

ONE YEAR AFTER STUDY

A419 Commonhead Junction Improvement



November 2008

JOB NUMBER: 5048002			DOCUMENT REF: A419Commonhead OYA v5.doc			
Revision	Purpose / Description	Originated	Checked	Reviewed	Authorised	Date
01	Draft	NB	PW			Jun 08
02	Environment added	PMQ				Nov 08
03	Internal review	NB		PR	PR	Jan 09
04	External reviews	NB				Mar 09
<p>ATKINS CONSULTANTS LTD The AXIS, 10 Holliday Street, Birmingham, B1 1TF Tel 0121 483 5000, Fax 0121 483 6161</p>						

Contents

<i>Section</i>	<i>Page</i>
Glossary	iii
Executive Summary	5
1. Introduction	6
Background	6
The Scheme	7
The POPE Report	7
2. Traffic Data Collection and Analysis	10
Traffic Volumes	10
Journey Times	14
3. Safety	17
Accident Data Collection	17
Results	17
Security	20
4. Economy	22
Scheme Costs	22
Predicted and Observed Benefits	22
Reliability	24
Wider Economic Impact	25
5. Environmental Summary	26
Environment	27
6. Accessibility & Integration	37
Accessibility	37
Integration	38
7. Appraisal Summary Table	41
8. Summary	44
Annex A - Traffic Volumes	45
Annex B – Journey Times	46
Annex C – Queue Lengths	51
Annex D - Environment – Full Evaluation	57
Environment	58

List of Tables

Table 2-1 – Predicted and Actual Flows (2008 AADT)	13
Table 3-1 – Personal Injury Accidents and Casualties	18
Table 4-1 – Vehicle-Time Benefits at 2002 Values	23
Table 4-2 Predicted and Observed Benefits at 2002 Values	24
Table 4-3 - Predicted and Observed Costs and Benefits	24
Table 5.1 – Summary of POPE-Environment Consultation Responses	27
Table 5.2 – Summary of predicted effects on the Noise sub-objective	28
Table 5.3 – Summary of predicted effects on the Air Quality sub-objective	29
Table A-1 – Traffic Volumes (AWT)	45
Table B-1 – Average Times for A419 Northbound via Flyover (min:sec)	46
Table B-1 – Average Times for A419 Southbound via Flyover (min:sec)	46
Table B-1- Average Times at A419 Northbound via Roundabout (min:sec)	47
Table B-1 - Average Times at A419 Southbound via Roundabout (min:sec)	48
Table B-1 – Average Times at A4259 Eastbound (min:sec)	49
Table B-1 – Average Times at A4259 Westbound (min:sec)	49
Table B-1 – Average Times at Pack Hill Westbound (min:sec)	50
Table B-1 – Average Times at Pack Hill Eastbound (min:sec)	50
Table D.1 – Summary of POPE-Environment Consultation Responses	58
Table D.2 – Summary of predicted effects on the Noise sub-objective	59
Table D.3 – ES predicted Effects, proposed Mitigation and the Evaluation of Noise	60
Table D.4 – Summary of predicted effects on the Air Quality sub-objective	63
Table D.5– ES predicted Effects, proposed Mitigation and the Evaluation of Air Quality	64
Table D.6 – Summary of predicted effects on Heritage	75
Table D.7 – ES predicted Effects, proposed Mitigation and the Evaluation of Heritage	77
Table D.8 – Summary of predicted effects on Water	80
Table D.9– ES predicted Effects, proposed Mitigation and the Evaluation of Water	81
Table D.10 – Summary of predicted effects on Physical Fitness	82
Table D.11 – ES predicted Effects, Mitigation and Evaluation of Physical Fitness	83
Table D.12 – Summary of predicted effects on Journey Ambience	85
Table D.13 – ES predicted Effects, Mitigation and Evaluation of Journey Ambience	86

The maps in this document are reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office © Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. Highways Agency Licence No. 100018928. Published 2005.

Glossary

The following table details the acronyms and specialist terms used within the context of this report.

Term	Definition
AADT	Annual Average Daily Traffic. Average of 24 hour flows, seven days a week, for all days within the year.
AAWT	Annual Average Weekday Traffic. As AADT but for five days, (Monday to Friday) only.
Accessibility	Accessibility can be defined as 'ease of reaching'. The accessibility objective is concerned with increasing the ability with which people in different locations, and with differing availability of transport, can reach different types of facility.
AST	Appraisal Summary Table. This records the impacts of the scheme according to the Government's five key objects for transport, as defined in DfT guidance contained on its Transport Analysis Guidance web pages, WebTAG
ATC	Automatic Traffic Count, a machine which measures traffic flow at a point in the road.
AWT	Average Weekday Traffic. Average of Monday to Friday 24 hour flows.
COBA	COst Benefit Analysis – a computer program which compares the costs of providing road schemes with the benefits derived by road users (in terms of time, vehicle operating costs and accidents), and expresses the results in terms of a monetary valuation. The COBA model uses the fixed trip matrix.
DfT	Department for Transport
Discounting	Discounting is a technique used to compare costs and benefits that occur in different time periods and is the process of adjusting future cash flows to their present values to reflect the time value of money. A standard base year needs to be used which is 2002 for the appraisal used in this report.
ECI	Early Contractor Involvement. A form of contract in which the Highways Agency enters into partnership with a contractor at an early stage in the design of a scheme.
EST	Evaluation Summary Table. In POPE studies, this is a summary of the evaluations of the TAG objectives using a similar format to the forecasts in the AST.
HGV	Heavy Goods Vehicle.
Highways Agency	An Executive Agency of the Department for Transport, responsible for operating, maintaining and improving the strategic road network

	in England.
IP	Inter Peak , the time between the AM and PM peaks
Light vehicle	Not a HGV. For traffic flow data, it is a vehicle less than 5.2m in length.
OPR	Order Publication Report
PAR	Project Appraisal Report These are undertaken for Highways Agency improvement schemes which are not TPIs
PIA	Personal Injury Accident. A road traffic accident in which at least one person required medical treatment.
PIA/mvkm	PIA/mvkm is the number of PIAs per million vehicle kilometres where 'vehicle kilometres' are the number of vehicles using a section of the road multiplied by the length of the road.
POPE	Post Opening Project Evaluation , before & after monitoring of all major highway schemes in England.
Seasonality	Seasonality is the variation in traffic behaviour across the year due to varying daylight levels, weather conditions, school holidays, etc.
Severance	Community severance is the separation of adjacent areas by road or heavy traffic, causing negative impact on non-motorised users, particularly pedestrians.
TIS	Traffic Impact Study
TPI	Targeted Programme of Improvements. The Highways Agency's programme of investment in improvements to the Trunk road and Motorway road network comprised of a number of major schemes each costing more than £5m. Now known as Major Schemes.
TUBA	Transport Users' Benefit Appraisal. A DfT program used to assess the economic benefits of a scheme, particularly resulting from time savings. It has replaced COBA for this purpose in many schemes, but TUBA does not cover accident benefits.
VOT	Value Of Time
vpd	Vehicles Per Day
webTAG	Department for Transport's website for guidance on the conduct of transport studies at http://www.webtag.org.uk/

Executive Summary

The A419 Commonhead Junction Improvement officially opened on 30th March 2007. The scheme added an overpass to carry A419 through traffic over the roundabout junction with the A4259/ B4192 at Commonhead, which is located about 1.5 km north of M4 Junction 15, near Swindon, Wiltshire. The scheme objectives were to reduce congestion and improve safety.

Traffic volumes are shown in Figure 0.1 below. The rate of growth on the A419 has been higher than on other roads, suggesting it has become relatively more attractive since the improvement. Average journey times have improved by up to 1min: 52 sec, and queues at the roundabout have been reduced.

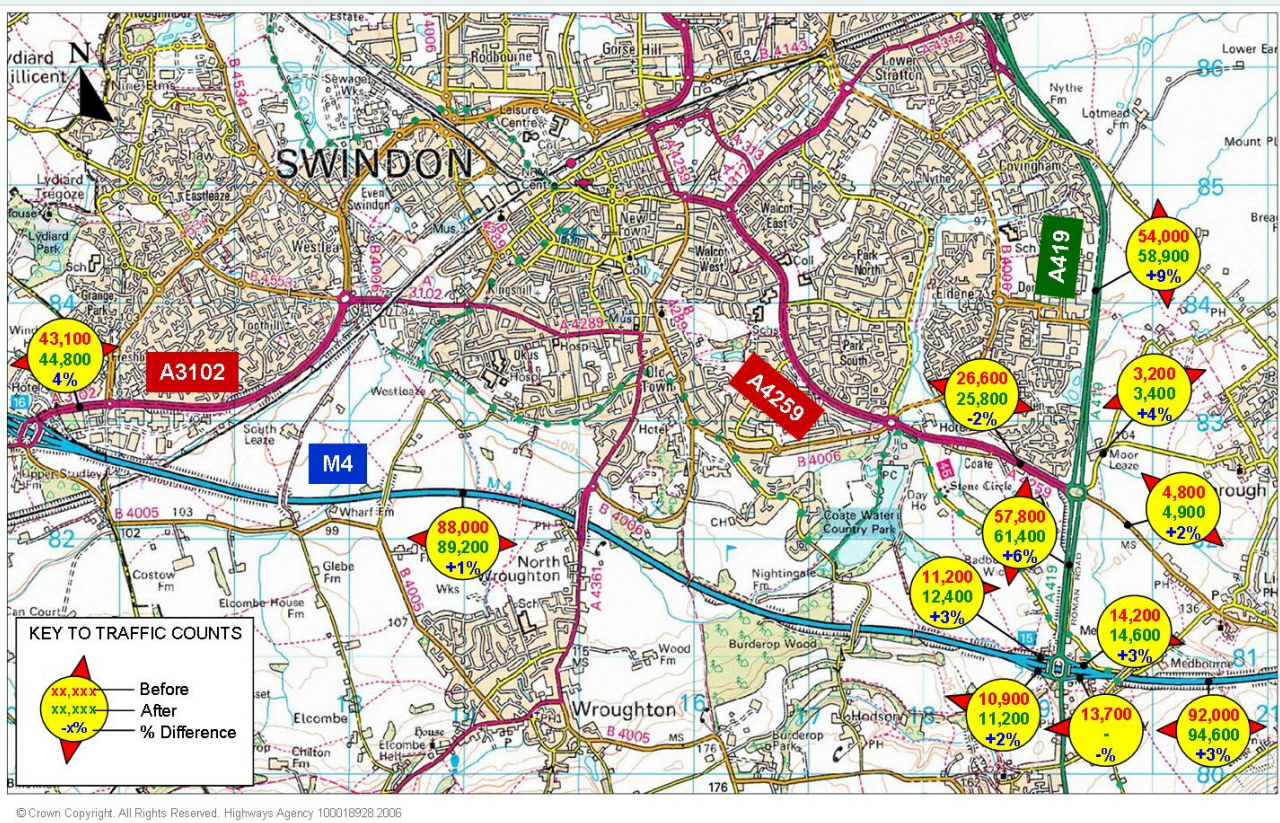


Figure 0.1 – Traffic Volumes (AWT) ‘Before’ and ‘One Year After’

Accidents have fallen from 20.7 per year to 6.0 per year. This annual saving of 14.7 per year exceeds the 3.0 per year predicted.

The outturn construction cost of £13.4 million (2002 prices, undiscounted) is 13% less than predicted.

Travel time benefits over 60 years are calculated to be £95.85 million, and accident benefits are calculated to be £36.87 million (both at 2002 prices and values). The Benefit Cost Ratio derived from these items is 11.2

The congestion and safety objectives have been fulfilled, and the economic performance of the scheme, based on one-year-after data, has been better than predicted.

The Environmental impacts are assessed to be generally as predicted.

1. Introduction

BACKGROUND

- 1.1 The A419/ A417 trunk road is a strategic route linking the M4 motorway at Junction 15 near Swindon, with the M5 at Junction 11a near Gloucester. For much of its length the road is dual carriageway, and most of the rural junctions are grade-separated. The A419 passes northeast of Swindon, linking the town with the trunk and motorway network. Commonhead Junction is located where the A419 is joined by the A4259 to the west, the B4192 to the east, and the minor road Pack Hill. The junction is situated about 1.5 km north of M4 Junction 15, as shown in Figure 1.1.
- 1.2 This section of the A419 falls within Highways Agency Area 2, and is part of the A417/ A419 Swindon to Gloucester DBFO, with the concession held by Road Management Services. The junction is within the geographic county of Wiltshire, and is administered by Swindon Borough Council, a unitary authority.
- 1.3 Historically, junctions on the A419 near Swindon have experienced congestion and associated safety problems, particularly shunts at queues. Congestion sometimes impeded access to the Great Western Hospital, located southwest of Commonhead Junction.

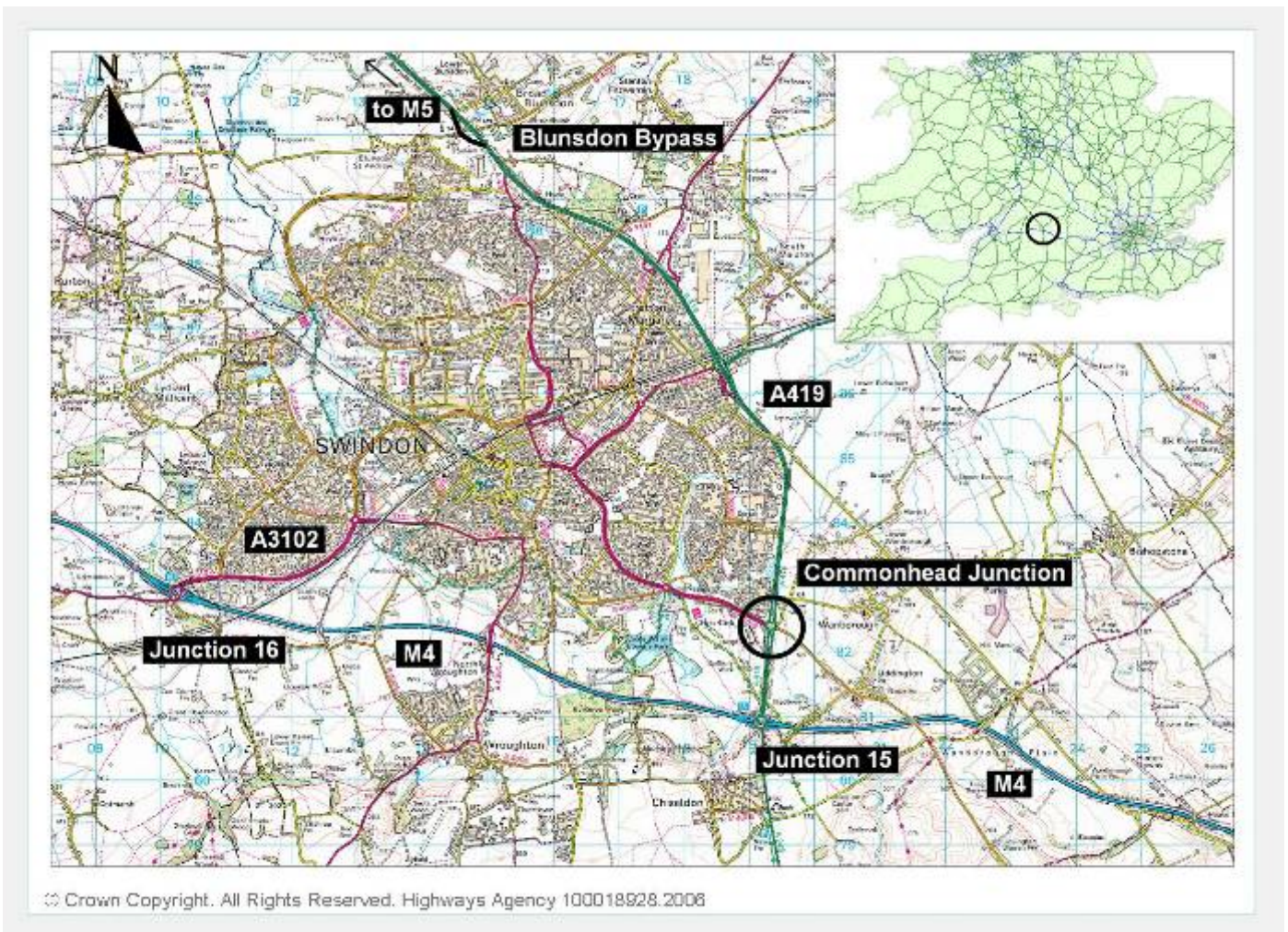


Figure 1.1 – Scheme Location and Context

A419 COMMONHEAD JUNCTION IMPROVEMENT – ONE YEAR AFTER

- 1.4 The 1998 Trunk Roads Review announced the Blunsdon Road-Based Study to investigate the problems of the A419 between Blunsdon, north of Swindon, and the M4 Junction 15, southeast of Swindon. This was completed in 2001, and recommended the following package of measures:
- ◆ A two-level grade separated junction at Commonhead (the subject of this report);
 - ◆ A western bypass for the village of Blunsdon;
 - ◆ Signalising M4 Junction 15 roundabout; and
 - ◆ Slip road improvements on the A419 at Dorcan, A420, and A361.
- 1.5 At that stage it was not decided whether the A419 should cross Commonhead Junction as an underpass or an overpass. The underpass alternative was supported by Swindon Borough Council. At Public Consultation many local residents also expressed a preference for an underpass, as this would give less noise and visual intrusion than an overpass. However an underpass would have intercepted the water table, resulting in increased construction and maintenance costs. The Highways Agency therefore chose the flyover alternative. The scheme was added to the Programme of Major Schemes (then called the Targeted Programme of Improvements, or TPI) in December 2002.
- 1.6 McAlpine Capital Projects was appointed in July 2003 to develop the scheme under Early Contractor Involvement (ECI). A Public Inquiry was not held. Construction started on 19th September 2005, and the flyover opened to traffic on 6th February 2007, with official scheme opening on 30th March 2007.

THE SCHEME

- 1.7 The objectives of the scheme were:
- ◆ To reduce congestion; and
 - ◆ To improve safety.
- 1.8 Before improvement, Commonhead Junction was a signalised at-grade roundabout. It had been designed to allow for future grade-separation, with a wide central reserve north and south of the roundabout. Before construction of the flyover, these reserves were landscaped, with earth mounding and mature planting.
- 1.9 The scheme provided a 700 m flyover carrying the A419 over the roundabout, with existing carriageways being retained as slip roads. The three sets of traffic signals at the roundabout were removed, but a signal-controlled crossing for pedestrians and cyclists was provided on the slip roads north of the roundabout. A one-way access to the minor road Day House Lane (southeast of the junction) was closed, but alternative routes exist. The layout is illustrated in Figure 1.2.

THE POPE REPORT

- 1.10 The Highways Agency has a requirement to carry out post-opening evaluations of trunk road schemes recently implemented under the Major Schemes Programme. The purpose of these evaluations is to determine how far the objectives and predicted benefits have been achieved.
- 1.11 This report represents the 'One-Year After' report for the A419 Junction Improvement, and is prepared under the Highways Agency Post-Opening Project Evaluation (POPE) Commission.

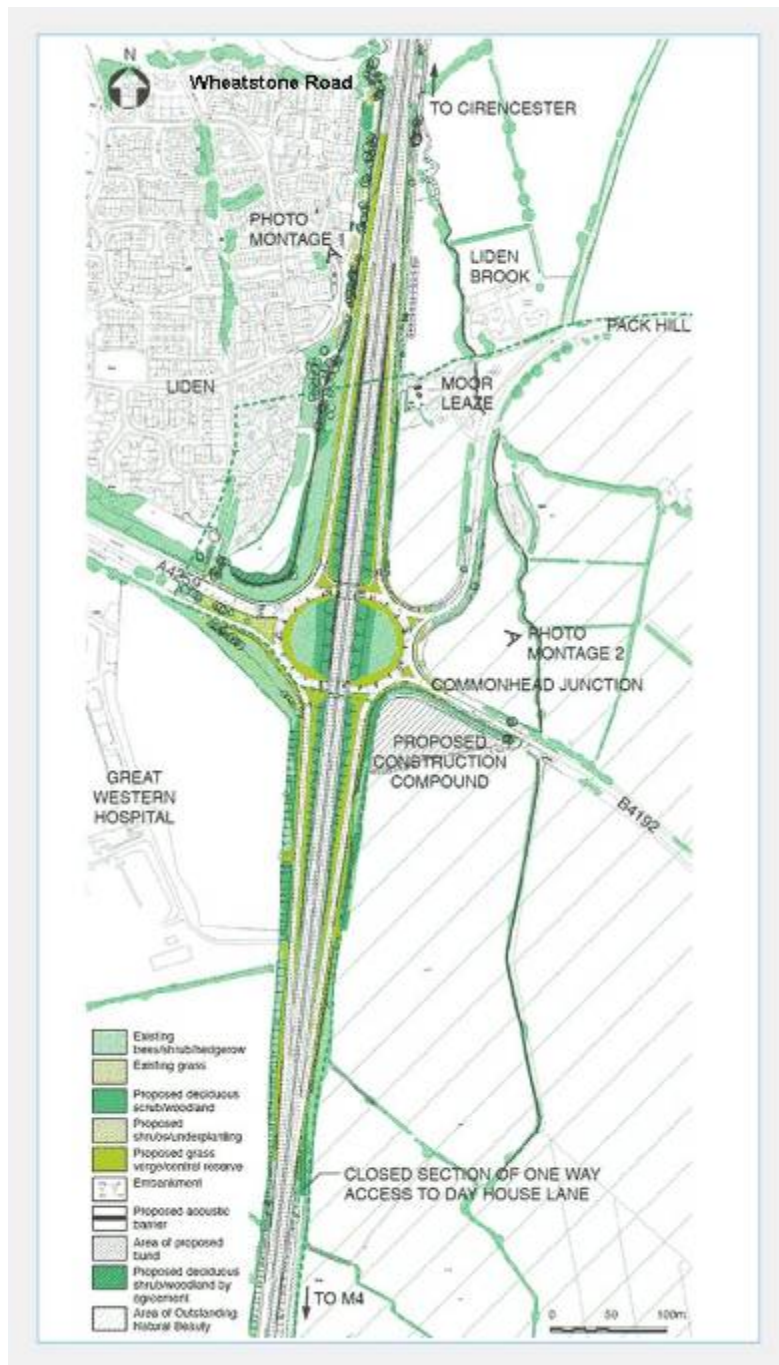


Figure 1.2 – Scheme Layout

1.12 This report sets out a number of assessments, namely:

- ◆ A comparison of the ‘Before’ and ‘After’ traffic volumes on the A419 and adjacent roads, and comparing these with predictions;
- ◆ A comparison of ‘Before’ and ‘After’ journey times;
- ◆ An analysis of accidents;
- ◆ An evaluation of the outturn economic benefits, based on changes in traffic volumes, journey times and accidents;
- ◆ A comparison of the outturn cost with the budgeted cost;
- ◆ An evaluation of environmental outcomes compared with forecast impacts; and
- ◆ A review of the original Appraisal Summary Table in the form of a new Evaluation Summary Table (EST).

Structure of the Report

1.13 Following this introduction, the report continues as follows:

- ◆ Section 2 discusses the traffic flows, journey times, and comparison with forecasts;
- ◆ Section 3 considers safety;
- ◆ Section 4 derives updated economic benefits based on vehicle-time and accident savings in the first year, and compares these with forecasts;
- ◆ Section 5 summarises Environmental impacts;
- ◆ Section 6 presents the original Appraisal Summary Table (AST), and then re-evaluates the outcomes with an Evaluation Summary Table (EST);
- ◆ Section 7 summarises the main conclusions of the report; and
- ◆ Annex A: gives detailed results from automatic traffic counts summarised in section 2.
- ◆ Annex B: gives detailed results from the journey time surveys summarised in section 2.
- ◆ Annex C: gives a graphical presentation of queue length changes; and
- ◆ Annex D: gives the full Environmental impact evaluation.

Sources

1.14 The following sources were used in compiling this report:

- ◆ The Highways Agency supplied traffic data for its roads, provided information on scheme costs, and took part in consultations on a variety of other matters;
- ◆ Swindon Borough Council provided traffic count and accident data, and was consulted on a variety of other matters ;
- ◆ Traffic surveys commissioned specifically for this study;
- ◆ The Appraisal Summary Table dated December 2004;
- ◆ *A419 Commonhead Junction Improvement: Socio Economic Study*, Mouchel Parkman, September 2004;
- ◆ *A419 Commonhead Junction Improvement Published Scheme: Traffic Modelling, Forecasting and Economic Appraisal Report*, Mouchel Parkman, January 2005;
- ◆ *A419 Commonhead Junction Improvement: Environmental Statement*, Highways Agency, January 2005;
- ◆ Statutory environmental consultees (Natural England, English Heritage and the Environment Agency); and
- ◆ Site visits by Atkins transport planners and environmental specialists.

