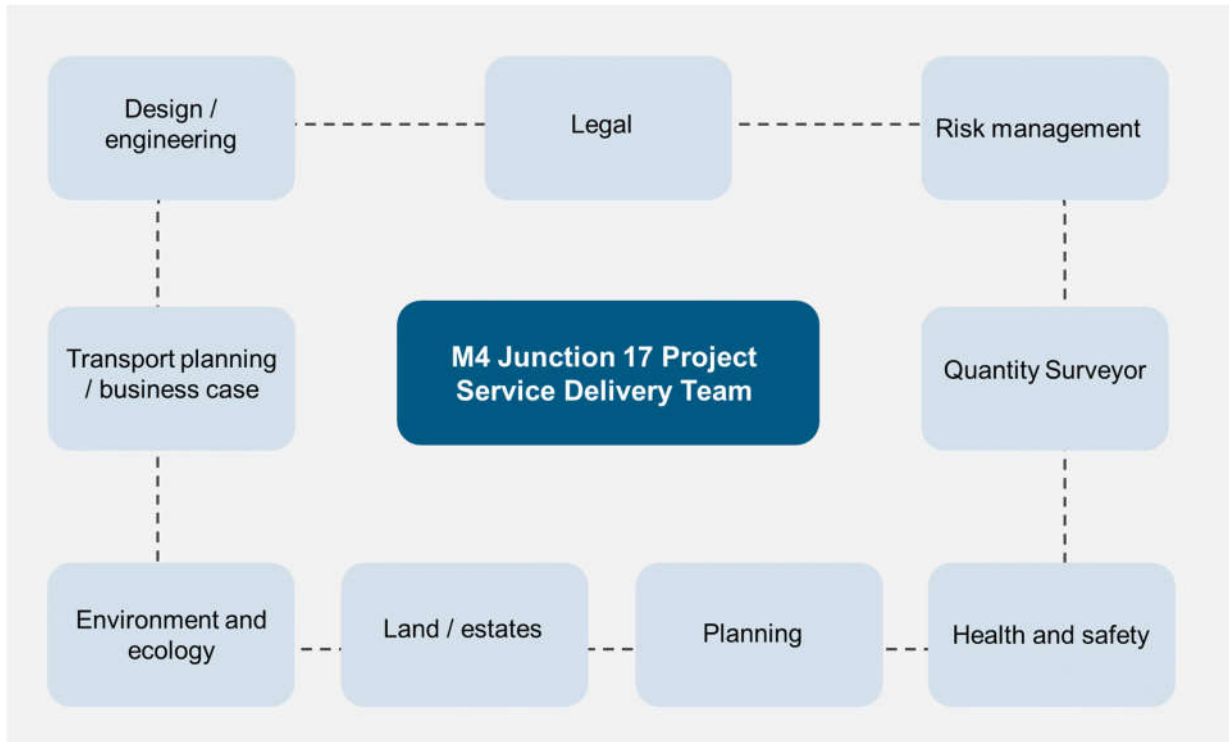
The day-to-day management of the project is by the **Service Delivery Team (SDT)** which is overseen by the Project Manager and comprises **officers from the Council and representatives of the relevant consultants and contractors**. The SDT meets monthly to review progress, monitor expenditure and quality, and plan future work and resource requirements. The meetings follow a set agenda, which includes monthly flash reports from the design team on progress, risks and issues.

The SDT responsibilities include:

- Progress monitoring against programme;
- Future actions and emerging risks and issues;
- Finances;
- Stakeholder engagement and communications;
- Decisions required by Project Board or others;
- Resources;
- Risk Management;
- Coordination with other major projects; and
- Reports to Project and Programme Boards.

The SDT covers a number of specific technical work streams associated with project development and delivery (**Figure 7-2**). These would be expected to evolve as the project progresses.

Figure 7-2 – M4 Junction 17 Service Delivery Team



Each work stream has a nominated lead who is responsible for the related technical activities and reports to the Project Manager. Meetings take place as required within these work streams to discuss technical matters and specific aspects of the scheme.

The SDT is the main point of contact during most of the project for other organisations, including the local town and parish councils, public, businesses and other organisations. The SDT will be expanded to include the main contractor and any key subcontractors and suppliers, including the public utilities once procurement has been completed.

The SDTs are supported and monitored by the **Contract Management Meeting (CMM)** which reviews performance across the Council's highways contracts and is attended by the Council's Director of Highways and Environment, Heads of Service and the local Directors of the term consultant and main contractor. The meetings can be attended by the Cabinet member and other contractors and Council staff are invited to attend as required.

The **Innovation and Collaboration Forum** and the **Environment Forum** support the work of the CMM in connection with those aspects of the Council's highway contracts. A Contract Management Progress Meeting is held monthly with the consultant and contractor to review contract undertakings, key performance indicators, satisfaction scoring, early warning notices and contractual procedures, which are reported to CMM as necessary. This management structure has worked well for many years and has successfully delivered a wide range of service and schemes for the Council.

## 7.5. Project Plan

### 7.5.1. M4 Junction 17 delivery programme

The current delivery programme is based on scheme completion in early 2026. Key project milestones achieved so far and those planned from OBC submission to scheme completion are listed in **Table 7-1**. A full programme Gantt chart (developed in P6 Primavera) can be found in **Appendix E4**.

**Table 7-1 - Project milestones**

Milestone	Completion date
Options Assessment Report	April 2019
Strategic Outline Business Case submission	July 2019
Preliminary Environmental Assessment Report	May 2021
Options Assessment Report refresh	May 2021
Operational assessment (with National Highways)	September 2021
Outline Business Case submission	August 2022
OBC approval	October 2022
Topographical survey / drainage survey / ground investigations	June 2023
Preliminary design	August 2023
Ecology surveys	October 2023
Traffic Regulation Orders process (including statutory consultation)	December 2023
Detailed design	February 2024
Environmental Assessment Report	February 2024
Section 6 Agreement (Detailed Design Stage)	February 2024
Tender preparation	March 2024
Draft Full Business Case	April 2024
Tender process complete (identification of preferred contractor)	September 2024
FBC submission	October 2024
FBC approval	December 2024
Section 6 Agreement (Procurement of Works & Finalise Agreement)	January 2025
Award of contract	February 2025
Start construction	April 2025
Finish construction	March 2026
Section 6 Agreement (Construction and Final Accounts)	March 2026

Post OBC approval, the programme provides for a period of approximately 18 months to reach completion of detailed design. This includes completion of the necessary TRO processes (including statutory consultation). This milestone will also be associated with the Section 6 Agreement with National Highways, allowing the tender process to progress. Submission of the Full Business Case (FBC) is scheduled for October 2024, following the tender process and determination of the final contractor price. The contract award would follow FBC approval and the next step of the Section 6 Agreement, with construction planned to commence in April 2025 with a duration of approximately 11 months. Scheme opening is currently scheduled for March 2026.

## 7.6. Communications and stakeholder management

### 7.6.1. Overview

Stakeholder communications and PR aspects are managed by Wiltshire Council's communications team which is responsible for keeping stakeholders well informed throughout the scheme development and construction process. Stakeholder input has played an important role in the development of the scheme to date and will continue to do so in determining more detailed aspects of the scheme design and delivery.

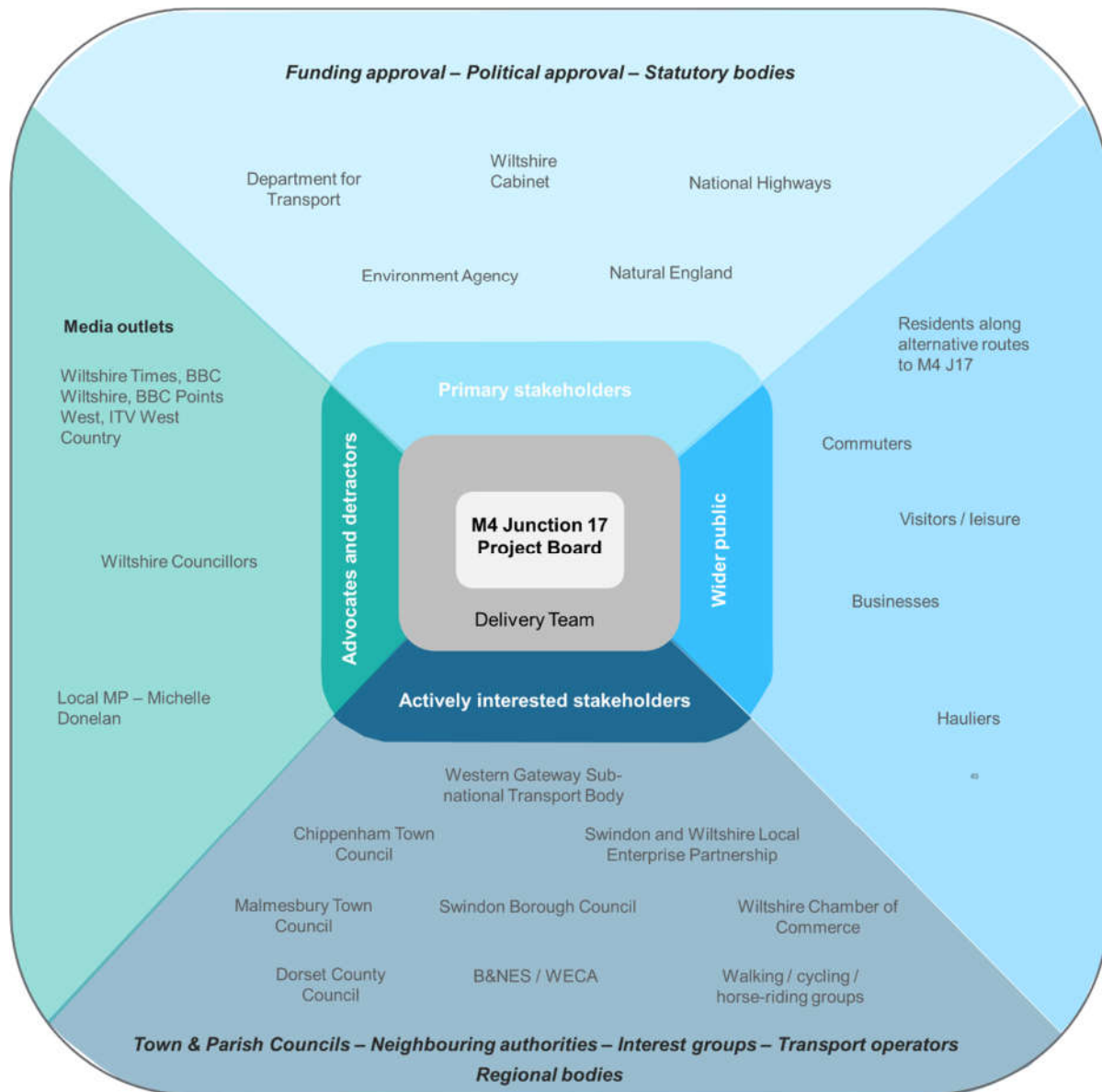
A **Stakeholder Engagement and Communications Plan** is in place which provides the framework for all communications and engagement activity throughout the project lifecycle (**Appendix E3**).

