

# Post Opening Project Evaluation

## A66 Long Newton Grade Separated Junction Five Years After Study

September 2014



### Notice

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# Executive Summary

## Scheme Description

The A66 Long Newton junction scheme was a Highway's Agency major project in Stockton-on-Tees which opened to traffic in June 2008. The purpose of the scheme was to replace a series of substandard junctions on the A66 with a grade separated (split level) junction, which in turn would improve access to Durham Tees Valley airport. A local link road was also included in the scheme to enable an increase in public transport provision.

This document summarises the findings of a five years after evaluation study which was completed in 2014.

## Scheme Objectives

Objectives (Public Inquiry Statement of Case 2003)	Objective Achieved?
To improve road safety by reducing personal injury collisions (PICs) on the A66.	✓
To reduce the volume of traffic on roads in west Long Newton, as a result of airport traffic being rerouted through the new grade separated junction. Consequently, journey time delays should also be reduced.	✓
To increase the provision of public transport facilities in both Long Newton and Elton.	✓
To limit the impact of the scheme on the surrounding environment.	✓
To provide a safer route affecting fewer properties to the airport.	✓

## Key Findings

- Collision data indicates an annual saving of 2.5 personal injury collisions (PICs) over the study area, lower than forecast. However a saving of 3.5 PICs is seen over the routes directly impacted by the scheme, which is in line with forecasts.
- Traffic flows are lower than forecast. This is likely to be partly linked to the decline in passenger numbers at Durham Tees Valley airport.
- Journey time savings for traffic using the new junction are higher than forecast.
- Failure of some of the landscaping elements (such as planting to alleviate visual intrusion purposes) is likely to result in an adverse impact for landscape and biodiversity in localised areas.

## Summary of Scheme Impacts

### Traffic

- Average weekday traffic flows have reduced on the A66 by around 1% west of the scheme, with a small increase of 3% observed to the east of the scheme.
- Traffic flows on the alternative route of the A67 and A135 have seen a decrease of 31% and 12% respectively.
- Observed traffic flows were generally lower than forecast with and without the scheme. This is likely to be partly linked to the decline in passenger numbers at Durham Tees Valley airport.

- Average journey times have reduced for traffic using the new junction, with greater savings seen in the peak periods.
- Overall journey time savings are higher than forecast for traffic using the new junction, whilst traffic using the alternative A67/A315 route receive lower than forecast journey time savings.

## Safety

- After accounting for the background reduction in collisions rates, collisions over the study area have reduced by 2.5 per year, a reduction of 10%.
- Analysis of observed collision data for the key routes (the A66 and Darlington Road through the village of Long Newton) in the vicinity of the scheme which were directly affected by the scheme shows an average reduction of 3.5 collisions a year (a reduction of 54%). This is higher than the wider study area, strongly suggesting that the scheme has had a direct impact on safety for the A66 improved section.
- The savings observed on the scheme key links are in line with the forecasts (around a 54% reduction in annual collisions), but the forecast saving of 17% of collisions over the wider study area has not been achieved, with a reduction of 10% observed.
- The severity of collisions has reduced post opening, although as the number of collisions is low, no firm conclusions can be drawn on the impact of the scheme on severity.

## Environment

- Based on observed traffic flows, the noise and air quality impacts of the scheme are considered to be as expected for the village of Elton, and better than expected for the village of Long Newton.
- Carbon emissions have increased in line with expectations, due to improved journey times (increased speeds) for traffic using the new junction.
- The landscape mitigation measures (such as planting to tie in the new works to existing, and for reducing visual intrusion of the route) are generally as expected (slight adverse) however the failure and poor performance of significant elements of the planting stock are likely to have resulted in localised moderate adverse effects that are worse than expected.
- Biodiversity mitigation measures have been implemented as expected; therefore the overall evaluation of the scheme is neutral, as expected. However the failure of some of the landscaping elements is likely to result in a slight adverse impact for localised areas.
- All aspects of heritage mitigation have been addressed. The effects of the scheme on heritage and archaeology are considered to be as expected.
- The scheme drainage measures appear to be performing as intended. The overall effect of the scheme on water quality and drainage are as expected.
- The new link road and footway successfully segregates walkers and cyclists from the main A66 traffic.
- Journey ambience has improved as expected with farm accesses onto the A66 removed and replaced by the new junction improving safety.

## Accessibility and Integration

- The removal of traffic from the villages has reduced severance, and the provision of the new link road has improved links between the villages. The new link road has also enabled a local bus service to be reinstated for the two villages.

## Summary of Scheme Economic Performance

		Forecast	Outturn Re-forecast
Journey Time Benefits		£3.77m	£3.31m
Vehicle Operating Costs		-£0.54m	-£0.54m
Safety Benefits		£18.62m	£8.09m
Total Present Value Benefits (PVB)		£21.85m	£10.86m
Total Present Value Costs (PVC)		£10.40m	£10.73m
Indirect Tax		£0.1m	£0.1m
<b>Benefit Cost Ratio (BCR)</b>	<b>Indirect Tax as a Cost</b>	<b>2.09</b>	<b>1.01</b>
	<b>Indirect Tax as a Benefit</b>	<b>2.08</b>	<b>1.02</b>

- Outturn safety benefits of £8.09m are lower than forecast.
- Journey time benefits are slightly lower than forecast, partly due to lower than expected traffic flows, although journey time savings are also slightly higher than forecast.
- Overall the outturn PVB of £10.86m is 50% lower than the forecast PVB.
- The scheme has been delivered within budget.
- The outturn BCR, which is lower than forecast, indicates that the scheme is low value for money.



# 1. Introduction

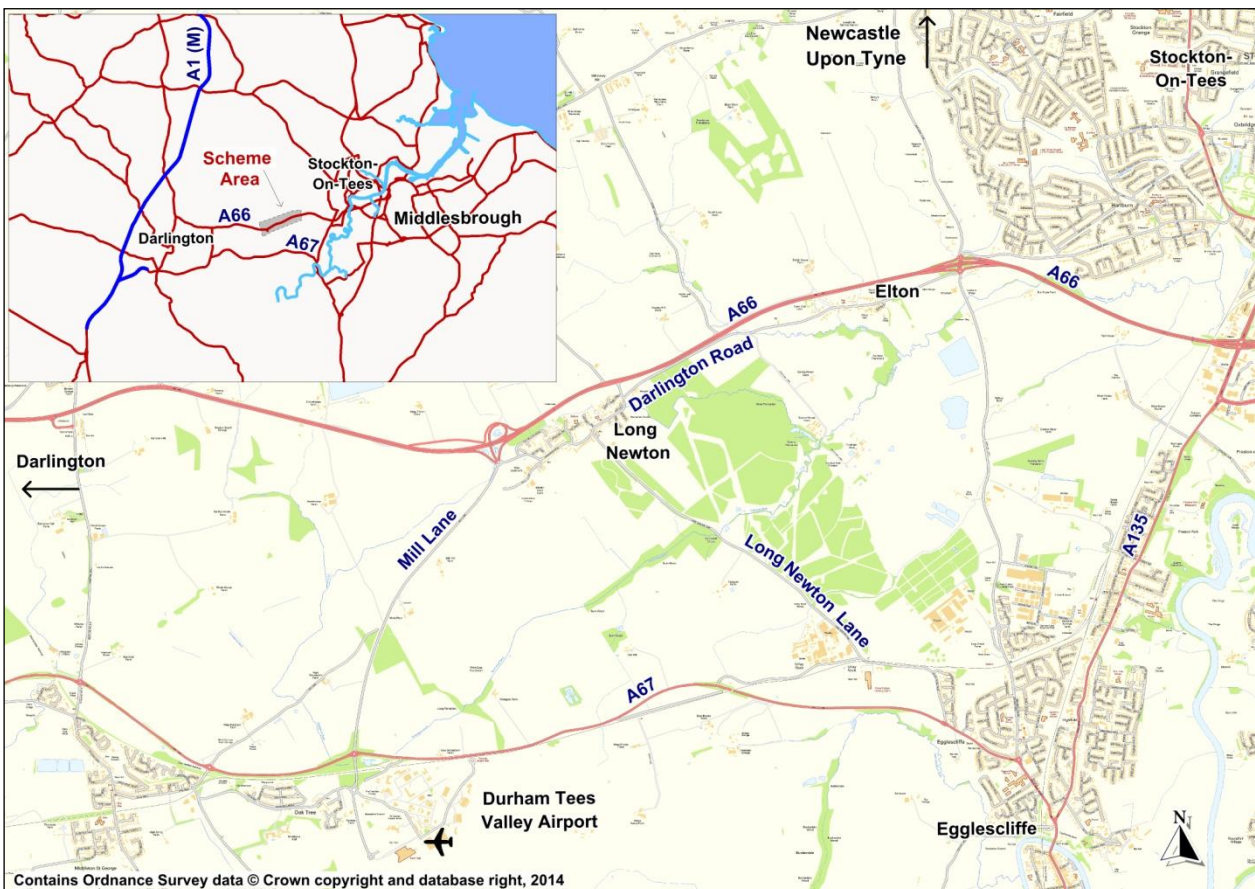
## Background

- 1.1 This report presents a Five Years After (FYA) opening evaluation of the A66 Long Newton Grade Separated Junction improvement scheme (hereafter known as ‘the scheme’), which opened in June 2008. The evaluation has been prepared as part of the Highways Agency’s (HA’s) Post Opening Project Evaluation (POPE) programme and builds upon the findings of the One Year After (OYA) study published in October 2010.

## Scheme Context

- 1.2 The A66 is a major east to west route linking Middlesbrough and Teesside to the east to the A1 and Cumbria to the west. The scheme is situated in Highways Agency Area 14, and is located between Darlington and Stockton-on-Tees, on the A66 Trunk Road (shown in Figure 1.1).
- 1.3 Long Newton Junction is located north west of the village of Long Newton. The neighbouring village to the east of Long Newton is Elton, and were both bypassed when the A66 was upgraded to a dual carriageway in the 1960’s.

Figure 1.1 – Location of Scheme



- 1.4 Over time, traffic volumes and speeds on this section of dual carriageway between Stockton on Tees and Darlington have increased. As a result all the junctions east of Elton are now grade separated (two level junctions, with the A66 given priority). However, west of Elton

(apart from one junction to the east of Darlington), the junctions remain at grade (single level), which causes conflict and journey time delays particularly at peak times.

- 1.5 This section of the A66 had numerous private and field accesses joining directly onto the busy trunk road, which increased the probability of conflict with traffic on the A66, and increased the potential for collisions.
- 1.6 In addition a considerable number of collisions have occurred along this section of the A66, many of which concerned the at-grade junctions and central reserve crossings associated with them. Consequently, the main aim of the scheme is to improve road safety and reduce delays, whilst providing value for money and minimising the affect on the environment. The scheme also provides a gateway access to Durham Tees Valley Airport for traffic travelling to and from the surrounding areas.
- 1.7 At the time of scheme appraisal the forecast continued expansion of Durham Tees Valley Airport (formerly known as Teesside International Airport) required a new access from the A66, which would encourage airport traffic to use the A66 rather than the less suitable local highway network in the surrounding area. The new grade separated junction west of Long Newton was intended to provide access to the improved section of Mill Lane leading to the airport.
- 1.8 In September 2002 a bus service which linked Long Newton and Elton stopped operating due to safety concerns from the operator regarding where the route accessed the A66. This service cut resulted in villagers who did not have another mode of transport having to walk between the two villages.

## Scheme Description

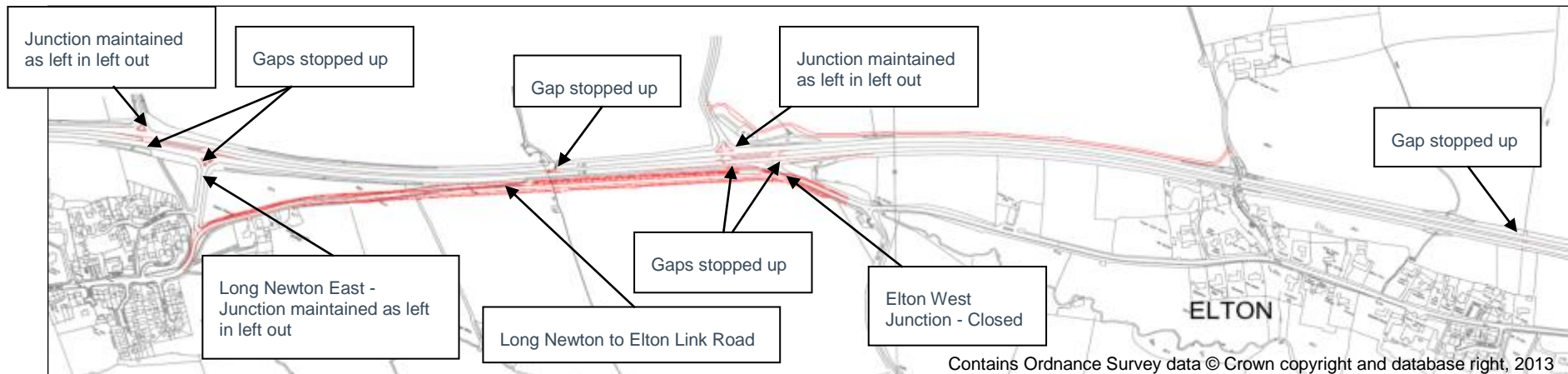
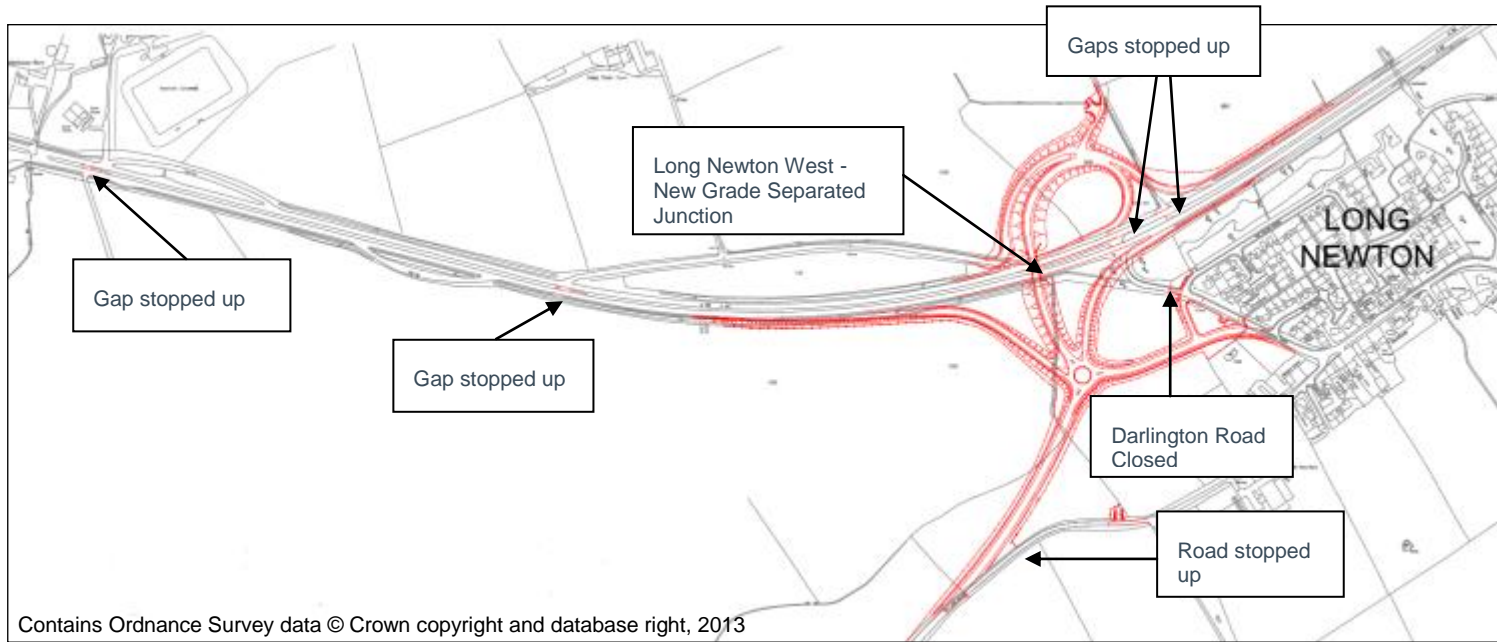
- 1.9 The Long Newton Grade Separated Junction (GSJ) is a major Highways Agency scheme to close two at-grade junctions, one with the A67 at Long Newton and the other at Elton West and install a grade separated (two level) junction to the west of Long Newton.
- 1.10 The scheme also included the following:
  - Closure of ten gaps in the A66 central reserve and 26 private and field accesses directly onto the A66 and the closure of the central reserve gap at Long Newton West.
  - Construction of a new 1.1km Link Road between Long Newton and Elton villages, Elton to provide a route away from the A66 for local and agricultural traffic, buses, pedestrians and cyclists.
  - Rerouting of airport traffic through the new junction.
  - Increase provisions for public transport facilities to both villages.
  - Traffic calming measures in Long Newton Village.

## Scheme Details

- 1.11 The main changes along the A66 between west Long Newton and Elton are shown in Figure 1.2.



Figure 1.2 –Key Features of the Scheme



## Scheme Objectives

- 1.12 The overarching objectives of the A66 Long Newton Grade Separated Junction scheme (taken from the HA Public Inquiry (2003) Statement of Case) include the following:
- **To improve road safety by reducing personal injury collisions (PICs) on the A66.**
  - **To reduce the volume of traffic on roads in west Long Newton, as a result of airport traffic being rerouted through the new grade separated junction. Consequently, journey time delays would also be reduced.**
  - **To increase the provision of public transport facilities in both Long Newton and Elton.**
  - **Limit the impact of the scheme on the surrounding environment.**
  - **Provide a safer route affecting fewer properties to the airport.**

## Durham Tees Valley Airport

- 1.13 Durham Tees Valley Airport is approximately one mile south of the A66 Long Newton junction scheme. One of the principle aims behind this scheme was to provide a safer route for traffic to the airport. This was due to the anticipated continued expansion of the airport (at the time of scheme appraisal), which would have had a direct consequence of increased traffic on the local roads. Post opening, a new signing strategy was implemented to direct airport traffic along the A66 and towards the airport through the improved junction at Long Newton. A summary of the actual growth of the airport is provided in the traffic chapter of this report.

## Scheme History

- 1.14 A brief history of the key events throughout the A66 Long Newton scheme development is shown in Table 1.1.

**Table 1.1 – Chronology of the A66 Long Newton Junction Scheme**

Date	Event
1960's	The A66 dual carriageway opened, bypassing Long Newton and Elton
1980's	DfT Studies into Grade Separated Junction
1990's	Public Inquiry and Orders re-published
March 2001	Following delays to funding, Government accepts recommendation of the Regional Planning Body that the scheme should be constructed as quickly as possible to assist job creation at nearby Durham Tees Valley Airport (Formerly known as Teesside International Airport)
October 2002	Improvements to the A66 at Long Newton included in the Targeted Programme of Improvements (TPI), Orders re-published
July 2003	2 <sup>nd</sup> Public Inquiry
February 2005	Legal Orders to build the scheme and to purchase the land were formally made
February 2007	Highways Agency award contract for detailed design and scheme construction

June 2007	Construction work started
2nd May 2008	Grade Separated Junction opens to traffic
5 <sup>th</sup> June 2008	Long Newton to Elton Link Road opens to traffic
October 2010	One Year After Study was completed

## Post Opening Project Evaluation (POPE)

### Highways Agency's Appraisal Process

- 1.15 The HA is responsible for improving the strategic highway network (motorways and trunk roads) by delivering the Major Schemes programme. At each key decision stage through the planning process, schemes are subject to a rigorous appraisal process to provide a justification for the project's continued development. When submitting a proposal for a major transport scheme, the Department for Transport (DfT) specifies that an Appraisal Summary Table (AST) is produced which records the degree to which five objectives<sup>1</sup> (Environment, Safety, Economy, Accessibility and Integration) have been achieved. The AST for this scheme is presented in Table 7-1 of this report.

### Post Opening Project Evaluation

- 1.16 POPE studies are undertaken for all Major Schemes at two stages: one and five years after opening. This is carried out as it is imperative to evaluate the strengths and weaknesses in the techniques used for appraising schemes, so that improvements can be made in the future. For POPE, this is achieved by comparing information collected pre and post scheme to traffic, against predictions made during the planning process. The outturn impacts of a scheme are summarised in an Evaluation Summary Table (EST) which summarises the extent to which the objectives of a scheme have been achieved. The EST for this scheme can be found in Table 7.2 of this report.
- 1.17 POPE of Major Schemes goes beyond monitoring progress against the targets set beforehand. It also provides the opportunity to study which aspects of the intervention and appraisal tools used to evaluate it are performing better or worse than expected, and how they can be made more effective. More specifically the objectives of POPE evaluation reports are to:
- Provide a quantitative and qualitative analysis of scheme impacts consistent with national transport appraisal guidance (Web TAG) and scheme specific objectives.
  - Identify and describe discrepancies between forecast and outturn impacts.
  - Provide explanations of reasons for differences between forecast and outturn impacts.
  - Identify key issues relating to appraisal methods that will assist the HA in ongoing improvement of appraisal approaches and tools used for Major Schemes.

### Summary of the A66 Long Newton Junction One Year After (OYA) Opening Study

- 1.18 The purpose of the FYA study is to verify and study in more detail the emerging trends and conclusions presented in the OYA study report. The main conclusions made in the A66 Long Newton Junction OYA report published in 2010 were as follows:
- Based on the information available at the OYA, this scheme had met its objectives.

<sup>1</sup> As of August 2011, this approach has been revised. However, POPE is concerned with evaluation against the appraisal and as such follows the objectives used at that time.

- Road safety improved on the A66. The number of collisions reduced at a statistically significant level and the reduction in Personal Injury Collisions (PICs) was greater than predicted.
- Collisions at central reserves were eliminated, and there were no reportable collisions in the villages since scheme opening.
- There was an increase in the provision of public transport facilities, for both Long Newton and Elton villages.
- Residents reported improved safety in the villages, but some Elton residents are concerned about the impacts of increased speeds.
- Predicted do-minimum traffic flows were reasonably accurate. There were some large percentage differences between predicted do-something flows at some locations, although absolute differences were small.
- Journey time benefits were above predictions due to journey time savings being greater than forecast for the trips that use the new junction. Collision savings are higher than forecast and are the main source of monetary benefit (PVB). With the outturn PVC lower than predicted when converted to the same cost base, the outturn BCR is better than expected.
- A safer route to the airport has now been provided, affecting fewer properties. The level of re-assignment of airport traffic through the new junction was underestimated.
- The impact of the scheme on the surrounding environment has been limited and mitigation measures have been implemented as planned.
- The scheme has reduced severance for pedestrians and cyclists and enabled the re-instatement of bus services linking the villages.
- The scheme is consistent with, and contributes to, regional and local transport planning policies.

### Five Years After (FYA) Study

- 1.19 This FYA report will reconsider the status of the above findings and provide further clarity on the longer term effects of the improvements on the immediate area affected by the scheme. This is of particular importance when considering collision and environmental impacts, and longer term economic regeneration effects.

### Report Structure

- 1.20 The remainder of this report is structured as follows:
- Chapter 2 – Traffic Impact Analysis
  - Chapter 3 – Safety
  - Chapter 4 – Economy
  - Chapter 5 – Environment
  - Chapter 6 – Accessibility and Integration
  - Chapter 7 – Appraisal Summary Table and Evaluation Summary Table
  - Chapter 8 – Conclusions
  - Appendix A – List of Tables and Figures
  - Appendix B – Glossary
  - Appendix C – Environmental Information requested
  - Appendix D – Photographic Record of Scheme

## 2. Traffic Impact Analysis

### Introduction

- 2.1 This section considers before and after opening traffic data from a number of sources to provide an after opening comparison and to provide pre scheme and after journey times on key links around the scheme. It also considers changes in traffic flows and journey times on the new link road between Long Newton and Elton.
- 2.2 This chapter includes the following:
- A description of national, regional and local background traffic trends.
  - A summary of the sources used to compile data for this evaluation.
  - A detailed comparison of pre scheme and FYA traffic flows on the key routes in the study area likely to be affected by the scheme.
  - An evaluation of the key differences between forecast and outturn impacts of the scheme in terms of traffic flows and journey times.

### Background Changes in Traffic

- 2.3 Historically in POPE scheme evaluations, the 'before scheme' counts have often been factored to take account of background traffic growth so that they are directly comparable with the 'after' counts. This usually involved the use of National Road Traffic Forecasts (NRTF), with local adjustments made using National Transport Model (NTM) local growth factors.
- 2.4 However, in light of the recent economic downturn coinciding with scheme implementation, a more considered approach is now undertaken to better understand the effects of the recent economic climate and its impact upon this evaluation.
- 2.5 In order to better understand the effects of the recent economic downturn, it is useful to look at the long term trends in traffic nationally, regionally and in the local area of the scheme.

### National Trends

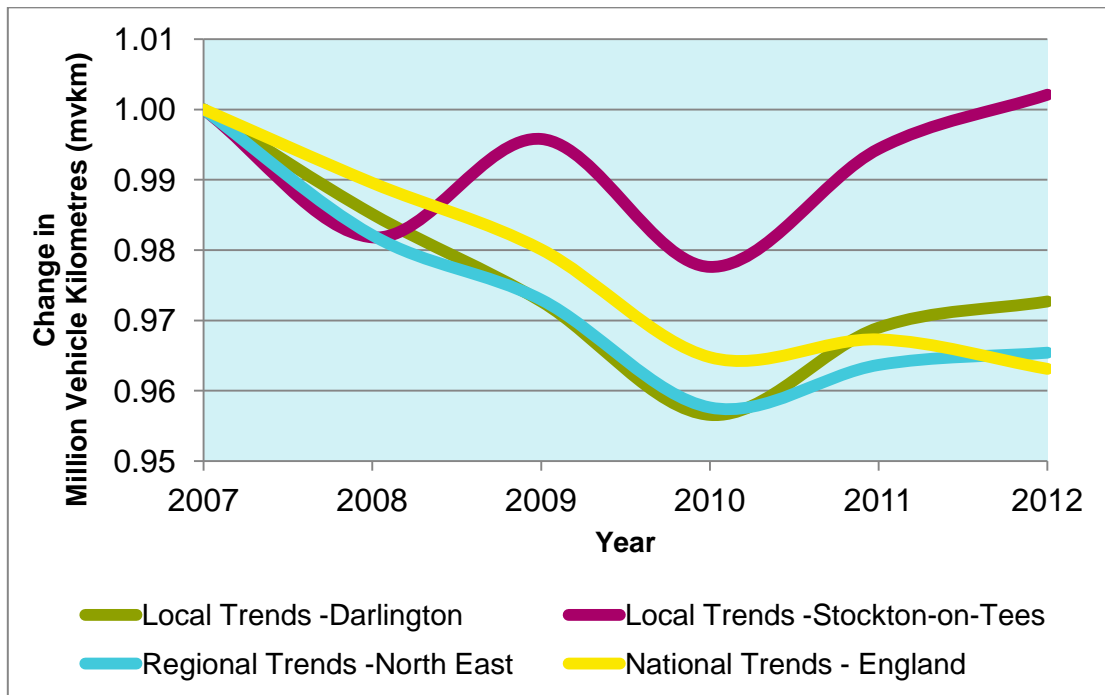
- 2.6 The Department for Transport (DfT) produces observed annual statistics for all motor vehicles in terms of distances travelled expressed as numbers. These are reported by road types<sup>2</sup> for Great Britain and by region<sup>3</sup>. At present, this data is available up to 2012. Here we present the proportional changes by year since the start of scheme construction in 2007, for:
- National data for rural A roads.
  - Regional data for the areas covering the scheme (Stockton-on-Tees and Darlington).
- 2.7 National, regional and local traffic trends are shown in Figure 2.1.

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<sup>2</sup> Road traffic by road class ([www.gov.uk/government/organisations/department-for-transport/series/road-traffic-statistics](http://www.gov.uk/government/organisations/department-for-transport/series/road-traffic-statistics)) Table TRA0202. Motor vehicle traffic (vehicle kilometres) by road class, annual from 1993-2012

<sup>3</sup> Road Traffic and Speeds (<http://www.dft.gov.uk/pgr/statistics/datatablespublications/roads/traffic>) Table TRA8904b. Motor vehicle traffic (vehicle kilometres) by local authority in the North East of England, annual from 1993 to 2012

Figure 2.1 – Trends since the start of construction (2007) regional and national

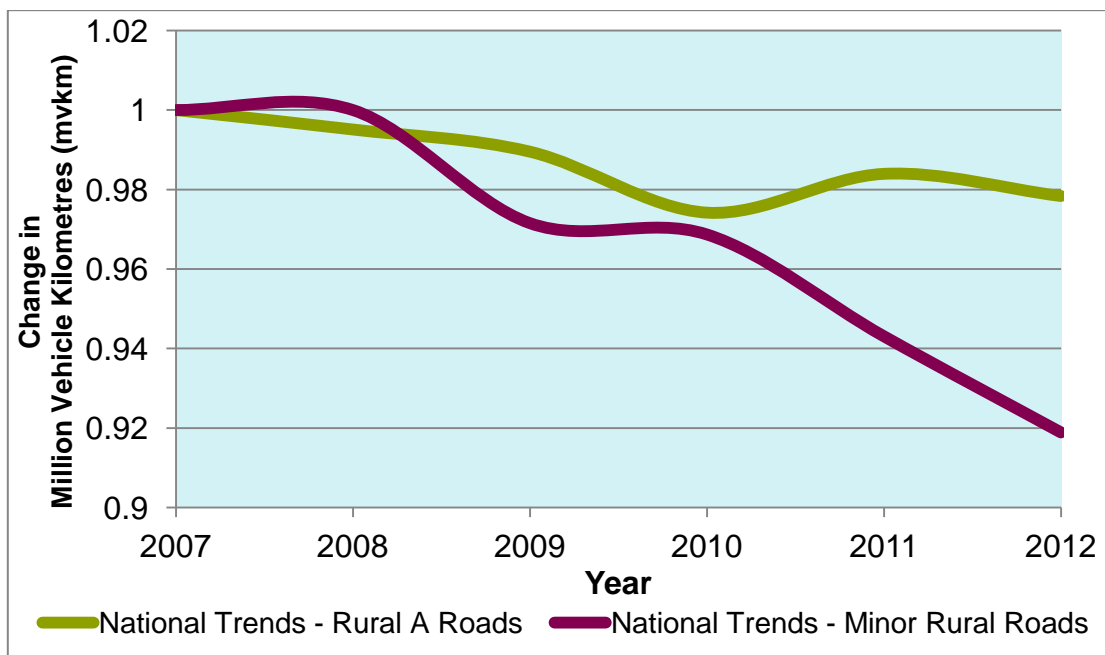


2.8 It can be seen from Figure 2.1 that:

- During 2008, when the scheme opened, traffic flows continued to decrease nationally, regionally and in Darlington until 2010.
- Traffic flows in Stockton-on-Tees have fluctuated between 2008 and 2012, and at the end of 2012 was the only area to experience traffic flows close to those seen at the beginning of 2007.
- Overall traffic flows between 2007 and 2012 (other than in Stockton-on-Tees) have decreased by between 3-4%.

2.9 Changes for rural A roads and minor rural roads are shown in Figure 2.2.

Figure 2.2 – Trends since the start of construction (2007) rural A roads and minor rural roads





2.10 It can be seen from Figure 2.2 that:

- Traffic flows on rural A roads have decreased slightly (2%) between the start of construction and 2012.
- The minor rural road traffic decreased sharply from 2008, with total vehicle kilometres travelled in 2012 being approximately 8% lower than those seen in 2007 although the local trends (not available at road type level) shown in Figure 2.1 suggest that the minor rural roads in the local area may not have decreased as much as shown nationally.

2.11 This information should be kept in mind when assessing the changes in traffic volumes in and around the scheme, as it is important to determine whether changes have occurred due to the scheme, or national traffic trends.

