A350 Yarnbrook and West Ashton Relief Road

Outline Business Case: Appendices Part 1

Wiltshire Council

24 March 2015

ATKINS

Plan Design Enable

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Document history

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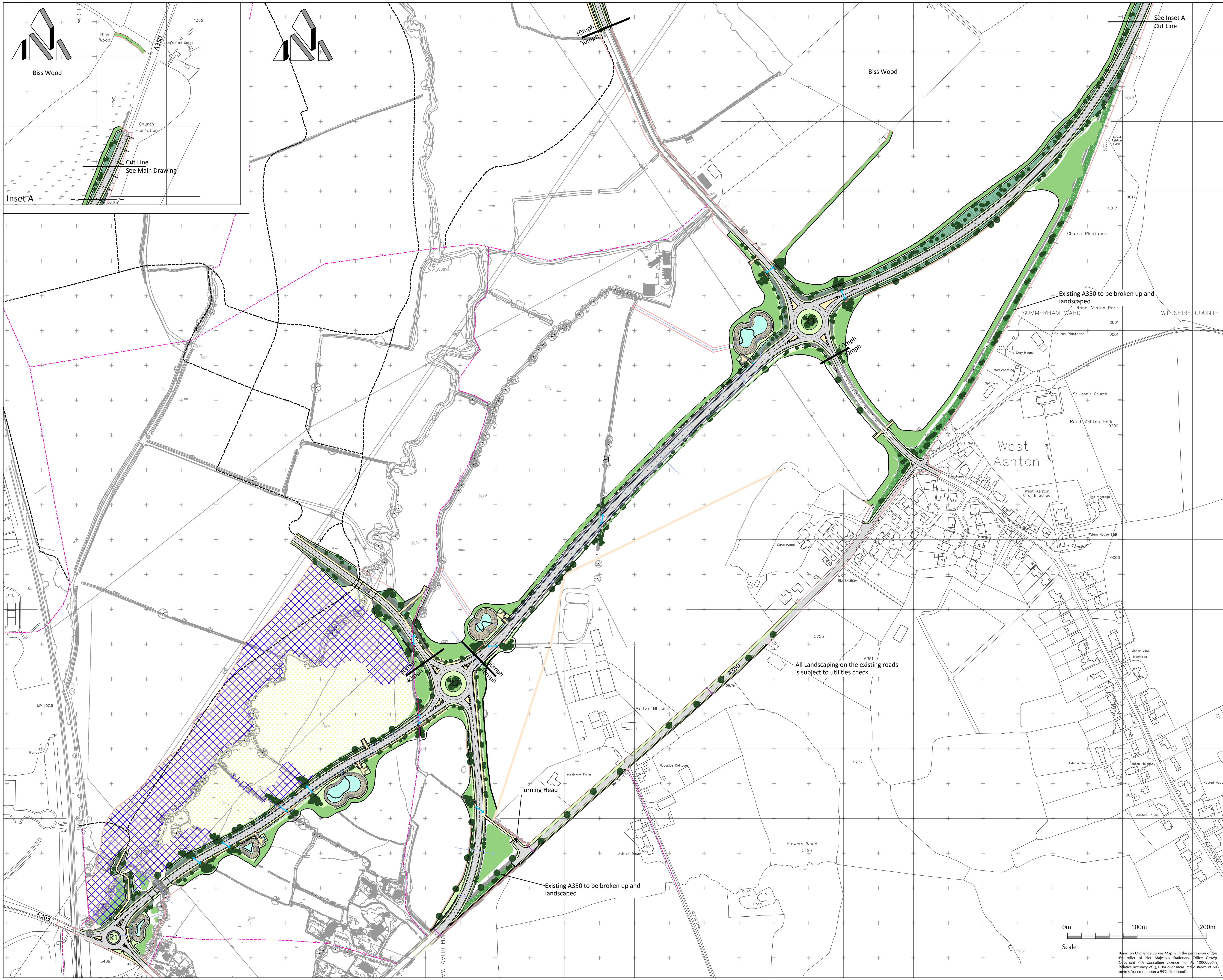
2	Draft OBC for Client Comment	TP	PB	PC/JFC	JFC	21/1/15
2.1	Revised version following Client Comment	TP	PB	PC/JFC	JFC	17/2/15
3	For SWLTB ITA Review	TP	PB	PC/JFC	JFC	27/2/15
4	For SWLTB Website	TP	PB	PC/JFC	JFC	24/3/15

Table of contents

Part 1:

Appendix A. Scheme Drawing



![PFA consulting logo]

Stratton Park House, Wanborough Road
Swindon, SN3 4HG

Telephone
01793 828000

Facsimile
01793 835500

Email
admin@pfaplc.com

Website
www.pfaplc.com

Notes:

1. Drawing based on topographical survey undertaken between July 2008 and January 2014 by D and H surveys.

Key:

- Planning Application Boundary for Highway and associated works.
- Proposed Woodland/Tree Planting
- Proposed Carriageway
- Proposed Footway/Cycleway
- Proposed Grassed Verge
- Proposed Earthworks Slope, generally 1:3.
- Proposed Farm Access/Hard Landscaping
- Proposed Detention Basin 1:4 Side Slopes
- Proposed Detention Basin Base
- Flood Compensation and Ecological Management.
- Existing Public Rights of Way
- Areas of excavation required to compensate for flood volume lost due to Highways works.
- Structured enhanced Bat Crossing, Hop Over.
- Bat Crossings of existing A350. Refer to drawing P480/34
- Proposed Pedestrian/Cycle Routes

Rev	Date	Description	Initials

Client

Ashton Park Trowbridge Ltd and Persimmon Homes Ltd

Project

Ashton Park Urban Extension, South East Trowbridge

Drawing Title

Yarnbrook and West Ashton Relief Road Overview

Drawing No. **P480/117**

Date	March 2015
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E-Mail	csumbler@pfaplc.com
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Appendix B. Options Assessment Report

Wiltshire Highways Consultancy Contract

Major Transport Schemes Options Assessment Report (OAR)

Yarnbrook and West Ashton Relief Road

Date: 30 October 2014 **version: 2.2**

Document Title	5132933_OAR_A350Yarnbrook_WAshton_v2.1
Author	N Winnard / T Poole
Owner	T Poole
Distribution	Rob Murphy, Chris Isherwood (PFA), Julian Alexander (PFA) as part of OBC
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2.0	29 August 2014	Updated Draft	TP
2.1	02 September 2014	Updated Draft	TP
2.2	30 October 2014	Updated Section 5	TP

Approvals

Name	Signature	Title	Date of Issue	Version
Jonathan Foster-Clark		Senior Managing Consultant	30 October 2014	2.2

Document References

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Table of Contents

1 Introduction

1.1 Background

On 8th July 2013 the Swindon & Wiltshire Local Transport Body (SWLTB) approved a provisional prioritised and contingency scheme programme for major transport schemes in the 2015-19 funding period[1], with a prioritised scheme list submitted to the Department for Transport (DfT) in advance of the 31st July 2013 deadline. The SWLTB also approved the A350 Yarnbrook and West Ashton Relief Road as a 'contingency scheme' based on an assessment broadly equivalent to a Strategic Outline Business Case. Scheme promoters were then instructed to produce Option Assessment Reports (OARs) and Appraisal Specification Reports (ASRs) for each 'prioritised' and 'contingency' scheme before approval could be given by the SWLTB to prepare Outline Business Cases (OBCs)[2]. This OAR was initially drafted in December 2013, and has been updated for submission to the Swindon & Wiltshire LTB in September 2014.

Preparation of an OAR ensures that:

- The full range of options, that have previously been considered for dealing with the identified transport problems, are presented in a single document;
- The option development process for each scheme is adequately documented, with clear reasons provided for the specific options that are to be carried forward to the OBC. This is consistent with Stage 1 of the overall scheme assessment process set out in WebTAG[3], the Department for Transport's online guidance for conducting transport studies;
- Abortive OBC work is avoided by clarifying and agreeing, at an early stage, which of the specific scheme options will be included within the OBC - the OAR therefore influences the Appraisal Specification Report (ASR), which sets out how the scheme will be appraised for the OBC; and
- Sufficient background information exists to support inclusion of the scheme in the Swindon and Wiltshire Strategic Economic Plan. The Strategic Economic Plan will be important in making the case for securing additional (competitive) funding from Government as part of a Growth Deal for Swindon and Wiltshire.

1.2 Document Purpose

This document forms the OAR for the A350 Yarnbrook and West Ashton Relief Road scheme. It sets out the key transport problems, transport needs, objectives and options for the A350 corridor to the south east of Trowbridge.

The overarching aim of this OAR is to identify the reasons why certain options for the A350 Yarnbrook and West Ashton Relief Road are being progressed to the OBC stage, pulling together the evidence that exists and work that has been undertaken by Wiltshire Council over recent years.

[1] Swindon and Wiltshire Local Transport Body – Minutes of the meeting held on Monday, 8 July 2013. Section 6, resolution 1.
[2] Option Assessment Reports encourage scheme promoters to articulate clearly the key transport problems, transport needs, objectives and options for a particular scheme. The Appraisal Specification Report clarifies the methodology and scope of further scheme appraisal, setting out what will be assessed in the Outline Business Case and how each element will be assessed.
[3] TAG Unit 2.1.1d 'The Steps in the Process – Overview' and TAG Unit 2.1.2d 'Option Development (Stage 1)'

1.3 Document Structure

The structure of this document matches the eight step process that is recommended for the option development stage in TAG Unit 2.1.2d. These eight steps have been grouped as follows:

- Section 2 sets out the key current and expected (future) transport **problems** on the A350 to the south east of Trowbridge, the **need** for a transport intervention in this location and the **objectives** that should be met by any options being considered. Section 2 covers Steps 1-4 of the recommended WebTAG process;
- Section 3 presents a 'long-list' of **potential options** that have been considered for addressing the transport problems, along with an initial assessment of those options. A 'short-list' of the best performing options is provided. This section covers Steps 5-6 of the WebTAG process.
- Section 4 provides a **more detailed assessment** of the short-listed options; and
- Section 5 **confirms the option** that will be taken forward to the ASR and OBC stage.

2 Problems and Objectives (Steps 1-4)

2.1 Step 1: Understanding the Current Situation

The A350 is a strategic transport corridor that links five major towns in the west of Wiltshire including the principal settlements of Chippenham and Trowbridge. The corridor is made up of the A350 national primary route between the A303, A36 and M4, and the rail line between Warminster and Chippenham.

The corridor forms a key connection for Trowbridge to the wider strategic network, including the M4 (Junction 17) to the north and the A36(T) to the south. However, high traffic volumes, particularly in the peak periods, result in congestion, delays and unpredictable journey times. Long queues commonly form on the A350 corridor to the south east of Trowbridge during the morning and evening peak periods.

In this first step of the recommended WebTAG process for option development, the 'current travel demands and levels of service' on the corridor are established, relevant 'current policies' for spatial planning and transport in this area are identified, along with 'opportunities and constraints' that exist for improving the transport network.

Current policies

The key local policies for spatial planning and transport that affect the A350 to the south east of Trowbridge are the Wiltshire Local Transport Plan 2011-2026 (LTP3)[4], and the emerging Wiltshire Core Strategy[5] (including the Trowbridge Transport Strategy). The most relevant aspects are summarised in the following sections. Any options for addressing the problems on the A350 corridor will need to be developed in light of this policy context.

[4] *Wiltshire Local Transport Plan 2011-2026: Strategy*, Wiltshire Council, March 2011

[5] The most recent version of the Core Strategy is - Tracked changes' version EXAM/34B of the Core Strategy (April 2014) – this version contains all the modifications to the Core Strategy submitted to the Inspector http://www.wiltshire.gov.uk/wcs-exam-34b-hearing-session-tracked-changes-version-2014-april.pdf.

Wiltshire Core Strategy

The overall aim of the Core Strategy is to "*strengthen communities, wherever possible, by maintaining and increasing the supply of jobs to ensure that Wiltshire remains strong and prosperous"*. Job growth and meeting the needs of business are central to the Core Strategy, in part to prevent any further increase in out-commuting. Furthermore, inward investment is to be encouraged by ensuring that potential barriers to investment, such as inadequate infrastructure, are overcome. Any proposals to deal with congestion issues on the A350 should support the principle of job growth.

Traffic growth on this section of the A350 is forecast to increase with planned development (in addition to expected background traffic growth). The emerging Core Strategy made provision for 178ha of employment land and at least 37,000 homes to 2026. The Core Strategy Examination in Public (EiP) Inspector has since requested that the housing allocations will be increased to 42,000 over the plan period[6] - Wiltshire Council is currently in the process of revising the Core Strategy[7].

Trowbridge is identified as one of three Principal Settlements within the Core Strategy (Core Policy 1) and is therefore a primary focus for employment and housing growth. The Ashton Park Urban Extension, South East of Trowbridge, has been allocated to deliver 2,600 homes and 15ha employment land. The Core Strategy recognises that the delivery of this growth requires necessary supporting infrastructure improvements, including on the transport network (Core Policy 3). This is to be supported by area based sustainable transport strategies comprising packages of integrated transport measures (Core Policy 63). The Core Strategy recognises that the scheme will have a significant benefit to the town.

The Core Strategy identifies the important role of the strategic transport network in supporting its vision and objectives and catering for the efficient movement of inter-urban and long-distance trips. In particular, it identifies the need to enhance the A350 primary route due to its strategic importance and the delivery of significant housing and employment land focused within the A350 corridor over the plan period – "*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*" (Core Policy 66). The policy further details specific identified improvements – "*The A350 national primary route at Yarnbrook/West Ashton will be improved. The improvement works necessary will be identified through further study work..."* In addition to supporting development growth in Wiltshire in general, this improvement is a key element of the Spatial Strategy for the Trowbridge Community Area (Core Policy 29) and the delivery strategy for the Ashton Park Urban Extension.

Wiltshire Local Transport Plan 3 (2011-2026)

The LTP vision is 'to develop a transport system which helps support economic growth across Wiltshire's communities, giving choice and opportunity for people to access essential services'. It sets out a long term transport strategy developed around five goals. The most important goals for Wiltshire's transport system are to support economic growth and to reduce carbon

[6] At the time of writing, the most recent Core Strategy version is - Tracked changes' version EXAM/34B of the Core Strategy (April 2014) – this version contains all the modifications to the Core Strategy submitted to the Inspector http://www.wiltshire.gov.uk/wcs-exam-34b-hearing-session-tracked-changes-version-2014-april.pdf.

[7] Examination of Wiltshire Core Strategy Development Plan Document http://www.wiltshire.gov.uk/planninganddevelopment/planningpolicy/wiltshirecorestrategy/wiltshirecorestrategyexamination.htm

emissions. In terms of supporting the economy, maintaining / enhancing the role of the strategic transport network in facilitating the efficient movement of people and goods is considered to be central to achieving this.

The plan recognises the strong links with supporting the Core Strategy - "*A sustainable, effective and reliable transport network is essential to the delivery of planned housing and employment growth in Wiltshire*". The preferred strategic transport options include measures to "*ease congestion at significant 'hot spots' and maintain journey time reliability on key routes*". The LTP highlights that there is scope to encourage modal shift or reduce demand for travel in Wiltshire. Other investment priorities include: buses, sustainable transport packages, walking networks, congestion management, cycle networks, freight management, local safety schemes and smarter choices.

Trowbridge Transport Strategy

The Trowbridge Transport Strategy considered current and forecast transport issues and assessed a number of different options. The report on the emerging strategy[8] proposes a package of measures, including road improvements. An improvement on the A350 at Yarnbrook / West Ashton is specifically identified as being a necessary component of the strategy for the Trowbridge area.

While the Local Transport Plan and the transport-related policies contained within the Core Strategy both emphasise the importance of developing and promoting sustainable transport options other than the private car, it is clear that the Core Strategy housing and employment allocations will place considerable pressure on the A350 corridor. Options for addressing the congestion issues on the A350 may not necessarily work towards all of the current policy objectives, but should aim to work towards some objectives with no worse than a neutral impact on other policy objectives. Furthermore, improvements to the A350 will be complemented by other measures in the Trowbridge Transport Strategy, for example: improvements to pedestrian routes and cycle routes on key corridors, cycle parking, improved bus services, bus priority measures, improvements to Trowbridge railway station, travel plans, traffic demand management and traffic calming, and selected road improvements.

Current travel demands and levels of service

The section of the A350 to the south east of Trowbridge (between north of Westbury and south of Melksham) is single carriageway, approximately 10km in length. There are two main junctions on to the south east of Trowbridge, at Yarnbrook and at West Ashton. The existing junction at Yarnbrook is a four-arm priority roundabout which connects the A350 to the A363 Westbury Road (providing access to Trowbridge and out towards the A361 / A36 to the west) and the B3097 Hawkeridge Road (running south towards Westbury). The existing junction at West Ashton is a signalised cross-roads where the A350 intersects West Ashton Road / Bratton Road which runs in a north-west / south-east direction between Trowbridge and West Ashton village.

Traffic flows on the A350 primary route are some of the highest in Wiltshire and the route continues to suffer from some journey time variability and congestion hotspots, including at Yarnbrook / West Ashton in particular. These problems are recognised in the Trowbridge Transport Strategy development work.

[8] *Trowbridge Transport Strategy Development – Report on Emerging Strategy*, Mott MacDonald, 2012

The A350 corridor has historically been identified as a priority by Wiltshire Council and the A350 primary route has periodically been improved. Because of its strategic importance, and the locally significant traffic growth that has occurred in the last ten years, the Core Strategy states that the A350 route will be selectively improved to maintain and enhance journey time reliability. Furthermore, the Swindon & Wiltshire Strategic Economic Plan (SEP)[9] identifies the A350 corridor as a growth zone, where there are currently large agglomerations of economic activity and where there is the greatest capacity for supporting sustainable growth in the future. There is further information about the scheme's role in the SEP under Step 2: Understanding the Future Situation.

Figure 1 illustrates Swindon & Wiltshire Local Enterprise Partnership's (SWLEP) transport vision for 2026, which includes highway improvements to improve the north-south links along the A350. North-south connectivity is relatively poor compared to east-west connectivity (provided by the M4 and A303).

[9] The Swindon & Wiltshire SEP was submitted to Government on 31 March 2014 - http://www.swlep.biz/resources/document635349836561033846.pdf In the SEP, the Yarnbrook and West Ashton Relief Road is referred to as the 'A350 West Ashton/Yarnbrook Junction Improvements'.

Figure 1: T2026 Overarching Vision[10]

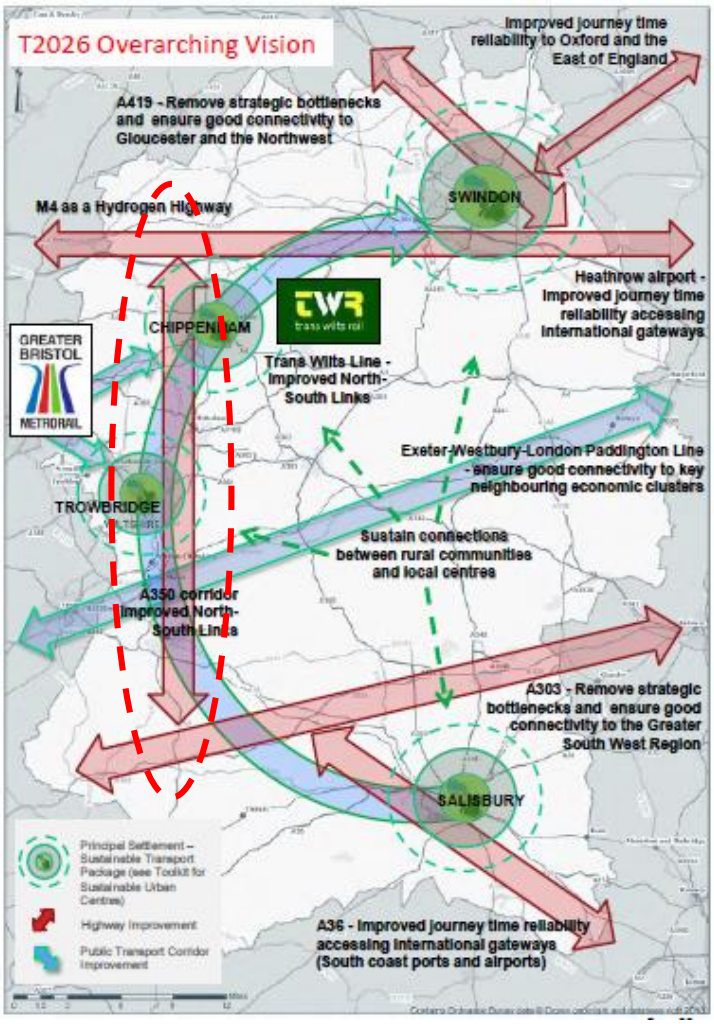
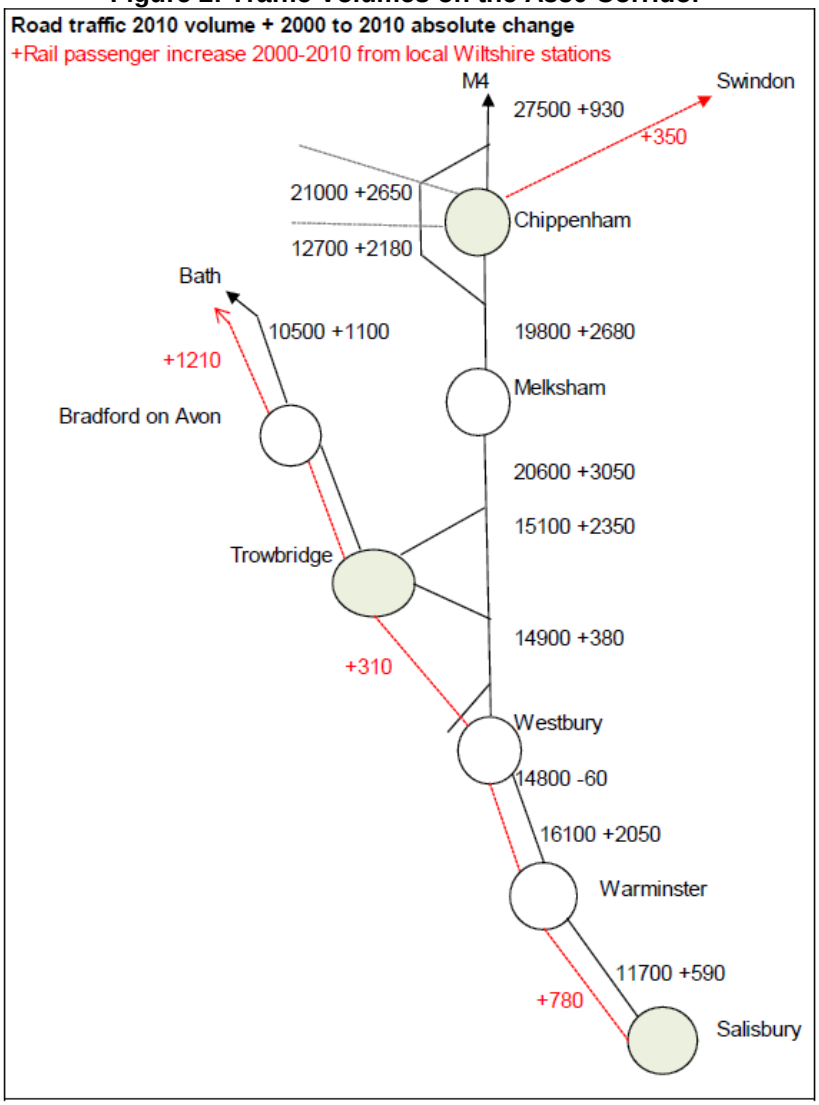


Figure 2 illustrates traffic volumes (AADT) on the A350 corridor, including the absolute change from 2000 to 2010. It also illustrates the increase in rail passenger numbers at local Wiltshire stations over the same period. The rail service between Chippenham and Westbury via Melksham (i.e. within the A350 corridor) was previously underutilised as a passenger line, and has been enhanced from two to eight trains per day since December 2013 as part of the LSTF project (it was previously reduced from five trains per day to two at the end of 2006).