This section presents key details of the approach set out within the Plan.

### 7.6.2. Stakeholder groups

A stakeholder mapping exercise has identified a wide range of stakeholders which have been categorised in relation to their role and type of influence on the project. A summary overview is provided in **Figure 7-3**, see **Appendix E3** for full details.

**Figure 7-3 – Key stakeholders / stakeholder groups**



### 7.6.3. Stakeholder management and communication objectives

The scheme has the potential to impact upon those living, working, using services and doing business in the area and beyond.

The communication objectives are to:



- **inform** stakeholders of the scheme progress and **enable feedback** on the detailed design, to reduce risk and aid scheme approval;
- **communicate and share** information with stakeholders in a **timely and appropriate manner**, building trust and maximising support for the scheme;
- plan and provide **appropriate channels of two-way communication** for identified audiences, to ensure they understand how the Council provides information, and receives and acts on feedback;
- **proactively pre-empt and address potential concerns** and perceptions of the scheme which are inconsistent with the objectives and forecast outcomes;
- attend to the views of stakeholders representing the protected characteristics listed under the **Equality Act 2010, and the Public-Sector Equality Duty**;
- provide **consistent, clear information to those affected by the scheme**, including the nature of scheme-related impacts and how and when it will affect people; and
- use **clear, accessible language** and deliver messages which are tailored to the requirements of specific audiences

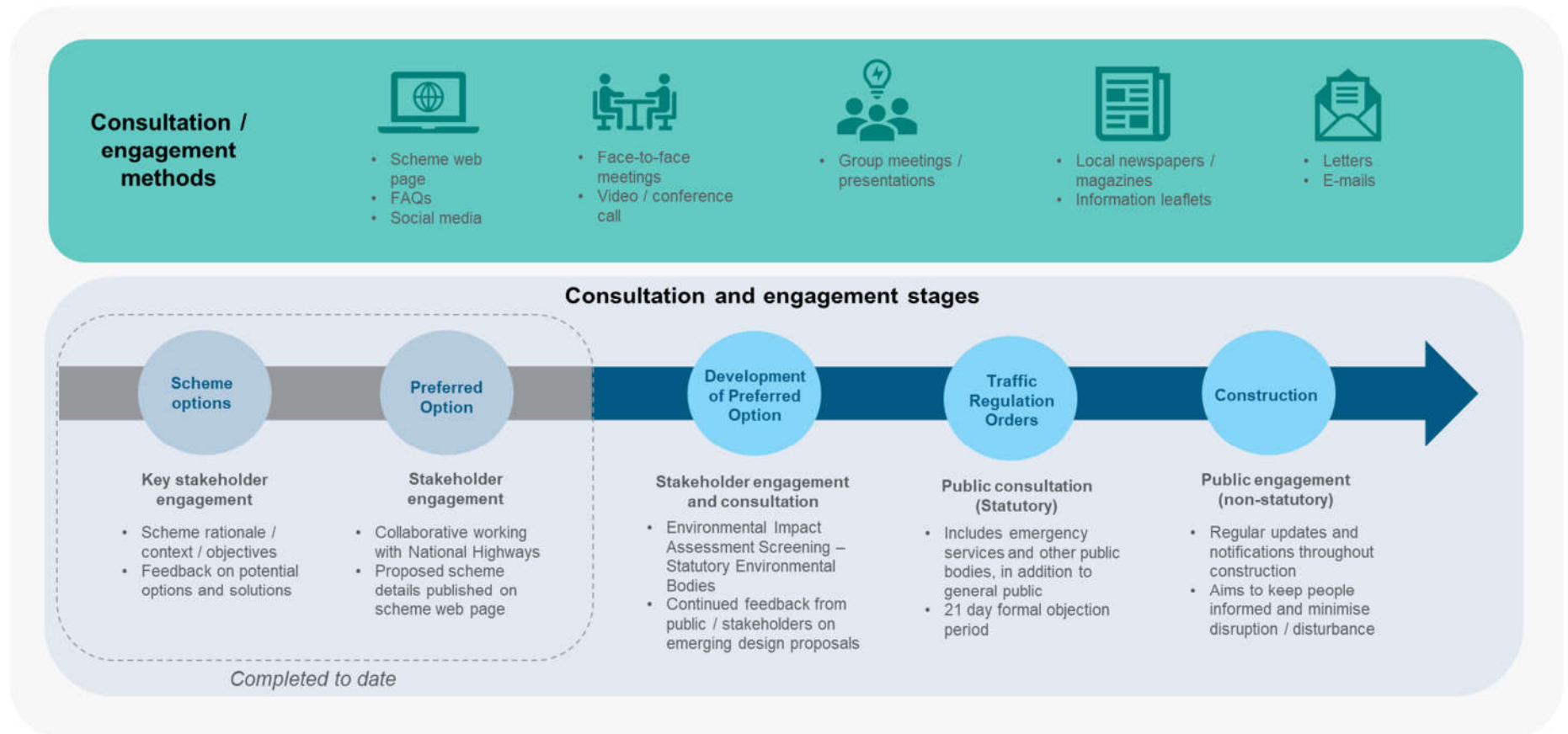
Stakeholder management will be an ongoing activity throughout the project lifecycle. The Stakeholder Engagement and Communications Plan identifies a number of key messages for stakeholders relating to the development and delivery of the project to ensure consistent and clear communication. These would be expected to evolve as the project progresses.

#### 7.6.4. Communications approach and engagement activity

Engaging with stakeholders may include informing, consulting, involving, collaborating and empowering them to understand issues, allowing them to make informed choices and feedback. At key stages in the scheme development and delivery specific consultation and engagement exercises are planned; these comprise both non-statutory and statutory consultation (**Figure 7-4**).



Figure 7-4 – Overview of the approach to stakeholder consultation and engagement



During the early stages of project development key local and regional stakeholders, including the business community, were engaged as part of the development of the Western Gateway STB's Regional Evidence Base, which ultimately identified the M4 Junction 17 scheme as a priority investment on the Major Road Network. The Western Gateway STB will continue to provide an important means of communication and engagement with a broad, regional stakeholder base.

National Highways is considered to be a primary stakeholder owing to the interaction of the scheme with the SRN. A collaborative relationship has therefore been developed based on regular liaison between the M4 Junction 17 project team and National Highways and this is expected to continue throughout the project lifecycle.

In order to make general scheme information available to a broad audience and to provide the opportunity for feedback, Wiltshire Council has established a [dedicated website](#) with information on the scheme, including **Frequently Asked Questions**. This will be kept up to date as a key resource throughout the project.

Local **area boards**<sup>48</sup> are another means of keeping local communities informed about the scheme and progress on its implementation. There are area boards covering Chippenham and Malmesbury, which are considered to have the most relevance to the M4 Junction 17 project. There are also **Community Area Transport Groups** (CATGs) associated with the area boards which can consider transport issues in more detail, set priorities and report back to the area boards. Working with these groups has proved very successful on other recent schemes on the A350, particularly on the NPIF scheme at A350 Farmers Roundabout, Melksham.

During the scheme construction period there will be inevitable delays to road users, but the impacts will be minimised as much as possible through the provision of timely, specific and accurate information. This will ensure affected parties are informed of any disruption well in advance and can plan / adapt their journeys accordingly. A variety of communication channels will be utilised including social media and publications. It is also expected that the contractor for the construction works will be required to develop a **Communications and Customer Care Plan** with plans for managing specific stakeholder needs throughout project delivery and providing regular scheme progress updates. All communications activity would be co-ordinated with National Highways to ensure consistency in messaging.

### Good practice in communications during construction

For the A350 Farmers Roundabout scheme, Wiltshire Council appointed a contractor with a high regard for communications. The contractor employed a public liaison officer who managed the day-to-day communication - this was a key part of the quality questions during the tendering. Regular newsletters were produced by the public liaison officer to keep the public updated on progress.