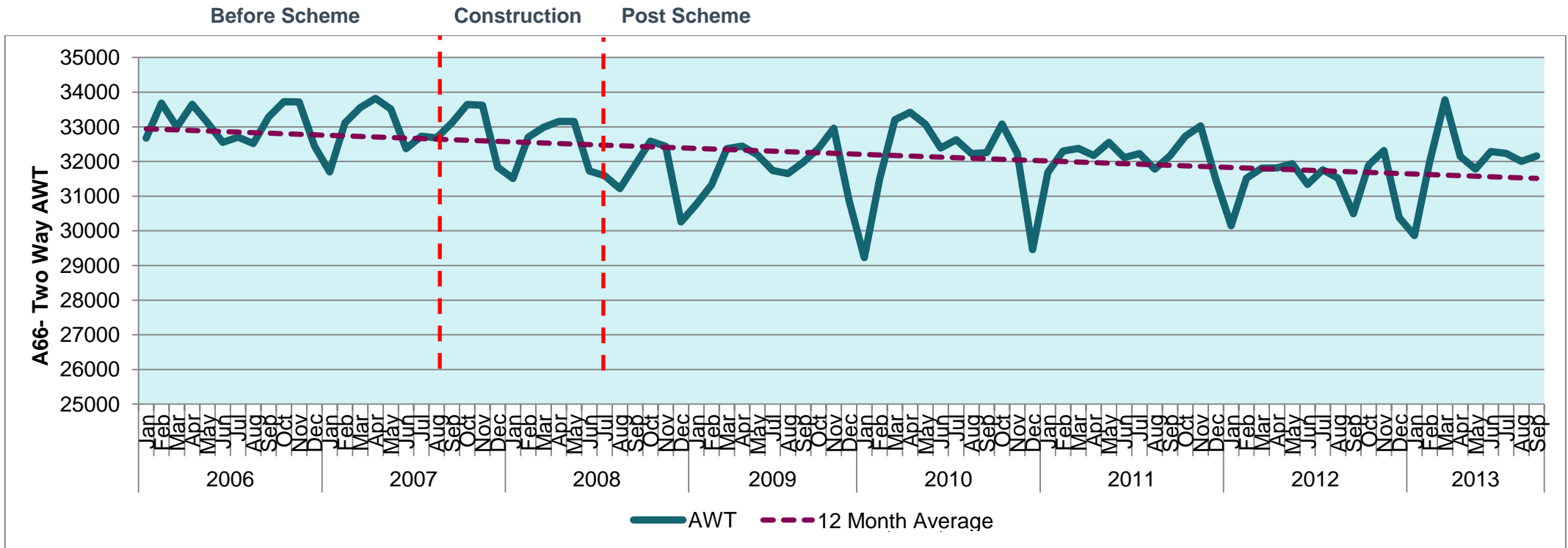
## Long Term Traffic Trends on the A66

2.12 In order to get a greater understanding of the historical fluctuations of annual traffic flows, Figure 2.3 shows the traffic flow trends (average weekday traffic, AWT) on the A66 in the vicinity of the improvements. These trends have been presented from before scheme construction, through construction and post scheme opening.

2.13 The following observations can be made from Figure 2.3:

- Since scheme opening in June 2008, the A66 to the west of Long Newton junction has witnessed a steady decrease in traffic volumes which has continued into 2013, of approximately 1%.
- There is strong seasonality in traffic volumes at the scheme location. December and January typically represent the lowest traffic volumes, whilst April and October represent the peaks. This is the same trend shown before and post scheme.
- The sudden dip in the traffic flow during the winter of 2009 to 2010, can be attributed to particularly bad winter weather during this period.

Figure 2.3 - Historic Profile of AWT at A66 Long Newton



## Data Sources

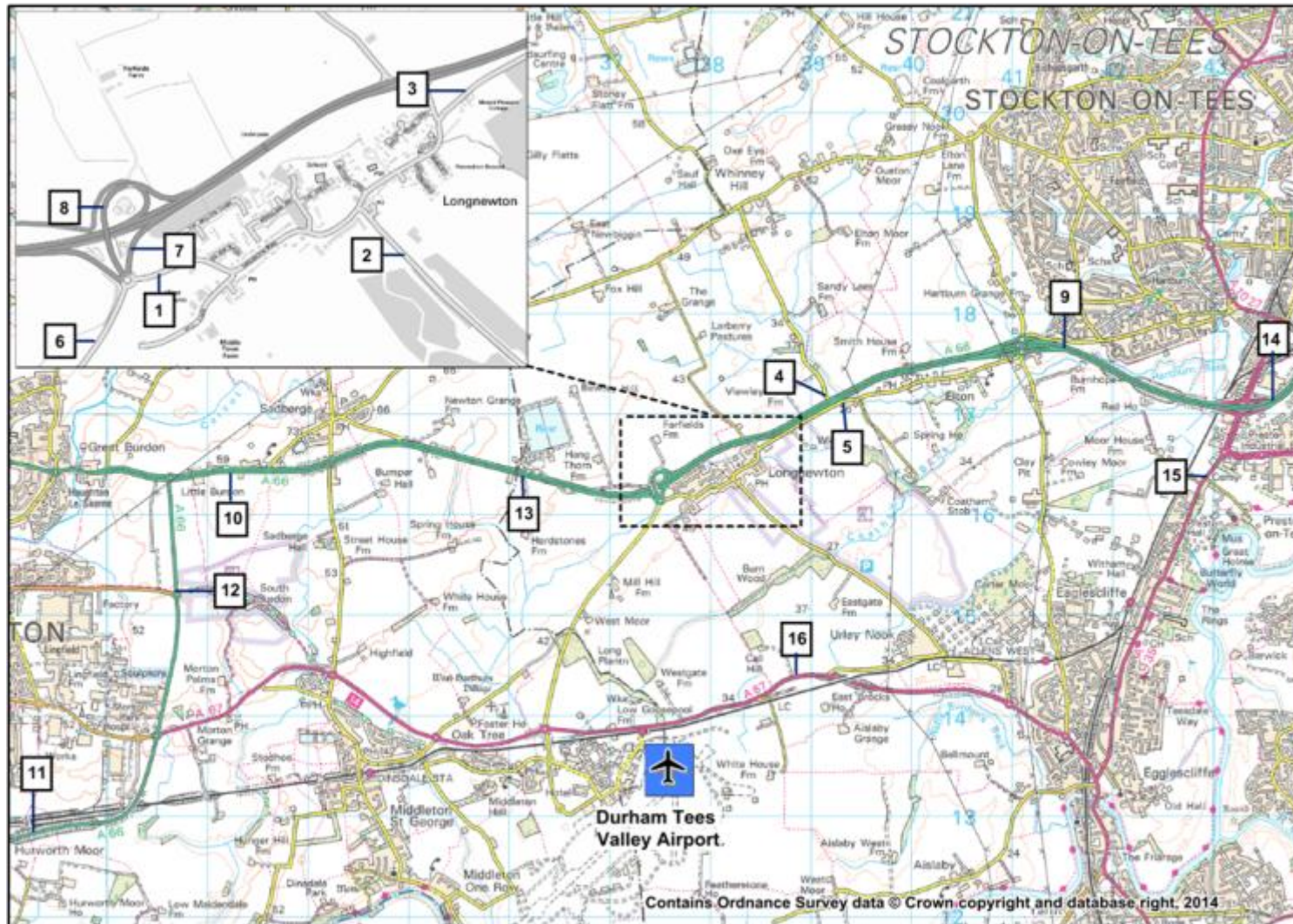
### Traffic Counts

- 2.14 The main sources of traffic data used to inform this evaluation include:
- Permanent traffic count data obtained from HA sites (TRADS) on the HA network.
  - Count data supplied by Stockton-on-Tees Borough Council, which has been used before scheme construction and FYA data.
  - Temporary radar recording sites commissioned specifically for use on this evaluation at FYA.
- 2.15 Traffic forecasts were taken from:
- The Traffic and Economics Evidence (TEE) Report for the A66 Long Newton Grade Separated Junction scheme (July 2003).
- 2.16 Counts were undertaken before scheme, OYA and FYA opening, the locations of which can be seen in Figure 2.4. The same locations have been used for all three sets of counts in order to assess any changes that may be as a result of the schemes implementation. However, the FYA data includes two additional counts at the new junction. Traffic data was collected at the following intervals:
- March 2007 (before scheme)
  - June/November 2013 (FYA opening)

### Journey Time Surveys

- 2.17 Before scheme opening journey times were obtained from the use of moving observer surveys in March 2007. The following time periods were used:
- AM Peak (0800 to 0900)
  - Inter-Peak (1000 to 1500)
  - PM Peak (1700 to 1800)
- 2.18 The new Elton link road (joining Elton and Long Newton) journey time has not been measured at FYA opening, due to low traffic flows.
- 2.19 In order to evaluate the changes in journey time seen as a result of the scheme, data from satellite navigation devices (from July 2012 to June 2013) has been used to derive post-opening journey times on the A66, A67, A135 and Mill Lane (shown on Figure 1.1) for the same time periods as the pre-scheme surveys. Motorists who use satellite navigation devices have the option to voluntarily allow anonymous data about their journeys to be collected and used to provide a range of services, including the analysis of historic journey times along specific routes.
- 2.20 The journey time routes and the designated timing points are shown in Figure 2.5.

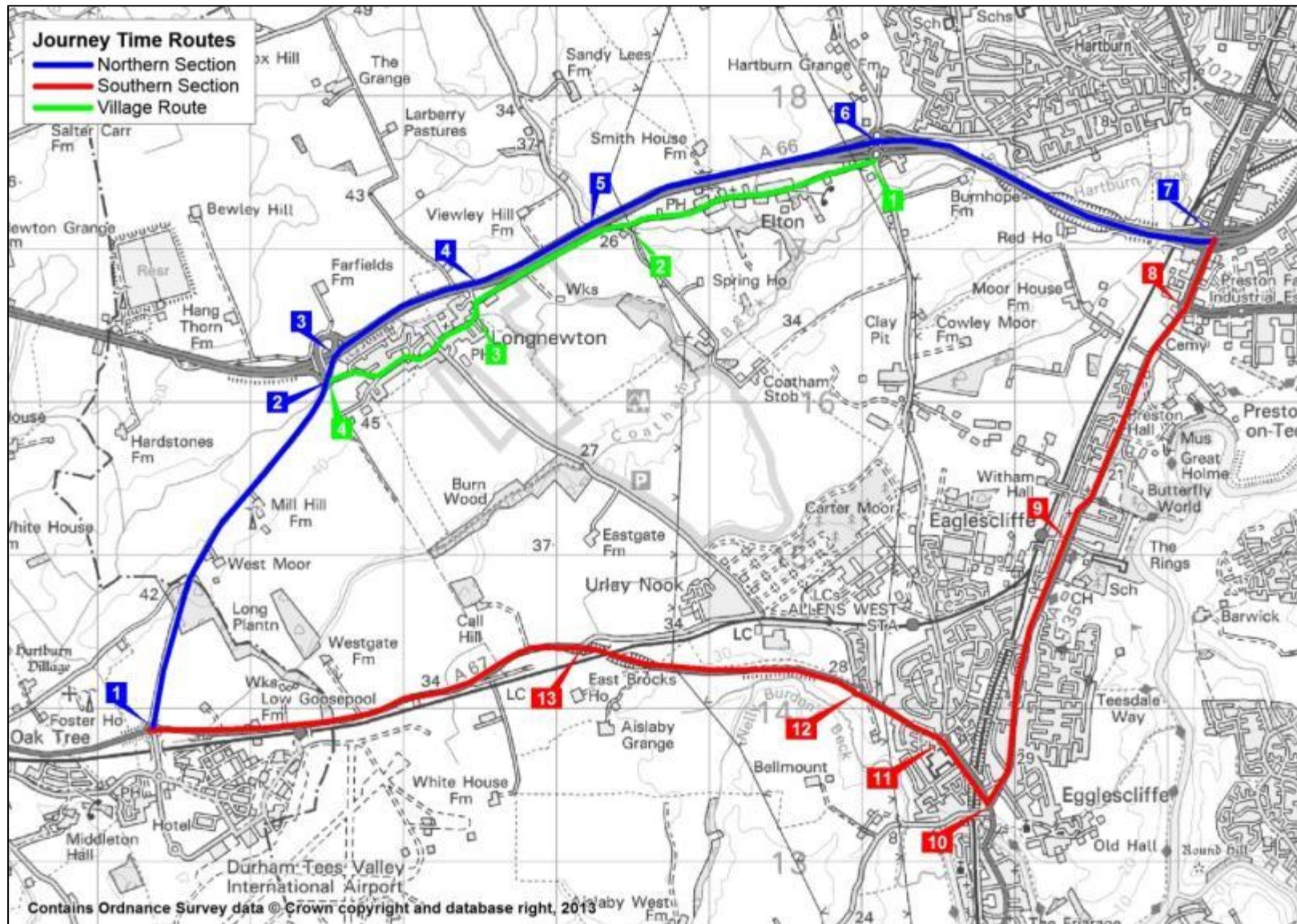
Figure 2.4 – Traffic Count Locations



Site Reference	Location
1	Unnamed road between Mill Lane and Darlington Rd
2	Corner of Long Newton Lane
3	Long Newton East
4	Sandy Leas Lane
5	Elton West
6	Mill Lane
7	A66 Westbound Off-Slip
8	A66 EB on and Off-Slip
9	A66, East of Elton Village
10	A66, West of Long Newton
11	A66 between A67 and A167
12	A66 between A67 near Darlington (east) and A1150
13	A66 between A1150 and Mill Lane
14	A66 within the A135 junction
15	A135 Yarm Road
16	A67 east of airport entrance



Figure 2.5 – Journey time routes and timing points



## Traffic Volume Analysis

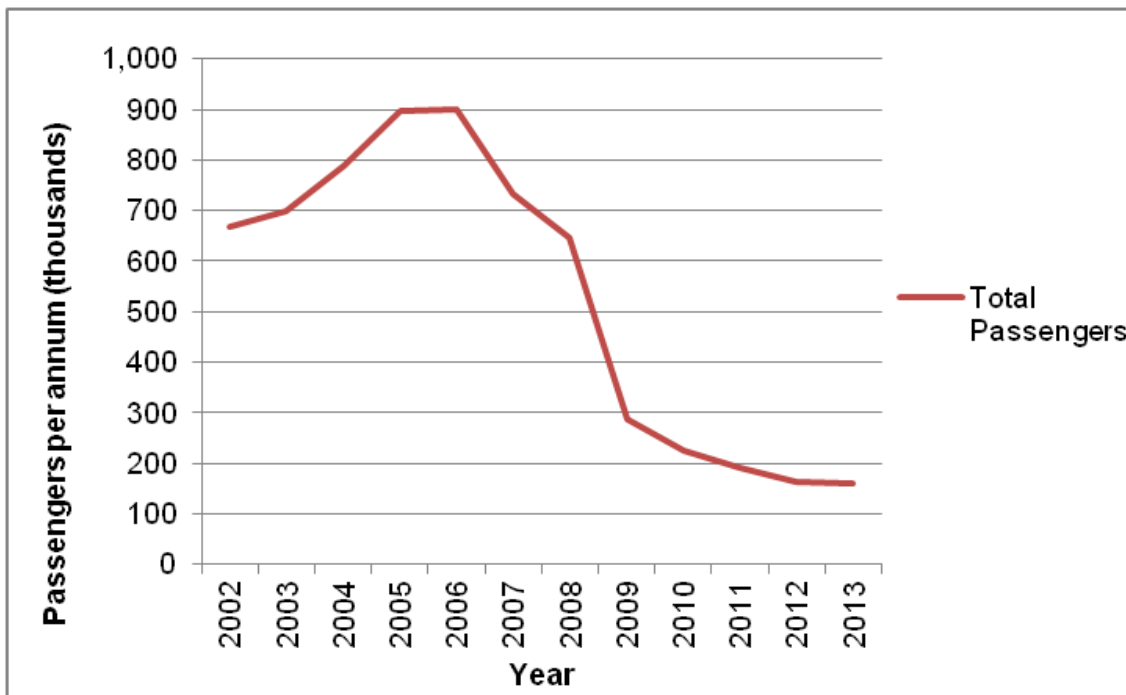
2.21 This section of the report uses data from the sources described earlier to inform the pre scheme and after analysis of changes in traffic volumes and journey times for the scheme.

### Durham Tees Valley Airport – actual change in passenger numbers

2.22 To enable the observed traffic flow changes to be presented in the context of wider changes, Figure 2.6 shows that patronage levels for the airport rose between 2004 and 2005 by 100,000 passengers (to over 900,000 passengers per annum)<sup>4</sup>. However, as stated in the OYA opening report, the airport experienced a significant drop in passenger numbers from over 900,000 in 2006 to just over 200,000 in 2010. This trend continued to 2013, when the patronage level was 160,000.

2.23 The decrease in passenger numbers has been partly caused by the withdrawal of two important air companies from the airport<sup>5</sup>. It should also be noted that passenger numbers for all UK airports decreased between 2008 and 2013, but this was a much smaller proportion (3% decrease between 2008 and 2013) than Durham Tees Valley Airport, which in 2013 had patronage levels 75% below those observed in 2008.

Figure 2.6 – Durham Tees Valley Airport Annual Passenger Numbers between 2002 and 2013

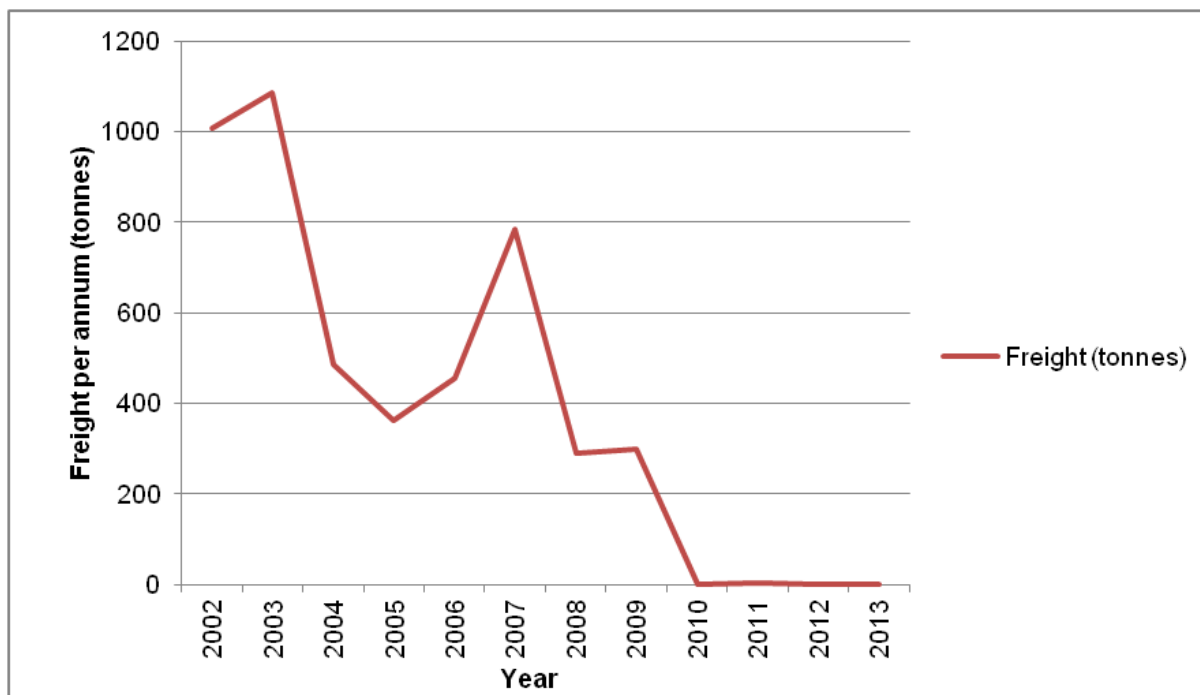


<sup>4</sup> CAA Statistics, © Civil Aviation Authority 2014

<sup>5</sup> CAA UK Airports Market – General Context, September 2011



Figure 2.7 – Durham Tees Valley Airport Annual Freight between 2002 and 2013



- 2.24 Figure 2.7 shows the change in annual freight carried between 2002 and 2013 at Durham Tees Valley Airport. Over 1,000 tonnes of freight per annum was carried in 2003 however by 2010 the airport was not used for any freight.
- 2.25 In October 2013 it was reported in a local newspaper<sup>6</sup> that Durham Tees Valley Airport had confirmed it was moving away from chartered holiday flights as it looks to focus on business customers.
- 2.26 The considerable passenger and freight decreases will have had a direct impact on the traffic volumes to and from the airport, as the CAA Passenger Survey Report (2005)<sup>7</sup> showed that 73% of passengers travelled to the airport by private car, and 22% by taxi. Therefore the decline in passenger use should be taken into consideration when assessing differences both between observed changes between before and FYA flows, and forecast and observed flow differences.

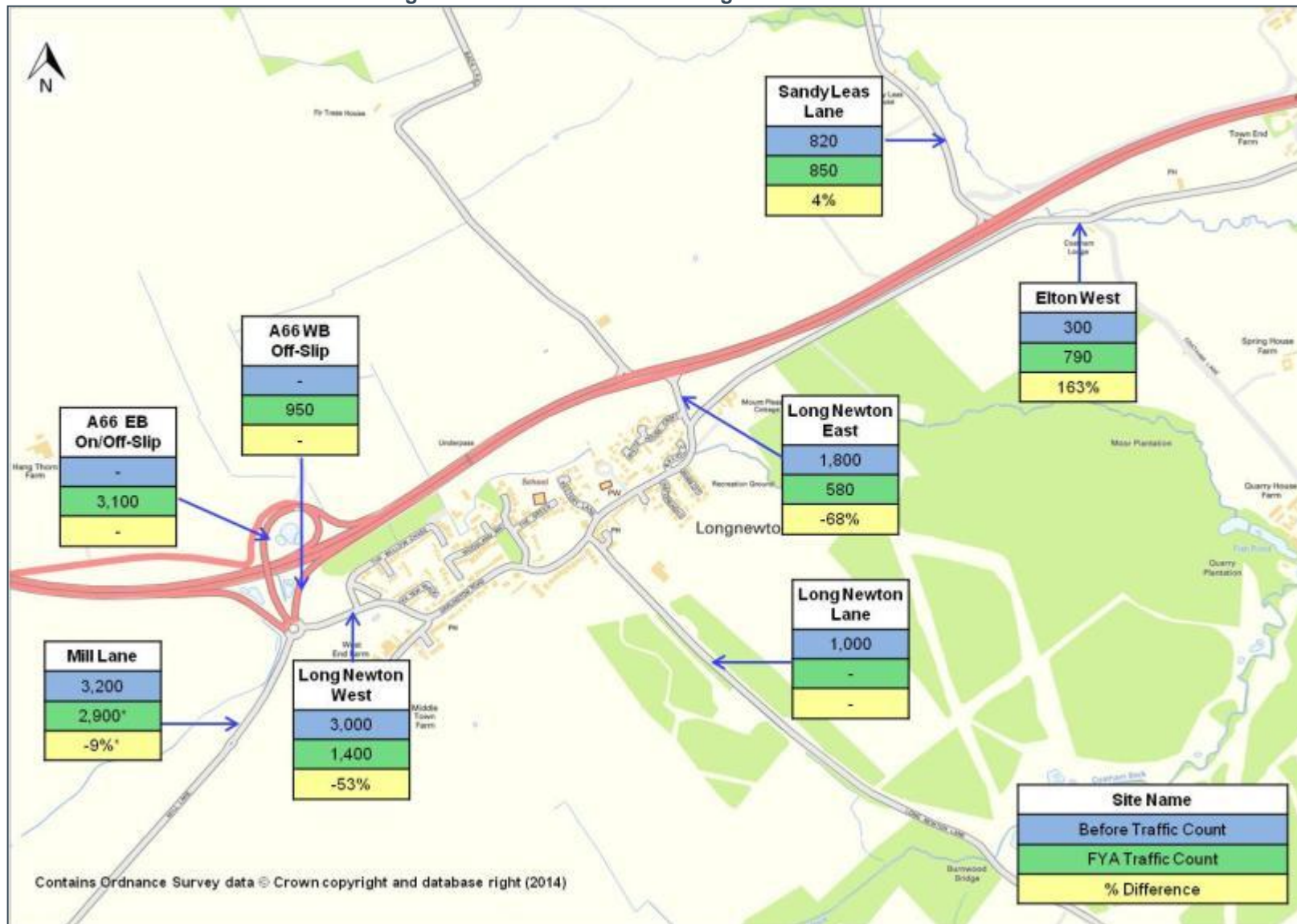
### Observed Flows

- 2.27 A comparison of before scheme and post-opening average weekday traffic (AWT) flows are presented in Figure 2.8 and Figure 2.9. It should be noted that all flows are 2-way 24 hour flows with the exception of A66 Westbound off-slip (one way traffic).

<sup>6</sup>[http://www.thenorthernecho.co.uk/news/10772881.Durham\\_Tees\\_Valley\\_Airport\\_confirms\\_end\\_of\\_charter\\_flights/](http://www.thenorthernecho.co.uk/news/10772881.Durham_Tees_Valley_Airport_confirms_end_of_charter_flights/) October 2013

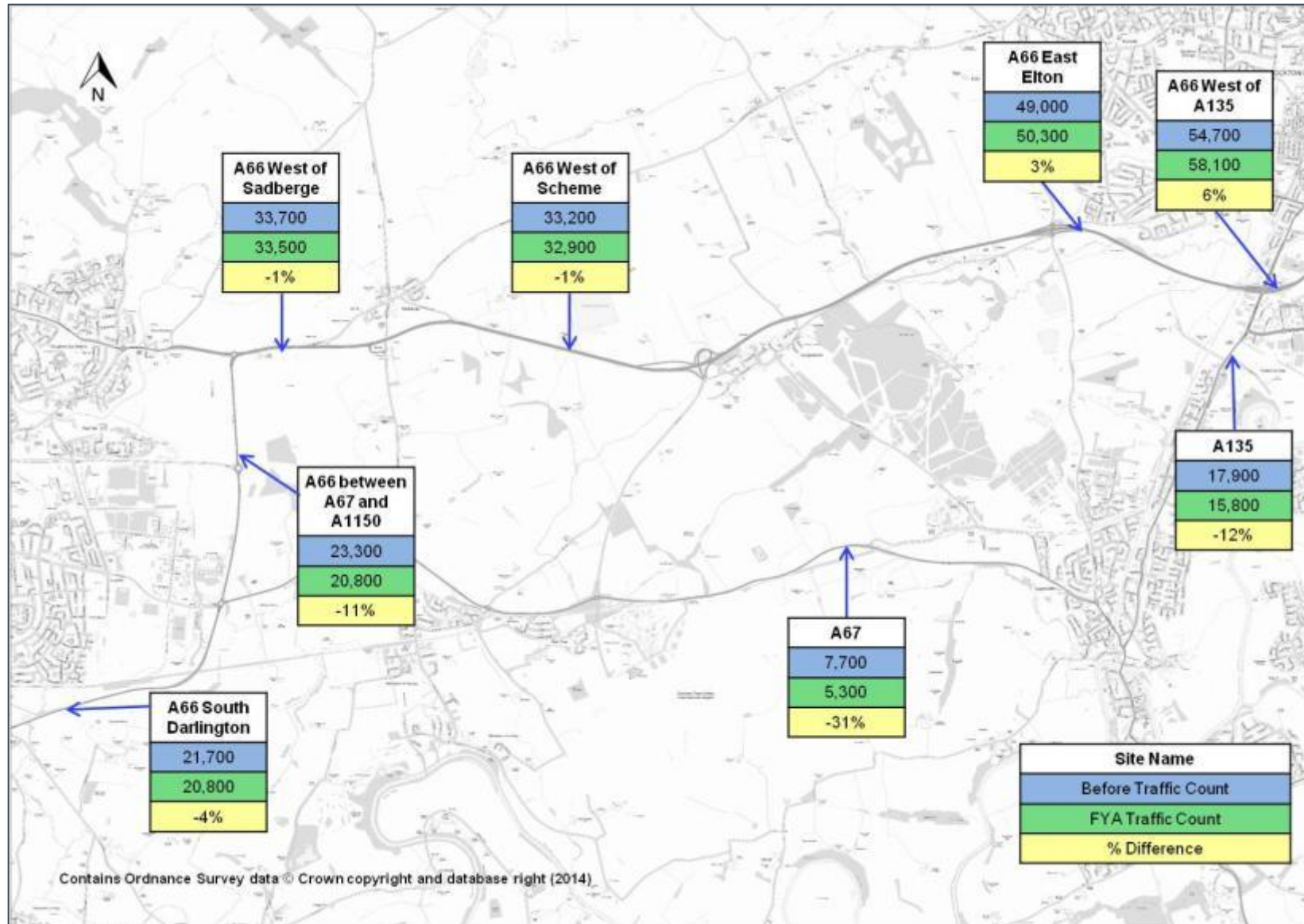
<sup>7</sup> CAA Passenger Survey Report 2005 (<http://www.caa.co.uk/docs/81/2005CAAPaxSurveyReport.pdf>)

Figure 2.8 - Traffic Volume Changes for Scheme Area



\* FYA Northbound flow used to calculate a two way flow based on OYA direction ratio

Figure 2.9 - Traffic Volume Changes for Wider Scheme Area



- 2.28 Figure 2.8 shows that the majority of sites show large percentage changes from the before situation, albeit from relatively low bases. The traffic counts in Figure 2.9 show that most locations have experienced a decrease in traffic. The main findings include:
- There has been a 68% decrease in traffic in the east of Long Newton accessing Long Newton from the A66 (A66 Long Newton East junction).
  - Traffic accessing the new junction through Darlington Road (Long Newton West) in the west of Long Newton has decreased by 53%, which is likely to be due to Mill Lane through traffic accessing the junction direct using the new Mill Lane link to the roundabout rather than having to travel along this route.
  - Traffic at Elton West (the section of Darlington Road to the west of Elton) has increased by 165%. This increase is probably re-assigned traffic that would have previously used Elton West Junction and Long Newton East Junction, which as a result of the scheme are now closed. As a result, traffic will have increased through Elton village in order to access the A66.
  - It should be noted that the higher percentage decreases and increase experienced between before and FYA scheme opening in the immediate scheme area, are based on small absolute numbers. For example, the 165% increase in traffic on the western approach to Elton, is an increase of approximately 390 vehicles a year travelling on this section of road which are relatively low flows.
  - Traffic flows on the A67 have decreased by 31%. This is likely to be linked to the reduction in traffic using the airport itself, combined with the overall slight decline in flows regionally.
  - As described earlier in this section, passenger numbers to the airport have declined substantially in recent years, which is likely to be the overarching reason for the decrease in traffic around the scheme area over and above the regional trend decreases.
  - Overall flows along the A66 have changed very little, with small increases seen closer to Stockton on Tees unlikely to be linked to the Long Newton junction scheme.

## Forecast Traffic Flows

- 2.29 The pre scheme appraisal process for the A66 Long Newton scheme involved the forecasting of traffic flows for Do Minimum (DM) and Do Something (DS) scenarios. The DS scenario includes the scheme whilst the DM scenario does not. This section compares modelled flows with observed flows to ascertain the accuracy of the original predictions.

### Forecasting Assumptions

- 2.30 In order to understand the differences between the forecast and actual traffic impacts, it is first necessary to develop an understanding of how the scheme was appraised and the key assumptions used. This may then assist in explaining any differences observed.
- 2.31 Forecasts for the A66 Long Newton scheme were undertaken using a spreadsheet model based on observed 2001 counts. The DS scenario was calculated using a manual reassignment process applied to the DM scenario based on expected changes due to the closure of existing junctions and implementation of the new junction and local access road. National Road Traffic Forecasts (NRTF) were then applied to produce forecasts of the future traffic flows with and without the scheme.
- 2.32 Overall, three sets of traffic forecasts have been produced for the scheme as shown below:
- Environmental Statement forecasts (1995)



- Public Inquiry Forecasts - No airport growth forecast/Durham Tess Valley Airport Growth Forecast (2003 and presented at the public inquiry)
- Local area SATURN modelling of the area immediately adjacent to the scheme (2005 for Value Engineering workshop).

### Anticipated traffic growth associated with the Airport

2.33 The Airport handled 669,000 passengers in 2002. Published information at the time of scheme appraisal showed an intention to increase passenger numbers to 3 million by 2030. Clearly the growth of passenger numbers at this site would lead to an increase in highway traffic seeking to access the Airport. Therefore an additional set of traffic forecasts was presented at the Inquiry. This showed that traffic would increase on Mill Lane, but that flows through the villages of Long Newton and Elton would be unaffected.

