

# Stafford Western Access Improvements Major Scheme Business Case Main Report

June 2010



**ATKINS**



**Staffordshire  
County Council**

Front cover illustration shows Chell Road, Stafford

*the knot unites*



# STAFFORD WESTERN ACCESS IMPROVEMENTS

## MAJOR SCHEME BUSINESS CASE

JUNE 2010

JOB: Stafford Western Access Improvements			DOCUMENT REF: Major Scheme Business Case			
Revision	Purpose Description	Originated	Checked	Reviewed	Authorised	Date
01	Draft Report	AC	ND	ND	CS	28/05/10
02	Final Report	AC	ND	ND	CS	10/06/10

STAFFORDSHIRE COUNTY COUNCIL DEVELOPMENT SERVICES DIRECTORATE

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# EXECUTIVE SUMMARY

## Scheme Description

The proposed Stafford Western Access Improvements consists of a Western Access Route and complementary sustainable transport measures and will form part of a wider sustainable integrated transport strategy for Stafford for the period up to 2026. The strategy will assist in the delivery of the Stafford growth agenda and assumed Regional Spatial Strategy housing and employment allocations.

The Western Access Route will be a single carriageway highway between Martin Drive and A34 Foregate Street / Greyfriars Place, to afford relief to A518 Chell Road, Tenterbanks, Victoria Road, Station Road and Newport Road. It has been assumed that the Doxey Road bridge over the West Coast Mainline will need to be reconstructed as an integral part of the scheme. Providing this additional highway capacity to the west of the town will enable the removal of through traffic from the town centre, creating improved conditions for bus services, pedestrians and cyclists and opening up further opportunities to provide complementary sustainable transport measures within and to the town centre. It will also help to accommodate future development traffic in Stafford and, in particular, it will improve the access arrangements to potential development sites in western Stafford.

## Scheme Cost

Staffordshire County Council is confident that the cost estimates are realistic and robust. The base cost has been estimated using realistic unit rates and quantities and has taken into account responses from environmental stakeholders, Network Rail, utility companies and an independent property specialist for the public sector. The Quantified Cost Estimate of the Western Access Route has also been agreed by an independent surveyor and is summarised in Table 1.

**Table 1: Summary of Quantified Cost Estimate**

<b>Element</b>	<b>Cost Estimate £'000</b>
Eligible Preparation Costs	1,800
Base Cost	33,035
Quantified Risk Assessment	3,895
Inflation	0
<b>Total</b>	<b>38,730</b>

The funding package assumes a contribution of £33,686,000 from the Department for Transport and a £5,044,000 local contribution. The additional complementary interventions will be financed through Local Transport Plan resources, public transport operators and developer contributions.

## Scheme Background

The Stafford Western Access Improvements is considered to be a priority for the West Midlands Region and the current Regional Funding Allocation programme contains an allocation of £31m for the period 2012/13 to 2015/2016. The County Council is seeking



agreement with the West Midlands Joint Strategy and Investment Board to increase this allocation by £2.686m.

Stafford Borough Council views the bid as timely in the context of their Local Development Framework preparation as it gives a greater level of certainty with respect to the delivery of the Borough's housing and employment requirements. The draft Regional Spatial Strategy recommended the delivery of 8,000 houses in Stafford Town, with a potentially large allocation in western Stafford, and a long term employment requirement for the Borough of 120 hectares. Notwithstanding the anticipated abandonment of the RSS, it is assumed that the local planning authority will support a similar level of growth for Stafford.

Evidence shows that without the provision of additional highway capacity, as part of a wider sustainable transport strategy, the forecast travel demand associated with new housing and employment will lead to congestion which will constrain the development of an effective and economically justifiable transport strategy. Western Stafford is the favoured location for providing additional capacity because of the likely distribution of new development emerging from the Local Development Framework process and evidence base.

The Stafford Western Access Improvements Options Assessment Report (OAR) was produced in March 2010 and follows the Department for Transport's Draft TAG Unit 2.1.2 on Option Development (Stage 1). It assesses nine potential interventions and demonstrates a clear path from identifying the problems in Stafford to arriving at the preferred solution.

A consultation exercise was completed to inform the Options Assessment Report. It included letters and questionnaires to statutory consultees, key stakeholders, elected Members and affected residents. There was also a two day public exhibition in the town centre, a full page advertisement in the local press and a dedicated Staffordshire County Council web page. Widespread interest resulted in the return of over 900 questionnaires, with over 52% of respondents electing for one of the route options. Of those expressing an option, the vast majority went for the option that we have taken forward in this business case.

### **Scheme Objectives**

The scheme objectives are as follows:

1. To provide high quality transport infrastructure required to deliver development in Stafford
2. To reduce congestion on routes into and around the town centre which act as a constraint on regeneration proposals
3. To facilitate improved access by sustainable modes between housing growth areas and the town centre
4. To facilitate improved access to public transport services
5. To improve safety and security for all road users

The objectives of the preferred option fit clearly with Department for Transport's - Delivering a Sustainable Transport System (2008) (DaSTS) which will guide the objectives of the third Local Transport Plan, draft West Midlands Regional Spatial

Strategy (2007), Staffordshire Local Transport Plan (2006) and Stafford Borough Council’s Sustainable Community Strategy (2008).

### Scheme Appraisal

A Stafford SATURN 2007 base year model has been developed by consultants Atkins. The model structure is weekday AM peak hour (08:00 – 09:00) and PM peak hour (17:00 – 18:00) for an average weekday in a neutral month. Calibration and validation of the model demonstrates that it accurately reflects existing traffic movements through the study area and the model is WebTAG compliant as agreed with DfT in April 2010. Journey purposes have been disaggregated, time and distance parameters applied and variable demand modelling undertaken using DIADEM (Dynamic Integrated Assignment and Demand Modelling).

The Options Assessment Report clearly identifies a preferred option which delivers against the intervention objectives and provides the justification for the decision not to take forward a credible lower cost alternative for further consideration. All other highway options were ruled out and it was concluded that a solely sustainable transport solution would not satisfactorily meet the intervention objectives or deliver the Stafford growth agenda in transport terms.

The appraisal follows the principles of NATA (New Approach to Appraisal) aligning to the Government’s five main objectives for transport. The Growth Agenda scenario under variable demand conditions is used in the assessment as it is viewed as the most likely future land use development scenario. The appraisal results are summarised in Table 2. Sensitivity and scenario analysis has been undertaken around the Growth Agenda scenario to examine the impact of changes in costs and benefits on the business case for the scheme. The consistency in results across the different model scenarios demonstrates that the model and appraisal framework is stable. The scheme provides high value for money for all cost-based tests, even with a 15% increase in Optimism Bias.

**Table 2: Assessment Summary**

<b>NATA Objective</b>	<b>Overall Assessment of the Western Access Route</b> <i>(Note: the sustainable transport element of the scheme is not assessed)</i>
Economic Impact	<ul style="list-style-type: none"> <li>• The scheme will provide wider economic benefits</li> <li>• The scheme represents good value for money with a Benefit to Cost Ratio of 2.22</li> <li>• There will be reduced congestion and improved journey times in the town centre</li> </ul>
Environmental Impact	<ul style="list-style-type: none"> <li>• National air quality strategy objectives will not be exceeded</li> <li>• Carbon emissions will reduce, providing £1.57m benefits</li> <li>• Net population annoyed by noise is estimated to be 22</li> <li>• There will be landscape benefits and a neutral impact on the Site of Special Scientific Interest</li> <li>• The potential impact on archaeological remains is low</li> <li>• Evidence suggests the impact on water can be mitigated. Hydrological Assessments will confirm this</li> <li>• There will be large journey ambience benefits</li> </ul>

Safety Impact	<ul style="list-style-type: none"> <li>• There will be reduction in accidents, generating benefits of £3.64m</li> </ul>
Accessibility Impact	<ul style="list-style-type: none"> <li>• Severance for pedestrians will be significantly reduced</li> <li>• The Western Access Route does not improve bus services although complementary public transport measures will be provided in the town as part of the overall scheme</li> </ul>
Integration Impact	<ul style="list-style-type: none"> <li>• Local, regional and national policies will benefit</li> <li>• No wider policies will be hindered</li> </ul>

## Project Management and Delivery

A Project Management System has been established which identifies the Senior Responsible Owner of the project, the decision making processes, roles, responsibilities and accountability. An overall project delivery plan sets out the main project stages and anticipated timescales, and the critical path is summarised in Table 3.

**Table 3: Critical Path of Project**

Critical Path	Timescale
Programme Entry Confirmation	December 2010
Confirmation of Orders	November 2012
Planning Consent	January 2013
Conditional Approval	March 2013
Appoint Contractor	September 2013
Final Approval	December 2013
Commence Construction	May 2014
Opening of Scheme	May 2016

## Managing Risks

The management of the risks will be critical to the successful delivery of this major project. A Quantified Risk Assessment (QRA) has been completed to ensure that all key risks are identified and costed. The Risk Register will be maintained and reviewed regularly throughout the project and revised as necessary as part of Project Board meetings. This will ensure that appropriate mitigation measures are undertaken and any new or previously unforeseen risks are identified.

## Procurement

A number of procurement routes have been considered and the traditional route of advertising in the Official Journal of the European Union (OJEU) has been identified as the most desirable option. It is expected to take place after receiving Conditional Approval for funding and will be advertised as a 'construction only' contract. Staffordshire County Council has a dedicated Corporate Procurement Team that will manage this process.

Appraisal Summary Table – PREFERRED OPTION (Growth Agenda Scenario)				
GROWTH SCENARIO		Description:	Problems	Present Value of Costs to Public Accounts £39.4m
OBJECTIVE	SUB-OBJECTIVE	QUALITATIVE IMPACTS	QUANTITATIVE ASSESSMENT	ASSESSMENT
ENVIRONMENT	Noise	Adverse and beneficial impacts are balanced for existing properties. For the scenario including development proposals there is a small adverse change in Net Noise Annoyance with the scheme. Increases of greater than 5 dB are predicted at 104 properties. Four properties may qualify under Noise Insulation Regulations.	Total population assessed = 9206 Population annoyed without scheme = 778 Population annoyed with scheme = 800	Net population annoyed is +22
	Local Air Quality	No designated Air Quality Management Area. Overall slight deterioration in NO <sub>2</sub> and PM <sub>10</sub> . No exceedances of the annual average NO <sub>2</sub> or PM <sub>10</sub> national air quality strategy objective at 20 metres from the road centreline at any location, in either the do-minimum or Do-something scenario in 2016.	Properties with improvement: 1725 (NO <sub>2</sub> ), 1585 (PM <sub>10</sub> ). Properties with deterioration: 3223 (NO <sub>2</sub> ), 3363 (PM <sub>10</sub> ). Properties with no change: 0 for both NO <sub>2</sub> and PM <sub>10</sub>	Concentrations weighted for exposure: NO <sub>2</sub> 99, PM <sub>10</sub> 47
	Greenhouse Gases	There will be a reduction in carbon emissions due to more efficient car journey times leading to a reduction in fuel consumption. Benefits have been estimated using TUBA through the highway modelling.	-198 tonnes carbon emissions compared to do-min in 2016. Decrease of 0.9% over the appraisal period.	Overall impact PVB = £1.57m
	Landscape	An initial landscaping scheme has been identified. Loss of wet woodland will be compensated by additional planting. Benefits will be gained from a new community amenity area adjacent to the SSSI. Embankments of the route will be sensitively landscaped. Planting will include low maintenance native species. There will be no impact on levels of tranquility in the area.	Not applicable	Slight beneficial
	Townscape	The route passes through the locally distinctive Unicorn building resulting in a minor negative impact, although this area is also a proposed development site. The route diverts traffic away from locally distinctive traditional terraced houses at Castletown. The height of elevated sections will not adversely affect the townscape.	Not applicable	Slight adverse
	Heritage of Historic Resources	Appropriate archaeological mitigation will be implemented. There will be a reduction in traffic in the Foregate Conservation Area. Impact on the SSSI water meadow and dismantled railway lines is neutral. There is an unknown level of archaeological remains, but the potential is low. No pre-determination archaeological investigations are required.	Not applicable	Slight adverse
	Biodiversity	Mitigation measures have been discussed with Natural England. An area of SSSI will be restored and an amenity area for the Nature Reserve will be provided. The route will impinge on a small area of willow carr woodland. The River Sow bridge will cater for other movement and impact on bats. Disturbed areas will be replanted with native species. A habitat survey will confirm presence of protected species.	Not applicable	Neutral
	Water Environment	No impact on Source Protection Zones but does cross floodplains. The road drainage system will manage run-off rates and ensure no discharges into water courses. There will be consultation with Environment Agency, Drainage Board and Natural England to agree working methods. As a detailed hydrological assessment has yet to be completed, a slight adverse impact on the water environment cannot be ruled out.	Not applicable	Slight adverse

	<b>Physical Fitness</b>	The additional number of pedestrians and cyclists is expected to be insignificant as a result of new walking and cycling facility along the access route. However, sustainable complementary measures are likely to encourage additional walk and cycle journeys.	Additional walking and cycling has been calculated to be negligible	Neutral
<b>SAFETY</b>	<b>Journey Ambience</b>	Frustration will be reduced as road layout, geometry, network conditions and ability to make good progress are all better with the route. Fear of accidents will reduce as the new highway will be built to high design standards and avoids areas of high pedestrian movement.	AADT for this route is over 10,000	Large beneficial
	<b>Accidents</b>	Casualty savings are calculated in COBA, based on a 60 year assessment period. Benefits are concentrated on the area around the scheme, particularly in the town centre.	A reduction of 36 accidents and reductions of 3, 18 and 59 fatal, serious and slight injuries respectively.	PVB = £33.64m
	<b>Security</b>	Existing routes in the town are well lit with CCTV and good informal surveillance. New route will be designed to a high standard as regards security with good informal surveillance as passing through existing residential and retail areas.	Not quantified	Neutral
<b>ECONOMY</b>	<b>Public Accounts</b>	The scheme will be funded 13% from local contributions and 87% DfT contribution.	Central Government PVC = £34.3m Local Government PVC = £5.15m	PVC = £39.4m
	<b>Transport Economic Efficiency: Business Users &amp; Transport Providers</b>	Journey time and vehicle operating cost savings through reduced congestion for both private vehicle users, freight and public transport users.	Business Users PVB £33.8m Transport Providers PVB £0m	PVB = £33.8m
	<b>Transport Economic Efficiency: Consumers</b>		Users PVB £48.5m	PVB = £48.5m
<b>ACCESSIBILITY</b>	<b>Reliability</b>	There will be improved journey time reliability due to the reduction in congestion in the town centre and the improvements in journey times.	Monetary benefits have not been calculated	Beneficial
	<b>Wider Economic Impacts</b>	An Economic Impact Report is not required as the Regional Economic Strategy does not identify Stafford as a Regeneration Zone. However it is a settlement of significant development, local regeneration area and has growth point status. The scheme will increase accessibility for disadvantaged areas and supports town centre regeneration.	Not applicable	Slight Beneficial
	<b>Option values</b>	This scheme will not create a step change in the service level of a transport mode. However, complementary sustainable transport measures will be provided within and to the town centre as part of an integrated transport strategy.	Not applicable	Neutral
<b>INTEGRATION</b>	<b>Severance</b>	Changes in severance occur in a number of locations. More locations experience an improvement in severance than a negative impact. The main improvement is on Chell Road where, within a 12 hour period, 5069 people crossed in one direction and 4833 people crossed in the other direction.	The total number of people affected across all levels of severance is greater than 1000	Large beneficial
	<b>Access to the Transport System</b>	The scheme does not include any proposed improvements or alterations to bus services. However complementary sustainable transport measures will be provided within and to the town centre as part of an integrated transport strategy.	Not applicable	Neutral
	<b>Transport Interchange</b>	The scheme does not make changes to interchange facilities in Stafford. However complementary sustainable transport measures will be provided within and to the town centre as part of an integrated transport strategy.	Not applicable	Neutral
	<b>Land-Use Policy</b>	The scheme will benefit a range of local, regional and national land use and transport policies. No policies will be hindered.	Not applicable	Beneficial
	<b>Other Government Policies</b>	The bid will help policies of the DfT, DCLG, and wider policies on Health, Education and Economy, and other local and regional policies. It is not expected to hinder policies.	Not applicable	Beneficial

### Local Authority Major Schemes: Initial Application for Funding Approval

This pro-forma should be used by Local Authorities making an initial bid for funding approval for a major transport scheme within the terms of DfT's "Guidance for Local Authorities seeking Government funding for major transport schemes" published in August 2007.

The application for funding approval should comprise:-

1. This covering form
2. The Major Schemes Checklist (Appendix B of the above guidance)
3. A Major Scheme Business Case, as defined by the guidance
4. Electronic versions of the appraisal pro-forma at Appendix F of the guidance

<b>Lead Scheme Promoter:</b>	Staffordshire County Council	<b>Region:</b>	West Midlands
<b>Lead Scheme Promoter (if not in the list above)</b> Please type the name in this box:			
<b>Other Scheme Promoter:</b>			
<b>Scheme Name:</b>	Stafford Western Access Improvements		
<b>Has an application for DfT funding been previously submitted for this scheme or any variant of it? If so, please provide details including Scheme Name.</b>	No		
<b>Type of Funding (e.g. LTP Major, TIF, CIF etc.)</b> If 'Other' Please specify:	LTP Major Scheme		
<b>Scheme Type:</b>	Road		
<b>Subtype:</b>	Other Road		
<b>Scheme Description</b> (no more than 100 words):	The proposed scheme consists of a new single carriageway highway link, approximately 1.2km long, between the A518 Newport Road and A34 Foregate Street. It is an intrinsic part of a sustainable integrated transport strategy for the period to 2026 relieving town centre congestion and facilitating extensive sustainable transport measures. It will assist in the delivery of the Stafford growth agenda and Regional Spatial Strategy housing and employment allocations. In particular, it will improve the access arrangements to potential development sites in western Stafford.		
<b>Has an Economic Impact Report been included (Y/N)?</b>	No		
<b>Approval Sought:</b>	Programme Entry		
<b>Name and contact details of LA officer responsible for submitting bid:</b>	LA Nick Dawson, Group Manager Transport Planning and Strategy, Development Services Directorate, Staffordshire County Council, Riverway, Stafford, ST16 3TJ, 01785 276629, nick.dawson@staffordshire.gov.uk		
<b>Name and contact details of the Senior Responsible Officer:</b>	Deputy Corporate Director Staffordshire Highways, David Wilson, Development Services Directorate, Staffordshire County Council, Riverway, Stafford, ST16 3TJ, 01785 277200, david.wilson@staffordshire.gov.uk		

Year	Preparatory Costs (£m)	Please select the year from the drop-down lists						Total (£m)
		2013/14 (£m)	2014/15 (£m)	2015/16 (£m)	2016/17 (£m)	(£m)	(£m)	
DR Contribution requested (see note below)	973	3,363	16,688	11,154	1,508			33,686
LA Contribution	973	28	878	2,788	377			5,044
Developer Contribution								0
Others								0
<b>Total funding requirement</b>	<b>1,946</b>	<b>3,391</b>	<b>17,566</b>	<b>13,942</b>	<b>1,885</b>	<b>0</b>	<b>0</b>	<b>38,730</b>

The DR contribution should **exclude** VAT and optimism bias but should **include** costs estimated from a ORA.  
All figures should **include** inflation.  
Please state what inflation assumption(s) have been used: 0% between 2008 Q2 and 2016 Q3 based on latest construction price trend information

Please provide estimated timescale in months (giving a range if necessary). (If prices are expected to be known by the time powers are in place e.g. in case of Early Contractor involvement, please leave the middle question blank).  
Please ensure these timescales are consistent with the spending profile supplied above.

Between Programme Entry being granted and all necessary powers being in place (as necessary for Conditional approval):	23
Between Conditional Approval being granted and Contractor prices being known (as necessary for Full approval):	7
Between Full Approval and completion of scheme:	29

Authorities should submit this form electronically and in hard copy along with five hard copies and five CD-ROM versions of the MSBC to:-

Regional and Local Major Projects Division  
Department for Transport  
Room 3/18  
Great Minster House  
76 Marsham Street  
London SW1P 4DR

Three hard copies and three CD-ROM versions should also be sent to the relevant Government Office.

One of the DIT hard copies should be clearly marked as the 'original' or 'master' copy.

The CD-ROM copies should include completed versions of the appraisal pro-forma (AST, TEE tables etc.) which can be found at Appendix F of the guidance.

# MAJOR SCHEME BUSINESS CASE CHECKLIST

## Scheme Description

Item	Section/Page
A detailed physical description of the scheme, and the other appraised option(s), including maps, scale diagrams and a written commentary.	Chapter 4 (p19). Figure 4.2. Appendix 4.1

## Strategic Case

Item	Section/Page
The objectives of the scheme	Section 5.2 (p30)
A description of the process by which the scheme came to be identified as the preferred option for meeting those objectives	Chapter 2 (p17), Section 6.1.3 (p39), App 2.1, 2.2 and 6.1
How the objectives of the scheme align with wider local objectives, particularly those of the relevant Local Transport Plan.	Section 5.3.2 (p33), App 2.1(p9-10), App 5.1, 5.2, 5.3
How the objectives of the scheme align with sub-regional and regional objectives, (except for schemes of predominantly local significance)	Section 5.3.1 (p31), App 2.1 (p6-8), App 5.1
Written endorsement from regional bodies	Chapter 1 (p16)

## Value For Money

### Cost Benefit Analysis

Item	Section/Page
A clear explanation of the underlying assumptions used in the Cost Benefit Analysis.	Section 6.1 (p35)
Information on local factors used. For example the derivation of growth factors, M factors in COBA and annualisation factors in TUBA (to include full details of any calculations).	Section 6.1.2 (p38), App 6.5 (para 4.31)
A diagram of the network (if COBA used).	Figures 6.9 and 6.10
Information on the number of junctions modelled (if COBA used), for both the do-minimum and the do-something.	N/A
Details of assumptions about operating costs and commercial viability (e.g. public transport, park and ride, etc.).	N/A
Full appraisal inputs/outputs (when used, COBA and/or TUBA input and output files should be supplied).	Can be provided on request
Details of the maintenance delay costs/savings.	Section 6.1.1 (p35),



	Section 6.3.3 (p69), Table 4.1 (p25)
Details of the delays during construction.	Section 6.1.1 (p35), Section 6.3.3 (p69), Section 4.9 (p25)

## NATA Assessment

Item	Section/Page
Evidence of consultation with key stakeholders (including any NGOs consulted and responses).	Section 6.3.8 (p90), Section 7.6 (p95), App 5.3, 6.10, 6.11, 6.13, 7.3, 7.4, 7.5
Assessment of Environmental impacts, to include an environmental constraints map.	Section 6.3.1 (p48), App 6.7
Assessment of Safety impacts and the assumed accident rates presented (COBA output should be provided if an accident only COBA has been run).	Section 6.3.2 (p64), COBA output provided on request
Assessment of Economic impacts.	Section 6.3.3 (p69)
Assessment of Accessibility impacts.	Section 6.3.4 (p77)
Assessment of Integration impacts.	Section 6.3.5 (p79)
A comprehensive Appraisal Summary Table.	Section 6.3 (p81)
The following supporting analyses:	
Distribution and Equity.	Section 6.3.7 (p83), App 6.8 and 6.9
Affordability and Financial Sustainability.	Section 6.3.6 (p83), App 6.6
Practicality and Public Acceptability (Evidence of public consultation supplied).	Section 6.3.8 (p90), App 5.2, 6.10, 6.11, 6.12, 6.13
Contribution to 10 year plan targets.	N/A
NATA worksheets.	Appendix 6.6

## Modelling

Item	Section/Page
An Existing Data and Traffic Surveys Report to include:	
Details of the sources, locations (illustrated on a map), methods of collection, dates, days of week, durations, sample factors, estimation of accuracy, etc.	App 6.2: Sec 3 / 4, p4-12
Details of any specialist surveys (e.g. stated preference).	App 6.2: p6-12, para 4.3-4.24

Traffic and passenger flows; including daily, hourly and seasonal profiles, including details by vehicle class where appropriate.	App 6.3: p15-17, para 4.10-4.17
Journey times by mode, including variability if appropriate.	App 6.2: p14-16. para 5.11-5.17. App 6.10: Tables 5.1 / 5.2 (p26-27)
Details of the pattern and scale of traffic delays and queues.	App 2.1: Fig 2.2 / 2.3. App 2.2: Fig 2.4 / 2.5. App 6.4 App D
Desire line diagrams for important parts of the network.	App 6.3: App B
Diagrams of existing traffic flows, both in the immediate corridor and other relevant corridors.	App 6.3: Fig 4.6 (p23)
An Assignment Model Validation Report to include:	
Appendix 6.4	
Description of the road traffic and public transport passenger assignment model development, including model network and zone plans, details of treatment of congestion on the road system and crowding on the public transport system.	Section 3, p30-38
Description of the data used in model building and validation with a clear distinction made for any independent validation data.	p10-19, para 2.13-2.47
Evidence of the validity of the networks employed, including range checks, link length checks, and route choice evidence.	p39 para 4.3-4.8, p48-52 para 4.26-4.29
Details of the segmentation used, including the rationale for that chosen.	Para 2.8 (p9), Para 3.34-3.36 (p36-37)
Validation of the trip matrices, including estimation of measurement and sample errors.	Para 5.8-5.9 (p62-65)
Details of any 'matrix estimation' techniques used and evidence of the effect of the estimation process on the scale and pattern of the base travel matrices.	Para 4.11-4.21 (p40-47)
Validation of the trip assignment, including comparisons of flows (on links and across screenlines/cordons) and, for road traffic models, turning movements at key junctions.	Para 5.3-5.7 (p61-62) & Para 4.35-4.48 (p54-60)
Journey time validation, including, for road traffic models, checks on queue pattern and magnitudes of delays/queues.	Para 5.10-5.17 (p65-68)
Detail of the assignment convergence.	Para 4.22-4.25 (p48)

Present year validation if the model is more than 5 years old.	N/A
A diagram of modelled traffic flows, both in the immediate corridor and other relevant corridors.	App 6.5 Fig 6.2 (p36)
A Demand Model Report to include:	Appendix 6.5
Where no Variable Demand Model has been developed evidence should be provided to support this decision (e.g. follow guidance in WebTAG Unit 3.10.1 Variable Demand Modelling - Preliminary Assessment Procedures).	N/A
Description of the demand model.	Para 2.1-2.12 (p7-9) & Para 5.17-5.21 (p24-26)
Description of the data used in the model building and validation.	App 6.4 Para 2.13-2.47 (p10-19)
Details of the segmentation used, including the rationale for that chosen. This should include justification for any segments remaining fixed.	Para 2.6-2.8 (p7-8) & 5.21 (p26) LMVR Para 3.34-3.36 (p36-37)
Evidence of model calibration and validation and details of any sensitivity tests.	Appendix E Section 4.2
Details of any imported model components and rationale for their use.	N/A
Validation of the supply model sensitivity in cases where the detailed assignment models do not iterate directly with the demand model.	N/A (DIADEM iterates directly with SATURN)
Details of the realism testing, including outturn elasticities of demand with respect to fuel cost and public transport fares.	Appendix E (in particular - Section 4.4)
Details of the demand/supply convergence.	Para 5.26-5.31 (p27-28)
A Forecasting Report to include:	Appendix 6.5
Description of the methods used in forecasting future traffic demand.	Para 2.9-2.12 (p8-9) & Para 4.1 – 4.29 (p13-19)
Description of the future year demand assumptions (e.g. land use and economic growth - for the do-minimum, core and variant scenarios).	Para 4.14-4.29 (p15-19)
Description of the future year transport supply assumptions (i.e. networks examined for the do minimum, core scenario and variant scenarios).	Para 3.1-3.13 (p11-12)

Description of the travel cost assumptions (e.g. fuel costs, PT fares, parking).	Para 5.7-5.16 (p22-24)
Comparison of the local forecast results to national forecasts, at an overall and sectoral level.	Appendix B
Presentation of the forecast travel demand and conditions for the core scenario and variant scenarios including a diagram of forecast flows for the do-minimum and the scheme options for affected corridors.	Section 6 and 7 (p32-54)
If the model includes very slow speeds or high junction delays evidence of their plausibility.	N/A
An explanation of any forecasts of flows above capacity, especially for the do-minimum, and an explanation of how these are accounted for in the modelling/appraisal.	N/A
Presentation of the sensitivity tests carried out (to include optimistic and pessimistic tests).	Section 7 (p51-54)

## Delivery

Item	Section/Page
<b>Governance</b>	
Named Senior Responsible Owner (SRO)	p7, App 7.1
Proposed Governance Structure	Section 7.2 (p93), Figure 7.1, App 7.1
Composition of Project Board	Appendix 7.1 (Sections 2.2 and 2.3)
Details of resourcing level for the scheme	Appendix 7.1 (Section 2.3)
<b>Project Planning</b>	
Project Plan (e.g. in GANNT chart form)	Figure 7.2
List of key milestones and dates	Section 7.3 (p94), Table 7.1
Clear critical path and dependencies	Section 7.3 (p94), Table 7.1, Figure 7.2
<b>Risk Management</b>	
Risk Register with likelihood, probability and mitigation measures, including Quantified Risk Assessment.	Section 7.5 (p95), Appendix 7.2
Description of proposed Risk Management process and escalation procedures.	Section 7.5 (p95), Appendix 7.2
<b>Stakeholder Management</b>	
Identification and analysis of key stakeholders and their interests.	Section 7.6 (p95), Table 7.2 (p96), App 7.3

Description of public consultation already carried out.	Section 7.6 (p95), App 6.10
Plans for future consultation and stakeholder management.	Section 7.6 (p95)
Evidence of consultation with Statutory Bodies (Natural England, English Heritage and Environment Agency) and their responses.	Appendix 7.4
<b>Evaluation</b>	
Statement of core evaluation objectives	Section 7.7 (p97)
<b>Assurance (schemes with gross cost of £50m or more)</b>	
Confirmation of date Gateway Review carried out (or planned).	Section 7.4 (p94)

## Commercial

Item	Section/Page
Preferred procurement route with rationale for choice	Chapter 8 (p98)
For ECI proposals, contract type and risk sharing arrangement	Chapter 8 (p98)
Details of proposed risk sharing approach (for other than traditional procurement)	Chapter 8 (p98)

## Financial

Item	Section/Page
Detailed cost breakdown	Chapter 9 (p100), App 9.2
Evidence of how cost estimates have been derived	Chapter 9 (p100), App 9.2
Independent surveyor's report verifying cost estimates	Appendix 9.3
Details of and justification for inflation assumption used.	Section 9.5 (p101)
Costing for risk based on QRA	Section 9.6 (p102)
Estimate of eligible preparatory costs	Section 9.3 (p101)
Details of measures to secure necessary third party contributions, if applicable	N/A
Description and estimate of any ongoing revenue liability (other than routine maintenance) and proposals to meet it	Section 6.3.6 (p83)
Section 151 Officer sign-off for cost estimates	Appendix 9.1

# 1. INTRODUCTION

This is the Full Major Scheme Business Case for the Stafford Western Access Improvements which has been produced by Staffordshire County Council and term consultants Atkins. This proposal is included in the West Midlands Regional Funding Allocation as a potential major scheme for preparation and commencement before 2014. The draft West Midlands Regional Spatial Strategy identifies Stafford as a Settlement of Significant Development. The town has also been recognised as a Growth Point by Central Government and is identified as an Impact Investment Location in Regional Funding Advice.

The Stafford Western Access Improvements consists of a Western Access Route and complementary sustainable transport measures which are an intrinsic part of the sustainable integrated transport strategy for Stafford for the period to 2026. The Western Access Route will enable the removal of through traffic from the town centre, creating improved conditions for bus services, pedestrians and cyclists and opening up further opportunities to provide complementary sustainable transport measures within and to the town centre. It will also help to accommodate future development traffic in Stafford and, in particular, it will improve the access arrangements to potential development sites in the west. This submission relates solely to the Western Access Route; Staffordshire County Council will secure funding for the complementary measures through its own resources and other third party contributions.

Staffordshire County Council is confident that the business case provides enough level of detail to achieve DfT approval for Programme Entry. The business case indicates that the scheme has a reasonable prospect of achieving high value for money and is supported by key stakeholders.

This business case follows the principles of NATA (New Approach to Appraisal) aligning to the Government's five main objectives for transport (environment, safety, economy, accessibility and integration) as formulated in 1998. Although the recently updated appraisal draft guidance has not been used in full, the business case provides evidence that the proposed scheme will be in line with the Government's new goals for transport (tackle climate change; support economic growth; promote equality of opportunity; improve quality of life and promote a healthy, natural environment; and better safety, security and health) as articulated in DaSTS (Delivering a Sustainable Transport System).

This bid has taken into account Draft DfT guidance published in September 2009 regarding the development of options (TAG Unit 2.1.2). The Stafford Western Access Improvements Stage 1: Options Assessment Report is provided in Appendix 2.1. It describes how the scheme has arisen from a robust option appraisal process designed to meet specific objectives, provides a NATA assessment of all options and recommends a preferred option for further appraisal. The Options Assessment Report also explains why the County Council has concluded that there is no credible lower cost alternative that can be justified for further consideration.

This main report is therefore considered to be Stage 2 of the Major Scheme Business Case providing:

- A summary of the conclusions of the Options Assessment Report (full report included in Appendix 2.1)
- A full description of the preferred scheme at a level of detail required for Programme Entry
- A cost breakdown that has been informed by a robust base estimate and Quantified Risk Assessment
- A full NATA assessment for the preferred scheme and most likely land use scenario
- Evidence to show that the scheme represents good value for money
- A description of the SATURN variable demand modelling methodology (DIADEM) which has been confirmed by the DfT to be WebTAG Compliant (Appendix 3.1)
- Confirmation that the proposed scheme has local support from key stakeholders
- Evidence that Staffordshire County Council can successfully procure, manage and deliver the proposed scheme

The scheme meets the following criteria for Programme Entry:

- Promoted by Staffordshire County Council
- Prioritised by Government Office for West Midlands and is included within the Regional Funding Allocation programme
- The County Council is seeking agreement with the West Midlands Joint Strategy and Investment Board to increase the Regional Funding Allocation by £2.686m from £31m to £33.686m
- Supportive of, and aligned with, the Local Transport Plan and identified in the current LTP2 and Draft LTP3
- Supported by a local contribution of 13% of the total scheme cost. This contribution is underwritten by the local authority (See Appendix 9.1). The local authority is also prepared to meet the necessary share of any cost overrun
- Total scheme cost is over £5 million

The County Council is aware that Regional Funding Allocations are currently being reviewed for the period beyond 2010/11. The outcome of this review will not be known until the end of 2010 which may delay the decision regarding Programme Entry. The Project Plan submitted as part of the bid follows current guidance that states Programme Entry is expected to be confirmed within 6 months of submitting the bid. Staffordshire County Council is fully committed to the delivery of this scheme and is confident that delivery can still be achieved by 2016 even with this likely delay in achieving Programme Entry.