2. Traffic Data Collection and Analysis

TRAFFIC VOLUMES

Count Data Collection

2.1 Traffic counts were previously obtained ‘Before’ construction (October 2005), and ‘After’ opening (June 2007). For this One Year After study, further traffic data was collected in April 2008, from the following sources:

- ◆ Highways Agency volume data from permanent count sites on the A419, the M4 motorway, and slip roads at M4 Junction 15;
- ◆ Temporary automatic traffic counters at Commonhead, on the A4259, B4192, Pack Hill, the slip roads, and the flyover itself;
- ◆ A Swindon Borough Council permanent count site on the A3102, which is an alternative route between Swindon and the M4 motorway.

2.2 The locations of the count sites are shown in Figure 2.1 below.

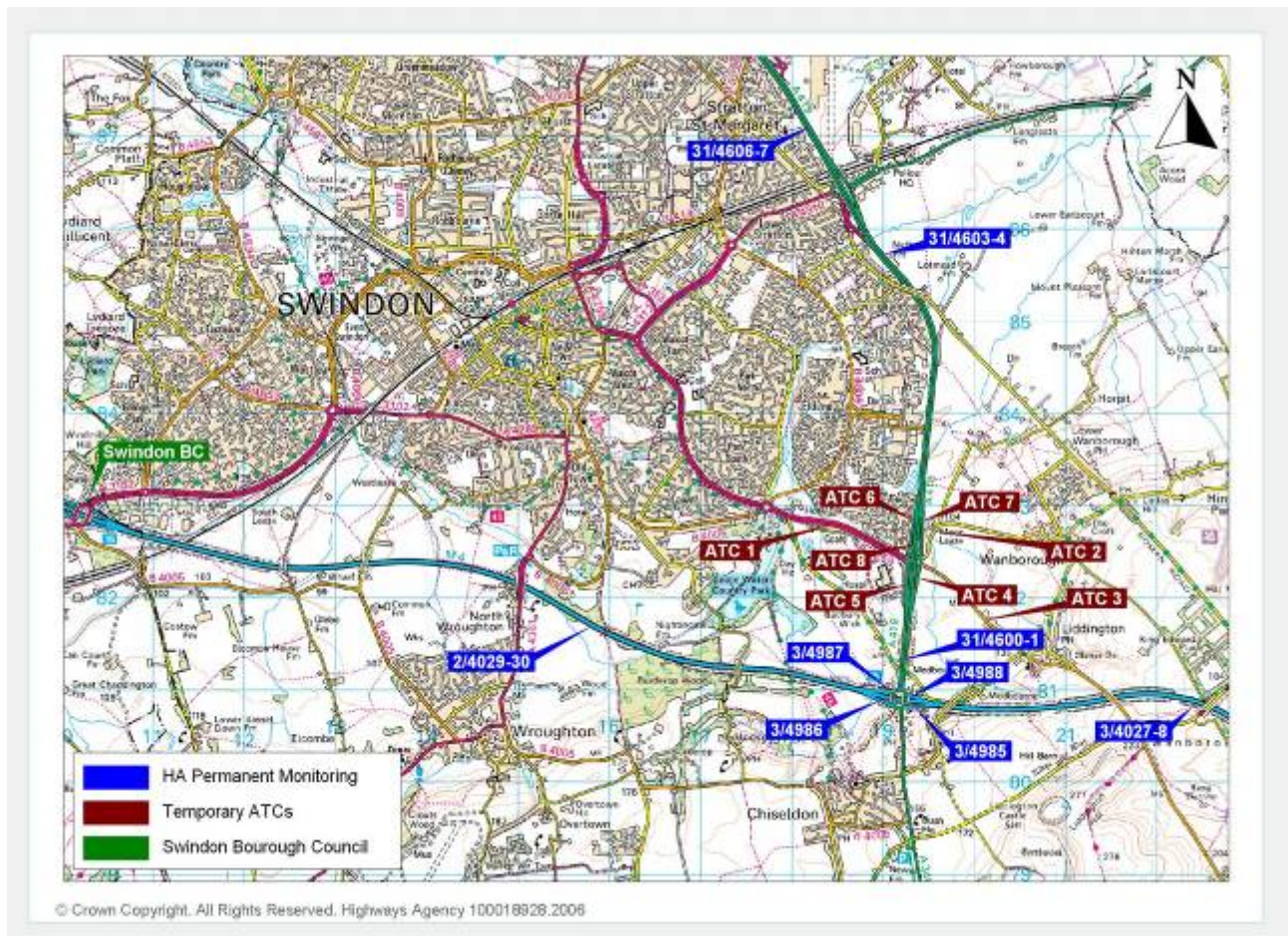


Figure 2.1 – Traffic Count Locations

2.3 A video turning count at Commonhead roundabout was undertaken in June 2007, and was reported in the Traffic Impact Study (TIS). This has not been repeated, but the flows on approach arms remain similar to those reported in the TIS, hence there is every reason to believe that the turning flows of 2007 continue to be valid. By comparison with the ‘Before’ survey, there has been a 57% reduction in traffic on the roundabout.

Traffic Volume Results

2.4 Details of traffic volumes are tabulated in Annex A at the end of this report, and results are summarised below in Figure 3.2 (for the wider area) and Figure 3.3 (close to Commonhead junction). The figures are 2-way 24-hour average weekday flows (AWT). The counts shown have been adjusted for seasonality only, by factoring the April 2008 figures up to October, the same month as the 'Before' surveys were taken in 2005. Note however, that for the economic evaluation reported in chapter 5, long-term growth is also taken into account.

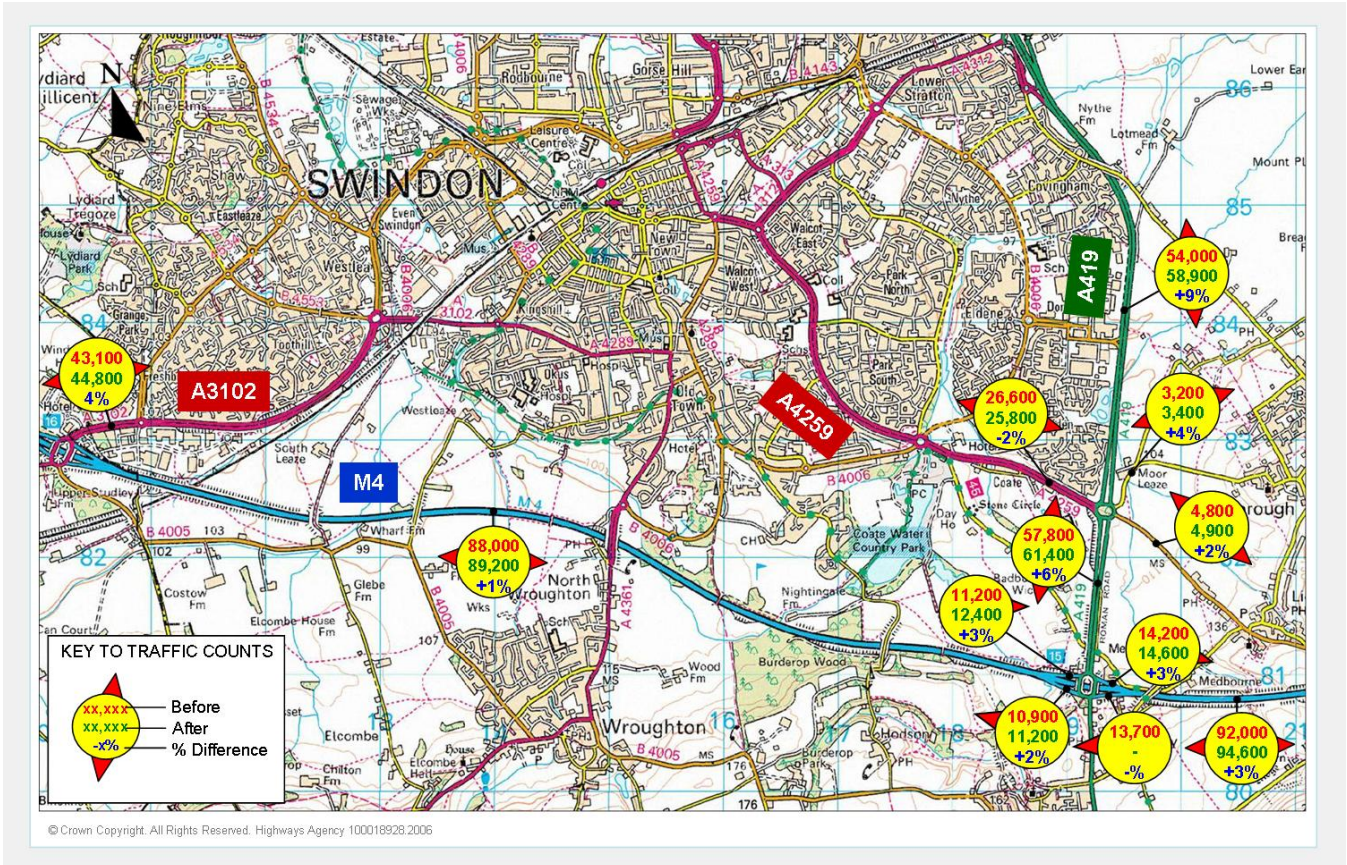
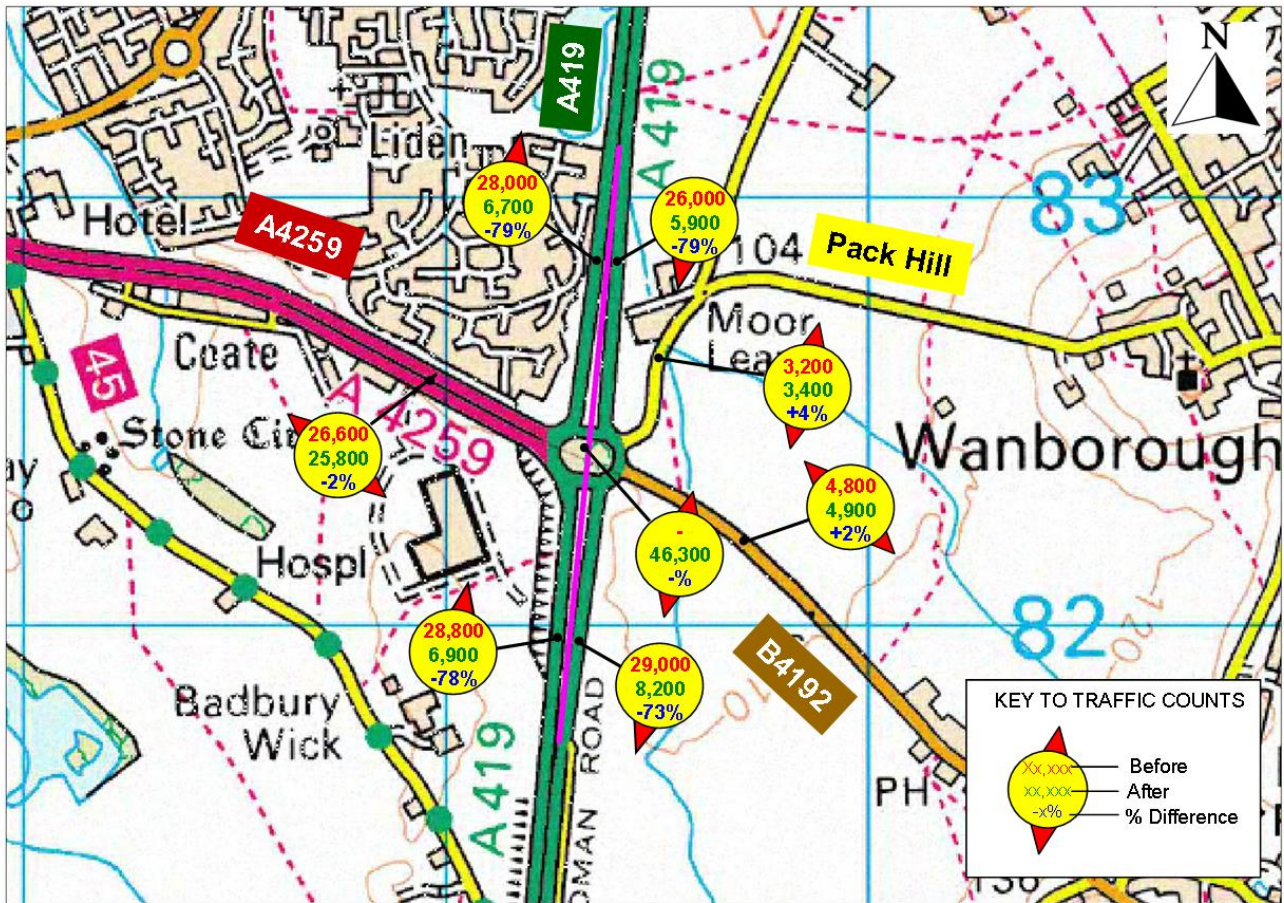


Figure 2.2 – Before and After Counts in the Wider Area (AWT)

- 2.5 It is apparent that the 6%-9% growth in traffic on the A419 has been greater than on local roads, and also than on the M4. Traffic has increased by 4% on the A3102, north of M4 Junction 16. This suggests the improvement to Commonhead junction has increased the attractiveness of the A419 for trips between Swindon and the M4.
- 2.6 The percentage increases should be viewed in the context of background traffic growth. Between 2005 and 2008, there has been 4% growth in Swindon and in Wiltshire. Thus, the increase in traffic on the M4 south of Swindon has been less than background growth; on the A3102 it has matched background growth, and on the A419 has exceeded it.



© Crown Copyright. All Rights Reserved. Highways Agency 100018928.2006

Figure 2.3 – Before and After Counts Close to Commonhead Junction (AWT)

Trends

- 2.7 Whereas Figure 2.2 and 2.3 shows Before-and-After flows at particular times, it is also useful to see the trends in volumes on important links over a number of years. Figure 2.4 gives trend information for 24hr-AWTs at three ATC sites on the M4 and two sites on the A419 (north and south of Commonhead).
- 2.8 The graph shows slight seasonal variation at both the A419 sites, but with relatively steady growth of about 2% per year, which was interrupted during the construction of the Commonhead flyover. By contrast, the M4 has pronounced seasonal variation superimposed on a smaller long-term growth.

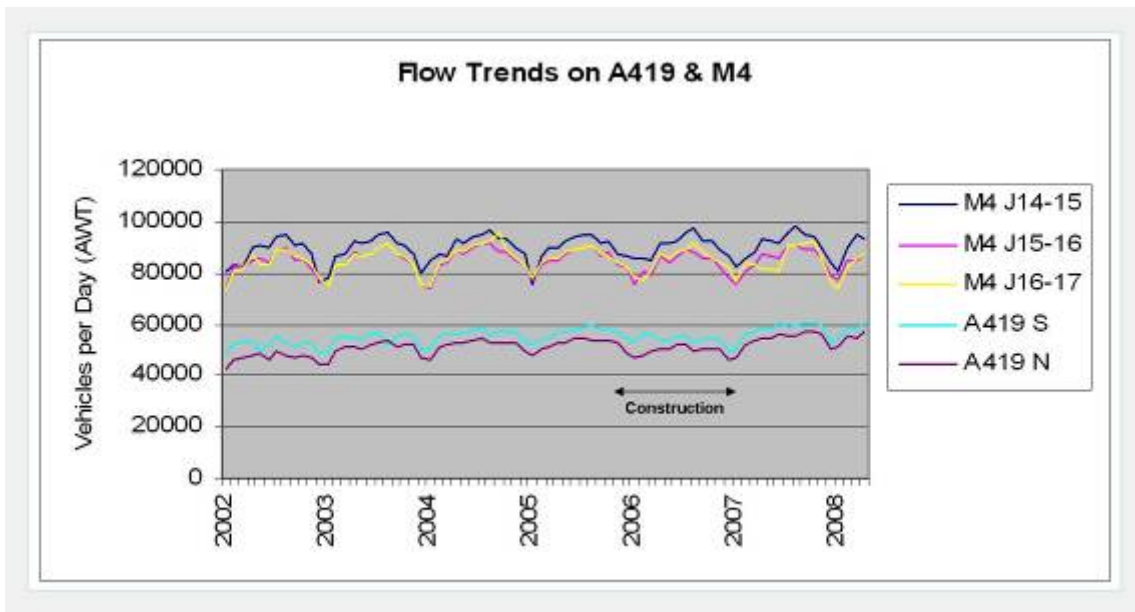


Figure 2.4 – Trends in AWTs on A419 and M4

Predicted and Actual Traffic Volumes

- 2.9 As described in the Forecasting and Economic Assessment Report (FEAR), forecasts were based on the Swindon Area Traffic Model, developed in 1999, and updated to a base year of 2003. This SATURN model used trip matrices for 2003 and 2011, supplied by Swindon Borough Council. The matrices for the assumed 2008 opening year, and 2023 design year, were both derived from the 2011 matrix, by applying “growth” factors from TEMPRO and NRTF (the “growth” from 2011 to 2008 was less than 1.000, i.e. the forecast worked backward in time). Variable demand assessment was performed using elastic assignment within SATURN.
- 2.10 The following table compares predicted and actual flows on links around Commonhead, for the Do-Minimum and Do-Something cases. The predictions shown are the average of Low and High Growth forecasts. The ‘Actual Do-Minimum’ represents the ‘Before’ AADT factored to 2008.

Table 2-1 – Predicted and Actual Flows (2008 AADT)

Link	Predicted		Actual		Actual / Predicted	
	DM	DS	DM	DS	DM	DS
A419 N of Commonhead	51,750	54,150	51,760	53,933	0%	0%
A419 S of Commonhead	56,539	58,770	55,526	56,575	-2%	-4%
A419 Flyover	-	42,000	-	42,917	-	2%
A419 NB Onslip	24,921	5168	26,217	5,862	5%	13%
A419 NB Offslip	28,762	8580	27,720	6,284	-4%	-27%
A419 SB Onslip	27,777	8190	27,806	7,374	0%	-10%
A419 SB Offslip	25,807	7020	24,992	5,154	-3%	-27%
A4259 W of Junction	41,000	40,000	24,737	23,229	-40%	-42%

- 2.11 The actual flows on the A419 itself are close to the predictions, with differences of less than 10% in both the Do-Minimum and Do-Something, while there is greater variation in the slip road flows. However, the predicted figures for A4259 were clearly in error, for unknown reasons. The increase in trips using the A419 was correctly forecast, which may be due to a local increase in trips, or reassignment from minor roads not counted.

JOURNEY TIMES

Data Collection

2.12 Journey time runs were undertaken on four routes, as shown in Figure 2.5. The routes were as follows:

- ◆ A419 between M4 J15 roundabout, and Merlin Way slip roads, via Commonhead flyover ('After' only), shown red;
- ◆ The same route as above, but via Commonhead roundabout, also shown red;
- ◆ A4259 between Dorcan Way and Melbourne Road, via Commonhead roundabout, shown blue; and
- ◆ Pack Hill between The Marsh and Commonhead roundabout, shown green.

2.13 The surveys were undertaken on Tuesday 29th April 2008, with between seven and ten runs in each direction, in each of the AM peak, PM peak, and interpeak periods.

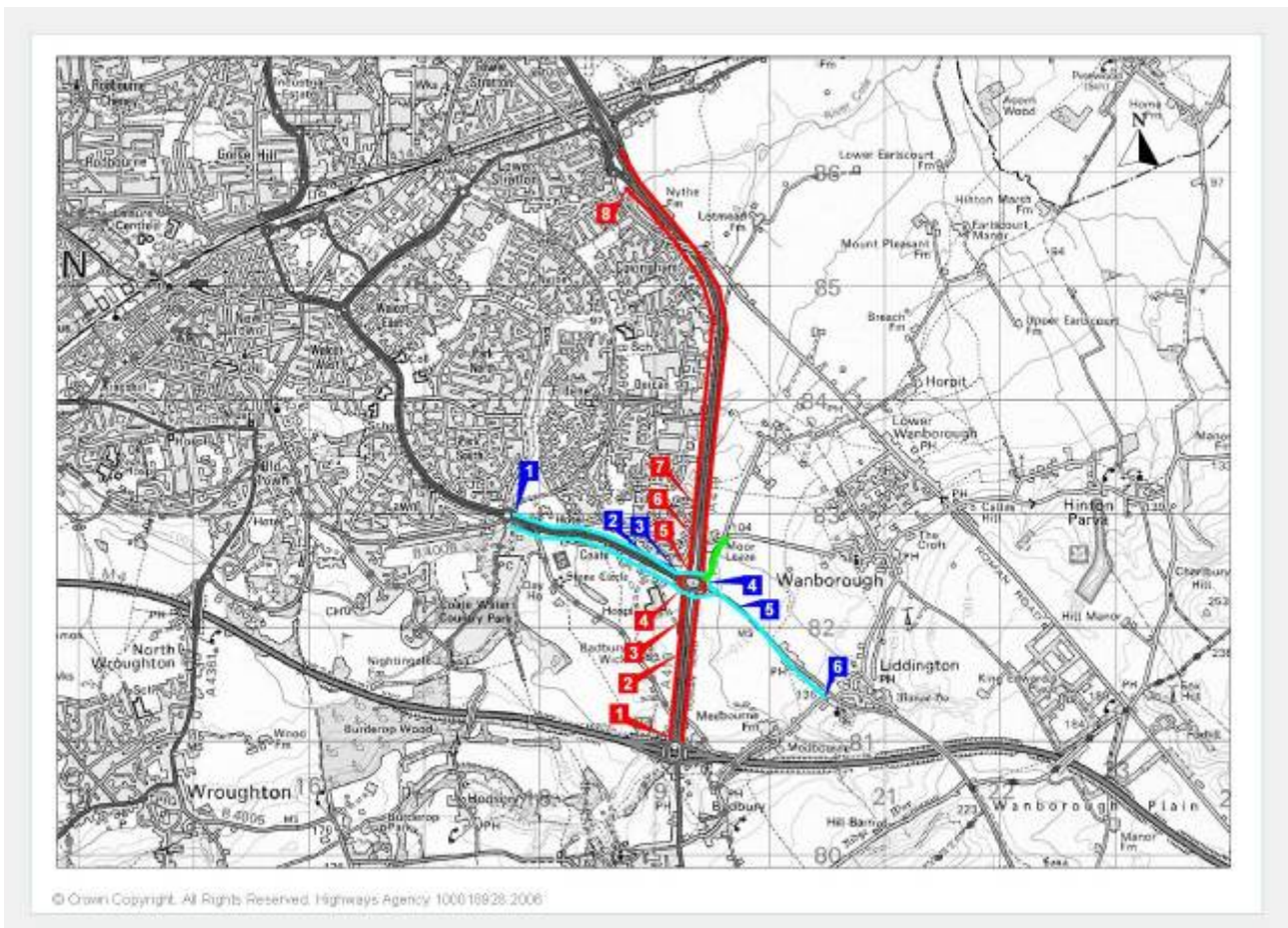


Figure 2.5 – Journey Time Routes ('After')

Journey Time Results

2.14 Average times between all timing points are tabulated in Annex B at the end of this report. The enumerators were instructed to record queue delays, and these are shown in Annex B. It should be noted that very little time was lost in queues, and most of the delays that were experienced were actually associated with M4 Junction 15, and with the hospital entrance, rather than with Commonhead Junction itself.

2.15 Average times for the whole routes are shown in Tables 2.2 to 2.4, which also show results of the ‘Before’ and ‘Immediately After’ surveys, and the time saved ‘1 Year After’ compared with ‘Before’.

Table 2-2 – Journey Times & Savings on A419 (min:sec)

		BEFORE	IMMEDIATELY AFTER		1 YEAR AFTER		SAVING 1 YR AFTER	
		via R'bout	via R'bout	via Flyover	via R'bout	via Flyover	via R'bout	via Flyover
A419 North-bound	AM	04:52	04:15	03:02	03:54	03:00	00:58	01:52
	IP	04:19	04:06	03:09	03:52	02:59	00:26	01:20
	PM	04:09	03:58	03:11	03:57	03:23	00:12	00:46
A419 South-bound	AM	04:46	04:24	03:35	04:06	03:16	00:40	01:30
	IP	04:17	04:09	03:40	03:54	03:11	00:23	01:06
	PM	04:30	04:15	03:51	04:46	03:46	-00:16	00:44

Table 2-3– Journey Times & Savings on A4259 (min:sec)

		Before	Immediately After	1 Year After	Saving (1 Yr)
A4259 East-bound	AM	04:17	04:03	03:18	00:59
	IP	03:45	03:56	03:15	00:30
	PM	03:49	04:06	03:25	00:24
A4259 West-bound	AM	05:28	03:52	03:51	01:37
	IP	04:20	03:58	03:38	00:42
	PM	04:42	03:54	03:41	01:01

Table 2-4– Journey Times & Savings on Pack Hill (min:sec)

		Before	Immediately After	1 Year After	Saving (1 Yr)
Pack Hill East-bound	AM	00:34	00:31	00:45	-00:11
	IP	00:31	00:32	00:45	-00:14
	PM	00:30	00:30	00:46	-00:16
Pack Hill West-bound	AM	01:11	00:38	01:01	00:10
	IP	00:56	00:51	00:59	-00:03
	PM	00:52	00:49	01:04	-00:12

2.16 In general the journey times ‘1 Year After’ are similar to those ‘Immediately After’. Table 2.2 shows that the largest time savings from using the flyover occur in the AM peak, when up to 1 min 52 sec is saved. The saving at other times is approximately a minute. Table 2.3 shows that east-west trips on the A4259 also save approximately a minute. However, at Pack Hill, there is very little time difference.