[10] Source: SWLEP Strategic Economic Plan - Swindon & Wiltshire Transport Vision 2026

Figure 2: Traffic Volumes on the A350 Corridor[11]

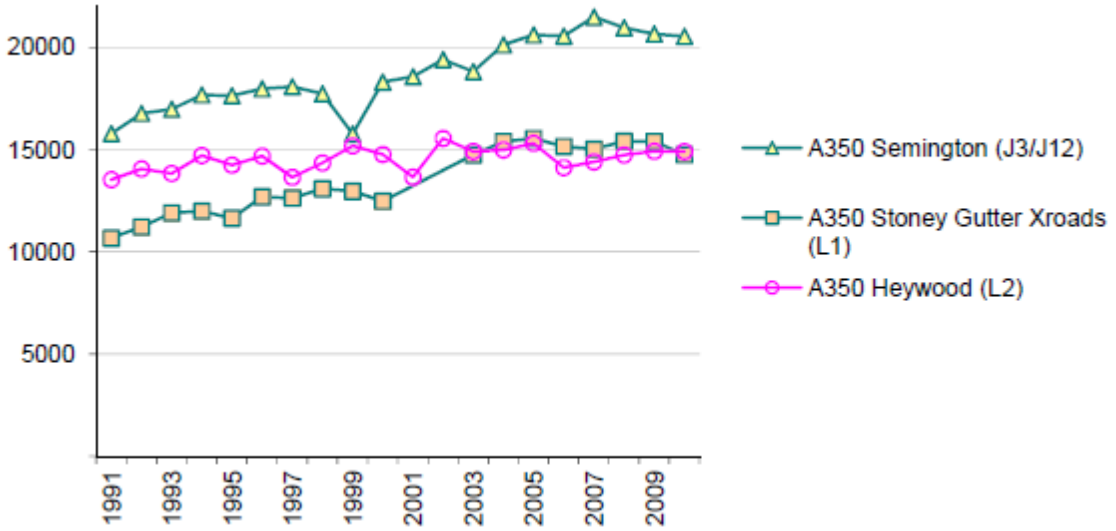


The highest traffic growth (approx. 15%) has been experienced on the section of the A350 between Westbury and Melksham (south east of Trowbridge), where the Yarnbrook and West Ashton junctions are located. Traffic flows (AADT) here are in the region of 15,000 to 21,000 (two-way traffic). Figure 3 illustrates the year on year growth in annual daily traffic at three locations on this section from 1991 to 2010. This shows a steady increase in traffic, although with some slight reduction in more recent years.

The AM peak period (0700 to 1000) and PM peak period (1600 to 1900) each account for approximately 24% of daily traffic. The peak hours each account for approximately 10% of daily traffic. The concentration of traffic in the peak periods results in the Yarnbrook and West Ashton junctions operating above capacity.

[11] Source: Wiltshire LSTF Bid Document

Figure 3: Traffic Flows on the A350 between Westbury and Melksham[12]



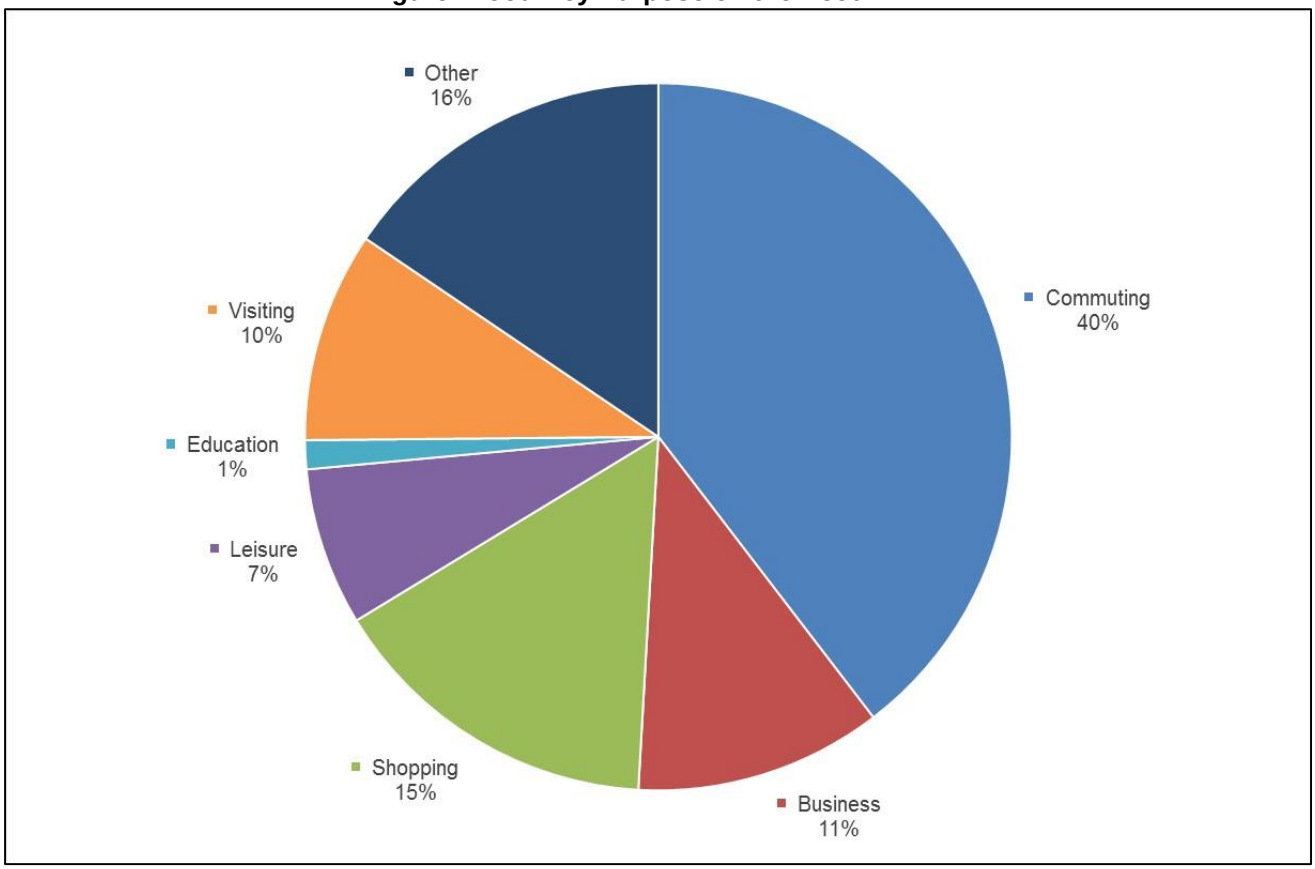
Due to the strategic nature of the A350, it is an important route for freight traffic (both generated internally within Wiltshire and longer distance traffic travelling to/ from the south west and the M4). Heavy Goods Vehicles (HGV) account for approximately 10% of all traffic on the section of the A350 to the south east of Trowbridge[13].

Approximately 60% of peak hour traffic on this section of the A350 is 'through' traffic[14]. This emphasises its strategic role in providing connectivity to the wider transport network beyond Trowbridge. As well as supporting inter-urban trips within Wiltshire, this reflects the fact that Wiltshire acts as a gateway to the south west region.

Figure 4 illustrates the breakdown of journey purpose on the A350, based on Road Side Interviews (RSI) in 2007. This demonstrates that the greatest demand is for commuting (40% of trips), with business trips accounting for a further 11%. Note that the RSI survey was carried out in the October half term, and hence the proportion of education trips is low.

[12] Source: *Joint Strategic Assessment for the Trowbridge Community Area*, 2011
[13] Source: Automatic Number Plate Surveys (2009) in *Traffic in Trowbridge*, PFA, 2011
[14] The A350 sites in the 2009 ANPR surveys were at A350 Semington Road to the north of Trowbridge, and A350 Westbury Road to the south. Through traffic is counted as being matched at both sites within the same peak hour period.

Figure 4: Journey Purpose on the A350[15]

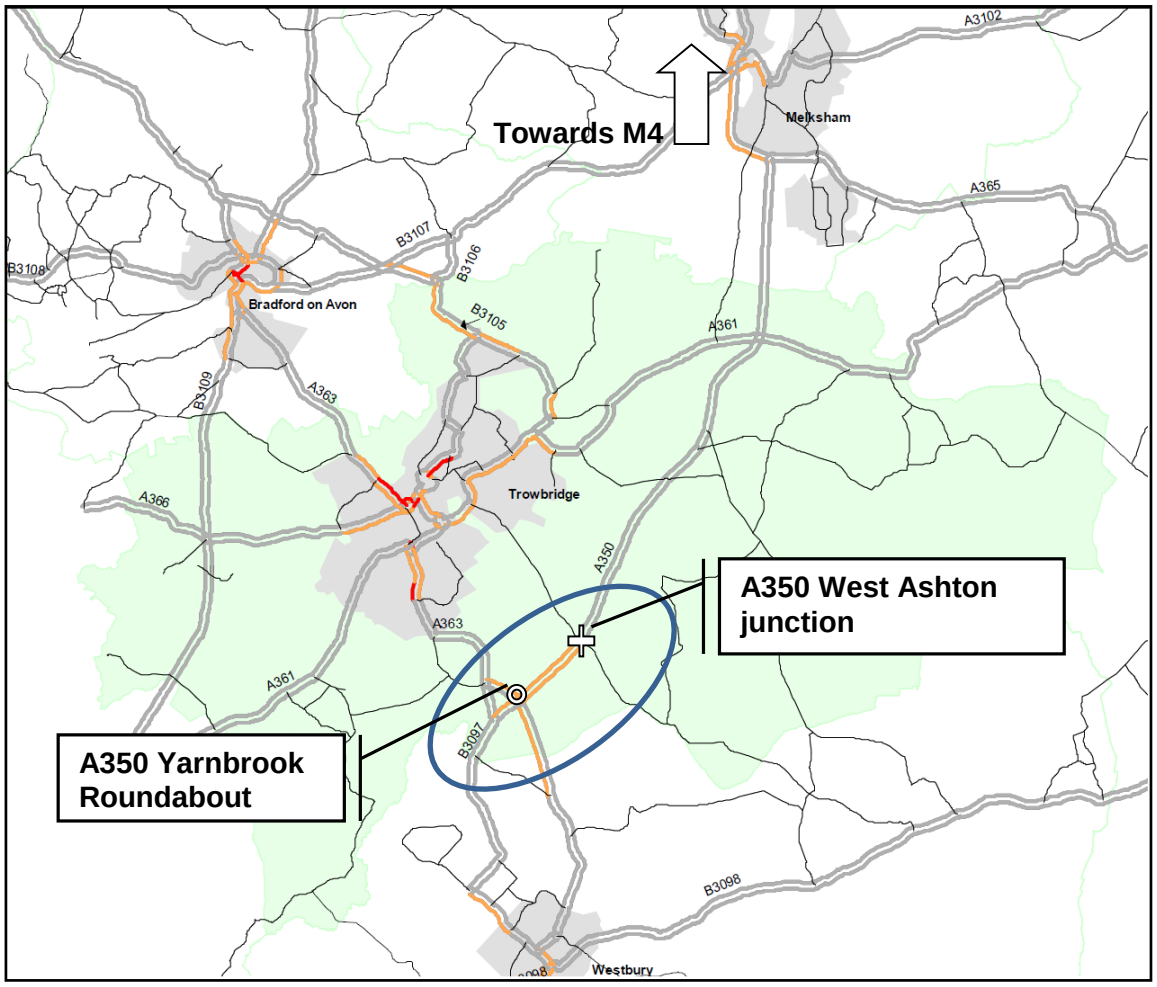


The traffic growth experienced over recent years and the high level of demand in the peak periods means that a number of arms on the Yarnbrook and West Ashton junctions operate above capacity (>85%). At the West Ashton crossroads this particularly affects the A350(N) in the AM peak, the A350(S) in the AM and PM peaks and West Ashton Rd in the PM peak. At the Yarnbrook junction the greatest capacity issues are experienced on the A350(S) in the AM peak.

The capacity constraints result in congestion with queuing and delays, which also contribute to unreliable journey times. Figure 5, from the Joint Strategic Assessment (JSA) for Trowbridge, shows the average delay to cars (in seconds per kilometre) in the morning peak period, compared with free-flow conditions (measured by night-time journeys). The JSA highlights that some increase in time is inevitable and does not imply what would be recognised as congested conditions. The average AM peak delay on the A350 between Westbury and West Ashton was 90 seconds, and less than half a minute in the southbound direction.

[15] 2007 Roadside Interview Survey. Note that the RSI on which the A350 share was based was conducted during the October half-term in 2007, so the share of education travel is relatively low.

Figure 5: Additional Journey Time Per Kilometre, 2003-2007[16]



Source: link transit times from anonymised vehicle tracking data provided by ITIS Holdings plc.

Current opportunities and constraints

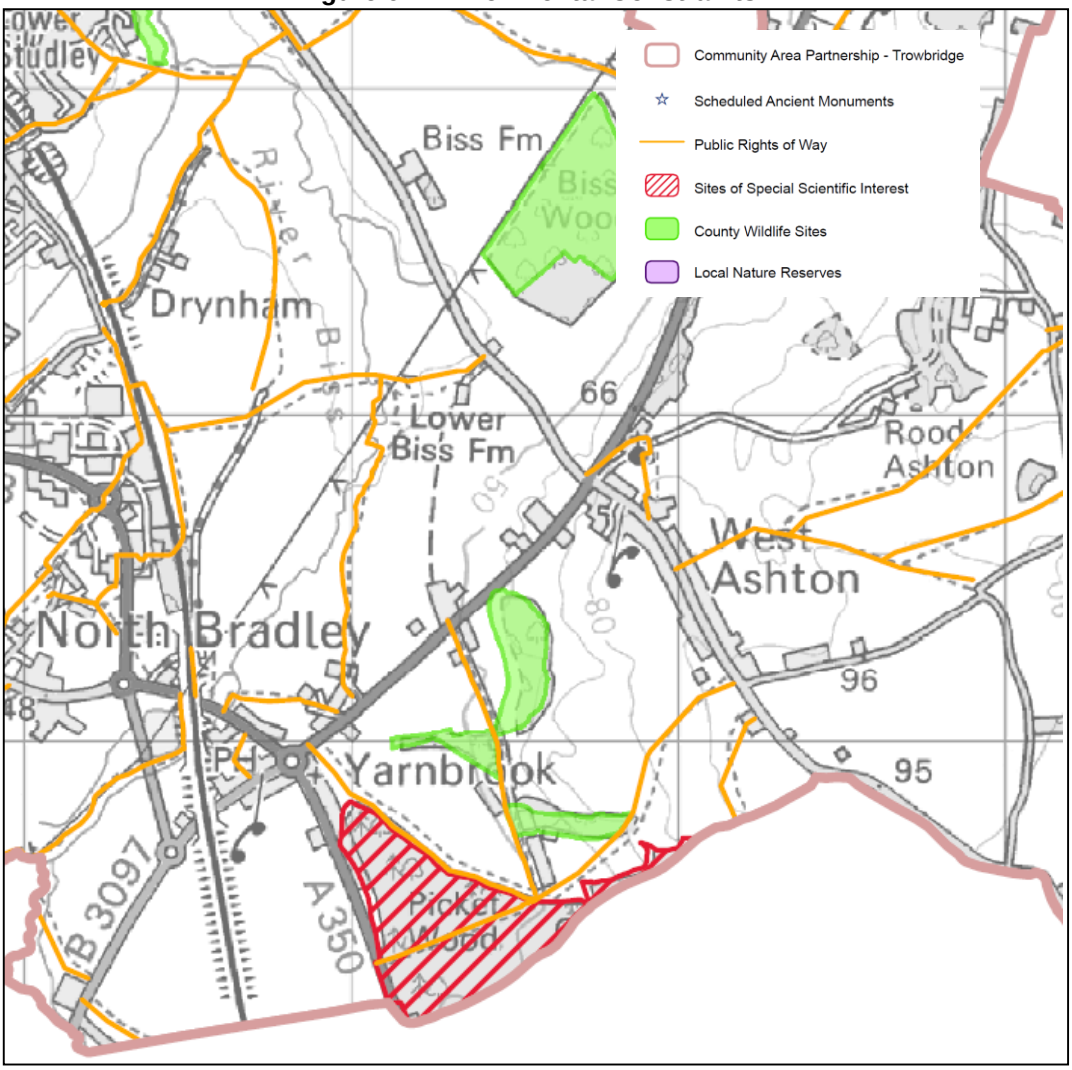
There are a number of existing constraints which may limit the potential transport options available. This is based on information available when this OAR was initially drafted in December 2013; the appraisal in the OBC will be based on the Ashton Park Environmental Statement.

<u>Environmental constraints</u>

Trowbridge is constrained by Green Belt to the north and west. The River Biss flows through the town and significant areas of woodland are situated to the east of the town. Figure 6 illustrates environmental designations within the vicinity of the section of the A350 to the south east of Trowbridge.

[16] Source: *Joint Strategic Assessment for the Trowbridge Community Area*, 2011

Figure 6: Environmental Constraints[17]



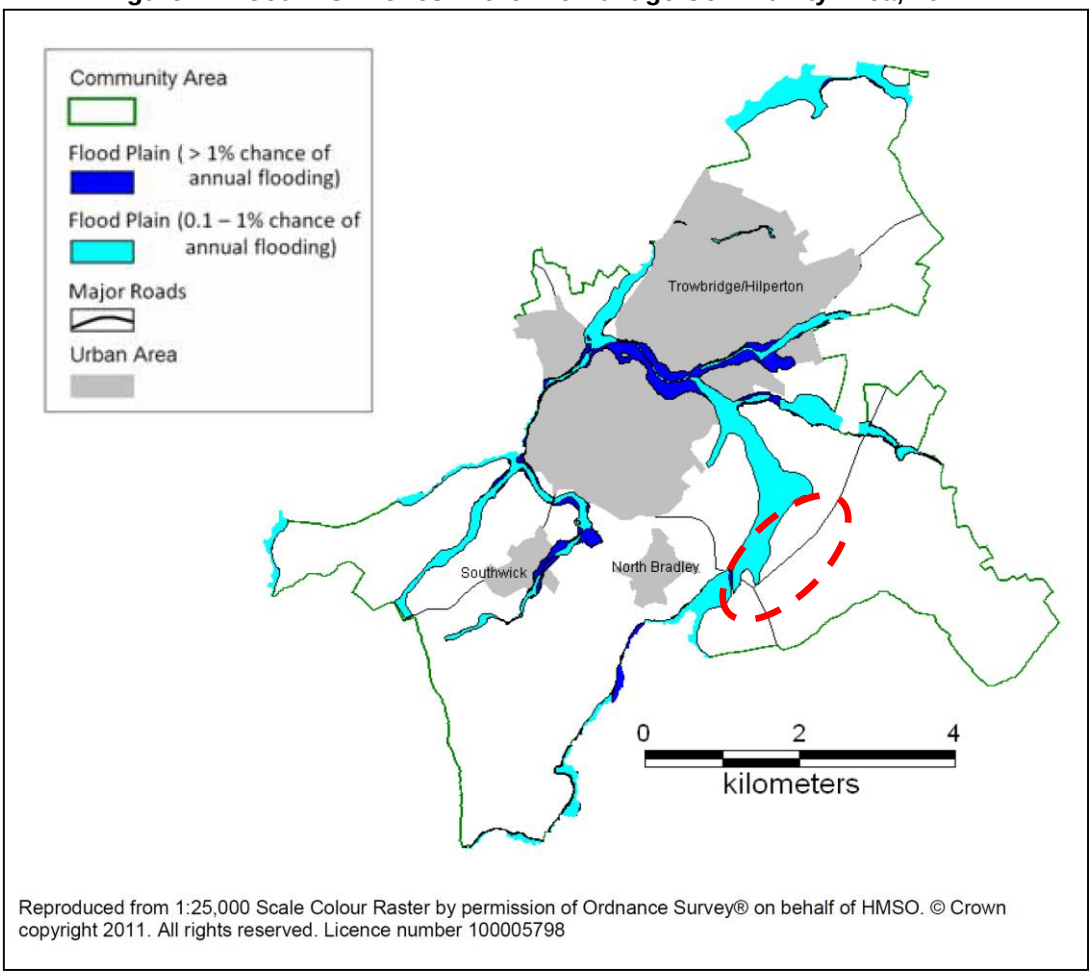
The surrounding area is generally an open rural landscape consisting of agricultural / grassland habitats. To the north and west is the urban edge of Trowbridge and North Bradley and the White Horse Business Park.

There are no nationally designated Landscape areas (eg AONB), Environmentally Sensitive Areas (ESA) or Registered Parks & Gardens within 2km of this section of the A350. There are several areas of notable habitat, including Ancient Woodland (Picket & Clanger Wood) designated as a Site of Special Scientific Interest (SSSI) approximately 500m to the south of Yarnbrook. There are also other ancient woodland blocks / trees covered by Tree Preservation Orders (TPO) approximately 400m to the east of the northern end of this section and 400m to the north of the eastern end. Biss Woods is owned by the Wiltshire Wildlife Trust. Flowers Wood and Church Plantation are also located within the surrounding area. These designations, and particularly the SSSI, will have an influence on transport options.

[17] Source: Natural England (2010)

The River Biss flows to the north west of this section of the A350. Information on the probable extent of flooding in the region has been developed by the Environment Agency, and this is illustrated in Figure 7. The map shows areas identified as medium probability of flooding (zone 2 – between 0.1 and 1% chance of flooding annually) and a small area of high probability (zone 3 – greater than 1% chance of flooding annually).

Figure 7: Flood Risk Zones in the Trowbridge Community Area, 2011[18]



Other physical constraints

Existing road and rail infrastructure are illustrated in Figure 11 along with the options considered in this report. The villages of Yarnbrook and West Ashton are located on the A350 route. The southbound A350 approaches the West Ashton signalised junction on a rising grade. West Ashton lies on the southern side of the A350 with properties in close proximity to the junction. The subsequent approach to the Yarnbrook roundabout is on a straight down grade after a substandard crest. The Yarnbrook roundabout itself is very small and tight, hemmed in by existing frontage development which forms part of the small community of Yarnbrook (this includes several properties including a petrol station and a public house). To the south of Yarnbrook there are residential properties along the eastern side of the A350. The current poor

[18] Source: *Joint Strategic Assessment for the Trowbridge Community Area*, 2011

alignment (including the vertical alignment) means that there are constraints to potential online improvements, including those related to property frontages and community severance.

The Portsmouth – Cardiff railway line runs in a north-south direction to the west of Yarnbrook. A railway embankment separates the Business Park from the open fields and represents a further physical constraint in the area.

Opportunities
The Ashton Park Urban Extension identified in the Core Strategy is located to the north-west of this section of the A350.The development of the site presents opportunities to improve the A350 corridor whilst also facilitating access to the site (and hence generate additional non-transport benefits, and S106/CIL developer contributions).

An improvement to the A350 could also address the existing road safety problem at West Ashton, if that is still a problem – the Yarnbrook and West Ashton Relief Road will divert A350 traffic away from the crossroads. There has been an historic road safety problem at the West Ashton crossroads which represents an accident cluster, and 'after' data will need to be reviewed once available. Furthermore, forecast increases in traffic are likely to compromise the safe, efficient and reliable movement of people and goods on the A350 corridor. The accident benefits of the Yarnbrook and West Ashton Relief Road will be assessed as part of the OBC.

The TransWilts railway line (following the A350 corridor between Warminster and Chippenham) was previously underutilised as a passenger line, and has been enhanced from two to eight trains per day since December 2013 as part of the LSTF project. Subject to funding there is the opportunity for further improvements to the TransWilts rail corridor including increased service frequency and improvements to rail stations.

2.2 Step 2: Understanding the Future Situation

In addition to background traffic growth, it is important to understand future development and changes in land use that may influence travel demands as this will ensure the consideration of potential transport options takes account of the most likely future scenario. In this second step of the recommended WebTAG process for option development, the 'future land uses and policies' that are likely to affect levels of service on the A350 corridor are established, relevant 'future transport system changes' in close proximity are identified. An assessment of 'future travel demands' along the corridor is also made.