### Local Area SATURN Model (2005)

2.34 At the Public Inquiry it was recognised that a more sophisticated traffic model would have been preferred given the large number of scheme option tests that were put forward by objectors to the scheme. A local area SATURN model was built for testing 8 options for the grade separated junction as part of the scheme’s Value Engineering workshop in 2005. This covered the area bounded by the A66/Darlington Road/Mill Lane.

2.35 In version 2 of the Traffic and Economic Technical Note 1 for this scheme, it was proposed that should a significant traffic and economic analysis be required for the scheme then it would be prudent to develop a SATURN model of the scheme in order to allow better analysis of the traffic impacts of any options. This would have allowed a Transport User Benefits Appraisal (TUBA) economic evaluation of the scheme to be undertaken, with the scheme accidents benefits evaluated using COst Benefit Analysis (COBA). However, no further SATURN models were developed the value engineering workshop concluded that the other options did not provide any cost advantages to the scheme that was approved at the public inquiry.

### Forecast vs. Observed traffic flows

2.36 Although a SATURN model was built to help inform different scheme options, forecast traffic flows were not required to be updated as the scheme did not change. For the purposes of this report, the forecasts without the airport growth are used to compare with observed. These forecasts were based on an opening year of 2005 and a design year of 2020. Straight line interpolation has been undertaken to estimate the 2013 forecast traffic flows, to enable a direct comparison with the observed 2013 flows.

2.37 The forecast FYA flows and the FYA observed traffic flows (ADT) are compared in Table 2.1. No traffic forecasts were available for the A67 or the A135.

**Table 2.1 – Forecast DS vs. FYA Observed flows (ADT)**

Site	Location	Predicted ADT Do-Something (2013)	Observed FYA Flow (2013)	% Difference
3	Darlington Road, Long Newton East	1,500	530	-65%
6	Mill Lane	3,200	2,400	-25%
5	Darlington Road, Elton West	610	750	29%
10	A66, West of Junction	34,600	30,000	-13%
1	Darlington Road, Long Newton West	2,100	1,200	-43%

2.38 The key points shown from this comparison are:

- Observed traffic is lower than forecast for all locations, with the exclusion of Darlington Road at Elton.
- Darlington Road at Elton has seen an observed flow 29% above the forecast, however this represents relatively low levels of traffic.

2.39 A comparison has also been made to consider whether the observed change in traffic flows follows a similar pattern to that forecast, although from different bases. This is shown in Table 2.2.

**Table 2.2 – Forecast changes vs. Observed Traffic change comparison (ADT)**

Site	Location	Predicted ADT Do-Minimum (2007)	Predicted ADT Do-Something (2013)	DM and DS % Dif	Observed Before Flow (2007)	Observed FYA Flow (2013)	Before and FYA % Dif
3	Long Newton East	2,000	1,700	-15%	1,700	530	-69%
6	Mill Lane	3,200	3,200	0%	2,900	2,400	-17%
5	Elton West	330	610	84%	300	750	150%
10	A66 west of junction	34,600	34,600	0%	33,100	30,000	-9%
1	Long Newton West	2,300	1,700	-26%	2,700	1,200	-66%

2.40 The key points shown from this comparison are:

- Mill Lane and the A66 west of the junction were forecast to have no change in traffic as a result of the scheme showing that the scheme was not expected to result in any reassignment of traffic. Observed before scheme and FYA flows show small decreases in traffic which is likely to be linked to the lack of overall traffic growth regionally over this period, and the decrease in passengers at the airport.
- Long Newton East was expected to experience a decrease of 15% in traffic as a result of the scheme. Observed traffic flows at show that traffic at FYA is 69% less than observed pre scheme.
- Traffic to the west side of Elton was forecast to have an increase in traffic of 84% as a result of the scheme. The observed FYA traffic shows an increase of 150% compared to pre scheme. Whilst this is a large proportion it should be noted that this figure is based on relatively small numbers.
- Traffic travelling towards the new junction from Long Newton was forecast to decrease by 26% as a result of the scheme. The observed traffic figures show there has actually been a traffic decrease of 66% post opening.

## Journey Time Analysis

2.41 This section examines the evidence for changes in journey times along the northern route and the southern route, as illustrated in Figure 2.5.



2.42 The before scheme and FYA journey times have been analysed in Table 2.3 and Table 2.4, for the northern and southern routes respectively.

**Table 2.3 – Journey Times – Northern Route (Through Scheme)**

Route Direction	Time Period	Journey Time (minutes : seconds)		
		Before	FYA	Saving between before and FYA (minutes : seconds)
Eastbound - Northern Route	AM Peak	9:04	7:19	1:45
	Inter Peak	7:31	6:30	1:01
	PM Peak	7:52	6:47	0:55
Westbound - Northern Route	AM Peak	7:10	6:31	0:39
	Inter Peak	6:57	6:12	0:45
	PM Peak	7:07	6:34	0:33

2.43 The key points regarding journey time savings for traffic on the Mill Lane and A66 northern route are:

- Journey time savings were experienced during the AM, inter and PM peaks along the northern route, in both directions.
- Journey time savings were greater in the eastbound direction, ranging from 55 seconds to one minute and 45 seconds.
- Journey time savings on the westbound northern route ranged from 33 to 45 seconds.
- Journey time savings were expected on this section as the scheme is located along the northern route.

**Table 2.4 – Journey Times – Southern Route**

Route Direction	Time Period	Journey Time (minutes : seconds)		
		Before	FYA	Saving between before and FYA (minutes : seconds)
Westbound - Southern Route	AM Peak	12:14	13:51	-1:37
	Inter Peak	11:04	11:32	-0:28
	PM Peak	13:07	11:58	1:09
Eastbound - Southern Route	AM Peak	12:24	14:54	-2:30
	Inter Peak	11:05	12:21	-1:16
	PM Peak	11:16	15:47	-4:31

- 2.44 The key points regarding journey time savings for traffic on the A66 and A135 southern route are:
- Other than during the westbound PM peak, the southern route has shown increases in journey times, which vary from approximately half a minute to one and a half minutes on the westbound route during the inter peak and AM peak respectively.
  - Journey times have increased eastbound, from between one minute 16 seconds to four minutes and 31 seconds. The largest increases in journey time were experienced along this route during the AM and PM peaks, which saw journey time increases of two and a half minutes and four and a half minutes respectively.
  - The southern route journey time increases were experienced predominantly between timing points 10 and 11 in the eastbound direction and 10 to 9 in the westbound direction (as illustrated in Figure 2.5). These route sections are at the approach to the A135 junction with the A67, south of Egglecliffe. Stockton Council was unable to provide any reason why this would be the case, but it is considered to be unrelated to the A66 Long Newton scheme.

### Forecast vs. Outturn Journey Times

- 2.45 Neither the AST nor the scheme economic report made specific mention of predicted journey times.
- 2.46 The Public Inquiry Statement of Case for Transport and Economics 2003 stated that some vehicles would benefit from the removal of delays caused by waiting to seek gaps in the traffic when crossing the A66. However, the closure of Elton West junction would result in increased journey times for a small amount of traffic forced on to slightly longer routes.
- 2.47 DM and DS journey times have been extracted from the COBA model for the northern and southern routes and are compared to the observed journey times in the following tables. It should be noted that the COBA model outputs do not specify traffic direction, therefore the predicted journey times are the same for eastbound and westbound traffic for the northern and southern routes.

**Table 2.5 – Journey Times – Do Minimum vs. Before Scheme**

Journey Time Route	Direction	Time Period	Journey Times (mm:ss)		
			Predicted (Do-Minimum)	Observed (Before Scheme)	Difference
Northern	Eastbound	AM Peak	6:38	9:04	+2:26
		PM Peak	6:40	7:52	+1:12
	Westbound	AM Peak	6:38	7:10	+0:32
		PM Peak	6:40	7:07	+0:27
Southern	Eastbound	AM Peak	9:26	12:14	+2:48
		PM Peak	9:30	13:07	+3:37
	Westbound	AM Peak	9:26	12:24	+2:58
		PM Peak	9:30	11:16	+1:46

- 2.48 All of the predicted journey times for the DM scenario are faster than those observed before scheme opening, as shown in Table 2.5.

- 2.49 On the northern route, the majority of journey times observed before scheme were between 27 seconds and two minutes 26 seconds longer than predicted do minimum scenario. The observed before scheme journey times were longest in the eastbound direction (towards Stockton-on-Tees and Middlesbrough).
- 2.50 On the southern route the observed before journey times were longer than those predicted. The westbound journey times were between one minute 46 seconds and almost three minutes longer. The eastbound journey times were almost three minutes longer than predicted during the AM peak, and almost two minutes longer during the PM peak.

**Table 2.6 – Journey Times – Do Something vs. FYA**

Journey Time Route	Direction	Time Period	Journey Times (mm:ss)		
			Predicted (Do-Something)	Observed (FYA)	Difference
Northern	Eastbound	AM Peak	6:20	7:19	+0:59
		PM Peak	6:22	6:47	+0:25
	Westbound	AM Peak	6:20	6:31	+0:11
		PM Peak	6:22	6:34	+0:12
Southern	Eastbound	AM Peak	9:26	14:54	+5:22
		PM Peak	9:29	15:47	+6:21
	Westbound	AM Peak	9:26	13:51	+4:25
		PM Peak	9:29	11:58	+2:29

- 2.51 The DS journey times are compared to FYA observed journey time in Table 2.6. The forecast DS journey times for the southern route show that there was not expected to be any change on this route compared to the pre scheme situation. A small time saving is forecast for traffic using the northern route.
- 2.52 Post opening, the observed times on the northern route are still above that forecast, but are more consistent. Along the westbound northern route the journey times were just over ten seconds longer than those stated in the forecast DS scenario. The eastbound northern route journey time was 25 seconds to one minute longer than predicted.
- 2.53 The FYA observed journey times for the southern route were significantly longer than those predicted. The southern westbound route took two and a half minutes longer than predicted during the PM peak and almost four and a half minutes longer during the AM peak. The southern eastbound route took five minutes and 22 seconds longer than predicted during the AM peak and six minutes and 21 seconds longer during the PM peak.
- 2.54 Overall, journey time savings are greater than forecast for the northern route, but worse than forecast on the southern route.

## Reliability

- 2.55 WebTAG states that reliability is a sub-objective of the economic assessment of a scheme and refers to the impact of the scheme on improving journey time variability. It also states that assessment of reliability is a rapidly developing area.
- 2.56 The assessment of reliability made in this section is within the context of what is achievable using the existing guidance and data. The standard deviations of journey times have not been compared because the pre and post scheme observed data are from different sources and sample sizes thus variation cannot be compared on a like-for-like basis.

### Assessment of reliability using route stress

- 2.57 The only forecast for the reliability impact of this scheme is within the AST and is based on the route stress metric which is defined in DMRB<sup>8</sup>. This gives figures for stress based on the ratio of traffic flow to road capacity. The net change in stress is then used to give a qualitative assessment.
- 2.58 The AST forecast a neutral impact as the route stress was forecast to change by only a small margin as shown in Table 2.7. DfT<sup>9</sup> guidance states that only values between 75% - 125% should be considered and anything outside this range should be adjusted up or down to 75% or 125%, hence the adjusted stress figures are included in brackets. The table also shows outturn stress before and FYA scheme opening.

**Table 2.7 – Route Stress**

	Forecast (AST) (Adjusted stress in brackets)		Calculated Outturn 'Stress' (Adjusted stress in brackets)	
	Do Minimum	Do Something	Before	FYA
<b>A66</b>	56.5% (75%)	55.4% (75%)	48% (75%)	46% (75%)

- 2.59 Table 2.7 shows that:
- Observed before and FYA route stress is slightly lower than the forecast in the AST.
  - There has been no change in route stress FYA opening.
- 2.60 The 'neutral' entry on the AST has therefore been achieved FYA opening.

<sup>8</sup> Design Manual for Roads and Bridges (DMRB) Volume 5 section 1 part 3

<sup>9</sup> <http://www.dft.gov.uk/pgr/economics/rdg/multimodal/aneuadealfortrunkroadsinengla5491?page=7>

## Key Points – Traffic Impacts

### Traffic Flow impacts

- Traffic on the A66 to the west of the scheme has reduced slightly (-1%), whilst traffic on the A66 to the east of the scheme has increased by around 3%.
- Traffic on the A67 and A135 have both seen a decrease of 31% and 12% respectively.
- A large increase is seen to the west of Elton, on the new Elton Link Road. This is due to the road now linking with Long Newton, whereas previously it was a no-through road. Here there has been a 163% increase in traffic, however it should be noted this is based on relatively low vehicle numbers (from 300 to 790 vehicles on an average weekday).

### Traffic Forecasts

- Other than the new grade separated junction, all of the roads nearest the scheme have lower observed traffic flows than predicted. The A66 FYA traffic flows are 13% lower than predicted, Mill Lane is 25% lower and east of Long Newton village has traffic flows 65% lower than expected.
- A decrease in traffic of 69% to the east of Long Newton is observed between before and FYA opening, higher than that predicted (-15%).
- Mill Lane and the A66 (between the A1150 and A67) have not experienced any significant changes in observed traffic and predicted traffic.
- Darlington Road (west of Elton) was forecast to experience a traffic increase of 84%, whereas the observed before and FYA data showed there had been a rise of 150%.
- Overall, observed traffic flows were lower than forecast in the majority of cases.

### Journey Times

- The northern route (including Mill Lane and the A66), mostly incurred journey time savings when comparing before scheme and FYA opening journey times. These varied between savings of half a minute and one minute 45 seconds. There were higher savings in the eastbound direction (particularly during the AM peak), of between one minute and one minute 45 seconds.
- The southern route experienced journey time increases between before scheme opening and FYA in both directions and time periods except the westbound PM peak. The eastbound route experienced larger increases in journey times than the westbound route, especially during the PM peak, which experienced an increase of four and a half minutes.

### Journey Time Forecasting

- The predicted DM journey times were all lower than the observed before scheme journey times. The southern route experienced the longest journey times in comparison to the before journey times, particularly in the eastbound direction.
- The DS journey times were also all lower than the FYA observed journey times. The FYA journey times were much higher on the southbound route, particularly in the eastbound direction, where journey times were between five minutes 20 seconds and six minutes 20 seconds higher than expected.
- Overall, observed journey time savings were higher than forecast on the northern route, and lower than forecast on the southern route.

# 3. Safety

## Introduction

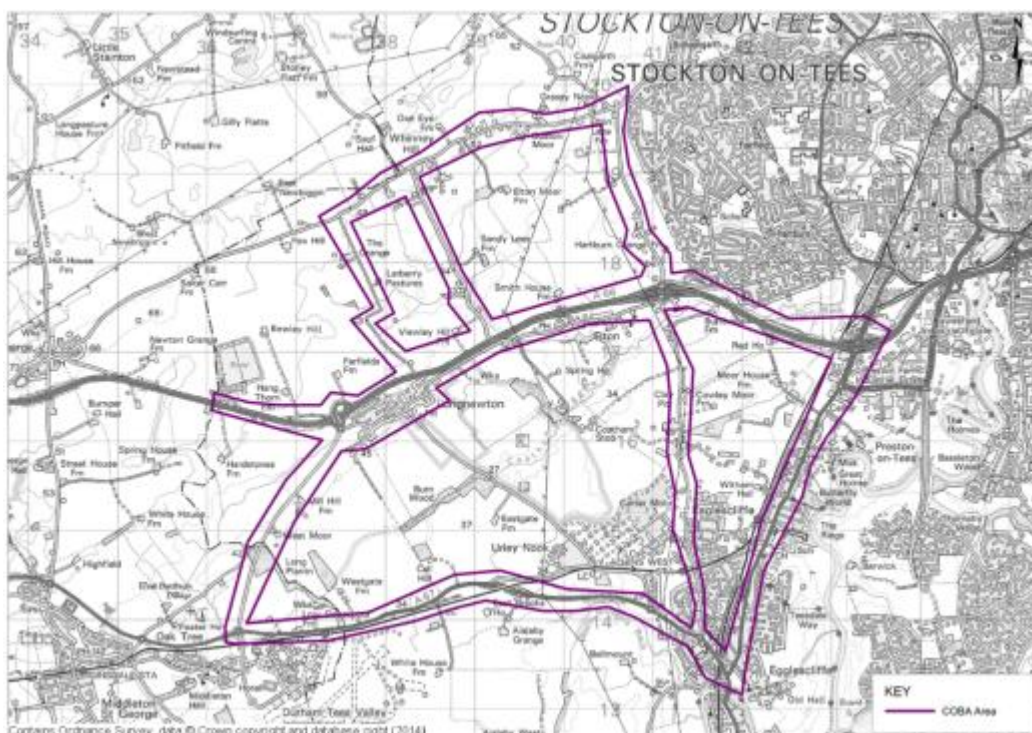
- 3.1 This section of the report examines how successful the scheme has been in addressing the objective of improving safety. The focus of this objective is to reduce the loss of life, injuries and damage to property resulting from transport collisions and crime. This is assessed by analysing the changes in Personal Injury Collisions (PICs) occurring in the five years pre scheme and five years post opening.
- 3.2 The safety objective consists of two sub-objectives:
  - To reduce collisions.
  - To improve security.

## Sources

### Forecasts

- 3.3 For the purposes of assessing the collision impacts of the scheme, forecasts were produced for the number of collisions the scheme was expected to save, together with the associated numbers of casualties and the monetary benefit of the savings. Forecasts of the impact of the A66 Long Newton scheme on safety have been obtained from the scheme COBA model dated December 2005 and the AST.
- 3.4 The extent of the COBA model area is shown in Figure 3.1 this covers the links directly affected by the scheme, as well as the main routes in the immediate and wider vicinity of the scheme where changes in traffic and hence changes in collisions may occur. In order to ensure a like-for-like comparison between the predicted and observed collision changes, the overall geographical area of analysis used for this study is the same area covered by the COBA model.

**Figure 3.1 – COBA Collision Appraisal Area**





- 3.5 The forecast impact on safety is expressed in terms of numbers of PICs saved with the associated numbers of casualties and the economic benefit of the saving over 60 years. It was predicted that the scheme would, over the 60 year appraisal period, save 383.6 collisions and 610 casualties (including 82 killed or seriously injured (KSI)) for the area covered in the COBA model and illustrated in Figure 3.1.
- 3.6 This section of the study concerns collision numbers; the economic impact of changes in collisions are evaluated in the Economy chapter of this report.

### Observed Data

- 3.7 Collisions, by their nature, include a random element and are somewhat unpredictable events, therefore to ensure that the scheme is the only known change in the appraisal area, collision data has been obtained for the most recent five years prior to construction rather than using the more outdated data used in the appraisal. This has been obtained from Stockton Borough Council and the HA Area 12 MAC for this area covering the following time periods:
- Before scheme: June 2002 to May 2007
  - FYA: July 2008 to June 2013
- 3.8 A small section of the COBA area covers Darlington Council jurisdiction, however no data was provided for this either pre or post scheme. This section covers the junction of the A67 and Mill Lane, with a short section of each route. The collision data obtained is based on PIC records (i.e. collisions that may involve injuries to one or more persons) recorded as STATS19 data, which has been collected by the police when attending collisions. Collisions that do not result in injury are not included in this dataset, therefore are not used in this evaluation.
- 3.9 It should be noted that at this stage the collision data has not yet been validated by the Department for Transport (DfT). The requirement for up to date and site specific information necessitated the use of invalidated data sourced from the local authority. The data is judged to be sufficiently robust for use in this study, but it may be subject to change. However, it is not anticipated that this would be significant in terms of the analysis of collision numbers presented in this report.

### Collision Numbers

- 3.10 This section analyses the observed changes in PICs following the implementation of the scheme. One of the stated objectives of the scheme was to improve road safety on the A66. This section includes an investigation into the changes in the number of collisions and associated casualties as well as whether there have been any changes in the relative severity. This section first considers the impact on the whole modelled (COBA) area and then further detail is provided the impacts on just the key links of the scheme.

### Background Collision Reduction

- 3.11 It is widely recognised that, for over a decade, there has been a year-on-year reduction in the number of personal injury collisions on the roads, even against a trend of increasing traffic volumes during much of that period. The reasons for the reduction are considered to be wide ranging and include improved safety measures in vehicles and reduced numbers of younger drivers. This background trend needs to be considered when considering the changes in collision numbers in the scheme area in the before and after periods. If the scheme had not been built, collision numbers in the area are still likely to have been influenced by wider trends and reduced.
- 3.12 When the number of collisions in this area in the years before and after the scheme was built is compared, and associate the net change primarily with the scheme, the background reduction needs to be taken into account. The best way to do this is to assume that, if the

scheme had not been built, the number of collisions on the roads in the study area here would have dropped at the same rate as they did nationally during the same time period<sup>10</sup>. This gives what is known as a counterfactual scenario. This is then compared for the counterfactual 'without scheme' scenario on a like-for-like basis with the observed post opening data which is the 'with scheme' scenario.

- 3.13 The difference between the numbers of collisions in these two scenarios can then be attributed to the scheme rather than the wider national trends. This result will inform the calculation of monetised safety benefits achieved by the scheme as discussed in the economy chapter of this report.

### COBA Modelled Area

#### Evaluation of Collision Numbers and Severity

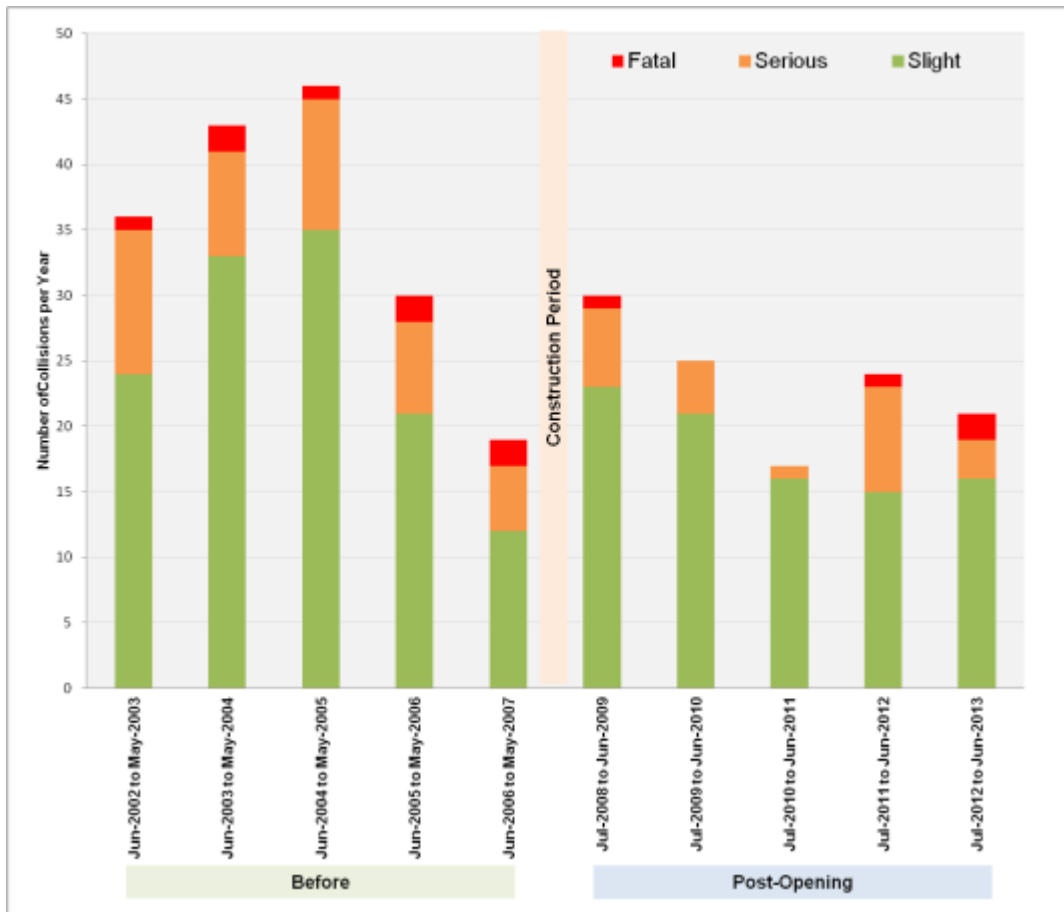
- 3.14 An evaluation of the before and after collision numbers by year for the whole of the COBA modelled area is shown in Table 3.1 and Figure 3.2. This enables a direct comparison with forecast collision savings derived from COBA. The severity of a collision is defined by the most serious injury incurred.
- 3.15 The table also includes the counterfactual without scheme which is comparable to the after data.

Table 3.1 - Number of Collisions by Severity in the COBA Area

Period	Time Period		Collision Severity			Total	Annual Average
	From	To	Fatal	Serious	Slight		
Pre Scheme	June 2002	May 2003	1	11	24	36	34.8
	June 2003	May 2004	2	8	33	43	
	June 2004	May 2005	1	10	35	46	
	June 2005	May 2006	2	7	21	30	
	June 2006	May 2007	2	5	12	19	
<b>Without Scheme Counterfactual</b>							<b>25.9</b>
Construction	June 2007	May 2008	0	0	1	1	1
Post Opening	July 2008	June 2009	0	4	21	25	23.4
	July 2009	June 2010	0	1	16	17	
	July 2010	June 2011	1	8	15	24	
	July 2011	June 2012	2	3	16	21	
	July 2012	June 2013	1	6	23	30	

<sup>10</sup> National trend data is sourced from DfT table RAS10002

Figure 3.2 – Number of collisions on year by year basis for COBA modelled area



3.16 From Table 3.1 and Figure 3.2 it can be seen that:

- The total number of collisions recorded over the post opening period was 117, and average of 23.4 per year. This represents a 33% (11.4 collisions) decrease when compared to the before scheme period.
- The ‘without scheme’ counterfactual collision rate (accounting for the background reductions in collisions over time) is calculated as 25.9 collisions per year. Compared to the post opening period collision rate, this represents an annual collision saving of 2.5. This is not considered to be a statistically significant change, and is discussed further in section 3.29.
- The annual average number of fatal collisions in the study area has reduced by 50% post opening.
- The annual average number of serious collisions has reduced by 46%, from an average of 8.2 per year to an average of 4.4 per year.

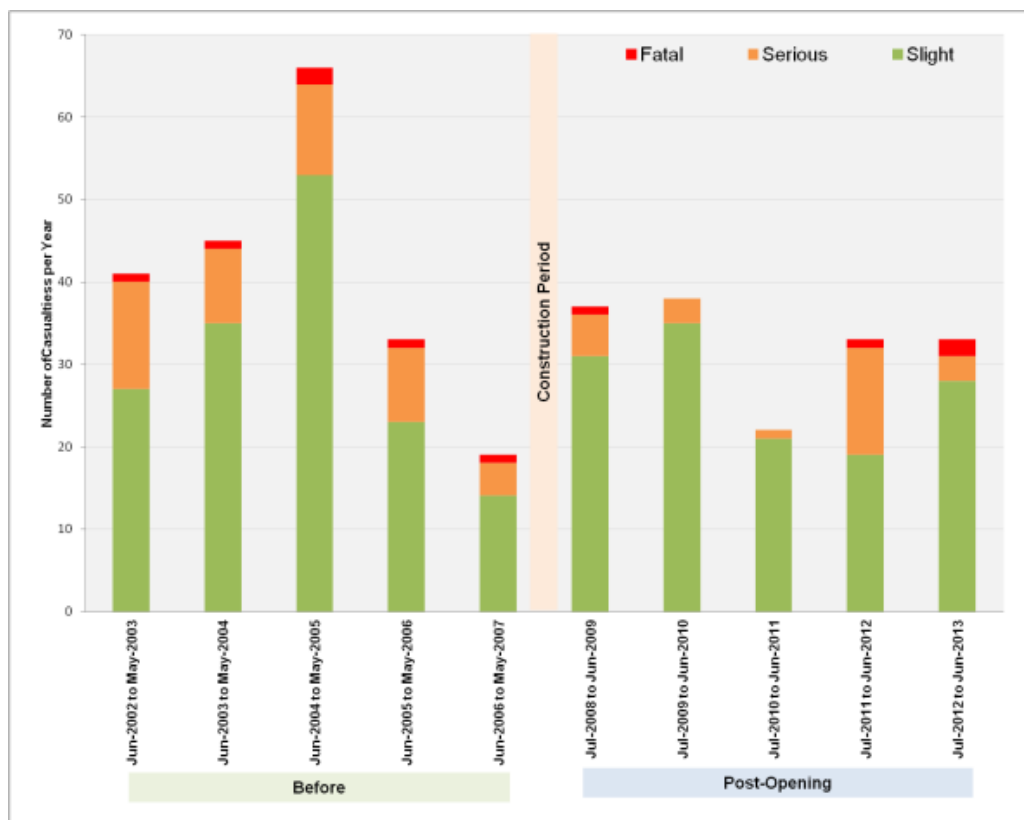
### Evaluation of Casualty Numbers and Severity

3.17 The number of people killed or seriously injured (KSI) in road collisions is also of interest. The number of KSI casualties as a proportion of total casualties (i.e. the KSI index) is also a useful indicator of trends in the severity of casualties. It should be noted that the ‘without scheme’ counterfactual value (accounting for background reduction in associated collisions) has not been calculated for casualty numbers here.

**Table 3.2 - Number of Casualties by Severity in the COBA Area**

Period	Time Period		Casualty Severity			Total	Annual Average
	From	To	Fatal	Serious	Slight		
Pre Scheme	June 2002	May 2003	1	13	27	41	40.8
	June 2003	May 2004	1	9	35	45	
	June 2004	May 2005	2	11	53	66	
	June 2005	May 2006	1	9	23	33	
	June 2006	May 2007	1	4	14	19	
Construction	June 2007	May 2008	0	0	1	1	1
Post Opening	July 2008	June 2009	1	5	31	37	32.6
	July 2009	June 2010	0	3	35	38	
	July 2010	June 2011	0	1	21	22	
	July 2011	June 2012	1	13	19	33	
	July 2012	June 2013	2	3	28	33	

**Figure 3.3 – Number of casualties on year by year basis for COBA modelled area**



3.18 Table 3.2 and Figure 3.3 shows that there has been a large decrease in the average number of casualties per year, reducing by 20% from an average of 40.8 per year pre scheme to an average of 32.6 per year post opening. The average severity of casualties has also reduced.

## A66 Long Newton Key Links Section

### Evaluation of Collision Numbers and Severity

- 3.19 An analysis of the PIC records for the local scheme area (illustrated in Figure 3.2) has been undertaken to investigate the impact the of the scheme on collisions, along the A66 (between west of Long Newton and east of Elton) and the Village of Long Newton.