2.17 The following table shows time savings on roundabout approaches, measured from a distance of 200 metres to the stop line. This shows that the greatest savings are from east-west movements from the A4259/ B4192. Elsewhere, there are two instances where times have marginally increased.

Table 2-5 – Time Savings at Roundabout Approaches (min:sec)

Roundabout Arm	Approach Time Saving		
	AM	IP	PM
A419 Southbound	00:11	-00:04	00:13
Pack Hill	00:11	00:02	-00:08
B4192	00:59	00:16	00:30
A419 Northbound	00:18	00:15	00:10
A4259	00:37	00:19	00:24

2.18 It is not possible to compare actual journey times with those predicted, because the forecast journey times are not present in the FEAR, TUBA, or AST.

- 2.19 Queue lengths were also measured for each lane at all approaches to the roundabout, in each one-hour peak. The results are shown graphically in Annex D. The graphs are all to the same scale. While it may be difficult to distinguish actual queue lengths in cases where numbers are low, this presentation does have the advantage of permitting comparisons between arms, and between the ‘Before’ and ‘1 Year After’ situations.
- 2.20 The queues remain very similar to those measured immediately after opening. On the A419, queues rarely now exceed 50 metres, whereas before the scheme they could reach hundreds of metres. The 1-Year After survey found no queues from A4259 Marlborough Road on the roundabout approach (although it was stated that queueing could occur at the hospital access).

Main Traffic Conclusions
<ul style="list-style-type: none"> ◆ The flyover now carries 46,300 vpd, and the slip roads are used by about 6,000 to 8,000 vpd. ◆ The provision of an overpass has reduced traffic using Commonhead roundabout by 57%. ◆ Predicted flows on the A419 have proved to be reasonably accurate, however the prediction for the A4259 (west of the junction) was far too high. ◆ Since the construction of the flyover, journey times on the A419 have been cut by nearly 2 minutes in the AM peak, and about 1 minute at other times. ◆ Other causes of delay in the area still remain, e.g. the signals at Great Western Hospital on the A4259, and the M4 junction with A419.

3. Safety

ACCIDENT DATA COLLECTION

- 3.1 Records of personal injury accidents (PIAs) and casualties were obtained from Swindon Borough Council. The study area includes Commonhead Junction and approach roads, together with the A419 between Wheatstone Road in the north and M4 Junction 15 in the south. This is identical to the network used in the COBA assessment of accident benefits.
- 3.2 In adopting this study area, it was recognised that some accidents on the approach to M4 Junction 15 might be included, and this was considered to be valid, because changes in flows or speeds on the A419 resulting from the Commonhead improvement would be expected to influence the frequency of accidents (especially rear shunts) approaching the Junction 15 roundabout.
- 3.3 The accident records covered three complete years before the start of construction and one complete year after opening. To fully assess the safety impact of an improvement, it is usual to work with a minimum of three years' data, therefore the results given in this One Year After report should be considered provisional.

RESULTS

- 3.4 The locations of accidents occurring within the study area are shown below in Figures 3.1 and 3.2. These are differentiated by severity.

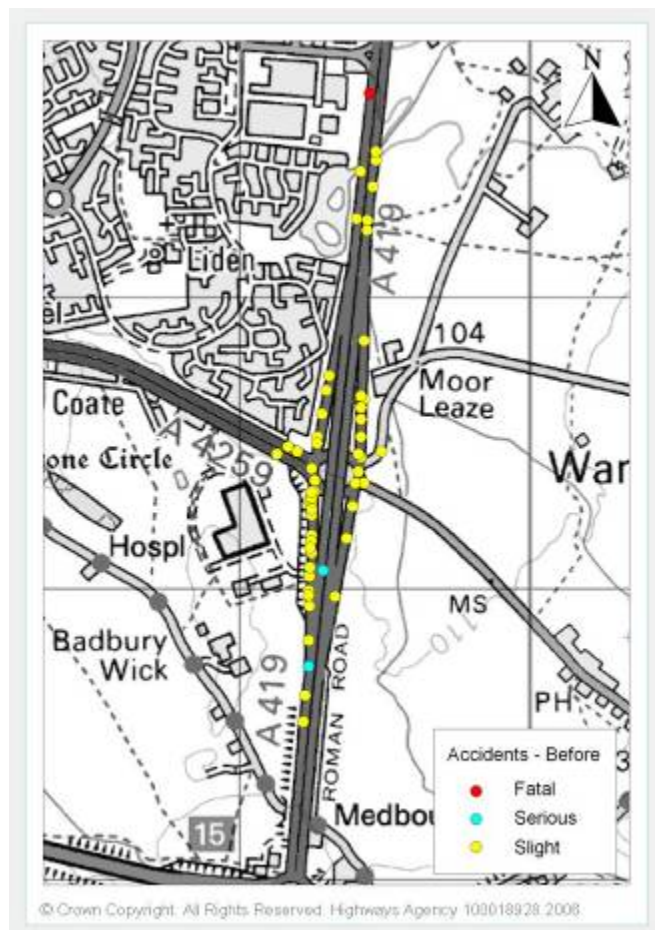


Figure 3.1 – Accidents over 3 Years ‘Before’ Scheme Construction

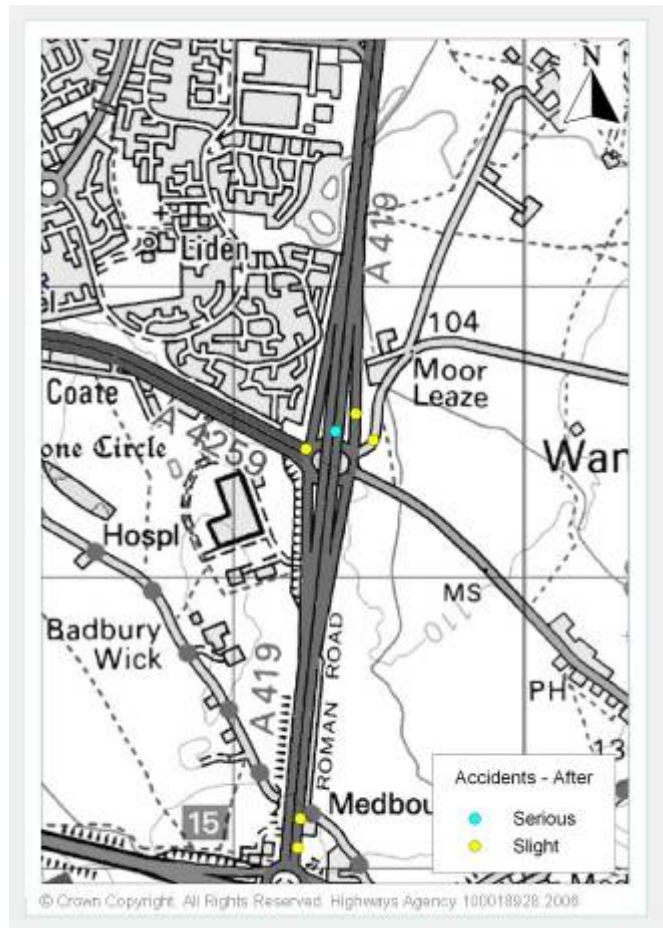


Figure 3.2 – Personal Injury Accidents during 1 Year ‘After’ Scheme Opening

3.5 Table 3.1 gives the numbers of accidents and casualties by severity. This shows that there were 62 accidents in the three years ‘Before’, equivalent to 20.7 per year. There were only 6 accidents in the year after scheme opening, a drop of 14.7 per year, or 68%.

Table 3-1 – Personal Injury Accidents and Casualties

	Accidents			Casualties		
	Before		After 1 Year	Before		After 1 Year
	3 Years	Per Year		3 Years	Per Year	
Slight	59.0	19.7	5.0	90.0	30.0	10.0
Serious	2.0	0.7	1.0	2.0	0.7	1.0
Fatal	1.0	0.3	0.0	1.0	0.3	0.0
Total	62.0	20.7	6.0	93.0	31.0	11.0
Severity Index	0.05	0.05	0.17			

3.6 The ‘severity index’ is the proportion of Serious+Fatal to Total accidents. This value is seen to have risen from 0.05 to 0.17. This need not cause concern, because the numbers of high-severity accidents are very small, and hence random variations are capable of giving large changes to this index.

3.7 In terms of casualties, the table shows that there has been a reduction from 31 per year ‘Before’ to 11 per year ‘After’, a drop of 20 per year, or 65%.

3.8 Because of the change in traffic flow, it is usual to measure accident rates in relation to vehicle-kilometres travelled. The following table derives the rate per million vehicle-kilometres (pia/mvkm), ‘Before’ and ‘After’. It is apparent that there has been an improvement from 0.400 to 0.107 pia/mvkm.

Table 3.2 – Accident Rates per Million Vehicle-Kilometers

	Accidents per year	Dist km	AADT	mvkm	pia/mvkm
Before	20.7	2.75	51,532	51.725	0.400
After	6.0	2.75	55,753	55.962	0.107

- 3.9 The observed rates may be compared with national average rates for the same type of road, as given by COBA. The average rate changes with time, but in 2007 was 0.117 pia/mvkm, for links and junctions combined, on modern dual carriageways with speed limits of 50-70 mph. The observed 'Before' rate was worse than this figure, and the 'After' rate is slightly better.
- 3.10 To assess the significance of changes in accident rates following an improvement, it is common in accident studies to use the chi-squared test. This checks whether the change in accident numbers in conjunction with changes in vehicle-kilometres travelled on a network is likely to be a real change due to the improvement, rather than random fluctuation due to chance.

Table 3-3 – Significance Testing

Total Accidents 'Before'	a	62
Total Accidents 'After'	b	6
Total Accidents 'Before'+ 'After'	c=a+b	68
Total million Vehicle-km 'Before'	d	164
Total million Vehicle-km 'After'	e	57
Total million Vehicle-km 'Before' + 'After'	f=d+e	221
Expected Accidents 'Before'	$g=c*d/f$	50.4
Expected Accidents 'After'	$h=c*e/f$	17.6
Chi Squared Test		
'Before'	$i=(a-g)^2/g$	2.67
'After'	$j=(b-h)^2/h$	7.65
Sum	$k=i+j$	10.33
Critical Value for 95% confidence (Number of Degrees of Freedom = 1, p=0.05)		3.84

- 3.11 As shown in Table 3.3, the result of the chi-squared test exceeds the critical value for the 95% confidence level, thus it is reasonable to conclude that the change in accident numbers is not a result of chance alone, and therefore it is likely that the scheme has had a direct impact on accident numbers.
- 3.12 It is of interest to discover whether any change in the nature of accidents has occurred as a result of the scheme. Therefore Table 3.4 below lists the numbers of accidents in various categories 'Before' and 'After' the Scheme.

Table 3-4 – Categorised Accidents ‘Before’ and ‘After’

Type of accident	Before		After 1 Year
	3 Years	Per Year	
Rear shunt	34.0	11.3	3.0
Single vehicle loss of control	9.0	3.0	1.0
Collision changing lane on road	8.0	2.7	0.0
Collision changing lane on roundabout	6.0	2.0	1.0
Head-on collision	1.0	0.3	0.0
Collision due to traffic signal violation	1.0	0.3	0.0
Collision while avoiding parked vehicle	1.0	0.3	0.0
Collision between vehicle & cyclist	1.0	0.3	1.0
Collision between vehicle and horse	1.0	0.3	0.0
Total	62.0	20.7	6.0

- 3.13 The largest category is the rear shunt, accounting for half of all accidents in the study area, both ‘Before’ and ‘After’. This kind of accident usually arises when vehicles travelling fast in free-flow conditions fail to slow down on the approach to a junction and collide with queued traffic. The absolute numbers have of course fallen, due to the reduction in queueing and slow-moving traffic on the approach to Commonhead junction .
- 3.14 The second-largest category was the single-vehicle accident. This has also become less frequent, because through-traffic on the A419 no longer needs to negotiate the roundabout, which may lead to loss of control. Other kinds of accident are comparatively rare. There were no accidents involving pedestrians.

Comparison with Predictions

- 3.15 Accident predictions were carried out using COBA for the economic assessment of the scheme. The following table compares the predicted and actual values for the year 2007.

Table 3-5 – Predicted and Actual Numbers of Accidents in 2007

		Do Minimum	Do Something	Saving
Predicted	Low Growth	11.4	8.6	2.8
	High Growth	11.0	8.0	3.0
Actual		20.7	6.0	14.7

- 3.16 It is clear that the annual accident rate and reduction due to the scheme were both under-predicted. Whereas COBA indicated a saving of 2.8 - 3.0 accidents, or 25%, the actual saving has been 14.7 accidents, or 68%, in the first year.
- 3.17 COBA predicted that the number of accidents saved over 60 years would be 182 (low growth) to 212 (high growth). Clearly if the accident rate observed in 2007 is maintained, the forecast accident benefits over the assessment period will be exceeded.
- 3.18 As mentioned earlier, a single year’s data is sufficient to give only a provisional indication of safety benefits. Firmer conclusions will be possible in the POPE Five Years After evaluation.

SECURITY

- 3.19 The improved lighting on the pedestrian footway and cycleway has resulted in a slight beneficial impact on security.

Main Safety Conclusions

- ◆ The number of accidents has fallen from an average of 20.7 per year to 6.0 per year, a 68% fall.
- ◆ The corresponding casualty rate has fallen from 31.0 per year to 11.0 per year.
- ◆ The reduction in stationary or slow-moving traffic approaching Commonhead Junction has lessened the risk of shunts, which had been a frequent but not a usually serious form of accident.
- ◆ The observed accident reduction in 2007 has exceeded that predicted by COBA for an identical network.

4. Economy

SCHEME COSTS

- 4.1 The actual total expenditure notified by the Highways Agency is £15.0 million. This represents the total as spent between the years 2002 and 2008. For comparative purposes, it is necessary to convert both predicted and actual costs to a common base year. In POPE studies, a 2002 base year is used. This has the effect of reducing the figures, because the bulk of the expenditure took place after 2002, since which time there has been inflation.
- 4.2 Table 4.1 below compares predicted and actual costs, at 2002 prices. The prediction is that given in the TUBA appraisal. Both discounted and undiscounted values are shown. Note that for comparison of predicted and actual costs, it is appropriate to consider undiscounted values, while for comparing costs with future benefits, the discounted values should be used.

Table 4-1 – Predicted and Actual Costs (at 2002 Prices)

	Predicted (£m)	Actual (£m)
Undiscounted	15.2	13.4
Discounted	13.7	11.9

- 4.3 The table shows that the actual cost was £13.4 million (undiscounted), and this is 13% lower than the predicted cost of £15.2 million.

Public Accounts

- 4.4 The AST shows an Indirect Tax Revenue ‘cost’ of minus £38.92m, giving a net ‘cost’ (after deducting the positive investment or construction cost) of minus £24.62m. The implication is that the revenue obtained by the government from duty on the additional fuel consumed, due to higher vehicle speeds, would be greater (nearly twice as great) as the cost of constructing the scheme. This would make the scheme self-financing.
- 4.5 The Indirect Tax Revenue figure shown in the AST is the average of the low- and high-growth values given in the TUBA outputs. This study has not evaluated indirect tax revenue, as this requires much more detailed information on all model link characteristics, which is beyond the scope of POPE.

PREDICTED AND OBSERVED BENEFITS

- 4.6 From observed data, it is possible to re-evaluate the two most important components of economic benefit, namely:
- ◆ Vehicle-time savings; and
 - ◆ Accident savings.
- 4.7 The traditional POPE methodology for re-evaluating monetary benefits relies on comparing the observed vehicle-hours saved in the opening year on the most important links, with predicted vehicle-hours saved on the same links in the same year. The proportion is then applied to the total predicted monetary benefit, to obtain a re-evaluated monetary benefit, which is sometimes referred to as the ‘actual’ benefit for short.

- 4.8 Accident benefits are treated in exactly the same way, but with observed accidents saved in the opening year replacing vehicle-hours saved.
- 4.9 In the case of this scheme, time benefits were predicted using TUBA (dated November 2004), which uses a matrix-based approach, rather than network-based, hence it is not possible to identify vehicle –time savings on specific links. Instead, the re-evaluation uses an average value of time to apply to the observed vehicle-time saving.
- 4.10 For accidents however, the prediction used COBA (dated July 2004), therefore the normal POPE methodology can be used, and is considered appropriate.
- 4.11 It may be noted that the Forecasting and Economic Appraisal Report (FEAR) incorporates the results of the TUBA and COBA runs, and is dated January 2005.

Vehicle-hours

- 4.12 Annual vehicle-hours have been measured from traffic count and journey time surveys, for all possible movements at Commonhead junction, in both the ‘Before’ and ‘After’ situations. The time saving has been calculated by a rule-of-half methodology, to conform with TUBA practice. It should be noted that the TUBA appraisal was based on a highway model with an extensive network; however it is expected that the great majority of the time savings have resulted from changes to Commonhead Junction itself. The resulting time saving has been calculated as 189,753 hours per year.
- 4.13 The following table gives the monetary benefit of this time saving, based on a value of time, capitalisation factor, and discount factor, taken from PAR 4.1d guidance. The result is £95.850 million, over 60 years. This represents a re-forecast of the benefit in the light of one-year after traffic data.

Table 4-1 – Vehicle-Time Benefits at 2002 Values

Re-forecast Time Benefits	
Vehicle Hours Saved in Opening Year	189,753
Value Of Time (VOT) per hour at 2002 prices	£12.44
Annual Time Saving at 2002 prices	£2,360,525
60-Year Capitalisation Factor	49.88
60-Year Time Saving	£117,752,440
Discount factor	0.814
Time Savings in Opening Year discounted to 2002	£1,921,468
Value of Time Benefits discounted to 2002	£95,850,486

Accidents

- 4.14 The observed accident saving, as described in the previous chapter, is 14.7 in the opening year. This is 4.9 times the predicted number of accidents saved in the same year. The predicted monetary benefit was £7.525 million over 60 years. Factoring this up by 4.9 results in a new re-evaluated benefit of £36.87 million. These figures are tabulated below.

Table 4.2 – Accident Benefits in 2002 Values

	Accidents Saved in Opening Yr	Monetary Benefit over 60 Yrs
Predicted	3.0	£7.53 m
Actual	14.7	£36.87 m

4.15 As noted in chapter 3, it is normal for accident studies to be based on a minimum of 3 years’ data, therefore the very favourable result reported here for the first year, may not be sustained.

Comparison with Predictions

4.16 The predicted and observed benefits are shown in the following table. The predictions are those given in the Forecasting and Economic Assessment Report, and are based on TUBA for travel time and COBA for accidents.

Table 4-2 Predicted and Observed Benefits at 2002 Values

	Benefits (£ million)	
	Predicted	Observed
Travel Time	61.41	95.85
Accidents	7.53	36.87
Combined	68.93	132.72

4.17 The combined benefit is £132.72 million, which is nearly double that predicted. Note that vehicle operating costs have not been evaluated, and are excluded from the above table.

Value for Money

4.18 A scheme’s value is assessed by the Benefit Cost Ratio (BCR), obtained by dividing the Present Value of Benefits (PVB) by the Present Value of Costs (PVC). The predicted BCR was 4.7; however this was based on benefits and costs that included items other than those evaluated here.

4.19 The following table is based on the items evaluated in POPE, namely discounted construction cost, travel time benefit and accident benefit. Indirect tax revenue is not included.

Table 4-3 - Predicted and Observed Costs and Benefits (£m)

	Predicted	Observed
Cost	13.66	11.88
Benefit	68.93	132.72
BCR	5.04	11.17

4.20 It can be seen that the combination of lower-than-expected cost, and higher-than-expected benefit, has resulted in a BCR of 11.17, which is more favourable than predicted.

Table 4-4 - Predicted and Observed Costs and Benefits (£m)

	Predicted	Observed
Cost	13.66	11.88
Benefit	68.93	132.72
BCR	5.04	11.17

RELIABILITY

4.21 The scheme forecasting stated that Reliability would be improved by A419 through traffic experiencing free flow conditions, and turning traffic experiencing reduced congestion at Commonhead roundabout. Chapter 2 showed that these predictions have been fulfilled, therefore it is considered that Reliability has improved.

4.22 A quantitative measure of Reliability is provided by Route Stress. This is appropriate for appraising links between junctions, and is essentially a measure of volume: capacity, where values between 75% and 125% are considered to be related to Reliability. The scheme forecasting did not refer to Route Stress, doubtless because this is a junction improvement, therefore no attempt is made to calculate it here.

WIDER ECONOMIC IMPACT

4.23 The scheme does not fall within a designated regeneration priority area. For this reason the scheme forecasting considered that the impact of the scheme on Wider Economic Impact was not applicable.

4.24 However, in Swindon town centre, an urban regeneration company (The New Swindon Company) has been established to promote comprehensive regeneration. The effect of Commonhead junction improvement on the town centre is likely to be slight.

4.25 There is much other existing industrial and commercial business in Swindon, e.g. the Honda motor works, situated near the A419 approximately 5 km north of Commonhead. Such business stands to benefit from the reduced congestion on the A419 at Commonhead. Therefore it is considered the impact has been beneficial.

Main Economy Conclusions
<ul style="list-style-type: none"> ◆ The actual construction cost of £13.4 million (undiscounted) is 13% lower than predicted. ◆ The travel time saving in the first year has been 189,753 hours, and this corresponds to a benefit of £95.85 million over 60 years, assuming an average value of time. ◆ The accident saving in the first year has been 14.7, and this corresponds to a benefit of £36.87 million over 60 years. ◆ The Benefit Cost Ratio, based on these figures, is 11.17, compared with 5.04 predicted for combined time and accident benefits.

5. Environmental Summary

- 5.1 An evaluation of this scheme's impacts is given in Annex D at the end of the report. This chapter presents a brief summary.

Data Collection

- 5.2 Background information has been provided by the Employer's Agent, including that summarised in Table 5.1. The following list includes all of the documents used in the preparation of the assessment of the Environment Objective of the POPE report.

Table 5.1 – Summary of background information provided

Information requested	Comments
As Built drawings for landscape, ecological mitigation measures, drainage, fencing, earthworks etc preferable electronically or on CD	As Built drawings provided on CD by Employer's Agent
Copies of the Landscape and Ecology Handover Environmental Management Plan (HEMP)	Draft HEMP included as part of the Health and Safety File, which was provided on a CD
Contact names for consultation. Additional list of interested parties to be consulted	No specific contact names available.
Archaeology report	Hart, J. & Alexander, M. (2007) Bronze Age Activity and a Medieval Hollow-way at the A419 Commonhead Junction, Swindon. Cotswold Archaeology. Report provided by the Employer's Agent.
Part 1 Claims	Information requested from HA but not provided
Any post opening survey or monitoring e.g. for ecology, water quality	Information contained in the Draft HEMP

Site Visit

- 5.3 A site visit was undertaken on 23rd October 2008 which allowed the scheme to be viewed from the highway, adjacent local roads and from other publicly accessible areas, for example, footpaths.

Consultation

- 5.4 As part of the POPE evaluation process we have consulted with the Statutory Bodies; Natural England, English Heritage and The Environment Agency; as well as Swindon Borough Council, regarding their views on the local impacts of the scheme on the environmental resources in the area surrounding the route. The consultees were also

asked to comment on whether, in their opinion, the mitigation measures implemented have been effective.

- 5.5 Table 5.2 shows which organisations were contacted during the compilation of this report, their field of interest, and the responses received. A summary of their comments (or lack of them) is included within each relevant topic in this environment section of the POPE report.

Table 5.2 – Summary of POPE-Environment Consultation Responses

Organisation	Field of Interest	Response Received	
		Answered requested list of questions	Comments
Natural England	Landscape and Biodiversity	No	NE was unable to respond to any of the questions with the information it currently has. It suggested submitting detailed ecological monitoring and survey information for its consideration.
English Heritage	Heritage	No	No response
Environment Agency	Water	No	EA commented on the water quality of Liden Brook.
Swindon Borough Council	General	No	Commented on built heritage.