Future land-uses and policies

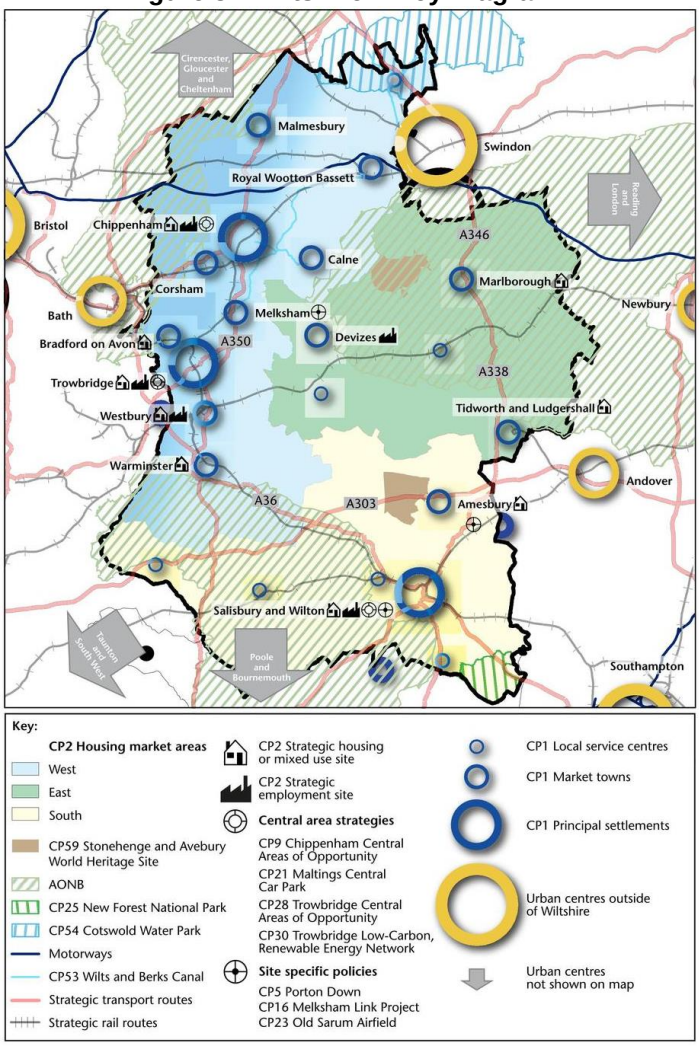
General development proposals within the Core Strategy
The emerging Core Strategy made provision for 178ha of employment land and at least 37,000 homes to 2026. The Core Strategy Examination in Public (EiP) Inspector has since requested that the housing allocations will be increased to 42,000 over the plan period[19] - Wiltshire Council is currently in the process of revising the Core Strategy[20]. A significant proportion of this growth is focused within the A350 corridor, as illustrated in Figure 8 and detailed in Table 1.

[19] Examination of Wiltshire Core Strategy Development Plan Document - Wiltshire Council response to 10th Procedural Letter http://www.wiltshire.gov.uk/wcs-exam76-wc-response-to-inspectors-10th-procedural-letter.pdf
[20] Examination of Wiltshire Core Strategy Development Plan Document http://www.wiltshire.gov.uk/planninganddevelopment/planningpolicy/wiltshirecorestrategy/wiltshirecorestrategyexamination.htm

Table 1: Core Strategy Housing and Employment Proposals[21]

Location	Dwellings	Jobs (employment land)
Chippenham	4,510	26.5 ha
Melksham	2,240	6 ha
Trowbridge	5,860 (+950 once secondary school provision is in place)	25 ha
Westbury	1,500	18.5 ha
Warminster	1,920	6 ha

Figure 8: Wiltshire – Key Diagram[22]



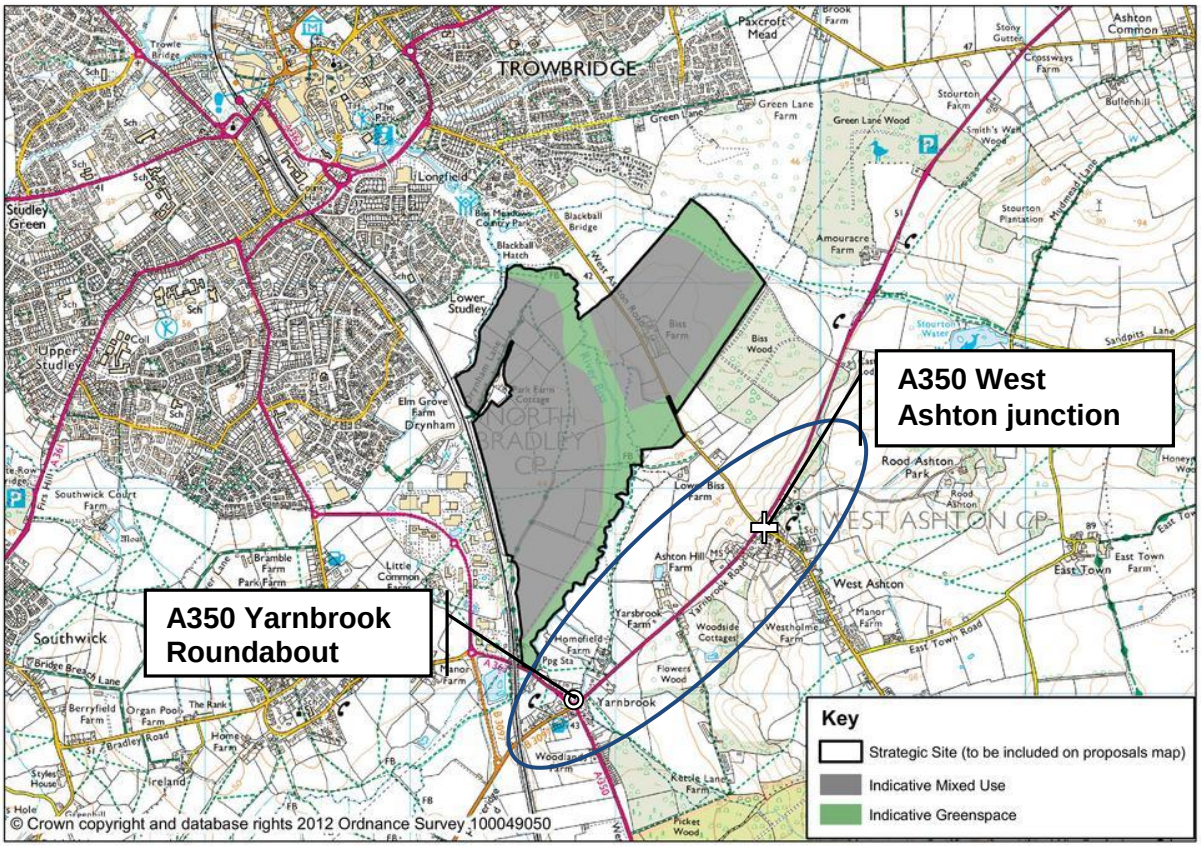
[21] EXAM/34B - Tracked changes' version EXAM/34B of the Core Strategy (April 2014) – this version contains all the modifications to the Core Strategy submitted to the Inspector http://www.wiltshire.gov.uk/wcs-exam-34b-hearing-session-tracked-changes-version-2014-april.pdf Figures shown are for the towns, and exclude the wider community areas.

[22] EXAM/34B - Tracked changes version of the Wiltshire Core Strategy, April 2014.

Ashton Park Urban Extension, South East of Trowbridge.

This site, identified in the emerging Core Strategy, is located to the north west of the A350 (Figure 9) and would comprise an urban extension of up to 2,600 dwellings (including affordable housing) and 15ha of employment land (providing approximately 1,500 jobs), with associated social infrastructure. It is a key strategic allocation. The site is approximately 165ha and lies east of the main railway line, generally west of Biss Wood and/or the River Biss and south of the Castle Mead development and its associated country park. Access to the site, particularly to/from the A350, is a key consideration.

Figure 9: Ashton Park Urban Extension



Strategic Economic Plan

Schemes promoted by Wiltshire Council also need to support the economic growth aspirations of the SEP[23], prepared by the SWLEP.

The SEP sets out the vision and charts out the measures that will need to be taken to secure economic growth and accelerate employment and housing delivery (as set out in the Core Strategies) across Swindon and Wiltshire. The SEP focuses, in particular, on enabling economic growth in three core geographic areas: Swindon; A350 Corridor; and South Wiltshire. To

[23] *Aligning Local Innovation with Government Ambition: Strategic Economic Plan,* Swindon & Wiltshire Local Enterprise Partnership, March 2014 http://www.swlep.biz/resources/document635349836561033846.pdf

support SEP development, work was undertaken to set out how Wiltshire's transport system should be developed through to 2026.

The final SEP was submitted to Government on 31 March 2014 and contains a strong emphasis on growth along the A350 corridor, with supporting transport infrastructure investment. In the SEP, the Yarnbrook and West Ashton Relief Road is seen as an enabler to:

- Reduce queues and delays on the A350 corridor thus enhancing north-south connections; and
- Enable housing and employment growth in the Ashton Park (Trowbridge) urban expansion, and the longer term growth of Trowbridge as a Principal Town Centre.

The SWLEP is currently preparing its second Growth Deal submission to HM Government. An announcement regarding timings for the submission is expected in the Autumn Statement of the Chancellor of the Exchequer, although it is anticipated that renewed negotiation on round two Growth Deals will commence in November 2014 and conclude in January 2015. The SWLEP Board will select which projects are submitted for round two negotiations once the Chancellor's announcement has been made. Producing an OBC will provide the Yarnbrook and West Ashton Relief Road project with the best possible chance of securing an allocation from the Local Growth Fund (LGF) through the round two Growth Deal programme.

Committed developments

Significant committed developments within the vicinity of this section of the A350 include:

- East of Trowbridge, Castle Mead site (under construction) – 650 dwellings;
- Southview Residential Development – 300 dwellings; and
- Biss Farm Business Park – 12ha commercial development.

Future transport system changes

As well as future changes in land use, it is also important to understand how the transport network is expected to change in the future within the area of concern. Some of these changes to the transport network may be directly associated with proposed developments.

Recent transport schemes

The A350 West Ashton crossroads have recently been the subject of a scheme intended to increase capacity through the provision of an additional dedicated left turn lane on the northbound A350 arm. This scheme was delivered as part of the Castle Mead development.

Proposed / planned transport schemes

The following significant transport schemes have also been identified as having a high degree of certainty for delivery in the future:

- **A350 dualling north of Chippenham** (between the Badger roundabout and Jacksom's Lane) – this scheme received funding via the Local Pinch Point Fund in 2013 and is intended to address a key pinch point on the A350 which causes congestion and increased journey times. The scheme will also improve the viability of employment sites. This is currently under construction;
- **TransWilts rail corridor** – the rail service between Westbury and Swindon (via Melksham / Chippenham) has been enhanced since December 2013 as part of the LSTF project to encourage increased rail use and modal shift from the car – the rail service increased from two trains per day each way to eight trains per day each way;

- **Hilperton Relief Road** – connecting A361 Trowbridge Road with Canal Road/Wyke Road/Horse Road, secured by East Trowbridge residential development; and
- **East Trowbridge Distributor Road** – connecting A361 Hilperton Drive with West Ashton Road, secured by East Trowbridge residential development and West Ashton Business Park.

Both the Hilperton Relief Road (T1) and the East Trowbridge Distributor Road (T2) are considered important committed highway improvements which will result in changing traffic patterns in Trowbridge.

Future travel demands

The future changes in land use and the transport network identified in the sections above will have a resultant impact on future travel demand, in addition to background traffic growth. Traffic modelling using the Trowbridge Traffic Model[24] provides the best available information on the extent and nature of this impact.

Table 2 compares the total trips in the Trowbridge model for the AM and PM Peak hour for three different scenarios: a 2009 base year, a 2026 future scenario with committed development (and committed transport schemes) and a further scenario with the Trowbridge Strategic Site included.

Note that for the purposes of the Trowbridge Transport Strategy 2026 Model Forecasting Problems and Issues Report (2011), this traffic modelling did not include any off-site highway improvements other than for the purpose of providing access to development comprising the Trowbridge strategic site. Therefore a new site access roundabout on the A350 to the east of Yarnbrook Roundabout was modelled with a new link connecting the roundabout to the proposed roundabout on West Ashton Road at the southern end of the proposed Eastern Distributor Road.

Both the Hilperton Relief Road and the East Trowbridge Distributor Road are considered important committed highway improvements which will result in changing traffic patterns in Trowbridge, and are included in the 2026 scenarios.

Table 2: Comparison of Trips between 2009 and 2026 Scenarios

Scenario	AM Peak Hour	PM Peak Hour
2009 Base Year	14924	13742
2026 With Committed Development (Reference Case)	18807	17707
2026 Reference Case + Trowbridge Strategic Site	21444	19926

The modelled impact in terms of traffic flows on the A350 and other relevant roads is shown in Table 3. Traffic flows on the A350 are forecast to increase by approximately 15 to 20% in the AM peak hour under the '2026 Reference Case + Trowbridge Strategic Site' scenario.

[24] *Trowbridge Traffic Model Forecasting Problems & Issues Report*, PFA, 2011

Table 3: Modelled flows – AM Peak Hour (PCU, Two Way)[25]

	2009 Base	2026 Reference	% Increase	2026 with Trowbridge Strategic Site	% Increase
A350 south of Yarnbrook	1163	1442	24%	1345	16%
A350 west of West Ashton Crossroads	1878	2191	17%	2278	21%
A363 north-west of Yarnbrook	1229	1511	23%	1871	52%
B3097 west of Yarnbrook	1321	1622	23%	1756	33%

The forecast changes in traffic flow are expected to impact upon the operation of the network – it will become highly constrained without further intervention and will increasingly fail to cope with the additional trips created by planned growth. The traffic modelling forecasts a deterioration in network performance in the 2026 forecast year, with overall increased journey time, increased queuing and delays and reduced average speed across the modelled network, as shown in Table 4.

Table 4: SATURN Simulation Summary Statistics - AM Peak Hour (08:00 – 09:00)[26]

Scenario	Av. Journey time (secs)	Av Journey Distance (km)	Av Speed (kph)	CO2 Emissions (kg)	Over-Capacity Queues (hrs)
2009 Base Year	411	3.73	32.6	4865	58
2026 With Committed Development (Reference Case)	466	3.78	29.2	6592	249
2026 Reference Case + Trowbridge Strategic Site	564	3.81	24.3	8128	705

The forecast impact on the Yarnbrook and West Ashton junctions is shown in Table 5. The performance of these junctions deteriorates in the 2026 Reference Case. In the 2026 scenario with the Trowbridge Strategic Site the performance of the Yarnbrook roundabout deteriorates further still in particular. A number of the arms of both of these junctions are forecast to operate well above capacity, with resultant increases in queuing and delays on the A350 corridor.

[25] Source: *Trowbridge Traffic Model Forecasting Problems & Issues Report*, PFA, 2011. 2-way pcus
[26] Source: *Trowbridge Traffic Model Forecasting Problems & Issues Report*, PFA, 2011

Table 5: Forecast Impact on the Yarnbrook and West Ashton Junctions[27]

Junction	Scenario	Overall Junction Capacity		Arms with capacity > 85%
		AM Peak	PM Peak	
A350 / West Ashton Rd	2009 base	75%	72%	A350(N) in AM peak A350(S) in AM & PM peaks West Ashton Rd PM peak
	2026 Ref case	85%	78%	A350(N) in AM & PM peaks A350(S) in AM & PM peaks W. Ashton Rd AM & PM peak
	2026 with Strategic Site	86%	78%	A350(N) in AM & PM peaks A350(S) in AM & PM peaks W. Ashton Rd AM & PM peak
A350 / A363 Yarnbrook Rbt	2009 base	56%	55%	A350(S) in AM peak
	2026 Ref case	72%	69%	A350(S) in AM peak A350(N) in AM & PM peaks
	2026 with Strategic Site	98%	88%	A350(S) in AM & PM peaks A350(N) in AM & PM peaks A363 Westbury Rd in AM & PM peaks

Traffic modelling[28] also forecasts impacts on journey times on key routes, including on the A350 (between Heywood to the south of Yarnbrook and the Semington roundabout) where the capacity issues at Yarnbrook and West Ashton contribute to increased delays. In the AM peak, journey times on this section of the A350 southbound are forecast to increase by approximately 40% between the 2009 base year and the 2026 forecast year (including the Trowbridge Strategic Site), and by approximately 28% in the northbound direction.

2.3 Step 3: Establishing the Need for Intervention

The problems relating to the A350 corridor to the south east of Trowbridge present a barrier to delivering key policy objectives, including those relating to housing and employment growth in the emerging Core Strategy and economic objectives of the SWLEP (and the emerging Strategic Economic Plan).

Without investment in suitable interventions, there would be an increasingly detrimental impact on the safe, efficient and reliable movement of people and goods on the strategic A350 north-south route in Wiltshire. Furthermore, opportunities for providing adequate access to the Ashton Park development site would be limited and present a constraint to delivering new housing and jobs in Trowbridge at a key strategic site allocation.

Table 6 identifies the main problems that any intervention should seek to overcome, and the underlying basis for the intervention.

[27] Source: *Trowbridge Traffic Model Forecasting Problems & Issues Report*, PFA, 2011
[28] *Trowbridge Transport Strategy: Report on Emerging Strategy*, Mott MacDonald, 2012

Table 6: A350 Trowbridge – the need for intervention

Problem	Commentary
Problem 1 – Congestion and poor journey time reliability on the A350 to the south east of Trowbridge	The section of the A350 to the south east of Trowbridge suffers queuing and delays that are manifested as a journey time reliability problem, particularly in the peak periods. This is due to the level of demand (both in terms of general traffic and goods vehicles) and a lack of capacity at the Yarnbrook and West Ashton junctions. Traffic flows exceed the reasonable capacity of a road of this type with a poor vertical alignment and frontage access. Accommodating planned growth is forecast to cause further strain on the network, as illustrated by the results of development modelling for Trowbridge. The opportunities to improve the A350 corridor would help to mitigate the impact of background traffic growth and future development traffic. The traffic congestion also results in localised environmental impacts which affect residents within the vicinity of the Yarnbrook and West Ashton junctions.
Problem 2 – Poor north-south connectivity threatens the strategic role of the A350	The A350 provides a vital link to the A303, A36, M4 and the wider trunk road network. Maximum traffic flow along the most heavily trafficked section is 27,000 vehicles per day. Poor journey time reliability negatively impacts on north-south connectivity across the county, affecting both inter-urban traffic within Wiltshire/Swindon, and longer distance strategic traffic (i.e. between Dorset and the M4, and beyond). Journey time reliability is worst during the morning and evening peak periods. The SEP identifies the A350 corridor as a growth zone, where there are currently large agglomerations of economic activity and where there is the greatest capacity for supporting sustainable growth in the future. The SEP's vision for 2026 includes highway improvements, such as the Yarnbrook and West Ashton Relief Road, to improve the north-south links along the A350. Without intervention, journey time reliability is expected to worsen and poor connectivity will continue to reduce the viability of new development sites and negatively impact on the economic competitiveness of the area.
Problem 3 – Planned Housing and employment growth	The Ashton Park Urban Extension is a key strategic site allocation with 2,600 dwellings and 15ha employment land proposed. This represents over 36% of the housing allocation for Trowbridge (and 6% of the total for Wiltshire) to 2026 identified in the Core Strategy. Site access (and connection to the strategic road network) is a primary consideration in the viability of the development. Traffic modelling indicates that, without intervention, the operation of the network, including the Yarnbrook Roundabout and West Ashton Crossroad junctions, would be significantly compromised. There are opportunities to unlock the development potential of the Ashton Park urban extension, providing for direct access into the proposed new employment areas and thus supporting economic growth. Improved access to the A350 would also support a Principal Employment Area at West Ashton Road as well as the White Horse Business Park.
Problem 4 – accidents	There is an historic road safety problem at the West Ashton crossroads which represents an accident cluster. Note that the junction has been recently upgraded, and that accident data will need to be reviewed when data becomes available. The Yarnbrook and West Ashton Relief Road will divert A350 traffic away from the crossroads. The accident benefits of the Yarnbrook and West Ashton Relief Road will be assessed as part of the OBC. Furthermore, forecast increases in traffic are likely to compromise the safe, efficient and reliable movement of people and goods on the A350 corridor.

2.4 Step 4a: Identifying Objectives

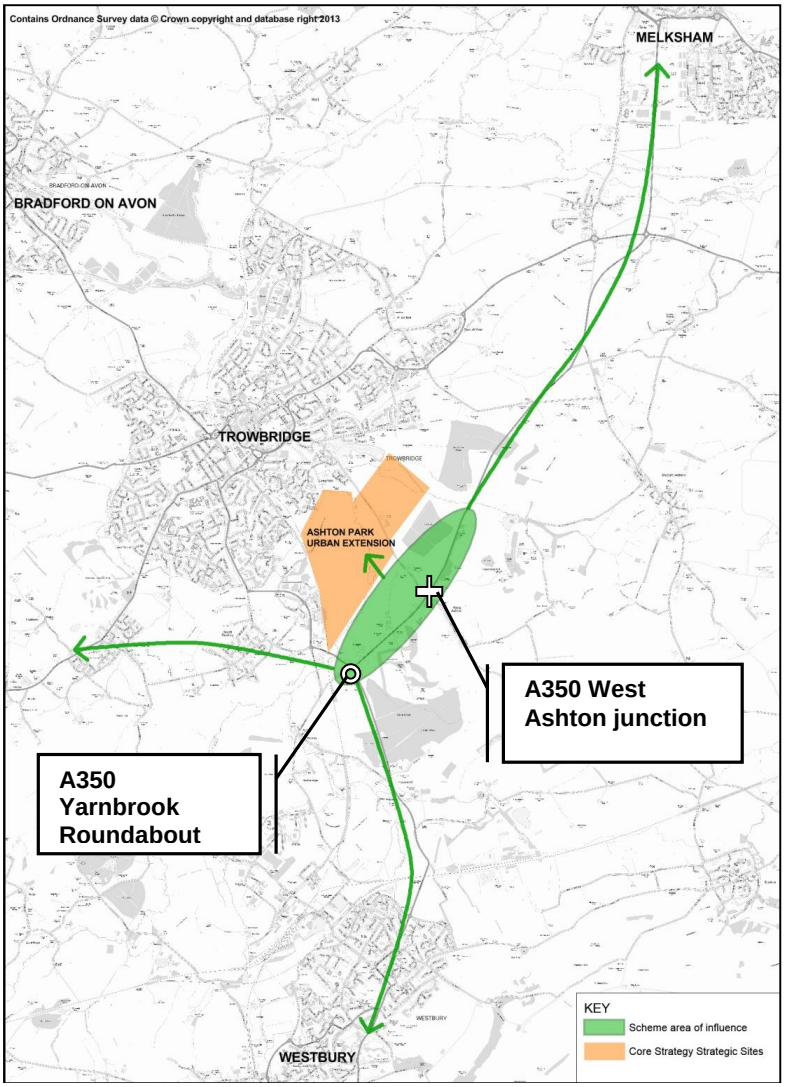
Based on the identified problems, opportunities and constraints, the objectives for any improvements on the A350 corridor to the south east of Trowbridge should be to:

(i) Reduce traffic queues and delays on the A350 corridor at West Ashton and approaching Yarnbrook Roundabout;
(ii) Improve journey time reliability on the A350 corridor;
(iii) Facilitate housing and employment growth in the Ashton Park (Trowbridge) Urban Extension; and
(iv) Reduce the number of road accidents in the West Ashton area.

2.5 Step 4b: Define Geographic Area of Impact

Given the problems identified in Table 6, and the objectives identified in Step 4a, the immediate area of impact to be addressed by any intervention is concerned with the general A350 corridor to the south east of Trowbridge and access to the Ashton Park site. However, due to the strategic nature of this corridor, the area of impact also extends along the A350 corridor to the north (towards Melksham / Chippenham) and to the south (towards Westbury). The area of impact is illustrated in Figure 10.