<sup>48</sup> The area boards are a way of working to bring local decision making into the heart of the community and include local Wiltshire Council members, town and parish councils, voluntary and community groups, youth organisations, sports clubs and local charities. Public meetings can be used to launch consultations and stakeholder engagement events as well as providing updates on projects.

## 7.7. Project Reporting

The Project Manager is responsible for leading the Service Delivery Team and providing **accurate, timely and appropriate communications** within the project team to ensure that all parties are up-to-date with relevant information. Project management is supported by a number of tools including the Project Implementation Plan, the delivery programme (Section 7.5), the Risk Register (Section 7.11), and the Stakeholder and Communications Plan (Section 7.6).

The Project Manager ensures that the Project Board is provided with sufficient information and that the Project Board clearly understands the information in order to provide the necessary guidance on programme decisions. The preparation of regular **highlight reports** provides a clear and consistent means of serving this purpose. The highlight reports include a RAG assessment of risks and an update of the key issues impacting on:

- project programme;
- budget;
- public / political support;
- project resources;
- environment and ecology; and
- land and legal matters.

SDT meetings are held monthly, with flash reports provided to the Project Manager. Key outcomes are escalated to the Project Board through the highlight reports. Urgent matters such as non-compliances and matters with the potential to affect budget or programme are reported at these meetings or raised as an issue by the project team staff outside the meeting by exception. The project governance structure identifies the route hierarchy by which matters are escalated.

The SRO is responsible for keeping the Cabinet Members aware of the development of the scheme towards meeting the project objectives.

Ultimately, whether identified by the project team through the established project communication process or escalated to the Project Board / Leadership Team by exception, assurance on project governance will be closely monitored and opportunities for appropriate intervention maintained through the project governance process.

## 7.8. Implementation of Work Streams

Key work streams, outputs and associated work packages associated with the implementation of the scheme are summarised in **Table 7-2**. These predominantly reflect the current stage of scheme development. As the scheme progresses the definition of work streams is expected to be reviewed and updated, in particular with a stronger focus on construction activity (before, during and after main works) through to project closure. Information will therefore be updated at FBC.

**Table 7-2 – Key work streams and work packages for M4 Junction 17 project implementation**

Work stream	Related key deliverables / products	Work packages	
Project management / governance	<ul style="list-style-type: none"> <li>• Project Delivery Plan</li> <li>• Delivery programme</li> <li>• Progress reporting</li> </ul>	<ul style="list-style-type: none"> <li>• Project assurance</li> <li>• Programme review</li> <li>• Change management</li> </ul>	<ul style="list-style-type: none"> <li>• Financial review</li> <li>• Resource management</li> <li>• Information management</li> </ul>
Health and safety	<ul style="list-style-type: none"> <li>• Designer Risk Assessment</li> </ul>	<ul style="list-style-type: none"> <li>• Safety alerts</li> <li>• Risk monitoring</li> </ul>	<ul style="list-style-type: none"> <li>• Risk assessment (project activities)</li> <li>• GG104 assessments</li> </ul>
Design	<ul style="list-style-type: none"> <li>• Preliminary design package</li> <li>• Detailed design package</li> <li>• Design Strategy Record</li> </ul>	<ul style="list-style-type: none"> <li>• Construction Design Management (CDM)</li> <li>• Topographical survey</li> <li>• Highways design</li> <li>• Operational traffic modelling</li> <li>• Road Safety Audits / designer response</li> <li>• Ground investigations</li> </ul>	<ul style="list-style-type: none"> <li>• Geotechnical design</li> <li>• Drainage design</li> <li>• Pavements design</li> <li>• Lighting design</li> <li>• Signals design</li> <li>• Walking, cycling &amp; horseriding assessment and review</li> <li>• Structural design</li> </ul>
Cost estimation	<ul style="list-style-type: none"> <li>• Scheme cost estimate</li> </ul>	<ul style="list-style-type: none"> <li>• Bill of Quantities</li> <li>• Whole life costs</li> <li>• Uncertainty estimating</li> </ul>	<ul style="list-style-type: none"> <li>• QCRA</li> </ul>
Risk management	<ul style="list-style-type: none"> <li>• Risk Management Plan</li> <li>• Risk Register</li> </ul>	<ul style="list-style-type: none"> <li>• Risk workshops</li> </ul>	<ul style="list-style-type: none"> <li>• Risk analysis</li> </ul>
Economics and business case	<ul style="list-style-type: none"> <li>• Outline Business Case</li> <li>• Full Business Case</li> </ul>	<ul style="list-style-type: none"> <li>• Traffic modelling</li> <li>• Economic appraisal and assessment</li> </ul>	<ul style="list-style-type: none"> <li>• Funding strategy</li> <li>• Business case preparation</li> <li>• DfT assurance review</li> </ul>
Environment	<ul style="list-style-type: none"> <li>• EIA Screening Report</li> <li>• Environmental Assessment Report</li> </ul>	<ul style="list-style-type: none"> <li>• Noise</li> <li>• Air quality</li> <li>• Landscape</li> <li>• Biodiversity</li> <li>• Cultural heritage</li> </ul>	<ul style="list-style-type: none"> <li>• Water environment</li> <li>• Soils and geology</li> <li>• Climate change effects</li> </ul>
Procurement	<ul style="list-style-type: none"> <li>• ITT package</li> <li>• Identification of preferred contractor</li> </ul>	<ul style="list-style-type: none"> <li>• Procurement Strategy</li> <li>• Soft market testing</li> <li>• Contract documents</li> </ul>	<ul style="list-style-type: none"> <li>• Tender assessment</li> </ul>
Stakeholder management	<ul style="list-style-type: none"> <li>• Stakeholder Management and Communications Plan</li> </ul>	<ul style="list-style-type: none"> <li>• Stakeholder analysis</li> <li>• Stakeholder engagement</li> <li>• Scheme web page</li> </ul>	<ul style="list-style-type: none"> <li>• Regular communications updates</li> <li>• Statutory consultation</li> </ul>
Construction - planning	<ul style="list-style-type: none"> <li>• Construction Management Plan</li> </ul>	<ul style="list-style-type: none"> <li>• Construction Phasing Plan</li> <li>• Traffic Management Plan</li> <li>• Contract management team mobilisation</li> </ul>	<ul style="list-style-type: none"> <li>• Construction Environmental Management Plan</li> </ul>
Construction - delivery	<ul style="list-style-type: none"> <li>• Advanced works</li> <li>• Main construction works</li> </ul>	<ul style="list-style-type: none"> <li>• Contract management</li> <li>• Site supervision</li> </ul>	

## 7.9. Key Issues for Implementation

Whilst the project overall is considered to be of relatively low complexity there are known factors which will have a bearing on successful delivery and implementation. The most significant of these, as identified at this OBC stage, are summarised below.

### 7.9.1. Chippenham Gateway works at M4 J17

See also Section 7.3. The works are due to be implemented in Summer/Autumn 2022. This will provide clarity / certainty with regards to the base conditions upon which the M4 J17 MRN scheme is to be implemented. This will inform further preliminary and detailed design following OBC approval.

### 7.9.2. Design compliance - Departures from Standards

The current stage of design for the preferred option has identified several departures from standards. Key departures relevant to National Highways have been submitted and signed off. Further departures have been submitted to Wiltshire Council and have been approved in principle, subject to preliminary and detailed design development.

### 7.9.3. Structural capacity assessment

The preferred option design requires technical evidence confirming that the existing overbridges at M4 J17 are capable of taking three lanes of traffic loading (with three narrow lanes being proposed using the existing carriageway). A desk based structural capacity assessment is planned to be undertaken as a priority following OBC approval, in conjunction with National Highways. It is anticipated that this will provide the necessary confirmation.

### 7.9.4. Section 6 agreement with National Highways

Wiltshire Council is following National Highway's Third-Party Agreement Protocol in order to enter a Section 6 Agreement (under the Highways Act 1980) which will delegate the necessary powers to Wiltshire Council to carry out works on a trunk road (M4). The agreement requires a staged approach, as follows:

1. Pre-agreement stage;
2. Detailed design and drafting the agreement;
3. Procurement of works and finalising the agreement; and
4. Construction and final accounts.

### 7.9.5. National Highways Project Control Framework

Agreement has been reached in principle between Wiltshire Council and National Highways that the scheme will not be subject to the full requirements of National Highway's Project Control Framework (PCF). However, a proportionate application of key PCF products is to be determined and will influence the project scope and resources. It is planned to reach agreement on this following OBC submission/approval in order to provide certainty around the scope of the next phase of the project.

### 7.9.6. Land requirements

The scheme extents are within the existing highway boundary and hence no third party land acquisition is required. However, it is currently envisaged that some temporary land easement will be necessary to enable construction works. As the design develops, these needs will become more defined and the necessary arrangements will be sought with affected landowner(s) at an early stage.

### 7.9.7. Traffic management

As the scheme is located at a strategic transport node, traffic management during construction works will be an important consideration in order to minimise travel disruption and to allow the works to progress efficiently and safely. Wiltshire Council will work closely with National Highways in this regard and will obtain relevant approvals. Traffic management will be an important factor in the procurement of the preferred contractor. Efficient traffic management will be supported by:

- A Construction Phasing Plan;
- A Construction Method Statement (CMS); and
- A Construction Traffic Management Plan.

Details of the traffic management approach would be provided at FBC, following the completion of detailed design and selection of the preferred contractor.