ENVIRONMENT

Traffic growth

- 5.6 Two of the environmental parameters noise and local air quality are directly related to traffic flows and their assumed growth until the Design Year. No new modelling has been undertaken as part of this study. An assumption has been made that the level of traffic and the level of traffic noise or local air quality associated with that traffic are directly related. Therefore, if the observed level of traffic is as forecast it could be assumed that the traffic noise and local air quality impacts are as expected.
- 5.7 The ES stated that this section of the A419 carried an approximate daily traffic total of 52,000 prior to opening and was anticipated to increase to approximately 58,000 by 2008 (proposed opening year of the scheme) and up to approximately 66,000 by 2023 (15 years after the proposed opening of the scheme).
- 5.8 The predicted and actual traffic flows are summarised in Table 2-1 in Chapter 2 of this report. The predicted traffic flow north of the scheme on in the A419 was 54,200 AADT and south of the scheme was 58,800 AADT. The actual traffic flow in 2008 was 53,900 AADT north of the scheme on in the A419 and south of the scheme was 56,600 AADT. The predicted traffic flows north of the scheme are very close to those predicted but slightly less. South of the scheme the actual traffic flows are 5% less than predicted. Therefore, for environmental evaluation purposes, it may be assumed that traffic flow is generally as expected.

Noise

Summary of Predicted Impacts

- 5.9 Table 5.3 contains a summary of the impacts predicted in the AST and the ES of the scheme on the Noise sub-objective.

Table 5.3 – Summary of predicted effects on the Noise Sub-Objective

Origin of Assessment	Summary of Predicted Effect	Assessment
AST	Overall improvement due to the scheme. Mitigation measures have been designed to reduce impacts wherever possible. Perceptible increase of less than 3dB only at the hospital. Without scheme 113 people annoyed but a decrease with scheme when 100 people would be annoyed; 13 less.	Benefit
ES	Out of over 300 houses in the study area, it has been found that almost 130 houses would experience at least a perceptible 1dB decrease in noise between 2008 with the existing road layout and the scheme in 2023. Of these, over 3 would be slight (3 to 5dB) decreases and another 7 would benefit from moderate or substantial decreases (more than 5dB) in noise. At the same time, no houses would experience a perceptible increase in noise, and it is expected that no dwellings would be likely to qualify for noise insulation.	Slight benefit

Consultation

5.10 None of the consultees commented on noise related issues.

Predicted effects, their mitigation, and the one-year-after evaluation

5.11 The evaluation of the Noise sub-objective is related to the predicted traffic flow rate compared to the observed traffic flow rate. No new modelling or noise monitoring was conducted as part of this assessment.

Key Findings

- 5.12 The ES and AST both predicted the scheme to have a beneficial effect on the Noise sub-objective.
- 5.13 The mitigation in form of noise barriers and low noise road surface have been constructed as proposed in the ES.
- 5.14 The traffic flow on the scheme is as predicted in the ES.
- 5.15 Based on mitigation measures only it is considered that the scheme is likely to have had a beneficial effect on the Noise sub-objective as expected in the ES.

Air Quality

Summary of Predicted Impacts

5.16 Table 5.4 contains a summary of the impacts predicted in the AST and the ES of the scheme on the Air Quality sub-objective.

Table 5.4 – Summary of predicted effects on the Air Quality Sub-Objective

Origin of Assessment	Summary of Predicted Effect	Assessment
AST	Does not affect an AQMA. No predicted exceedances of the objective. No significant increases in PM10 concentrations or NO ₂ concentration. 260 properties with an improvement, 0 properties with a deterioration	Benefit
ES	The scheme would result in an overall improvement in local air quality due to reduced congestion and improved traffic flow. An estimated 260 properties would experience better local air quality.	Slight benefit

Consultation

5.17 None of the consultees commented on air quality related issues.

Predicted effects, their mitigation, and the one-year-after evaluation

5.18 The evaluation of the Air Quality sub-objective is related to the predicted traffic flow rate compared to the observed traffic flow rate. No new air quality monitoring or modelling was conducted as part of this assessment.

5.19 In terms of proposed mitigation in the ES, the scheme itself was predicted to reduce congestion at Commonhead Junction and thus improve air quality in the local area. No other specific mitigation was proposed. Key Findings

5.20 The ES and AST both predicted that the scheme would have a beneficial effect on the Air Quality.

5.21 The scheme was predicted to result in an overall improvement in local air quality due to reduced congestion and improved traffic flow.

5.22 Since the traffic flows are as expected in the ES and congestion has reduced it is considered that the scheme is likely to have had a beneficial effect on the Air Quality sub-objective as expected in the ES.

Greenhouse Gases

5.23 The AST predicted an increase in greenhouse gas emissions due to faster speeds on the main carriageway. The ES quantified this as an extra 800 tonnes of carbon dioxide per year. This would be the equivalent of 218 tonnes of carbon.

5.24 This POPE evaluation has calculated the change in tonnes of carbon emitted in accordance with the DMRB method, which takes into account actual vehicle flows, speeds, and HGV proportion. The following table shows the results.

5.25 In fact a speed increase within the range observed has the effect of reducing carbon emission in the area. The observed traffic data indicates a reduction of 1,142 tonnes of carbon in the opening year, compared with a predicted increase of 218 tonnes.

Table 5.5 Change in Carbon Emission in Opening Year

	Tonnes of Carbon	
	Predicted	Observed
Do-Minimum	-	2,720
Do-Something	-	1,578
Change	+218	-1,142

5.26 The table has not attempted to show predicted emissions using the DMRMB method, because not all the inputs can be replicated from the available data. Instead prediction from the ES has been inserted.

Landscape

Summary of Predicted Impacts

5.27 Table 5.6 contains a summary of the impacts predicted in the AST and the ES of the scheme on the Landscape sub-objective.

Table 5.6– Summary of predicted effects on the Landscape Sub-Objective

Origin of Assessment	Summary of Predicted Effect	Assessment
AST	The scheme would be constructed within the highway boundary, although land would be required for the construction of noise mitigation. The central reserve and roundabout tree belts which would be reduced make an important contribution in defining the urban edge alongside the North Wessex Downs AONB. Supplementary and replacement planting would reduce the impact.	Slight adverse
ES	The overall landscape residual impacts during operation was predicted as being slight adverse because the Wanborough Vale landscape area, which is partly within the North Wessex Downs Area of Outstanding Natural Beauty (AONB) and in an Area of Local Landscape Importance (ALLI), would be slightly adversely affected. However, the majority of other landscape character types would not be affected by the proposals. 15 years after opening approximately 231 of the properties assessed would have no change in their views, and 249 properties would experience some increased intrusion into their views. The scheme would result in the loss of an estimated 3ha of existing vegetation, and 2ha of planting would be provided. On balance the scheme would be slightly more intrusive in both landscape and visual terms.	Slight adverse

Consultation

5.28 Natural England (NE) was unable to respond to any of the questions with the information it currently has. Only a detailed monitoring and survey project aimed at comparing the original expected impacts and proposed mitigation strategies with what is actually occurring on the ground now, would enable NE to look into the query. To its knowledge no such survey or monitoring has been submitted to NE.

Predicted effects, their mitigation, and the one-year-after evaluation

5.29 In the ES the impacts of the scheme, have been assessed according to the Local Landscape Character Areas (LCA). The impacts on character and quality were assessed together to give an overall landscape impact. The impacts were assessed both at opening year and at design year (15 years after opening).

Key Findings

- 5.30 The ES and AST both predicted that the scheme would have a slight adverse effect on the Landscape sub-objective.
- 5.31 The scheme would cause a slight adverse effect of the adjacent North Wessex Downs Area of Outstanding Natural Beauty (AONB) and Area of Local Landscape Importance (ALLI).
- 5.32 The effect on Wanborough Vale Character Area to the east is considered to be a slight adverse effect, as predicted in the ES. The scheme will remain visible from receptors to the east, in the direction of Liddington and Wanborough. However, as the planting on the embankments matures most of the carriageway should be screened, with the exception of the underpasses which are likely to remain visible at design year. The embankment has been planted as predicted in the ES but the embankment itself will remain as a visible feature in the landscape.
- 5.33 The effect of the scheme on the Coate Urban Fringe to the west is considered to be neutral as predicted in the ES.
- 5.34 The effect of the scheme on the Liden Urban Residential Area Character Area and The Great Western Hospital is considered to be neutral as predicted in the ES due to planting that has been carried out as proposed. There will remain a slight overall adverse visual effect on properties in Moor Leaze and Liden due to the presence of the embankment, as predicted in the ES. The neutral visual impact is dependant on successful establishment of the landscape planting, which should be assessed during the five year after report.
- 5.35 Overall, it is considered that the scheme has a slight adverse effect on the Landscape sub-objective as expected in the ES.

Biodiversity

Summary of Predicted Impacts

- 5.36 Table 5.7 contains a summary of the impacts predicted in the AST and the ES of the scheme on the Biodiversity sub-objective.

Table 5.7 – Summary of predicted effects on the Biodiversity sub-objective

Origin of Assessment	Summary of Predicted Effect	Assessment
AST	Habitat loss of scrub woodland within the existing highway boundary can not be fully mitigated. Higher traffic speeds would result in higher incidental mortality of animals attempting to cross the A419. However there is little evidence of wildlife currently crossing the A419.	Slight adverse
ES	Liden Brook is part of the River Cole Site of Nature Conservation Interest. Evidence of breeding birds and Otter has been found locally. Although vegetation in the existing central reserves would be removed, replacement planting would be provided where possible and the overall effect would be minor. The overall impact of the scheme on ecological features has been considered to be slight adverse, given the degree of habitat loss and the opportunities for mitigation and enhancement.	Slight adverse

Consultation

- 5.37 Natural England (NE) was unable to respond to any of the questions with the information it currently has. Only a detailed monitoring and survey project aimed at comparing the original expected impacts and proposed mitigation strategies with what is actually occurring

on the ground now, would enable NE to look into the query. To its knowledge no such survey or monitoring has been submitted to Natural England.

5.38 The Employer’s Agent stated that ‘Bird and bat boxes were installed to the west side of the Liden bund acoustic fence to prevent headlights disturbing nesting species. Also, we do not believe that any boxes were installed along the Liden Brook. To our knowledge no agreement was arranged for these additional boxes, and certainly we have not installed them.’

Key Findings

5.39 The ES and AST both predicted that the scheme would have a slight adverse effect on the Biodiversity sub-objective.

5.40 As it was before the junction improvement the Liden Brook /River Cole SNCI is bisected by the scheme. The attenuation ditch structure has been constructed as proposed in the ES and it is likely that there is a neutral effect on the water quality of the SNCI as expected in the ES. Water quality monitoring results would be required to confirm this.

5.41 Mitigation measures have been incorporated into the scheme as expected and it is likely that the impacts on biodiversity are as expected.

5.42 No additional bird and bat boxes have been provided off-site (which would have been by additional agreement, if possible).

5.43 No monitoring information or animal mortality data has been made available for this report and it is suggested that these aspects are reviewed as part of the five year after report.

5.44 No evidence of an ecological monitoring plan for any species or habitat has been provided during this assessment. Ecological monitoring work should be conducted on site and the results used to inform the long term management plan and the HEMP which should include a plan for all protected species recorded on site.

5.45 It is considered that the scheme has a slight adverse effect on the Biodiversity sub-objective as expected in the ES.

Heritage

Summary of Predicted Impacts

5.46 Table 5.8 contains a summary of the impacts predicted in the AST and the ES of the scheme on the Heritage sub-objective.

Table 5.8 – Summary of predicted effects on the Heritage Sub-Objective

Origin of Assessment	Summary of Predicted Effect	Assessment
AST	The scheme may result in the disturbance of a Roman road, if it survives, and would have a minor detrimental effect on the rural historic landscape. These are considered to be slight adverse impacts of minor significance. There would be a slight adverse impact of minor significance on the setting of Liddington Castle, this would reduce to a neutral impact of neutral significance after 15 years.	Slight adverse

ES	There is the possibility that remains of a Roman road exist in the roundabout area and this would be investigated prior to construction. The proposed construction compound would be sited on an area of land adjacent to the roundabout where archaeological remains are unlikely. As the scheme is contained within the existing road corridor, the overall impact would be minor.	Slight adverse
----	--	----------------

Consultation

- 5.47 Swindon Borough Council commented that Swindon Borough Council commented that the impact on those heritage assets identified in the ES was, as predicted, neutral.
- 5.48 The archaeologist who conducted the on-site archaeological investigations explained that two trenches were excavated along the predicted location of the Roman Road. Whilst the route way was located there was no evidence found of the Roman Road surface. A medieval surface was found on the same alignment as well as a shallow ditch containing Bronze Age pottery. An excavation report was submitted to the Highways Agency. An article is expected to be published in 2009 in The Wiltshire Archaeological and Natural History Magazine titled 'Bronze Age Activity and a Medieval Hollow-way, A419 Commonhead Junction'.

Key findings

- 5.49 The ES and AST both predicted that the scheme would have a slight adverse effect on the Heritage sub-objective.
- 5.50 A total of six sites of archaeological significance were identified during Stage 1 & 2 assessments within an approximate 200m radius around Commonhead junction. A further eight archaeological sites were identified in the wider vicinity. These comprise of four prehistoric sites, six Roman sites, one medieval site, two post-medieval sites and undated human burial. There are no listed buildings, conservation areas or historic landscape features within the existing highway boundary.
- 5.51 The Roman Road had already been reduced to a negligible surface before the addition of a Medieval road surface. Therefore, it is likely that the effect of the scheme are considered to be slightly adverse as expected in the ES.
- 5.52 A shallow ditch containing Bronze Age pottery was found. It is likely that the effect on Bronze Age features is neutral as expected in the ES.
- 5.53 The visibility of the scheme from Liddington Castle SAM was not assessed. It is assumed that there is a slight adverse effect as predicted. The five year after should assess if the planting has reduced the effect to neutral after 15 years.
- 5.54 The visibility of the scheme from the 12 listed buildings was not assessed during the site visit. Swindon Borough Council have commented that the effect on the majority of listed buildings is likely to neutral as expected in the ES.
- 5.55 The historic hedgerow on the east of the southbound carriageway south of Commonhead junction has been retained and new planting has extended the length of the hedgerow north to the junction to join other existing hedgerows and vegetation unaffected by the scheme. The historic hedgerow in the centre of the roundabout island was removed therefore the effect is considered to be slightly adverse as expected in the ES.
- 5.56 A copy of the archaeological evaluation report was requested but was not made available during this assessment. This report and the article to be published in 2009 in The Wiltshire Archaeological and Natural History Magazine should be reviewed during the five year after assessment.

Water

Summary of Predicted Impacts

- 5.57 Table 5.9 contains a summary of the impacts predicted in the AST and the ES of the scheme on the Water sub-objective.

Table 5.9 – Summary of predicted effects on the Water Sub-Objective

Origin of Assessment	Summary of Predicted Effect	Assessment
AST	Features and elements present in the water environment are typical of the locality and the scheme will have negligible impacts on the surface and ground water quality and flows.	Neutral
ES	Greater protection for Liden Brook and Liden attenuation pond would be provided through the construction of an attenuation control structure on the main drainage ditch. In addition to Liden Brook there is a minor groundwater aquifer. New road drainage would minimise the effects on surface and groundwater quality and provide greater protection of the water environment.	Neutral

Consultation

- 5.58 The Environment Agency (EA) sample results indicate that there has not been a significant change in water quality within Liden Brook since the completion of the scheme. However, it should be noted that the EA only have six months of water quality data post February 2007 and so cannot state definitively whether the scheme has had a long term impact on Liden Brook.

Key Findings

- 5.59 The ES and AST both predicted that the scheme would have a neutral effect on the Water sub-objective.
- 5.60 The Environment Agency (EA) sample results indicate that there has not been a significant change in water quality within Liden Brook since the completion of the scheme. However, it should be noted that the EA only have six months of water quality data post February 2007 and so cannot state definitively whether the scheme has had a long term impact on Liden Brook. It is recommended that this aspect is reviewed in the five year after report.
- 5.61 Greater protection for the Liden Brook and Liden attenuation pond than pre-existed has been provided by the attenuation drainage ditch to the east of the southbound slip road to the north of the junction.
- 5.62 Mitigation measures including attenuation drainage ditch and highways drainage have been incorporated into the scheme as expected. There is no evidence to suggest they are operating other than as expected.
- 5.63 It is considered that the effect of the scheme on the Water sub-objective is neutral as expected in the ES.

Physical Fitness

Summary of Predicted Impacts

- 5.64 Table 5.10 contains a summary of the impacts predicted in the AST and the ES of the scheme on the Physical Fitness sub-objective.

Table 5.10 – Summary of predicted effects on the Physical Fitness Sub-Objective

Origin of Assessment	Summary of Predicted Effect	Assessment
AST	Existing cyclist and pedestrian movements at the junction are small in number, the provision of a crossing could facilitate increased movements in the future.	Slight benefit
ES	No rights of way would be directly affected by the scheme. The scheme would improve access across the trunk road for pedestrians and cyclists	Slight benefit

Consultation

5.65 None of the consultees commented on physical fitness related issues.

Key Findings

5.66 The ES and AST both predicted that the scheme would have a slightly beneficial effect on the Physical Fitness sub-objective.

5.67 None of the four PRow adjacent to the scheme have been affected by the scheme and the effect of the scheme on PRow is considered to be neutral as expected in the ES.

5.68 The inclusion of the signalised crossing has reduced east-west severance caused by the A419.

5.69 It is considered that the scheme is likely to have had a slightly beneficial impact on Physical Fitness as expected in the ES.

Journey Ambience

Summary of Predicted Impacts

5.70 Table 5.11 contains a summary of the impacts predicted in the AST and the ES of the scheme on the Journey Ambience sub-objective.

Table 5.11 – Summary of predicted effects on the Journey Ambience sub-objective

Origin of Assessment	Summary of Predicted Effect	Assessment
AST	One layby will be closed but suitable substitute facilities are available. There would be reduced driver frustration for over 40,000 daily movements.	Large benefit
ES	The scheme would have no significant adverse impact on vehicle traveller views. There would be a slight adverse impact in relation to the closure of one lay-by on the south-bound carriageway, this is considered to be of negligible significance due to the availability of alternative facilities. Overall, the scheme would have beneficial impact in relation to the reduction of driver stress.	Benefit

Consultation

5.71 None of the consultees commented on journey ambience related issues.

Key Findings

5.72 The AST predicted that the scheme would have a large beneficial effect on the Journey Ambience sub-objective. The ES predicted that the scheme would have a beneficial effect on the Journey Ambience sub-objective.

- 5.73 The view from the road remains largely unaffected by the scheme. There has been some additional planting but this has been to fill gaps in existing planting to create a continuous band of vegetation along the carriageway where possible. The carriageway on embankment has more open views to the east but views to the west are restricted by the environmental barriers. It is considered that the effect of the scheme on views from the road is neutral as expected in the ES.
- 5.74 Overall, the scheme is considered to have had beneficial impacts in relation to the reduction of driver stress. The removal of the roundabout has reduced congestion and improved safety. It is considered that the effect of the scheme on driver stress is beneficial as expected in the ES.
- 5.75 One lay-by has been closed as a result of the scheme but this was predicted to have a negligible impact on traveller care. The impact on traveller care due to the closure of the lay-by should be considered during the five year after report.

Main Environmental Conclusions

- ◆ Based on traffic flows and mitigation measures only it is considered that the scheme is likely to have had a beneficial effect on the Noise sub-objective as expected.
- ◆ Since the traffic flows are as expected in the ES and congestion has reduced it is considered that the scheme is likely to have had a beneficial effect on the Air Quality sub-objective as expected. Greenhouse gas emissions have decreased as a result of the improved vehicle flow.
- ◆ There is slight overall adverse visual effect due to the presence of the embankment in the landscape, as predicted in the ES. The visual impact is dependent on successful establishment of the landscape planting, which should be assessed during the five year after report. Overall, it is considered that the scheme has a slight adverse effect on the Landscape sub-objective as expected.
- ◆ Mitigation measures for biodiversity have been incorporated into the scheme as expected and it is likely that the impacts on biodiversity are slightly adverse as expected in the ES. However, no additional bird and bat boxes have been provided off-site. Overall, it is considered that the effect of the scheme on the Biodiversity sub-objective effect is as expected.
- ◆ The visibility of the scheme from Liddington Castle SAM or from the 12 listed buildings was not assessed during the site visit. The effect on these buildings should be considered during the five year after study. The effect of the scheme on the Heritage sub-objective is likely to have been slightly adverse as expected.
- ◆ Greater protection for the Liden Brook and Liden attenuation pond than pre-existed has been provided by the attenuation drainage ditch to the east of the southbound slip road to the north of the junction. The effect of the scheme on the Water sub-objective is neutral as expected.
- ◆ The inclusion of the signalised crossing has reduced east-west severance caused by the A419. The scheme is likely to have had a slightly beneficial impact on Physical Fitness as expected.
- ◆ One lay-by has been closed as a result of the scheme but this was predicted to have a negligible impact on traveller care. The impact on traveller care due to the closure of the lay-by should be considered during the five year after report. If the effect of the lay-by closure has been negligible as predicted in the ES then overall the scheme is likely to have had a beneficial impact on Journey Ambience as expected.

6. Accessibility & Integration

ACCESSIBILITY

Option Values

- 6.1 Option values is concerned with the availability of transport options, which may not be routinely used by a traveller, but which may be used in unexpected circumstances. The Appraisal stated that the scheme did not introduce any new transport options, nor preclude any existing options, therefore the sub-objective was not applicable.
- 6.2 The present evaluation is that the scheme has had a neutral effect on option values.

Severance

- 6.3 Severance is concerned with the obstruction to movement by non-motorised travellers, in particular pedestrians. The Appraisal predicted that the removal of a substantial volume of traffic from the surface roundabout, where pedestrians cross, and the improved pedestrian crossing facilities, would have a slightly reduce severance.
- 6.4 None of the four public rights of way adjacent to the scheme has been obstructed or diverted. The present evaluation is that the scheme has slightly beneficial effect on severance, as a result of the reduction in traffic at the signalised pedestrian crossing (See Figures 6.1 and 6.2).



Figure 6.1 – Signals on Slip Road



Figure 6.2 – Footpath & Cycleway

Access to Transport System

- 6.5 This sub-objective relates to access to modes of transport other than car. The Appraisal stated that as the scheme had no effect on alternative modes of transport, the impact would be neutral.
- 6.6 The present evaluation is that the scheme has had a neutral effect on access to transport system.

INTEGRATION

Transport Interchange

- 6.7 This sub-objective considers access to car and to the public transport system. The Appraisal for this scheme did not include transport interchange, other than an entry in the AST stating 'None'.
- 6.8 Swindon's railway and bus stations are situated in the town centre, about 6 km west of Commonhead. Therefore the scheme cannot be expected to have much relevance to these facilities, other than by a reduction in vehicle journey times in the east-west direction across the roundabout. Chapter 2 showed that average journey time savings between the A4259 and B4192 were less than a minute, and time savings from Pack Hill were negligible. Therefore it is not considered that the accessibility of the railway or bus stations has been substantially affected.
- 6.9 Local bus services are provided by Thamesdown and Stagecoach companies. The operations managers of both providers were consulted over the effects of the scheme.
- 6.10 The Thamesdown operations manager responded as follows:
- ◆ The hourly service (no. 46/ 47/ 48) crossing Commonhead roundabout in the east-west direction has not experienced any change due to the junction improvement; and
 - ◆ Traffic flow on the A4259 west of Commonhead has become continuous, whereas formerly it was broken up by the traffic signals at the junction. This has made it more difficult for buses to gain access to the A4259 from Great Western Hospital and from the B4006 at Coate Water roundabout. As a result the service (no.16) between Swindon and the hospital has become less reliable. It is also one of the reasons for an increase of 10 minutes in the scheduled time for the service (no. 13/ 14) between Eldene and Haydon Wick.
- 6.11 The Stagecoach operations manager commented:
- ◆ The hourly service between Swindon and Marlborough has experienced a significant improvement in reliability owing to the smoother traffic flow in the morning and afternoon peaks. Although the timetable has not been changed, there is now little, if any, disruption to bus services.

Land Use Policy

- 6.12 The scheme is on the margin of the North Wessex Downs Area of Outstanding Natural Beauty (AONB), designated under the National Parks and Access to the Countryside Act of 1949. Development is restricted within AONBs. Although the scheme has not taken land from the designated area, it is visible from part of it. Visual intrusion was considered in Chapter 5, and was judged to have a slight adverse impact.
- 6.13 *The Wiltshire Structure Plan*, adopted January 2001, includes transport Policy T10 stating: "Local Highway Authorities in conjunction with the Highways Agency will seek to develop and improve the highway network in accordance with a functional hierarchy of Roads, defined by their relative importance to long distance travel: - 1) national primary routes including the A419....."
- 6.14 Alteration 9 to the Structure Plan, intended to extend its duration to 2016, states "The following trunk road schemes are proposed for construction: 1) Commonhead Roundabout Overpass....."

