

Post Opening Project Evaluation

M27 J11-12 Climbing Lanes

One Year After Study



June 2010

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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.
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.
AM	denoting the morning peak period
AST	Appraisal Summary Table. This records the impacts of the scheme according to the Government’s five key objects for transport, as defined in Daft guidance contained on its Transport Analysis Guidance web pages, Web TAG
BCR	Benefit Cost Ratio. The ratio between the monetised benefits and costs of a scheme, used as a measure of value for money in economic terms
CEMP	Construction Environmental Management Plan
CO ₂	Carbon dioxide.
COBA	Cost Benefit Analysis – a computer program traditionally used to compare scheme costs with the monetary benefits of savings in time, vehicle operating costs and accidents. COBA may also be used to calculate accident benefits only, if time and operating cost benefits are assessed by other means.
Daft	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 POPE.
Do-Minimum	In forecasting, this is the road network without the proposed scheme.
Do-Something	The road network with the proposed scheme. Modelling results from the Do-something case are compared with the Do-minimum case, to show the effects of the scheme.
ES	Environmental Statement.
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.

FYA	Five Years After scheme opening
HEMP	Handover Environmental Management Plan
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.
HLTP	Hampshire Local Transport Plan.
IP	Inter Peak, the time between the AM and PM peaks
JTDB	The Highways Agency's journey time database.
Light vehicle	Not a HGV. For traffic flow data, it is a vehicle less than 5.2m in length.
MAC	Managing Agent Contractor. A company appointed by the Highways Agency to maintain trunk roads in a defined area.
NATA	New Approach to Transport Appraisal. Used since 1998.
NMU	Non-Motorised User. Pedestrians, cyclists and equestrians.
NO _x	Oxides of nitrogen
NO ₂	Nitrogen dioxide
NPV	Net Present Value (PVB minus PVC).
OYA	One Year After scheme opening
Part 1 Claims	Under Part I of the Land Compensation Act 1973 ('the Act'), compensation can be claimed by people who own and also occupy property that has been reduced in value by more than £50 by physical factors caused by the use of a new or altered road.
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.
PM	Evening peak period
PM ₁₀	Particulate Matter 10 microns or less in diameter
PROW	Public Right of Way
PVB	Present Value of Benefit. The sum of scheme benefits expressed in the value of a designated present value year.
PVC	Present Value of Cost. The sum of scheme costs expressed in the value of a designated present value year.
SEEDA	South East of England Development Agency.

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Severance	Community severance is the separation of adjacent areas by road or heavy traffic, causing negative impact on non-motorised users, particularly pedestrians.
SINC	Site of Importance for Nature Conservation.
SPA	Special Protection Area (for wild birds)
SSSI	Site of Special Scientific Interest. Designated for biological or geological importance.
STATS19	A database of injury accident statistics recorded by police officers attending accidents
TEMPRO	The DfT's national trip end model, that provides traffic growth forecasts.
TRADS	The Highways Agency's database of traffic counts on motorways and trunk roads.
Vehicle hours	Vehicle hours refers to the total time spent by all vehicles using a road and is expressed normally as a yearly value. For example, if 10,000 vehicles a day used a route with a 6 minute journey time, then the route's vehicle hours for the year would be 365,000.
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

Scheme Description

This is a Highways Agency major scheme to provide climbing lanes approximately 1.1 miles (1.8 km) long in each carriageway, approaching a summit between junctions 11 and 12 of the M27. The widened sections of carriageway are now 4 lanes wide, and return to 3 lanes by outside lane merging.

Objectives	Objective Achieved?
• To improve traffic flows and reduce congestion (ES)	Yes
• To minimise environmental impacts (ES)	Yes
• To improve safety (public exhibition leaflet)	Too early to conclude
• To improve journey times and reliability (public exhibition leaflet)	Yes

Main Findings

- Traffic flows were predicted not to change as a result of the scheme, and this has been confirmed.
- Time savings were better than predicted, hence the economic benefit is better than predicted.
- Accident levels were predicted to be unchanged with the scheme, and this had been confirmed.
- The outturn cost of £13.2 million is almost exactly as predicted.
- Environmental outcomes are broadly as predicted.
- Noise and local air quality are generally as expected. Greenhouse gas emissions are greater than before (due to higher vehicle speeds) but the increase is less than predicted.
- Landscape and biodiversity: mitigation measures are generally in line with proposals, although it is too soon to evaluate the establishment of new planting. The proposed motorway lighting has been reduced, resulting in less light impact than predicted
- The impacts on heritage, water, physical fitness, and journey ambience are generally as predicted.

Summary of Scheme Impacts

Traffic

- The traffic volume on the M27 J11-12 is about 116,800 vpd, one year after scheme opening. This is about 3% lower than before the scheme. This is similar to reductions observed at other nearby sites, and to general background traffic reduction.

- It is therefore likely that traffic levels have been influenced by the economic recession, and not by the scheme.
- Even though the expected traffic increase due to background traffic growth has not occurred, the actual traffic flow remains within 10% of the prediction.
- Journey time savings have been greater than predicted. Average peak journey time savings are 32 seconds (compared with 15 seconds predicted). Average offpeak journey time savings are 5 seconds (compared with 2 seconds predicted).

Safety

- There has been a small reduction in accidents and casualties, but the change is not statistically significant.
- The accident rate before the scheme was a little higher than the national average, and is now about the same as the national average.
- There was no reduction in the number of accidents following scheme opening, this is in line with expectation. This conclusion is based on one year of post opening accident data and therefore requires further analysis in the five year after study.

Environment

- Noise and local air quality are likely to be generally as expected, although additional noise mitigation is likely to mean that the noise impact is a little better than expected for a few properties. Greenhouse gas emissions are greater than before (due to higher vehicle speeds) but the net increase is less than predicted.
- Landscape and biodiversity: mitigation measures are generally in line with proposals, although it is too soon to evaluate the establishment of new planting. The proposed motorway lighting has been reduced, resulting in less light impact than predicted.
- The impacts on heritage (neutral), water (slightly beneficial), physical fitness (neutral), and journey ambience (neutral) are generally as predicted

Accessibility

- The scheme was limited to works within the existing motorway boundary, and has not had an impact on community severance or the public transport services available.

Integration

- The scheme is generally supported by regional and local land use policies, including the Regional Spatial Strategy for the South East.

Summary of Scheme Economic Performance

- The outturn cost was £13.2 million, almost exactly as predicted, while the Present Value of Cost (PVC), which is lower due to the indirect tax revenue, is £4.9 million.
- The monetary benefit from time saving is re-forecast to be £94.6 million, higher than predicted. No safety benefit was predicted, or seems likely to result from the scheme, based on the first year of operation.

Costs and Benefits (2002 present value year)	Forecast	Outturn
Journey Time Benefit	£65.7m	£94.6m
Safety Benefits	n/a	n/a
Present Value Benefits (60 years)	£65.7m	£94.6m
Investment Costs	£13.3m	£13.2m
Indirect Tax revenue	-£8.3m	-£8.4m
Present Value Costs	£4.9m	£4.9m
Benefit Cost Ratio (BCR)	13.4	19.3

1. Introduction

Background

- 1.1 The M27 Junction 11-12 Climbing Lanes scheme is a major scheme of the Highways Agency which opened in September 2008. The scheme provided additional lanes approximately 1.1 miles (1.8 km) long, in each direction on the approach to the crest of a hill. The scheme was designed to separate slow-moving heavy goods vehicles from faster traffic, and improve the general vehicle flow on this section of motorway.
- 1.2 The M27 is a strategic route between Portsmouth and Southampton, and forms part of the Trans-European Network (TERN) along the south coast of England. The M27 carries the highest traffic volumes in the south coast corridor. The link between junctions 11 and 12 is situated on the northern fringe of Portsmouth. The location of the scheme and its context within the road network is shown below in Figure 1.1.
- 1.3 The scheme falls within the Highways Agency Area 3, and the managing agent is EnterpriseMouchel. The motorway link is located in the geographic county of Hampshire, however it crosses the administrative boundary between Hampshire County Council in the west, and the unitary authority of City of Portsmouth in the east.



Figure 1.1 – Location of M27 J11-12 Climbing Lanes

The Scheme

- 1.4 This section of the M27 was previously of 3-lane standard along the whole link. The road rises to a summit approximately mid-way between junctions 11 and 12. The new eastbound climbing lane starts as a continuation of the Junction 11 eastbound on-slip, and continues for a distance of approximately 1.7 km, terminating about 600 metres east of the Hill Road overbridge. The return to normal carriageway width here is achieved by the fourth (outside) lane tapering into the third lane. Therefore traffic in the inside climbing lane need not change lanes past the end of the scheme.
- 1.5 The westbound carriageway widening starts about 200 metres west of the Paulsgrove Rail underbridge, with an additional outside lane, which continues for a distance of about 1.8 km. This also terminates with a taper from the outside lane.
- 1.6 Along the length of the scheme, the nearside (climbing) lane has the standard width of 3.65 metres. The other lanes are reduced slightly to 3.50 metres. There is a 3-metre wide nearside hard shoulder, a 1-metre offside hard strip, and a 3-metre central reserve. The nearside hard shoulder width is reduced at bridges.
- 1.7 The location of the climbing lanes in relation to other features of the road is shown below in Figure 1.2.

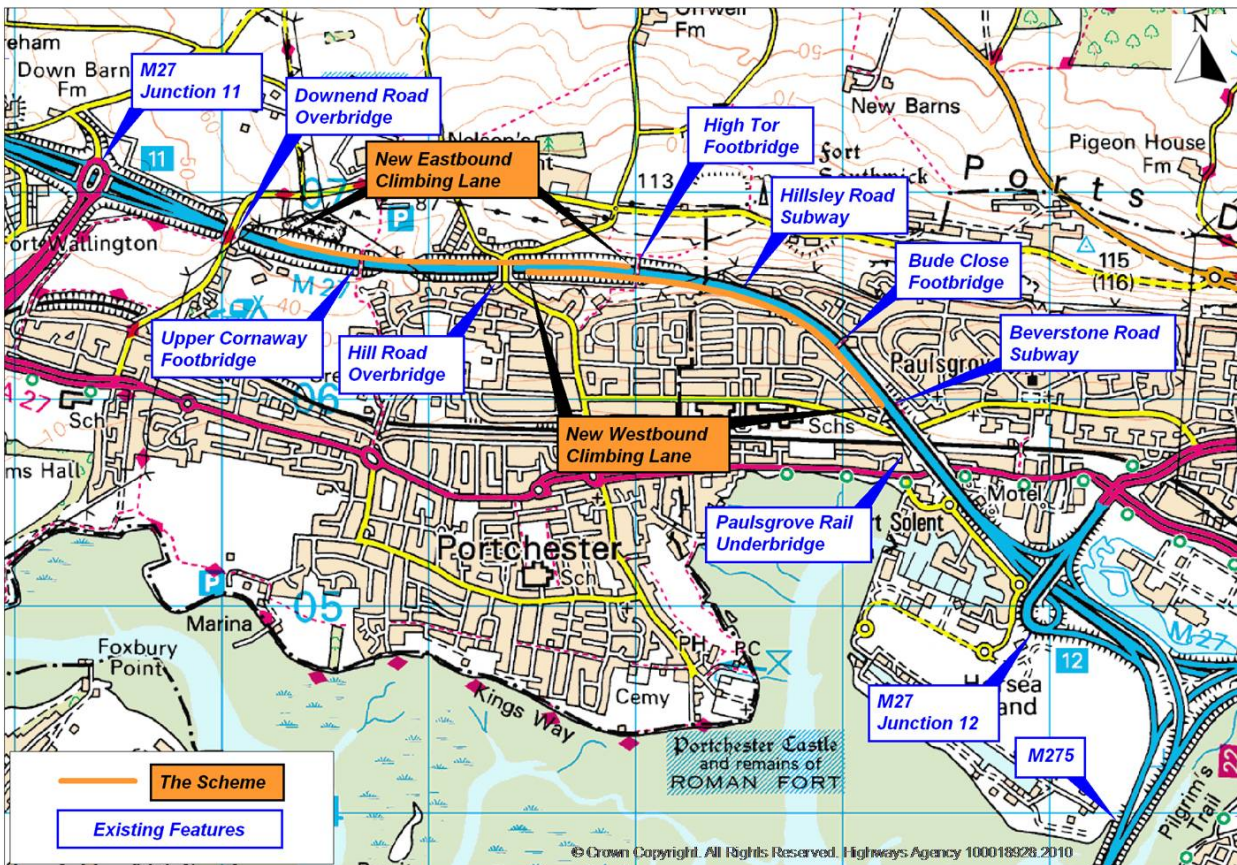


Figure 1.2 – Scheme Layout

History of the Scheme

- 1.8 The gradients leading up to the crest of the hill, approximately midway between the two junctions, mean there is a high proportion of slow moving traffic, which before the scheme, caused disruption to the flow and hence congestion. The reduction in overall vehicle speed caused by the slow-moving heavy vehicles on the uphill gradients, had been causing

concern for a number of years. Climbing lanes were proposed in the M27 Integrated Transport Study of 2001, and again in the South Coast Multi-Modal Study of 2002. The scheme entered the Highways Agency's Targeted Programme of Improvements in 2005. This is now known as the Major Schemes Programme.

- 1.9 A Public Inquiry was held in October 2006, with the Decision announcement and Orders being made in February 2007. Construction started in January 2008, and the scheme was open to traffic in September 2008.

Scheme Objectives

- 1.10 The objectives of the scheme, as given in the Environmental Statement, July 2006 (ES), were:
- To improve traffic flows and relieve congestion; and
 - To minimise adverse environmental impacts.
- 1.11 In addition to the above, two other objectives were listed in the Public Exhibition leaflet dated November 2005:
- To improve safety; and
 - To improve journey times and reliability.
- 1.12 Regarding safety, the Forecasting & Economics Report found that there would be no accident saving, and the AST gave a neutral safety assessment.

The POPE Report

- 1.13 The Highways Agency has a requirement to carry out post-opening evaluations of its Major Schemes, to identify how far the predicted objectives and benefits have been achieved. This report represents the One Year After (OYA) report for the M27 Junctions 11-12 Climbing Lanes, and is prepared under the Post-Opening Project Evaluation (POPE) Commission. This will be followed by a Five Years After (FYA) report in 2014.
- 1.14 This report evaluates the scheme impacts against a number of criteria dictated by the key objectives set out in WebTag:
- 'Before' and 'After' traffic, and a comparison with predictions;
 - A comparison of 'Before' and 'After' journey times;
 - An analysis of changes in accidents;
 - The outturn economic benefits, based on the changes in traffic volumes, journey times, and accidents;
 - A summary of how the scheme contributes to key policy and wider accessibility objectives;
 - A comparison of the outturn cost with the predicted cost;
 - A comparison of the environmental impacts with those predicted; and
 - A review of the original Appraisal Summary Table (AST) in the form of a new Evaluation Summary Table (EST).

Structure of the Report

1.15 The remainder of this report is structured as follows:

- **Chapter 2** discusses the traffic flows, journey times, and comparisons with forecasts;
- **Chapter 3** considers safety;
- **Chapter 4** derives updated economic benefits based on vehicle-time and accident savings and compares these with forecasts;
- **Chapter 5** reviews the environmental impacts of the scheme and evaluates the mitigation measures described within the ES;
- **Chapter 6** considers accessibility and integration;
- **Chapter 7** presents the original Appraisal Summary Table (AST), and then re-evaluates the outcomes with an Evaluation Summary Table (EST); and
- **Chapter 8** summarises the main conclusions of the report.

Sources

1.16 The following sources were used in compiling this report:

- Traffic data from the Highways Agency Traffic Information System (HATRIS);
- Accident data provided by Hampshire Police;
- Journey time surveys commissioned specifically for this study;
- Appraisal Summary Table (March 2006);
- Report of Surveys and Baseline Conditions (January 2005);
- Forecasting and Economics Report (July 2006);
- COBA files (July 2006);
- Environmental Statement, volumes 1-3 (July 2006);
- Non-Technical Summary of the Environmental Statement (July 2006); and
- Other environmental documents as detailed in the relevant section.

2. Traffic Impact

2.1 This chapter sets out key changes in traffic behaviour following the formal opening of the M27 J11-12 improvements. The chapter explicitly explores the schemes impact on local traffic volumes and journey times and provides some discussion on the role of the recession on traffic demand along this part of the M27.

Traffic Volumes

2.2 Traffic data has been obtained from the TRADS database of counts on trunk roads and motorways for the months of October 2007 (before the start of scheme construction) and October 2009 (one year after opening). Traffic volumes are tabulated below, and are shown on the map in Figure 1.1. These are average 2-way daily flows, without correction for background growth.