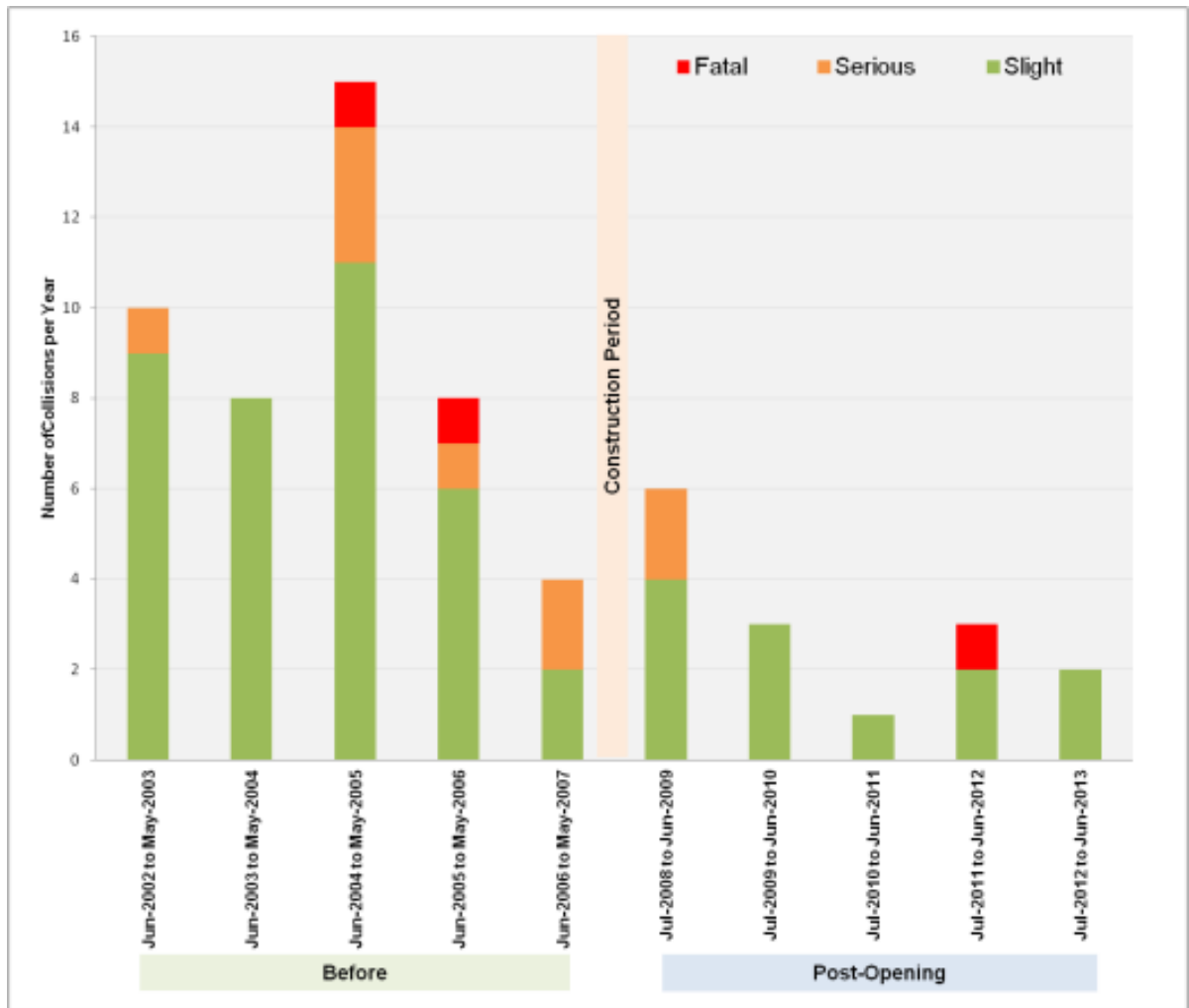
Figure 3.4 – Key Links Collision Appraisal Area



Table 3.3 - Number of Collisions by Severity in the Scheme Key Links area

Period	Time Period		Collision Severity			Total	Annual Average
	From	To	Fatal	Serious	Slight		
Pre Scheme	June 2002	May 2003	0	1	9	10	9.0
	June 2003	May 2004	0	0	8	8	
	June 2004	May 2005	1	3	11	15	
	June 2005	May 2006	1	1	6	8	
	June 2006	May 2007	0	2	2	4	
<b>Without Scheme Counterfactual</b>							<b>6.5</b>
Post Opening	July 2008	June 2009	0	2	4	6	3.0
	July 2009	June 2010	0	0	3	3	
	July 2010	June 2011	0	0	1	1	
	July 2011	June 2012	1	0	2	3	
	July 2012	June 2013	0	0	2	2	

Figure 3.5 – Number of collisions on year by year basis for scheme Key Links area



3.20 From Table 3.3 and Figure 3.5 it can be seen that;

- The number of collisions recorded over the post opening period was 15, an average of 3 per year. This is a 67% decrease when compared to the pre scheme period when an average of 9 collisions was recorded per year.
- The 'without scheme' counterfactual collision rate (accounting for the background reduction in collisions over time) is calculated as 6.5 collisions per year. Compared to the post opening collision rate, this represents an annual collision saving of 3.5 per year. This saving exceeds that seen over the wider COBA area, suggesting that the scheme has had a direct beneficial impact on the frequency of collisions along the improved links. This saving is considered to be statistically significant, and is discussed further in section 3.29.
- The number of fatal collisions has reduced by 50% post opening, from 0.4 per year to 0.2 per year, however due to the low numbers, firm conclusions cannot be drawn.
- The number of serious collisions post opening has reduced by over 70% when compared to the pre scheme levels.



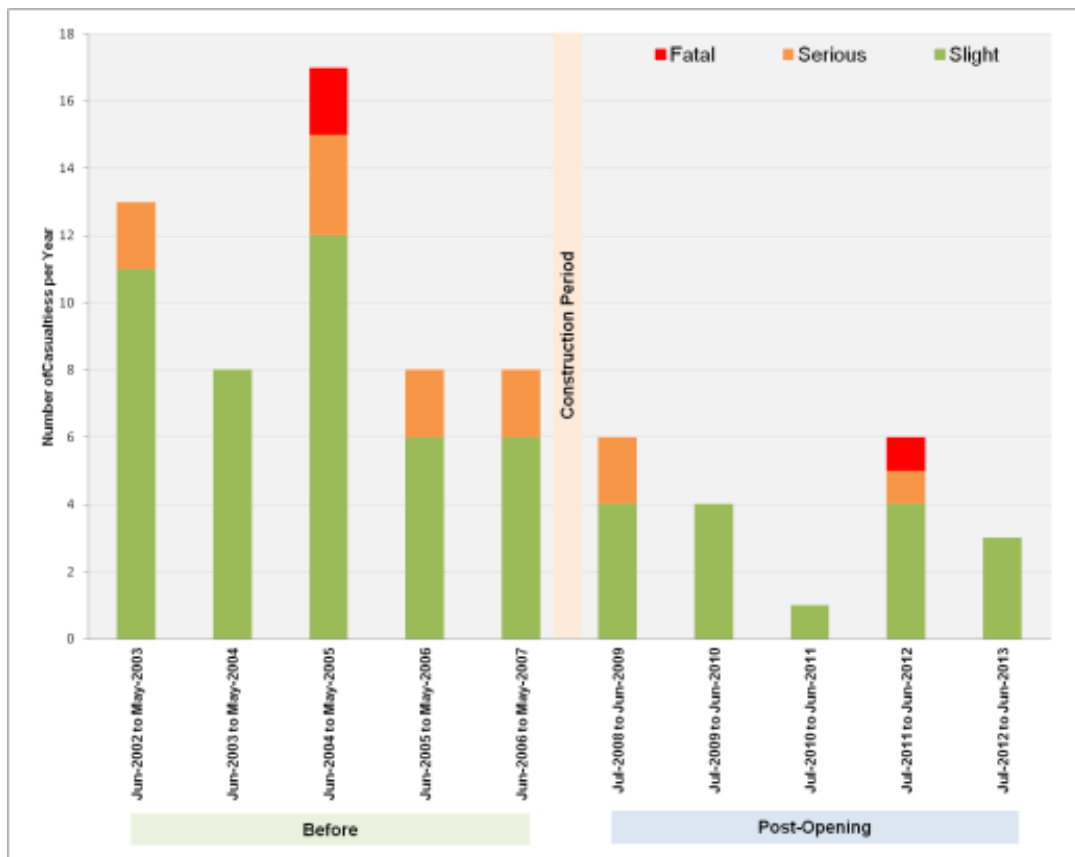
**Evaluation of Casualty Numbers and Severity**

3.21 The casualty numbers for the scheme key links are presented in Table 3.4 and Figure 3.6.

**Table 3.4 - Number of Casualties by Severity for the scheme Key Links**

Period	Time Period		Casualty Severity			Total	Annual Average
	From	To	Fatal	Serious	Slight		
Pre Scheme	June 2002	May 2003	0	2	11	13	10.8
	June 2003	May 2004	0	0	8	8	
	June 2004	May 2005	2	3	12	17	
	June 2005	May 2006	0	2	6	8	
	June 2006	May 2007	0	2	6	8	
Post Opening	July 2008	June 2009	0	2	4	6	4.0
	July 2009	June 2010	0	0	4	4	
	July 2010	June 2011	0	0	1	1	
	July 2011	June 2012	1	1	4	6	
	July 2012	June 2013	0	0	3	3	

**Figure 3.6 – Number of casualties on year by year basis for scheme Key Links area**



3.22 The following conclusions can be drawn:

- There has been a large decrease in the average number of casualties per year, reducing by 63% from an average of 10.8 per year prior to construction, to an average of 4 casualties per year post opening.
- The severity of collisions has also reduced post opening.

### Evaluation of Collision and Casualty Severity Index

3.23 The collision severity index is the ratio of the number of collisions classed as serious or fatal compared to the total number of collisions. At the time of the scheme appraisal this was noted to be 12%<sup>11</sup> for the A66 and local routes through Elton and Long Newton. The casualty severity index is the ratio of the number of casualties classed as killed or seriously injured (KSI) compared to the total number of casualties. A summary of the before and after opening collision and casualty severity indices by year for the whole of the COBA modelled area and the A66 Long Newton scheme key links is shown

**Table 3.5 – Collision and Casualty Severity Index**

Period	COBA Area		Scheme Key Links	
	Average Collision Severity Index	Average casualty KSI	Average Collision Severity Index	Average casualty KSI
<b>Pre Scheme</b>	0.28	0.25	0.20	0.20
<b>Post Opening</b>	0.22	0.18	0.20	0.20

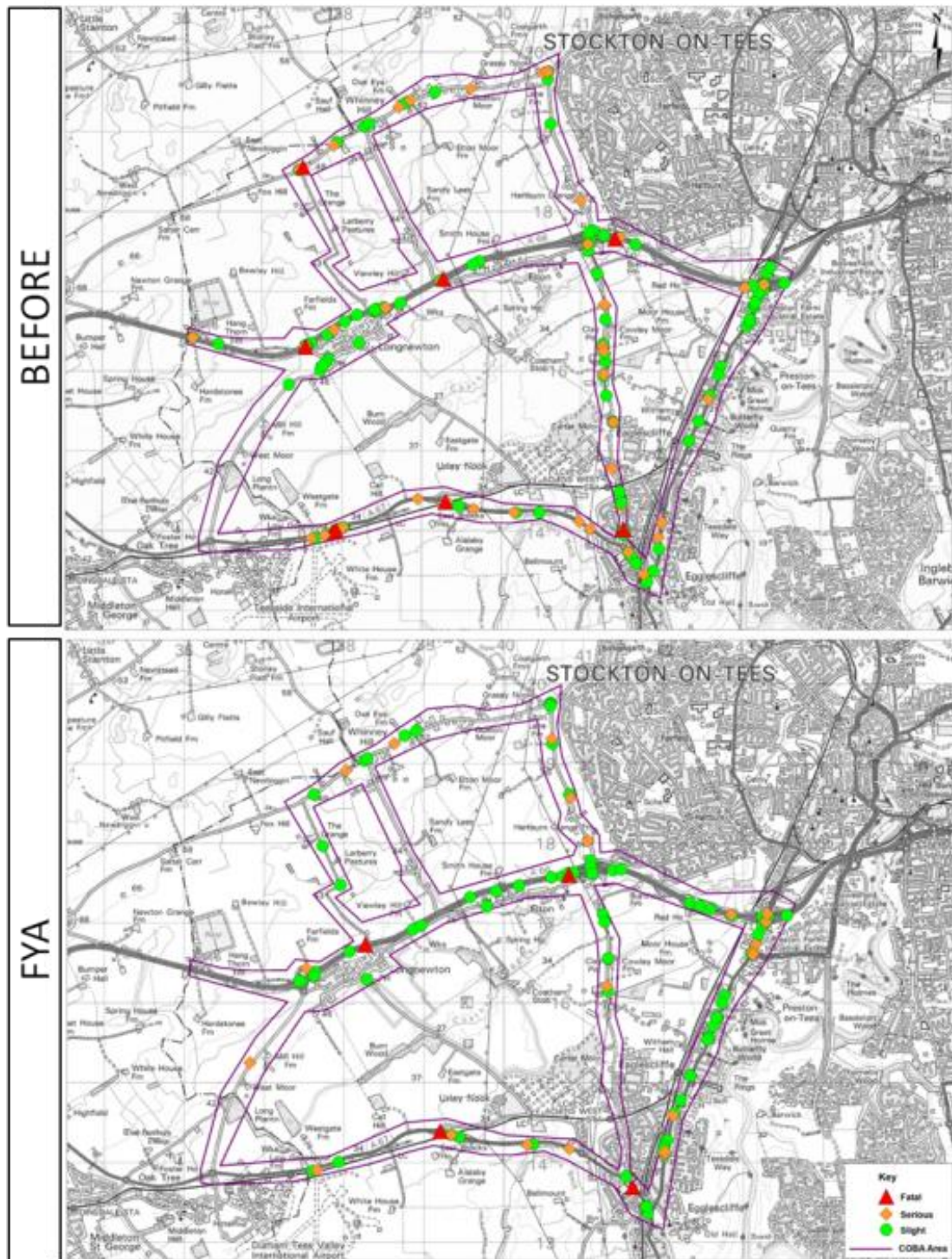
3.24 The collision severity index and the KSI for the COBA modelled area has fallen post opening. There has been no change over the scheme key links, indicating that the decrease in collisions outlined previously has been evenly split across all collision severity categories.

### Location of Collisions

3.25 The location of collisions over the COBA area for the five years pre scheme, and the five years post opening are shown in Figure 3.7. It should be noted that Darlington Council were unable to provide any collision data for the section of the COBA area that is within their area. Therefore there is no data pre or post scheme for the junction of the A67 and Mill Lane, and short sections of the A67 and Mill Lane adjoining this junction.

<sup>11</sup> A66 Long Newton GSJ Public Inquiry Statement of Case, based on 1995-2002 data.

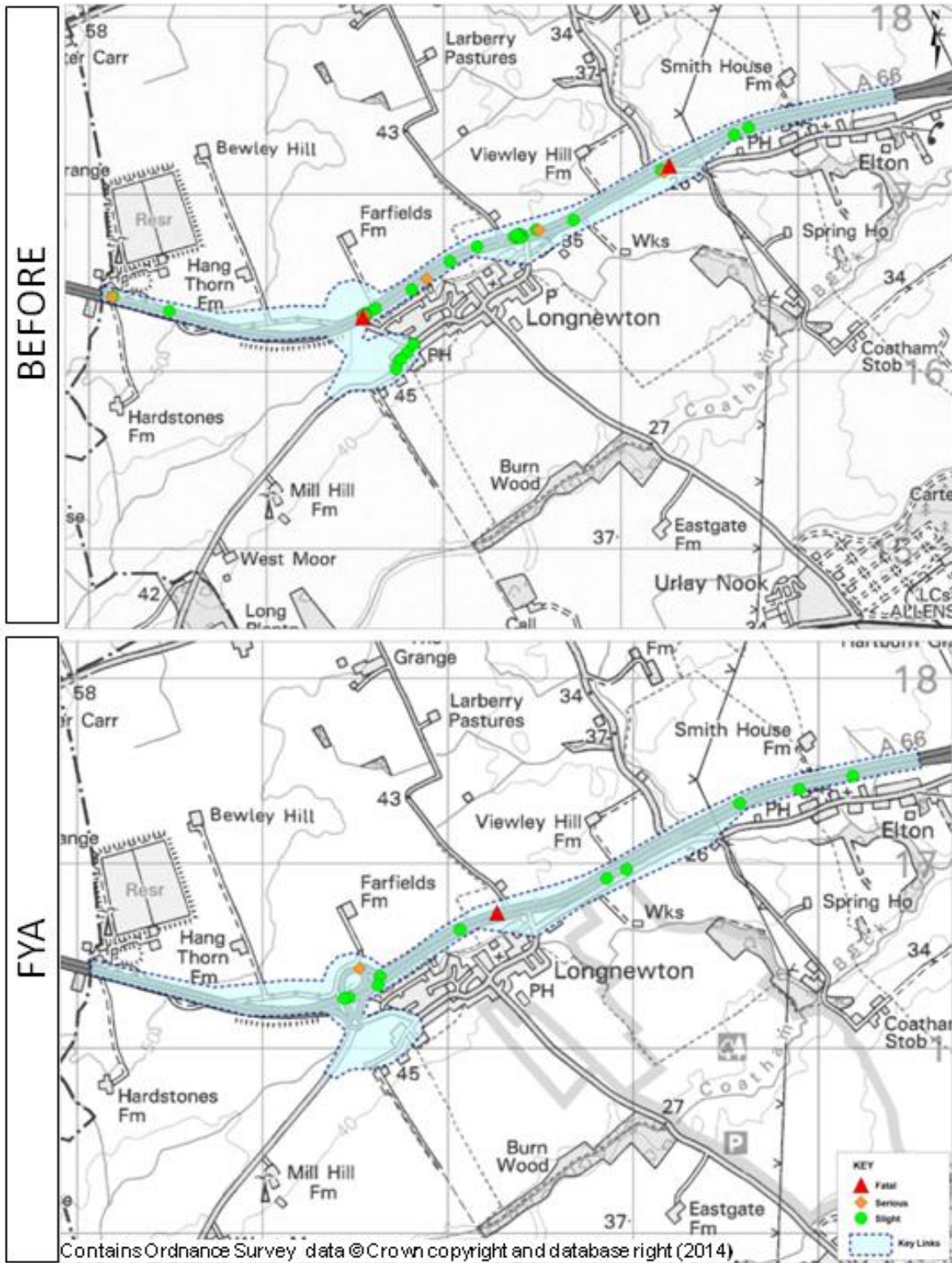
Figure 3.7 – COBA Area Collision Locations – Pre scheme (top), Post scheme (bottom)



3.26 Figure 3.7 shows that prior to scheme opening, collisions were spread across the area, with clusters seen at the major junctions. Several clusters are seen around the scheme key links and this is considered in more detail in Figure 3.8.



Figure 3.8 – Collision Locations on the Scheme Key Links, Pre and Post Opening



- 3.27 It can be seen that pre scheme there were a number of clusters of collisions around the gaps in the central reservation, and around the junction in Long Newton. Post opening there has been a reduction in collisions where these gaps have been closed, and due to the redesigned junction in Long Newton, no further collisions have occurred.
- 3.28 The remaining cluster is at the new grade separated junction at Long Newton on the A66. However this averages at around one collision per year, and may be due to the higher speeds now occurring for traffic using this junction.

### Statistical Significance

- 3.29 In order to determine whether the changes in collision numbers observed pre and post opening are statistically significant, Chi-Square tests have been undertaken. This test uses the before (counterfactual) and after numbers of collisions to establish whether the changes are significant or likely to have occurred by chance. This test has been undertaken over the scheme key links and the wider COBA area.
- 3.30 The result found that we can be 95% confident the observed changes over the key links area are statistically significant, and therefore that the reduction in the number of collisions over the key links area is likely to be directly linked to the scheme.
- 3.31 The same test over the wider COBA area shows that the changes seen are not statistically significant, due to the wider area covered which was not directly impacted by the scheme.

### Forecast vs. Outturn Collision Numbers

- 3.32 This section compares the number of observed collisions discussed earlier with those predicted to occur. The predictions have been obtained from the COBA model for this scheme and cover the whole of the modelled area (previously shown in Figure 3.1). For the outturn collisions, the annual average pre and post opening are used for the same area used in the COBA appraisal.

**Table 3.6 – Comparison of forecast and outturn collisions across the COBA area**

		Annual Collisions
<b>Forecast Opening Year</b>	Do Minimum (without scheme)	34.5
	Do Something (with scheme)	28.5
	<b>Forecast Saving</b>	<b>6.0 (17%)</b>
<b>Outturn Annual Average</b>	Before Opening Observed	34.8
	Without scheme (counterfactual for same period as after data) <sup>12</sup>	25.9
	After Opening Observed	23.4
	<b>Observed Saving</b>	<b>2.5 (9.6%)</b>

- 3.33 Table 3.6 shows:
  - The COBA model for the scheme predicted a saving of 6 collisions in the open year. The vast majority of this saving was forecast to occur at junctions, due to the closing of gaps in the central reserve, and building the grade separated junction.
  - Post opening, the number of collisions over the same area has reduced by 2.5 collisions, below that forecast.
- 3.34 The nature of the scheme means that the majority of the savings were forecast to occur on the links directly affected by the scheme. Table 3.7 illustrates the same comparison, but over a smaller area.

<sup>12</sup> Counterfactual without scheme is the observed rate in the before period multiplied by the national reduction in collisions rate per mvkm during the comparable period, for the middle year of the data collection periods,

**Table 3.7 – Comparison of forecast and outturn collisions across the scheme Key Links**

		Annual Collisions
<b>Forecast Opening Year</b>	Do Minimum (without scheme)	11.1
	Do Something (with scheme)	5.2
	<b>Forecast Saving</b>	<b>5.9 (53%)</b>
<b>Outturn Annual Average</b>	Before Opening Observed	9.0
	Without scheme (counterfactual for same period as after data) <sup>13</sup>	6.5
	After Opening Observed	3.0
	<b>Observed Saving</b>	<b>3.5 (54%)</b>

3.35 This table shows that the majority (98%) of the forecast savings over the full COBA area, where forecast to occur over the scheme key links. A 53% reduction was forecast to occur, equating to a reduction of 5.9 collisions per year. The observed data shows that, even when the background collision reduction is taken into account, a similar percent saving is observed, of 54%, although due to the lower observed pre scheme annual average, this only equates to an average of 3.5 collisions.

### Collision Rates

3.36 The numbers of collisions along a length of road used together with the AADT for the same section can be used calculate a collision rate, known as the number of personal injury collisions by the number of million vehicle kilometres (PIC/mvkm).

3.37 In this section, combined observed collision rates<sup>14</sup> during the pre and post scheme periods for the key links improved by the scheme (the new junction, the A66 dual carriageway and the new link road between Elton and Long Newton) are compared with the forecasts (from COBA) for the same links and junctions. Table 3.8 shows the collision rate calculated for the A66 Long Newton key links pre and post opening.

**Table 3.8 – Forecast vs. Observed Collision rates (PIC/mvkm) for scheme Key Links**

<b>Predicted (2008 opening year)</b>	Do Minimum (without scheme)	0.24
	Do Something (with scheme)	0.10
	<b>Forecast Saving</b>	<b>0.14</b>
<b>Observed (pre scheme vs. Post opening collision rates)</b>	Before Opening Observed	0.17
	Without scheme (counterfactual for same period as after data) <sup>15</sup>	0.13
	After Opening Observed	0.06
	<b>Observed Saving</b>	<b>0.07</b>

3.38 It can be seen that the observed reduction in collision rate across the scheme key links is lower than expected, with a saving of 0.07 PIC/mvkm compared to a forecast reduction of 0.14 PIC/mvkm. This is due to taking the background reduction into account. A saving is still

<sup>13</sup> Counterfactual without scheme is the observed rate in the before period multiplied by the national reduction in collisions rate per mvkm during the comparable period, for the middle year of the data collection periods, in this case 2004 for the before period and 2010 for the post opening period. The reduction factor in collision rate per mvkm for all road types was 0.732.

<sup>14</sup> In this case 2004 for the before period and 2010 for the post opening period. The reduction factor in collision rate per mvkm for all road types was 0.732.

<sup>15</sup> Counterfactual without scheme is the observed rate in the before period multiplied by the national reduction in collisions rate per mvkm during the comparable period, for the middle year of the data collection periods, in this case 2004 for the before period and 2010 for the post opening period. The reduction factor in collision rate per mvkm for all road types was 0.732.



observed, hence it can be considered that the scheme has successfully reduced the rate of collisions for the key links affected by the scheme.

### Fatalities & Weighted Injuries

3.39 The collision rates discussed previously and shown in Table 3.8 does not take into account the severity of collisions. To analyse this, the Fatalities and Weighted Injuries (FWI) metric is presented which is a combined measure of casualties based on the numbers of fatal, serious and slight casualties. The FWI for the five years before and the available after period are shown in Table 3.9. To take into account any change in traffic on the A66, and for comparison with other schemes, we also present the FWI rate per billion vehicle kilometres (bvkm). It should be noted that these figures do not account for changes in the background reduction in casualties.

Table 3.9 – FWI on the A66 trunk road

Period	FWI/Collision	FWI/year	FWI/bvkm
Pre Scheme	0.074	0.67	12.8
Post Opening	0.097	0.29	5.9

3.40 This shows that the seriousness of collisions has increased slightly post opening; however the number of fatal and serious injuries per year, and per bvkm has reduced.

### Personal Security

3.41 The aim of this sub-objective is to reflect both changes in security and the likely number of users affected. In terms of roads, security includes the perception of risk from personal injury, damage to or theft of vehicles, and theft of property for individuals or from vehicles.

3.42 For highway schemes, security issues may arise from the following:

- On the road itself (e.g. being attacked whilst broken down).
- In service areas, car parks, and so on (e.g. vehicle damage while parked at a service station, being attacked while walking to a parked car).
- At junctions (e.g. smash and grab incidents while queuing at lights).

3.43 The primary indicators for roads include surveillance, landscaping, lighting and visibility, emergency call facilities and pedestrian and cyclist facilities.

#### Forecast

3.44 The scheme AST states in terms of security, '*Reduced safety due to council request for no lighting on Long Newton – Elton Link Road*'. As such the scheme forecast a slight adverse impact on security.

#### Evaluation

3.45 No lighting is provided along the Elton Link Road, apart from at the village entry into Long Newton, although site observations undertaken as part of this evaluation did not reveal any areas for concern that could have an increased risk or perception of crime over and above that which may be typical of any non built up area.

3.46 Taking these factors into account, it is considered that the scheme has had a slight adverse impact on security as expected.

## Key Points - Safety

### Collisions

- Analysis of the data over the wider COBA area shows a reduction of 2.5 collisions per year, a reduction of 9.6%.
- Analysis of observed collision data for the scheme key links which were directly affected by the scheme shows an average reduction of 3.5 collisions a year (a reduction of 54%). This is higher than the wider COBA area, strongly suggesting that the scheme has had a direct impact for safety on the A66 improved section.
- Statistical tests show that the change over the scheme key links is shown to be statistically significant; however the change over the wider COBA area may be due to chance.
- The overall reduction in collision rate in terms of observed PIC/mvkm for key links affected by the scheme is lower than forecast, with a reduction of 0.07 PIC/mvkm (after background collision decline is considered), compared to a forecast reduction of 0.14 PIC/mvkm.
- The severity of collisions has also reduced post opening.

### Forecast vs. Outturn Collision Savings

- The scheme was forecast to have a saving of 6 collisions (17%) in the opening year for the COBA area. When the observed data is considered (compared to the counterfactual before), a smaller average saving of 2.5 collisions is seen, a 9.6% reduction.
- When the key links are considered, a reduction of 5.9 collisions (53%) was forecast, and an observed counterfactual reduction of 3.5 collisions (54%) is seen. This suggests that the forecast change for the scheme key links were accurate in terms of percentage, and highlights that most of the savings seen over the COBA area are focussed on the scheme key links.

### Location of Collisions

- Pre scheme, collisions were spread across the COBA area, with noticeable clusters at junctions, including those along the A66 between Elton and Long Newton.
- Post opening, collisions are still spread over the COBA area, however closer analysis of the scheme key links shows that the collisions have reduced, particularly those previously occurring around the gaps in the central reservation.

### Security

- The scheme has introduced a new section of single carriageway between Elton and Long Newton which has not been lit, on the request of the local council. Overall the impact of the scheme on security is considered to be slight adverse, as expected.

## 4. Economy

### Introduction

- 4.1 This section presents an evaluation of how the scheme is performing against the economy objective, which consists of the following sub objectives:
- Achieve good value for money in relation to impacts on public accounts.
  - Improve transport economic efficiency for business users, consumer users and transport providers.
  - Improve reliability (already covered in Chapter 2).
  - Provide beneficial wider economic impacts.
- 4.2 When a scheme is appraised, an economic assessment is used to determine the scheme's value for money. This assessment is based on an estimation of costs and benefits from different sources:
- Transport economy efficiency (TEE) benefits (savings related to travel times, vehicles operating costs and user charges).
  - Collision costs (savings related to numbers and severity level of collisions).
  - Costs to users due to construction and maintenance.
- 4.3 This section provides a comparison between the outturn costs and benefits and the forecast economic impacts. Consideration is also given to the schemes wider economic impact. Outturn journey time and safety economic impacts are based on the observed results reported in previous chapters of this report and reforecast to a 60 year appraisal period.

### Sources

- 4.4 The Economic Assessment presented in this section is based on the COBA model developed for the July 2003 Public Inquiry. A number of updates were then made prior to construction; first in March 2005, then in August 2005 with a final update of December 2005.
- 4.5 For the purposes of this report, the COBA model dated December 2005 has been used for the TEE and safety benefits, which has an opening year of 2008. The summary outputs from this version match those presented in the July 2006 AST which has been used as the basis of this report. The forecast scheme costs are taken from the COBA model, which are also presented in the AST.
- 4.6 The outturn spend profile for this scheme has been obtained from the Highways Agency Regional Finance Manager in September 2013. All costs presented in this report are in 2002 prices.

### Scheme Costs

#### Investment Costs

- 4.7 The investment cost is the cost to the HA of constructing the scheme and purchasing the land. Comparison between the forecast and outturn is presented in Table 4–1. The latest updated costs prior to construction taken from the December 2005 updated COBA.

**Table 4–1 – Summary of Investment Costs**

Forecast Cost (December 2005)		Outturn Cost (as of September 2013)		% Difference
COBA (2001, Q3 prices)	£9.69m	As spent costs in 2003-2013 years and prices	£12.26m	
Cost in £million 2002 prices, undiscounted	£9.81m	Cost in £million 2002 prices, undiscounted	£10.32m	5%

4.8 The key point to note as shown in the table is that the outturn costs were 5% above that forecast, when converted to a comparable base.

### Indirect Tax

4.9 Indirect tax revenue is the expected change in revenue to the Government due to changes in the transport sector as a result of the scheme over the appraisal period. For the highway scheme in this study, the tax impact is derived primarily from the monetisation of the forecast changes in fuel consumption over the 60 year period. A scheme may result in changed fuel consumption due to:

- Changes in speeds resulting in greater or lesser fuel efficiency for the same trips
- Changes in distance travelled
- Increased road use through induced traffic or the reduction of trip suppression.

4.10 Note that at the time this scheme was appraised, costs were taken to include the wider costs for public accounts, and thus the impact of the scheme on indirect tax was included in these wider costs.

4.11 For this scheme, the impact on indirect tax was small at -£102,000 (less than 1% of the costs) as whilst some trips would be shorter using the new junction, others would be longer due to the central reserve gap closures. Indirect tax has therefore not been reassessed for the outturn reforecast, and for the purposes of the outturn BCR, has been assumed as forecast.

### Present Value Costs (PVC)

4.12 Cost benefit analysis of a Major Scheme requires the costs to be considered for the whole of the appraisal period and they need to be expressed on a like-for-like basis with the monetary benefits. This basis is termed Present Value. Present Value is the value today of an amount of money in the future. In cost-benefit analysis, values in differing years are converted to a standard base year by the process of discounting giving a present value.

4.13 Following current Treasury Green Book guidance, calculation of the present value entails the conversion to market prices, then discounting by year. This uses a rate of 3.5% for the first 30 years, and 3% thereafter.

4.14 The outturn PVC in this case includes updated scheme costs but also assumes that the indirect tax is as forecast and is presented in Table 4–2.

**Table 4–2 – Investment Costs as Present Value (£m)**

Present Value (costs in 2002 market prices, discounted)	Forecast	Outturn
Investment Costs	£10.50m	£10.83m
Indirect Tax	-£0.10m	-£0.10m
<b>Present Value costs</b>	<b>£10.40m</b>	<b>£10.73m</b>

## Evaluation of Collision Benefits

### Forecast Safety Benefits

- 4.15 The forecast safety benefits for this scheme were derived from the COBA (which also monetises the benefits), with the findings detailed in the scheme AST. A 60 year scheme saving of 383.6 collisions was forecast, with a corresponding 60 year monetary benefit of £18.62m (2002 prices discounted to 2002). This represents 90% of total scheme benefits. These figures were based on a central growth forecast which was considered at the time of appraisal to be the most likely growth scenario.
- 4.16 The forecast savings were due to be as a result of the closure of 10 central reserve crossings on the A66, and the complete closure of two at grade priority junctions with the A66 at Long Newton west and Elton east.

### Monetised Safety Benefits

- 4.17 The POPE methodology for the evaluation of the outturn of the economic value of benefits arising from safety improvements is based on the comparison of observed and forecast collision changes at the POPE evaluation stage (in this case five years after opening, and using the pre scheme counterfactual scenario to take background decline in collisions into account). This is then combined with the assumption that the observed safety impact at this stage can be taken as indicative of that over the whole 60 year appraisal period.
- 4.18 The methodology for calculating benefits is based on the presumption that the forecast ratio of the number of collisions saved in the first year to the forecast 60 year benefits can be used to generate a reforecast economic benefit based on the observed saving in collisions reported in Chapter 3 of this report.
- 4.19 Monetisation of these savings is calculated by:
- Calculating the net difference between the forecast opening year saving and the opening year observed collision savings in the COBA area.
  - Monetising the net difference using the PAR method which values collisions by road type and enables capitalisation over 60 years based on expected traffic growth.
  - Calculating the 60 year outturn benefits for the whole area by combining the forecast from COBA (for the whole study area) with the outturn assessment of the net difference.
- 4.20 The evaluation of the monetary safety benefits is shown in Table 4–3. All values are in 2002 prices discounted to 2002.