A419 COMMONHEAD JUNCTION IMPROVEMENT – ONE YEAR AFTER

- 6.15 A key objective of Structure Plan policies is to encourage the growth and development of Swindon, as one of the key Principal Urban Areas (PUAs) in the region, as defined by Regional Planning Guidance (RPG10).
- 6.16 *The Swindon Borough Local Plan*, adopted July 2006, contains Policy T11, safeguarding land for A419(T) Blunsdon Bypass. The justification also refers to a grade-separated Junction at Commonhead as part of the A419 Blunsdon Study. Policy T4 reserved land for park and ride proposals at Commonhead adjacent to the Great Western Hospital. Policy DS3 provided for comprehensive major development at Coate (situated off the A4259 about 1 km west of Commonhead). Proposals included:
- ◆ A 60 ha university campus;
 - ◆ Approximately 1800 houses;
 - ◆ An extension to the Great Western Hospital; and
 - ◆ 35 ha of Class B1 uses linked to the university campus.
- 6.17 The following additional proposed developments in the Local Plan, although not directly affected by the scheme, would benefit from reduced congestion on the A419, and resulting perceived improvements to accessibility.
- ◆ Dorcan (about 2 km north of Commonhead); and
 - ◆ South Marston Airfield (about 5 km north of Commonhead).
- 6.18 Local Plan Policy DS2 allocated two further large areas of land as Strategic Development Areas.
- 6.19 A key component of the Local Plan is the regeneration of Swindon town centre. An urban regeneration company (The New Swindon Company) has been established to achieve the comprehensive regeneration of Swindon's central area.
- 6.20 Thus both Structure and Local Plans provided for the Commonhead junction scheme. It was seen as supporting their broad economic development policies.

Other Government Policies

- 6.21 Regional Planning Guidance for the South West (RPG 10) aims to maintain and enhance the prosperity of the northern sub-region (containing Swindon), and to concentrate new development in Principal Urban Areas to achieve sustainable development by reducing the need to commute by car. Swindon is identified as a major growth centre, and recognises the need for investment in public transport and other infrastructure to support this growth.
- 6.22 As part of RPG 10, the South West Regional Transport Strategy, in Policy TRAN4, lists improvements to the A419 among the schemes needed to encourage sustainable transport within and between the Principal Urban Areas.
- 6.23 The second South West Regional Economic Strategy 2003-2012 was produced by the South West of England Regional Development Agency (2003), and stated that regeneration activity should be focussed in the areas of greatest need, including the Swindon urban regeneration company area. Strategic Action 3.1 gives priority to improving the region's transport network, and includes support for the strategic transport projects (identified in the Regional Transport Strategy) and for transport improvements around the Principal Urban Areas.
- 6.24 The London to South West and South Wales Multi Modal Study, 2002 (SWARMMS) designated Swindon as a Principal Urban Area, in the London to Bristol Corridor. To ease

congestion on the A419, it recommended grade separation of Commonhead junction, and the construction of a new bypass at Blunsdon.

6.25 The A419 Commonhead junction improvement is thus in accord with government policies for transport and economic growth.

Main Accessibility and Integration Conclusions

- ◆ Severance has improved due to the reduction in traffic passing the signalised pedestrian crossing.
- ◆ The reliability of bus services using the A419 is reported to have improved due to the smoother flow of traffic in the morning and afternoon peaks. However the reliability of bus services using the A4259 is reported to have deteriorated due to the continuous flow of traffic to/ from Commonhead, in contrast to the previous situation where it was broken by traffic signals.
- ◆ Improvements to the A419 were proposed in the Regional Transport Strategy and the SWARMMS study. The Commonhead scheme featured in the Wiltshire Structure Plan and the Swindon Borough Local Plan, and was seen as benefiting proposed developments.

7. Appraisal Summary Table

- 7.1 An appraisal Summary Table (AST) is a one-page summary of the main economic, environmental, and social impacts of a major road scheme. The AST for Commonhead (December 2004 version) is reproduced as Table 6.1.
- 7.2 The 'Evaluation Summary Table' (EST) has been devised for the POPE process to summarise actual scheme impacts. Where possible the EST mirrors the appearance and process of the AST, to permit comparison between the two. The EST for Commonhead is given in Table 7.2.
- 7.3 The following table lists the scheme objectives and the corresponding text sections in this report.

Table 7.1 – Scheme Objectives and Sub-Objectives

Objective	Sub-Objective	Text Section
Environment	Noise	5.9
	Local Air Quality	5.16
	Greenhouse Gases	5.23
	Landscape & Townscape	5.27
	Heritage of Historic Resources	5.45
	Biodiversity	5.36
	Water Environment	5.56
	Physical Fitness	5.63
	Journey Ambience	5.69
Safety	Accidents	3.1
	Security	3.17
Economy	Public Accounts	4.1
	Business Users and Transport Providers	4.6
	Consumers	4.6
	Reliability	4.18
	Wider Economic Impacts	4.2
Accessibility	Option Values	6.1
	Severance	6.3
	Access to Transport System	6.5
Integration	Transport Interchange	6.7
	Land Use Policy	6.12
	Other Government Policies	6.21

Table 7-1 – Appraisal Summary Table (AST) dated December 2004

Option: A419 Commonhead Junction Improvement		Description: Grade separated junction with a new free flowing A419 passing over existing roundabout	Problems: High level of congestion particularly at peak times and high accident rate on junction approaches	Scheme Cost: £16.10m
OBJECTIVE	SUB-OBJECTIVE	QUALITATIVE IMPACTS	QUANTITATIVE ASSESSMENT	ASSESSMENT
ENVIRONMENTAL IMPACT	Noise	Overall improvement due to the scheme. Mitigation measures have been designed to reduce impacts wherever possible. Perceptible increase of less than 3dB only at the hospital.	Do minimum 113 people annoyed Do something 100 people annoyed	Estimated population annoyed by noise – 13 people less
	Local air quality	Does not affect an AQMA. No predicted exceedences of the objective. No significant increases in PM ₁₀ concentrations or NO ₂ concentration.	260 properties with an improvement, 0 properties with a deterioration	PM ₁₀ = -83.7 NO ₂ = -2252.9
	Greenhouse Gases	Increase due to an increase in speed on the main carriageway	Neutral (0.35% increase in Swindon)	768 tonnes CO ₂ increase
	Landscape	The scheme would be constructed within the highway boundary, although land would be required for the construction of noise mitigation. The central reserve and roundabout tree belts which would be reduced make an important contribution in defining the urban edge alongside the North Wessex Downs AONB. Supplementary and replacement planting would reduce the impact.		Slight adverse
	Townscape	No effect on townscape		Neutral
	Heritage of Historic Resources	The scheme may result in the disturbance of a Roman road, if it survives, and would have a minor detrimental effect on the rural historic landscape. These are considered to be slight adverse impacts of minor significance. There would be a slight adverse impact of minor significance on the setting of Liddington Castle, this would reduce to a neutral impact of neutral significance after 15 years.		Slight adverse
	Biodiversity	Habitat loss of scrub woodland within the existing highway boundary can not be fully mitigated. Higher traffic speeds would result in higher incidental mortality of animals attempting to cross the A419. However there is little evidence of wildlife currently crossing the A419.		Slight adverse
	Water Environment	Features and elements present in the water environment are typical of the locality and the scheme will have negligible impacts on the surface and ground water quality and flows.		Neutral
	Physical fitness	Existing cyclist and pedestrian movements at the junction are small in number, the provision of a crossing could facilitate increased movements in the future.	<10 – Pedestrians, <10 Cyclists	Minor health benefits
	Journey Ambience	One layby will be closed but suitable substitute facilities are available. There would be reduced driver frustration for over 40,000 daily movements.		Large beneficial
SAFETY	Accidents	The removal of through traffic from the junction results in a reduction of accidents.	Accidents -197, Deaths -1.5 Serious -16.5, Slight -271	PVB £7.52 m
	Security	The scheme would include improved lighting and visibility for non motorised users		Slight beneficial
ECONOMY	Public Accounts		Investment cost = £13.672m Indirect tax revenues = -£38.29	PVC -£24.62m
	TEE: Business Users & Transport Providers	Commonhead Junction Improvement scheme provides benefits to Swindon. A BCR ratio of 4.66 is estimated	Provides benefits to business users and transport of £15.57m. Travel time: 627 vehicle hours saved	PVB £15.57m
	TEE: Consumers	The scheme reduces congestion at the roundabout, reduces delays and also improves journey times	Provides benefits to consumers of £2.39m	PVB 2.39m
	Reliability	Online improvement. Assessment based on reduction in congestion at improved junctions		Slight beneficial
	Wider Economic Impacts	Not a regeneration area	N/A	N/A
ACCESSIBILITY	Option values	No adverse impact	N/A	N/A
	Severance	There will be a slight to moderate reduction in traffic severance and improved crossing facilities provided.		Slight beneficial
	Access to transport system	No impacts on alternative modes.	Neutral	Neutral
INTEGRATION	Transport Interchange	None.	N/A	N/A
	Land Use Policy	The scheme will improve capacity and have beneficial impacts on the southern side of Swindon. The location is on the boundary of an AONB, but the improvement is predominantly within the existing highway boundaries.		Beneficial
	Other Government Policies	The scheme assists in achieving other Government policies through contributing to economic prosperity and social integration in an environmentally responsible manner.		Beneficial

Table 7-2 – Evaluation Summary Table (EST)

Option: A419 Commonhead Junction Improvement		Description: Grade separated junction with a new free flowing A419 passing over existing roundabout	Problems: High level of congestion particularly at peak times and high accident rate on junction approaches	Scheme Cost: £13.4m
OBJECTIVE	SUB-OBJECTIVE	QUALITATIVE IMPACTS	QUANTITATIVE ASSESSMENT	ASSESSMENT
ENVIRONMENTAL IMPACT	Noise	Based on traffic flows and mitigation measures only it is considered that the scheme is likely to have had a beneficial effect as expected.		Beneficial
	Local air quality	Since the traffic flows are as expected in the ES and congestion has reduced it is considered that the scheme is likely to have had a beneficial effect as expected.		Beneficial
	Greenhouse Gases	A saving of 1,142 tonnes of carbon is calculated for the opening year		Beneficial
	Landscape	There is slight overall adverse visual effect due to the presence of the carriageway on embankment, as predicted in the ES. The visual impact is dependant on successful establishment of the landscape planting. Overall, it is considered that the scheme has a slight adverse effect as expected.		Slight adverse
	Townscape	No effect on townscape		Neutral
	Heritage of Historic Resources	The effect of the scheme on the Heritage sub-objective is likely to have been slightly adverse as expected.		Slight adverse
	Biodiversity	No additional bird and bat boxes have been provided off-site, however, overall, it is considered that the effect of the scheme is as expected.		Slight adverse
	Water Environment	Greater protection for the Liden Brook and Liden attenuation pond than pre-existed has been provided by the attenuation drainage ditch to the east of the southbound slip road to the north of the junction. The effect of the scheme is neutral as expected.		Neutral
	Physical fitness	The inclusion of the signalised crossing has reduced east-west severance caused by the A419. The scheme is likely to have had a slightly beneficial impact as expected.		Minor health benefits
	Journey Ambience	One lay-by was closed but suitable substitute facilities are thought to be available. If the effect of the lay-by closure has been negligible, as predicted in the ES, then overall the scheme is likely to have had a beneficial impact as expected.		Large beneficial
SAFETY	Accidents	Significant accident saving (preliminary result based on only one year's data since opening).	Accidents -920, Deaths -7 Serious -77, Slight -1265	PVB £36.87 m
	Security	The improved lighting on pedestrian footway and cycleway has slightly improved security.		Slight beneficial
ECONOMY	Public Accounts	The indirect tax revenue has not been evaluated.		PVC £11.9m (construction)
	TEE: Travel Time	Through traffic on the A419 uses the flyover and avoids queues at the roundabout Reduction in queues and improvement to journey times	Up to 1m:52s saved on A419	PVB £95.85m
	Reliability	Reduction in congestion leads to an improvement in Reliability.		Beneficial
	Wider Economic Impacts	Not a regeneration area, but benefit to existing local industry and business.	N/A	Beneficial
ACCESSIBILITY	Option values	No transport options have been introduced		Neutral
	Severance	Signalised pedestrian facility and reduced traffic passing the crossing point have reduced severance.		Slight beneficial
	Access to transport system	No impacts on alternative modes.	Neutral	Neutral
INTEGRATION	Transport Interchange	Deterioration in bus services on A4259, due to continuous traffic flow with removal of Commonhead signals		Negative
	Land Use Policy	The scheme has improved capacity and benefited developments in the south and east of Swindon, in accordance with Structure Plan and Local Plan policies		Beneficial
	Other Government Policies	The scheme has assisted policies for transport and development in RPG 10 and SWARMMS		Beneficial

8. Summary

- 8.1 The A419 Commonhead Junction Improvement officially opened on 30th March 2007. The scheme provided an overpass to carry A419 through traffic over the roundabout junction with the A4259/ B4192 at Commonhead, located about 1.5 km north of M4 Junction 15, near Swindon, Wiltshire. The scheme objectives were to reduce congestion and improve safety.
- 8.2 The overpass carries a traffic volume of 46,300 vpd (AWT). The slip roads, which previously formed the mainline A419, now carry 6,000 to 8,000 vpd. There has been a 57% reduction in traffic using Commonhead Roundabout. Actual traffic flows are similar to those predicted for the A419 and slip roads; however predictions for the A4259 were nearly twice the actual volume.
- 8.3 Trips using the A419 overpass are now nearly 2 minutes quicker per vehicle than before. East-west trips on the A4259 are also quicker, by up to 1.6 minutes per vehicle.
- 8.4 The number of accidents has fallen from 20.7 to 6.0 per year, a 68% fall that is greater than predicted. Normally accident analysis is based on more than one year's data, so this is only a provisional result.
- 8.5 The outturn construction cost of £13.4 million (undiscounted) is 13% lower than predicted.
- 8.6 The vehicle-time benefit is estimated to be £95.85 million, and the accident benefit is estimated to be £36.87 million, assuming standard values of time and accidents, and capitalisation factors. Comparing the benefits from these two items with the cost gives a BCR of 11.2.
- 8.7 The environmental impacts have been generally as predicted, with slight adverse effects on visual impacts and biodiversity as expected, although these should improve as landscape planting becomes established. There has been a reduction in greenhouse gas emissions.
- 8.8 The scheme has been completed in accordance with regional and local policies aimed at promoting sustainable transport and economic development.
- 8.9 The scheme objectives were to reduce congestion and improve safety, and clearly both have been achieved.

Annex A

Table A-1 – Traffic Volumes (AWT)

Location	Before	Immediately After	1 Year After	1 Yr Change from Before
A419 N of Commonhead	54,008	56,287	58,875	9%
A419 S of Commonhead	57,819	60,149	61,420	6%
A4259 Marlborough Rd	26,550	25,373	25,877	-3%
Pack Hill	3,242	2,855	3,364	4%
B4192 Purley Rd	4,795	4,636	4,911	2%
A419 NB onslip	28,046	6,018	6,697	-76%
A419 SB offslip	25,962	5,505	5,898	-77%
A419 NB offslip	28,848	6,607	6,903	-76%
A419 SB onslip	28,971	8,262	8,237	-72%
A419 Commonhead Flyover	-	45,280	46,280	
A3102 NE of M4 J16	43,054	43,092	44,819	4%
M4 J15 WB offslip	13,703	14,302	No data	
M4 J15 WB onslip	10,942	11,191	12,301	12%
M4 J15 EB offslip	11,177	11,563	12,445	11%
M4 J15 EB onslip	14,207	14,390	14,643	3%
M4 J14-15	92,023	94,445	94,583	3%
M4 J15-16	87,993	91,183	89,190	1%
M4 J16-17	86,386	88,842	88,746	3%

Annex B – Journey Times

Table B-1 – Average Times for A419 Northbound via Flyover (min:sec)

		AM	IP	PM
1-2	F/F Time	00:31	00:30	00:35
	Delay	00:00	00:00	00:00
	Total Time	00:31	00:30	00:35
2-3	F/F Time	00:41	00:39	00:46
	Delay	00:00	00:00	00:00
	Total Time	00:41	00:39	00:46
3-4	F/F Time	01:48	01:50	02:02
	Delay	00:00	00:00	00:00
	Total Time	01:48	01:50	02:02
Entire Route	F/F Time	03:00	02:58	03:22
	Delay	00:00	00:00	00:00
	Total Time	03:00	02:58	03:22

Timing Points: 1 M4 J15 roundabout exit
 2 Diverge at slip
 3 Merge at slip
 4 Diverge to Merlin Way

Table B-1 – Average Times for A419 Southbound via Flyover (min:sec)

		AM	IP	PM
4-3	F/F Time	01:58	01:58	02:03
	Delay	00:00	00:00	00:00
	Total Time	01:58	01:58	02:03
3-2	F/F Time	00:40	00:40	00:43
	Delay	00:00	00:00	00:00
	Total Time	00:40	00:40	00:43
2-1	F/F Time	00:37	00:33	00:33
	Delay	00:01	00:00	00:27
	Total Time	00:38	00:33	01:00
Entire Route	F/F Time	03:15	03:11	03:19
	Delay	00:01	00:00	00:27
	Total Time	03:16	03:11	03:46

Table B-1- Average Times at A419 Northbound via Roundabout (min:sec)

		AM	IP	PM
1-2	F/F time	00:40	00:39	00:41
	Delay time	00:00	00:00	00:00
	Total time	00:40	00:39	00:41
2-3	F/F time	00:16	00:16	00:16
	Delay time	00:00	00:00	00:00
	Total time	00:16	00:16	00:16
3-4	F/F time	00:13	00:13	00:13
	Delay time	00:02	00:01	00:02
	Total time	00:15	00:14	00:15
4-5	F/F time	00:12	00:12	00:12
	Delay time	00:00	00:00	00:00
	Total time	00:12	00:12	00:12
5-6	F/F time	00:11	00:11	00:11
	Delay time	00:00	00:00	00:00
	Total time	00:11	00:11	00:11
6-7	F/F time	00:17	00:17	00:17
	Delay time	00:00	00:00	00:00
	Total time	00:17	00:17	00:17
7-8	F/F time	02:03	02:03	02:05
	Delay time	00:00	00:00	00:00
	Total time	02:03	02:03	02:05
Entire Route	F/F time	03:51	03:51	03:55
	Delay time	00:00	00:00	00:00
	Total time	03:53	03:53	03:57

- Timing points: 1 M4 J15 roundabout exit
 2 Diverge at slip
 3 200m south of roundabout stop line
 4 Roundabout stop line
 5 Roundabout exit
 6 200m north of roundabout
 7 Merge from slip
 8 Diverge to Merlin Way

Table B-1 - Average Times at A419 Southbound via Roundabout (min:sec)

		AM	IP	PM
8-7	F/F time	02:10	02:02	02:01
	Delay time	00:00	00:00	00:00
	Total time	02:10	02:02	02:01
7-6	F/F time	00:19	00:19	00:20
	Delay time	00:01	00:01	00:02
	Total time	00:20	00:19	00:22
6-5	F/F time	00:20	00:21	00:20
	Delay time	00:00	00:00	00:00
	Total time	00:20	00:21	00:20
5-4	F/F time	00:12	00:11	00:11
	Delay time	00:00	00:00	00:04
	Total time	00:12	00:11	00:15
4-3	F/F time	00:14	00:14	00:11
	Delay time	00:00	00:00	00:09
	Total time	00:14	00:14	00:20
3-2	F/F time	00:13	00:13	00:13
	Delay time	00:00	00:00	00:20
	Total time	00:13	00:13	00:33
2-1	F/F time	00:34	00:33	00:25
	Delay time	00:03	00:01	00:30
	Total time	00:37	00:34	00:55
Entire Route	F/F time	04:02	03:53	03:40
	Delay time	00:04	00:01	01:05
	Total time	04:06	03:55	04:45

Table B-1 – Average Times at A4259 Eastbound (min:sec)

		AM	IP	PM
1-2	F/F time	01:10	01:10	01:12
	Delay	00:05	00:04	00:05
	Total time	01:15	01:14	01:17
2-3	F/F time	00:15	00:14	00:15
	Delay	00:00	00:00	00:00
	Total time	00:15	00:14	00:15
3-4	F/F time	00:18	00:17	00:21
	Delay	00:00	00:00	00:00
	Total time	00:18	00:17	00:21
4-5	F/F time	00:13	00:13	00:13
	Delay	00:00	00:00	00:00
	Total time	00:13	00:13	00:13
5-6	F/F time	01:17	01:17	01:19
	Delay	00:00	00:00	00:00
	Total time	01:17	01:17	01:19
Total Route	F/F time	03:13	03:12	03:19
	Delay	00:05	00:04	00:05
	Total time	03:18	03:16	03:24

- Timing points
- 1 Dorcan Way roundabout exit
 - 2 200m west of roundabout
 - 3 Roundabout stop line
 - 4 Roundabout exit
 - 5 200m east of roundabout
 - 6 Junction with Melbourne Road

Table B-1 – Average Times at A4259 Westbound (min:sec)

		AM	IP	PM
6-5	F/F time	01:11	01:16	01:16
	Delay	00:00	00:00	00:00
	Total time	01:11	01:16	01:16
5-4	F/F time	00:15	00:15	00:14
	Delay	00:07	00:00	00:08
	Total time	00:21	00:15	00:22
4-3	F/F time	00:14	00:14	00:13
	Delay	00:00	00:00	00:00
	Total time	00:14	00:14	00:13
3-2	F/F time	00:16	00:16	00:16
	Delay	00:00	00:00	00:00
	Total time	00:16	00:16	00:16
2-1	F/F time	01:37	01:32	01:29
	Delay	00:11	00:06	00:05
	Total time	01:49	01:37	01:34
Total Route	F/F time	03:32	03:32	03:28
	Delay	00:18	00:06	00:13
	Total time	03:50	03:38	03:41

Table B-1 – Average Times at Pack Hill Westbound (min:sec)

		AM	IP	PM
1-2	F/F time	00:25	00:28	00:25
	Delay	00:00	00:00	00:00
	Total time	00:25	00:28	00:25
2-3	F/F time	00:25	00:28	00:23
	Delay	00:11	00:04	00:15
	Total time	00:36	00:31	00:39
Total Route	F/F time	00:50	00:55	00:49
	Delay	00:11	00:04	00:15
	Total time	01:01	00:59	01:04

- Timing points 1 Pack Hill/ The Marsh
 2 200m east of roundabout
 3 Roundabout stop line
 4

Table B-1 – Average Times at Pack Hill Eastbound (min:sec)

		AM	IP	PM
3-2	F/F time	00:22	00:22	00:23
	Delay	00:00	00:00	00:00
	Total time	00:22	00:22	00:23
2-1	F/F time	00:23	00:23	00:23
	Delay	00:00	00:00	00:00
	Total time	00:23	00:23	00:23
Total Route	F/F time	00:45	00:45	00:46
	Delay	00:00	00:00	00:00
	Total time	00:45	00:45	00:46