Figure 10: A350 south east of Trowbridge, Area of Impact



3 Initial Option Assessment (Steps 5-6)

3.1 Step 5: Generating Options

Nine potential options have been identified (see Table 7) which address, at least in part, some or all of the objectives defined in Section 2.4. Options have been identified from existing sources. Many of the highways based options were initially considered as part of route options for a Westbury Bypass (A350 Westbury Bypass Route Study Report - Ringway Parkman, 2001). More recently, the Trowbridge Transport Strategy options assessment work has considered more generally the transport investment priorities for the area (based on a multi-modal package of measures). This identified a need to tackle capacity constraints at Yarnbrook and West

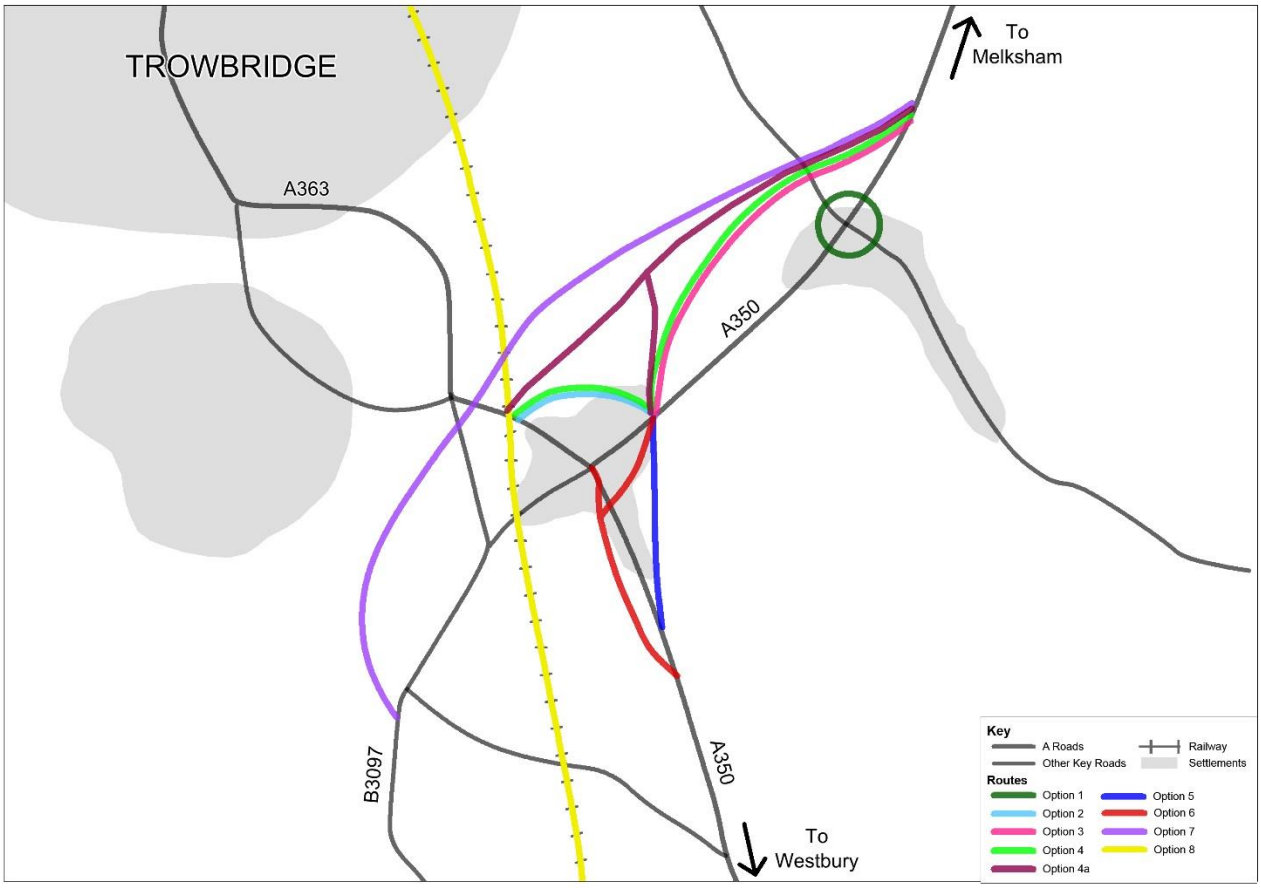
Ashton on the A350 corridor to mitigate the effects of future growth, even with other complementary measures in place.

Table 7 lists the potential options, the objectives which they contribute to, and the relevant origin source of the option. A summary description of each option is provided below the table. These interventions are considered to cover the full range of options that have previously been considered for this area, based on available information.

Table 7: Option Long List

Option	Objectives	Sources
Option 1 – On-line capacity / alignment improvements	(i) (ii) (iv)	A350 Westbury Bypass Route Study Report (Ringway Parkman, 2001) Trowbridge Transport Strategy Development – Options Assessment Report (Mott MacDonald, 2011)
Option 2 – Yarnbrook Northern Relief Road	(i) (ii)(iii)	A350 Westbury Bypass Route Study Report (Ringway Parkman, 2001) Trowbridge Transport Strategy Development – Options Assessment Report (Mott MacDonald, 2011)
Option 3 – West Ashton Relief Road	(i) (ii) (iii) (iv)	A350 Westbury Bypass Route Study Report (Ringway Parkman, 2001) Trowbridge Transport Strategy Development – Options Assessment Report (Mott MacDonald, 2011)
Option 4 – Combined Yarnbrook Northern Relief Road and West Ashton Relief Road	(i) (ii) (iii) (iv)	A350 Westbury Bypass Route Study Report (Ringway Parkman, 2001) Trowbridge Transport Strategy Development – Options Assessment Report (Mott MacDonald, 2011)
Option 5 – Yarnbrook Eastern Bypass	(i) (ii)	A350 Westbury Bypass Route Study Report (Ringway Parkman, 2001)
Option 6 – Yarnbrook ‘Spider’	(i) (ii)	A350 Westbury Bypass Route Study Report (Ringway Parkman, 2001)
Option 7 – Yarnbrook Northern Flyover	(i) (ii)	A350 Westbury Bypass Route Study Report (Ringway Parkman, 2001)
Option 8 – TransWilts service enhancements	(i) (ii)	Trowbridge Transport Strategy Development – Options Assessment Report (Mott MacDonald, 2011)

Figure 11: Options Long List



1. **On-line capacity / alignment improvements**
   This option involves online improvements to the existing alignment and capacity improvements to the West Ashton crossroads junction.

2. **Yarnbrook Northern Relief Road**
   This option includes a Northern Link (single carriageway road) departing the existing A350 alignment to the east of Yarnbrook via a new roundabout, passing around the north of Yarnbrook village, and connecting with the existing A363 alignment to the north west of Yarnbrook with a new roundabout. It does not involve any works within Yarnbrook itself. All roads to the existing roundabout would be maintained, offering a choice of routes through Yarnbrook. Traffic would use the existing A350 alignment between West Ashton crossroads and the new roundabout to the east of Yarnbrook. A350 through traffic would need to continue to use the existing Yarnbrook roundabout. Access to the Ashton Park site could be provided via an intermediate junction on the Northern Link.

3. **West Ashton Relief Road**
   A single carriageway road departing from the existing A350 alignment to the east of West Ashton crossroads, intersecting the West Ashton Road with an at-grade junction, and passing to the north-west of West Ashton village, then connecting with the A350 to the east of Yarnbrook.

4. **Combined Yarnbrook Northern Relief Road and West Ashton Relief Road**
As Options 2 and 3 combined - a single carriageway road departing from the existing A350 alignment to the east of West Ashton crossroads, intersecting the West Ashton Road with an at-grade junction, and passing to the north-west of West Ashton village, then connecting with the new roundabout (as part of the Northern Link arrangement) on the A350 to the east of Yarnbrook. A350 through traffic would need to continue to use the existing Yarnbrook roundabout. Access to the Ashton Park site to the north could be provided via an intermediate junction on the Northern Link.

Variant 4a– Yarnbrook and West Ashton Relief Road
Single carriageway road departing from the existing A350 alignment to the east of West Ashton crossroads, intersecting the West Ashton Road with an at-grade junction and passing to the north-west of West Ashton village. Instead of connecting with the Northern Link arrangement, the alignment would continue almost parallel to the existing A350, to the north of Yarnbrook village, connecting with the existing A363 to the west. A further intermediate junction would be provided with a link to the A350 between Yarnbrook and West Ashton. A350 through traffic would need to continue to use the existing Yarnbrook roundabout. Access to the Ashton Park site to the north could be provided via the intermediate junction.

5. **Yarnbrook Eastern Bypass**
This option would run from a new roundabout on the A350 east of Yarnbrook, through the northern fringe of Picket Wood at existing levels to rejoin the A350 at a new roundabout south of Yarnbrook. This alignment provides a direct and less intrusive route around Yarnbrook. However, the route runs through the northern fringe of the Picket Wood SSSI. English Nature has previously objected to any route through the SSSI. This option could be combined with Option 4 (or variants of) to provide additional relief to Yarnbrook roundabout from A350 through traffic in addition to relief of West Ashton.

6. **Yarnbrook "Spider"**
The 'Spider' option would effectively replace the existing mini roundabout at Yarnbrook with a new roundabout some 200 metres to the south, providing higher capacity. The new A350 alignment would depart from the existing A350 to the east of Yarnbrook and head in a south westerly direction to connect with the new roundabout to the south of Yarnbrook. It would require the acquisition of one or two residential properties on the east side of Westbury Road, and sever some twenty properties from easy access to the village facilities. This option could be combined with Option 4 (or variants of) to provide additional relief to Yarnbrook roundabout from A350 through traffic in addition to relief of West Ashton.

7. **Yarnbrook Northern Flyover**
This option would provide a route that deviates from the A350 alignment east of West Ashton crossroads, and passes under the C49 West Ashton Road at a new grade separated junction. It would descend into the valley to cross over the River Biss before running west. It would climb the embankment to cross over the railway, the A363 and B3097 Phillips Way on a high viaduct and/ or embankments before dropping again to follow the edge of the floodplain past Manor Farm. It would then swing south crossing the River Biss again and follow the west bank of the Bitham Brook to the Dursley roundabout. This option would require an improved B3097 and provision of a link to connect back to the A350 (from the West Wilts Trading Estate access on Hawkeridge Road).

8. **Enhanced TransWilts rail service**
   This option involves further improvements to the TransWilts rail corridor including increased service frequency and improvements to rail stations. The intention of this measure would be to encourage mode shift for medium distance (inter-urban) trips that would otherwise be made on the A350 by private car.

The A350 Westbury Bypass Route Study Report broadly identified a Yarnbrook / West Ashton northern relief road (i.e. Options 2 and 3 combined) (or a Yarnbrook 'Spider' type alignment (i.e. Option 7)) as the preferred solutions. The Trowbridge Transport Strategy work identified a Yarnbrook northern relief road (i.e. Option 2) and a West Ashton northern relief road (i.e. Option 3) as components of the emerging preferred strategy; Option 4 combines Options 2 and 3.

Relevant information from the consideration of options in these sources has contributed to an initial sift of the nine identified options.

3.2 Step 6: Initial Sifting

This stage of the option assessment process involves an initial option sifting exercise. The aim of this exercise is to identify any 'show-stoppers' which would preclude further consideration of an option. The available information on each of the options identified in Step 5 has been used to identify potential 'show-stoppers', based around key criteria under the DfT Transport Business Case model. Options 4 and 4a have been treated as one scheme for the purposes of Initial Sifting due to their broad similarities.

Table 8 presents the outcomes of the initial option sifting, with an 'X' representing an identified 'show-stopper'. A brief explanation of options with identified 'show-stoppers' follows the table.

The initial option sifting exercise has identified at least one 'show-stopper' associated with the following options:

- **Option 1: On-line capacity / alignment improvements –** Previous consideration of this option indicated that online improvements would not be practical in terms of delivery because of the close proximity of frontage property which would result in demolition and problems with residential and farm access. It is also likely to raise significant public acceptability issues as a result.

- **Option 5: Yarnbrook Eastern Bypass -** The route runs through the northern fringe of the Picket Wood SSSI. English Nature has previously objected to any route through the SSSI and alternative alignments exist.

- **Option 6 – Yarnbrook 'Spider' –** Whilst this option had passed the sifting stage in the previous version of this report, this option would have a large adverse social impact – previous consideration of the Yarnbrook 'Spider' identified that it would require the acquisition of one or two residential properties on the east side of Westbury Road, and sever some twenty properties from easy access to the village facilities. It would therefore have a considerable impact on the Yarnbrook community. Strong opposition to this option was identified at the time. These options are likely to have higher risk associated with delivery.

- **Option 7: Yarnbrook Northern Flyover -** Previous consideration of this option indicated that impacts on the floodplains would be significant and extensive, with two river crossings required. The Environment Agency would require a strategic flood attenuation scheme with this option. There would be significant visual intrusion from the need for a high viaduct. This option is also expensive.

Table 8: Initial Option Sifting – Show-Stoppers

	Strategic Case			Economic Case			Management Case		Financial Case	
Option	**Against some key objectives**	**Against local policy**	**Against national policy**	**Certainty of very poor value for money**	**Large adverse environmental impact**	**Large adverse social impact**	**Major deliverability risks (practicality / timescale)**	**Public Acceptability**	**Unaffordable (capital)**	**Unaffordable (revenue)**
On-line capacity / alignment improvements							X			
Yarnbrook Northern Relief Road										
West Ashton Relief Road										
Combined Yarnbrook Northern Relief Road and West Ashton Relief Road										
Yarnbrook Eastern Bypass					X		X			
Yarnbrook 'Spider'					X		X	X		
Yarnbrook Northern Flyover					X				X	
TransWilts rail service enhancement										

4 Detailed Option Assessment (Steps 7-8)

4.1 Step 7: Development and Assessment of Potential Options

Following the initial options sifting, the following potential options have been identified for further assessment:

- Option 2 – Yarnbrook Northern Relief Road
- Option 3 – West Ashton Relief Road
- Option 4 – Combined Yarnbrook Northern Relief Road and West Ashton Relief Road*
- Option 8 – TransWilts service enhancements

*Note that Options 4 and 4a have been treated as one scheme for the purposes of Detailed Option Assessment scoring due to their broad similarities.

These options have been assessed and scored using the Swindon & Wiltshire LTB's major scheme prioritisation methodology.

Swindon and Wiltshire LTB's scoring method was designed originally to help prioritise different major schemes in a constrained funding environment. However, the scoring method can be adapted for different purposes, including comparing options for a scheme in a specific location. Some minor adjustments have been made to the original scoring method as follows:

- The 'scale of problem' adjustment (in the Strategic Case) is identical for all scheme options, as the options presented are designed to deal with the same set of transport problems on the A350 to the south east of Trowbridge;
- The 'number of jobs' score (in the Economic Case) is identical for all scheme options and, similarly, the 'number of houses' scores. These scores relate directly to the number of jobs and houses anticipated to be provided on allocated development sites within the vicinity of the scheme. The 'certainty of unlocking' adjustments for employment and housing sites are therefore used to identify the differences between options.
- The 'amount of potential third party funding' (in the Financial Case) is identical for all options, with the funding 'risk assessment' score used to reflect the fact that funding may be easier to secure for some options compared to others.

The scoring method allows scores to be calculated and weightings applied for each of the five cases from the government's five cases model. The same weightings applied in the LTB major scheme prioritisation have been used for this option assessment process, to reflect the different levels of importance that have already been attributed by the LTB to the five cases. The weightings applied (totalling 100%) are: 30% for the Strategic Case; 30% for the Economic Case; 10% for the Commercial Case; 10% for the Financial Case; and 20% for the Management Case.

The total score for each option is a maximum of 60 and a minimum of zero. It should be noted that the value for money or anticipated performance / effectiveness of an option cannot be inferred directly from the absolute score; a low score does not necessarily mean that the scheme performs poorly. The purpose of the total score is to enable comparison of the relative, rather than absolute, performance of the options where the most favourable option is the one which scores the highest.

Table 9 presents the results of the option scoring assessment.

Table 9: Detailed Option Scoring Assessment

Option	Weighted Score *(max. = 60)*	Unweighted scores by case *(maximum = 60)*				
		Strategic	Economic	Commercial	Management	Financial
Option 2 - Yarnbrook Northern Relief Road	**44.3**	50.0	36.3	60.0	30.0	54.0
Option 3 - West Ashton Relief Road	**43.4**	50.0	33.8	60.0	30.0	54.0
Option 4 - Combined Yarnbrook Northern Relief Road and West Ashton Relief Road	**45.3**	53.3	36.3	60.0	30.0	54.0
Option 8 - TransWilts service enhancements	**34.5**	36.7	33.8	30.0	40.0	30.0

The results of the options scoring assessment indicate that the best performing option is Option 4, with a total weighted score of 45.3. The following sections provide a summary of the key rationale behind the scoring, under each of the five cases.

Strategic Case

The assessment for the Strategic Case considers strategic fit with local / national policies and scheme objectives and the likelihood of achieving the intended outcomes.

Options 2, 3, and 4 all score relatively well in terms of strategic fit with local / national policies and alignment with the scheme objectives. These options contribute positively to national policy objectives for supporting the economy and local priorities for delivering housing and employment opportunities identified in the emerging Core Strategy, and protecting the strategic function of the A350. The overall strategic fit for these options is moderately beneficial. In terms of carbon reduction the impact is likely to be neutral at best, and could result in slight increases.

Option 8 scores less well for the Strategic Case overall based on a poorer fit with the scheme objectives. It is also less likely to deliver the required outcomes and achieve the necessary relief to the Yarnbrook and West Ashton junctions as it relies upon modal shift to reduce traffic demand as opposed to providing a direct intervention.

Economic Case

The assessment for the Economic Case considers economic impacts (in terms of unlocking jobs and housing), environmental impacts, social impacts and overall value for money.

Options 2 and 4 perform particularly well in terms of the likelihood in unlocking jobs and housing. This is associated with better access to the Ashton Park urban extension site from the north along the A363, as well as better access from the A350 corridor, but also in terms of supporting the wider A350 growth corridor). The Trowbridge Transport Strategy identified a northern relief road alignment as being necessary to connect the Ashton Park site to the strategic road network and in order to mitigate the impacts of the additional traffic.

The overall impact on the environment takes into account impacts on noise, air quality, greenhouse gases, landscape, townscape, heritage of historic resources, biodiversity and water environment. An overall moderate adverse environmental impact is expected with all options, except Option 8.

Option 8 is assessed as having slight environmental and social benefits, but less likely to unlock jobs and housing.

Commercial Case
Procurement challenges are assessed as low risk for the majority of the options, with a single delivery agent involved. For Option 8, potential rail service enhancements are likely to pose a more significant challenge and consequently have greater risk attached.

Management / Delivery Case
Assessment against the Management / Delivery Case considers the engineering complexity and level of delivery risk, public and stakeholder acceptability and scheme development. In terms of engineering complexity, ground conditions in the area are generally challenging and would need to be addressed through the design process - this applies to Options 2, 3 and 4.

Financial Case
Most of the options produce similar scores in terms of assessment against the financial case. Option 8 scores less well based on lower certainty of third party funding; further improvements to the TransWilts rail corridor could require initial and ongoing revenue support if not part of a rail franchise.

4.2 Step 8: Option Assessment Report
Step 8 is the formal report summarising the work undertaken for Steps 1 to 7, as set out in TAG Unit 2.1.2d. This OAR therefore represents Step 8 of the option development stage.

5 Confirmation of Option for Outline Business Case

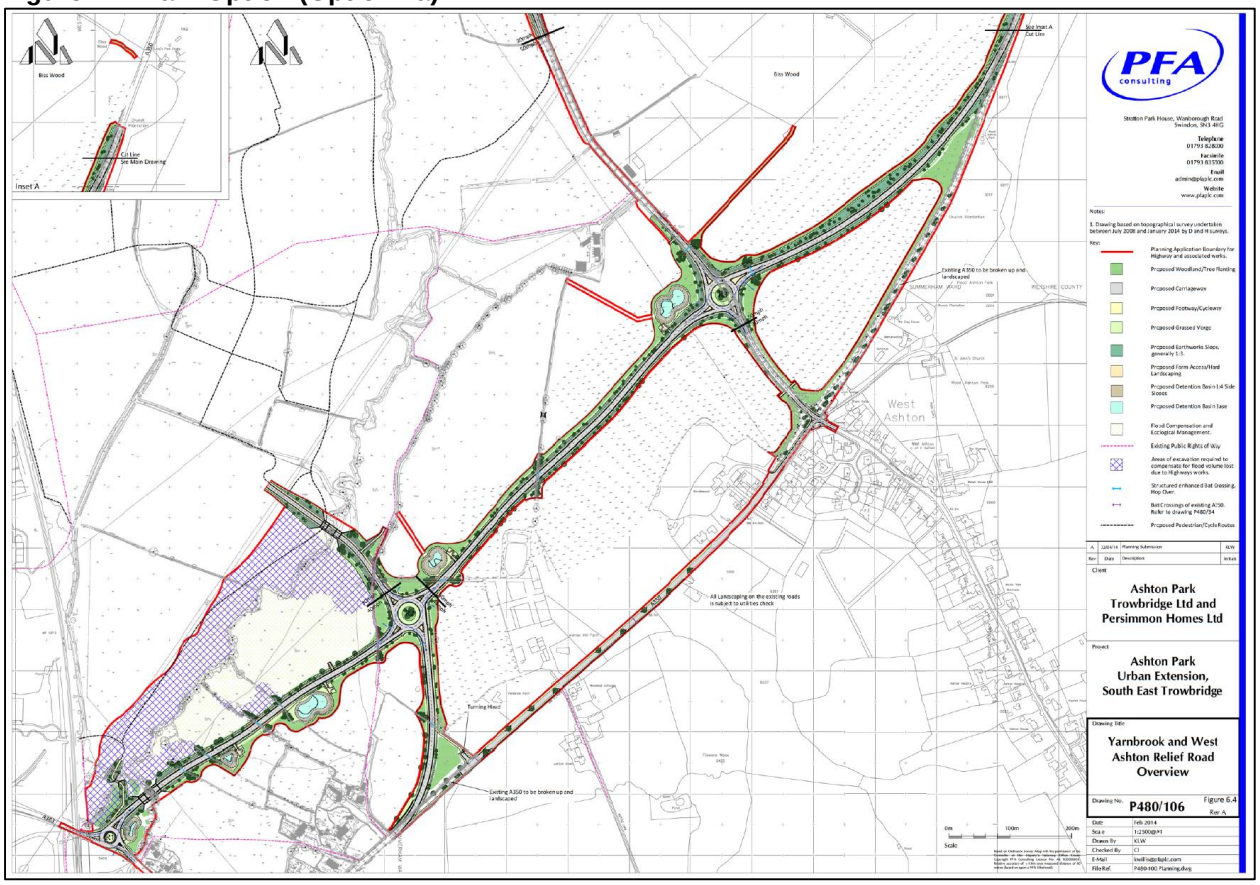
The results of the options scoring assessment indicate that the best performing option is Option 4. There are two variants of Option 4 – Option 4a is based on the scheme being progressed as one scheme, as opposed to two separate elements. This has been developed as part of a shared approach between Wiltshire Council and the developers, and takes into account more detailed issues in this highly constrained corridor:

Main Option (Option 4a): Single carriageway road passing to the north-west of West Ashton village and to the north of Yarnbrook village, connecting with the existing A350 alignment to the east and the A363 to the west. There would be an at-grade junction with West Ashton Road and a further intermediate junction and link to tie-in with the A350 between Yarnbrook and West Ashton.

The Main Option is shown in Figure 12, taking into account the scheme development work undertaken by the developers' consultant to refine the alignment.

The current alignment of the scheme (see Figure 12) has evolved to reflect the developers' land control and identification of constraints by the developers' team of consultants, through surveys and assessment work carried out to inform the Environmental Statement for the Ashton Park planning application. Overall the constraints are extensive and give rise to a highly constrained corridor. For example, the design incorporates flood compensatory earthworks to retain flood storage lost where the road crosses the flood plain. The developers' consultants have also adjusted the alignment based on the results of bat surveys and discussions with Natural England; designed to mitigate the impact on bat flight paths, including the introduction of bat hop-overs and planting.