**Table 4–3 – Comparison of Forecast and Re-forecast Collision benefits**

<b>Forecast (COBA area)</b>	Forecast Collision Saving (Opening Year)	(a)	6
	Central growth forecast (60 years)	(b)	<b>£18.62m</b>
<b>Observed COBA area</b>	Average Annual Collision Saving in Post-Opening Period (based on adjusted counterfactual) ( <b>see Table 3.6</b> )	(c)	2.5
	Net difference between forecast and observed	(d) = (c) – (a)	-3.5
	Monetisation of net difference for opening year	(e)	-£0.31m
	Monetisation of (d) into 60 year impact of net difference between forecast and observed (using PAR 3.3 guidance)	(f)	-£10.53m
	<b>Outturn 60-year benefit</b>	<b>(b) + (f)</b>	<b>£8.09m</b>

4.21 Table 4–3 demonstrates that the re-forecast 60 year monetary safety benefits for the appraisal area are substantially lower than originally forecast.

### Evaluation of Journey Time Benefits

4.22 The POPE evaluation methodology is based on monetising the vehicle hour changes as a result of the scheme. The outturn 60 year vehicle hour changes for this scheme have been based on the observed opening year journey times and traffic flows. The PAR approach has been used to monetise the difference. The PAR approach is normally used by the HA for the appraisal of smaller schemes and will therefore only provide an estimate of economic benefit, as is based on a smaller number of links than the original appraisal used.

#### Forecast Journey Time Benefits

4.23 The scheme forecasts showed that the most journey time benefits would occur along Mill Lane, with little change expected elsewhere. Therefore the re-evaluation has focused on observed journey time benefits along that section (survey timing points 1-3 as shown in Figure 2-2).

4.24 Other routes have not been assessed for the following reasons:

- Traffic flows and journey times on the A66 may be as a result of changes outside the scheme, and the high flows may overwhelm the impacts as a result of the junction. Journey time benefits as a result of the gap closures on the A66 are likely to be small due to the relatively low number of vehicles making the movements.
- Journey times and traffic on the A67 and A135 were forecast to remain relatively unchanged after opening, with minimal journey time benefits. Post opening, flows have decreased and journey times have increased along these routes. These changes, as discussed in Section 2 of this report, are not thought to be related to the scheme and if included would detract from the impacts of the scheme.

#### Monetised Journey Time Benefits

4.25 As detailed in Chapter 2 of this report, traffic flows have reduced along Mill Lane. Therefore in order to not overestimate the benefits for traffic no longer using the route, the journey time savings observed between pre and post opening have been applied to the observed traffic using Mill Lane post opening. This results in a vehicle hour saving of 8,129 a year which has been monetised below.

**Table 4–4 – Monetised outturn vehicle hour savings**

	2002 prices
<b>Vehicle Hours Saved</b>	8,129
<b>Value of Time (VOT) per average vehicle</b>	£12.66
<b>Annual VOT savings</b>	£102,915
<b>Capitalisation factor (no traffic growth)<sup>16</sup></b>	39.552
<b>VOT benefits (60 years)</b>	£4.07m
<b>60 year vehicle hour benefits discounted to 2002</b>	<b>£3.31m</b>

4.26 Table 4–4 shows that the reforecast vehicle hour benefits are £3.31m over 60 years.

<sup>16</sup> PAR 5.0 guidance



### Vehicle Operating Costs (VOC)

- 4.27 For most highway schemes, including this one, the VOC and indirect tax impacts are both very closely linked to changes in fuel consumption (e.g. changes in distance travelled or speeds) which have similar magnitude of impacts, but from opposite sides of the benefits balance. That is, if there is increased fuel consumption, VOC will increase due to users paying more for fuel (i.e. a disbenefit) and thus more indirect tax will be collected by the Treasury. For this scheme, the additional VOC of £0.54m represents less than 3% of the benefits and have not been reassessed for the outturn reforecast. For the purposes of the BCR, outturn VOCs have been considered as forecast.

### Construction Delay and Maintenance

- 4.28 COBA used to estimate the impact of the scheme on road users in terms of journey times and operating costs during the construction phase. The results of this were presented in the December 2005 COBA and showed a disbenefit of £0.9m. It is not possible to undertake an evaluation of the monetary impact of construction as this would have required traffic surveys to have been undertaken during periods of roadworks and is outside the scope of POPE.
- 4.29 The impact of long term maintenance was forecast to be £0 for this scheme, and as such has not been evaluated further here.

### Present Value Benefits (PVB)

- 4.30 A comparison of all forecast and outturn benefits is presented in Table 4–5. All figures are 2002 prices discounted to 2002.

Table 4–5 – Summary of Scheme Present Value Benefits

Benefit	Forecast	Reforecast based on FYA outturn impacts
Journey Time benefits	£3.77m	£3.31m
Vehicle Operating Costs	-£0.54m	-£0.54m
Safety benefits	£18.62m	£8.09m
<b>Total</b>	<b>£21.78m</b>	<b>£10.86m</b>

- 4.31 The journey time benefits are higher than forecast, however the outturn reforecast does not take account of any disbenefit for vehicles from the villages that have to travel further to access the A66 due to the gap closures.
- 4.32 The greater than expected journey time benefits may be due to lower traffic flows than forecast, potentially allowing for higher speeds. In addition, the observed savings on Mill Lane are higher than the journey time savings forecast. Further detail is given in Chapter 2.
- 4.33 Overall outturn benefits are 50% below the forecasts.

### Benefit Cost Ratio

- 4.34 The Benefit Cost Ratio (BCR) is used as an indicator of the overall value for money of the scheme. It is the comparison of the benefits (PVB) and costs (PVC) expressed in terms of present value.
- 4.35 Projects with a BCR greater than 1 have greater benefits than costs; hence they have positive net benefits. The higher the ratio, the greater the benefits are relative to the costs.
- 4.36 Table 4–6 shows the BCR calculation for the A66 Long Newton Junction scheme.

**Table 4–6 – Forecast vs. Outturn Re-forecast BCR**

		Forecast	Re-Forecast based on FYA Outturn Impacts
Indirect Tax as a Cost	PVB	£21.78m	£10.86m
	PVC	£10.4m	£10.73m
	BCR	<b>2.09</b>	<b>1.01</b>
Indirect Tax as a Benefit	PVB	£21.88m	£10.96m
	PVC	£10.5m	£10.83m
	BCR	<b>2.08</b>	<b>1.01</b>

- 4.37 It can be seen that the reforecast BCR is lower than forecast due to lower than expected safety benefits which represent the majority of the benefits both forecast and outturn. According to DfT guidance, a BCR of 1.01 represents low value for money.
- 4.38 It should be noted that the BCR ignores non-monetised impacts. In the former NATA assessment (which was current at the time of scheme appraisal) and its replacement, the Transport Business Case, the impacts on wider objectives must be assessed but are not monetised. The evaluation of the environmental, accessibility and integration objectives are covered in the following sections.

### Wider Economic Impacts

- 4.39 It is inherently difficult to isolate wider economic impacts which could be attributed to the scheme. However it is important to understand the socio-economic context in which the scheme opened and how the upgrading of the A66 junction with Mill Lane may have assisted local and regional socio-economic aspirations.
- 4.40 The AST stated that no developments were dependent on the scheme going ahead. One of the main objectives of the scheme was to ensure that future planned (at the time of scheme appraisal) growth at Durham Tees Valley airport was not constrained. As previously discussed in this report, anticipated growth has not materialised. It is noted however that the improved highway network provided by this scheme will support growth at the airport site if other uses such as employment or residential are developed in the future.
- 4.41 However, it is a reasonable assumption that the improvement in journey times on the northern route will support economic activity in the wider area.
- 4.42 The overall assessment of the impact of the scheme on the wider economy is neutral at this stage.

### Key Points - Economy

#### Benefits

- The outturn safety benefits are calculated to be £8.09m, 57% lower than the forecast of £18.62m. This difference is partly due to taking account of the national background decline in collisions seen between the appraisal period and the post opening period.
- Outturn journey time benefits of £3.31m are slightly lower than the forecast of £3.77m. This is due to a combination of lower than expected traffic flows, and higher than expected journey time savings.
- Overall, the outturn PVB is 50% lower than forecast.

#### Costs

- Outturn investment costs were 5% higher than forecast at £10.32m.

#### Benefit Cost Ratio

- Using the reforecast benefits, the scheme achieves a BCR of 1.01 which shows the scheme has delivered low value for money.

#### Wider Economic Impacts

- The expected traffic from the airport development has not materialised, but is not linked to the scheme. The scheme has provided additional capacity for traffic travelling towards the airport site, and therefore is supporting any future development of the site. Overall the scheme is considered to have had a neutral impact on the wider economy.

## 5. Environment

### Introduction

- 5.1 This section documents the evaluation of the environmental sub-objectives, focussing on those aspects not fully evaluated at the One Year After (OYA) stage or where suggestions were made for further study.

#### Summary of OYA Evaluation

The OYA evaluation identified a number of areas where further analysis was recommended at the Five Year After (FYA) stage to confirm the longer term impacts of the scheme on the surrounding environment, these are summarised as follows:

**Consultation** – Elton Parish Council should be consulted as part of the FYA evaluation.

**Noise & Air Quality** – Although overall volumes of traffic have remained low and traffic noise is unlikely to be a problem, noise and air quality should be reconsidered at FYA.

**Landscape** – The full suite of As Built drawings and the Handover Environmental Management Plan (HEMP) prescribing the maintenance and management of the landscape planting and seeded areas during the aftercare period should be available at the FYA stage, and the ongoing establishment of the planting and visual impacts should be reviewed as part of the FYA evaluation. Lighting could also be considered at FYA.

**Biodiversity** – Wetland habitat and species rich grassland maintenance and establishment should be considered as part of the FYA evaluation.

- 5.2 The ES assessed the potential impacts of the construction and operation of a new grade separated junction on the A66 Trunk Road 200m west of Long Newton, and did not identify any major environmental constraints.
- 5.3 The following environmental sub-objectives were appraised in the ES and in the Appraisal Summary Table (AST) according to NATA guidance at that time (2002):
- Noise
  - Local Air Quality
  - Greenhouse Gases
  - Heritage
  - Landscape
  - Biodiversity
  - Water Environment;
  - Physical Fitness
  - Journey Ambience
- 5.4 For each of these environmental sub-objectives, the evaluation in this section assesses the environmental impacts predicted in the scheme's AST and ES against those observed five years after opening.
- 5.5 In the context of the findings from the OYA evaluation and using new evidence collected five years after opening, this section presents:

- An evaluation of the ongoing effectiveness of the mitigation measures implemented as part of the scheme.
- An updated summary of key impacts against all of the nine environment WebTAG sub-objectives, with particular focus on assessment of sub-objectives where it was too early to conclude at the OYA evaluation stage.
- Additional analysis relevant to close out issues/ areas for further study as identified at the OYA stage for consideration at the FYA stage.

## Methodology

- 5.6 This section focuses on those aspects not fully evaluated at OYA, or where at OYA, suggestions were made for further study and also any issues that have arisen since the OYA evaluation. The detail of the OYA evaluation is not repeated here, and reference is made to the OYA evaluation where required, although key points are incorporated into this FYA report where appropriate to provide contextual understanding.
- 5.7 No new modelling or survey work has been undertaken for this FYA environmental evaluation.

## Data Collection

- 5.8 The following documents/ data have been used for the FYA:
- Appraisal Summary Table (2006).
  - A66 (T) Long Newton Grade Separated Junction Environmental Statement January 1995 including main text, appendices, figures and non-technical summary.
  - Supplementary Environmental Assessment Review October 2002.
  - General Environmental Evidence for Public Inquiry 2003.
  - Air Quality Proof of Evidence for Public Inquiry 2003.
  - Archaeological Watching Brief, A66 Long Newton Grade Separated Junction, Stockton-on-Tees (April 2009).
  - Updated ecological surveys (2006 and 2007).
  - Draft 'As Built' drawings for landscape and ecology Revision AB 2009.
  - Post Opening Project Evaluation One Year After Study: A66 Long Newton Grade Separated Junction (October 2010).
  - Highways Agency Area 14 Environmental Local Network Management Study (LNMS) 2009-10: Balancing Pond Report (January 2010).
  - A66 Long Newton Handover Environmental Management Plan (Dec 2012).
- 5.9 A full list of the background information requested and received to help with the compilation of this report is included in Appendix C.

## Site Visit

- 5.10 As part of the FYA evaluation, a site visit was undertaken in early July 2013. This included the taking of photographs to provide a comparison with material produced for the ES and at OYA (Appendix D).

## Consultation

- 5.11 Statutory environmental organisations (Natural England, English Heritage and the Environment Agency), Stockton-on-Tees Borough Council, Long Newton Parish Council, Egglecliffe and Eaglescliffe Parish Council, Tees Archaeology (as agent for Stockton BC), and Tees Valley Wildlife Trust (as Agent for Stockton BC) were contacted as part of the FYA evaluation regarding their views on the impacts they perceive the road has had on the environment as shown in Table 5.1, below.



- 5.12 Although the OYA evaluation identified that consultation should be extended to Elton Parish Council to confirm the longer term impacts of the scheme on the surrounding environment, the council was not operating at the time of the FYA consultation period and consequently consultation was not possible.

**Table 5.1 – Summary of Environmental Consultation Responses**

Organisation	Field of Interest	Comments at OYA	Comments at FYA
Natural England	Biodiversity & Landscape	Unable to provide feedback as NE has not carried out any monitoring.	Natural England (NE) does not consider that the scheme poses any likely or significant risk to those features of the natural environment for which NE would otherwise provide a more detailed consultation response. No specific comments made.
English Heritage	Heritage	Telephone response that as no heritage of national importance deferred to County Archaeologist.	Responded that impacts upon designated/ non-designated heritage assets had been less than substantial, and that the level of evaluation had been shown to be broadly proportionate.
Environment Agency	Water	Unable to comment on biodiversity, likely to be as expected for flood risk, although not aware of flood event to test system as yet.	Responded that unable to comment as have had no involvement in this project.
Stockton-on-Tees Borough Council	General	Responded for PROW and listed buildings. Unable to provide feedback for landscape.	Did not respond to the invitation to provide feedback.
Long Newton Parish Council	General	Impacts generally as expected.	Commented that overall, the scheme has benefited the village community and has been generally welcomed. Also responded that although impacts on Biodiversity, Water Quality and Drainage, Physical fitness, and Journey Ambience were as expected, impacts on Noise and Landscape were worse than expected.
Elton Parish Council	General	The posts of Clerk and Chair of the Parish Council are currently being advertised. Therefore, no consultation was possible with the Parish at the OYA stage. Consultation should be conducted at the FYA stage.	Not operating, so no consultation possible at FYA.

Organisation	Field of Interest	Comments at OYA	Comments at FYA
Egglescliffe and Eaglescliffe Parish Council	General	Not contacted at OYA.	Parish council has not found any noticeable impact in the parish area.
Tees Archaeology (as agent for Stockton BC)	Heritage	Impacts as expected although considers that the 1992 assessment might have been revised later in the project with more focus on pre-construction archaeological evaluation rather than watching brief.	Did not respond to the invitation to provide feedback.
Tees Valley Wildlife Trust (as Agent for Stockton BC)	Biodiversity	As expected for local biodiversity, better than expected for mitigation.	Did not respond to the invitation to provide feedback.

- 5.13 The Area 14 Managing Agent Contractor (MAC) has also been consulted with regard to animal mortality figures which have been made available for the A66 route corridor at Long Newton for the period between 2003 and 2012 inclusive. These figures are discussed in the biodiversity chapter.

## Traffic Forecast Evaluation

- 5.14 Three of the environmental sub-objectives (noise, local air quality and greenhouse gases) are directly related to traffic flows. No new noise or air quality surveys are undertaken for Post-Opening Project Evaluation (POPE) and an assumption is made that the level of traffic and the level of traffic noise and local air quality are related.
- 5.15 The ES outlines the need for the scheme and includes data on the Annual Average Daily Totals (AADT) for traffic flows. In order to provide a context for the following review and evaluation of environmental topics, the key findings given in the ES are summarised as follows:
- The ES traffic assessment noted that the proposals would lead to a redistribution of traffic within the study corridor, although the impact on A66 traffic flows would be negligible.
  - The AADT for the Long Newton section of the A66 in 1995 was c.27,500 vehicles, and was expected to double by 2015.
  - Traffic flows for Long Newton varied between 1,300 and 1,800 vehicles per day, and the scheme was expected to reduce flows especially in the eastern and western parts of the village.
  - In Elton, daily traffic flows were approximately 250 vehicles per day in the western part of the village, and 550 vehicles per day at the eastern end of Darlington Road. It was expected that traffic would increase by approximately 150 vehicles per day at year of opening, assumed in the ES to be 1998.
- 5.16 The OYA study noted that due to the time lapse between the ES (1995) and construction, traffic forecasts for the scheme were updated based on 2001 existing traffic flows for the 'Do Something' scenario for Opening Year 2005, and Design Year 2020. Existing and predicted 2005 flows were as follows:
- Long Newton: 1,670 vehicles per day, expected to reduce to 1,450.
  - Elton: 590 vehicles per day, expected to increase to 950.

- 5.17 In Table 5.2, below, the predicted 2013 flows are estimated using a straight line interpolation from the 2005 and 2020 DS predictions. The table shows AADT traffic flows for both the local area (Sites 3, 5 and 6); and the wider area (Site 13). The location of traffic data collection points is shown in Figure 2.4 of this report, where further analysis of these flows is provided.
- 5.18 As per the OYA study, no comparisons with forecast HGV proportions were made at FYA due to forecasts not being available. Observed changes in HGV proportions are noted in the traffic chapter of this report.

**Table 5.2 – Comparison of AADT for Traffic Flows and Observed AADT for Traffic Flows at FYA (2013).**

Site	Location	Predicted FYA flow *(013)	Observed FYA Flow (2013)	No. Diff. (FYA)	% Difference (FYA)
3	Long Newton East	1,700	530	-1,170	-69%
5	Elton West	610	750	140	23%
6	Mill Lane, south of Old Mill Lane tie-in	3,200	2,400	-800	-25%
13	A66 west of junction	34,600	30,000	-4,600	-13%

## Five Years After Environmental Assessment

- 5.19 For each sub objective, a brief summary of statements from the AST, ES and OYA evaluations (including close out/ key issues identified for further reporting at the FYA stage) which have been included to provide the context for the FYA evaluation.

### Noise

- 5.20 The AST stated that noise benefits would be in the area around the proposed junction with 12 fewer people exposed to traffic noise greater than 65dB(A)\*. Elsewhere, noise changes due to the scheme were expected to be generally less than 1 dBL<sub>A10</sub>, 18h\*\*. Overall it was assessed that two fewer people would be annoyed by noise as a result of the scheme.
- 5.21 The ES predicted traffic flows on the A66 would remain largely unaltered as a result of the scheme, and no properties were identified as qualifying for noise insulation.
- 5.22 For the proposed grade separated junction (GSJ), the ES stated that the impact of the scheme would be negligible with the low forecast flows giving imperceptible changes in noise levels as a result of the scheme. However, to the west of Long Newton, the removal of traffic from part of Darlington Road and Mill Lane was expected to result in a perceptible decrease in noise. No properties would receive a perceptible increase in noise as a result of the scheme.
- 5.23 For the Elton Link Road, noise nuisance was not expected to be a problem as traffic volumes were predicted to be low; the ES predicted that no properties would receive a perceptible increase in noise as a result of the scheme.
- 5.24 Since the ES, the scheme was updated to include the use of a low-noise surfacing for the new junction slip roads and side roads.

\* A-weighted noise level. Although the unit of measurement used for sound pressure levels and noise levels are usually quoted in decibels (dB), the human ear is less sensitive at low and high frequencies. The A-weighting is therefore applied to measured sound pressure levels so that these levels correspond more closely to the subjective response, and is expressed in dB(A).

\*\* L<sub>A10</sub> is the A-weighted sound level in dB that is exceeded 10% of the measurement period. This is the standard index used within the UK to describe traffic noise

- 5.25 The OYA noise evaluation noted that where traffic had been rerouted away from properties in Long Newton it was likely that the local noise climate had improved as expected. It was also noted at OYA that traffic at the eastern end of the Elton Link Road was higher than expected, and that it was possible that traffic through Elton had increased more than expected.
- 5.26 The OYA evaluation concluded that overall volumes of traffic had remained low, and that noise from traffic was unlikely to be a problem. It was noted however, that noise should be reconsidered at FYA and could include traffic counts in Elton. It was also noted at OYA that no properties were deemed eligible for noise insulation.

**Consultation**

- 5.27 Long Newton Parish Council commented that reports had been received of an increase in perceived noise levels resulting from traffic flow across the interface of the new road surfacing with the retained road surfacing at the western end of the village adjacent to The Yew Walk.

**Evaluation**

- 5.28 Although low-noise surfacing for the new junction slip roads and side roads was specified in the Scheme update since the ES (1995 version), it was not confirmed at OYA whether this had been installed; no high speed Road Surface Index (RSI) values were made available for the FYA study and as such, any noise reduction properties of the installed surfacing remain unconfirmed.
- 5.29 In terms of the OYA study’s suggestion that traffic counts in Elton should be included in any FYA noise evaluation, no pre scheme data at this location was available for comparison. The traffic counts at Elton West (Site 5) are considered to be a fair representation of the through traffic in Elton, the site being located just to the west of the village, whilst any increase further east into the village would be village traffic that would exist without the scheme.
- 5.30 An assumption is made by POPE methodology that noise levels will be as expected if observed traffic flows are within 25% more or 20% less than predicted; as can be seen by the comparison of both the predicted and observed AADT flows in Table 5.2 above, the data indicates that the observed flows are;
  - 23% greater than forecast at Site 5 Elton West.
  - Between 13% and 69% lower than forecast at three locations: Site 3 – Long Newton East; Site 6 - Mill Lane, south of Old Mill Lane tie-in; and Site 13 - A66 west of junction.
- 5.31 Although traffic flow on Elton West is 23% greater than predicted in the ES, the overall number of vehicles exceeding the predicted figure is 140 AADT; although the percentage difference is close to the tolerances assumed by POPE, the absolute number of vehicles exceeding the tolerance is low and as such, is not considered to be significant (i.e. neutral) in this case; consequently, the effects of the scheme in terms of Noise at this location are considered to be as expected.
- 5.32 However, the traffic flows at three locations are between 13% and 69% less than predicted by the ES, with the overall number of vehicles falling short of the predicted figures by between 800 and 4,600 AADT at each of the three locations; two of these percentage differences are more than 20% lower than forecast as such it is likely that the local noise climate due to traffic is better than expected.
- 5.33 Based on the information presented in this evaluation, it is therefore concluded that the overall effects of the scheme in terms of noise are as expected at Elton, but are better than expected at Long Newton where traffic flows are significantly less than predicted.

**Table 5.3 – Evaluation Summary: Noise**

Sub-Objective	FYA Score	Evaluation
Noise	-	As expected at Elton, better than expected at Long Newton.

## Local Air Quality

- 5.34 The AST stated that realignment at Long Newton would bring equivalent benefits and deterioration affecting 9 properties, and that all other changes in exposure would be less than  $1\mu\text{g}/\text{m}^3$ \*. Properties along Darlington Road would experience deterioration in air quality. Overall, the AST forecast an improvement at 37 properties, and deterioration at 361 properties.
- 5.35 The ES noted that there were 276 properties in Long Newton and 23 properties in Elton that were likely to be affected by changes in air quality resulting from forecasted changes in traffic flows on existing roads or the new works. The ES predicted that air quality levels in the east and west of Long Newton would improve, whilst in the centre of the village there would be a slight increase in the levels of pollution. In Elton, it was expected that there would be virtually no change in air quality as a consequence of the scheme.
- 5.36 The ES concluded that the majority of properties were likely to experience an improvement or no change in air quality on completion of the scheme, and this would be enhanced in future years as vehicle technology improved.
- 5.37 Since the ES, the Air Quality Proof of Evidence for the Public Inquiry in 2003 concluded that;
- The existing air quality in the Long Newton and Elton area was good, with roadside concentrations of Nitrogen Dioxide (NO<sub>2</sub>) and Particulate Matter (PM<sub>10</sub>), the key pollutants to be assessed near roads, achieving the air quality criteria; and
  - The proposed junction would result in a marginal overall improvement in local air quality, with concentrations of NO<sub>2</sub> and PM<sub>10</sub> expected to meet the Air Quality Strategy objectives at properties likely to be affected by changes in air quality resulting from forecasted changes in traffic flows on existing roads or the new works.
- 5.38 The OYA evaluation stated that based on traffic flows, it was likely that local air quality impacts would be as expected as although traffic flows at the eastern end of the Elton Link Road were higher than expected, the overall number of vehicles was less than 1,000 vehicles per day and as such, the overall number of vehicles was low.

### Consultation

- 5.39 No responses relating to this topic were received.

### Evaluation

- 5.40 An assumption is made by POPE methodology that local air quality will be as expected if observed traffic flows are within 10% more or 10% less than predicted; as can be seen by the comparison of both the predicted and observed AADT flows in Table 5.2, above, the data indicates that the observed flows are;
- 23% greater than forecast at Site 5 (Elton West).
  - Between 13% and 69% lower than forecast at four locations: Site 3 – Long Newton East; Site 6 - Mill Lane, south of Old Mill Lane tie-in; and Site 13 - A66 west of junction.
- 5.41 Although traffic flow on Elton West is 23% greater than predicted by the ES, the overall number of vehicles exceeding the predicted figure is 140 AADT; although the percentage difference is outside of the tolerances assumed by POPE, the absolute number of vehicles exceeding the tolerance is low and as such, is not considered to be significant (i.e. neutral) in this case; consequently, the effects of the scheme on Local Air Quality at this location are considered to be as expected.

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\* The concentration of an air pollutant is given in micrograms (one-millionth of a gram) per cubic metre of air:  $\mu\text{g}/\text{m}^3$



- 5.42 However, the traffic flows at four locations are between 13% and 69% less than predicted by the ES, with the overall number of vehicles falling short of the predicted figures by over 1,000 AADT at two of the three locations; these percentage differences are percentage differences are considered to be significant i.e. more than 10% less than forecast.
- 5.43 Based on the information presented in this evaluation, it is therefore concluded that the overall effects of the scheme in terms of local air quality are as expected at Elton, but are better than expected at Long Newton where traffic flows are significantly less than predicted.

**Table 5.4 – Evaluation Summary: Local Air Quality**

Sub-Objective	FYA Score	Evaluation
Local Air Quality	-	As expected at Elton, better than expected at Long Newton.

## Greenhouse Gases

- 5.44 The assessment of the impacts of transport schemes on emissions of greenhouse gases is one of the environment sub-objectives. WebTAG notes that carbon dioxide (CO<sub>2</sub>) is considered the most important greenhouse gas which is therefore used as the key indicator for the purposes of assessing the impacts of transport options on climate change. Changes in CO<sub>2</sub> are expressed in terms of equivalent tonnes of carbon released as a result of the scheme.

### Forecast

- 5.45 The ES states that that the scheme would result in an increase of 2% (248 tonnes CO<sub>2</sub>) however this was only focused on the villages of Long Newton and Elton and used an older methodology as was undertaken pre 1995. Since this appraisal, guidance has been updated. The AST for this scheme indicates an increase of 3,240 tonnes CO<sub>2</sub>. (884 tonnes Carbon). This would have been calculated using the DMRB air quality assessment spreadsheet.

### Evaluation

- 5.46 No detailed breakdown was available as the traffic data used for the AST assessment. Observed pre and post opening flows and journey times on the A66 and Mill Lane have been used to calculate a comparison. To capture the varying impact level during the differing time periods we have assessed the emissions by time periods during the day. This results in much lower levels of carbon, but a similar level of increase as forecast.

**Table 5.5 – Change in Greenhouse Gases (tonnes of carbon)**

Assessment Scenario	AST Forecast	Observed change
Do-Minimum	6,984	3,592
Do-Something	7,868	4,008
<b>Net Change</b>	<b>+884 (12.6%)</b>	<b>+416 (11.5%)</b>

- 5.47 The observed change is calculated over a smaller area than the AST forecast and does not take into account any changes due to traffic having to travel further due to gap closures. Although traffic flows are lower than forecast (see chapter 2) speeds are slightly higher than forecast, resulting in the increase observed. Overall it is considered that, with the caveats above, the impact of the scheme on greenhouse gases is likely to be as expected.

## Landscape

- 5.48 The AST stated that there would be loss of land from an area with an open agricultural landscape character, but that replacement planting of hedges and trees would mitigate the

effects on landscape character in the long-term. The AST also identified that adverse visual impacts on properties would be mitigated by screen planting. Overall, the impacts were assessed as slight adverse.

5.49 The ES predicted that in terms of landscape impact:

- Although the GSJ would not affect any designated areas, engineered embankments would be imposed onto a relatively open agricultural landscape with the loss of some existing vegetation. Comprehensive landscape mitigation proposals were expected to strengthen the landscape framework of the area and link to existing groups of mature vegetation. However, the construction of the junction with its associated lighting was predicted to have a major impact on the immediate landscape; and
- The proposed Elton Link Road would have a minor impact on the landscape, due to the partial utilisation of an existing section of road, the retention of most of the existing hedgerows, and the introduction of an improved planting framework.

5.50 The ES predicted that in terms of visual impact:

- The visual impact of the GSJ would generally be substantial for those properties immediately surrounding the junction, but comprehensive landscape proposals were expected to reduce this impact as the planting matured. Although the bridge and lighting were predicted to remain prominent, the visual impact was expected to be reduced by the use of lanterns designed to prevent the side emission of light, and the use of columns below standard height across the bridge.
- The Elton Link Road was not expected to be generally visible from the surrounding area, and mounding combined with planting between the Elton Link Road and the A66 was predicted to screen headlight glare. However, there was expected to be a significant visual impact for road users at the proposed junction with Coatham Lane in the opening year, and a moderate adverse visual impact due to additional traffic movements on the Elton Link Road close to Mount Pleasant Cottages was expected.

5.51 The ES also stated that the principal mitigation measures would be comprehensive landscape proposals that would include measures proposed to reduce visual intrusion.

5.52 The OYA evaluation stated that although the GSJ was visible within the landscape, the new planting should effectively screen traffic and help integrate the scheme into the local landscape over time. The OYA evaluation also noted that although the construction of the Elton Link Road had changed the character of the previously existing local lane, both the retained and new planting would help integrate the link road into the landscape.

5.53 Plant failures were noted at OYA, and the OYA evaluation stated that it was essential that all plant defects were replaced during the aftercare period to ensure that the long term scheme objectives were met. The new ornamental planting at the eastern end of Long Newton was noted as struggling to establish, and that considerable replacement planting and weeding was required to ensure its success.

5.54 The OYA evaluation noted that the Handover Environmental Management Plan (HEMP) should be available at the FYA stage, and that it would be appropriate that the ongoing establishment of the planting be reviewed as part of the FYA evaluation. The report further noted that a night time inspection and evaluation of the lighting aspects of the scheme could be considered at FYA.

### Consultation

5.55 Natural England does not consider that the scheme poses any likely or significant risk to those features of the natural environment for which Natural England would otherwise provide a more detailed consultation response, and consequently no specific comment was made.

5.56 Long Newton Parish Council commented that although there have been an estimated 50% failure in terms of tree planting, the survival rate of hedgerow plants was better. The council also commented that light pollution was significant for some residents and although partially mitigated by the planting proposals, had not been fully mitigated due the failure of a proportion of the plant (tree) stock.

- 5.57 The Parish Council also noted that the ornamental planting bed at the eastern end of the village had been replaced with grass (considering this to be “*a bit of an improvement*”), and noted that the ornamental planting bed at the western end of the village was considered to be “*satisfactory*”.