Table 2.1 – Before & After Traffic Volumes (AADT)

Location	Before (Oct 07)		1 Yr After (Oct 09)		Volume Difference
	Volume	% Heavy	Volume	% Heavy	
1 M27 between Junctions 10 - 11	107,200	13%	106,200	12%	-1%
2 M27 between Junctions 11 – 12	120,200	12%	116,800	10%	-3%
3 M27 between Junction 12 & A3	61,400	14%	60,800	13%	-2%
4 A27 East of A3	117,800	11%	117,600	10%	-0%
5 A27 Link to M27 Junction 11	50,000	13%	48,900	12%	-2%
6 M275 South of M27	84,900	8%	81,500	8%	-4%

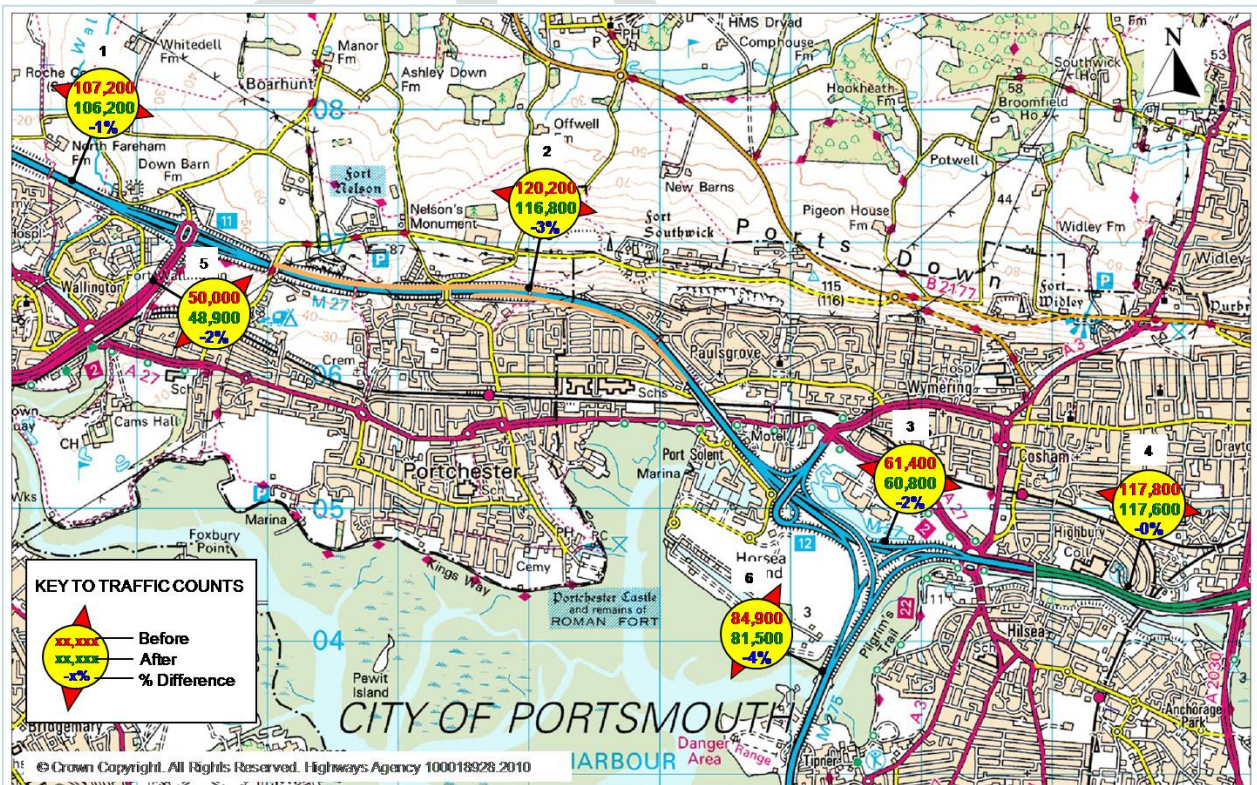


Figure 2.1 – Before & After Traffic Volumes (AADT)

2.3 Figure 2.1 shows that the flows one year after opening were lower than those before the scheme, at all the sites. The difference ranges from only 200 vehicles per day (vpd) on the A27 east of the M27, to 3,400 vpd on the M27 J11-12. Traffic volumes at the monitored sites were up to 4% lower than those before opening.

2.4 Although figure 2.1 gives a snapshot of traffic flows at two particular points in time, it is also useful to see these in the context of longer-term trends. Figure 2.2 gives an indication of growth at the local and regional levels, by plotting vehicle-kilometres travelled in each year from 2000 to 2008 (the most recent year for which data is available)¹. Since the graph aims to show trends rather than absolute numbers, the figures for southeast England have been divided by 5, and those for Southampton and Portsmouth have been multiplied by 10, to give similar magnitudes and allow them to be plotted on the same graph. The following points may be noted from Figure 2.2:

- There has been growth at all regional levels between 2000 and 2007.
- In 2008 there was a reduction in travel, no doubt due to national economic recession.
- The growth for Hampshire appears to have been a little greater than for all southeast England, and this was shared by the cities of Southampton and Portsmouth until 2004; however there has been no traffic growth in those cities since then.

2.5 At the time of writing, 2008 is the latest year for which regional traffic data is available. However provisional national figures are available for 2009, and these show a continued fall of 1.3% from 2008 to 2009. If traffic at the sites shown in Figure 2.1 followed the national trend, then it would be expected that all sites would show a reduction between 2007 and 2009. Indeed this is what is observed.

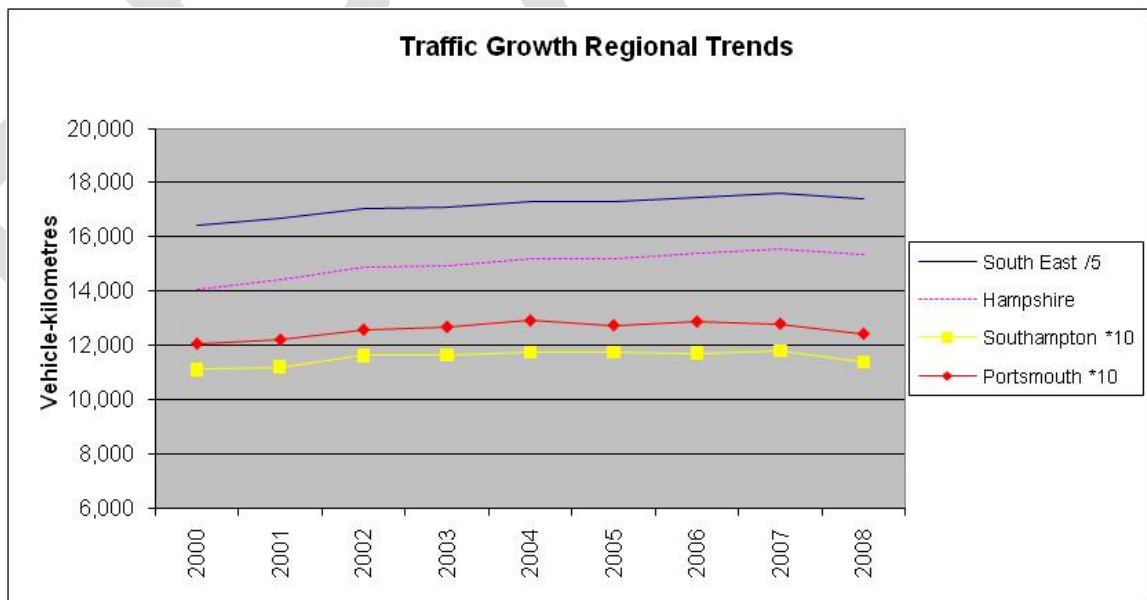


Figure 2.2 – Regional Traffic Trends

¹ From DfT Transport Statistics for Local Authorities 1993-2008

- 2.6 Figure 2.3 shows variation in AADT on the links shown in Figure 2.1, plus two other M27 links to the west. These are shown from 2000 to 2009, except for those sites which only have data from 2005.
- 2.7 At the sites shown in Figure 2.3, the rate of traffic growth was highest in the early part of the decade, and reached a maximum around 2006/7. There was then a decline. It may be noted that the decline was sharpest in 2008 on the M27 J11-12, but flows almost recovered to the previous level by 2009. Because the dip corresponded to the time of the scheme construction, and because it was most noticeable on the one link affected by scheme construction, it may be concluded this dip was due to a temporary reassignment of traffic to alternative routes due to the roadworks in addition to the effects of recession. Once completed, the scheme did not affect traffic volumes.

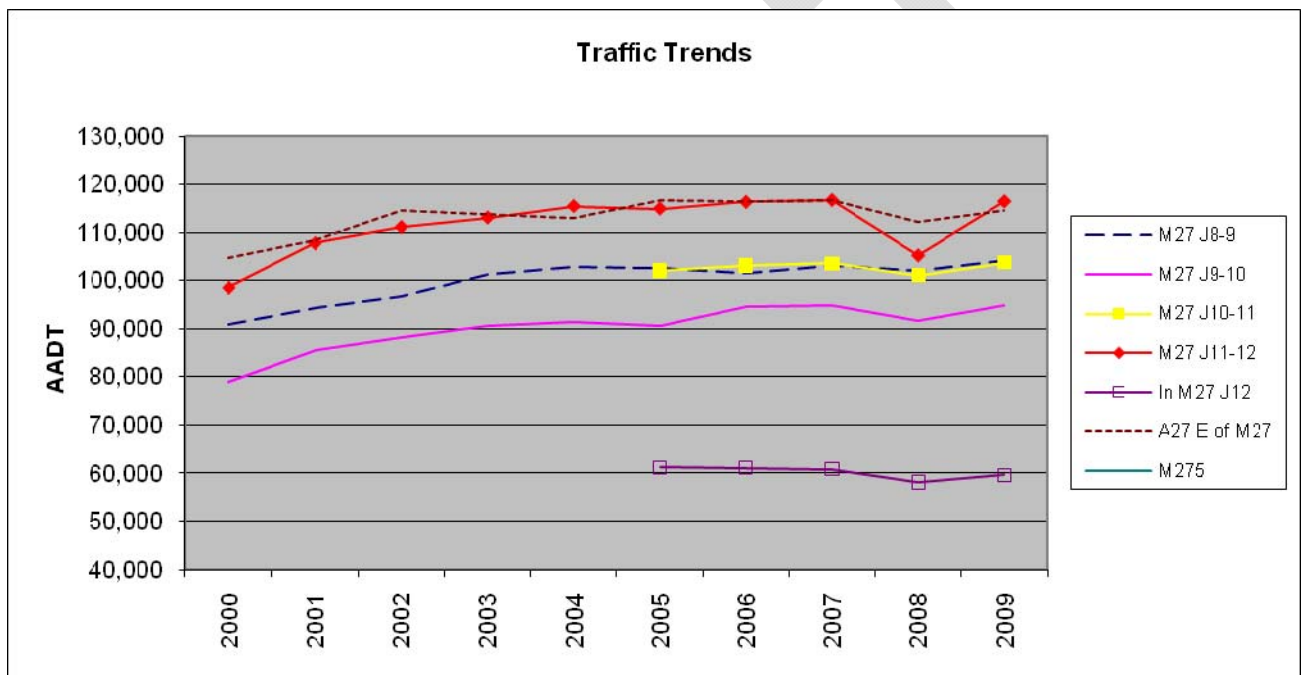


Figure 2.3 – Traffic Volume Trends

- 2.8 Traffic growth on the various links of the M27, and the background growth at the various regional levels, were relatively uniform between the years 2002 and 2007. This growth averaged 1.0% per year. Therefore it might be reasonable to assume that in the absence of an economic downturn, growth would have continued at this level from 2007 onwards. In such a case, 'After' volumes in 2009 would have been 2.0% higher than 2007 levels.
- 2.9 These graphs suggest that the construction of the scheme had only a temporary effect on traffic levels (reduced flows for the duration of the works). However, long term there has been not been a significant decrease or increase in volume.

Comparison of Predicted and Actual Traffic Volumes

- 2.10 The *Forecasting and Economics Report (July 2006)* gives baseline 2003 flows and predicted flows for the years 2009 (the first year of the scheme), 2024, and 2031. The predictions are the same for the Do-Minimum (DM) and Do-Something (DS) cases. In the following tables, actual observed flows (AADT) are compared with the 2009 predictions.

2.11 Table 2.2a provides a comparison of the un-adjusted predicted and out-turn flows DS and DM flows.

Table 2.2a – Comparison of Predicted and Actual Traffic Volumes – Un-factored Flows

Link	Do Minimum			Do Something		
	Predicted DM - 2009	Actual Before Count*	% Diff	Predicted DS 2009	Actual DS 2009	% Diff
M27 J10-11	112,800	107,200	-5%	112,800	106,200	-6%
M27 J11-12	125,900	120,200	-5%	125,900	116,800	-7%
M27 In J12	66,800	61,400	-8%	66,800	60,800	-9%

*proxy only – reflects pre-opening flows in 2007 only

2.12 The results show that both the DM and DS traffic flows have been reasonably well forecast and lie within a range of 5% -9%. However it is important to recognise that actual traffic flows have been partially influenced by a background reduction in demand to travel caused by the recent economic downturn. This is considered in the section that follows.

2.13 Table 2.2b provides a further comparison of predicted and out-turn traffic volumes adjusted to account for recessionary impacts. The key assumptions made in Table 2.2b are summarised as follows:

- Predicted Do Minimum and Do Something flows have been kept constant in line with the original forecasts summarised in Table 2.2a;
- Actual Do Minimum flows (collected in 2007) have been increased by 2% to account for the annual growth evident before opening;
- Actual Do Something flows (collected in 2009) have been increased by 5% - this assumes that had the recession not occurred then traffic volumes would have a net increase of 2% in contrast to the observed 3% reduction on the M27 between 2007 and 2009.

Table 2.2b – Predicted and Actual Traffic Volumes – ‘Adjusted Actual Flows’

Link	Do Minimum			Do Something		
	Predicted DM 2009	Actual DM 2007 +2%	% Diff	Predicted DS 2009	Actual DS 2009 +5%	% Diff
M27 J10-11	112,800	109,300	-3%	112,800	111,200	-1%
M27 J11-12	125,900	122,600	-3%	125,900	122,500	-3%
M27 In J12	66,800	62,600	-6%	66,800	63,800	-4%

2.14 The effect of adjusting the observed flow information to account of the recessionary impacts on M27 traffic confirms that forecasts would have been more accurate had the recession not occurred, with flows being an average of 3.3% lower than forecast.

2.15 An alternative approach to removing the effect of the recession would be to factor all flows (predicted and actual) back to 2007 levels. The following assumptions are made:

- Predicted 2007 DM and DS flows were directly interpolated from the 2003 and 2009 flow forecasts.

- The actual 'Before' was left unchanged;
- The actual 'After' flows (actual DS flows) were factored up by 3% (to bring flows in line with 2007 levels).

2.16 The results of these adjustments are summarised in Table 2.2c.

Table 2.2c – Predicted and Actual Traffic Volumes – ‘Predicted’ Factored

Link	Do Minimum			Do Something		
	Predicted interpolated to 2007	Actual 2007	% Diff	Predicted interpolated to 2007	Actual +3%*	% Diff
M27 J10-11	109,100	107,200	-2%	109,100	109,200	0%
M27 J11-12	121,800	120,200	-1%	121,800	120,300	-1%
M27 In J12	64,600	61,400	-5%	64,600	62,700	-3%

*Actual 2009 flows uplifted by 3% back to 2007 levels

2.17 In all cases the observed flows are a little lower than predicted, with flows on average being 2% less than forecast. In summary, the results presented here have illustrated that had the recession not occurred, flow predictions on the whole would have been more accurate. The implications of these trends on economic benefits in considered further in the latter sections of this report.

2.18 The forecasting used a traffic model with a 2003 base year. Growth to 2009 was forecast in accordance with TEMPRO and NRTF97. Owing to the economic downturn, observed growth has been lower than this overall, which accounts for the differences shown in Table 2.2. The forecast assumed that the scheme would not increase traffic flows along this section of the M27. The observed data in each of the above scenarios confirms indicates that this assumption was correct.

Journey Times

2.19 The JTDB database was interrogated for journey times on link M27 J11-12, for a 12-month period before the start of scheme construction (November 2006 – October 2007), and a 12-month period after scheme opening (November 2008 – October 2009). The following comparisons have been made:

- The daily link travel times (average between 07:00 and 19:00), averaged over all the days in each month –Figure 2.4; and
- The journey times for each hour of the day, averaged over all days in the year – Figure 2.5.