Annex C – Queue Lengths

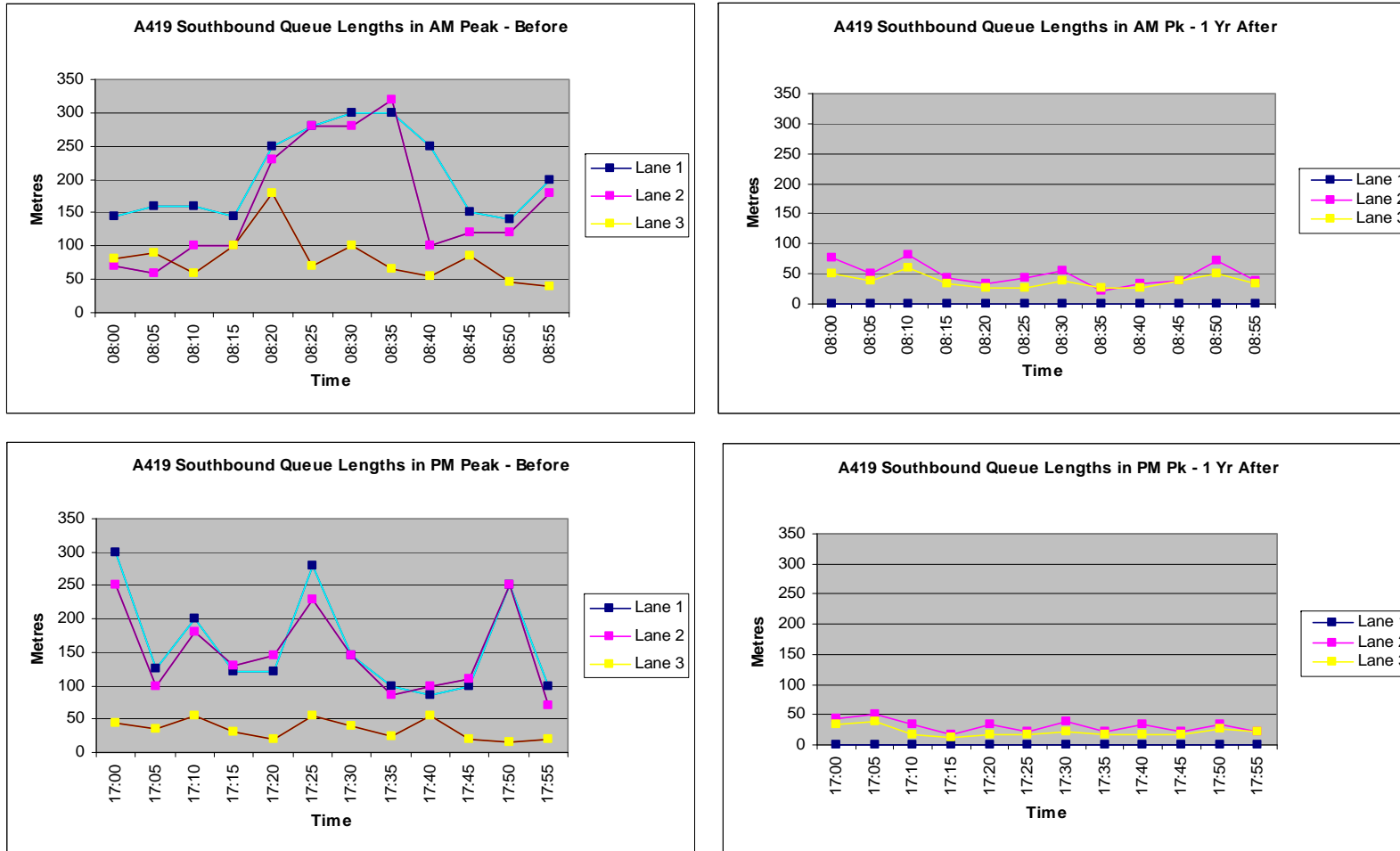


Figure C.1 – Queue Lengths on A419 Southbound

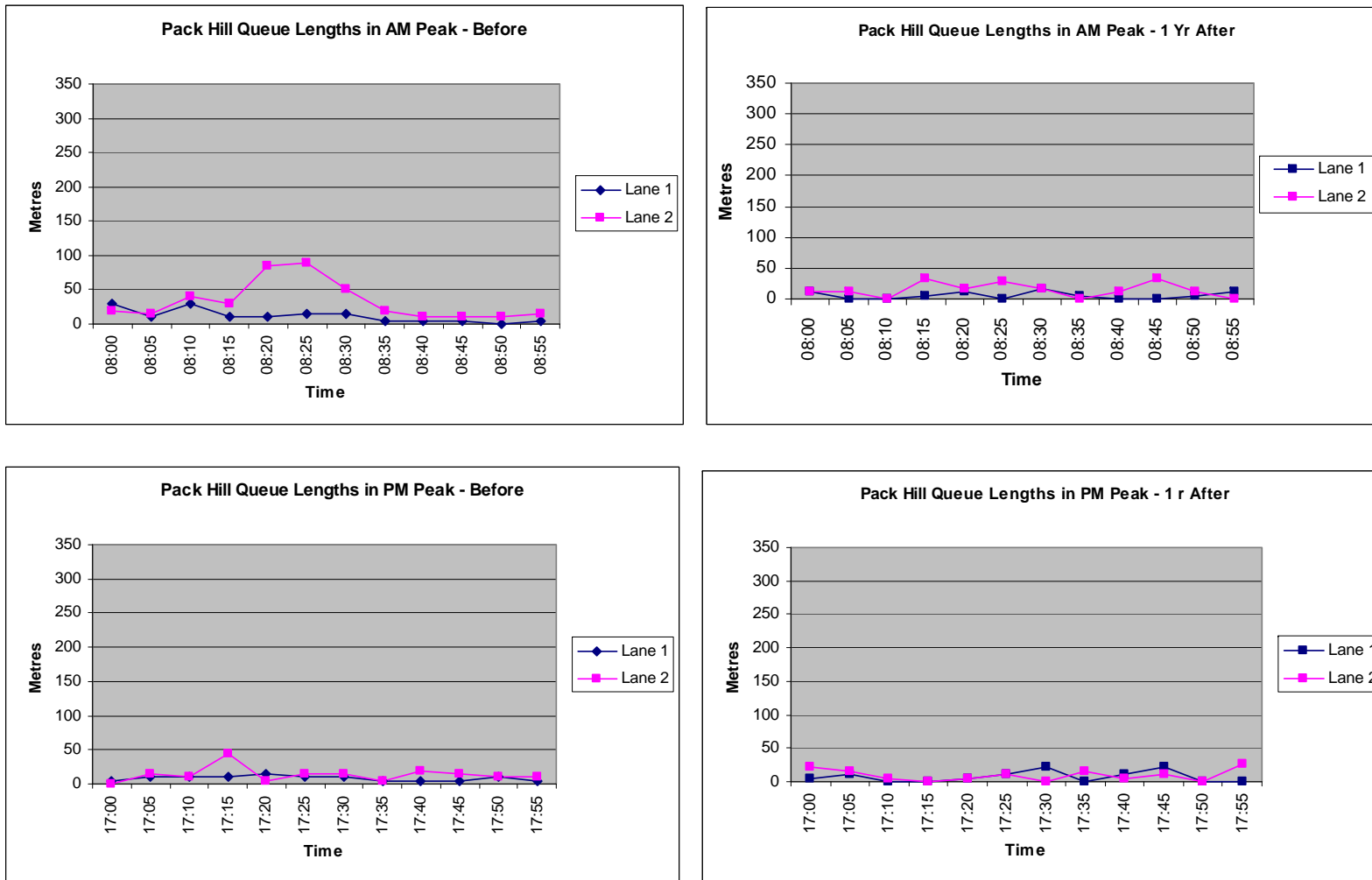


Figure C.2 – Queue Lengths on Pack Hill

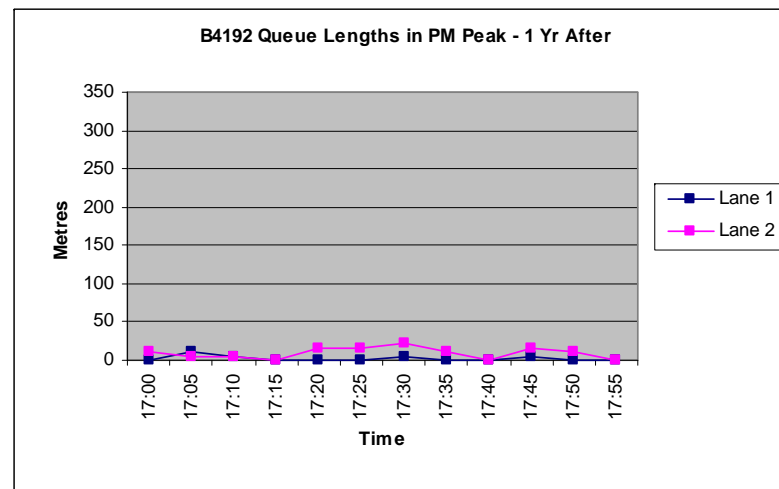
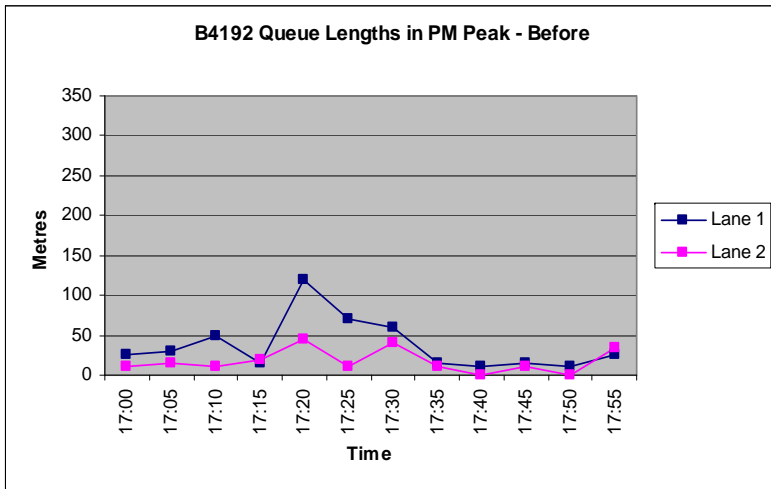
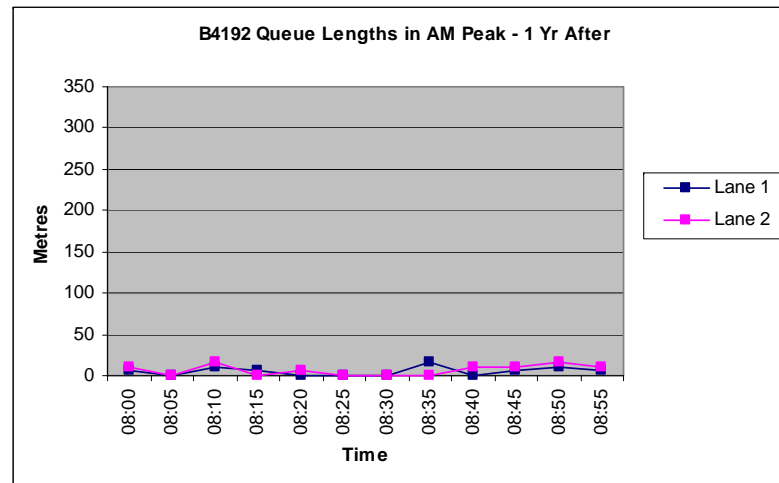
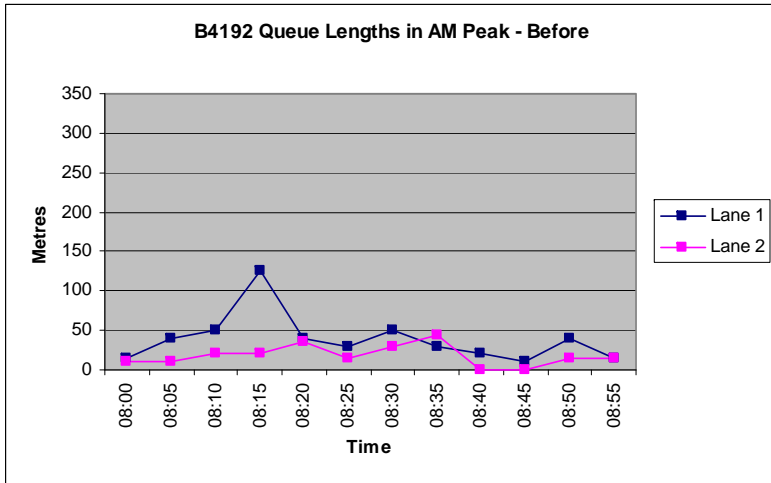


Figure C.3 – Queue Lengths on B4192

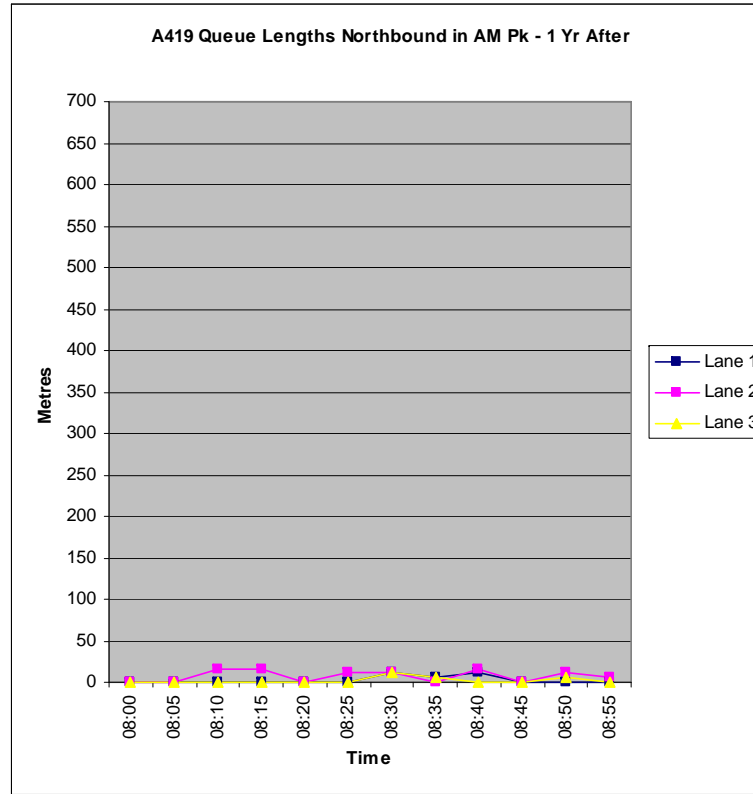
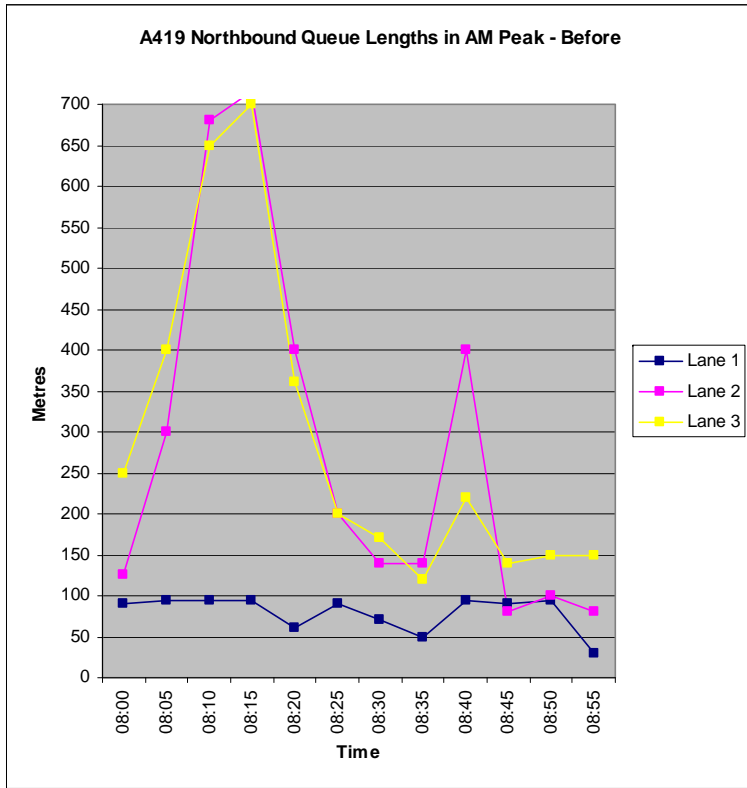


Figure C.4 – Queue Lengths on A419 Northbound (AM Peak)

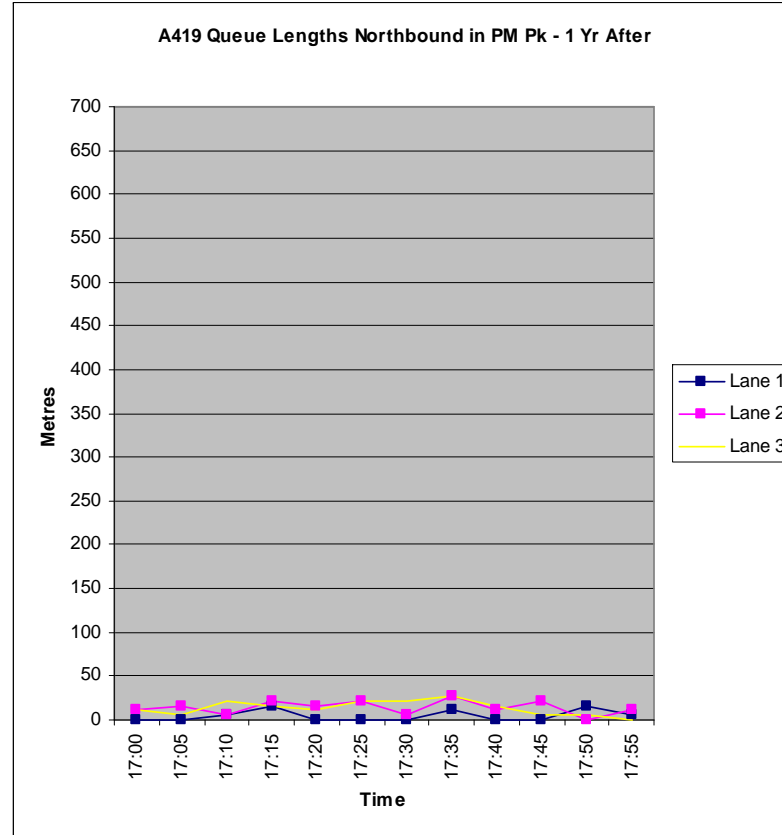
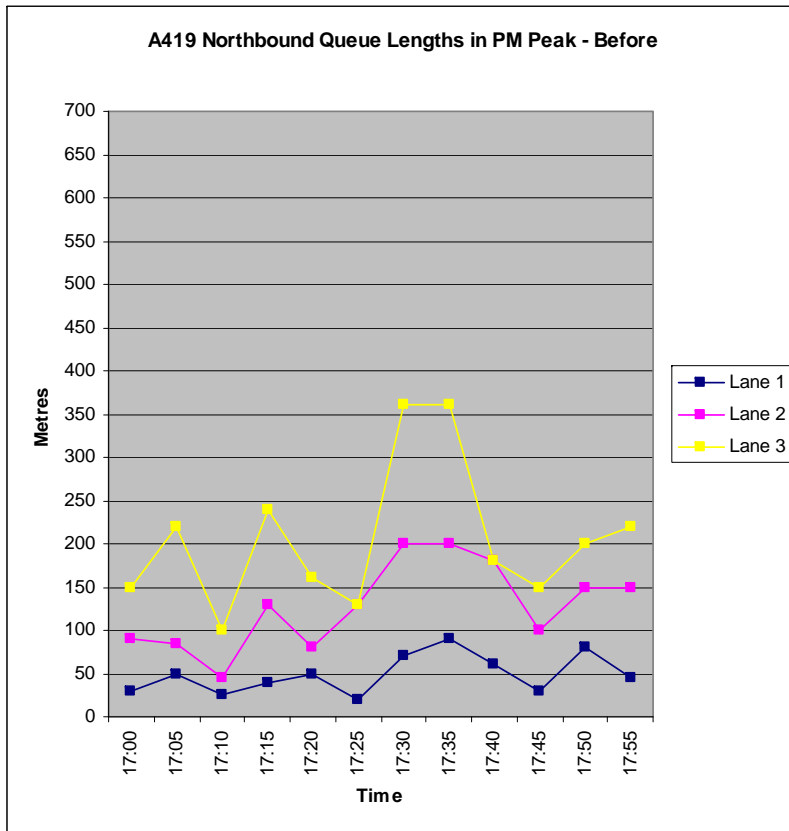


Figure C.4 continued – Queue Lengths on A419 Northbound (PM Peak)

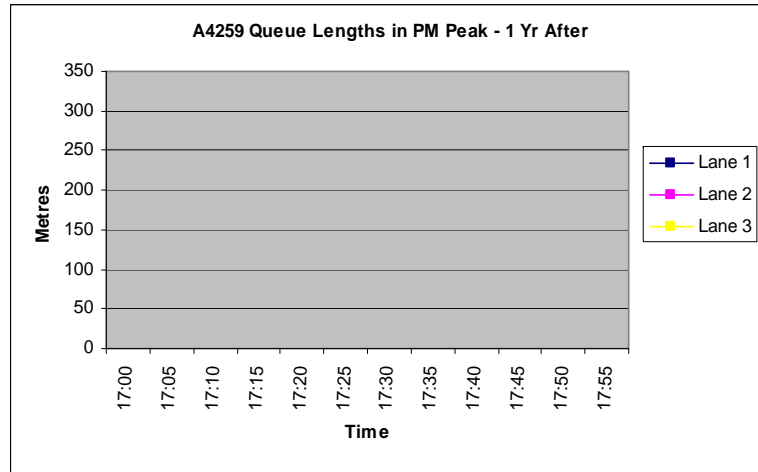
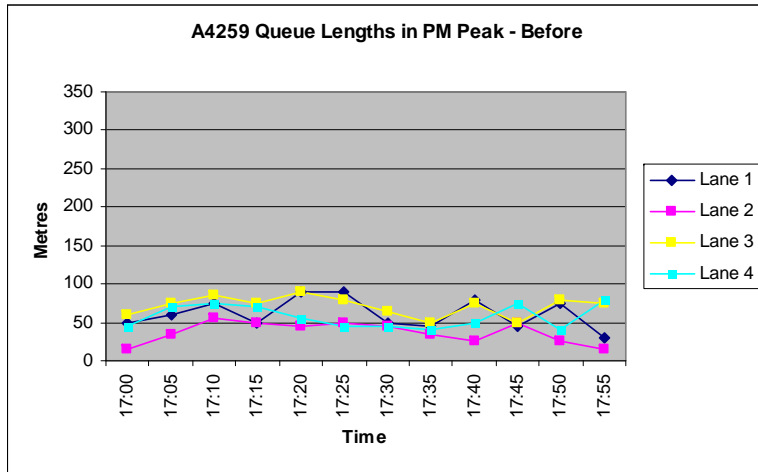
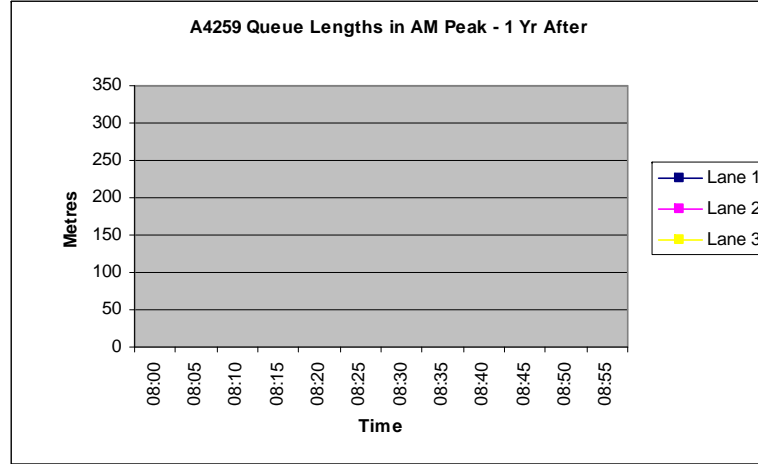
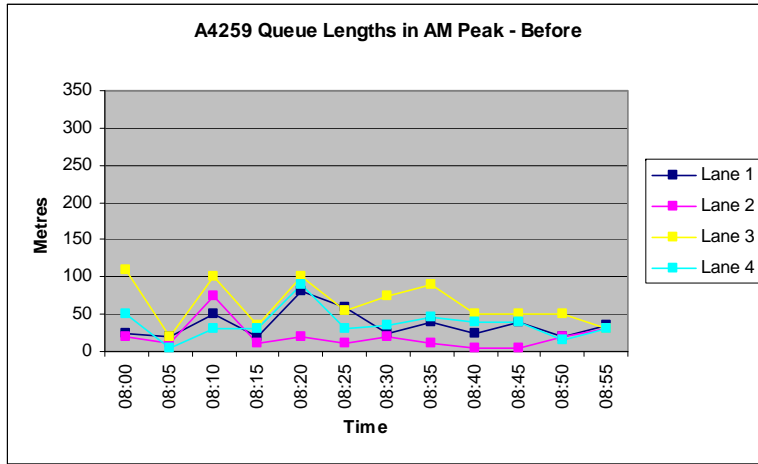


Figure C.5 – Queue Lengths on A4259

Note – The survey showed no queues forming at the roundabout from this arm, one year after.

Annex D: Environment – Full Evaluation

This Annex presents the full review of the scheme's influence upon the Environment Objective.

Data Collection

Background information has been provided by the Design and Build Company, including environmental and landscape planting plans. The following list includes all of the documents used in the preparation of the assessment of the Environment Objective of the POPE report.

Table D.1 – Summary of background information provided

Information requested	Comments
As Built drawings for landscape, ecological mitigation measures, drainage, fencing, earthworks etc preferable electronically or on CD	As Built drawings provided on CD by Employer's Agent
Copies of the Landscape and Ecology Handover Environmental Management Plan (HEMP)	Draft HEMP included as part of the Health and Safety File, which was provided on a CD
Contact names for consultation. Additional list of interested parties to be consulted	No specific contact names available.
Archaeology report	Hart, J. & Alexander, M. (2007) Bronze Age Activity and a Medieval Hollow-way at the A419 Commonhead Junction, Swindon. Cotswold Archaeology. Report provided by the Employer's Agent.
Part 1 Claims	Information requested from HA but not provided
Any post opening survey or monitoring e.g. for ecology, water quality	Information contained in the Draft HEMP

Site Visit

A site visit was undertaken on 23rd October 2008 which allowed the scheme to be viewed from the highway, adjacent local roads and from other publicly accessible areas, for example, footpaths.

Consultation

As part of the POPE evaluation process we have consulted with the Statutory Bodies; Natural England, English Heritage and The Environment Agency; as well as Swindon Borough Council, regarding their views on the local impacts of the scheme on the environmental resources in the area surrounding the route. The consultees were also asked to comment on whether, in their opinion, the mitigation measures implemented have been effective.