### Evaluation

- 5.58 Where landscape and visual impacts of the proposals were identified in the ES, mitigation measures were proposed with the aim of developing a landscape framework that would integrate the scheme into the surrounding area and be effective in mitigating the impact of the scheme upon nearby properties and road users.
- 5.59 The landscape mitigation measures outlined by the ES included respecting existing landscape patterns by linking new planting to existing, alleviating visual intrusion with dense screen planting, using appropriate plant species and plant mixes to create ecologically diverse/ long term habitats, extending basic engineering earthworks to complement the existing topography, and protecting/ enhancing existing areas of nature conservation.
- 5.60 The landscape proposals comprised extensive planting of native trees, woodland blocks, and hedgerows to provide screening and to integrate the scheme into the existing landscape, and included areas of species rich and open grassland to reflect the existing landscape and enhance the amenity and ecological value of the scheme. Balancing ponds were also included as part of the drainage design, but as noted in the HEMP, were given a natural profile and planted with wetland and aquatic plants to improve water quality and enhance visual amenity.
- 5.61 Comparison views with ES photomontages and OYA photographs are shown in Appendix D.
- 5.62 The HEMP stated that the planting had established well over the 3 year landscape aftercare period (completed in July 2012) and that for the majority of plots, the planting had reached its expected level of development and establishment. However, it outlined the need for continued management to maintain planted areas free of weeds until such time as the canopy had closed over completely, and to maintain areas of grassland to an acceptable and safe height as appropriate.
- 5.63 The HEMP also noted that its purpose was not to provide a specific programme of landscape maintenance works, but instead was intended to provide non-prescriptive guidance on the management of the soft estate to allow the future managing agent to adopt its own approach to management. However, management tasks for a recommended initial 5 year period following handover were provided, together with guidance on achieving the long term performance objectives for the site.
- 5.64 In terms of specific issues present at Handover, the HEMP noted the following;
- Weed control. The site was noted to be relatively clear of weeds, but it was considered that continued management would be required due to the presence of uncontrolled noxious weeds in the surrounding fields outside of the HA landownership;
  - Grassland. Grassland areas were considered to have established well, but species rich grassland was noted as having become depleted in the variety of species present. Careful management to ensure a recovery of diversity was recommended;
  - Planting. Planting was generally considered to be acceptable and although it was acknowledged that problem areas remained, it was noted that these areas were mainly limited to accommodation works handed back to the landowners;
  - Plant stations. A number planting stakes, ties, and tubes remained where planting was not considered to have developed sufficiently for removal, and it was advised that these be removed from visible areas and disposed of off-site when the planting had matured suitably; and
  - Balancing Ponds. Although clear of pond weed, the main issue noted during the aftercare period was that of excessive duckweed growth; monitoring as part of ongoing management was advised.

### Weed Control

- 5.65 In terms of weed control, the FYA site visit to evaluate the ongoing establishment of the planting found the road corridor generally to be free of noxious weeds. Dock and redshank, weeds specifically stated in the HEMP as constituting a significant maintenance issue during the aftercare period, appeared to be well controlled.
- 5.66 Other problem weed species specifically noted by the HEMP were ragwort and thistle; although small localised infestations of both were observed throughout the scheme during the FYA site visit, colonies were mainly confined to the grassland area along the Elton link road adjacent to the A66 (ragwort) and along the east bound verge of Mill Lane (thistle); see Figure 5.1 and Figure 5.2.

**Figure 5.1 – Ragwort along the Elton link road**



**Figure 5.2 – Thistle along the eastbound verge of Mill Lane**



- 5.67 The small scale of the ragwort infestation indicates that it is being controlled reasonably well and as such, the infestation is not considered to be significant. However, localised occurrences similar to those observed during the FYA site visit are likely to remain evident throughout the scheme in locations where noxious weeds are to be found on adjacent land outside the highway boundary.
- 5.68 The sporadic thistle colonies are not considered to be significant as subject to ongoing management and maintenance, they are likely to be excluded from the grassland areas over time.
- 5.69 Significant weed growth was observed in the amenity planting at the western entrance to Long Newton, and although it is evident from Figure 5.3, below, that the planting has established to a degree, the success of this planting as a formal feature would likely be improved if these weeds were to be removed and the beds maintained more frequently.



**Figure 5.3 – Weed growth in the amenity planting bed at the western entrance to Long Newton, at the junction of Darlington Road and The Yew Walk**



5.70 Weed control was considered by the OYA evaluation to be a necessity to ensure the success of the amenity planting at the eastern end of Long Newton; the HEMP noted that due to issues with weeds, vandalism, stolen plants and the subsequent intensive management required to maintain this amenity bed, the planting had been removed and replaced by grass; this is shown in Figure 5.4.

**Figure 5.4 – Amenity planting that has been replaced by amenity grass at the eastern entrance to Long Newton, where Darlington Road connects with the road to Elton**



### Grassland

5.71 Although the HEMP considered that grassland areas had established well by Handover, two areas of species rich grassland adjacent to both the east and westbound verges of the A66 directly east of the new GSJ had notably failed to establish at the time of the FYA site visit; see Figure 5.5, below. The establishment failure of both of these areas is considered likely to be as a result of damage caused by a major flood event suffered by the area in October 2010 (discussed in the Water Quality and Drainage sub-objective, below).

**Figure 5.5 – Unestablished area of species rich grassland adjacent to the balancing pond (left) and eastbound exit-slip road of the A66 (right)**



- 5.72 The FYA site visit observed that the remainder of the amenity, species rich, and open grassland areas appeared to have established well, and were free of significant scrub cover. Consequently, it is considered that the environmental functions of the grassland are generally developing in line with the landscape proposals, and there is no reason to suggest that these functions will not be realised by the Design Year subject to ongoing management and maintenance.
- 5.73 Species rich grassland was noted in the HEMP as having become depleted in the variety of species present, and careful management to ensure a recovery of species diversity was recommended; although the FYA site visit observed that grassland maintenance for all grassland elements had been carried out in accordance with the HEMP, it should be noted that future surveys are required to confirm whether this management has been successful or not;
- Amenity grass. These areas were neatly trimmed and their formal appearance maintained, with arisings having been removed. See Figure 5.4, above.
  - Species rich grassland. Appearance has been enhanced by a mown 0.5m strip adjacent to footpaths and verges, and arisings have been removed. The annual cut specified to be undertaken in late summer had not been carried out at the time of the FYA site visit in early July. See Figure 5.6, below.
  - Open grassland. Appearance has been enhanced by a mown 0.5m strip adjacent to footpaths, and visibility and safety has been maintained by mowing for visibility splays, verge edges and central reservations. Arisings have been removed. See Figure 5.7, below.



**Figure 5.6 – Maintained species rich grassland along the north verge of the Elton link road**



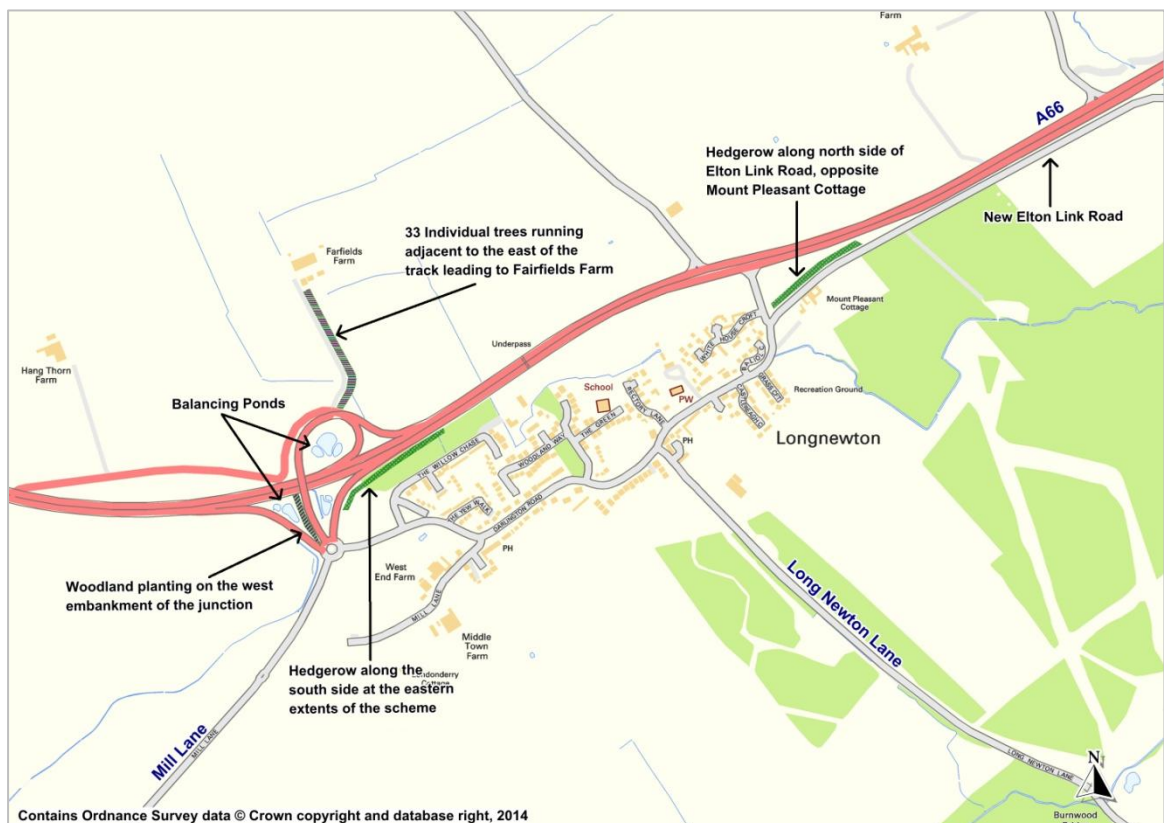
**Figure 5.7– Open grassland along Mill Lane (right)**



**Planting**

5.74 Planting was generally considered by the HEMP to be acceptable at Handover, although three problem areas were acknowledged and noted as being accommodation works that had been handed back to the landowners - locations are shown in Figure 5.8, below);

**Figure 5.8 – Planting Problem Areas**



5.75 These three areas of accommodation works are:

- 33 No. Individual trees running adjacent to the east of the access track leading to Fairfield's Farm. The HEMP noted that these trees had continually failed, and considered that this was due to either them suffering crop spray damage, or the specified species (Fagus) not being suited to the soil of the area. The HEMP stated that these trees had not been replaced, and the situation was observed not to have changed at the time of the FYA site visit.

- 1 No. Hedgerow along the north side of the Elton link road, opposite Mount Pleasant Cottage. The HEMP stated that this hedgerow was repeatedly damaged by donkeys kept in the adjacent field, noting that although the plants had not been replaced they appeared to be recovering. The FYA site visit observed that significant gaps remain in this hedgerow, and that no replacement planting has been undertaken; see Figure 5.9; and
- 1 No. Hedgerow along the south side of the Elton link road, at the eastern extents of the scheme. The HEMP stated that a small section of this hedgerow adjacent to the gate appeared to be constantly waterlogged, and noted that the plants were not replaced at the last beat up as they were still alive. The HEMP considered that this area should either be drained, or the plants replaced with more suitable species. No signs of waterlogging were observed during the FYA site visit, but gaps remain in this hedgerow and no replacement planting has been undertaken; see Figure 5.10.

5.76 The landscape proposals show these accommodation works as having screening and landscape integration functions, and it is considered that unless replacement planting is undertaken and the replanted plots receive ongoing maintenance and management, the environmental functions of these plots may not be fully realised by the Design Year.

**Figure 5.9 – Gaps in the hedgerows opposite Mount Pleasant Cottage**



**Figure 5.10 – Gaps in the hedgerows along the Elton link road at the eastern extents of the scheme**



5.77 In addition to those problem areas in the accommodation works identified by the HEMP, the FYA site visit observed that although the majority of the accommodation hedge encircling the field directly to the northeast of the new roundabout was intact (Figure 5.11, below), gaps were present in the section along Darlington Road (Figure 5.12, also below); anecdotal evidence received from members of the public during the site visit suggests the cause to be the horses previously stabled at this location, although this remains unconfirmed.

5.78 Unlike the other accommodation works however, replacement planting to gap up this hedge has been undertaken although the replacement trees appear to be considerably smaller than the (standard) trees specified by the landscape proposals.

**Figure 5.11 – Intact hedgerow north of the new roundabout**



**Figure 5.12 – replanted gaps in the same hedgerow along Darlington Road**



5.79 The FYA site visit observed two further areas of planting that are not considered to be performing as well as expected, that were not noted by the OYA evaluation;

- The woodland planting on the west embankment of the GSJ (Figure 5.13). This plot appears to be sparsely planted and although the remaining plants have established reasonably well, the plants are stunted. The reasons for this stunted characteristic remain unclear, although it is possible that poor soil conditions and/ or their exposed aspect may be a contributing factor; and
- The linear belt of trees and shrubs along the A66 westbound carriageway leading up to the junction with Darlington Road (Figure 5.14). This planting plot is on the field boundary opposite the accommodation hedgerow noted by the HEMP as having suffered browsing damage from donkeys; it is therefore considered likely that this plot has suffered similar grazing damage.

5.80 The landscape proposals show both plots as having screening and landscape integration functions, and the embankment planting as having an additional visual amenity function. Unless failed plants within both plots are replaced and receive ongoing maintenance and management, their environmental functions may not be fully realised by the Design Year.

**Figure 5.13 – Sparse/ stunted woodland planting on the west embankment of the GSJ**



**Figure 5.14 – Gaps in the linear belt of trees and shrubs near the A66 westbound junction with Darlington Road**



5.81 Plant failures within the tree and shrub planting (particularly regarding larger trees) were noted at OYA, and the OYA evaluation stated that it was essential that all plant defects were replaced during the 3 year aftercare period to ensure that the long term objectives of the scheme were met.



- 5.82 Intermittent failures in the plant stock were also observed during the FYA site visit, but no evidence of historic replanting was evident. Although these occasional cases of tree and shrub failure are not considered to be significant in isolation, unless as a minimum the individual/hedgerow trees are replaced and subjected to ongoing maintenance and management, the strong landscape framework and hedgerow structure may not fully develop as intended.
- 5.83 The remainder of the planting within the scheme was found to be progressing well at the time of the FYA site visit with plant stock appearing to be generally healthy, established and in good condition, and plant plots generally clear of litter and rubbish; See Figure 5.6 (above) and Figure 5.17 and Figure 5.18.

**Plant Stations**

- 5.84 The HEMP noted that a number planting stakes, ties, and tubes remained in place where planting was not considered to have developed sufficiently and the FYA site visit observed that although the majority of plant shelters had been removed from planting along the Elton link road, some shelters remained around the western extents of the scheme. However, this is not considered significant as the HEMP advised that all plant stakes and shelters should be removed within 2 years of handover (i.e. by 2014).
- 5.85 The OYA evaluation noted that at some tree stations, ties were broken so that the trees were not upright. This was also observed to be the case during the FYA visit, and unless this is rectified, it is likely that vertical growth will be compromised further; see Figure 5.15.
- 5.86 A limited number of individual trees were also observed at FYA to be without weed free planting stations adjacent to the westbound carriageway opposite Sandy Lees Lane. This is not considered to be significant given the number (and location) of these trees, but unless weed free plant stations, stakes and ties are re-installed (or the plants are replaced), it is likely that the vertical growth of these plants will continue to be compromised; see Figure 5.16.

**Figure 5.15 – Individual trees with broken plant ties**



**Figure 5.16 – Compromised vertical growth in individual trees without planting stations**



- 5.87 Other maintenance recommendations outlined by the HEMP appear to have been adhered to where the established plant stock has matured sufficiently, specific observations being that weeds were well controlled in woodland and shrub areas, perennial vegetation remains undamaged at the base of hedgerows, and mulch is present in the area of amenity planting.
- 5.88 Overall and where appropriate to their environmental functions, current maintenance and management appears to be encouraging woodland, trees, shrub and hedgerows to develop as well as can be reasonably expected; examples are illustrated by Figure 5.17 and Figure 5.18.

**Figure 5.17 – Extensive hedgerow planting along the Elton link road (left) linked to the existing mature hedgerow (centre right), screening A66 traffic from the wider landscape and integrating the link road into the existing landscape framework**



**Figure 5.18 – Planting along Darlington Road starting to develop a screening function for the residential properties facing the new roundabout at the edge of Long Newton**



### **Balancing Ponds**

- 5.89 Although balancing ponds were considered by the HEMP to be clear of pond weed at Handover, the main issue noted during the aftercare period was considered to be that of excessive duckweed growth.
- 5.90 The FYA site visit observed that although duckweed was present within all ponds and that water levels in all three ponds were low, the reed and marginal planting of each pond throughout the scheme was well established and is considered to be thriving; see Figure 5.19 and Figure 5.20, below.

**Figure 5.19 – Balancing pond containing duckweed**



**Figure 5.20 – Balancing pond with well established marginal planting**



- 5.91 At the time of the site visit, balancing pond maintenance recommendations outlined by the HEMP appeared to have been adhered to where appropriate; barley straw had been applied to water bodies affected by algae, pond edges were free of woody vegetation and inlets/outlets were free of excessive vegetation. The MAC has also confirmed that the ditches around the ponds have been recently dredged.
- 5.92 Regarding the excessive duckweed growth noted by the HEMP, the levels of duckweed growth at the time of the FYA site visit did not appear to be having a significantly detrimental effect on the reed and marginal planting; however, it should be noted that continued ongoing maintenance and management of duckweed will be required to prevent any such problems arising in the future.

### Lighting

- 5.93 The OYA evaluation noted that a night time inspection of the scheme was not undertaken, but suggested that a night time inspection and evaluation of the lighting aspects of the scheme could be considered at the FYA stage.
- 5.94 The ES stated that due to the elevation of the new roundabout and overbridge together with the proximity and height of the lighting columns, there were expected to be substantial adverse night-time visual impacts at several properties. The ES also noted that even with cut off lanterns, i.e. those designed to cut out the sideways spillage of light, it would not be possible to screen the impact of the night time illumination at certain locations, particularly during the winter months.
- 5.95 The OYA evaluation confirmed that lighting mitigation comprised the use of shorter than standard columns and full cut off lanterns, and that lighting column heights varied from 6m to 15m, depending on location. It was also stated that the A66 was lit prior to construction of the scheme.
- 5.96 A night time inspection was undertaken as part of the FYA site visit; see Figure 5.21 and Figure 5.22, below. During the inspection it was observed that;
- When compared to the existing pre-scheme lanterns that were retained, there appeared to be less light spillage from the lanterns installed around the new GSJ and roundabout as part of the scheme; and
  - Although screen planting was appropriately located and was observed to be generally developing the screening function for which it was intended, the elevation of the scheme and height of the lighting columns in relation to the screen planting is such that the scheme remains, and is likely to remain, prominent at night.
- 5.97 In terms of the comments made by the Parish Council that light pollution had not been fully mitigated due the failure of a proportion of the plant (tree) stock, the ES predicted that would not be possible to screen the impact of night time illumination at certain locations due to the elevation of the new roundabout and overbridge together with the proximity and height of the



lighting columns; the FYA site visit confirmed that in relation to the screen planting, the scheme would likely remain prominent at night due to the reasons stated in the ES and that as such, it is considered that night time illumination would not have been fully mitigated had the plant stock survived.

- 5.98 It is therefore considered that the night time impacts of the scheme are likely to be substantial adverse at several properties as predicted by the ES, and consequently are considered to be as expected.

**Figure 5.21 – New lighting around the new roundabout (centre left), and along the Darlington Road.**



**Figure 5.22 – New lighting around the GSJ (centre left) and new roundabout (centre), and retained lighting along the A66 (left) and Mill Lane (right)**



### Summary

- 5.99 In summary, the OYA evaluation stated that it was essential that all plant defects were replaced during the aftercare period and at Handover, the planting was considered to be generally acceptable by the HEMP.
- 5.100 Although no target plant coverage within a specific time period was stated in the HEMP it is considered that noted plant failures aside, the current levels of growth, coverage, establishment, and condition of the majority of the plant stock at FYA indicates that the visual screening and landscape integration functions of the mitigation measures are generally developing well, and there is no reason to suggest that these functions will not be fulfilled by the Design Year subject to ongoing maintenance and management as recommended by the HEMP.

- 5.101 Consequently, and in terms of landscape impact, it is considered that;
- The introduction of planting linked to retained groups of mature vegetation is beginning to mature, strengthening and improving the landscape framework throughout the scheme extents; and
  - Although the new planting is generally on target to integrate the scheme into the local landscape over time, the GSJ with its associated earthworks and lighting is likely to continue to have an impact on the immediate landscape.
- 5.102 In terms of visual impact, it is considered that;
- The earthworks and successful establishment of the planting along the Elton link road suggest that the link road will be effectively screened from the wider landscape over time; and
  - Although the maturing plant stock is beginning to alleviate the visual intrusion of the GSJ for those properties immediately surrounding the junction, the bridge and lighting are likely to remain prominent.
- 5.103 However, unless the accommodation works acknowledged noted by the HEMP as being problem areas, the woodland planting on the west embankment of the GSJ, and the linear belt of trees and shrubs along the A66 westbound carriageway leading up to the junction with Darlington Road receive replacement planting in conjunction with ongoing maintenance and management, it is unlikely that the screening and landscape integration functions of these plots will be realised by the Design Year.
- 5.104 It is therefore concluded that although the effects of the scheme on the landscape are generally Slight Adverse and are to be as expected, the poor performance and failure of significant elements of the planting stock are likely to have resulted in localised Moderate Adverse effects that are worse than expected.

**Table 5.6 – Evaluation Summary: Landscape**

Sub-Objective	FYA Score	Evaluation
Landscape	Slight to Moderate Adverse	Worse than expected

## Townscape

- 5.105 The AST stated that impacts on Townscape would be neutral, as the proposed works would take place close to, or outside of, the village envelope and would not influence the townscape value of either Long Newton or Elton.
- 5.106 The ES did not specifically mention Townscape, but did note that the proposals would benefit the village of Long Newton by reducing through traffic at the western end of the village.
- 5.107 The OYA evaluation concluded that, as expected, there had been no impacts on Townscape.

## Consultation

- 5.108 Long Newton Parish Council commented that the scheme had created a "rat run" during peak flow periods through Long Newton village and down Long Newton Lane between Darlington and Urlay Nook, and that traffic tended to speed through the western end of the village.

## Evaluation

- 5.109 Regarding the consultation comments about the creation of a rat run down Long Newton Lane, traffic figures for Long Newton Lane, south east of Darlington Road (Site 2), indicate that AADT traffic flows at this location are 83% less than forecasted by the ES, the absolute number of vehicles falling short of the predicted figure by over 1,000 AADT; as such, this percentage difference could be considered to be significant, although the traffic flow data does not differentiate between through traffic and whether the traffic is for Long Newton.

- 5.110 However, as no maximum and minimum tolerance values exist for the evaluation of Townscape in terms of traffic flow and, it is therefore considered that the scheme has benefited the village of Long Newton by reducing through traffic at the western end of the village as predicted by the ES.
- 5.111 No further evaluation has been undertaken, as no further changes regarding Townscape have been identified during the FYA site visit and there were no unresolved issues from the OYA evaluation.
- 5.112 Based on this information, it is concluded that the effects of the scheme on Townscape are neutral, as expected.

**Table 5.7 – Evaluation Summary: Townscape**

Sub-Objective	FYA Score	Evaluation
Townscape	Neutral	As expected

## Heritage

- 5.113 The AST stated that listed buildings, enclosures and earthworks of local importance would not be affected by the scheme, although typical hedgerow patterns resulting from historic rural activity would be slightly disrupted, leading to some adverse effects. Overall, the AST assessed the impact of the scheme as slight adverse.
- 5.114 The ES noted that one of the factors to have influenced the scheme design was an ancient archaeological field system (ridge and furrow) located west of Long Newton in the field between Darlington Road and Mill Lane, and that although no known sites of archaeological importance would be affected by the proposals, there was the potential for archaeological discoveries to be made as a result of the junction improvements.
- 5.115 The ES also noted that there were no Conservation Areas within the study area, and that there would be no impact on any listed structures in the area, including three notable Grade II\* Listed buildings.
- 5.116 The OYA evaluation reported that very few archaeological features were identified, and that the finds were all typical of topsoil and subsoil deposits. The OYA evaluation concluded that:
  - None of the listed buildings in Long Newton and Elton had been directly affected by the scheme; and
  - There had been some disruption to hedgerow patterns, as expected.

## Consultation

- 5.117 English Heritage (EH) responded that;
  - Impacts upon designated and non-designated heritage assets, including hedgerow patterns and archaeology heritage assets, had been less than substantial or material;
  - The level of evaluation had been shown to be broadly proportionate as regards to expected impacts; and
  - EH was not aware of any issue, circumstance, or impact arising in respect of the historic environment and/ or its heritage assets that was not foreseen.

## Evaluation

- 5.118 POPE methodology assumes that by the FYA evaluation, all archaeological reports should have been published and deposited in the agreed archive for future reference; the OYA evaluation noted that the project archive was held by Tees Archaeology under the site code LAG07.
- 5.119 No further evaluation has been undertaken, as no changes regarding Cultural Heritage were identified during the FYA evaluation and there were no unresolved issues from the OYA evaluation

- 5.120 It is therefore concluded that the effects of the scheme on the heritage resource remain as expected.

**Table 5.8 – Evaluation Summary: Heritage**

Sub-Objective	FYA Score	Evaluation
Heritage	Slight Adverse	As expected

## Biodiversity

- 5.121 The AST stated that the loss of hedges, trees, ditches and grassland would be minor, but that the lost habitats would be replaced. The AST also stated that there would be no significant effects on legally protected species, and that topsoil from sections of a grass verge designated as a Site of Nature Conservation Interest (SNCI), would be translocated to new verges and managed. Overall, the impact of the scheme on biodiversity was assessed by the AST as neutral.
- 5.122 The ES noted that the study area largely comprised intensely managed agricultural land, and predicted that the scheme would not have a significant impact on either flora or fauna. The ES also stated that any impacts of the scheme would be mitigated by the landscape proposals which were expected to increase habitat diversity and develop wildlife corridors, thereby improving local habitats in the long term.
- 5.123 The ES also noted that the ecology associated with the ditches was not deemed to be of special importance, the ditches being affected by run-off from agricultural practices and road salt spraying.
- 5.124 The OYA evaluation concluded that the loss of existing vegetation, ditches and grassland was as expected, and reported that except for use of an outlier badger sett near a realigned farm track where mitigation was agreed, no protected species were found during surveys or during construction.
- 5.125 The OYA evaluation also stated that it was too early to fully evaluate the success or otherwise of many of the habitats at OYA, it would be appropriate that ongoing habitat maintenance and establishment be considered as part of the FYA evaluation, and that bat and bird box provision should be confirmed. It was further noted that a Handover Environmental Management Plan (HEMP) would be produced for the scheme and that this should be made available for the FYA report.

## Consultation

- 5.126 Natural England (NE) does not consider that the scheme poses any likely or significant risk to those features of the natural environment for which NE would otherwise provide a more detailed consultation response, and consequently no specific comment was made.
- 5.127 Long Newton Parish Council commented that the balancing ponds (and the areas around them) may benefit from more planting.

## Evaluation

- 5.128 The ES specialist report on Ecology and Nature Conservation noted that apart from the impact on the *Carex spicata* SNCI, no other ecological impact was significant except at a local scale, and that therefore it was not feasible to justify extensive ecological mitigation works.
- 5.129 The HEMP (2012) lists all of the mitigation measures incorporated into the scheme as part of the ecological design, but was unavailable at the time of the OYA evaluation; the full range of ecological design mitigation measures are therefore summarised:
- **Habitats:** Mitigation proposals and ecological design included provision of new tree, shrub, hedge, and species rich grassland planting for terrestrial habitats, and suitable wetland/ water plants and wildflower wetland grasses to the borders of aquatic

habitats; all plants were of native species and of local provenance to the site as possible;

- **Botany:** The site of the *C.spicata* SNCI was surveyed in March 2007 and monitored throughout the construction period. No evidence of *C.spicata* was found and it is considered by the HEMP that the species may have been lost from this area;
- **Water Voles:** Surveys undertaken between February and May 2007 found evidence of water vole in 2 No. ditches, but no further mitigation was required (beyond ensuring that there was no discharge of pollutants into the ditches during construction) as these ditches were not directly affected by the works;
- **Great Crested Newts (GCN):** Surveys undertaken during February 2007 found no GCN except for 5 No. in a single pond with little connective habitat located over 250m away from the works. A European Protected species licence was not required, and no further mitigation was undertaken;
- **Badgers:** A survey of the existing sett holes along Hardstone's Track was undertaken during March 2007 but no evidence of occupation was noted; the holes were soft filled and the area was monitored over the next few months. In May 2007, evidence of badger use of the sett as a temporary outlier was noted and as the sett would have been destroyed by the works, an exclusion licence was applied for and the sett was permanently closed during August 2007. No further mitigation was required;
- **Bats:** Trees to be felled to facilitate the works were fully inspected for the presence of bats prior to felling with high powered torches and endoscopes; no bat roosts were found and the trees were subsequently felled. In accordance with agreements made during the Public Inquiry, bat boxes were installed in the Long Newton Parish Woodland adjacent to the site; and
- **Birds:** A survey of trees, hedgerows and rough grass areas was undertaken prior to vegetation clearance to ensure that no nesting birds would be affected by the construction works. In accordance with agreements made during the Public Inquiry, bird boxes were installed in the Long Newton Parish Woodland adjacent to the site.

### Habitats

5.130 Implementation of the ecological mitigation measures outlined in the HEMP and able to be confirmed during the FYA site visit were;

- Habitat creation, comprising new tree, shrub, hedge, and species rich grassland planting for terrestrial habitats, and suitable wetland/ water plants and wildflower wetland grasses to the borders of aquatic habitats (the establishment of which are described and evaluated in the Landscape sub-objective, above); and
- Provision of bird/ bat boxes in Long Newton Parish Woodland; see Figure 5.23, below.

**Figure 5.23 – Bird/ bat box provision in Long Newton Parish Woodland**





## Botany

- 5.131 Regarding the translocation and management of *C.spicata* stated as a mitigation measure in both the AST and the ES, no mention was made of species or topsoil translocation by the HEMP when outlining the ecological design and mitigation measures undertaken as part of the scheme.
- 5.132 However, although the ES Supplementary Review stated that there did not appear to be any records of the species on the site later than June 1992, the Landscape and Ecology Management Plan (LEMP) contained within Appendix III of the Construction Environmental Management Plan (CEMP) did note that the species had historically been recorded along the verge of Darlington Road.
- 5.133 The LEMP also stated that the hedgerow and scrub area in this area would be cut back to allow light and warmth back to the road verge in an effort to encourage the re-establishment of the species, and went on to recommend that the area be monitored during the construction phase to determine whether said efforts were successful.
- 5.134 The treatment of existing vegetation adjacent to the scheme, i.e. along Darlington Road, was also considered by the LEMP; “*areas of sensitive vegetation will be protected from damage caused by activities associated with construction by the provision of protective fencing*”.
- 5.135 It is therefore considered that translocation of *C.spicata* was likely not undertaken; however, it would appear that the SNCI was protected while measures were taken to encourage the re-establishment of the species, and the site was monitored for the presence of the species throughout the construction period.
- 5.136 The location of the SNCI at the time of the FYA site visit is shown in Figure 5.24, below.

**Figure 5.24 – Location of *Carex spicata* SNCI on the verge of Darlington Road**



- 5.137 Although POPE is unaware of the results of the *C.spicata* monitoring referred to by the LEMP, the HEMP considered that the species had potentially been lost from the area by 2012.
- 5.138 Although POPE has been unable to confirm whether the habitat remains designated as an SNCI at FYA, the OYA study did note that it was not included as a SNCI in the June 1997 Stockton on Tees Local Plan.
- 5.139 It is therefore considered that the loss of *C.spicata* from the SNCI occurred prior to construction of the scheme, and although all reasonable conservation measures were undertaken to protect the habitat from the effects of construction and efforts were made to encourage re-establishment of the species, these efforts have likely proved to be unsuccessful.

## Species

- 5.140 Animal mortality figures have been received from the MAC from the period between 2003 and 2012 (inclusive), are these are shown in Table 5.9, below. Although it can be seen that there have been 2 recorded instances of badger mortality since the opening of the scheme, no data regarding specific locations was provided. However, given that the mortality numbers are low

and are spread out over time, it is considered that the effects of the scheme on species (legally protected or otherwise) are likely to be neutral, as predicted by the AST.