Figure 12: Main Option (Option 4a)

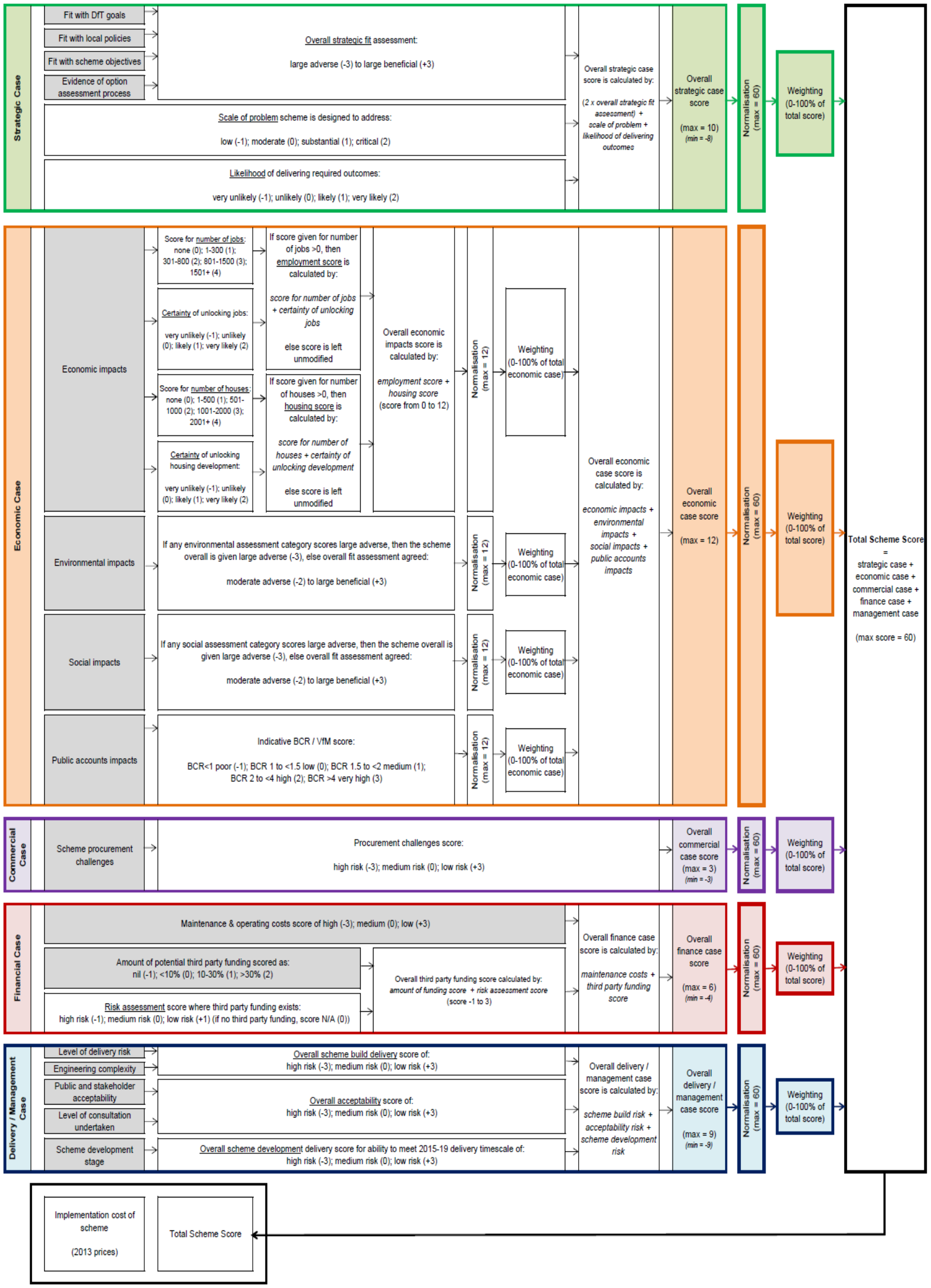


The scheme option to be included for appraisal in the OBC is the main option, with no low cost alternative.

This is the same option which is being promoted by the developer of the Ashton Park development, which will be submitted to Wiltshire Council as part of the Outline Planning Application for the urban extension. Refinement to the scheme's alignment has been undertaken by the developers' consultant, taking into account environmental constraints identified whilst developing the Environmental Statement for the Ashton Park development.

Whilst Option 4 is an alternative option (which combines Options 2 and 3 as separate schemes), it has been agreed between Wiltshire Council and the developers that the Yarnbrook and West Ashton Relief Road will be included in the Ashton Park planning application on the basis of the 'shared approach'. Option 4 is considered to be inappropriate when scheme is being progressed as one scheme jointly between Wiltshire Council and the developers, and provides a complete alternative to this current section of the A350. Furthermore, the shared approach brings efficiencies, for example joint working and in scheme delivery. For example, the developers' consultants have been progressing the scheme design and preparing an Environmental Statement ready for submitting a planning application. Building the Yarnbrook and West Ashton Relief Road as one scheme negates the need for any interim junctions to address one section being built sooner, and the other being built at a later date.

Appendix A: Option Assessment Scoring Flow Diagram


Strategic Case
Fit with DfT goals
Fit with local policies
Fit with scheme objectives
Evidence of option assessment process
Overall strategic fit assessment:
large adverse (-3) to large beneficial (+3)
Scale of problem scheme is designed to address:
low (-1); moderate (0); substantial (1); critical (2)
Likelihood of delivering required outcomes:
very unlikely (-1); unlikely (0); likely (1); very likely (2)
Overall strategic case score is calculated by:
(2 x overall strategic fit assessment) + scale of problem + likelihood of delivering outcomes
Overall strategic case score
(max = 10)
(min = -8)
Normalisation (max = 60)
Weighting (0-100% of total score)
Economic Case
Economic impacts
Score for number of jobs: none (0); 1-300 (1); 301-800 (2); 801-1500 (3); 1501+ (4)
Certainty of unlocking jobs:
very unlikely (-1); unlikely (0); likely (1); very likely (2)
If score given for number of jobs >0, then employment score is calculated by:
score for number of jobs + certainty of unlocking jobs
else score is left unmodified
Score for number of houses: none (0); 1-500 (1); 501-1000 (2); 1001-2000 (3); 2001+ (4)
Certainty of unlocking housing development:
very unlikely (-1); unlikely (0); likely (1); very likely (2)
If score given for number of houses >0, then housing score is calculated by:
score for number of houses + certainty of unlocking development
else score is left unmodified
Overall economic impacts score is calculated by:
employment score + housing score
(score from 0 to 12)
Normalisation (max = 12)
Weighting (0-100% of total economic case)
Environmental impacts
If any environmental assessment category scores large adverse, then the scheme overall is given large adverse (-3), else overall fit assessment agreed:
moderate adverse (-2) to large beneficial (+3)
Social impacts
If any social assessment category scores large adverse, then the scheme overall is given large adverse (-3), else overall fit assessment agreed:
moderate adverse (-2) to large beneficial (+3)
Public accounts impacts
Indicative BCR / VfM score:
BCR<1 poor (-1); BCR 1 to <1.5 low (0); BCR 1.5 to <2 medium (1); BCR 2 to <4 high (2); BCR >4 very high (3)
Overall economic case score is calculated by:
economic impacts + environmental impacts + social impacts + public accounts impacts
Overall economic case score
(max = 12)
Normalisation (max = 60)
Weighting (0-100% of total score)
Total Scheme Score = strategic case + economic case + commercial case + finance case + management case
(max score = 60)
Commercial Case
Scheme procurement challenges
Procurement challenges score:
high risk (-3); medium risk (0); low risk (+3)
Overall commercial case score
(max = 3)
(min = -3)
Normalisation (max = 60)
Weighting (0-100% of total score)
Financial Case
Maintenance & operating costs score of high (-3); medium (0); low (+3)
Amount of potential third party funding scored as: nil (-1); <10% (0); 10-30% (1); >30% (2)
Risk assessment score where third party funding exists: high risk (-1); medium risk (0); low risk (+1) (if no third party funding, score N/A (0))
Overall third party funding score calculated by: amount of funding score + risk assessment score
(score -1 to 3)
Overall finance case score is calculated by:
maintenance costs + third party funding score
Overall finance case score
(max = 6)
(min = -4)
Normalisation (max = 60)
Weighting (0-100% of total score)
Delivery / Management Case
Level of delivery risk
Engineering complexity
Public and stakeholder acceptability
Level of consultation undertaken
Scheme development stage
Overall scheme build delivery score of: high risk (-3); medium risk (0); low risk (+3)
Overall acceptability score of: high risk (-3); medium risk (0); low risk (+3)
Overall scheme development delivery score for ability to meet 2015-19 delivery timescale of: high risk (-3); medium risk (0); low risk (+3)
Overall delivery / management case score is calculated by:
scheme build risk + acceptability risk + scheme development risk
Overall delivery / management case score
(max = 9)
(min = -9)
Normalisation (max = 60)
Weighting (0-100% of total score)
Implementation cost of scheme
(2013 prices)
Total Scheme Score

Appendix C. Appraisal Specification Report

Wiltshire Highways Consultancy Contract

Major Transport Schemes Appraisal Specification Report

Yarnbrook and West Ashton Relief Road

[DRAFT]

Date: 20 August 2014 **version: 3.1**

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3.1	19 August 2014	Updated for ITA approval	TP

Approvals

Name	Signature	Title	Date of Issue	Version
Jonathan Foster-Clark		Senior Managing Consultant	20/8/14	3.1

Document References

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Table of Contents

1 Introduction

1.1 Background

On 8th July 2013 the Swindon & Wiltshire Local Transport Body (SWLTB) approved a provisional prioritised and contingency scheme programme for major transport schemes in the 2015-19 funding period[1], with a prioritised scheme list submitted to the Department for Transport (DfT) in advance of the 31st July 2013 deadline. The SWLTB also approved the A350 Yarnbrook and West Ashton Relief Road as a 'contingency scheme' based on an assessment broadly equivalent to a Strategic Outline Business Case. Scheme promoters were then instructed to produce Option Assessment Reports (OARs) and Appraisal Specification Reports (ASR) for each 'prioritised' and 'contingency' scheme before approval could be given by the SWLTB to prepare Outline Business Cases[2].

To ensure that all prioritised and contingency schemes are in a position to gain approval to proceed towards the Outline Business Case (OBC) stage, both Wiltshire Council and Swindon Borough Council (as scheme promoters) prepared initial Appraisal Summary Reports (ASRs) and Appraisal Specification Summary Tables (ASSTs) for consideration by the SWLTB in October 2013. However, further development of the ASRs and ASSTs was required beyond this date as views of statutory environmental bodies and other stakeholders needed to be sought on the proposed appraisal methodology before work on the OBCs could commence.

The purpose of an ASR / ASST is to '*clarify the methodology and scope of further appraisal, and agree this with the Sponsoring Organisation [SWLTB], prior to undertaking the work'*[3]. In other words, setting out *what* will be assessed in the OBCs for each major scheme and *how* each element will be assessed. This will ensure that the SWLTB has sufficient information on which to give approval to proceed to the OBC stage and that it has confidence that further appraisal will be sufficiently robust to inform decisions about whether or not to proceed with the scheme.

The Yarnbrook and West Ashton Relief Road will form part of the South East Trowbridge development, known as Ashton Park. It has been agreed between Wiltshire Council and the developers that the Yarnbrook and West Ashton Relief Road be included in the Ashton Park planning application on the basis of a 'shared approach'. Ashton Park Trowbridge Ltd & Persimmon Homes Ltd are currently preparing a planning application in support of the Ashton Park development; the application will be in outline with all matters reserved for subsequent approval, except vehicular access to the site, including the Yarnbrook and West Ashton Relief Road.

1.2 Document Purpose

This Appraisal Specification Report (ASR) presents a proposed appraisal approach for the A350 Yarnbrook and West Ashton Relief Road, with an ASST in **Annex A**.

[1] Swindon and Wiltshire Local Transport Body – Minutes of the meeting held on Monday, 8 July 2013. Section 6, resolution 1.
[2] Option Assessment Reports encourage scheme promoters to articulate clearly the key transport problems, transport needs, objectives and options for a particular scheme. The Appraisal Specification Report clarifies the methodology and scope of further scheme appraisal, setting out what will be assessed in the Outline Business Case and how each element will be assessed.
[3] Transport Appraisal Process: Option Development (Stage 1)
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/275728/webtag-tag-transport-appraisal-process.pdf#nameddest=chptr03

The ASR has been developed with reference to relevant guidance provided in WebTAG guidance on the Transport Appraisal Process, in particular Step 9 (Clarify Modelling and Appraisal Methodology). It explains how the appraisal will be undertaken and details the:

- Proposed approach to modelling and forecasting;
- Proposed methodology for assessing each of the sub-impacts presented within the standard transport scheme Appraisal Summary Table; and
- Proposed level of design or specification which will inform the cost estimation, and how improved cost information will be obtained.

This report also identifies the key components (contents) of the OBC, under each of the five cases of the Department for Transport's Transport Business Case model[4]. The OBC will be structured around the five cases: strategic; economic; commercial; financial; and management. This is in line with the approach set out by the SWLTB in Part 3 of the SWLTB Assurance Framework.

1.3 Document Structure

The remainder of this document is structured around the five cases:

- Section 2 presents the current position on the **Strategic Case** for the A350 Yarnbrook and West Ashton Relief Road, including the 'rationale for intervention' and actions that will be undertaken for further developing the Strategic Case;
- Section 3 sets out **Economic Case** requirements, containing:
  - Overall approach to modelling and appraisal for the scheme;
  - Proposed methodology for assessing each of the sub-impacts of the Appraisal Summary Table (with detail contained in the ASST in **Annex A**); and
  - Proposed level of scheme specification, design and costing.
- Section 4 sets out key aspects of developing the **Commercial Case**, focusing on procurement option assessment;
- Section 5 covers developing the **Financial Case**; and
- Section 6 focuses on the timescales and phasing aspects of developing the **Management Case.**

1.4 Document Status

This ASR is for review and approval by the LTB's Independent Technical Advisor (ITA). It will be updated if any clarifications are required.

[4] 'The Transport Business Cases' (Department for Transport, January 2013)

2 Strategic Case

2.1 Overview

The Strategic Case determines the need for investment. At the OBC stage it will clearly demonstrate the case for change – that is, a clear rationale for making the investment. The Strategic Case will also demonstrate 'strategic fit', which is how an investment will further the aims and objectives of Wiltshire Council, the Swindon and Wiltshire Local Enterprise Partnership (SWLEP) and the Department for Transport.

It is particularly important to make the case clearly and succinctly as it will be one of the core assessment criteria for future transport scheme funding as part of future rounds of the Growth Deal process.

The Strategic Case will contain the following elements[5]:

1. A description of the key components of the scheme and how it fits with the aims and objectives of Wiltshire Council, the developer, the SWLTB / SWLEP and the Department for Transport. The local growth agenda will be central to this part of the Strategic Case;
2. Identification of the problem(s) the scheme will be addressing – including evidence of the extent of the problem(s), specific barriers / challenges, and how the scheme will overcome them (including the scale of impact);
3. Details (and supporting evidence) of the impacts of not progressing the scheme;
4. A list of specific, measurable, achievable, realistic, time-bound (SMART) objectives for the scheme to address the problem(s) identified;
5. A description of the expected outcomes - How will it be possible to know when the objectives have been met, and what will 'success' actually mean?;
6. Clarification of what the project is expected to deliver on the ground, including what is in-scope and what is out of scope;
7. Identification of any high-level constraints affecting the scheme's ability to solve the problem(s) identified;
8. Identification of any factors (interdependencies) upon which the scheme depends to be successful;
9. Details of the main stakeholder groups and their contribution to the project - any potential conflicts between different stakeholder groups and their demands will need to be identified; and
10. A description of the scheme options being considered, including the reasons for any options being discounted.

It is important that the Strategic Case shapes the appraisal specification (i.e. that the appraisal methodology reflects the particular scheme characteristics, its purpose and the anticipated benefits). Therefore, based upon a review of the latest published information, and liaison with the Wiltshire Council lead officer, this section provides a brief description of the A350 Yarnbrook and West Ashton scheme and the 'rationale for intervention', including specific scheme

[5] http://assets.dft.gov.uk/publications/transport-business-case/strategic-case-guidance.pdf

objectives. It also identifies any need for further development in the logic supporting the Strategic Case.

2.2 Rationale for Intervention

The A350 corridor, which runs to the east of Trowbridge, suffers from peak hour congestion and unreliable journey times. It is a strategically important route and provides connections to other towns to the north and south. The traffic issues are long standing and well documented and have been exacerbated by locally significant traffic growth in the last ten years. In particular, queues occur at the West Ashton traffic signals and at the Yarnbrook Roundabout. Both of these junctions currently operate well over capacity during peak periods. The traffic congestion also results in localised environmental impacts which affect residents within the vicinity of the Yarnbrook and West Ashton junctions. There is also an historic road safety problem, particularly at West Ashton.

Traffic growth on this section of the A350 is forecast to increase with planned development (in addition to expected background traffic growth). The emerging Core Strategy made provision for 178ha of employment land and at least 37,000 homes to 2026. The Core Strategy Examination in Public (EiP) Inspector has since requested that the housing allocations will be increased to 42,000 over the plan period[6] - Wiltshire Council is currently in the process of revising the Core Strategy[7].

Trowbridge is identified as one of three Principal Settlements within the Core Strategy (Core Policy 1) and is therefore a primary focus for employment and housing growth. The Ashton Park Urban Extension strategic site lies to the north-west of the section of the A350 between Yarnbrook and West Ashton. This mixed use development site is expected to deliver in the region of 1,500 jobs and 2,600 dwellings, representing a significant proportion of the total housing and jobs identified for the Trowbridge Community Area. There are key challenges surrounding access to the site (particularly the employment area) and the impacts on the surrounding highway network (including the A350).

There are constraints to any significant online improvements on this section of the A350, particularly related to property frontage. There are also environmental constraints within the vicinity of the A350. Planned public transport improvements (such as enhancements to services on the Trans Wilts rail corridor) are not expected, on their own, to provide sufficient relief to the A350 corridor.

The emerging Trowbridge Transport Strategy[8] confirms the need for off-line improvements to the A350 route as part of a comprehensive multi-modal transport strategy. Without investment in suitable intervention, there would be an increasingly detrimental impact on the safe, efficient and reliable movement of people and goods on the strategic A350 north-south route in Wiltshire. Furthermore, opportunities for providing adequate access to the Ashton Park Urban Extension would be limited and present a constraint to delivering new housing and jobs in Trowbridge

[6] Examination of Wiltshire Core Strategy Development Plan Document - Wiltshire Council response to 10th Procedural Letter http://www.wiltshire.gov.uk/wcs-exam76-wc-response-to-inspectors-10th-procedural-letter.pdf
[7] Examination of Wiltshire Core Strategy Development Plan Document http://www.wiltshire.gov.uk/planninganddevelopment/planningpolicy/wiltshirecorestrategy/wiltshirecorestrategyexamination.htm
[8] Trowbridge Transport Strategy Development – Report on Emerging Strategy (Mott MacDonald, Oct 2012)

In addition, improved access to the A350 Corridor will assist in unlocking new jobs within this Growth Zone of the Swindon & Wilshire Strategic Economic Plan.

2.3 Scheme Objectives

The objectives of the A350 Yarnbrook and West Ashton Relief Road are to:

(i) Reduce traffic queues and delays on the A350 corridor at West Ashton and approaching Yarnbrook Roundabout;

(ii) Improve journey time reliability on the A350 corridor;

(iii) Facilitate housing and employment growth in the Ashton Park (Trowbridge) Urban Extension; and

(iv) Reduce the number of road accidents in the West Ashton area.

2.4 Scheme Options for Appraisal

There is a long history of option development and assessment related to improvements to the A350 at Yarnbrook and West Ashton, including those options previously considered in association with a Westbury Bypass scheme. Future transport needs in the Trowbridge area have most recently been considered in the development of the Trowbridge Transport Strategy. Taking into account planned development and background traffic growth, the study considered a range of options, including different transport modes and smarter choices type measures and sought the views of stakeholders.

The emerging strategy identified A350 Yarnbrook and West Ashton Relief Roads as necessary components of a multi-modal transport strategy. An option for an on-line improvement at West Ashton was considered, but not included within the emerging strategy. The relative merits and practicalities of delivering separate Yarnbrook / West Ashton elements against a single relief road scheme have been subject to further consideration.

Based on current knowledge and understanding of the options under consideration, which would meet the scheme objectives, the following scheme option will be appraised in the OBC:

Main Option: Single carriageway road passing to the north-west of West Ashton village and to the north of Yarnbrook village, connecting with the existing A350 alignment to the east and the A363 to the west. There would be an at-grade junction with West Ashton Road and a further intermediate junction and link to tie-in with the A350 between Yarnbrook and West Ashton.

The scheme option to be included for appraisal in the OBC is the main option, with no low cost alternative.

This is the same option which is being promoted by the developer of the Ashton Park development, which will be submitted to Wiltshire Council as part of the Outline Planning Application for the urban extension. Refinement to the scheme's alignment has been undertaken by the developer's consultant, taking into account environmental constraints identified whilst developing the Environmental Statement for the Ashton Park development.

2.5 Further Development Required

Notwithstanding the required key elements of any transport scheme Strategic Case (as identified in section 2.1), the following aspects will be the subject of further work to ensure that a robust Strategic Case is presented within the OBC:

- Clarifying the interdependencies with the Ashton Park Urban Extension;
- Providing further evidence of the specific problems, including existing and forecast traffic conditions (informed by modelling work);
- Providing further evidence and understanding of the extent of relief for traffic using the A350 (including understanding of the relative benefits for different movements, e.g. north-south on the A350, east-west via Southwick / A363 / A350); and
- Clarifying the relative benefits to local and longer distance traffic.

3 Economic Case

3.1 Overview

The Economic Case of an OBC assesses options to identify their key impacts and presents the resulting value for money, i.e. the extent to which the scheme's benefits outweigh its costs, whether monetised or not. The economic, environmental, social, public accounts and distributional impacts of a proposal are all appraised, in line with the DfT's modelling and appraisal guidance (WebTAG), under a range of sub-impact headings. These are presented in an Appraisal Summary Table (AST), providing a brief and consistent summary of expected qualitative, quantitative and monetised impacts. The impacts will need to be assessed in different levels of detail, depending on the type of scheme and the anticipated level of impact.

The Economic Case section of the OBC will contain the following elements:

1. A description of how the value for money of the scheme has been established and the scenarios that have been modelled;
2. Confirmation of the scheme options that have been appraised;
3. Details of any key assumptions made (e.g. regarding other nearby schemes or development that will be assumed to be delivered);
4. Details of how different variables affect the value for money assessment, including the findings of any sensitivity tests;
5. Commentary on the scheme's expected economic, environmental, social and public accounts impact;
6. A completed WebTAG Appraisal Summary Table;
7. A simple description of how the scheme represents 'value for money' and the Benefit-Cost Ratio (BCR); and
8. A Value for Money Statement, in line with the Value for Money guidance.

An important output from the Economic Case is the Value for Money Statement. This is based on summing the monetised impacts to establish an initial BCR, which implies an initial value for money band (poor, low, medium, high, or very high). This band is then adjusted to account for impacts where qualitative or quantitative, but not monetised, information is available. A Value for Money Statement is also required by Part 3 of the SWLTB Assurance Framework.

3.2 Appraisal Specification Summary Tables

An Appraisal Specification Summary Table (ASST) has been developed for the scheme and is contained in **Annex A.** This identifies which of the AST sub-impacts are to be assessed and proposes a methodology to be used in undertaking the appraisal work for the OBC, including the rationale for the proposed approach. Summary information on the proposed appraisal approach is provided later in this section, with the detail contained within the ASST in **Annex A**.

The ASST presents a proportionate approach to appraisal, as recommended in WebTAG guidance on the Transport Appraisal Process. The proposed methodology has therefore considered:

- The scale and severity of the impacts identified in previous assessment work[9];
- The level of uncertainty around estimated impacts; and
- The focus of the particular scheme objectives.

The appraisal methodology has been focussed on the most significant impacts, those where there is uncertainty, and those which could have the greatest influence on the BCR. Where impacts have been previously assessed as 'neutral' or 'slight', *and* there is deemed to be sufficiently strong evidence that the impacts would remain the same even if further appraisal were undertaken, then no further requirement for appraisal has been recommended. The scope for proportionality relates to the proposed approach to modelling and in the assessment of environmental and social impacts.

The ASST also identifies the types of output to be provided for the AST (e.g. quantified, qualitative, monetised or distributional).

The WebTAG guidance on the Transport Appraisal Process requires that the Statutory Environmental Bodies should have the opportunity to inform the proposed appraisal methodology that has been set out in the ASST. An Environmental Statement[10] for the Ashton Park planning application has been produced by the developers' environmental consultant Pegasus, which is due for submission to Wiltshire Council as planning authority. This will be used as the source of information for the OBC environmental appraisal. Since the developers' consultant should have already been in contact with the Statutory Environmental Bodies as part of the planning process, it is suggested that Statutory Environmental Bodies consultation as part of the OBC process is not required. Contact with the Statutory Environmental Bodies will be confirmed with Pegasus – PFA has already indicated contact has been made with Natural England.

Furthermore, a due diligence review of the designs provided by PFA will be undertaken, and any associated environmental queries will be relayed to PFA/Pegasus. This review will be undertaken from the perspective of Wiltshire Council adopting the highway, and Atkins and Wiltshire Council potentially taking the scheme on at a later date.

Distributional Impacts have been informed by a Distributional Impacts Step 1 screening in **Annex C**.

3.3 Summary of Proposed Appraisal Approach

A summary of the proposed appraisal methodology for each scheme is presented in this section. This includes the key principles guiding the proposed approach and the proportionality applied. The ASST in **Annex A** provides the detail.

[9] Including the 'Wiltshire Major Scheme Assessment Tables' (July 2013)
[10] Note that a copy of the Environmental Statement is required to inform OBC development.

Developing modelling tools and undertaking new data collection can have significant time and cost implications. In defining a proportionate approach to appraisal, the suitability of making use of existing tools has been considered in the first instance.

A proportionate appraisal across the economic, environmental and social sub-impacts will be undertaken for the OBC. Although these assessments will not necessarily satisfy statutory planning requirements, the OBC will allow for all major impacts to be identified and described, providing the basis for sound decision-making on progressing the scheme.