Table D2 shows which organisations were contacted during the compilation of this report, their field of interest, and the responses received (or lack of them). The organisations were contacted by telephone to find the relevant person to write a formal request to. These people were identified and contacted in writing, followed up if necessary by telephone calls. A summary of comments, where received, is included within each relevant topic in this environment section of the POPE report.

Table D.2 – Summary of POPE-Environment Consultation Responses

Organisation	Field of Interest	Response Received	
		Answered requested list of questions	Comments
Natural England	Landscape and Biodiversity	No	NE was unable to respond to any of the questions with the information it currently has. It suggested submitting detailed ecological monitoring and survey information for its consideration.
English Heritage	Heritage	No	No response
Environment Agency	Water	No	EA commented on the water quality of Liden Brook.
Swindon Borough Council	General	No	Commented on Built Heritage

ENVIRONMENT

Traffic growth

Two of the environmental parameters noise and local air quality are directly related to traffic flows and their assumed growth until the Design Year. No new modelling has been undertaken as part of this study. An assumption has been made that the level of traffic and the level of traffic noise or local air quality associated with that traffic are directly related. Therefore, if the observed level of traffic is as forecast it could be assumed that the traffic noise and local air quality impacts are as expected.

The ES stated that this section of the A419 carried an approximate daily traffic total of 52,000 prior to opening and was anticipated to increase to approximately 58,000 by 2008 (proposed opening year of the scheme) and up to approximately 66,000 by 2023 (15 years after the proposed opening of the scheme).

The predicted and actual traffic flows are summarised in Table 2-1 in Chapter 2 of this report. The predicted traffic flow north of the scheme on in the A419 was 54,200 AADT and south of the scheme was 58,800 AADT. The actual traffic flow in 2008 was 53,900 AADT north of the scheme on in the A419 and south of the scheme was 55,600 AADT. The predicted traffic flows north of the scheme are very close to those predicted but slightly less. South of the scheme the actual traffic flows are 5% less than predicted. Therefore, for the purpose of environmental evaluation, it can be assumed that the traffic flow is generally as expected.

Noise

Summary of Predicted Impacts

Table D.3 contains a summary of the impacts predicted in the AST and the ES of the scheme on the Noise sub-objective.

Table D.3 – Summary of predicted effects on the Noise Sub-Objective

Origin of Assessment	Summary of Predicted Effect	Assessment
AST	Overall improvement due to the scheme. Mitigation measures have been designed to reduce impacts wherever possible. Perceptible increase of less than 3dB only at the hospital. Without scheme 113 people annoyed but a decrease with scheme when 100 people would be annoyed; 13 less.	Benefit
ES	Out of over 300 houses in the study area, it has been found that almost 130 houses would experience at least a perceptible 1dB decrease in noise between 2008 with the existing road layout and the scheme in 2023. Of these, over 3 would be slight (3 to 5dB) decreases and another 7 would benefit from moderate or substantial decreases (more than 5dB) in noise. At the same time, no houses would experience a perceptible increase in noise, and it is expected that no dwellings would be likely to qualify for noise insulation.	Slight benefit

Consultation

None of the consultees commented on noise related issues.

Predicted effects, their mitigation, and the one-year-after evaluation

The evaluation of the Noise sub-objective is related to the predicted traffic flow rate compared to the observed traffic flow rate. No new modelling or noise monitoring was conducted as part of this assessment.

Table D.4 contains the effects predicted in the ES on the Noise sub-objective and the proposed mitigation measures. This table also includes an evaluation of the post – construction effect on the Noise sub-objective.

Table D.4 – ES predicted Effects, proposed Mitigation and the Evaluation of the Noise Sub-Objective

	Effect predicted in ES	Mitigation	Evaluation of the Noise sub-objective
North Liden	<p>The properties on the far side of the Liden attenuation pond experienced noise levels before the scheme in the low 60s dB, with those closer to the A419 experiencing noise levels around 70dB. The changes in noise level would be due to raising the elevation of the carriageway, increasing the speed of the through traffic and the low noise road surface.</p> <p>Although traffic flows would increase, the overall noise levels would be reduced by 2023 due to resurfacing of the carriageway.</p>	<p>Noise barrier to be constructed on top of the pre-existing bund.</p> <p>Noise absorbent barrier to be constructed less than 2.5m from the west edge of the carriageway.</p> <p>The scheme would be constructed with a low noise road surface.</p>	<p>The noise barrier has been constructed on top of the pre-existing bund as predicted in the ES (see Photograph 5.1). The low noise surface has been used as predicted. The traffic flow north of the scheme is as predicted. Therefore the effect of noise is likely to be as expected in the ES.</p>
South Liden	<p>This area comprises a housing estate with noise levels at properties which face directly on to the A419 in the mid to high 60s dB. Noise levels at those properties facing on to the A4259 are in the mid 60s dB and are dominated by noise from this road rather than by noise from the A419. There would be an increase in total noise level of 0.6dB on the A4259 as a result of the scheme.</p> <p>Properties which are close to the barrier to be erected on the existing bund would benefit from reductions in total noise levels of approximately 5dB. Other assessed receivers would be shown to have no change in total noise level or an imperceptible reduction in noise.</p>	<p>Noise barrier to be constructed on top of pre-existing bund.</p> <p>Noise absorbent barrier to be constructed less than 2.5m from the west edge of the carriageway.</p> <p>The overpass would be surfaced with one of the modern proprietary thin wearing courses (TWC).</p>	<p>The noise barrier on top of the existing bund has been constructed as predicted in the ES (Photograph 5.2). The noise absorbent barrier was constructed less than 2.5m from the west edge of the carriageway. The overpass is constructed with a low noise surface. The traffic flow north of the scheme is as predicted. Therefore the effect of noise is likely to be as expected in the ES.</p>
East of the A419	<p>There are three farms within 100m of the A419 which is the dominant noise source with levels in the mid 60s dB. There would be a perceptible reduction in total noise level at one of the three dwellings in this area, and no perceptible change in total noise level at the other two.</p>	<p>Noise absorbent barrier to be constructed less than 2.5m from the east edge of the carriageway.</p>	<p>The noise absorbent barrier to the east of the south bound carriageway has been constructed as predicted. The traffic flows are as predicted therefore the effect of noise is likely to be as expected in the ES.</p>
Great Western Hospital and Properties South West of Commonhead Junction	<p>Properties in Badbury Wick would generally receive an imperceptible increase in total noise of less than 1dB due to the scheme. Noise levels at the Hospital buildings would increase by a perceptible 1 to 2dB.</p> <p>Properties facing on to the A4259, get a small contribution from the A419 due to the orientation of their facades, and there would be no overall change in noise level due to the scheme.</p>	<p>No noise barriers were specified.</p>	<p>No noise barriers have been constructed between the carriageway and the Hospital buildings (Photograph 5.3) as predicted in the ES. The traffic flow south of the scheme is as slightly less than predicted. Therefore the effect of noise is likely to be as expected in the ES.</p>
Noise Insulation regulations	<p>Assuming all of the proposed mitigation measures were implemented it was expected that no dwellings were likely to qualify for noise insulation.</p>	<p>All proposed environmental barriers and low noise surface should be implemented.</p>	<p>No information has been made available relating to noise insulation.</p>

Photograph D.1 – Noise barrier on the carriageway looking south from North Liden residential area.



Photograph D.2 – Noise barrier (in background above garage roofs) shown from Matley Moor in South Liden residential area.



Photograph D.3 – North bound slip road adjacent to the Great Western Hospital looking north towards Commonhead junction.



Key Findings

The ES and AST both predicted the scheme to have a beneficial effect on the Noise sub-objective.

The mitigation in form of noise barriers and low noise road surface have been constructed as proposed in the ES.

The traffic flow on the scheme is as predicted in the ES.

Based on mitigation measurers only it is considered that the scheme is likely to have had a beneficial effect on the Noise sub-objective as expected in the ES.

Air Quality

Summary of Predicted Impacts

Table D.5 contains a summary of the impacts predicted in the AST and the ES of the scheme on the Air Quality sub-objective.

Table D.5 – Summary of predicted effects on the Air Quality Sub-Objective

Origin of Assessment	Summary of Predicted Effect	Assessment
AST	Does not affect an AQMA. No predicted exceedances of the objective. No significant increases in PM10 concentrations or NO ₂ concentration. 260 properties with an improvement, 0 properties with a deterioration	Benefit
ES	The scheme would result in an overall improvement in local air quality due to reduced congestion and improved traffic flow. An estimated 260 properties would experience better local air quality.	Slight benefit

Consultation

None of the consultees commented on air quality related issues.

Predicted effects, their mitigation, and the one-year-after evaluation

The evaluation of the Air Quality sub-objective is related to the predicted traffic flow rate compared to the observed traffic flow rate. No new air quality monitoring or modelling was conducted as part of this assessment.

Table D.6 contains the effects predicted in the ES on the Air Quality sub-objective and the proposed mitigation measures. This table also includes an evaluation of the post construction effect on the Air Quality sub-objective.

In terms of proposed mitigation in the ES, the scheme itself was predicted to reduce congestion at Commonhead Junction and thus improve air quality in the local area. No other specific mitigation was proposed.

Table D.6– ES predicted Effects, proposed Mitigation and the Evaluation of the Air Quality sub-objective

	Effect predicted in ES	Mitigation	Evaluation of the Air Quality sub-objective
North Liden	A very small reduction in pollutant concentrations, representing an improvement in air quality with the scheme.	No specific mitigation was proposed.	The traffic flow is as expected and therefore the effects of the scheme on air quality are likely to be as expected in the ES.
South Liden	A very small reduction in pollutant concentrations, representing an improvement in air quality with the scheme.	No specific mitigation was proposed.	The traffic flow is as expected and therefore the effects of the scheme on air quality are likely to be as expected in the ES.
East of the A419	A very small reduction in pollutant concentrations, representing an improvement in air quality with the scheme.	No specific mitigation was proposed.	The traffic flow is as expected and therefore the effects of the scheme on air quality are likely to be as expected in the ES.
Great Western Hospital	Was expected to experience a very small increase in nitrogen dioxide concentration.	No specific mitigation was proposed.	The traffic flow is as expected and therefore the effects of the scheme on air quality are likely to be as expected in the ES.

Key Findings

The ES and AST both predicted that the scheme would have a beneficial effect on the Air Quality.

The scheme was predicted to result in an overall improvement in local air quality due to reduced congestion and improved traffic flow.

Since the traffic flows are as expected in the ES and congestion has reduced it is considered that the scheme is likely to have had a beneficial effect on the Air Quality sub-objective as expected in the ES.

Greenhouse Gases

The AST predicted an increase in greenhouse gas emissions due to faster speeds on the main carriageway. The ES quantified this as an extra 800 tonnes of carbon per year.

This POPE evaluation has calculated the change in tonnes of carbon emitted in accordance with the DMRB method, which takes into account vehicle flows, speeds, and HGV proportion. The following table shows the results.

In fact a speed increase within the range observed has the effect of reducing carbon emission. The observed traffic data indicates a reduction of 1,142 tonnes of carbon in the opening year.

Table D.7 Change in Carbon Emission in Opening Year

	Tonnes of Carbon	
	Predicted	Observed
Do-Minimum	2,865	2,720
Do-Something	1,708	1,578
Change	-1,157	-1,142

The observed change may be compared with the predicted change using forecast traffic data. Unfortunately POPE only has knowledge of the forecast link flows, but not the link speeds or HGV proportions. Therefore only flow values could be changed, and because these are generally similar between forecast and outturn, the calculated change in carbon emission (-1157 tonnes) is also of similar magnitude. The fact that this is negative, whereas the original prediction was for an increase in carbon, indicates that the original predicted inputs have not been fully replicated.

Landscape

Summary of Predicted Impacts

Table 5.8 contains a summary of the impacts predicted in the AST and the ES of the scheme on the Landscape sub-objective.

Table D.8– Summary of predicted effects on the Landscape sub-objective

Origin of Assessment	Summary of Predicted Effect	Assessment
AST	The scheme would be constructed within the highway boundary, although land would be required for the construction of noise mitigation. The central reserve and roundabout tree belts which would be reduced make an important contribution in defining the urban edge alongside the North Wessex Downs AONB. Supplementary and replacement planting would reduce the impact.	Slight adverse
ES	The overall landscape residual impacts during operation was predicted as being slight adverse because the Wanborough Vale landscape area, which is partly within the North Wessex Downs Area of Outstanding Natural Beauty (AONB) and in an Area of Local Landscape Importance (ALLI), would be slightly adversely affected. However, the majority of other landscape character types would not be affected by the proposals. 15 years after opening approximately 231 of the properties assessed would have no change in their views, and 249 properties would experience some increased intrusion into their views. The scheme would result in the loss of an estimated 3ha of existing vegetation, and 2ha of planting would be provided. On balance the scheme would be slightly more intrusive in both landscape and visual terms.	Slight adverse

Consultation

Natural England (NE) was unable to respond to any of the questions with the information it currently has. Only a detailed monitoring and survey project aimed at comparing the original expected impacts and proposed mitigation strategies with what is actually occurring on the ground now, would enable NE to look into the query. To its knowledge no such survey or monitoring has been submitted to NE. (It should be noted that with regards to this comment that the Highways Agency would not normally undertake this work).

Predicted effects their mitigation and the one-year-after evaluation

In the ES the impacts of the scheme, have been assessed according to the Local Landscape Character Areas (LCA). The impacts on character and quality were assessed together to give an overall landscape impact. The impacts were assessed both at opening year and at design year (15 years after opening).

Table D.9 contains the effects predicted in the ES on the Landscape sub-objective and the proposed mitigation measures. This table also includes an evaluation of the post construction effect on the Landscape sub-objective.

Table D.9 – ES predicted Effects, proposed Mitigation and the Evaluation of the Landscape sub-objective

	Effect predicted in ES	Proposed Mitigation	Evaluation of the Landscape sub-objective
Wanborough Vale (east of the scheme)	As a result of the adjacent North Wessex Downs Area of Outstanding Natural Beauty (AONB) and Area of Local Landscape Importance (ALLI) character areas, the scheme proposals would result in residual slight adverse effects.	The retention of existing vegetation wherever possible, for example on the highway boundary and the roundabout island. The complete screening of views from receptors immediately to the east of the junction is not possible due to the lack of opportunity to plant trees and shrubs in the area of the under-bridges.	To the east of the A419 to the south of the junction all proposed vegetation has been retained. This has been improved with new planting to link the existing planting into a contiguous strip of planting. To the east of the A419 to the north of the junction the opportunity for planting has been very limited. The embankment has been planted as predicted but the embankment itself will remain as a visible feature in the landscape (Photograph 5.4). The scheme will remain visible from receptors to the east, however, as the planting on the embankments matures most of the carriageway should be screened, with the exception of the underpasses which are likely to remain visible (Photograph 5.5).
Coate Urban Fringe (west of scheme beyond Great Western Hospital)	The scheme proposals would result in a residual neutral effect to the Coate Urban Fringe character area, by virtue of the distance of the proposals; no residual impacts on the character area are predicted. The scheme would result in a residual slight adverse visual impact.	No specific mitigation was required. Planting was carried out along embankment.	The effects are as expected in the ES as the scheme would be partially visible to some receptors at Badbury Wick however the effect on the landscape character of the area would be neutral.
Liden Urban Residential Area, Liden bund and The Great Western Hospital	The scheme proposals would generally result in a residual neutral effect in these character areas. Where the acoustic barrier could be fully screened by screen planting, impacts would be reduced to a neutral effect and thus no residual impact. An overall slight adverse residual visual impact during operation is predicted. Residual visual impacts are limited to day time only, except for a limited number of receptors close to the junction.	No specific mitigation was required. Planting was carried out along embankment.	Planting has been carried out on the eastern side of the noise barriers. Therefore, as predicted in the ES these effects should be neutral when planting has matured fully, subject to successful establishment. A slight adverse visual impact for some receptors is expected due to the embankment. The embankment has been planted with trees along its length and so the view of the embankment will improve by the design year as the vegetation matures. As expected in the ES a slight adverse impact is still likely to occur.
Lighting	The pre-existing lit junction was assessed in the context of Swindon and the Great Western Hospital	No lighting would be installed on the main A419 overpass.	No night time lighting assessment was carried out as part of this assessment. The new carriageway on embankment is not lit as

POST OPENING PROJECT EVALUATION

A419 COMMONHEAD JUNCTION IMPROVEMENT – ONE YEAR AFTER

	Effect predicted in ES	Proposed Mitigation	Evaluation of the Landscape sub-objective
	<p>building. This urban lighting provides a lit setting for the junction lighting when viewed from the AONB.</p> <p>The night time visual impact of traffic using the raised road was seen in the context of the Great Western Hospital which had a disproportionately high night time negative impact due to its height and lighting on all floors. Therefore, the degree of change was predicted to be very slight.</p> <p>Night time impacts would be partially reduced due to the use of cut off lighting thus reducing the glare impact.</p>	<p>Approximately 50 lighting columns at the roundabout would remain, with improvements including full cut off lanterns. The under bridge area and the cycle/foot way would be lit.</p>	<p>expected in the ES. Cut off lanterns have been used as expected in the ES.</p>

Photographs

Photograph D.4 – Looking west from Great Moor Leaze Farm: an HGV can be seen on the embankment of the south-bound carriageway.



Photograph D.5 – East entrance to the northern underpass looking in a northerly direction.



Key Findings

The ES and AST both predicted that the scheme would have a slight adverse effect on the Landscape sub-objective.

The scheme would cause a slight adverse effect of the adjacent North Wessex Downs Area of Outstanding Natural Beauty (AONB) and Area of Local Landscape Importance (ALLI).

The effect on Wanborough Vale Character Area to the east is considered to be a slight adverse effect, as predicted in the ES. The scheme will remain visible from receptors to the east, in the direction of Liddington and Wanborough. However, as the planting on the embankments matures most of the carriageway should be screened, with the exception of the underpasses which are likely to remain visible at design year. The embankment has been planted as predicted in the ES but the embankment itself will remain as a visible feature in the landscape.

The effect of the scheme on the Coate Urban Fringe to the west is considered to be neutral as predicted in the ES.

The effect of the scheme on the Liden Urban Residential Area Character Area and The Great Western Hospital is considered to be neutral as predicted in the ES due to planting that has been carried out as proposed. There will remain a slight overall adverse visual effect in Moor Leaze and Liden due to the presence of the embankment, as predicted in the ES. The neutral visual impact is dependant on successful establishment of the landscape planting, which should be assessed during the five year after report.

Overall, it is considered that the scheme has a slight adverse effect on the Landscape sub-objective as expected in the ES.

Biodiversity

Summary of Predicted Impacts

Table 5.10 contains a summary of the impacts predicted in the AST and the ES of the scheme on the Biodiversity sub-objective.

Table D.10 – Summary of predicted effects on the Biodiversity sub-objective

Origin of Assessment	Summary of Predicted Effect	Assessment
AST	Habitat loss of scrub woodland within the existing highway boundary can not be fully mitigated. Higher traffic speeds would result in higher incidental mortality of animals attempting to cross the A419. However there is little evidence of wildlife currently crossing the A419.	Slight adverse
ES	Liden Brook is part of the River Cole Site of Nature Conservation Interest. Evidence of breeding birds and Otter has been found locally. Although vegetation in the existing central reserves would be removed, replacement planting would be provided where possible and the overall effect would be minor. The overall impact of the scheme on ecological features has been considered to be slight adverse, given the degree of habitat loss and the opportunities for mitigation and enhancement.	Slight adverse

Consultation

Natural England (NE) was unable to respond to any of the questions with the information it currently has. Only a detailed monitoring and survey project aimed at comparing the original expected impacts and proposed mitigation strategies with what is actually occurring on the ground now, would enable NE to look into the query. To its knowledge no such survey or monitoring has been submitted to Natural England.

The Employer’s Agent stated that ‘Bird and bat boxes were installed to the west side of the Liden bund acoustic fence to prevent headlights disturbing nesting species. Also, we do not believe that any boxes were installed along the Liden Brook. To our knowledge no agreement was arranged for these additional boxes, and certainly we have not installed them’.

Predicted effects their mitigation and the one-year-after evaluation

Table D.11 contains the effects predicted in the ES on the Biodiversity sub-objective and the proposed mitigation measures. This table also includes an evaluation of the post construction effect on the Biodiversity sub-objective.

Table D.11 – ES predicted Effects, proposed Mitigation and the Evaluation of the Biodiversity Sub-Objective

	Effect predicted in ES	Mitigation	Evaluation of the Bio-diversity sub-objective
Liden Brook (Part of River Cole SNCI)	Predicted increases in traffic volume for the scheme are minimal and consequently increases in highway run-off would be equally low. Likely Magnitude of effect is neutral.	Attenuation and drainage treatment is proposed, within the existing drainage network	The Liden Brook /River Cole SNCI is bisected by the scheme. The attenuation ditch structure has been constructed as proposed in the ES. A neutral effect on the water quality of the SNCI is likely as expected in the ES, although water quality monitoring results would be required to confirm this.
Scrub/woodland associated with central reserves, Commonhead roundabout island	Replacement tree/shrub planting along the central reserves and on Commonhead Roundabout would be less dense than the existing vegetation in order to avoid risk of use by Deer. This would reduce the potential nesting habitat and shelter for birds but would also discourage occasional crossing by mammals (less cover). Coupled with the provision of nest boxes in adjacent habitat the likely effect of the scheme is of minor negative magnitude as replacement planting would be less dense than existing and less mature (assuming assessment is based on growth at year 15).	Replacement tree and shrub planting would be carried out on embankments and pre-existing central reservation. Tree and shrub planting on the embankments of the scheme would, over the long term, provide feeding and shelter for birds from adjacent habitats. Bird and bat boxes would be provided.	Five bird nesting boxes have been provided in the Commonhead central roundabout. Bat boxes were a mitigation measure stated in the ES. A Species Action Plan (SAP) relating to bats was identified during the ES, and bats were identified during bat surveys, but no evidence of bat boxes has been provided. Existing vegetation that was removed during construction in the central roundabout has been replanted where possible. The effect is considered to be a slight negative as predicted in the ES.
Tree/scrub along Liden Bund	Additional tree/shrub planting on the Liden side of the new noise fence would, over time provide habitat for nesting birds in addition to the retained habitat. Effect of neutral magnitude. Potential for an impact of positive magnitude assuming nest boxes are used by birds.	Provision of nest boxes would provide additional nesting opportunities to supplement landscape planting. Nest boxes would be maintained annually.	Some additional tree and shrub planting has been carried out on the eastern side of the new noise fence providing some additional habitat. Ten bird nesting boxes have been provided. Six bat boxes have also been provided along the northern half of bund as expected. The bird and bat boxes have been provided as expected in the ES so the effect is as expected. If the bird and bat boxes are in fact being utilised the effect is better than expected in the ES. This could be verified by an ecological monitoring survey.
Trees/scrub along Liden Brook north of Commonhead	Indirect impacts from noise are likely to be of neutral magnitude.	None proposed. Provision of bird/bat boxes if possible by agreement would represent a	No bird or bat boxes were provided along Liden Brook. Therefore the effects of the scheme are likely to be neutral as predicted in the ES

	Effect predicted in ES	Mitigation	Evaluation of the Bio-diversity sub-objective
junction		positive impact.	
Breeding Birds	<p>Habitat lost to construction of the central reserves and Commonhead roundabout would be replaced but not on a like for like basis (see above). Elevation of the overpass above the existing A419 coupled with increased traffic speed could lead to a greater number of bird strikes by vehicles. Minor negative magnitude.</p> <p>Provision of nest boxes along Liden bund would provide alternative nesting habitat, the benefits of which would be increased if additional off-site provision could be secured by agreement (e.g. along Liden Brook). Overall magnitude likely to be minor negative overall unless off-site provision could be secured which could reduce the magnitude to neutral.</p>	<p>Loss of nesting habitat for birds would be mitigated over time by new planting and by providing nest boxes.</p> <p>A management plan would ensure the long term maintenance and contribute to the long term success of this mitigation.</p>	<p>On site nesting boxes have been provided and proposed planting has been carried out.</p> <p>No evidence has been provided that the off site provision of nesting boxes was possible. Employer's Agent stated that to their knowledge no agreement was agreed for these additional boxes, and they have not installed them.</p> <p>The effects of the scheme on breeding birds are likely to be slight negative as expected in the ES. The effect on breeding birds should be considered as part on ongoing ecological monitoring of the site. The effect on breeding birds should be considered as part of the five year after report.</p> <p>Ecological monitoring results should inform the long term management plan and the HEMP. The draft HEMP was not made available.</p>
Badgers	<p>Increased traffic speeds could lead to a higher risk that Badger which occasionally attempt to cross the road are killed. Likely magnitude of impact is minor negative.</p>	<p>Specific mitigation to reduce this slight risk (e.g. fencing) was not considered appropriate given the apparent low level of existing crossings and the lack of opportunity to direct animals to a safe crossing point.</p>	<p>No badger fencing was erected as expected. No animal mortality figures were available during this assessment. The five year after report could consider the animal mortality figures and assess the number of badger deaths.</p> <p>Ecological monitoring survey work should be conducted on site. The results should inform the HEMP which should include a plan for this species.</p>
Otters	<p>No habitat loss is associated with the scheme and the potential for indirect effects through reduction in water quality are considered to be of neutral magnitude given the minor increase in traffic volume.</p> <p>Increased traffic speed on the carriageway alongside Liden Brook and the attenuation pond, where otters may attempt to cross, could lead to increased road mortality. No casualties had been recorded along this section. In consideration of this, and the relatively small local population (known that 17 animals</p>	<p>Neither of the existing culverts at the Liden attenuation pond was suitable for retro-fit solutions e.g. ledges.</p> <p>No fencing was provided as it was considered that its use could be potentially damaging as it would serve to concentrate any attempted crossings into one area and could create an accident blackspot.</p>	<p>No evidence of otters in the area has been provided. Ecological monitoring survey work should be conducted on site. The results should inform the HEMP which should include a plan for this species. The draft HEMP was not made available.</p>

	Effect predicted in ES	Mitigation	Evaluation of the Bio-diversity sub-objective
	released in 1999) the potential impact could vary between minor and intermediate negative magnitude.		
Water Voles	No evidence was recorded during survey. No habitat loss is associated with the operational phase of the scheme so magnitude of the impact would be neutral.	None proposed.	No evidence of water voles in the area has been provided. Ecological monitoring survey work should be conducted on site. The results should inform the HEMP which should include a plan for this species.
Bats	Increases in traffic speed and vertical height of the road together with removal of vegetation along the central reserve could result in increases in bat mortality from vehicle collisions/and or increase the barrier effect of the road. Numbers of bats likely to be affected would be small based on survey data and magnitude of impact in the short – medium term would be minor negative at worst.	Bat boxes provided and maintained along Liden bund would enhance roosting opportunities for bats locally. Overall magnitude of impact in the long term likely to be neutral.	Bat boxes were provided along Liden Bund. Ecological monitoring work should be conducted on site and the results used to inform the long term management plan and the HEMP. The draft HEMP was not made available.
Reptiles	No evidence was recorded during survey.	No specific mitigation was required.	
Dormouse	No evidence was recorded during survey.	No specific mitigation was required.	