## 2. OPTIONS ASSESSMENT REPORT

The Options Assessment Report was produced in March 2010 and follows the Department for Transport's Draft TAG Unit 2.1.2 on Option Development (Stage 1). It demonstrates a clear path from identifying the problems in Stafford to arriving at the preferred solution. The report is provided in Appendix 2.1 and covers the following:

- The need for an intervention including the requirement to accommodate strategic land use options for housing and employment development to achieve the Stafford growth agenda
- Appraisal Summary Tables and initial scheme designs for nine different transport intervention options formulated to relieve town centre transport problems and deliver development growth to 2026. All interventions are compared against a realistic do-minimum option
- The justification for the selection of the Preferred Option and why a credible lower cost alternative is not being taken forward as part of this business case.

Plans showing all options are provided in the Options Assessment Report. The result of the appraisal identifies that Option F (Green) should be taken forward as the Preferred Option. It has the highest Benefit to Cost Ratio and achieves 85% of the intervention objectives. The appraisal also concludes that this option delivers the best operational conditions (lowest degree of congestion) in the AM and PM peak hours and it is expected that any environmental implications can be satisfactorily mitigated.

Major scheme business cases often identify a sustainable transport package as their credible lower cost alternative. The Options Assessment Report provides robust evidence to demonstrate that a non-road building solution is not capable of delivering the objectives of the intervention. A solely sustainable transport option for Stafford was considered in detail in a major scheme business case submitted to the DfT and Department for Communities and Local Government for Community Infrastructure Fund (CIF2) in 2009, and is provided in Appendix 2.2. With an outturn cost of £4.028m, this option constitutes the lowest cost alternative but cannot be considered 'credible' since it only achieves 50% of the intervention objectives and impacts negatively on highway users, in particular business users, and ultimately the local economy. It cannot, on its own satisfactorily deliver the Stafford growth agenda in transport terms. However, alongside the Western Access Route, the measures modelled in that submission are likely to provide significant benefits and are still likely to be delivered through local resources.

The consultation exercise revealed that 48% of consultees favoured a do-nothing scenario and of those who expressed a preference, the preferred route in this business case was by far the most popular option. Staffordshire County Council does not consider doing nothing to be a realistic course of action as Stafford needs an integrated and sustainable transport strategy to deliver its Regional Spatial Strategy allocation and growth point ambitions. The 2031 do-minimum traffic situation is summarised in the Options Assessment Report. It shows that if development takes place with only minimal transport intervention, there will be a high level of congestion in the AM and/or PM peak periods along routes within and to the town centre.



## **3. APPRAISAL SPECIFICATION SUMMARY**

### **3.1 Options to be Appraised**

The Options Assessment Report clearly identifies a preferred option which delivers against the intervention objectives but does not justify a credible lower cost alternative for further consideration. However, three cost-based sensitivity tests and four land use scenario tests have been undertaken around the Growth Agenda / Central Case scenario to examine their impact on costs and benefits.

### **3.2 Modelling Approach**

The intervention options were all compared in the Options Assessment Report using a fixed demand highway model with an 'elastic' function to model potential trip suppression. In contrast, this further appraisal of the preferred option has used a WebTAG compliant variable demand DIADEM model, as agreed with DfT in April 2010.

### **3.3 Detail of Costs and Design**

Following the Options report, design details have been revisited and ground investigations and survey work has been undertaken to inform this appraisal of the preferred option. There has also been further consultation with key stakeholders and a rigorous Quantified Risk Assessment, all of which has led to the production of a robust Quantified Cost Estimate. The following factors principally explain the £2.686m cost variation between the previous estimate and the current QCE for the scheme:

- The cost of the structures has been revised to take into account Network Rail requirements
- Environmental mitigation measures have increased to ensure support for the scheme from Environmental Agency and Natural England and to make sure there is a neutral impact on the nearby Site of Special Scientific Interest
- Land acquisition costs have been revised following advice received by an independent property specialist for the public sector (The District Valuer)
- As a result of the consultation process, a minor route re-aligned has been made to reduce the impact of the road on existing communities
- Amendments to the scheme design have been made to meet the requirements of Central Networks regarding the clearance required for an overhead electricity cable

### **3.4 Scope for Proportionality in the Assessment of Sub Objectives**

The Options Assessment Report has identified the likely severity of impacts on the NATA sub objectives and this has informed the scope for proportionality in this full appraisal. The Options Assessment Report identifies where the likely 'larger' impacts will be (both beneficial and adverse) and sufficient evidence is provided to conclude that this further appraisal can 'assume a neutral impact' for sub-objectives on Security, Options Value, Access to the Transport System and Transport Interchange. An Economic Impact Report has not been completed, as job creation is not the key driver of this scheme and the West Midlands Regional Economic Strategy does not identify Stafford as a Regeneration Zone.

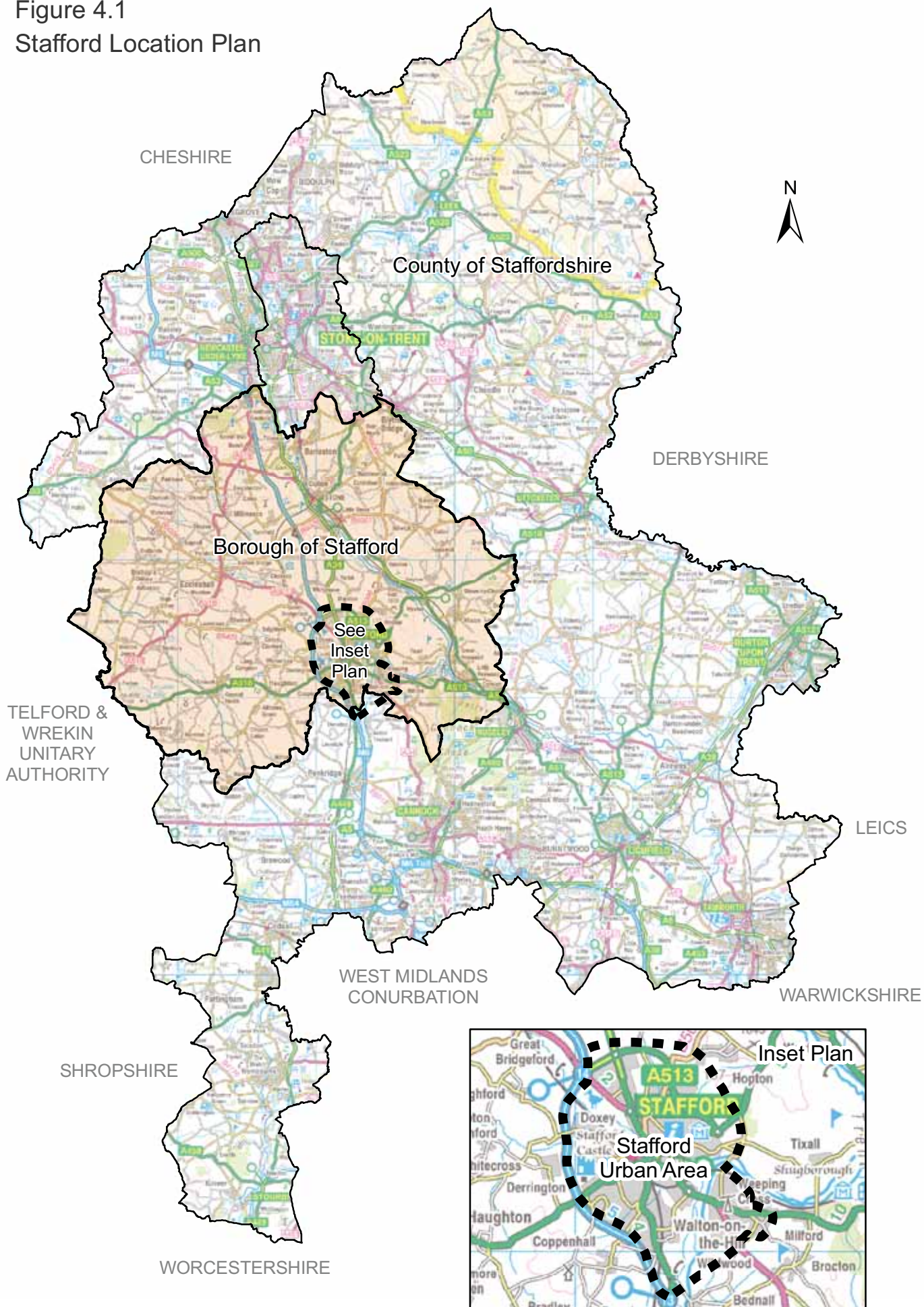
## **4. SCHEME DESCRIPTION**

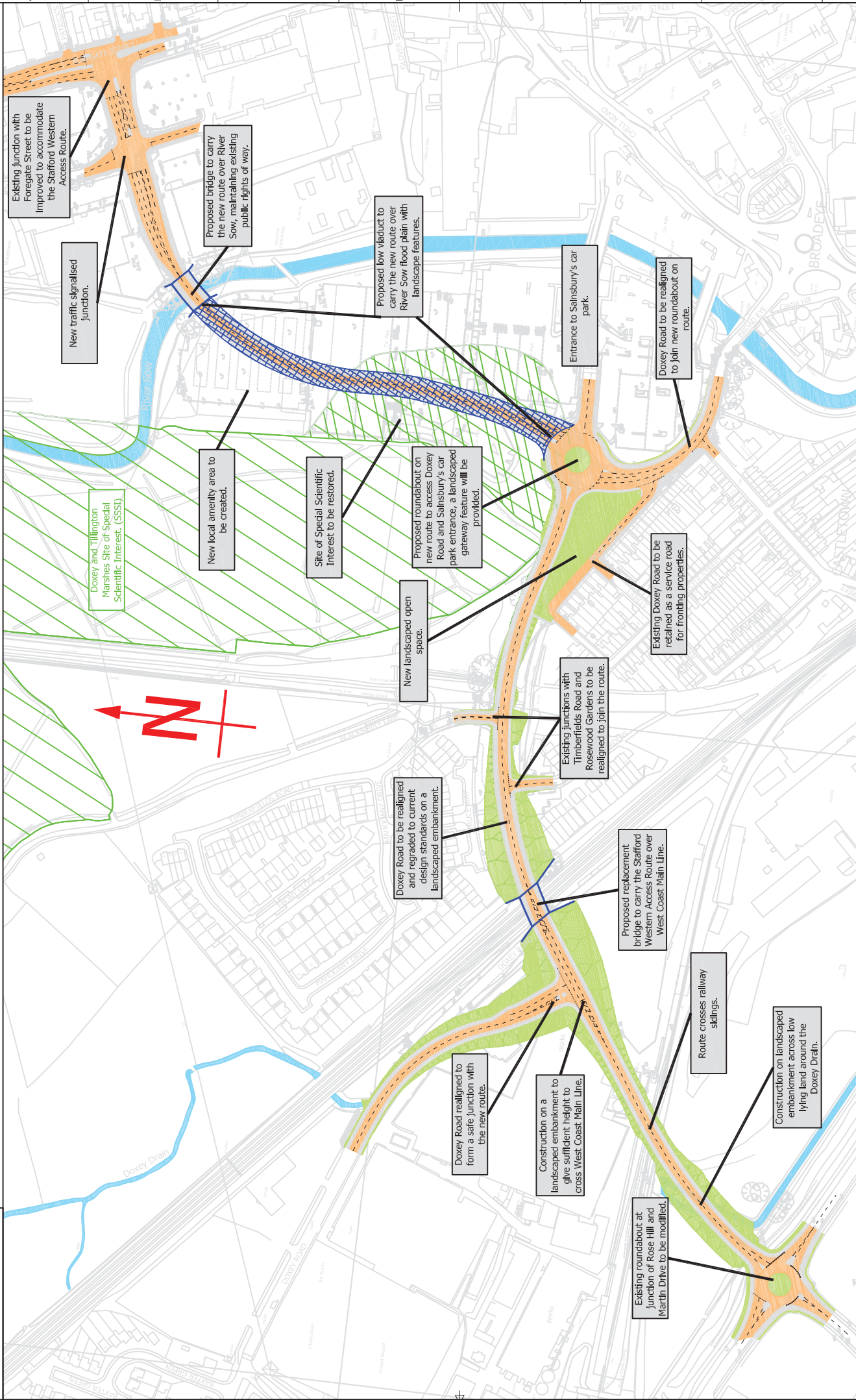
### **4.1 Introduction**

Stafford Borough occupies a strategic position to the north of the West Midlands Region and Stafford is the County Town of Staffordshire. The M6 runs north-south to the west of Stafford providing connections to Stoke-on-Trent, Birmingham, Manchester, the M54, the M42 and the M6 Toll. The location of Stafford is shown on Figure 4.1 and the preferred option for the Western Access Route is located within Stafford urban area to the west of the town centre.

The Stafford Western Access Improvements consists of a Western Access Route and complementary sustainable transport measure. The proposed scheme for the access route is a 7.3 metre wide, two lane, single carriageway road, approximately 1.2 kilometres in length between the junction of Martin Drive/Rose Hill and the A34 Foregate Street. It includes 3 metre wide footway/cycleways on both sides of the road for the full length. The road will be street lit to current design standards, minimising light pollution and will be subject to a 30 mph speed limit. A review of existing footway and cycleway links between the Martin Drive/Rose Hill junction and the A518 Newport Road will also be undertaken. The detailed alignment is shown on Figure 4.2.

Figure 4.1  
Stafford Location Plan





<p><b>Richard Briggs</b>                  CORPORATE DIRECTOR (DEVELOPMENT SERVICES)                  DEVELOPMENT SERVICES DIRECTORATE                  RIVERWAY                  STAFFORD, ST16 3TD</p> <p><small>Any copyright or other material on this drawing is reproduced with the permission of the Council. It is the responsibility of the Controller of the Highway's Unauthorised reproduction infringes Crown Copyright and may lead to prosecution. Staffordshire County Council Licence No. 10001982</small></p>		<p><b>Staffordshire</b>                  County Council</p>																													
<p><b>Scheme Title:</b>                  Stafford Western Access Route</p>		<p><b>Drawing Title:</b>                  General Arrangement Preferred Route</p>																													
<p><b>Figure 4.2</b></p>		<p><b>Amendments</b></p> <table border="1"> <tr> <th>No</th> <th>Date</th> <th>By</th> <th>Drawn</th> </tr> <tr> <td>F</td> <td></td> <td></td> <td></td> </tr> <tr> <td>E</td> <td></td> <td></td> <td></td> </tr> <tr> <td>D</td> <td></td> <td></td> <td></td> </tr> <tr> <td>C</td> <td></td> <td></td> <td></td> </tr> <tr> <td>B</td> <td></td> <td></td> <td></td> </tr> <tr> <td>A</td> <td></td> <td></td> <td></td> </tr> </table>		No	Date	By	Drawn	F				E				D				C				B				A			
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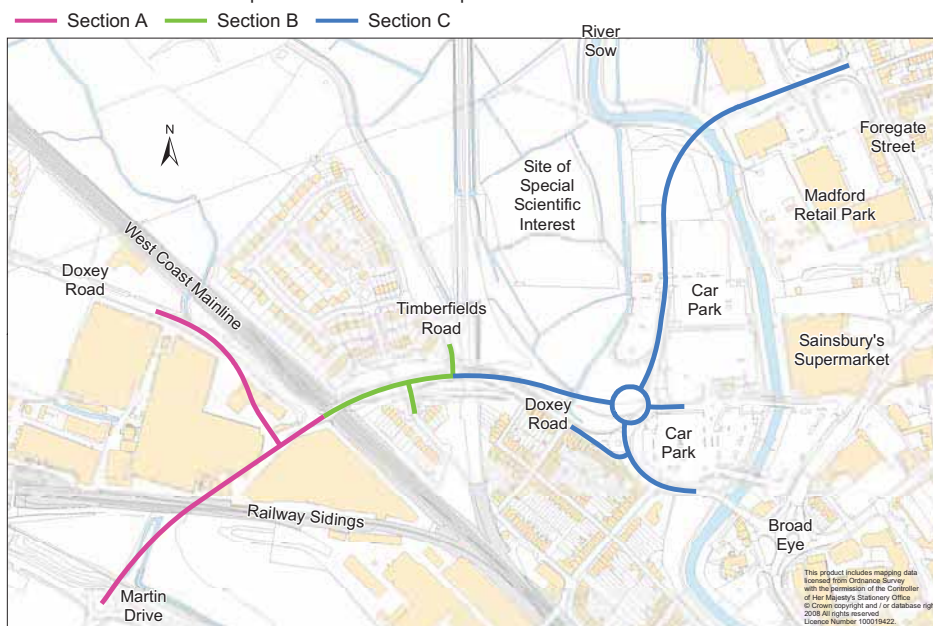
The description of the proposed option has been separated into three sections as shown on Figure 4.3.

**Section A:** A34 Foregate Street to Timberfields Road/Doxey Road Junction (approximately 700 metres)

**Section B:** Along Doxey Road from Timberfields Road including Doxey Road Railway Bridge (approximately 160m)

**Section C:** Doxey Road (west of the Railway Bridge) to Martin Drive, Castlefields (approximately 320 metres)

Figure 4.3  
Stafford Western Access Improvements: Preferred Option



## 4.2 Section A: A34 Foregate Street to Timberfields Road/Doxey Road Junction

The A34 existing traffic signal controlled junction will be improved. This will involve the widening of Greyfriars Place to provide three lanes out onto A34 Foregate Street and two lanes in from A34 Foregate Street, and signals linked to the Stafford urban traffic control system. An initial design for this junction is provided in Appendix 4.1. The route links through Madford Retail Park to the River Sow. Half of this section through the retail park is privately owned and half of it follows existing highway owned by the County Council.

Within Madford Retail Park there is an existing mini roundabout junction that will be replaced with a new traffic signal controlled junction linked to the traffic signal controlled junction on the A34. Consideration will be given to the provision of new public transport infrastructure to improve access to Madford Retail Park as part of the package of complimentary measures described in Section 4.10.

A new bridge will be constructed over the River Sow and the public rights of way alongside the river will be maintained under the bridge. All public rights of way affected by the scheme are shown on Figure 4.4. Sufficient clearance will be maintained

between the new road and an existing overhead electricity pylon which links across the Doxey Marshes and the new access route.

From the River Sow, a low viaduct will be constructed in a southerly direction to Doxey Road. Two thirds of this land is owned by Stafford Borough Council and a third is privately owned. The viaduct will be raised on supporting columns above the River Sow flood plain and the design will be agreed with the Environment Agency in line with a Flood Risk Assessment. This section of the road also affects the edge of Doxey and Tillington Marshes Site of Special Scientific Interest (SSSI) however the section of the SSSI that the route runs across is already damaged and is currently a car park. Natural England advise that road construction should be used as an opportunity to restore habitats and improve access and facilities for the community. This is included in the scheme design to compensate for the potential impact of the road on the SSSI.

A new roundabout junction is proposed on Doxey Road at the entrance to Sainsbury's supermarket and an initial design is included in Appendix 4.1, taking into account the results of a capacity assessment. From this new roundabout to Timberfields Road, Doxey Road will be realigned to take the main carriageway away from existing properties. A new separate access road will serve the existing properties utilising a section of the existing Doxey Road and re-joining the main carriageway by way of a new priority junction.



A34 Foregate Street Junction



River Sow

#### **4.3 Section B: Along Doxey Road from Timberfields Road including Doxey Road Railway Bridge**

Doxey Road, between Timberfields Road and the railway bridge, will be realigned and regraded in accordance with current design standards. The existing Doxey Road/Rosewood Gardens and Doxey Road/Timberfields Road priority junctions will be modified to accommodate alterations in levels to the main carriageway. The existing public rights of way in the vicinity of the Doxey Road/ Timberfields Road will be accommodated by the provision of a safe crossing facility for pedestrians and cyclists.

The existing Doxey Road bridge over the West Coast Mainline is owned and maintained by Network Rail. Its current condition is substandard in terms of its vertical and horizontal railway clearances, and vehicle containment parapets. The bridge will be re-built on the same alignment accommodating a 7.3 metre wide carriageway and 3 metre footway/cycleways both sides. It will provide horizontal and vertical clearances

and up-graded vehicle restraints that are satisfactory to Network Rail, greatly improving the existing situation. The form of construction is expected to comprise bored concrete bearing piles, supporting reinforced concrete abutments with a bridge deck of precast concrete beams and parapet units. The new structure will be owned and maintained by Staffordshire County Council.



Doxey Road Railway Bridge

#### **4.4 Section C: Doxey Road (west of the Railway Bridge) to Martin Drive, Castlefields**

To the west of the West Coast Mainline railway bridge, a short section of Doxey Road will be realigned as a 7.3 metre wide, 205 metre long, single carriageway to provide an improved priority junction incorporating a protected right turn facility. An initial design for this priority junction is included in Appendix 4.1, taking into account the results of a capacity assessment. From Doxey Road the route crosses an existing employment site which is also likely to be a future development site. It will be constructed on embankment to provide sufficient height for crossing the West Coast Mainline.

The Western Access Route will then cross railway sidings between Castlefields and Castletown that are owned by Network Rail. Recent discussions with Network Rail indicate the likelihood of the sidings being abandoned prior to 2014 and it is therefore considered at this stage in the development of the scheme that they will be crossed at-grade as opposed to being bridged. The existing public rights of way in the vicinity of the sidings will be accommodated. The access route will then be constructed on embankment over privately owned low lying scrubland, which is also a potential development site to the existing roundabout at the Martin Drive/Rose Hill junction at Castlefields. This junction will be modified to incorporate an additional fourth arm as shown in Appendix 4.1. The existing Doxey Drain will be incorporated in the design of both the junction and the embankment, in line with Environment Agency requirements.



Martin Drive/Rose Hill junction, Castlefields



Route of scheme from Doxey Road

## 4.5 Vertical Alignment

The levels for the proposed road will be constructed as near to the existing ground/road levels as possible. However, at two locations the access route will be significantly higher than existing levels. The first of these is on the approaches to the new bridge over the West Coast Mainline railway. Network Rail has stated that the new bridge should provide greater headroom, in compliance with their current standards, than the existing structure. This will result in the carriageway levels being increased by approximately 1.8 metres. Secondly, the carriageway on the new viaduct will be approximately 3 metres above ground level for the majority of its length, principally to ensure that future maintenance of the structure can be undertaken safely, as required by the CDM Regulations 2007.

## 4.6 Drainage

The highway drainage will use gullies and/or combined kerb and drainage units. A system will be provided using Sustainable Drainage (SuDS) techniques and will utilise green/open drainage features where possible. The carriageway will drain through a piped network located within the highway corridor to ultimately discharge into one or more of the existing watercourses located adjacent to the scheme, including the River Sow, Doxey Drain, Pan's Drain and Tillington Drain. The requirements for petrol interceptors, silt traps, a secondary containment system etc. have not yet been fully investigated but they will be assessed in accordance with the requirements of the Environmental Impact Assessment and any mitigation measures will be identified and provided as necessary.

## 4.7 Landscaping

Figure 6.4 shows the landscaping mitigation measures included in the scheme which are summarised as follows.

### 4.7.1 Foregate Street to Sainsbury's Roundabout

Extension and enhancements will be provided to Doxey and Tillington Marshes to provide ecological mitigation. Some small areas of wet woodland and scrub will be



provided alongside the route to provide structure to the new amenity area and low level visual mitigation of the road's support structure, but without restricting views from the road across the marshes. Natural England agrees that landscape mitigation proposals should include some planting on the perimeter of the SSSI for visual mitigation, subject to future details being agreed by stakeholders.

#### **4.7.2 Sainsbury's Roundabout to the West Coast Mainline Bridge**

On the northern side of the carriageway wet woodland will be replanted to replace any lost during construction. This will provide mitigation for lost habitat, reduce visual impact of the road and enhance the perceived tranquillity for users of the adjacent countryside.

The new road alignment and new local access road serving existing properties in Castletown provides the opportunity to create new high quality open space provision that will also provide a buffer between the road and residential properties. There will be an opportunity to develop a 'gateway feature', either integrated into the design of the open space or located on the roundabout. Incorporating a piece of public art could promote community participation in the development.

Semi-ornamental planting will be used on the road embankments to reduce visual and perceived impact. Additional planting is proposed on the open space alongside Spruce Way to filter views of the road.

#### **4.7.3 West Coast Mainline Bridge to Martin Drive/Rose Hill Junction**

Woodland planting will be established on the proposed embankments to provide visual mitigation and advanced infrastructure enhancement for the potential development site. Planting will be predominantly native species for enhanced biodiversity, with some ornamentals for year round interest. Planting location is fluid at this stage to allow for flexibility in locating possible new development access roads.

### **4.8 Highway Design Principles**

#### **4.8.1 Junction Designs**

Preliminary junction designs have been completed based on predicted traffic flows from the SATURN model, and are provided in Appendix 4.1. Standards used from the Design Manual for Roads and Bridges (DMRB) include TD 16/07 Geometric Design of Roundabouts and TD 42/95 Geometric Design of Major/Minor Priority Junctions.

ARCADY is used for the assessment of roundabouts. It is able to accurately predict accident rates, capacity and delay (both queueing and geometric) for almost any size of roundabout, ranging from multi-armed grade separated roundabouts to mini-roundabouts in suburban locations. PICADY incorporates Transport Research Laboratory research on junction design issues and predicts accident rates, capacities, queue lengths and delays (both queueing and geometric) at non-signalised major/minor priority junctions. LINSIG has been used to inform the design of the improvement scheme for the A34 Foregate Street junction.

## 4.8.2 Highway Geometry

The design of the proposed Stafford Western Access Route will be in accordance with the requirements of the Design Manual for Roads and Bridges, published by the Highways Agency, current during the detail design stage of the scheme.

A Design Speed of 70A kph, as required by TD 9/93 paragraph 1.8, has been adopted for the scheme. The constraints and the urban nature of the site has necessitated that the proposed horizontal alignment incorporates relaxations in curve radius below the Desirable Minimum standards, but they remain within the permitted limits.

The Desirable Minimum Stopping Sight Distance is achieved throughout the route. The provision of Full Overtaking Sight Distance within the scheme has not been possible and is thought undesirable for this essentially urban route.

A 30mph speed limit, imposed by the presence of a road lighting scheme throughout, is considered appropriate because all existing public highways interfacing with the proposed access route are subject to speed limits of 30mph or lower.

## 4.9 Construction and Maintenance Proposals

Table 4.1 summarises the expected change in the maintenance regime over the 60 year appraisal period.

**Table 4.1: Change in Maintenance Works**

Description	Maintenance Work	Frequency
West Coast Mainline Railway Bridge	Responsibility of maintenance of this bridge will pass from Network Rail to SCC	Annual
Stafford Western Access Improvements	The new section of roads forming the scheme will require regular maintenance	Surface Dressing – years 7, 14, 27, 34, 47 and 54 after opening Plan/Resurface Surface Course – years 20 and 60 Plane/Resurface/Binder Course – year 40
A5187 Station Road / Victoria Street/Tenterbanks	These roads will be downgraded to 'C' roads requiring less maintenance	Surface Dressing – years 10, 20, 40, 50 after opening Plan/Resurface Surface Course – year 30 Plane/Resurface/Binder Course – year 60

The anticipated construction period is May 2014 to May 2016. The majority of the new route is 'off line' from the existing highway, except for the section that follows the existing Doxey Road and there are intersections with the existing network at Martin Drive (Castlefields), Doxey Road and A34 Foregate Street. Even though the transporting of construction material will be restricted to suitable major routes, there may be implications for the local network during the construction period. The type of

construction material used and its transportation will take into account Environment Agency Standards, as appropriate.

#### **4.9.1 Foregate Street Junction**

The construction period for the Foregate Street junction redesign will be approximately nine months due to complex utility works. Work will only take place in the off-peak periods when a reduction in capacity at the junction will be inevitable. It is expected that capacity at the junction will be maintained during peak periods. However, if there is any unavoidable disturbance in peak periods, the County Council will ensure that capacity reductions are minimised.

#### **4.9.2 Sainsbury's Roundabout**

Access to Sainsbury's will be maintained throughout the construction period of the new Doxey Road roundabout, although temporary restricted access to Sainsbury's during off peak periods may result in traffic delays at Broad Eye junction.

#### **4.9.3 Doxey Road Railway Bridge**

The demolition of the existing bridge and the construction of the proposed bridge are anticipated to take approximately 42 weeks and many of the operations will need to be carried out under railway possessions. In order to minimise traffic disruption to Doxey Road during this period, a temporary single lane bridge would be provided alongside and would be used under traffic signal control to accommodate vehicles, pedestrians, cyclists and the Statutory Undertaker's apparatus. This temporary bridge is likely to require a weight restriction of 7.5 tonnes.

During construction of the new bridge, traffic from Doxey to the town centre will also have the option of using the completed section of the Western Access Route between Doxey Road and Castlefields.

#### **4.9.4 Castlefields**

Construction vehicles on Kingsway and Martin Drive may have a detrimental impact on the existing residents of Castlefields in terms of noise, vibration, small increases in traffic on Rose Hill and Redgrave Drive, and possible temporary restricted access to Castlefields.

### **4.10 Complementary Sustainable Transport Measures**

#### **4.10.1 Wider Sustainable Transport Strategy**

Sustainable transport schemes that encourage walking, cycling and greater public transport use have been progressively delivered in the town since 2002 as part of the Stafford Urban Area Transport Management Strategy (SUATMS) which runs to 2011. Staffordshire County Council remains committed to pursuing a wider sustainable transport strategy for Stafford in the period to 2026. The strategy is emerging as part of an ongoing Stafford Transport Study. The draft strategy is shown in Figure 4.5 and will be finalised as Stafford Borough Council progress their Local Development Framework.

Constructing additional highway capacity to the west of the town centre will allow the opportunity to provide the complementary sustainable transport measures within and to the town centre that are shown on Figure 4.6. These measures will be a part of the wider strategy and will be funded by Local Transport Plan resources, public transport operators and developers.

#### **4.10.2 Enhanced Bus Services**

High frequency bus services will be provided along the proposed Western Access Route to serve emerging development proposals in western Stafford. The scheme will also allow the frequency of bus services for existing residents at Doxey to be increased and improved bus access to the Madford Retail Park on the A34, as well as the town centre, particularly along Chell Road, Tenterbanks, Victoria Road and Station Road.

#### **4.10.3 Enhanced Bus Interchange**

There are currently a number of small bus interchanges serving Stafford town centre which will all be improved with Real Time Passenger Information by 2016. Six key bus services call at an existing interchange adjacent to Gaol Square and Queensway which is currently proposed to be improved as part of the Local Transport Plan capital programme. Traffic relief at Gaol Square, Queensway and Chell Road, which is expected to be provided by the Stafford Western Access Improvements, will make it easier for buses to enter and exit this interchange.

The most important bus interchange serving the town centre is located on Chell Road. Traffic relief afforded to Chell Road will create the opportunity to increase road space for buses enabling the diversion of all local buses to this location, creating an effective on-street bus interchange, allowing facilities to be extended and safer access to bus stops to be provided for pedestrians.

Finally, the proposed route will improve access to Madford Retail Park to the north of the town centre on the A34 allowing enhanced bus services and a new interchange to be introduced in this location.

#### **4.10.4 Improved Access to Rail Services**

Stafford railway station is located close to the town centre and provides passenger services to destinations such as Birmingham, Stoke-on-Trent, Manchester, London and Liverpool. The main problem identified at the railway station is the lack of affordable parking which results in rail passengers parking on local residential streets, including Kingsway at Castlefields which forms part of the Stafford Western Access Route. The proposed scheme will therefore provide the opportunity to:

- Facilitate significant levels of housing that will have convenient access by walking, cycling and bus to the railway station
- Reduce congestion on Station Road improving vehicular access to Network Rail's new multi-storey car park, which is being constructed in 2010

- Introduce complementary residents' parking schemes and Traffic Regulation Orders to reduce on-street parking at Castlefields and Castletown caused by parking problems at the station and traffic congestion in the town

#### **4.10.5 Urban Traffic Control and Bus Priority**

Staffordshire County Council will continue to extend the Urban Traffic Control network to make better use of existing highway capacity by linking and co-ordinating the timing of traffic signals to improve the operation of junctions. The Stafford transport strategy will also focus on improving bus reliability and journey times on the key radial routes into the town centre. The additional capacity provided by the Western Access Route will make it easier to give buses priority at signal controlled junctions on these routes.

#### **4.10.6 Walking and Cycling Links to the Town Centre**

High quality, safe and convenient pedestrian and cycle routes will be constructed as an integral part of the design of the proposed access route and every opportunity will be taken to maximise the journey ambience. The developers of proposed housing sites in the west will also be required to enhance existing walking and cycling routes to both the railway station and the town centre, including the Millennium Way, which runs along the disused Stafford to Newport railway line, and the Castlefields walking and cycling link.

The public rights of way along the River Sow, as shown on Figure 4.4 will be enhanced as part of a larger project called Waterscape which is currently being jointly funded through Local Transport Plan resources and by Stafford Borough Council to provide high quality off-road walking and cycling facilities between residential areas and the town centre utilising the attractive environment along the river.

#### **4.10.7 Town Centre Pedestrian Priority**

One of the objectives of SUATMS (the existing transport strategy for Stafford) is to reduce the impact of traffic in the town centre by expanding the pedestrianised area and reducing the speed of the remaining traffic to a maximum of 20mph. The recent and proposed improvements are shown on Figure 3.2 in Appendix 2.2. The Western Access Route will afford traffic relief to Chell Road which will allow similar strategic pedestrian enhancements to be undertaken.

#### **4.10.8 Traffic Management and Safety Measures**

Appropriate traffic management and safety measures will be implemented on the existing local network if considered necessary following post scheme monitoring of the actual impact of changes in traffic flows and speeds. Potential candidates for treatment include Castlefields, Doxey Road, West Way, Station Road, Browning Street and Gaol Road. Town centre traffic management measures will be reviewed and strengthened following completion of the scheme including car park variable message signs to reduce circulatory traffic within the town.

#### **4.10.9 Supporting Sustainable Transport Initiatives**

Demand management techniques are an increasingly important tool in the delivery of sustainable outcomes and encouraging smarter travel. Local Transport Plan capital funds will be used for smarter choice initiatives that encourage the use of the sustainable complementary measures that have been delivered on the ground. The types of initiatives envisaged will include cycle maps, cycle promotion, bus route promotion mail drops, bus/rail integration (PlusBus), town centre promotion events, on-bus advertising and walking promotion.