## 7.10. Contract Management

Details of contract management for the main construction works will be defined fully as the procurement process develops. Full details will therefore be provided at FBC stage. It is currently envisaged that Wiltshire Council will establish a dedicated contract management team that will be in place before, during and after the scheme contract. The team is expected to comprise the following key members:

- Contracts Manager;
- NEC4 Supervisor (site based);
- Clerk of Works; and
- Quantity Surveyor (QS).

It is expected that the QS team involved at the design phase will remain involved during the works, to ensure continuity of the knowledge built up during the scheme development. The contract management team will complete all as-built information and the health and safety file.

## 7.11. Risk Management Strategy

### 7.11.1. Risk management approach

Effective risk management is fundamental to successful project delivery and the management of uncertainty. It applies at all stages of project execution and is an essential part of project management.

A full **Risk Management Plan** can be found in **Appendix E5**.

The Risk Management Plan provides a management framework to ensure that levels of risk and uncertainty impacting the M4 Junction 17 scheme are properly identified, reviewed and managed throughout the project lifecycle. This creates an environment and a context for **pro-actively identifying and dealing with risks** and issues. This includes **prioritising and assessing risk** so that the right resources can be applied in a timely manner for **implementing mitigation plans** to minimise risks or increase opportunities. This applies to recording and communicating these risks, as well as the eventual close-out of specific risks and the project itself.

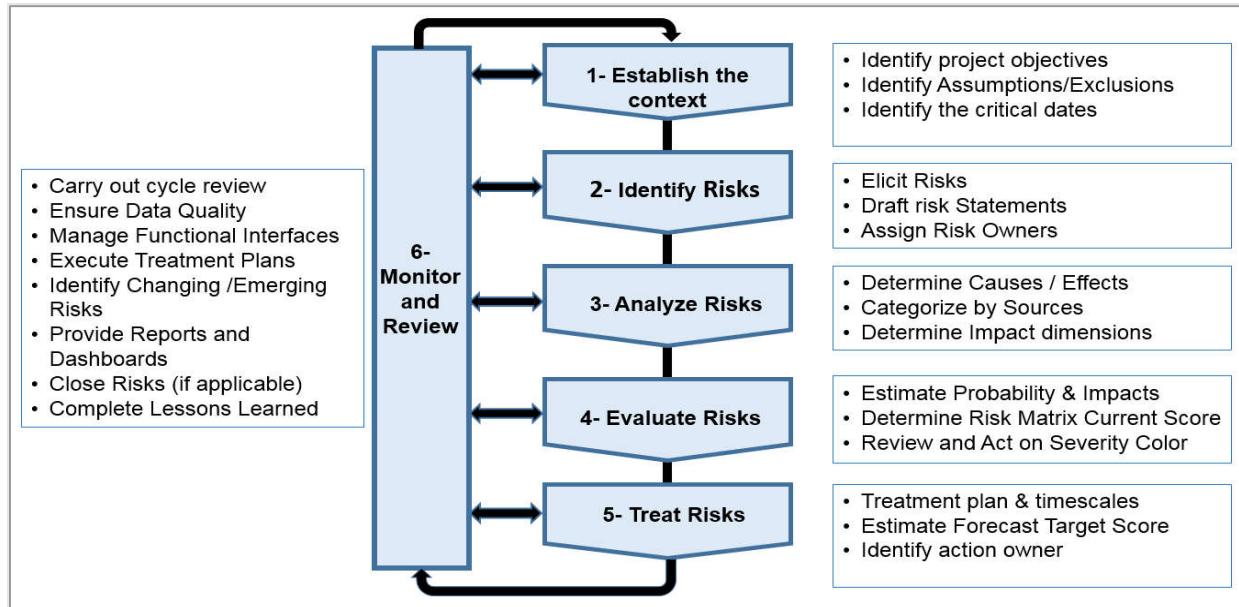
The aims of the Risk Management Plan include:

- Assignment of **clear roles and responsibilities** within the project team for risk management.
- Enhanced team communication and **commonality of approach**.
- Assisting the Project Manager to **understand the potential risk exposure**, to develop a **focused treatment plan** to reduce the likelihood of risks occurring or to mitigate the impacts, and to **understand confidence in achieving project targets**.
- Understanding the **resource constraints and time dependencies**.
- Support the **allocation of project contingency funds** and sufficiency of management reserve.
- Increasing the value of the project investment through **identification and exploitation of opportunities**.

The overall risk management approach is summarised in **Figure 7-5**.



Figure 7-5 - Overview of the risk management process



Risks will be mitigated by a combination of impact reduction and / or probability reduction:

- Risk Avoidance
- Risk Transfer
- Risk Reduction
- Risk Acceptance

### 7.11.2. Risk identification / Risk Register

The Risk Register (**Appendix E6**) covers identified risk across all scheme components. It has been developed through the use of **risk workshops**, including several undertaken throughout preparation of the OBC. The workshops, led by the Risk Manager, included client and consultant teams representing all aspects of the project delivery, including design, environment, economics, modelling and finance teams. For each risk, a clear understanding of the cause, event and impact has been determined to enable an assessment regarding the rating levels of probability and impact.

Regular risk workshops will continue throughout the project development in order to review / update existing risks and to identify any new risks.

### 7.11.3. Risk analysis and evaluation

The Risk Register uses automatic scoring once the risk probabilities and impacts are assessed and quantified, using the relevant banding levels (risk parameters). The only exceptions are performance or quality impacts, where a suitable description of the impact is used for the Risk Owner to determine the qualitative score which is then input directly into the performance / quality impact level field (e.g. a '3' for medium level performance would indicate a significant criterion is not met).

The risk parameters set for qualitative analysis with the Risk Register scoring are shown in **Table 7-3**.



**Table 7-3 – Risk parameter scoring**

Score Ref	Rank	Probability (%)		Impact Criteria				Project Performance	
		Min	Max	Cost Range (£)		Schedule Range (days)			Reputation
				Min	Max	Min	Max		
5	Very High	75	90	>1M		>90		Major national adverse media coverage.	Unable to deliver critical criteria.
4	High	50	75	500k	1M	60	90	Major local/minor national adverse media coverage.	Major impact on delivery of criteria.
3	Medium	25	50	250k	500k	30	60	Minor local adverse media coverage.	Partial delivery of criteria.
2	Low	10	25	100k	250k	14	30	Complaint trends.	Late or inconsistent delivery of criteria.
1	Very Low	1	10		100k		14	One off, limited complaints.	Negligible impact on criteria.

Risks are further evaluated using a scoring matrix or Probability Impact Diagram (PID), as illustrated in **Figure 7-6**. The highest risk impact score and the probability score is used to obtain a single value Risk Score for each risk. The risks, when reordered from high to low risk scores, ranks them in order of importance, or significance to the project

Figure 7-6 – Risk Probability Impact Diagram

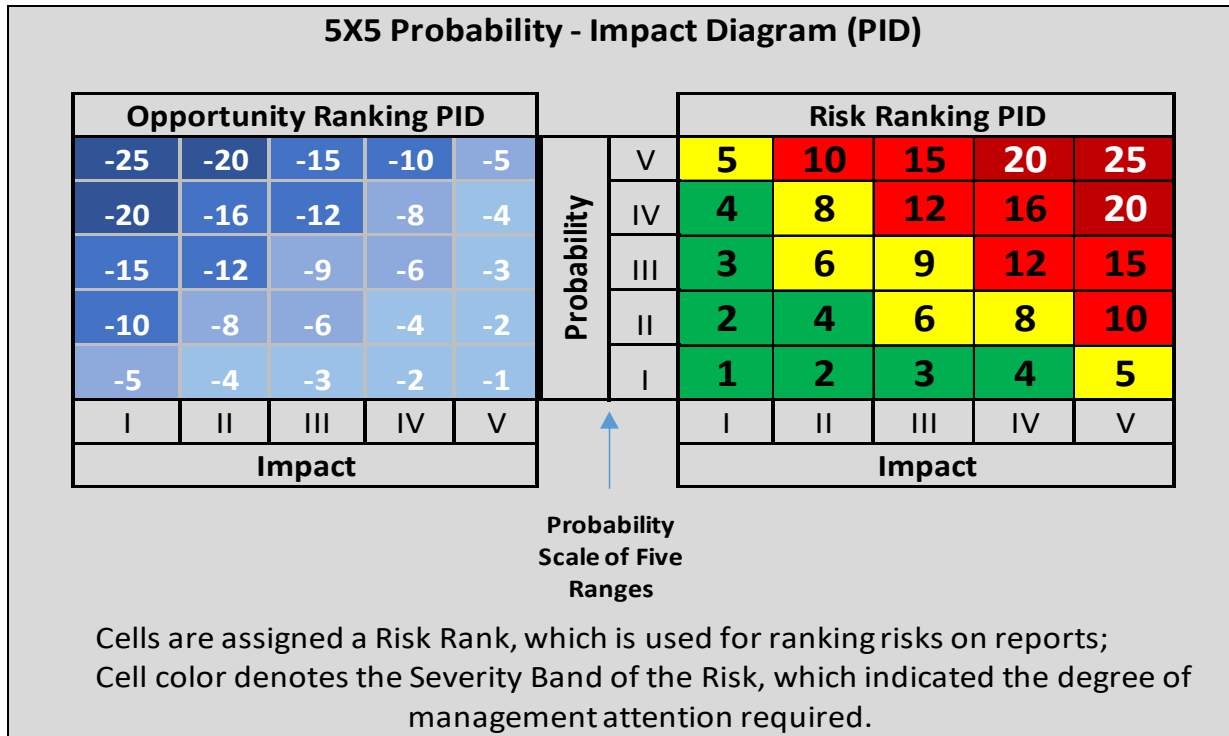


Table 7-4 provides an outline of the minimum actions required of the Project Manager based on the severity score derived from qualitative assessment. These actions include appropriate reporting and escalation of risks within both Wiltshire Council and Atkins.