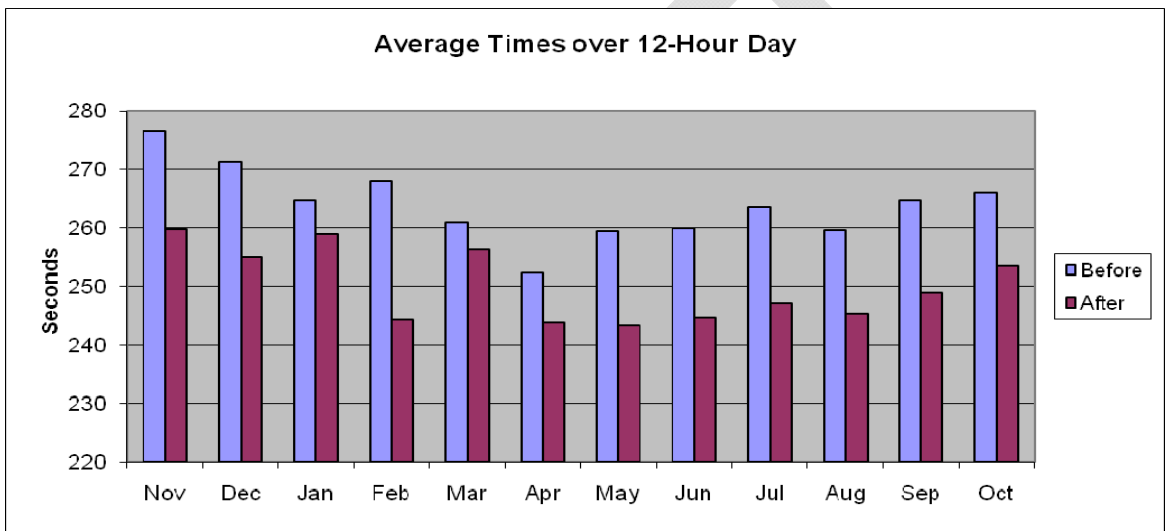


Figure 2.4 – Comparison of Average Daily Link Times during the Year

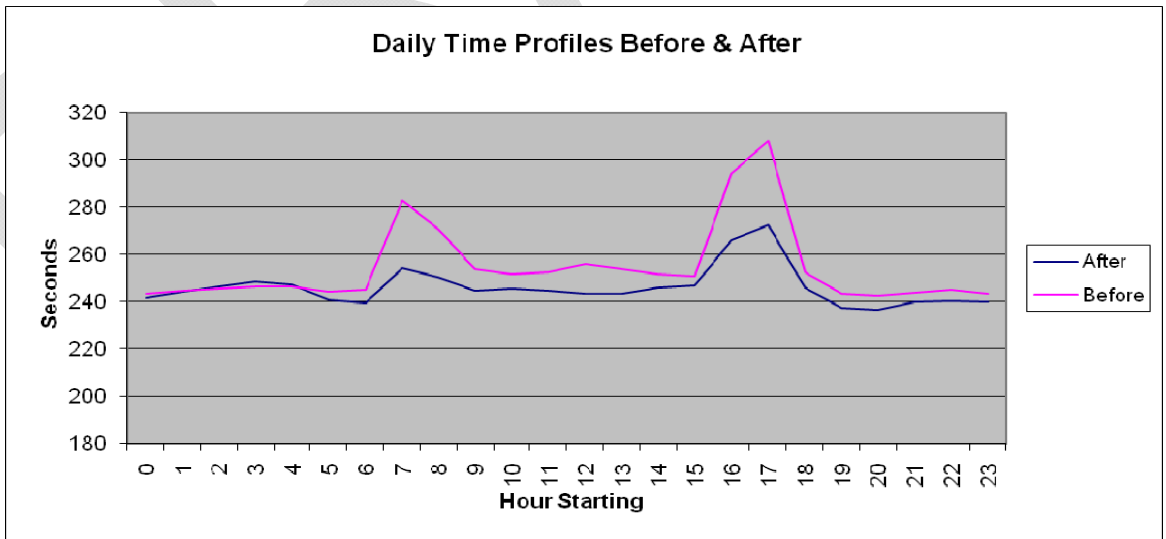


Figure 2.5 – Average Hourly Link Times During the Day

2.20 Figure 2.4 shows there was a seasonal variation in journey times (reflecting seasonal variation in traffic flows) in both years, but in all months the ‘After’ times were clearly

lower than 'Before'.. Figure 2.5 shows that link times during the night were very similar in both years, but times during the day, and particularly at peak times, have improved in the 'After' year. This indicates that traffic is now able to keep moving at a higher speed while there is high traffic flow.

Journey Time Comparison with Prediction

2.21 No predicted time savings are quoted in the Appraisal Summary Table (AST) for this scheme, but modelled times may be obtained from the COBA files. These are compared with the actual times in the table below.

Table 2.3 – Predicted and Actual Link Times (Seconds) on M27 J11-12

		Without Scheme (Do-Min)	With Scheme (Do-Some)	Saving
Predicted	Off peak	243	241	2
	Peak	306	291	15
Actual	Offpeak	248	243	5
	Peak	296	264	32

2.22 Table 2.3 shows that time savings were predicted to arise mainly in the peaks, and this is confirmed by the actual data from the JTDB. However, the observed savings have been greater than predicted, with an average of 5 seconds being saved off peak, and 32 seconds being saved in the peak. However these savings should be considered in the context of background traffic reductions caused by the recession.

Main Traffic Conclusions

- The volume of traffic on M27 J11-12 one year after opening is about 116,800 vehicles per day (vpd), 3% lower than before the scheme. Traffic has also fallen at other count sites in the vicinity;
- Traffic volumes on the A27 remain relatively unchanged indicating limited re-assignment between the A27 and M27 following the improvements – this is consistent with the traffic forecasts;
- Heavy vehicles (over 5.2 metres in length) accounted for 12% of total volume 'Before' the scheme and 10% 'After' – a relatively marginal change;
- The main reason for the forecasting inaccuracy was the economic recession;
- The traffic reduction is likely to be a result of the economic recession. It was predicted that the scheme would not affect traffic volumes, but these would increase in line with general background growth;
- The actual flows are within 10% of predictions, even though the expected background growth has not occurred. The level of accuracy improves where flow figures are adjusted to account for recessionary effects;
- After the scheme, average daily link journey times have reduced, and the reduction is most evident in peak periods; and
- The average off-peak saving has been 5 seconds compared with 2 seconds predicted, and the average peak saving has been 32 seconds compared with 15 seconds predicted. It is not however clear how much of this individual saving can be attributed to the scheme due to background recessionary effects.

3. Safety

Introduction

- 3.1 Improving safety was not a scheme objective in the ES presented at Public Inquiry, but it was highlighted in the Public Exhibition Leaflet. Accident benefits were not considered in scheme forecasting, on the grounds that standard accident rates in COBA for 4-lane motorways are the same as for 3 lanes, hence COBA would be unable to calculate a benefit.
- 3.2 Nevertheless, accident rate changes are evaluated for all major schemes under POPE. For the present scheme, accident data has been obtained to test whether the climbing lanes have actually had an impact on safety.
- 3.3 It is usual in accident studies to consider 3-5 years' data, therefore any results obtained one year after scheme opening must be regarded as provisional, reflecting only emerging trends.

Data Sources

- 3.4 In order to evaluate the impact on safety, records of personal injury accidents (PIA's) between junctions 11 and 12 were obtained from Hampshire Constabulary. The data is based on the records of PIA's recorded in the STATS19 data recorded by the local police when attending accidents.
- 3.5 The accident data referred to in this report has not necessarily been derived from the national validated accident statistics produced by DfT. As such, the data may subsequently be found to be incomplete or contain inaccuracies. The requirement for up-to-date information and site specific data was a consideration in the decision to use unvalidated data and, as it is sourced from the police it is sufficiently robust for use in this context.
- 3.6 The periods covered are:
- Five complete years before the start of scheme construction (January 2003 – December 2007), and
 - One year after scheme opening (November 2008 - October 2009).

Numbers of Accidents and Casualties

- 3.7 The numbers and severities of accidents 'Before' and 'After' are shown in Table 3.1. The severity of an accident is determined from the worst casualty resulting from the accident. Some accidents have more than one casualty, and so the equivalent information for casualties is shown in Table 3.2.

Table 3.1 – Before & After Accidents

Year		Slight	Serious	Fatal	Total	Severity Index
Before	2003	24	3	0	27	
	2004	18	1	1	20	
	2005	16	1	0	17	
	2006	25	1	1	27	
	2007	15	2	0	17	
	Total	98	8	2	108	0.093
	Av per year	19.6	1.6	0.4	21.6	
After	2008/09	17.0	1.0	0.0	18.0	0.056
Average Annual Saving		2.6	0.6	0.4	3.6	

Table 3.2 – Before & After Casualties

Year		Slight	Serious	Fatal	Total	Severity Index
Before	2003	43	3	0	46	
	2004	30	2	1	33	
	2005	23	1	0	24	
	2006	31	2	1	34	
	2007	20	2	0	22	
	Total	147	10	2	159	0.075
	Av per year	29.4	2.0	0.4	31.8	
After	2008/09	25.0	1.0	0.0	26.0	0.038
Average Annual Saving		5.4	1.0	0.4	5.8	

3.8 The key points shown by this data are:

- There were 108 injury accidents in the study area during the five years before scheme construction. This represents an average of 21.6 accidents per year;
- For comparison, there were 18 accidents over the single year after scheme opening;
- The number of accidents in the 'After' year is 3.6 (or 17%) lower than the average of the five 'Before' years. However the 'After' total is within the range of numbers in the 'Before' 5 years, and is thus considered consistent with those before the scheme;
- The severity index for accidents (defined as the proportion of serious + fatal accidents to the total) has fallen from 0.093 to 0.056; and
- There were 159 casualties during the five 'Before' years, or an average of 31.8 per year, and this fell to 26 in the single 'After' year.

Accident Rates

- 3.9 Accident rates are more meaningful when they take into account the changing volume of traffic. For this purpose it is common to use the measure of 'personal injury accidents per million vehicle-kilometres' (PIA/mvkm). This has been done in Table 3.3 below.

Table 3.3 – Accident Rates

	Accs/ Year	Dist (km)	AADT	Annual mvkm	PIA/ mvkm	Nat avg PIA/mvkm
Before	21.6	5.2	120,200	228.140	0.095	0.078
After	18.0	5.2	116,800	221.686	0.081	0.070

- 3.10 The accident rate has fallen from 0.095 PIA/mvkm 'Before', to 0.081 PIA/mvkm 'After'. This reflects the reduction in the annual average number of accidents, and the reduced traffic volume.
- 3.11 The last column of the table shows the national average accident rate for this type of road. It will be seen that the observed accident rate was higher than the national average 'Before' the scheme, but has become more similar to the national average 'After'.
- 3.12 It will also be noted that the national average figure is a little lower 'After' than 'Before'. This does not reflect the change in road standard due to the scheme, since average rates are the same for 4-lane as for 3-lane motorways. The decrease is due to the general fall in accident rates over time.

Statistical Significance of Results

- 3.13 To assess the statistical significance of changes in accident rates following an improvement, it is common in accident studies to use the chi-squared test. The purpose of the Chi Squared test is to compare the observed number of accidents with an expected value. The test result then establishes whether the change is significant or likely to have occurred by chance.
- 3.14 A test has been carried out on the accident data given above, and this does not show a statistically significant change. Thus the drop in the average annual number of accidents may have occurred by chance, and not as a result of the scheme.

Accident Locations Before and After

- 3.15 The locations of accidents in the five years before the start of scheme construction are shown in Figures 3.1 (for eastbound traffic), and Figure 3.2 (westbound). Similarly the accident locations in the year after opening are shown in Figures 3.3 and 3.4. These are plotted from the grid references given in the data records.
- 3.16 The purpose of these maps is to identify whether there is any spatial change in the distribution of accidents after opening compared to before opening. The traffic directions have been separated because this might show whether accidents are related to road gradients. Bearing in mind that the crest of the hill is approximately mid-way between junctions 11 and 12, eastbound traffic would be climbing over the western half of the link, but descending over the eastern part of the link, and conversely for westbound traffic.
- 3.17 The figures actually show that before the scheme accidents were fairly evenly distributed along the link, but with slightly higher concentrations at each end. From this it is

concluded that hill gradient did not influence accidents, but the presence of junctions may have been a contributing factor. In the single year after opening, there were too few accidents to discern a spatial pattern.

3.18 It may be noted that in the 'Before' period, there were more accidents in the eastbound direction (60), than westbound (48). This may be a matter of chance, and the 'After' accidents are evenly split by direction.

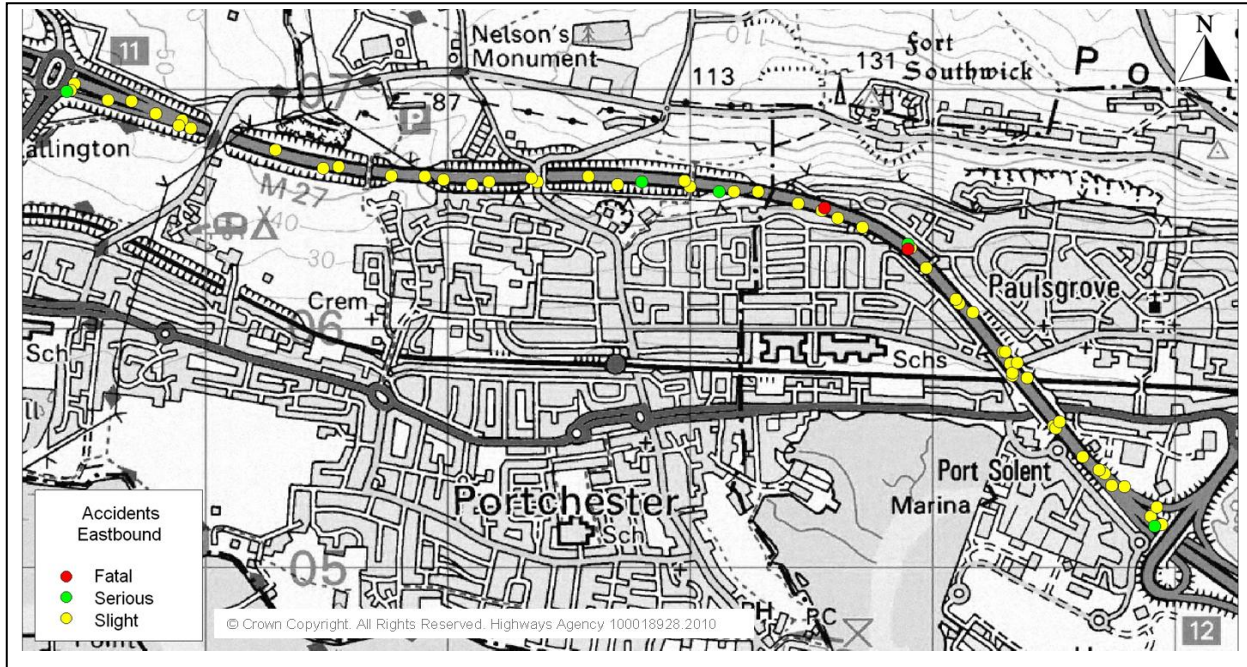


Figure 3.1 – Locations of Accidents Eastbound in 5 Years Before Scheme Construction

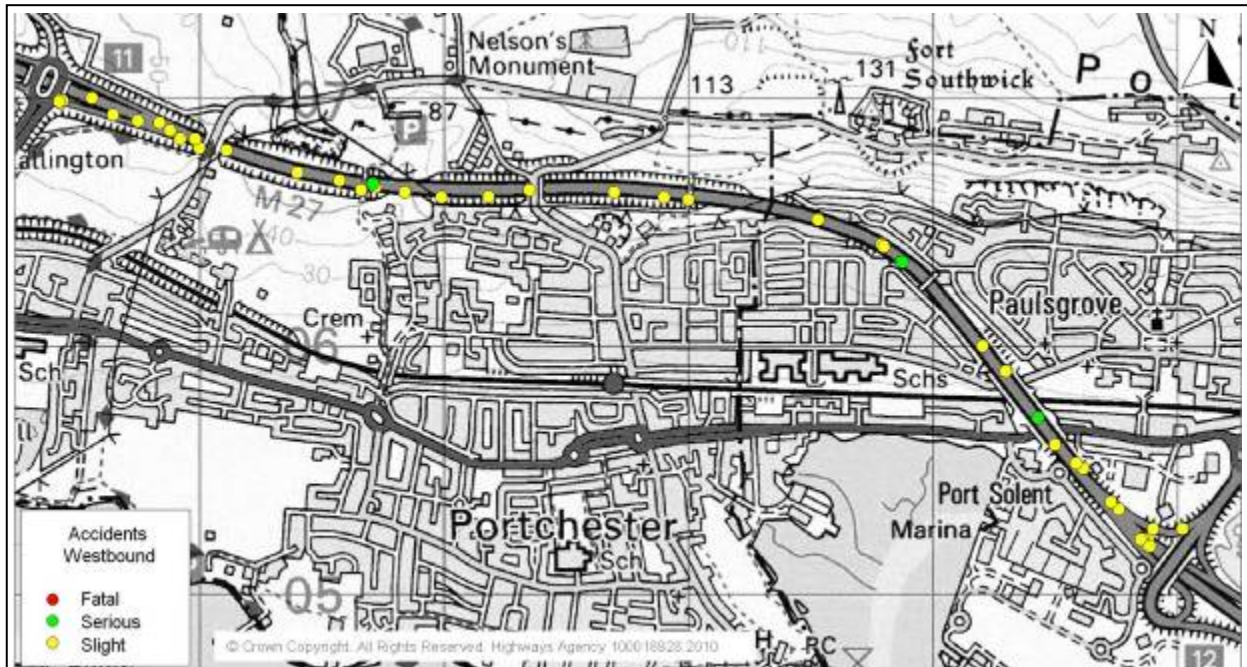


Figure 3.2 – Locations of Accidents Westbound in 5 Years Before Scheme Construction