Scheme economic appraisal will be undertaken using the existing Trowbridge SATURN highway model, with a targeted validation checks on the model. The targeted validation checks have required additional traffic cordon counts around the Yarnbrook and West Ashton area; traffic counts were undertaken in July 2014 in preparation for this. Although the scheme is on the periphery of the current modelled area, the geographic scope of the SATURN model will not need to be extended as there are no major developments to the south or east of the modelled area. There is also little real route choice to or from the south of Yarnbrook except for links currently coded in the model.

The transport impacts forecasting process will be the same as adopted for the Strategic Site (Ashton Park Urban Extension) modelling work, undertaken in 2011[11], with an additional opening year (2021) scenario created in addition to the 2026 forecast year which already exists. The following key principles will apply:

- 60-year economic appraisal period, for consistency with other transport scheme assessments across the UK;
- Proportionate approach has been developed with regard to TAG Unit A2-3 (transport appraisal in context of dependent development), see **Annex B**. Based on **Annex B**, two scenarios will be modelled for the 2021 and 2026 forecast years:
    - Do Minimum - without the housing development and without any form of transport scheme;
    - Do Something - with the housing development and with a transport scheme.
- Benefits will be monetised and annualised for all weekdays.

SATURN model outputs will be used to support the assessment of accident impacts, using traffic flow forecasts in combination with local accident data.

Note that the Scope of Work form stated that basic noise and air quality modelling would be undertaken based on OBC flows. However, this would also be duplicating work undertaken by the developer, and would extend the OBC programme by over a month. A more proportionate approach is proposed, whereby the noise and air quality chapters of the Environmental Statement will be reviewed. Assuming there are no issues, the Environmental Statement will be used to inform the noise appraisal of the OBC.

3.4 Scheme Design and Costing

The level of detail to which design is taken at the OBC stage has a direct impact on the scope and level of appraisal that is possible and the ability to develop robust quantified cost estimates. The level of design also has to be proportionate to the stage of appraisal, but sufficiently well

[11] Trowbridge Traffic Model – 2026 Model Forecasting Problems & Issues report (PFA Consulting, June 2011)

defined and specified to allow an appropriate level of assessment and to give confidence in the results of the appraisal.

Table 1 identifies the current status of the scheme design and associated cost estimate. It also sets out the proposed level to which the design and cost estimate will need to be taken at the OBC stage, and on what basis the designs and cost estimates will be produced.

Table 1: Scheme Design and Costing Specification

Current design and cost estimate status	Intended design status for OBC	Approach to design and costing for OBC
Preliminary design. High-level cost estimate based on metre-run rate and key risk additions.	Preliminary design with scale plans, showing horizontal alignment and land-take requirements. The OBC will be based on the design produced by PFA, as part of its imminent planning submission.	• Bill of Quantities will be produced to cover all elements of Manual of Contract Documents for Highways Works (MCDHW) Vol. 4. • An assessment of Statutory Undertaker diversions will be undertaken, since the presence of services can significantly increase scheme costs. If services are present, this can be reflected in the scheme cost, although at this stage high level allowances would need to be made. • Risk workshop to identify key risks, a Quantified Risk Assessment will be undertaken, to determine an expected cost value for risk. • Detailed estimate of site supervision, preparatory, and land purchase costs, including costs of statutory processes (public inquiry and planning approvals). • Bill of quantities for annual maintenance and operating liabilities. • Estimate of capital renewal costs over 60-year appraisal period. • Apply suitable Optimism Bias uplift and real price adjustments (for economic appraisal only).

4 Commercial Case

4.1 Overview

The Commercial Case of an OBC provides evidence on the commercial viability of a proposal and the procurement strategy that will be used to construct the scheme. It also presents evidence on risk allocation and transfer.

The Commercial Case will contain the following key elements:

1. A proposed procurement strategy, including details of how different options have been assessed to arrive at the preferred procurement approach(es);
2. An outline of the proposed payment mechanisms and pricing framework (e.g. linked to performance and availability);
3. Identification of the commercial risks (based on the wider risk assessment) and how different types of risk might be addressed and shared between the parties involved (including whether the risk transfer is supported by any incentives that prompt the intended outcomes);
4. Demonstration that the risk allocation is consistent with the cost estimate;
5. Details of the contract timescales; and
6. Details of the proposed contract management and implementation timescale.

4.2 Procurement Option Assessment

At this relatively early stage, Wiltshire Council and the developers are yet to agree which party will procure and deliver the scheme. This will need to be agreed in principle to inform the OBC. A key aspect of this task is to agree risk allocation in principle, namely, which party will be liable for cost overruns – for example, if the scheme is delayed (added inflation) or ground problems are identified once construction commences.

Once it is known which party will procure the scheme, different appropriate procurement options will be assessed at the OBC stage to support the rationale for selecting a preferred approach.

Procurement options will be scored on the following broad criteria:

- Consistency with legal requirements. In particular, considering the OJEU thresholds and the need to follow certain OJEU procurement routes;
- Ability to ensure timely and cost effective procurement;
- Ability to ensure that contract requirements are delivered; and
- Ability to obtain an acceptable balance between cost certainty and risk exposure.

If the developer is to procure the scheme, it is recommended that the developer provides significant input to this chapter, with input from Wiltshire Council legal/procurement on any requirements that may be placed on the developer.

5 Financial Case

5.1 Overview

The Financial Case provides evidence on the affordability of the proposal, how it is to be funded and any technical accounting issues. It includes the financial profile of the different options and the impact of the proposed investment on budgets and accounts.

The Financial Case will contain the following key elements:

1. The expected whole life costs of the scheme, including the base cost and risk allowance in out-turn prices drawn from industry forecasts (optimism bias will not be included for this element);
2. A cost profile showing year on year costs, and breakdown by cost type and parties on whom they fall;
3. Details of key financial risks (including any risk allowance quantification) and the risk management strategy;
4. Demonstration that sufficient funding is available to cover the identified costs in each year;
5. Details of any sources of third party / alternative funding contributions, including associated conditions and consideration of the financial risks / contingencies that would result should any particular stream fail to materialise; and
6. Consideration of the long-term financial sustainability of the scheme, including robust plans to ensure the affordability of any ongoing costs for operation, maintenance and major capital renewals.

5.2 Scheme Development Work

The high level cost estimates for the scheme as provided in the 'Major Scheme Assessment Tables' (July 2013) will be revised. More detailed scheme costs will be derived based on the more advanced design stage. Section 3.4 of this document covers the approach to design and costing for the scheme at the OBC stage. In general, scheme costs will incorporate construction costs, land purchase and associated legal costs, preparatory costs, supervision costs, maintenance / capital renewal costs and a risk allowance.

A key output of the Financial Case will be a proposed funding package for the scheme, setting out the year-on-year profile of funding required. This will include the funding source, including third party contributions. At this relatively early stage, Wiltshire Council and the developers are yet to agree which party will and deliver the scheme - this will need to be agreed in principle to enable the funding package to be drawn up. Respective contributions to the scheme will need to be agreed in principle, however it is understood this will not be agreed formally until the developer has certainty that the scheme will be funded.

6 Management Case

6.1 Overview

Clear and effective management arrangements are key to successful delivery of a major scheme. The Management Case ensures that the project is deliverable. It demonstrates that timescales and phasing are well established and realistic, that an appropriate governance structure is in place to oversee delivery, that risks have been identified and suitable management processes developed, and that there are robust plans for communications and stakeholder management. The Management Case also ensures that the benefits set out in the Economic Case are realised and will include measures to assess and evaluate this.

The Management Case will contain the following key elements:

1. A governance / organisational structure – joint governance arrangements identifying key roles and responsibilities (and their skills and experience), including a Senior Responsible Owner (SRO), defined through a suitable structure which includes arrangements for reporting and decision making. A Yarnbrook and West Ashton scheme Project Board to be set up, with representatives from Wiltshire Council, PFA and Atkins;
2. A project plan for the further development, roll-out and implementation of the scheme - key outputs and milestones and critical path will be identified in the form of a GANTT chart;
3. Details of the reporting, assurance and approval process (including key stage-gates in scheme development / delivery);
4. A risk management strategy, setting out how risks have been identified, their likely impact, appropriate mitigation, and how the risks will be managed (and by who);
5. A communications strategy – including identification of key stakeholders, their level of participation and the means of involving them. Joint communications to be agreed with developers;
6. A benefits realisation plan setting out the approach to ensuring that the stated benefits are delivered; and
7. A monitoring and evaluation plan - identifying suitable performance indicators to monitor progress against the identified scheme outcomes and the means of evaluating the overall effectiveness of the scheme.

6.2 Timescales and Phasing

At this relatively early stage, Wiltshire Council and the developers are yet to agree which party will fund and deliver the scheme – this needs to be agreed in principle as it affects many aspects of the management case. If Wiltshire Council delivers the scheme, agreement needs to be sought on at which point it will be handed over to Wiltshire Council. Nevertheless, if the funding is handed over to the developer to deliver the scheme, the LTB will require the necessary assurances about how the project will be managed by the developer, and Wiltshire Council's role.

The OBC will present realistic and robust timescales for scheme development and implementation. In determining programme timescales for the scheme, the following will be considered:

- Time required for further scheme design;

- Key approval stages (e.g. SWLTB approval to proceed to Full Business Case and granting of full approval, representing stage 3 of the scheme assessment and approval process as set out in the SWLTB Assurance Framework);
- Consultation with stakeholders and the public;
- Time required for obtaining planning permissions and statutory powers;
- Procurement process timescales; and
- Expected construction duration.

Particular attention will be given to the timescales for obtaining planning permission. PFA has advised that a public inquiry, which would significantly extend timescales, is unlikely. The timescales for, and interdependencies with, the Ashton Park Urban Extension will also be considered.

6.3 Risk Management

Risk management is a structured approach to identifying, assessing, and responding to risks that occur during a project. It will be important to identify key risks at an early stage in scheme development, to inform the risk budget included in the scheme costs.

The approach to risk management for OBC development will be proportionate to the scale and complexity of the scheme. A balance will be sought between the time and cost of assessing risks and reducing Wiltshire Council's exposure to risk to an 'acceptable' level.

The consideration of risk at the OBC stage will include:

- A risk assessment exercise (which will take the form of a risk workshop for the A350 Yarnbrook and West Ashton Relief Road), to identify and assess the impacts of risk (e.g. in terms of programme delay or cost increase), and estimating the likelihood of risk impacts;
- Producing and maintaining a risk register;
- Identifying the means of responding to risks (i.e. mitigation); and
- Putting arrangements in place to review risks periodically and mechanisms for reporting / escalation.

Resources and effort will be focussed on identifying those risks that are likely to have the most significant impacts on scheme costs. TAG Unit A1-2[12] recommends that for smaller schemes there may be scope for using generalised risk allowances for each cost element to represent the expected costs. However, it is important that the risk assessment process is still undertaken to arrive at the overall range for the cost estimate and the expected cost allowing for risk. For the A350 Yarnbrook and West Ashton Relief Road scheme, a Quantified Risk Assessment will be undertaken, to determine an expected cost value for risk.

Another important aspect of managing and assessing risks will be determining responsibilities for assessing different types of risk, particularly the division between those to be assessed by Wiltshire Council and those to be assessed by any third party (including consultants). This will be clarified at an early stage in OBC development.

[12] TAG Unit A1-2: Scheme Costs (https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/275128/webtag-tag-unit-a1-2-scheme-costs.pdf)

7 Next Steps

This initial ASR has outlined the requirements and key considerations for progressing the Yarnbrook and West Ashton Relief Road to the OBC stage.

This initial ASR has identified the key elements for each of the five cases within the OBC. In relation to the Economic Case, it has also set out a proposed proportionate approach to appraisal in the form of an ASST (**Annex A**). In particular, it has identified:

- A proposed approach to modelling and forecasting;
- A proposed methodology for assessing each of the sub-impacts presented within the AST, at the OBC stage; and
- A proposed level of design or specification to inform cost estimation at the OBC stage.

The next steps are to:

- Agree the proportionate approach regarding housing related development with the LTB's Independent Technical Advisor (ITA). A technical note has been produced as an addendum to this ASR (**Annex B**);
- Issue this Appraisal Specification Report (ASR) to the LTB's ITA for approval;
- Develop the OBC following the methods set out in the ASST, and the development points contained in this ASR.

Annex A: Appraisal Specification Summary Table (ASST)

Table A1 – A350 Yarnbrook and West Ashton Relief Road: Appraisal Specification Summary Table

A350 Yarnbrook and West Ashton Relief Road				
Sub-Impacts	**Estimated Impact**	**Level of Certainty**	**Proposed Proportionate Appraisal Methodology & Output Type**	**Further Comments on Proposed Approach**
Sub-impacts match those in a standard Appraisal Summary Table	*Taken directly from the Scheme Assessment Table produced for scheme prioritisation, July 2013*	*Certainty of estimated impact shown in the Scheme Assessment Table:* *High / Medium / Low*	*Impacts previously assessed as 'neutral' or 'slight positive / negative' may not necessarily require further appraisal.* *Output Types: Quantitative / Qualitative / Monetary / Distributional*	*Refer to guidance documents (e.g. WebTAG, DMRB)* *Reasons for particular choice of approach*
Economy				

Business users & transport providers	Moderate Beneficial	High	• Targeted validation checks of the Trowbridge SATURN model is proposed, with 2014 traffic counts at the same locations as for the 2009 model and additional counts in a cordon surrounding the scheme location.
			• 2009-2014 growth factors will be derived from the same location counts and used to factor the new cordon counts for use in the 2009 base year model.
			• New forecast year for 2021 (assumed opening year) will be created, using the same forecasting process as used previously for the 2026 forecast year. Journey times, trip distances and trip volumes will be skimmed from these forecast years.
			• Proportionate approach has been developed with regard to TAG Unit A2-3 (transport appraisal in context of dependent development), see **Annex B**. Based on **Annex B**, two scenarios will be modelled:
			  ○ Do Minimum - without the housing development and without any form of transport scheme;
			  ○ Do Something - with the housing development and with a transport scheme.
			• Sensitivity tests will comprise:
			  ○ Broad % changes in benefits and costs; and
			  ○ Constraining to TEMPRO - As the urban extension may not be in TEMPRO, a sensitivity test will involve constraining to TEMPRO (rather than forming the core scenario as per WebTAG).
			• SATURN model skims will be imported into a spreadsheet based on TUBA principles to calculate the monetised scheme benefits over the 60-year appraisal period.
			• Benefits will be annualised to all weekdays (excluding weekends), using traffic count data collected for the targeted validation checks.
				• Scheme is located on the edge of the modelled network, meaning a targeted validation checks are required to ensure more reliable forecasting.
				• A more substantial model upgrade is not deemed to be necessary, as there are no major developments to the south and east of the scheme and route choices are limited in reality around the Yarnbrook and West Ashton area.
				• Background traffic growth forecasts will be based on NTM with local TEMPRO 6.2 adjustments. Note that constraining to TEMPRO will be undertaken as a sensitivity test, and not the core scenarios.
				• 2021 is assumed to be the scheme 'opening year'
				• 2026 is available as a forecasting year from previous work.
				• Proposed approach is compatible with modelling work undertaken for the Strategic Site in 2011.
				• Atkins has developed a spreadsheet tool, which applies TUBA methodology but allows for variations to the basic formula used for calculation of benefits, or similar outputs, enabling functions other than the rule of a half to be applied while retaining all other aspects of the programme's calculations. Tool has been validated by applying the rule of a half and making comparison against TUBA outputs for equivalent calculations (**Annex B**).
				• Proportionate approach (**Annex B**) to be agreed with the ITA.

A350 Yarnbrook and West Ashton Relief Road				
Sub-Impacts	**Estimated Impact**	**Level of Certainty**	**Proposed Proportionate Appraisal Methodology & Output Type**	**Further Comments on Proposed Approach**
			• **Monetised appraisal output 2010 price base.**	
Reliability impact on business users	Moderate Beneficial	Medium	• A spreadsheet based analysis that aligns with TAG Unit A1-3 will be adopted, using SATURN trip volume and journey time skims. This will provide a monetised reliability benefit. • **Monetised appraisal output 2010 price base.**	• TAG Unit A1-3 methodology for urban road variability will be adopted. • Method aligned fully with TAG Unit A1-3.
Regeneration	*Not previously assessed*	-	• No appraisal proposed – no regeneration areas affected.	• No further comments.
Wider impacts	*Not previously assessed*	-	• Agglomeration / labour market impacts will not be appraised. • Increased output in imperfect markets will be taken as proxy of 10% of business user benefits, as calculated for the business user sub-impact. • **Monetised appraisal output, 2010 price base.**	• 'Wider impacts' refers to impacts on *national* economy (TAG Unit A2-1). • Agglomeration / labour market impacts are not expected, so use of WITA is considered to be disproportionate to the scale of the scheme. • Benefits from dependent development (based on land value uplifts) to be reported in line with TAG Unit A2-3 if development dependency is confirmed by transport modelling.
Environmental				
Noise	Slight Adverse	Medium	• Initial appraisal for the Scheme Assessment Table identified likely adverse impacts on sensitive receptors within 200m of the scheme. • Owing to the extent of proposed scheme, following scoping, a statutory Environmental Statement is considered to be required – this has already been produced by the developers' consultant for the entire Ashton Park development – a copy is required to inform the OBC. • The Scope of Work form had stated that basic noise modelling would be undertaken based on OBC flows. However, this would also be duplicating work undertaken by the developer, and extend the OBC programme by over a month. A more proportionate approach is proposed, whereby the noise chapter of the Environmental Statement will be reviewed. Assuming there are no issues, the Environmental Statement will be used to inform the noise appraisal of the OBC. • As previous assessment suggests impacts on noise levels for a small number of properties and school, the level of impact (number of properties) will not enable a robust quantitative assessment. A qualitative Distributional Impact will be completed using noise model outputs plotted on demographic data. • **Quantitative appraisal output.**	• Scheme is likely to have adverse & beneficial impacts by taking traffic away from approximately 8-10 dwellings but bringing traffic closer to approximately 8-10 dwellings, • Slight to moderate adverse impacts for approximately 8-10 homes and slight beneficial impacts for another 8-10 homes. • Major adverse impacts expected during construction phase. • For Distributional Impact, the approach will follow, where possible TAG Unit 4-2, based on work undertaken for the Environmental Statement. • Above comments need to be reviewed based on the Environmental Statement.

A350 Yarnbrook and West Ashton Relief Road				
Sub-Impacts	**Estimated Impact**	**Level of Certainty**	**Proposed Proportionate Appraisal Methodology & Output Type**	**Further Comments on Proposed Approach**
Air quality	Neutral	Medium	• Initial appraisal for the Scheme Assessment Table identified likely adverse and beneficial impacts on sensitive receptors within 200m of the proposed scheme. • There are no AQMA or designated sites within 200m of the scheme. • Owing to the extent of proposed scheme, following scoping, a statutory Environmental Statement is considered to be required – this has already been produced by the developers' consultant for the entire Ashton Park development – a copy is required to inform the OBC. • The Scope of Work form had stated that basic air quality modelling would be undertaken based on OBC flows. However, this would also be duplicating work undertaken by the developer, and extend the OBC programme by over a month. A more proportionate approach is proposed, whereby the air quality chapter of the Environmental Statement will be reviewed. Assuming there are no issues, the Environmental Statement will be used to inform the air quality appraisal of the OBC. Note that WebTAG requirements differ from DMRB. • Previous assessment suggests impacts on air quality for a number of properties and school. A quantitative Distributional Impact will be completed using air quality model outputs plotted on demographic data. • **Quantitative appraisal output.**	• A number of receptors near to the existing roads are still within 200m of the proposed scheme and the change in traffic flows is not clear as the junction at Yarnbrook will still be open to traffic. • Potentially sensitive receptors within 200m of the scheme comprise approximately 40 properties on Yarnbrook Road and Kettle Lane and approximately 20 properties on West Ashton Road and Westbury Road. • If the majority of traffic using the existing road is diverted to use the proposed scheme, a number of receptors may benefit from the centreline moving north westwards and a potential reduction in congestion, although some receptors may experience a disbenefit by being closer to the new road. • From the information provided the overall impact is assessed as Neutral. • Quantitative assessment would identify whether there is an overall benefit or disbenefits and Distributional Impact can also be undertaken. • For Distributional Impact, approach will follow TAG Unit A4-2, based on work undertaken for the Environmental Statement. • Above comments need to be reviewed based on the Environmental Statement.
Greenhouse gases	Neutral	Medium	• Initial appraisal for the Scheme Assessment Table identified no likely impacts on greenhouse gasses as a result of the proposed scheme. • Undertake quantitative assessment, based on outputs from a spreadsheet based on TUBA principles. • Owing to the extent of proposed scheme, following scoping, a statutory Environmental Statement is considered to be required – this has already been produced by the developers' consultant for the entire Ashton Park development – a copy is required to inform the OBC. • **Quantitative appraisal output.**	• No further comments.

A350 Yarnbrook and West Ashton Relief Road				
Sub-Impacts	**Estimated Impact**	**Level of Certainty**	**Proposed Proportionate Appraisal Methodology & Output Type**	**Further Comments on Proposed Approach**
Landscape	Moderate adverse	High	• Initial appraisal for the Scheme Assessment Table identified likely adverse impacts on the landscape as a result of the proposed scheme. • Owing to the extent of proposed scheme, following scoping, a statutory Environmental Statement is considered to be required – this has already been produced by the developers' consultant for the entire Ashton Park development – a copy is required to inform the OBC. • Information from Environmental Statement to inform the OBC environmental appraisal; no further environmental work to be undertaken as part of the OBC. • **Qualitative appraisal output.**	• No landscape designations present within 2km of the scheme. • Proposed road will cut through existing agricultural landscape of open rolling fields. • Properties at West Ashton & Yarnbrook will be affected by proposed road & by likely increase in lighting levels in currently unlit area. • Scheme will be visible over wide area. • Above comments need to be reviewed based on the Environmental Statement.
Townscape	Neutral	Medium	• Initial appraisal for the Scheme Assessment Table identified no impacts on the urban environment. • Owing to the extent of proposed scheme, following scoping, a statutory Environmental Statement is considered to be required – this has already been produced by the developers' consultant for the entire Ashton Park development – a copy is required to inform the OBC. • Information from Environmental Statement to inform the OBC environmental appraisal; no further environmental work to be undertaken as part of the OBC. • **Qualitative appraisal output.**	• Scheme is located in an open rural landscape. There are views of the proposed scheme from Trowbridge to the north, but there will be no impacts on the coherence or distinctiveness of the urban environment. • Above comments need to be reviewed based on the Environmental Statement.
Heritage of historic resources	Slight adverse	Medium	• Initial appraisal for the Scheme Assessment Table identified no impacts on known heritage assets but potential impacts on archaeology. • Owing to the extent of proposed scheme, following scoping, a statutory Environmental Statement is considered to be required – this has already been produced by the developers' consultant for the entire Ashton Park development – a copy is required to inform the OBC. • Information from Environmental Statement to inform the OBC environmental appraisal; no further environmental work to be undertaken as part of the OBC. • **Qualitative appraisal output.**	• Locally listed heritage assets could be affected by changes to setting or via direct physical impacts. • Impacts may be mitigated through design and/or screening and archaeological investigation and recording. • Above comments need to be reviewed based on the Environmental Statement.

A350 Yarnbrook and West Ashton Relief Road				
Sub-Impacts	**Estimated Impact**	**Level of Certainty**	**Proposed Proportionate Appraisal Methodology & Output Type**	**Further Comments on Proposed Approach**
Biodiversity	Moderate Adverse	Medium	• Initial appraisal for the Scheme Assessment Table identified likely adverse impacts as a result of the proposed scheme. • Owing to the extent of proposed scheme, following scoping, a statutory Environmental Statement is considered to be required – this has already been produced by the developers' consultant for the entire Ashton Park development – a copy is required to inform the OBC. • Information from Environmental Statement to inform the environmental appraisal; no further environmental work to be undertaken as part of the OBC. • **Qualitative appraisal output.**	• SSSI: Picket & Clanger Wood is within approximately 785m of the proposed scheme. Impacts are unlikely. • Woodland, mature hedgerows & trees will be subject to adverse impacts. • Watercourses will be subject to adverse impacts. • Agricultural land & grassland will be subject to adverse impacts. • There is potential for protected species to be subject to adverse impacts. • Above comments need to be reviewed based on the Environmental Statement.
Water environment	Moderate adverse	High	• Initial appraisal for the Scheme Assessment Table identified potential adverse impacts as a result of the proposed scheme. • Owing to the extent of proposed scheme, following scoping, a statutory Environmental Statement is considered to be required – this has already been produced by the developers' consultant for the entire Ashton Park development – a copy is required to inform the OBC. • Information from Environmental Statement to inform the OBC environmental appraisal; no further environmental work to be undertaken as part of the OBC. • **Qualitative appraisal output.**	• Initial appraisal identified an increase in area of hard surface leading to an increase in surface water run-off & thereby potential impacts on a number of small watercourses & on the floodplain. Significant impacts were identified on these, requiring further detailed assessment. • Above comment needs to be reviewed based on the Environmental Statement.
• Geology & Soils • Disruption due to construction • Land use • Impacts on Policies & Plans	*Not previously assessed*	-	• Owing to the extent of proposed scheme, following scoping, a statutory Environmental Statement is considered to be required – this has already been produced by the developers' consultant for the entire Ashton Park development – a copy is required to inform the OBC. • No further environmental work to be undertaken as part of the OBC. • **Qualitative appraisal outputs.**	• This will be covered by the Environmental Statement produced by the Ashton Park developers' consultant.
Social				
Commuting and other users	Moderate Beneficial	High	• Same approach as outlined for 'business users' will be adopted, but taking forecasts from the non-business journey trip purpose matrices. • The modelled highway journey time outputs will be assessed to complete a quantitative Distributional Impact appraisal. • **Monetised appraisal output 2010 price base.**	• The proposed approach is compatible with modelling work undertaken for the Strategic Site in 2011. • The distributional impact approach will follow TAG Unit A4-2.