Table 7-4 – Actions by risk severity level

Severity	Action
Very High	Escalate to Wiltshire Council Organisational Level.
	Escalate to Atkins Business Unit and agree on appropriate management with Business Head.
High	Escalate to Wiltshire Council Programme Level and agree on appropriate management with Wiltshire Council Project Manager.
	Report to Atkins Business Unit.
Moderate	Manage at Project Level and report at Wiltshire Council Level.
Low	Manage and report at Project Level.

#### 7.11.4. Risk treatment

The treatment of threats will aim to prevent or reduce project overspend, delayed deliverables or reduced performance levels. It will promote activities that will help to avoid or reduce adverse impacts or the chance of these events happening. In contrast, treatment of an opportunity will aim to improve the chances of realising the opportunity and maximising the cost saving, accelerated timescales or improved quality of the project output.

There are three types of treatment or mitigation actions:

- ACTION - A physical task with a defined deliverable or outcome.
- CONTROL - On-going monitoring, stakeholder engage or procedure changes.
- FALLBACK ACTIONS - A set of actions which will be taken only if the risk happens.

The Risk Register (**Appendix E6**) sets out the mitigation measures for all current risks and their Risk Owners. Each identified treatment action is assigned an Action Owner responsible for ensuring that the actions are executed to plan within the timescales or costs. The Action Owner reports progress of these actions to the Risk Owner.

The success of the actions taken will be monitored on a regular basis to check effectiveness. If the actions are not improving towards achieving the post-mitigated values, then alternative actions or strategies will be considered.

### 7.11.5. Risk monitoring and reporting

The identification, definition, analysis, and mitigation plans for risks are captured in the Risk Register, which is managed by the Risk Manager. It is the responsibility of all those on the project to identify risks and notify the Risk Manager so that risks can be properly captured.

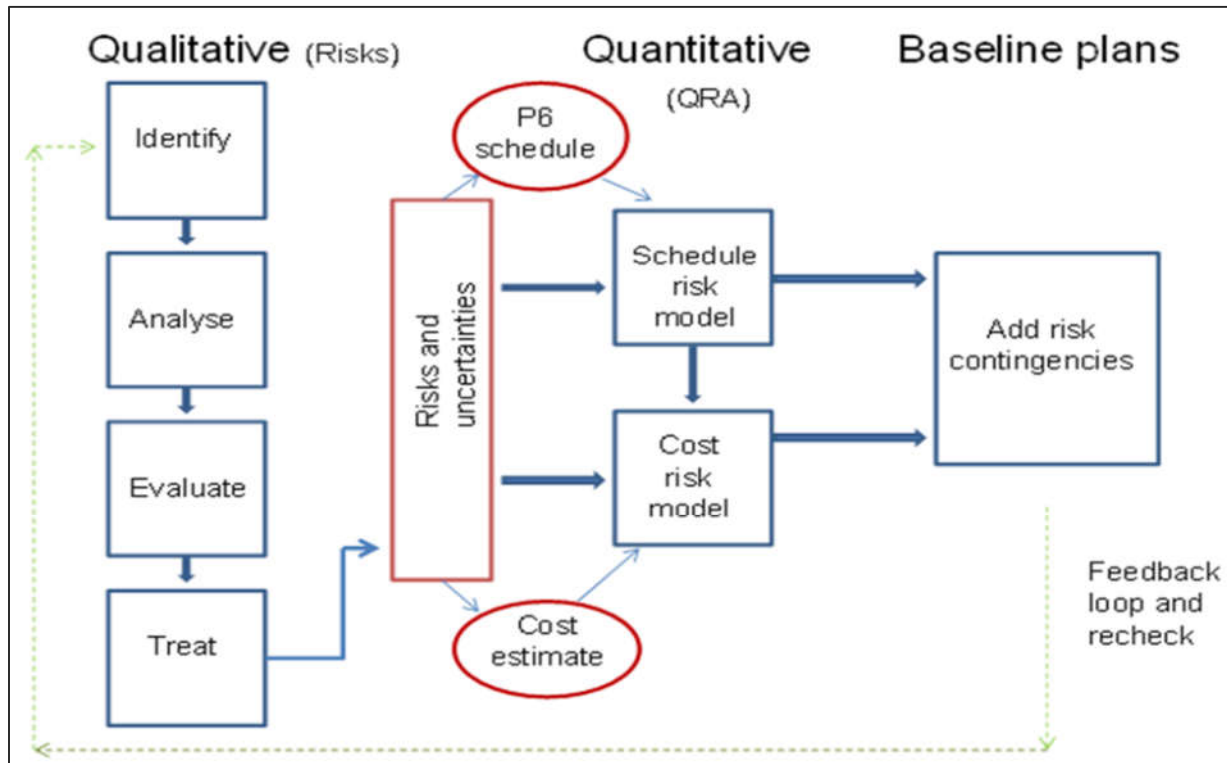
The Risk Register is discussed and updated on a monthly basis between the Project Manager and the Risk Manager in order to ensure it is effectively maintained, reflects the current risk profile of the project, and that actions are being tracked and carried out. Changes to the Risk Register are reported to the monthly Project Board meetings.

Risk Review Workshops are carried out with the wider project team to review and update the Risk Register as appropriate. These workshops take place on at least a quarterly basis and will continue throughout scheme development and delivery.

### 7.11.6. Quantified Risk Analysis

Quantified Risk Analysis (**Figure 7-7**) entails the Quantitative Cost Risk Analysis (QCRA) and Quantitative Schedule Risk Analysis (QSRA). Outputs inform the Project Manager of the current level of confidence in achieving the budget, key dates, cost range and earliest and latest achievable dates. The QCRA is updated at key stages to inform the risk cost allowance (see also the Financial Case).

Figure 7-7 - Overview of the Quantified Risk Analysis process



## 7.12. Benefits Management and Evaluation Realisation Plan

### 7.12.1. Benefits management approach

Benefits management for the M4 Junction 17 project includes the identification, definition, tracking, realisation and optimisation of benefits. It is applied across the project lifecycle, as summarised in **Table 7-5**.

**Table 7-5 – Overview of benefits management approach<sup>49</sup>**

Project stage	Business case step	Benefits management process	Benefits management activity (focus)
Policy / strategy	Pre business case	Define success	Early consideration of drivers, objectives and desired outcomes
Feasibility	Strategic Outline Case	Identify and quantify	Identify and prioritise / categorise benefits Establish theory of change and strategic alignment (benefit mapping)
Appraise and select	Outline Business Case	Value and appraise	Modelling and valuation of benefits Outline measurement and reporting arrangements Outline roles and responsibilities
Define	Full Business Case	Plan to realise	Baseline benefits measures and confirm targets Finalise measurement and reporting arrangements Track benefit risks and dependencies
Deliver	n/a	Work to realise	Measure, track and report benefits
Operate, embed, close	n/a		Implement mitigating action (if required)
Operations	n/a	Review performance	Post implementation review Document and disseminate key findings and lessons learned

A draft outline **Benefits Realisation, Monitoring and Evaluation Plan** has been developed (**Appendix E7**) which sets out current proposed arrangements for ensuring that the scheme is fully aligned with the key benefits and that there are appropriate means of measuring, and reporting on, the delivery of each of the benefits.

### 7.12.2. Benefits realisation

#### 7.12.2.1. Benefits identification, definition and mapping

Benefits initially identified in the earlier stages of project development have been reviewed and updated through the OBC preparation. This is based upon a revised benefits mapping exercise and identifies the linkages between the project drivers, outputs, outcomes and benefits and links the benefits to the project objectives. This process also identifies how the benefits are accounted for in the Economic Dimension.

Key benefits are highlighted in the Strategic Dimension (see Section 3.3.3) and the Benefits Realisation, Monitoring and Evaluation Plan identifies the selection of primary benefits for measurement and provides an outline profile of each of these. The primary benefits include: reductions in peak period journey times via M4 Junction 17; less variability in day to day journey times; reduction in the number and severity of collisions; improved customer/user satisfaction; reduced traffic impacts on less suitable routes; and increased ability to cater for future housing/ employment growth without adverse impacts to existing users. Ensuring that these

<sup>49</sup> This approach to benefits management aligns with the framework and practices set out in the Guide for Effective Benefits Management in Major Projects (Infrastructure and Projects Authority, October 2017)

benefits are realised will be central to the success of the overall scheme. Delivery of these benefits is also associated with positive contributions towards wider economic, social and environmental impacts.

#### 7.12.2.2. Benefits ownership and stakeholders

The benefits profiling exercise has identified the relevant benefit owners and associated stakeholders. In most cases, Wiltshire Council is identified as the benefit owner. It will also continue to work closely with stakeholders at a local and regional level to maximise potential wider benefits associated with the M4 Junction 17 scheme, particularly in relation to economic growth. This includes:

- Working with the Western Gateway Sub-national Transport Body in relation to strategic priorities and plans around strategic north-south connectivity and unlocking the potential of the A350 corridor; this includes the M4 to south coast strategic study led by National Highways; and
- Working with the Swindon and Wiltshire Local Enterprise Partnership in relation to the delivery of housing and employment growth within the A350 Growth Zone and strategic development opportunities within the vicinity of M4 Junction 17.