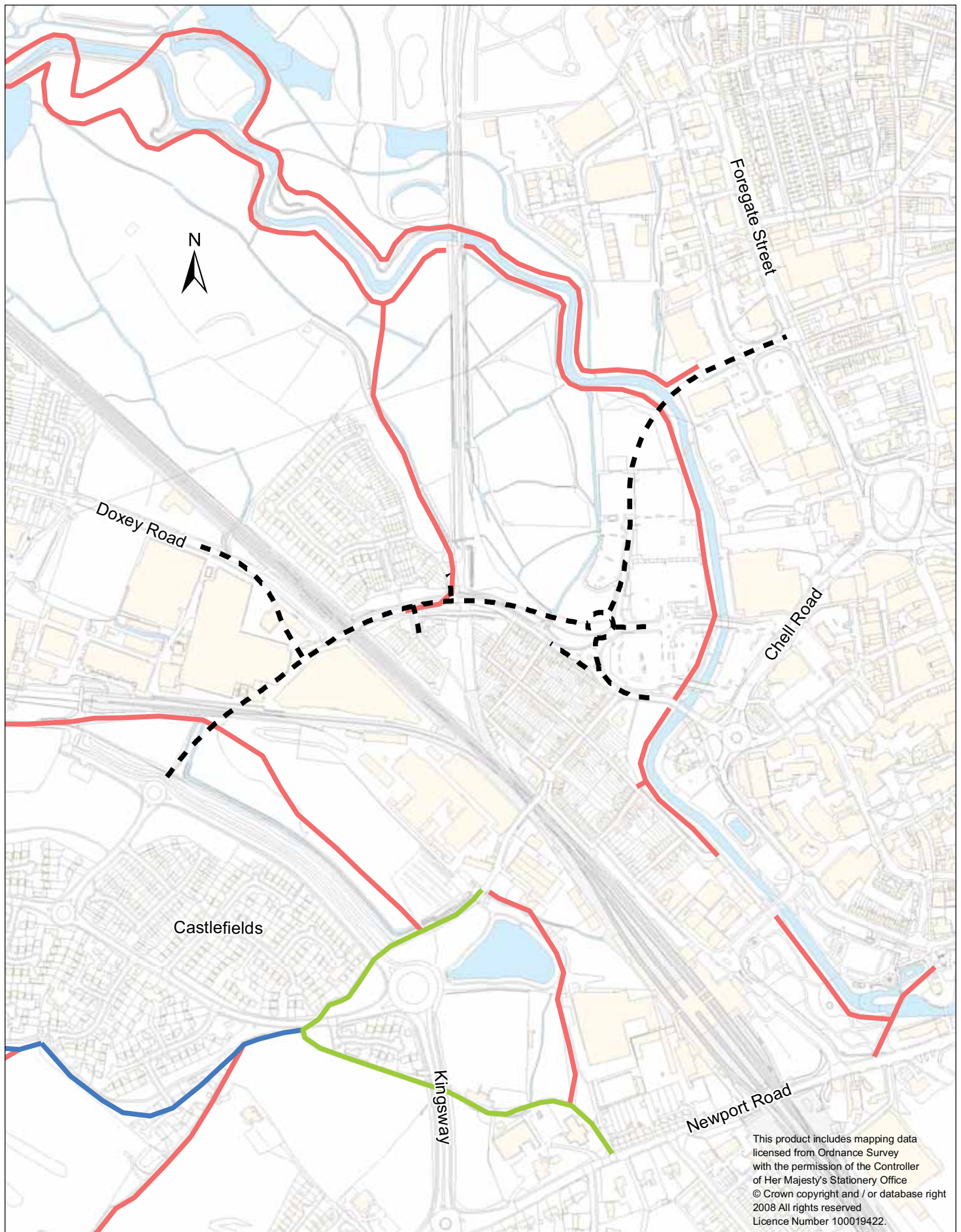
New greenfield development proposals in Stafford, to meet the housing growth agenda, will be promoted as Sustainable Urban Extensions with Residential Travel Plans provided by developers pursuant to a grant of planning permission. It is also proposed that consultants will be commissioned to prepare a Stafford Travel Plan Framework, managed by the highway and planning authority, to help reduce traffic generations from smaller developers and existing residents.

Figure 4.4

Stafford Western Access Improvements : Public Rights of Way

■■■■ Stafford Western Access Improvements

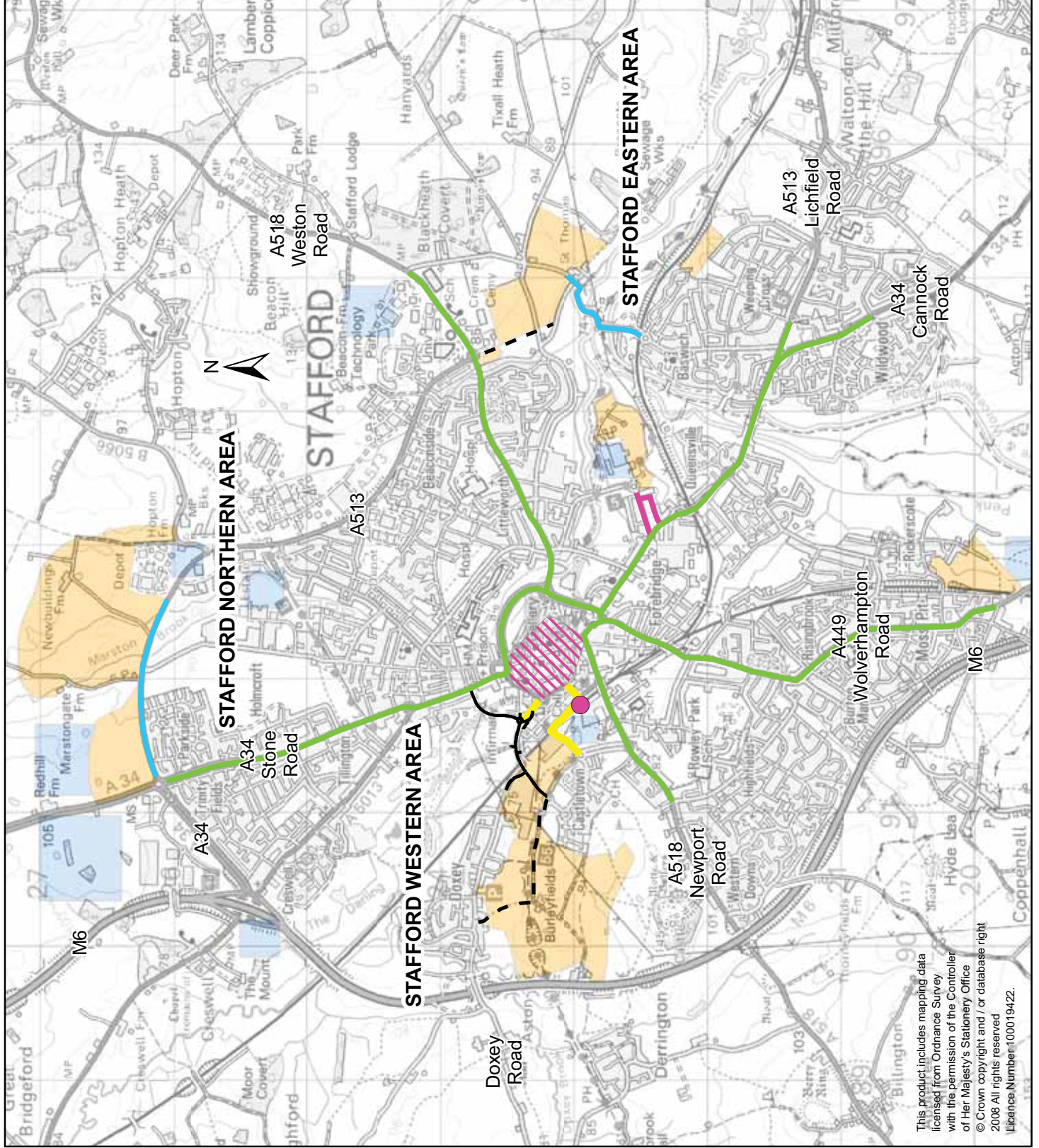
— Footpath — Bridleway — Byway open to all traffic



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Figure 4.5  
Stafford Wider Sustainable  
Transport Strategy

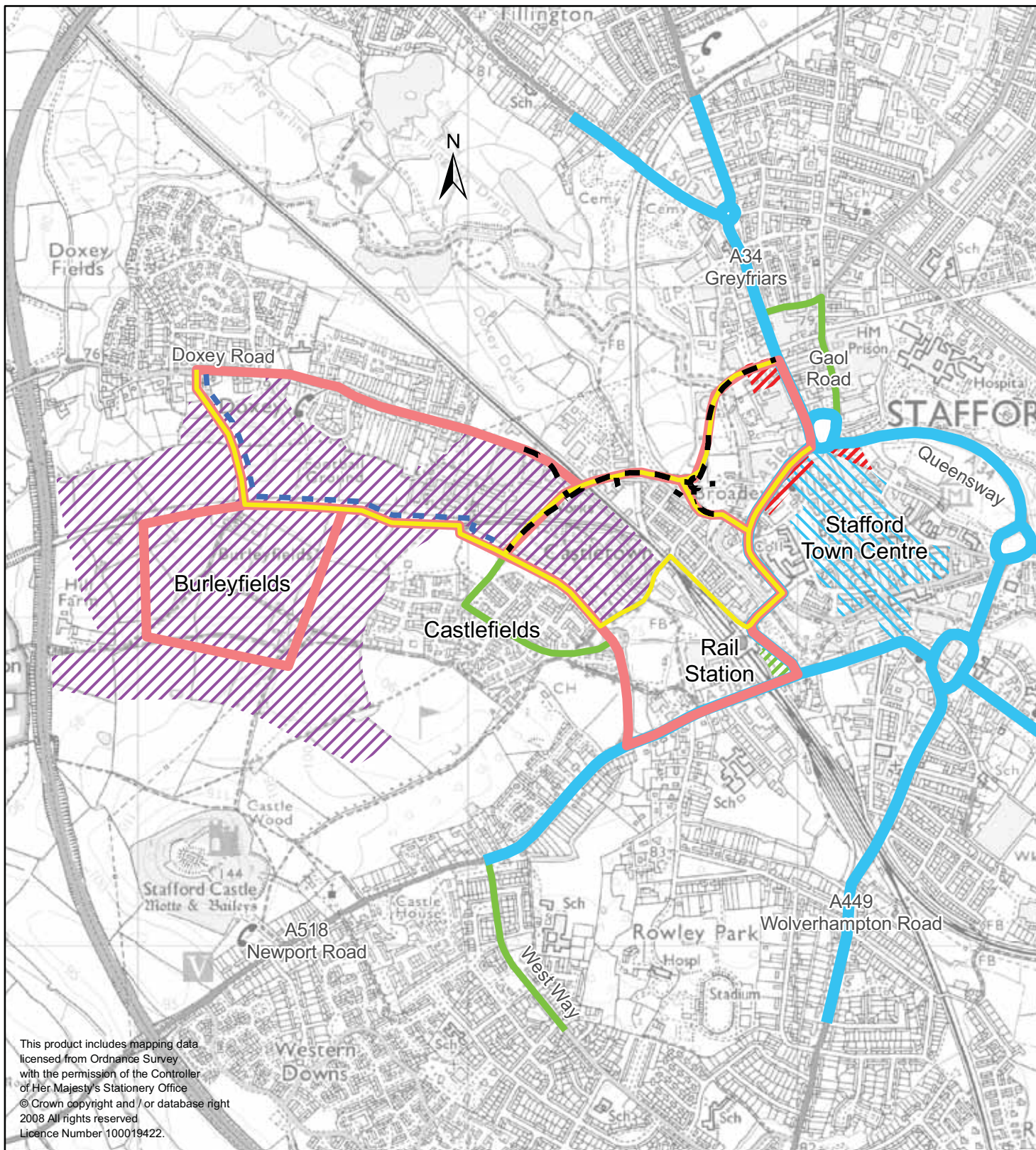
- Potential Housing Sites
  - Potential Employment Sites
- Stafford Western Access Improvements**
- Rail Access Improvements
  - New Potential Access Road
  - Road Scheme requiring funding through Major Scheme Business Case
  - UTC / Improved Bus Services
  - Cycle / Walking Routes
  - Town Centre Pedestrian Priority / Bus Interchange
- Stafford Eastern Access Improvements**
- New Potential Access Road
  - UTC / Improved Bus Services
  - Potential Capacity Improvements / Walking and Cycling
  - Traffic Management
- Stafford Northern Access Improvements**
- UTC / Improved Bus Services
  - Potential Capacity Improvements / Walking and Cycling



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Figure 4.6  
 Stafford Western Access Improvements  
 Complementary Sustainable Transport Measures



- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>--- New Potential Access Road</li> <li>--- Road Scheme requiring funding through Major Scheme Business Case</li> <li>— Enhanced Bus Service</li> <li>— Urban Traffic Control / Bus Priority</li> <li>— Enhanced Walking and Cycling</li> <li>— Potential Traffic Management (following post scheme monitoring)</li> </ul> | <ul style="list-style-type: none"> <li>Enhanced Bus Interchange</li> <li>Enhanced Rail Station Car Park</li> <li>Residential Development</li> <li>Town Centre Pedestrian Priority and Traffic Management</li> </ul> |
|--|---|

## 5. STRATEGIC CASE

### 5.1 Transport Problems

The Options Assessment Report in Appendix 2.1 identifies Stafford's existing and potential future transport problems and the process by which the preferred option has been identified.

Stafford lies at the intersection of several strategic routes (A34, A518 and A449) resulting in severance of many critical town centre activities and acting as a constraint on proposals to regenerate a number of edge of centre locations. As well as causing severance for pedestrians and cyclists, traffic volumes are acting as a barrier to improved bus service frequency and reliability in Stafford, deterring the potential for journeys to be made by sustainable modes. Stafford station, which is accessed directly from the A518, is expected to experience significant passenger growth following improvements to the West Coast Mainline, resulting in additional traffic volumes.

There is an extensive network of bus services operating in the Stafford urban area with the predominant provider being Arriva Midlands. They focus on serving the town centre which benefits from good connections to a wide range of destinations. However, according to 2001 Census data and locally derived data, bus patronage is relatively low with only around 5% of work journeys made by Stafford residents by bus. Stafford railway station is located close to the town centre, although currently only approximately 1.6% of work journeys by Stafford residents are made by train.

### 5.2 Scheme Objectives

The objectives of the proposed scheme reflect the problems and opportunities identified in the Options Assessment Report. The high level outcome (Objective1) reflects Stafford's growth agenda to which improved transport infrastructure will contribute towards. The scheme objectives and how the preferred scheme option relates to them are provided in Table 5.1.

**Table 5.1: Scheme Objectives**

<b>Scheme Objective</b>	<b>Preferred Option</b>
To provide high quality transport infrastructure required to deliver development in Stafford	The scheme will help the town to serve the 8,000 new homes planned for Stafford and improve access arrangements for a major mixed use regeneration scheme and a strategic housing allocation.
To reduce congestion on routes into and around the town centre which act as a constraint on regeneration proposals	By removing traffic in the town centre the scheme will make it easier for existing and new residents of Stafford to benefit from a thriving and regenerated town.
To facilitate improved access by sustainable modes between housing growth areas and the town centre	The scheme facilitates the development of a sustainable greenfield site in Stafford which is within walking and cycling distance of the railway station and the town centre. Walking, cycling and public transport facilities will be

	significantly enhanced between development sites in the west and the town centre as a result of the scheme.
To facilitate improved access to public transport services	<p>The scheme will provide the opportunity to increase the frequency of existing bus services and allow new services to access potential development sites. Increased road space in the town centre will allow bus facilities to be extended and safer access to bus stops to be provided for pedestrians.</p> <p>The scheme will reduce congestion near to the railway station and will also facilitate significant levels of housing that will have convenient access to the railway station.</p>
To improve safety and security for all road users	This is not a key priority for the scheme as the current accident rate within the local study area is equivalent to the expected annual accident rate. However the scheme will be designed to high safety and security standards and the COBA analysis estimates £3.64m of accident savings.

The Options Assessment Report identifies how the intervention objectives align with local, regional and national transport and land use objectives. The scheme objectives have been assessed against Department for Transport's - Delivering a Sustainable Transport System (2008) (DaSTS) which will guide the objectives of LTP3, draft West Midlands Regional Spatial Strategy (2007), Staffordshire Local Transport Plan (2006) and Stafford Borough Council's Sustainable Community Strategy (2008). The Options Assessment Report clearly demonstrates that there is a strong and clear fit with national, regional and local strategies. An additional assessment is provided in Appendix 5.1 identifying how the NATA assessment completed for the Stafford Western Access Improvements reflects the scheme's alignment with DaSTS goals and challenges.

### **5.3 Alignment with Regional and Local Objectives**

Chapter 4 of the Options Assessment Report provides a detailed description of the regional and local transport and planning background and how the scheme will help to achieve local and regional objectives. A summary is provided below.

#### **5.3.1 Regional Level**

The Stafford Western Access Improvements is included in the West Midlands Regional Funding Allocation as a potential major scheme for preparation and commencement before 2014. This provides a clear indication that the scheme is expected to make an important contribution to regional and local objectives.

The West Midlands Regional Spatial Strategy (RSS) provides the regional planning policy framework for the West Midlands. The strategy is currently being reviewed by a

three phase process, the second phase of which underwent an examination in public in 2009 with a panel report published in September 2009. The Government is yet to publish proposed changes to the strategy but the panel report recommended the following development provisions for Stafford Borough over the period 2006 to 2026:

- 11,000 new dwellings Borough wide
- An indicative figure of 8,000 for Stafford Town
- The potential for 1,000 additional dwellings at Stafford to meet the Ministry of Defence's requirements
- Employment land 5-year reservoir of 40 hectares (ha) with a total long term requirement (2006-26) of 120ha

Policy UR2 of the draft RSS, considers the towns and cities outside of major urban areas in the region. Stafford town is identified within this policy which states that:

“Local authorities and other agencies should seek to improve prospects in (the) following local regeneration areas by bringing forward local regeneration policies and programmes. Where possible access should be improved between concentrations of local deprivation and need within (these) towns and areas of economic opportunity, in line with policy T1. Any support for local regeneration programmes should not prejudice the need to focus resources within the Major Urban Areas.”

“The changing pattern of deprivation will continue to be monitored and the list of local regeneration areas kept under review.”

Policy UR3 expects that the network of strategic towns and cities in the West Midlands, including Stafford, should be enhanced to play a leading role in urban renaissance programmes in order to provide services for local communities, a sense of identity and as drivers of economic growth. Stafford is also identified as a market town in Policy RR3 which also gives it a key role in providing services and other facilities to help in the regenerate of its rural hinterlands.

Stafford Town is recognised as a ‘Settlement of Significant Development’ within the draft RSS where strategic housing will be delivered outside the West Midlands and North Staffordshire conurbations and improvements to the transport network are identified as a sub-regional priority. It is also identified as an Impact Investment Location in Regional Funding Advice where investment in transport, housing and economic development is prioritised.

The wider Stafford Borough area has also been successful in securing ‘growth point’ status, which will deliver sustainable growth in housing and employment, alongside vital new infrastructure. The ambitions of local partners in delivering the growth point include:

- An additional 5,000 to 6,000 new high quality homes by 2016 with a further 6,000 by 2026 to create new communities supported by district centres, health and education facilities. At least 4,500 new homes will be delivered in the County Town of Stafford by 2016

- Maintaining Stafford Borough's self sufficiency by delivering at least 80 hectares of high quality premium employment land by 2016 for new research and development facilities as well as growth opportunities to provide new businesses for graduates
- Provision of significant new green infrastructure for the Stafford Borough area including green links from the surrounding open countryside into the heart of communities to encourage healthy living for sport, recreation and leisure time activities
- Delivering new mixed use town centre proposals to create the County Town of Stafford as a regionally significant centre for retailing, leisure and cultural attractions with an emphasis on non-car modes of transport provision

### 5.3.2 Local Level

The local policy background for the proposed scheme includes the following:

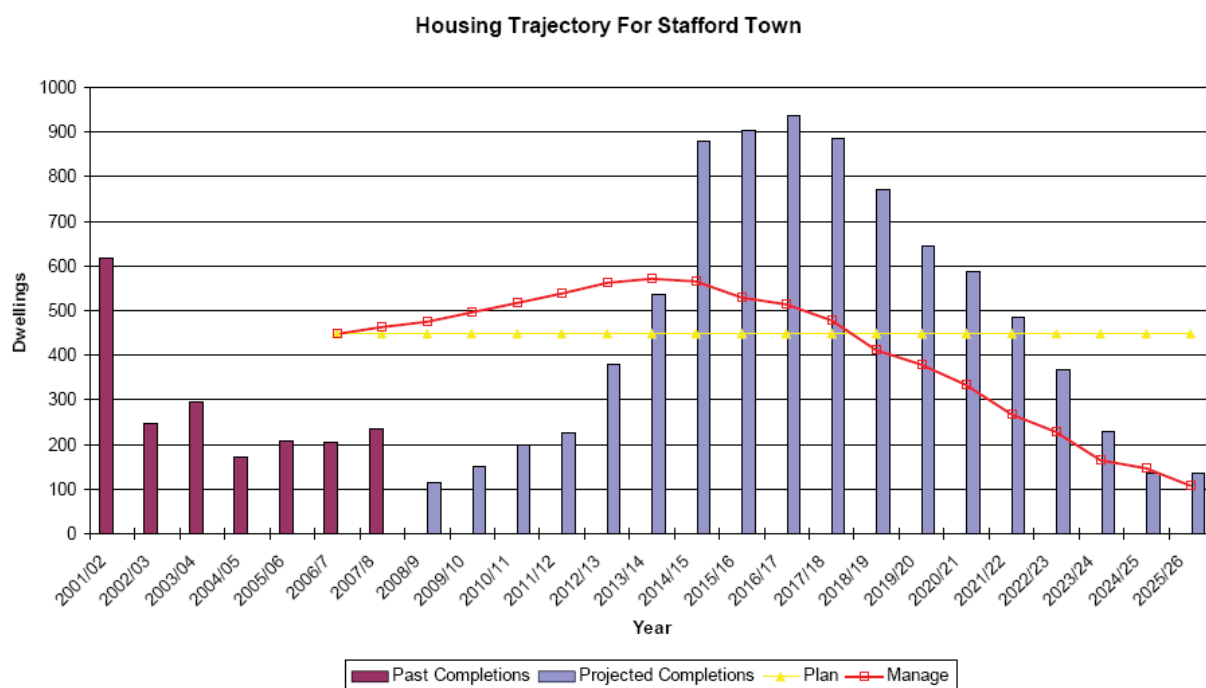
- The Stafford Western Access Improvements is identified as a potential major scheme for funding submission during the course of Staffordshire Local Transport Plan 2006 – 2011.
- The route was protected by Staffordshire County Council on 7<sup>th</sup> March 2008 (See Appendix 5.2).
- Policy T15C in the Staffordshire and Stoke-on-Trent Structure Plan 1996-2011 (adopted in 2001) identifies the Stafford Western Access Improvements as important for the implementation of the land use strategy within the Structure Plan, however, this policy no longer has any statutory status as it has not been saved prior to the adoption of the Local Development Framework.
- A protected road alignment for the Castlefields Link Road and Chell Road Diversion (Option C in the OAR) was considered for inclusion in the adopted Stafford Borough Council Local Plan 2001. A significant housing allocation at Castlefields was not included in the Local Plan therefore it was not considered appropriate to include the road proposals. There were also concerns about the protected alignment (Option C) in terms of its deliverability and its impact on communities in Castletown.
- The Local Development Framework Core Strategy preferred land use option is not currently scheduled for publication until late 2010, however the Borough Council view this bid as timely in the context of their LDF preparations as its success in achieving funding will give a greater level of certainty with respect to the delivery of key infrastructure.

A letter of support from Stafford Borough Council is provided in Appendix 5.3. The Borough Council currently expect that sites for approximately 6,000 new houses will need to be found on greenfield extensions to the town to meet the Borough's RSS requirement and growth point ambitions. The employment land requirement in Stafford is expected to be found by re-developing or extending existing employment areas. They also plan to produce a Supplementary Planning Document for the west of Stafford urban area focusing on the mixed land use development opportunities at Castlefields and Burleyfields. This is considered to be essential to ensure that the private development consortium, key stakeholders and the local authorities deliver the key infrastructure for the area, including the Stafford Western Access Improvements, as part of a comprehensive masterplanning process.

This business case supports the emerging outcomes of the Stafford Transport Study that the Borough and County Council’s are currently producing in partnership to help finalise the wider sustainable transport strategy and inform the LDF . A summary of the results of this work is provided in the Options Assessment Report. As part of the study, the Stafford SATURN traffic model has been used to assess the strategic impact of traffic likely to be generated by the proposed level of new development. Based on these results, the land use scenario for Stafford that has been assumed for this business case has been agreed with Stafford Borough Council and is shown on Figure 5.1. Notional housing numbers are indicated which are based upon site capacities and dialogue with interested developers. It is identified as the Growth Agenda scenario in the NATA assessment provided in Chapter 6.

Figure 5.2 gives an indication of how future housing growth targets are expected to be achieved. It sets out the historical annual housing completion rates for Stafford from 2000 to 2008 and those projected up to 2026 to reach the targets set in the draft RSS review. The housing trajectories are based on existing commitments coming forward until 2016, sites identified through the Strategic Housing Land Availability Assessment and outstanding housing allocations in Stafford Borough.

**Figure 5.2: Housing Trajectory for Stafford Town**



Household projection figures estimate that the population of Stafford Borough will increase by 15% by 2031, as show in Table 5.2.

**Table 5.2: Population Projections 2006 – 2031 for Stafford Borough**

Year	2006	2011	2016	2021	2026	2031	% change 2006-2031
Population projection ('000s)	123	127	131	135	139	142	15%



## **6. VALUE FOR MONEY**

### **6.1 Economic Assessment Report**

An economic assessment of the Western Access Route has been undertaken to establish the benefits, costs and value for money associated with the scheme proposals. The Net Present Value (NPV) represents the absolute difference between the Present Value of Benefits (PVB) and the Present Value of Costs (PVC). The Benefit-Cost Ratio (BCR) is the ratio of PVB to PVC and represents the overall value for money of the scheme. DfT guidance recommends that a BCR of greater than 2.0 represents high value for money. The economic assessment results for the Growth Agenda / Central Case scenario, under variable demand conditions, are presented as part of the Economic Impact NATA Assessment in Section 6.3.3.

Sensitivity and scenario analysis has been undertaken around the Growth Agenda / Central Case scenario to examine the impact of changes in costs and benefits on the business case for the scheme. The scenario tests also serve as a check on the robustness and stability of the modelling and appraisal framework. Three cost-based sensitivity tests and four 'demand-side' scenario tests have been undertaken to test the impact of uncertainty in planning assumptions.

TUBA has been used to estimate the Transport Economic Efficiency (TEE) benefits (See Table 6.13). This includes estimation of benefits relating to travel times, vehicle operating costs, user charges, and private sector revenues, all of which contribute to the Present Value of Benefits (PVB) for the scheme proposals. TUBA also calculates the Present Value of Costs (PVC), based on the scheme investment and maintenance data, and indirect tax revenues to central government. These data are presented in the form of the Public Accounts (PA) table (See Table 6.14).

The TEE benefits and Public Accounts information are combined (along with benefits from reductions in accidents and carbon emissions) to produce an overall value for money assessment, as presented in the Analysis of Monetised Costs and Benefits (AMCB) table (See Table 6.15).

TUBA is an industry-recognised software package, recommended by DfT for the appraisal of highway and public transport schemes such as this. It is of particular use where variable demand responses have been included in the transport modelling, as TUBA is based on the 'rule of half', which allows for explicit calculation of changes in demand between the 'do-minimum' and 'do-something' scenarios. All TUBA output files can be provided on request.

#### **6.1.1 Estimation of Costs**

The outturn scheme cost estimates provided by Staffordshire County Council are presented in Chapter 9. Total nominal scheme costs amount to £34.8million at a price base of Q2 2008, excluding risk or optimism bias. A Quantified Risk Assessment has been carried out which identifies a risk of £3.9million which has been added to the scheme costs to give a Quantified Cost Estimate of £38.7m. For the purpose of the economic assessment, an optimism bias of 44% has then been added to the costs, in



line with WebTAG guidance (Table 9, Section 3.5.9) for a road scheme at Stage 1 (Programme Entry).

All costs and benefits in the economic assessment have been converted to 2002 prices and values, as required by TUBA. A factor of 0.82 is applied to convert to 2002 prices, representing the difference between the RPI in 2002 and 2008. Discount rates at 3.5% per annum are applied to convert to present (2002) values. Finally, a factor of 1.209 is applied to convert from factor cost to market prices.

The revised costs allowing for risk, optimism bias, rebasing and discounting to 2002 prices and values are shown in Table 6.1. The total of £36.2 million is included as the investment cost in the Public Accounts table.

**Table 6.1: Present Value of Scheme Investment Costs (2002 prices and values)**

Year	Rate of Discount	Capital Expenditure, by Year & Component (£m)			
		Preparation & Supervision	Construction	Land	Total
2010	0.76	0.2	-	-	0.2
2011	0.73	0.8	-	-	0.8
2012	0.71	0.6	-	-	0.6
2013	0.68	0.2	-	2.2	2.4
2014	0.66	0.4	11.2	1.4	13.0
2015	0.64	0.4	14.6	0.3	15.3
2016	0.62	0.1	3.6	-	3.7
Total	-	2.8	29.4	4.0	36.2

### Implications for Tax Revenues

The format of the Transport Economic Efficiency (TEE) table presented in the NATA Assessment is such that the impact of schemes on central government indirect tax revenues is presented as part of the PVC. Indirect tax revenues are generated through fuel duty and any other charges incurred by transport users (e.g. tolls) and providers (e.g. public transport revenues). In this instance, with no road tolls and no public transport, the only impact on indirect tax revenues is through changes in fuel-related vehicle operating costs. The scheme leads to reduced vehicle operating costs, as it provides a more direct route for traffic between the north and west of Stafford reducing journey distances.

### Estimation of Costs during Construction & Maintenance

Transport users incur additional costs when the highway network is undergoing construction and/or maintenance works. There are four costs associated with these works: delay (value of time), vehicle operating costs, carbon emissions and accidents. Due to the nature of the works required to implement the Western Access Route, the

best software package available to assess the disbenefits associated with construction is the TUBA suite.

The construction of the Western Access Route will be undertaken in three stages, as detailed in section 6.3.8. The first two construction stages will have no impact on current users as they involve building new highway off-line without impacting on existing roads. Therefore, the construction dis-benefit relating to these stages is considered to be negligible.

The final stage involves rebuilding the West Coast Mainline Railway Bridge on Doxey Road. Work will only begin on this once the first two stages are complete and open to the public. During the planned 42 week construction period for the Railway Bridge, a temporary bridge will be utilised which will only accommodate single-way working, controlled by temporary signals. The temporary bridge will not be suitable for HGVs.

The impact of the temporary bridge operating one-way only has been assessed using TUBA. A number of assumptions have been applied in this analysis:

- The signal timings on the bridge will be optimised, with a 100 second cycle time and a 12 second inter-green
- The first two stages of the Western Access Route will be open to alleviate the impact of the bridge construction
- The bridge construction will take place in 2015 and service will be as normal either side of this year.

The Western Access Route will have an impact on maintenance costs on affected roads and structures as detailed in Section 4.9. It will not have an impact on maintenance delays as the scheme consists of new roads. The costs and benefits for construction and maintenance for the Growth Agenda scenario are presented in the NATA Assessment on Economic Impact in Section 6.3.3.

### **6.1.2 Estimation of Benefits**

The calculation of transport user benefits is based on the conventional consumer surplus theory. For the purposes of appraisal, use of the transport system is assumed to be the result of a balanced consideration of pros and cons by each individual decision-maker, subject to all the various constraints which exist.

Changes in the transport system give rise to changes in the perceived cost of personal travel and freight movement from certain points of origin to certain destinations. This perceived cost is a broadly defined measure of the inconvenience to the user of moving between two points, and includes changes in:

- Travel time
- User charges – fares, tariffs and tolls
- Vehicle operating costs met by the user

Consumer surplus is defined as the benefit that a consumer enjoys, in excess of the costs perceived. In the simplest case, where time of money costs change, but demand stays the same, the total change in consumer surplus equals:

$$\text{change in cost} * \text{number of travellers} = (P^0 - P^1) * T$$

This formula defines  $P_i$  as the perceived cost of travel (note that the superscript  $i$  is used to denote the scenario - 0 for do-minimum, 1 for do-something), and  $T$  is the number of travellers. This is commonly referred to as the fixed demand scenario - where the demand remains fixed in the 'do-minimum' and 'do-something' models - and is reported as a scenario test in Section 6.1.3.

Where, as is more usual, demand changes in response to the increase or decrease in travel costs, there is an additional impact on new or lost travellers. With a relatively small change in costs, the convention is to attribute half of the change in costs to the trips lost or gained. The total change in consumer surplus in this scenario is represented by:

$$\begin{aligned} & (\text{change in cost} * \text{do-minimum demand}) \\ & \quad + (\text{half change in costs} * \text{change in demand}) \\ & = (P^0 - P^1)T^0 + \frac{1}{2}(P^0 - P^1)(T^1 - T^0) \\ & = \frac{1}{2}(T^0 + T^1)(P^0 - P^1) \end{aligned}$$

This is referred to as the rule of half, and is the recommended calculation to apply in variable demand scenarios.

### Derivation of TEE Benefits

Travel time savings are calculated using the rule of half applied to generalised time skims from the SATURN highway model. Since parking costs are not included in the Stafford Transport model, generalised time equates solely to in-vehicle time. Travel times in the traffic model are represented in seconds. These are converted to vehicle hours and annualised for each modelled period, so that annual AM and PM peak travel time savings can be calculated.

Annual time savings are calculated for each modelled year. Benefits for non-modelled years are calculated via linear interpolation between modelled years, and flat-line extrapolation beyond the final modelled year. However, the impact of discounting on estimated benefits means that the benefits 'curve' declines toward the end of the project lifetime.

Default economic assumptions have been applied, as contained in the TUBA software and based on guidance contained in the DfT's WebTAG Unit 3.5.6.

### Derivation of Annualisation Factors

The Stafford SATURN model is based on 'peak hour' highway assignments so annualisation factors have been adopted to convert hourly benefits to annual benefits, as shown in Table 6.2.

**Table 6.2: Annualisation Factors**

Peak Hour	User Class	Annualisation Factor
AM Peak (08.00-09.00)	Cars (UC1, UC2, UC3)	657
	LGVs (UC4)	654
	HGVs (UC5,UC6)	746
PM Peak (17.00-18.00)	Cars (UC1, UC2, UC3)	659
	LGVs (UC4)	733
	HGVs (UC5,UC6)	783

These factors are based on counts at the 11 Roadside Interview sites conducted during the data collection part of the project in 2007. The factors have been calculated by examining the relationship between the peak hour (0800-0900 and 1700-1800) and the peak period (0700-1000 and 1600-1900). This provides the expansion factor from a one hour peak to a three hour peak period. Finally, this is multiplied by 253, the number of typical peak days in a year. This analysis was conducted separately for lights, LGVs and HGVs to give three individual factors to use across the user classes in the model.