**Table 5.9 – Animal Mortality Data, 2003-2012**

Animal RTA	Construction					OYA	FYA				
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Badger								1		1	N/A
Fox	1	1	1								N/A
Cat	1										N/A
Dog	1										N/A
Unspecified										1	N/A

- 5.141 As confirmed by the FYA site visit, each balancing pond throughout the scheme provides a varied wetland habitat for a variety of wildlife, and the land surrounding each pond has been engineered to provide a range of habitats where possible, thus maximising wildlife potential.
- 5.142 Although no ecological monitoring has been undertaken for the Scheme, the MAC has provided a Balancing Pond Report (January 2010) that along with water quality assessed the biodiversity of the balancing ponds around the GSJ:
- Adjacent to westbound carriageway, west of the GSJ. The initial survey of this pond in 2009 revealed no aquatic invertebrates, although a subsequent survey later that year recorded young stickleback and water boatman only. The report considered the water quality of the pond to be poor, with only 2-5% macrophyte cover. Marginal plants, including brooklime, water mint and ragged robin, had not established well at the time of the survey, and the shallower areas of the pond were recorded being silted up. With less than 4 aquatic plant species and little other plant/ animal life recorded, the pond was considered to be of low value for wildlife;
  - Adjacent to westbound carriageway, east of the GSJ. Surveys recorded stickleback fish and several invertebrate species, including pond skaters, water boatmen and pond snails; a common darter dragonfly was also recorded. The pond profile was noted as being relatively steep with exposed banks, and the recently planted marginals were noted as taking time to establish. The report considered this balancing pond to be of intermediate value for wildlife; and
  - Adjacent to eastbound carriageway, east of the GSJ. Great pond-snail, blue damselfly, red darter, abundant water boatman, hawker dragonfly and large pond snail were recorded during the 2009 surveys, the report suggesting the presence of snails being indicative of nutrient enrichment. Marginal plants were noted as being better established than in the other ponds, and species at that time were noted as including water mint, self-heal, knapweed, yarrow, scarlet pimpernel, brooklime, hawk-weed and birds-foot trefoil. The pond was considered to be of intermediate value to wildlife value.
- 5.143 It should be noted that the surveys for Balancing Pond Report were undertaken during the season directly after pond construction in 2008. Given the state of development of the landscape proposals observed during the FYA site visit (and discussed in the landscape sub-objective), the conclusions of the Balancing Pond Report are considered likely to be less favourable than the current, actual wildlife value of the ponds, as the wildlife value of the ponds has likely improved since 2009.
- 5.144 Additional information received from the MAC notes that two moorhens with eggs/ chicks were observed at the balancing ponds in June 2011, as were cinnabar moths.

### Summary

- 5.145 In summary, the ES stated that any ecological impacts of the scheme would be mitigated by the comprehensive landscape proposals, considering the landscape proposals to be the

principal mitigation measures which were expected to increase habitat diversity and develop wildlife corridors, thereby improving local habitats in the long term.

- 5.146 As discussed in the landscape sub-objective, above, and noted plant failures aside, the current levels of growth, coverage, establishment, and condition of the majority of the plant stock at FYA indicates that the ecological functions of the landscape proposals are likely to be developing as expected.
- 5.147 Consequently, it is considered that the habitat establishment and maintenance is also developing broadly in line with the ecological mitigation proposals as stated in the ES, with no reason to suggest that the ecological functions of the established planting will not be fulfilled by the Design Year subject to ongoing maintenance and management as recommended by the HEMP.
- 5.148 In terms of the plant failures noted in the landscape sub-objective, although the woodland planting on the west embankment of the GSJ and the linear belt of trees and shrubs along the A66 westbound carriageway leading up to the junction with Darlington Road are not specified as having any nature conservation and biodiversity function, they do contribute to the overall habitat diversity of the scheme, an increase in which is specified as being an ecological mitigation measure. It is therefore considered that the poor performance/ failure of these planting plots has had an impact on the predicted increase in overall habitat diversity, which is consequently considered to have not improved as would be expected at FYA.
- 5.149 The accommodation works are specified by the landscape proposals as having nature conservation and biodiversity functions and as previously outlined (in the Landscape sub-objective), it is considered that unless these works receive replacement planting in conjunction with ongoing maintenance and management, it is unlikely that the full, intended ecological function of these plots (as wildlife corridors) will be realised by the Design Year.
- 5.150 It is therefore concluded that although the effects of the scheme on the biodiversity are generally Neutral and are to be as expected, the failure and poor performance of significant elements of the landscape proposals are likely to have resulted in localised Slight Adverse ecological effects that are worse than expected.

**Table 5.10 – Evaluation Summary: Biodiversity**

Sub-Objective	FYA Score	Evaluation
Biodiversity	Neutral to Slight Adverse	Worse than expected

## Water Quality and Drainage

- 5.151 The AST stated that the proposals were aimed at improving safety (with the associated reduction in accidents and spillages), and that pollution control would also be improved. No effects on other aspects of the local water environment were predicted and overall, the AST assessed the impact of the scheme as neutral.
- 5.152 The ES stated that the effect of the proposals on the quality of existing watercourses was minimal, and that consultation with the National Rivers Authority (now the Environmental Agency) had indicated that:
  - The existing systems had sufficient capacity to accept the additional discharge quantities predicted; and
  - The drainage proposals would have no adverse impacts on water courses in the area.
- 5.153 The ES also noted that ditches were affected by run-off from agricultural practices and road salt spraying, but there were no ground water abstractions affected by the proposals and there were no ground water source protection zones in the area.
- 5.154 Based on the information made available at the time, the OYA evaluation concluded that:

- Mitigation measures had been incorporated into the scheme and were functioning as expected; and
- The impacts on the water environment were also as expected.

### Consultation

5.155 Long Newton Parish Council commented that there had been “a couple of significant rainfall incidents which have caused disruption to the A66. These did not impact the roads in Long Newton, other than cause additional traffic”. The improved road drainage system was considered to be successful overall.

### Evaluation

- 5.156 The HEMP confirmed that the balancing ponds were designed as hybrid wetlands in accordance with the Design Manual for Roads and Bridges (DMRB) Volume 4, Section 2 with the capacity for a 1:100 year flood event.
- 5.157 The MAC has provided a Balancing Pond Report (January 2010) that along with biodiversity, assessed water quality, considering the water quality of all three of the balancing ponds to be low. It should be noted however, that the surveys for Balancing Pond Report were undertaken during the season directly after pond construction in 2008 and as such, the conclusions of the report are considered likely to be less favourable than the current situation, as water quality within the ponds has likely improved since 2009.
- 5.158 Balancing pond inlets and outlets were observed to be generally clear and appearing to operate as expected during the FYA site visit, although encroaching vegetation and the beginnings of blockage were observed on occasion (Figure 5.25, below). Although not yet considered to be a problem, the potential exists for it to become so should vegetation not be cleared back from the inlets/ outlets, and litter removed from the protective grilles on a regular basis.

**Figure 5.25 – Vegetation encroachment and the beginnings of grille blockages at Balancing Pond Inlets/ Outlets**



- 5.159 Vegetative treatment systems (rushes) appear to have established well where planted.
- 5.160 The surrounds of the balancing ponds were also viewed, appearing to be maintained and generally performing as expected. The balancing ponds are illustrated below in Figure 5.26, Figure 5.27, Figure 5.28 and Figure 5.29.



**Figure 5.26 – Balancing Pond adjacent to the eastbound carriageway, east of the GSJ**



**Figure 5.27 – Balancing Pond adjacent to the westbound carriageway, east of the GSJ**



**Figure 5.28 – Balancing Pond adjacent to the westbound carriageway**



**Figure 5.29 – Balancing Pond west of the GSJ**



- 5.161 All other drainage facilities within the scheme noted during the FYA site visit were relatively clear of vegetation and/ or appeared to be maintained and functioning.
- 5.162 The whole of the GSJ suffered a major flood event in Oct 2010, images of which were provided by the MAC and are reproduced in **Figure 5.30**, below.
- 5.163 The MAC noted that the flood event may have resulted from a geotechnical issue with the scheme, but it is understood from the Employers Agent that there are no known geotechnical issues with the scheme that would have an impact on water quality.



**Figure 5.30 – The major flood event of October 2010**



- 5.164 It has been confirmed that the flood event was attributable to damage caused to the tops of twin 300mm Surface Water pipes beneath the carriageway that take flow from land drainage outside of the scheme (which crosses the A66) as well as flow from the scheme itself. It is understood that the tops of these pipes were damaged during the installation of combined kerb drainage that was not a part of the GSJ scheme, and it is further understood that the blockage resulting from the damage sustained to these pipes has been rectified.
- 5.165 No further information was received at FYA to indicate whether any other incidents had occurred that may have affected the drainage system, and no further information regarding water quality monitoring has been made available for this report. However, based on the FYA site visit, information provided by the MAC, and the comments received from consultation, it is concluded that the overall the effects of the scheme on water quality and drainage are likely to remain neutral, as expected.

**Table 5.11 – Evaluation Summary: Water Quality and Drainage**

Sub-Objective	FYA Score	Evaluation
Water Quality and Drainage	Neutral	As expected

## Physical Fitness

- 5.166 The AST stated that the network was not well used as it was unsafe and disjointed, but that the proposals would lead to safer, better links with increased opportunities for Non-Motorised Users (NMUs), and potential benefits for the communities of Long Newton and Elton. Overall, the impact was assessed by the AST as neutral.
- 5.167 The ES stated that the new GSJ would provide a safe footpath crossing of the A66 at Long Newton, and that the proposed paved areas and openings in the central reserve safety fence would facilitate pedestrians/ cyclists to cross the A66 at Back Lane and Sandy Leas Lane. The ES also stated that although no designated rights of way would be affected by the proposed Elton Link Road, NMU movements between the two villages would be improved due to the proposed segregation of NMUs from the main A66 carriageway.
- 5.168 The OYA evaluation concluded that the scheme had afforded increased opportunities for NMUs via the provision of safer footpaths/ cycle routes at Mill Lane, the GSJ, and along the Elton Link Road. Although no quantifiable data regarding any change in patterns of NMU use was available at OYA, the evaluation stated that it was given to understand that a small number of school journeys were made on foot via the GSJ, and that (anecdotally) the cycle routes were well used (probably as a result of them forming part of the national cycle network).

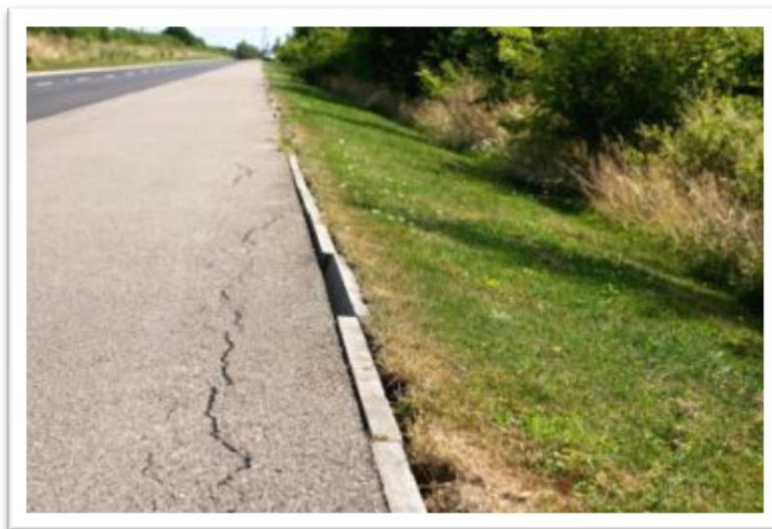
### Consultation

- 5.169 Long Newton Parish Council commented that the new Elton link road is well used by walkers, joggers and cyclists alike, although a lot of cyclists still use the road rather than the cycle path. The council also noted that many cyclists do not use the designated cycle path along Mill Lane, but prefer to use the interchange instead.
- 5.170 The consultation response also referred to problems arising from what the Council considered to be inadequate signing at the end of the cycle track in the village.

### Evaluation

- 5.171 It was confirmed at OYA that Non-Motorised User (NMU) audits or Vulnerable User (VU) studies were not a requirement for this scheme, and none have been undertaken specifically for this study.
- 5.172 Safe passageway over the A66 at the GSJ has been provided as expected, and the NMU link along the Elton Link Road provides a route away from the trunk road for cyclists and pedestrians.
- 5.173 The FYA site visit also observed that the A66 can be crossed in two stages at Back Lane and Sandy Leas Lane, NMUs being able to use the paved areas in the central reserve as a refuge to facilitate separate negotiation of each traffic flow direction.
- 5.174 Generally, all footpaths and cycleways viewed during the FYA site visit appeared to be maintained and capable of performing as expected, and cyclists, joggers and pedestrians were observed to be using the NMU routes throughout the FYA site visit.
- 5.175 However, a section of the footway along the Elton Link Road to the east of Long Newton is exhibiting signs of cracking and edge failure, and this is illustrated by Figure 5.31, below.

**Figure 5.31 – Section of cracking and edge failure along the new Elton Link Road NMU route, just to the east of Long Newton.**



- 5.176 The problems arising from what was considered by Long Newton Parish Council to be inadequate signing in the village at the end of the Elton Link Road NMU route were not specified in the response to consultation, although the council did state that Stockton Borough Council had been contacted and that remedial measures were anticipated when funds became available.
- 5.177 It is therefore concluded that the effects of the scheme on physical fitness are as expected, as the Elton Link Road and footway successfully segregates NMUs from the main A66 carriageway, and the A66 is able to be safely crossed at the GSJ and in two stages at Back Lane and Sandy Leas Lane.

**Table 5.12 – Evaluation Summary: Physical Fitness**

Sub-Objective	FYA Score	Evaluation
Physical Fitness	Neutral	As expected

## Journey Ambience

- 5.178 The journey ambience sub-objective considers traveller care (facilities and information), traveller views, and traveller stress (frustration, fear of potential accidents, and route uncertainty).
- 5.179 The AST stated that the qualitative impacts of the scheme would be better signage to Teesside Airport (now Durham Tees Valley Airport), and reduced fear of potential accidents due to the closure of at-grade junctions and new Public Rights of Way. The overall impact of the scheme was assessed by the AST as moderate beneficial.
- 5.180 The ES noted that although the junctions with the A66 had been upgraded to become grade separated east of Elton, the junctions remained at grade to the west of Elton which caused conflict and delay especially at peak times. The ES also stated that there were numerous private and field accesses directly onto the A66, which further increased conflict with traffic already travelling along the A66. The ES also noted that traffic patterns had changed considerably since the A66 was upgraded in 1965, and that the aim of the scheme was to enhance road safety and reduce delays.
- 5.181 The OYA evaluation considered that the effects of the scheme on driver stress were as expected as the scheme had closed junctions and farm accesses onto the A66, had provided clear signage, and had retained two at grade NMU crossings providing new links to the south side of the A66. Traveller views were also considered at OYA to be as expected, and traveller facilities, the third aspect of journey ambience, had not been changed by the scheme.

### Consultation

- 5.182 Long Newton Parish Council commented that the junction had greatly reduced stress when accessing the village and that especially during peak flow periods, had “*made life a lot easier*” for the village’s commuters.

### Evaluation

- 5.183 At the time of the FYA site visit, both the GSJ and the Elton Link Road were generally tidy and litter free and as discussed in the landscape sub-objective, above, planting throughout the scheme progressing well with plant stock appearing generally healthy, established and in good condition.
- 5.184 The current levels of plant growth and coverage suggest that traveller views of the GSJ and the Elton Link Road are generally developing as expected by the General Environmental Evidence for the Public Inquiry 2003, specifically that;
- Previous views of the wider countryside over a short length of the A66 have been replaced by views of the planted embankments and wetland areas to both east and westbound travellers on the A66;
  - Widespread views of the surroundings for users of the new junction and the open views of adjacent agriculture from the realigned lengths of the local roads are becoming more enclosed as the planting matures;
  - The junction embankments draw attention to the presence of the trunk road to users of some of the local roads, but the form of these earthworks are becoming at least partially obscured as the planting matures; and
  - Views to the south from the A66 are similar to those existing before the construction of the Elton Link Road, but the reinforced hedgerow and the adjacent planting is beginning to create a more enclosed character than before.

- 5.185 However, although the additional planting alongside the A66 at the eastern end of the Elton Link Road is beginning to provide local enclosure to users of the trunk road and is potentially reinforcing the sense of separation from the bypassed villages, this is not the case at the western end of the Elton Link Road. This is due to the failure of the linear belt of trees and shrubs along the A66 westbound carriageway leading up to the junction with Darlington Road and as discussed in the Landscape sub-objective and illustrated in **Figure 5.14** (above).
- 5.186 However, this is not considered to be significant given the retained mature trees at this location, and the fact that the remainder of landscape proposals are generally progressing as expected.
- 5.187 No further evaluation was undertaken, as no changes regarding driver stress or traveller care were identified during the FYA site visit and there were no unresolved issues from the OYA evaluation. Based on the information presented in this evaluation, it is concluded that the effects of the Scheme on Journey Ambiance remain as expected.
- 5.188 Table 5.13, below, summarises the evaluation of the scheme’s impact on journey ambiance.

**Table 5.13 – Summary of Journey Ambiance Evaluation**

<b>Traveller Factor</b>	<b>FYA Score</b>	<b>FYA evaluation</b>
Views	Neutral	Planting measures throughout the scheme are generally progressing well with plant stock in the main being healthy, established and in good condition with landscape functions developing as intended.
Stress	Beneficial	Farm accesses onto the A66 have been closed, the route is well signed, and the GSJ provides safe access and egress points to, from, and across the A66. Please see the traffic sections of this report for Journey Times and Accident data (Chapter 0).
Care	Neutral	No change
<b>Summary Score</b>	<b>Moderate beneficial, As Expected</b>	

## Key Points – Environment

### Noise and Air Quality

- Although traffic at Elton West is 37% greater than predicted by the ES, the absolute number of vehicles exceeding the predicted figure at this location is low (i.e. less than 1,000 AADT).
- Observed traffic flows are generally between 24% and 83% less than forecasted by the ES at Long Newton, the shortfall in the absolute number of vehicles predicted at each location being greater than 1,000 AADT.
- The impacts of the scheme for noise and local air quality are therefore considered to be as expected at Elton, and better than expected at Long Newton.

### Greenhouse Gases

- An 11.5% increase in carbon emissions has been observed (based on A66 and Mill Lane), slightly lower than the forecast 12.6% increase. The observed net increase in emissions is based on a smaller area and does not take into account any village traffic having to travel further to access the A66. However, overall speeds are higher than forecast, possibly due to traffic flows being lower than forecast. The impact of the scheme is likely to be as expected.

### Landscape

- Although the effects of the scheme on the landscape are generally Slight Adverse and are to be as expected, the failure and poor performance of significant elements of the planting stock are likely to have resulted in localised Moderate Adverse effects that are worse than expected.

### Townscape

- No significant changes regarding Townscape were identified during the FYA site visit, and there were no unresolved issues from the OYA report.

### Biodiversity

- It is considered that the loss of *C.spicata* from the SNCI occurred prior to construction of the scheme, and although all reasonable conservation measures were undertaken to protect the habitat from the effects of construction and efforts were made to encourage re-establishment of the species, these efforts have likely proved to be unsuccessful.
- Although the effects of the scheme are generally Neutral and are to be as expected, the failure and poor performance of significant elements of the landscape proposals are likely to have resulted in localised Slight Adverse effects that are worse than expected.

### Cultural Heritage

- As reported at OYA, all aspects mitigation have been addressed. The effects of the scheme on archaeology and built heritage are considered to be as expected.

### Water

- No information has been made available to POPE which would indicate that the scheme drainage measures are performing other than as intended. Based on the FYA site visit, information provided by the MAC, and the comments received from consultation, it is likely that the overall effect of the scheme on water quality and drainage are as expected.

### Physical Fitness

- The Elton Link Road and footway successfully segregates NMUs from the main A66 carriageway, and the A66 is able to be safely crossed at the GSJ and in two stages at Back Lane and Sandy Leas Lane.

### Journey Ambience

- Traveller views are considered to be as expected.
- Farm accesses onto the A66 have been closed, the route is well signed, and GSJ provides safe access and egress points to, from, and across the A66.



## 6. Accessibility and Integration

- 6.1 This chapter evaluates the impact of the scheme in terms of the accessibility and integration objectives; comparing qualitative forecast assessments from the scheme AST (shown in Table 7-1) with post-opening findings and analysis of policy objectives.
- 6.2 The accessibility objective is concerned with how the scheme has affected the ability of people in different locations to reach different types of facility, using any mode of transport. The accessibility objective consists of three sub-objectives. These are:
- Option values
  - Access to the transport system
  - Severance

### Accessibility

#### Option Values

- 6.3 Option values, as defined in WebTAG, largely relate to measures which will substantially change the availability of transport services within the study area.

#### Forecast

- 6.4 The AST for this scheme stated that there would be an additional hourly bus service, which should benefit Elton, providing a link between Long Newton and Elton. The new link road has also included a new shared use footway/cycleway (as shown in Figure 6.1) which would encourage residents to cycle and walk between the villages.

Figure 6.1 – Elton Link Road, New Shared Use Cycle/Footway



#### Evaluation

- 6.5 The bus service, which was suspended in September 2002, has been reinstated and as residents are likely to value the available option of travelling by bus this sub-objective has been assessed as slight beneficial, as expected. It should be noted however that timetabled bus frequency is one bus every two hours, rather than the hourly service that was originally reinstated immediately post opening. The bus services operating along the new link road between Long Newton and Elton include:

- 87A – Operates between Stockton and Long Newton. This service stops at Elton Village en route to Long Newton every two hours, from 08:23 to 16:28, Monday to Saturday.
- 87B – Operates between Long Newton and Stockton. This service stops at Elton from Long Newton every two hours, from 09:29 to 17:34, Monday to Saturday.

6.6 The impact is therefore slight beneficial, as expected.

### **Access to the Transport System**

6.7 The sub-objective assesses the access to the transport system based on two key variables; availability of a vehicle for private use and the proximity to a public transport service.

#### **Forecast**

6.8 There were no measures stated in this scheme's AST to improve Access to the Transport System for users.

#### **Evaluation**

6.9 The OYA report states that a residents' survey was undertaken which included questions about public transport use and services since the scheme opened. Respondents were asked for views about how access to the A66 had changed since scheme opening. Overall, 90% of respondents believed access to the A66 was better since opening.

6.10 The reinstated bus service will also have benefits for villagers, but overall the assessment is neutral as expected.

### **Severance**

6.11 This sub-objective is concerned with severance as it affects those using non-motorised modes, especially pedestrians. Transport links can have a detrimental social impact on communities, leading to severance. Where a busy road passes through a village or town, it can have the effect of dividing the local community. This can limit the ability of residents to travel, reducing accessibility to key facilities (health, education, shopping and employment) and reduce local social networks and community cohesion.

#### **Forecast**

6.12 The AST stated that there would be a reduction in severance between the villages of Long Newton and Elton, due to the new link road, with a score of slight beneficial.

#### **Evaluation**

6.13 The new junction reduces the severance of Long Newton and farms to the north of the A66. Additionally, the provision of the Elton Link Road provides an improved, safer connection between the two villages for buses, cyclists and pedestrians. The reduction of traffic in Long Newton will also have contributed to reduced severance within the village.

6.14 As a result of the resident survey analysis, it was assessed at the OYA opening stage that the scheme had a slight beneficial impact on this objective, which was predicted in the AST. As there is no evidence of deterioration in severance at FYA opening, the slight beneficial impact score for this objective will remain.

### **Integration**

6.15 The integration objective consists of two main elements:

- Interchange with other transport modes: how the scheme assists different modes of transport in working together and the ease of people moving between them to choose sustainable transport choices.

- Land Use Policy and Other Government Policies: how the scheme integrates with local land use and wider government objectives.

## Transport Interchange

### Forecast

- 6.16 The AST stated that the scheme should improve highway accessibility to Durham Tees Valley Airport. The assessment for this objective was expected to be neutral.

### Evaluation

- 6.17 Although patronage levels for the airport were significantly overestimated, the scheme has provided an improved link to the Airport for local traffic. Therefore the assessment is a neutral impact as expected.

## Land Use Policy

- 6.18 This section looks at the scheme in relation to national, regional and local level land use and development policies and considers its effects on policy integration.

### Forecast

- 6.19 The AST states:

*Structure Plan identifies scheme as a 'New Trunk Road Scheme'. Scheme also identified in Local Transport Plan and meets policies aimed at improving highway network. Impacts Area of Best Landscape, Cambridge Green Belt and encroaches 'best and most versatile' agricultural land adversely affecting related policies. Results in loss of woodland/hedgerow vegetation, some with TPOs, would have adverse impact on policies aimed at protecting landscape, vegetation & wildlife.*

- 6.20 For this objective the AST stated that this proposal relates well to national and regional objectives and has policy support at a local level. This objective was expected to have a beneficial impact.

### Evaluation

- 6.21 The relevant policies have been considered, and a summary evaluation is presented in Table 6.1. The overall evaluation score is beneficial, as expected.

Table 6.1 – Scheme Alignment with National, Regional and Local Policy

Policy/Document	Relevant Policy Objective/Reference	Relevant Scheme Impacts	Alignment
<p><b>Stockton on Tees Community Strategy 2012-2021</b></p>	<p>Vision for Stockton-on-Tees by 2021 is:</p> <ul style="list-style-type: none"> <li>• Stockton-on-Tees driving Economic Renaissance at the heart of a vibrant Tees Valley city-region</li> <li>• An enhanced quality of place, including renewed town centres and improved local neighbourhoods</li> <li>• Enhanced wellbeing and achievement for local people.</li> </ul> <p>Ambitions for 2021 are:</p> <ul style="list-style-type: none"> <li>• Improved transport networks</li> <li>• Improved city-scale facilities across the Tees Valley</li> <li>• Tackle Climate Change</li> <li>• Reduce crime and fear of crime</li> </ul> <p>A 10 year target has been set to achieve a 40% reduction in the number of people killed or seriously injured in road traffic accidents in the Borough from the 2005/09 average of 76 by 2020/21.</p>	<ul style="list-style-type: none"> <li>• There has been improved access because of the new Elton Link Road.</li> <li>• There has been an improvement to public transport access between the two villages, due to a new two-hourly bus service.</li> <li>• There has been a collision reduction between scheme opening and FYA. Overall collisions have decreased by 33%, serious accidents have reduced by 46% and fatal by 50%. Casualties have decreased by 63% at FYA.</li> </ul>	<p>✓</p>
<p><b>Stockton on Tees Local Plan 1997</b></p>	<p>Stockton on Tees Local Plan 1997 makes specific reference to the A66 (T) Long Newton Interchange.</p> <p>“Concern has been expressed over the number of serious and fatal accidents which have occurred on the A66 (T) particularly at the near junctions to Long Newton. In addition traffic in that area is expected to grow following improved links to Durham Tees Valley Airport. The Department of Transport is proposing to construct a new junction with the A66 (T) at the western end of the village and close off the existing road junctions. A link will also be provided between Long Newton and Elton for buses, local traffic, walkers and cyclists.”</p> <p>Policy TR12 states that: “Planning permission will not be granted for any development which affects the line of the proposed trunk road improvement schemes - A66 (T) Long Newton Interchange.”</p> <p>Objective 7 of the policy is “To support the maintenance and development of Teeside Airport”. It is mentioned that the road access to the airport is not good and construction of an improved A66 (T) junction to the west of Long Newton may encourage some airport users to travel via the C 140 road for which improvements may be proposed during the period of the Plan.</p>	<ul style="list-style-type: none"> <li>• The new link road has provided a new connection for buses, pedestrians, walkers and cyclists.</li> <li>• The new grade separated junction provides a good transport link between the A66 and the airport.</li> <li>• Collisions have reduced post opening.</li> </ul>	<p>✓</p>
<p><b>Stockton on Tees Local Transport Plan 3 (2011-2016)</b></p>	<p>The Third Stockton-on-Tees Local Transport Plan (LTP) covers the five-year period from April 2011 to March 2016, and sets out the Council’s strategy for the future development of the Borough’s transport network. Core aims are:</p> <ul style="list-style-type: none"> <li>• To reduce transport’s emissions of carbon dioxide and other greenhouse gases, with the desired outcome of tackling climate change.</li> <li>• To support national economic competitiveness and growth, by delivering reliable and efficient transport networks</li> <li>• To promote greater equality of opportunity for all citizens, with the desired outcome of achieving a fairer society</li> <li>• To promote active and sustainable transport modes, improve road safety, and encourage healthier travel.</li> </ul>	<ul style="list-style-type: none"> <li>• The transport network between the two villages has been improved through the new link road and the A66 junction.</li> <li>• Sustainable transport will be a more viable option for residents of Elton and Long Newton, due to the new bus service between the two villages and more opportunity for walking and cycling.</li> </ul>	<p>✓</p>
<p><b>Darlington Local Transport Plan 2 (2006-2011)</b></p>	<p>Key Strategy objectives set out in Darlington Local Transport Plan 2 are:</p> <ul style="list-style-type: none"> <li>• To improve access to employment and education</li> <li>• To tackle traffic congestion on key corridors and its potential impact on the economy and environment by making the most effective use of the transport network.</li> <li>• To improve travel safety and security for all by addressing the real and perceived risks.</li> <li>• To provide and promote travel choices to all, in particular to reduce the proportion of car driver trips.</li> <li>• To improve the health of the community through increasing levels of sustainable travel and improving access.</li> </ul> <p>Darlington developed a 3 pronged approach to tackling congestion, namely:</p> <ul style="list-style-type: none"> <li>• To tackle congestion hot spots with physical improvements at junctions on the highway network, adding greater capacity for traffic;</li> <li>• To manage the highway network so that it operates effectively and efficiently, for the benefit of all road users; and</li> <li>• To provide and promote sustainable travel choices to support travel behaviour change.</li> </ul>	<ul style="list-style-type: none"> <li>• The new grade separate junction, the closure of the central reserve gap at the Long Newton East junction and the closure of 10 gaps in the A66 central reserve and 26 private and field accesses direct onto the A66, has resulted in freer flowing traffic along the A66.</li> <li>• Travel behaviour change is now more likely due to the provision of the new link road, providing a safer means of travel, whether through public transport or walking and cycling.</li> </ul>	<p>✓</p>

Local and Sub Regional Policies

	<p><b>Darlington Local Transport Plan 3 (2011-2026)</b></p>	<p>Darlington's Third Local Transport Plan, sets out a transport strategy for the next 15 years (2011-2026) to support the delivery of One Darlington: Perfectly Placed, Darlington's Community Strategy.</p> <p>Key Tees Valley Transport Challenges confirmed by Transport for Tess Valley are:</p> <ul style="list-style-type: none"> <li>• Improve the journey experience of transport users of urban, regional and local networks, including interfaces with national &amp; international networks;</li> <li>• Deliver quantified reductions in greenhouse gas emissions within cities and regional networks, taking account of cross-network policy measures; and</li> <li>• Improve the connectivity and access to labour markets of key business centres.</li> </ul> <p>Objectives set out in LTP3 are:</p> <ul style="list-style-type: none"> <li>• To support employment, economic activity and sustainable development by providing and maintaining a reliable, predictable and efficient transport network</li> <li>• To tackle climate change through quantified reductions in greenhouse gas emissions from transport</li> <li>• To achieve better health and longer life expectancy for everyone by reducing the risk of death, injury or illness from transport and by providing travel options to keep people active and independent</li> <li>• To achieve a fairer society by enabling people to access jobs, education, training, health, food and green spaces</li> <li>• To achieve a better quality of life for all by improving the journey experience and minimising the negative impacts of transport such as noise, air pollution and accidents on the natural environment, heritage, landscape and people</li> </ul>	<ul style="list-style-type: none"> <li>• The new junction helps connect the road network with the airport, increasing regional and international connectivity, although the patronage levels at the airport have significantly decreased in recent years.</li> <li>• The connectivity between the A66 and the area south of Long Newton and Elton has been improved due to the new junction, and in turn it has improved access to key employment sites such as the airport.</li> </ul>	<p style="text-align: center;">✓</p>
	<p><b>North East of England Regional Spatial Strategy to 2021 (July 2008)</b></p>	<p>The key objectives for the transport strategy component of the RSS are to:</p> <ul style="list-style-type: none"> <li>• Improve access to markets and contribute to the competitiveness of North East businesses.</li> <li>• Improve sustainable access to the North East for inbound tourism.</li> <li>• Improve access to employment, learning, health facilities and services for all sections of society.</li> <li>• Minimise the impact of the movement of people and goods on the environment and climate change.</li> <li>• Improve connectivity and accessibility between the Tyne &amp; Wear and Tees Valley City- Regions.</li> <li>• Improve access and connectivity to the North East's international gateways.</li> <li>• Ensure safe transport networks and infrastructure.</li> </ul> <p>Policy 48.1 (International Gateways – Airports) stated, "To support the growth of the Region's airports, strategies, plans and programmes and planning proposals should take due account of the possible need to improve surface access links by all modes, particularly by public transport."</p> <p>Improvements at Long Newton junction were listed as a priority for improving access on the surrounding network to Durham Tees Valley Airport.</p> <p>A66 Long Newton Grade Separated Junction [GSJ] has been mentioned as Under construction and this scheme is said to improve/maintain accessibility within the Tees Valley City-Region, improve/maintain efficiency of movement along the four key transport corridors.</p>	<ul style="list-style-type: none"> <li>• The new junction has directly improved access to the airport through the provision of the new junction, assisting with connectivity.</li> <li>• Road safety has improved with the closure of central reserve gaps.</li> </ul>	<p style="text-align: center;">✓</p>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Regional Policy</p>	<p><b>A New Deal for Trunk Roads in England (1998)</b></p>	<p>The Government's overarching objectives for transport at the time of the appraisals were set out in this document, and include policies to:</p> <ul style="list-style-type: none"> <li>• Protect and enhance the built and natural environment;</li> <li>• Improve safety for all travellers;</li> <li>• Contribute to an efficient economy, and to support sustainable economic growth in appropriate locations;</li> <li>• Promote accessibility to everyday facilities for all, especially those without a car; and</li> <li>• Promote the integration of all forms of transport and land use planning, leading to a better, more efficient transport system.</li> </ul>	<ul style="list-style-type: none"> <li>• Access to local facilities will have been improved through the provision of the two-hourly bus service, which runs Monday to Saturday.</li> <li>• Road safety has improved.</li> </ul>	<p style="text-align: center;">✓</p>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">National Policy</p>	<p><b>Action for Roads - A network for the 21st century (July 2013)</b></p>	<ul style="list-style-type: none"> <li>• Support the UK economy and drive growth into the future through provision of a well-connected road infrastructure with sufficient capacity;</li> <li>• Push for greater safety, and avoid letting the improvements of recent years breed complacency; and</li> <li>• Ensure transport plays its part in meeting carbon budgets and other environmental targets.</li> </ul>	<ul style="list-style-type: none"> <li>• Improved access to the airport would help support the UK economy through providing more international opportunities. Although airport numbers have fallen sharply over recent years.</li> </ul>	<p style="text-align: center;">✓</p>



### **Key Points – Accessibility and Integration**

#### **Accessibility**

- The re-instated bus service will benefit residents, particularly in Elton. This bus service was originally an hourly service, however it now runs every two hours Monday to Saturday.
- The shared use cycle/footway along the new Elton Link Road will benefit residents, linking the two villages together.
- Severance will have decreased due to the provision of the new road linking the two villages.