#### 7.12.2.3. Benefits measurement

**Table 7-6** provides a summary of the outline approach to measurement of the primary benefits (full details can be found in **Appendix E7**). A number of measurable indicators (with proposed data sources) have been defined in order to assess how the scheme performs. Further development of the benefits realisation approach will include establishing baseline measurements and targets for each benefit; this is to be developed by Wiltshire Council in conjunction with key stakeholders and reported on within the FBC prior to project implementation. Baseline data collection will be completed in advance of any site preparation or works to avoid potential distortion of baseline measurements.

Evidence obtained through the benefits measurement will contribute to the overall project review and evaluation process (Section 7.13.2).

**Table 7-6 – Summary outline of the proposed benefits measurement approach**

Project outputs	Key outcomes	Primary benefit indicators	Key beneficiaries	Types / sources of data for measurement
Carriageway widening, alignment improvement and additional lanes on approaches to M4 J17	Reduction in journey times / higher average speeds	Change in peak period (AM/PM) journey times via M4 J17 (average by each arm)	Commuters (car/bus); business travel; freight; longer distance leisure travel	TomTom data Traffic flows
	Improved journey reliability	Change in day to day variability of peak period journey times (overall measure of standard deviation)	Commuters (car/bus); business travel; freight; longer distance leisure travel	TomTom data Traffic flows
Widening of the circulatory carriageway at M4 J17	Improved journey quality	Change in average / maximum queue lengths, by approach arm	Commuters (car/bus); business travel; freight; longer distance leisure travel	Queue survey data Traffic flows
	Reduced risk of collisions	Changes in the number and severity of collisions at, and on the approaches to, M4 J17	All road users	STATS19 collision data
Conversion of 2 lanes on circulatory overbridges to 3 narrow lanes	Improved level of customer service	Change in customer / user perception of the performance of the road network around M4 J17	Wiltshire Council National Highways	User surveys / anecdotal evidence
Completion of full signalisation of M4 J17	Reduction in traffic related impacts on less suitable routes	Changes in traffic volumes at M4 J17 / selected alternative routes	Residents / communities adjacent to alternative routes	Traffic flows (e.g. AADT)
New cycle route signage between Chippenham and Lower Stanton St Quintin (via Kington St Michael)	Enhanced viability of strategic housing sites	Approval of Wiltshire Local Plan Review Progress of strategic sites in the A350 and M4 Swindon Growth Zones	Wiltshire residents / wider society	Records / feedback from local planning authorities
	Enhanced productivity and economic growth	New / expanded businesses and significance of M4 J17 to investment decisions.	Local businesses; Wiltshire residents / wider society	Business feedback Feedback / data from Swindon & Wiltshire Local Enterprise Partnership

## 7.13. Programme/project review and evaluation

Project review and evaluation will ensure appropriate assurance, transparency and accountability is applied to the M4 Junction 17 project. This applies to the whole project lifecycle; the proposed arrangements for pre and post-implementation are outlined below.

### 7.13.1. Project review, assurance and approvals (pre-implementation)

#### 7.13.1.1. Wiltshire Council assurance and approvals

The project will be managed in accordance with the **Council's Constitution and related guidance**. The responsibility for approving progress on the scheme at key stages will be undertaken by the **Council's Cabinet**, which has various well-defined responsibilities, including controlling capital expenditure. The Cabinet is part of the Council and is responsible for most day-to-day decisions. Reports to the Cabinet act as a **Gateway Review** at key stages. This provides an audit trail and ensures relevant scrutiny and challenge, visibility and transparency, and compliance.

Key gateway decisions already undertaken and those anticipated throughout project development are summarised in **Table 7-7**.

**Table 7-7 - Summary of key decisions / gateways**

Stage or Gateway	Date	Notes
Scheme Development Initiation Approval	19 May 2020	Details: <a href="https://cms.wiltshire.gov.uk/ieListDocuments.aspx?Cid=141&amp;Mid=13064&amp;Ver=4">https://cms.wiltshire.gov.uk/ieListDocuments.aspx?Cid=141&amp;Mid=13064&amp;Ver=4</a>
Progression of preferred option	November 2022	Following DfT approval of OBC
Approval to invite tenders	January 2024	n/a
Approval to award contract	December 2024	Following identification of preferred contractor and assumed one month after FBC approval

At the key stages the Cabinet receives reports from the Council's Chief Executive outlining and confirming the background to the scheme, relevance to the Council's Business Plan, main considerations, conclusions and making recommendations. The report covers:

- Public Health,
- Procurement,
- Overview and Scrutiny
- Safeguarding implications
- Equalities,
- Environment and Climate Change,
- Risks of proceeding or not proceeding,
- Workforce implications
- Financial
- Legal implications.

The report would be **approved by relevant Directors** or their deputies and by **the Section 151 Officer** before being referred to the Cabinet for decision. Some decisions may be delegated where appropriate to the Cabinet member to consider in conjunction with the Director of Transport and Environment / SRO, having consulted the Director of Legal and Governance and the Section 151 Officer. When major decisions ("key decisions") are to be discussed or made by Cabinet, they are published in the Cabinet's forward work plan. Key decisions include those where a contract exceeds an annual value of £1 million or a total value exceeds £4 million. The contracts



for this project would exceed those values and would require Cabinet approval to proceed. The contract procurement process would be approved and monitored by the Council's **Strategic Procurement Board**.

Reports considered by Cabinet are publicly available; any confidential information is included in a Part 2 report which would not normally be publicly available, but which is considered by the Cabinet.

Further assurance is provided by the Council's **Overview and Scrutiny management** who review the report before submission and can request it to be referred to the Environment Select Committee for review and comment before Cabinet consider the matter. This makes sure that decisions are taken based on sound evidence, including the views of those with an interest in the matter, and are in the best interests of the people of Wiltshire.

Overview and Scrutiny has powers to require decision-makers to attend meetings and answer questions on any matter under review and also provide written evidence. These can also be from other agencies and contractors, often referred to as partners, who are delivering public services in Wiltshire. They can also seek the advice of experts outside of the council to help it in its work. Overview and scrutiny does not make decisions itself, but publishes findings and recommendations which must receive a response. Most of its meetings are held in public.

#### 7.13.1.2. Independent assurance

In addition to Wiltshire Council's own assurance processes, separate **independent assurance of the project is being undertaken by Local Partnerships**<sup>50</sup>. Local Partnerships is the only authorised provider of Gateway reviews for the Local Public sector and it liaises with Government departments on the assurance of major investment programmes. This independent assurance function complements and enhances the overall project governance by providing an external perspective and is expected to benefit project delivery, including through:

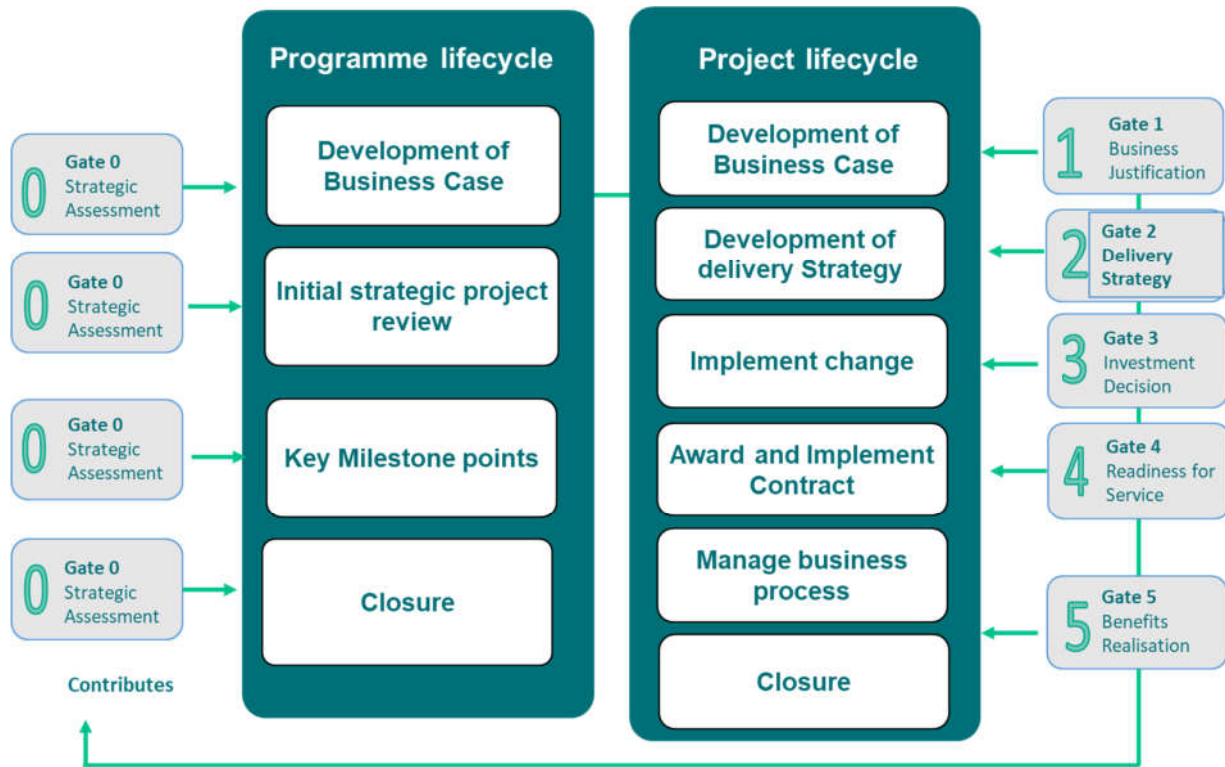
- Better scoping;
- Reducing risk;
- Harnessing best practice;
- Faster delivery of benefits;
- Appropriate structure of contracts; and
- Better value for money.