It is noted that annualisation based on traffic flows, as described above, can overestimate benefits as there is not a linear relationship between delays and traffic flows. However, given that the benefits for the inter-peak, weekend and overnight time periods have not been included in the cost benefit analysis, it is considered that the assessment is robust.

### Vehicle Operating Cost Savings

Vehicle operating costs are calculated for both fuel and non-fuel elements of the journey, based on formulae set out in the DfT's WebTAG Unit 3.5.6, and using the same annualisation factors. The rule of half formula is applied as for travel times, but with vehicle operating costs being based on distance travelled (vehicle-kilometres) and average vehicle speeds. All assumptions relating to fuel costs, duty and vehicle efficiency are those contained in the default TUBA economics file.

### 6.1.3 Sensitivity and Scenario Analysis

Sensitivity and scenario analysis has been undertaken around the Growth Agenda scenario to examine the impact of changes in costs and benefits on the business case for the scheme. The Growth Agenda case scenario under variable demand conditions is used in the NATA Assessment as it is viewed as the 'most likely' future scenario, however, the consistency in results across different model scenarios demonstrates that the model and appraisal framework is stable.

WebTAG guidance requires sensitivity tests to be carried out on the Optimism Bias, assumed to be 44% in the central case scenario. Tests have been carried out increasing and reducing the optimism bias by 15% giving optimism biases of 59% and 29% respectively.

The cost-based sensitivity tests carried out include the following:

- Sensitivity Test 1: 15% increase in Optimism Bias
- Sensitivity Test 2: 15% reduction in Optimism Bias
- Sensitivity Test 3: Indirect tax revenues as part of PVB (BKR test)

The above tests assume TEE benefits (travel time and vehicle operating cost savings) from the Growth Agenda model scenario, so no further modelling was required. Instead, changes are made directly to the TEE table.

Four demand-side scenario tests have been undertaken, as follow:

- Scenario Test 1: Growth Agenda Case scenario under ‘fixed trip matrix’ conditions;
- Scenario Test 2: Growth Agenda Case scenario with low traffic growth; and
- Scenario Test 3: Growth Agenda Case scenario with high traffic growth.
- Scenario Test 4: Core Scenario - Exclusion of the ‘foreseeable’ land use developments, this includes 6 residential developments and 7 industry developments.

The four scenario tests feed through to changes in travel costs and, consequently, TEE benefits. Whilst scheme investment costs and construction/maintenance costs are held constant at ‘Central Case’ levels, there will be a change to the scheme PVC through the indirect taxation effect. The assumptions for low and high traffic growth have been defined in the Model Forecasting Report in Appendix 6.5. Full TEE tables for all scenarios are provided in Appendix 6.1.

Table 6.3 summarises the results of the ‘cost-based’ sensitivity analysis. The changes feed through to a BCR lying in the range 2.03 to 2.45. The scheme therefore provides high value for money, based on WebTAG guidance, for all cost-based tests, even with a 15% increase in Optimism Bias.

**Table 6.3: Economic Summary Statistics from the ‘Cost-Based’ Sensitivity Analysis**

<b>Economic Summary Statistic</b>	<b>Central Case</b>	<b>Sensitivity Test 1</b>	<b>Sensitivity Test 2</b>	<b>Sensitivity Test 3</b>
PVB	£87.5m	£87.5m	£87.5m	£84.8m
PVC	£39.4m	£43.2m	£35.6m	£36.7m
NPV	£48.1m	£44.3m	£51.9m	£48.1m
BCR	2.22	2.03	2.45	2.31(BKR)
<b>Value for Money Assessment</b>	<b>High</b>	<b>High</b>	<b>High</b>	<b>High</b>

Table 6.4 summarises the results of the ‘demand-side’ scenario analysis. The changes feed through to a BCR lying in the range 0.85 to 2.90. It can be observed that there are greater benefits for those scenarios with higher levels of traffic, as would be expected.

For the low growth scenario, there is reduced congestion in the town centre resulting in reduced benefits and a ‘low’ value for money scheme rating. It should be noted,

however, that the Growth Agenda scenario already assumes limited traffic growth due to the recession as the latest Nation Trip End Model (NTEM) figures have been used in developing the future year matrices. The low growth assumptions are such that in 2016 traffic flows are actually lower than they were observed in 2007. It is considered, therefore, that the low level of traffic flow and the resulting low level of benefits modelled for this test are extreme and very unlikely to occur.

For the 'core' scenario there is assumed to be significantly less development in the west sector of Stafford resulting in a low BCR, as would be expected due to the lower level of demand for the scheme. This scenario is not, however, considered to be likely given current development proposals.

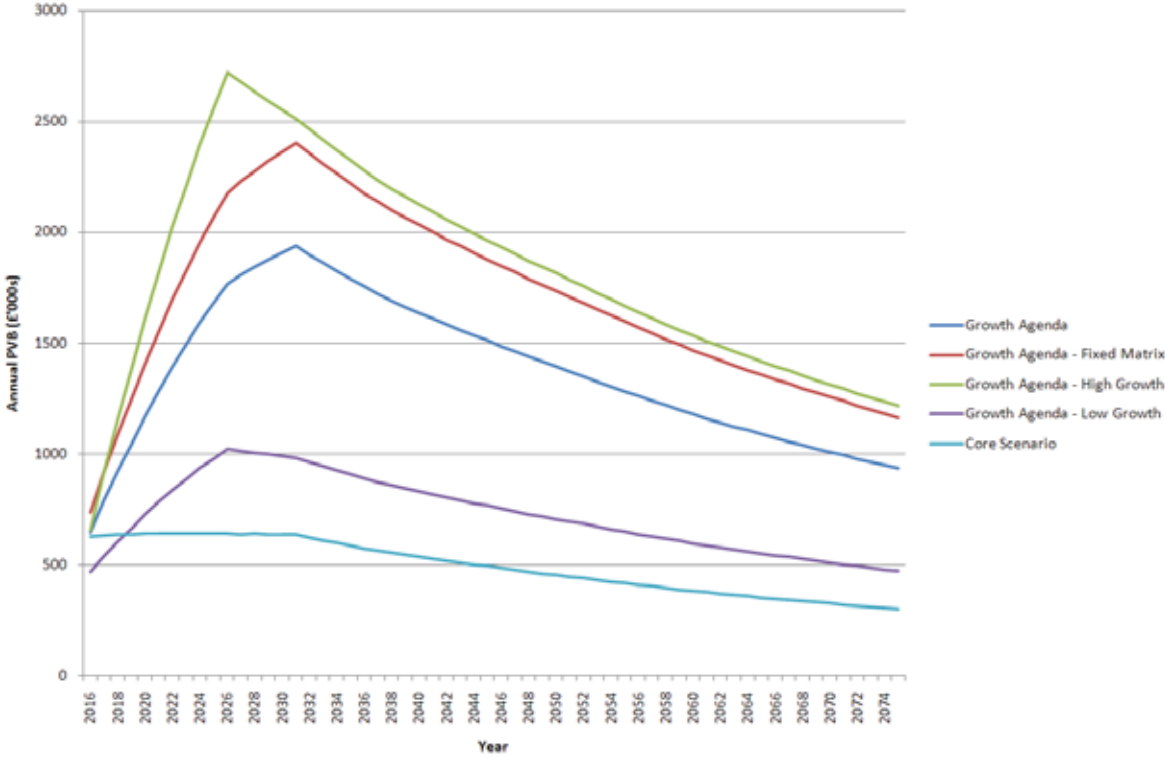
**Table 6.4: Economic Summary Statistics from the 'Demand Side' Sensitivity Analysis**

<b>Economic Summary Statistic</b>	<b>Growth Agenda Case</b>	<b>Scenario Test 1 (Fixed Trip Matrix)</b>	<b>Scenario Test 2 (Low Growth)</b>	<b>Scenario Test 3 (High Growth)</b>	<b>Scenario Test 4 (Core)</b>
PVB	£87.5m	£110.0m	£47.5m	£115.0m	£32.4m
PVC	£39.4m	£39.8m	£38.3m	£39.6m	£38.0m
NPV	£48.1m	£70.2m	£9.2m	£75.4m	-£5.7m
BCR	2.22	2.76	1.24	2.90	0.85
<b>Value for Money Assessment</b>	<b>High</b>	<b>High</b>	<b>Low</b>	<b>High</b>	<b>Poor</b>

### Comparison of Benefits Profiles

Figure 6.1 presents a comparison of the benefits profiles for the central case and each of the four scenario tests. The profile over time is similar across all scenarios, particularly between the Growth Agenda case, Scenario Test 1 (Fixed Matrix) and Scenario Test 3 (High Growth). Scenario 3 – the high traffic growth assessment - shows the highest level of benefit for all years with a much steeper benefits curve than the central case. At the other end of the scale, Scenario 4 – the core scenario – shows a flat profile of benefits between 2016 and 2031. The identical shape of the benefits curve on the decline from 2031 is to be expected – without any further modelled years between 2031 and the end of the project lifetime at 2075, all scenarios are subject to the same rate of discounting, merely applied to a different starting point on the curve.

**Figure 6.1: 60-Year Benefits Profiles for Growth Agenda Scenario and Sensitivity Tests**

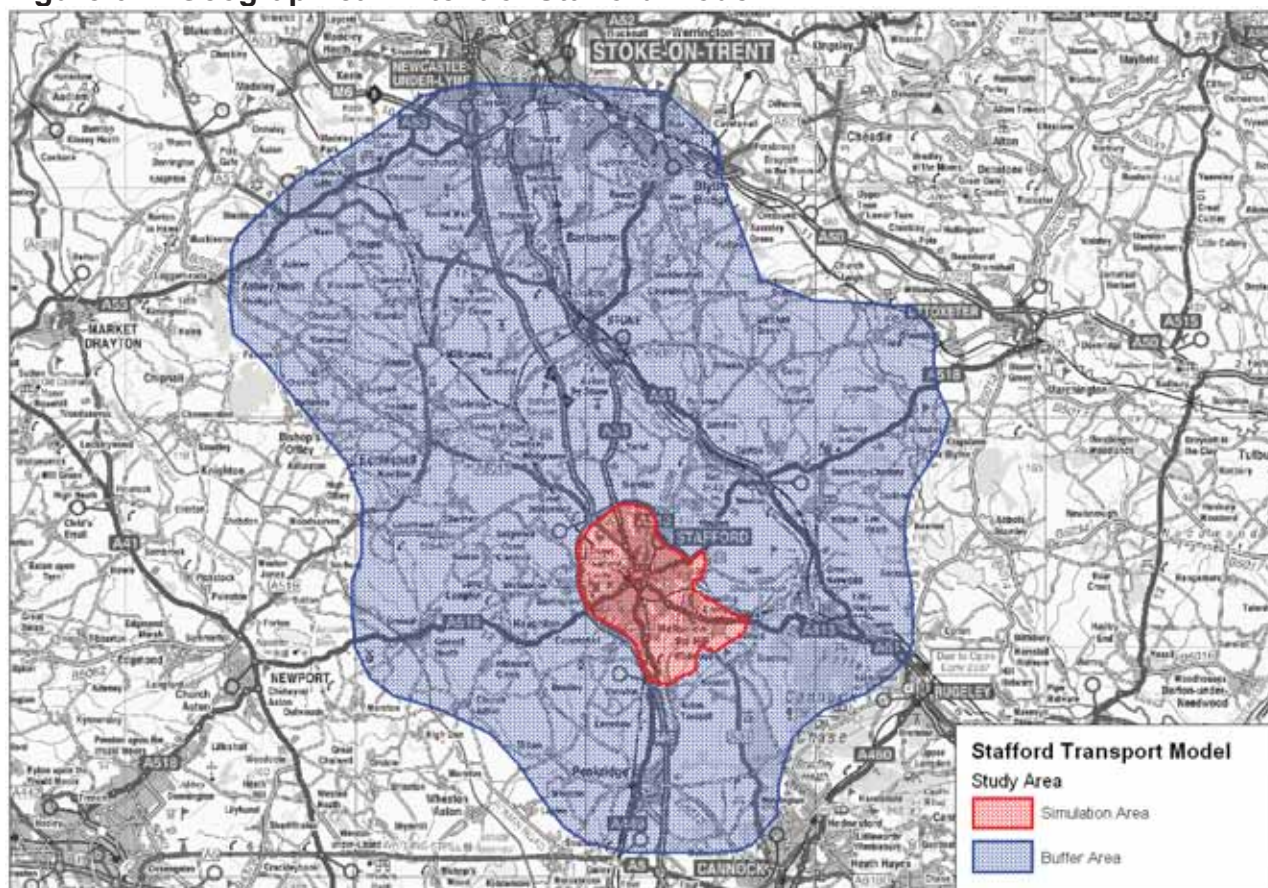


## 6.2 Modelling

Atkins were commissioned to update the Stafford Transport Model in line with DfT WebTAG guidance, so that the impact of the SWAI could be assessed. The key revision to the model was the inclusion of demand segmentation with generalised costs for both time and distance to enable variable demand modelling using DIADEM. This 'variable trip matrix' approach allows the demand matrix to change between two scenarios, following a change in travel costs as a result of highway improvements. 'Realism' testing was undertaken in the base year to ensure it was suitable for forecasting. A technical note explaining the agreed modelling approach is provided in Appendix 3.1. A public transport model has not been developed as the influence of transfer to / from public transport will be low and the scheme itself will not cause significant benefits or disbenefits to public transport.

The geographical extent of the model is shown in Figure 6.2. This is the broad study area upon which the Stafford Western Access Improvements are expected to have an impact.

**Figure 6.2: Geographical Extent of Stafford Model**



### 6.2.1 Traffic Model Survey Completion and Analysis Reports

A traffic model needs to reflect real life travel patterns for it to be used to examine future travel scenarios with any degree of confidence. To help achieve this, quality data relating to current travel patterns and network conditions is required. Atkins' Traffic Model Survey Completion Report (November 2007) is provided in Appendix 6.2



and details the processes associated with this data collection. Appendix 6.3 provides the Survey Analysis Note which presents the results of the traffic survey data.

Roadside Interviews (RSIs) surveys, Car Park (CP) surveys, Journey to Work (JTW) Census data and traffic counts were all used to understand current travel patterns. A programme of data collection was needed to obtain this information, although many of the traffic counts were already available.

In October 2007, RSI surveys were undertaken at 11 locations. Each was surveyed in the inbound direction for a 12 hour period (0700 – 1900 hours) recording vehicle type, vehicle occupancy, details of last and next stops, and journey purpose. The RSIs were designed to ensure all key traffic movements entering the town were captured and differing techniques were used depending on the site layouts. Some sites had separate interview bays, whilst at others pre-paid postcard surveys were distributed to drivers.

CP surveys were used to provide details on internal traffic movements which were not observed at any RSI. A mix of public and private CPs were selected to ensure work and shopping trips were fully covered. Surveys were conducted at 19 central area car parks between 0800 - 1100 and 1500 – 1800 hours during September and October 2007. The information collected was vehicle type, number of occupants, last and next stops, trip purpose, trip frequency and arrival / departure time.

JTW Census data was interrogated to provide information on traffic movements not picked up by RSI and CP surveys.

Traffic counts were used in a variety of ways, including factoring the RSI and CP data from the sample size to the observed count; providing information for the matrix building process; aiding calibration and validation of the model; and providing information on the level of utilisation on roads and junctions.

The major factor influencing urban network capacity is junctions. Junction capacity is largely determined by physical layout, conflicting movements and traffic composition and this type of data was collected from site visits, aerial photos, OS maps and signal data provided by Staffordshire County Council.

Journey Times surveys were completed to identify existing congestion problems, and for use in model validation. A total of 12 routes were completed, with 6 runs each direction, using moving observer method.

## **6.2.2 Local Model Validation Report**

A new Local Model Validation Report was produced by Atkins in February 2010 and is provided in Appendix 6.4. Both time periods calibrate and validate well against observed traffic data across the majority of the traffic model, with good calibration and validation in the areas of most interest to the SWAI.

### **Model Development**

The model network contains a mixture of simulation and buffer coding. Stafford town is simulated, allowing explicit junction modelling, while the wider area is buffer network.

Data such as HGV bans, speed limits, on-street parking and bus routes were all used to help build the model network. The model has a three tier zone structure – internal (Stafford town); buffer (e.g. villages); and external (e.g. regional areas). The geographic areas of zones are based upon aggregations of Census Output Areas.

The 'Prior' Demand Matrices were created by merging the CP, RSI and pre-merge matrices. The prior matrices have been split into 6 user classes to enable the different demand responses to changes in travel costs to be accurately reflected. These are – Car (Business); Car (Commuting); Car (Other); LGVs; HGVs (OGV1); and HGVs (OGV2).

Traffic was assigned to the network using Wardrop User Equilibrium, which seeks to minimise travel costs for all vehicles. The Cost of Travel parameters for the assignment (PPK and PPM) were calculated using WebTAG guidance, separately for each of the 6 user classes, and for each time period.

### **Model Calibration**

The calibration of the highway model was undertaken using a standard approach where the network and matrices were adjusted to ensure that the model gives plausible and expected routings, speeds and traffic flows. The network was calibrated by reviewing parameters such as link lengths, speeds, saturation flows, turn capacities and zone loading locations. Matrix Estimation (ME) was used to aid the development of trip matrices where there were few or no observations.

During the ME process the integrity of all observed data from the RSIs and CP surveys was maintained. The ME results were monitored closely, ensuring that the estimated matrix converged rapidly to a suitable standard. An increase in trips of 11% was witnessed in both peaks, and the majority of these were unobserved internal movements in north Stafford. There were no significant changes in trip length distributions.

Model calibration results were checked against the DMRB guidance. Assignment convergence was better than the recommended levels (i.e. the value for Delta should be less than 1% and Flow Change (P) less than 5% for 4 consecutive iterations for 90% of links). Guidance on traffic flow calibration was met for links flows and screenlines in both peaks (i.e. more than 85% of links were within given flow tolerances), and turning flows were calibrated to a good level (82% AM and 83% PM). Also, the  $R^2$  statistic was within the required range of 0.9 and 1.1 in both peaks.

### **Model Validation**

Model validation was undertaken which demonstrates that both peak hour models are an accurate representation of current network conditions and are therefore fit for purpose and considered acceptable for future year forecasting.

Traffic flows on links fell just short of the DMRB flow criteria (85%), with the AM and PM peaks meeting the guidance for 84% and 83% of the counts respectively. However, 86% (AM) and 85% (PM) of the links passed the GEH criteria for individual links, and the model validates well in the area of interest around the proposed scheme. Journey Times also validated well with 86% within the acceptability criteria in the AM peak and

91% in the PM peak (i.e. 85% of routes to be within 15% or 1 minute of the observed times).

### **6.2.3 Forecasting Report (May 2010) (including Demand Modelling)**

This report, provided in Appendix 6.5, proposes the development of future year transport models for the scheme's opening year of 2016, the 15 year design year of 2031 and an interim year of 2026, which is consistent with the end of the RSS / LDF period.

Having demonstrated the appropriateness of the forecasting methodology, the scheme's impact has been assessed for a range of scenarios for the three forecast years. The 'near certain' transport schemes included in the 2016, 2026 and 2031 do-minimum networks are defined, together with the do-something networks containing the proposed scheme. The 'sensitivity' of the benefits accrued was assessed with respect to traffic growth, potential developments and transport schemes. Uncertainty testing has underpinned the development of the future year networks and matrices. Assignments have been carried out using DIADEM and the effect of using this software has been demonstrated to be realistic. The impact of the scheme was assessed for a range of indicators including network assignment statistics, link flow changes network stress journey times and routing. The scheme delivers headline reductions in overcapacity peak hour queuing delays of 40% on key routes in 2031.

#### **Forecast Matrix Development**

The base matrices are described as being split into six user classes for each of the two time periods under consideration. Future general traffic growth is then estimated using NTEM 6.1 and NTM09. For journeys made by car, NTEM factors have been estimated and applied by purpose. However for LGVs and OGVs factors were derived using NTM (2009) values adjusted in line with TEMPRO. In order to correctly weight traffic growth, key development trips were included in the future year models based upon their definitions in the uncertainty log (WebTAG 3.15.5). The two components of matrix growth were combined to produce pre-constrained matrices (high demand) which were then constrained to NTEM 6.1 growth at a district level.

Four growth scenarios are described, a 'Growth Agenda Option' (the case for the scheme is justified in the context of this scenario), TEMPRO High and TEMPRO Low versions of the Growth Agenda Scenario, and a Core Scenario. In line with WebTAG 3.15.2, uncertainty in NTEM is considered for the Growth Agenda Forecast with the percentage increases for each user class and matrix totals, compared against the 2007 base figure for years 2016, 2026 and 2031. The derivation of 24 hour Average Annual Daily Traffic (AADT) and Annual Average Weekday Traffic (AAWT) forecasts necessary for to undertake noise and air quality assessments, is also described.

#### **Forecast Assignments**

Forecast trip matrices for 2016, 2026 and 2031, were assigned to model networks with and without the Western Access Route. Use was made of DIADEM software to account for variable demand in trip making. The development of the variable demand model structure is outlined and it is explained that six demand segments were created and the 'trip frequency' and 'distribution' responses have been considered for car trips

made for 'business', 'commuting' and 'other' journey purposes. Details of the generalised cost values pence per minute and pence per kilometre in the base and forecast years are tabulated for inspection.

There is a summary of the results of the realism testing undertaken, to derive Lambda parameters for DIADEM. Full details of the realism tests are appended in the form of a Technical Note (also sent to DfT March 2010). Statistics are presented that show that a good level of model convergence was achieved. It is particularly noteworthy that all model runs returned a relative gap parameter value of < 0.2%.

Assessments are reported concerning the impact of DIADEM on the number of trips suppressed or induced. The overall change in matrix total trips is very low (@ 0.30%); with marginally higher percentage change for the do-something Scenarios, which is in line with expectations. The impact of DIADEM has also been considered with respect to trip patterns. Sector analysis shows that a change in trip patterns away from high cost routes to lower cost routes is evident but that this is an expected response that shows DIADEM is functioning correctly. Total change in trips to each sector is generally less than 2%, with a maximum increase of 5%. The increase in trips is slightly higher in the do-something Scenarios which is intuitive given the additional capacity afforded by the scheme.

### **Traffic Forecasts**

The traffic impacts of the scheme were assessed by comparing the base year conditions with the forecast conditions for the Growth Agenda Land Use scenarios at the 2016 and 2031 time horizons. The benefits of the scheme in terms of improved network performance (reduced overcapacity queued time), traffic relief to key routes and junctions, travel time savings and changes in journey routings are quantified and explained.

### **Sensitivity Tests**

The results from a number of sensitivity tests are presented to demonstrate the impact on network performance and traffic flows resulting as a consequence of a different land-use or higher and lower levels of traffic growth. In this instance, the 'Core Scenario' represents a sensitivity test since the Growth Agenda is considered to be the most realistic assessment of future land use and traffic conditions for Stafford.

## 6.3 NATA Assessment of the Growth Agenda / Central Case Scenario

The preferred option has been appraised against the Government's five transport objectives:

- Environment
- Safety
- Economy
- Accessibility
- Integration

The results of the appraisal are summarised in the Appraisal Summary Tables (ASTs) provided at the end of this Chapter. Worksheets are provided in Appendix 6.6. The NATA assessment, assuming the Growth Agenda scenario under variable demand conditions, demonstrates that the preferred option (assuming appropriate mitigation measures and complementary sustainable transport measures) provides considerable economic, integration, safety, environmental and accessibility benefits.

### 6.3.1 Environmental Impact

#### Noise Sub Objective

A detailed assessment has been undertaken to quantify the estimated population annoyed with and without the scheme together with a monetary valuation of the predicted noise changes. The Growth Agenda scenario assumes that some 1,700 new houses proposed as part of the Castlefields development will be within 600m of the proposed Western Access Route and have therefore been included in the assessment.

#### *Methodology*

Road traffic noise calculations have been undertaken at selected receptor positions representative of all properties within 600m of the proposed route using Noisemap Server Edition environmental noise mapping software. The Noisemap software calculates in direct accordance with the methodology of the DoT/Welsh office document Calculation of Road Traffic Noise (CRTN). The main inputs to the model include:

- Three dimensional ground contour data
- Ground type (i.e. significant areas of hard or soft ground and/or water)
- Buildings (assumed 7m height)
- 3 dimensional road alignments (existing and proposed)
- Detailed traffic data

The three dimensional ground contour data was obtained from Intermap Mapping Data - Digital Terrain Model. Building outlines, ground type and existing road alignments were obtained from Ordnance Survey Mastermap data. The proposed route was modelled using a three dimensional AutoCAD® model of the road. The locations of existing residential properties within 600m of the scheme were identified using

Ordnance Survey Address-Point® data. Where address points were clearly identifiable as non-residential these were excluded from the assessment. Additional prediction points representative of the proposed new housing associated with the Castlefields development were added to the Noisemap model for the assessment of the Growth Point scenario.

Traffic data was provided from the Stafford SATURN Traffic Model for the opening year (2016) and the future assessment year (2031). The traffic data included all routes within 600m of the proposed route and affected routes outside of this area. As required by the CRTN methodology the data included 18 hour annual average weekday traffic (AAWT) flows, percentage heavy vehicles and average daily traffic speeds.

The national average household occupancy of 2.36 people per household (2001 Census) has been assumed in the assessment. This has been multiplied by the number of properties to give the population exposed within each noise band.

### *Assessment Results*

The resulting overall assessment scores are shown in Table 6.5. The worksheet and spreadsheet for the Growth Agenda are shown in Appendix 6.6. It should be noted that the calculation of population annoyed by noise is based solely on the assessment in the 15th year after opening.

**Table 6.5: Assessment Summary Results**

	<b>Growth Agenda Population</b>	<b>Existing Population</b>
Total Population Assessed	9206	5277
Estimated Population Annoyed Without Scheme	778	547
Estimated Population Annoyed With Scheme	800	554
Net Population Annoyed in 15 <sup>th</sup> Year After Opening	+22	+7

The changes in noise annoyance are approximately neutral for existing properties (excluding proposed housing developments). This is due to there being no housing close to the proposed route in the sections where no road previously existed, coupled with largely neutral noise impacts on the remaining road network. Adverse and beneficial impacts approximately balance out over the study area. Major noise increases of greater than 5 dB are predicted at 25 existing properties with the scheme when compared to the 'without scheme' situation in the 15th year.

Six existing properties could potentially be eligible for noise insulation works or grants under the Noise Insulation Regulations based on a predicted future noise level of greater than 68 dB with a predicted increase of greater than 1 dB with the scheme. This is only indicative at this stage and is based on free-field calculations as opposed to façade level calculations as required under the Regulations. A more detailed assessment should be undertaken at the detailed design stage to assess the eligibility of properties for insulation or grants by taking into account noise contributions from new

and altered sections of road as well as the location of noise-sensitive windows in each of these dwellings.

The Growth Agenda scenario shows a small adverse change Net Noise Annoyance with the scheme, although this is broadly neutral in the context of the size of the population assessed. This is due to the inclusion of receptors around the southern section of the Western Access Route between Doxey Road and Martin Drive, coupled with the noise increases due to increases in traffic volumes on Martin Drive and Rose Hill in Castlefields. The majority of properties do not change noise band with the scheme proposals and adverse noise increases are partially offset by noise decreases elsewhere in the study area. Major noise increases of greater than 5 dB are predicted at 104 properties with the scheme when compared to the 'without scheme' situation in the 15th year. Four properties have been identified as potentially qualifying under the Noise Insulation Regulations. This number is lower than for the scenario without proposed housing development due to higher baseline levels at two of the affected properties.

### *Assumptions and Limitations*

- Existing roads were assumed to be at local ground level with the exception of the bridge over the West Coast Mainline on Doxey Road which was modelled using height information provided for the 'with scheme' 3d drawings
- Free-field noise levels were calculated at selected receptor points at a height of 4m above local ground datum (approximately equivalent to first floor level)
- Only buildings which would need to be demolished in order for the road scheme to be built were excluded from the 'with scheme' models. No additional building outlines were added to represent the proposed future Castlefields development, since the details of these are not known at this stage
- The assessment does not take into account affected road links beyond 600m from the proposed Western Access Route. A future more detailed DMRB assessment as part of the Environmental Impact Assessment will take additional receptors potentially affected by changes outside this area into account.

## **Local and Regional Air Quality Sub Objectives**

### *Method of Assessment*

Daily average traffic flows, the proportion of heavy duty vehicles (HDVs), daily average vehicle speeds and road link lengths have been used for the opening (2016) and design year (2031), for both the do-minimum and do-something situations. Atkins' bespoke tools, developed in Microsoft Access, have been used to calculate two-way traffic data parameters as air quality model-ready data.

The WebTAG criterion for defining the affected network is to assess those links with a change in traffic flows of more than 10% AADT, unless the road is a motorway (due to the high traffic flows) or there are particular sensitivities (e.g. the presence of an AQMA). For this assessment, the more stringent Highways Agency Design Manual for Roads and Bridges (DMRB) criteria have been applied as links may be sensitive to the effects of lower percentage traffic flow changes. The traffic related criteria, set out in the DMRB, have been used to define the affected road network. These criteria are

based on a difference in one or more of the following parameters between the Do-minimum and do-something scheme scenarios:

- Road centreline alignment change by 5 metres (m) or more
- Annual average daily traffic (AADT) flows change by 1,000 vehicles or more
- HDV flows change by 200 AADT or more
- Daily average speed change by 10 kilometres per hour (kph) or more

The affected roads used in the assessment are shown in Figure 6.3. The entire network, which contains all links in the traffic model, was used in the regional air quality and greenhouse gas assessments.

Pollutant concentrations decrease with increasing distance from the road, so concentrations were calculated at 20 metres, 70 metres, 115 metres and 175 metres from the road centre, on each link, for the do-minimum and do-something scenarios for the opening year (2016).

The number of properties in 50 metre bands from the centre of each road link was counted to a distance of 200 metres for the do-minimum and do-something scenarios and then multiplied by the pollutant concentration calculated for that band. This was carried out for each of the four bands and the results added together to give a total for each scenario. The do-minimum value is deducted from the do-something value for each affected link. The overall assessment score is calculated by summing values over all links, with an improvement (decrease in concentrations) having a negative value, and a deterioration (increase in concentrations), having a positive value.

The procedure for the regional air pollution assessment is given in TAG unit 3.3.4 Regional Air Pollution, February 2004. This sub-objective references the DMRB regional assessment tool which has been transposed into a MS Access database to handle the entire affected road network. Results are presented as the change in mass emissions of NO<sub>x</sub> and PM<sub>10</sub>.

Due to the large size of the study area under consideration, Ordnance Survey Address-Point<sup>®</sup> data was used to determine the location and number of residential properties near the affected roads. Ordnance Survey Address-Point<sup>®</sup> data ensures that only those buildings with a postal address are included in the property counts. Locations where more sensitive individuals may be present, such as doctor's surgeries, elderly care homes, hospitals and schools, were identified and included in the assessment. In order to provide a consistent approach, properties were counted against the closest road on the affected network. The Ordnance Survey Address-Point<sup>®</sup> data was manually adjusted to take account of the potential construction of proposed properties in the do-something (Growth Agenda) scenario.

### *Baseline Conditions*

All local authorities are required by Part IV of the Environment Act 1995 to review air quality in their area. Stafford Borough Council's Local Air Quality Management review and assessment work has not identified the need for any Air Quality Management Areas (AQMAs). Stafford Borough Council has a number of kerbside and background located diffusion tubes and the most relevant data is displayed in Table 6.6 and the



location of the tubes is shown in Figure 6.3. The national Air Quality Strategy (AQS) objective for annual mean NO<sub>2</sub> of 40 µg/m<sup>3</sup> was not exceeded at any site, even at kerbside locations.

**Table 6.6: Annual Mean NO<sub>2</sub> (µg/m<sup>3</sup>) at SBC Diffusion Tube Sites**

Site ID	Type	2007	2008	2009
1	Kerbside	33	37	35
2	Kerbside	30	36	35
3	Kerbside	33	38	27
6	Kerbside	27	39	31
21	Kerbside	26	30	25
22	Kerbside	24	32	30
26	Kerbside	26	28	18
29	Kerbside	26	30	21
31	Kerbside	35	36	28
33	Kerbside	33	40	32
N3	Background	22	35	27
N4	Background	27	33	27

Estimates of background concentrations were obtained for the study area from one-kilometre square resolution grid data provided on the UK National Air Quality Archive. This data provides total concentrations of NO<sub>x</sub>, NO<sub>2</sub> and PM<sub>10</sub> for each grid square and the average of the background concentrations for the one kilometre grid squares containing the affected network are provided in Table 6.7.

**Table 6.7: Average Background Concentrations in the Study Area (µg/m<sup>3</sup>)**

Pollutant	2016
NO <sub>2</sub>	12.3
PM <sub>10</sub>	14.1

### *Assessment of Effects*

Table 6.8 shows the NO<sub>2</sub> and PM<sub>10</sub> for the opening year 2016. The worksheet is provided in Appendix 6.6.

**Table 6.8: NO<sub>2</sub> and PM<sub>10</sub> Assessment (2016)**

Pollutant	Assessment Score	Properties with Improvement	Properties with No Change	Properties with Deterioration
NO <sub>2</sub>	99	1725	0	3223
PM <sub>10</sub>	47	1585	0	3363

There will be no exceedance of the annual average NO<sub>2</sub> or PM<sub>10</sub> Air Quality Strategy objective at 20 metres from the road centreline at any location, in either the do-minimum or do-something scenarios in 2016. Any change in NO<sub>2</sub> concentration is considered to be insignificant in terms of TAG trigger statements (where the scenario would result in an increase in NO<sub>2</sub> concentrations of at least 2µg/m<sup>3</sup> and where concentrations exceed the AQS objective of 40µg/m<sup>3</sup> as an annual mean). Any change in PM<sub>10</sub> concentration is also considered to be insignificant in terms of TAG trigger statements (where the scenario would result in an increase in PM<sub>10</sub> concentrations of at least 1µg/m<sup>3</sup> and where concentrations exceed the AQS objective of 40µg/m<sup>3</sup> as an annual mean).