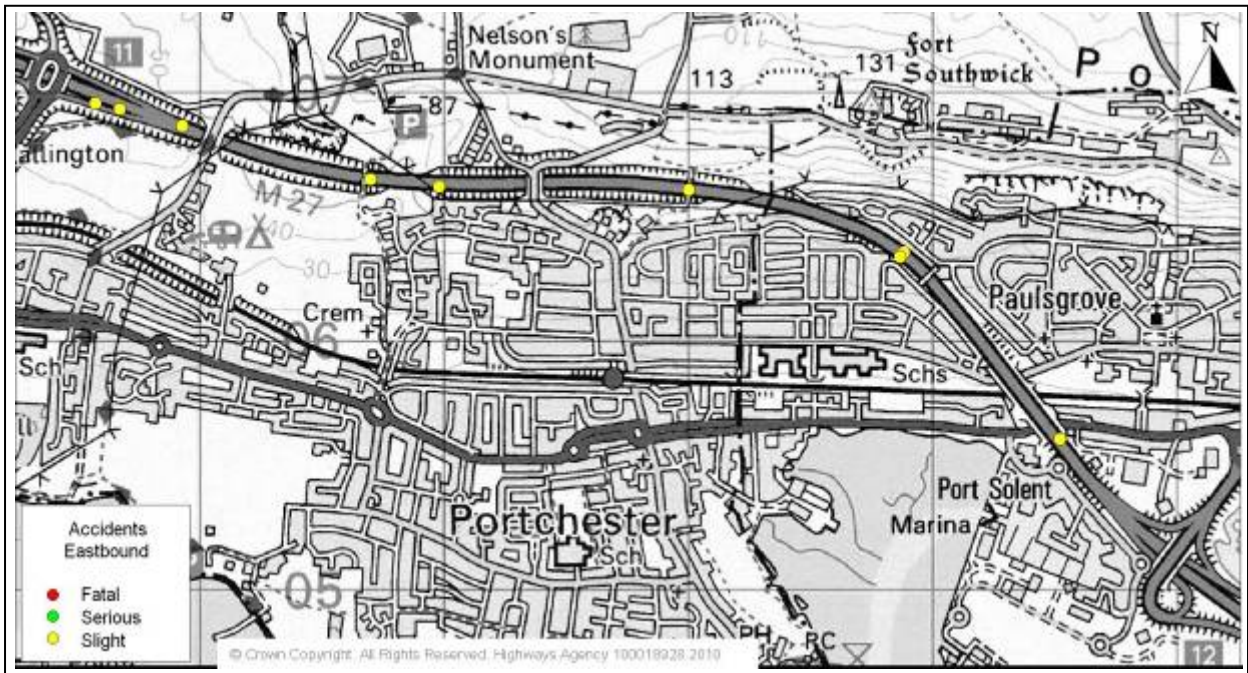


Figure 3.3 – Locations of Accidents Eastbound in 1 Year After Scheme Opening

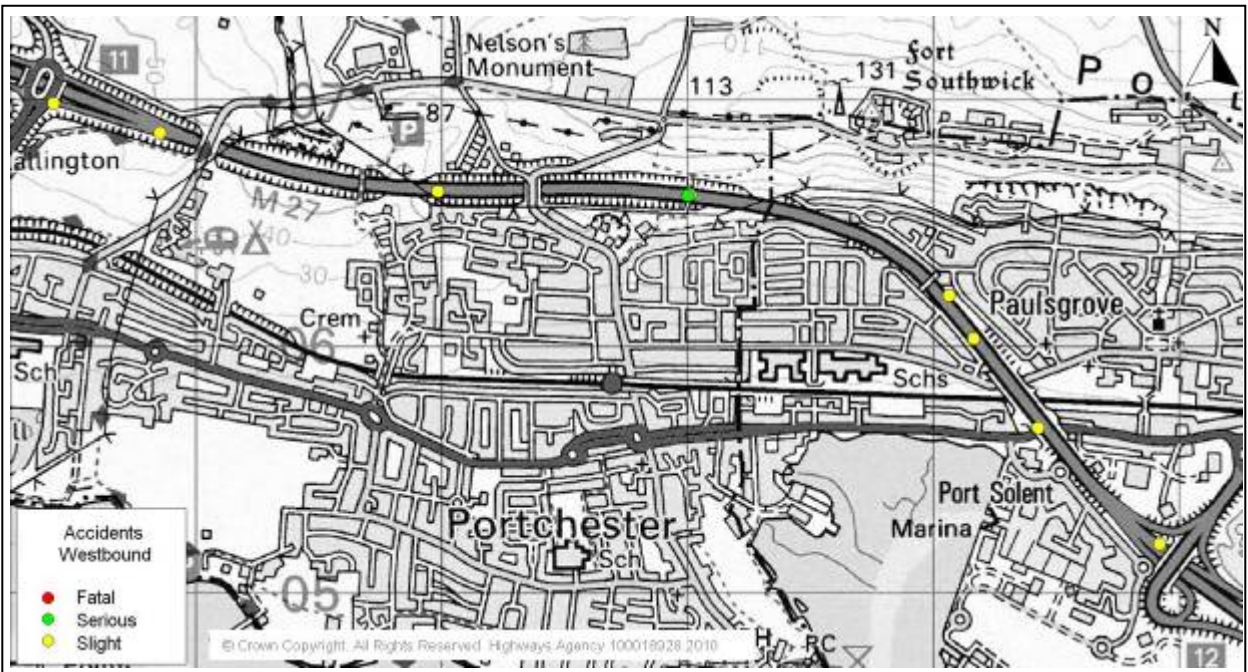


Figure 3.4 – Locations of Accidents Westbound in 1 Year After Scheme Opening

Impact on Accident Types

- 3.19 Road improvements may affect the types of accidents occurring as well as their frequencies. Table 3.4 shows numbers of accidents occurring 'before' and 'after' in different categories.
- 3.20 This reveals that there have been no significant changes in the proportions of the major categories of accident. Shunts on the main carriageway were the most common type of

accident, followed by lane-changing collisions, and single vehicle accidents. These rankings have remained the same since the opening of the scheme, and the proportions of these accident types have remained approximately the same, although the proportion of shunts has increased slightly.

Table 3.4 – Before and After Accident Categories

Category	Before		After	
	No. per year	%	No. per year	%
Shunt on main carriageway	7.4	34%	8	44%
Lane-change collision on main carriageway	5.2	24%	4	22%
Single vehicle loss of control	4.8	22%	3	17%
Shunt on slip road	1.6	7%	2	11%
Collision at slip merge	1.2	6%	1	6%
Vehicles colliding with out-of-control vehicle	0.8	4%	0	0%
Collision with object or animal in carriageway	0.6	3%	0	0%
Total	21.6	100%	18	100%

Security

- 3.21 Improving security was not a scheme objective, and no impact on security was predicted. There have been no changes to the indicators given in WebTAG 3.4.2 that would suggest any security impact.

Main Safety Conclusions

- The spatial distribution of accidents both before and after the scheme suggests that road gradient has not been a contributory factor;
- There has been a small reduction in the average number of accidents and casualties, but this is not statistically significant;
- The accident rate 'Before' was 0.095 PIA/mvkm, and has fallen to 0.0781 PIA/mvkm 'After';
- The accident rate was higher than the national average for this type of road 'Before', and remains slightly higher than the national average 'After';
- The proportions of different types of accident have not changed appreciably, with shunts remaining the most common; and
- Results based on one year's data should be treated as provisional, pending more reliable conclusions in the Five Years After report.

4. Economy

Introduction

- 4.1 The POPE methodology for evaluating monetary benefits of major schemes normally uses observed data, from which it is possible to evaluate the two most important components of economic benefit, namely:
- Vehicle-time savings; and
 - Accident Savings
- 4.2 Annual vehicle-hours have been measured from TRADS traffic counts and JTDB journey times in both the before and after situations, on the scheme link. No factoring for background growth has been carried out, as the evidence indicates this has not occurred. The vehicle-hours are calculated from the product of volume multiplied by journey time.
- 4.3 The COBA model files are available for this scheme and the model has been re-run with the option of showing 2009 journey times in order to calculate the predicted vehicle-hour savings on the same links as for those observed. From this, it is possible to derive the observed:predicted ratio of vehicle-hour savings. This ratio is applied to the predicted 60-year monetary benefit of time savings, to give a new re-forecast of the time benefit (this may be referred to as the 'actual' benefit for brevity).
- 4.4 Monetised accident benefits are normally treated in exactly the same way, using the observed accident reduction. However for this particular scheme, the forecasting did not consider accident benefits, therefore these will not be included in the evaluation of the scheme economics

Journey Time Benefits

- 4.5 As shown in Table 4.1, the central-case COBA model prediction was that the scheme would save 114,335 vehicle-hours in its first full opening year (2009). The value of the actual saving depends partly on the 'After' value of the traffic volume. Given the complexity of the recessionary traffic issue and its overall impact on reducing traffic volumes on the M27 between 2007 and 2009, the preferred option here is to use a figure identical to the 'Before' value, that is to assume that traffic volume has not changed, and that the change in vehicle-hours is solely due to time savings. This is version 'A' in Table 4.1. In this case, the saving works out to 164,576 vehicle-hours, which is about 1.4 times the forecast value.
- 4.6 The total monetary benefit from time savings alone (i.e. excluding vehicle operating cost changes) over the 60-year appraisal period was forecast to be £65.7 million. Since the actual time saving is about 1.4 times higher than forecast, the monetary benefit may be multiplied by this amount, to give a value of £94.6 million as the re-evaluated 60-year benefit.

Table 4.1 – Time Saving and Monetary Benefit

	Predicted	A) Actual (unchanged flow)	B) Actual (reduced flow)	C) Actual (increased flow)
VHrs saved in Opening Year	114,336	164,576	247,761	162,696
Time Benefit (60 yr)	£65.7m	£94.6m	£142.3m	£93.5m

- 4.7 The 2002 present-value year used for the scheme forecasting is the same as that used in POPE evaluation, therefore no re-basing is necessary. The figures are in market prices.
- 4.8 Table 4.1 also shows, in italics, the results based on alternative assumptions about 'After' traffic volumes. Version 'B' is based on the observed reduced flow. This results in a higher value of vehicle-hour savings and hence of the monetary benefit. While this is strictly in accordance with observations, it is not considered to provide the most appropriate measure of impact, because the traffic reduction is due to extraordinary economic conditions which may not be sustained.
- 4.9 A third alternative, labelled 'C' in Table 4.1, is to assume continued traffic growth at the observed pre-2007 rate. This assumption would remove the temporary effect of the economic recession. However, where traffic flow increases, it is customary to apply the 'rule-of-half' methodology, whereby the additional trips receive half the time benefit, and this increases the total benefit. In this case, the time saving would be 162,696 vehicle-hours (a very similar value to version 'A').
- 4.10 In all cases, the benefit exceeds predictions, because the actual journey time saving, from JTDB data, is greater than forecast. This higher than average saving should still be treated with some caution, given that the unexpected reduction in traffic volumes will have offered some degree of saving in its own right i.e. less traffic typically equates to faster journey times. In summary, version 'A' is the preferred approach to calculating opening year benefits and 60 year re-forecast benefits.

Accident Benefit

- 4.11 The scheme forecasting did not consider accident benefits, on the grounds that COBA standard default rates for 4-lane motorways are the same as for three lanes, hence COBA would be unable to calculate a benefit. This is in conformity with DfT guidance issued in 2004, which also applied to three climbing lane schemes on the M5. However it is in contrast to the procedure used with the recent M27 J3-4 Widening scheme, where actual historic accident data for the Do-Minimum was compared with default rates for the Do-Something, to derive a benefit.
- 4.12 In this POPE evaluation of the present scheme, accident data has been obtained to test whether the scheme has in fact had any impact on safety, and the results were presented in Chapter 3. In summary, a small improvement was observed, but the change was not statistically significant. Since accident benefits were not included in the scheme forecasting, they are not considered in this POPE economic evaluation.

Scheme Costs

- 4.13 POPE is required to obtain the full outturn cost of the scheme, and to compare this with the predicted cost. The costs are converted to a standard 2002 price base, to permit comparison with other major schemes.
- 4.14 The information is used for two purposes:
- To check whether the scheme was built to budget. Undiscounted costs are used for this purpose; and
 - To compare the cost with actual monetary benefits in a re-evaluation of the Benefit Cost Ratio (BCR) over the 60-year appraisal period. This uses costs discounted to 2002 at 3.5% p.a., converted to market prices.

- 4.15 The outturn costs for the years 2004 to 2009 have been obtained from the Regional Finance Manager, in October 2009. The total as-spent cost was £15.9 million. This value and the conversion to 2002 price base are shown in the 'Outturn' column of the following Table 4.2.

Table 4.2 – Outturn Costs (£ million)

	Predicted	Outturn
Cost, total as spent	£16.0m	£15.9m
Cost at 2002 prices	£13.3m	£13.2m
Cost discounted to 2002	£11.0m	£10.9m
Cost converted to market prices	£13.3m	£13.2m
Indirect tax revenue	£-8.4m	£-8.3m
Present Value of Cost (PVC)	£4.9m	£4.9m

- 4.16 The forecast cost has also been provided by the scheme project manager. It is the final estimate before the award of contract, and is dated August 2007. The figure is £16.0 million, including a 3% optimism bias, and the conversion for POPE purposes is shown in the 'Predicted' column of Table 4.2. The predicted construction cost in 2002 values and expressed as market prices was £13.3 million. The outturn figure was marginally lower than this, £13.2 million.
- 4.17 The total Present Value of Costs takes into account the impact of indirect tax revenue resulting from the scheme, which in this case increases, that is to say more tax is gained from the extra fuel consumed due to higher vehicle speeds. This is deducted from the construction cost. The PVC becomes £4.9 million, both predicted and outturn.

Benefit Cost Ratio

- 4.18 A scheme's value for money is measured by the BCR. Using the recommended approach to calculating benefits explained in paragraph 4.5, the BCR is evaluated at 19.3, compared with a predicted value of 13.4. The difference is due to higher than predicted benefits.
- 4.19 Note that WebTAG guidance has recently changed, such that indirect tax revenue is now treated as a positive benefit, instead of a negative cost. The effect in this case would be to reduce the BCR to 7.8. The new procedure is not adopted here, because it is felt more important to present results in the same form as the predictions.
- 4.20 This shows that the scheme has produced a good economic return.

Table 4.3 - Scheme Costs and Benefits (2002 Base)

	Predicted	Actual
Benefit	£65.7m	£94.6m
PVC	£4.9m	£4.9m
BCR	13.4	19.3

- 4.21 It should be noted that the BCR ignores non-monetised impacts. In New Approach to Transport Appraisal (NATA) assessments, the impact on environment, accessibility, and integration objectives must be assessed, but are not monetised. The evaluation of these objectives is covered in later chapters.

Reliability

- 4.22 The Forecasting and Economics Report (FAER) quotes Route Stress as a proxy for Reliability. This is essentially a measure of volume:capacity, with values between 75% and 125% being considered to be related to Reliability. The FAER predicted that stress would fall from 99% to 85%, giving a moderate improvement in reliability. The AST did not give a quantitative forecast, but described the impact as ‘moderate beneficial’.
- 4.23 The capacity of a link depends on the number of lanes. In this case the improvement has given 4 lanes in each direction where there are climbing lanes, and there remain 3 lanes where no climbing lanes. The prediction was based on a value of 3.5 lanes in each direction for the Do-Something case, because throughout the link there are a total of 7 lanes in both directions. The same value is therefore used in this POPE evaluation.
- 4.24 The following table shows predicted and actual route stress values. Versions ‘A’, ‘B’, and ‘C’ of the actual value use traffic assumptions corresponding to those described previously in connection with time benefits.

Table 4.4 – Route Stress

	Before	After
Predicted	99%	85%
Actual (A – unchanged flow)	100%	86%
Actual (B – reduced flow)	100%	83%
Actual (C – increased flow)	100%	88%

- 4.25 The re-evaluation gives ‘After’ route stress values close to the prediction, whichever option is considered. From guidance contained in WEBTAG Unit 3.5.7, these would all be scored as “moderate beneficial”. Nevertheless these values do indicate that some congestion remains.

Wider Economic Impacts

- 4.26 The AST stated that Paulsgrove and Wymering were subject to South East of England Development Agency (SEEDA) single regeneration funding, but the scheme was not in a regeneration area. The assessment was ‘neutral’.
- 4.27 SEEDA made a £2 million grant in year 2000 under the single regeneration budget, with the aim of facilitating access to IT skills, offering easy access to the internet, and using technology to promote community contact and support in Paulsgrove and Wymering. It is not considered that these objectives have been furthered by the M27 J11-12 Climbing Lane scheme.
- 4.28 In view of the fact that the scheme does not serve a designated regeneration area, and regeneration was not an objective, it is considered that Wider Economic Impacts have been neutral.

Main Economy Conclusions

- The 60-year monetary benefit from time savings is re-evaluated as £94.6 million, which is greater than predicted, although is a conservative estimate given the uncertainties regarding the effects of the recession on traffic levels in the vicinity of the improvement.
- Accident benefits are not included in the economic forecasting of climbing lane schemes, and are therefore not considered here. This may be vindicated by the fact that one year after opening, no statistically significant reduction in accident numbers has been observed;
- The cost of construction is £13.2 million, almost exactly as predicted. When indirect tax revenue is allowed for the PVC becomes £4.9 million, the same as predicted; and
- The BCR is 19.3. This is more favourable than predicted because of the higher than expected benefits, and demonstrates a good economic return. (Note however that the BCR would be 7.8 if indirect tax revenue was treated in the way most recently proposed.)
- There has been an improvement to reliability, as measured by Route Stress.