At key stages (or 'gates') the project will be subject to a **Peer Review**, with Local Partnerships reporting to the SRO. This provides assurance that the project can progress successfully to the next stage. The process applies throughout the project lifecycle (**Figure 7-8**).

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<sup>50</sup> Local Partnerships is a joint venture between the Local Government Association, HM Treasury and the Welsh Government. It facilitates change by working impartially and collaboratively across all parts of central, local and regional government, and the devolved administrations.

Figure 7-8 – Independent assurance process



The reviews comprise a top-down strategic review of the project including an examination of key documents and discussions with key people. The review assesses the rigor of project management processes, decision making and governance, and operational management and benefits realisation. Key findings, conclusions and recommendations are reported to the SRO for wider dissemination and agreement of key actions with the project team. An overall Delivery Confidence Assessment rating is provided based upon evaluation against a wide variety of delivery criteria. This provides an assessment of the level of **confidence in the project's ability to deliver its aims and objectives** within the timescales and budget, and to the quality requirements.

7.13.1.3. DfT assurance and approvals

The scheme is currently being progressed in line with the DfT's guidance regarding the transport business case<sup>51</sup>. This is a three-phase approval process, as illustrated in Figure 7-9.

Figure 7-9 - The three-phase decision making process



This OBC represents Phase Two of the decision-making process. It has established the need for intervention and has assessed the strategic fit and potential economic, social and environmental impacts for a preferred option. Based on information presented in the OBC, the DfT will undertake its assurance review and present its

<sup>51</sup> <https://www.gov.uk/government/publications/transport-business-case>

findings to Ministers. If DfT approval is granted to proceed to Phase Three (FBC) then (subject to Wiltshire Council approval) further scheme design and statutory processes would be completed, along with acquisition of land required for the scheme and procurement of the main contractor.

The FBC (Phase Three) is planned to be submitted to DfT in October 2024. This will:

- Provide details of the project's overall balance of benefits and costs against objectives and set out plans for monitoring and evaluation these benefits when required;
- Confirm the strategic fit and the case for change;
- Provide the business and financial rationale for the project;
- Detail the proposed contract management resourcing, processes and benefit realisation plans;
- Show how the return would justify the overall investment of time and money; and
- Continue to be used to align the progress of the project towards achieving the business objectives.

FBC approval is anticipated in December 2024, when a formal agreement would be made between the DfT and Wiltshire Council regarding the terms and conditions of funding expenditure. The decision to proceed with award of the main construction contract would be considered by Wiltshire Council; if approved this would allow construction works to proceed on site following a period of mobilisation.

## 7.13.2. Project review and evaluation (post-implementation)

### 7.13.2.1. Approach to post-implementation review and evaluation

In line with best practice, project review will extend to post scheme implementation to ensure that the whole project lifecycle is reflected and that there is **transparency and accountability** in relation to the project outcomes, delivery process (including construction), budget and timescales. This is of particular importance to the main scheme delivery and funding bodies; in particular, the Department for Transport (DfT) and Wiltshire Council (WC), as well as wider stakeholders (including National Highways).

Details of post-implementation review and evaluation are set out in the draft outline Benefits Realisation, Monitoring and Evaluation Plan (**Appendix E7**). This establishes the principles of:

- **'process' evaluation** – to consider the effectiveness of the planning and delivery of the project in terms of inputs and outputs, including use of resources and finances (e.g. outturn cost against budget) and delivery against programme; and
- **'impact' evaluation** – to consider how effective the project has been in meeting its intended outcomes and the wider impacts, including any unintended outcomes (this builds upon the benefits realisation – see Section 7.12.2).

The draft outline Benefits Realisation, Monitoring and Evaluation Plan proposes a one-year and three-year post-implementation review. The one-year review will have a stronger focus on process evaluation, whilst the three-year review will predominantly focus on impact evaluation.

### 7.13.2.2. Reporting and dissemination

Each of the post-implementation reviews would be supported by a concise report, setting out the scope of the evaluation and key findings, including lessons learned. It is anticipated that key information would be generally accessible through the project website, with a report also available and likely to be issued directly to key internal and external stakeholders, including DfT, National Highways and the Western Gateway Sub-national Transport Body. Wiltshire Council would promote knowledge sharing through dissemination of key findings and lessons learned internally and to wider audiences as appropriate.

## 7.14. Contingency plan

Early project termination would be managed to minimise adverse impacts, in particular potential financial and reputational implications. At the current stage of project development, early termination would be relatively low impact. Design services could be halted, ensuring all relevant design records are transferred to Wiltshire Council and held securely for potential future use. Appropriate stakeholder communication would be planned and undertaken to explain the project status and any next steps (as far as known). Depending upon the nature of the termination, Wiltshire Council may seek alternative means of delivering and/or funding the scheme in order to realise the planned benefits.

Details of the contingency plan will need to be further developed as the project progresses towards the tender of the main construction contract. Appropriate contingency plans and exit strategies will need to be reflected within the contract documentation. Similarly, terms of the funding agreement with DfT (subject to business case approval) will need to make provision for early termination, agreeable to both parties.

## 7.15. Recommendations

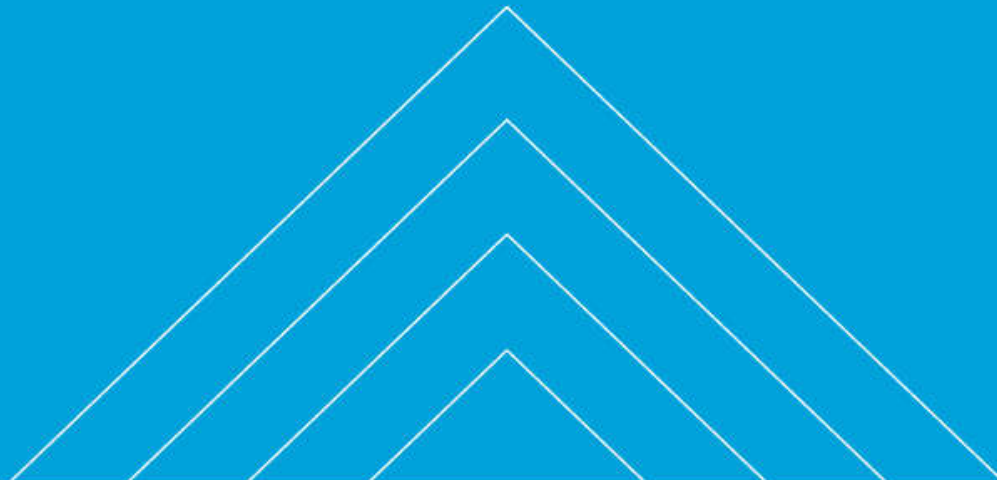
The M4 Junction 17 project is underpinned by a management approach which is proportionate to the nature and scale of the scheme, the current stage of scheme development, and its delivery complexity and risk. Wiltshire Council has appropriate governance structures in place, a robust delivery programme and active risk management. Other key points include that:

- Wiltshire Council is able to demonstrate good experience of similar project delivery, including a previous improvement scheme at M4 Junction 17 delivered in 2018;
- The project is considered to be a conventional highways infrastructure project of relatively low complexity:
  - The scheme is a permitted development, within the extents of the existing highway boundary.
  - There are few residential properties within the vicinity of the scheme.
  - The scheme preferred option does not involve works to the overbridge structures.
- National Highways has been engaged throughout scheme development and suitable processes are in place for this to continue through to scheme implementation;
- Key review / approval stages are defined and reflected within the delivery programme; and
- A Carbon Management Plan (**Appendix E8**) is in place which assesses the carbon impacts of the project over the whole lifecycle (construction and operation) and seeks to encourage the adoption of measures during scheme development and delivery to reduce the overall carbon impact.

The Management Dimension will continue to evolve as the scheme progresses towards FBC. Particular elements to be subject to further development and refinement should include:

- Development of the formal delivery arrangements via the Section 6 agreement with National Highways;
- Confirmation of the proportionate application of / alignment with the National Highway's Project Control Framework;
- Further development of the approach to benefits realisation, monitoring and evaluation;
- Detailed planning of engagement / consultation activity during scheme implementation; and
- Continued monitoring and review of project risks and implementation of mitigation measures.

# Appendices



# Appendix A. Strategic Dimension Appendices

Appendix reference	Title
A.1.	M4 Junction 17 MRN Options Assessment Report
A.2.	Walking, Cycling and Horse-riding Assessment & Review
A.3.	Scheme drawings

## A.1. Options Assessment Report

The Options Assessment Report (OAR) documents the process of generating, sifting and assessing a range of options to address the scheme objectives. It is prepared in line with DfT (TAG) guidance.

This report is provided as a separate file.

Please refer to:

**A1\_WC\_M4J17-ATK-GEB-XX-RP-TB-000004\_C01.pdf**



## A.2. Walking, Cycling and Horse-riding Assessment & Review

The WCHAR provides an evidence-based assessment of the potential needs of non-motorised users in order to inform the design process.

This report is provided as a separate file.