#### **Integration**

- The new grade separated junction has meant improved access for traffic travelling to Durham Tees Valley Airport, resulting in a more integrated transport network.

## 7. Appraisal Summary Table & Evaluation Summary Table

### Appraisal Summary Table

- 7.1 The AST is a brief summary of the main economic, safety, environmental and social impacts of a highway scheme. Table 7-1 presents the AST for the A66 Long Newton Grade Separate Junction Improvement Scheme.
- 7.2 The AST presents a brief description of the scheme, a statement detailing the problems that the scheme planned to address, and makes an assessment of the scheme's predicted qualitative and quantitative impacts against the following core objectives:
- **Environment** – an estimate of the impact of the scheme on factors such as noise, local air quality, landscape, biodiversity, and water;
  - **Safety** – measured reduction in the number and severity of collisions and qualitative assessment of impacts on security;
  - **Economy** – estimated impact of the scheme upon journey times, vehicle operating costs, scheme costs, journey time reliability and wider economic impact;
  - **Accessibility** – a review of scheme impact upon access to the public transport network, community severance, and non-motorised user impact; and
  - **Integration** – a description of how a scheme is integrated with wider local planning, regional and national policy objectives.

### Evaluation Summary Table

- 7.3 The EST was devised for the POPE process to record a summary of the outturn impacts against the NATA objectives, compared to the predictions in the AST.
- 7.4 Drawing on the results presented in this report, Table 7.2 presents the EST for the scheme. An assessment of each of the objectives at the FYA stage is given. Where possible, the format of the EST mirrors the appearance and process of the AST to enable direct comparison between the two.

Table 7-1 Appraisal Summary Table (AST)

OBJ	SUB-OBJECTIVE	QUALITATIVE IMPACTS	QUANTITATIVE IMPACT	ASSESSMENT
Environment	Noise	Noise benefits are in the area around the proposed junction - 12 fewer people exposed to >65dBA. Elsewhere, noise changes due to the scheme are generally less than 1 dBLA10,18h.	Do-minimum: 87 people annoyed Do-something: 85 people annoyed.	2 fewer people annoyed by noise.
	Local Air Quality	Realignment at Long Newton brings equivalent benefits and deterioration affecting 9 properties. All other changes in exposure are less than 1µg/m3. Properties along Darlington Rd will experience a reduction in air quality.	Improvement at 37 properties. Deterioration at 361 properties.	Concentrations weighted for exposure -3 (PM10) - 13 (NO2)
	Greenhouse Gases	Small increase (13%) in CO <sub>2</sub> emissions with the scheme compared to the do-minimum in 2007.	25608 tonnes of CO <sub>2</sub> with DM 28848 tonnes of CO <sub>2</sub> with DS	+ 3240 tonnes CO <sub>2</sub>
	Landscape	Loss of land from an area that is of an open agricultural landscape character. Replacement planting (hedges and trees) mitigates effects on landscape character in long-term. Adverse visual impacts on properties mitigated by screen planting.	Not applicable	Slight Adverse
	Townscape	Not applicable as proposed works take place close to or outside of the village envelope and so will not influence the townscape value of either Long Newton or Elton	Not applicable	Neutral
	Heritage of Historic Resources	Listed buildings, enclosures and earthworks of local importance would not be affected by the scheme. Historic rural activity has resulted in a typical hedgerow pattern that will be slightly disrupted, leading to some adverse effects.	Not applicable	Slight adverse
	Biodiversity	Loss of hedges, trees, ditches and grassland is minor and will be replaced. No significant effects on legally protected species. Topsoil from sections of a grass verge SNCI will be translocated to new verges and managed.	Not applicable	Neutral
	Water Environment	Proposals are aimed at improving safety with an associated reduction in accidents and spillages. There would also be improved pollution control. No effects on other aspects of the local water environment are predicted.	Not applicable	Neutral
	Physical Fitness	Network not well used as it is unsafe and disjointed. Proposals (new link road, right of way, increased safety of GSJ) will lead to safer, better links for NMUs and will increase opportunities. Potential benefits for Long Newton & Elton communities.		Neutral
	Journey Ambience	Better signage to Durham Tees Valley Airport, reduced fear of potential accidents due to closure of at-grade junctions and new PRow.	Not applicable	Moderate Beneficial
Safety	Accidents	Accident benefits mainly accrue from the closure of 10 central reserve crossings on the A66 and the complete closure of two at grade priority junctions with the A66 at Long Newton west and Elton west.	Accidents Saved: 383.6 Fatal Casualties Saved: 6.3 Serious Casualties Saved: 75.2 Slight Casualties Saved: 528.9	PVB £18.618m
	Security	Reduced safety due to council request for no lighting on Long Newton – Elton Link Road	Not applicable	Slight Adverse
Economy	Public Accounts	No comment.	Central Govt PVC=£10.398m Local Govt PVC=£0m	PVC £10.398m
	TEE	No comment.	Users PVB=£2.308m, Transport Providers PVB=-£0.015m, Other PVB = £0m.	PVB £2.323m
	Reliability	Although the driver stress levels drop by 1.14%, the restricted range in which the stress can fall (75% - 125%) means that the overall effect is zero	Do Minimum Stress = 56.52%, Do Something Stress = 55.38%, Stress Difference = -1.14%	Neutral
	Wider Economic Impacts	Serves Preston Ward (Assisted Area Tier 2/3) and Stockton Borough (Objective 2 Status)	Serves regenerations area Development depends on scheme	Yes No
Accessibility	Option Values	Additional bus service benefiting Elton per hour	Not applicable	Slight Beneficial
	Severance	Reduced severance between villages of Long Newton and Elton	Not applicable	Slight Beneficial
	Access to the Transport System			Neutral
Integ	Transport Interchange	The scheme improves highway accessibility to Durham Tees Valley Airport		Neutral
	Land Use Policy & Other Gov't Policies	The proposal relates well to national and regional objectives and has policy support at a local level. Potential for more convenient car journeys hinders healthy lifestyle policies, balanced by provision of NMu and Link Road, which promote healthy lifestyles (encourages NMUs) and social inclusion (by reducing community severance).		Beneficial/Neutral

Table 7.2 Evaluation Summary Table (EST)

OBJ	SUB-OBJECTIVE	QUALITATIVE IMPACTS	QUANTITATIVE IMPACT	ASSESSMENT
Environment	Noise	Although traffic at Elton West is 37% greater than predicted by the ES, the absolute number of vehicles exceeding the predicted figure at this location is low (i.e. less than 1,000 AADT). Observed traffic flows are generally between 24% and 83% less than forecasted by the ES at Long Newton, the shortfall in the absolute number of vehicles predicted at each location being greater than 1,000 AADT.		As expected at Elton, better than expected at Long Newton.
	Local Air Quality	Although traffic at Elton West is 37% greater than predicted by the ES, the absolute number of vehicles exceeding the predicted figure at this location is low (i.e. less than 1,000 AADT). Observed traffic flows are generally between 24% and 83% less than forecasted by the ES at Long Newton, the shortfall in the absolute number of vehicles predicted at each location being greater than 1,000 AADT.		As expected at Elton, better than expected at Long Newton.
	Greenhouse Gases	Carbon output from vehicles using the A66 and Mill Lane through the new junction has increased post opening, however this is in line with forecasts.	Observed increase 11.5% (441 tonnes)	As expected
	Landscape	Although the effects of the scheme on the landscape are generally Slight Adverse and are to be as expected, the failure and poor performance of significant elements of the planting stock are likely to have resulted in localised Moderate Adverse effects that are worse than expected.		Worse than expected (moderate adverse)
	Townscape	No significant changes regarding Townscape were identified during the FYA site visit and there were no unresolved issues from the OYA report.		As expected (Neutral)
	Heritage of Historic Resources	As reported at OYA, all aspects of mitigation have been addressed.		As expected (slight adverse)
	Biodiversity	It is considered that the loss of C.spicata from the SNCI occurred prior to construction of the scheme, and although all reasonable conservation measures were undertaken to protect the habitat from the effects of construction and efforts were made to encourage re-establishment of the species, these efforts have likely proved to be unsuccessful. Although the effects of the scheme are generally Neutral and are to be as expected, the failure and poor performance of significant elements of the landscape proposals are likely to have resulted in localised Slight Adverse effects which are worse than expected.		Worse than expected (neutral)
	Water Environment	Based on the FYA site visit, information provided by the MAC, and the comments received from consultation, it is likely that the overall effect of the scheme on water quality and drainage remain Neutral.		As expected (neutral)
	Physical Fitness	The Elton Link Road and footway successfully segregates NMUs from the main A66 carriageway, and the A66 is able to be safely crossed at the GSJ and in two stages at Back Lane and Sandy Leas Lane.		As expected (neutral)
	Journey Ambience	Traveller views are considered to be as expected. Farm accesses onto the A66 have been closed, the route is well signed, and the GSJ provides safe access and egress points to, from, and across the A66.		As expected (moderate beneficial)
Safety	Accidents	Safety has improved as a result of a decrease (overall collisions have decreased by 33%) in collisions.	A reduction of 2.5 collisions per year (a decrease 10%) A reduction from 8.2 serious collisions per year to 4.4	PVB £8.09m
	Security	Slightly reduced security due to the council not wanting street lighting on the new link road. Although this does not reveal any areas for concern.		As expected (slight adverse)
Economy	Public Accounts		Reforecast PVC based on FYA costs £10.83m	As expected
	TEE	Travel times using the junction have reduced at the FYA stage when compared to those seen pre scheme. Times have reduced in all time periods.	Reforecast JT benefits of £3.31m	As expected
	Reliability	Post opening travel times through the junction are more consistent throughout the day.	Route Stress 75%	As expected (neutral)
Accessibility	Wider Economic Impacts	Improvements to journey times and improvements to the main route to the airport has improved links.		As expected (neutral)
	Option Values	The bus service has been reinstated, initially planned to be an hourly service, current bus timetabling shows buses only run every two hours.		As expected (slight beneficial)
	Severance	Severance has been reduced as a consequence of the new link road running along the old A66. This also provides a safety and more appealing route for pedestrians and cyclists.		As expected (slight beneficial)
Integration	Access to the Transport System	The new grade separated junction has provided an improved link onto the A66, this was supported by the residents survey at OYA, where 90% of residents believed access to the A66 was better since scheme opening.		As expected (neutral)
	Transport Interchange	Although the airport patronage was overestimated, the scheme has provided an additional link to the airport.		As expected (neutral)
	Land Use Policy & Other Gov't Policies	The scheme was identified in Local Transport Plan and meets policies aimed at improving highway network. This scheme relates well to national and regional objectives and has policy support at a local level.		As expected (beneficial/neutral)

## 8. Conclusions

- 8.1 To conclude this report, this section summarises how the scheme is meeting its specified objectives.

### Scheme Specific Objectives

- 8.2 **Table 8.1** presents an evaluation of the scheme's objectives using the evidence presented in this study.

**Table 8.1 Success against Scheme Objectives**

Objective	Has the scheme objective been achieved?	
<b>To improve road safety by reducing personal injury collisions (PIC)</b>	Since scheme opening, there has been an annual average reduction of 2.5 collisions a year over the wider COBA area, and an average reduction of 3.5 collisions a year over the scheme key links. This shows that there has been an improvement in safety as a result of the scheme.	✓
<b>To reduce the volume of traffic on roads in west Long Newton, as a result of airport traffic being rerouted through the new grade separated junction. Consequently, journey time delays should also be reduced.</b>	Traffic has reduced through the village of Long Newton, and journey times through the junction have improved by around 1 minute.	✓
<b>To increase the provision of public transport facilities in both Long Newton and Elton.</b>	Post opening, the local bus service has been reinstated.	✓
<b>Limit the impact of the scheme on the surrounding environment.</b>	The scheme has been sensitively incorporated into the surrounding environment.	✓
<b>Provide a safer route affecting fewer properties to the airport.</b>	The reduction in traffic through the village of Long Newton reduces the impact on local properties. Safety has also improved through the junction.	✓



# Appendices

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## Appendix B. Glossary

Terms	Definition
AADT	<b>Annual Average Daily Traffic.</b> Average of 24 hour flows, seven days a week, for all days within a 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.
ADT	<b>Average Daily Traffic.</b> Average daily flows across a given period.
AST	<b>Appraisal Summary Table.</b> This records the impacts of the scheme according to the Government's five key objects for transport, as defined in DfT guidance contained on its Transport Analysis Guidance web pages, WebTAG.
ATC	<b>Automatic Traffic Count</b>
AAWT	<b>Annual Average Weekday Traffic.</b> As AADT but for five days (Monday to Friday) only.
AWT	<b>Average Weekday Traffic.</b> As ADT but for five days (Monday to Friday) only.
BCR	<b>Benefit Cost Ratio.</b> This is the ratio of benefits to costs when both are expressed in terms of present value i.e. PVB divided by PVC.
Bvkm	<b>Billion Vehicle Kilometres</b>
CEMP	<b>Construction Environmental Management Plan</b>
COBA	<b>Cost Benefit Analysis.</b> A computer program which compares the costs of providing road schemes with the benefits derived by road users (in terms of time, vehicle operating costs and collisions), and expresses the results in terms of a monetary valuation. The COBA model uses the fixed trip matrix unless it is being used in Collision-only mode.
CRF	<b>Congestion Reference Flow</b>
DfT	<b>Department for Transport</b>
Discount Rate	The percentage rate applied to cash flows to enable comparisons to be made between payments made at different times. The rate quantifies the extent to which a sum of money is worth more to the Government today than the same amount in a year's time.
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, e.g. £1 worth of benefits now is worth more than £1 in the future. A standard base year needs to be used which is 2002 for the appraisal used in this report.
DM	<b>Do Minimum.</b> In scheme modelling, this is the scenario which comprises the existing road network plus improvement schemes that have already been committed.
DMRB	<b>Design Manual for Roads and Bridges</b>
DS	<b>Do Something.</b> In scheme modelling, this is the scenario detailing the planned scheme plus improvement schemes that have already been committed.
EA	<b>Environment Agency</b>
ES	<b>Environmental Statement</b>
EST	<b>Evaluation Summary Table.</b> 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	<b>Five Year After</b>
GCN	<b>Great Crested Newts</b>
GSJ	<b>Grade Separated Junction</b> (a split level junction giving priority for the most heavily trafficked route to avoid the junction movements)
HA	<b>Highways Agency.</b> An Executive Agency of the DfT, responsible for operating,



Terms	Definition
	maintaining and improving the strategic road network in England.
<b>HEMP</b>	<b>Handover Environmental Management Plan</b>
<b>HGV</b>	<b>Heavy Goods Vehicle</b>
<b>KSI</b>	<b>Killed or Seriously Injured.</b> KSI is the proportion of casualties who are killed or seriously injured and is used as a measure of collision severity.
<b>LEMP</b>	<b>Landscape Environmental Management Plan</b>
<b>LNS</b>	<b>Low Noise Surfacing</b>
<b>MAC</b>	<b>Managing Area Contractor</b> Organisation normally contracted in 5-year terms for undertaking the management of the road network within a HA area.
<b>MVKM</b>	<b>Million Vehicle Kilometres</b>
<b>NATA</b>	<b>New Approach to Appraisal.</b> The basis of the standard DfT appraisal approach when this scheme was appraised.
<b>NMU</b>	<b>Non-Motorised User.</b> A generic term covering pedestrians, cyclists and equestrians. Sometimes referred to as a vulnerable user (VU)
<b>NE</b>	<b>Natural England</b>
<b>NRTF</b>	<b>National Road Traffic Forecasts.</b> This document defines the latest forecasts produced by the Department of the Environment, Transport and the Regions of the growth in the volume of motor traffic. At the time this scheme was appraised, the most recent one was NRTF97, i.e. dating from 1997.
<b>ONS</b>	<b>Office for National Statistics</b>
<b>OYA</b>	<b>One Year After</b>
<b>PIA</b>	<b>Personal Injury Collisions</b>
<b>POPE</b>	<b>Post Opening Project Evaluation.</b> The before and after monitoring of all major highway schemes in England.
<b>Present Value</b>	<b>Present Value.</b> The value today of an amount of money in the future. In cost benefit analysis, values in differing years are converted to a standard base year by the process of discounting giving a present value.
<b>PVB</b>	<b>Present Value Benefits.</b> Value of a stream of benefits accruing over the appraisal period of a scheme expressed in the value of a present value.
<b>PVC</b>	<b>Present Value Costs.</b> As for PVB but for a stream of costs associated with a project
<b>RSA</b>	<b>Road Safety Audit</b>
<b>RSI</b>	<b>Road Surface Index</b>
<b>SNCI</b>	<b>Site of Nature Conservation Interest</b>
<b>STATS19</b>	A database of injury collision statistics recorded by police officers attending collision.
<b>TAR</b>	<b>Transport Appraisal Report</b>
<b>TEE</b>	<b>Transport Economic Efficiency</b>
<b>TEMPRO</b>	<b>Trip End Model Program.</b> This program provides access to the DfT's national Trip End Model projections of growth in travel demand, and the underlying car ownership and planning data projections.
<b>TRADS</b>	<b>Traffic Flow Data System.</b> Database holding information on traffic flows at sites on the strategic network.
<b>UK</b>	<b>United Kingdom</b>
<b>webTAG</b>	DfT's website for guidance on the conduct of transport studies at <a href="http://www.webtag.org.uk/">http://www.webtag.org.uk/</a>

## Appendix C. Information requested for Environmental section

Table C.1 - Information requested to evaluate the environmental sub-objective.

Environment Specific Requirements	OYA Response	FYA Response
Environment Statement (ES) or Stage 3 Scheme Assessment Report (SAR) or Environmental Assessment Report (EAR) including Environmental Masterplan (EMP) drawings.	A66 (T) Long Newton Grade Separated Junction Environmental Statement January 1995 including main text, appendices, figures and non-technical summary.	Received at OYA.
AST.	Provided (July 2006 version).	Received at OYA.
Any amendments / updates, additional surveys or reports since the ES / SAR / EAR.	ES information reviewed and updated for Public Inquiry 2003. Further ecological surveys 2006 and 2007	No additional information received at FYA.
Any changes to the scheme since the ES / SAR / EAR e.g. to lighting and signs, retention of material on site in earthworks in the form of landscape bunds or other, or to proposed mitigation measures.	-	None received.
As built drawings for landscape/ biodiversity/ environmental mitigation measures/ drainage/ fencing/ earthworks etc.	ES information reviewed and updated for Public Inquiry 2003. Further ecological surveys 2006 and 2007	Received at OYA as noted. Handover Plans for Landscape and Ecology contained in HEMP received.
Construction Environment Management Plan (CEMP), Landscape and Ecology Aftercare Plan (LEAP), Landscape Management Plan (LMP) or Handover Environmental Management Plan (HEMP).	CEMP provided. HEMP in process of preparation and will be available at FYA	CEMP received at OYA. HEMP (Dec 2012) received from MAC at FYA.
Health and Safety File – Environment sections (to include all environment As-Built reports).	-	None received.
Relevant Contact Names for consultation.	Provided.	Received at OYA. Some sourced by POPE.
Archaeological Reports (popular and academic).	Archaeological Watching Brief March 2007 Archaeological Watching Brief Report April 2009	Received at OYA.
The Road Surface Influence (RSI) value of any low noise surface installed.	-	None received.
The insulation performance properties of any noise barriers installed (The BS EN 1794-2 result provided by the noise barrier manufacturer).	-	Noise barriers were not a scheme requirement.
List of properties eligible for noise insulation.	No properties were deemed eligible for Noise Insulation or for	Received at OYA.

Post Opening Project Evaluation

A66 Long Newton Junction Five Years After Opening Study

Environment Specific Requirements	OYA Response	FYA Response
	Construction Noise Insulation	
Employers Requirements Works Information - Environment sections.	Provided	Received at OYA.
Reports for any pre/ post opening survey and monitoring work e.g. for noise, biodiversity, water quality).	No requirement for any post opening surveys as part of the contract.	Received from the MAC: Highways Agency Area 14 Environmental Local Network Management Study (LNMS) 2009-10: Balancing Pond Report (January 2010).
Animal mortality data.	Provided by MAC	Provided by the MAC.
Pre or Post opening Non-motorised User (NMU) Audits or Vulnerable User Surveys.	Not required as part of appraisal. (No NMU Survey has been undertaken post road opening).	N/A
Information may be available regarding environmental enhancements to streetscape/ townscape for bypassed settlements	Ornamental planting included as part of the scheme	No additional information received at FYA.
Scheme Newsletters / publicity material/ Award information for the scheme.	Provided and available on HA web page	Those received at OYA available at FYA.

## Appendix D. Photographic Record of Scheme

**OYA Figure 8.3: New roundabout with hard surface finish**



**OYA (December 2009)**



**FYA (July 2013)**

New roundabout with hard surface finish rather than planting, noted by the OYA evaluation as being due to the nature of the location, signage and drainage issues, as well as visibility considerations and long term maintenance.

**OYA Figure 8.4: View to balancing pond north of the A66**



**OYA (December 2009)**



**FYA (July 2013)**

View to the balancing pond north of the A66. Note the unestablished area of species rich grassland adjacent to the balancing pond (foreground) and eastbound exit-slip road of the A66; establishment may have been compromised as a consequence of the major flood event suffered by the area in October 2010.



**OYA Figure 8.5: Balancing pond located in the south-east loop of junction**



**OYA (December 2009)**



**FYA (July 2013)**

The surrounds of the balancing ponds on the west side of the GSJ were inspected during the FYA site visit and appeared to be well maintained, with planting establishing as expected.

**OYA Figure 8.7: At grade crossing of A66 to Sandy Leas Lane with new NMU link on south side**



**OYA (December 2009)**



**FYA (July 2013)**

All footpaths and cycleways viewed during the FYA site visit appeared to be maintained and capable of performing as expected and cyclists, joggers and pedestrians were observed to be using the NMU routes throughout the FYA site visit.

**OYA Figure 8.8: New NMU provision along stopped up section of Mill Lane. Realigned Mill Lane from the GSJ is to the left of view**



**OYA (December 2009)**



**FYA (July 2013)**

As well as at the GSJ and along the Elton Link Road, the scheme has afforded increased opportunities for NMUs via the provision of safer footpaths/ cycle routes at Mill Lane. Maintenance of grassland is in accordance with the HEMP with a mown 0.5m strip adjacent to footpaths and verges; arisings have been removed.



**ES Figure 11A – Photographic Locations: Photo 2**



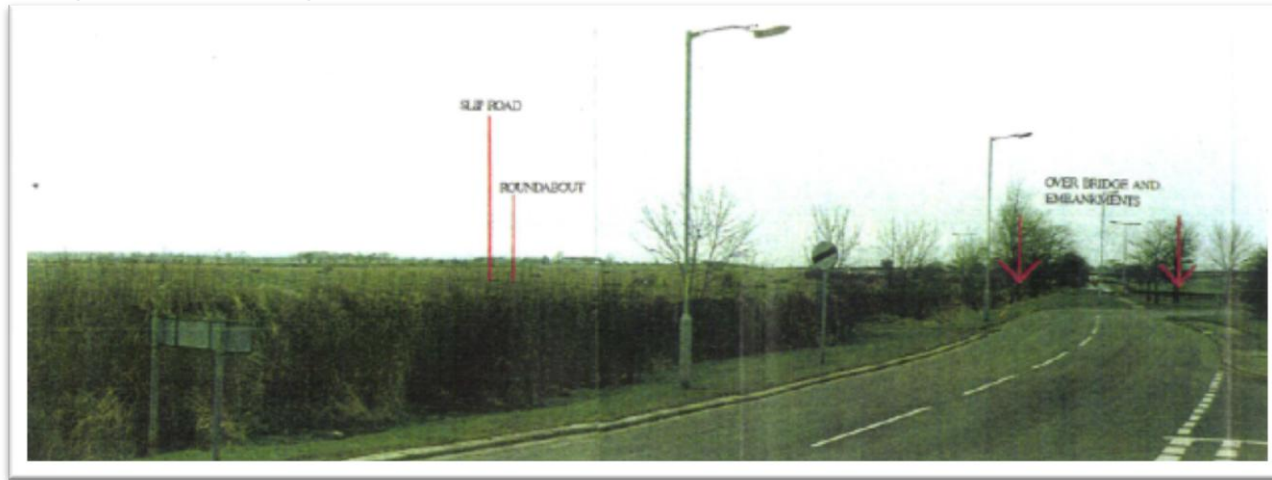
**ES (c.1995)**



**FYA (July 2013)**

Looking south from lay-by towards Long Newton village.

**ES Figure 11B – Photographic Locations: Photo 3**



**ES (c.1995)**



**FYA (July 2013)**

View looking from Willow Chase, north.



**ES Figure 11C – Photographic Locations: Photo 5**



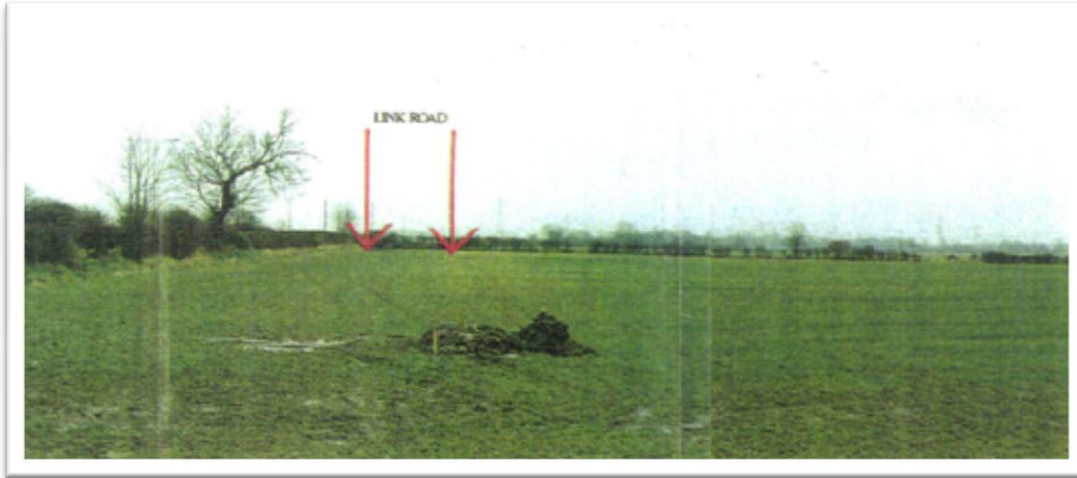
ES (c.1995)



FYA (July 2013)

View along link road from Mount Pleasant.

**ES Figure 11C – Photographic Locations: Photo 7**



**ES (c.1995)**



**FYA (July 2013)**

View east along link road.

**Before and After: Looking southeast from near the proposed bridge location**



**General Environmental Evidence for the Public Inquiry (c.2003)**



OYA (December 2009)





**FYA (July 2013)**

New overbridge on embankment over the A66. Note the woodland planting plot on the west embankment of the GSJ (to the left of the overbridge). Unless replacement planting in conjunction with ongoing maintenance and management is undertaken, it is unlikely that the environmental functions of this plot will be realised by the Design Year.

**Before and After: Looking east from Darlington Road towards Elton**



General Environmental Evidence for the Public Inquiry (c.2003)



OYA (December 2009)

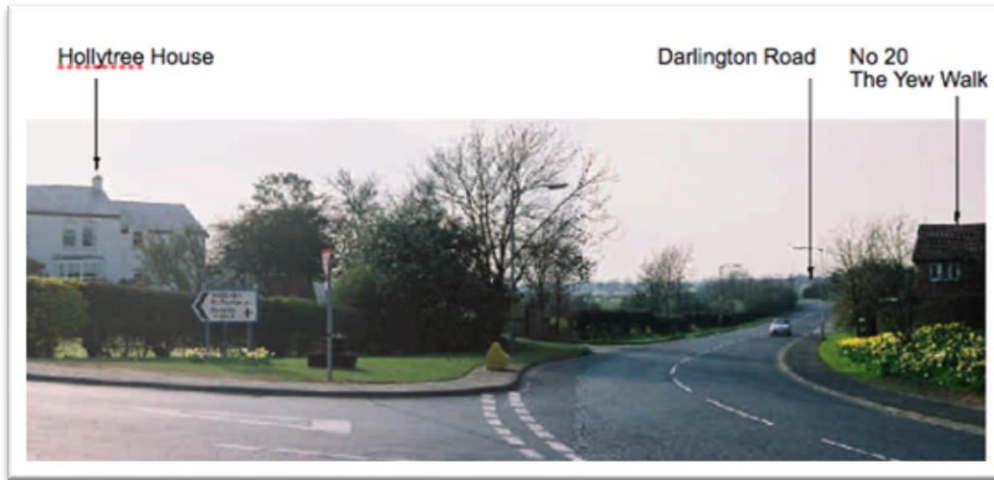




**FYA (July 2013)**

Elton west junction closed and new planting/ species rich grassland provided to compliment the retained trees and shrubs.

**Before and After: Looking west from the end of Mill Lane**



**General Environmental Evidence for the Public Inquiry (c.2003)**



**OYA (December 2009)**



**FYA (July 2013)**

Looking from the end of Mill Lane along realigned Darlington Road with new boundary hedge replacing hedge removed. Mill Lane is now a “*no through route*” for vehicles and has become part of the National Cycle Network (Route 14) between Stockton and Darlington.