5. Environmental Impacts

- 5.1 This chapter summarises the findings of the OYA evaluation of the environmental sub-objectives of the scheme. In relation to environment, the Environmental Statement stated that the scheme would:

“...improve the existing conditions where possible and minimise and mitigate environmental impacts on areas within and adjacent to the length of the M27 concerned.”

Data Collection

- 5.2 The following documents have been used in the compilation of this chapter of the report:

- Appraisal Summary Table, 28 July 2006;
- M27 Junctions 11 to 12 Climbing Lanes Environmental Statement, July 2006, Volume 1 Text, Volume 2 Appendices and Volume 3 Figures;
- M27 Junction 11-12 Climbing Lane Study, Forecasting and Economics Report, July 2006;
- M27 Junction 11-12 Climbing Lanes Handover Environmental Management Plan (HEMP), Draft September 2008, Draft updated January 2009;
- Environmental Commitments Register, 20 March 2009; and
- As Built drawings for Planting Design, March 2008, and Landscape Design, December 2008.

- 5.3 A full list of the background information requested and received to help with the compilation of this chapter of the report is included in Table A.1 in the Appendix.

Site Inspection

- 5.4 A site inspection was undertaken in November 2009. This included a review of the physical aspects of the scheme and inspection from publically accessible locations (e.g. footpaths, over bridges, subways).

- 5.5 Where possible, viewpoint locations noted in the landscape and visual assessment chapter of the ES were visited and comparison photographs taken from the same location. A selection of photos of the ‘before’ and ‘after’ views is included in Appendix B of this report.

- 5.6 It is important to note that the ES presented views of both summer and winter scenarios. Due to the timing of this POPE report, only the winter scenario has been captured and used for comparison.

Consultations

- 5.7 Table 5.1 lists the organisations contacted regarding their views on the impacts they perceive the scheme has had on the environment, and whether they feel the mitigation measures implemented have been effective.

Table 5.1 - Summary of environmental consultation responses

Organisation	Field of Interest	Comments
Natural England	Biodiversity & Landscape	Natural England commented that they have not received any feedback regarding this development, either positive or negative and as a result were unable to provide more detailed feedback.
English Heritage	Heritage	Valued the opportunity to comment and input into the POPE process however at this time do not have sufficient resources to review the scheme findings.
Environment Agency	Water	The EA have commented that they know of no particular flood risk problems since the installation of the new climbing lanes. The EA also commented on Environment Management and stated that there have been no incidents specifically related to the stretch of Motorway affected since the improvements, however there weren't really any incidents before the improvements either.
Portsmouth City Council	Environment	No response.
Fareham Borough Council	Noise Air Quality	The Council have stated that there has been no assessment of changes in noise levels before or after the scheme so it is not possible to state if there has been a change in the noise levels however they added that there has not been any increase in noise complaints. In relation to air quality the Council have noted that there have been no changes to air quality monitoring undertaken in the Portchester area since the completion of the scheme.
Boarhunt Parish Council	Environment	No response.
Southwick & Widley Parish Council	Environment	No response.

- 5.8 The Highways Agency Part 1 Team has been contacted regarding part 1 claims and it is understood that it is too early in the claims period to say how many will be successful. It is therefore suggested that this information should be made available for the FYA report.
- 5.9 The MAC was also consulted with regard to animal mortality figures which have been made available for the period February to December 2009.
- 5.10 The scheme has been carried out within the existing highway boundary and therefore it is not anticipated that any changes in animal mortality figures would be attributable to the scheme. However, the MAC should still be re-contacted for the FYA report.
- 5.11 The Contractor has also provided background information to help with this evaluation.

Traffic Forecasts Evaluation

- 5.12 Three of the environmental sub-objectives (noise, local air quality and greenhouse gases) are directly related to traffic flows. No new environmental surveys are undertaken

for POPE and an assumption is made that if traffic is as expected then it is likely that local noise and air quality are as expected.

- 5.13 The evaluation of traffic forecast was not included in the ES, but formed part of a separate Forecasting and Economics Report (FAER). Discussion of the FAER is included in chapter 2 of this POPE report. Predicted and actual traffic volumes are set out in Tables 2.2a, 2.2b and 2.2c.
- 5.14 The forecast assumed that the scheme would not affect traffic flows. The observed data and evaluation set out in paragraphs 2.7 to 2.11 indicates that this is the case and that flows are within 10% of predictions, even with the economic downturn.

Noise

- 5.15 The AST stated that AADT's were not predicted to increase but that lane¹ speed would increase slightly. Accounting for mitigation proposals (use of low noise surfacing) the AST states that the 'do something' compared with the 'do minimum scenario would result in an increase of 20 to the Estimated Population Annoyed.
- 5.16 The ES stated that the following noise mitigation measures would be included in the scheme:
- Use of low noise surfacing material on all lanes of affected carriageway; and
 - Use of noise barrier (although primarily for visual screening purposes) near the allotments on Danes Road.
- 5.17 On opening in 2009, with mitigation in place, the scheme was predicted to result in a decrease in exposure to traffic noise for the vast majority of properties. With the scheme in design year (2024) all properties were predicted to experience decreases in exposure to traffic noise. These decreases would be marginally less with the scheme than without.
- 5.18 The ES stated that, in relation to vibration, with or without the scheme there would be a drop in the percentage bothered by noise and vibration.
- 5.19 Furthermore the ES stated that there were no properties within 300m of the scheme that would be likely to be eligible under the Noise Insulation Regulations.

Changes since the ES

- 5.20 It is understood from the HEMP that two acoustic barriers were included in the scheme as Contractor design changes; at Anson Grove, Browning Avenue and adjacent to part of Falmouth Road (example shown in Figure 5.1). These were replaced and upgraded as a result of the scheme.

Consultation

- 5.21 Fareham Borough Council stated that there has been no assessment of changes in noise levels before or after the scheme so it is not possible to state if there has been a change in the noise levels however they added that there has not been any increase in noise complaints.
- 5.22 The Council response also noted that there were no comments on the noise mitigation measures employed in this scheme

¹ The AST states "line speed" however this is interpreted as a spelling mistake in the AST and correction been made to lane speed.

Evaluation

- 5.23 A low noise surface has been used throughout the scheme as expected. It is understood that no post opening noise surveys have been undertaken.
- 5.24 An acoustic barrier has been constructed along the section of the M27 near Danes Road allotments, as identified in the ES. The 'As Built' Planting Design Drawings also show an acoustic barrier constructed to the rear of Anson Grove, Browning Avenue (Figure 5.1) and part of Falmouth Road. These are replacement and upgraded barriers for ones that were removed as part of the widening scheme.
- 5.25 Based on the traffic forecast evaluation, which concludes that the scheme did not affect traffic flows, it is likely that the impact of the scheme on the local noise climate is generally as expected. Although traffic flows are lower, hence noise may be lower, this is as a result of the economic downturn and not the scheme and is also within 10% of predictions.

Table 5.2 – Summary of noise evaluation

Origin of Assessment	Summary of Effects	Assessment
AST (Forecast)	<p>Benefits from new low noise surfacing on all lanes of the affected carriageway will be achieved, although this will be marginally offset by the effects of the increased line speed. The net result will be a marginal decrease in noise levels.</p> <p>Estimated number of people continued to be exposed to road traffic noise in excess of 70dB = 269</p> <p>Estimated number of people continued to be exposed to road traffic noise in excess of 75bD = 0</p> <p>Estimated number of people no longer exposed to road traffic noise in excess of 75dB in opening year = 135</p>	<p>Estimated Population Annoyed (do something - do minimum) = 20</p>
EST(OYA Evaluation)	<p>Based on traffic flows, which are within 10% of predictions, it is likely that the local noise climate due to traffic is as expected..</p>	<p>Likely to be as expected.</p>

Figure 5.1 – Acoustic barrier to the north of Browning Avenue



Local Air Quality

- 5.26 The AST states that in future scenarios all residential properties experience NO₂ and PM₁₀ levels that are within Air Quality Objectives and that the scheme is predicted to result in a slight deterioration in air quality due to an increase in traffic speed and the reduction in distance between properties and traffic. A total of 1378 residential properties were predicted to deteriorate in air quality (for both PM₁₀ and NO₂). Impacts on Portsdown Site of Special Scientific Interest (SSSI), Downend Chalk Pit SSSI and Portsmouth Harbour Special Protection Area (SPA) were predicted to be negligible.
- 5.27 The ES noted the following with regard to air quality:

Local Air Quality

- The baseline position of pollutant concentrations within the study area were well within the mandatory Air Quality Objectives for all pollutants except nitrogen dioxide;
- By the Opening Year, the ES predicted that pollutant concentrations would remain within the mandatory Air Quality Objectives, with or without the scheme;
- The ES predicted that pollutant concentrations would decrease in future years;
- In both Do-minimum and Do-Something scenarios, the ES predicts that PM10 would exceed the provisional Air Quality Objective for the annual mean of this pollutant (it also stated that this is primarily due to high background concentrations); and
- Overall the ES predicted a slight deterioration of Local Air Quality however this was not considered significant as the deterioration would not exceed mandatory Air Quality Objectives;

Regional Air Quality

- The ES stated that the total emissions of greenhouse gases and trans-boundary pollutants for the M27 traffic (within the study area) would increase as a result of the scheme, however this was considered insignificant as it would form less than 0.002% of emissions from UK wide transport (in 2024).

Consultation

- 5.28 No response was received from Portsmouth City Council.
- 5.29 Fareham Borough Council stated that there have been no changes to the air quality monitored in the Portchester area since the completion of the scheme.

Evaluation

- 5.30 The traffic forecast evaluation concludes that the scheme would not affect traffic flows. With the effects of the economic downturn taken into account, link flows have shown no change and therefore it is likely that the impacts of the scheme on the different aspects of air quality are generally as expected.
- 5.31 Numbers of HGV's on the link were not included in the forecast report provided to POPE and therefore this has not been included in the evaluation.

Table 5.3 – Summary of air quality evaluation

Origin of Assessment	Summary of Effects	Assessment
<p style="text-align: center;">AST (Forecast)</p>	<p>There are no Air Quality Management Areas identified in the study area and all residential properties experience levels of NO₂ and PM₁₀ that are within the Air Quality Management Objectives (for future scenarios). The scheme is predicted to result in a slight deterioration in air quality however no increase of annual mean PM₁₀ (more than 1µg/m³) or NO₂ (more than 2µg/m³) at residential properties.</p> <p>Quantitative measure: No of properties where air quality predicted to improve (both PM₁₀ and NO₂) - 0 No of properties where air quality predicted to deteriorate (both PM₁₀ and NO₂) - 1378</p>	<p>PM₁₀ Assessment Score: +77.77 NO₂ Assessment Score: +71.86</p>
<p style="text-align: center;">EST (OYA Evaluation)</p>	<p>Based on traffic forecast evaluation, which are generally in line with expectations (within 10% of predictions), it is likely that impacts on air quality will be as expected.</p>	<p>As expected.</p>

Greenhouse Gases

5.32 The assessment of the impacts of transport schemes on emissions of greenhouse gases is now one of the environment sub-objectives. WebTAG notes that Carbon Dioxide (CO₂) is considered the most important greenhouse gas therefore, has been used as the key indicator for the purposes of assessing the impacts of transport options on climate change. Changes in CO₂ levels are considered in terms of equivalent tonnes of Carbon released as a result of the scheme under evaluation. Carbon emissions should be estimated for the 'with scheme' and 'without scheme' options for each year of the appraisal period.

5.33 The ES does not mention Greenhouse Gases.

Forecast

5.34 The prediction given in the AST was that there would be 50,989 tonnes of CO₂ emitted in the Do-Minimum, and 52,586 tonnes of CO₂ in the Do-Something (2009). This is an increase of 1,597 tonnes of CO₂ in 2009, resulting from the scheme.

5.35 By current guidelines, greenhouse gas emissions are reported in terms of tonnes of carbon. On this basis, the emission was predicted to rise from 13,906 to 14,342 (+436) tonnes of carbon in 2009. This would be due to increased vehicle speeds.

Evaluation

5.36 POPE evaluations are based on COBA version 11.7, where possible. This is the only version of the program that calculates carbon emissions. The scheme forecasting was carried out with COBA 11.6, and therefore this was not the source of the greenhouse gas predictions used for the AST, which is unknown. When the COBA data file used for economic forecasting is input to the program version 11.7 instead of version 11.6, a value of +368 tonnes of additional carbon is obtained for 2009 (a somewhat lower value than given in the AST).

- 5.37 To evaluate the carbon emission, actual traffic flows were inserted in the data file, these being the observed 'Before' counts, with identical values 'After'. This conforms to the COBA assumption of a fixed trip matrix, and corresponds with the procedure used in preferred option 'A' in the economic re-evaluation.
- 5.38 With these observed flows, the resulting carbon emissions are slightly lower than with the original flows. The increase becomes 325 tonnes of carbon. This is to be expected, because of the slight over-estimate of predicted traffic flows. The results of this analysis are shown in Table 5.4 below.

Table 5.4 – Tonnes of carbon emitted in 2009

	Predicted		Actual COBA
	AST	COBA	
Without Scheme	13,906	21,200	20,422
With Scheme	14,342	21,568	20,747
Net Increase	+436	+368	+325

- 5.39 They key points regarding the greenhouse gas impacts are:
- The AST and the COBA models (predicted and actual) show a net increase of carbon with the scheme;
 - Although showing a net increase, the COBA prediction based on actual traffic flows is lower than the COBA predicted flows using the economic forecast and also than that of the AST. As described in chapter 2, the economic downturn has contributed to slightly reduced traffic flows and when this is factored back into the appraisal, flows are largely as expected.
- 5.40 Therefore based on the carbon emissions calculated in this chapter, the impacts on greenhouse gases are better than predicted in the AST, but broadly as expected in the COBA model.

Landscape & Townscape

- 5.41 The AST stated that as the scheme is accommodated within the highway boundary visual impact would be limited to a short distance and small areas of residential properties immediately adjacent to the road. The assessment was neutral.
- 5.42 The AST also stated that as the scheme is wholly located within the existing highway corridor no townscape features would be impacted on.
- 5.43 The ES stated that visual impacts were principally confined to within the highway boundary and largely constituted an increase in urbanisation of the highway corridor. The ES also noted that the components of the scheme did not greatly impact on the landscape character and visual impacts would only affect those receptors with direct views of the highway corridor.
- 5.44 The Landscape and Visual Assessment (LVIA) chapter of the ES included a section on lighting impacts. The ES noted that lighting impacts would be *“the single greatest impact during operation...of increased light pollution from the inclusion of highway lighting within both verges between chainage 40300 and 43500”*.

5.45 The ES included a description of the context of existing urban lighting and that lighting was already present between chainage 42600 to junction 12 (approximate chainage of 44400). The ES also set out proposed mitigation measures in distinct sections that related to the identified landscape character areas. Landscape mitigation measures proposed in the ES are summarised as follows:

- maximise retention of existing vegetation;
- mitigation planting with selected species to reflect those present and promote local biodiversity;
- removal of scrub encroachment in areas of chalk grassland;
- provide on and offsite planting (refer to Figure 5.2);
- careful siting and design of structures such as screen fencing and highway lighting; and
- galvanised post and wire fence where fencing is required for health and safety purposes.

5.46 Two key locations were identified for screen planting; these included Cornaway Allotment Gardens and the entrance to Hillsley Road Subway.

Changes to the Scheme since the ES

5.47 Compared to the original proposal approximately 3km of proposed lighting was removed from the scheme (including not replacing existing lighting - see Appendix B, Before & After Views). This would result in lower impacts than forecast during the daytime scenario as there would be less lighting columns and a reduction in urbanisation.

5.48 Changes were made to the drainage design during the construction period. These changes were implemented due to the small working area available in some locations that would have resulted in loss of screening vegetation.

Figure 5.2 – Small scale landscape mitigation planting at Hillsley Road Subway



Consultation

- 5.49 No responses in relation to landscape have been received from Natural England or from Portsmouth City Council. However, given the limited nature of the predicted impacts of the scheme it is unlikely to be a key consideration for these stakeholders at this time.