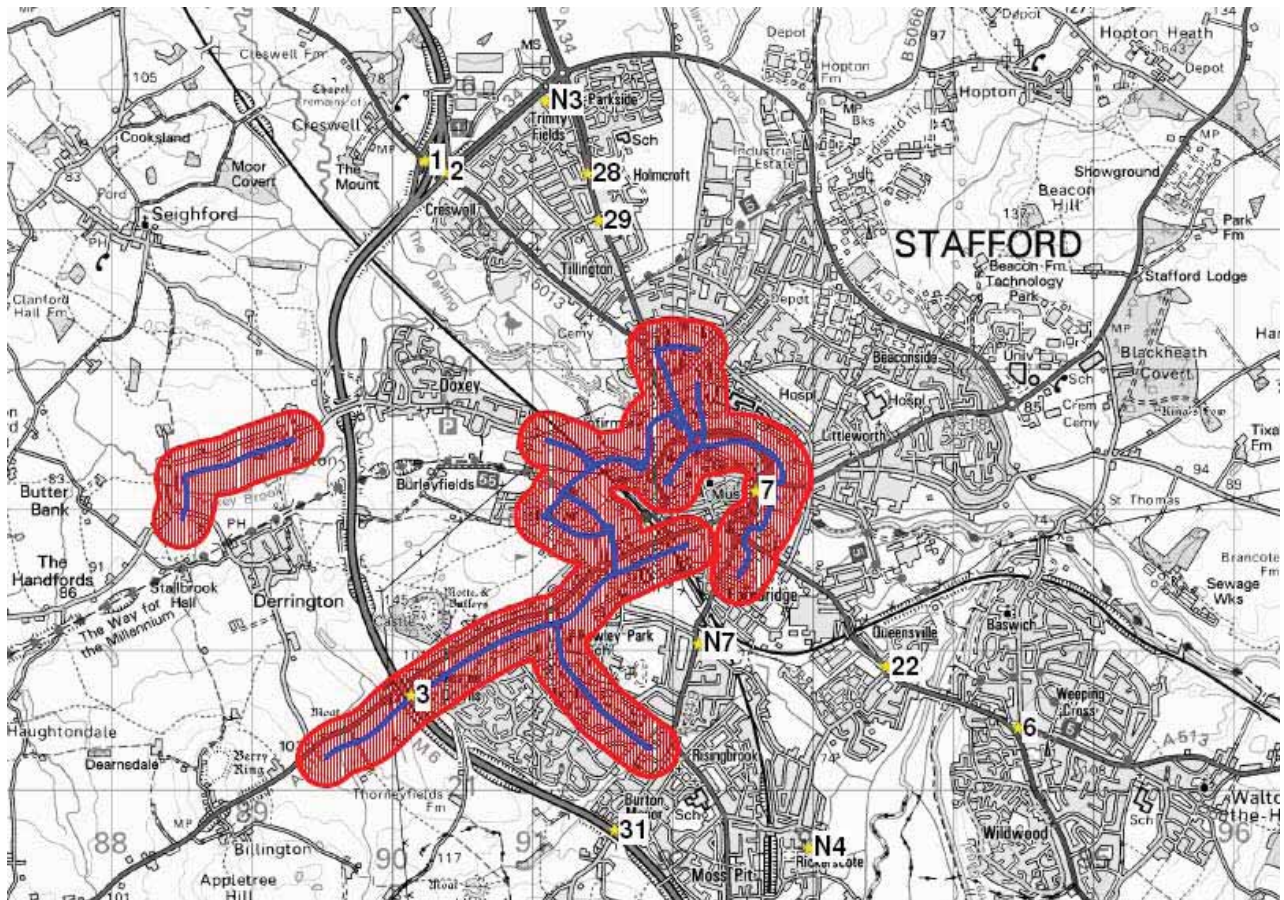
The assessment of the do-something scenario shows that there is expected to be an overall slight deterioration in NO<sub>2</sub> and PM<sub>10</sub> with the scheme, as indicated by the positive assessment scores. However this slight deterioration is only associated with the proposed additional housing associated with the growth agenda.

Results from the regional assessment are presented in Table 6.9. Emissions from all roads in the study area included in the traffic model are shown for the do-minimum and do-something situations in the opening year 2016 and design year 2031. A decrease in emissions of NO<sub>x</sub> and PM<sub>10</sub> is expected in 2016 and 2031 of less than 1%.

**Table 6.9: Results of the Detailed Regional Assessment (tonnes/year) Growth Agenda Scenario**

Year	Scenario	NO <sub>x</sub>	PM <sub>10</sub>
2016	Do-minimum	189.3	8.6
	Do-something	188.4	8.5
	Change	-0.8	<-0.1
	% Change	<1%	<1%
2031	Do-minimum	74.9	5.8
	Do-something	74.2	5.9
	Change	-0.6	<-0.1
	% Change	<1%	<1%

**Figure 6.3: Air Quality Affected Network, 200m Buffer and Local Diffusion Monitoring Sites**



### **Greenhouse Gases Sub Objective**

The TUBA programme provides a calculation for estimating changes in fuel consumption that automatically produces an estimate of the carbon emissions and the net present value of the associated damages, as described in TAG. TAG Unit 3.3.5 stipulates that if TUBA is used to estimate the change in carbon emissions it is important that all 8760 hours of the year are represented in the analysis.

In addition DMRB guidance urges caution when using TUBA to calculate emissions as it uses trip average speeds rather than link average speeds. For the economic assessment, therefore the alternative methodology offered in WebTAG Unit 3.3.5 has been adopted - whereby carbon emissions have been estimated using the DMRB Screening Method v1.03c and the costs have been calculated using the TAG global emissions excel spreadsheet, as provided by DfT.

The latest version of the DMRB Screening Tool v1.03c uses the Vehicle Operating Costs data provided in WebTAG Unit 3.5.6 Values of Time and Operating Costs to calculate the carbon emissions. The average fuel consumption, based on average speed and vehicle category, is calculated for the given traffic composition. The impacts of improved vehicle efficiency through technology changes, which result in reduced fuel

consumption between 2003 and 2020, as set out in WebTAG Unit 3.5.6, are included in the tool.

The DMRB spreadsheet provides a regional impact assessment, which is used to determine the total carbon emissions for the do-minimum and do-something scenarios. This spreadsheet has been used to calculate the total carbon emissions from the traffic network for both the do-minimum and do-something scenarios for each year of the 60 year appraisal period (2014 – 2073 inclusive).

The results of the assessment are expressed as a set of mass emissions (tonnes of pollutant per year), for each year of the appraisal period. The difference in emissions (expressed in tonnes of carbon per annum) between the do-minimum and Do-something scenario is calculated for each year. The social cost per tonne of carbon is combined with the change in emissions as a result of the scheme for each year of the 60 year period (using the TAG global emissions worksheet). The worksheet calculates the social cost of the effect of the scheme for each year. This value is then discounted at standard HM Treasury rates (3.5% for the first 30 years and 3% thereafter), to give a 2002 net present value of carbon emissions for that particular year. The values for each of the 60 years of the appraisal period are summated to provide the net present value of the change in carbon emissions as a result of the scheme.

Overall a benefit due to reduced carbon emissions, over the 60 year appraisal period, of £1.57 million (2002 values and prices discounted to 2002) has been calculated for the scheme. The worksheet is provided in Appendix 6.6.

### **Landscape Sub Objective**

The policy objective is to maintain the current high quality of landscape in this area of Stafford, with an emphasis on ensuring development blends in unobtrusively. The area is already influenced by development but its impact is currently well contained by characteristic vegetation on the urban fringe. The characteristics of the landscape are highlighted in Figure 6.4 and the sub objective worksheet is provided in Appendix 6.6.

The section of the route north of Doxey Road is adjacent to an area of low lying marshland subdivided by watercourses and sparse areas of scrub and damp woodland. The scheme will result in the loss of wet woodland but this will be compensated by additional planting provided to enhance the landscape to give a slight beneficial impact. The side slopes of the Western Access Route will be sensitively landscaped throughout. The planting will be carried out using appropriate native species, which will also be chosen to ensure they are low maintenance.

The area includes a network of paths for informal recreation which contribute towards the cultural aspects of the landscape. The scheme includes proposals for a community amenity area adjacent to the Doxey and Tillington Marshes SSSI, which will provide moderate benefits. The scheme will not affect levels of tranquillity in the area. There is currently a sense of separation from urban surroundings but with intrusion from local road and railway lines.

<b>This sub objective has been scored as SLIGHT BENEFICIAL</b>
--



## Townscape Sub Objective

The route passes through a variety of different land uses comprising industrial, commercial, residential and car parking. The different areas are of varying quality; the most valuable being the traditional, historic areas. Figure 6.5 highlights the points of interest in terms of townscape.

Large scale industrial and warehouse buildings are located adjacent to Doxey Road to the western end of the route. Amongst these buildings is the locally distinctive Unicorn works which is of local or sub-regional importance. The re-aligned route of the Doxey Road will pass through this building resulting in a minor negative impact. However, it should be noted that this is being actively promoted for redevelopment as part of the relocation plans of the occupying business.

To the north of the West Coast Mainline and Doxey Road is an area of modern housing fronted with three-storey town house style residential units which is largely unaffected by the proposals in townscape terms. However, Castletown is an area of locally distinctive traditional terraced houses having a traditional high density grid iron pattern. The proposed position of the new Doxey Road/ Sainsbury's entrance roundabout moves traffic away from the edge of Castletown thus reducing any physical impact on this area. The route will have no impact on existing and remnant railway structures along Doxey Road.

The northern section of the route passes through an area of open surface parking however it will not sever any existing pedestrian movements between these facilities and the town centre.

Madford Retail Park is located at the northern edge of the route and is within the boundary of Foregate Conservation Area. The access route will have no impact on this area in terms of townscape, as the type of buildings located here are common to town centres.

The height of the elevated sections of carriageway on the viaduct and approaching the new bridge on Doxey Road are expected to be higher than existing levels. It is not considered that this will adversely affect the townscape assessment if appropriate design features are implemented. The sub objective worksheet is provided in Appendix 6.6.

<b>This sub objective has been scored as SLIGHT ADVERSE</b>
---

## Biodiversity Sub Objective

Biodiversity is an important consideration for this scheme and an outline of the environmental constraints and mitigation opportunities is shown in Figure 6.6. The Site of Special Scientific Interest is within the River Sow floodplain and supports a wide range of protected and rare species. The site is of ornithological importance all year round and has special significance for the number of breeding snipe *gallinago gallinago*. Work is ongoing with Natural England to minimise any potential impacts on biodiversity and mitigation measures have already been agreed. Consultations will also continue with the Environmental Agency and Staffordshire Wildlife Trust. A Water

Level Management Plan will be produced to bring the site into target ecological condition, as defined by Natural England and thereby contributing to the UK Government target of having 95% of SSSIs in target ecological condition by the end of 2010.

The road passes through an area of SSSI classified as destroyed as it is currently in use as a service road and car park. The area immediately to the west of the alignment will be provided in compensation as an area of SSSI restoration. The scheme has therefore been assessed as neutral in terms of its impact on the SSSI. The creation of an amenity area will provide a beneficial impact on the Nature Reserve providing high quality biodiversity information for the local community. This area will be easily accessed by walking and cycling.

The new roundabout on Doxey Road at the entrance to Sainsbury's will impinge on an area of willow carr woodland which is a Biodiversity Action Plan (BAP) habitat. In a BAP habitat, a number of species may be present, particularly birds and amphibians. Behind this is an area of existing SSSI which will be protected through minimisation of the construction footprint and any necessary restoration. The Doxey Road area of the scheme will also require consideration of toads which have an established point of crossing and there is the potential of bats utilising disused railway structures adjacent to the road.

The impact of the access route on the River Sow has been assessed as slight adverse/neutral due to its high biodiversity value and the presence of water voles, otters and mature trees. The design of the bridge will include space for otter movement and careful design of the associated lighting will reduce the impact on both bats and otters. Mitigation will include the replanting of any disturbed areas with native species.

It is possible that there may be a negative impact on an area at the southern end of the access route near to Castlefields which may need to be mitigated. A habitat survey will be completed as part of the Environmental Impact Assessment to determine this impact.

The sub objective worksheet is provided in Appendix 6.6.

<b>This sub objective has been scored as NEUTRAL</b>
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### **Heritage and Historic Resources Sub Objective**

The only designated feature along the course of the route is Foregate Conservation Area which is dominated by a mixture of nineteenth and twentieth century development and is shown on Figure 6.5. The twentieth century retail park development has already had a negative impact on the character of the Conservation Area, however elements do survive including the old Stafford Infirmary building, terraced housing and factory buildings. It is considered that there will be a neutral impact as traffic flows provided by the SATURN model show a reduction in traffic in both the AM and PM peaks along Foregate Street adjacent to these surviving buildings.

The route clips the edge of a series of well preserved 19th century water meadows which are located within the boundary of Doxey and Tillington Marshes Site of Special

Scientific Interest (SSSI). The water meadows survive in good condition although along the majority of the proposed route all earthworks have been removed. The impact of the route on the water meadow is therefore neutral.

There will also be a neutral impact on the Stafford to Uttoxeter and Stafford to Wellington dismantled railway lines which are bisected by the access route. Although the lines have influenced the wider development of the town in this area, they now only survive in a relatively poor condition.

It is possible that palaeoenvironmental remains are present within the impacted area which results in a potentially negative impact on anything that may be present along the route. However, no palaeoenvironmental work has been conducted in this area to test the potential condition of surviving remains. The Historic Environmental Records (HER) suggests that there is low potential for archaeological remains to be associated with palaeoenvironmental remains. It is considered that there will be minimal direct impact; however there is the potential for indirect impacts in terms of changes to the water table in the SSSI. A slight negative assessment has therefore been made of the impact on the Heritage of the Historic Environment because of this unknown level of remains and their importance.

Appropriate archaeological mitigation will be implemented at relevant stages within the project. The form and scale of the mitigation response will be determined at detailed design stage in consultation with Staffordshire County Council’s Principal Archaeologist. Taking into consideration the low potential for archaeological remains across the length of the route, it is considered that no pre-determination archaeological investigations would be appropriate in this instance. The worksheet sub objective is provided in Appendix 6.6.

**This sub objective has been scored as SLIGHT ADVERSE**

### **Water Environment Sub Objective**

The preferred route alignment passes within Flood Zone 3b which is functional floodplain, Flood Zones 3a where there is high probability of flooding, and Flood Zone 2 where there is a medium probability. The Flood Zones are shown on Figure 6.7 and the location of the road in relation to watercourses is shown on Figure 6.8. The route crosses Doxey Drain, Pan’s Drain and the River Sow and Table 6.10 classifies the importance of the relevant water receptors and features.

**Table 6.10: Water Environment Receptors and Importance**

<b>Water Environment Feature</b>	<b>Importance</b>
River Sow	Medium
Doxey Drain	Medium
Pan’s Drain	Medium
Tillington Drain (not crossed by the road)	Medium
Doxey and Tillington Marshes SSSI	Very high
Groundwater	Low
Flood Risk	High



Staffordshire County Council will work closely with the Environment Agency, the Sow and Penk Internal Drainage Board and Natural England to agree working methods. The County Council will also be involved in a Steering Group that has been set up by the Drainage Board to implement a Water Level Management Plan for the Site of Special Scientific Interest.

The Environment Agency response to the road proposal is provided in Appendix 7.4. They consider the Western Access Route to be classified as essential infrastructure as defined in Planning Policy Statement 25: development and Flood Risk (PPS25). In order for the road proposal to be acceptable to the Environment Agency, it will:

- Provide wider sustainable benefits to the community that outweigh flood risk
- Be built on previously developed land (70% of the Western Access Route will be constructed across PDL and existing highway)
- Not increase flood risk elsewhere, and wherever possible, will reduce flood risk overall

A detailed Hydrological Assessment, Flood Risk Assessment and a Contaminated Land Preliminary Risk Assessment will be completed following Programme Entry to inform the Environmental Impact Assessment and the Planning Application. Although water quality and flood mitigation measures are already included in the scheme design, additional mitigation measures may be identified as part of these further assessments to ensure that the final design for the scheme will have a neutral impact. These investigations will primarily focus on road drainage proposals, the construction methodology of the viaduct, further assessment of the connectivity of the shallow groundwater and the sensitive water environment of the SSSI.

Based on existing evidence, the impact of the scheme on the River Sow is considered to be insignificant in terms of flow regime and of low significance in terms of quality and flood risk. The quality of water and change of flood impact are unlikely to be altered for the drains and the SSSI. The effect on groundwater flow and quality is also expected to be of low significance due to the unimportant nature of the groundwater as a resource. However, due to the fact that detailed assessments have not yet been completed the Western Access Route has currently been given a WebTAG assessment of 'slight adverse' which is considered to be the worst case scenario. The worksheet sub objective is provided in Appendix 6.6.

### *Surface Water Quality*

Without the necessary mitigation measures, the route has the potential to negatively impact on water quality through the introduction of pollutants during the construction process and suspended solids in runoff which could then discharge to local watercourses. The implementation of good working practices and mitigation measures will ensure pollution is limited, leading to an impact of low significance on water quality. Before commencing any construction work the Environment Agency's Pollution Prevention Guidance note 5 will be referred to.

During the operation of the road, the impact on suspended solids and contaminants on the surface watercourses as a result of vehicle movements would be mitigated by the proposed road drainage scheme and as such the resultant impact is determined to be

insignificant. With a suitable road drainage scheme in place no road discharges should be made to the SSSI which is primarily located up-gradient of the scheme. Water quality of receiving watercourses will not diminish in line with the European Water Framework Directive. Sustainable Drainage (SuDS) techniques will be used where appropriate and green/open drainage features will be used where possible.

#### *River Flow, Runoff and Flood Risk*

The Flood Risk Assessment will comply with Annex E of PPS25 and its accompanying current revision of the Practice Guide. The PPS25 Sequential Test will be applied by Stafford Borough Council, based on the Strategic Flood Risk Assessment for the district. This will confirm that there is no reasonable alternative but to develop in the floodplain.

There is the potential for increased infiltration as a result of the construction process and therefore a reduction in runoff to the surrounding watercourses. However, as there is likely to be connectivity between the shallow groundwater aquifer and the watercourses, there is unlikely to be a reduction in the base flow to the watercourses. Therefore, the short term impact of construction on the surface water flow is considered to be insignificant.

Agreement with the Environment Agency and Natural England will be required in relation to the method of construction of the foundations of the viaduct adjacent to the SSSI to minimise impacts. Appropriate mitigation measures will be required to avoid the potential for a significant adverse impact on the water table and surrounding water surface features. This is possible where pumping of groundwater levels is required and water is discharged to local watercourses, potentially increasing flood risk. Such impacts during construction should be both temporary and reversible provided that appropriate management and mitigation measures are employed.

Once operational, the potential impact of the access route in terms of flood risk is deemed to be of low significance due to the following:

- Increasing the volume and speed of runoff where permeable ground material has been replaced with impermeable road surface, potentially increases local flood risk within adjacent watercourses. However the implementation of the road's drainage system would control runoff to prevent an increase in flooding.
- The supporting columns of the viaduct which are located within the floodplain will be designed to ensure that they do not impact on flood flow paths particularly for the management of the SSSI.

#### *Groundwater Quality*

Reference to the 1:50,000 scale geological map Sheet 139 (Stafford) indicates that the site is located on Triassic Mercia Mudstone which is designated a 'Non Aquifer' by the Environment Agency. It predominantly has lower permeability layers which may store and yield limited amounts of groundwater. Superficial Alluvium and Glaciofluvial deposits are indicated for the site which are designated as 'Minor-Aquifers' by the Environment Agency. They have permeable layers capable of supporting local water supplies and can form the base flow to rivers. With the implementation of the road

drainage network the impact of the scheme in terms of groundwater quality is likely to be insignificant.

During construction, spillages of contaminants on permeable ground could directly impact on groundwater quality. However, due to the potential connectivity between the shallow groundwater and river base flow the impact of such discharges in the short term is considered to have low significance. This will be reduced to insignificant with appropriate management and mitigation measures. The SSSI is predominantly located up groundwater gradient of the scheme however the connectivity between the shallow groundwater and the SSSI suggests there could be a low significance for the SSSI.

As part of the planning application, a Preliminary Risk Assessment will be carried out identifying the potential for contamination and possible risks to 'Controlled Waters' receptors (the underlying Minor Aquifers, watercourses and the SSSI). This will include an assessment of the likely sources and pathways of contaminants and the risks posed to 'Controlled Waters' and the potential options for breaking the source-pathway-receptor linkage.

#### *Groundwater Flow*

The geology suggests connectivity between the shallow groundwater and the surface watercourses. Mitigation measures will be implemented to reduce the impact on groundwater flow if pumping is required for constructing the viaduct foundations. However, the impact on the minor aquifer would be insignificant due to its low level of importance. Appropriate mitigation measures will ensure the impact on the SSSI is of low significance as a result of the connectivity between the shallow groundwater and the SSSI.

There is the potential for increased infiltration into the shallow aquifer as a result of the construction process which has the potential to increase groundwater flow. However this is likely to have an insignificant impact. It is likely that the long-term implication on groundwater flow in the area of the SSSI will be of low significance resulting from the permanent placement of the viaduct foundations, due to the permeable nature of the Glaciofluvial Deposits.

<b>This sub objective has been scored as SLIGHT ADVERSE</b>
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#### **Physical Fitness Sub Objective**

The physical fitness sub objective considers the impact of transport proposals on health as a result of changes in walking and cycling. The Stafford Western Access Improvements will provide a high quality shared footway and cycleway that will take travellers to the western edge of the town centre and directly to facilities such as employment, retail and education. The scheme provides an alternative route for walkers and cyclists that will have a similar travel time to existing routes. Additional pedestrians and cyclists may therefore be encouraged by this increase in available facilities. The scheme will also provide a more direct and attractive walking and cycling route for school children between Doxey and the catchment area high school at Highfields, although any potential physical fitness benefits have not been measured.

The extent of existing walking and cycling journeys has been estimated utilising origin and destination data by mode from the Castlefields Travel Survey conducted in 2009 (see Appendix 6.7 for details). The Castlefields area of Stafford is located adjacent to the Western Access Route and is geographically most similar to potential housing development in the area.

All households on the Castlefields estate were surveyed which involved sending out 402 questionnaires. Overall 131 survey forms were returned giving a response rate of 33%. The main part of the survey was a single day travel diary which allowed respondents to complete the details of up to eight journeys. Information required included the origin and destination, mode of travel and journey purpose. Mapping the location of trip ends enabled consideration of the number of journeys likely to benefit from the Stafford Western Access Improvements.

Applying the methodology provided in TAG Unit 3.14.1 to forecast changes in the numbers of cyclists results in a negligible change. However, as the existing modal share for cyclists is very small, the data available was not considered sufficient to give statistical confidence in the results. Therefore it is reasonable to assume no change in the number of cyclists. The existing number of pedestrians travelling from this area to the town centre is quite large and there is no local data to suggest that this level will increase.

The additional number of pedestrians and cyclists expected as a result of the new walking and cycling facility along the access route has therefore been assessed to be insignificant in terms of improving physical fitness. However, the sustainable complimentary measure detailed in Section 4.10 will also improve walking and cycling facilities for residents. They have not been included as part of this assessment but are likely to encourage additional walk and cycle journeys.

<b>This sub objective has been scored as NEUTRAL</b>
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### **Journey Ambience Sub Objective**

The journey ambience sub-objective considers the different aspects that affect the quality of a journey including traveller care, travellers' view and traveller stress.

Traveller care is subdivided into cleanliness, facilities, information and environment. Cleanliness and facilities are not applicable to this scheme as they relate to the provision of lay-bys, toilets and service areas. Environment is applicable to public transport schemes as it encompasses issues such as overcrowding and temperature. Existing highway and public transport routes through Stafford town centre have good quality information including directional signs and general travel information, and this will be maintained on the Western Access Route. In terms of route uncertainty, the impact of the Western Access Route will be neutral. Signage will be provided on the new route to a quality that is comparable with existing routes.

The views available to travellers along routes through Stafford town centre typically contain a mixture of housing and business properties, some of which have locally distinctive architecture. The existing route passes Victoria Park, but overall the views are intermittent because of the town centre buildings. The proposed route will take

walkers, cyclists and car drivers past the edge of Doxey and Tillington Marshes SSSI on an elevated road surface, providing open views across the marshes where there is a wide variety of birds. These views are not currently experienced by travellers.

Frustration experienced by travellers includes the layout and condition of the road and an ability to make good progress. Without the scheme, travellers in Stafford will experience congestion in future years which will reduce their ability to make good progress. Implementation of the proposed scheme will help to alleviate this, reducing traveller frustration. The layout and geometry of existing routes in Stafford is good quality and this will be maintained along the Western Access Route. There will also be benefits for school children walking and cycling between Doxey and the catchment area for the high school at Highfields.

Fear of potential accidents is a possibility on the existing routes in Stafford town centre because of the large pedestrian movements in some areas. The proposed route avoids these areas of potential conflict reducing the fear of accidents for travellers.

Overall, the implementation of the scheme will provide increased journey ambience and as the number of users per day is in excess of 10,000, the overall assessment score is large beneficial. The worksheet sub objective is provided in Appendix 6.6.

<b>This sub objective has been scored as LARGE BENEFICIAL</b>
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Figure 6.5

Stafford Western Access Improvements  
Townscape and Heritage Constraints

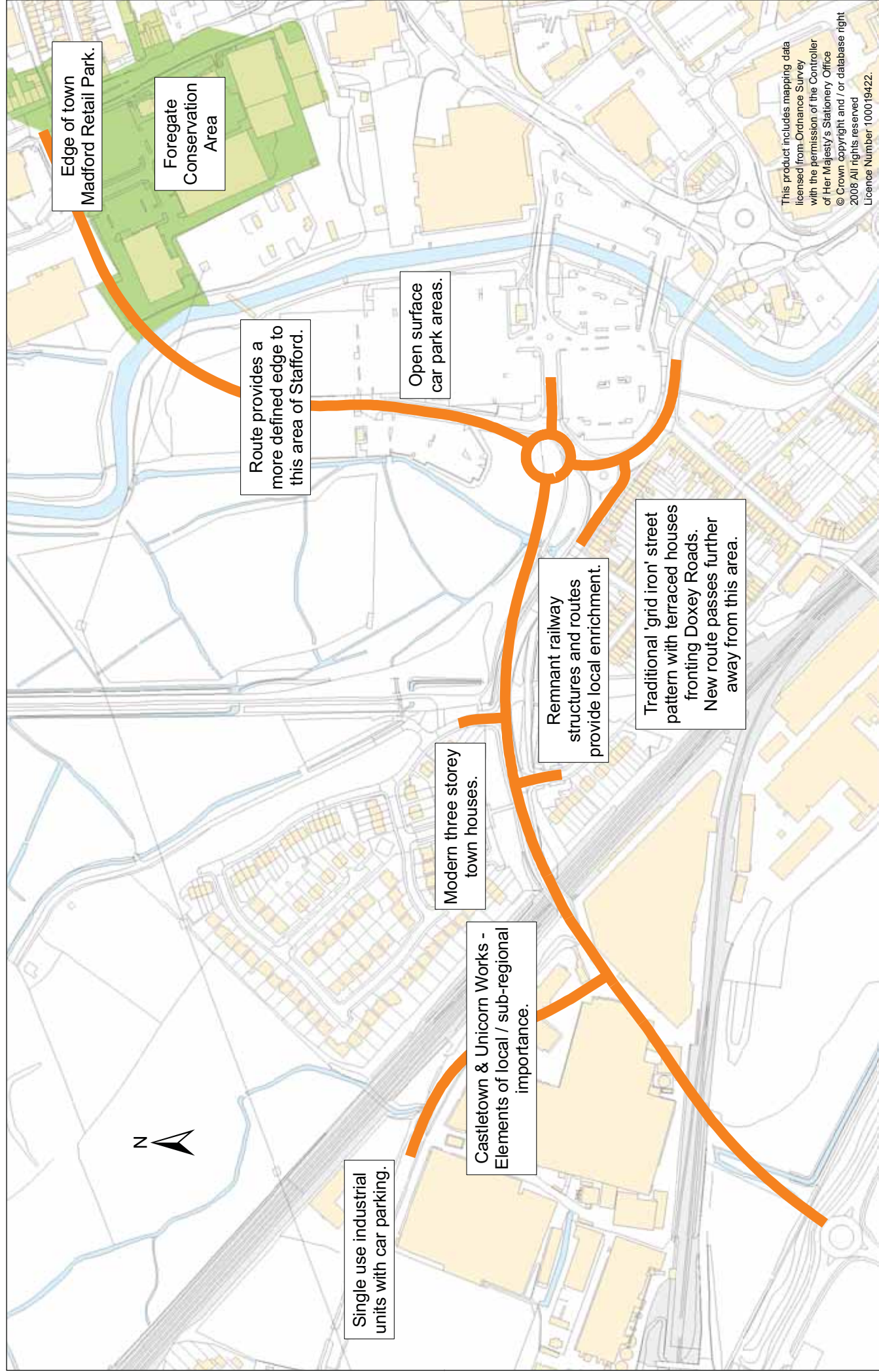


Figure 6.6  
Stafford Western Access Improvements  
Biodiversity Constraints and Mitigation

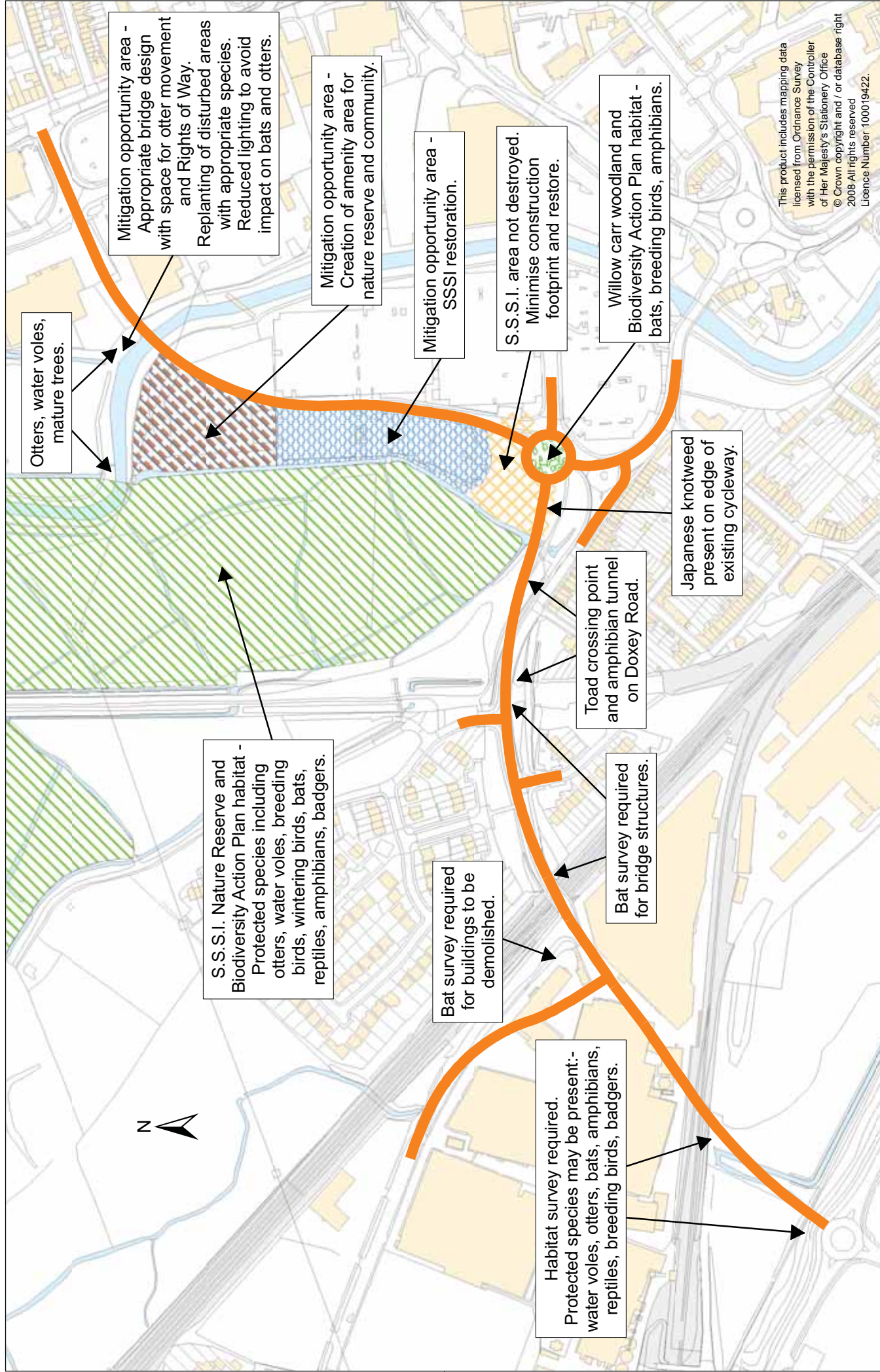


Figure 6.7

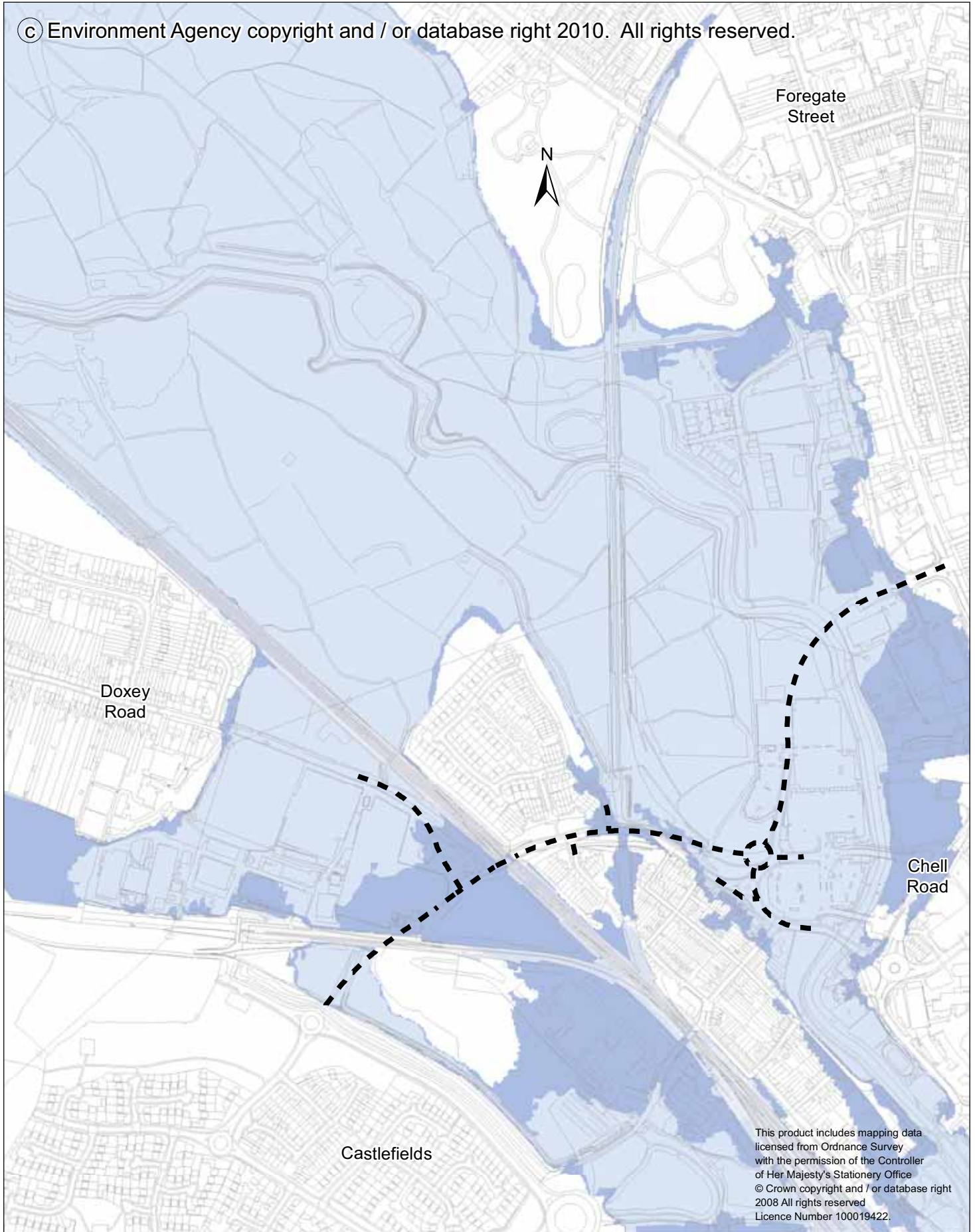
Stafford Western Access Improvements : Groundwater Protection Zone & Flood Zone 3