Key Findings

The ES and AST both predicted that the scheme would have a slight adverse effect on the Biodiversity sub-objective.

As it was before the junction improvement the Liden Brook /River Cole SNCI is bisected by the scheme. The attenuation ditch structure has been constructed as proposed in the ES and it is likely that there is a neutral effect on the water quality of the SNCI as expected in the ES. Water quality monitoring results would be required to confirm this.

Mitigation measures have been incorporated into the scheme as expected and it is likely that the impacts on biodiversity are as expected.

No additional bird and bat boxes have been provided off-site (which would have been by additional agreement, if possible).

No monitoring information or animal mortality data has been made available for this report and it is suggested that these aspects are reviewed as part of the five year after report.

No evidence of an ecological monitoring plan for any species or habitat has been provided during this assessment. Ecological monitoring work should be conducted on site and the results used to inform the long term management plan and the HEMP which should include a plan for all protected species recorded on site.

It is considered that the scheme has a slight adverse effect on the Biodiversity sub-objective as expected in the ES.

Heritage

Summary of Predicted Impacts

Table 5.12 contains a summary of the impacts predicted in the AST and the ES of the scheme on the Heritage sub-objective.

Table D.12 – Summary of predicted effects on the Heritage sub-objective

Origin of Assessment	Summary of Predicted Effect	Assessment
AST	The scheme may result in the disturbance of a Roman road, if it survives, and would have a minor detrimental effect on the rural historic landscape. These are considered to be slight adverse impacts of minor significance. There would be a slight adverse impact of minor significance on the setting of Liddington Castle, this would reduce to a neutral impact of neutral significance after 15 years.	Slight adverse
ES	There is the possibility that remains of a Roman road exist in the roundabout area and this would be investigated prior to construction. The proposed construction compound would be sited on an area of land adjacent to the roundabout where archaeological remains are unlikely. As the scheme is contained within the existing road corridor, the overall impact would be minor.	Slight adverse

Consultation

Swindon Borough Council commented that the impact on those heritage assets identified in the ES was, as predicted, neutral.

The archaeologist who conducted the on-site archaeological investigations explained that two trenches were excavated along the predicted location of the Roman Road. Whilst the route way was located there was no evidence found of the Roman Road surface. A medieval surface was found on the same alignment as well as a shallow ditch containing Bronze Age pottery. An excavation report was submitted to the Highways Agency. An article is expected to be published in 2009 in The Wiltshire Archaeological and Natural History Magazine titled 'Bronze Age Activity and a Medieval Hollow-way, A419 Commonhead Junction'.

Predicted effects, their mitigation, and the one-year-after evaluation

Table D.13 contains the effects predicted in the ES on the Heritage sub-objective and the proposed mitigation measures.

Table D.13 – ES predicted Effects, proposed Mitigation and the Evaluation of the Heritage sub-objective

Area	Effect predicted in ES	Proposed Mitigation	Evaluation of the Heritage sub-objective
Roman Road	The Roman road which may survive in the centre of the current roundabout island is likely to be heavily truncated, if not destroyed, by the scheme which would be a slight adverse impact.	The proposed mitigation comprises the excavation of one or more trenches along the anticipated line of the Roman road, within Commonhead roundabout island. A watching brief would take place during groundworks.	Two trenches were excavated along the predicted location of the Roman Road. Whilst the route way was located there was no evidence found of the Roman Road surface, however, a medieval road surface was found and it is likely that the Roman Road had already been reduced to a negligible surface before the addition of the Medieval road surface.
Late Bronze Age or Early Iron Age features	Any possible Bronze Age and Romano-British deposits surviving within the site are likely to be partially or wholly destroyed, which would be a slight adverse impact of neutral significance. The findspot of a Bronze Age sword is likely to be disturbed which would be a neutral impact.	A watching brief would take place during groundworks.	A shallow ditch containing Bronze Age pottery was found. It is likely that the effect is neutral as expected in the ES.
SAM - Liddington Castle Iron Age hillfort	The scheme would be visible from Liddington Castle which would be a slight adverse impact. This will be reduced to a neutral effect after 15 years, when vegetation will have matured.	Minimisation of the indirect effects of the scheme on the historic environment in terms of detrimental impact on setting through visual intrusion, noise and ambience.	The visibility of the scheme from Liddington Castle was not assessed during the site visit. The five year after report should assess if the planting has screened traffic and reduced the effect to neutral after 15 years.
SAM - Durocornovium Roman town	Of the two Scheduled Ancient Monuments within the visual envelope of the site, the site of Durocornovium is below ground and so does not have a setting that would be visually affected by the scheme therefore there is a neutral effect.	Minimisation of the indirect effects of the scheme on the historic environment in terms of detrimental impact on setting through visual intrusion, noise and ambience.	There are no direct impacts on Durocornovium Roman town, therefore the neutral effect predicted in the ES is likely to be as expected. This should be assessed during the five year after study.
Listed buildings	The scheme would be visible from twelve Grade II Listed buildings and one Grade I Listed building. This would not significantly affect their setting, so the impact is considered to be neutral.	Minimisation of the indirect effects of the scheme on the historic environment in terms of detrimental impact on setting through visual intrusion, noise and ambience.	The visibility of the scheme from the 12 listed buildings was not assessed during the site visit. Swindon Borough Council have commented that the effect on the majority of listed buildings is likely to be neutral as expected but that listed buildings located close to the scheme were likely to have experienced a positive effect due to an improvement in rural setting and ambience. The effect on listed buildings is likely to be better than expected in the ES.

POST OPENING PROJECT EVALUATION

A419 COMMONHEAD JUNCTION IMPROVEMENT – ONE YEAR AFTER

<p>Wanborough, Liddington, Badbury, and Hodson Conservation Areas</p>	<p>The four Conservation Areas from which the scheme would be visible would not be significantly impacted upon by the scheme and so the impact would be neutral.</p>	<p>No specific mitigation is proposed.</p>	<p>The effect is likely to be neutral as expected in the ES.</p>
<p>Historic hedgerows</p>	<p>The scheme would impact upon one hedgerow which may be considered of some cultural heritage value in the centre of the roundabout island. This would be a slight adverse effect.</p>	<p>Gaps in another hedgerow, also considered of cultural heritage value and present along the eastern highway boundary of the scheme, would be filled by planting as part of the mitigation of the scheme, hence restoring the hedgerow. This would have a slight beneficial effect.</p>	<p>The historic hedgerow to the east of the southbound carriageway to the south of Commonhead junction has been retained and new planting has extended the length of the hedgerow north to the junction to join other existing hedgerows and vegetation unaffected by the scheme. The historic hedgerow in the centre of the roundabout island was removed therefore the effect is considered to be slightly adverse as expected in the ES.</p>

Key findings

The ES and AST both predicted that the scheme would have a slight adverse effect on the Heritage sub-objective.

A total of six sites of archaeological significance were identified within an approximate 200m radius around Commonhead junction. A further eight archaeological sites were identified in the wider vicinity. These comprise of four prehistoric sites, six Roman sites, one medieval site, two post-medieval sites and undated human burial. There are no listed buildings, conservation areas or historic landscape features within the existing highway boundary.

The excavation report by Hart, J. & Alexander, M. (2007) published by Cotswold Archaeology, stated that, two areas were excavated to investigate the anticipated line of the Roman road. One trench to the north of the roundabout revealed a wide hollow or ditch, aligned to the modern road, and dated by pottery and a radiocarbon determination to the Middle Bronze Age. Excavation on the roundabout island revealed an undated linear hollow on the same alignment with a rutted surface at its base. The hollow was re-surfaced in the medieval period and eight horseshoe fragments were found on, or above, this surface. Although no evidence of a Roman road surface survived, the results suggest that the Roman road and its medieval and modern successors follow a more ancient alignment.

The Roman Road had already been reduced to a negligible surface before the addition of a Medieval road surface. Therefore, it is likely that the effect of the scheme are considered to be slightly adverse as expected in the ES.

A shallow ditch containing Bronze Age pottery was found. It is likely that the effect on Bronze Age features is neutral as expected in the ES.

The visibility of the scheme from the 12 listed buildings was not assessed during the site visit. Swindon Borough Council have commented that the effect on the majority of listed buildings is likely to be neutral, as expected in the ES.

The visibility of the scheme from the 12 listed buildings was not assessed during the site visit. Swindon Borough Council have commented that the effect on the majority of listed buildings is likely to neutral as expected but that listed buildings located close to the scheme were likely to have experienced a positive effect due to an improvement in rural setting and ambiance. The effect on listed buildings is likely to be better than expected in the ES.

The historic hedgerow on the east of the southbound carriageway south of Commonhead junction has been retained and new planting has extended the length of the hedgerow north to the junction to join other existing hedgerows and vegetation unaffected by the scheme. The historic hedgerow in the centre of the roundabout island was removed therefore the effect is considered to be slightly adverse as expected in the ES.

A copy of the archaeological evaluation report was requested but was not made available during this assessment. This report and the article to be published in 2009 in The Wiltshire Archaeological and Natural History Magazine should be reviewed during the five year after assessment.

The finds and archive will be deposited at Swindon Museum under accession number 2005/17.

Water

Summary of Predicted Impacts

Table 5.14 contains a summary of the impacts predicted in the AST and the ES of the scheme on the Water sub-objective.

Table D.14 – Summary of predicted effects on the Water sub-objective

Origin of Assessment	Summary of Predicted Effect	Assessment
AST	Features and elements present in the water environment are typical of the locality and the scheme will have negligible impacts on the surface and ground water quality and flows.	Neutral
ES	Greater protection for Liden Brook and Liden attenuation pond would be provided through the construction of an attenuation control structure on the main drainage ditch. In addition to Liden Brook there is a minor groundwater aquifer. New road drainage would minimise the effects on surface and groundwater quality and provide greater protection of the water environment.	Neutral

Consultation

The Environment Agency (EA) sample results indicate that there has not been a significant change in water quality within Liden Brook since the completion of the scheme. However, it should be noted that the EA only have six months of water quality data post February 2007 and so cannot state definitively whether the scheme has had a long term impact on Liden Brook.

Predicted effects, their mitigation, and the one-year-after evaluation

Table D.15 contains the effects predicted in the ES on the Water sub-objective and the proposed mitigation measures.

Table D.15– ES predicted Effects, proposed Mitigation and the Evaluation of the Water sub-objective

Water feature	Effect predicted in ES	Proposed mitigation	Evaluation of the Water sub-objective
Liden Brook	The drainage system as designed would maintain the quality and integrity of Liden Brook, its ecosystem and not significantly alter existing discharges. A neutral impact was predicted.	Road drainage would be passed through an attenuation control structure on the main drainage ditch prior to the discharge point on the Liden Brook.	Greater protection for the Liden Brook and Liden attenuation pond has been provided by the attenuation drainage ditch to the east of the southbound slip road to the north of the junction. The effect is considered to be neutral as expected in the ES. Long term effects would require further monitoring.
Liden attenuation pond	There would be no exacerbation of flooding potential within receiving watercourses or drainage ditches.	The drainage design for the scheme takes into account the slight increase in runoff from the new road through the construction of an attenuation control structure within the eastern drainage channel. During higher flow conditions some of the Liden Brook flow could bypass the culvert crossing to Liden attenuation pond and flow northwards along the channel on the east side of the A419 to rejoin the natural route of Liden Brook north of the pond.	Greater protection for the Liden Brook and Liden attenuation pond has been provided by the attenuation drainage ditch to the east of the southbound slip road to the north of the junction. The effect is considered to be neutral as expected in the ES.
Highway drainage	There would be an increased rate of run-off from the relatively impermeable carriageway that would be constructed over the pre-existing unpaved central reserve.	Highway run-off would be collected by concrete v-channels along the outer edge of both carriageways. Filter drains would be provided along all proposed embankment toes to collect slope run-off. These drains will discharge to the closest appropriate part of the existing drainage network. The increased rate of run-off from the new carriageway would be fully attenuated by proposed flow control structures to be built within the channel north east of the junction, up stream of the confluence with the Liden Brook and the subsequent existing attenuation pond.	Routine runoff within the scheme area passes into the local highway drainage network; there are no new direct outfalls to receiving waters as a result of the scheme. The local highway drainage network outfalls at the nearby water attenuation feature, in Liden, which in turn discharges to Liden Brook. The effect is considered to be neutral as expected in the ES.
Groundwater	ES predicted that groundwater was not at risk.	The proposed drainage design would minimise any effects on groundwater quality. No additional mitigation measures have been included in the scheme design in this respect.	The site is underlain by two minor aquifers. These do not feed any springs in the immediate vicinity of the site and are not used for water supply purposes. The site is unclassified on the local Environment Agency Groundwater Vulnerability Map and does not fall within a Source Protection Zone. The effect is considered to be neutral as expected in the ES.

Key Findings

The ES and AST both predicted that the scheme would have a neutral effect on the Water sub-objective.

The Environment Agency (EA) sample results indicate that there has not been a significant change in water quality within Liden Brook since the completion of the scheme. However, it should be noted that the EA only have six months of water quality data post February 2007 and so cannot state definitively whether the scheme has had a long term impact on Liden Brook. It is recommended that this aspect is reviewed in the five year after report.

Greater protection for the Liden Brook and Liden attenuation pond than pre-existed has been provided by the attenuation drainage ditch to the east of the southbound slip road to the north of the junction.

Mitigation measures including attenuation drainage ditch and highways drainage have been incorporated into the scheme as expected. There is no evidence to suggest they are operating other than as expected.

It is considered that the effect of the scheme on the Water sub-objective is neutral as expected in the ES.

Physical Fitness

Summary of Predicted Impacts

Table 5. contains a summary of the impacts predicted in the AST and the ES of the scheme on the Physical Fitness sub-objective.

Table D.26 – Summary of predicted effects on the Physical Fitness sub-objective

Origin of Assessment	Summary of Predicted Effect	Assessment
AST	Existing cyclist and pedestrian movements at the junction are small in number, the provision of a crossing could facilitate increased movements in the future.	Slight benefit
ES	No rights of way would be directly affected by the scheme. The scheme would improve access across the trunk road for pedestrians and cyclists	Slight benefit

Consultation

None of the consultees commented on physical fitness related issues.

Predicted effects, their mitigation, and the one-year-after evaluation

Table D.27 contains the effects predicted in the ES on the Physical Fitness sub-objective and the proposed mitigation measures.

Table D.2 7 – ES predicted Effects, proposed Mitigation and the Evaluation of the Physical Fitness sub-objective

Area	Effect predicted in ES	Proposed Mitigation	Evaluation of the Physical Fitness sub-objective
Public Rights of Way (PRoW)	There are four definitive PRoWs within the study area of the scheme. Three PRoWs are located to the east of the existing A419 and one PRoW to the west of the A419. None of the PRoW would be affected by the scheme.	The design of the scheme would provide a pedestrian and cyclist signalised crossing facility to the north of the junction, which would facilitate the safe crossing of the slip roads to the north of the junction. The crossing would also provide a cycle and pedestrian path connecting the proposed crossing to the existing paths on the A4259 to the west of the existing junction.	<p>The mitigation measures in the design are as expected in the ES. None of the four PRoW adjacent to the scheme have been affected by the scheme.</p> <p>The effect of the scheme on PRoW has been neutral as expected in the ES.</p>
Cycle routes	Cycle ways identified by Swindon Borough Council join with the proposed signalised crossing at Commonhead and thus would increase the various route options for cyclists in the area. In particular, there would be an improved access route to the White Horse Route from the residential areas to the south of Swindon.	The design of the scheme would provide a pedestrian and cyclist signalised crossing facility to the north of the junction, which would facilitate the safe crossing of the slip roads to the north of the junction. The crossing would also provide a cycle and pedestrian path connecting the proposed crossing to the existing paths on the A4259 to the west of the existing junction.	<p>The provision of the signalised junction for pedestrians and cyclists has improved the route for users crossing the junction (Photograph 5.6).</p> <p>The effect on the number of users could be assessed by consideration of a non-motorised user (NMU) survey conducted post construction and comparison with the NMU survey conducted for the ES. This was information was requested but it is not known if a NMU survey has been conducted post-construction.</p>
Severance	The A419 provides a point of community severance for some facilities most noticeably the Great Western Hospital.	The scheme would improve east-west movements for both motorised and non-motorised users from the residential communities to the east of the A419 as the through traffic would be removed from the existing junction. This would decrease the degree of severance caused by the A419.	The inclusion of the signalised crossing has reduced east-west severance caused by the A419.

Photographs

Photograph D.6 – The northern underpass taken from the A4259 facing north-east, showing the pedestrian and cyclist route crossing the signalled junction.



Key Findings

The ES and AST both predicted that the scheme would have a slightly beneficial effect on the Physical Fitness sub-objective.

None of the four PRow adjacent to the scheme have been affected by the scheme and the effect of the scheme on PRow is considered to be neutral as expected in the ES.

The inclusion of the signalised crossing has reduced east-west severance caused by the A419.

It is considered that the scheme is likely to have had a slightly beneficial impact on Physical Fitness as expected in the ES.

Journey Ambience

Summary of Predicted Impacts

Table 5.8 contains a summary of the impacts predicted in the AST and the ES of the scheme on the Journey Ambience sub-objective.

Table D.28 – Summary of predicted effects on the Journey Ambience sub-objective

Origin of Assessment	Summary of Predicted Effect	Assessment
AST	One layby will be closed but suitable substitute facilities are available. There would be reduced driver frustration for over 40,000 daily movements.	Large benefit
ES	The scheme would have no significant adverse impact on vehicle traveller views. There would be a slight adverse impact in relation to the closure of one lay-by on the south-bound carriageway, this is considered to be of negligible significance due to the availability of alternative facilities. Overall, the scheme would have beneficial impact in relation to the reduction of driver stress.	Benefit

Consultation

None of the consultees commented on journey ambience related issues.

Predicted effects, their mitigation, and the one-year-after evaluation

Table D.29 contains the effects predicted in the ES on the Journey Ambience sub-objective and the proposed mitigation measures.

Table D.29 – ES predicted Effects, proposed Mitigation and the Evaluation of the Journey Ambience sub-objective

	Effect predicted in ES	Proposed Mitigation	Evaluation of the sub-objective
View from the road	The scheme would have no significant adverse impact on vehicle traveller views. The only difference would be the short term increase in available views of the surrounding landscape (including the AONB) from the elevated overpass; this beneficial impact would reduce as the proposed landscape mitigation planting becomes more established. Therefore, the overall impact on traveller views would be neutral.	The removal of planting combined with the elevation of the carriageway would provide more open views to the east as the A419 overpass rises across the junction. The overpass would provide an elevated vantage for vehicle travellers but it also creates a large visual barrier, thus continuing the blocking views from the existing carriageway in a similar fashion to the existing vegetation.	<p>Whilst the view from the road is affected in the short term, the view from the road remains largely unaffected by the scheme. There has been some additional planting but this has been to fill gaps in existing planting to create a continuous band of vegetation along the carriageway where possible. The carriageway on embankment will have more open views to the east but views to the west will be restricted by the environmental barriers.</p> <p>It is considered that the effect of the scheme on views from the road will be neutral as expected in the ES.</p>
Driver stress	The ES predicted the scheme would reduce driver stress levels from high to low in the vicinity of Commonhead Junction. This represents a reduction in driver frustration due to improved traffic flows and increased vehicular speed.	The design of the scheme would result in the reduction of driver stress due to the provision of reduced queuing and increased traffic speeds in accordance with the national average.	<p>The congestion and safety objectives of the scheme have been fulfilled. The removal of the roundabout has reduced congestion and increased vehicular speed which is likely to have decreased driver frustration.</p> <p>It is considered that the effect of the scheme on driver stress is likely to be beneficial as expected in the ES.</p>
Traveller care	There would be a slight adverse impact in relation to the closure of one lay-by on the existing south-bound carriageway, this is considered to be of negligible significance due to the availability of alternative facilities.		The location of the alternative lay-by facilities referred to in the ES are not known. The impact on traveller care due to the closure of the lay-by should be considered during the five year after report.

Key Findings

The AST predicted that the scheme would have a large beneficial effect on the Journey Ambience sub-objective. The ES predicted that the scheme would have a beneficial effect on the Journey Ambience sub-objective.

The view from the road remains largely unaffected by the scheme. There has been some additional planting but this has been to fill gaps in existing planting to create a continuous band of vegetation along the carriageway where possible. The carriageway on embankment has more open views to the east but views to the west are restricted by the environmental barriers. It is considered that the effect of the scheme on views from the road is neutral as expected in the ES.

Overall, the scheme is considered to have had beneficial impacts in relation to the reduction of driver stress. The removal of the roundabout has reduced congestion and improved safety. It is considered that the effect of the scheme on driver stress is beneficial as expected in the ES.

One lay-by has been closed as a result of the scheme but this was predicted to have a negligible impact on traveller care. The impact on traveller care due to the closure of the lay-by should be considered during the five year after report.

Main Environmental Conclusions

- ◆ Based on traffic flows and mitigation measures only it is considered that the scheme is likely to have had a beneficial effect on the Noise sub-objective as expected.
- ◆ Since the traffic flows are as expected in the ES and congestion has reduced it is considered that the scheme is likely to have had a beneficial effect on the Air Quality sub-objective as expected. Greenhouse gas emissions have decreased as a result of the improved vehicle flow.
- ◆ There is slight overall adverse visual effect due to the presence of the embankment in the landscape, as predicted in the ES. The visual impact is dependent on successful establishment of the landscape planting, which should be assessed during the five year after report. Overall, it is considered that the scheme has a slight adverse effect on the Landscape sub-objective as expected.
- ◆ Mitigation measures for biodiversity have been incorporated into the scheme as expected and it is likely that the impacts on biodiversity are slightly adverse as expected in the ES. However, no additional bird and bat boxes have been provided off-site. Overall, it is considered that the effect of the scheme on the Biodiversity sub-objective effect is as expected.
- ◆ The visibility of the scheme from Liddington Castle SAM or from the 12 listed buildings was not assessed during the site visit. The effect on these buildings should be considered during the five year after study. The effect of the scheme on the Heritage sub-objective is likely to have been slightly adverse as expected.
- ◆ Greater protection for the Liden Brook and Liden attenuation pond than pre-existed has been provided by the attenuation drainage ditch to the east of the southbound slip road to the north of the junction. The effect of the scheme on the Water sub-objective is neutral as expected.
- ◆ The inclusion of the signalised crossing has reduced east-west severance caused by the A419. The scheme is likely to have had a slightly beneficial impact on Physical Fitness as expected.
- ◆ One lay-by has been closed as a result of the scheme but this was predicted to have a negligible impact on traveller care. The impact on traveller care due to the closure of the lay-by should be considered during the five year after report. If the effect of the lay-by closure has been negligible as predicted in the ES then overall the scheme is likely to have had a beneficial impact on Journey Ambience as expected.