Evaluation

- 5.50 The scheme has, as expected, been implemented within the highway corridor with minimal disturbance and changes to the existing cutting slopes. Given the existing context of the road corridor and the location in cutting, the influence on surrounding landscape character has been limited. Also, the scheme has not resulted in any new views towards the road or significant changes to existing views.
- 5.51 This is, in part, due to the changes to the lighting scheme and the drainage design which have reduced visual impacts and enabled the retention of existing vegetation respectively.
- 5.52 In relation to drainage, attenuation tanks and pollution control measures were relocated on site to avoid excessive clearance of vegetation which would have had a potential increase in visual impacts.
- 5.53 The reduced lighting scheme was expected to have the effect of reducing the influence of motorway lighting on adjacent residential or urban areas and adjacent open spaces. These benefits have been achieved, although it is worth noting that the route corridor was already well lit, given the overall urban context of the scheme. .
- 5.54 The scheme has resulted in some minor loss of verge habitats, however clearance of vegetation was minimised. Compensation for the loss of these areas of habitat has been provided in the form of some small areas of landscape planting. Habitat enhancement was implemented in selected off site receptor areas. This included selective scrub removal and creation of hibernacula. The species used are native and the composition of the proposed mix was expected to reflect the nature of existing scrub vegetation. Due to the timing of the POPE site visit, the actual species planting could not be identified and this should be reviewed at the POPE FYA stage. Details of off-site planting were not provided and this should also be considered at the FYA stage.
- 5.55 Further compensation for loss of vegetation was expected to be provided by the implementation of appropriate landscape management to improve the quality, structure and diversity of the grassland and scrub vegetation. This would include measures such as scrub removal in retained areas of chalk grassland which would contribute to improvements to the quality of important habitats. It was not possible to confirm during the site visit whether any of the management work has been carried out yet and as the HEMP had not been finalised at the time of the site visit. It is suggested that the long term landscape management operations should be reviewed at the POPE FYA stage.
- 5.56 Cutting slopes have been treated in a variety of ways and include retained open faces; this variation contributes to the visual amenity of the road corridor as well as the potential biodiversity value of the verges and cutting.
- 5.57 Mitigation has also been provided in the form of limited areas of screen planting at key locations, including close to Cornaway Allotment Gardens and Hillsley Road subway entrance. The Environmental Commitments Register notes that no topsoil was imported in order to prevent introduction of undesirable species. The lack of topsoil was proposed to promote biodiversity but could affect the establishment rates of tree and shrub planting; the growth rates should be considered as part of the FYA study.

- 5.58 As the site visit was undertaken during the dormant season no comment can be made on the health and establishment rates of planting stock. As planting stock is only one season old it is too soon to evaluate the effectiveness of the planting measures and this should also be reviewed as part of the FYA evaluation.
- 5.59 Mitigation in the form of screen fencing was also observed during the site visit (Figure 5.3), and as expected, this does provide visual screening of traffic from adjacent residential areas.
- 5.60 The existing motorway corridor is distinct from the adjacent areas (more open landscape to the north and townscape to the south). It is considered that, as expected, no townscape features have been impacted on as a result of the scheme. The reduced lighting scheme has reduced the impact of the motorway lighting, although the scheme is within an already well lit urban area.

Figure 5.3 – Fencing alongside residential areas forming noise barrier and visual screen



Table 5.2 – Summary of landscape evaluation

Origin of Assessment	Summary of Effects	Assessment
AST (Forecast)	The AST stated that as the scheme is accommodated highway boundary visual impact is limited to short distance and small areas of residential properties immediately adjacent to the road.	Neutral
EST (OYA Evaluation)	<p>As built scenario has been adapted to relocate drainage components and avoid excessive loss of vegetation.</p> <p>Mitigation measures have been generally provided in line with proposals. Too soon to evaluate establishment of new planting and this should be reviewed as part of the FYA report however screen fencing has provided some visual screening of the road corridor.</p> <p>the scheme lighting has been reduced, which is beneficial although as the scheme is within an urban area which is already subject to street lighting outside the scheme</p>	As expected.

Biodiversity

- 5.61 The AST stated that there would be no significant long term impacts to Portsmouth Harbour Special Protection Area (SPA), Portsdown Site of Special Scientific Interest (SSSI) (Figure 5.4) or any Site of Importance for Nature Conservation (SINC’s). It also stated that short term impacts on reptiles, invertebrates and vegetation would be mitigated by habitat enhancement. The assessment was neutral.
- 5.62 The ES noted that the scheme would not result in any effects on Portsmouth Harbour SPA (directly or indirectly) nor would it have significant long term effects on Portsdown SSSI or any of the SINC’s within the study area. However the ES does note that there would be short to medium term adverse impacts at Hill Road Paddock SINC and Anson Grove SINC, however these would drop to neutral in the long term.
- 5.63 Within the highway corridor the ES noted that there would be temporary minor negative impacts upon the chalk grassland and the associated protected and notable species (namely invertebrate and reptile populations), due to construction activities.
- 5.64 Overall, the scheme was predicted to have slight adverse effects in the short to medium term. In the long term the overall effect on biodiversity would be neutral.
- 5.65 The ES noted a number of proposed mitigation measures in relation to ecology. These included:
- mitigation through design resulting in less habitat loss through use of narrower lanes and reduced central reserve width;
 - drainage design to include facilities to improve quality of water discharged into the environment;
 - cut off lanterns for lighting to minimise spill into adjacent wildlife habitats;
 - pre-construction surveys and watching briefs;
 - timing of construction to avoid peak season of Brent Geese (qualifying species for Portsmouth Harbour SPA); and

- compensation for loss and disturbance by management to improve chalk grassland, including scrub encroachment and removal of introduced species.

Figure 5.4 – Nearby Portchester Common SSSI (referred to as Portsdown SSSI)



5.66 Mitigation detailed as part of the landscape chapter also included planting with selected species to reflect those present and promote local biodiversity.

Consultation

5.67 Natural England commented that they have not received any feedback regarding this development, either positive or negative and as a result were unable to provide more detailed feedback.

5.68 No response has been received from Portsmouth City Council.

Evaluation

5.69 The scheme has, as expected, been implemented within the highway corridor with minimal disturbance and changes to the existing cutting slopes and verges.

5.70 Mitigation measures outlined in the ES have also been implemented as expected and included specific measures and method statements. These are recorded in the HEMP and Environmental Commitments Register and include:

- Adherence to ecological method statements to avoid harm to species and habitats (Figure 5.5);
- Undertaking of pre-construction surveys to identify important areas for nature conservation;
- A watching brief for protected species maintained during construction;
- Timing of works to minimise disturbance to Brent Geese;

- Compensation for loss of verge habitats - in the form of management (cyclical and long term) to retained areas to improve quality of important habitats (i.e. scrub removal); and
- Areas left to naturally regenerate with no importation of earthworks material or topsoil to avoid the introduction of competitive species.

5.71 It is too soon to assess the effectiveness of new planting and management regimes and this should be considered as part of the POPE FYA evaluation.

5.72 Reptile translocation was undertaken as advance works by the MAC prior to the main contract being awarded due to seasonal constraints; hibernacula's were created outside the widened scheme and the reptile fences installed. Special fencing was used to exclude reptiles from the working area during construction however the final scheme has not significantly altered reptile habitat. Habitat enhancement was implemented in selected off site receptor areas. This included selective scrub removal and creation of hibernacula. From the information made available to POPE, monitoring appears to have been carried out as part of the destructive habitat surveys prior to the commencement of the contract. Further details of this should be confirmed at the POPE FYA stage the HEMP will have been finalised.

Figure 5.5 – Typical example of retained habitat and vegetation cover



Table 5.3 – Summary biodiversity evaluation

Origin of Assessment	Summary of Effects	Assessment
AST (Forecast)	The AST stated that there would be no significant long term impacts to Portsmouth Harbour SPA, Portsdown SSSI or any SINC's. It also states that short term impacts on reptiles, invertebrates and vegetation would be mitigated by habitat enhancement.	Neutral
EST (OYA Evaluation)	There has been limited disturbance to habitats as expected. Mitigation has been implemented largely as expected. The establishment of habitat enhancement should be considered at FYA	Likely to be as expected based on the information available at this OYA stage.

Heritage of Historic Resources

- 5.73 The AST stated that there would be no identified impacts on known sites of national or local importance within the study area and that there was very low potential for discovery of additional sites (although the possibility existed). The assessment was neutral.
- 5.74 The ES noted that the study area contains four scheduled monuments (three of which are also listed buildings), together with five other listed buildings. Historically important hedgerows also exist within the study area.
- 5.75 The ES stated that the scheme would not fundamentally alter the alignment or scale of the road and therefore there would be negligible impact on the visual setting of any upstanding monuments or buildings. The ES also stated that the potential for survival of hitherto unrecorded archaeological deposits within the motorway fence line was extremely low and that any surviving features would already be truncated, depleted or otherwise damaged.
- 5.76 The significance of specific permanent effects was noted as follows:
- groundworks in the vicinity of the previously recorded Bronze Age cremations (neutral effect on feature of very low importance);
 - indirect impacts on setting of archaeological and historic monuments and buildings (neutral effect on features of high or very high importance); and
 - indirect impacts on historic landscape as a whole (neutral effect on feature of low importance).
- 5.77 The principle aim of the archaeological mitigation was noted as to minimise the physical effect of the scheme on the visible and buried cultural heritage resource and archaeology as far as is reasonably practicable. Proposals for mitigation to achieve this aim were noted in the ES as follows:
- archaeological watching brief for earth moving and ground disturbance; and
 - Archaeological Project Design developed to provide a framework and methodology for site works.

Consultation

- 5.78 English Heritage commented that:

- Unfortunately it does not have the resources available to be able to offer a considered evidence based assessment of effectiveness of the mitigation. It had very limited involvement with the application process and has no baseline information nor carried out any monitoring.

Evaluation

- 5.79 The scheme has, as expected, been implemented within the highway corridor with minimal disturbance and changes to the existing cutting slopes. Given the existing context of the road corridor and the location in cutting, the influence on setting of surrounding historic features (such as Listed Buildings and Scheduled Monuments) is considered to be neutral.
- 5.80 It is understood that the archaeological evaluation and watching briefs were undertaken as planned. This included specific Archaeological Project design that provided a framework and methodology for site works and subsequent analysis.
- 5.81 An Archaeological Watching Brief was undertaken and maintained during ground works associated with the works. It is understood that no archaeological features, deposits or artefacts were exposed during the Archaeological Watching Brief. The archive was proposed to be deposited for storage with the Hampshire County Council Museum Service, Winchester and this will be confirmed at the FYA stage.

Table 5.4 – Summary of heritage evaluation

Origin of Assessment	Summary of Effects	Assessment
AST (Forecast)	There are no identified impacts on known sites of national or local importance within the study area and that there is very low potential for discovery of additional sites (although the possibility exists).	Neutral
EST (OYA Evaluation)	Based on the information available it is considered that impacts are as expected.	As expected.

Water Environment

- 5.82 The AST stated that by eliminating road runoff to aquifers (by sealed drainage) water quality would be improved. The inclusion of spill containment before each outfall would also reduce the risk of accidental spillage. There would be no significant effect on Portsmouth Harbour SPA as quality of discharge would be improved and outfall rate maintained by the attenuation system. The predicted impacts were assessed to be slight beneficial overall.
- 5.83 The ES stated that the permanent land drainage and flooding effects would result in a small increase in the volume of runoff in proportion to the area drained, but after the proposed mitigation the assessment was neutral on these attributes.
- 5.84 In relation to water quality, the application of an appropriate Construction Environmental Management Plan (CEMP) and adoption of best practice during the construction phase would mean any temporary effect to either the surface or groundwater system would be negligible. Furthermore the ES stated that the interception facilities to be incorporated at each outfall would be designed such that they could be isolated to prevent discharge to outfalls in the event of an accident or spill.

- 5.85 During the operation of the scheme, the predicted effects on water quality were stated as minor beneficial due to a predicted reduction of contaminants in the run-off and the reduction of accidental spillages impacting on watercourses.
- 5.86 The ES also addressed impact on groundwater resources and quality. On this matter the ES stated that the underlying chalk aquifer was both vulnerable and important but that the water table was said to be approximately 10m below the existing carriageway.
- 5.87 The ES stated that all existing and new gullies, culverts and drainage pipework should either be modified or designed to be sealed to prevent road drainage from discharging to ground (Figure 5.6). However it was concluded that these volumes would be slightly reduced. The overall predicted effects were assessed as minor beneficial.
- 5.88 The ES stated that the mitigation measures would be applied through the CEMP. Examples of the mitigation measures are summarised as follows:
- During construction compliance with general good practice and relevant guidance documents, including consent standards from the EA;
 - During operation, improved surface water drainage and attenuation capacity (both east and westbound);
 - Inclusion of interception facilities, including petrol/oil separators that can be pumped during cyclical maintenance;
 - Incorporation of shut off valves at either end of the scheme as part of the interception facilities; and
 - Due to the proposed steeper cuttings (lower part of eastbound carriageway) a new system of fin drains and/ or soakaways.

Figure 5.6 – Drainage channel and gully and restored tie in with chalk verge



Consultation

- 5.89 The EA have commented that they know of no particular flood risk problems since the installation of the new climbing lanes.
- 5.90 The EA also commented on Environment Management and stated that there have been no incidents specifically related to the stretch of Motorway affected since the improvements, however noted that incidents were relatively few before the improvements.

Evaluation

- 5.91 The Environmental Commitments register records that formal EA consents were not required for the scheme. It also notes a number of mitigation measures that were implemented, these included:
 - interceptor facilities to be provided downstream of attenuation tanks;
 - all run off from paved surfaces to be collected in channels and gulleys and discharged through sealed pipe systems; and
 - fin drains along concrete channels provided to account for steeper cutting angles in certain areas of the scheme.
- 5.92 As noted in the landscape section above, it is understood that the drainage design for the scheme was adapted during construction to allow for retention of existing vegetation (and therefore eliminating potential for additional landscape and visual impacts). No information has been made available to POPE which indicates that the drainage design is operating other than as intended and, based on the information available it would appear that mitigation has been implemented largely as expected.
- 5.93 POPE is not aware that there have been any impacts on the Portsmouth Harbour SPA, Brent Geese populations (qualifying species) or the chalk aquifer and this is as expected in the ES.
- 5.94 It is suggested that water is considered again at the FYA stage, particularly with regard to the effectiveness of the measures included in the scheme. Consultation should be repeated as no feedback has been received for the OYA report.

Table 5.5 – Summary of water evaluation

Origin of Assessment	Summary of Effects	Assessment
AST (Forecast)	Eliminating road runoff to aquifers (by sealed drainage) water quality would be improved. The inclusion of spill containment before each outfall would also reduce the risk of accidental spillage. There would be no significant effect on Portsmouth Harbour SPA as quality of discharged is improved and rate is maintained by the attenuation system. The impacts were assessed to be slight beneficial overall.	Slight beneficial
EST (OYA Evaluation)	All works undertaken within existing motorway corridor with design and mitigation implemented largely as expected. No information has been provided to POPE which would indicate that the facilities are performing other than as expected. Minor variations to location of attenuation tanks are unlikely to have resulted in changes to the effectiveness of the drainage scheme.	Likely to be as expected.

Physical Fitness

- 5.95 The AST stated that there would be no change to cycling or walking opportunities. The impacts were assessed to be neutral.
- 5.96 Impacts pertaining to physical fitness are covered in the 'Pedestrians, Cyclists, Equestrians and Community Effects' chapter of the ES. The baseline description included in the ES notes the presence of several subways and overbridges that facilitate access across the motorway corridor (Figure 5.7).
- 5.97 The ES stated that the proposals would not affect any of the nine motorway crossing points and therefore pedestrians who use these to access important community facilities would be unaffected. The ES also stated that, as the non-vehicle user crossing points already spanned the busy motorway, the scheme was unlikely to affect the current amenity value of the crossing points.
- 5.98 The ES noted that as there were no predicted direct impacts upon the motorway crossing points or significant community facilities then no mitigation would be necessary. However the ES did state that during the construction period the contractors should be sensitive to these uses.

Figure 5.7 – Existing underpass entrance at Beverston Road



Consultation

- 5.99 No responses in relation to Physical Fitness have been received from Portsmouth City Council or from Fareham Borough Council.

Evaluation

- 5.100 It is understood that a post opening Non-motorised User (NMU) survey has not been undertaken however given that routes were unlikely to be affected (predicted impacts of neutral) these are not likely to have been required. Furthermore, no new NMU surveys

have been carried out specifically for POPE, which would provide any quantifiable measures of use of the Public Rights of Ways (PROWs). At the time of the site visit, walkers and cyclists were using the overbridges and underpasses.

- 5.101 It would appear that the impacts on public rights of way are in line with expectations and have not been affected by the scheme.

Table 5.6 – Summary of physical fitness evaluation

Origin of Assessment	Summary of Effects	Assessment
AST (Forecast)	There would be no change to cycling or walking opportunities.	Neutral
EST (OYA Evaluation)	The scheme has not impacted on any of the motorways crossing points or the amenity of the NMU facilities.	As expected

Journey Ambience (Vehicle Travellers)

- 5.102 The AST stated that the scheme would slightly reduce frustration for drivers due to separation from HGV's, but that stress would remain high due to the nature of the road. The impacts were assessed to be neutral overall.
- 5.103 The ES stated that the assessment considered two broad categories of effect, namely 'Views from the Road' and 'Driver Stress'.
- 5.104 The ES stated that the construction of the scheme was expected to cause short term slight adverse effects on traveller views and on driver stress. It noted that traveller views would remain restricted by the motorway corridor. During operation of the scheme, the ES stated that the overall effect on travellers' views would be neutral. Figure 5.8 provides an illustration of drivers' views.
- 5.105 A moderate beneficial impact on driver stress was predicted due to the increased capacity of the carriageway, enhanced surface quality, reduced frustration and fear of accidents. Nevertheless, overall driver stress would remain high due to the nature of the M27.
- 5.106 Mitigation measures described in the ES were limited to standardised approaches for signage, lighting, safety barriers and surfaces, minor alteration to all of these would have some limited effect on views from the road and on driver stress.

Figure 5.8 – View of the motorway corridor and the vehicle travellers experience looking east from Upper Cornaway Lane footbridge



Consultation

- 5.107 No responses in relation to Journey Ambience have been received from Portsmouth City Council or from Fareham Borough Council.