A350 Yarnbrook and West Ashton Relief Road				
Sub-Impacts	**Estimated Impact**	**Level of Certainty**	**Proposed Proportionate Appraisal Methodology & Output Type**	**Further Comments on Proposed Approach**
Reliability impact on commuting and other users	Moderate Beneficial	Medium	• Same approach as outlined for 'business users' will be adopted, but taking forecasts from the non-business journey trip purpose matrices. • **Monetised appraisal output 2010 price base.**	• No further comments.
Physical activity	*Not previously assessed*	-	• A qualitative assessment on social impacts will be completed. • **Qualitative appraisal output.**	• The removal of traffic from the local roads could encourage more cycling and walking around Yarnbrook and West Ashton. • Approach will follow TAG Unit A4-1.
Journey quality	*Not previously assessed*	-	• The improved conditions for travellers will be assessed for Social Impacts qualitatively against the three criteria – Traveller Care, Views and Stress. • **Qualitative appraisal output.**	• Approach will follow TAG Unit A4-1.
Accidents	Neutral	Medium	• Spreadsheet-based quantitative / monetised analysis, using local accident data in the area surrounding the scheme (A350 and A363) and forecast changes in traffic flows from SATURN. This will confirm whether or not the neutral impact is likely to be correct. • The modelled accident outputs will be assessed to complete a quantitative Distributional Impact appraisal. • **Quantitative appraisal output.**	• Spreadsheet based analysis using COBALT principles will be applied to the accident forecasting. • Approach will follow TAG Unit A4-1.
Security	*Not previously assessed*	-	• The new relief road will be designed to a high specification and likely to include effective lighting and other safety features. A qualitative assessment to appraise the social impact will be undertaken using designs of the new road. • **Qualitative appraisal output.**	• Approach follows TAG Unit A4-1.
Access to services	Neutral	High	• No public transport services operate along the route, hence no improvement to journey times. • No further appraisal.	• Approach follows TAG Unit A4-1.
Affordability	*Not previously assessed*	-	• Outputs from spreadsheet based on TUBA principles will be assessed to complete a quantitative appraisal. • **Quantitative appraisal output.**	• Approach to follow TAG Unit A4-1.
Severance	Slight Adverse	Medium	• The scheme severs a public right of way which will be appraised for social impacts using a qualitative approach. • **Qualitative appraisal output.**	• Approach to follow TAG Unit A4-1.
Option values	Neutral	High	• No new modes of transport will be introduced. • No further social impact assessment required.	• No further comments.

A350 Yarnbrook and West Ashton Relief Road				
Sub-Impacts	**Estimated Impact**	**Level of Certainty**	**Proposed Proportionate Appraisal Methodology & Output Type**	**Further Comments on Proposed Approach**
Public Accounts				
Cost to broad transport budget	*Not previously assessed*	-	• The Present Value of Costs (PVC) for the 60-year appraisal period will be calculated, along with the Present Value of Benefits (PVB) from the spreadsheet based on TUBA principles, to produce a BCR. • **Monetised appraisal output 2010 price base.**	• Costs will be adjusted for real cost increases, risk and Optimism Bias, and then discounted to a 2010 price base in line with TAG Unit A1-2.
Indirect tax revenues	*Not previously assessed*	-	• Estimated from SATURN model outputs using a spreadsheet based on TUBA principles, and applied to the PVB. An increase in indirect tax revenues is seen as a wider benefit to society. • **Monetised appraisal output 2010 price base.**	• No further comments.

Annex B: Housing Dependency – Proportionate Approach

Technical note

Project:	Yarnbrook and West Ashton Relief Road	**To:**	Rob Murphy
Subject:	Housing Dependency – Proportionate Approach	**From:**	Tracey Poole
Date:	7th August 2014	**cc:**	Eric Norton, Paul Chase

1. Introduction

Atkins has been commissioned to produce the Outline Business Case (OBC) for the Yarnbrook and West Ashton Relief Road. Phase 1 of the project included developing a proportionate approach for appraisal, and the submission of 'Scope of Works' forms to the Swindon & Wiltshire Local Transport Body (SWLTB). The SWLTB has agreed that a proportionate approach can be undertaken regarding the appraisal of the Yarnbrook and West Ashton Relief Road, taking into account the scheme's value and complexity. The appraisal approach was approved by the SWLTB on the 17th July 2014.

The approved Scope of Works table for the Economic Case outlined modelling scenarios to enable the benefits of the scheme to be isolated, both with and without the urban extension housing. This was based on TAG Unit A2-3 (transport appraisal in context of dependent development). The Scope of Works form caveated that "modelling scenarios to be further developed and agreed with the ITA". Further work to identify modelling scenarios has concluded that for this stage of testing, the additional modelling required by TAG Unit A2-3 is not considered proportionate to the assessment required. Therefore this technical note sets out an alternative proportionate approach.

This technical note is an annex to the Yarnbrook and West Ashton Relief Road Appraisal Specification Report (ASR) (August 2014).

2. Appraisal in the Context of Dependent Development

2.1. Development Background

It has been agreed between Wiltshire Council and the developers that the Yarnbrook and West Ashton Relief Road be included in the Ashton Park planning application on the basis of the 'shared approach'. The application will include details of the Yarnbrook and West Ashton Relief and associated drainage. The application will be in outline with all matters reserved for subsequent approval, except vehicular access to the site, including the YWARR. The application proposes the following:

"*Mixed Use Development Comprising: Residential (up to 2,500 dwellings – Classes C3 & C2), Employment (Class B1, B2 & B8), 2 No. Local Centres (Classes A1- A5, D1, C2 & C3), 2 No Primary Schools, Secondary School, Ecological Visitor Facility, Public Open Space, landscaping and associated highways works including Yarnbrook/West Ashton Relief Road*".

Atkins, on behalf of Wiltshire Council, is developing the OBC, with the Council's intention of securing major scheme funding contribution towards the road through the Growth Deal process.

2.2. Dependency

The scheme under consideration at Ashton Park, Trowbridge consists of both transport and development elements, neither of which will proceed without the other.

Without transport intervention, the impact of the development would be to cause widespread congestion on the roads around Trowbridge, with a number of junctions severely exceeding capacity. The development would therefore not receive planning permission.

Conversely the transport element of the scheme might not be necessary without the development and as such might not receive funding. The funding of the scheme is dependent upon a contribution from the developer who will benefit through the development being enabled and the land value gains which will therefore be achieved.

2.2.1. Testing for Dependency

An assignment of the Do Something[1] (DS) demand matrix to the Do Minimum[2] (DM) network will be used to test the first element of this dependency, i.e. that the development cannot be built without the network improvements. It is expected that this model will either not converge or will result in very large delays across the network. This will indicate whether or not the existing transport network is still able to provide a reasonable level of service if the development is put in place with no transport improvements.

The WebTAG approach to testing for dependency requires not only a test of whether the entire development is dependent upon transport improvements, but also to establish how much of the development is dependent, by considering how much of it could go ahead without improving the network, such that a reasonable level of service is still provided.

The value of this is to define a DM scenario in which the maximum level of development which the network can support is included, with the remaining development forming the DS scenario. The proportion of land value gains attributable to the dependent portion of the development should then be calculated as a part of the scheme value, rather than assuming that the impact of the whole development is enabled by the transport improvements.

However, for this stage of testing, the additional modelling required is not considered proportionate to the assessment required. In this situation the developer has made clear that should the whole development not be enabled, there will be no interest in implementing fractions of that development which can be supported by the existing infrastructure. The DM scenario with some elements of the development included is therefore not a realistic scenario to model.

In order to measure the impacts of land value gain which are attributable to the transport improvements, sensitivity testing will be carried out to indicate the overall value of the scheme based on incremental portions of the development being deemed to be dependent.

2.3. Measuring Benefits of Dependent Developments

With the DM scenario established it will be necessary to calculate user benefits of implementing the DS scenario. For schemes which are composed of both transport and development elements the standard approach to benefit calculation cannot be applied. The following sections explain why the standard approach is not applicable and use this explanation to set out an alternative, more proportionate system for benefit calculation.

2.3.1. Standard Appraisal Methodology

The calculation of user benefit generated by a transport scheme is performed by assessing the change in consumer surplus between a Do-Minimum (DM) scenario and a Do-Something (DS) scenario.

Each trip is assumed to have a certain value to the traveller associated with it and if the cost of making that trip is higher than the value of the trip itself, the trip will not be made. If the value of the trip is higher than its cost then the trip will be made. The consumer surplus is defined as the difference between the value of the trips which are made and the cost incurred in making them.

Variable demand modelling is used to determine how many trips are made between each OD pair, based on the cost of making those movements. A demand curve, calibrated in response to local data such as housing,

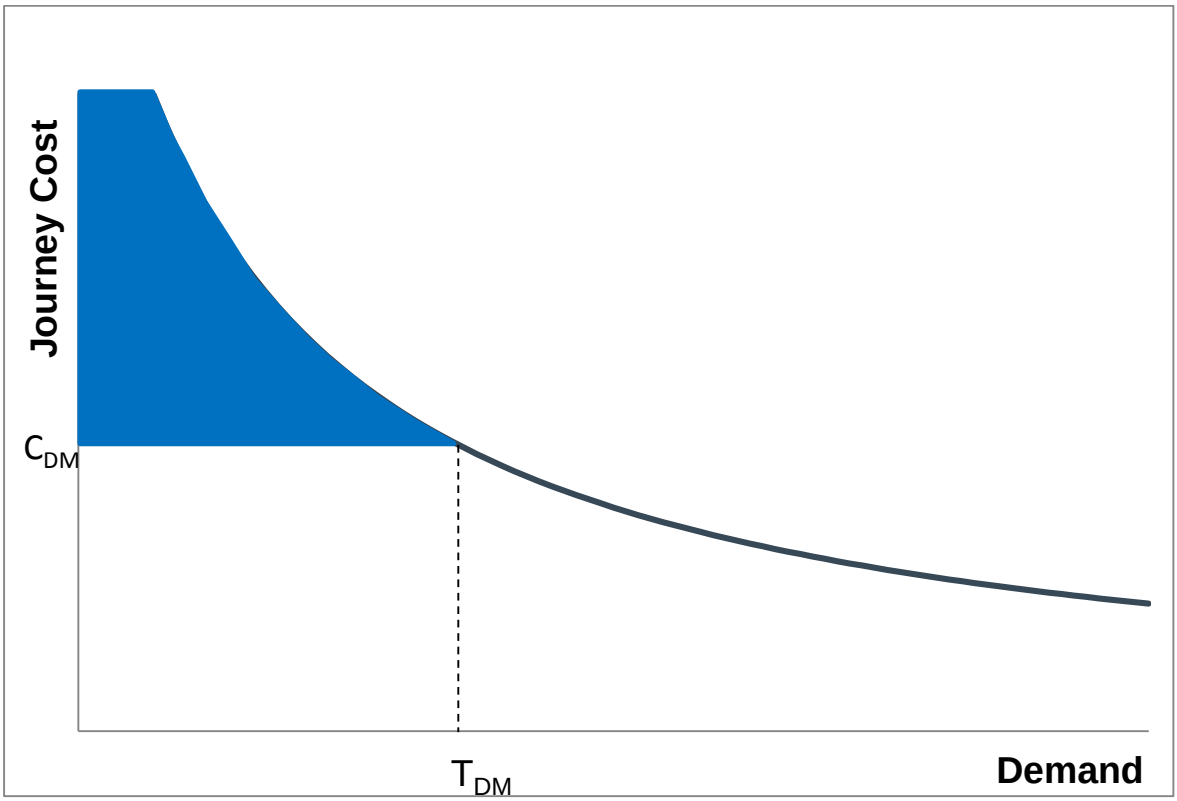
[1] Do Something (DS) = With Scheme scenario.
[2] Do Minimum (DM) = Without Scheme scenario.

employment, car ownership and current recorded trip numbers, is defined which provides a forecast of the number of trips which will be made between two zones for any given cost of travel. Given the cost of making such a trip in the Do-Minimum scenario (C_{DM}), it is thus possible to calculate the number of trips (T_{DM}).

Some trips have a high value and so will be made even if the cost of travel is significantly higher than C_{DM} and these trips will enjoy a large consumer surplus. At the other extreme there will be trips whose value is very close or equal to C_{DM} in which case the consumer surplus will be close to or equal to zero.

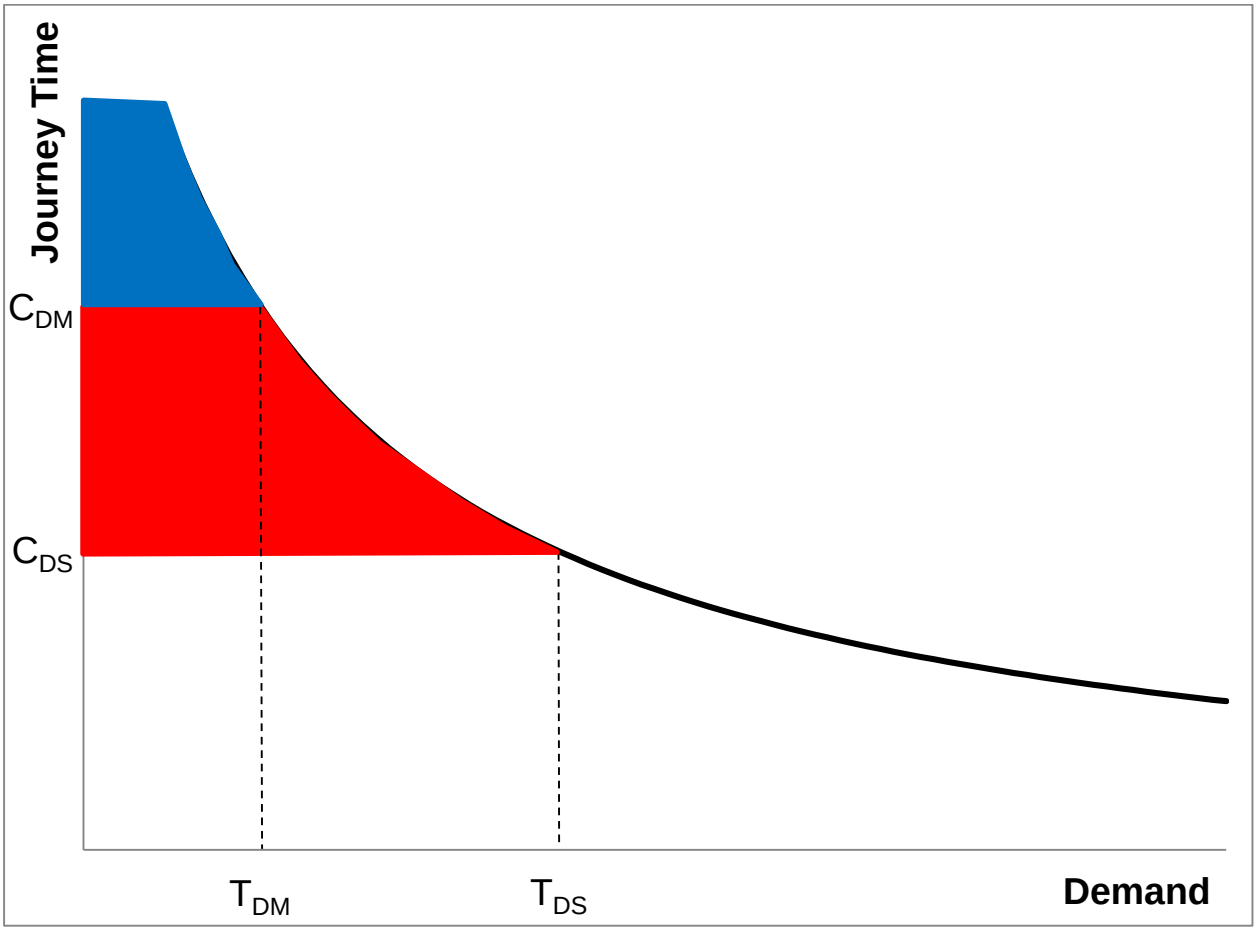
In Figure 1, the area below the C_{DM} point on the Cost axis represents trips which have a lower value than the DM cost of travel and so are not made, while the area above the C_{DM} point represents trips which have a higher value than that cost and so will be made and thus generate a consumer surplus. The blue area therefore represents the total consumer surplus of all trips which will be made in the DM scenario, based on the cost of travel being C_{DM}.

Figure 1. Consumer Surplus



The measurement of user benefit is based on the calculation of the change in consumer surplus from one scenario (DM) to the other (DS). Figure 2 shows how a reduction in cost in a DS scenario, indicated by C_{DS} results in an increased consumer surplus, with the blue area showing the consumer surplus in DM and the combined red and blue area being the consumer surplus in DS. The change in consumer surplus, i.e. the user benefit, is therefore given by the red area.

Figure 2. User Benefit



The usual approach to measuring the size of this red area, as used by the DfT's TUBA software, is to approximate the section of the shape on the demand curve to a straight line, and so treating the area as the sum of a rectangle and triangle, the areas of each of which can be calculated based on the change in trip numbers and cost. This calculation is referred to as the "rule of a half" and makes use of the equation:

$$\text{User Benefit} = \tfrac{1}{2} (T_{DM} + T_{DS}) * (C_{DM} - C_{DS})$$

In this approach, the approximation of the demand curve to a straight line in based on the assumption of the cost change between DM and DS involved being small, which results in the loss of accuracy generated by this approximation being minimal.

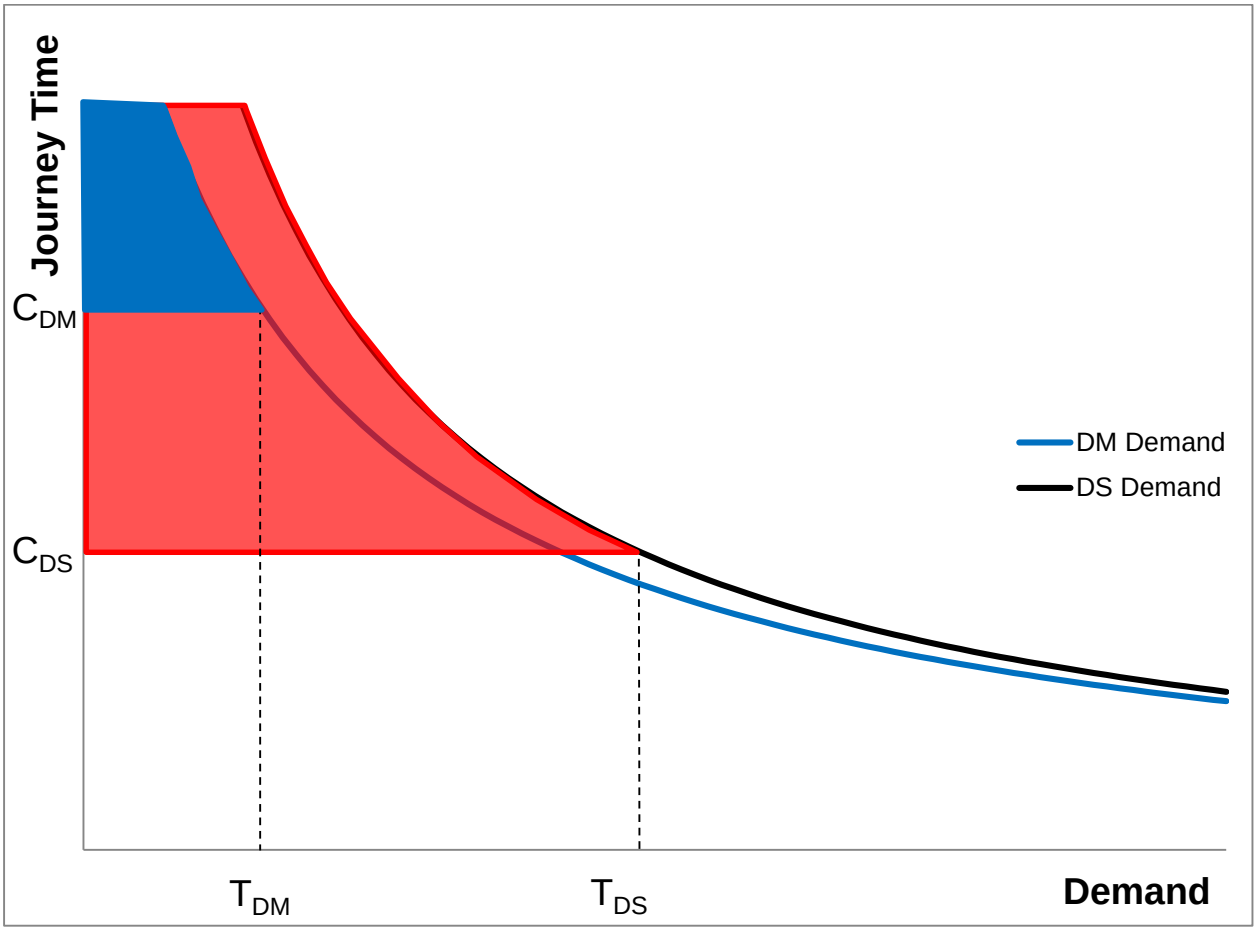
2.3.2. Dependent Development

The difficulty with using the above method of measuring user benefit in situations where a transport intervention is used to enable a development is set out in Figure 3.

In the case of most land use development, there is no dependency on transport improvements. As a result the development included in the DM and DS scenarios is the same and the demand curve stays constant. However, when a development is dependent upon a transport scheme, the change from DM to DS involves not only a change in cost but also a shift in demand.

As the figure shows, this means that a different demand curve must be used to calculate the DS consumer surplus to that used in calculating the DM consumer surplus and so the red area which represents the user benefit can no longer be approximated using the approach set out above. An alternative method of calculation must therefore be applied.