■■■■ Stafford Western Access Improvements

Environment Agency flood zones  
1 in 100

Environment Agency flood zones  
1 in 1000

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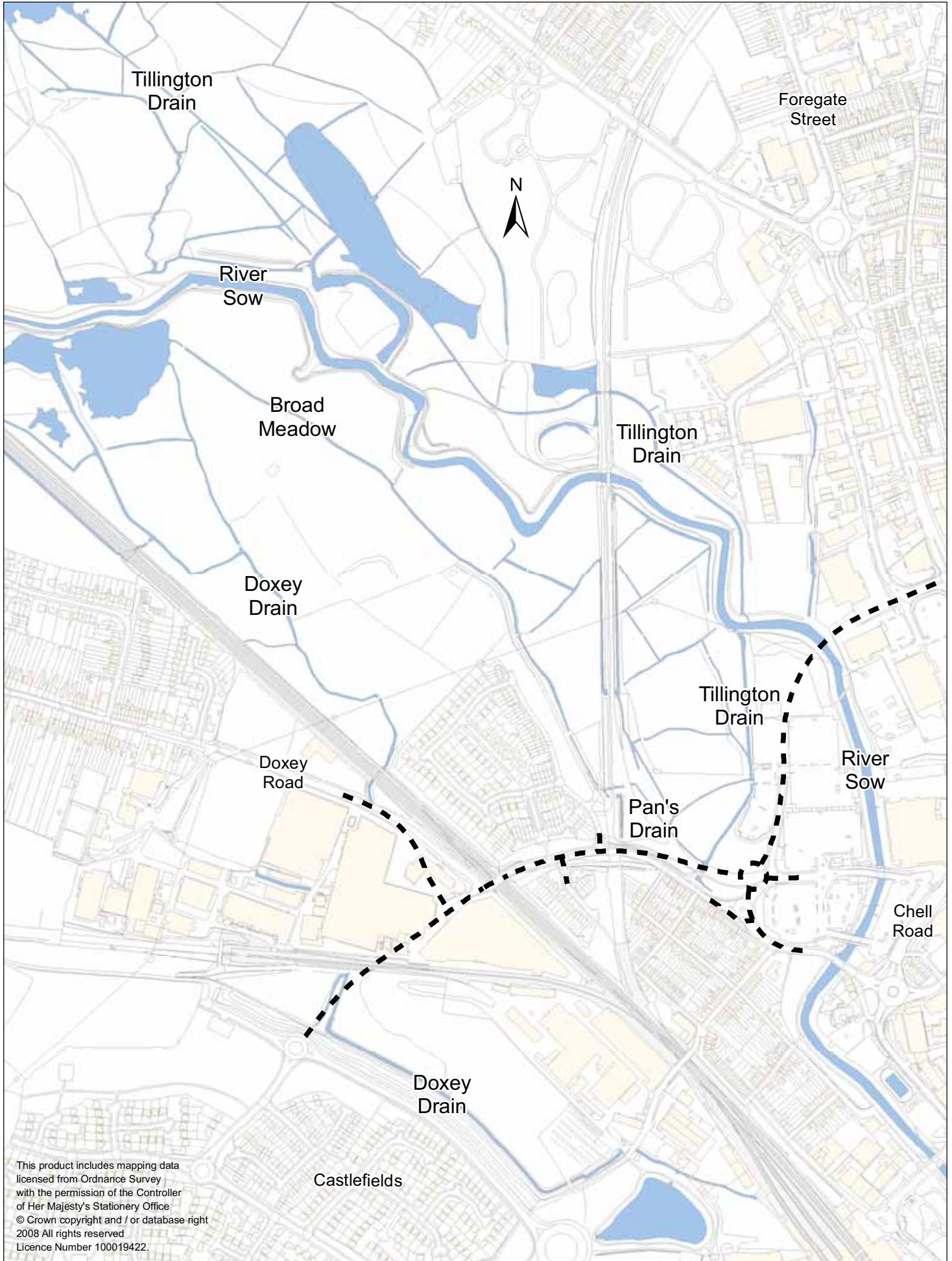
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Figure 6.8

Stafford Western Access Improvements : Local Watercourses

■■■■ Stafford Western Access Improvements



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## 6.3.2 Safety Impact

### Accident Sub Objective

The proposed Western Access Route is expected to reduce the overall number of accidents on the surrounding local network. Trips using the proposed scheme will navigate fewer junctions than the alternative routes and should, therefore, benefit from a safer journey. Figure 6.9 shows the location of all accidents occurring over the five year period between July 2004 and June 2009 across the core study area. Closer investigation of this highlights the number and severity of Personal Injury Accidents (PIAs) which have occurred in the Stafford Study area, as shown in Table 6.11.

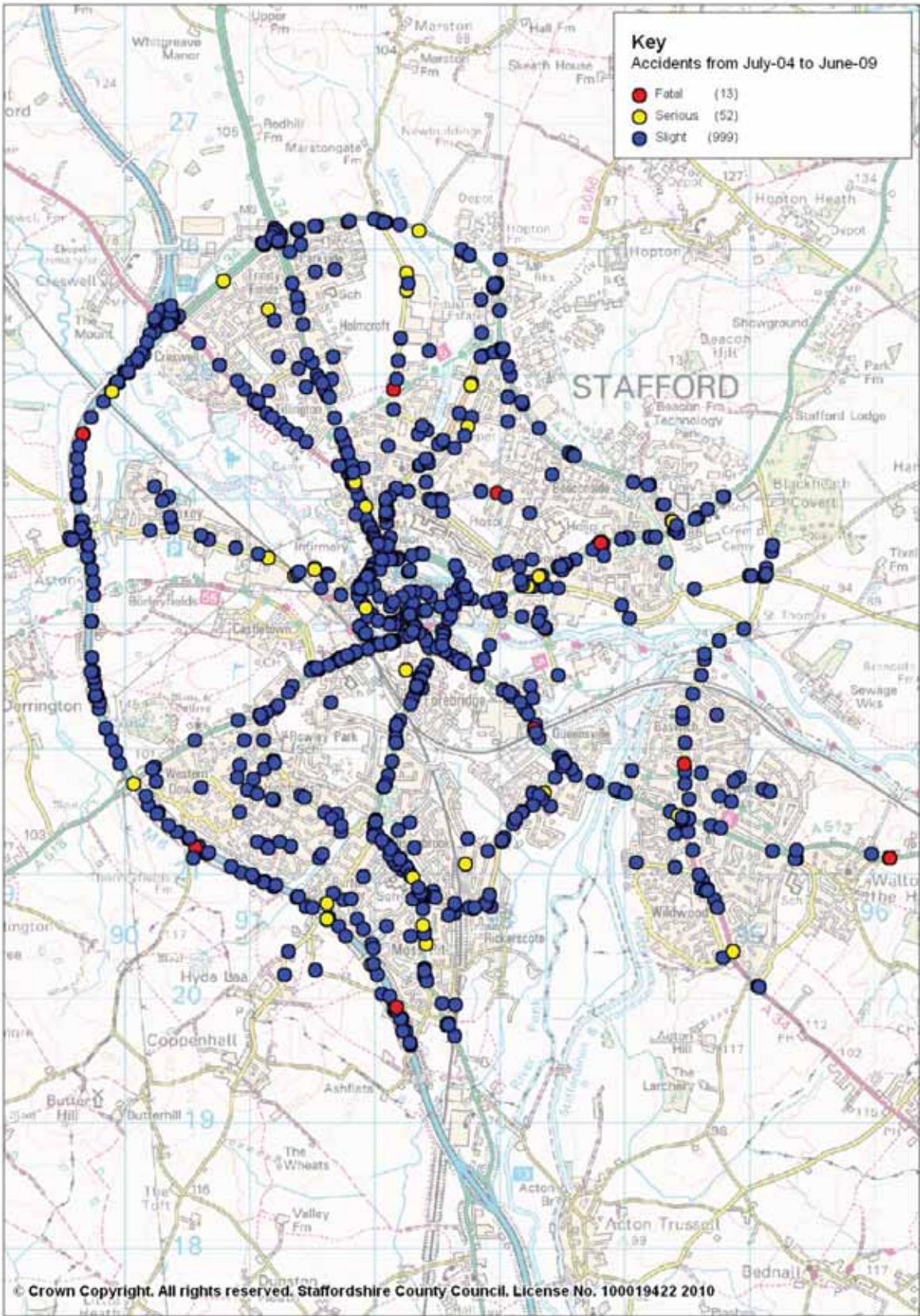
**Table 6.11: Personal Injury Accidents occurring in the Study Area**

Year	Fatal	Serious	Slight	Total PIA's
2004	1	5	111	117
2005	2	14	227	243
2006	2	8	213	223
2007	4	7	191	202
2008	2	16	183	201
2009	2	2	74	78
<b>Average per Year</b>	<b>2.6</b>	<b>10.4</b>	<b>199.8</b>	<b>212.8</b>

The severity of a PIA is classed as fatal, serious or slight according to the following definitions:

- A **fatal** accident involves the death of at least one person, either killed immediately or within 30 days of the accident. This is the usual international definition, adopted by the Vienna Convention in 1968.
- A **serious** accident is one in which at least one person is seriously injured, but no-one suffers a fatal injury. A serious injury is one which does not cause death less than 30 days after the accident and in which a person suffers (a) an injury for which that person is detained in hospital as an in-patient, or (b) any of the following injuries (whether or not the person is detained in hospital): fractures, concussion, internal injuries, crushing, severe cuts and lacerations, severe general shock requiring treatment, or (c) any injury causing death 30 or more days after the accident.
- A **slight** accident is one in which at least one person suffers "slight" injuries, but no-one is seriously injured, or fatally injured. A "slight" injury is any other injury - for example, a sprain, bruise or cut which is not judged to be severe, or slight shock requiring roadside attention.

Figure 6.9: Location of PIAs in Core Study Area



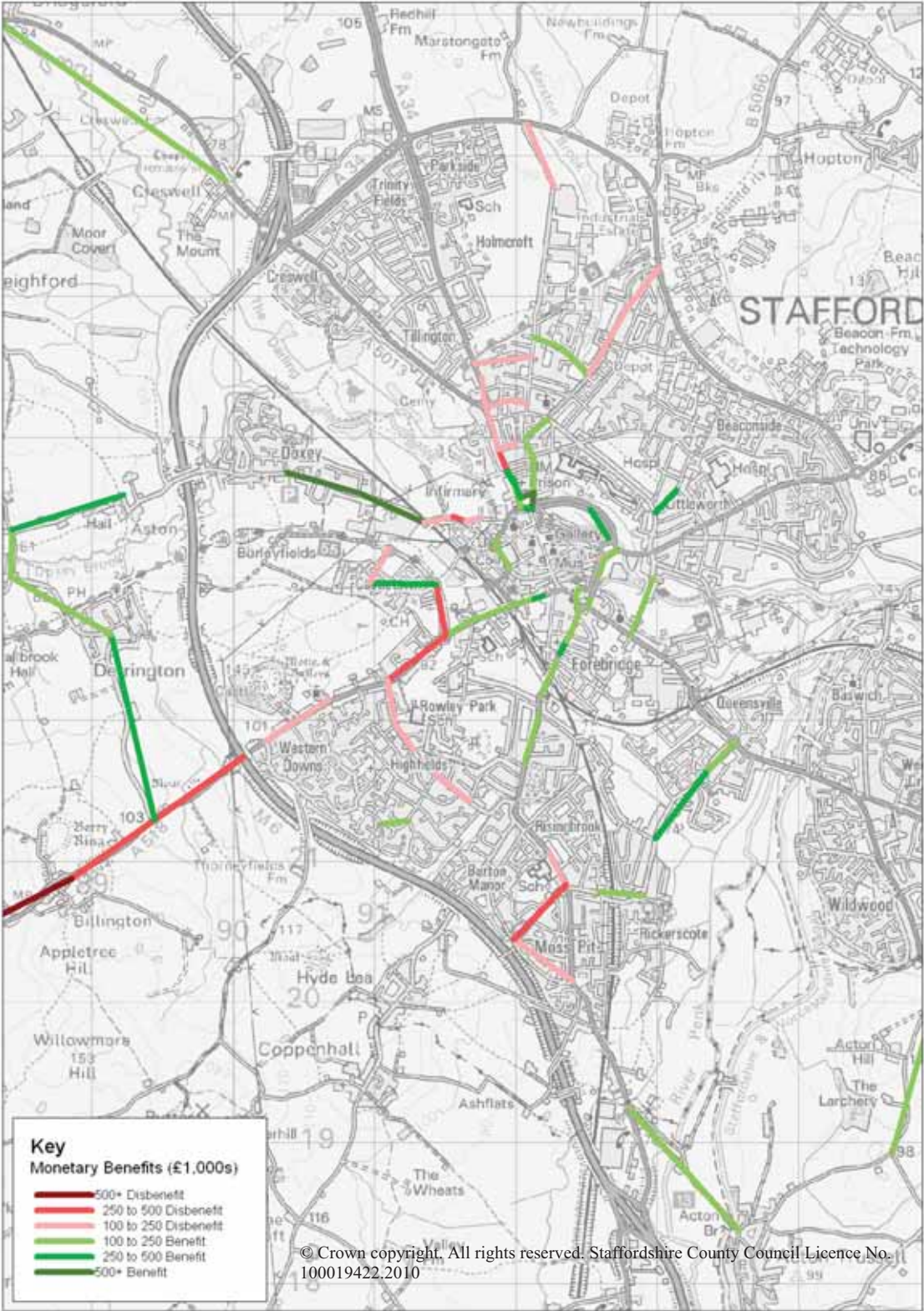
The estimation of accident benefits has been undertaken using COBA, the industry-recognised software for this type of analysis. All COBA output files can be provided on request. The whole of the SATURN network was modelled using COBA to ensure that the impact on accident numbers was represented across the full study area. There is, therefore, full consistency with the future year forecasts of demand generated by the SATURN model. Modelled flows have been converted from PCUs into vehicles for input into the COBA program.

Each link in the network was assigned an accident rate. For the key strategic links a local accident rate was calculated using 5 years of observed personal injury accident data using the accidents in Figure 6.9 and modelled 2007 flows where observed data were not available. The observed data used to calculate accident rates only included personal injury accidents, as damage-only accidents are not reported to the same extent and would not give an accurate representation. For more minor roads COBA default accident rates were used, which ensured that the accident rates were not skewed by limited flow information on minor roads. The accident rate is calculated by dividing the number of accidents by the number of vehicle kilometres travelled. These rates were then used to forecast the number of accidents in the future based on changes in traffic volumes.

COBA presents results in the form of changes in the number of personal injury accidents (PIAs), and disaggregates this further by severity of injury: fatal, serious and slight. A monetised value is assigned to the accidents, so that total accident costs can be calculated for the situation before (the 'do-minimum') and after (the 'do-something') the implementation of the Stafford Western Access Improvements. Accident costs are summed across the same 60-year project lifetime as used in the calculation of TEE benefits, and discounted back to the 2002 base year. The difference between the discounted 60-year accident costs represents the accident benefits related to the scheme.

Table 6.12 shows the results of the accident analysis undertaken in COBA in terms of the number of accidents (PIAs) and severity of injury (fatal, serious and slight). The spatial distribution of accident benefits are shown in Figure 6.10. The benefits are concentrated on the area around the scheme. The majority of the benefits are predicted to occur on the alternative routes to the Western Access Route where trips are reassigning onto the scheme. This reduction largely occurs in the town centre on roads including Tenterbanks and A34 Queensway. Other key benefits are seen on Doxey Road to the west of the scheme as traffic is encouraged to use A518 Newport Road to enter the town centre instead. Dis-benefits occur on the new sections of highway in addition to the strip of Doxey Road used as part of the new route. Other dis-benefits are seen on Newport Road and Foregate Street as traffic is now channelled onto these roads to access the new western route.

Figure 6.10: Spatial Distribution of Accident Benefits – 60 year appraisal period



**Table 6.12: Modelled Accidents in 60 Year Appraisal Period**

Scenario	PIAs	Accidents, by Severity		
		Fatal	Serious	Slight
Do-minimum (a)	42042	745	5591	58609
Do-something (b)	42006	742	5573	58550
Difference (a) – (b)	36	3	18	59

The reduction in number of accidents, and in the severity of injuries, has been converted into a monetary value based on the accident rates and values set out in COBA. The cost of accidents in the ‘do-minimum’ and ‘do-something’ scenarios amount to £1,812 million and £1,808 million respectively, generating an accident ‘benefit’ of £3.64 million over the 60-year project lifetime.

### Security Sub Objective

This sub-objective considers the degree of change in levels of security for road users, public transport passengers and freight, combined with the number of travellers affected. It is considered that sufficient evidence is provided in the Options Assessment Report to conclude that the impact of the scheme on security will be neutral for the following reasons:

- There will be no change in formal surveillance with the scheme in place as Stafford town centre already has a high level of CCTV operated by Staffordshire County Council and Stafford Borough Council.
- The existing routes in the town centre have good visibility and are assessed as moderate in terms of informal surveillance as they are overlooked by residential and business properties. Current levels of informal surveillance will be maintained as parts of the new access route will also be overlooked by residential development and public car parks.
- There is currently a moderate level of landscaping creating concealed areas in the town centre and this will also be the case along the proposed access route.
- Lighting and visibility is currently high within the town centre and the scheme will also be designed to a high standard. Existing pedestrian and cycling facilities in the town are also well lit and designed for visibility and there are no underpasses where personal security may be an issue. There will be shared footway/ cycleways along the new route which will also be designed to a high standard in terms of visibility and lighting.

The worksheet sub objective is provided in Appendix 6.6.

**Based on the assessment provided in the Options Assessment Report, the impact on this sub objective has been assumed as NEUTRAL**

### 6.3.3 Economic Impact

This section presents the results of the economic assessment for the Growth Agenda scenario under variable demand conditions. For the Western Access Route, the Growth Agenda scenario is seen as the most likely future scenario due to Stafford's growth point status. The results from alternative scenarios and sensitivity tests are presented in Section 6.1.3.

The overall impact of the scheme is demonstrated through the analysis of monetised costs and benefits: a total PVB of £87.5m, PVC of £39.4m, generating a NPV of £48.1m and BCR of 2.22. The scheme therefore represents high value for money based on WebTAG guidance for scheme appraisal. The majority of PVB will be in the form of travel time savings (£74m), which is realistic for a scheme of this nature. Other benefits arise in the form of vehicle operating costs (£8m), reduced accidents (See Accident Sub Objective) and reduced carbon emissions (See Greenhouse Gases Sub Objective).

The results are based on an assumption that the scheme leads to changes in travel costs and that this in turn leads to changes in the level of demand. The assessment therefore allows for induced demand and for the release of trips that, in the 'dominimum', are suppressed due to prohibitive journey costs.

All benefits and costs have been assessed over a 60-year project lifetime then discounted back to a common base year (2002). Discount rates of 3.5% and 3.0% have been applied to benefits and costs for years 1-30 and 31-60 respectively. The price base is also 2002. All prices in the appraisal have been adjusted for inflation to be shown in 2002 prices. This rebasing of prices is undertaken within TUBA by comparing the RPI in the current year with that in 2002 (176.2).

#### Transport Economic Efficiency (TEE) Sub Objective

Table 6.13 presents the TEE benefits for the Central/Growth Agenda scenario. The scheme produces substantial benefits amounting to £82.3 million over the 60-year project lifetime. These benefits are generated by travel time savings, which amount to £74 million, combined with vehicle operating cost benefits of £8 million. The scheme will provide a shorter route for many trips providing both time savings and lower vehicle operating costs. The reduced congestion in the town centre resulting from the scheme will also provide time savings for traffic not directly using the new roads.

The construction of the scheme is assessed to have negligible impact on benefits as the only disruption to existing traffic will occur during upgrading of the West Coast Mainline Railway Bridge by which time the majority of the scheme will already be open and generating benefits. It is noted that the main disbenefits arising during construction are for freight which is due to the HGV ban on the temporary rail bridge during construction.

Approximately 59% of the benefits accrue to consumer users which appears feasible. Although business users have a higher value of time, consumer users form a significantly higher proportion of total road users.

**Table 6.13: TEE Table for the Central Case Scenario**

**Table 1: Economic Efficiency of the Transport System (Central Case Scenario) £000s**

Consumers	ALL MODES		ROAD	BUS & COACH	RAIL	OTHER	
User Benefits	TOTAL		Private Cars & LGVs	Passengers	Passengers		
Travel Time	43260		43260				
Vehicle Operating Costs	5148		5148				
User Charges	0		0				
During Construction & Maintenance	77		77				
<b>NET CONSUMER BENEFITS</b>	<b>48485</b>	(1)	<b>48485</b>	<b>0</b>	<b>0</b>	<b>0</b>	
<b>Business</b>							
User Benefits			Personal	Freight	Passengers	Passengers	Freight
Travel Time	31091		16923	14168			
Vehicle Operating Costs	2770		755	2015			
User Charges	0		0	0			
During Construction & Maintenance	-70		-8	-62			
<b>Subtotal</b>	<b>33791</b>	(2)	<b>17670</b>	<b>16121</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Private Sector Provider Impacts</b>					<b>Passengers</b>	<b>Passengers</b>	
Revenue	0		0				
Operating Costs	0		0				
Investment Costs	0		0				
Grant/Subsidy	0		0				
<b>Subtotal</b>	<b>0</b>	(3)	<b>0</b>		<b>0</b>	<b>0</b>	<b>0</b>
<b>Other Business Impacts</b>							
Developer Contributions	0	(4)					
<b>NET BUSINESS IMPACT</b>	<b>33791</b>	(5) = (2) + (3) + (4)					
<b>TOTAL</b>							
Present Value of Transport Economic Efficiency Benefits	82276	(6) = (1) + (5)					

Notes: Benefits appear as positive numbers, while costs appear as negative numbers

It should be noted that these benefits do not include benefits generated during the inter-peak, weekend and overnight time periods. Benefits to public transport have also not been included. Public transport would benefit from the reduced congestion in the town centre. The PVB derived, therefore, is conservative.

### Public Accounts Sub Objective

Table 6.14 presents the Public Accounts table for the central/Growth Agenda case scenario. As set out in Section 6.1, the scheme investment costs amount to £36 million. In addition the cost of maintenance compared to the do-minimum will result in an additional cost of £0.53 million. Central government indirect tax revenues will reduce by £3 million, resulting in an overall PVC in the public accounts of £39 million.

The reduction in indirect tax revenue is directly related to the reduction in vehicle operating costs described above. The reduction in vehicle-kilometres travelled on the network leads to a reduction in fuel consumption, which in turn culminates in a reduction in fuel duty received by the government.

The split of investment costs between the local authority and the DfT has been supplied by Staffordshire County Council, with the local authority contributing approximately 13% of the total.



## Table 6.14: Public Accounts Table for the Central/Growth Agenda Case Scenario

Table 2: Public Accounts (Central Case Scenario) £000s

	ALL MODES		ROAD	BUS & COACH	RAIL	OTHER
	TOTAL		INFRASTRUCTURE			
<b>Local Government Funding</b>						
Revenue	0					
Operating Costs	529		529			
Investment Costs	4621		4621			
Developer & Other Contributions	0					
Grant/Subsidy Payments	0					
<b>NET IMPACT</b>	5150	(7)	5150	0	0	0
<b>Central Government Funding</b>						
Revenue	0					
Operating Costs	0					
Investment Costs	31545		31545			
Developer & Other Contributions	0		0			
Grant/Subsidy Payments	0					
Indirect Tax Revenues	2715		2715			
<b>NET IMPACT</b>	34260	(8)	34260	0	0	0
<b>TOTAL Present Value of Costs (PVC)</b>	39410	(9) = (7) + (8)				

Notes: Costs appear as positive numbers, while revenues and developer contributions appear as negative  
All entries are discounted present values, in 2002 prices and values

## Analysis of Monetised Costs and Benefits

Table 6.15 presents the Analysis of Monetised Costs and Benefits table. Benefits relating to accidents and carbon emissions are added to the present value of TEE benefits (described above) to produce an overall PVB of over £87 million. When combined with the PVC of £39 million, this results in a NPV of £48 million and a benefit-cost ratio of 2.22. The scheme therefore represents high value for money, based on DfT guidance (i.e. a BCR of greater than 2.0).

## Table 6.15: Analysis of Monetised Costs and Benefits Table

Table 3: Analysis of Monetised Costs and Benefits (Central Case Scenario) £000s

Noise		
Local Air Quality		
Greenhouse Gases	1574	
Journey Ambience		
Accidents	3641	
Consumer Users	48485	
Business Users and Providers	33791	
Reliability		
Option Values		
<b>Present Value of Benefits (PVB)</b>	87491	
Public Accounts		
<b>Present Value of Costs (PVC)</b>	39410	
<b>OVERALL IMPACTS</b>		
Net Present Value (NPV)	48081	NPV = PVB-PVC
Benefit to Cost Ratio	2.22	BCR = PVB/PVC
BKR	2.31	

Note: This table includes costs and benefits which are regularly or occasionally presented in monetised form in transport appraisals, together with some where monetisation is in prospect. There may also be other significant costs and benefits, some of which cannot be presented in monetised form. Where this is the case, the analysis presented above does NOT provide a good measure of value for money and should not be used the sole basis for decisions.

## Profile of Benefits over the 60-Year Project Lifetime

Figure 6.1 shows the profile of PVB across the 60-year project lifetime. The PVB rises through the early years of the project lifetime, with benefits increasing up to the final modelled year of 2031. This increase is plausible as the network will become more

congested in future years, offering greater potential for congestion relief (and monetised benefits) for the proposed scheme.

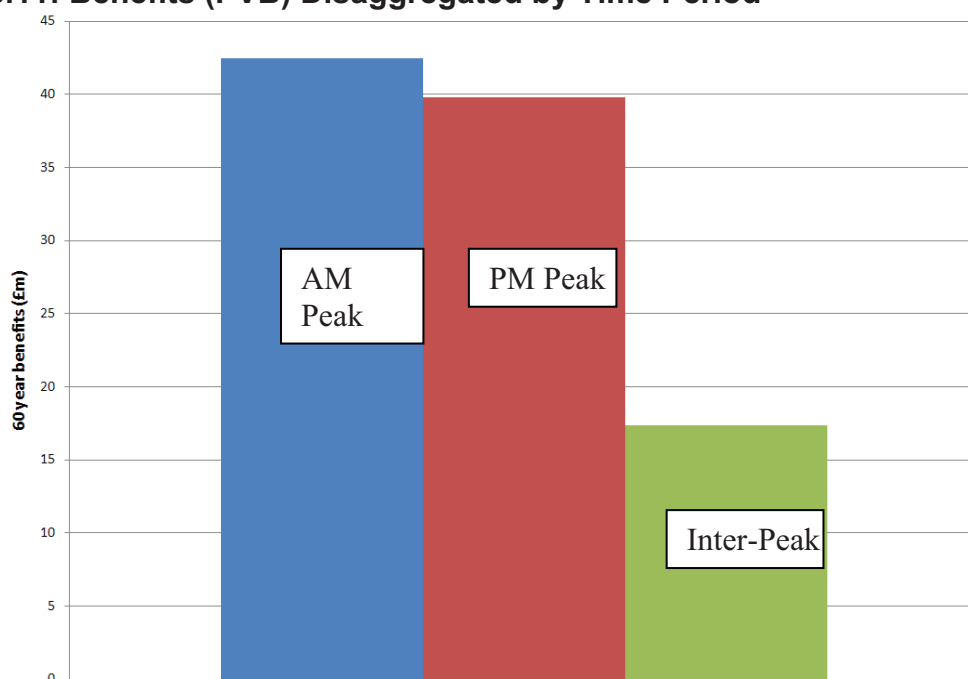
The rate of increase in PVB declines between the second (2026) and third (2031) modelled years, which is due to two factors: i) network saturation; and ii) the impact of discounting over time. The latter also explains the decline in the annual PVB between 2031 and 2075. TUBA assumes a flat benefits profile beyond the final modelled year, but the impact of discounting (beyond any increase in value of time) means the annual benefit falls. (Note that this still means there are benefits, merely of a lower value).

### Temporal Distribution of Benefits

An inter-peak model has been developed to demonstrate that benefits from the proposed scheme will be obtained during this period. As the model has not been validated, it has not been used as part of the cost benefit analysis. These inter-peak benefits are shown in Figure 6.11 but have not been included in the economic analysis and resultant BCR.

Figure 6.11 presents the PVB by time period, demonstrating when the scheme is likely to have the greatest impact in terms of reducing congestion. It can be observed that benefits are accrued by users in all time periods. Similar benefits are obtained during the AM and PM peaks, with less benefits occurring during the inter-peak due to lower levels of congestion.

**Figure 6.11: Benefits (PVB) Disaggregated by Time Period**



### Construction and Maintenance Delays

The construction of the scheme means road users will experience some delay during parts of the construction period. The proposed phasing of the scheme aims to offset the impact of these delays as much as possible. The only construction phase that should involve any delay is the upgrading of the West Coast Mainline Railway Bridge

where there will only be single way working. The schedule is such that both the Doxey Road to Foregate Street and Newport Road to Doxey Road sections of the scheme would be open prior to the partial bridge closure. Therefore, the benefit of these two highway measures will offset the disbenefit of the bridge construction works.

The impact of the temporary signals and one-way flow across the West Coast Mainline Railway Bridge has been assessed using SATURN and TUBA for the full 42 week period of construction. Table 6.16 presents the net disbenefits arising from delays during construction after consideration of the benefits accruing from the opening of the two sections of highway. As can be seen, these construction disbenefits are very small.

**Table 6.16: Disbenefits from Delays during Construction**

Stage	Duration	Nature of Traffic Management	Cost of Traffic Delays
1. Doxey Rd to Foregate St	-	Not Required	£-
2. Newport Rd to Doxey Road	-	Not Required	£-
3. West Coast Mainline Bridge	42 Weeks	One-way running across temporary bridge controlled by signals	£5,000
<b>Total</b>			<b>£5,000</b>

The Stafford Western Access Route will have an impact on maintenance costs for affected roads and structures. Table 6.17 presents the maintenance disbenefits over the 60 year appraisal period for the scheme. All costs and benefits are provided in 2002 values and prices.

**Table 6.17: Maintenance Disbenefits (over the 60 years)**

Description	Maintenance Work	Cost
West Coast Mainline Railway Bridge	Responsibility of maintenance of this bridge will pass from Network Rail to SCC	£457,000
Stafford Western Access Improvements	The new section of roads forming the scheme will require regular maintenance	£94,000
A5187 Station Road / Victoria Street/Tenterbanks	These roads will be downgraded to 'C' roads requiring less maintenance	- £22,000
<b>Total</b>		<b>£529,000</b>

### Reliability Sub Objective

In addition to the 'conventional' travel time savings (as calculated by TUBA), there is the potential for the Stafford Western Access Improvements to bring benefits in the form of improved journey reliability. In this context, reliability is defined as variation in

journey times that transport users are unable to predict. Hence, reliability is confined to random effects, arising from either variability in recurrent congestion at the same period each day – Day to Day Variability (DTDV) - or variability in non-recurrent congestion such as incidents. It excludes predictable variation relating to varying levels of demand by time of day, day of week, and seasonal effects that travellers are assumed to be aware of. Measurements of the monetised journey time reliability benefits from a scheme proposal should be based solely on the unpredictable variation, because of the extra costs incurred by travellers.

DfT guidance on how to estimate reliability benefits varies according to the scheme being assessed. The proposed scheme is not a dual-carriageway or motorway which precludes the use of the preferred software package, INCA. WebTAG guidance 3.5.7 recommends that for an urban road area, a locally calibrated model developed to predict journey time variability should be used to assess reliability benefits. In the absence of a local model, the benefits can be estimated based on the change in standard deviation of journey times.

It is evident that the proposed scheme will reduce congestion and improve journey times in the town centre. The Forecasting Report, produced by Atkins and provided in Appendix 6.5, details the journey time savings through the town centre and the reduced overcapacity as a result of the proposed scheme. Using the standard 'Urban Road Variability' model provided in WebTAG section 3.3.2, the scheme will, therefore, be beneficial in terms of journey time reliability. However, as the Stafford Transport Model is an assignment model it is not possible to obtain changes in travel time between all origins and destinations using fixed distance routes as traffic will re-assign to different routes. The monetary benefits for reliability have not, therefore, been determined although it is noted that these would be positive.

## **Wider Economic Impact**

### *Need for an Economic Impact Report*

The underpinning requirement to undertake an Economic Impact Report is whether the proposed transport scheme will have an impact on the economic activity in a regeneration area. The DfT guidance does not include a national definition of a "regeneration area", but states that in many cases the notion of an identifiable regeneration area can be equated with the designation as an area with a specific regeneration priority in achieving the objectives of the relevant Regional Economic Strategy. Advantage West Midlands produced 'Connecting to Success – The West Midlands Regional Economic Strategy' in December 2007. The strategy identifies three priority delivery mechanisms for the region including:

- Regeneration Zones – defined around areas of multiple market failure, and represent the greatest levels of need, deprivation and disadvantage.
- High Technology Corridors – which are based around the region's knowledge assets and have the potential to diversify the economy into higher value added sectors.
- Birmingham – as the major economic driver of the region as a whole, which hosts an agglomeration of economic assets, and adds value to external perceptions as both a representative image and a key gateway to the region as a whole.