Evaluation

Travellers Views

- 5.108 The nature of the motorway corridor and the extents of the cutting have not been altered significantly. The signage strategy for the scheme is largely unaltered with only minor changes (relocation) due to the widening and additional signage to indicate merges.
- 5.109 In some locations acoustic fencing has been updated however the extent and nature of views are similar to the before scheme scenario. Minor changes to views from the road have occurred over very short sections where a new barrier has been implemented.
- 5.110 Overall impacts on traveller's views are considered to be as expected.

Driver Stress

- 5.111 Chapters 2 and 3 of this POPE report address traffic volume and flow and road safety. The broad findings in relation to these factors can be summarised as follows:
- traffic volumes are largely in line with predictions;
 - average daily link journey times have reduced, particularly in peak periods; and
 - the spatial distribution, rate and nature of accidents is broadly similar to before the scheme.
- 5.112 Although the scheme was predicted to result in a beneficial effect on driver stress (due to the increased capacity of the carriageway, enhanced surface quality, reduced frustration

and fear of accidents) it was noted that driver stress would remain ‘high’. Based on the information presented in this POPE report on the analysis of traffic flows and safety, the prediction that driver stress would remain high is considered ‘as expected’.

Traveller Care

5.113 Although not specifically mentioned in the ES, this is one of the factors making up the Journey Ambience sub-objective. The scheme has not changed access from the M27 to local facilities and as such, the impact of the scheme on traveller care is considered to be neutral.

Table 5.7 – Summary of journey ambience evaluation

Origin of Assessment	Summary of Effects	Assessment
AST (Forecast)	The scheme would slightly reduce frustration due to separation from HGV’s, but that stress remains high due to the nature of the road. The impacts were assessed to be neutral overall.	Neutral
EST (OYA Evaluation)	Traveller views remain largely unaltered as a result of the scheme. The scheme has had a beneficial effect on driver stress however the motorway scenario means that stress remains high. Traveller care has not been altered. The overall effect on Journey Ambience is neutral.	As expected

Summary

Key Points from Environment Chapter

Noise – Based on traffic flows it is likely that there the local noise climate is as expected.

Local Air Quality – Based on traffic flows, which are generally in line with expectations (within 10% of predictions), it is likely that impacts on air quality will be as expected.

Greenhouse Gases – AST and COBA models (predicted and actual) show a net increase of carbon with the scheme, however with COBA modelling based on flows is lower than predicted therefore impacts on greenhouse gases are considered to be better than expected.

Landscape and Townscape – Mitigation measures generally provided in line with proposals. Too soon to evaluate establishment of new planting and this should be reviewed as part of the FYA report however screen fencing has provided some visual screening of the road corridor. The design was adapted to relocate drainage components and avoid excessive loss of vegetation and the proposed lighting scheme has been reduced and this reduces the influence of the motorway lighting within the well lit route corridor. Overall impacts as expected.

Biodiversity – As expected there appear to have been no impacts on the Portsmouth Harbour SPA, Brent Geese populations (a qualifying species). Mitigation measures generally provided in line with proposals. Too soon to evaluate establishment of new planting and seeding which should be reviewed as part of the FYA report, as should effectiveness of habitat improvements through landscape management.

Heritage of Historic Resources – Based on the information available it is considered that impacts are as expected.

Water Environment – Based on the information available, likely to be as expected, and there appear to have been no impacts on the Portsmouth Harbour SPA, or the chalk aquifer. Furthermore engineering solutions were adapted during construction to facilitate retention of existing vegetation, thus reducing ecological and visual impacts. Overall impacts as expected.

Physical Fitness – The scheme has not affected the existing NMU provisions either directly or the amenity value and it is considered that impacts are as expected.

Journey Ambience – Traveller views remain largely unaltered as a result of the scheme. The scheme has had a beneficial effect on driver stress however the motorway scenario means that stress remains high. Traveller care has not been altered. The overall effect on Journey Ambience is neutral.

6. Accessibility and Integration

Accessibility

Option Values

- 6.1 This sub-objective 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 AST stated that there was no change to the availability of transport services, and gave a 'neutral' assessment. This is upheld in the present evaluation.

Severance

- 6.2 Severance is concerned with obstruction to the movement of non-motorised travellers, in particular pedestrians. The AST stated that there would be no change to routes crossing the scheme, and gave a 'neutral' assessment.
- 6.3 As part of the proposal, an existing over-bridge on this section of the motorway was to have benefitted from improved motorway lighting, making this a more attractive route for use by the local community. However, this improved lighting was not implemented. The impact of the scheme on Severance is considered to be neutral.

Access to the Transport System

- 6.4 This sub-objective relates to access to modes of transport other than private or business vehicles. The AST stated that there would be no changes affecting the transport system, and gave a 'neutral' assessment.
- 6.5 This part of the M27 is not heavily used by scheduled coach services. However the National Express service between Southampton and Heathrow does run along it, with a frequency of 10 coaches per day. A representative of the company stated that there had been no impact as a result of the climbing lane provision. Hence the improvement to congestion and journey times on this link appears to have had no effect on public transport.

Integration

Transport Interchange

- 6.6 This sub-objective considers access to the private and public transport system. The AST stated that the scheme would have no effect on passenger or freight interchange facilities, and gave a 'neutral' assessment. This is upheld in the present evaluation.

Land Use Policy

- 6.7 The AST stated that all works would be carried out within the existing highway boundary, that there would be no changes to local landscape patterns, and that the scheme is generally supported by national, regional, and local policies.
- 6.8 The landscape impacts were evaluated in the previous chapter. The following paragraphs evaluate the support for the scheme by national, regional, and local policies.

Regional Strategy

- 6.9 The South East Plan Regional Spatial Strategy was published 'as final' May 2009 and the M27 climbing lanes scheme is listed as a strategic transport infrastructure priority.

6.10 The South Hampshire Sub Regional Transport Policy SH7 states that “The transport and planning authorities will work together to... manage the strategic transport network for longer distance journeys (especially from/to the ports of Southampton and Portsmouth and Southampton Airport) and the local network for shorter journeys”.

6.11 A Strategic Development Area is allocated just to the north of Fareham. This envisages the construction of up to 10,000 dwellings, with access to the M27 at either junction 10 or 11.

Regional Economic Strategy 2006-2016

6.12 Within the Regional Economic Strategy (RES) there is no specific mention of the M27 Junction 11 -12 climbing lanes scheme however the Urban South Hampshire area including Portsmouth and Southampton has been identified as one of eight locations within the South East targeted for infrastructure investments.

6.13 Portsmouth and Southampton are identified in the Regional Economic Strategy (RES) as being Regional Hubs and as such are centres of economic activity and transport services.

6.14 The seventh of nine priorities established for the Coastal South East Region is to “Improve connectivity along the coast and with key hinterlands and London”. The results of which would be shown through: “Appropriate solutions adopted and investment secured for improvements along the M27 / A27 / A259 South Coast artery, A2 and Solent-Midlands A34 corridor”

6.15 One RES objective is to achieve “Smart Growth: spreading the benefits of competitiveness”. One of the targets for achieving this is to: “Reduce road congestion and pollution levels by improving travel choice, promoting public transport, managing demand and facilitating modal shifts”. The climbing lanes scheme assists in the meeting of this objective.

Regional Transport Strategy – Regional Planning Guidance for the South East (RPG9)

6.16 The Strategy was published March 2001 with an update to Chapter 9 in July 2004. The M27 Integrated Transport Study is mentioned (which considered the impact of spatial issues along the M27 corridor on the transport system) and concluded that there is a need to actively manage the capacity of the M27.

County Policy

6.17 The Hampshire County Structure Plan ceased to have any effect from the 27th of September 2007 when it was replaced by the South East Plan. 24 saved policies were in effect until the 6th of May 2009.

6.18 The Hampshire Local Transport Plan (HLTP) is consistent with current regional planning documents. The objectives of the HLTP are:

- To increase accessibility to services;
- To promote safety;
- To reduce the impact and effect of congestion;
- To widen travel choice;
- To contribute towards improvements in air quality;
- To support wider quality of life objectives; and
- To encourage value for money and efficient asset management.

- 6.19 The HLTP includes a number of Area Transport Strategies. The M27 Junctions 11-12 is covered within the Solent Transport Strategy, which indicates that the scheme will play a part in the regeneration of the Fareham – Gosport Peninsular.
- 6.20 Reduced employment opportunities on the Solent Peninsular have caused the area to suffer from high levels of unemployment, social exclusion and the development of pockets of deprivation. Improving transport is perceived as a key way in which to facilitate the regeneration of the area as poor transport links and congestion have limited the development taking place on available brownfield sites.
- 6.21 The HLTP states that Hampshire County Council welcomed the climbing lanes scheme as: “These may, in part, help to address capacity issues on the M27 and therefore be of assistance in improving access to the Fareham and Gosport peninsula”¹.
- 6.22 The HLTP mentions that housing allocations for the Gosport area are high which will increase congestion in the area making congestion tackling measures imperative.
- 6.23 The HLTP states that the South Downs area running from Winchester to Eastbourne is currently being designated as a National Park this will include the East Hampshire and Sussex Downs Areas of Outstanding Natural Beauty. Although the M27 climbing lanes scheme does not fall within this area it is expected that the tourism and leisure opportunities presented will increase the amount of traffic using the M27 between Junctions 11-12 where the climbing lanes have been implemented.
- 6.24 The Port at Portsmouth is designated as an International Gateway in the HLTP and is reached by leaving the M27 at Junction 12 and using the M275. The Port is the UK’s second busiest continental ferry port that caters for passengers and road haulage operators. Expected growth at the port will increase the amount of traffic using the M27 Junctions 11-12.
- 6.25 Southampton Airport and Port are both designated as International Gateways access to which is via the M27. Works carried out at Junctions 11-12 of the M27 will have effects on the congestion and functioning of the motorway network around Southampton.

Portsmouth City Local Plan

- 6.26 The Portsmouth City Local Transport Plan (PCLP) 2001 -2011, adopted 21st July 2006, does not mention the M27 climbing lanes scheme.

Development allocations or community land affected by the proposal

- 6.27 The scheme does not directly affect any development allocations or community land due to its being the addition of two lanes onto an already existing motorway.

Housing Employment and Regeneration

- 6.28 The PCLP mentions the Gateway Project which involves a coordinated approach being taken toward environmental improvements in the west of the city including along the M27/M275 and Mile End Road. This is a scheme that is located at Junction 12 of the M27 and so is very close to the climbing lanes scheme. The benefits of the climbing lanes scheme will be felt at the Gateway Project including congestion reduction and the associated environmental benefits.

¹ Hampshire Local Transport Plan <http://www3.hants.gov.uk/hampshire-transport/local-transport-plan.htm>
Accessed 29/10/09

Main Accessibility and Integration Conclusions

- The scheme has had no appreciable impact on Option Values;
- The scheme has had no appreciable impact on Severance;
- The scheme has had no appreciable impact on Access to the Transport System;
- The scheme has had no appreciable impact on Transport Interchange; and
- On balance the scheme supports regional and local land use policies.

7. Appraisal Summary Table

- 7.1 An Appraisal Summary Table (AST) is a one-page summary of the predicted economic, environmental, and social impacts of a major road scheme.
- 7.2 The version of the AST dated 28 July 2006 is reproduced as Table 7.1, and is evaluated in this POPE study.
- 7.3 The Evaluation Summary Table (EST) has been devised for the POPE process to record a summary of the actual scheme impacts. Where possible the EST mirrors the appearance and process of the AST, to permit comparison between the two. The EST for this scheme is given in Table 7.2.
- 7.4 The monetary benefit quoted in the AST match those given in the Forecasting and Economics Report (FAER), with 'Low' in the AST corresponding to 'Pessimistic' in FAER, and 'High' in the AST corresponding to 'Optimistic' in FAER. No central case is shown in the AST, but there are 'Reference' case figures in FAER. This reference case matches the COBA output supplied to POPE.
- 7.5 With regard to scheme cost, the figure of £45m shown in the top right-hand corner of the AST seems to be the net present value (NPV), not the PVC.

Table 7.1 – Appraisal Summary Table (28 July 2006)

APPRAISAL SUMMARY TABLE – Stage 3: Environmental Statement																
M27 JUNCTION 11-12 CLIMBING LANES		Description: New climbing lanes on the M27 between Fareham and Portsmouth eastward from Junction 11 and westwards from Junction 12	Problems: Flows at capacity at peak periods. Slow moving traffic contributing to congestion	Present Value of Costs to Public Accounts £45m												
OBJECTIVE	SUB-OBJECTIVE	QUALITATIVE IMPACTS	QUANTITATIVE ASSESSMENT	ASSESSMENT												
ENVIRONMENT	Noise	AADTs are not predicted to increase, but line speed will increase slightly. Existing noise attenuation measures will be retained as mitigation. Benefits from new low-noise surfacing on all lanes of the affected carriageways will be achieved, although this will be marginally offset by the effects of increased line speed. The net result will be a marginal decrease in noise levels. An estimated 269 people will continue to be exposed to road traffic noise in excess of 70dB with zero in excess of 75 dB. 135 people would no longer be exposed to road traffic noise in excess of 75 dB in the opening year.	Estimated population annoyed: Do Minimum: 731 Do Something: 751	Estimated population annoyed: Do Something–Do Minimum =20												
	Local Air Quality	There are currently no Air Quality Management Areas in the study area. All residential properties experience NO ₂ and PM ₁₀ levels within the Air Quality Objectives in future scenarios. The scheme is predicted to result in a slight deterioration in air quality due to an increase in traffic speed and the reduction in distance between properties and traffic. However no increases of annual mean PM ₁₀ of more than 1µg/m ³ or increases in annual NO ₂ of more than 2µg/m ³ are predicted at residential properties. Impacts on Portsdown SSSI, Downland Chalk Pit SSSI and Portsmouth Harbour SPA are negligible.	<table border="1"> <tr> <td>No. of Properties</td> <td>PM₁₀</td> <td>NO₂</td> </tr> <tr> <td>Air Q improved</td> <td>0</td> <td>0</td> </tr> <tr> <td>Air Q Deterioration</td> <td>1378</td> <td>1378</td> </tr> </table>	No. of Properties	PM ₁₀	NO ₂	Air Q improved	0	0	Air Q Deterioration	1378	1378	PM ₁₀ Assessment score +77.77 NO ₂ Assessment +71.86			
	No. of Properties	PM ₁₀	NO ₂													
	Air Q improved	0	0													
	Air Q Deterioration	1378	1378													
	Greenhouse Gases	In the opening year, total CO ₂ emissions predicted with the scheme in operation (Do Something 52,586 tonnes/yr) are slightly higher than those predicted for the Do Minimum scenario (50,989 tonnes/yr) as a result of increases in traffic speeds.	Present (2003) = 49,254 (tonnes/yr) Do-minimum 2009 = 50,989 Do-scheme 2009 = 52,586	2009(DS-DM)=+1597 tonnes/yr												
	Landscape	Proposed scheme is accommodated within the existing highway boundary. Visual impact limited to short distance on small areas of residential properties adjacent. Existing landform – cuttings and steeply sloping topography to the north of the scheme ensure a very tight visual envelope that closely follows the majority of the highway boundary		Neutral												
	Townscape	Scheme wholly contained within existing highway corridor – no townscape features impacted upon.		Neutral												
	Heritage of Historic Resources	No identified impacts on known sites of national or local importance within study area; very low potential for discovery of additional sites, but possibility does exist		Neutral												
	Biodiversity	Proposals confined to the existing footprint. No significant long term impacts predicted to Portsmouth Harbour SPA, Portsdown SSSI or any SINC. Short term impacts on reptiles, invertebrates and vegetation mitigated by habitat enhancement and recreation.		Neutral												
Water Environment	Water quality improvements by eliminating road runoff to aquifers by sealed drainage. Risks from accidental spillage reduced by the incorporation of spill containment before each outfall. No significant effect on Portsmouth Harbour SPA as quality of discharge improved by passive interception and increase in quantity of freshwater SPA by additional drained carriageway area is <0.02% and rate is kept at current levels by attenuation within system.		Slight beneficial													
Physical Fitness	No change to cycling/ walking opportunities		Neutral													
Journey Ambience	Slight reduction in frustration due to separation from HGVs, but Stress remains 'high' due to nature of road.		Neutral													
SAFETY	Accidents	Accident benefits are possible, however DMRB guidance (volume 13 section 1) provides a constant accident rate for D3 and D4 motorways, hence evaluation has not been included within the economic assessment.		Neutral												
	Security	No change to any indicators		Neutral												
ECONOMY	Public Accounts	COBA and QUADRO results using a 3.5% discount rate. All costs are 2002 prices discounted to 2002 and are shown in weighted £m	High: central govt PVC £8.868m Low: central govt PVC £8.430m	High: PVC £8.868m Low: PVC £8.430m												
	TEE: Business Users & Transport Providers	COBA and QUADRO results using a 3.5% discount rate. All costs are 2002 prices discounted to 2002 and are shown in weighted £m	<table border="1"> <tr> <td></td> <td>High</td> <td>Low</td> </tr> <tr> <td>Users PVB</td> <td>£41.174m</td> <td>£19.317m</td> </tr> <tr> <td>Trans prov PVB</td> <td>-£0.003m</td> <td>-£0.022m</td> </tr> <tr> <td>Other PVB</td> <td>£0.000m</td> <td>£0.000m</td> </tr> </table>		High	Low	Users PVB	£41.174m	£19.317m	Trans prov PVB	-£0.003m	-£0.022m	Other PVB	£0.000m	£0.000m	High: PVB £41.171m Low: PVB £8.430m
		High	Low													
	Users PVB	£41.174m	£19.317m													
	Trans prov PVB	-£0.003m	-£0.022m													
Other PVB	£0.000m	£0.000m														
TEE: Consumers	COBA and QUADRO results using a 3.5% discount rate. All costs are 2002 prices discounted to 2002 and are shown in weighted £m	High: Users PVB £33.312m Low: Users PVB £15.207m	High: Users PVB £33.312m Low: Users PVB £15.207m													
Reliability	Journey time reliability likely to be improved		Moderate beneficial													
Wider Economic Impacts	Paulsgrove and Wymering subject to SEEDA single regeneration funding, but scheme not in a Regeneration Area		Neutral													
ACCESSIBILITY	Option Values	No change to availability of transport services		Neutral												
	Severance	No change to routes crossing the scheme		Neutral												
	Access to the Transport System	No changes affecting changes to the transport system		Neutral												
INTEGRATION	Transport Interchange	No effect on passenger or freight interchange facilities		Neutral												
	Land Use Policy	All works to be carried out within the existing highway boundary. No changes to local landscape patterns. Scheme generally supported by national, regional, and local policies		Slight beneficial												
	Other Government Policies	Policies are neither helped nor hindered, reflecting the nature of the scheme proposal		Neutral												