Figure 3. User Benefit with Dependent Development



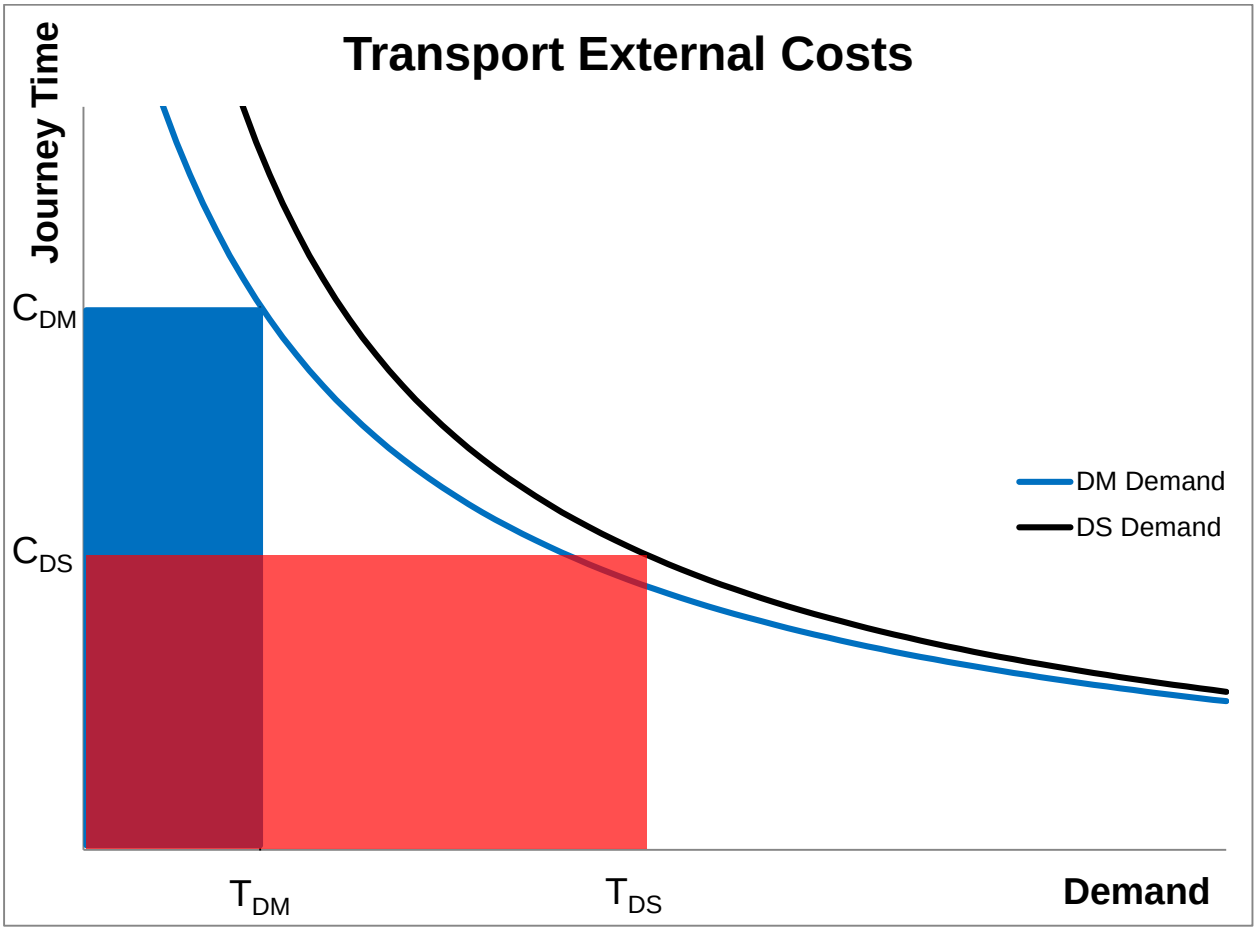
The approach set out in WebTAG unit A2-3 to measure the change in consumer surplus is to disaggregate the transport and development elements and measure the impact of each incrementally.

First the change in consumer surplus generated by the transport scheme compared to the DM scenario is calculated. These two scenarios are both based on the DM demand curve so the usual “rule of a half” approach can be applied. Secondly the impact of the development is measured, using the scenario which includes the transport improvements as a do-minimum.

Secondly the impact of the development itself is assessed given that the transport improvements are already in place. As demonstrated in Figure 3 a consumer surplus calculation cannot be used for this assessment, so instead the recommended approach is to measure the change in transport cost to transport users other than those trips to and from the new development. This change is described as transport external costs.

Figure 4 illustrates the calculation used in measuring transport external costs. This figure shows the difference between total cost of travel in the DM scenario (including the transport improvements but not the development) and the total cost in the DS scenario (including both transport improvements and development). In addition to this calculation the transport external costs must exclude the costs of trips made to or from the development itself, the cost of which are not considered to be external. This is therefore a measure of the level of disruption to existing traffic, caused by the new development.

Figure 4. Transport External Costs

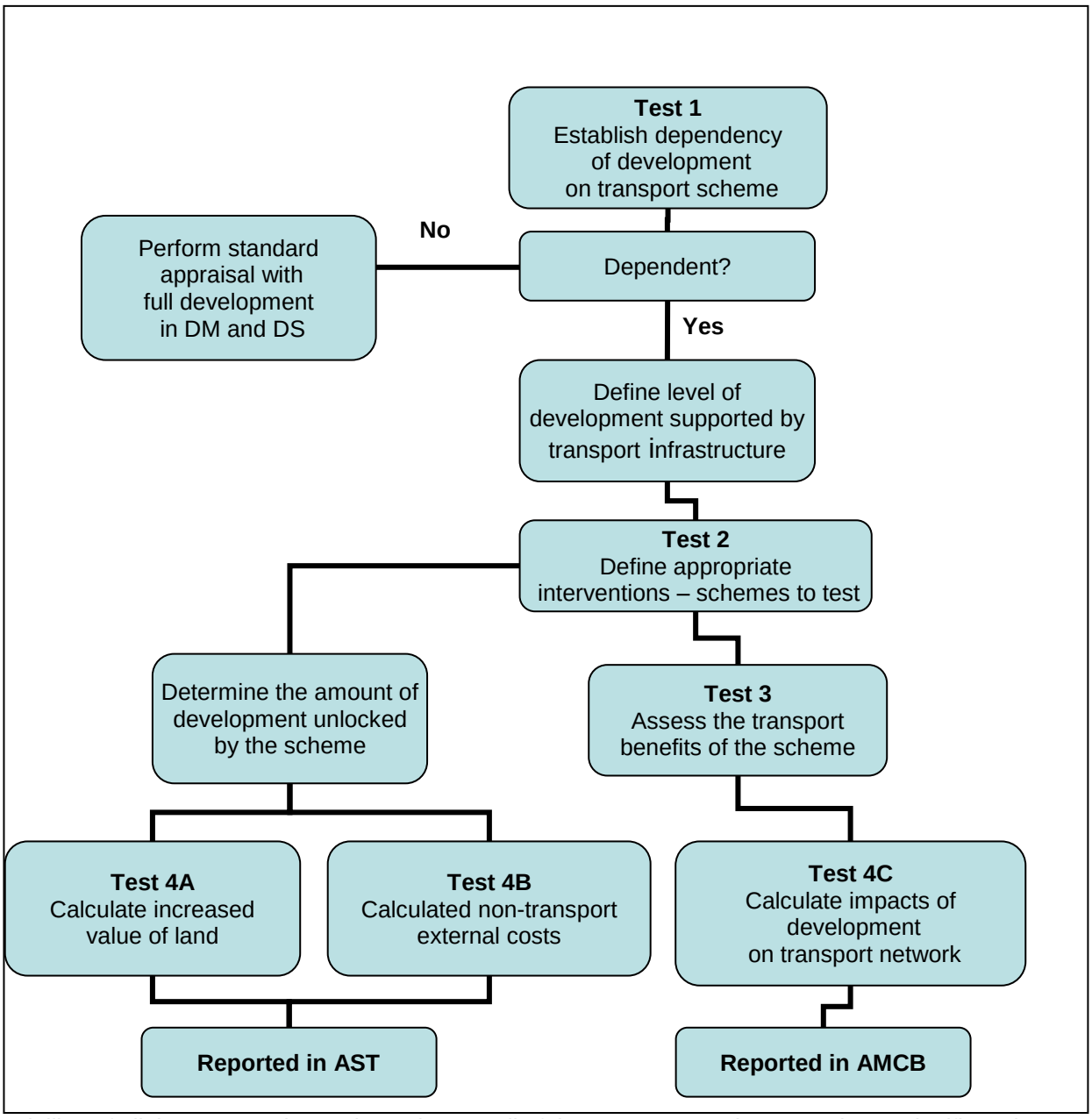


The difficulty of this approach is that the measurement of these various benefit types requires modelling not only of a DM and a DS scenario, but also two further scenarios:

- **Scenario A** - without the housing development and without any form of transport scheme;
- **Scenario B** - with the housing development but without any form of transport scheme;
- **Scenario C** - with the housing development and with a transport scheme; and
- **Scenario D** - without the housing development but with a transport scheme.

In addition a complex process of appraisal is required for determining how each of the tests should be applied and what other benefits should be included as part of the scheme. This process is set out step by step in Figure 5.

Figure 5. WebTAG Approach to Calculating Benefits with Dependent Development



Modelling of all these scenarios and carrying out all of the tests set out above requires a significant increase in time and cost required for preparing the appraisal. While clearly necessary at the stage of Detailed Business Case submission, this is not considered to be proportionate for the Outline Business Case. With various details such as the assessment of costs and construction profile still to be refined, a more proportionate approach to appraisal of benefits, at a scale comparable with other elements of the business case is considered to be more appropriate.

3. Proportionate Approach

As discussed above, the approach to appraisal of schemes which enable land development which is set out in WebTAG is considered to be disproportionately time consuming for the current level of assessment of the Ashton Park Trowbridge scheme. In order to take a more proportionate approach, an alternative method of appraisal has been proposed, which avoids the inaccuracies which the WebTAG methodology seeks to mitigate while minimising the need for additional modelling. The details of this approach are set out below.

It must be recognised that a "proportionate" approach does not mean disregarding the shortcomings of standard appraisal techniques for schemes such as this which have been discussed in Section 2 in order to simplify and reduce costs. The proportionate approach discussed below applies an alternative methodology for resolving the difficulties posed to the appraisal process by the dependent development, which while not in line with the WebTAG approach, will generate an accurate assessment of user benefits.

The explanation and definition of this proportionate approach is set out in two stages. The remainder of Section 3 provides details of how the approach would work with a variable demand model. This is used to demonstrate the robustness of the approach and provide comparability with the method recommended by WebTAG for appraising schemes which include dependent development.

Section 4 extends the methodology set out in Section 3 in order to apply it to the appraisal of the Ashton Park Trowbridge development, the modelling of which has been based on fixed, rather than variable, demand assignment.

Two scenarios will be modelled for this proportionate approach:

- **Scenario A** - without the housing development and without any form of transport scheme (DM);
- **Scenario C** - with the housing development and with a transport scheme (DS);

3.1. Consumer Surplus Calculation

As has been demonstrated in Figure 3, the usual WebTAG based approach to calculating user benefits based on the change in consumer surplus is not suitable when a scheme includes both transport and dependent development elements.

However, the value of user benefit can still be measured as the difference between consumer surplus in the DM scenario and consumer surplus in the DS scenario. The difficulty comes in measuring what this change is.

Whereas the demand curve could be approximated with a straight line when applying the "rule of a half" user benefit calculation, this is only acceptable over small differences in cost. The entire consumer surplus in a single scenario cannot therefore be approximated in the same way, as the range of cost involved will be from the actual cost up to the maximum cost at which a single trip would still be made.

The solution to this, which will be applied as the proportionate approach to appraisal for this combined transport and development scheme is to use the demand curve specification, as determined by the variable demand model, to calculate the consumer surplus of each scenario separately. This separate calculation will be applied rather than measuring the difference between consumer surplus' in two different scenarios.

3.1.1. Measuring Consumer Surplus

The demand curve for each OD pair is defined, according to WebTAG, based on a specific relationship between the cost of making a trip and the number of trips which will be made. This relationship is calibrated within the demand modelling process to take account of local data for each OD pair regarding trip generation and attraction, car ownership and the effects of other zones which may attract trips away.

The demand model therefore defines a different demand curve for each OD pair in the model, all based on the same structural equation, which is used to determine the level of demand based on an input cost, using a number of user defined parameters.

Through the mathematical process of integration it is possible to calculate the area under this curve using the equation by which the curve is defined. It is also possible using this technique to measure the area under the curve between any two points of cost, therefore enabling the area under the curve above a given cost to be found. This gives a direct calculation of the blue highlighted area as shown in Figure 1.

If the demand curve is defined as a function of cost, f(C) such that for any given cost C, f(C) = demand, then the consumer surplus may be defined as:

$$\text{Consumer Surplus} = \int_{\text{CDM}}^{\infty} \text{f(C)}\ dc$$

Indicating that the integral is in respect of the variable C (cost) and is taken from the DM cost point C_{DM} up to the maximum cost at which there is still demand (beyond which the value of f(C) will be zero).

As has been discussed in Section 2, the involvement of the dependent development results in different demand curves being defined for the DM and the DS scenarios. The calculation of consumer surplus in each case, for any given OD pair, would therefore be based on:

DM consumer surplus = the area under the DM demand curve above the DM cost point

DS consumer surplus = the area under the DS demand curve above the DS cost point

The user benefit may then be defined as the difference between the DS consumer surplus and the DM consumer surplus in the normal way.

3.2. Application of Integration Approach

Putting the approach described above into practice will mean making use of data extracted from the variable demand model, which is not normally used for the subsequent appraisal.

The integration of the formula defining the demand curve is a standard algebraic manipulation, which will be identical for all OD pairs. This will generate a new formula from which the consumer surplus for each scenario may be calculated based on the input of:

- The values of various parameters which have been used in defining the demand curves and vary by OD pair, having been calibrated by the demand modelling process; and
- The cost of travel, determined by the final assignment of the highway model.

Technical note

4. Fixed Demand Assessment

The methodology described above as a proportionate approach to carrying out appraisal in the context of dependent development is used to illustrate the suitability of the approach on a general basis. The following section describes how, in relation to a fixed demand highway assignment such as is being applied for the assessment of the Ashton Park Trowbridge development, a simplified version of that approach may be applied with no loss of accuracy.

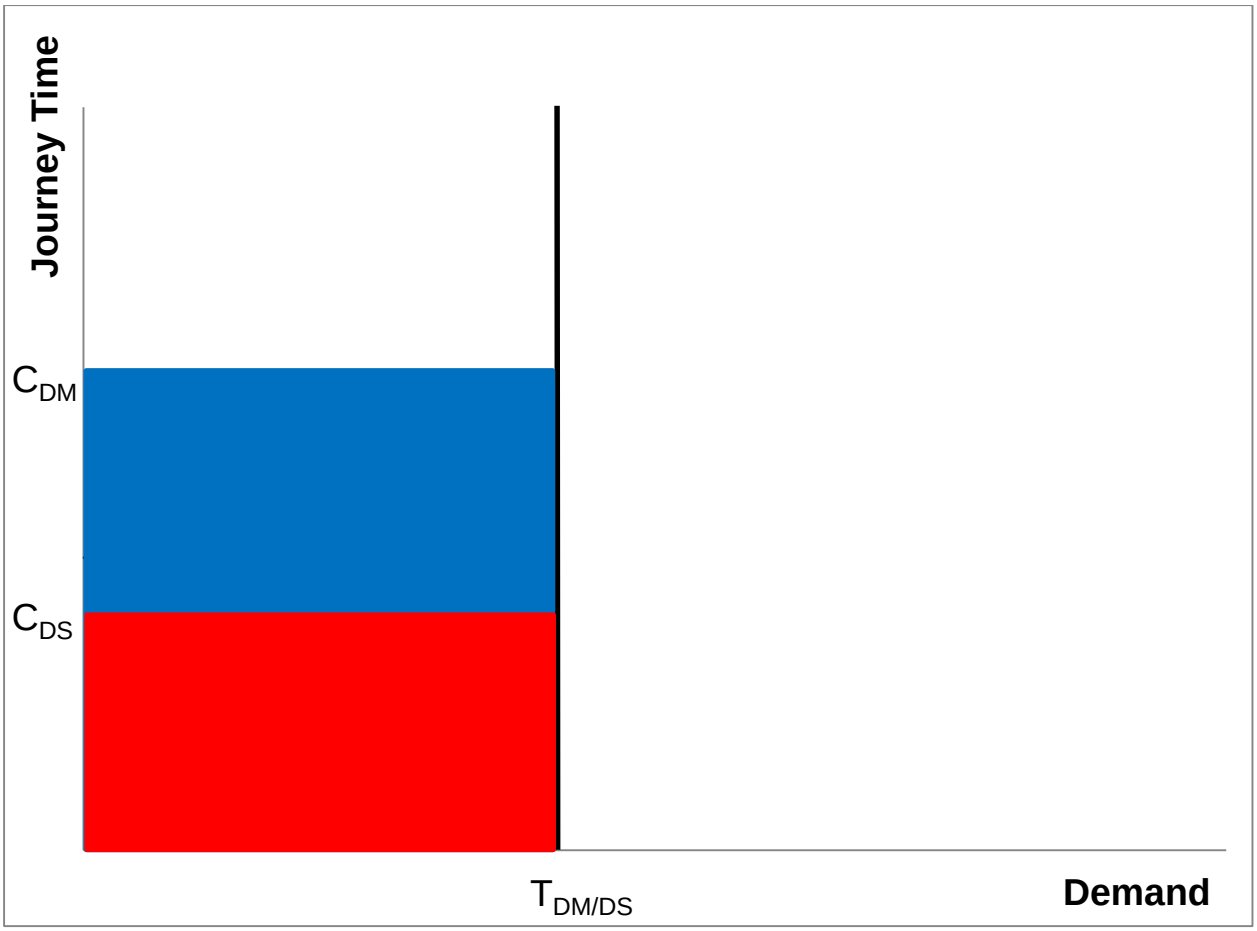
4.1. User Benefit in a Fixed Demand Model

When modelling is carried out based upon a fixed demand assignment (FDA), the demand curves as set out in Sections 2 and 3 will instead become straight lines, indicating that the level of demand for a given OD pair remaining constant regardless of the journey cost. This constant demand is based on the assumption that an accurate forecast of demand has been made in the demand modelling process and that changes to journey time are not considered likely to be sufficient that any significant changes to demand will occur. This is part of the proportionate approach being taken to modelling.

The valuation of user benefit when using a FDA model is based not on consumer surplus, but on change in cost incurred. This is because, with the number of trips fixed, the total value of trips made is also fixed, so the only variable is the cost of making those trips.

This value can then be measured simply as the number of trips multiplied by the change in cost between DM and DS, as is shown in Figure 6. In this chart, the red area represents the DS cost and the combined red and blue area represent the cost in DM.

Figure 6. User Benefit based on Fixed Demand without Dependent Development



Based on this cost change, user benefits can be calculated as:

$$\text{User Benefit} = T_{DM} \times C_{DM} - T_{DS} \times C_{DS}$$

$$= 0.5 \times (T_{DM} + T_{DS}) \times (C_{DM} - C_{DS})$$

This calculation of user benefit is still consistent with the rule of a half, but includes the implied assumption that $T_{DM} = T_{DS}$.

4.2. Dependent Development with a Fixed Demand Model

When FDA modelling is applied to a scheme which includes a dependent development, this assumption of demand being a single constant value for any given OD pair alters. While changes in cost still do not result in changes to demand, the fact that development assumptions differ between DM and DS scenarios means that the fixed level of demand is different in the two scenarios.

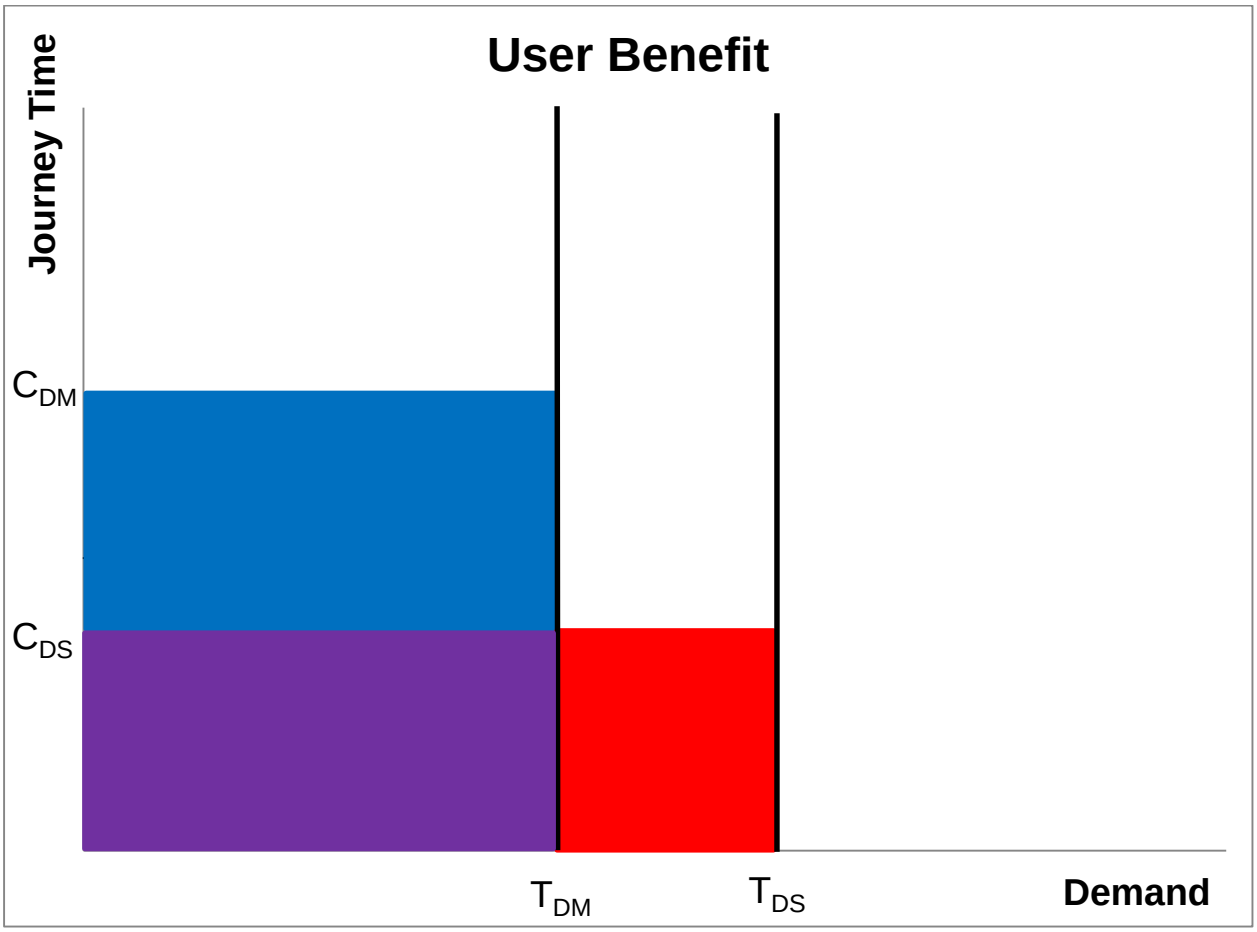
Once again, the value of trips made, in both the DM and DS scenarios, will remain constant regardless of journey cost and so the user benefit is determined only by the change in cost.

In Figures 7, the cost in DM is shown by the sum of the blue and purple areas, while the cost in DS is given by the sum of the purple and red areas. The value of user benefit generated can therefore be calculated as:

$$\text{User Benefit} = T_{DM} \times C_{DM} - T_{DS} \times C_{DS}$$

This formula is consistent with that used to calculate benefits when no development is dependent upon the scheme, but the assumption of demand being fixed between DM and DS scenarios no longer holds and the equivalence to the rule of a half no longer applies.

Figure 7. User Benefit based on Fixed Demand with Dependent Development



For the majority of zones in the FDA model, the demand will not be affected by the proposed development and so the user benefit can be accurately calculated in line with Figure 6. For those zones which do have demand changes, which includes both the zones containing the new development and the other zones from which that demand will have been transferred, the benefit calculation illustrated in Figure 7 will be required.

However, as has been shown, in both cases the formula used to calculate that benefit can be set out as:

$$\text{User Benefit} = T_{DM} \times C_{DM} - T_{DS} \times C_{DS}$$

The network wide benefit will therefore be assessed using this approach, which requires an alternative method to the DfT's TUBA software to be applied.

Atkins has developed such a tool, which applies TUBA methodology but allows for variations to the basic formula used for calculation of benefits, or similar outputs, enabling functions other than the rule of a half to be applied while retaining all other aspects of the programme's calculations. This tool has been validated by applying the rule of a half and making comparison against TUBA outputs for equivalent calculations.

4.2.1. Monetisation of Benefits

Once the value of the change in consumer surplus has been defined for each OD pair and for each modelled year, the economic appraisal will revert to standard WebTAG methodology, in line with that applied by the TUBA software. This will involve:

- Forecasting benefits over a 60 year appraisal period;
- Applying values of time and growth indices to capture the increase in monetary worth of time savings in future years; and
- Discounting benefits to give a present value of benefit in the standard base year of 2010, in order to be directly comparable with benefits forecast for other schemes.

5. Next Steps

The approach outlined in this note provides a proportionate approach to the modelling and appraisal of the Yarnbrook and West Ashton Relief Road. It is recommended that this note is submitted to the LTB's Independent Technical Advisor (ITA) for approval. Confirmation on the approach is needed by the 8th September 2014 to avoid any abortive work. The fee proposal for Phase 2 is based on the approach set out in this note; if the ITA requires a different approach then the proposal and programme will be reviewed and updated accordingly.

Annex C: Distributional Impacts Step 1 Screening

Note that the DI Step 1 Screening is appended to the Distributional Impacts Report, in Appendix F of the A350 Yarnbrook and West Ashton Relief Road OBC.

Atkins
The Hub
500 Park Avenue
Aztec West
Bristol
BS32 4RZ