Although Stafford is not identified among these priority delivery mechanisms, it is identified as a possible location for more limited resources as a 'location facing economic change or responding to opportunity'. Stafford has a largely self-contained local economy and forms its own travel to work area. This self containment and the potential for further growth in both housing and employment have been recognised in the draft West Midlands Regional Spatial Strategy. As detailed in Section 5.3.1 of this business case the RSS recognises Stafford as a settlement of significant development and a local regeneration area and the Borough has been successful in securing growth point status.

Stafford clearly represents some characteristics of a "regeneration area" but it does not constitute the scale of challenge highlighted in Advantage West Midlands "Regeneration Zone" designation which is more appropriate to the definitions given in WebTAG guidance. As such, a full Economic Impact Report is not being proposed.

### *Stafford Regeneration Proposals*

Stafford has undergone a significant amount of industrial restructuring over the past decade, with jobs being shed particularly in the traditional manufacturing and engineering sectors, although this restructuring has stabilised more recently, particularly among job losses in the manufacturing industries. Between 2003 and 2008, the total level of employment in the town of Stafford increased by around 2,400 jobs (an increase of just under 8%), however, virtually all of this employment growth has been in either the health and social care sector, or public services, administration and defence sector, which between them account for around 50% of all employment in Stafford town – 17,000 jobs. Despite the recent development of Prime Point 14 to the north of Stafford, adjacent to the M6 and A34, levels of employment in the distribution and logistics sector are lower than in other parts of Staffordshire.

Stafford has not suffered from the effects of the recent economic recession to the same extent as other parts of Staffordshire (particularly Cannock and Tamworth) as it has experienced economic restructuring during earlier periods, and has a labour force that is less reliant on the sectors identified as being particularly vulnerable to recession (particularly manufacturing and construction) in the Black Country and wider West Midlands conurbation. Notwithstanding this, the uncertainty over public funding cuts in relation to the recession is very real, and given the town's current reliance on public sector employment, the future resilience of public sector employment into the future should be considered carefully. Any broadening of the current economic structure of the town and the development of enabling infrastructure to support this growth is therefore welcomed.

Growth point status will allow Stafford to realise the town's potential as a major vibrant commercial and employment centre within the County and wider West Midlands Region, and help reposition itself as the County Town. The new highway link and associated transport proposals, including new and improved public transport facilities and services, footpaths and cycleways will compliment a range of major housing, employment commercial and environmental improvement projects that have either been recently completed, are currently under construction or are planned in the near future, as part of the Borough and County Council's proposals to regenerate Stafford Town Centre.

Regeneration proposals that are currently under construction include:

- The Mills - comprises a new restaurant on the ground floor with 20 residential apartments overlooking the River Sow
- Stafford College - a transformation of the college campus providing new training facilities and raising the profile of the college
- Tipping Street - new County Council offices and new retail units on the site of the current pay and display car park in Tipping Street. This will bring approximately 1,600 employees into the heart of Stafford town centre
- Railway Station Car Park - proposal being developed by Network Rail to create a 450 space multi-storey car park (net increase of 280 spaces) on the site of the existing surface car park

Potential short term future regeneration proposals include:

- Riverside Regeneration - a proposal which includes a new department store, shops, offices, residential apartments, hotel, cinema and multi- storey car park on the site of the former Riverside Recreation Centre, Bridge Street car park and the Queensway island site
- St George's Park - restoration of Listed Buildings at the former St George's Hospital and create new offices, houses, student accommodation, a retirement village and a new hotel
- Kingsmead Car Park - proposals for the creation of a new multi-storey car park along with other town centre uses – possibly including new retail units
- Civic Centre, Riverside - a range of improvements including a new retail frontage on South Walls as well as a new restaurant with a terrace overlooking the river
- Castlefields - 'Regeneration Phase' of housing and employment to the west of the town centre and railway station

### *Areas of deprivation*

Although the town of Stafford has relatively few areas of concentrated deprivation, the Index of Multiple Deprivation 2007 highlights localities in Highfields and Western Downs, and Penside wards which sit within the most deprived 20% of lower super output areas (LSOAs) in England. As well as these localities, the Staffordshire Local Area Agreement includes a priority to reduce the levels of benefits being claimed in areas where more than 20% of working age people are claiming benefits (National Indicator NI 152).

Appendix 6.8 provides plans showing the areas with the highest levels of worklessness within Stafford and the juxtaposition between the two identified areas of deprivation and the Western Access Route, complimentary transport measures and emerging employment areas. Figure 6.14 shows the spatial distribution of the Western Access Route benefits. The LSOAs do not benefit from the scheme directly, but will indirectly benefit from reduced town centre congestion. However by reducing forecast levels of congestion and increasing accessibility and connectivity between areas of worklessness and employment opportunity, the scheme in its wider context, will clearly benefit those residents who are currently disadvantaged from a transport perspective.

<b>This sub objective has been scored as SLIGHT BENEFICIAL</b>
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## 6.3.4 Accessibility Impact

### Option Values Sub Objective

The option values sub objective relates to the value placed on the unexpected use of transport infrastructure and is often linked to the addition or withdrawal of a mode. This appraisal is not required for the Stafford Western Access Improvements as there will not be a step change in the level of service offered by a mode of transport. However, complementary sustainable transport measures, that are not part of this assessment, will be provided within and to the town centre as part of an integrated transport strategy for Stafford. This includes the expected provision of additional bus services to the west of Stafford which will give existing non-bus users the option of bus travel. An indicative scale of the assessment for the complementary measures would be slight beneficial.

<b>Based on the assessment provided in the Options Assessment Report, the impact on this sub objective has been assumed as NEUTRAL</b>
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### Severance Sub Objective

The severance sub objective considers hindrance to pedestrian movement for the do-minimum and the do-something cases. The Western Access Route passes through Stafford town centre which has resulted in a severance assessment at a number of locations. The sub objective worksheet is provided in Appendix 6.6.

There is a high pedestrian movement across Chell Road which provides access between Sainsbury's and the town centre. There is a signal controlled crossing which causes pedestrians a slight level of severance due to the wait to cross. Pedestrian flows at this point are high; a 12 hour count showed that 5,069 people crossed in one direction and 4,833 people in the other. It should be noted that in this location many of the pedestrians will make a return journey. Traffic flows will be significantly reduced along Chell Road with the scheme in place, allowing the existing crossing to be operated more frequently thereby reducing severance.

The Western Access Route will pass through Madford Retail Park causing pedestrian severance, although pedestrian movement is currently low within the retail park at the location of the proposed scheme. Also severance will be limited to slight by the provision of crossing facilities.

At present pedestrians walking into the town centre along the Doxey Road by the rail bridge can make their journey without needing to cross a road for much of their journey. The scheme joins the Doxey Road at this location and will create slight severance for some pedestrians. A new crossing will limit the impact and the number of pedestrians in this area is low.

There are no pedestrian facilities to aid crossing the road at the junction of the Doxey Road / Sainsbury's entrance. Implementation of the Stafford Western Access Improvements will allow pedestrians to cross the road at the point of the new roundabout via new islands in two stages reducing severance. However, the total number of vehicles along this section of road will increase which will result in an overall neutral change in severance at this location.

The overall assessment is large beneficial as a reduction in severance is experienced by over 1,000 people per day. A small number of people will experience increased severance but the net improvement is still above the 1,000 people threshold.

**This sub objective has been scored as LARGE BENEFICIAL**

#### **Access to the Transport System Sub Objective**

The access to the transport system sub objective considers changes in access to daytime bus services with and without the Stafford Western Access Improvements in place. Sufficient evidence was provided in the Options Assessment Report to conclude that the impact of the scheme on this sub objective will be neutral as the scheme does not include any proposed improvements or alterations to bus services. However complementary sustainable transport measures, that are not part of this assessment, will be provided within and to the town centre as part of an integrated transport strategy. This is expected to include the provision of high frequency bus services along the Western Access Route increasing accessibility by bus for development proposals to the west of Stafford.

**Based on the assessment provided in the Options Assessment Report, the impact on this sub objective has been assumed as NEUTRAL**



## 6.3.5 Integration Impact

### Transport Interchange Sub Objective

The transport interchange sub objective considers the quality of interchange facilities in terms of information provision, waiting environment and reliability of connection. The assessment is based on the change of facilities with and without the scheme in place. The scheme does not include proposals to make changes to interchange facilities in Stafford; therefore this sub objective has not been assessed. However complementary sustainable transport measures, not included in this assessment, will be provided within and to the town centre as part of an integrated transport strategy for Stafford. This includes improvements to a number of interchange facilities in the town centre in terms of passenger information and reliability of connections between services. An indicative scale of the assessment for these complementary measures would be slight beneficial.

**Based on the assessment provided in the Options Assessment Report, the impact on this sub objective has been assumed as NEUTRAL**

### Land Use Policy Sub Objective

Chapter 5 of this report and Chapter 4 of the Options Assessment Report (Appendix 2.1) summarises the local, regional and national policy that have influenced the development of this scheme. The assessment assumes that appropriate environmental mitigation measures are deliverable as part of the design for the scheme and consultation with key environment stakeholders supports this view. The objectives of the intervention have been assessed against the Department for Transport's - Delivering a Sustainable Transport System (2008) (which will guide the objectives of LTP3), West Midlands Regional Spatial Strategy (2007), Staffordshire Local Transport Plan (2006) and Stafford Borough Council's Sustainable Community Strategy (2008). It is clearly demonstrated that there is a strong and clear fit with national, regional and local strategies.

Delivering a Sustainable Transport System (2008) is the Government's current transport policy which will guide the delivery of national transport infrastructure and local transport policy which is currently being developed for Staffordshire County Council's third Local Transport Plan. As agreed with the Department for Transport, this major scheme business case follows the NATA assessment approach however it is considered that the scheme is DaSTS compliant as demonstrated in Appendix 5.1 which provides a comparison between NATA objectives and DaSTS goals and challenges.

Overall Worksheet 1: Integration – Land-Use Policy in Appendix 6.6 provides the evidence that more land use policies are facilitated than hindered.

**This sub objective has been scored as BENEFICIAL**

### Other Government Policies Sub Objective

An assessment has been carried out to identify whether this transport proposal is consistent with or hinders other Government policies, beyond land use and transport

policies. The scheme will help deliver policies of the Department for Transport and Department for Communities and Local Government. Environmental mitigation measures will be put in place to ensure that policies of the Department for Environment, Food and Rural Affairs are not hindered. There will be a small benefit to some of the policies supported by the Department of Health, Department of Energy and Climate Change and Department for Business, Innovation and Skills. There will be a neutral impact on all other Government Departments.

Overall, Worksheet 1: Integration – Other Government Policy in Appendix 6.6 provides evidence to suggest that more key policies will benefit rather than be hindered by this scheme, thus contributing positively to Government policy.

## Appraisal Summary Table – PREFERRED OPTION (Growth Agenda Scenario)

Description:		Problems	Present Value of Costs to Public Accounts £39.4m
GROWTH SCENARIO	SUB-OBJECTIVE	QUALITATIVE IMPACTS	QUANTITATIVE ASSESSMENT
<b>ENVIRONMENT</b>	<b>Noise</b>	Adverse and beneficial impacts are balanced for existing properties. For the scenario including development proposals there is a small adverse change in Net Noise Annoyance with the scheme. Increases of greater than 5 dB are predicted at 104 properties. Four properties may qualify under Noise Insulation Regulations.	Total population assessed = 9206 Population annoyed without scheme = 778 Population annoyed with scheme = 800
	<b>Local Air Quality</b>	No designated Air Quality Management Area. Overall slight deterioration in NO <sub>2</sub> and PM <sub>10</sub> . No exceedances of the annual average NO <sub>2</sub> or PM <sub>10</sub> national air quality strategy objective at 20 metres from the road centreline at any location, in either the do-minimum or do-something scenario in 2016.	Properties with improvement: 1725 (NO <sub>2</sub> ), 1585 (PM <sub>10</sub> ). Properties with deterioration: 3223 (NO <sub>2</sub> ), 3363 (PM <sub>10</sub> ). Properties with no change: 0 for both NO <sub>2</sub> and PM <sub>10</sub>
	<b>Greenhouse Gases</b>	There will be a reduction in carbon emissions due to more efficient car journey times leading to a reduction in fuel consumption. Benefits have been estimated using TUBA through the highway modelling.	-198 tonnes carbon emissions compared to do-min in 2016. Decrease of 0.9% over the appraisal period.
	<b>Landscape</b>	An initial landscaping scheme has been identified. Loss of wet woodland will be compensated by additional planting. Benefits will be gained from a new community amenity area adjacent to the SSSI. Embankments of the route will be sensitively landscaped. Planting will include low maintenance native species. There will be no impact on levels of tranquility in the area.	Not applicable
	<b>Townscape</b>	The route passes through the locally distinctive Unicorn building resulting in a minor negative impact, although this area is also a proposed development site. The route diverts traffic away from locally distinctive traditional terraced houses at Castletown. The height of elevated sections will not adversely affect the townscape.	Not applicable
	<b>Heritage of Historic Resources</b>	Appropriate archaeological mitigation will be implemented. There will be a reduction in traffic in the Foregate Conservation Area. Impact on the SSSI water meadow and dismantled railway lines is neutral. There is an unknown level of archaeological remains, but the potential is low. No pre-determination archaeological investigations are required.	Not applicable
	<b>Biodiversity</b>	Mitigation measures have been discussed with Natural England. An area of SSSI will be restored and an amenity area for the Nature Reserve will be provided. The route will impinge on a small area of willow carr woodland. The River Sow bridge will cater for other movement and impact on bats. Disturbed areas will be replanted with native species. A habitat survey will confirm presence of protected species.	Not applicable
	<b>Water Environment</b>	No impact on Source Protection Zones but does cross floodplains. The road drainage system will manage run-off rates and ensure no discharges into water courses. There will be consultation with Environment Agency, Drainage Board and Natural England to agree working methods. As a detailed hydrological assessment has yet to be completed, a slight adverse impact on the water environment cannot be ruled out.	Not applicable
			<b>ASSESSMENT</b>
			Net population annoyed is +22  Concentrations weighted for exposure: NO <sub>2</sub> 99, PM <sub>10</sub> 47  Overall impact PVB = £1.57m  Slight beneficial  Slight adverse  Slight adverse  Neutral  Slight adverse

	<b>Physical Fitness</b>	The additional number of pedestrians and cyclists is expected to be insignificant as a result of new walking and cycling facility along the access route. However, sustainable complementary measures are likely to encourage additional walk and cycle journeys.	Additional walking and cycling has been calculated to be negligible	Neutral
	<b>Journey Ambience</b>	Frustration will be reduced as road layout, geometry, network conditions and ability to make good progress are all better with the route. Fear of accidents will reduce as the new highway will be built to high design standards and avoids areas of high pedestrian movement.	AADT for this route is over 10,000	Large beneficial
<b>SAFETY</b>	<b>Accidents</b>	Casualty savings are calculated in COBA, based on a 60 year assessment period. Benefits are concentrated on the area around the scheme, particularly in the town centre.	A reduction of 36 accidents and reductions of 3, 18 and 59 fatal, serious and slight injuries respectively.	PVB = £33.64m
	<b>Security</b>	Existing routes in the town are well lit with CCTV and good informal surveillance. New route will be designed to a high standard as regards security with good informal surveillance as passing through existing residential and retail areas.	Not quantified	Neutral
<b>ECONOMY</b>	<b>Public Accounts</b>	The scheme will be funded 13% from local contributions and 87% DfT contribution.	Central Government PVB = £34.3m Local Government PVB = £5.15m	PVC = £39.4m
	<b>Transport Economic Efficiency: Business Users &amp; Transport Providers</b>	Journey time and vehicle operating cost savings through reduced congestion for both private vehicle users, freight and public transport users.	Business Users PVB £33.8m Transport Providers PVB £0m	PVB = £33.8m
	<b>Transport Economic Efficiency: Consumers</b>		Users PVB £48.5m	PVB = £48.5m
	<b>Reliability</b>	There will be improved journey time reliability due to the reduction in congestion in the town centre and the improvements in journey times.	Monetary benefits have not been calculated	Beneficial
<b>ACCESSIBILITY</b>	<b>Wider Economic Impacts</b>	An Economic Impact Report is not required as the Regional Economic Strategy does not identify Stafford as a Regeneration Zone. However it is a settlement of significant development, local regeneration area and has growth point status. The scheme will increase accessibility for deprived areas and supports town centre regeneration.	Not applicable	Slight Beneficial
	<b>Option values</b>	This scheme will not create a step change in the service level of a transport mode. However, complementary sustainable transport measures will be provided within and to the town centre as part of an integrated transport strategy.	Not applicable	Neutral
	<b>Severance</b>	Changes in severance occur in a number of locations. More locations experience an improvement in severance than a negative impact. The main improvement is on Chell Road where, within a 12 hour period, 5069 people crossed in one direction and 4833 people crossed in the other direction.	The total number of people affected across all levels of severance is greater than 1000	Large beneficial
	<b>Access to the Transport System</b>	The scheme does not include any proposed improvements or alterations to bus services. However complementary sustainable transport measures will be provided within and to the town centre as part of an integrated transport strategy.	Not applicable	Neutral
<b>INTEGRATION</b>	<b>Transport Interchange</b>	The scheme does not make changes to interchange facilities in Stafford. However complementary sustainable transport measures will be provided within and to the town centre as part of an integrated transport strategy.	Not applicable	Neutral
	<b>Land-Use Policy</b>	The scheme will benefit a range of local, regional and national land use and transport policies. No policies will be hindered.	Not applicable	Beneficial
	<b>Other Government Policies</b>	The bid will help policies of the DfT, DCLG, and wider policies on Health, Education and Economy, and other local and regional policies. It is not expected to hinder policies.	Not applicable	Beneficial

### 6.3.6 Affordability and Financial Sustainability

The affordability and financial sustainability of the scheme has been considered. The investment costs will be met through a combination of local and central government funding. As a highway scheme, the Western Access Route does not require a significant ongoing revenue commitment. Routine highway maintenance will be required to maintain the carriageway in a suitable condition and the maintenance responsibility for the new bridge over the West Coast Mainline on Doxey Road will be transferred from Network Rail to Staffordshire County Council. The maintenance commitments will be accounted for in the local authority's highway maintenance budgets as part of the annual settlement from Central Government.

The affordability and financial sustainability table has been completed for the preferred option and is included within the NATA worksheets in Appendix 6.6.

### 6.3.7 Distribution and Equity Analysis

#### Spatial Distribution of Benefits

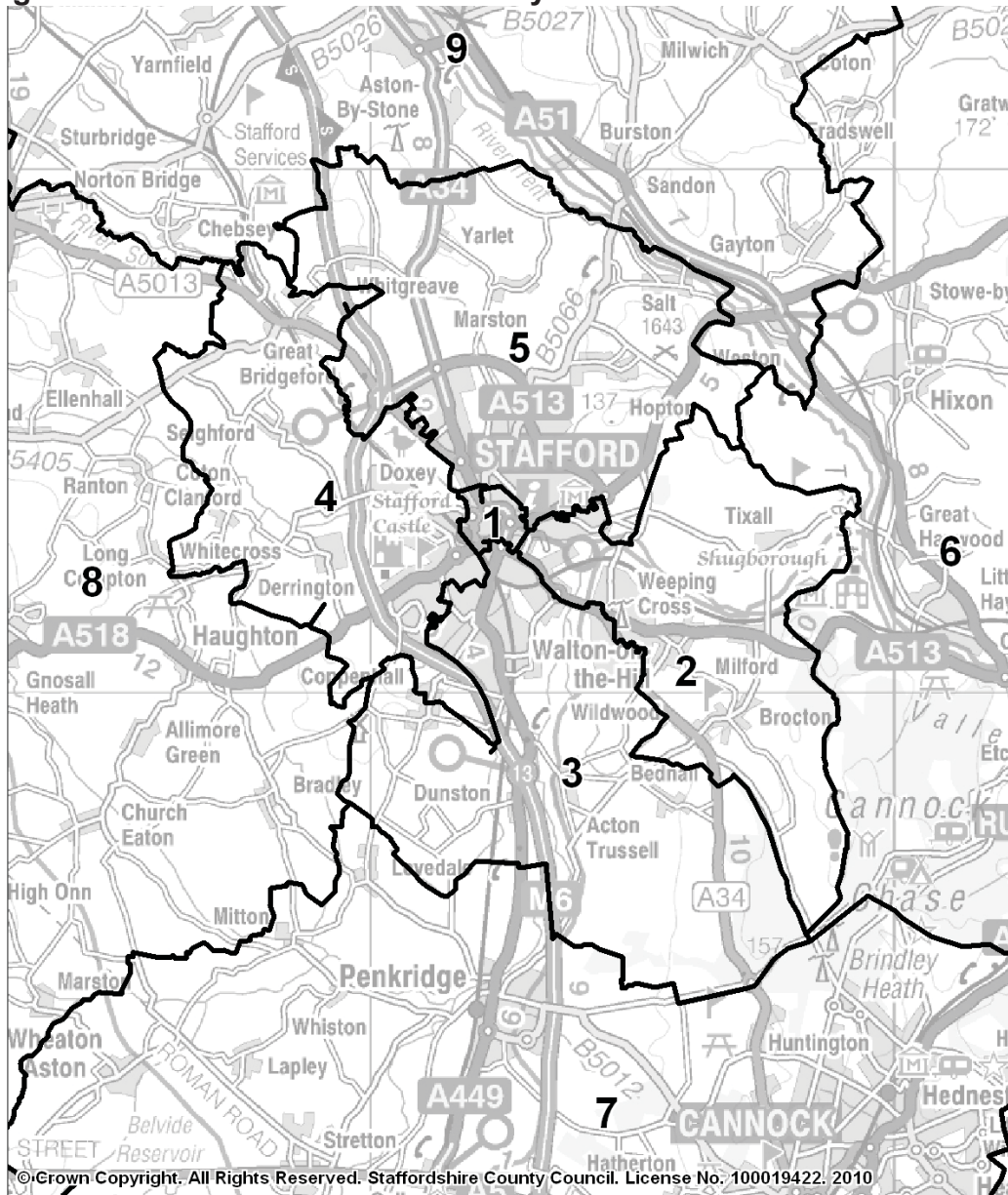
Sector analysis has been undertaken to gain a better understanding of the journeys that are generating the greatest benefits. A nine sector system is principally used to evaluate all the scenarios on a like-for-like basis. This is described in Table 6.18 and shown geographically in Figure 6.12.

Sector analysis provides an important check on the ability of the model to produce plausible forecasts of future year travel demand. It also shows the extent to which model 'noise' is potentially having an impact on the results produced by TUBA. This is usually identified by spurious-looking benefits or disbenefits for movements across the study area that would not be expected to be affected by the scheme (e.g. external-external movements that don't pass through or close to the scheme).

**Table 6.18: Sector System Descriptions**

Sector	Description
1	Town Centre
2	East Stafford
3	South Stafford
4	West Stafford
5	North Stafford
6	Outer East
7	Outer South
8	Outer West
9	Outer North

**Figure 6.12: Main Nine Area Sector System**



**Sector Analysis Results**

For this scheme, it is plausible to expect benefits primarily in sectors 1, 4 and 5. This is due to the fact that the scheme adds additional highway capacity between the west and north of Stafford town centre, therefore, it should benefit the town centre (1), west (4) and north (5). The scheme may be expected to benefit other areas indirectly. For example, by reducing town centre congestion, trips from all other sectors are likely to benefit.

The transport models used to assess the Western Access Route are relatively small, so model ‘noise’ is unlikely to be a major concern. The matrices presented in Table 6.19 to Table 6.21 present the sector benefits (total PVB) for 2016, 2026 and 2031 respectively for the combined AM and PM Peak modelled time periods. Further detailed sector analysis has also been undertaken by type of benefit (time savings, fuel and non-fuel VOCs) and by time period for each modelled year. The results of this

analysis are presented in Appendix 6.9, along with the corresponding results of the sector analysis from the different model scenarios.

It can be observed that the majority of benefits accrue from trips to and from sectors 1, 4 and 5 as would be expected. Trips to the town centre (sector 1) contribute 23%, 19% and 19% of the benefits in 2016, 2026 and 2031 forecast years respectively. Trips from the western sector (4) benefit the most from the scheme contributing 42% of the benefits in 2026 and 2031. Trips to sector 5 also act as expected peaking at 20% of the benefits in 2026.

It should be noted that all sectors provide benefits in all years, demonstrating that the improvements are positive for trips to and from each of the nine sectors. This is consistent with the above assertion that the reduced congestion within Stafford will indirectly benefit all sectors.

The greatest individual benefits come between sectors 4 and 5 (and vice-versa). This is to be expected as this corresponds to west-north and north-west movements which the new highway connects.

Trips within sector 5 see some small dis-benefits as a result of the scheme, mainly due to the improvements channelling traffic through sector 5 to use the improved network.

**Table 6.19: Sector Benefits (Total PVB, 2016, Growth Agenda Scenario)**

Total PVB £'000s	1	2	3	4	5	6	7	8	9	Total	Percentage
1	6	6	13	75	3	11	15	12	-3	139	21%
2	6	1	3	1	-1	0	1	-1	-1	8	1%
3	20	5	5	8	4	5	2	2	2	54	8%
4	21	3	7	23	20	3	5	3	19	105	16%
5	21	8	11	36	7	7	9	12	1	113	17%
6	7	1	1	3	0	0	1	1	-1	12	2%
7	23	2	1	7	6	3	0	1	16	60	9%
8	16	1	1	6	9	6	2	3	4	47	7%
9	26	8	6	39	8	5	-1	9	10	110	17%
<b>Total</b>	<b>147</b>	<b>35</b>	<b>48</b>	<b>199</b>	<b>57</b>	<b>40</b>	<b>33</b>	<b>41</b>	<b>48</b>	<b>648</b>	<b>100%</b>
<b>Percentage</b>	<b>23%</b>	<b>5%</b>	<b>7%</b>	<b>31%</b>	<b>9%</b>	<b>6%</b>	<b>5%</b>	<b>6%</b>	<b>7%</b>	<b>100%</b>	

**Table 6.20: Sector Benefits (Total PVB, 2026, Growth Agenda Scenario)**

Total PVB £'000s	1	2	3	4	5	6	7	8	9	Total	Percentage
1	12	8	14	108	21	12	20	30	13	235	13%
2	11	0	1	12	-3	0	-1	5	-3	23	1%
3	19	0	2	6	10	2	0	2	1	41	2%
4	136	29	41	35	270	40	43	20	120	735	42%
5	42	6	15	182	-4	4	4	28	-3	272	15%
6	14	2	3	16	1	1	1	9	0	49	3%
7	30	1	2	9	9	4	0	1	18	75	4%
8	34	8	5	8	36	29	4	8	21	155	9%
9	32	8	6	89	8	8	6	13	11	182	10%
<b>Total</b>	<b>330</b>	<b>61</b>	<b>89</b>	<b>466</b>	<b>349</b>	<b>99</b>	<b>78</b>	<b>116</b>	<b>180</b>	<b>1767</b>	<b>100%</b>
<b>Percentage</b>	<b>19%</b>	<b>3%</b>	<b>5%</b>	<b>26%</b>	<b>20%</b>	<b>6%</b>	<b>4%</b>	<b>7%</b>	<b>10%</b>	<b>100%</b>	

**Table 6.21: Sector Benefits (Total PVB, 2031, Growth Agenda)**

Total PVB £'000s	1	2	3	4	5	6	7	8	9	Total	Percentage
1	13	8	17	108	22	13	26	33	13	254	13%
2	14	0	1	13	-3	0	0	6	-3	28	1%
3	22	1	3	8	13	2	0	3	2	54	3%
4	146	33	55	42	281	46	55	24	127	809	42%
5	42	7	18	178	-9	4	6	30	-8	266	14%
6	18	2	2	18	6	1	1	18	3	69	4%
7	34	1	2	8	17	3	1	2	27	94	5%
8	38	9	6	8	41	34	5	9	26	176	9%
9	33	3	8	88	9	9	11	17	11	188	10%
<b>Total</b>	<b>360</b>	<b>64</b>	<b>112</b>	<b>470</b>	<b>377</b>	<b>112</b>	<b>104</b>	<b>141</b>	<b>197</b>	<b>1938</b>	<b>100%</b>
<b>Percentage</b>	<b>19%</b>	<b>3%</b>	<b>6%</b>	<b>24%</b>	<b>19%</b>	<b>6%</b>	<b>5%</b>	<b>7%</b>	<b>10%</b>	<b>100%</b>	

For the Growth Agenda scenario, a more detailed 44 sector system has also been used to gain an in-depth understanding of the geographical distribution of benefits. The majority of these, within Stafford have been based on Super Output Areas, whereas outside of Stafford, broad sectors have been used. This increased sectoring inside of Stafford reflects the fact that the impact of the scheme should be more localised. Table 6.22 presents the description of the 44 sectors, the locations of which are shown in Figure 6.13.

**Table 6.22: Sectors Defined for the SWAI Study Area**

Sector	Name
1, 4, 16	Forebridge
2, 3, 14, 15	Littleworth
5, 6, 20	Rowley
7, 32, 33	Tillington
8, 21, 34, 35	Holmcroft
9, 10, 22	Common
11, 12, 13	Coton
17, 18	Penkside
19, 25, 26, 27	Manor
23, 24, 39, 40	Weeping Cross
28, 29, 30, 31	Highfields and Western Downs
36, 37, 38	Baswich
41	West
42	South
43	East
44	North

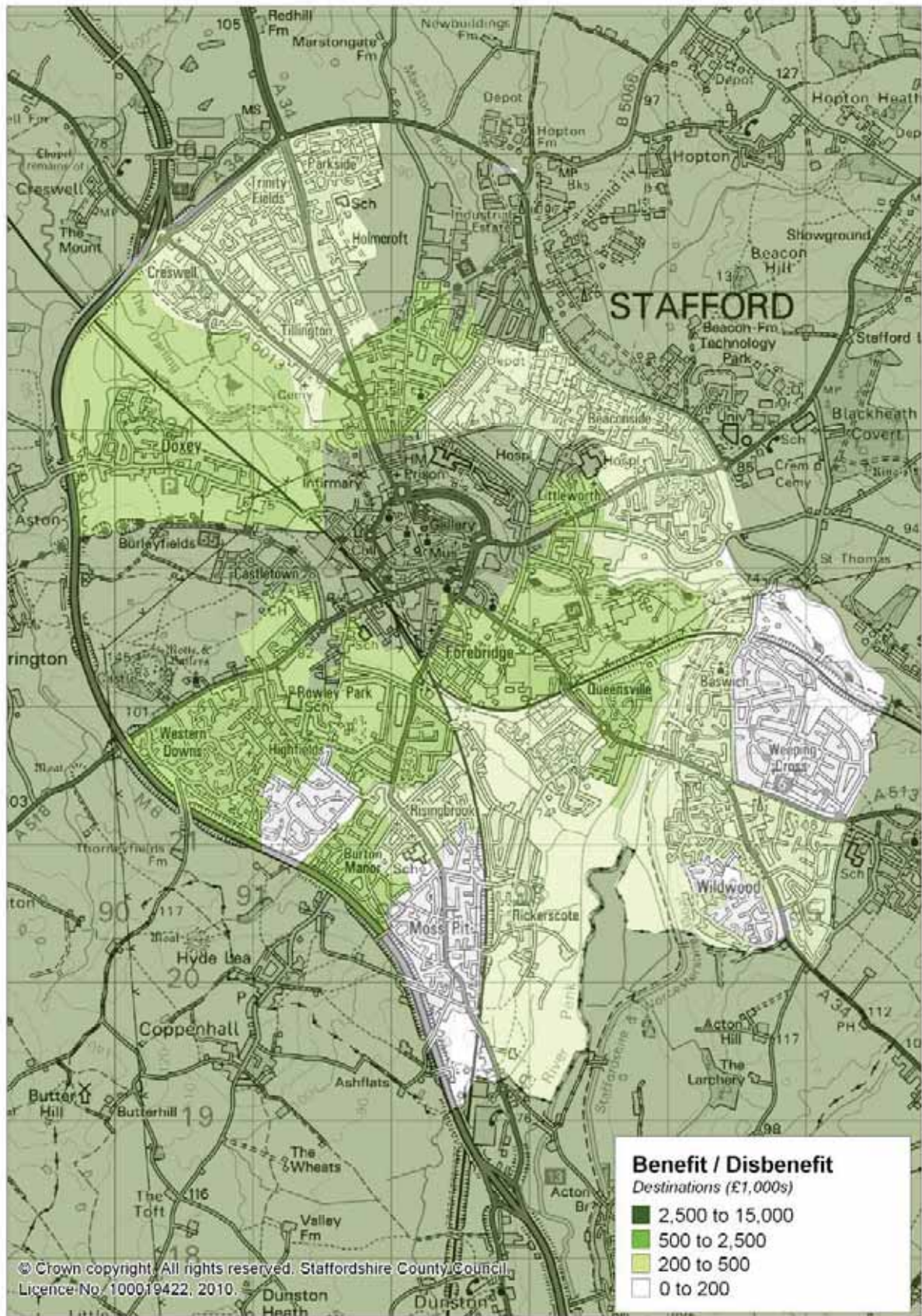


Figure 6.13: Detailed Sector System



To help understand where the benefits lie geographically, the detailed sector diagram has been used to produce a benefit diagram by destination sector as seen in Figure 6.14. The benefits shown are for the combined AM and PM peaks over the 60 year appraisal period. This diagram demonstrates that benefits are evident for all sectors with a particularly strong focus in the town centre and west. The north of Stafford also achieves significant benefits with only the southern sectors producing a lower level of benefits as expected.

Figure 6.14: Monetary benefits by Sector Destinations- 60 year appraisal period



## Environmental Benefits

The extent and significance of impacts on noise, air quality, landscape, biodiversity, heritage and water environment is considered in section 6.3.1 of this business case.

## Accident Benefits

The spatial distribution of accident benefits are shown in Figure 6.10 and it is evident that they are concentrated on the area around the scheme. The majority of the benefits are predicted to occur on the alternative routes to Western Access Route where trips are reassigning onto the scheme. This reduction largely occurs in the town centre on roads including Tenterbanks and A34 Queensway. Other key benefits are seen on Doxey Road to the west of the scheme as traffic is encouraged to use A518 Newport Road to enter the town centre instead. Dis-benefits occur on the new sections of highway in addition to the strip of Doxey Road used as part of the new route. Other dis-benefits are seen on Newport Road and Foregate Street as traffic is now channelled onto these roads to access the new western route.