Table 7.2 – Evaluation Summary Table

EVALUATION SUMMARY TABLE – Stage: One Year After				
M27 JUNCTION 11-12 CLIMBING LANES		Description: New climbing lanes on the M27 between Fareham and Portsmouth eastward from Junction 11 and westwards from Junction 12	Problems: Flows at capacity at peak periods. Slow moving traffic contributing to congestion	Cost £13.2m
OBJECTIVE	SUB-OBJECTIVE	QUALITATIVE IMPACTS	QUANTITATIVE ASSESSMENT	ASSESSMENT
ENVIRONMENT	Noise	Based on traffic flows it is likely that there the local noise is as expected.		Likely to be as expected
	Local Air Quality	Based on traffic forecast evaluation, which are generally in line with expectations (within 10% of predictions), it is likely that impacts on air quality will be as expected.		Likely to be as expected
	Greenhouse Gases	AST and COBA models (predicted and actual) show a net increase of carbon with the scheme, however with actual COBA modelling is lower than predicted therefore impacts on greenhouse gases are considered to be better than expected.	Predicted Opening Year Carbon Emission: + 368 Tonnes of Carbon Outturn Opening Year Carbon Emission: + 325 Tonnes of Carbon	Likely to be as expected
	Landscape	As built scenario has been adapted to relocate drainage components and avoid excessive loss of vegetation. Mitigation measures have been generally provided in line with proposals. Too soon to evaluate establishment of new planting and this should be reviewed as part of the FYA report however screen fencing has provided some visual screening of the road corridor. Lighting impacts were a key impact considered in the ES however the lighting scheme has been significantly reduced, therefore impacts are considered to be better than expected.		Neutral, as expected
	Townscape	N/A		
	Heritage of Historic Resources	Based on the information available it is considered that impacts are as expected.		Neutral, as expected
	Biodiversity	Long term impacts of the scheme were predicted to be neutral due to the context of the works and limited disturbance to habitats.		Neutral, as expected
	Water Environment	All works undertaken within existing motorway corridor with design and mitigation implemented largely as expected. No information has been provided to POPE which would indicate that the facilities are performing other than as expected. Minor variations to location of attenuation tanks are unlikely to have resulted in changes to the effectiveness of the drainage scheme.		Slight beneficial, as expected
	Physical Fitness	The scheme has not impacted on any of the motorways crossing points or the amenity of the NMU.		Neutral, as expected
	Journey Ambience	Traveller views remain largely unaltered as a result of the scheme. The scheme has had a beneficial effect on driver stress however the motorway scenario means that stress remains high. Traveller care has not been altered. The overall effect on Journey Ambience is neutral.		Neutral, as expected
SAFETY	Accidents	There has been a small reduction in the annual number of accidents, but this is not statistically significant.	3.6 fewer accidents in opening year	Neutral
	Security	No impact		Neutral
ECONOMY	Public Accounts	Cost in 2002 prices discounted to 2002 at 3.5% p.a., including indirect tax revenue		£4.9m
	TEE: Consumers & Business	6857 vehicle-hours saved in 2009 (all types of vehicle)	Time saving 5 sec offpeak, 32 sec peak	PVB £94.6m
	Reliability	Reduction in route stress from 100% before to 86% after		Moderate beneficial
	Wider Economic Impacts	The scheme does not serve a designated regeneration area.		Neutral
ACCESSIBILITY	Option Values	No change to availability of transport services		Neutral
	Severance	No change to routes crossing the M27.		Neutral
	Access to the Transport System	No changes affecting the transport system		Neutral
INTEGRATION	Transport Interchange	No change to passenger or freight interchange facilities		Neutral
	Land Use Policy	Supported by national, regional and local land use policies		Beneficial
	Other Government Policies	The effect on other policies is slight		Neutral

8. Conclusions

- 8.1 The M27 J11-12 Climbing Lanes scheme is located north of Portsmouth, and opened in September 2008. An additional lane was provided in each direction over a length of approximately 1.8 km, on the approach to the crest of a hill. It was intended to alleviate congestion caused by slow-moving heavy vehicles climbing the gradient, by separating them from faster traffic.
- 8.2 **Traffic Impact**– The average volume of traffic one year after opening was 116,800 vehicles per day, 3% lower than before the start of scheme construction. This is attributable to the national economic downturn, not to the scheme. Flows were not predicted to change as a result of the scheme, but the flow in 2009 was 7% lower than predicted. However, if flows are adjusted to take account of the recession, then there has been little change in flow on the scheme link.
- 8.3 Average journey time savings are 5 seconds offpeak, and 32 seconds in the peak. These savings are greater than predicted.
- 8.4 **Safety** – There were 18 injury accidents in the year after opening, 3.6 lower than the average of the five years before the start of scheme construction. However this value falls within the range of accidents five years before opening, and the difference is not statistically significant.
- 8.5 **Economy** – The re-evaluated monetary benefit of time savings over 60 years is £94.6 million, which is more than predicted. No evaluation of accident benefits has been made because they were not forecast. The PVC, taking into account indirect tax revenue, was £4.9 million, exactly as forecast. The BCR of 19.3 is better than predicted due to higher than predicted journey time benefits, and shows a good economic return.
- 8.6 **Noise** – Based on traffic flows it is likely that the local noise climate is slightly worse as expected.
- 8.7 **Air Quality** – Based on traffic flows , which are generally in line with expectations (within 10% of predictions), it is likely that impacts on air quality will be slightly worse as expected.
- 8.8 **Greenhouse Gases** – AST and COBA models (predicted and actual) show a net increase of carbon with the scheme, however with COBA modelling using actual flows, it is lower than predicted. The impacts on greenhouse gases are considered to be negative but better than expected.
- 8.9 **Landscape and Townscape** – Mitigation measures have been generally provided in line with proposals. It is too soon to evaluate establishment of new planting, and this should be reviewed as part of the FYA report, however screen fencing has provided some visual screening of the road corridor. The design was adapted to relocate drainage components and avoid excessive loss of vegetation, and the proposed lighting scheme has been reduced and this reduces the influence of the motorway lighting within the well lit route corridor. Overall impacts are as expected.
- 8.10 **Biodiversity** – Mitigation measures generally provided in line with proposals. Too soon to evaluate establishment of new planting and seeding which should be reviewed as part of the FYA report, as should effectiveness of habitat improvements through landscape management.

- 8.11 **Heritage of Historic Resources** – Based on the information available it is considered that impacts are neutral as expected.
- 8.12 **Water Environment** – Based on the information available, the impacts are likely to be slightly beneficial as expected, and there appear to have been no impacts on the Portsmouth Harbour SPA, Brent Geese populations (a qualifying species) or the chalk aquifer. Furthermore engineering solutions were adapted during construction to facilitate retention of existing vegetation, thus reducing ecological and visual impacts. Overall impacts are as expected.
- 8.13 **Physical Fitness** – The scheme has not affected the existing NMU provisions either directly or the amenity value and it is considered that impacts are as expected.
- 8.14 **Journey Ambience** – Traveller views remain largely unaltered as a result of the scheme. The scheme has had a beneficial effect on driver stress however the motorway environment means that stress remains high. Traveller care has not been altered. The overall effect on Journey Ambience is neutral as expected.
- 8.15 **Accessibility & Integration** – There has been no impact on Accessibility. The scheme supports regional and local land use policies.
- 8.16 **Scheme Objectives**

Table 8.1 – Fulfilment of Scheme Objectives

Source	Objective	Achieved?
ES	Improve traffic flows and relieve congestion	Yes
ES	Minimise adverse environmental impacts	Yes
Public Exhibition Leaflet	Improve safety	The change in accident numbers is not statistically significant one year after, however a more robust conclusion will be possible five years after.
Public Exhibition Leaflet	Improve journey times and reliability	Yes

Appendix A

Environment Information Requested

Table 0.1 – Environment Related Information Requested and Response

Requested Information	Response
Environmental Statement	M27 Junctions 11 to 12 Climbing Lanes Environmental Statement, July 2006, Volume 1 Text, Volume 2 Appendices and Volume 3 Figures
AST	AST version 28 July 2006
Any amendments/ updates/addendums etc to the ES or any further studies or reports relevant to environmental issues. Have there been any significant changes to the scheme since the ES.	No formal amendments to the ES. Significant changes to the scheme picked up through As Built drawings and CEMP documentation. Significant changes included minor variations to the drainage design and reduction in lighting proposals.
'As Built' drawings for landscape, ecological mitigation measures, drainage, fencing, earthworks etc. Preferably electronically or on CD.	Provided on via email from Project Sponsor
Copies of the Landscape/Ecology Management Plan or Handover Environmental Management Plans	All CEMP/Hemp information obtained through Contractor and contact with Clerk of Works. This report was written using the Draft HEMP, although it is understood that the final draft has now been provided to the HA.
Contact names for consultation	Sourced by the POPE team
Archaeology - were there any finds etc. Have any Archaeological reports been written either popular or academic and if so are these available?	Watching brief results - no finds. Watching brief report stating that archive to be stored at Hampshire County Council Museum.
Have any properties been eligible for noise insulation?	Information not provided for the OYA stage, to be reviewed at FYA evaluation
Have there been any Part 1 Claims regarding noise, air quality or lighting? Have any post opening surveys been undertaken?	HA Part 1 Team confirmed that it is too early in the claims process. This information should be provided for the FYA report Not aware of any post opening surveys being required
Has any post opening survey or monitoring been carried out e.g. for ecology/biodiversity or water quality and if so would copies of the reports be available?	As far as aware, no post opening or monitoring for noise, air quality or ecology
Animal Mortality Data	Limited information provided by MAC
Any publicity material	Newsletters sourced from HA web page/ Project Sponsor
Copy of NMU post opening survey	No information available/ surveys undertaken
Environmental enhancements to bypassed settlements	N/A

Appendix B

'Before' & 'After' Viewpoints

B.1 'Before' & 'After' Viewpoints

B.1.1 'Before' and 'After' views from Upper Cornaway Lane footbridge.

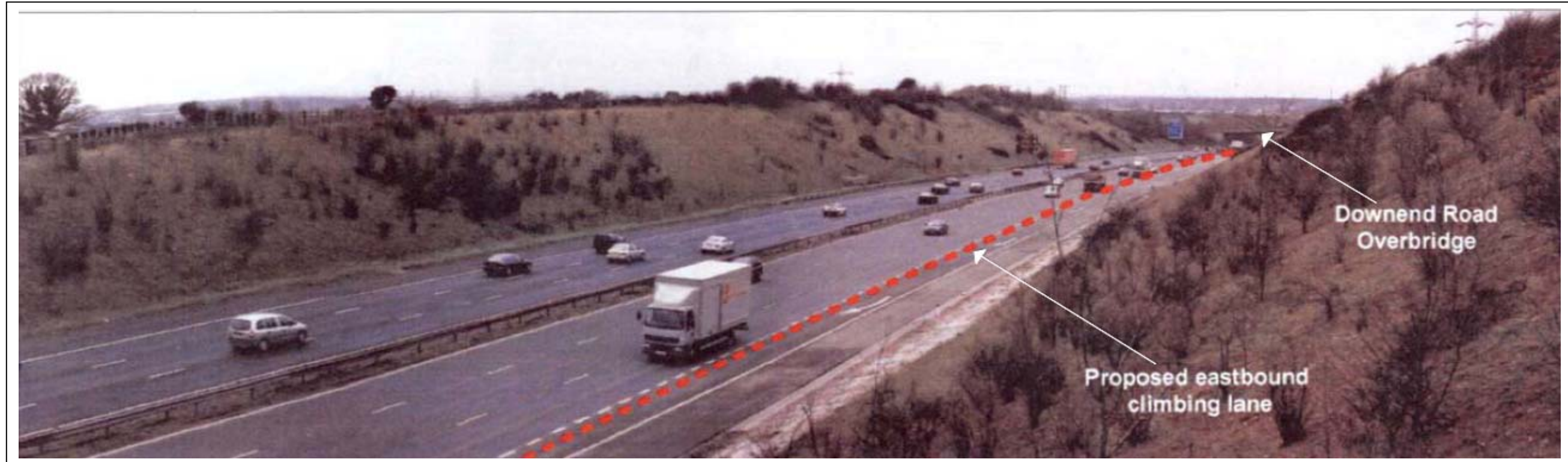


Figure B.1 – ES Figure 9.4a – Viewpoint A[1]: Upper Cornaway Lane Footbridge looking west (FP 117) Winter



Figure B.2 – POPE view looking west from Upper Cornaway footbridge: View illustrates the deep motorway cutting, westbound climbing lane, open chalk verges and slightly amended signage layout (eastbound)

B.1.2 'Before' and 'After' views from Hill Road Overbridge (looking east).

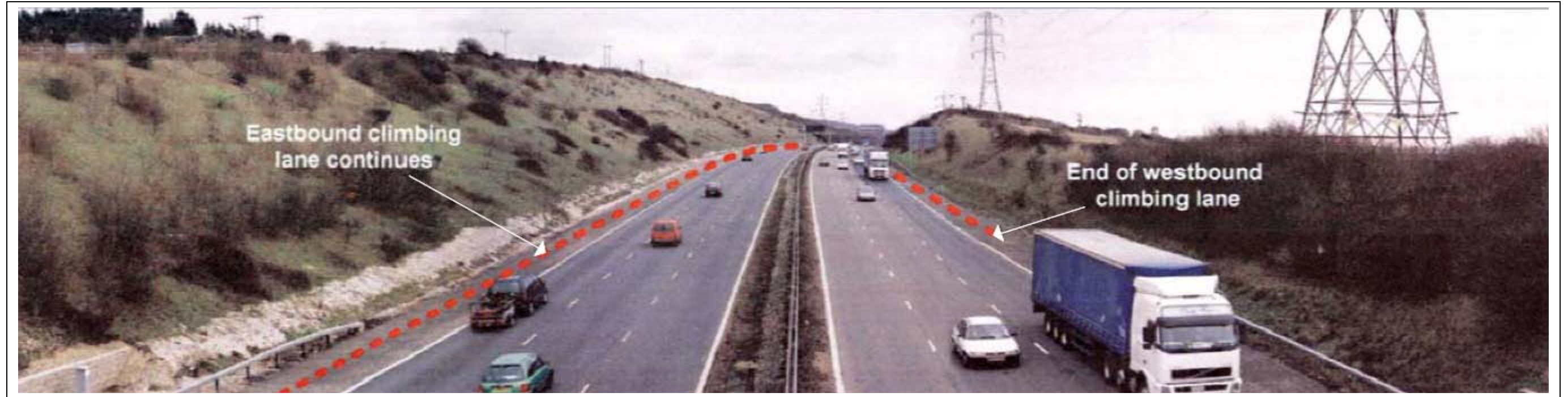


Figure B.3 – ES Figure 9. 4b – Viewpoint C[2]: Hill Road Overbridge looking east - Winter



Figure B.4 – POPE views looking east from Hill Road overbridge: Views illustrates new signage, relocated cabinets, open chalk verges (as before) and retained/reinforced vegetation on cutting slopes

B.1.3 'Before' and 'After' views from High Tor footbridge.



Figure B.5 - ES Figure 9. 4b – Viewpoint D: High Tor Footbridge looking east (FP119B) - Winter



Figure B.6 – POPE view looking east from High Tor footbridge: View illustrates westbound climbing lane, retained signage (eastbound carriageway) and new VMS

B.1.4 'Before' and 'After' views from Hillsley Road.



Figure B.7 – ES Figure 9.4c – Viewpoint E: Hillsley Road looking south - Winter



Figure B.8 – POPE view looking south from Hillsley Road: View illustrates former lighting columns now removed and westbound climbing lane.

Post Opening Project Evaluation

M27 J11-12 Climbing Lanes - One Year After Study