Please refer to:

**A2\_WC\_M4J17-ATK-GEN-XX-RP-CX-000001\_C01.pdf**

## A.3. Scheme drawings

The following drawings are provided as separate files:

### A.3.1. Location plan

A3-1\_WC\_M4J17-ATK-HML-XX-DR-CH-000015\_P01.2.pdf

### A.3.2. General arrangement

A3-2\_WC\_M4J17-ATK-HML-XX-DR-CH-000005\_P01.2.pdf

### A.3.3. Proposed cycle route signage

A3-3\_WC\_M4J17-ATK-HML-XX-DR-CH-000016\_P01.1.pdf

## Appendix B. Economic Dimension appendices

Appendix reference	Title
B.1.	Local Model Validation Report (SATURN)
B.2.	Traffic Forecasting Report (SATURN)
B.3.	Local Model Validation Report (VISSIM)
B.4.	Traffic Forecasting Report (VISSIM)
B.5.	Appraisal Specification Report
B.6.	Economic Appraisal Report
B.7.	Appraisal Summary Table
B.8.	Appraisal tables (TEE / AMCB / Public Accounts)
B.9.	Cost proforma
B.10.	Social and Distributional Impacts Report
B.11.	Environment appraisal

## B.1. Local Model Validation Report (SATURN)

This report documents the development, calibration and validation of the Wiltshire Transport Model (base model) for use with the M4 Junction 17 Outline Business Case.

This report is provided as a separate file.

Please refer to:

**B1\_WC\_M4J17-ATK-GEN-XX-RP-TR-000001.pdf**

## B.2. Traffic Forecasting Report (SATURN)

This report documents the development of forecast traffic demands for the Wiltshire Transport Model and its application for forecasting traffic conditions with and without the scheme.

This report is provided as a separate file.

Please refer to:

**B2\_WC\_M4J17-ATK-GEB-XX-RP-TR-000003\_C01.pdf**

### B.3. Local Model Validation Report (VISSIM)

This report documents the development, calibration and validation of the M4 Junction 17 VISSIM microsimulation (base) model. The model was originally developed by Jacobs on behalf of National Highways.

This report is provided as a separate file.

Please refer to:

**B3\_679475CH.ST.01.85\_M4 J17 VISSIM Model LMVR\_v3.0.pdf**

## B.4. Traffic Forecasting Report (VISSIM)

This report documents the forecast traffic impacts with and without the scheme using the VISSIM microsimulation model (as part of a hybrid modelling approach with the SATURN model)..

This report is provided as a separate file.

Please refer to:

**B4\_WC\_M4J17-ATK-GEB-XX-RP-TR-000004\_C01.pdf**



## B.5. Appraisal Specification Report

This report documents the proposed approach to undertaking economic appraisal for the scheme, in line with DfT (TAG) requirements.

This report is provided as two separate files.

Please refer to:

### B.5.1. Appraisal Specification Report (original)

**B5-1\_WC\_M4J17-ATK-GEN-XX-RP-TB-000002.Rev4.pdf**

### B.5.2. Appraisal Specification Report (addendum / update)

**B5-2\_WC\_M4J17-ATK-GEN-XX-RP-TB-000018.pdf**

## B.6. Economic Appraisal Report

The Economic Appraisal Report (EAR) provides supporting technical details in relation to the economic appraisal.

This is provided as a separate file.

Please refer to:

**B6\_WC\_M4J17-ATK-GEB-XX-RP-TB-000005\_C01.pdf**

## B.7. Appraisal Summary Table

The Appraisal Summary Table (AST) provides a summary of the key outcomes of the economic appraisal across all economic, environmental and social impacts.

This is provided as a separate Excel file.

Please refer to:

**B7\_WC\_M4J17-ATK-GEB-XX-RP-TB-000001.xlsx**

## B.8. Appraisal tables

These appraisal table present key outputs from the economic appraisal in the prescribed format by DfT.

These are provided as separate Excel files.

Please refer to:

### B.8.1. Transport Economic Efficiency Table

**B8-1\_WC\_M4J17-ATK-GEB-XX-SH-TB-000002.xlsx**

### B.8.2. Analysis of Monetised Costs and Benefits Table

**B8-2\_WC\_M4J17-ATK-GEB-XX-SH-TB-000001.xlsx**

### B.8.3. Public Accounts Table

**B8-3\_WC\_M4J17-ATK-GEB-XX-SH-TB-000003.xlsx**

## B.9. Cost proforma

The cost proforma presents the costing information for the purposes of the economic appraisal (PVC) in the prescribed format by DfT.

This is provided as a separate Excel file.

Please refer to:

**B9\_WC\_M4J17-ATK-GEB-XX-SH-TB-000004.xlsx**

## B.10. Social and Distributional Impacts Report

The SDI report provides details of the assessment of social impacts and also relevant distributional impacts, in line with DfT guidance.

This is provided as a separate file.

Please refer to:

**B10\_WC\_M4J17-ATK-GEB-XX-RP-TB-000006\_C01.pdf**

## B.11. Environment Appraisal Report

This report sets out the methodology, assumptions and outputs in support of the assessment of environmental impacts of the scheme, in line with the Economic Dimension.

This is provided as a separate file.

Please refer to:

**B11\_WC\_M4J17-ATK-EGN-XX-RP-LM-000001\_C01.pdf**

The Environment Appraisal Report is also supported by standard format TAG worksheets for each relevant environmental impact.

These are provided as separate Excel files.

Please refer to:

### B.11.1. Air quality

**B11-1\_WC\_M4J17-ATK-EAQ-XX-RP-LA-000003.xlsx**

### B.11.2. Greenhouse gases

**B11-1\_WC\_M4J17-ATK-EAQ-XX-RP-LA-000004.xlsx**

### B.11.3. Noise

**B11-3\_WC\_M4J17-ATK-ENV-XX-RP-LN-000002.xlsx**

### B.11.4. Biodiversity

**B11-4\_WC\_M4J17-ATK-EBD-XX-RP-LE-000003.xlsx**

### B.11.5. Water

**B11-5\_WC\_M4J17-ATK-EWE-XX-RP-LW-000001.xlsx**

### B.11.6. Landscape

**B11-6\_WC\_M4J17-ATK-ELS-XX-RP-LL-000001.xlsx**

### B.11.7. Heritage

**B11-7\_WC\_M4J17-ATK-EHR-XX-RP-LH-000001.xlsx**



# Appendix C. Commercial Dimension appendices

Appendix reference	Title
C.1.	Procurement Strategy

## C.1. Procurement Strategy

This report documents the consideration of the procurement needs of the project and the identification of the preferred procurement approach and delivery model.

This is provided as a separate file.

Please refer to:

**C1\_WC\_M4J17-ATK-GEN-XX-RP-ZM-000001\_C01.pdf**

# Appendix D. Financial Dimension appendices

Appendix reference	Title
D.1.	Quantified Cost Risk Analysis (QCRA)

## D.1. Quantified Cost Risk Analysis

This technical note provides supporting information with regards to the QCRA undertaken to support the derivation of the project risk cost included in the overall cost estimate.

This is provided as a separate file.

Please refer to:

**D1\_EZ QCRA M4 J17 Pre T June 2022.pdf**

# Appendix E. Management Dimension appendices

Appendix reference	Title
E.1.	Wiltshire Council project delivery experience
E.2.	Project governance
E.3.	Stakeholder Engagement and Communications Plan
E.4.	Delivery programme
E.5.	Risk Management Plan
E.6.	Risk Register
E.7.	Benefits Realisation, Monitoring and Evaluation Plan
E.8.	Carbon Management Plan

## E.1. Wiltshire Council project delivery experience

This note provides details of Wiltshire Council's relevant experience in managing and delivering projects of a similar nature and scale to the M4 Junction 17 project.

This is provided as a separate file.

Please refer to:

**E1\_WC\_M4J17-ATK-GEB-XX-RP-TB-000002\_C01.pdf**

## E.2. Project governance

This provides an organogram of the governance of the arrangements for the project.

This is provided as a separate file.

Please refer to:

**E2\_WC\_M4J17-ATK-GEB-XX-RP-TB-000003\_C01.pdf**



### E.3. Stakeholder Engagement and Communications Plan

This report presents the objectives and planned approach for stakeholder management throughout the project lifecycle.

This is provided as a separate file.

Please refer to:

**E3\_WC\_M4J17-ATK-GEN-XX-RP-TB-000016\_C01.pdf**

## E.4. Project delivery programme

This provides a detailed programme for project delivery in Gantt chart form.

This is provided as a separate file.

Please refer to:

**E4\_190822- M4 Junction 17 Scheme Programme.pdf**

## E.5. Risk Management Plan

This report details the processes and protocols established to manage risk related to the project.

This is provided as a separate file.

Please refer to:

**E5\_WC\_M4J17-ATK-GEN-XX-RK-ZM-000001\_C01.pdf**

## E.6. Risk Register

This provides the record of the current set of project risks, including details of each risk, risk owners and identified mitigation.

This is provided as a separate Excel file.

Please refer to:

**E6\_WC\_M4J17-ATK-HEN-XX-RK-ZM-000001.xlsx**

## E.7. Benefits Realisation, Monitoring and Evaluation Plan

This report sets out the key benefits expected to arise from the scheme and how these will be measured to enable the overall success of the project to be evaluated.

This is provided as a separate file.

Please refer to:

**E7\_WC\_M4J17-ATK-GEN-XX-RP-TB-000015\_C01.pdf**

## E.8. Carbon Management Plan

This report considers the whole-life carbon implications of the project and the key steps identified to minimise the carbon impacts.

This is provided as a separate file.

Please refer to:

**E8\_WC\_M4J17-ATK-EGN-XX-RP-LM-000003\_C02.pdf**

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