The County Council will monitor the routes that may be adversely affected and will remediate as appropriate as part of an on going commitment to improving road safety.

## Social Inclusion Benefits

Figures in Appendix 6.8 show the spatial distribution of different social and population groups in Stafford and can be compared with Figure 6.14 to determine whether there are any groups that do not benefit or are significantly disadvantaged by the proposed scheme in terms of changes in levels in traffic, noise, air quality or accidents.

The evaluation concludes that the Stafford Western Access Improvements do not create significantly disproportionate impacts on any of the social groups considered. A summary of this assessment is provided in Table 6.23.

**Table 6.23: Impact of the Scheme on Different Social Groups**

<b>Social Group</b>	<b>Impact of Stafford Western Access Improvements (Access Route and complementary measures)</b>
Population claiming out of work benefits	Stafford Western Access Improvements provides accessibility and highway benefits for areas where over 13% of the population are out of work, including the town centre, Foregate Street and Castletown, and Doxey and Highfields where there is over 19% out of work.
Areas designated with Health Deprivation and Disability	Stafford Western Access Improvements provides accessibility and highway benefits for Highfields, the town centre, Castletown and Foregate Street which are all ranked within 20-30% of the most deprived areas nationally, in terms of health.
Population receiving disability living allowance	The number of claimants receiving disability living allowance is highest in Highfields and there are also a significant number in the town centre, Castletown and Foregate Street. These areas will benefit from improved

	accessibility. The complementary measures will give disabled users and passengers with pushchairs and shopping better access to and onto buses at bus interchange facilities in Chell Road that will be Disability Discrimination Act 2005 (DDA) compliant.
Population with a limiting long term illness	15 to 24% of the population in areas that benefit from the Stafford Western Access Improvements have limiting long term illnesses.
Children's journey to school	The improved walking and cycling facilities provided as part of the Stafford Western Access Improvements will significantly benefit school children who live in Doxey and travel to their catchment area High School at Highfields.
Retired population	The retired population is relatively evenly spread across Stafford. However the areas in the north and south east of Stafford with the highest percentage of retired people won't directly benefit or disbenefit from the proposed scheme.

### 6.3.8 Practicality and Public Acceptability

An overall assessment of practicality has been completed and all identified measures have been built into the design and management process for the scheme. Public acceptability has been judged from the responses to the public consultations and the level of support from key stakeholders. This is reported in Chapter 7 on Project Delivery and the Consultation Report contained in Appendix 6.10.

#### Feasibility

The issue of feasibility has been investigated. The preferred option for the scheme was approved by the Council Cabinet in May 2010 (see Appendix 6.11) and is fully supported by Stafford Borough Council (See Appendix 5.3).

Staffordshire County Council is confident that the cost estimates are realistic and robust. The base cost has been estimated using realistic unit rates and quantities and in full consultation with environmental stakeholders, Network Rail and utility companies. The risks have been assessed in detail as part of a Quantified Risk Assessment and a strategy has been put in place to manage these risks, together with a robust Project Management Process.

The feasibility of acquiring the land to deliver the scheme has been considered in detail by independent property specialists for the public sector who have estimated the cost of land acquisition and have provided valuable advice regarding planning and legal issues and a potential public inquiry related to Compulsory Purchase Orders. The need for a CPO public inquiry has been included in the Project Plan in Section 7.3. The County Council are confident that the land required for the westerly section of the route between Castlefields and Doxey Road will be assembled as part of a Masterplanning process lead by Stafford Borough Council through a Local Development Framework Supplementary Planning Document. Appendix 6.12 identifies the land acquisition requirements of the proposed scheme.

## **Enforcement**

Given the nature of the proposed scheme, minimal supporting enforcement will be required. The design of the highway will ensure self-enforcement in terms of controlling vehicle speeds and minimising accidents, although it will include the provision of CCTV at the main junctions.

## **Area of Interest**

Staffordshire County Council will take the major role in delivering the scheme. However, all stakeholders and local residents have been consulted in the development of the scheme and will be kept informed of progress on a regular basis.

## **Complexity**

Staffordshire County Council has put in place a robust project management system, a realistic project plan, a detailed risk register and a Basic Assets Protection Agreement with Network Rail to ensure that the scheme will be successfully delivered. Major schemes can be complex to deliver however the work that has been completed so far on the scheme has not highlighted any issues associated with either the technical aspects or the project delivery that cannot be overcome.

## **Timescale**

The timescale for the project is set out in the Project Plan in Chapter 7.

## **Phasing**

The development of the Western Access Route will be phased as indicated in the Project Plan. It is currently expected that construction will be phased as follows. The sections referred to below are shown on Figure 4.3.

- Section A between A34 Foregate Street to Doxey Road and along Doxey Road to Timberfields Road will be commenced first, starting at the A34.
- Following commencement of Section A, the construction of Section C from Martin Drive to the West Coast Mainline railway bridge will commence. There is expected to be a period when Sections A and C are being constructed in parallel.
- Section B along Doxey Road from Timberfields Road and including the rebuilding of the West Coast Mainline railway bridge will commence following the completion of Section C. Section A from the A34 to Doxey Road is also expected to be complete prior to the commencement of Section B.

Complementary sustainable transport measures to be funded through the County Council's capital programme will be phased following completion of the road scheme. Transport improvements to be funded by housing developers will be phased as appropriate.

## **Partitioning**

Partitioning means that a measure can be broken into separate components, but all will not necessarily be implemented. Given the nature of the scheme, there is little scope for partitioning. The new highway will only meet the objectives required if it is built to the extent and specifications indicated.

## **Complimentarity**

The proposals for a new highway link are independent but a range of complimentary measures to manage traffic on the existing highway network and provide sustainable travel facilities has been proposed and are described in Chapter 4. These measures aim to ensure that through traffic transfers to the new route and that the existing highway supports local traffic movements, including walking, cycling and public transport.

## **Conflicts**

It is considered that any measures introduced or planned to date will compliment the delivery of the proposed scheme and vice versa.

## **Political nature of policies and proposals**

Proposals to develop the scheme have political, key stakeholder and public support. Subsequent public consultation exercises as part of the planning process will enable key stakeholders and local residents to continue to be informed of progress in the development of the scheme, to ensure that they understand the issues involved and are given the opportunity to raise their views. Whilst these views have proved useful in developing options for the scheme, the choice of the preferred option in the business case has been based on both consultation responses and technical evidence.

Local Councillors have been consulted and have indicated their support. Formal political approval for the Preferred Option was achieved in May 2010 prior to the submission of this business case. A letter of support from the Member of Parliament for Stafford Constituency is provided in Appendix 6.13.

## 7. PROJECT DELIVERY

### 7.1 Project Management System

A Project Management System has been established using guidance provided by the Project Management Handbook for Local Authorities. Further details are provided in Appendix 7.1. The County Council follows the principles set out in 'PRINCE' and uses the 'CS PROJECT Professional' and 'Systems Applications and Projects' (SAP) management tools. These tools can be provided to the DfT on request.

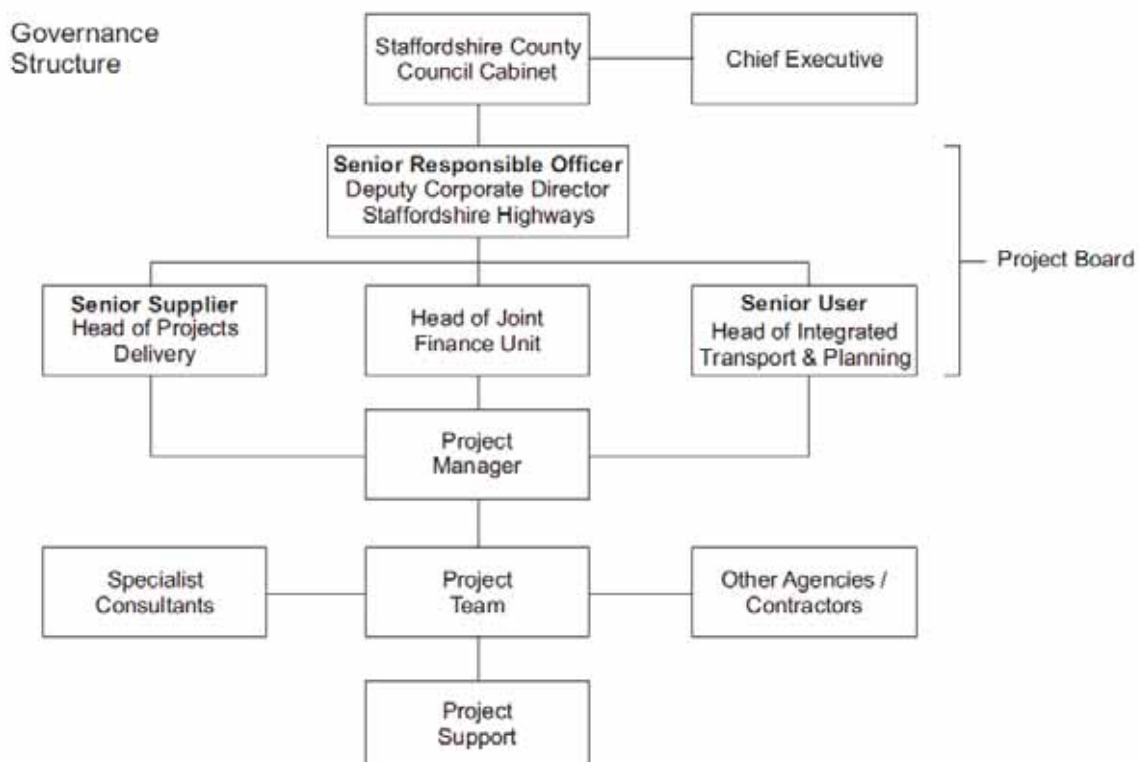
### 7.2 Governance

Approval of the preferred Option was provided by Informal Cabinet on 28<sup>th</sup> April and Full cabinet in May 2010. All stages within the statutory processes will be approved by the Cabinet. The Cabinet Member for Highways & Environment will approve reports to be submitted to Cabinet to seek approval to the strategic issues related to the scheme. The Cabinet Member has delegated powers to deal with many of the day to day issues relating to the Councils role as the Highway Authority. In accordance with our Project Management System a Project Board has been established with authority to direct the delivery of the scheme. Further details of roles, responsibilities and accountabilities are listed in Appendix 7.1.

The Governance Structure for the development and delivery of the Stafford Western Access Improvements is set out in Figure 7.1.

**Figure 7.1: Governance Structure**

Stafford Western Access Improvements:



### 7.3 Project Planning

An overall project delivery plan has been developed, setting out the main project stages and anticipated timescales. The Project Plan is provided in Figure 7.2 and includes each key stage of the project, including milestones and an identifiable critical path. This plan has assumed a single traditional construction contract as described further in Chapter 8. However an alternative approach has also been considered which could take advantage of established framework contracts in both the rail and highway sectors and which could potentially shorten the Project Plan. The plan will be reviewed and updated on a regular basis and will be considered at Project Board meetings. The key milestones, timescales and dependencies are summarised in Table 7.1.

**Table 7.1: Key Milestones, Timescales and Dependencies**

<b>Key Milestone</b>	<b>Timescale</b>	<b>Key dependencies</b>
Confirmation of Programme Entry	December 2010	DfT's review of Regional Funding Allocations for major schemes Successful business case
Environmental Impact Assessment (EIA)	June 2010 to June 2012	Complete OJEU process Environmental surveys
Planning Consent	March 2012 to Jan 2013	Detailed design Public consultation Outcome of EIA
Orders Confirmed	Sept 2011 to Nov 2012	Detailed design Public consultation CPO public inquiry
Confirmation of Conditional Approval	March 2013	Availability of funding Successful business case
Appoint Contractor	Dec 2012 to Sept 2013	Complete OJEU process Detailed design and costs
Confirmation of Final Approval	Dec 2013	Availability of funding Successful business case
Construction Period	Jan 2014 to May 2016	Land acquisition Network Rail possessions Contractor involvement

### 7.4 Financial Management

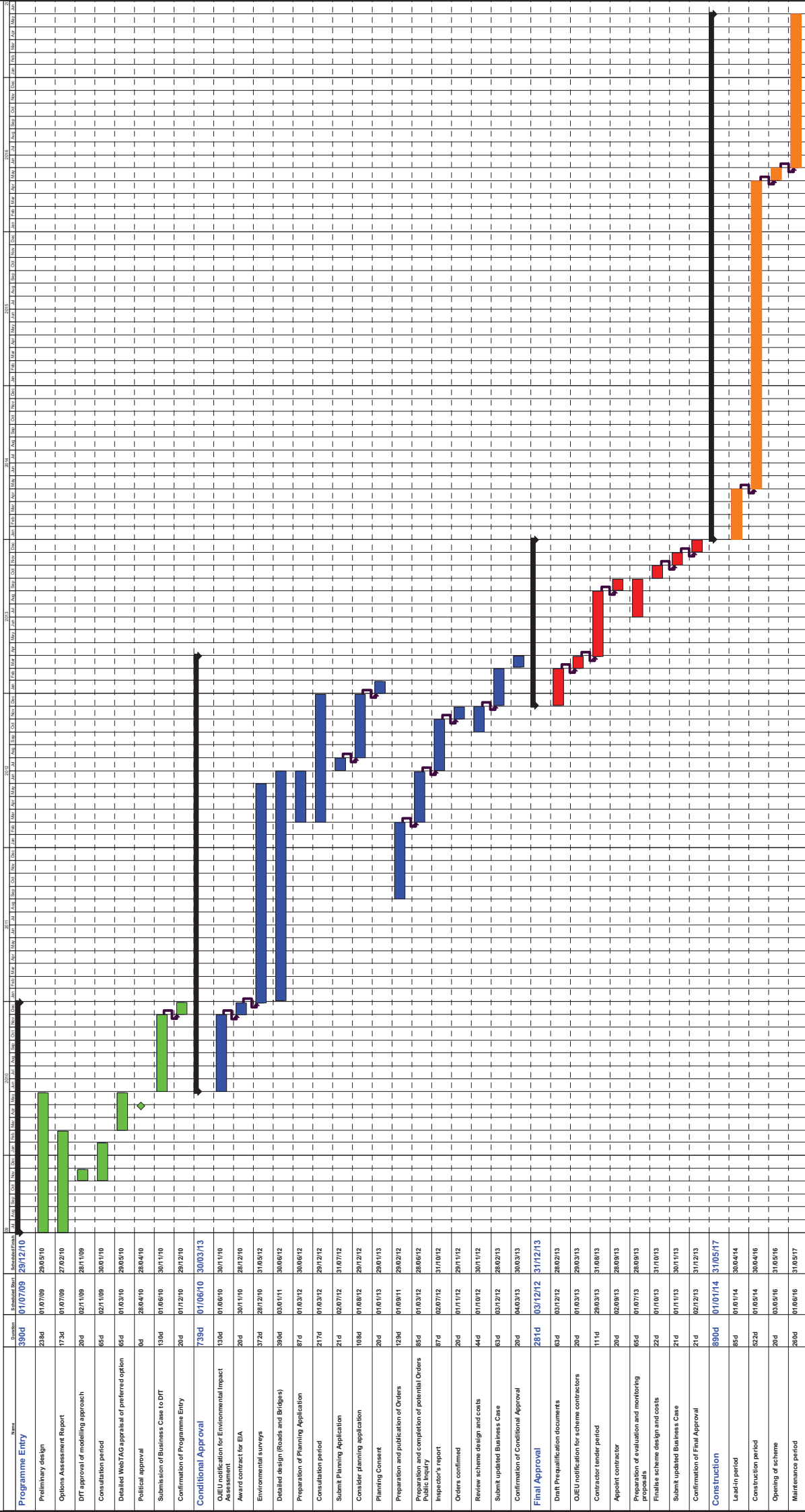
The gross cost of the Western Access Route will not be greater than £50 million therefore an external Gateway Review has not been carried out. However, a project review process will be put in place to ensure that the project is monitored effectively as part of the Project Management System.

Costs will be managed using the County Council's SAP (Systems Application and Management) management tool. With quarterly financial reviews carried out as standard practice. A system of change management control will be put in place with all variations over a threshold amount reported to the Project Board for approval. During the construction phase measures will be taken to incentivise the contractor to manage costs downwards and achieve value for money, and cost out turn certainty.



# STAFFORD WESTERN ACCESS IMPROVEMENT PROGRAMME

## Figure 7.2 - PROJECT PLAN



## **7.5 Risk Management**

The management of the risks will be critical to the successful delivery of this major project. A Quantified Risk Assessment (QRA) workshop took place on 8<sup>th</sup> March 2010 facilitated by Faithful+Gould to ensure that all key risks are identified and costed. The key outputs were a Risk Register and a Quantified Risk Assessment using a Monte Carlo Cost Model (See Appendix 7.2). The Risk Register identifies the mitigation measures that may need to be put in place to manage the risks identified and to ensure the successful delivery of the scheme. The mitigation measures to be carried out during the development of the project to reduce the level of risk currently identified, include the following:

- Thorough environmental surveys
- Hydrological assessment
- Continued consultation with Statutory consultees
- Detailed ground investigations
- GPS survey to establish clearance required for overhead power lines
- Successful collaboration with Network Rail
- Land acquisition
- Co-ordination with potential housing development
- Early Contractor Involvement
- Clear and thorough contractual arrangements and documentation

The Risk Register will be maintained and reviewed regularly throughout the project and revised as necessary as part of Project Board meetings. This will ensure that appropriate mitigation measures are taken and any new or previously unforeseen risks are identified. The risks for the Stafford Western Access Improvements will be owned and managed in line with the County Council's Corporate Risk Management Policy. Risks that may have the greatest impact on delivery will be closely monitored and managed.

## **7.6 Communication Plan and Stakeholder Management**

During December 2009 and January 2010 Staffordshire County Council carried out a consultation exercise to explain to local residents and stakeholders the options for improving transport infrastructure in Stafford to help accommodate likely forecast traffic growth. Four possible road alignments to the west of Stafford were suggested and consultees were invited to express their views about the proposed alternative solutions. The outcome of the consultation process has informed the intervention options and the decision regarding which option should be taken forward for further detailed analysis in this business case. The overall consultation results are summarised in Appendix 6.10. The sustainable transport option was subject to a separate consultation with key stakeholders in May 2009 as part of the Community Infrastructure Fund bidding process (see Appendix 2.2).

A Communications Log has been developed to manage and record the interaction with all consultees and is included in Appendix 7.3, including date of contact, issues raised and action taken. It is a 'live' document which will be regularly updated as the project progresses.

Business case documents will be published on Staffordshire County Council's dedicated website for the Stafford Western Access Improvements. Formal consultations will take place to inform the planning application and Environmental Impact Assessment following confirmation of Programme Entry and prior to Conditional Approval of the scheme (See Project Plan, Figure 7.2).

Consultation responses have been received from key environmental stakeholders and are provided in Appendix 7.4. There will be continued close liaison with stakeholders in order to ensure that issues identified at Programme Entry stage are being satisfactorily addressed and appropriately mitigated. The County Council will work closely with partners on the SSSI project Steering Group which has been set up by the Sow and Penk Internal Drainage Board in order to implement a SSSI Water Level Management Plan.

Network Rail has confirmed that they have no objections in principle to the proposals, subject to a detailed engineering review and acceptance, insofar as the work's impact upon Network Rail Infrastructure. The County Council is committed to covering Network Rail costs and entering into a suitable asset protection agreement (See Appendix 7.5). An initial request from Network Rail for £10,000 will be paid by the County Council to cover initial work with Network Rail. The key stakeholders and their interests are summarised in Table 7.2.

**Table 7.2: Key Stakeholders and their Interest**

<b>Key Stakeholders</b>	<b>Interest</b>	<b>Letter of Support</b>
<b>Network Rail</b>	A formal agreement is required to cross the infrequently used railway sidings between Castlefields and Castletown. Rail possessions are required to rebuild the Doxey Road railway bridge. A Basic Assets Protection Agreement has been set up between Network Rail and Staffordshire County Council	✓
<b>Stafford Borough Council</b>	Key partner in the delivery of Stafford's growth agenda through the Local Development Framework.	✓
<b>Environment Agency</b>	They have informed and guided the Environment sub objectives in this business case and will ensure the environmental implications are fully understood when completing the Environmental Impact Assessment.	✓
<b>Natural England</b>	They have informed and guided the Environment sub objectives in this business case and will ensure the environmental implications are fully understood when completing the Environmental Impact Assessment.	✓
<b>English Heritage</b>	They have informed and guided the Environment sub objectives in this business case and will ensure the environmental implications are fully understood when completing the Environmental Impact Assessment.	✓
<b>Local Councillors</b>	Key decision makers in the Project Management System.	Cabinet Report
<b>Highways Agency</b>	The proposal does not have a material impact on the National Highway Network.	X

<b>Landowners</b>	Negotiations/Compulsory Purchase Orders are necessary to assemble the land required to deliver the scheme. A masterplanning process as part of the Borough Council's LDF will be completed with a development consortium to ensure efficient delivery of the western part of the scheme between Castlefield and Doxey Road.	<b>X</b>
<b>Local bus operators</b>	The Western Access Improvements includes the complementary measures described in Chapter 4. They are integral to the delivery of a Sustainable Transport Strategy for Stafford which will focus on improving public transport provision.	<b>X</b>
<b>Utility companies</b>	Consultation will be essential during the development of the scheme to reduce potential risks during construction.	<b>X</b>

Appendix 6.12 provides details of the landowners affected by the scheme. They are listed below and have been contacted as part of the consultation process.

- Network Rail
- Stafford Borough Council
- Middlesbrough Borough Council
- Axa Sun Life Plc
- Tenpin Ltd
- Castle Wharf Ltd
- Staffordshire County Council
- George Wimpey
- Unicorn Abrasives Ltd
- St Modwen Properties trading as Key Property
- Investments

## 7.7 Evaluation

The evaluation and monitoring process will use before and after data to determine the extent to which the original scheme objectives have been met, in line with DfT guidelines. The scheme's impact will be monitored during the construction phases, and short term and longer term impacts will be measured after completion of the scheme. The detailed evaluation methodology will not be developed until later in the project, however it is necessary to have some proposals developed at this stage so that any monitoring that is needed prior to the scheme being implemented can be carried out. The core objectives of the evaluation process include:

- Assessing the impact of the scheme on the transport network in terms of congestion and accidents
- Considering the impact of the scheme on local travel patterns and use of alternative modes of transport
- Considering the benefits related to delivering a sustainable transport strategy for Stafford
- Monitoring the impact of the scheme in terms of the level of housing provision in the Stafford housing growth area to meet Regional Spatial Strategy objectives
- Identifying the scheme's contribution to local, regional and national objectives
- Assessing and monitoring the impact of environmental improvements

The outcome of the monitoring process will be reported to the Project Board and, if necessary, the County Council's Cabinet. Quarterly monitoring reports will also be submitted to the Department for Transport.

## 8. COMMERCIAL ARRANGEMENTS

Staffordshire County Council's Staffordshire Highways team has been recognised nationally as an excellent four star service, one of the top ten in the UK, and it has been highlighted by the Government as an exemplar of best practise and a Centre of Excellence in managing the highway network. Staffordshire Highways brings together a core of professionals from Staffordshire County Council and private contractors, Enterprise, to deliver its maintenance and construction programmes. The current contract with Enterprise does not provide for the construction of schemes of the value of the Western Access Route although it does provide for the delivery of the complementary measures on the existing highway network. In addition Enterprise can provide construction expertise at an early stage in the process and they would be available to support the in-house project team in the detailed design work required to achieve statutory approvals for the scheme, prior to Conditional Approval.

The value of the scheme dictates that the procurement process will be governed by EU procurement law and the Public Contract Regulations 2006. All evaluation methodology will be aligned to procurement policy and will be compliant with industry best-practice and EU legislation. Staffordshire County Council has had recent success in delivery of schemes of this value with the completion of Rugeley Eastern Bypass. Value for money was achieved on this highly challenging project as a result of working in close partnership with the parties to the contract, delivering the scheme on budget and below the original cost in real terms, three months ahead of programme.

Two alternative procurement processes have been considered for the delivery of the Western Access Route.

The first approach and the one on which the current Project Plan figure 7.2 is based upon provides for a single bespoke procurement of a construction only contract with an approximate value of £25 million. The procurement process will take place after receiving Conditional Approval. Staffordshire County Council has a dedicated Corporate Procurement Team that will manage this process.

The second approach would be based upon a collaborative approach together with Network rail and the Midland Highway Alliance to take advantage of established framework contracts for work of this type. The construction of a new bridge over the West Coast Mainline will impose constraints on the sequence of construction. These constraints lend themselves to the construction of the new alignment in three sections. Section A (A34 Foregate Street to Timberfields Road) could potentially be delivered by the Midlands Highway Alliance existing framework contract. Section C (west of West Coast Mainline to Martin Drive) could also be delivered by the same contract or by the private sector to be agreed as part of the masterplanning process for land use development opportunities at Castlefields and Burleyfields. Section B (rebuilding the West Coast Mainline bridge) could be delivered by the existing Network Rail's Framework Contract.

The Midlands Highway Alliance which includes 13 local Authorities and the Highways Agency have in place a Medium Schemes Framework Contract for highway contracts up to a value of £12 million. This contract which has been through the necessary procurement processes would allow for the appointment of a contractor to Section A at

an early stage thus gaining the advantages associated with Early Contractor Involvement. By avoiding the need for a separate procurement process this would have the advantage of allowing the delivery programme to be accelerated and procurement costs saved. Once again the contract would be placed on a construction only basis following Conditional Approval.

It is expected that the majority of risks will be owned by the County Council during the design and statutory procedures stages. Risks at the construction stage will be identified such that only those outside the control of the contractor will remain as risks with the County Council. Only at this stage will contracts be awarded.

Whichever procurement route is adopted the construction contract will be awarded under the 'New Engineering Contract Third Edition' (NEC3) suite, utilising the 'Engineering and Construction Contract (ECC), Option C – Target Cost with Priced Activity Schedule'. This form of contract encourages a partnering approach to the management of programme and risk. It was used with success on Rugeley Eastern Bypass by the County Council and has been adopted by the Midlands Highway Alliance for its framework contract.

## 9. FINANCIAL OVERVIEW

### 9.1 Introduction

Following detailed investigations, consultations and design work carried out during the completion of this business case, the County Council is now confident that the scheme is based on a robust cost estimate that will be updated and refreshed as the scheme progresses through the approval stages. The Quantified Cost Estimate for the scheme is £38,730,000 which assumes a DfT contribution of £33,686,000. The County Council is seeking agreement with the West Midlands Joint Strategy and Investment Board to increase the Regional Funding Allocation by £2.686m.

In line with current guidance, it is assumed that the DfT will contribute the following:

- 50% of eligible preparatory costs between Programme Entry and Full Approval
- 87% of the Quantified Cost Estimate
- 50% of any increase in the cost of the scheme between the Quantified Cost Estimate and the Approved Scheme Cost

The risks and costs to the County Council have been considered by the authority's Section 151 Officer and the signed declaration is included Appendix 9.1.

### 9.2 Base Cost Estimate

A detailed cost estimate has been prepared based on the current proposed alignment shown on Figure 4.2. The breakdown of the base cost is provided in Tables 9.1 and 9.2 and a cost breakdown of the engineering works is provided in Appendix 9.2. In accordance with DfT's requirements, an independent survey has been completed to scrutinise the base cost estimates prepared by Staffordshire County Council. The Surveyor's Report is provided in Appendix 9.3.

**Table 9.1: Base Cost Estimate**

<b>Element of Base Cost</b>	<b>Cost Estimate £'000s</b>
Construction Cost	27,870
Land Acquisition Cost	4,165
Eligible Preparation Costs	1,800
Supervision Cost	1,000
<b>Total</b>	<b>34,835</b>

**Table 9.2: Breakdown of Construction Cost Estimate**

<b>Element of Base Construction Cost</b>	<b>Cost Estimate £'000s</b>
Junction Works	2,750
Carriageway Construction	2,455
Structures	14,975
Earthworks	1,070
Utility Diversions	3,500
Environmental Mitigation	2,620
Accommodation Works	500
<b>Total</b>	<b>27,870</b>

### 9.3 Preparatory Costs

Eligible preparatory costs are associated with detailed design, procurement and the preparation of business case submissions for Conditional and Full Approval. They are broken down in Table 9.3.

**Table 9.3: Breakdown of Eligible Preparatory Cost Estimate**

<b>Element of Eligible Preparatory Cost</b>	<b>Cost Estimate £'000s</b>
Environmental Impact Assessment	200
River/Flood study	50
River/Flood Improvements Design	50
Environmental/Landscapes Design	100
Site Investigation	200
Engineering Scheme Design	750
Utility Liaison	100
Network Rail Fees	100
Statutory Liaison	10
Consultation	15
Planning Application Preparation	15
Specialist Advice	150
Transport Modelling	30
Finalising Business Case	30
<b>Total</b>	<b>1,800</b>

In line with government guidance, the non-eligible preparatory costs have been assumed to comprise:

- Costs of publication and publicity for applications and orders
- Planning application fees
- Preparation of evidence and presentation at public inquiry
- Land acquisition fees and procedures

### 9.4 Maintenance Costs

Ongoing maintenance costs will be met by the County Council. A lifecycle plan has been completed for the proposed new access route and the downgraded town centre route, in terms of surface dress and plane/resurface surface/binder course maintenance. The 60 year maintenance costs for the new Doxey Road railway bridge over the West Coast Mainline are estimated to total £757,700.

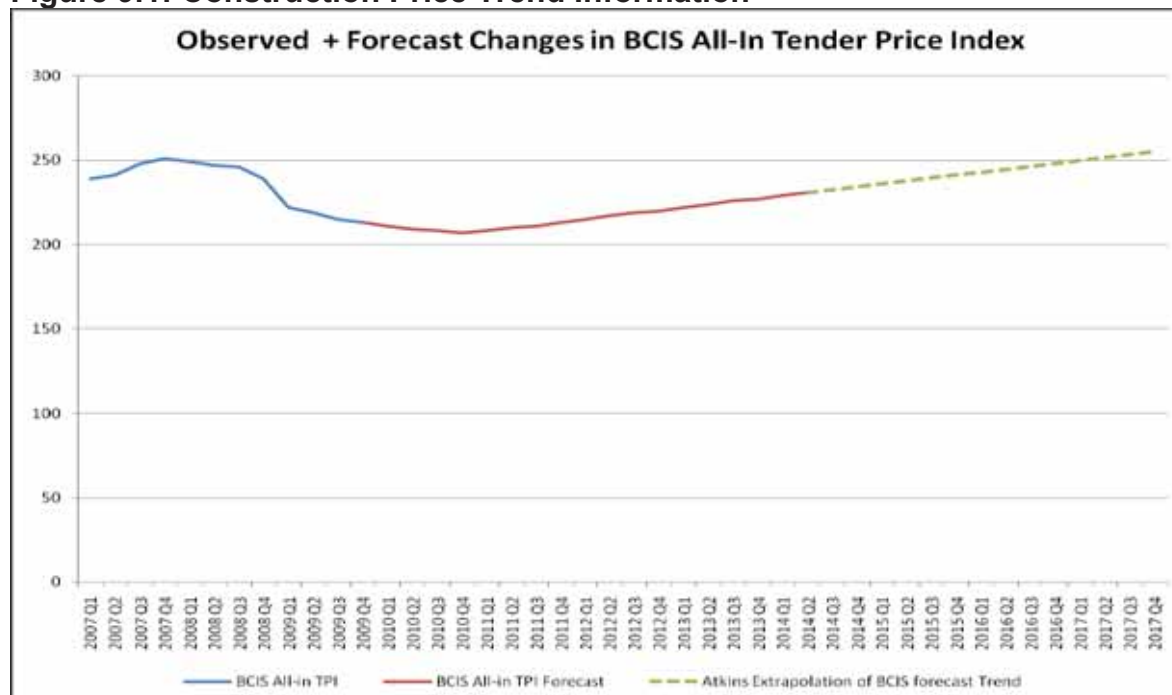
### 9.5 Inflation Assumptions

The inflation assumption for this business case has taken into account the latest construction price trend information from the Building Cost Information Service, specifically the All-in Tender Price Index. Figure 9.1 shows that construction costs hit a peak in 2007 Q4 and then fell and are expected to carry on falling until Q4 2010. After this time, costs are expected to grow at a rate below 1% per year. The costs that are used in this business case are estimated at a price base of 2008 Q2. The projections



show that construction costs are unlikely to reach this level again until Q3 2016, which is why the costs in this bid have not been inflated.

**Figure 9.1: Construction Price Trend Information**



The forecasts indicate that the costs expected during construction period of 2015/16 will be the same as at the current estimate point of 2008 Q2

## 9.6 Quantified Cost Estimate (QCE)

The Quantified Cost Estimate consists of the most likely base cost, risk allowance and an assumption regarding inflation. The risk allowance has been assumed to be the Mean Risk Value that has been calculated using a Monte Carlo Cost Model as part of a Quantified Risk Assessment. The P50 and P80 risk values are reported in this QRA in Appendix 7.2. The breakdown of the Quantified Cost Estimate is provided in Table 9.4.

**Table 9.4: Summary of Quantified Cost Estimate**

Element	Cost Estimate £'000
Eligible Preparation Costs	1,800
Base Cost	33,035
Quantified Risk Assessment	3,895
Inflation	0
<b>Total</b>	<b>38,730</b>

The funding profile is provided in Tables 9.5 and Table 9.6 summarises the funding package for the scheme in line with government guidance.

**Table 9.5: Quantified Cost Estimate Funding Profile (£000's)**

Cost	10/11	11/12	12/13	13/14	14/15	15/16	16/17	Total
Construction Cost	-	-	-	-	14,300	11,925	1,645	27,870
Land Acquisition Cost	-	-	-	3,000	1,000	165	-	4,165
Eligible Preparatory Costs	240	955	505	100	-	-	-	1,800
Supervision Cost	-	-	-	-	500	450	50	1,000
Quantified Risk	27	107	56	347	1,767	1,402	190	3,895
Quantified Cost Estimate	267	1,062	561	3,447	17,567	13,942	1,885	38,730
Additional Risk Layer	59	234	124	758	3,865	3,067	415	8,521
Approved Scheme Cost	326	1,295	685	4,205	21,431	17,009	2,299	47,251

**Table 9.6: Funding Package (£000's)**

	Preparatory costs between PE and CA	Preparatory costs between CA and FA	Costs after Full Approval				Total
			2013/14	2014/15	2015/16	2016/17	
Total Scheme Cost (QCE)	1,890	56	3,391	17,567	13,942	1,885	38,730
DfT requested contribution	945	28	3,363	16,688	11,154	1,508	33,686 (87%)
Local authority contribution	945	28	28	878	2,788	377	5,044 (13%)
Third party contribution	-	-	-	-	-	-	-

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